

# PROJECT MANUAL

## 50 Monroe Street Elevator Modernization

50 Monroe Street, Rockville, MD 20850



PREPARED FOR:  
City of Rockville

Delta Project No. 2019.331.003

February 16, 2022  
100% Submission

PREPARED BY:



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## SECTION 011000 - SUMMARY

### PART 1 - GENERAL

#### 1.1 PROJECT IDENTIFICATION

- A. Project Name and Location: 50 Monroe Street Elevator Modernization, 50 Monroe St, Rockville, MD 20852
- B. Project Summary Description: The project includes two distinct and related scopes of work, as follows.
1. SCOPE OF WORK 1: Scope of work 1 includes all work associated with the installation of a new temporary ramp system to provide accessibility access from the plaza level that connects to the Rockville Metro Station to the street level at Monroe Street. The work includes the ramp system, ramp ballast, and ramp lighting. Reference the Division 1 specifications, specifications 055129 "Prefabricated aluminum ramps", the electrical specifications associated with the lighting at the ramp, and drawings A-101, A-201, A-301, A-401, A501 and E-102 for information regarding Scope of Work 1.  
  
At the discretion of the City of Rockville, the work associated with scope of work 1 may be contracted first, separately from the contract for Scope of Work 2.
  2. SCOPE OF WORK 2: Scope of work 2 includes all work associated with the repair and modernization of the existing elevator, including renovations in the elevator machine room and electrical room and improvements to the existing elevator enclosure. Reference the Division 1 specifications, specifications 096516 "Resilient Sheet Flooring", specification 142423 "Hydraulic Passenger Elevators" the electrical and mechanical specifications, and drawings A-101, A-201, E-001, E-002, E-101, and M-001 for information regarding Scope of Work 2.  
  
At the discretion of the City of Rockville, the work associated with scope of work 2 may be contracted separately and after the contract for scope of work 1
- C. Architect: The term Architect refers to the project designer. The Architect's status relative to the construction will be delineated in writing by the Contracting Officer prior to the pre-construction conference. The project was designed by: Delta Engineers, Architects, and Land Surveyors, 8401 Connecticut Ave., Suite 350, Chevy Chase, MD, 20854, 301-718-0800; David Asofsky. All correspondence from the Contractor to the Architect will be through the Contracting Officer.
- D. The Project Officer for the project is Mr. Noel Gonzales of the City of Rockville.

#### 1.2 WORK SEQUENCE

- A. The Work shall be conducted in phases, in the following order, with an earlier phase substantially complete before the beginning of the next phase.
- B. The work shall be substantially complete, ready for occupancy, within 150 calendar days after notice to proceed.

### 1.3 WORK UNDER OTHER CONTRACTS

- A. The Contractor shall cooperate with other contractors performing related work, including providing labor, materials and other costs necessary to satisfactorily coordinate the Contract work with work performed under other contracts.

### 1.4 MISCELLANEOUS PROVISIONS

- A. Work in the extension of existing conditions shall correspond in all respects with the existing conditions to which it connects, or to similar existing conditions, in materials, workmanship and finish.
- B. Alterations to Existing Conditions: Existing conditions shall be cut, drilled, removed, temporarily removed, or removed and replaced, as necessary for performance of work under the contract.
  - 1. Replacements of existing conditions that are removed shall match similar existing conditions.
  - 2. Unless otherwise indicated, existing structural members shall not be cut or altered without authorization by the Project Officer.
  - 3. Conditions remaining in place, which are damaged or defaced during the work, shall be restored to the condition existing at time of award of contract.
  - 4. Discolored or unfinished surfaces exposed by removal of existing conditions, that are indicated to be final exposed surfaces, shall be refinished or replaced as necessary to produce uniform and harmonious contiguous surfaces.
- C. Existing structures will remain in place
- D. Existing structures have been or will be removed, at no expense to the Contractor, to top of foundation walls or ground level, unless otherwise indicated.
- E. Existing structures shall be removed to top of foundation walls or ground level, unless otherwise indicated.
- F. Existing utility services with related meters and equipment will remain in place.
- G. Existing utility services with related meters and equipment have been removed at no expense to the Contractor.
- H. Existing utility services shall be disconnected and removed to the extent indicated.
- I. Outside Utility Connections: Underground and overhead utility services shall be provided complete to all points of connection indicated, and any "Limit of Contract" lines or other general limits indicated shall not apply to utility services and connections outside of these lines or limits.

### SPECIFICATION FORMATS AND CONVENTIONS

- J. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "Master Format" numbering system.
  - 1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the specifications are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the



beginning of the specifications to determine numbers and names of sections included in the Contract Documents.

- K. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
  2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
    - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 011000



## SECTION 011400 - WORK RESTRICTIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This Section documents conditions and procedures on the City of Rockville park that may impact the performance of work by the contractor including the following:

1. Contractor use of premises
2. City of Rockville occupancy of adjacent spaces
3. City of Rockville occupancy prior to substantial completion
4. Working hours
- 5.

- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to work restriction documentation including but not limited to the following Division 1 specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Project Management and Coordination"
3. Division 1 Section "Construction Progress Documentation"
4. Division 1 Section "Submittal Requirements"
5. Division 1 Section "Quality Requirements"
6. Division 1 Section "Construction Quality Control"
7. Division 1 Section "Temporary Facilities and Controls"
8. Division 1 Section "Safety and Health"
9. Division 1 Section "Execution Requirements"
10. Division 1 Section "Cutting and Patching"
11. Division 1 Section "Selective Demolition"
- 12.
13. Division 1 Section "Closeout Procedures"
14. Division 1 Section "Project Record Documents"

#### 1.3 CONTRACTOR USE OF PREMISES

- A. The Project Officer will conduct a pre-construction survey with the Contractor to review and document the existing conditions surrounding the project premises prior to the beginning of any construction activity.
- B. During the construction period, the Contractor shall have full use of the premises for construction operations, including full use of the site as defined in the contract documents, limited only by the right of CITY OF ROCKVILLE to perform work or retain other contractors to perform work on portions of the project

- C. The Contractor shall limit use of the site and premises to the work in areas indicated in the contract documents, to allow for City of Rockville occupancy and public use.
- D. The Contractor shall schedule his work so as to cause the least amount of interference with City of Rockville campus operations. All work schedules shall be approved by the Project Officer.
- E. Permission to interrupt any building services and/or utility services shall be requested in writing a minimum of fifteen (15) working days prior to the desired date of interruption. City of Rockville reserves the right to refuse any request and to schedule such interruption on a later or earlier date and time which is mutually agreeable to City of Rockville and the Contractor.
- F. The Contractor, his employees and all subcontractors shall become familiar with and comply with all City of Rockville regulations, including fire, traffic, safety, and security regulations.
- G. All personnel employed by the Contractor or subcontractors and working on the City of Rockville campus shall keep within the limits of the work and avenues of ingress and egress. Entry to any restricted area is strictly forbidden unless they are required to do so and are cleared for such entry in writing by the Project Officer.
- H. The Contractor's equipment shall be conspicuously marked for identification purposes.
- I. Confine operations at the site to areas indicated. Do not disturb portions of the site beyond the areas in which work is indicated.
- J. Keep driveways and entrances serving the premises clear and available at all times to City of Rockville employees and visitors. Do not use these areas for parking or storage of materials.
- K. Lock automotive type vehicles, such as trucks or other mechanized or motorized construction equipment, when parked and unattended so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.
- L. Schedule deliveries to minimize space and time requirements for storage of material and equipment on site.
- M. Maintain existing building in a safe and weather tight condition throughout the construction period. Provide temporary heating and cooling as required to keep indoor temperatures between 65 degrees F and 80 degrees F. A heating and cooling plan shall be submitted to the Project Officer within 14 calendar days of the Notice to Proceed for approval.
- N. Repair damage caused by construction operations. Take precautions to protect the building, its occupants and the public during the construction period.
- O. Keep public areas, such as hallways, stairs, lobbies and toilet rooms, free from accumulation of waste material, rubbish, construction debris, and construction materials and remove such daily.
- P. For all work in Building 10/ACRF, all demolition and construction debris shall be taken to the construction dumpster at the B2 level East loading dock only.
- Q. The Contractor will not be allowed any storage area, other than within the limits of construction. Coordinate the storage of materials to maintain safe passage and emergency egress through the site at all times. If additional storage is necessary, obtain and pay for such storage off site. Payment for stored materials will not be permitted.
- R. Existing materials and equipment that are removed as part of the construction operations, and that are not reused or designated to be salvaged as City of Rockville or other's property, shall

be removed from the site. Storage or sale of excess salvageable materials and equipment is not permitted on site.

#### 1.4 CITY OF ROCKVILLE OCCUPANCY OF ADJACENT PREMISES

- A. City of Rockville will occupy the site and the existing building areas immediately adjacent to the construction site during the entire period of construction, unless otherwise specified.
  - 1. Cooperate with City of Rockville representatives during construction operations to minimize conflicts and facilitate City of Rockville usage. Perform the work in a manner that does not interfere with City of Rockville operations. Delays may be incurred. If the Project Officer determines that the safety and health of building occupants is in jeopardy, the Contractor must modify his construction plan and procedures to avoid the potential hazard before continuing with construction.
  - 2. Some areas within the limits of the contract may be occupied during performance of work under this Contract. In addition, City of Rockville reserves the right to complete the work not specifically in this contract, but within the physical limits of the contract, by City of Rockville or City of Rockville contract personnel.

#### 1.5 CITY OF ROCKVILLE OCCUPANCY PRIOR TO SUBSTANTIAL COMPLETION

- A. City of Rockville reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the work. City of Rockville installation of equipment and partial occupancy shall not constitute acceptance of the total work.
  - 1. Prior to partial City of Rockville occupancy, mechanical and electrical systems for the space shall be fully operational, and required inspections and tests shall be successfully completed. Upon occupancy, City of Rockville will operate and maintain mechanical and electrical systems serving the occupied portions of the building.
  - 2. Upon occupancy, City of Rockville will assume responsibility for maintenance and custodial service for the occupied portions of the building.
  - 3. The warranty period for the occupied portion of the building only will commence on the date of occupancy by City of Rockville.

#### 1.6 WORKING HOURS

- A. Contractor's General Working Hours: The normal work day is between the hours of 6:30am to 4:30pm Monday through Friday, except for the holidays and other times as listed in Section H of the Contract.
- B. Work shall not be performed during other than General Working Hours except when such timeliness of performance is required to safeguard life or property. Other deviations may be authorized by the Project Officer.
- C. Requests for deviations from General Working Hours, including work on holidays, shall be submitted in writing to the Project Officer not less than fifteen (15) calendar days in advance of the proposed work period. Once approved, the schedule must be delivered to the City of Rockville prior to the start of work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011400

## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS.

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative provisions for managing and coordinating construction operations including, but not limited to, the following:

1. General project coordination.
2. Utility service interruptions.
3. Coordination drawings.
4. Conservation.
5. Administrative and supervisory personnel.
6. Conferences and meetings.
7. Cleaning and protection.

- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to project management and coordination. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Work Restrictions"
3. Division 1 Section "Construction Progress Documentation"
4. Division 1 Section "Submittal Procedures"
5. Division 1 Section "Quality Requirements"
6. Division 1 Section "Construction Quality Control"
7. Division 1 Section "Temporary Facilities and Controls"
8. Division 1 Section "Safety and Health"
9. Division 1 Section "Product Requirements"
10. Division 1 Section "Execution Requirements"
11. Division 1 Section "Cutting and Patching"
12. Division 1 Section "Selective Demolition"
13. Division 1 Section "Closeout Procedures"
14. Division 1 Section "Project Record Documents"
15. Division 1 Section "Operation and Maintenance Documentation"
16. Division 1 Section "Demonstration and Training"

#### 1.3 GENERAL PROJECT COORDINATION

- A. Coordination of Trades: Coordinate construction operations included in the various sections of the Specifications to provide an efficient and orderly installation of each part of the Work. Coordinate construction operations included under different sections of the Specifications that depend on each other for proper installation, connection or operation.

1. Schedule construction operations in the sequence required to obtain the best results where the installation of one part of the work depends on installation of other components before or after that part.
  2. Coordinate installation of different components to provide maximum accessibility for required maintenance, service, removal/installation of component parts, testing and repair.
  3. Accommodate items scheduled for later installation.
  4. Provide for coordinated incorporation of Contractor's accepted Value Engineering proposals and Change Orders.
  5. Locate pipes, conduits, ducts, equipment, and their related supports so that they do not interfere with the intended use of lifting devices for adjacent equipment and components.
- B. Notification: Where required by this section and others, prepare and distribute memoranda to each party performing work at the project site, outlining special procedures required for coordination, including required notices, reports, attendance at meetings and meeting minutes as part of the memoranda.
- C. Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other construction activities to avoid conflicts and promote orderly progress of the work. Administrative procedures include but are not limited to the following:
1. Preparation of schedules.
  2. Installation and removal of temporary facilities and controls.
  3. Delivery and processing of submittals.
  4. Progress meetings.
  5. Preinstallation conferences
  6. Project closeout activities.

#### 1.4 COORDINATION DRAWINGS

- A. Prepare coordination drawings when specified, where careful coordination is needed for installation of products and materials fabricated by separate entities, or where limited space availability necessitates maximum utilization of the space for efficient installation of different components.
1. Show the relationship of components shown on separate shop drawings.
  2. Indicate required installation sequences.
  3. Provide vertical and horizontal dimensions necessary to locate each component and avoid conflicts within the space.
  4. Comply with shop drawing requirements for sheet size and submittal methods specified in Division 1 Section "Submittal Procedures."
  5. Refer to Division 2-16 technical specification sections for specific Coordination Drawing requirements.
- B. Refer to Division 15 Section "Basic Mechanical Requirements" and Division 16 Section "Basic Electrical Requirements" and coordinate coordination drawing requirements for specific mechanical and electrical installations.
- C. Provide coordination drawings for equipment and system installations in mechanical and electrical rooms and spaces where two or more entities will provide the work and separate shop drawings are insufficient to show coordination.



1.5 CONSERVATION

- A. Consider conservation of energy, water and materials in the conduct of construction operation. Salvage materials and equipment involved in the performance of, but not incorporated into, the work.
- B. Energy Conservation Plan:
  - 1. Develop a program to minimize use of energy. Program shall minimally include the following written information (Energy Conservation Plan):
    - a. Designation of an energy conservation officer as a part time position.
    - b. Identification of energy conservation measures to reduce energy usage.
    - c. Establishment of energy usage goals for the project.
    - d. Means for enforcing energy conservation measures.
  - 2. Contractor's energy conservation officer shall provide on-site instruction of workers in the methods to conserve energy, and shall manage the energy conservation program for the duration of the Contract.
    - a. Contractor shall initiate the plan by issuing notices to the parties of the project, installation of meters or other instruments to record usage where required, and other measures to encourage energy conservation.
    - b. The energy conservation officer shall report monthly, in writing, the measures taken to effect energy conservation, records or estimates of usage and savings, and other points of interest. Copies of each report shall be distributed to each significant party of the project, including the Contracting Officer.
    - c. Post copies of the plan in conspicuous locations so that all personnel employed on the Project may be made aware of the need to conserve energy at all times.
- C. Recycled Waste Management Plan:
  - 1. Establish and document a program to maximize recycling of waste materials. Program shall minimally include the following written information:
    - a. Designation of a waste management coordinator. Based on the workload required this may be a part-time function.
    - b. Identification of recyclable materials.
    - c. Identification of available local recycling firms and agencies to receive recyclable materials.
    - d. Establishment of quantity goals for collection of each recyclable material.
    - e. Designation of one or more locations on the project site for collection, sorting and temporary storage of recyclable materials.
    - f. Means and schedule for transporting and delivery of recyclable materials to recycling firms and agencies.
  - 2. Contractor's waste management coordinator shall provide on-site instruction of workers in the identification, separation and handling of recyclable materials, and shall manage the process for the duration of the Contract.
    - a. Contractor shall lay out and define specific areas to facilitate separation of materials for recycling, and shall maintain collection bins clearly marked to avoid contamination of the recyclable materials.
    - b. The waste management coordinator shall report monthly, in writing, the quantity of each recyclable material collected during the previous month and cumulatively to

date, compared to the quantity goal, and other points of interest. Copies of each report shall be distributed to each significant party of the project, including the Contracting Officer.

