BIDDING DOCUMENTS

PROJECT MANUAL
SUMMIT MAINTENANCE FACILITY- BUILDING IMPROVEMENTS

CONTRACT# 8152

LOCATION OF WORK:
SUMMIT MAINTENANCE FACILITY
1902 FREEPORT ROAD
MADISON WISCONSIN

FEBRUARY 1, 2018

CONTACTS:

CITY OF MADISON:

Engineering Division
City-County Building, Room 118
210 Martin Luther King Jr. Blvd.
Madison, WI 53703
(608) 266-4366

ENGINEER, HVAC:

HEIN Engineering Group
Michael Hein, PE, Project Engineer
17 Applegate Court, Suite #200
Madison, WI 53713
(608) 288-9260

ENGINEER, STRUCTURAL

JSD PROFESSIONAL SERVICES, INC
Preston Baker
161 Horizon Drive, Suite 101
Verona, WI 53593
(608) 848-5060

DIVISION 1- GENERAL REQUIREMENTS

SECTION 01 00 00

Contents

PART 1 – GENERAL

1.1. SCOPE

A. The work under this section includes general rules for the project.

The scope of work for the North Building includes:

- Demo the existing roof structure down to the CMU wall
- Repoint the existing CMU wall and miscellaneous wall patching
- Remove existing glass block windows and fill in with CMU
- Patch west foundation wall
- Paint and flash lintels above hollow metal doors
- Install new overhead doors and operators
- Install new hollow metal doors and hardware
- Extend the existing wall 48" in height with new glass block windows and expanded opening for new overhead doors.
- Install new roof system including trusses, decking, asphalt shingles, soffit, fascia, gutters and downspouts
- Repair interior concrete floor
- Install new gable end siding
- Install new ventilation system and controls
- Install new lighting and sensors
- Install new electrical panel board with associated conduit receptacles
- Install two new bollards on the site
- Interior and exterior painting/caulking

The scope of work for the South Building includes:

- Installation of new EPDM roofing system
- Installation of fascia, gutters and downspouts
- Repair damaged CMU wall
- Repairs to existing exterior stucco wall finishing system DAFS
- Exterior painting/caulking, includes doors and replacement of miscellaneous trim

The proposal page will request individual bids for the North and South Buildings. Utilize this outline as a guideline to separate the scope of work in order to provide a lump sum bid for each. This outline does not include all aspects of the work necessary to complete all work. The contractor shall include in each individual bid all materials and work necessary to provide a completed project as specified in the plans and specifications.

1.2. PRE-BID INFORMATION

A. There will be a pre-bid tour of the existing building on **Tuesday, February 13th, 2018 at 1:30 PM** to provide bidders the opportunity to acquaint themselves with the project. A representative from the designer's office will be present to take questions that will be answered by addendum. Alternate site visits may be arranged with the Project Manager.

1.3. CONTACTS

A. Send all pre-bid inquiries to the owner's project management

B. The owner's representative and designee for project management:
   1. Paul Stauffer
   2. Company: City of Madison
   3. Address: Room 115, 210 Martin Luther King Jr. Blvd.
   4. Phone: Office (608)266-4366, Cell (608) 575-5270
   5. Email: pstauffer@cityofmadison.com

C. The owner's designee for engineering is:
   HVAC
   1. Michael Hein
   2. Company: Hein Engineering Group.
   3. Address: 17 Applegate Court. Suite #200
   4. Phone: (608) 288-9260
   5. Email: hein@chorus.net

   STRUCTURAL
   6. Preston Baker
   7. Company: JSD Professional Services
   8. Address: 161 Horizon Drive, Suite 101
   9. Phone: (608) 848-5060
   10. Email: preston.baker@jsdinc.com

1.4. QUALIFICATIONS OF BIDDER

A. By submitting the bid, the bidder and each subcontractor certifies as to meeting the following requirements:
   1. Has completed one projects of at least 50% of the size or value of the division of work being bid and the type of work completed is similar to that being bid. Additional requirements will be described in the appropriate technical section of these specifications.
   2. Has access to all necessary equipment and has organizational capacity and technical competence necessary to do the work properly and expeditiously.
   3. Maintains a permanent place of business.
   4. Additional qualifications as stated in project specifications.

1.5. WORK BY THE OWNER AND OWNER FURNISHED EQUIPMENT

A. Any asbestos removal shall be performed by owner under a separate contract. There is no anticipated asbestos removal anticipated for this project, however, existing building materials that may have hazardous content and are located within the work area (example: floor tile, ceiling tile, pipe insulation) shall be sampled, tested, and removed by the City. If any suspect hazardous building materials are found by the contractor during demolition or renovation work that have not been sampled and tested, work must stop and a certified hazardous material inspector must be contacted by the City to assess the situation. Inaccessible areas may exist within the facility.

B. There is no work that is to be completed by the owner. A separate contractor shall be let by the City for repaving the asphalt parking lot, and upgrading the storm water pipe between the North and South Building. This contract will provide for the storm water drain pipes for the west downspouts on the west end of both building. Curbing will also be installed around the perimeter of the buildings. Work shall not be concurrent with this contract. Coordination will be thru the City Project manager.

1.6. SALVAGE MATERIALS

A. Refer to plan set for items that will be salvaged for reuse or turned over to the City. All other materials removed shall become the property of and shall be disposed of by the Contractor.

1.7. PROVISIONS FOR FUTURE WORK

Not applicable.

1.8. SPECIAL SITE CONDITIONS

A. Unless otherwise noted, construction operations shall be limited to the hours between ***7:30 a.m. and 6:00 p.m***., Mondays through Fridays, except for holidays. A request must be made to the owner forty-eight hours in advance for approval of work days or hours other than those stated above. Compliance is required with applicable Noise Ordinances.

B. A temporary field office is not required.

C. The Contractor shall provide and maintain sanitary temporary toilets, located where directed by the owner, in sufficient number required for the force employed. The toilets shall comply with International Building Code Chapter 29 on Plumbing Systems. Toilets shall be self-contained chemical type. The Contractor shall maintain and supply the temporary toilets in a sanitary condition at all times.

1.9. ALTERNATES

A. Not applicable

1.10. STANDARD SPECIFICATIONS

A. The City of Madison Standard Publications for Public Works Construction (Edition at publication date of this bid) forms a part of these contract documents as if attached hereto. These Standard Specifications are available from the City Engineer, City Engineering Division, Room 115, City County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53710 or electronically from the City Website http://www.cityofmadison.com/business/pw/specs.cfm. The Contractor shall review these standard specifications prior to preparation of proposal for the work to be done under this contract. Failure to do so does not relive the Contractor from meeting all requirements.

1.11. GENERAL REQUIREMENTS

A. All articles in these General Requirements are applicable to all Divisions fully as if repeated within that Division. The Conditions of the Contract, General and Supplementary General Conditions, and these General Requirements shall apply to the Contractor engaged in this work. Items listed under Scope of Work are not necessarily all inclusive. These specifications and drawings are intended to include everything necessary to perform the entire work properly. Every item necessarily required might not be specifically mentioned or shown. Unless expressly stated, all systems and equipment shall be complete and operable. All devices and installation methods necessary for a functioning system are considered included in this contract even if a detail is missing or unclear. The words “furnish”, “install”, “as required”, and “provide” shall mean the same in a sense that the Contractor shall furnish and install all the necessary materials, apparatus, and devices to complete the equipment and systems installation herein specified, except such parts as are specifically exempted herein. This also includes that the contractor demolishes and disposes of an existing item if demolition is required to install the new item, even if demolition drawings or specification don’t mention demolition of the specific item. If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract.

B. The terms “city”, “owner”, city engineer” and “project manager” are used interchangeably. The terms “contractor”, “sub-contractor” and “general contractor“ are used interchangeably.
C. Portions of these specifications are of the abbreviated, simplified type and may include incomplete sentences. Omissions of words or phrases such as “the Contractor shall”, “in conformity with”, “shall be”, “as noted on the drawings”, “in accordance with details”, are intentional. Omitted words or phrases shall be supplied by inference in the same manner, as they are when a note occurs on the drawings. Such terms as approved, reviewed, equal, as directed, , as permitted, acceptable, satisfactory mean by or to the owner.
D. If a conflict exists within the Specifications or exists within the Drawings, the Contractor shall furnish the item, system, or workmanship, which is the highest quality, largest, largest quantity or most closely fits the owner’s intent. Materials and labor shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the owner’s inspections, tests and approval from the commencement until the acceptance of the completed work. Whenever a particular manufacturer's product is named, it is intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply. It must be understood that the details and drawings are diagrammatic. The Contractor shall verify all dimensions at the site and be responsible for their accuracy. If items are too large to fit into existing space Contractor shall provide smaller model of same type upon approval by owner at no cost to owner. All sizes as given are minimum except as noted. Prior to bidding, bidder must visit site to become familiar and verify existing conditions. Failure to do so does not relieve the bidder from the responsibility to verify existing conditions, to point out errors in drawings or specifications or code violations.
E. The area to be set aside for the work under this contract is shown on the drawings, and the Contractor shall confine the construction to the immediate area within the construction limits. The Contractor shall immediately upon entering the site for purpose of beginning work, locate general reference points and take such action as is necessary to prevent their destruction. The Contractor shall lay out its work and be responsible for all lines, elevations and measurements of the building and other work executed under its Contract. The Contractor must exercise proper precaution to verify dimensions on the drawings before laying out work and will be held responsible for any error resulting from failure to exercise such precaution. The Contractor shall verify grades, lines, levels, locations, and dimensions as shown on drawings and report any errors or inconsistencies to owner before commencing work. Starting of work by the Contractor shall imply acceptance of existing conditions. Confine all operations, equipment, apparatus and storage of materials, to the immediate area of work to the greatest possible extent. Contractor shall ascertain, observe and comply with all rules and regulations in effect on the project site, including but not limited to parking and traffic regulations, use of walks, security restrictions and hours of allowable ingress and egress. Any special traffic control during construction involving lane closures shall be in accordance with the federal standard, Manual of Uniform Traffic Control Devices.
F. The work site shall be kept clean and neat at all times. Accumulation of debris shall be avoided and all new equipment and material shall be stored neatly and protected. Failure to comply will result in the contractor responsible for the disorderly conditions to be removed from job site.
G. Owner will not furnish Watchpersons. The Contractor shall provide such precautionary measures, to include the furnishing of watchpersons if deemed necessary, to protect persons and property from damage or loss where the Contractor's work is involved. The contractor is responsible for securing any material stored on site. In case of theft or damage

1.12. CONTRACTOR’S RESPONSIBILITY PRIOR BIDDING

A. Bidders shall bring inadequacies, omissions or conflicts to owner’s attention at least ten (10) days before the date set for bid submission. Prompt clarification will be supplied to all bidders of record by addendum. Failure to request clarification or interpretation of the drawings and specifications will not relieve the successful Bidder of responsibility. Signing of the contract will be considered as implicitly denoting that the Contractor has thorough understanding of the scope of work, existing conditions, and comprehension of the contract documents. Owner is not responsible for verbal instructions.
B. During bidding time owner will allow contractors to visit the site to familiarize themselves with the existing conditions and to ask questions for clarification. Failure to attend the scheduled walkthrough implies that the contractor accepts all existing conditions and includes all work to handle existing conditions in his bid price.
C. Prior bidding, bidder must obtain information on payment conditions, discounts, shipping charges, and other cost from vendor and/or manufacturer of the products specified.

1.13. PAYMENT AND CHANGE ORDERS

A. Refer to Sections:
   1. 10 26 57 Change Order Requests (COR)
   2. 10 26 63 Change Order (CO)

   Located at the end of this section.

1.14. COOPERATION AND RESPONSIBILITIES BETWEEN TRADES

A. The Contractor assumes responsibility for all work specified in this contract except for work explicitly noted as be done by owner or a Contractor separately hired by owner. The Contractor coordinate the work of all trades on the project. If plans or specifications designate parts of the work to be done by a specific trade it is meant as a suggestion only. It is up to the trades to agree on division of work and cost. Any work not done by a subcontractor will be the responsibility of the contractor (general contractor, party the owner is in contract with).
B. All Contractors shall work in cooperation with the Contractor and with each other, and fit their work into the structure as job conditions may demand. Owner shall make all final decisions as to the right-of-way and run of pipe, ducts, etc., at prearranged meetings with responsible representatives of the Contractors involved. Contractor(s) shall coordinate the work

with adjacent work with other Contractors prior to installation and shall cooperate with all other trades to facilitate the general progress of the work. The Contractor shall coordinate and schedule the work of all its subcontractors, and shall furnish all information required by them for proper scheduling and execution of the work. In the same manner, the Contractor shall coordinate the work with that of owner, and any other Contractor operating in the area, including reasonable adjustments of schedule in order to allow other Contractors or the owner to do their work. Any installed work that is not coordinated and that interferes with other Contractor's work shall be removed or relocated at the Contractor's expense.

C. In case it is indicated which trade is responsible for which work, this is meant as a suggestion and it is the Contractor's responsibility in its contracts with subcontractors to clarify who ultimately will do the work. If conflicts arise between the Contractor and subcontractor about who is responsible for which work to be done it is the Contractor's responsibility to make sure the work gets done in time even if the dispute between Contractor and subcontractor gets settled later.

1.15. SUBMITTALS

A. Documents have to be submitted in electronic form (PDF) as described below no later than 3 business days after start work letter is issued. Owner will review, and process shop drawings and other required submittals with reasonable promptness. No delay will be allowed in the progress of the job attributable to Contractor's failure to supply submittals in time. PDF shall be in good quality in electronic original from manufacturer. Scanned PDF are not acceptable.

B. The Contractor shall submit an electronic copy of all shop drawings, submittal data consisting of brochures, catalogs, material lists, wiring diagrams, Material Safety Data Sheets (MSDS), samples, erection drawings, and equipment layouts for review by owner. General catalog sheets showing a series of the same device is not acceptable unless the specific model is clearly marked. Each submittal shall be provided together with a transmittal letter or form. Each original transmittal shall be assigned a transmittal number. The number shall begin with the first initial of the name of the Contractor's firm followed by a serial number. The re-submittals shall indicate the same number with numerical suffix in sequence. Each transmittal shall itemize the enclosures and indicate the distribution of the transmittal and the enclosures. The following information shall be included on all submitted documents: Agency/Location/Address obtained, project number, building name, project name. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.

C. Submit all original documents providing information regarding sustainability requirements including but not limited to recycled content, VOC, certified wood, disposal certificates and transportation distance. Contractor is required to prove that material and methods used meet all requirements specified elsewhere.

D. Owner will return the marked and stamped drawings together with transmittal letter or form to Contractor. If re-submittal is required, owner will so note and Contractor shall make another submission for review after correction resolving the review comments on the prior submittals. The above procedure shall be repeated until owner favorably reviews the submittal. The submittals must be approved before material is ordered and fabrication is authorized.

E. Owner's favorable review of shop drawings and other submittals shall not relieve the Contractor of responsibility for deviations from drawings or specifications, unless the Contractor has in writing called the owner's attention to such deviations at the time of submission, and the owner has acknowledged in writing such deviations; nor shall it relieve the Contractor from responsibility for errors of any sort in such drawings. If deviations, discrepancies, or conflicts between shop drawing submittals and the drawings and specifications are discovered either prior to or after the shop drawing submittals are reviewed by owner, the drawings and specifications shall control and shall be followed. The Contractor shall be responsible for and shall check the correctness of all documents including those subcontractors prior to submitting them to owner for review.

F. The Contractor shall furnish prints of the favorably reviewed final shop drawings, erection drawings, equipment layouts and vendor data to subcontractors and suppliers for the proper coordination of their work. The Contractor shall keep one (1) complete set of the above documents at the job site for the use by owner.

G. <u>After the completion of the project, and prior to final payment, submit:</u>

1. One (1) copy of the Waste Manifest Records to the owner, if required in accordance with "Safety and Environment" Requirements Article "HAZARDOUS SUBSTANCES".
2. The original and one (1) copy of all guarantee/warranty documents.
3. A copy of the O&M manual.

1.16. GUARANTEES

A. All work, material and equipment shall be guaranteed by the Contractor to be free of faults for at least one year or longer if specified elsewhere. This year begins from the date of final acceptance from owner. The Contractor agrees to return to the project and commence work as directed upon notification by owner and will furnish at his own expense all necessary labor and material to make proper repairs or corrections made necessary by defective material or inferior workmanship furnished or performed under this contract. If a subcontractor is not complying, the Contractor shall be held responsible.

B. All corrections and repairs are to be made no more than 30 days after notification of the Contractor for equipment and material that is not critical to the operation of the building. Critical equipment and material, including but not limited to HVAC, roofing, electrical, elevator, shall be repaired or brought into temporary and safe working condition in less than 7 days and temporary alternatives have to be provided by the Contractor if function is critical for use of the facility. If Contractor fails to do so the owner reserves the right to perform the work himself or subcontract a different Contractor and charge the Contractor the full cost of the repair and correction and cost of any material, rental fee, labor and equipment to provide temporary relief and protection to enable safe operation of the building.

C. All equipment and material warranty by the manufacturer that lasts longer than the 1-year warranty by the contractor requires sufficient documentation acceptable by the manufacturer to honor the warranty beyond the first year. Documents

required include manufacturer's warranty certification for this specific material and equipment at the job site, purchase orders or any other documents that will be required beyond the first year for the manufacturer to honor warranty.

D. The contractor shall be responsible for reviewing all materials used in the project and compiling a list of items with warranties. All warranties shall be included in the project manual.

1.17. SCHEDULE OF OPERATIONS

A. Within 5 calendar days after the effective date of Start Work Letter, the Contractor shall provide a critical path method (CPM) network diagram and a preliminary construction progress schedule. The diagram shall show the order in which the Contractor proposes to accomplish the work. The CPM shall show interdependence and duration, along with installation man-hours by craft of each activity. Any work element longer than 15 days shall be broken down into component parts. The critical path and float for each activity shall also be shown. The diagram or bar chart shall be neatly lettered and legibly drawn to a time scale. This initial network diagram and all consecutive versions shall include preliminary dates throughout the end of the project.

B. Install work in phases to accommodate owner 's occupancy requirements.

C. After the initial submittal, the Contractor shall update the schedule monthly by entering actual progress for the period and submit copies as part of the payment request. Contractor shall maintain and provide a 6-week construction schedule that is compatible and complimentary to the general CONSTRUCTION SCHEDULE, and shall include detail of daily tasks over a 6-week period to be updated weekly and communicated and coordinated at the weekly Trade Meetings by the Contractor's field supervisor.

D. Include tests and other commissioning activities in schedule

1.18. DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

A. Drawings indicate approximate locations of the various items. These items are shown approximately to scale and attempt to show how these items should be integrated with building construction. Locate all the various items on-the-job measurements in conformance with code and cooperation with other trades. Before locating items, confer with the owner as to desired location in the various areas. In no case items shall be located by scaling drawings. Contractor must relocate items and bear cost of redoing work or other trades' work necessitated by failure to comply with this requirement.

B. Demolition drawings, location, circuit numbers, number and type of fixtures, type of mounting and control devices may not be correct. All sizes are approximations and have to be field-verified by contractor. In case of a discrepancy within and between the drawings that would cause and awkward or improper installation the engineer has to be notified for clarification prior to installation. Any work in conflict with the drawings shall be corrected at contractor's expense and at no cost to the owner. Contractor shall determine if scheduled devices fit into space and shall advice if not BEFORE ordering fixtures or devices.

C. Information pertaining to existing conditions that are described in the specifications or appear on the drawings is based on available records. While such data has been collected with reasonable care, there is no expressed or implied guarantee that conditions so indicated are entirely representative of those actually existing. This information is provided to inform the Contractor of known, existing conditions so that due diligence is taken by the Contractor to avoid damage. Where site observation or documents indicate existing underground utilities/services in close proximity (within four feet horizontally and/or four feet vertically) to necessary new construction work, the Contractor shall be responsible to test, probe or otherwise determine exact locations so as to prevent damage to such utilities/services.

D. Standard References such as ANSI, AASHO, AWWA, AISC, Commercial Standards, Federal Specifications, NEMA, UL, and the like incorporated in the requirements by reference shall be those of the latest edition at time of receiving bids, unless otherwise specified. The manufacturers, producers and their agents of required materials shall have such specifications available for reference and are fully familiar with their requirements as pertains to their product or material.

E. The Contractor shall not take advantage of any apparent error or omission in the plans or specifications, and the owner shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications.

F. In addition to verifying at the site all measurements shown on the Drawings, Contractor shall consult the Drawings and Specifications of related work or existing construction that may in any manner affect the work of this contract. Contractor shall promptly report to the owner, in writing, any errors, omissions, violations, or inconsistencies that may be discovered as a result of such verifications; otherwise, it shall be understood that Contractor accepts all such related data and conditions without reservations.

G. Each trade shall keep one set of plans and specifications on site. In addition construction bulletins, change orders etc. as applicable to the trades shall be on site.

H. It shall be the responsibility of the Contractor to submit to the owner within ten (10) days after final inspection, one complete marked-up set of contract drawings fully illustrating all revisions made by all the crafts in the course of the work. This shall include all field changes, adjustments, variances, substitutions and deletions, whether covered by Change Order or not. Underground utility installations must be located precisely as constructed on the marked-up drawings. Contractor shall markup changes for as-built drawings on a daily base.

I. Layout of existing piping, conduits, and locations of equipment are shown as exactly as could be determined during design of the facilities; but their accuracy, particularly when such layouts and drawings are schematic, cannot be guaranteed. Contractor shall check all Specifications including the Drawings for possible interference with electrical, mechanical, and structural details, as well as interference with existing building or equipment, and shall notify the owner of the interference for resolution of the interference before commencing work. Any completed work that interferes shall be corrected by Contractor at Contractor expense so that the original design can be followed.

J. Electronic design files may be provided by the owner at its digression as they are needed for the contractor to perform the work. Contractor shall use electronic design files on their own risk and assume all liability. Electronic documents are not contract documents and significant discrepancies may exist between these electronic files and contract documents and actual site conditions.

K. Contractor shall provide list with all equipment installed. This list shall contain, but not limited to, type, make and special product key and number. For grant purposes the contractor may have to provide detailed information about equipment installed and labor provided to third party institutions, such as Focus on Energy.

L. Using datum, the lot lines and present levels have been established as shown on the drawings. Other grades, lines, levels and benchmarks, shall be established and maintained by the Contractor, who shall be responsible for them. As work progresses, the Contractor shall lay out on forms and floor, the locations of all partitions, walls and fix column centerlines as a guide to all trades. The Contractor shall make provision to preserve property line stakes, benchmarks, or datum point. If any are lost, displaced or disturbed through neglect of any Contractor, Contractor's agents or employees, the Contractor responsible shall pay the cost of restoration.

1.19. QUALITY ASSURANCE

A. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to owner.

B. All products and materials used are to be new, undamaged, clean and in good condition. Existing products and materials are not to be reused unless specifically indicated.

C. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the Contractor is responsible for all costs involved in integrating the equipment or accessories into the system and for obtaining the performance from the system into which these items are placed. This may include changes found necessary during the testing, adjusting, and balancing phase of the project.

D. Contractor shall assume the responsibility for the protection of all finished construction under the Contract and shall repair and restore any and all damage of finished work to its original state. Wheeling of any loads over any type of floor, either with or without plank protection, will be permitted only in rubber-tired wheelbarrows, buggies, trucks or dollies. Where structural concrete is also the finished surface, care must be taken to avoid marking or damaging those surfaces. All structures and equipment shall be constructed, installed and operated with guards, controls and other devices in place.

E. Contractor shall obtain complete data at the site and inspect surfaces that are to receive the Work before proceeding with fabricating, assembling, fitting or erecting any work under this contract. Contractor shall notify owner in writing in case of discrepancies between existing work and drawings, and of any defects in such surfaces that are to receive the Contractor's work. Owner will evaluate the notice and direct what remedial action will be taken.

F. Starting of work implies acceptance of existing work or the work of others. Removal and replacement of work applied to defective surfaces, in order to correct defects, shall be done at the expense of the Contractor who applied work to defective surfaces.

G. For outdoor work the Contractor shall:

1. Provide, erect and maintain all required planking, barricades, guard rails, temporary walkways, etc., of sufficient size and strength necessary for protection of stored material and equipment; paved surfaces, walks, curbs, gutters and drives; streets adjacent to or within project area; adjoining property and all project work to prevent accidents to the public and the workmen at the job site.
2. Notify adjacent property owners if their property interferes with the work so that arrangements for proper protection can be made.
3. Provide protection against rain, snow, wind, ice, storms, or heat to maintain all work, materials, apparatus, and fixtures, incorporated in the work or stored on the site, free from injury or damage. At the end of the day's work, cover all new work likely to be damaged. Remove snow and ice as necessary for safety and proper execution of the work.
4. Protect the building and foundations from damage at all times from rain, ground water and back up from drains or sewers. Provide all equipment and enclosures as necessary to provide this protection.
5. Damaged property shall be repaired or replaced in order to return it to its original condition. Damaged lawns shall be re-seeded.
6. Take all necessary precautions to protect owner 's property as well as adjacent property, including trees, shrubs, buildings, sanitary and storm sewers, water piping, gas piping, electric conduit or cable, etc., from any and all damage which may result due to work on this project.
7. Repair work outside of property line in accordance with the requirements of the authority having jurisdiction.
8. Repair any work, damaged by failure to provide proper and adequate protection, to its original state to the satisfaction of owner or remove and replace with new work at the Contractor's expense.
9. Protect trees indicated on the drawings to remain and trees in locations that would not interfere with new construction, from all damage. Do not injure trunks, branches, or roots of trees that are to remain. Do cutting and trimming only as approved and as directed by owner. The value of trees destroyed or damaged will be charged against the account of the Contractor responsible for the damage in an amount equal to the expense of replacing the trees with those of similar kind and size.

H. The contractor shall be fully responsible for inspecting the work of its suppliers, and subcontractors to assure that the work complies with the standards for materials and workmanship required by the contract documents. The Contractor shall:

1. Monitor quality control over subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of the quality specified in the contract documents.

2. Comply fully with manufacturer's instructions, including each step in sequence.
3. Request clarification from owner before proceeding with work when manufacturers' instructions or reference standards conflict with Subcontract Documents.
4. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or manufactures instructions require more precise workmanship.
5. Ensure that work is performed by persons specializing in the specific trade and class of work required, and qualified to produce workmanship of specified quality.
6. Secure products in place with positive anchorage devices designed and sized to withstand seismic, static and dynamic loading, vibration, physical distortion or disfigurement.

I. If reference standards or manufacturers' instructions contain provisions that would alter or are at variance with relationships between the parties to the contract set forth in the contract Documents, the provisions in the contract Documents shall take precedence.

J. When required by individual Specification sections, Contractor shall provide the following services from a manufacturer's representative:
1. Review of Specifications and design and concurrence or suggestions for modification.
2. Site observation of conditions of use and substrate.
3. Observation of the installation work in progress and on completion.
4. Start up, testing, and adjustment of equipment.
5. Instruction to the owner in operation and maintenance.
6. Provide written signed report by manufacturer's representative documenting services provided and any comments or recommendations.

K. Inspection or testing performed by the owner shall not relieve the Contractor from responsibility for performing his own quality control and for complying with the requirements of the contract Documents. Owner will not be responsible for the Contractor's failure to carry out work in accordance with the contract Documents.

1.20. CODES AND PERMITS

A. Applicable provisions of Public Law, the Constitution and Laws and Statutes of the State of Wisconsin and the codes and regulations of governmental departments are hereby referred to and made a part of this contract and all work performed shall be in accordance with such laws, regulations and the latest edition or supplement or amendment thereto in effect at the time of submittal of bid shall be considered to be the issue in effect (unless shown otherwise) of all applicable codes including, but not limited to:
1. Wisconsin Building Code
2. Wisconsin Electrical Code
3. Wisconsin Mechanical Code
4. Wisconsin Plumbing Code
5. Wisconsin Energy Code
6. Wisconsin Fire Code
7. NFPA 70 National Electrical Code
8. General Services Administration 41 CFR Part 101-19
9. Americans with Disabilities Act (ADA)
10. Energy Conservation Performance Standards,
11. Local Codes
12. Occupational Safety and Health Act (OSHA)
13. Occupational Safety and Health Standards, Department of Labor
14. Safety and Health Regulations for Construction, Department of Labor
15. Wisconsin Fire Code
16. National Electrical Safety Code, ANSI C2
17. Environmental Protection Agency regulations
18. Clean Air Act
19. Clean Water Act
20. Resource Conservation and Recovery Act
21. Toxic substances Control Act
22. Wisconsin Department of Health and Family Services
23. State and Regional Water Quality Control Boards
24. County and Municipal ordinances

B. In case of conflict or overlap of the above references, the most stringent provision shall apply.

C. The newest version of the a code or standard shall apply even if an older version is adopted by the Jurisdiction Having Authority.

D. If necessary, file and maintain Notification of Demolition and/or Renovation and Application for Permit Exemption (WDNR Form 4500-113) in accordance with the Wisconsin Administrative Code Chapter NR447.

E. Contractor is expected to know or to ascertain, in general and in detail, the requirements of all codes and ordinances, and all rulings and interpretations of code requirements being made by all authorities having jurisdiction over the work performed by them, applicable to the construction and operation of systems covered by this contract. Where codes or standard specifications other than those listed in this paragraph are referred to in the different Divisions of these specifications, it

is understood that they apply as fully as if cited here. Where differences exist between codes affecting this work, the code affording the greatest protection to the owner shall govern.

F. All cost for items and procedures necessary to satisfy requirements of all applicable codes, ordinances and authorities, whether or not these are specifically covered by drawings or specifications. All cases of serious conflict or omission between the drawings, specifications, and codes shall be brought to the owner's attention as herein before specified. The Contractor shall carry out work and complete construction as required by applicable codes and ordinances and in such a manner as to obtain approval of all authorities whose approval is required.

G. Contractor is responsible for obtaining permits at its own cost including expenses for supporting documents. Deliver original permits to the owner before work starts. Apply for, arrange and pay for all required installation inspections required. Deliver originals of these certificates to the owner. Include copies of the certificates in the Operating and Maintenance Instructions. Contractor shall arrange all required inspections and correct all deficiencies at no cost to owner.

H. The Contractor must maintain all licenses required for the work performed and required by authorities. The Contractor must submit proof of holding the license or certificate upon request. If a Contractor loses a license for whatever reason he must inform the owner immediately after learning about that himself.

I. PERMIT TO PENETRATE GROUND OR EXISTING SURFACES OF OWNER PROPERTY:

1. Prior to any penetration of the ground or existing concrete surfaces (including the use of stakes or poles) in excess of 1.5", the Subcontractor shall obtain from the Project Representative a Permit to penetrate or Excavate Existing Surface of owner property and shall adhere to the conditions of the permit during such work. The Permit and all conditions in it shall be considered part of these specifications and shall be included in the contractor's bid amount.
2. In areas where a Permit to penetrate or excavate existing surfaces of owner property is not required, contractors shall verify by safe means, prior to drilling, that no utilities or services are enclosed within the area to be drilled.

J. FIRE SAFETY PERMIT:

1. All operations with open flames or that cause sparks or is near gas lines or near combustible storage containers require a daily Fire Safety Permit issued by the Project Representative. Contractor shall not commence such work until the permit is issued. Activities requiring a Permit include, but are not limited to, electric arc and gas welding and flame cutting, other open flame operations, tar kettles, powder activated tools and excavations. Fire watch personnel shall be provided the contractor in sufficient number to continuously monitor all locations where work is conducting requiring a fire permit. The fire watch personnel shall remain on the job at least thirty minutes after such operations are completed. Fire safety personnel may be installers or welders.
2. Noncombustible shields or covers shall be provided by the contractor on tables, floors, walls, around the workstation, and over equipment to protect building structures, equipment and personnel from sparks and fragments of hot metal. Contractor shall also take these precautions to protect against sparks and hot metallic oxides generated by grinding, drilling or sawing operations.

K. AIR EMISSIONS PERMITS AND NOTIFICATIONS:

1. For all projects that involve removal of regulated asbestos containing materials, the contractor shall complete the required asbestos removal forms and notify the authorities at least 10 working days in advance of the activity.
2. For any operations required to obtain an Authority to Construct or Permit to Operate from the authorities, the contractor shall provide in advance to the Project Manager the information needed for the application. Authorities may take more than 40 working days to process the application and issue the Authority to Construct or Permit to Operate; the contractor shall include this time in his Schedule of Operations; OWNER will grant no extra cost under this contract for this wait period.

1.21. ENVIRONMENT, SAFETY AND HEALTH (EHS)

A. The owner can request additional safety or environmental protection measures at any time. If contractor does not follow safety or environmental protection requirements, the owner can hire a different contractor or self-perform to ensure compliance and charge the original contractor for the cost.

B. Contractor shall provide all labor, materials, equipment, services and supervision required to maintain work sites that meet the environment, safety and health (ES&H) requirements of all applicable federal, state, and local regulations and protect the environment and the safety and health of its employees, the employees of its lower tier subcontractors, owner employees and the general public.

C. The contractor shall provide a qualified onsite EHS Representative with the authority to enforce all of the safety requirements and implement the contractor's Injury and Illness Prevention Program and Hazard Abatement Plan. The contractor shall remove and replace its Health and Safety Representative at the request of the owner, if the Safety Representative is unsuccessful in enforcing the EHS requirements. The contractor's EHS representative shall conduct safety inspections of the project operations, materials, and equipment frequently throughout the day to ensure that all safety deficiencies are identified and corrected. The owner reserves the right to enforce measures if the contractor's onsite EHS representative does not enforce all requirements. Inspection findings and corrective actions taken shall be documented, and the record shall be kept on the construction work site and be made available to owner upon request. If safety deficiencies are found, owner will issue a Safety Deficiency Notice to the contractor. Upon receipt of a written Safety Deficiency Notice from the Owner, the contractor shall take appropriate action to correct the deficiency and discontinue the hazardous activity until the hazard is abated. Failure to correct or eliminate violation(s) within the period specified might result in the order to stop all or any part of the work. The contractor shall submit to the owner a written response to the Safety Deficiency Notice describing what corrective action it has taken, the date such corrective action was completed and actions that it will take to prevent future recurrence of the same incident.

D. Provide protection for workmen, public, adjacent construction and occupants of existing building(s). Personal Protective Equipment (PPE) such as hard hats, ear plugs and dust masks, shall be provided to all employees and use shall be enforced by the onsite EHS Representative. PPE also shall be provided to site visitors near the main entrances to the jobsite. PPE shall be provided in sufficient numbers to outfit typical number of visitors (i.e. designers, inspectors, shipment workers)

E. WORK SITE SAFETY ORIENTATION: Each employee shall receive initial EH&S orientation prior to performing any work on the project. The contractor shall maintain on the work site a detailed outline of the orientation and a signed and dated roster of all employees who have completed the project EHS indoctrination. Make documentation available to owner on request. The orientation shall, at a minimum, cover the following points:
   1. Employee rights and responsibilities.
   2. Construction contractor responsibilities.
   3. Alcohol and drug abuse policy
   4. Contractor's disciplinary procedures.
   5. First aid and medical facilities.
   6. Site and project specific hazards.
   7. Hazard recognition and procedures for reporting or correcting unsafe conditions or practices.
   8. Procedures for reporting accidents and incidents.
   9. Fire fighting and other emergency procedures to include local warning and evacuation systems.
   10. Hazard Communication Program.
   11. Access to employee exposure monitoring data and medical records.
   12. Protection of the environment, including air, water, and storm drains from construction pollutants.
   13. Location of and access to reviewed project Illness and Injury Prevention Program, Hazard Analysis and Hazard Abatement Plan
   14. Location and contents of required postings

F. A comprehensive EH&S program shall be established including but not be limited to:
   1. Confined Space Entry
   2. Site specific Emergency Response, First Aid, & Medical Services. Identify employees with CPR/First Aid certification available at the work site.
   3. Fire Protection and Prevention
   4. Hazard Communications
   5. Hazardous Waste Operations
   6. Hazardous Work Permits
   7. Toxic and Hazardous substances
   8. Inspection, Maintenance, and Certification of Heavy Equipment, Cranes, and Motor Vehicles
   9. Lock Out/Tag Out (LOTO) Subcontractors are required to include LOTO
   10. Personal Protective and Life Saving Equipment
   11. Radiation Protection
   12. Construction Safety Training
   13. Control of silica dust released during demolition or drilling of concrete or released from work with other materials that contain silica.

G. A comprehensive activity hazard analysis and hazard abatement plan shall be established including but not be limited to:
   1. Description of work phase or activity
   2. Identification of potential hazards associated with the activity
   3. A list of the contractor's planned controls to mitigate the identified hazards
   4. Name of the contractor's employee responsible for inspecting the activity and ensuring that all proposed safety measures are followed
   5. Construction activities for which an Activity Hazard Analysis and Hazard Abatement Plan may be required include, but are not limited to:
   6. Hoisting and handling of materials
   7. Excavations
   8. Trenching and drilling
   9. Concrete placement and false work
   10. Welding
   11. Steel erection
   12. Work performed six feet or higher above ground
   13. Electrical work
   14. Demolition
   15. Work in confined spaces
   16. Work that causes the release of silica such as demolition or drilling of concrete or work with materials that contain silica.
   17. Work with epoxy coatings
   18. Work with or around hazardous materials
   19. Work on hilly terrain
   20. Use and handling of flammable materials
   21. The owner must favorably review the Activity Hazard analysis and Hazard Abatement Plan before work can start on that activity.

H. ELECTRICAL WORK:
   1. Energized electrical work within panels and equipment is not allowed.
   2. Workers shall be qualified to perform electrical tasks in accordance with OSHA 29 CFR 1910 and 1926 requirements.
   3. Work practices must be compliant with NFPA 70E, newest edition – Standard for Electrical Safety in the Workplace.

I. Rubbish, debris and scrap shall not be thrown through any window or other opening, or dropped from any great height; it shall be conducted to the ground, to waiting truck(s) or removable container(s) by means of approved chutes or other means of controlled conveyance.

J. Form and scrap lumber shall have all nails withdrawn or bent over; shall be neatly stacked, placed in trash bins, or removed from the premises.

K. Take all necessary precautions while dismantling piping containing gas, gasoline, oil or other explosive or toxic fluids or gases. Purge lines and contain materials in accordance with all applicable regulations. Store such piping outdoors until fumes are removed. Verify that all gas and electrical utilities have been abandoned or disconnected and associated hazards mitigated, prior to beginning any demolition.

L. All material classified by authorities to be a material that needs special treatment must be recycled, reused or disposed of by a special contractor that holds a valid license to work with such material. If hazardous materials are not anticipated, but encountered, terminate operations and contact owner immediately.

M. CONTROL OF CRYSTALLINE SILICA DUST: The subcontractor shall provide all necessary control measures at the work site to keep worker exposure to crystalline silica dust within the OSHA Established Permissible Exposure Limits (PEL's). Dust control measures may require spraying of water or engineering controls at the dust generating points. It also may include the use of respirators, industrial grade HEPA vacuums, and HEPA filtered locally exhausted tools. Construction operations known to cause the release of silica dusts include, but are not limited to:
   1. Chipping, sawing, grinding, hammering, and drilling of concrete, rock, or brick.
   2. Work with cementitious materials such as grout, mortar, stucco, gunnite, etc.
   3. Dry sweeping of dust originating from concrete or rock

N. CONSTRUCTION ACTIVITY POLLUTION PREVENTION:
   1. Follow Requirements in Storm Water Pollution Prevention Plan (SWPPP) and Erosion and Sedimentation Control (ESC) Plan
   2. Stabilize any relocated and moved soil with fast growing grasses and place mulch (hay, woodchips, straw) on it to cover and hold soil
   3. Divert surface runoff from distributed areas into sediment basin or sediment traps with a mound of stabilized soil
   4. Construct posts with filter fabric media to remove sediment from stormwater leaving the site.
   5. Follow requirements in site development plan and don't disturb areas beyond the marked area.

O. INDOOR AIR QUALITY:
   1. Not Applicable.

P. FIRE PROTECTION AND PREVENTION:
   1. The contractor shall develop and maintain an effective fire protection and prevention program at the job site through all phases of demolition, alteration, repair, and construction work. Contractor shall ensure the accessibility and availability of fire protection and suppression equipment.
   2. Smoking is be prohibited everywhere on the job site – no exceptions. Signs shall be posted. In visible locations.
   3. No burning of rubbish or debris will be allowed at the site. Combustible waste shall be removed immediately or stored in fire resistive containers until disposed of in an approved manner.
   4. The Contractor shall provide and maintain in working order during the entire construction period, a minimum of three (3) fire extinguishers on each floor level, including basement of the building, and one (1) in temporary office. Extinguishers shall be nonfreezing type such as A-B-C rated dry chemical, of not less than 10-pound capacity each. In addition, any subcontractor who maintains an enclosed shed on the site shall provide and maintain, in an accessible location, one or more similar nonfreezing type fire extinguisher in each enclosed shed.

Q. ACCIDENTS AND SPILLS:
   1. The contractor shall immediately notify the owner of any accidents, injuries or occupational illnesses that occur on the project, regardless of the employer of the involved personnel or the owner of the involved materials or equipment. For OSHA recordable injuries, the subcontractor shall also furnish a copy of the OSHA Form 301(or equivalent) to the Project Representative within five days of the injury.
   2. In the event a job site accident occurs, the contractor shall immediately implement controls and restrictions on the accident site to ensure the site remains undisturbed until released in writing by the owner to resume work. The contractor shall provide accident investigation follow-up and shall support Owner's accident Investigation and reporting protocol.
   3. The contractor shall promptly report to owner any spill, deposit, leak, drainage, debris, residue, spoil, residual, and/or by-product, whether its presence at the jobsite is occasioned by accident, inadvertence, intent, discarding, or abandonment by the Subcontractor or its lower tier subcontractors. This reporting requirement applies to petroleum products, oil, lubricants, chemical substances, waste materials, and waste substances, which are <u>in such quantities</u> as to constitute a hazardous substance or hazardous waste. All such occurrences of <u>any quantity</u> involving paints, solvents, thinners, degreasers, PCBs, halogenated hydrocarbons, volatile organic compounds, and/or asbestos shall be deemed a reportable event. These identification and reporting requirements shall be the responsibility of the contractor for both its

own work forces as well as for any sub tier contractor, material man or supplier performing work on site for the contractor. All removal, cleanup, and associated costs, which result from contractor or lower tier subcontractor, material man, or supplier presence at the jobsite, shall be at the contractor's sole expense.