#### 1.6 SUBMITTALS

- A. Staff Names: Within 14 calendar days of the start of site operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
  - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.
  - 2. Provide updated lists when individuals assigned to positions change or positions are added to the contractor's staff team.
- B. Meeting minutes: The contractor shall provide meeting minutes from the following meeting as required by this section. Additional meeting minutes requirements may be located in other sections.
  - 1. Preconstruction Conference.
  - 2. Preinstallation Conferences.
  - 3. Progress meetings.
  - 4. Coordination Meetings

#### 1.7 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. In addition to the Project Superintendent, the Contractor shall provide other administrative and supervisory personnel as required for proper performance of the work.
- B. Project Coordinator: Provide a full-time project coordinator, experienced in the administration and supervision of building construction, including mechanical and electrical work. The project coordinator shall be authorized to act as the coordinator of construction activities, including but not limited to the following:
  - 1. Scheduling and sequencing of work.
  - 2. Sharing access to work spaces.
  - 3. Installations.
  - 4. Protection of work.
  - 5. Cutting and patching.
  - 6. Selections for compatibility.
  - 7. Preparation of coordination of drawings.
  - 8. Inspection and tests.
  - 9. Temporary services and facilities.
  - 10. Conduct Project Coordination Meetings
  - 11. Commissioning
- C. Mechanical and Electrical Coordinator: Provide a full-time mechanical and electrical coordinator, experienced in the coordination of mechanical and electrical construction of the types required for the project, and experienced in coordination of mechanical and electrical construction with other operations. The mechanical and electrical coordinator shall be licensed to practice as a professional engineer in the location of the project, and shall be authorized to

act as the coordinator for mechanical and electrical activities, including but not limited to the following:

1. Scheduling and sequencing of mechanical and electrical activities.
  2. Sharing access to mechanical and electrical work spaces.
  3. Integration of mechanical and electrical work into limited spaces available for mechanical and electrical installations.
  4. Protection of mechanical and electrical work.
  5. Cutting and patching for mechanical and electrical work.
  6. Tolerances for mechanical and electrical work.
  7. Preparation of mechanical and electrical coordination drawings.
  8. Mechanical and electrical inspections and tests.
  9. Utilization of mechanical and electrical temporary services and facilities.
- D. Safety and Health Officer: Provide a safety and health officer whose duties shall consist of developing and implementing safety and health programs specified in Division 1 Section "Safety and Health."
- E. Energy Conservation Officer: Provide an energy conservation officer whose duties shall consist of developing and implementing a program for minimizing use of energy on the site.
- F. Waste Management Coordinator: Provide a waste management coordinator whose duties shall consist of developing and implementing a program for maximizing recycling of waste.
- G. Integrated Pest Management Quality Control Supervisor: Provide an Integrated Pest Management Quality Control Supervisor with duties as indicated in Division 1 Section "Temporary Facilities and Controls."
- H. Traffic Safety Supervisor: Provide a Traffic Safety Supervisor with duties as indicated in Division 1 Section "Temporary Traffic Controls."

## 1.8 CONFERENCES AND MEETINGS

- A. Preconstruction Conference:
1. The Contractor shall attend a preconstruction conference scheduled by the Project Officer at a time and place convenient to both parties. Work shall not commence prior to the conference. Conference shall review responsibilities and personnel assignments.
  2. Attendees: Participants at the conference shall be familiar with the project, shall be authorized to conclude matters relating to the Work, and at a minimum include representatives of the following parties or their designated representatives:
    - a. Contracting Officer.
    - b. Architect.
  3. Agenda: Subjects for discussion shall include items of significance that could effect progress, including but not limited to the following:
    - a. Tentative construction schedule.
    - b. Critical work sequencing.
    - c. Designation of responsible personnel.
    - d. Procedures for processing field decisions and Change Orders.
    - e. Procedures for processing Applications for Payment.
    - f. Submittal of Shop Drawings, Product Data, and Samples.



1. Attendees: In addition to the Contractor and Project Officer, each subcontractor, supplier or other entity involved in coordination or planning construction activities shall be represented. All participants shall be authorized to conclude matters relating to the work.
2. Agenda: Review the plans and requirements of each entity present, including but not limited to the subjects listed for Progress Meetings.
3. Reporting: No later than 3 calendar days after each meeting, the Contractor shall distribute minutes of the meeting to each party present and to other concerned parties who should have been present, and including the Contracting Officer. Include a brief summary, in narrative form, of progress since the previous meeting and report.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Prior to installations, require the installer of each major component to inspect both the substrate and conditions under which work is to be performed.
  1. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
  2. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
- B. Construction in Progress: Keep construction in progress, adjoining materials in place, and adjoining materials clean during handling and installation. Apply protective coverings where required for protection from damage or deterioration.
- C. Completed Construction: Clean completed construction, and provide maintenance, as frequently as necessary to prevent damage or soiling or other deterioration through the remainder of the construction period. Adjust and lubricate operable components as necessary to assure operability without damage.

END OF SECTION 013100



## SECTION 013300 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes certain administrative and procedural requirements for shop drawings, coordination drawings, fire protection working plans, schedules, samples and certain other quality assurance submittals.
- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to submittals. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Project Management and Coordination"
3. Division 1 Section "Quality Requirements"
4. Division 1 Section "References"
5. Division 1 Section "Construction Quality Control"
6. Division 1 Section "Temporary Facilities and Controls"
7. Division 1 Section "Temporary Traffic Controls"
8. Division 1 Section "Safety and Health"
9. Division 1 Section "Product Requirements"
10. Division 1 Section "Execution Requirements"
11. Division 1 Section "Cutting and Patching"
12. Division 1 Section "Selective Demolition"
13. Division 1 Section "Closeout Procedures"
14. Division 1 Section "Project Record Documents"
15. Division 1 Section "Operation and Maintenance Documentation"
16. Division 1 Section "Demonstration and Training"

#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that is specified in the contract documents as requiring City of Rockville approval or other City of Rockville action.
- B. Informational Submittals: Written and graphic information that is not specifically indicated as requiring City of Rockville approval or other City of Rockville action but is indicated as a submittal in the specifications. Informational submittals may be rejected by City of Rockville for not complying with requirements.
- C. Shop drawings: Drawings and schedules specifically prepared for the project, except for coordination drawings.

- D. Coordination drawings: See Division 1 Section "Project Management and Coordination" For definition and contract requirements.
- E. Product data: Manufacturer's standard catalogs, pamphlets and other printed materials, and includes but is not limited to the following:
  - 1. Product specifications
  - 2. Installation instructions
  - 3. Color charts
  - 4. Catalog cuts
  - 5. Rough-in diagrams and templates
  - 6. Wiring diagrams
  - 7. Performance curves
  - 8. Operational range diagrams
  - 9. Mill reports
- F. Samples: Product samples of such scale to allow delivery for review, as well as field samples or mock-ups of full-size physical examples erected on-site or elsewhere, or establish a true-scale standard by which the corresponding work will be judged or a standard for compliance testing.
- G. Other quality assurance submittals include materials specifically prepared for the project, except drawings and schedules, and include but are not limited to the following:
  - 1. Design data and calculations
  - 2. Certifications of compliance or conformance
  - 3. Manufacturer's instructions and field reports

#### 1.4 GENERAL SUBMITTAL REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities and with the Submittal Schedule specified in Division 1 Section "Construction Progress Documentation."
- B. All submittals will be certified by the Contractor as conforming to the requirements of the contract documents prior to being forwarded to the Contracting Officer.
  - 1. Submittals identified with a "G" adjacent to the requirement on the submittal register are action submittals and require City of Rockville approval prior to the product or item submitted being incorporated into the project.
  - 2. Submittal requirements without the action designation are informational submittals and should be submitted for information prior to the product or item submitted being incorporated into the work.
- C. All submittals shall be transmitted to the Contracting Officer within 30 calendar days after receipt of Notice to Proceed, unless the approved Submittal Schedule specifically provides for an earlier or later submission. Transmit each submittal sufficiently in advance of the scheduled performance of related construction activities to avoid delaying the work, allowing for the review times specified in this section.
- D. Coordinate each submittal with other submittals and related activities that require sequential scheduling, to allow for testing, purchase, fabrication and product delivery in a timely manner.



- E. Schedule transmittal of different categories of submittals for the same Definable Feature of Work (DFOW) and for different elements of related parts of the work at the same time so as to minimize delay because of the need to review submittals concurrently for coordination. See Division 1 Section "Construction Quality Control" for definition of DFOW
1. City of Rockville reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- F. Allow sufficient time for submittal review, corrections following the initial review and resubmittal review before activities scheduled after the submittal approval.
1. Preliminary submittal review: Allow 14 calendar days from receipt by City of Rockville the submittal for preliminary review
  2. Any resubmission required after City of Rockville review shall be made within 14 calendar days after return of the submittal, unless specifically authorized otherwise by the Project Officer.
  3. Resubmittal review: Allow 14 calendar days from receipt by City of Rockville of the submittals for the initial review. If consultants are included in the review process add an additional 14 for review.
  4. Special Review Timelines:
    - a. Provide not less than 30 calendar days for review of each fire protection submittal and resubmittal.
- G. Construction will generally not be allowed to proceed without approved submittals. The Contracting Officer may, as requested in writing on a case-by-case basis, allow construction to proceed with submittal approval pending. Failure by the Contractor to provide the required submittals in a timely manner will not result in an extension to the Contractor's Construction Schedule.
- H. Failure by the Contractor to provide the required submittals in a timely manner may result in progress payment requests being returned to the Contractor until submittals are up-to-date.
- I. Submittal Preparation: Identify and prepare drawings and samples as specified in the Construction Contract Clauses and other specification sections. Provide a permanent label on each submittal with the following information:
1. Project name, contract number and work request number.
  2. Date of submission
  3. Name, address and telephone number of firm or entity that prepared the submittal.
  4. Name, address and telephone number of the Contractor.
  5. Name, address and telephone number of the subcontractor, supplier or manufacturer.
  6. Number and title of appropriate specification section.
  7. Drawing number and detail references, as appropriate.
  8. Space to record Contractor's review and approval markings approximately **5 by 5 inches (250 by 250 mm)**.
  9. A blank page with a listing of all pages in the submittal shall be attached to the front of the submittal package with at least a 4" by 6" space for the City of Rockville.
- J. Submittal Transmittal: Package each submittal for transmission and handling. Transmit each submittal from the Contractor to the Contracting Officer by use of a transmittal form. The following minimum information shall be included on the transmittal form.
1. Project name and number.
  2. Date

3. Destination (To:)
  4. Source (From:)
  5. Names of subcontractor, manufacturer and supplier, as applicable.
  6. Category of submittal
  7. Description of submittal
  8. Number and title of appropriate specification section.
  9. Submittal number, including means to separately identify initial submittal and each resubmittal.
  10. Certification by Contractor stating that submittal complies with the Contract Documents, or statement of deviations from the requirements of the Contract Documents including minor variations and limitations. Deviations may be listed on an attached sheet referenced on the transmittal form.
  11. Signature of transmitter.
- K. Direct Transmittal to Consultant: When allowed by the Project Officer, submittals may be transmitted directly to design Engineer's consultants, provide duplicate copy of transmittal to A&E's and Project Officer. The consultant will return submittal to the Engineer for return to the Contractor.
- L. Certifications: Submit notarized certifications from the party certifying compliance of the submittal with specified requirements. Certifications shall be signed by an officer or other individual authorized to sign documents on behalf of the company certifying compliance. Certifications shall be as described in Division 1 Section "Construction Quality Control."
- M. Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."
- N. Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."
- O. Submittal Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

## PART 2 - PRODUCTS

### 2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable to the project.
  3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.

- f. Wiring diagrams showing factory-installed wiring.
  - g. Printed performance curves.
  - h. Operational range diagrams.
  - i. Mill reports.
  - j. Standard product operating and maintenance manuals.
  - k. Compliance with recognized trade association standards.
  - l. Compliance with recognized testing agency standards.
  - m. Application of testing agency labels and seals.
  - n. Notation of coordination requirements.
  - o. Notation of dimensions verified for fit by field measurements.
4. Number of Copies: Submit four copies of each submittal, unless otherwise indicated. City of Rockville will return two copies. Mark up and retain one returned copy as a Project Record Document.
  5. Number of Copies: Submit copies of each submittal, as follows, unless otherwise indicated:
    - a. Preliminary Submittal: Submit a single copy of each submittal where selection of options, color, pattern, texture, or similar characteristics is required. City of Rockville will return submittal with options selected.
    - b. Initial Submittal: Submit five copies, unless copies are required for operation and maintenance manuals. Submit five copies where copies are required for operation and maintenance manuals. City of Rockville will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare and submit originally prepared information, drawn accurately to scale. Do not reproduce Contract Documents or copy standard printed materials as the basis for Shop Drawings and Coordination Drawings.
1. Preparation: Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products and materials.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shopwork manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Design calculations.
    - j. Compliance with specified standards.
    - k. Notation of coordination requirements.
    - l. Notation of dimensions established by any field measurement.
    - m. Highlighted or encircled deviations from the Contract Documents, if any.
  2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (750 by 1000 mm).
  4. Number of Copies: Submit one correctable, translucent, reproducible print and one blue- or black-line print of each submittal. Architect, through Construction Manager, will return the reproducible print.
  5. Number of Copies: Submit three blue- or black-line prints of each submittal, unless prints are required for operation and maintenance manuals. Submit five prints where prints are

required for operation and maintenance manuals. Architect and Construction Manager will retain two prints; remainder will be returned. Mark up and retain one returned print as a Project Record Drawing.

6. Number of Copies: Submit copies of each submittal, as follows:
  - a. Initial Submittal: Submit one correctable, translucent, reproducible print and one blue- or black-line print. The reproducible print will be returned.
  - b. Initial Submittal: Submit two blue- or black-line prints. One print will be returned.
  - c. Final Submittal: Submit five (5) blue- or black-line prints, unless prints are required for operation and maintenance manuals. Submit five prints where prints are required for operation and maintenance manuals. CITY OF ROCKVILLE will retain two prints; remainder will be returned. Mark up and retain one returned print as a Project Record Drawing.
  
- D. Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."
  
- E. Samples: Prepare physical units of materials or products, including the following:
  1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
  2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
    - a. Generic description of Sample.
    - b. Product name or name of manufacturer.
    - c. Sample source.
  5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
    - a. Size limitations.
    - b. Compliance with recognized standards.
    - c. Availability.
    - d. Delivery time.
  6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
    - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least 5 (five) sets of paired units that show approximate limits of the variations.



- D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- J. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- K. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- L. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- M. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- N. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.

- O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures and Operation and Maintenance Data."
- P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.
- R. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
  - 1. Name, address, and telephone number of factory-authorized service representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 6. Statement whether conditions, products, and installation will affect warranty.
  - 7. Other required items indicated in individual Specification Sections.
- S. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- T. Construction Photographs: Comply with requirements in Division 1 Section "Photographic Documentation."

- 2.3 Material Safety Data Sheets: Submit information directly to CITY OF ROCKVILLE. MSDS sheets submitted directly to Engineer will be returned.

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. Review each submittal prior to transmission to City of Rockville and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with certification stamp before submitting to City of Rockville
- B. Certification Stamp: Stamp each submittal with a uniform certification stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's certification, and statement certifying that submittal has been reviewed, checked, and complies with the Contract Documents.

#### 3.2 CITY OF ROCKVILLE ACTION

- A. Except for submittals for record or for information or for another purpose where no action and return is required, the Contracting Officer will review submittals and mark returned copies to indicate action taken.
- B. Compliance with specified characteristics is the Contractor's responsibility, and is not part of the Contracting Officer's review and indication of action taken. No matter what review action is taken, final acceptance will depend on the contractor's full compliance with the Contract Documents.
- C. Submittals that do not contain the required marking of approval by the Contracting Officer, as indicated in the specifications, shall not be used for construction.
- D. Action Stamp: Each submittal will be stamped with a uniform action stamp. The stamp shall be marked to indicate one of the following actions taken:
  - 1. "Approved" or "Approved as Submitted": The work covered by the submittal may proceed, provided it complies with the notations or corrections on the submittal and with the requirements of the Contract Documents.
  - 2. "Approved as noted, Resubmission not required": The contractor is authorized to proceed with work as noted provided the contractor takes no exception to the notations.
  - 3. "Approved as noted, Resubmission Required": The contractor is authorized to proceed with portions of the work as noted. The contractor must resubmit those items/components so noted with additional information or requirements, for approval, before work may proceed on that portion of the submittal.
  - 4. "Disapproved": The submittal is incomplete or does not comply with design concept or requirements of the contract documents. No work shall proceed for this item until resubmittal with appropriate changes is approved.
  - 5. "Not Reviewed": A submittal marked "not reviewed" will indicate submittal does not have evidence of being reviewed and certified by the Construction Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals which are returned for lack of review by the contractor or for being incomplete, with appropriate action, coordination, or change.
  - 6. "Receipt Acknowledged" or no action: Submittals which are for the record or for information only or for another purpose not requiring review action.



END OF SECTION 013300



## SECTION 014000 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes general administrative and procedural requirements for the contractor's quality control program. Requirements for the Contractor to provide quality control services required by the Contracting Officer are not limited by provisions of this Section. The specific technical quality control program required for the work is defined by the combination of this section and Division 1 Section "Construction Quality Control."
- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to quality requirements. Specific submittal requirements of these related specification sections are not included in this section. Product quality requirements are contained in Divisions 2 through 16. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Work Restrictions"
  - 3. Division 1 Section "Project Management and Coordination"
  - 4. Division 1 Section "References"
  - 5. Division 1 Section "Construction Quality Control"
  - 6. Division 1 Section "Temporary Facilities and Controls"
  - 7. Division 1 Section "Safety and Health"
  - 8. Division 1 Section "Product Requirements"
  - 9. Division 1 Section "Execution Requirements"
  - 10. Division 1 Section "Cutting and Patching"
  - 11. Division 1 Section "Selective Demolition"
  - 12. Division 1 Section "Closeout Procedures"
  - 13. Division 1 Section "Project Record Documents"
  - 14. Division 1 Section "Operation and Maintenance Documentation"
  - 15. Division 1 Section "Demonstration and Training"

#### 1.3 DEFINITIONS

- A. Quality Assurance: Activities, actions, and procedures performed by City of Rockville or their designated representatives, before and during execution of the work to verify that the contractor's quality control program is producing the quality of work required by the contract documents and ensure that the construction complies with all requirements.
- B. Quality Control: Tests, inspections, procedures, and related actions performed by the contractor during and after execution of the work to evaluate that completed construction complies with contract requirements. Services do not include contract enforcement activities performed by the City of Rockville or their designated representative.

- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the remaining work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

#### 1.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of the Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the Contracting Officer.

#### 1.5 SUBMITTALS

- A. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- B. Permits, Licenses, and Certificates: For City of Rockville 's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

#### 1.6 QUALITY CONTROL QUALIFICATIONS

- A. Qualification requirements for the specified contractor's quality control organization are included in Division 1 Section "Construction Quality Control."
- B. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this project.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance.
- E. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance.

- F. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where the project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this project in material, design, and extent.
- G. Specialists: Certain sections of the specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other sections of these specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
  - 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION 014000



## SECTION 014200 - REFERENCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 DEFINITIONS

- A. General Explanation: Specification language often includes terms that are defined elsewhere in the Contract Documents, including the Construction Contract Clauses. Certain terms are defined in this section. These definitions or explanations are not necessarily complete or exclusive, but are general for the work and may be explained more explicitly in other Sections.
- B. "General Conditions" refer collectively to the Construction Contract Clauses, Labor Standards and the U.S. Department of Labor Wage Decision and Special Contract Requirements bound into the specifications.
- C. "Indicated" refers to graphic representations, notes or schedules on the Drawings, or to requirements elsewhere in the Specifications or other Contract Documents. Terms such as "shown", "noted", "scheduled" and "specified" have the same meaning as "indicated" and are used to further help locate the reference, but no limitation on location is intended except as specifically stated.
- D. Where "directed", "authorized", "selected", "approved", or a similar term is used in conjunction with the Contractor's submittals, applications, requests and other activities, and the specifications state that an individual other than the Contracting Officer, such as the Project Officer, Architect or Construction Engineer, shall provide this action, it is understood that only the Contracting Officer has this authority unless the individual stated is so authorized in writing by the Contracting Officer.
  - 1. When the individual is so authorized by the Contracting Officer, the Contractor may still appeal the action to the Contracting Officer.
  - 2. The Contracting Officer's decision will be final.
  - 3. In no case shall the Contracting Officer's action be interpreted as releasing the Contractor from responsibility to fulfill the requirements of the Contract Documents.
- E. "Regulations" include laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work.
- F. "Project site" refers to the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other work.
- G. "Furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembling, installation and similar operations.

- H. "Government Furnished" means the Government will supply the items so referenced, with the Contractor having the responsibility of pick-up, storage, delivery to the work site and final installation.
  - I. "Install" describes operations at the Project site, including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.
  - J. "Provide" means to furnish and install, complete in place and ready for full use.
  - K. The requirement for packaging, packing, marking, and preparation for shipment or delivery included in the referenced specifications will apply only to those materials and equipment that are furnished directly to the Government and not to materials and equipment that are furnished and installed by the Contractor.
  - L. "Installer" is the Contractor or another entity engaged by the Contractor, either directly or indirectly through subcontracting, to perform a particular construction operation at the Project site, including installation, erection, application and similar operations. Installers shall be skilled in the operations they perform. Where indicated, installers shall also be Specialists as defined in the Construction Contract Clauses.
    - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
  - M. "Owner" refers to the City of Rockville.
  - N. "Government" refers to the City of Rockville.
  - O. "Project Officer" refers to the City of Rockville Technical Representative.
  - P. "Building Manager/Facility Manager" is the Government employee responsible for the administration, operation and maintenance of the building.
  - Q. "Construction Quality Manager" is the individual or entity, under Contract to the Government, responsible for performing the day-to-day coordination and administration of the construction Contract, including performing field inspections, recommending approval or rejection of material and workmanship, monitoring labor and safety provisions, maintaining inspection logs and records of defects, and similar activities.
  - R. "Notice to Proceed" is the Contracting Officer's notification in writing to the Contractor to proceed with the individual task orders, activating the time period for construction and establishing the completion date.
- 1.3 DRAWING SYMBOLS
- A. Except as otherwise indicated, symbols used on the Drawings are those symbols recognized in the construction industry for the purposes.
    - 1. These include graphic symbols defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., latest edition, as well as graphic symbols recommended by ASHRAE, ASME, ASPE, CSI, IEEE and similar technical organizations for the mechanical and electrical Drawings.



2. Refer uncertainties as to meaning of symbols to the Contracting Officer for clarification before proceeding.

#### 1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect, to the extent referenced, as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.
- B. Conflicting Requirements. Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantity or quality, comply with the most stringent requirement. Immediately refer uncertainties, and requirements that are different but apparently equal, to the Contracting Officer in writing for a decision before proceeding.
- C. Minimum Quantity and Quality: The quantity or quality indicated shall be the minimum provided. The actual installation may comply exactly with the minimum quantity or quality indicated, or it may exceed the minimum levels within reasonable limits.
  1. Indicated numeric values are minimum or maximum as appropriate for the context of the requirements.
  2. Refer uncertainties to the Contracting Officer for a decision before proceeding.

#### 1.5 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation <a href="http://www.dca.ca.gov/bhfti">www.dca.ca.gov/bhfti</a> <a href="http://www.cpssc.gov">www.cpssc.gov</a>	(800) 952-5210 (916) 445-1254  (301) 504-0990
DOC	Department of Commerce <a href="http://www.doc.gov">www.doc.gov</a>	(202) 482-2000
EPA	Environmental Protection Agency <a href="http://www.epa.gov">www.epa.gov</a>	(202) 260-2090
FAA	Federal Aviation Administration <a href="http://www.faa.gov">www.faa.gov</a>	(202) 366-4000
FCC	Federal Communications Commission <a href="http://www.fcc.gov">www.fcc.gov</a>	(202) 418-0190
FDA	Food and Drug Administration <a href="http://www.fda.gov">www.fda.gov</a>	(888) 463-6332
GSA	General Services Administration <a href="http://www.gsa.gov">www.gsa.gov</a>	(202) 708-5082

HUD	Department of Housing and Urban Development <a href="http://www.hud.gov">www.hud.gov</a>	(202) 708-1112
LBL	Lawrence Berkeley Laboratory (See LBNL)	
LBNL	Lawrence Berkeley National Laboratory <a href="http://www.lbl.gov">www.lbl.gov</a>	(510) 486-5605
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology <a href="http://www.nist.gov">www.nist.gov</a>	(301) 975-6478
OSHA	Occupational Safety & Health Administration <a href="http://www.osha.gov">www.osha.gov</a>	(202) 693-1999
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
TRB	Transportation Research Board <a href="http://www.nas.edu/trb">www.nas.edu/trb</a>	(202) 334-2934
USDA	Department of Agriculture <a href="http://www.usda.gov">www.usda.gov</a>	(202) 720-2791
USPS	Postal Service <a href="http://www.usps.com">www.usps.com</a> <a href="http://www.aham.org">www.aham.org</a>	(202) 268-2000
AI	Asphalt Institute <a href="http://www.asphaltinstitute.org">www.asphaltinstitute.org</a>	(859) 288-4960
AIA	American Institute of Architects (The) <a href="http://www.e-architect.com">www.e-architect.com</a>	(202) 626-7300
AISC	American Institute of Steel Construction <a href="http://www.aisc.org">www.aisc.org</a>	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute <a href="http://www.steel.org">www.steel.org</a>	(202) 452-7100
AITC	American Institute of Timber Construction <a href="http://www.aitc-glulam.org">www.aitc-glulam.org</a>	(303) 792-9559
ALA	American Laminators Association (See LMA)	
ALCA	Associated Landscape Contractors of America <a href="http://www.alca.org">www.alca.org</a>	(800) 395-2522 (703) 736-9666
ALSC	American Lumber Standard Committee	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc.	(847) 394-0150

	<a href="http://www.amca.org">www.amca.org</a>	
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen) <a href="http://www.anla.org">www.anla.org</a>	(202) 789-2900
ANSI	American National Standards Institute <a href="http://www.ansi.org">www.ansi.org</a>	(202) 293-8020
AOSA	Association of Official Seed Analysts <a href="http://www.aosaseed.com">www.aosaseed.com</a>	(402) 476-3852
APA	APA - The Engineered Wood Association <a href="http://www.apawood.org">www.apawood.org</a>	(253) 565-6600
APA	Architectural Precast Association <a href="http://www.archprecast.org">www.archprecast.org</a>	(941) 454-6989
API	American Petroleum Institute <a href="http://www.api.org">www.api.org</a>	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute <a href="http://www.ari.org">www.ari.org</a>	(703) 524-8800
ASCA	Architectural Spray Coaters Association <a href="http://www.ascassoc.com">www.ascassoc.com</a>	(609) 848-6120
ASCE	American Society of Civil Engineers <a href="http://www.asce.org">www.asce.org</a>	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers <a href="http://www.ashrae.org">www.ashrae.org</a>	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) <a href="http://www.asme.org">www.asme.org</a>	(800) 843-2763 (212) 591-7722
ASSE	American Society of Sanitary Engineering <a href="http://www.asse-plumbing.org">www.asse-plumbing.org</a>	(440) 835-3040
ASTM	American Society for Testing and Materials <a href="http://www.astm.org">www.astm.org</a>	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industries International) <a href="http://www.awci.org">www.awci.org</a>	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (See WCMA)	
AWI	Architectural Woodwork Institute <a href="http://www.awinet.org">www.awinet.org</a>	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association	(817) 326-6300

	<a href="http://www.awpa.com">www.awpa.com</a>	
AWS	American Welding Society <a href="http://www.aws.org">www.aws.org</a>	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association <a href="http://www.awwa.org">www.awwa.org</a>	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association <a href="http://www.buildershardware.com">www.buildershardware.com</a>	(212) 297-2122
BIA	Brick Industry Association (The) <a href="http://www.bia.org">www.bia.org</a>	(703) 620-0010
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) <a href="http://www.bifma.com">www.bifma.com</a>	(616) 285-3963
CCC	Carpet Cushion Council <a href="http://www.carpetcushion.org">www.carpetcushion.org</a>	(203) 637-1312
CCFSS	Center for Cold-Formed Steel Structures <a href="http://www.umr.edu/~ccfss">www.umr.edu/~ccfss</a>	(573) 341-4471
CDA	Copper Development Association Inc. <a href="http://www.copper.org">www.copper.org</a>	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association <a href="http://www.canelect.ca">www.canelect.ca</a>	(613) 230-9263
CFFA	Chemical Fabrics & Film Association, Inc. <a href="http://www.chemicalfabricsandfilm.com">www.chemicalfabricsandfilm.com</a>	(216) 241-7333
CGA	Compressed Gas Association <a href="http://www.cganet.com">www.cganet.com</a>	(703) 412-0900
CGSB	Canadian General Standards Board <a href="http://www.pwgsc.gc.ca/cgsb">www.pwgsc.gc.ca/cgsb</a>	(819) 956-0425
CIMA	Cellulose Insulation Manufacturers Association <a href="http://www.cellulose.org">www.cellulose.org</a>	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association <a href="http://www.cisca.org">www.cisca.org</a>	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute <a href="http://www.cispi.org">www.cispi.org</a>	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute <a href="http://www.chainlinkinfo.org">www.chainlinkinfo.org</a>	(301) 596-2583
CPA	Composite Panel Association (Formerly: National Particleboard Association) <a href="http://www.pbmdf.com">www.pbmdf.com</a>	(301) 670-0604