R. WASTE MANAGEMENT:

1. Recycle all recyclable material. This includes any material for which there is a recycling facility in Wisconsin.
2. Separate all waste material in plastic, metal, paper, acoustical tile, brick, concrete, clean wood, glass, gypsum drywall, carpet and insulation and provide designated on-site collection areas.
3. Keep track of volume and weight of each material and track if it was recycled, reused, donated or disposed otherwise.
4. It is permissible to separate waste off-site by specialized recycling contractor. This contractor needs to be provide proof of recycling and needs to be WASTECAP certified as "Accredited Professional in Construction and Demolition Debris Recycling".
5. Prior to demolition or construction activities, the General Contractor, with input of all contractors and their subcontractors, shall develop and submit a Waste Management Plan to owner. Priority is given to reuse, followed by recycling followed by disposal including proper land filling or incineration. Disposal only will be acceptable if other methods are not commercially available. The Waste Management Plan includes but is not limited to the following:
    a. A list of each material proposed to be salvaged, reused, or recycled, Materials to be included, at a minimum, are the following:
        i. Concrete: Clean concrete, concrete with rebar, asphalt concrete.
        ii. Metals: Steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass or bronze, including banding, ductwork, framing, roofing and siding, flashing, piping and rebar.
        iii. Clean Fill: Earth, rocks, and gravel.
        iv. Wood: Clean dimensional wood, wood pallets, engineered wood products including plywood, particleboard, I joist.
        v. Biodegradable landscaping materials.
        vi. Cardboard, paper, packaging.
        vii. Masonry: Brick, ceramic tile, CMU.
        viii. Roofing: Clay or concrete tiles, asphalt shingles.
        ix. Gypsum board.
        x. Acoustic ceiling panels.
        xi. Carpet and pad.
        xii. Paint.
        xiii. Insulation.
        xiv. Plastics: ABS, PVC
        xv. Beverage containers
        xvi. Cardboard.
        xvii. Concrete
        xviii. Brick and concrete masonry units (CMU).
        xix. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
        xx. Gypsum wallboard.
        xxi. Clean dimensional wood
        xxii. Wood doors
        xxiii. Acoustical ceiling tiles/panels
        xxiv. Glass
    b. Separation and Materials Handling Procedures: How waste materials (as identified above), will be separated, cleaned (if necessary) and protected from contamination.
    c. Waste Material Estimating Sheet (Appendix A at the end of this Section)
    d. Proposed Alternatives to Land filling: List each material planned to be salvaged or recycled, quantities, and proposed destination.
6. The contractor shall provide separation, bins for temporary onsite storage, handling, transportation, recycling, salvage, and land filling for all demolition and waste materials and keep recycling and waste bins areas neat, clean and clearly marked in order to avoid contamination or mixing materials and maintain logs onsite for each load of materials removed from site.
7. During the progress of the work, the General Contractor shall report to owner the quantity of each material recycled, reused, or salvaged, and the receiving party. All contractors shall maintain a record of weight tickets, manifests, receipts, and invoices for review by owner on request.
8. At the completion of the project the General Contractor shall submit a final summary of the progress reports, including the percentage of recycled waste (weight or volume) to the quantity of waste that would have been otherwise land filled.
9. Contractor is to provide the following documents upon request for payment:
    a. Waste Materials Estimating Sheet (Appendix A at the end of this Section)
    b. Landfill Log (Appendix B at the end of this Section)
    c. Waste Diversion Log (Appendix C at the end of this Section)

d. Legible copies of manifests, weight tickets, and receipts. Manifests shall be from recycling and/or disposal site operators that can legally accept the materials for the purpose of reuse, recycling or disposal. These documents shall include the contract number and the job site name.

10. Examples of documents include, but are not limited to:
    a. Cover sheet for hazardous materials recycling contract
    b. Vendor "Pickup Request"
    c. Vendor "Certificate of Recycling and/or Disposal"
    d. Vendor invoice
    e. Maintain at the Project site Landfill Logs and Waste Diversion Logs for each load of materials removed from site.
    f. Discuss Waste management plans and implementation during all construction-related meetings.
    g. Immediately Inform the owner if hazardous materials are encountered or suspected, and stop work in the suspect area. Do not proceed with work in the suspect area until approved by the owner.
11. The following resources are provided for information only, to aid the Contractor in managing the construction waste:
    a. The Wisconsin DNR, Bureau of Waste Management http:/www.dnr.state.wi.us/org/aw/wm/
    b. The UW-Extension's Solid and Hazardous Waste Education Center http://www1.uwex.edu/ces/shwec/
    c. WasteCap Wisconsin, Inc. http://www.wastecapwi.org or telephone: 414-961-1100 or 608-245-1100
12. The contractor shall provide summaries of type and amount of material recycled, reused or disposed of. Those summaries shall include enough information and detail to satisfy requirements by external auditors. At a minimum the documentation needs to meet the current LEED requirements and requirements set by the EPA and federal government for federally funded projects. These requirements may or may not be mentioned specifically in this contract and the contractor is required to learn about specifics and to add documentation as required by such third party auditors.

1.22. STAIRS, SCAFFOLDS, HOISTS, ELEVATORS OR CRANES

A. The Contractor shall furnish and maintain equipment such as temporary stairs, fixed ladders, ramps, chutes, runways and the like as required for proper execution of work by all trades, and shall remove them on completion of the work. The Contractor shall erect permanent stair framing as soon as possible. Provide stairs with temporary treads, handrails, and shaft protection. Contractors requiring scaffolds shall make arrangements with the Contractor, or shall provide their own and remove them on completion of the work. The Contractor shall underlay its interior scaffolds with planking to prevent uprights from resting directly on the floor construction.

B. Contractor shall provide and pay for its own hoist/crane or other apparatus necessary for unloading/setting or moving their equipment and materials. Installation and removal of equipment for this activity must be accounted for in the Project Schedule. Equipment and operations for this activity shall comply with applicable Department of Commerce and OSHA requirements. No material hoist may be used to transport personnel unless it meets Department of Commerce and OSHA requirements for that purpose.

C. Existing elevators may be used on a limited basis with the owner's permission and agreement. The Contractor will pay costs of warranty extensions and additional service work required. Appropriate protection must be provided by the using Contractor and that Contractor shall be responsible for any structural, mechanical or finish damage to the elevator and its parts and to adjoining building finishes and components.

1.23. SAFEGUARDS - EXISTING EQUIPMENT, UNDERGROUND UTILITIES AND ARTIFACTS

A. Existing utilities, including those listed as abandoned, shall not be moved or otherwise disturbed without written verification by the owner that the utility is abandoned.

B. When altering existing facilities, the Contractor shall take every precaution to preserve and protect existing facilities, both those to be altered and those to remain unaltered that are within the limits of the work.

C. The Contractor shall notify the owner of structural members, piping, conduit, or equipment not indicated for removal that may cause interference with the work. Work shall not proceed in the affected area until instructions have been issued. Do not drill or penetrate existing structures without prior permission. The removal of existing work shall be by methods that will not jeopardize the integrity of structures or systems that are to remain.

D. Existing utilities, including but not limited to roof drainage systems, underground cables, ducts, roadways, manholes, building fire alarm, public address or telecommunications wiring shall not be moved or otherwise disturbed, nor electrical circuits or switches operated or taken in or out of service, without prior consent of the owner. Contractor shall compensate loss to the owner resulting from damage to utilities, facilities and other owner or public items damaged.

E. Take measures necessary to safeguard all existing work and facilities that are inside and outside the limits of the work or items that are within the construction limits but are intended to remain. Report any damage to the owner immediately. Correct and pay for all damages.

F. If bones or artifacts are encountered during digging, the owner requires that the Contractor stop work within a 50-foot radius of the find and immediately notify the owner. Work may continue only with approval from the owner.

1.24. OPERATION AND MAINTENANCE DATA

A. All OM documents are to be submitted as electronic copy for review at the time the respective equipment is delivered. No hardcopy shall be provided until the OM manuals are approved.

B. Submit data bound in 8-1/2 x 11 inch (A4) text pages, Use three D side rings if necessary and binders with durable plastic covers. Submit all documents in electronic form as well as in hardcopy. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 20-pound white paper, in three parts as follows:
E. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.
F. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
    1. Summary list of maintenance items indicating frequency and type of maintenance required for all systems covered in this contract.
    2. List of components.
    3. A description of recommended replacement parts and materials, which the owner should stock.
    4. Parts list for each component.
    5. A summary of equipment vendors, or location where replacement parts can be purchased.
    6. Copies of all approved submittals.
    7. Operating instructions.
    8. Maintenance instructions for components systems, Preventive maintenance recommendations.
    9. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
G. Part 3: Project documents and certificates, including the following:
    1. Product data.
    2. Certificates.
    3. Photocopies of warranties.
    4. Name, address, and telephone number of the person or office to contact for service during the warranty period.
    5. Name, address, and telephone number of the person or service organization to be contacted for service after the warranty period.
H. Submit all O&M manuals in original electronic form (PDF). Scanned copies are not acceptable. PDF need to be of high quality and searchable.
I. Submit 1 draft copy of completed volumes 15 [fifteen] days after approval of applicable submittal or receipt of the product. Revise content of all document sets as required prior to final submission. Submit 2 [two] sets of revised final volumes, within 10 [ten] days after final inspection.

1.25. ACCESS PANELS AND DOORS

A. Not Applicable.

1.26. LOOSE AND DETACHABLE PARTS

A. Contractor shall retain all loose and small detachable parts of apparatus and equipment furnished under this Contract, until completion of the work and shall turn them over to the owner to receive them.
B. Furnish one can of touch-up paint for each different color factory finish furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts".

PART 2 – PRODUCTS

2.1. SPECIFIED ITEMS - SUBSTITUTES

A. Wherever catalog numbers and specific or trade names are used in conjunction with a designated material, product, item, or service mentioned in these Specifications, they are used to establish the standards of quality, utility, and appearance required. Substitutions will be approved, subject to the following provisions:
    a. Contractors or manufacturers may request that their product be substituted for specified products where sole sourcing is not stated, (i.e. no substitutions allowed). Requested may be submitted up to 10 calendar days prior bid due date. All requests must be accompanied by sufficient information to judge its suitability for this project. Accepted substitutions shall be listed per addendum.
    b. Owner may reject any substitute request without providing specific reasons.
    c. Owner may accept substitution requests after contract award, but reserves the right to refuse review or acceptance of any requests without providing specific reasons.
    d. All Substitutions must be accepted by the owner in writing. The owner will accept, in writing, such proposed substitutions as are in his or her opinion, equal in quality, utility, and appearance to the items or materials specified. Such acceptance shall not relieve the Contractor from complying with the requirements of the drawings and specifications, and the Contractor shall be responsible at Contractor's own expense for any changes resulting from Contractor proposed substitutions which affect the other parts of Contractor's own work or the work of others.
    e. The manufacturer shall be a company specializing in the manufacture of the specified equipment and accessories with minimum five years documented experience.
    f. Failure of the Contractor to submit proposed substitutions for approval in the manner described above and within the time prescribed shall be sufficient cause for disapproval by owner of any substitutions otherwise proposed.

B. Specifications may mention other manufacturers than the specific device specified. Those are manufacturers that in general are acceptable, but may not have a product for this specific project. Those manufacturers still may be rejected without providing specific reasons. The bidder only can rely on using items specifically mentioned in the contract documents.

2.2. APPROVED TESTING LABORATORIES

A. The following laboratories are approved for providing electrical product safety testing and listing services as required in these specifications:
   1. Underwriters Laboratories Inc.
   2. Electrical Testing Laboratories, Inc.

2.3. HAZARDOUS SUBSTANCES

A. The Subcontractor shall submit to the Project Representative, for review by the EH&S Division, any proposed procurement, stocking, installing, or other use of materials containing asbestos, cadmium, chromates, or lead.

B. All materials and applications shall comply with requirements of any and all Districts Regulations, including, but not limited to architectural coatings, general solvent and surface coatings, solvent cleaning operations, adhesive and sealants, visible emissions, and asbestos.

C. Contractor shall keep and maintain proof of compliance with the above-referenced regulations, including any recordkeeping obligations, for a period of two years after completion of the project. Contractor shall make such documents or evidence available if so requested by owner.

D. No materials outlawed in any of the 50 US states are to be used. Only equipment and material legal in all 50 states is to be used. All Federal, state, county and local codes and ordinances regarding are to be considered deciding if a piece of equipment or material is to be used.

E. The contractor assumes responsibility for proper removal, collection and storage of hazardous substances on site and disposal of those if hazardous substances were known to be present and pointed out in these specifications or on the plans. If hazardous substances are not known to be present and are found, the owner assumes responsibility for additional cost due to removal, collection and storage on site. All hazardous substances are to be disposed in accordance with all federal, state and local laws, codes and regulations. It is the contractor's responsibility to recognize typical hazardous substances not known to be present. This includes all substances that were used in buildings of that type in the period since original construction.

F. Contractor will assume that all electronic components, machinery, refrigeration devices and other common devices contain hazardous substances and include disposal of such in bid price, even if those substances are not mentioned separately. If special tests are necessary the owner assumes responsibility for such.

G. ASBESTOS:
   1. Contractor's attention is directed to WAC NR 447, WAC HSS 159 and the Occupational Safety and Health Act (OSHA) in general, part 1926.1101--ASBESTOS in particular. Contractor is responsible for compliance with all applicable regulations when the work includes fastening to or coring through Asbestos Containing Materials (ACM) and disturbance of asbestos containing caulking and mastics. Unless otherwise indicated, all caulking, sealants, glazing compounds, gaskets, asphalt roofing materials and miscellaneous adhesives are assumed to contain asbestos and are considered to be Category I non-friable ACM as defined in NR 447. Waste material containing Category I non-friable ACM, is regulated as Construction and Demolition (C&D) waste and may be disposed of at a Department of Natural Resources (DNR) approved C&D waste landfill. If Contractor's work methods cause non-friable ACM to become friable, the Contractor is responsible for the disposal of the friable asbestos waste at a landfill specifically approved by DNR to accept friable asbestos. A copy of the signed waste manifest for the disposal of all friable asbestos waste shall be provided to owner prior to request for final payment.
   2. The regulations referenced above require removal of friable ACM and Category II non-friable ACM prior to <u>demolition</u> of a building. Category I non-friable ACM does not need to be removed from a building prior to demolition if the waste generated from the demolition is taken to a DNR approved C & D waste landfill. If the contractor chooses to recycle building materials from a building to be demolished, the contractor is responsible for removal and disposal of all Category I non-friable ACM in accordance with applicable regulations prior to demolition. If the contractor's demolition methods will cause non-friable ACM to become friable, the contractor is responsible for removal and disposal of all Category I non-friable ACM in accordance with applicable regulations prior to demolition.
   3. The asbestos abatement contractor will require sole occupancy of the workspace during asbestos abatement work. Contractor shall communicate with the asbestos abatement contractor and make adequate allowance for the asbestos abatement work in the work schedule

H. LEAD BASED PAINT: Conform with OSHA and EPA recommended worker safety requirements when removing lead based paint or material bearing lead based paint or material contaminated with lead by the demolition process. Contractor's attention is directed to the Occupational Safety and Health Act (OSHA) in general and particularly to 29 CFR 1910 (LEAD STANDARD) and to CFR 1926 (LEAD EXPOSURE IN THE CONSTRUCTION INDUSTRY). For OSHA compliance and regulation interpretations, contractors may contact the area OSHA office for this project. [Milwaukee, telephone (414) 297-3315; Appleton, telephone (414) 734-4521; Eau Claire, telephone (715) 832-9019]. Dispose of refuse containing lead based paint or contaminated with lead by the demolition process in conformance with State of Wisconsin Hazardous Waste Regulations set forth by the Department of Natural Resources and in conformance with OSHA and EPA recommended worker safety requirements.

I. PCB'S: Contractor shall assume all ballasts and transformers not specificallylabelled as "no PCB" type to contain PCB and to dispose properly meeting all regulatory requirements

J. MERCURY-CONTAINING DEVICES: Mercury containing devices are accumulated in our facilities for eventual recycling through a contracted vendor. These devices include certain building controls and switches, thermometers, and lamps. Lamps are stored in accordance with Environmental Protection Agency universal waste regulation 40 CFR part 273 including storing them in containers with labels describing the contents and the start date of accumulation.

K. PAINT AND RELATED PRODUCTS: The oil-based paints are disposed of as hazardous waste

L. USED APPLIANCES AND BUILDING EQUIPMENT: Used appliances include microwaves, refrigerators, and ice machines. Smaller pieces of building equipment include items such as water heaters and variable-drive motors. All of these items are recycled by a contracted vendor at eh contractor's expense.

M. VOC: Volatile Organic Compounds in materials shall be limited to these maximum values:

1. Adhesives and Sealants:
2. Wood Glues: 30 g/L.
3. Metal-to-Metal Adhesives: 30 g/L.
4. Adhesives for Porous Materials (Except Wood): 50 g/L.
5. Subfloor Adhesives: 50 g/L.
6. Plastic Foam Adhesives: 50 g/L.
7. Carpet Adhesives: 50 g/L.
8. Carpet Pad Adhesives: 50 g/L.
9. VCT and Asphalt Tile Adhesives: 50 g/L.
10. Cove Base Adhesives: 50 g/L.
11. Gypsum Board and Panel Adhesives: 50 g/L.
12. Rubber Floor Adhesives: 60 g/L.
13. Ceramic Tile Adhesives: 65 g/L.
14. Multipurpose Construction Adhesives: 70 g/L.
15. Fiberglass Adhesives: 80 g/L.
16. Contact Adhesive: 80 g/L.
17. Structural Glazing Adhesives: 100 g/L.
18. Wood Flooring Adhesive: 100 g/L.
19. Structural Wood Member Adhesive: 140 g/L.
20. Single-Ply Roof Membrane Adhesive: 250 g/L.
21. Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, rubber, or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
22. Top and Trim Adhesive: 250 g/L.
23. Plastic Cement Welding Compounds: 250 g/L.
24. ABS Welding Compounds: 325 g/L.
25. CPVC Welding Compounds: 490 g/L.
26. PVC Welding Compounds: 510 g/L.
27. Adhesive Primer for Plastic: 550 g/L.
28. Sheet Applied Rubber Lining Adhesive: 850 g/L.
29. Aerosol Adhesive, General Purpose Mist Spray: 65 percent by weight.
30. Aerosol Adhesive, General Purpose Web Spray: 55 percent by weight.
31. Special Purpose Aerosol Adhesive (All Types): 70 percent by weight.
32. Other Adhesives: 250 g/L.
33. Architectural Sealants: 250 g/L.
34. Non-membrane Roof Sealants: 300 g/L.
35. Single-Ply Roof Membrane Sealants: 450 g/L.
36. Other Sealants: 420 g/L.
37. Sealant Primers for Nonporous Substrates: 250 g/L.
38. Sealant Primers for Porous Substrates: 775 g/L.
39. Modified Bituminous Sealant Primers: 500 g/L.
40. Other Sealant Primers: 750 g/L.
41. Inside Paints and Coatings:
42. Flat Paints, Coatings, and Primers: VOC not more than 50 g/L.
43. Nonflat Paints and Coatings: VOC not more than 150 g/L.
44. Dry-Fog Coatings: VOC not more than 400 g/L.
45. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
46. Anticorrosive and Antirust Paints applied to Ferrous Metals: VOC not more than 250 g/L.
47. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
48. Pretreatment Wash Primers: VOC not more than 420 g/L.
49. Clear Wood Finishes, Varnishes: VOC not 1 more than 350 g/L.
50. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
51. Floor Coatings: VOC not more than 100 g/L.
52. Shellacs, Clear: VOC not more than 730 g/L.
53. Shellacs, Pigmented: VOC not more than 550 g/L.
54. Stains: VOC not more than 250 g/L.

2.4. BARRICADES, SIGNS, WARNING DEVICES, AND TEMPORARY PLASTIC BARRIERS

A. Traffic barricades, traffic signs, and warning devices shall meet the requirements of applicable OSHA standards and the FHA Manual of Uniform Traffic Control Devices (MUTCD).

B. UV stabilized high-density polyethylene barrier fence free of holes tears and other defects. Provide 4' tall fence in diamond or rectangular pattern. Fencing shall be "safety orange" color, unless otherwise noted.

C. Posts for temporary plastic barrier fencing shall be 5' tall, minimum 12 gauge, painted metal posts.

2.5. SEALING AND FIRESTOPPING

A. Manufacturers: 3M, Hilti, Rectorseal, STI/SpecSeal, Tremco, or approved equal.

B. All firestopping systems shall be provided by the same manufacturer and shall be UL listed.

C. Submittals: Contractor shall submit product data for each firestop system. Submittals shall include product characteristics, performance and limitation criteria, test data, MSDS sheets, installation details and procedures for each method of installation applicable to this project. For non-standard conditions where no UL tested system exists, submit manufacturer's drawings for UL system with known performance for which an engineering judgment can be based upon.

D. Use a product that has a rating not less than the rating of the wall or floor being penetrated.

E. Contractor shall use firestop putty, caulk sealant, intumescent wrapstrips, intumescent firestop collars, firestop blocks, firestop mortar or a combination of these products to provide a UL listed system for each application required for this project. Provide mineral wool backing where specified in manufacturer's application detail.

F. Where shown or specified, pack annular space with fiberglass batt insulation or mineral wool insulation. Provide 4" sheet metal escutcheon around duct on both sides of partition or floor to cover annular space.

G. Install approved product in accordance with the manufacturer's instructions where an installation penetrates a fire/smoke rated surface. When pipe is insulated, use a product, which maintains the integrity of the insulation and vapor barrier.

H. Whenever possible, avoid penetrations of fire and smoke rated partitions. When they cannot be avoided, verify that sufficient space is available for the penetration to be effectively fire and smoke stopped.

PART 3 – EXECUTION

3.1. PROJECT MEETINGS

A. Project meetings will be held at the time designated by the owner. If the principal of the firm does not attend meetings, a responsible representative of the Contractor who can bind the Contractor to a decision at the meetings shall attend. The contractor will write a report covering all items discussed and decisions reached and copy of such report distributed to all parties involved within 3 business days. All contractors, sub-contractors and other related parties shall attend. Attendance especially is required if such contractor is scheduled to perform work within the next 6 weeks.