CPPA	Corrugated Polyethylene Pipe Association <a href="http://www.cppa-info.org">www.cppa-info.org</a>	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) <a href="http://www.carpet-rug.com">www.carpet-rug.com</a>	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute <a href="http://www.crsi.org">www.crsi.org</a>	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) <a href="http://www.csa-international.org">www.csa-international.org</a>	(800) 463-6727 (416) 747-4000
CSI	Construction Specifications Institute (The) <a href="http://www.csinet.org">www.csinet.org</a>	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau <a href="http://www.cedarbureau.org">www.cedarbureau.org</a>	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) <a href="http://www.cti.org">www.cti.org</a>	(281) 583-4087
DHI	Door and Hardware Institute <a href="http://www.dhi.org">www.dhi.org</a>	(703) 222-2010
EIA/TIA	Electronic Industries Alliance/Telecommunications Industry Association <a href="http://www.eia.org">www.eia.org</a>	(703) 907-7500
EIMA	EIFS Industry Members Association <a href="http://www.eifsfacts.com">www.eifsfacts.com</a>	(800) 294-3462 (770) 968-7945
EJMA	Expansion Joint Manufacturers Association, Inc. <a href="http://www.ejma.org">www.ejma.org</a>	(914) 332-0040
FCI	Fluid Controls Institute <a href="http://www.fluidcontrolsintitute.org">www.fluidcontrolsintitute.org</a>	(216) 241-7333
FGMA	Flat Glass Marketing Association (See GANA)	
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) <a href="http://www.fmglobal.com">www.fmglobal.com</a>	(401) 275-3000
GA	Gypsum Association <a href="http://www.gypsum.org">www.gypsum.org</a>	(202) 289-5440
GANA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association) <a href="http://www.glasswebsite.com/gana">www.glasswebsite.com/gana</a>	(785) 271-0208

GRI	Geosynthetic Research Institute <a href="http://www.drexel.edu/gri">www.drexel.edu/gri</a>	(215) 895-2343
GTA	Glass Tempering Division of Glass Association of North America (See GANA)	
HI	Hydraulic Institute <a href="http://www.pumps.org">www.pumps.org</a>	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute <a href="http://www.gamanet.org">www.gamanet.org</a>	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association <a href="http://www.hpva.org">www.hpva.org</a>	(703) 435-2900
HPW	H. P. White Laboratory, Inc. <a href="http://www.hpwhite.com">www.hpwhite.com</a>	(410) 838-6550
IAS	International Approval Services (See CSA International)	
ICEA	Insulated Cable Engineers Association, Inc. <a href="http://www.icea.net">www.icea.net</a>	(508) 394-4424
ICRI	International Concrete Repair Institute (The) <a href="http://www.icri.org">www.icri.org</a>	(703) 450-0116
IEC	International Electrotechnical Commission <a href="http://www.iec.ch">www.iec.ch</a>	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) <a href="http://www.ieee.org">www.ieee.org</a>	(212) 419-7900
IESNA	Illuminating Engineering Society of North America <a href="http://www.iesna.org">www.iesna.org</a>	(212) 248-5000
IGCC	Insulating Glass Certification Council <a href="http://www.igcc.org">www.igcc.org</a>	(315) 646-2234
ILI	Indiana Limestone Institute of America, Inc. <a href="http://www.iliai.com">www.iliai.com</a>	(812) 275-4426
IRI	Industrial Risk Insurers <a href="http://www.industrialrisk.com">www.industrialrisk.com</a>	(800) 243-8308 (860) 520-7300
ITS	Intertek Testing Services <a href="http://www.itsglobal.com">www.itsglobal.com</a>	(800) 345-3851 (607) 753-6711
IWS	Insect Screening Weavers Association (Now defunct)	
KCMA	Kitchen Cabinet Manufacturers Association	(703) 264-1690

	<a href="http://www.kcma.org">www.kcma.org</a>	
LGS	Light Gage Structural Institute <a href="http://www.loseke.com">www.loseke.com</a>	(972) 370-0967
LMA	Laminating Materials Association (Formerly: ALA - American Laminators Association) <a href="http://www.lma.org">www.lma.org</a>	(201) 664-2700
LPI	Lightning Protection Institute <a href="http://www.lightning.org">www.lightning.org</a>	(800) 488-6864 (847) 577-7200
LSGA	Laminated Safety Glass Association (See GANA)	
MBMA	Metal Building Manufacturers Association <a href="http://www.mbma.com">www.mbma.com</a>	(216) 241-7333
MCA	Metal Construction Association <a href="http://www.metalconstruction.org">www.metalconstruction.org</a>	(312) 201-0193
MFMA	Maple Flooring Manufacturers Association <a href="http://www.maplefloor.org">www.maplefloor.org</a>	(847) 480-9138
MFMA	Metal Framing Manufacturers Association	(312) 644-6610
MGPHO	Medical Gas Professional Healthcare Organization, Inc. <a href="http://www.mgpho.org">www.mgpho.org</a>	(877) 238-5157 (913) 681-6548
MHIA	Material Handling Industry of America <a href="http://www.mhia.org">www.mhia.org</a>	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America <a href="http://www.marble-institute.com">www.marble-institute.com</a>	(614) 228-6194
ML/SFA	Metal Lath/Steel Framing Association (See SSMA)	
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. <a href="http://www.mss-hq.com">www.mss-hq.com</a>	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers <a href="http://www.naamm.org">www.naamm.org</a>	(312) 332-0405
NAAMM	North American Association of Mirror Manufacturers (See GANA)	
NACE	NACE International (National Association of Corrosion Engineers International) <a href="http://www.nace.org">www.nace.org</a>	(281) 228-6200
NAIMA	North American Insulation Manufacturers Association (The) <a href="http://www.naima.org">www.naima.org</a>	(703) 684-0084

NAMI	National Accreditation and Management Institute, Inc.	(304) 258-5100
NAPM	National Association of Photographic Manufacturers (See PIMA)	
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(414) 248-9094
NCTA	National Cable Television Association www.ncta.com	(202) 775-3669
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(303) 697-8441
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-6372
NGA	National Glass Association www.glass.org	(703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NPA	National Particleboard Association (See CPA)	
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070



NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSA	National Stone Association www.aggregates.org	(800) 342-1415 (703) 525-8788
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NTMA	National Terrazzo and Mosaic Association, Inc. www.ntma.com	(800) 323-9736 (703) 779-1022
NWWDA	National Wood Window and Door Association (See WDMA)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting and Decorating Contractors of America www.pdca.com	(800) 332-7322 (703) 359-0826
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (508) 230-3516
PGI	PVC Geomembrane Institute //pgi-tp.ce.uiuc.edu	(217) 333-3929
PIMA	Photographic & Imaging Manufacturers Association (Formerly: NAPM - National Association of Photographic Manufacturers) www.pima.net	(914) 698-7603
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute (Contact by mail only)	
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
RMA	Rubber Manufacturers Association www.rma.org	(800) 220-7620 (202) 682-4800
SAE	SAE International www.sae.org	(724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabfurn.com	(843) 689-6878

SGCC	Safety Glazing Certification Council <a href="http://www.sgcc.org">www.sgcc.org</a>	(315) 646-2234
SIGMA	Sealed Insulating Glass Manufacturers Association <a href="http://www.sigmaonline.org/sigma">www.sigmaonline.org/sigma</a>	(312) 644-6610
SJI	Steel Joist Institute <a href="http://www.steeljoist.org">www.steeljoist.org</a>	(843) 626-1995
SMA	Screen Manufacturers Association	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association <a href="http://www.smacna.org">www.smacna.org</a>	(703) 803-2980
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) <a href="http://www.sprayfoam.org">www.sprayfoam.org</a>	(800) 523-6154
SPI	The Society of the Plastics Industry <a href="http://www.plasticsindustry.org">www.plasticsindustry.org</a>	(202) 974-5200
SPIB	Southern Pine Inspection Bureau (The) <a href="http://www.spib.org">www.spib.org</a>	(850) 434-2611
SPI/SPFD	The Society of the Plastics Industry Spray Polyurethane Foam Division (See SPFA)	
SPRI	SPRI (Single Ply Roofing Institute) <a href="http://www.spri.org">www.spri.org</a>	(781) 444-0242
SSINA	Specialty Steel Industry of North America <a href="http://www.ssina.com">www.ssina.com</a>	(800) 982-0355 (202) 342-8630
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association) <a href="http://www.ssma.com">www.ssma.com</a>	(312) 456-5590
SSPC	SSPC: The Society for Protective Coatings <a href="http://www.sspc.org">www.sspc.org</a>	(800) 837-8303 (412) 281-2331
STI	Steel Tank Institute <a href="http://www.steeltank.com">www.steeltank.com</a>	(847) 438-8265
SWI	Steel Window Institute <a href="http://www.steelwindows.com">www.steelwindows.com</a>	(216) 241-7333
SWRI	Sealant, Waterproofing, and Restoration Institute <a href="http://www.swrionline.org">www.swrionline.org</a>	(816) 472-7974
TCA	Tile Council of America, Inc. <a href="http://www.tileusa.com">www.tileusa.com</a>	(864) 646-8453

TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TPI	Truss Plate Institute	(608) 833-5900
TPI	Turfgrass Producers International www.turfgrassod.org	(800) 405-8873 (847) 705-9898
UFAC	Upholstered Furniture Action Council www.ufac.org	(336) 885-5065
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USITT	United States Institute for Theatre Technology, Inc. www.culturenet.ca/usitt	(800) 938-7488 (315) 463-6463
USP	U.S. Pharmacopeia www.usp.org	(800) 822-8772 (301) 881-0666
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Formerly: AWCMA - American Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4653 (212) 661-4261
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WIC	Woodwork Institute of California www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs	(800) 952-5210
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	Bureau of Home Furnishings and Thermal Insulation <a href="http://www.dca.ca.gov/bhfti">www.dca.ca.gov/bhfti</a> <a href="http://www.cpssc.gov">www.cpssc.gov</a>	(916) 445-1254 (301) 504-0990
DOC	Department of Commerce <a href="http://www.doc.gov">www.doc.gov</a>	(202) 482-2000
EPA	Environmental Protection Agency <a href="http://www.epa.gov">www.epa.gov</a>	(202) 260-2090
FAA	Federal Aviation Administration <a href="http://www.faa.gov">www.faa.gov</a>	(202) 366-4000
FCC	Federal Communications Commission <a href="http://www.fcc.gov">www.fcc.gov</a>	(202) 418-0190
FDA	Food and Drug Administration	(888) 463-6332

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation <a href="http://www.dca.ca.gov/bhfti">www.dca.ca.gov/bhfti</a> <a href="http://www.cpssc.gov">www.cpssc.gov</a>	(800) 952-5210 (916) 445-1254 (301) 504-0990
DOC	Department of Commerce <a href="http://www.doc.gov">www.doc.gov</a>	(202) 482-2000
EPA	Environmental Protection Agency <a href="http://www.epa.gov">www.epa.gov</a>	(202) 260-2090
FAA	Federal Aviation Administration <a href="http://www.faa.gov">www.faa.gov</a>	(202) 366-4000
FCC	Federal Communications Commission <a href="http://www.fcc.gov">www.fcc.gov</a>	(202) 418-0190
FDA	Food and Drug Administration <a href="http://www.fda.gov">www.fda.gov</a>	(888) 463-6332
GSA	General Services Administration <a href="http://www.gsa.gov">www.gsa.gov</a>	(202) 708-5082
HUD	Department of Housing and Urban Development <a href="http://www.hud.gov">www.hud.gov</a>	(202) 708-1112
LBL	Lawrence Berkeley Laboratory (See LBNL)	
LBNL	Lawrence Berkeley National Laboratory <a href="http://www.lbl.gov">www.lbl.gov</a>	(510) 486-5605
NCHRP	National Cooperative Highway Research Program	

(See TRB)

NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(202) 693-1999
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

- D. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 445-1254
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PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 014200



## SECTION 014500 - CONSTRUCTION QUALITY CONTROL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the contractor's Quality Control (QC) Program. The QC Program required for the work is defined by the combination of this section and Division 1 Section "Quality Requirements."
- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to quality control. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Work Restrictions"
  - 3. Division 1 Section "Project Management and Coordination"
  - 4. Division 1 Section "Submittal Procedures"
  - 5. Division 1 Section "Quality Requirements"
  - 6. Division 1 Section "References"
  - 7. Division 1 Section "Temporary Facilities and Controls"
  - 8. Division 1 Section "Safety and Health"
  - 9. Division 1 Section "Product Requirements"
  - 10. Division 1 Section "Execution Requirements"
  - 11. Division 1 Section "Cutting and Patching"
  - 12. Division 1 Section "Selective Demolition"
  - 13. Division 1 Section "Closeout Procedures"
  - 14. Division 1 Section "Project Record Documents"
  - 15. Division 1 Section "Operation and Maintenance Documentation"
  - 16. Division 1 Section "Demonstration and Training"
- C. The contractor's QC Program includes tests, inspections, procedures, and related actions performed by the contractor or other contractually designated party during and after execution of the work to verify that completed construction complies with contract requirements. Services do not include contract enforcement activities performed by the NIH or their designated representative.
- D. Specific QC requirements for individual construction activities are included in the technical sections that specify those construction activities.
- E. The intent of this section is to describe the duties and responsibilities of the contractor's QC Program. The Contractor has the option of assembling a QC Program to match that described in this specification section or proposing an alternate program that meets the same intent. The Contractor Officer can waive all or portions of this specification if the contractor has an established proven alternative QC Program which can be documented as meeting the intent of

the provisions in this specification section. The contractor is required to submit any alternate QC Program to meet the same milestones described herein and have the alternate QC Program accepted by the Contracting Officer prior to the start of work. No additional time will be allowed for the review process of an alternate program. Any costs savings resulting from an alternate QC Program will require a change order to be incorporated into the contract. No additional costs will be authorized for an alternate QC Program.

- F. This specification section does not relieve the Contractor of responsibility for compliance with Contract Document requirements, and does not limit the Contractor's QC procedures that facilitate compliance with Contract Document requirements.
- G. The term Contracting Officer and Project Officer shall also mean his/her representative who has been so designated in writing.

### 1.3 GOVERNING REGULATIONS AND AUTHORITIES

- A. The latest edition of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
  - 1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) ASTM A880 Criteria for Use in Evaluation of Testing Laboratories and Organization for Examination and Inspection of Steel, Stainless Steel, and Related Alloys
  - 2. ASTM C1077 Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
  - 3. ASTM D3666 Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
  - 4. ASTM D3740 Minimum Requirements for Agencies Engaged in the Testing and/ or Inspection of Soil and Rock as Used in Engineering Design and Construction
  - 5. ASTM E329 Agencies Engaged in the Testing and/ or Inspection of Materials Used in Construction
  - 6. ASTM E543 Agencies Performing Nondestructive Testing
- B. Obtain copies of applicable regulations and make these available at the project site for reference.

### 1.4 QUALITY CONTROL RESPONSIBILITIES

- A. Work is to be performed under the general direction of the Contracting Officer and shall be subject to inspection by the Contracting Officer's Technical Representative. No representative of the Contracting Officer is permitted to change specifications or drawings without the written authorization of the Contracting Officer.
- B. The contractor shall be familiar with the latest provisions of the inspection requirements of local jurisdictions and the NIH and shall include compliance with those requirements in the work of this contract. These local provisions shall be enforced when they exceed the provisions as outlined in the specifications. The provisions of the specifications shall be considered a minimum.
- C. Unless specifically indicated otherwise, the Contractor shall provide a contractor QC (QC) Program specified or required by this contract. Costs for these services are included in the Contract price.