B. PRE-CONSTRUCTION MEETING: Owner, design representatives and all contractor and sub-contractor representatives attend.

C. PRE-INSTALLATION MEETING: prior installation, layout or other activities related to major systems, separate meetings will be held to ensure proper coordination. These meetings will be initiated by the contractor. Not initiating these meetings doesn't relieve the contractor from coordination responsibilities. The owner may set up such meetings as needed

3.2. CONTINUITY OF SERVICE, TRAFFIC, SHUTDOWN AND ACCESS

A. SITE ACCESS: The stairs shall be taken out of service for the dates as indicated in Section D of the General Requirements.

B. Contractor shall verify the locations of any water, drainage, gas, sewer, electric, drainage, gas, sewer, electric, telephone/communication, fuel, steam lines or other utilities and site features which may be encountered in any excavations or other site work. All lines shall be properly underpinned and supported to avoid disruption of service.

3.3. DEMOLITION

A. Perform all demolition as indicated on the drawings to accomplish new work. Demolition Drawings are based on casual field observation and/or existing record documents. Verify field measurements and circuiting arrangements as shown on Drawings, verify that abandoned wiring, piping, ducting and equipment serve only abandoned facilities. Report discrepancies to the owner before disturbing existing installation. Beginning of demolition means installer accepts existing conditions.

B. Demolition all abandoned services and devices in areas affected by this contract, even if not shown on plans. This includes but is not limited to wiring, conduits, piping, and equipment.

C. Patch holes and openings caused by removal of material and equipment, or formerly covered by such, with like material and texture of surrounding surface. Paint to match surroundings.

D. Disconnect all services in a manner which allows for future connection to that service. Disconnect services to equipment at unions, flanges, valves, or fittings wherever possible.

E. Approval of all Jurisdictions Having Authority shall be obtained prior to disposal of any equipment and materials. All disposal has to be in compliance with all local, county, state and nationwide regulations.

F. Don't demolition or damage equipment and material that is to stay in place. Replace and repair any equipment and installations that get damaged during demolition. The Contractor shall restore all disturbed areas in accordance with the drawings and specifications. If plans and specifications do not address restoration of specific areas, these areas will be restored to pre-construction conditions as approved by owner.

G. Verify the locations of, and protect, any buildings, structures, utilities, paved surfaces, signs, streetlights, utilities, landscaping and all other such facilities that are intended to remain or be salvaged. Make such explorations and probes as necessary to ascertain any required protection measures that shall be used before proceeding with demolition.
H. Provide and maintain adequate catch platforms, warning lights, barricades, guards, weather protection, dust protection, fences, planking, bracing, shoring, piling, signs, and other items required for proper protection.
I. Report damage of any facilities or items scheduled for salvaging to owner.
J. Explosives shall not be used for demolition.
K. Remove all equipment, fixtures and other materials scheduled for salvage prior to beginning demolition operations.
L. Abandon gas, electric and communication utilities in accordance with local utility company requirements, or applicable substantive requirements if considered private.
M. Carry out vehicle loading as necessary within the project boundaries or as defined or indicated on the drawings, but not in locations that block vehicular traffic on the streets or pedestrian traffic on adjacent public walks.
N. Dismantle each structure in an orderly manner to provide complete stability of the structure at all times. Provide bracing and shoring where necessary to avoid premature collapse of structure.
O. Conduct demolition operations and the removal of rubbish and debris in such a way that a minimum of nuisance dust is caused. Constantly sprinkle rubbish and debris with water if necessary to keep nuisance dust to a minimum.
P. Where necessary to prevent collapse of any construction, install temporary shores, underpinning, struts or bracing. Do not commence demolition work until all temporary construction is complete.
Q. Masonry and concrete shall be demolished in small sections. Use braces and shores as necessary to support the structure of the building or structure and protect it from damage. Where limits of demolition are exposed in the finished work, cutting shall be made with saws, providing an absolutely straight line, plumb, true and square.
R. Operate equipment so as to cause a minimum of damage to plaster which is to remain, and so as to keep dust and dirt to a minimum.

3.4. TEMPORARY CONSTRUCTION

A. Temporary construction shall conform to all requirements and laws of state and local authorities, which pertain to operation, safety, and fire hazards. Contractor shall furnish and install all items necessary for conformance with such requirements, whether called for under separate sections of these Specifications or not. Contractor shall provide, maintain, and remove upon completion of his work:
B. Employ temporary crossovers and bypass to utilities, electrical connections, traffic and footbridges, and walkways used to maintain services or communications, which cannot be interrupted or curtailed.
C. Provide temporary rigging, scaffolding, shoring, hoisting equipment, and all other temporary work as required for this project.

3.5. INSTALLATION

A. Install in accordance with manufacturer's instructions and all code requirements. Provide the owner with copy of manufacturer’s instructions prior to installation. The Contractor shall be responsible for correcting any infringement on this requirement at no cost to owner.
B. Provide carpentry, cutting, patching, and core drilling required for installation of material and equipment.

3.6. DELIVERY, STORAGE AND HANDLING OF MATERIALS

A. Contractor must be present to accept delivery of all equipment and material shipments. Owner will not knowingly accept, unload or store anything delivered to the site for the Contractor's use. Inadvertent acceptance of delivered items by owner shall not constitute acceptance or responsibility for any of the materials or equipment. It is the Contractor's responsibility to assume liability for equipment or material delivered to the job site.
B. Comply with manufacturer’s ordering instructions and lead-time requirements to avoid construction delays. Materials and equipment shall be delivered to the site in adequate time to ensure uninterrupted progress of the work and inspection of material by owner. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact. Packaged units shall be delivered in their original crates.
C. Store in a clean and dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic. Promptly inspect shipments to insure that the material is undamaged and complies with specifications. Materials or equipment, which do not conform to the Specifications or are damaged shall not be incorporated in the work and shall be immediately removed from the site.
D. Contractor shall confine equipment, apparatus, storage of materials and operations to limits indicated on the drawings or by specific direction of owner. The Contractor assumes full responsibility for damage due to the storage of materials.
E. Material shall be stored according to manufacturer's recommendations as a minimum. Provide and maintain watertight storage sheds on the premises where directed, for storage of materials that might be damaged by weather. Materials, construction sheds, and earth stockpiles shall be located so as not to interfere with the use of the park.
F. If necessary, material will be stored off site at the Contractor's expense. Offsite storage agreements will not relieve the Contractor from using proper storage techniques. Storage and protection methods must allow inspection to verify products.
G. All materials shall be stored in a manner that prevents release of hazardous material to the environment. All hazardous materials, including motor fuels, shall be properly handled and contained to prevent spills or other releases. The Contractor shall develop and maintain a contingency plan to provide emergency response, containment, and cleanup of spills of hazardous materials resulting from contract activities. All spills and releases shall be reported to owner immediately

3.7. CONCRETE WORK

A. Concrete to be 3,000 psi at 28 days, 3/4 inch aggregate, five bags cement, three inch slump, air entraining admixture. The ACI 614 Recommended Practice for Measuring, Mixing and Placing of Concrete shall constitute the execution requirements. When patching existing concrete flooring the newly exposed/surface of the existing concrete should be saturated with water/surface dry (no standing water) to promote adhesion to the new concrete.

3.8. OPENINGS, SLEEVES, CUTTING, STRUCTURAL ATTACHMENT, PATCHING AND PAINTING

A. Before any drilling, cutting or other type of opening the contractor shall verify that no conduits, wires, pipes or other items are in or near opening area.

B. Openings shall be the responsibility of the Contractor requiring the openings even if such openings are not shown on drawings. The Contractor shall install sleeves for all openings and shall submit to the owner for review and approval, layout drawings of all such required sleeves and/or openings. Sleeve and opening sizes and locations shall be dimensioned from column lines and floor elevations or from a point of reference approved by owner.

C. No devices or materials shall be attached to non-structural or structural members or parts of the structure without approval by owner. All items shall be attached to structurally stable parts only.

3.9. IDENTIFICATION

A. Refer to IDENTIFICATION requirements in the HVAC 23 00 00 and Electrical 26 00 00 Sections of this Project Manual.

3.10. TRAINING AND DEMONSTRATION

A. The owner's facility staff (and occupants and service Contractors as needed), shall receive orientation and training on the proper care and maintenance of the roofing system with emphasis on preventative inspections. This training shall be summarized in the O&M Manual.

B. Refer to Training Requirements in the HVAC (23 00 00) and Electrical (26 00 00) Sections of this Project Manual.

3.11. TESTS, PUNCH LIST AND FINAL ACCEPTANCE

A. Contractor shall make all necessary adjustments and replacements affecting the work, which is necessary to fulfill owner's requirements and to comply with the directions and recommendations of the manufacturer, and to comply with all codes and regulations, which may apply to the entire installation.

B. Notice that the work is ready for final inspection and acceptance shall be given after the Contractor has carefully inspected all portions of the work, has reviewed in detail the drawings and specifications, and that to the best of the Contractor's knowledge all conditions of the contract documents have been fulfilled. The owner and the Contractor shall make a joint inspection of the work and owner will issue a punchlist.
   1. Multiple punch lists can be submitted and neither punchlist may be considered final. Punchlist can be submitted throughout the entire warranty period.
   2. If Contractor fails to perform required corrective work in less than 30 days upon receipt of punch list by Contractor, owner can perform corrections or hire a separate contractor and charge the Contractor the full cost.
   3. Contractor shall advice owner that the necessary work has been performed. If punch list items were not resolved and the work was not performed in less than 30 days upon receipt of punch list by Contractor, the Contractor shall be required to compensate the owner for additional site visits of project manager, design professional and other related staff at a rate of $ 100/hour plus mileage. The amount shall be paid to the owner prior to processing the final payment. Payment may be processed as deductive change order.

C. After deficiencies, if any, have been corrected or accounted for, and after all work is satisfactorily complete, the City will accept the work; and Notice of Completion will be filed by owner. The contractor shall inspect the roofing system before claiming completion. Prior to final acceptance, filing of the Notice of Completion or processing of final payment, the following shall be done and submitted reviewed and accepted by owner:
   1. Certificates of compliance and guarantees required under various Sections
   2. Operating and maintenance manuals
   3. Instruction to City personnel, as required
   4. Replacement material as required in specifications
   5. As –built documents
   6. All punch list items resolved
   7. All training provided (except deferred seasonal training)
   8. All warranty issues brought to Contractor's attention so far resolved
   9. Warranty documents signed by representative of manufacturer, guarantee documents, roofing agreement and other warranty related documents

3.12. CLEANING

A. The construction site shall be kept in clean and safe manner. The Contractor shall clean up and remove from the premises, on a daily basis accumulation of surplus materials, rubbish, debris and scrap and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this Contractor shall remove all tools, excess material and equipment, etc., from the site. Contractors or subcontractors found to be in violation may be required to leave the jobsite until their staff is trained in orderly, clean and safe construction site work. Clean and safe construction site includes but is not limited to:

1. All trades keep a separate and neat area for material, equipment etc.
2. Equipment and material not needed anymore is removed from the jobsite
3. Demolition material and equipment is removed from jobsite daily
4. All material and equipment is sorted and stored properly

B. Spreading of dirt, dust and other construction related material must be kept to a minimum. Occupied and work areas must be separated by seals. Such seals shall be inspected and repaired frequently as needed to ensure proper sealing at all times.

C. Keep streets, walks and all other adjacent paved areas clean and swept clear of dirt, mud and debris deposited as a result of this operation. Protect surrounding area from dust. Control rodents, and other vermin associated with demolition operations.

D. All installed items shall be cleaned at time of installation, and all lens exteriors shall be cleaned just prior to final inspection. Equipment shall be thoroughly cleaned of all stains, paint, spots, dirt and dust. All temporary labels not used for instruction or operation shall be removed. Dust, dirt and other foreign matter shall be removed completely from all internal surfaces of all mechanical and electrical units, cabinets, ducts, pipes, etc. Dirt, soil, fingerprints, stains and the like, shall be completely removed from all exposed finished surfaces.

E. Contractor shall wash all glass immediately prior to the occupancy of this project. Work shall include the removal of labels, paint splattering, glazing compound and sealant. Surfaces shall include mirrors and both sides of all glass in windows, borrowed lights, partitions, doors and sidelights. In addition to the above, the Contractor shall be responsible for the general "broom" cleaning of the premises and for expediting all of the cleaning, washing, waxing and polishing required within the technical sections of the specifications governing work under this Contract. The Contractor shall also perform "final" cleaning of all exposed surfaces to remove all foreign matter, spots, soil, construction dust, etc., so as to put the project in a complete and finished condition ready for acceptance and use intended.

F. If rubbish and debris is not removed, or if surfaces are not cleaned as specified above, the owner reserves the right to have said work done by others and the related cost(s) will be deducted from monies due the Contractor.

END OF SECTION

APPENDIX A - WASTE MATERIALS ESTIMATING SHEET

Instructions: Use as many sheets as needed.

PROJECT TITLE: _____

COMPANY: _____

DATE: _____

		Total Amount Generated		Amount Recycled		Amount Salvaged		Amount Sent to Landfill	
Material	Destination	Tons	Cu Yds	Tons	Cu Yds	Tons	Cu Yds	Tons	Cu Yds
Total									

APPENDIX B - LANDFILL LOG

Instructions: Use as many sheets as needed.
Project Title: _____
Company: _____
Log Dates: ___ ____ through ___

Date	Destination	Cubic Yards Land filled	Tons Land filled
Total			

APPENDIX C - WASTE DIVERSION LOG

Instructions: Use as many sheets as needed.

Project Title: _____

Company: _____

Log Dates: ___ ____ through ___

Material	Date	Destination	Salvaged	Recycled	Tons	Cubic Yards	Cost
Total							

SECTION 01 26 57
CHANGE ORDER REQUESTS (COR)

PART 1 – GENERAL

1.1. SUMMARY

A. Except in cases of emergency no changes in the Work required by the Contract Documents may be made by the General Contractor (GC) without having prior approval of the City Engineer or his representative.

B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in the Work by written Change Order (CO). Such changes may include additions and/or deletions.

C. Where the City desires to make changes in the Work through use of written Change Order Request (COR), the following procedures apply:

1. If requested by the City, the GC shall prepare and submit a detailed proposal, including all cost and time adjustments to which the GC believes it will be entitled if the change proposed is incorporated into the Contract. The City shall be under no legal obligation to issue a Change Order for such proposal.
2. The parties shall attempt in good faith to reach agreement on the adjustments needed to the Contract to properly incorporate the proposed change(s) into the Work. In the event that the parties agree on such adjustments, the City may issue a Change Order and incorporate such changes and agreed to adjustments, if any.
3. In some instances, it may be necessary for the City to authorize Work or direct changes in Work for which no final and binding agreement has been reached and for which unit prices are not applicable. In such cases the following shall apply.
    a. Upon written request by the City, the GC shall perform proposed Work
    b. The cost of such change may be determined in accordance with this specification.
    c. In the event agreement cannot be accomplished as contemplated herein, the City may authorize the Work to be performed by City forces or to hire others to complete the Work. Such action on the part of the City shall not be the basis of a claim by the GC for failure to allow it to perform the changed Work.

D. Where changes in the Work are made by the City through use of a force account basis, the GC shall as soon as practicable, and in no case later than ten (10) working days from the receipt of such order, unless another time period has been agreed to by both parties, give the City written Notice, stating:

1. The date, circumstances and source of the extra work; and,
2. The cost of performing extra work described by such Order, if any; and,
3. Effect of the order on the required completion date of the Project, if any.

E. The giving of each Notice by the GC as prescribed by this specification, shall be a requirement to liability of the City for payment of any additional costs incurred by the GC in implementing changes in the Work. Under this specification, no order or statement of the City shall be treated as a Change Order, or shall entitle the GC to an equitable adjustment of the terms of this Contract or damages for costs incurred by the GC on any activity for which the Notice was not given.

F. In the event Work is required due to an emergency as described in this specification the GC must request an equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the commencement of such emergency.

G. All GC requests for equitable adjustment shall be submitted to the CPM per the specifications below. Such requests shall set forth with specificity the amount of and reason(s) for the proposed adjustment and shall be accompanied by supporting information and documents.

H. No adjustment of any kind shall be made to this Contract, if asserted by the GC for the first time, after the date of final payment.

I. This specification shall be used by the GC when preparing documentation for any COR to ensure each has been properly and completely filled out as required by the City of Madison.

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 26 63 Change Order (CO)

B. Parts of this specification will reference articles within "The City of Madison Standard Specifications for Public Works Construction".

1. Use the following link to access the Standard Specifications web page:
   http://www.cityofmadison.com/business/pw/specs.cfm
   a. Click on the "Part" chapter identified in the specification text. For example if the specification says "Refer to City of Madison Standard Specification **2**10.2" click the link for Part II, the Part II PDF will open.
   b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you to the referenced text.

1.3. DEFINITIONS AND STANDARDS

A. LABOR: The amount of time and cost associated with the performance of human effort for a defined scope of Work. Labor is further defined as follows:
   1. Labor rate is the total hourly rate which includes the base rate of pay, fringe benefits plus each company's cost of required insurance, also referred to as a reimbursable labor rate.
   2. Unit labor is the labor hours anticipated to install the corresponding unit of material.
   3. Labor cost is the labor hours multiplied by the hourly labor rates.

B. MATERIAL: Actual material cost is the amount paid, or to be paid, by the GC for materials, supplies and equipment entering permanently into the Work, including cost of transportation and applicable taxes. The cost shall not exceed the usual and customary cost for such items available in the geographical area of the project.

C. LARGE TOOLS AND MAJOR EQUIPMENT: Large tools and major equipment are those with an initial cost greater than $1,500, whether from the GC or other sources.
   1. Tool and equipment use and time allowed is only for extra work associated with change orders.
      a. Rental Rate is the machine cost associated with operating a piece of equipment for a defined length of time (hour, day, week, or month) and shall not exceed the usual and customary amount for such items available in the geographical area of the project.
      b. Rental cost is the rental rate multiplied by the anticipated duration the equipment shall be required.
   2. The GC shall provide a breakdown of all rental rates to indicate what items and costs are associated with the rate. Examples of items to include in the breakdown would be fuel consumption, lubrication, maintenance and other similar expenses but not including profit and overhead.
   3. When large tools and equipment needed for Change Order work are not already at the job site, the actual cost to get the item there is also reimbursable.

D. BOND COST: The cost shall be calculated at 1% of the total proposed change order.

E. SUB-CONTRACTOR COSTS: Sub-contractor costs are for those labor, material, and equipment costs required by subcontracted specialties to complete the Change Order work including allowable markups as outlined within this specification.

F. OVERHEAD AND PROFIT Markup: The allowable markup percentage to a COR by the GC and Sub-contractors for overhead and profit. All of the following are expenses associated with overhead and profit and shall not be reimbursable as individual items on any COR:
   1. CHANGE ORDER PREPARATION: All costs associated with the preparing and processing of the change order.
   2. DESIGN, ESTIMATING, AND SUPERVISION: All such efforts, unless specifically requested by Owner as additional Work to be documented as a COR or portion thereof.
   3. INSTALLATION LAYOUT: The layout required for the installation of material and equipment, and the installation design, is the responsibility of the GC.

4. SMALL TOOLS AND SUPPLIES: The cost of small hand tools with an initial cost of $1,500 or less, along with consumable supplies and expendable items such as drill bits, saw blades, gasoline, lubricating or cutting oil, and similar items.
5. GENERAL EXPENSE: The general expense, which is those items that are a specific job cost not associated with direct labor and material such as job trailers, foreman truck, and similar items.
6. RECORD DRAWINGS: The preparation of record or as-built drawings.
7. OTHER COSTS: Any miscellaneous cost not directly assessable to the execution of the Change Order including but not limited to the following:
    a. All association dues, assessments, and similar items.
    b. All education, training, and similar items.
    c. All drafting and/or engineering, unless specifically requested by Owner as additional Work to be documented as a Change Order proposal or portion thereof.
    d. All other items including but not limited to review, coordination, estimating and expediting, field and office supervision, administrative work, etc.

G. Contract Extension: The necessary amount of time to be added to the contract deadlines for the completion of a change order.

1.4. CONTRACT EXTENSION

A. The GC shall not assume that every COR will require a Contract Extension. If the GC feels a contract extension is warranted he/she shall provide sufficient scheduling information that shows how the COR being requested impacts the critical path of the project.

B. The City of Madison strongly encourages the GC to explore alternative methods and practices prior to submitting a COR with a request for contract extension.

1.5. OVERHEAD AND PROFIT MARKUP

A. Pursuant to the City of Madison Standard Specifications for Public Works Construction, Section 104.7, Extra Work, the following maximum allowable markups shall be strictly enforced on all change orders associated with the execution of this contract.
1. The total maximum overhead and profit shall not exceed fifteen percent (15%) of the total costs.
2. The total maximum overhead and profit shall be distributed as follows:
    a. For work performed and materials provided solely by the General Contractor, fifteen percent (15%) of the total costs.
    b. For work performed and materials provided solely by Sub-contractors and supervised by the General Contractor:
        i. Supervision of the GC, five percent (5%) of the total Sub-contractor cost.
        ii. Sub-contractors work and materials ten percent (10%) of the total Sub-contractor cost.

1.6. PERFORMANCE REQUIREMENTS

A. The GC shall become thoroughly familiar with this specification as it will identify procedures and expenses that are or are not allowed under the Change Order and Change Order Request process.

B. The GC shall be responsible for all of the following:
1. Carefully reviewing the CB that is associated with the COR.
2. Collecting required supporting documentation from all contractors that quantify the need for a COR.
    a. Labor hours and wage rates
    b. Material costs
    c. Equipment costs

C. The following shall apply to establishing prices for labor, materials, and equipment costs:
1. Where Work to be completed has previously been established by individual bid items in the contract bid proposal the GC shall use the unit bid prices previously established.
2. Where Work to be completed was bid as a Lump Sum without individual bid items the GC shall provide a breakdown of all labor, materials, equipment including unit rates and quantities required.