- D. The contractor's QC Program shall include but not be limited to a QC Plan, a QC Staff, specified QC meetings, a three phased QC system described in this section, submittal review and certification, specified testing, completion inspections, QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract.
1. The QC Program shall cover on-site and off-site work and shall be keyed to the work sequence identified in the contractor's construction schedule.
  2. No work or testing may be performed unless the contractor's QC Manager is on the work site.
  3. The contractor's QC Manager shall report to an officer of the firm and shall not be subordinate to the Project Superintendent or the Project Manager.
  4. The contractor's QC Manager, Project Superintendent, and the contractor's management team must work together effectively. Although the QC Manager is the primary individual responsible for QC, the Contractor will ultimately be held responsible for the quality of work on the job. The project superintendent will be held responsible for the quality of production.
- E. Testing and inspecting services may be required to verify compliance with requirements specified or indicated in the contract documents. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- F. Where individual technical specification sections specifically indicate that certain tests, inspections or other QC services are to be provided by a testing agency, the Contractor shall employ and pay for a qualified independent testing agency to perform the QC services.
- G. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures that facilitate compliance with the Contract Document requirements.
- H. Where specific quality control tests or services are indicated as a NIH responsibility, the NIH will engage a qualified agency to perform these services.
1. NIH will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- I. The Contractor shall cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. The contractor will provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field-curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.

- J. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

#### 1.5 SUBMITTALS

- A. Submit a preliminary Definable Features of Work listing within 14 calendar days of receipt of the notice to Proceed.
- B. Submit a draft Quality Control Plan within 30 calendar days following receipt the Notice to Proceed.
- C. The only work that is authorized to proceed prior to the approval of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying.
- D. Contractors should plan on a NIH review period of 14 calendar days prior to receiving comments on the draft QC Plan submission. The planned duration of the NIH review is provided as a planning figure and will vary dependent on the complexity and accuracy of the submission. No additional time will be allowed the Contractor for a NIH review longer than the above duration.
- E. Submit revised Quality Control Plan within 14 calendar days following receipt of NIH comments.

#### 1.6 CONTRACTOR'S QUALITY CONTROL ORGANIZATION

- A. Quality Control Manager Duties and Qualifications
  - 1. Provide a QC Manager at the work site to implement and manage the QC Program.
    - a. In addition to implementing and managing the QC Program, the QC Manager may perform the duties of project superintendent.
    - b. The only duties and responsibilities of the QC Manager are to manage and implement the QC Program on this contract. The QC Manager shall not be designated as the Project Superintendent or the safety competent person as defined OSHA Regulations (Standards) 29 CFR 1926.
    - c. The QC Manager is required to attend the QC Plan Meeting, attend the Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of QC, perform submittal review and certification, ensure testing is performed and provide QC certifications and documentation required in this contract. The QC Manager is responsible for managing and coordinating the three phases of QC and documentation of work performed by Testing Laboratory personnel and any other inspection and testing personnel required by this Contract.
      - 1) Specific duties of the QC Manager include but are not limited to:
        - a) Maintains access to quality references called for in the specifications
        - b) Ensures all submittals are prepared, certified, and submitted as required in a timely manner to avoid project delays.

- c) Coordinates changes or substitution requests made by the contractor to the Project Officer, however, he does not have the authority to approve them.
  - d) Inspects all work for compliance and maintains a Rework Items list on all non-conforming work.
  - e) Coordinates all testing requirements to maintain the production schedule.
  - f) Ensures that As-Built Drawings and Specifications and As-Built Record of Material documents are current and on site.
  - g) Coordinates submission of all miscellaneous plans required by various Division 1 specification sections to the Contracting Officer.
- 2) The QC Manager reports to an officer of the firm and not to the site superintendent.
  - 3) The QC Manager has the authority to stop the work and the responsibility to stop the work if the work does not conform to the contract requirements. Failure to exercise this responsibility is cause for NIH directing replacement of the QC Manager.
  - 4) Regardless who is designated as the Safety Competent Person as defined in OSHA Regulations (Standards) 29 CFR 1926.32(f) and assigned other safety responsibilities as described in Division 1 Section "Safety and Health." The QC Manager is always responsible for observing the work and monitoring safe work practices during the normal course of his jobsite duties.

2. QC Manager Qualifications.

- a. An individual with a minimum of 10 years experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must be familiar with the requirements of OSHA Regulations (Standards) 29 CFR 1926, and have experience in the areas of hazard identification and safety compliance.
- b. A graduate of a four year accredited college program in one of the following disciplines: Engineering, Architecture, Construction Management, Engineering Technology, Building Construction, or Building Science **with a minimum of 10** years experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must be familiar with the requirements of OSHA Regulations (Standards) 29 CFR 1926, and have experience in the areas of hazard identification and safety compliance.

B. Additional QC Management Staff Requirements. The QC requirements of this project require the QC staff to also include the following individuals:

- 1. Alternate QC Manager. The contractor will provide an Alternate QC Manager with similar qualifications as those of the QC Manager to serve in the event of the QC Manager's absence. The period of absence of the QC Manager shall not exceed two weeks at any one time, and not more than 30 workdays in the aggregate during a calendar year. The alternate QC Manager shall be designated in the QC Plan and should be familiar with the workings and status of the QC Program. The Alternate QC Manager may be a member of the contractor's production staff while not performing QC Manager duties.

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2. Submittal Reviewer. Provide Submittal Reviewer, other than the QC Manager, qualified in the disciplines being reviewed, to review and certify that the submittals meet the requirements of this Contract prior to certification by the QC Manager.
3. The technical specification sections may also require the presence of manufacturer or factory technical or quality representatives or engineers to be on-site prior to observe or conduct all or portions of the installation. See Division 1 Section "Quality Requirements" for individual qualifications. These representatives shall be considered an extension of the QC staff.
4. The QC Supervisor for the Pest Management Contractor (PMC) required by Division 1 Section "Temporary Facilities and Controls" shall be considered a member of the QC staff. Copies of all PMC reports will be maintained by the QC Organization and PMC activities will be included in QC Reports

#### 1.7 QUALITY CONTROL PLAN

- A. QC Plan Meeting: Conduct a QC Plan meeting with the Project Officer within 10 calendar days of receipt of the Notice To Proceed with the purpose of developing a mutual understanding of the QC Plan requirements prior to plan development and submission.
- B. Submit a QC Plan to the Contracting Officer for approval conforming to the requirements specified elsewhere in this section within 30 calendar days after receipt of the Notice to Proceed. Coordinate submission of the QC Plan with the preparation and submission of the contractor's preliminary and final construction schedules as described in Division 1 Section "Construction Progress Documentation." The QC Plan submission should be concurrent or follow the submission of the schedule.
- C. The initial submission of the QC Plan shall include a preliminary submittal of the list of definable features of work (DFOW) described in the following paragraphs that shall cover the first 90 days of construction. Submit the completed list of DFOWs in conjunction with the Preliminary Contractor's Construction Schedule described in Division 1 Section "Construction Progress Documentation." Any approval by the NIH of the QC Plan with this preliminary list shall be considered to be "approved as noted, re-submittal required" and will be in effect only until the completed list of DFOW is received and approved.
- D. The final submission of the QC Plan should be coordinated with the submission of the contractor's construction schedule as described in Division 1 Section "Construction Progress Documentation." If the completed list of DFOWs and accepted contractor's schedule is not received within the time indicated in Division 1 Section "Construction Progress Documentation," work beyond that authorized under the "approved as noted" will not commence. The contractor will not be entitled to a contract time extension for lost time due to failure to submit a conforming QC Plan or Construction Schedule.
- E. The contractor's QC Program is subject to continuous evaluation, review, and verification by the Project Officer and the Contracting Officer. Acceptance of the Contractor's QC Plan is conditional and will be predicated on satisfactory performance during the construction. The Contracting Officer reserves the right to require changes in the QC Plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. All QC organization personnel shall be subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the contract.

- F. The Contractor will notify the Contracting Officer, in writing, of any proposed change to the submitted QC Plan, including pending changes in the QC organization personnel, a minimum of seven calendar days prior to the effective date of the proposed change. Proposed changes shall be subject to acceptance by the Contracting Officer prior to implementation.
- G. QC Plan Requirements. Provide, for approval by the Contracting Officer, a QC Plan with pages numbered sequentially that covers both on-site and off-site work and includes the following:
1. A table of contents listing the major sections identified with tabs in the following order:
    - a. QC Organization
    - b. Names And Qualifications
    - c. Duties, Responsibility And Authority Of QC Personnel
    - d. Outside Organizations
    - e. Appointment Letters
    - f. Submittal Procedures And Initial Submittal Register
    - g. Testing Laboratory Information
    - h. Testing Plan And Log
    - i. Procedures To Complete Rework Items
    - j. Documentation Procedures
    - k. List Of Definable Features Of Work (DFOW)
    - l. Procedures For Performing The Three Phases Of Control
    - m. QC Personnel Matrix
    - n. Procedures For Completion Inspection
    - o. Appendix
  2. A chart showing the contractor's QC organizational structure.
  3. Names and qualifications, in resume format, for each person in the QC organization.
  4. Duties, responsibilities and authorities of each person in the QC organization.
  5. A listing of outside organizations such as, architectural and consulting engineering firms that will be employed by the Contractor and a description of the services these firms will provide.
  6. Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC Program as described in this contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of quality control, and their authority to stop work which is not in compliance with the contract.
  7. Copies of letters of direction signed by the QC Manager to all other QC staff outlining their duties, authorities, and responsibilities.
  8. Procedures for reviewing, approving and managing submittals. Provide the names of the persons in the QC organization authorized to review and certify submittals prior to submission to the Contracting Officer.
  9. Include a copy of the initial submittal of the Submittal Register per the requirements of Division 1 Section "Submittal Procedures."
  10. Testing laboratory information required by the paragraphs entitled "Testing Agencies and Reports" of this section
  11. A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.
  12. Procedures to identify, record, track and complete rework items.
  13. Documentation procedures, including proposed report formats.
  14. List of definable features of work.
    - a. A definable feature of work (DFOW) is a task which is separate and distinct from other tasks, has the same control requirements and work crews.

- b. The list shall be cross-referenced to the contractor's Construction Schedule and the specification sections.
  - c. For projects requiring a Progress Chart, the list of definable features of work shall include but not be limited to all items of work on the schedule.
  - d. For projects requiring a CPM Schedule, the list of definable features of work shall include but not be limited to all critical path activities.
  - e. All activities for which this specification requires QC Specialists or special inspection personnel should also be included as separate DFOWs.
  - f. Cutting and Patching activities as described in Division 1 Section "Cutting and Patching" shall be treated as separate DFOWs.
  - g. All activities that can be expected to impact NIH operations will be treated as separate DFOWs including but not limited to utility outages and temporary traffic provisions.
15. Procedures for performing the three phases of quality control. For each DFOW, provide copies of the DFOWs Preparatory and Initial Phase Checklists. Each list shall include a breakdown of quality checks that will be used when performing the QC functions, inspections, and tests required by the contract documents. The preparatory and initial phases and meetings shall be conducted with a view towards obtaining quality construction by planning ahead and identifying potential problems for each definable feature of work. The three phases of quality control are further defined in a following section of this specification.
16. Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.
17. Appendix to include the anticipated miscellaneous project management and coordination plans being submitted for the project including but not limited to:
- a. Utility Service Interruption Plan
  - b. Hazardous Waste/Waste Management Plan
  - c. Heating and Cooling Plan
  - d. Integrated Pest Management Plan
  - e. Demolition Plan
  - f. Photographic Documentation Plan

#### 1.8 COORDINATION AND MUTUAL UNDERSTANDING MEETING

- A. After submission of the QC Plan, and prior to the start of construction, meet with the Contracting Officer to present the QC Program proposed by the contractor. The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, and the coordination of the Contractor's management, production and QC personnel.
- B. At the meeting, the Contractor will be required to explain in detail how the three phases of quality control will be implemented for each definable feature of work.
- C. As a minimum, the Contractor's personnel required to attend shall include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager and/or A/E as appropriate and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities shall have a principal of the firm at the meeting.
- D. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor, Engineer, and the Contracting Officer (or their designated representative). A copy of the signed minutes shall be provided by the Contractor to all attendees. Repeat the coordination and mutual understanding meeting when a new QC Manager is appointed.

1.9 QC MEETINGS.

- A. After the start of construction, the QC Manager shall conduct **bi-weekly** QC meetings at the work site with the project superintendent. The QC Manager shall prepare the minutes of the meeting and provide a copy to the Contracting Officer within 2 working days after the meeting. The Contracting Officer or their designated representative may attend these meetings. The QC Manager shall notify the Contracting Officer or their designated representative at least 48 hours in advance of each meeting. As a minimum, the following shall be accomplished at each meeting:
  - 1. Work or testing accomplished since last meeting
  - 2. Rework items identified since last meeting
  - 3. Rework items completed since last meeting;
- B. Review the minutes of the previous meeting;
- C. Review the schedule and the status of work:
  - 1. Work or testing accomplished since last meeting
  - 2. Rework items identified since last meeting
  - 3. Rework items completed since last meeting;
- D. Review the status of submittals:
  - 1. Submittals reviewed and approved since last meeting
  - 2. Submittals required in the near future;
- E. Review the work to be accomplished in the next 2 (two) weeks and documentation required:
  - 1. Establish completion dates for outstanding rework items
  - 2. Update the schedule showing planned and actual dates of the preparatory, initial and follow-up phases, including testing and any other inspection required by this contract
  - 3. Discuss construction methods and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each definable feature of work
  - 4. Discuss status of off-site work or testing
  - 5. Discuss documentation required for the scheduled tasks;
  - 6. Discuss safety requirements for upcoming activities:
- F. Resolve QC and production problems:
  - 1. Assist in resolving Request for Information issues; and
- G. Address items that may require revising the QC Plan:
  - 1. Changes in QC organization personnel
  - 2. Changes in QC procedures.
  - 3. Review health and safety plan
  - 4. Other issues or topics as requested by the Project Officer.

1.10 THREE PHASES OF QUALITY CONTROL

- A. The three phases of quality control, describes the process that forms the backbone of the required QC system. The three phases, Preparatory, Initial, and Follow up shall adequately cover both on-site and off-site work and shall include the following for each definable feature of work.
  - 1. Preparatory Phase

- a. Notify the Contracting Officer at least 2 workdays in advance of the beginning of each Preparatory Phase. This phase shall include a meeting conducted by the QC Manager and attended by the Superintendent, and the Foreman responsible for the DFOW. Document the results of the Preparatory Phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. The Preparatory Phase Meeting can be combined with the Preinstallation Conference if held.
- b. Perform the following prior to beginning work on each DFOW:
  - 1) Review each paragraph of the applicable specification sections
  - 2) Review the Contract drawings
  - 3) Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required
  - 4) Review the testing plan and cutting and patching plan and other miscellaneous project management and coordination plans as appropriate and ensure that provisions have been made to provide the required QC testing
  - 5) Examine the work area to ensure that the required preliminary work has been completed. If manufacturer's field services are specified, verify that inspections have been accomplished and results noted. See Division 1 Section "Execution" for additional requirements.
  - 6) Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data
  - 7) Discuss construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW
  - 8) Review the Safety Plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.
  - 9) Review any hazardous material processes required for materials involved in the DFOW.

## 2. Initial Phase

- a. Notify the Contracting Officer at least 2 workdays in advance of the beginning of each Initial Phase. When construction crews are ready to start work on a DFOW, conduct an Initial Phase meeting with the superintendent, and the foreman responsible for that DFOW. Observe the initial segment of the definable feature of work to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily Contractor Quality Control Report and in the Initial Phase Checklist. Repeat the Initial Phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met.
- b. Perform the following for each DFOW:
  - 1) Establish the quality of workmanship required
  - 2) Resolve conflicts
  - 3) Ensure that testing is performed as specified and as incorporated into the testing plan.
  - 4) Check work procedures for compliance with the Safety Plan and the appropriate activity hazard analysis to ensure that applicable safety requirements are met.
  - 5) Verify that all the requirements agreed to as a result of the Preparatory Phase have been or are being accomplished.



3. Follow-Up Phase

a. Perform the following for on-going work daily, or more frequently as necessary until the completion of each DFWO and document in the daily Contractor Quality Control Report:

- 1) Ensure the work is in compliance with Contract requirements;
- 2) Maintain the quality of workmanship required
- 3) Ensure that testing is performed by the specified or approved source;
- 4) Ensure that rework items are being corrected
- 5) Perform safety inspections.
- 6) Ensure Preparatory and Initial Phase requirements are being met.

4. Additional Preparatory and Initial Phases. Additional Preparatory and Initial Phases shall be conducted on the same DFWOs for the following conditions:

- a. If the quality of on-going work is unacceptable, if there are changes in the applicable QC organization,
- b. If there are changes in the on-site production supervision or work crew,
- c. If cutting or patching is required following completion of the DFWO,
- d. If work on a definable feature is resumed after substantial period of inactivity, or
- e. If other problems develop.

B. Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases if off site QC will be required.

1.11 SUBMITTAL REVIEW AND APPROVAL

A. The QC organization shall be responsible for reviewing and certifying that all submittals are in compliance with the contract requirements. Those submittals requiring additional NIH approval shall be certified prior to being forwarded to NIH for approval.

B. Those submittals requiring specific NIH approval are specifically identified in the technical specifications and will be forwarded for approval as described in Division 1 Section "Submittal Procedures."

C. Submittal documentation requirements for contractor QC certified submittals are identical to those of NIH approved submittals and are described in Division 1 Section "Submittal Procedures."

D. Procedures for submission, review and approval of technical submittals are described in Division 1 Section "Submittal Procedures."

1.12 TESTING AGENCIES AND REPORTS

A. Qualification Data: Contractor shall submit for Contracting Officer Approval each testing agency's firm name, and credentials to perform the specified services, to the NIH for the Contracting Officer's approval at least 15 calendar days before scheduled inspections or tests.

1. A qualified independent testing agency shall be an accredited entity engaged to perform tests or inspections, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those tests or inspections.
2. Testing agencies shall be acceptable to the Contracting Officer.

3. Contractor shall not employ the same testing agency engaged by NIH, unless agreed to in writing by NIH.
  4. Unless other accreditation is specified in the applicable individual technical specification section, each testing agency shall be an agency pre-qualified with the experience and capability to conduct testing and inspections indicated, as documented by ASTM E 548 that specializes in types of tests and inspections to be performed or shall be recognized by the Occupational Safety and Health Administration (OSHA) in accordance with 29 CFR Part 1910.7 to test and approve equipment or materials for their safe intended use.
  5. Testing agencies shall be authorized by authorities having jurisdiction to operate in the geographic location of the project.
  6. The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.
  7. Testing and inspecting requested by the Contractor not required by the Contract Documents are Contractor's responsibility.
  8. Submit additional copies of each written test report directly to authorities having jurisdiction, when they so direct.
  9. Testing agencies may not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the work.
- B. Schedule of Tests and Inspections: The Contractor shall prepare and submit a comprehensive Schedule of Tests and Inspections required by the contract documents.
1. Coordinate the Schedule of Tests and Inspections with the Contractor's Construction Schedule and other related documents. Prepare in tabular form to include the following:
    - a. Specification Section number and title.
    - b. Description of test and inspection.
    - c. Identification of applicable standards.
    - d. Identification of test and inspection methods.
    - e. Number of tests and inspections required.
    - f. Time schedule or time span for tests and inspections.
    - g. Entity responsible for performing tests and inspections.
    - h. Requirements for obtaining samples.
    - i. Unique characteristics of each quality-control service.
- C. Test Results and Reports
1. Provide actual results in a written format in the number of copies required by the QC Manager and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify Contracting Officer directly through the Project Officer immediately. Written test reports will include the following information:
    - a. Date of issue.
    - b. Project title and number.
    - c. Name, address, and telephone number of testing agency.
    - d. Dates and locations of samples and tests or inspections.
    - e. Names of individuals making the test or inspection.
    - f. Designation of the work and test method.
    - g. Identifications of product and specification section.
    - h. Complete test or inspection data.
    - i. Test results and an interpretation of test results.
    - j. Ambient conditions at the time of sample taking and testing.
    - k. Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.

- I. Name and signature of laboratory inspector.
    - m. Recommendations on retesting.
  2. Provide 2 (two) copies to the Project Officer of each test and inspection report.
  3. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results shall be signed by a testing laboratory representative authorized to sign certified test reports.
  4. Furnish the signed reports, certifications, and other documentation to the Contracting Officer or his designated representative via the QC Manager. Furnish a summary report of field tests at the end of each month. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month.

### 1.13 QUALITY CONTROL CERTIFICATIONS AND COMPLETION INSPECTIONS

#### A. QC Certifications

1. Contractor Quality Control Report Certification. Each Contractor QC Report shall contain the following statement:
2. "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report." (signed by the QC Manager)
3. Invoice Certification. Furnish a certificate to the Contracting Officer with each payment request, signed by the QC Manager, attesting that Project Record Documents are current and attesting that the work for which payment is requested, including stored material, is in compliance with Contract requirements.
4. Completion Certification. Upon completion of work under this Contract, the QC Manager shall furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract."

#### B. Completion Inspections

1. Punch-Out Inspection.
  - a. Near the completion of all work or any increment thereof established by a contract clause or stated elsewhere in the specifications, the QC Manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications.
  - b. Include in the punch list any remaining items on the "Rework Items List" which were not corrected prior to the Punch-Out Inspection.
  - c. The punch list shall include the estimated date by which the deficiencies will be corrected. A copy of the punch list shall be provided to the Contracting Officer.
  - d. The QC Manager or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected.
  - e. The Contractor shall notify the Contracting Officer or his designated representative that the facility is ready for the NIH Pre-Final Inspection.
2. Pre-Final Inspection
  - a. The NIH will perform this inspection to verify that the facility is complete and ready to be occupied. A NIH Pre-Final Punch List may be developed as a result of this inspection.

- b. Any items noted on the Pre-Final inspection shall be corrected in a timely manner and shall be accomplished before the contract completion date or phase completion date if the project is divided into phases with separate completion dates.
  - c. The QC Manager shall ensure that all items on the Pre-Final Punch List are corrected prior to notifying the NIH that a Final inspection with the customer can be scheduled.
3. Final Acceptance Inspection
- a. The QC Manager, the superintendent or other primary contractor management personnel, and the Contracting Officer's representative will be in attendance at this inspection. Additional NIH personnel may be in attendance.
  - b. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final Inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the Final Inspection stating that all specific items previously identified to the Contractor as being unacceptable, along with all the remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.
  - c. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the additional NIH inspection costs in accordance with the Contract Clause entitled "Inspection of Construction."
  - d. When the Contracting Officer takes possession of partially completed work, it will be in accordance with Contract Clause "Use and Possession Prior to Completion".

1.14 QUALITY CONTROL DOCUMENTATION.

- A. Maintain current and complete records of on-site and off-site QC Program operations and activities. QC Documentation is to be coordinated with Division 1 Sections "Construction Progress Documentation," "Photographic Documentation," "Closeout Procedures," and "Project Record Documents" if included in the project specifications.
- B. The Contractor shall have an identification and data retrieval system. Records, reports, drawings, submittals, and equipment shall be identified to reference the following:
  - 1. Contract Number
  - 2. Contract Specification Number
  - 3. Contract Drawing Number
  - 4. Submittal Document Number
  - 5. Contract Change Number
- C. Quality Control Site Records. Establish and maintain on the jobsite the following documentation readily available to the NIH Project Officer during all business hours.
  - 1. All completed Preparatory and Initial Phase Checklists, arranged by specification section.
  - 2. All milestone inspections, arranged by Activity/ Event Number.
  - 3. Photographic Documentation
  - 4. A current up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section.
  - 5. Copies of all contract modifications, arranged in numerical order. Also include documentation that the modified work was accomplished.
  - 6. A current up-to-date copy of the Rework Items List.

7. Current up-to-date copies of all punch lists issued by the QC Staff of the Contractor and Sub-Contractors and all punch lists issued by the NIH.
- D. Contractor Production Report. Reports are required for each day that work is performed and shall be attached to the Contractor Quality Control Report prepared for the same day. Account for each calendar day throughout the life of the Contract. The reporting of work shall be identified by terminology consistent with the construction schedule as described in Division 1 Section "Construction Progress Documentation."
- E. Contractor Quality Control Report. Reports are required for each day that work is performed and for every seven consecutive calendar days of no work and on the last day of a no-work period. Account for each calendar day throughout the life of the Contract. The reporting of work shall be identified by terminology consistent with the construction schedule.
  1. Contractor Quality Control Reports are to be prepared, signed and dated by the QC Manager and shall contain the following information:
    - a. Date of report, report number, Contract Number, and Contract Title.
    - b. Indicate if Preparatory Phase work was performed (Yes/No checkboxes).
    - c. If Preparatory Phase work was performed (including on-site and off-site work), identify its Schedule Activity Number and DFOW. The Index # is a cross reference to the Preparatory Phase Checklist. An example of the Index # is: 0025-P01, where "0025" is the Contractor Quality Control Report Number, "P" indicates Preparatory Phase, and "01" is the Preparatory Phase Checklist number(s) for this date. Each entry in this section must be accompanied with a corresponding copy of the Preparatory Phase Checklist.
    - d. Indicate if Initial Phase work was performed (Yes/No checkboxes).
    - e. If Initial Phase work was performed today (including on-site and off-site work), identify its Schedule Activity No. and DFOW. The Index # is a cross reference to the Initial Phase Checklist. An example of the Index # is: 0025-I01, where "0025" is the Contractor Quality Control Report Number, "I" indicates Initial Phase, and "01" is the Initial Phase Checklist number(s) for this date. Each entry in this section must be accompanied with a copy of the corresponding Initial Phase Checklist.
    - f. Results of the Follow-up Phase inspections held that day (including on-site and off-site work), including Schedule Activity No., the location of the DFOW, Specification Sections, etc. Indicate in the report for this definable feature of work that the work complies with the Contract as approved in the Initial Phase, work complies with safety requirements, and that required testing has been performed and include a list of who performed the tests.
    - g. List the rework items identified, but not corrected by close of business; along with its associated Schedule Activity Number.
    - h. List the rework items corrected from the rework items list along with the corrective action taken and its associated Schedule Activity Number.
    - i. Include a "remarks" section in this report which will contain pertinent information including directions received, QC problem areas, deviations from the QC Plan, construction deficiencies encountered, photographic documentation accomplished, QC meetings held, acknowledgement that as-built drawings have been updated, corrective direction given by the QC Organization and corrective action taken by the Contractor. For each remark given, identify the Schedule Activity Number that is associated with the remark.
    - j. Contractor Quality Control Report certification, signature and date.
  2. Attach a summary report to the last daily Contractor Quality Control Report of each month.
    - a. Include reference to submission of Monthly Integrated Pest Management Report.

- b. Include reference to monthly Energy Conservation Report.
- F. Preparatory Phase Checklist. Each DFOW that is in the Preparatory Phase shall have this checklist filled out for it. The checklist shall be identified by terminology consistent with the construction schedule. Attach a copy of the completed checklist to the Contractor Quality Control Report of the same date.
1. The checklist shall contain the following information:
    - a. Specification Section, date of report, and Contract number shall be filled out. Duplicate this information in the header of the second page of the report.
    - b. DFOW, Schedule Activity Number and Index # entry and format will match entry in the Preparatory Phase section of the Contractor Quality Control Report. Duplicate this information in the header of the second page of the report.
    - c. Personnel Present: Indicate the number of hours of advance notice that was given to the NIH Representative and indicate (Yes/No checkboxes) whether or not the NIH Rep was notified. Indicate the Names of Preparatory Phase Meeting attendees, their position and company/NIH Activity they are with.
    - d. Submittals: Indicate if submittals have been approved (Yes/No checkboxes), if no indicate what has not been submitted. Are materials on hand (Yes/No checkboxes) and if not, what items are missing. Check delivered material/equipment against approved submittals and comment as required.
    - e. Material Storage: Indicate if materials/equipment is stored properly (Yes/No checkboxes) and if not, what action is/was taken.
    - f. Specifications: Review and comment on specification paragraphs that describe the material/equipment, procedure for accomplishing the work and clarify any differences.
    - g. Preliminary Work & Permits: Ensure preliminary work is in accordance with the contract documents and any necessary permits are on file, if not, describe the action taken.
    - h. Testing: Identify who performs tests, the frequency, and where tests are to occur. Review the testing plan, report abnormalities, and if the test facilities have been approved.
    - i. Safety: Indicate if an activity hazard analysis has been reviewed (Yes/No checkboxes) and comment on the review of the applicable portions of OSHA Regulations (Standards) 29 CFR 1926.
    - j. Meeting Comments: Note comments and remarks during the Preparatory Phase Meeting that were not addressed in previous sections of this checklist.
    - k. Other Items or Remarks: Note any other remarks or items that were a result of the Preparatory Phase.
  2. QC Manager will sign and date the checklist.
- G. Initial Phase Checklist. Each DFOW that is in the Initial Phase shall have this checklist filled out for it. The checklist shall be identified by terminology consistent with the construction schedule. Attach this checklist to the Contractor Quality Control Report of the same date.
1. The checklist shall contain the following information:
    - a. Specification Section, date of report, and Contract number shall be entered.
    - b. DFOW, Schedule Activity Number and Index Number entry and format will match entry in the Initial Phase section of the Contractor Quality Control Report.
    - c. Personnel Present: Indicate the number of hours of advance notice that was given to the NIH Representative and indicate (Yes/No checkboxes) whether or not the NIH Rep was notified. Indicate the Names of Initial Phase Meeting attendees, their position and company/NIH Activity they are with.

- d. Procedure Compliance: Comment on compliance with procedures identified at Preparatory Phase of Control and assurance that work is in accordance with plans, specifications and submittals.
  - e. Preliminary Work: Ensure preliminary work being placed is in compliance and if not, what action is/was taken.
  - f. Workmanship: Identify where initial work is located; if a sample panel is required (Yes/No checkboxes); is the initial work the sample (Yes/No checkboxes); and if Yes, describe the panel location and precautions taken to preserve the sample.
  - g. Resolution: Comment on any differences and the resolutions reached.
  - h. Check Safety: Comment on the safety review of the job conditions.
  - i. Other: Note any other remarks or items that were a result of the Initial Phase.
2. The QC Manager will sign and date the checklist.
- H. Reports from the QC Specialist(s).
1. Reports are required for each day that work is performed in their area of responsibility. QC specialist reports shall include the same documentation requirements as the Contractor Quality Control Report for their area of responsibility.
  2. QC specialist reports are to be prepared, signed and dated by the QC specialists and shall be attached to the Contractor Quality Control Report prepared for the same day.
- I. Testing Plan and Log.
1. As tests are performed, the QC Manager shall record on the "Testing Plan and Log" the date the test was conducted, the date the test results were forwarded to the Contracting Officer, remarks and acknowledgement that an accredited or Contracting Officer approved testing laboratory was used.
  2. Attach a copy of the updated "Testing Plan and Log" to the last daily Contractor Quality Control Report of each month.
  3. Testing Plan and Log may be an expanded version of the Testing and Inspection Schedule.
- J. Rework Items List.
1. The QC Manager shall maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected.
  2. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the "Rework Items List" to the last daily Contractor Quality Control Report of each month.
  3. The Contractor shall be responsible for including on this list items needing rework including those identified by the Contracting Officer.
- K. Record Documents.
1. The QC Manager is required to ensure the record documents including Record Drawings and Record Specifications required by Division 1 Section "Closeout Procedures" and Division 1 Section "Project Record Documentation" are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings.
  2. Ensure each deviation has been identified with the appropriate modifying documentation (e. g. PC No., Modification No., Request for Information No., etc.).
  3. The QC Manager , shall initial each deviation and each revision.
  4. Upon completion of work, the QC Manager shall furnish a certificate attesting to the accuracy of the Record Documents prior to submission to the Contracting Officer.