D. The completion date is determined by Owner. The schedule, however, is the responsibility of the GC. Time extensions for extra Work will be considered when a schedule analysis of the critical path shows that the Change Order Request places the Work beyond the completion date stated in the Contract.

1.7. QUALITY ASSURANCE

A. The GC shall be responsible for ensuring that all COR supporting documentation meets the following requirements prior to completing the COR form:

1. Sufficiently indicates labor, material, and other expenses related to completing the intent of the CB.
2. No costs exceed the usual and customary amount for such items available in the geographical area of the project, and no costs exceed those established under the contract.

B. The Project Engineer (PE), City Project Manager (CPM), other members of the consulting staff, and city staff shall review all COR requests to ensure that the intent of the CB will be met under the proposal of the COR or request additional information as necessary.

PART 2 – PRODUCTS

2.1. CHANGE ORDER REQUEST FORM

A. Will be provided by CPM.

PART 3 - EXECUTION

3.1. ESTABLISHING A CHANGE ORDER REQUEST

A. Upon receipt of a Construction Bulletin (CB) where the GC believes a significant change in contract scope warrants the submittal of a COR the GC shall do all of the following within ten (10) working days after receipt of the CB:
   1. Review the CB with all necessary trades and sub-contractors required by the change in scope.
      a. Additions or deletions to the contract scope shall be as directed within the CB.
      b. Additions or deletions of labor and materials shall be determined by the GC based on the directives of the CB.
   2. Assemble all required back-up documentation for additions and deletions, including material breakdown, labor breakdown and other related contract costs as previously outlined in this specification.
   3. Submit a COR request form.

B. Submitting a COR does not obligate the GC to complete the work associated with the COR nor does it obligate the Owner to approve the COR as a change to the contract.

3.2. CHANGE ORDER REQUEST REVIEW, APPROVAL, AND PROCESSING

A. The PE and CPM shall review all CORs submitted by the GC.
   1. Additional consulting staff and city staff having knowledge of the components of the COR shall review and advise the PE and CPM as to the accuracy of the items, quantities, and associated costs of the COR as directed by the CB.
   2. The CPM shall review the COR with the Owner.

B. If required the PE and CPM, shall in good faith, further negotiate the COR with the GC as necessary. All amendments to any COR shall be documented.

C. After final review of the COR the CPM and Owner may accept the COR.

D. The CPM shall prepare the COR in the form of an official Board of Public Works Change Order for final review and approval as outlined in Section 01 26 63 Change Order (CO).

E. The GC shall not act upon any accepted COR until it has received final approval through the Public Works process as an official CO to the Work unless instructed to do so by the CPM. Proceeding without the final approval of a fully authorized Change Order is at the GC's own risk.

3.3. EMERGENCY CHANGE ORDER REQUEST

A. In the event Work is required due to an emergency as described in the Contract Documents, the GC must request an equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the commencement of such emergency.

B. The GC shall provide full documentation of all labor, materials and equipment used during the period of emergency as part of the COR submittal.

END OF SECTION

SECTION 01 26 63
CHANGE ORDER (CO)

PART 1 – GENERAL

1.1. SUMMARY

A. Except in cases of emergency, no changes in the Work required by the Contract Documents may be made by the General Contractor (GC) without having prior approval of the City Project Manager (CPM).

B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in the Work by written Change Order. Such changes may include additions and/or deletions.

C. The Change Order (CO) is a Board of Public Works (BPW) form that is reviewed and approved by a specific process.

D. The CO form is typically made up of multiple Change Order Requests (CORs) and/or Bid Items as appropriate depending on the type of project and how the contract was bid.

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 26 63 Change Order Request (COR)

1.3. BOARD OF PUBLIC WORKS PROCEDURE

A. The Board of Public Works has a very explicit procedure for the review and approval of all change orders associated with any Public Works Contract as follows:

1. The Supervisory Chain of the CPM shall review and approve any CO under $20,000 provided it does not include either of the following:
   a. The CO does not request a time extension to the contract.
   b. The CO does not cause the contract contingency sum to be exceeded.
2. The Board of Public Works shall review and approve any CO that requires any of the following:
   a. Any CO over $20,000.
   b. Any CO requesting a time extension to the contract regardless of the monetary value of the CO.
   c. Any CO that that causes the contract contingency sum to be exceeded.

B. The Board of Public Works generally meets every other week and only once in August and December. The GC is cautioned that, under normal scheduling, a CO requiring a BPW review will take a minimum of two (2) weeks to achieve final approval.

1. The City shall not be responsible for additional delays to the Work caused by the scheduling constraints of the Board of Public Works.

C. *SPECIAL NOTE:* The GC is cautioned to never proceed unless told to do so by the CPM. Only in rare instances may the CPM give a written notice to proceed on a COR without an approved CO. Proceeding without the written notice of the CPM or an approved CO is at the GC's own risk.

PART 2 – PRODUCTS

2.1. CHANGE ORDER FORM

A. Provided by CPM.

PART 3 - EXECUTION

3.1. PREPARATION OF THE CHANGE ORDER

A. The CPM shall prepare the required CO as follows:

1. Provide information for all contract information.

2. Provide a general description of the items described within the change order.
3. Provide detailed information for each Item on the CO form. At the option of the CPM he/she may include multiple Change Order Requests each as their own item.
4. Provide required pricing breakdown and accounting information as needed for the item.
5. Insert attachments of contractor/architect provided information that clarifies and quantifies the CO. Attachments may include but not be limited to material lists, estimated labor breakdown, revised details or specifications, and other documents that may be related to the requested change.
6. Save the final version of the completed CO.

3.2. EXECUTION OF THE CHANGE ORDER

A. The GC shall do the following:
   1. Review all items on the CO form.
   2. The GC shall notify the CPM immediately of any errors or discrepancies on the form and shall not sign or save it.
      a. The CPM shall make any corrections as needed, re-save the form, and notify the GC.
   3. If/when the GC concurs with the CO form as drafted the GC shall digitally sign the form.

B. The CPM shall do the following:
   1. Monitor the review process
   2. Ensure that proper BPW procedures are executed as needed by the CO approval process.
      a. Schedule the CO on the next available BPW agenda if required.
         i. Attend the BPW meeting to speak on the CO to board members and answer questions.
         ii. The GC and/or PE may be required to attend the BPW meeting to address specific information as it relates to the Work and/or materials associated with the CO.
   3. Monitor final approval and distribution of the CO.
   4. Notify the GC that the CO has been completed.
   5. Ensure that the CO is posted to the next Public Works payment schedule.
   6. Verify that the GC's next Progress Payment-Schedule of Values show the CO as part of the contract sum.

C. Upon final approval of the CO the GC may proceed with executing the Work associated with the CO.

END OF SECTION

04 01 40 REPOINTING OF MASONRY JOINTS

1.1 SCOPE OF WORK

Work for this project shall consist of raking out mortar joints and repointing as indicated on the plan set. Inspection and identification of the areas of mortar replacement were conducted prior to removal of the loose paint. The contractor shall provide an additional 300 linear feet of repointing in the base bid to cover any of additional joints not noted in the inspection. The contractor should note that there is some settling cracks in the building which will require some mortar joints to be replace for the full depth of the mortar joint. This is estimated at less than 10% of the joints scheduled for repointing. This work shall be included in the base bid. Once the walls have been prepared for painting and the loose paint has been removed, the contractor shall provide a plan for the actual repointing work that will be accomplished. Quantities may be adjusted at this time. The City Project Manager shall approve of any additional repointing beyond this scope.

1.2 DEFINITIONS

A. Repointing: The process of raking out (removing) mortar and replacing it with new mortar.

B. Pointing: The process of placing new mortar in existing joint spaces, which have previously been raked out. This term does not include the raking out process.

C. Tuckpointing: The process of touching up existing mortar joints by filling in recesses with new mortar, without first raking out the joints.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each product indicated including recommendations for their applications and use. Includes test reports and certifications substantiating that products comply with requirements.

B. Submit color/texture samples.
For each type of mortar for pointing and masonry rebuilding and repair, submit samples in the form of mortar strips 6 inches long by 1/2 inch wide set in aluminum or plastic channels. These samples must be have cured a minimum of 30 days prior to the start of work. The Project Manager must approve the mortar type and color match prior to starting work. The formula for the successful color match shall be submitted to the project manager.

C. Restoration program for each phase of the restoration process, including protection of surrounding materials on building and site during operations. Describe in detail the materials, methods, and equipment to be used for each phase of the restoration work.

1.3 QUALITY ASSURANCE

A. Restoration Specialist: Work must be performed by a firm having not less than 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration processes and operations indicated. Submit 3 references for similar type work.

B. After awarding the contract and prior to starting work: Prepare 2 separate sample areas of approximately 2 feet high by 2 feet wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints

and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints appearance to adjacent existing joints. The intent of the new pointing work is to match cleaned existing mortar. Newly pointed areas should be consistent with existing adjacent mortar joints for color and texture.

1.4 PROJECT CONDITIONS

A. Do not repoint mortar joints or repair masonry unless air temperature is between 40°F and 85°F and will remain so for at least 48 hours after completion of work.

B. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Immediately remove grout and mortar in contact with exposed masonry and other surfaces.

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

1.5 SEQUENCING/SCHEDULING

A. Perform masonry restoration work in the following sequence:

1. Repair any existing masonry as specified in the scope of work, including replacing existing masonry with new masonry materials.
2. Rake out existing mortar from joints indicated to be repointed.
3. Repoint existing mortar joints of masonry indicated to be restored.

PART 2 - PRODUCTS

2.0 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I

B. Hydrated Lime: ASTM C 207, Type S

C. Mortar Sand: ASTM C 144, unless otherwise indicated.
1. Color: Provide natural sand; of color necessary to produce required mortar color.
2. For the repointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

E. Water: Potable.

F. Selection of Mortar: Use repointing mortar of the same or weaker composition as the original mortar.

2.1 REPOINTING MORTAR MIXES

A. Measurement and Mixing: Measure cementitious and aggregate material in a dry condition by volume. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.

Mixing Pointing Mortar:

1. Dry mix all solid materials.
2. Add sufficient water to produce a damp mix that will retain it shape when pressed into a ball by hand. Mix from 3-7 minutes, preferably with a mechanical mixer.
3. Let mortar stand for not less than 1 hour not more that 1 ½ hour for prehydration.
4. Add sufficient water to bring the mortar to the proper consistency for tuckpointing, somewhat drier than mortar used for laying the units.
5. Use the mortar within 2 ½ hours of its initial mixing. Permit tempering of the mortar within the time interval.

B. Colored Mortar: Produce mortar of color required by using pre-manufactured concentrated colored mortar pigment.

1. Colored Mortar Pigment: Where colored mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

C. Do not use admixtures of any kind in mortar, unless otherwise indicated.

D. Mortar Proportions: Mix mortar materials in the following proportions:

1. Pointing Mortar for CMU: Type S, One part white portland cement, one half part lime, and four and one half parts colored or natural mortar aggregate.

a. Add colored mortar pigment to product as required.

PART 3 - EXECUTION

3.9 REPOINTING MASONRY

A. Rake out joints as follows:

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 3/4 inch nor less than that required to expose sound, unweathered mortar.

2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

3. Do not spall edges of masonry units or widen joints. Replace damaged masonry units.

a. Power-operated rotary hand saws and grinders may be used only if the contractor is able to satisfactorily field demonstrate to the Project Manager the ability of the operators to use tools without damaging the masonry. The equipment must be sized for the operator in order to satisfactorily control the cutting action with precision. Any masonry units that are damaged in this process shall be the responsibility of the contractor to repair or replace.

b. The contractor shall provide dust containment when using power operated grinders or saws that generate silica dust. The contractor shall field demonstrate safeguards that adequately protect the general public from the hazardous of silica dust.

B. Repoint joints as follows:

1. Rinse/saturate the masonry joint surfaces with water to remove dust and mortar particles and thoroughly saturate the masonry. Time the rinsing application so that at the time of pointing excess water has evaporated or run off and joint surfaces are damp but free of standing water. If rinse water has dried, dampen masonry joint surfaces before pointing.

2. Repoint mortar joints less that 1 1/4” in depth in a single lift. Start at one end and work away from the starting area. Compact the mortar thoroughly to ensure joints are fully packed and no voids or air pockets are in the mortar. Apply additional lifts not greater than 1 1/4” in depth. Allow freshly applied mortar joint to become “thumbprint hard” before applying an additional lift.

3. Once area is complete, and mortar is thumbprint hard, final tool (strike) mortar joints in opposite direction ensuring mortar joints are fully packed and tool (strike) to final appearance. Joints shall match existing joints as closely as possible. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar. Remove excess mortar from edge of joint by brushing.

4. Spray a light mist of water on mortar to aid in proper curing. Maintain mortar in a damp condition while on jobsite. Final spray a light mist of water on mortar just prior to leaving jobsite.

3.10 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using wood scrapers, stiff nylon or bristle brushes and clean water spray-applied at a low pressure.

B. Using metal scrapers or brushes is not permitted.

C. Using acid or alkali cleaning agents is not permitted. Any cleaning chemicals must be approved prior to use.

D. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.

E. Clean masonry debris from surrounding building structures, such as roof and gutters; remove debris from inside of gutters and downspouts. Rinse off roof and flush gutters and downspouts.

F. Sweep and rake adjacent pavement and grounds to remove masonry debris. Where necessary, pressure wash surfaces to remove mortar, dust, dirt and stains.

END OF SECTION

07 31 00 ASPHALT SHINGLES

PART 1 GENERAL SECTION

A. Asphalt roofing shingles.

B. Leak barrier and deck protection.

C. Metal flashing associated with shingle roofing.

D. Attic Ventilation.

1.02 SUBMITTALS

A. Submit copies of manufacturer's product data sheets, detail drawings and samples for each type of roofing product.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide all primary roofing products, including shingles, underlayment, self-adhering leak barrier, starter strips, ridge cap shingles and ventilation by a single manufacturer in order to obtain the specified warranty.

B. Installer Qualifications: Installer must be approved by the manufacturer at the proper level for installation of all roofing products that are to be installed under this section in order to obtain the specified warranty. For the GAF-Elk roofing system the installer must have GAF Master Elite status. For other roofing systems the installer must have an equivalent qualification.

C. Manufacturer Inspection: Provide for a manufacturer's factory representative to inspect the installation of the shingles and core accessory products in compliance with the manufacturer's warranty as in conformance with GAF Golden Pledge warranty or pre-approved equal.

1.04 REGULATORY REQUIREMENTS

A. Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.

C. Install all roofing products in accordance with all federal, state and local building codes.

D. All work shall be performed in a manner consistent with current OSHA guidelines.

E. Obtain all necessary building permits.

F. The contractor shall be responsible for meeting all the requirements of the Madison General Ordinance, Chapter 10, Section 10.185, Recycling and Reuse of Construction and Demolition Debris, for commercial buildings.

1.05 PRE-CONSTRUCTION MEETING

A. A pre-construction meeting shall take place prior to the start of the roofing installation. The contractor and any subcontractors will be required to attend.

B. Attendees: Meeting's mandatory attendees shall include the certified contractor and the manufacturer's representative. Non-mandatory attendees shall include the owner's representative, architect or engineer's representative, and the general contractor's representative.

C. Topics: Certified contractor and manufacturer's representative shall review all pertinent requirements for the project, including but not limited to, site product storage, scheduling, weather considerations, project duration, and requirements for the specified warranty.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store all products in manufacturer's unopened, labeled packaging until they are ready for installation.

B. Store products in a covered, ventilated area, at temperature not more than 110 degrees F (43 degrees C); do not store near steam pipes, radiators, or in direct sunlight.

C. Store bundles on a flat surface. Maximum stacking height shall not exceed manufacturer's recommendations. Store all rolls on end.

D. Store and dispose of solvent-based materials in accordance with all federal, state and local regulations.

1.07 WEATHER CONDITIONS

A. Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with the manufacturer's recommendations

1.08 WARRANTY, MINIMUM REQUIREMENTS

A. Provide a manufacturer's forty (40) year written warranty to the City of Madison that includes a minimum of twenty (20) years non-prorated protection, where the manufacturer is responsible for the contractor's workmanship for 25 years and the contractor is required to be certified by the manufacturer. For the GAF roofing system this certification would be the Master Elite status. Other pre-approved roofing systems would require an equivalent certification. This warranty shall includes the cost of labor to remove, disposes and replace part or all of the defective shingled roofing system that affects performance, including replacement of any or all manufacturer products and component due to material defect or workmanship by the contractor. This coverage includes a minimum of six (6) manufacturer products that composes the complete roofing system required to achieve the specified manufacturer warranty system. This includes shingles, underlayment, self-adhering leak

barrier, starter strips, ridge cap shingles and ventilation. The Contractor shall provide and install all additional products, materials not specifically mentioned as required by the manufacturer's recommendation and/or system guarantee instructions, to obtain complete guarantee coverage for the project as required by this specification. The Contractor shall acquire current proof of manufacturer certification for the products to be installed on the project and submit such dated certification status to the City along with the product submittal package. The roofing system shall be installed such as to obtain the maximum wind speed rating of 130 mph.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: GAF Materials Corporation, or equivalent manufacture that is able to meet or exceeds all requirements of warranty and installation materials. CertainTeed is considered a preapproved equal for the purpose of this bid provided all submittals are approved.

2.02 SHINGLES

A. Heavyweight, granule surfaced, self sealing asphalt shingle with a strong fiberglass reinforced Micro Weave® core and StainGuard® protection, which prevents pronounced discoloration from blue-green algae through formulation/unique blends of granules. Architectural laminate styling provides a wood shake appearance with a 5 5/8" exposure. Features GAF patented High Definition® color blends and enhanced shadow effect. . UL 790 Class A rated with UL 997 Wind Resistance Label; ASTM D 7158, Class H; ASTM D 3161, Type 1; ASTM D 3018, Type 1; ASTM D 3462; CSA 123.5-98; Dade County Approved, Florida Building Code Approved, Texas Dept of Insurance Approved, ICC Report Approval. Timberline® Ultra® High Definition Shingles, by GAF or pre-approved equal.

1. Color: As selected from manufacturer's full range.

2.03 HIP AND RIDGE SHINGLES

A. High profile self-sealing hip and ridge cap shingle matching the color of selected roof shingle. Each bundle covers approx. 20 lineal feet. Timbertex® Premium Ridge Cap Shingles, by GAF or pre-approved equal.

2.04 STARTER STRIP

A. Self-sealing starter shingle designed for all roof shingles. Each bundle covers approx. 60/120 lineal feet (18288/36576 mm). ProStart™ Starter Strip by GAF or pre-approved equal.

2.05 LEAK BARRIER

A. Self-adhering, self-sealing, bituminous leak barrier surfaced with fine, skid-resistant granules. Each Roll contains approx. 150 sq ft, 65 lbs (29.9 kg), 36" X 50' or 200 sq ft, 85 lbs (38.6 kg), 36" X 66.7'. 58 mils thick. WeatherWatch®, by GAF or pre-approved equal.

2.06 SHINGLE UNDERLAYMENT

A. Premium, water repellant, breather type non-asphaltic underlayment. UV stabilized polypropylene construction. Meets or exceeds ASTM D226 and D4869. Approved by Dade Country, Florida Building Code, and has a pending ICC Report Approval. Deck-Armor™ Premium Breathable Roof Deck Protection, by GAF or pre-approved equal.

2.07 ROOFING SEALANT

A. General-purpose asphalt roofing cement meeting the requirements of ASTM D 4586, Type I or II. Matrix Standard Plastic Roof Cement #203, by BMCA or pre-approved equal

B. General-purpose asphalt roofing cement meeting the requirements of ASTM D 4586, Type I or II. Matrix Standard Wet/Dry Roof Cement #204, by BMCA or pre-approved equal

C. Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II.

2.08 ATTIC VENTILATION

A. Roof ventilation shall be achieved utilizing passive ventilation products. Exhaust ventilation shall be achieved by using Cobra® Snow Country™ ridge vent providing 18.0 sq inches Net Free Ventilation Area per lineal foot. Cobra® Snow Country™ ridge vent shall be installed at all ridge tops as indicated on the plans.

2.09 NAILS

A. Standard round wire, zinc-coated steel or aluminum; 10 to 12 gauge, barbed or deformed shank, with heads 3/8 inch (9.5 mm) to 7/16 inch (11 mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19 mm) or through plywood or oriented strand board by at least 1/8 inch.

2.10 METAL FLASHING, SOFFIT, FASCIA AND EAVE/RAKE EDGE FLASHING 1

A. Metal flashing, fascia, soffit, “F” or “J” trim and eave edge flashing shall be installed per manufactures instructions.

B. Soffit panels shall be fully vented 0.32” aluminum PAC-CLAD 750 or equivalent.

C. All edge flashing, drip edge, fascia, trim shall be a minimum 24 gauge galvanized sheet metal prefinished with Kynar and brake formed to provide details as shown on the plans. Furnish in 8’ or 10‘lengths. Color: color to be determined from manufacture full range of colors, and may be field or shop fabricated.

2.11 METAL GUTTER AND DOWNSPOUTS

A. All of the existing metal gutters and downspouts shall be removed and replaced with new gutters and downspouts as indicated on plans. Downspouts shall closed type with a cross sectional area of 3”X4”. Downspouts may be the standard .020 aluminum prefabricated type

with cleanouts per locations as shown on the drawings. Gutters shall be 6 inch Type K seamless over the full eave distance.

B. 24 gauge hot-dip galvanized steel sheet with full strength Kynar paint finish, complying with ASTM A 653/A 653M, G90/Z275. Color: to be selected from manufacturer standard color range. The contractor has the option to use .032 aluminum with Kynar finish for the gutter material.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until the roof deck has been properly prepared.