- L. Report Forms. The Project Officer will make available sample formats for the various reports required by this contract which will meet the requirements of this specification. While use of these specific formats are not required, any other format used shall contain the same information.
  
- M. Notification of Non-Compliance. The Contracting Officer will notify the Contractor of any detected non-compliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time for excess costs or damages by the Contractor.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 014500



## SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities and security and protection. All costs associated with such work and subsequent removal shall be the sole burden of the Contractor. The Contractor is responsible for any repairs required to restore City of Rockville property to original or better condition if so damaged by temporary construction.
- B. Temporary utilities include but are not limited to the following:
  - 1. Temporary water service and distribution.
  - 2. Temporary electric power and lighting.
  - 3. Temporary heat and ventilation.
- C. Support facilities include but are not limited to the following:
  - 1. Construction Signage.
  - 2. Waste disposal services.
  - 3. Other construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include but are not limited to the following:
  - 1. Security enclosure and lockup.
  - 2. Barricades, warning signs, and lights.
- E. Provide temporary facilities and controls required for construction activities except, if any, for facilities and controls indicated as existing or provided by City of Rockville or others.
- F. City of Rockville will not be responsible for any cost or use charges for temporary facilities or utilities as a basis of claims for Change Orders.
- G. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to temporary facilities and controls. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Work Restrictions"
  - 3. Division 1 Section "Project Management and Coordination"
  - 4. Division 1 Section "Quality Requirements"
  - 5. Division 1 Section "References"
  - 6. Division 1 Section "Construction Quality Control"
  - 7. Division 1 Section "Safety and Health"

8. Division 1 Section "Execution Requirements"
9. Division 1 Section "Cutting and Patching"
10. Division 1 Section "Selective Demolition"
11. Division 1 Section "Closeout Procedures"
12. Division 1 Section "Project Record Documents"
13. Division 1 Section "Operation and Maintenance Documentation"
14. Division 1 Section "Demonstration and Training"

### 1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by the Project Officer, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

### 1.4 UTILITY USE CHARGES

- A. The Contractor shall provide all temporary utilities which are used and required by all entities engaged in construction activities at the Project site.
- B. The point at which the City of Rockville will deliver such utilities and the quantity available are as directed by the Project Officer. The Contractor shall pay all costs incurred in connecting, converting and transferring City of Rockville utilities to the work. The Contractor shall make connections, including providing backflow preventing devices on connections to domestic water lines, shall provide transformers, and shall make all disconnections.
- C. Water Service: The Contractor may use reasonable amounts of water from the existing City of Rockville water system, without metering and without payment of use charges.
- D. Sewer Service: The Contractor may use the existing City of Rockville sewer system, without payment of use charges.
- E. Electric Power Service: The Contractor may use reasonable amounts of electric power from the existing City of Rockville electric power distribution system, without metering and without payment of use charges.

### 1.5 SUBMITTALS

- A. Reports: Submit reports of tests, inspections, meter readings and similar procedures for temporary utilities.
- B. Implementation and Termination Schedule: Within 15 calendar days after the date established for the submittal of the Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility. If implementation or termination will interrupt utility service outside the limit of construction include milestones for submission of outage requests in the schedule. Coordinate schedule with requirements for the Utility Service Interruption Plan contained in Division 1 Section "Project Management and Coordination."
- C. Shop Drawings: Submit layout indicating location of all fencing, gate locations, and size and type of fencing and gates

- D. State of Maryland Stormwater Management requirements: Submit 2 signed copies of the proposed Sequence of Construction plan sent by the Contractor to the State of Maryland to the Project Officer. Submit 1 copy of the State of Maryland approval to the Contracting Officer.
- E. Integrated Pest Management (IPM) Program. Within 14 calendar days after the date of Notice to Proceed, submit the following for approval:
  - 1. IPM Service Plan. The plan shall include a description of the implemented pest management program during all phases of construction. Include at a minimum, the following:
    - a. Grounds and ground cover for task orders which involve any exterior work.
    - b. Solid waste management.
    - c. Site (interior and exterior) sanitation.
    - d. Other factors that contribute to pest infestation.
    - e. Regularly scheduled monitoring and survey program for the identification and control of insect and rodent pests.
  - 2. Identification of the IPM Quality Control supervisor. Include a copy of the qualification certificate and resume.
  - 3. Copy of the Commercial Pesticide Applicators Business License.
  - 4. Copy of Pesticide Applicators Certificates and resume for all personnel assigned to each task order.

#### 1.6 QUALITY REQUIREMENTS

- A. Standards and Regulations: Comply with industry standards and with applicable laws and regulations of authorities having jurisdiction, including but not limited to the following:
  - 1. Building code requirements.
  - 2. Health and Safety regulations.
  - 3. Utility company regulations.
  - 4. Police, fire department and rescue squad rules.
  - 5. Environmental protection regulations.
  - 6. NFPA 241 "Standards for Safeguarding Construction, Alterations and Demolition Operations".
  - 7. ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition".
  - 8. NECA Electrical Design Library "Temporary Electrical Facilities", and NEMA, NECA and UL standards and regulations for temporary electric service. Install service in accordance with NFPA 70, "National Electric Code."
  - 9. Maryland Pesticide Applicators Laws and Regulations.
- B. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

#### 1.7 PROJECT CONDITIONS

- A. Install, operate, maintain and protect temporary facilities and controls.
  - 1. Keep temporary services and facilities clean and neat in appearance.
  - 2. Operate temporary services in a safe and efficient manner.
  - 3. Relocate temporary services and facilities as needed as work progresses.

4. Do not overload temporary services and facilities or permit them to interfere with progress.
  5. Provide necessary fire prevention measures.
  6. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on-site.
- B. Prepare a schedule indicating dates for implementation and termination of each temporary utility and incorporate into the project schedule. At the earliest feasible time, when acceptable to the Project Officer, change over from temporary services to use of permanent services and remove temporary facilities when no longer needed.
- C. Temporary Use of Permanent Facilities: Contractor shall assume responsibility for the operation, maintenance and protection of each permanent service during its use as a construction facility prior to acceptance by NIH.
- D. Existing Equipment and Items: Cover or otherwise protect and provide security for existing equipment and other items that are to remain in place, to prevent soiling, damage and loss.
1. Temporarily move equipment and other items that interfere with the performance of required work. Upon completion of the work, return the equipment and items to their original location and installation condition.
  2. Store equipment and other items that have been temporarily removed. Upon reinstallation, clean and, if damaged, repair or replace equipment and items to match their condition prior to removal.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide new or undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Tarpaulins: Waterproof, fire-resistant UL labeled with flame spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- C. Water: Potable and approved by local health authorities.
- D. Wood: Lumber complying with DOC PS 20 and applicable grading rules of an inspection agency certified by ALSC's Board of Review for specific use. Provide preservative treated lumber where partially or fully in contact with the earth, concrete or masonry.
- E. Sign, Directory and Other Graphic Panel Materials: Unless otherwise indicated, products shall comply as follows:
1. Panels: Exterior type Grade B-B high density concrete-form-overlay plywood.
  2. Paint: Exterior primer and exterior grade alkyd gloss enamel top coat.
- F. Safety Barrier and Covered Walkway Materials: Unless otherwise indicated, products shall comply as follows.
1. Panels: Minimum **5/8 inch (16 mm)** thick exterior plywood.
  2. Paint: Exterior primer and exterior grade acrylic-latex emulsion top coat.

- G. Open-Mesh Fencing: Minimum **0.12 inch (3 mm)** thick galvanized **2 inch (50 mm)** chainlink fabric fencing with galvanized steel pipe posts, **1-1/2 inches (38 mm)** inside diameter for line posts and **2-1/2 inches (64 mm)** inside diameter for corner posts. At the discretion of the Project Officer, steel posts and vinyl "snow fencing", or removable chain link fencing, may be provided on a temporary basis for work areas adjacent to the project site.
  - 1. Fence height: Minimum **8 feet (2.5 m)**.
  - 2. Top Protection: Galvanized barbed-wire top strand.
  
- H. Open-Mesh fencing with Vinyl Slats: Minimum **0.12 inch (3 mm)** thick galvanized **2 inch (50 mm)** chainlink fabric fencing with galvanized steel pipe posts, **1-1/2 inches (38 mm)** inside diameter for line posts and **2-1/2 inches (64 mm)** inside diameter for corner posts.
  - 1. Fence height: Minimum **8 feet (2.5 m)**.
  - 2. Top Protection: Galvanized barbed-wire top strand.
  - 3. Vinyl Slats: Dark Brown, installed vertically.
  
- I. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
  
- J. Gypsum Board: Minimum **1/2 inch (12.7 mm)** thick by **48 inches (1219 mm)** wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.
  
- K. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
  
- L. Job-Built Temporary Office, Shop and Shed Materials: Unless otherwise indicated, products shall comply with the following:
  - 1. Framing, Sheathing and Siding: UL labeled fire-treated lumber and plywood.
  - 2. Roofing: UL Class A standard weight asphalt shingles, or UL Class C mineral surfaced roll roofing.
  - 3. Exterior Paint: Exterior primer and exterior grade acrylic-latex emulsion top coat as specified in Division 9 Section "Painting".
  - 4. Interior Wall Panels for Offices: Gypsum board as specified above.
  - 5. Interior Paint for Offices: 2 coats interior latex-flat wall paint as specified in Division 9 Section "Painting."

## 2.2 EQUIPMENT

- A. General: Provide new or undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended. All equipment must meet applicable local codes governing its use.
  
- B. Water Hoses: **3/4 inch (19 mm)** heavy duty abrasion-resistant flexible rubber hoses, **100 feet (30 m)** long with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
  
- C. Electric Outlets: Properly configured NEMA-polarized outlets to prevent insertion of 110 to 120 Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground fault circuit interrupters, reset button and pilot light for connection of power tools and equipment.
  
- D. Electric Power Cords: Grounded extension cords.
  - 1. Provide hard-service cords where exposed to abrasion or traffic.

2. Provide waterproof connectors to connect separate lengths of electric cords where single lengths will not reach areas of construction activity.
  3. Do not exceed safe length-voltage ratio.
- E. Lamps and Light Fixtures: General service incandescent lamps of wattage required for adequate illumination.
1. Provide guard cages or tempered glass enclosures where exposed to breakage.
  2. Provide exterior fixtures where exposed to moisture.
- F. Unless the Project Officer authorizes the use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel consumed as appropriate for the space being heated.
- G. Temporary Offices: Prefabricated or mobile units or similar job-built enclosures, inclusive of but not limited to lockable entrances, operable windows, serviceable finishes, heating and air conditioning, electric power and lighting, and foundations adequate for the loads.
- H. Self-Contained Toilet Units: Temporary single-occupant toilet units of the chemical, aerated recirculation, or combustion type for use by all construction personnel. Units shall be properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- I. Fire Extinguishers: Hand-carried portable UL-rated fire extinguishers.
1. Class A extinguishers for temporary offices and similar spaces.
  2. Class ABC dry chemical extinguishers or a combination of extinguishers of NFPA recommended classes for the exposures in other locations.
  3. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent and size required by location and class of fire exposure.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Use qualified personnel for installation of temporary facilities.
- B. Locate facilities where they will serve the project adequately and result in minimum interference with performance of construction activities. Maintain, relocate and modify facilities as required during the construction period. Contractor is responsible for scheduling in order to provide each facility ready for use when needed to avoid delay. Temporary facilities shall remain in place until no longer needed or are replaced by authorized use of completed permanent facilities.

#### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: The Contractor shall connect to existing services.

1. Notification to interrupt any building service and/or utility service shall be requested in writing to the Project Officer a minimum of 15 working days prior to the desired date of interruption. CITY OF ROCKVILLE reserves the right to refuse any request and to schedule such interruption on a later or earlier date and time which is mutually agreeable to CITY OF ROCKVILLE and the Contractor.
  2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
  3. Obtain easements to bring in temporary utilities to the site where CITY OF ROCKVILLE easements are not available for that purpose.
- B. Water Service: Install temporary water service and distribution piping of sizes and pressures adequate for construction needs until permanent water service is in use. Sterilize water piping prior to use.
1. Provide rubber hoses as necessary to serve Project site.
  2. As soon as water is required at each level, extend service to form a temporary water- and fire-protection standpipe. Provide distribution piping. Space outlets so water can be reached with a 100-foot (30-m) hose. Provide one hose at each outlet.
  3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
  4. Provide backflow preventors at connections to existing water service.
  5. Provide pumps to supply a minimum of 30-psi (200-kPa) static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.
- C. Electric Power Service: Provide weatherproof, grounded, electric power service and distribution system of sufficient size, capacity and power characteristics for construction needs. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
1. Make connections at location(s) designated by the Project Officer.
  2. Feeder and branch wiring with area distribution boxes shall be located so that power is available throughout the project site by use of power cords.
  3. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
  4. Install all electrical devices, both temporary and permanent, in accordance with the National Electric Code.
  5. Provide 4-gang outlets, spaced so 100-foot (30-m) extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.
- D. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions at all times.
1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system.
  2. Install temporary lighting in accordance with the National Electric Code.
- E. Heating and Cooling: Provide temporary heat and cooling required for the construction activities in new and existing spaces, including but not limited to curing or drying completed installations and protecting construction from adverse effects of low temperatures and/or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain a minimum temperature of 50 degrees F (10 degrees C) in permanently enclosed portions of building for normal construction activities, and 65 degrees F (18.3 degrees C) for finishing activities and areas where finished Work has been installed.
  2. Provide temporary heating and cooling for occupied CITY OF ROCKVILLE spaces where construction activities preclude the existing heating and cooling systems from maintaining normal operating temperatures.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Heating Facilities: Except where CITY OF ROCKVILLE authorizes use of the permanent system, provide vented self-contained, LP-gas or fuel oil heaters with individual space thermostatic control. Do not use gasoline-burning space heaters, open flame or salamander-type heating units. All temporary heating and cooling systems shall be operated in accordance with the manufacturer's instructions.
- H. Telephone Service: The Contractor shall provide temporary telephone service within the contract area only if requested in writing by the Project Officer. If required, telephone service shall be removed prior to contract completion. The Contractor shall pay all costs of service. Installation and removal of service shall be subject to the approval of the Project Officer.
- I. Sanitary and Drinking Water Facilities: Provide temporary toilets, wash facilities and drinking water fixtures in compliance with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  2. Toilets: Use of existing CITY OF ROCKVILLE toilet facilities will be permitted. Clean and maintain facilities in a condition acceptable to the Contracting Officer and, at completion of construction, restore facilities to condition prevalent at the time of initial use.
  3. Toilets: Install separate self-contained toilet units for male and female personnel. Shield toilets to ensure privacy.
  4. Toilets: Install temporary toilet facilities connected to local water and sanitary lines. Provide lavatories, mirrors, urinals, and water closets. Provide only potable-water connections. Provide individual compartments for water closets. Provide suitable enclosure with nonabsorbent sanitary finish materials and adequate heat, ventilation, and lighting.
  5. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Supply cleaning compounds appropriate for each type of material handled.
    - a. Dispose of drainage through proper connections to local sanitary lines.
    - b. Supply cleaning compounds appropriate for each condition.
    - c. Include safety showers, eyewash fountains and similar facilities for the convenience, safety and sanitation of personnel.
  6. Drinking-Water Fixtures: Install drinking-water fountains connected to the existing water service where indicated.
  7. Drinking -Water Facilities: Provide bottled-water, drinking-water units.
    - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 degrees F (7.2 to 12.7 degrees C).