B. If roof deck preparation is the responsibility of another installer, notify the project manager of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Verify that the deck is dry, sound, clean and smooth. It shall be free of any depressions, waves, and projections. Cover with sheet metal, all holes over 1 inch (25 mm) in diameter, cracks over 1/2 inch (12 mm) in width, loose knots and excessively resinous areas.

B. Clean deck surfaces thoroughly prior to installation of eaves protection membrane and underlayment.

3.03 INSTALLATION OF UNDERLAYMENTS

A. General:
   1. Install using methods recommended by manufacturer, in accordance with local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.

B. Eaves, Rakes and Ridge:
   1. Install eaves and rake edge metal flashing tight with fascia boards; lap joints 2 inches (50 mm) and seal with plastic cement; nail at the top of the flange.
   2. Manufacturer's workmanship coverage shall require eaves protection membrane (Leak Barrier) up the slope from eaves edge at least a full **69 inches** or to at least 24 inches (610 mm) beyond the interior "warm wall", whichever is greater. Lap ends 6 inches (150 mm) and bond. Install full 36" width leak barrier along rake edge. Install full 36" leak barrier up to ridge vent slot.

C. Valleys:
   1. Not applicable.

D. Roof Deck:
   1. Install one layer of roof deck underlayment over the entire area not protected by eaves or valley membrane. Install sheets horizontally so water sheds and nail in place.
   2. On roofs sloped at more than 4 in 12, lap horizontal edges at least 3 inches (76 mm) and at least 6" inches (152 mm) on end laps and offset from adjacent end laps by 3' (914mm). Along eave edges completely cover leak barrier protection and install on to the non corrosive metal edge.
   3. On roofs sloped between 2 in 12 and 4 in 12, overlap a full 28.5" over the underlying course. Continue up the roof using 25.5" (648mm) exposure. Overlap12" (305mm) at the end lap and offset the adjacent end lap by 6'.Standard application for low slope requires deck protection to have seams taped with butyl adhesive based tape or waterproof cloth duct tape.

E. Shingle Underlayment Application:
   1. Shingle underlayment shall be installed over a clean, dry deck.
   2. Install leak barrier at eaves, valleys, rakes, skylights, dormers and other vulnerable leak areas.
   3. Lay shingle underlayment over deck and overlap 3" at side laps and 6" at end laps.
   4. For exposure to rain or snow, overlap 12" at end laps.
   5. For side and end laps: fasten shingle underlayment 12" o.c. (6"o.c. for high wind areas). Fasten Deck Armor or equivalent underlayment with plastic cap nails or staples with plastic caps in accordance with appropriate installation instructions.
   6. For middle of the roll: fasten shingle underlayment 24" o.c. (12" o.c. for high wind areas).
   7. For exposure to rail or snow, completely cover all side laps, end laps and fasteners with tape.
   8. For long-term exposure see complete shingle underlayment installation instructions for side lap detail.
   9. If roof may be exposed to high winds, apply tape over all fasteners at the center of the roll to prevent rain or snow from entering at the fasteners.
   10. For slopes less that 2:12, a double application of shingle underlayment is required. See complete underlayment (Deck-Armor or equivalent) installation instructions for more information.

F. Penetrations:
   1. Vent pipes: Install a 24 inch (610 mm) square piece of leak barrier protection membrane lapping over roof deck underlayment; seal tightly to pipe.
   2. Vertical walls: Install leak barrier protection membrane extending at least 6 inches (150 mm) up the wall and 12 inches (305 mm) on to the roof surface. Lap the membrane over the roof deck underlayment.
   3. Skylights, curbs and roof hatches: Install eaves protection membrane from under the built-in counterflashing and 12 inches (305 mm) on to the roof surface lapping over roof deck underlayment.
   4. Chimneys: Install eaves protection membrane around entire chimney extending at least 6 inches (150 mm) up the wall and 12 inches (305 mm) on to the roof surface. Lap the membrane over the roof deck underlayment.
   5. Rake Edges: Install metal edge flashing over eaves protection membrane and roof deck underlayment; set tight to rake boards; lap joints at least 2 inches (50 mm) and seal with plastic cement; secure with nails. Provide maximum wind resistance as required

elsewhere by installing manufacturers starter with factory adhesive run vertically up the full length of the rake edge. Position the starter so that it overlaps the eave edge starter at least 3”(76mm). Nail vertically along a line 1 ½” to 3” in from the rake edge.

3.04 INSTALLATION OF SHINGLES

A. General:
1. Install in accordance with manufacturer’s instructions and local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
2. Minimize breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F (4 degrees C).
3. Handle carefully in hot weather to avoid scuffing the surfacing, or damaging the shingle edges.

B. Placement and Nailing:
1. Secure with 6 nails per shingle per manufacturer’s instructions or local codes so as to meet manufacturer’s requirements for 130 mph wind warranty. (Also see manufacturer’s requirement to run starter with factory adhesive entire vertical length of rake edge.
2. Placement of nails varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.
3. Nails must be driven flush with the shingle surface. Do not overdrive or underdrive the nails.
4. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.

C. Valleys
1. Not applicable.

D. Penetrations
1. All Penetrations are to be flashed according to manufacturers, ARMA and NRCA application instructions and construction details.

3.05 VENTILATION

A. General
1. Ventilation must meet or exceed current F.H.A., H.U.D. and local code requirements.

B. Roof Exhaust Vent:
1. Install accordance to manufactured recommendations.

3.06 PROTECTION

A. Protect installed products from foot traffic until completion of the project.

B. Any roof areas that are not completed by the end of the workday are to be protected from moisture and contaminants.

END OF SECTION

07 53 23 ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING (EPDM)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Name: City of Madison – Summit Maintenance Facility-Storage Building Improvement-South Building Roof Replacement

B. EPDM membrane roofing system, including all components specified.

C. Comply with the published recommendations and instructions of the roofing membrane manufacturer, at: Firestone, http://manual.fsbp.com or for Carlisle at: http://www.carlislesyntec.com/

D. Commencement of work by Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

E. Project requirements includes complete removal and disposal of existing roof system including membranes, flashings, insulations, fasteners, base tie-ins, metal flashings, etc. Exposed deck shall be inspected for damage, and reported to owner's representative prior to installing new system.

1.02 RELATED REQUIREMENTS

A. Not Applicable.

1.03 DEFINITIONS

A. LTTR: Long Term Thermal Resistance, as defined by ASTM C1289-13e-1.

1.04 REFERENCE STANDARDS

A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2012.

B. ASTM 1289-13e-1 - Standard Test Method Determination of L-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; 2009.

C. PS 1 - Structural Plywood; 2009.

D. PS 20 - American Softwood Lumber Standard; 2005.

E. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2003. (ANSI/SPRI ES-1)

1.05 ADMINISTRATIVE REQUIREMENTS

A. Pre-Construction Meeting: Before start of roofing work, The City shall hold a meeting where the Contractor shall discuss the proper installation of materials, review the shop drawing, submittals, manufacturer's standard details and requirements to achieve the stated warranty.
   1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work. This includes a representative from the roofing material manufacturer.
   2. The City Project Manager shall schedule the Pre-Construction Meeting.

1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data:
   1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements

and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.

C. Samples: Submit samples of each product to be used.

D. Shop Drawings: Provide:
   1. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, curbs, terminations, expansion joints, penetrations, curbing and drains.
   2. For tapered insulation, Not applicable.

E. Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications.

F. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.

G. Executed Warranty.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Roofing installer shall have the following:
   1. At least five years experience in installing specified system.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.

B. Store materials clear of ground and moisture with weather protective covering.

C. Keep combustible materials away from ignition sources.

1.09 WARRANTY

A. Comply with Manufacturers Project Closeout Submittal procedure to satisfy any warranty requirements.

B. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.

C. Warranty: Firestone Limited Warranty covering membrane, roof insulation, and other indicated components of the system, for the term indicated.
   1. Limit of Liability: No dollar limitation.
   2. Scope of Coverage: Repair leaks in the roofing system caused by:
      a. Ordinary wear and tear of the elements.
      b. Manufacturing defect in Firestone brand materials.
      c. Defective workmanship used to install these materials.
      d. Damage due to winds up to 55 mph (88 km/h).
   3. Not Covered:
      a. Damage due to winds in excess of 55 mph (88 km/h).
      b. Damage due hurricanes or tornadoes.
      c. Hail.
      d. Intentional damage.
      e. Unintentional damage due to normal rooftop inspections, maintenance, or service.

D. Metal Roof Edging with Exposed Decorative Fascia: Provide standard 20 year or greater warranty for painted finish covering color fade, chalk, and film integrity, after Owner selects the color.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer - Roofing System: Firestone Building Products LLC, Carmel, IN: www.firestonebpco.com.
   1. Roofing systems manufactured by others are acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:
      a. Specializing in manufacturing the roofing system to be provided.
      b. Minimum ten years of experience manufacturing the roofing system to be provided.
      c. Able to provide a no dollar limit, single source roof system warranty that is backed by corporate assets in excess of one billion dollars.
      d. ISO 9002 certified.
      e. Able to provide isocyanurate insulation that is produced in own facilities.
      f. Roofing systems manufactured by the companies listed below are acceptable provided they are completely equivalent in materials and warranty conditions:
         1. Carlisle Syntec Systems, Carlisle, PA: http://www.carlislesyntec.com/

B. Manufacturer of Insulation: Same manufacturer as roof membrane.

C. Manufacturer of Metal Roof Edging: Same manufacturer as roof membrane.
   1. Metal roof edging products by other manufacturers are not acceptable.
   2. Field- or shop-fabricated metal roof edgings are acceptable where application requires a custom fit.
   3. Factory fabricated products by other manufacturers are acceptable provided they are completely equivalent in materials and performance and do not affect warranty.

2.02 ROOFING SYSTEM DESCRIPTION

A. Roofing System: Ethylene-propylene-diene-monomer (EPDM) single-ply membrane.
   1. Membrane Attachment: Fully adhered.
   2. Warranty: Full system warranty; Firestone 30 year Platinum Limited Warranty covering membrane, roof insulation, and membrane accessories.
   3. Comply with applicable local building code requirements.

B. Roofing System Components: Listed in order from the top of the roof down:
   1. Membrane: 90 mil black EPDM Membrane
   2. Base Sheet Over Insulation: Not applicable.
   3. Insulation:
      a. Maximum Board Thickness: 1 inch (25 mm); only one layer is required for this project.
      b. Tapered: Not Applicable.
      c. Layering: Polyisocyanurate foam board, non-composite; mechanically fastened. Insulation shall be applied and fasten in a manner that it contours with the curvature of the roof. Total thickness shall be 1 inch.
      c. Top Layer:-Not Applicable, single layer of Polyisocyanurate to be mechanically fastened.
      d. Intermediate Layer(s),-Not Applicable, single layer of Polyisocyanurate to be mechanically fastened.
      e. Bottom Layer: Not Applicable, single layer of Polyisocyanurate to be mechanically fastened.
      f. Crickets: Not Applicable

2.03 EPDM MEMBRANE MATERIALS

A. Roofing and Flashing Membrane: Black, cured synthetic single-ply membrane composed of ethylene propylene diene terpolymer (EPDM) with the following properties:
   1. Thickness: 0.090 inch (1.5 mm).

2. Nominal Thickness Tolerance: Plus/minus 10 percent.
3. Sheet Width: Provide the widest available sheets to minimize field seaming.
4. Acceptable Product: RubberGard Platinum EPDM Membrane by Firestone

B. Membrane Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

C. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D 4811 Type II, and with the following properties:
1. Thickness: 0.055 inch (1.4 mm).
2. Acceptable Product: RubberGard EPDM FormFlash by Firestone.

D. Self-Adhesive Flashing Membrane: Semi-cured 45 mil EPDM membrane laminated to 35 mil (0.9 mm) EPDM tape adhesive; QuickSeam Flashing by Firestone.

E. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes; Firestone EPDM Pipe Flashing.

F. Self-Adhesive Lap Splice Tape: 35 mil (0.9 mm) EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer; QuickSeam Splice Tape by Firestone.

G. Splice Adhesive: Synthetic polymer-based, formulated for compatibility with EPDM membrane and metal surfaces; SA-1065 Splice Adhesive by Firestone.

H. Bonding Adhesive: Neoprene-based, formulated for compatibility with EPDM membrane and wide variety of substrate materials, including masonry, wood, and insulation facings; Bonding Adhesive BA-2004 by Firestone.

I. Adhesive Primer: Synthetic rubber based primer formulated for compatibility with EPDM membrane and tape adhesive, with VOC content less than 2.1 lb/gal (250 g/L); QuickPrime Plus LVOC by Firestone.

J. Seam Edge Treatment: EPDM rubber-based sealant, formulated for sealing exposed edges of membrane at seams; Lap Sealant HS by Firestone.

K. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.

L. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal by Firestone.

M. Metal Plates and Strips Used for Fastening Membrane and Insulation: Steel with Galvalume coating; corrosion-resistance meeting FM 4470 criteria.

N. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches (33 mm) wide by 0.10 inch (2.5 mm) thick; Firestone Termination Bar by Firestone.

2.04 ROOF INSULATION

A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C1289 Type II Class 1, with the following additional characteristics:
1. Thickness: As indicated elsewhere.
2. Size: 48 inches (1220 mm) by 96 inches (2440 mm), nominal.
   a. Exception: Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
3. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C1289.
4. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
5. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
6. Acceptable Product: ISO 95+ GL Polyisocyanurate Insulation by Firestone.

B. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

2.05 METAL ACCESSORIES

A. Metal Roof Edging and Fascia: Continuous metal edge member serving as termination of roof membrane and retainer for metal fascia; watertight with no exposed fasteners; mounted to roof edge nailer.
   1. Wind Performance:
      a. Membrane Pull-Off Resistance: 100 lbs/ft (1460 N/m), minimum, when tested in accordance with ANSI/SPRI ES-1 Test Method RE-1, current edition.
      b. Fascia Pull-Off Resistance: At least the minimum required when tested in accordance with ANSI/SPRI ES-1 Test Method RE-2, current edition.
      c. Provide product listed in current Factory Mutual Research Corporation Approval Guide with at least FM 1-270 rating.

   2. Description: Roof drip edge may be shop fabricated to meet manufactures requirements for stated warranty. Material shall be 24 gauge steel with PVDF finish.
   3. Estimated Fascia Face Height: 4” inches
   4. Edge Member Height Above Nailer: 0 inches (0 mm).
   5. Fascia, Gutters and Downspout Material and Finish: 24 gauge steel with PVDF Finish Color selected from standard factory colors (non premium) with installed protective plastic film. The contractor has the option to fabricate the gutters from .032 aluminum with the PVDF finish. Downspouts may be the standard .020 aluminum prefabricated type with cleanouts per locations as shown on the drawings.
   6. Length: 144 inches (3650 mm).
   7. Functional Characteristics: Fascia retainer supports while allowing for free thermal cycling of fascia.
   8. Aluminum Bar: Not Applicable.
   9. Anchor Bar Cleat: 20 gage, 0.036 inch (0.9 mm) G90 coated commercial type galvanized steel with pre-punched holes.
   10. Curved Applications: Factory modified or field fit to match curvature at gable ends.
   11. Fasteners: Factory-provided corrosion resistant fasteners, with drivers; no exposed fasteners permitted.
   12. Special Shaped Components: Provide factory-fabricated pieces necessary for complete installation, including miters, scuppers, and end caps; minimum 14 inch (355 mm) long legs on corner pieces.
   13. Scuppers: Not applicable.
   14. Accessories: Provide matching brick wall cap, downspout, extenders, and other special fabrications as shown on the drawings.

2.06 ACCESSORY MATERIALS

A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.
   1. Width: 6 inches (152 mm), nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it. Nailer to be installed in two ½” thicknesses of plywood with structural metal flashing to accept metal rivet fasteners as shown in drawing.
   2. Thickness: Same as thickness of roof insulation.

PART 3 INSTALLATION

3.01 GENERAL

A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where

manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.

D. Perform work using competent and properly equipped personnel.

E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F (15 to 25 degrees C).

G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
   1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
   2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
   3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.

I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.02 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.

B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

C. Examine roof substrate to verify that it is properly sloped to drains.

D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

E. Perform pull out test for fasteners attached to existing metal deck. Report any unacceptable conditions.

F Cut or trim existing metal deck to proper roof details as shown in drawing or submittals.

3.03 PREPARATION

A. Removal of the existing roof system will not be required. The new roofing system shall be installed over the existing metal deck. Remove existing gutters and downspouts and any materials that may interfere with the installation.
   1. At penetrations, apply new roofing materials over flashings, including lead, asphalt, mastic, etc. The mastic around penetrations is suspected to contain asbestos. They are not intended to be disturbed during this installation. Contact the City Project Manager if this material is to be disturbed.

B. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

C. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.

D. Fill all surface voids in the immediate substrate that are greater than 1/4 inch (6 mm) wide with fill material acceptable insulation to membrane manufacturer.

E. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

F. Wood Nailers: Provide wood nailers at all perimeters and other locations where indicated on the drawings, of total height matching the total thickness of insulation being used.

3.04 INSULATION AND COVER BOARD INSTALLATION

A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.

B. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.

C. Lay roof insulation in courses parallel to roof edges.

D. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch (6 mm). Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).

E. Mechanical Fastening: Using specified fasteners and insulation plates engage fasteners through insulation into deck to depth and in pattern required by membrane manufacturer.

3.05 SINGLE-PLY MEMBRANE INSTALLATION

A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.

B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.

D. Install membrane adhered to the substrate, with edge securement as specified.

E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.

F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches (1:6) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
   1. Exceptions: Round pipe penetrations less than 18 inches (460 mm) in diameter and square penetrations less than 4 inches (200 mm) square.
   2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

3.06 FLASHING AND ACCESSORIES INSTALLATION

A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.

B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
   1. Follow roofing manufacturer's instructions.
   2. Remove protective plastic surface film immediately before installation.

3. Install water block sealant under the membrane anchorage leg.
4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.
8. The flashing and fascia at the gable ends will need to be sized in such a length to best fit the curvature of these gable ends.

C. Existing Scuppers: Not Applicable.

D. Scuppers: Not Applicable.

E. Roofing Expansion Joints: Not Applicable.

F. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Not Applicable

G. Roof Drains: Not Applicable.

H. Roof Hatch: Not Applicable.

3.07 FIELD QUALITY CONTROL

A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).

B. Perform all corrections necessary for issuance of warranty.

3.08 CLEANING

A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.09 PROTECTION

A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

END OF SECTION

SECTION 23 00 00 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included:* Provide heating, ventilating, and air conditioning systems where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Exhaust systems including, inline fans, motors, dampers, controls and related items;
2. Air Inlets and Outlets;
3. Test, adjust, and balance air systems;
4. O&M manuals, warranty work and Owner instructions.

B. *Related Work*:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Equipment structural supports, etc.
3. Louvers provided by HVAC Contractor; installed by General Contractor.

C. *Work of Other Sections*:

1. Openings for ventilating work in walls, floors, roof, ceiling, etc., will be provided by General Contractor. Location and size of these openings will be the responsibility of the HVAC Contractor.
2. Lintels and structural supports for HVAC openings and equipment by the General Contractor.
3. Electrical line voltage wiring (110 volts and greater). Wiring diagrams will be furnished to Electrical Contractor by the HVAC Contractor.
4. Motor starters not provided integral with HVAC equipment shall be provided by the Electrical Contractor.
5. Floor drains and open site drains by Plumbing Contractor.
6. Painting HVAC equipment will be the responsibility of General Contractor.
7. Roofing, exterior wall and related exterior opens shall be caulked, sealed and patched by the General Contractor.

1.02 GENERAL PROVISIONS

A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.

B. The plans show various details indicating the general arrangement of the heating and ventilating work, sizes and locations of pipe work, ducts, units, etc., the said plans with figures, lettering, etc., shall be considered a part of these Specifications and no charge or alternation shall be made in either case unless ordered by the Engineer.

C. In addition to the heating and ventilating plans, see General Plans of the building, as all heating and ventilating work appearing on the latter plans will be part of this Contract unless especially specified to be done by other contractors, as well as, the said work detailed on the heating and ventilating plans.

1.03 QUALITY ASSURANCE

A. *Qualifications of Installers*:

1. For the actual fabrication, installation and testing of heating and ventilating work, use only thoroughly trained and experienced workmen completely familiar with the items required and manufacturer's current recommended methods of installation.
2. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for lack of skill on the part of the Workmen.

B. *Reference Standards*: The following standards are imposed, as applicable to work in each instances:

AABC	Associated Air Balance Council
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
MCA	Mechanical Contractors Association
MSS	Manufacturers Standardized Society
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association

C. Environmental design conditions for all occupied areas are as follows:

Inside:	70 deg. F	74 deg. F 50% RH
Outside:	-15 deg. F	91 deg. dbF/ 74 deg. wbF

1.04 CODES AND PERMITS

A. This Contractor must comply with building laws and other ordinances in force where the building is located as far as same apply to his work.

1. IBC 2009.
2. IMC 2009; SPS 364.

B. He must secure permits from proper offices and pay legal fees as may be necessary for fulfilling the requirements of these Specifications.

C. One (1) copy of all permits must be furnished to the Owner.

1.05 COORDINATION

A. Cooperate and coordinate with other trades to assure that all systems in the heating and ventilating work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

B. Arrange heating and ventilating work in neat, well organized manner with piping and similar services running parallel with primary lines of building construction, and with minimum of 8 foot overhead clearance where possible.

C. Locate operating and control equipment properly to provide easy access, and arrange entire heating and ventilating work with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF HVAC WORK

A. *Line Voltage Wiring*: The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.

B. *Control Wiring*: Exposed low voltage (less than 100 volts) temperature control wiring in connection with heating and ventilating system shall be in EMT conduit by the Heating Contractor in strict accordance with the applicable sections of the Electrical Specifications. *Concealed control wiring* may be routed to equipment without conduit, unless subject to physical damage.

C. This Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. HVAC Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to Electrical Contractor.

D. *Motors*: Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.

1. *Phases and Current*: 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide two (2) separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.
2. *High Efficiency Motors*: All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
3. *Service Factor*: 1.15 for three-phase; 1.35 for single-phase.
4. *Construction*: General purpose, continuous duty.
5. *Frames*: NEMA Standard for horsepower specified.
6. *Overload Protection*: Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.

E. *Starter and Switches*: Where motor starters and switches are indicated to be an integral part of equipment furnished by Heating installer, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.

F. *Wiring Connections*: Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.

G. *General Wiring*: Comply with applicable provisions of Division 16 Section.

1.07 PAINTING HVAC WORK

A. *General:* All field painting of mechanical equipment will be done by the General Contractor unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.

B. All equipment shall be provided with factory-applied prime finish, unless otherwise specified.

C. If the factory shop paint finish on any equipment furnished by the Contractor is damaged in shipment or during construction of the building, the equipment shall be refinished by the Contractor to the satisfaction of the Architect/Engineer.

D. Prime paint all field-fabricated metal work under HVAC work, comply with applicable provisions of Division 9.

1.08 IDENTIFICATION

A. *General*: Provide adequate marking of the HVAC system and control equipment to allow identification and coordination of maintenance activities and maintenance manuals. Tag and label HVAC equipment located in exposed or accessible areas to conform to ANSI A13.1-1981. After painting and/or covering is complete, identify all equipment, piping and ductwork by its abbreviated generic name as shown/scheduled/specified.

B. *Equipment*: Identify all major HVAC equipment with plastic-laminate signs of 2" high painted stencils and contrasting background. Provide test of sufficient clarity and lettering to convey adequate information at each location and mount permanently. Identify control equipment by 1-1/2" x 4" plastic laminate nameplates with 1/4" high lettering.

C. *Piping and Ductwork*: Identify all *exposed and accessible* piping and ductwork once every 30 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow directional arrows at each piping or duct identification. Provide appropriate sized letters to convey information on wrap-around signage, adhesive-backed or paint stenciled labels.

1. *Exposed* includes all piping and ductwork above suspended ceiling systems.

D. *Valves*: Identify all valves with 1-1/2" diameter minimum polished brass stamp-engraved or plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and submit valve tag schedule, service and tag description, incorporate in Instruction/O&M Manual.

E. *Operational Labels*: Where needed for proper or adequate information on operation and maintenance of HVAC systems, provide labels or markers of plasticized or laminated card stock, typewritten of appropriate size to convey the information.

F. Submit schedule of Identification labels for Architect/Engineer approval.

1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS

A. The General Contractor will be required to leave openings in new ceiling, floors, walls, roof, partitions, etc., as required to install the ventilating work specified or shown on the Drawings. The HVAC Contractor is responsible for correct size and location of his openings. Where penetrations through existing construction are required, they shall be the responsibility of the HVAC Contractor.

B. The HVAC Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof and where noted on the Drawings.

1. *Pipe sleeves*: Schedule 40 black steel pipe, 1” larger than the pipe;
2. *Duct sleeves*: 24 gauge galvanized sheetmetal, ½” larger than the duct on all sides.

C. Pack annular space between sleeves and pipe or ducts with fiberglass insulation and seal. Where penetrations through fire rated walls or floors, fill space with fire-resistive insulation similar to US Gypsum Thermafiber batts or other approved fire-resistive insulation material and seal annular openings with a UL approved , fire-stopping sealant/caulk.

D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be made in advance of construction of such parts of the building.

E. If the HVAC Contractor should neglect to inform the General Contractor of his opening requirements and that portion of the Building construction has been completed, the HVAC Contractor shall pay the General Contractor for providing these openings.

F. Make arrangements with various other contractors for all special framing, spacing and chases. Mason will leave chases in mason work, but HVAC Contractor is responsible for correct size and location.

1.10 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

1.11 CONCRETE FOR HVAC WORK

A. *General:* Comply with pertinent provisions of Division 1 and Division 3.

B. None anticipated for project.

1.12 EQUIPMENT ACCESS

A. *General:* All valves, volume dampers, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. Relocation of piping, ducts or equipment to accomplish equipment access shall be completed by this Contractor at no additional cost.

B. *Location:* Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.

C. *Construction:* Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and or furred-in spaces. Milcor or approved equal; 14 gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

1.13 EQUIPMENT SUPPORTS

A. *General*: Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.

1. Prime coat paint all supports.
2. Turn over equipment curbs to the General Contractor for installation; structural steel supports under equipment curbs by the General Contractor.

1.14 EQUIPMENT GUARDS

A. General: Provide equipment guard over belt-driven assemblies, pump shafts, exposed fans and elsewhere, as indicated in this specification or required by code.

1. Prime coat paint all supports.

1.15 GUARANTEE

A. All material and workmanship must be new and first class in every respect; the heating, ventilating and air conditioning equipment must be turned over to the owner in complete working order and free from mechanical defects.

B. The HVAC Contractor must guarantee all labor and materials for one (1) year from the substantial completion and acceptance of the HVAC system and keep or place same in repair for said period, unless such defects are clearly the result of bad management after HVAC system was turned over to the Owner.

C. The system must be guaranteed to operate noiselessly and to the satisfaction of the Owner and to supply and exhaust quantities of air shown on the Drawings.

D. Before final acceptance of this work, the Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by the Owner.

E. The HVAC Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the plans and specifications and that all system components have been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

1.16 SUBMITTALS

A. Refer to Division 1 for additional submittal requirements.

B. The HVAC Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Engineer's final approval.

C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.

D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.

E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Exhaust fans and accessories;
2. TAB air balance report;
3. Instructions and O&M manuals (2 copies);
4. As-built drawings.

F. Marked-up drawings indicated record installation as-built HVAC work.

1.17 HOUSEKEEPING AND CLEANUP

A. Periodically as work progress and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the work room clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

1.18 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

1.19 INSTRUCTIONS AND MANUALS

A. Upon completion of the installation, but before final acceptance of the system, this Contractor shall instruct the Owner on the care and operation of all parts of the system.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all HVAC equipment and installed under this contract. Prepare in bound copies

complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to the Architect for distribution.

1.20 AS-BUILT DRAWINGS

A. During construction maintain a set of prints showing installed as-built work for the project.

B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

PART 2 - PRODUCTS

2.01 DUCTWORK

A. *Sheet Metal*: Furnish, install, fit and secure in place all supply, return, exhaust and vent air ducts, risers, branches, etc., as shown and detailed on plans, built of galvanized iron as hereinafter specified.

1. Above ground, general ductwork: Galvanized steel, lock-forming quality, ASTM A527; 1.25 oz. zinc coating each side, mill phosphatized, ASTM A525.
2. Steel Ducts: Galvanized steel, lock-forming quality, ASTM A527; 1.25 oz. zinc coating each side, mill phosphatized, ASTM A525.

B. Ductwork Construction:

1. Sheet metal work shall be constructed according to practices recommended in the HVAC Duct Construction Standards - Metal and Flexible 1st ED. 1985, as published by SMACNA, and hereinafter specified.
2. *Ductwork Pressure-Velocity Classification*: + 2" static pressure class 2,500 FPM velocity level.
3. *Duct Sealing Requirements:* Seal Class B. Transverse and longitudinal joints.
4. All duct dimensions noted on the drawings are finished inside dimensions.
5. Install ducts, risers, etc., as indicated on plans, making necessary changes in cross section, offsets, etc., whether or not same is specifically indicated. If ducts cannot be run as shown on drawings, install ducts between required points, subject to the approval of Engineer without additional cost to the Owner.
6. At all outlets and inlets in rooms, flange ducts for attachment of grilles. Install grilles according to manufacturer's recommendations.
7. Sheet metal work throughout shall be assembled and erected in such a manner that no vibration will occur and no noise be transmitted by the moving air due to inappropriate fitting or offsets. *All corrective measures will be determined by the Engineer at the HVAC Contractor's expense.*.
8. All duct turns shall have either an inside radius equal to the duct width or be a miter turn with turning vanes. Turning vanes shall be double wall air-foil type.
9. *Branch Take-Off Fittings*: Round branch take-off fittings shall be low-loss type fittings such as bellmouth or conical type; *no scoops or 90 degree tee fittings allowed.* Square/rectangular branch take-off fittings shall have 45 degree leading edge with 4 inch minimum depth; *no air turns or scoops allowed.*

C. *Ductwork Accessories*:

1. *Volume Dampers:* Furnish and install in branches of supply air and exhaust ducts. Substantial volume dampers to be fitted with locking devices for adjusting the air delivery. Damper blades shall not exceed 6" width.
2. *Access Panels*: Install access panels with latches and gaskets in ducts at automatic dampers, coils, fire dampers, louver plenums and other duct mounted equipment. Panels in insulated ducts must be internally insulated.
3. *Openings around Ducts*: Through walls must be filled with fiber-glass, caulked and sealed with 14 gauge galvanized sheet metal angle around duct on each side of wall.

2.02 VIBATION ISOLATION

A. *General:*

1. Isolate all motor driven mechanical, unless otherwise noted, from the building structure and from the systems which they serve, to prevent equipment vibrations from being transmitted to the structure.
2. Consider equipment weight distribution to provide uniform deflections.
3. For equipment with variable speed capability, select vibration isolation devices based on the lowest speed.

B. *Manufacturers:* Products and methods of fabrication shall be as manufactured by Mason Industries, Korfund Co., Amber/Booth Co., Vibration Mounting and Controls, or Kinetics, similar to the manufacturers model listed.

C. *Performance:*

1. Select all vibration isolation devices to provide minimum 95% isolation efficiency or based on the minimum static deflection and mounting criteria listed below, whichever is greater.
2. *Vibration Isolation Schedule:*

Type of Equipment	*Isolation Type*	*Minimum Static Deflection - Inches*
Inline Exhaust Fans	Type 'X' Flexible Duct Connector &	¾"
	Type 'D' Hanger	¾"

D. *Type D Hangers*:

1. Mason type 30N, vibration hangers with a steel spring and 0.3" deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing thru a 30 degrees arc before contacting the hole and short circuiting the spring.
2. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection

E. *Type X Flexible Duct Connectors:*

1. Laminated flexible sheet of cotton duct and sheet elastomeric (neoprene or vinyl), reinforced with steel wire mesh where required for strength to withstand duct pressure indicated.
2. Form connectors with full-faced flanges and accordion bellows to perform as flexible isolation units.
3. Provide galvanized steel retaining rings for airtight connections with ductwork.

2.03 LOUVERS

A. Extruded aluminum louver, 4" deep, 40 deg. J-blades mounted, 3" O.C. with rain hooks. Stainless steel screws.

1. Frame: Aluminum extrusions 0.081" 6063-TS
2. Blades: Z-shaped extruded aluminum 6063-TS.
3. Bird Screens: 1/2" mesh PVC crated.
4. Insect Screens where scheduled - aluminum.
5. Finish: Powder-coat baked-on enamel finish, finish color selection by Architect.

2.04 FANS

A. *General*: Furnish fans in the size and capacity as shown on the drawings. Shall be manufactured by Broan, Carnes, Greenheck, ILG, Penn or approved equal.

B. Inline Fan: Furnish duct mounted centrifugal, direct-driven or belt-driven inline fan. Fan shall be constructed of heavy gauge steel with acrylic enamel finish over iron phosphate primer. Motor or drive compartment shall be isolated from the airstream and be externally ventilated. Bearings shall be prelubricated and sealed for 200,000 hours operation. Fan wheel shall be aluminum, backward inclined, centrifugal type, dynamically and statically balanced with venturi inlet. One side of the housing shall be equipped with a hingeable service door assembly supporting the motor, drives, wheel and inlet venturi for servicing without disconnecting the fan connections. Fan shall be AMCA certified for air and sound performance.

1. Accessories (as indicated on plans and schedules).

C. *Ceiling Mounted*: Furnish ceiling-mounted exhaust fans complete with centrifugal blower, inlet grille, gravity back-draft damper, and discharge duct connection as shown on the drawings. Fan shall be AMCA certified with a sound rating of less than 4.5 sones. Housing shall be insulated with minimum 1/2" acoustic insulation.

1. *Accessories (as indicated on plans and schedules).*

D. *Motors*: 1 HP and larger shall be suitable for 240/60/1 1-phase operation and less than 1 HP shall be 115/60/1 with integral thermal overload. Horsepower rating shall be such that motor will not be overloaded at rated capacity. Motors in air stream shall be totally enclosed, other shall be open type. Motors shall have permanently lubricated ball bearings, mounted on neoprene vibration-isolator supports. All units shall have remote disconnect switch.

1. ECM motor with local speed control, where scheduled.

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PART 3 - EXECUTION

3.01 JOB CONDITIONS

A. Examine and check conditions at the actual job site and determine facilities for delivery, storing and handling of materials and equipment.

B. Drawings show approximate locations of equipment, verify exact locations.

C. Cooperate as necessary with other trades in order that all systems in the work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

3.02 DUCTWORK INSTALLATION

A. Ducts shall be constructed, supported and installed in accordance with the latest low pressure duct standards of SMACNA. Install all turning vanes, access doors, extractors, and accessories as indicated or specified herein.

B. Fabricate and install all ductwork to be air tight in accordance with SMACNA Class B, seal. Evident air leaks in the ductwork shall be sealed.

C. Seal exposed outside ductwork joints water tight with mastic sealant.

D. Install all motor operated dampers per manufacturer's instructions in accordance with control sequence intended.

3.03 INSTALLATION OF EQUIPMENT

A. Locations: Install all equipment in the locations shown on the Drawings, except where specifically otherwise approved on the job by the Owner.

B. All equipment, as called for on the drawings and herein specified, shall be installed in strict accordance with manufacturer's recommendations.

C. Interferences: Avoid interference with structure, and with work of other trades, preserving adequate headroom and clearing all doors and passageways.

D. Inspection: Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

3.04 TESTING, ADJUSTING, AND BALANCING

A. Provide all necessary personnel, equipment, and services and perform all tests necessary to demonstrate the integrity of the completed installation to the approval of the Owner and Architect. The air system shall be tested, adjusted and balanced in accordance with the latest edition of the Associated Air Balance Council (AABC) Procedural Standards, NEBB or equivalent by an independent TAB Contractor. TAB work performed by the HVAC Contractor shall not be accepted.

B. Submit three (3) certified copies of the final report to Architect on applicable AABC reporting forms or equivalent for approval.

1. Air volume at supply, return and exhaust inlets and outlets;
2. Air volume at each fan/air handler unit for supply air, return/exhaust air and fresh air;
3. Static pressure drops at filter assemblies, DX coils, mixing boxes, supply and return/exhaust plenum-ducts;
4. Record fan speed, RPM, motor nameplates and amperage/voltage;
5. Measure and record supply air, return/exhaust air, fresh air and mixed air temperatures. Record entering and leaving temperatures (dry bulb and wet bulb) at all coils and heating apparatus;
6. Report all equipment model #'s and related drawing identification on the TAB report;

C. Upon completion of TAB work, mark equipment settings, including damper control levers, and similar devices to indicate final settings. Plug all holes in insulation, ductwork and housings with acceptable test plugs.

D. Eliminate noise and vibration and assure proper function of all controls, maintenance of temperature, and operation with the approved design.

3.05 CLEANING

A. Ductwork: After the ductwork has been tested and proved tight, thoroughly vacuum and clean all components of the ductwork. Remove all dirt, scale, oil and other foreign substances which may have accumulated during the installation process.

B. Equipment: After the equipment has been started and proved operational, carefully clean all accessible parts of each piece of equipment, thoroughly removing all traces of dirt, oil, grease and other foreign substances.

3.06 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

B. Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until work is accepted by the Owner.

C. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

3.07 INSTRUCTIONS

A. Instruct owner's representative in the operation and maintenance of all mechanical systems.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment installed under this contract. Prepare in bound copies with index tabs. Information must include parts list and wiring diagrams. Submit to Architect for presentation to the Owner.

3.08 CLOSEOUT OPERATIONS

A. Refer to Division 1 for additional project closeout requirements.

B. Closeout Equipment/System Operations: Sequence operations properly so that work of the project will not be damaged or endangered. Coordinate with seasonal requirements.

1. Operate each item of equipment and each system in a test run of appropriate duration with the Owner's operating personnel present to demonstrate sustained, satisfactory performance.
2. Adjust and correct operations as required for proper performance.
3. Clean and lubricate each system, and replace dirty filters, especially worn belts and parts and similar expandable items of the work.

C. Instruction, O&M: Instruct Owner (Owner's personnel) in the proper operation and maintenance of the HVAC systems. Train personnel in the setting and scheduling of programmable thermostats for occupied/unoccupied periods.

D. Service Organization: At time of substantial completion, Contractor shall provide Owner with a listing of qualified service organizations (including addresses and telephone numbers) for each piece of major equipment.

E. Turn-Over of Operations: At time of substantial completion, turn over the prime responsibility for operation of HVAC equipment and systems to the Owner's operating personnel. However, during the guarantee period, provide and operating engineer, who is completely familiar with work, to consult with and continue training the Owner's personnel on an as-needed basis.

END OF SECTION

SECTION 26 00 00 - ELECTRICAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included:* Provide complete electrical service and distribution system with equipment and materials where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Branch circuit wiring, for lighting, receptacles, motors and equipment;
2. Lighting fixtures;
3. Wiring system for equipment and controls provided under other Sections of these Specifications including General Construction, Plumbing and HVAC trades;
4. Power to overhead door operators by others.
5. Hangers, anchor sleeves, chase supports for fixtures, and other electrical materials and equipment;
6. Demolition and deactivation of electrical systems in existing facilities as noted on Drawings.
7. Other items and services required to complete the electrical systems.

B. *Related Work:*

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications;
2. Equipment structural supports, etc.;
3. All line voltage control wiring and starter interlocks, where specified;
4. Final equipment electrical connections.

C. *Work of Other Sections:*

1. Low-voltage (less than 100 volts) controls for General Construction, Plumbing, and HVAC trades.

1.02 GENERAL PROVISIONS

A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.

B. In addition to the electrical plans, see General Plans of the building, as all electrical work appearing on the latter plans will be part of this contract unless especially specified to be done by other contractors, as well as, the said work detailed on the electrical plans.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as required to complete the work of this Section in accordance with the requirements of governmental agencies

having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. *Reference Standard:* The following standards are imposed, as applicable to the work:

ASTM	American Society of Testing and Materials
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
UL	Underwriters Laboratories

1.04 CODES AND PERMITS

A. The Contractor must comply with national, state of Wisconsin and city of Kenosha building and electrical codes and other ordinances in force where the building is located as far as same apply to his work.

1. IBC 2009;
2. IEEC 2009;
3. NEC 2008;
4. Wisconsin Electrical Code SPS sections.

B. He must secure permits from proper offices and pay fees as may be necessary for fulfilling the requirements of these Specifications.

C. One (1) copy of all permits must be furnished to the Owner.

D. Electric Service Fee: Electrical Contractor shall secure and pay all fees for new electrical service from electric utility, including temporary power services.

1.05 COORDINATION

A. Cooperate and coordinate with other trades to assure that all systems in the electrical work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

B. Arrange electrical work in neat, well-organized manner with piping and similar running parallel with primary lines of building construction.

C. Locate operating and control equipment properly to provide easy access, and install entire electrical systems with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF THE MECHANICAL WORK

A. Line Voltage Wiring: The Electrical Contractor shall make all line voltage (100 volts and greater) electrical wiring, final connections and motor wiring for Mechanical equipment.

B. Control Wiring: Low-voltage (less than 100 volts) control wiring in conjunction with Mechanical work shall be by the Mechanical Contractor in strict accordance with the applicable sections of the Electrical Specifications.

C. Motors, Starters, and Disconnects: All motors starter and disconnects shall be provided by the Electrical Contractor, unless provided with the equipment or indicated otherwise.

1. Mechanical Contractors shall furnish list of and location of all Mechanical equipment and requirements for electrical connections, along with wiring diagrams.

1.07 FLOOR, WALL, ROOF AND CEILING OPENINGS

A. The General Contractor will be required to leave openings in new construction ceiling, floors, walls, roof, partitions, etc., as required to install the Electrical work specified or shown on the Drawings. The Electrical Contractor is responsible for correct size and location of openings.

B. Provisions for openings, holes and clearances through new construction walls, floors, ceilings and partitions are to be made in advance of construction of such parts of the building.

C The Electrical Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof locations, and where noted on the Drawings.

1.08 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the Electrical systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

1.09 TRENCHING AND BACKFILLING

A. Comply with pertinent provisions of Division 1.

B. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of the Specifications.

1.10 SUBMITTALS

A. Comply with pertinent provisions of Division 1.

B. *Shop Drawing Submittals*: Submit six (6) copies of shop drawings to the Architect for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Distribution Panelboards;
2. Starters and Disconnects;
3. Light Fixtures;
4. Electrical Devices.

C. *Shop Drawings*:

1. The Electrical Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the electrical work without approved shop drawings that have the Architect/Engineers final approval.
2. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities. Incomplete drawings will be disapproved.
3. This Contractor will be responsible for all figures, quantities and dimensions shown on the shop drawings.

4. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from responsibility of resubmitting equipment that will meet the space requirements.

D. *O & M Manual*: Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect two (2) copies of an operation and maintenance manual compiled in accordance with the provisions of Division 1 of these Specifications. Include the following within the bound O&M manual:

1. Copy of the approved Record Documents for this portion of the Work;
2. Copies of all warranties and guaranties.
3. As-built drawings.

E. *As-built Drawings:* Record installation as-built on a set of blueline prints during construction. Plan shall represent actual locations, materials and circuiting of equipment installed.

1.11 PRODUCT HANDLING

A. Comply with pertinent provisions of Division 1.

1.12 WARRANTY

A. In addition to standard one year warranty on all labor and materials, provide an additional warranty on ballasts for all new fluorescent and HID lighting fixtures as specified.

1.13 HOUSEKEEPING AND CLEAN-UP

A. Periodically as work progresses and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the workroom clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

1.14 TEMPORARY SERVICES

A. This Contractor shall provide temporary lighting and power as required throughout the construction period.

B. Arrange for temporary electrical utility with local electrical utility. Electrical Contractor shall pay all temporary electrical service and usage fees.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide only materials that are new, of the type and quality specified. Where Underwriters' Laboratories, Inc. has established standards for such materials, provide only materials bearing the UL label.

2.02 SERVICE ENTRANCES AND METERING

A. Existing Service: Reuse existing underground 100A, 120/240 volt, 1-phase, 3-wire electric service.

B. Metering: Reuse existing meter cabinet.

C. Service Distribution Panel (Panel 'A'):

1. Provide 100-amp, 1-phase main distribution panel as indicated on plans complete with 100-amp main circuit breaker - 22K AIC, 10K AIC branch circuit breakers, NEMA 1 enclosure, main service ground and solid neutral buss lugs and other components required for a complete installation.

2.03 IDENTIFICATION

A. Junction and pull boxes shall be stenciled utilizing a coded identification system. The following junction and pull boxes shall be identified using a coded system. Coding shall be submitted to Engineer for approval.

1. Light and Power - 120/240V;

B. Label circuit numbers for all accessible line voltage power distribution raceways and junction boxes.

C. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely fastened to the following equipment. Size 1" x 4" with 3/8" high letters unless space available dictates differently.

1. Panelboards.

D. Typewritten Directory: Each panelboard shall be provided with a typewritten directory in a steel frame with plastic cover contained on the inside of panel door. These directories shall indicate load served and rooms served by each protective device in the respective panel.

E. Identify all conductors per NEC:

120/240V - Phase A - Black
- Phase B - Red
- Neutral - White
- Ground - Green

2.04 POWER DISTRIBUTION SYSTEM

A. See plans for panelboard capacity, voltage ratings, and branch circuit breaker units.

B. All panelboards to be of the circuit breaker type with bolt-on circuit breakers. AIC rating as scheduled on drawings.

C. Branch circuit breakers shall be thermal magnetic; quick-make and quick break. Multi-pole breakers to have common trip. Handle ties of any sort not allowed.

D. Panelboards shall be Square "D" type NQOD with bolt-on branch circuit breakers rated for 10,000 AIC.

1. Square 'D' is the only approved manufacturer for this project.

F. Each panel shall be provided with a typewritten directory mounted on inside of panel door and covered with clear plastic. This directory shall indicate the load supplied by each branch circuit breaker in panel. Room numbers shall be actual room numbers.

G. Each panelboard shall be securely attached to the building structure on 3/4" AC plywood backer board with non-metallic painted surface.

H. All panelboards shall be equipped with an equipment grounding bar that is separate from the solid neutral bar.

2.05 WIRING DEVICES

A. *General*:

1. Devices shall be provided at each location shown on the plans or called for in the Specifications.
2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and Seymour, Hubbell or General Electric.
3. Device catalog references herein and on the plans are to be considered as standards of comparison. Comparable devices manufactured by the other manufacturer will be considered as an optional choice.
4. Device finish color to be selected by Architect.

B. *Receptacles*:

1. Duplex Receptacles: Industrial-specification grade, nylon face and base, NEMA 5-15R, 15A, tamperproof, side-wired only, 3-wire grounding type with the third terminal U-shaped and grounded to the conduit system or green wire ground. Use of self-grounding option not permitted.
   a. 15-amp: Leviton 5262;
   b. 20-amp: Leviton 5362;
2. GFCI Receptacle: Industrial-specification grade, NEMA 5-15R or 20R with indicator light and feed through. Provide tamper resistant devices in public areas.
   a. 15-amp: Leviton 7599; tamper resistant: Leviton T7599
   b. 20-amp: Leviton 7899; tamper resistant: Leviton T7899

C. *Switches:*

1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C., industrial-specification grade.
2. 15 amp switches shall not to be used unless specifically shown otherwise for special control.
3. Switches to be back and side wired, silent or quiet type.
4. The following catalog numbers refer to Leviton, Inc.:
   a. single pole – 1221-2;
   b. three way – 1223-2;
   c. four way – 1224-2;
   d. Single pole with pilot light – 1221-PLR;

D. *Plates*:

1. Provide as required for each outlet, single or multiple gang.
2. Provide blank covers on all empty boxes or outlets.
3. Plates shall be 204 stainless steel construction in all finished areas.
4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2" raised with no sharp edges.
5. Provide single gang die-cast weather resistant in-use covers equal to Leviton M5979 on receptacles in damp areas and exterior locations.

2.06 RACEWAY SYSTEM

A. *Steel Conduit*: Galvanized or sheradized steel intermediate or rigid metal conduit, or electrical metallic tubing (EMT) with steel set screw or compression ring type fittings.

1. Provide steel conduits as all exposed in the work areas.
2. Where conduit is installed underground or in the floor slab, provide rigid galvanized steel conduit, or PVC coated steel conduit is acceptable.

B. *Rigid Non-Metallic Conduit*: Schedule 40 PVC with solvent welded fittings.

1. Below grade installation only.
2. Encase in concrete below drives and roadways.

C. *Electrical Non-Metallic Tubing(ENT):*

1. Above grade indoor concealed installation only, for branch circuit wiring after the first metallic junction box from the panelboard.
2. Not allowed for service conduit and panelboard feeders.
3. Provide and install per NEC Article 331 with grounding conductor.

D. *Outlets, Junction Boxes and Switch Boxes*:

1. Provide standard one-piece units, galvanized or sheradized, of shape and size best suited to that particular location, of sufficient size to contain enclosed wires without crowding.
2. Provide deep boxes(2-1/8”) with 1" and larger conduit.
3. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron fixture studs and box hangers where required.
4. For switches and receptacles, provide boxes 4" square by 1-1/2" deep minimum with rings and covers as required.

E. *Low Voltage Cabling Raceways:*

1. Provide 4" square boxes with single device ring and 3/4" raceway stubbed to accessible area at ceiling with insulating bushing.
2. In areas with no ceiling, extend raceway to adjacent accessible ceiling space or to telephone backboard or as directed by Owner.
3. Provide pull string for all low-voltage raceways.

F. *Pull Boxes:*

1. Provide galvanized code-gauge sheet units with screw-on covers, of size and shape required to accommodate wires per NEC wire bending requirements, without crowding access and to suit the location.

G. Provide sleeves and chases where conduits pass through floors and walls.

2.07 CONDUCTORS

A. *Wire and Cable (600 Volt):* Provide 600 V insulated copper wire and cable, NEC standard, of types specified below for different applications, with UL label, and color coded as required by governmental agencies having jurisdiction. Use only copper wires and cables.

1. With conductors No. 4 and larger, provide insulating bushings.
2. Wire and cable shall be THHN or THWN.
3. Branch circuit wiring installed in wiring channels of continuous row-mounted fixtures shall be provided. UL listed type RHH or other approved 90 degree C wires, rated at 600 V.
4. Wire No. 10 and smaller shall be solid or stranded wire; wire larger than No. 10 shall be stranded wire.
5. Wire in conduits subjected to direct sunlight shall be THWN or RHWN.
6. Provide XHHW/CU wiring in underground exterior conduit.
7. Identify feeder neutrals with white tape or white paint.
8. All low-voltage wiring located in accessible areas shall be installed in metallic conduit.
9. Provide separate identified neutral conductor for emergency and exit lighting circuits.

10. All branch circuit conductors shall be connected by means of a screw terminal.

B. *Armored Cable (AC) or Metal-Clad Cable (MC):*

1. Limit AC and MC usage to concealed only locations, branch-circuit wiring after the first junction box from the panelboards; where approved by NEC, state and local electrical inspecting authorities.
2. Not allowed for Panelboard feeders or service conduit.
3. Provide and install per NEC Articles 333 and 334 with grounding conductor.

2.08 MOTOR WIRING

A. See plans for approximate location and sizes of all motors. Verify exact locations at job site with the contractor that is furnishing the motor driven equipment.

B. The Drawing motor schedules indicate that the anticipated horsepower loads and circuit sizes. Verify all these requirements with contractor concerned and install accordingly under this contract.

C. Install disconnect means where required by code for motors out of sight of controller. These shall be fusible safety switches, fusetron box cover unit, or non-fused switch as indicated on plans. All switches shall be horsepower rated.

D. All motors will be furnished and installed by others, unless noted otherwise.

E. Motor starters to be provided and installed by the Electrical Contractor unless indicated otherwise herein or on the plans. See Motor Schedule.

F. All final connections to motors to be made by this Contractor.

G. All motors to be connected using flexible metallic conduits extending from motor box to outlet box. Use liquid tight flexible metallic conduit with PVC covering in wet or oily locations and for all motors within 12" of floor. See paragraph on GROUNDING. All wires in flexible metallic conduit shall be stranded. Grounding wires shall be in all cases installed in flexible conduit and not wrapped around the outside of the conduit.

2.09 SAFETY SWITCHES

A. Provide safety switches of general duty type, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking, fusible or non-fusible as shown on the Drawings.

B. Provide enclosures clearly marked for maximum voltage, current, and horsepower rating, and:

1. Indoor: NEMA type 1.
2. Outdoor: NEMA type 3R, raintight.

C. Approved Manufacturers: Square D, Cutler Hammer or Siemans.

2.10 LIGHTING FIXTURES

A. Provide fixtures of the types shown on the Drawings, and with the following accessories as applicable.

B. *Light Fixtures*:

1. Provide units having a UL label.

2. Provide local label in addition if so required by governmental agencies having jurisdiction.
3. Verify all ceiling types as shown on final architectural plans and be responsible for ordering proper fixtures and accessories for the proper ceiling.

C. *LED Lighting:*

1. The manufacturer of the LED lighting fixture shall utilize high-brightness LEDs and high-efficiency electronic LED drivers, dimmed or no dimmed as required.
2. The LED fixture shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the fixture is to be installed
3. Light output of the LED system shall be the absolute photometry following IESNA LM-79 and IESNA LM-80 requirements and guidelines.
4. Minimum power factor of 0.90.
5. LED lighting fixture shall be mercury-free, lead-free and RoHS compliant.
6. The LED lighting fixture shall maintain 70% lumen output for a minimum of 50,000 hours.
7. All components of the LED lighting fixture shall be replaceable.
8. The LED lighting fixture shall carry a limited 3-year warranty minimum.

D. *Acceptable Lighting Fixture Manufacturers*:

1. Refer to **Fixture Schedule**. Engineer will evaluate and make final decision on whether submitted fixture is equal to specified light fixture.
2. Other fixture manufacturers who consider their products equal to those specified are required to request pre-approval for bidding as base bid in accord with Instructions to Bidders section.

2.11 OCCUPANCY SENSOR CONTROLS

A. Occupancy Sensors shall be equal to Sensor Switch or approved equal. Refer to Occupancy Sensor schedule on the Drawings for specific types required.

1. All sensors shall be capable of operating normally with electronic fluorescent ballasts and LED driver systems and rated motor loads.
2. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
3. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
4. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

B. Passive Infrared Sensors:

1. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
2. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.

C. Ultrasonic Sensors:

1. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
2. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within ± 0.005% tolerance, 32 kHz within ± 0.002% tolerance, or 40 kHz ± 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies

are not acceptable.

D. Dual Technology Sensors:

1. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.
2. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.

2.12 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. *Coordination*:

1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the work schedule.
3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.

B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

C. Where outlets are not specifically located on the Drawings, locate as determined in the field by the Architect. Where outlets are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.

D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.

E. The Electrical Drawings are diagrammatic, but are required to be followed closely as actual construction and work of other trades will permit. Where deviations are required to conform with actual construction and the work of other trades, make such deviations without additional cost to the Owner.

3.03 INSTALLATION OF RACEWAYS AND FITTINGS

A. Where conduit is installed concealed in walls or above ceiling, or exposed in work areas, provide rigid galvanized conduit or electrical metallic tubing with compression type fittings.

1. Seal joints to prevent entrance of water.
2. Provide ground wire of proper size per NEC 250.
3. Use nylon (rather than steel) fish tape.

B. Use flexible conduit only for short motor connections, or where subject to vibration.

C. Provide necessary sleeves and chases where conduits pass through floors and walls and provide other necessary openings and spaces, arranging for proper time to prevent unnecessary cutting in connection with the Work.

D. Where conduit is exposed, run parallel to or at right angle with lines of the building.

E. Securely and rigidly support conduits throughout the work.

3.04 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture Schedule shown on the Drawings.

B. Wire fixtures with fixture wiring of at least 90 degrees C rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.

C. Use only bonderized, galvanized, or sheradized steel for fixture installation for protection against rust and corrosion, and install fluorescent fixtures straight and true with reference to walls.

D. Install all lighting fixtures, including those mounted in continuous rows, so that the weight of the fixture is supported, either directly or indirectly, by a safe and sound structural member of the building, using adequate number and type of fastenings to assure safe installation.

1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable.

3.05 INSTALLATION OF POWER EQUIPMENT

A. Provide power and control wiring for motor starters and safety switches as shown on the Drawings.

3.06 INSTALLATION OF CONDUCTORS

A. Unless otherwise shown on the Drawings or noted in these Specifications, use No. 12 AWG conductors for all branch circuits, protected by 20 amp circuit breakers. For runs exceeding 100 feet, use larger wires to limit voltage drops.

B. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.

1. Make splices electrically and mechanically secure with pressure-type connectors.
2. Provide "Scotchlok", Buchanon "B-cap", or Ideal "Wing-nut" connectors for wires sizes 6 AWG and smaller.
3. Provide Burndy compression-type connectors, "Hydent" or equal applied with a mechanical tool and die equipment for wire sizes 4 AWG and larger.
4. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinyl-plastic electrical tape where insulation is required.

3.07 INSTALLATION OF PANELBOARDS

A. Unless otherwise shown on the Drawings, install panels with the top of the trim 6'-3" above the finished floor.

B. Mount a typewritten directory behind plastic on the inside of each panel door and on the directory, showing the circuit number and complete description of all outlets on each circuit.

C. Provide two (2) spare 1" conduits, stubbed out of the top of each flush-mounted panel and terminated in accessible ceiling space, with each conduit tagged with panel description.

3.08 TESTING AND INSPECTION

A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.

B. Make written notice to the Architect adequately in advance of each of the following stages of construction:

1. Test all parts of the electrical system and prove that all such items provided under this Section function electrically in the required manner.
2. Immediately submit to the Architect a report of maximum and minimum voltages and a copy of the recording volt-meter chart.
3. Also measure voltages between phases and between phase wires and neutrals and report these voltages to the Architect.

3.09 PROJECT COMPLETION

A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.

B. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted under Article 1.3 of this Section of these Specifications.

END OF SECTION

A&A ENVIRONMENTAL SERVICES

P.O. Box 708 • Poynette, WI 53955
Phone: (608) 240-1511 • Email: Office@aaenv.com • Fax: (608) 635-9717

Results

April 27, 2017

Paul Stauffer
City of Madison
210 Martin Luther King Jr. Blvd
Madison, WI 53703-3342
(608) 266-4366, Cell (608) 575-5270
PStauffer@cityofmadison.com

RE: 1902 Freeport Road, Madison, WI 53703

On April 20, 2017 bulk samples were collected from suspect asbestos building materials on the cold and warm storage buildings at the City of Madison Parks Facility located at 1902 Freeport Road in Madison, WI. The samples were limited to the areas requiring maintenance in the near future.

Cold Storage building materials sampled are as follows:

- Exterior textured paint – Samples 1 and 2
- Roofing materials
  - Bottom layer of roofing felt under hard board – Sample 7
  - Wood fiber hard board – Sample 8
  - Bottom layer of roofing felt on top of hard board – Sample 9
  - Middle layer of roofing felt on top of hard board – Sample 10
  - Top layer of roofing felt on top of hard board – Sample 11
  - Tar over roofing felts – Sample 12
  - Tar holding roofing felts to the hard board – Sample 13

Warm Storage building materials sampled are as follows:

- Topcoat stucco – Samples 3 and 5
- Basecoat stucco – Samples 4 and 6

All bulk samples were analyzed for asbestos content by polarized light microscopy (PLM) and were reported as no asbestos detected.

The warm storage building roof has gray tar flashing around the three roof penetrations and caulk strips on the seams of the metal roof. Both materials appear to be in good condition however must be assumed to contain asbestos. If these materials are left undisturbed the assumed asbestos materials could be left in place and covered with a new roof.

A&A Environmental Inc.'s inspectors are only able to inspect open, safe, and accessible areas inside and outside of the building. Inaccessible suspect material may be hidden throughout this building. Any additional suspect materials discovered during the course of abatement/demolition/remodeling must be assumed to be ACM until sampled by and EPA/State of Wisconsin certified asbestos inspector and proven negative.

If you have any questions concerning this report or the sampling performed please feel free to contact me.

Sincerely,

Kim Sopha
Project Manager/Inspector #AII01851

Encl

KAS/bls

CEI LABS

April 25, 2017

A & A Environmental Services
PO Box 708
Poynette, WI 53955

CLIENT PROJECT: 1902 Freeport Rd; 146
CEI LAB CODE: B17-0606

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on April 21, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

Tianbao Bai, Ph.D., CIH
Laboratory Director

NVLAP®
TESTING
NVLAP LAB CODE 101768-0

ASBESTOS ANALYTICAL REPORT
By: Polarized Light Microscopy

Prepared for

A & A Environmental Services

CLIENT PROJECT: 1902 Freeport Rd; 146

CEI LAB CODE: B17-0606

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 04/25/17

TOTAL SAMPLES ANALYZED: 13

SAMPLES >1% ASBESTOS:

TOTAL LAYERS ANALYZED: 13

TEL: 866-481-1412

www.ceilabs.com

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: 1902 Freeport Rd; 146

CEI LAB CODE: B17-0606

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
01		B238092	Brown	Paint	None Detected
02		B238093	Brown	Paint	None Detected
03		B238094	White	Stucco Top Coat	None Detected
04		B238095	Gray	Stucco Base Coat	None Detected
05		B238096	White	Stucco Top Coat	None Detected
06		B238097	Gray	Stucco Base Coat	None Detected
07		B238098	Black	Roofing	None Detected
08		B238099	Brown	Fiberboard	None Detected
09		B238100	Black	Roofing Felt	None Detected
10		B238101	Black	Roofing Felt	None Detected
11		B238102	Black	Roofing Felt	None Detected
12		B238103	Black	Tar	None Detected
13		B238104	Black	Tar	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: A & A Environmental Services
PO Box 708
Poynette, WI 53955

CEI Lab Code: B17-0606
Date Received: 04-21-17
Date Analyzed: 04-24-17
Date Reported: 04-25-17

Project: 1902 Freeport Rd; 146

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
01 B238092	Paint	Homogeneous Brown Non-fibrous Bound			90% 10%	Paint Silicates	None Detected
02 B238093	Paint	Homogeneous Brown Non-fibrous Bound			90% 10%	Paint Silicates	None Detected
03 B238094	Stucco Top Coat	Homogeneous White Non-fibrous Bound			40% 50% 10%	Binder Silicates Paint	None Detected
04 B238095	Stucco Base Coat	Homogeneous Gray Fibrous Bound	10%	Fiberglass	40% 50%	Binder Silicates	None Detected
05 B238096	Stucco Top Coat	Homogeneous White Non-fibrous Bound			40% 50% 10%	Binder Silicates Paint	None Detected
06 B238097	Stucco Base Coat	Homogeneous Gray Fibrous Bound	10%	Fiberglass	40% 50%	Binder Silicates	None Detected
07 B238098	Roofing	Homogeneous Black Fibrous Bound	70%	Cellulose	30%	Tar	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: A & A Environmental Services
PO Box 708
Poynette, WI 53955

CEI Lab Code: B17-0606
Date Received: 04-21-17
Date Analyzed: 04-24-17
Date Reported: 04-25-17

Project: 1902 Freeport Rd; 146

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
08 B238099	Fiberboard	Homogeneous Brown Fibrous Loosely Bound	100%	Cellulose			None Detected
09 B238100	Roofing Felt	Homogeneous Black Fibrous Bound	60%	Fiberglass	40%	Tar	None Detected
10 B238101	Roofing Felt	Homogeneous Black Fibrous Bound	60%	Fiberglass	40%	Tar	None Detected
11 B238102	Roofing Felt	Homogeneous Black Fibrous Bound	60%	Fiberglass	40%	Tar	None Detected
12 B238103	Tar	Homogeneous Black Fibrous Bound	10%	Cellulose	90%	Tar	None Detected
13 B238104	Tar	Homogeneous Black Fibrous Bound	10%	Cellulose	90%	Tar	None Detected

CEI LABS

LEGEND:	Non-Anth	= Non-Asbestiform Anthophyllite
	Non-Trem	= Non-Asbestiform Tremolite
	Calc Carb	= Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

ANALYST: Megan Fisher

APPROVED BY: Tianbao Bai, Ph.D., CIH
Laboratory Director

NVLAP® TESTING
NVLAP LAB CODE 101768-0

END OF PROJECT MANUAL
SUMMIT MAINTENANCE FACILITY- BUILDING IMPORVEMENTS
CONTRACT # 8152