- J. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers can not be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
- K. Sewers and Drainage: Where sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available, provide containers to remove and dispose of effluent off-site in a lawful manner.
  - 1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways.
  - 2. Connect temporary sewers as directed by the Project Officer and sewer utility officials.
  - 3. Maintain temporary sewers and facilities in a clean, sanitary condition. Following use, promptly restore sewers and facilities to normal conditions.
- L. Erosion and Sediment Control: The Contractor shall comply with all provisions of the Maryland Department of the Environment requirements for Storm Water Management, including all required submittals to the state.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. Construction Signage and Other Temporary Signs: Locate signs where indicated or directed by the Project Officer to inform the public and instruct persons seeking entrance to the project. Support exterior signs on posts or framing of steel or preservative-treated wood. All signage shall conform to the standards set forth in the DCAB Guide for Construction Site Signage.
  - 1. Exterior Construction Site Sign: All exterior construction sites shall have at least one and not more than three site signs. Signs will be provided by the Project Officer for installation by the Contractor. The Contractor shall provide a written request to the Project Officer 21 calendar days before work starts of his need for exterior construction site signs. The signs for smaller projects and those with a construction duration of less than six months will be 3' x 4'.
  - 2. Interior Construction Sign:
    - a. All interior construction areas shall have a minimum of 2 interior construction information signs. The signs will be provided by the Project Officer for installation by the Contractor. The Contractor shall provide a written request to the Project Officer 21 calendar days before work starts of his need for the Interior Construction Signs. The signs shall be placed on site not less than 14 calendar days prior to the start of construction. The signs will be either 8 1/2" x 11" or 11" x 17".
    - b. Construction in Progress Door Hanger Signs: Door hanger signs shall be hung on the door knobs on the outside of the entrance door(s) of the room(s) in which construction is being performed. The signs will be provided by the Project Officer for installation by the Contractor. The Contractor shall provide a written request to the Project Officer 21 calendar days before work starts of his need for the Construction in Progress signs. Include the number of signs needed. Door hanger signs shall be in place not less than 7 calendar days prior to construction. The signs are 100 x 225 mm paper.
    - c. Construction in Your Neighborhood Door Hanger Signs: Door hanger signs shall be hung on the door knobs on the outside of the adjacent corridors entrance door(s) on floors above and below the room(s) that may be affected by construction. The signs will be provided by the Project Officer for installation by the Contractor. The Contractor shall provide a written request to the Project Officer 21 calendar days before work starts of his need for the Construction in

Progress signs. Include the number of signs needed. Door hanger signs shall be in place not less than 7 calendar days prior to construction. The signs are 100 x 225mm paper.

3. Hard Hat Area Sign: The entire work area under this contract is designated as a Hard Hat Area. The Contractor shall assure that all contractor personnel, vendors, and visitors utilize hard hats within the project area. The Contractor shall provide hard hat area signs at each entrance to the Project site for all construction work performed under this contract. Sign shall be approximately 450 x 600 mm, with minimum 50 mm tall lettering as follows:

**HARD HAT AREA  
AUTHORIZED PERSONNEL ONLY  
ALL PERSONNEL ENTERING THIS  
CONSTRUCTION SITE SHALL BE EQUIPPED  
WITH PROPER SAFETY ATTIRE**

4. Asbestos Abatement Sign: The Contractor shall provide asbestos demolition signs during any asbestos demolition and removal activities in accordance with the requirements in Division 2 Section "Removal of Asbestos Material."
  5. Other Temporary Signs: The Contractor shall provide all signage for temporary construction, closing of roads, parking lots, sidewalks or other areas. Signage shall conform to the standards set forth in the DCAB Guide for Construction Site Signage. A copy of the guide may be obtained from the Project Officer.
  6. Do not permit installation of unauthorized signs.
- B. Waste Disposal Facilities:
1. See Division 1 Section "Use, Handling, Storage, Transporting, Accumulation and Disposal of CITY OF ROCKVILLE Controlled Material" for specific requirements related to waste disposal.
  2. Provide waste-collection containers in sizes adequate to handle waste from construction operations.
  3. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
- C. Janitorial Services: Provide janitorial services on a daily basis for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas.
- D. Temporary Elevator Usage: Refer to Division 14 Sections for temporary use of new elevators.
- E. Existing Elevator Usage: See Division 1 Section "Work Restrictions" for additional requirements on use of existing elevators.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- F. Existing Stair Usage: Use of existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to NIH. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

- G. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Enforce requirements strictly and dispose of material lawfully.

1. Comply with NFPA 241 for removal of combustible waste material and debris.
2. Do not hold waste materials more than 7 days during periods when the ambient temperature remains continuously less than 80 degF (27 degC), or more than 3 days when the temperature exceeds or is expected to rise above 80 degF (27 degC).
3. Handle and properly containerize hazardous, dangerous or unsanitary waste materials separately from other waste.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

- B. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard involved. Where appropriate and needed, provide lighting, including flashing red or amber lights.

- C. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

1. Storage: Provide a secure lockup for valuable stored materials and equipment.
2. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

- D. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of types needed to protect against reasonably predictable and controlled fire losses. Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".

1. Comply with NFPA 10 "Standard for Portable Fire Extinguishers". Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
  - a. Field Offices: Class A stored-pressure water-type extinguishers.
  - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
2. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each access route exit or entrance.
3. Store combustible materials in containers in fire-safe locations.

4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities and access routes. Prohibit smoking in hazardous fire-exposure areas.
  5. Provide supervision of welding operations, combustion-type temporary heating units and other sources of fire ignition.
  6. All required standpipe systems and sprinkler systems shall be maintained in conformity with the progress of building activity in such a manner that they are always in working order.
  7. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  8. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
  9. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
- E. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facilities, including connected services, and place into operation and use. Instruct key personnel in the use of the facilities.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress or completed, from exposure, inclement weather, other construction operations and similar conditions.
1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions or unacceptable effects.
  2. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
  3. Vertical Openings: Close openings of **25 sq. ft. (2.3 sq. m.)** or less with plywood or similar materials.
  4. Horizontal Openings: Close openings through floor or roof decks and other horizontal surfaces with load-bearing wood-framed construction.
  5. Where enclosure exceeds **100 sq. ft. (9.2 sq. m)** in area, use UL labeled fire-retardant-treated wood and plywood for framing and sheathing.
- G. Safety: The contractor shall protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor shall obtain prior approval from the Project Officer. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, the Contractor shall provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and shall obtain prior written approval from the Project Officer.

### 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect underground lines from damage during excavation operations.
- C. Temporary Facility Changeover: Except for using permanent fire protection facilities as soon as available, do not change over from temporary protection facilities until authorized by the Project Officer.
- D. Termination and Removal: Unless the Project Officer requests that a temporary facility be maintained longer, each temporary facility shall be removed when the need for its service has ended, when it can be replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are the property of the Contractor, except City of Rockville reserves the right to take possession of project identification signs.
  2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for subsoil or fill in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, in accordance with the requirements of the governing authority.

END OF SECTION 015000



## SECTION 015950 - SAFETY AND HEALTH

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. References: In addition to publications referenced in the Construction Contract Clauses, the following Code of Federal Regulations (CFR) publications designate and define hazardous materials and conditions, and establish procedures for handling these materials and conditions. Omission of any publication in this section does not remove any obligation or legal requirement on the part of the contractor to comply with all legal requirements for the location of the work.

1. 29 CFR, Part 1910: Occupational Safety and Health Administration (OSHA) General Industry and Health Standards.
2. 29 CFR, Part 1926: OSHA Construction Industry Standards.
3. 40 CFR, Part 61: National Emission Standards for Hazardous Air Pollutants.
4. 40 CFR, Part 261: Environmental Protection Agency (EPA) Characteristics of Hazardous Waste.
5. 40 CFR, Part 761, EPA Polychlorinated Biphenyls (PCBs), Manufacturing, Processing, Distribution in Commerce and Use Prohibitions.
6. 40 CFR, Part 763: EPA Asbestos.
7. Federal Standard 313A: Material Safety Data Sheets, Preparation and the Submission of.

- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to cutting and patching. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Work Restrictions"
3. Division 1 Section "Project Management and Coordination"
4. Division 1 Section "Submittal Procedures"
5. Division 1 Section "Quality Requirements"
6. Division 1 Section "References"
7. Division 1 Section "Construction Quality Control"
8. Division 1 Section "Temporary Facilities and Controls"
9. Division 1 Section "Safety and Health"
10. Division 1 Section "Product Requirements"
11. Division 1 Section "Execution Requirements"
12. Division 1 Section "Cutting and Patching"
13. Division 1 Section "Selective Demolition"
14. Division 1 Section "Closeout Procedures"
15. Division 1 Section "Operation and Maintenance Documentation"
16. Division 1 Section "Project Record Documents"
17. Division 1 Section "Demonstration and Training"
18. Division 13 Section "Removal of Asbestos Materials"

- C. Hazardous Materials: Some hazardous and toxic materials and substances are included in 29 CFR Part 1910, subparts H and Z, and in 29 CFR Part 1926 and others additionally defined in Federal Standard 313A. Commonly encountered hazardous materials include but are not limited to asbestos, PCBs, explosives and radioactive material.
  - 1. Asbestos may be found in spray-on fireproofing, insulation, boiler lagging, pipe coverings and other materials. See Division 13 Section "Removal of Asbestos Materials" for removal requirements.
  - 2. PCBs may be contained in transformers, capacitors, voltage regulators, oil switches, mechanical insulation and other materials.
- D. Acquisition of Publications: Referenced CFR publications may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

### 1.3 SUBMITTALS

- A. Contractor's Safety and Health Program: The contractor shall submit a Site Specific Safety and Health Program which includes a Site Specific Safety and Health Plan and a copy of the Company Safety and Health Plan to the Contracting Officer within 14 calendar days of the Notice to Proceed or before work commences on the project site, whichever is earlier.
  - 1. City of Rockville will review the submitted Safety and Health Plans for general conformance to the requirements of the Contract Documents.
  - 2. City of Rockville will not make any judgment as to the adequacy of the submitted plans with respect to federal, state, and local safety laws and safety regulations. If the plans are found to meet the requirements of the Contract Documents, City of Rockville will acknowledge that the Contractor has provided copies of the plans and accept them as meeting the contract requirement for the Contractor to provide copies of his safety program.
  - 3. City of Rockville will not approve any contractor Safety and Health Plan. Safety is the Contractor's responsibility under the current laws and governing regulation.
  - 4. Submission of the Safety and Health Plans to City of Rockville does not relieve the contractor of any safety responsibility.
  - 5. Specific content requirements for the Contractor's Safety and Health Program are included in this section.
- B. Accident Reports. The Contractor must submit to the Contracting Officer and Project Officer a written report within three calendar days of any accident, fire, emergency, theft or incident in which any personal or property damage took place, regardless of any other notifications performed. Include a copy of each accident report that is submitted by the Contractor or Subcontractors to their insurance carriers, within seven calendar days after the date of the accident.

### 1.4 PRECONSTRUCTION SAFETY MEETING

- A. Prior to commencing construction, representatives of the Contractor, including the general superintendent and one or more safety representatives, shall meet with the Contracting Officer for the purpose of reviewing Contract safety and health requirements.
  - 1. The Contractor's Safety and Health Program shall be reviewed, and implementation of safety and health provisions pertinent to the Work shall be discussed.



2. The Contractor shall be prepared to discuss, in detail, the Contractor's site specific Safety and Health Plan including measures intended to control any unsafe or unhealthy conditions associated with the work to be performed under the contract.
3. This meeting may be held in conjunction with the preconstruction conference, if so directed by the Contracting Officer. The conduct of this meeting is not contingent upon a general preconstruction meeting.
4. The level of detail for the safety meeting is dependent upon the nature of the work and the potential inherent hazards.
5. The Contractor shall advise the Contracting Officer of any special safety restrictions he has established so that City of Rockville personnel can be notified of these restrictions.
6. No later than 3 calendar days after the Preconstruction Safety Meeting, the Contractor shall distribute minutes of the meeting to each party present and to other concerned parties, including the Contracting Officer.

#### 1.5 COMPLIANCE WITH REGULATIONS

- A. Work shall comply with all applicable state and local safety and health regulations.
- B. In case of a conflict between applicable regulations, the more stringent requirements shall apply.
- C. Contractor Responsibility: The Contractor shall obtain all required permits for work to be performed. The Contractor shall assume full responsibility and liability for compliance with all applicable codes, standards and regulations pertaining to the health and safety of personnel during execution of the Work, and shall hold the Government harmless for any action on the Contractor's part, or that of the Contractor's employees or subcontractors, that results in illness, injury or death.

#### 1.6 ELECTRICAL

- A. The Contractor shall appoint an individual responsible for the electrical safety of each work team to restrict entry to dangerous locations to those authorized by him jointly with NIH.
- B. Electrical arc welding equipment shall not be connected to the building power supply.

#### 1.7 GAS PROTECTION

- A. The Contractor shall have one or more employees properly trained in operation of gas testing equipment and formally qualified as gas inspectors who shall be on duty during times workmen are in confined spaces. Their primary functions shall be to test for gas and operate testing equipment. Unless equipment of constant supervisory type with automatic alarm is employed, gas tests shall be made at least every 2 hours or more often when character of ground or experience indicates gas may be encountered. A gas test shall be made before workmen are permitted to enter the excavation after an idle period exceeding one-half hour.
- B. Readings shall be permanently recorded daily, indicating the concentration of gas, number and location of drilled piers, point of test, date, and time of test.
- C. Special requirements, coordination, and precautions will apply to areas that contain a hazardous atmosphere or, by virtue of their use or physical character, may be oxygen deficient. A check by CITY OF ROCKVILLE is required prior to entering areas that contain hazardous or

oxygen-deficient atmospheres. Surveillance and monitoring shall be required in these types of work spaces by both Contractor and Government personnel.

#### 1.8 MATERIAL DELIVERIE

- A. Whenever practicable, deliveries shall be made during regular CITY OF ROCKVILLE working hours and only when the Contractor's representative is available to receive them. Deliver material in approved containers and with properly licensed vehicles and operators. Open delivery vehicles are not permitted. Deliver materials in fully closed vehicles or tarp covered vehicles. All dump trucks shall be fully covered while in transport to and from the unloading site. All loads shall be securely fastened until unloading. Engines shall not be left running while vehicles are loading, unloading, waiting or parked. Do not block roads, walks, building entrances/exits, fire hydrants and standpipes, exterior tanks or building gas connections.

#### 1.9 HAZARDOUS MATERIALS

- A. The Contractor shall bring to the attention of the Contracting Officer, or the Contracting Officer's authorized representative, any material encountered during execution of the Work that the Contractor suspects is hazardous. The Contracting Officer shall determine whether the Contractor shall perform tests to determine if the material is hazardous. If the suspected material is leaking or spilling from its location the contractor is to contact the CITY OF ROCKVILLE Fire Department immediately.
- B. If the Contracting Officer directs the Contractor to perform tests on suspected hazardous materials and the material is found to be hazardous, or if the material is found to be hazardous without Contractor testing, and/or if additional protective measures are required, a change to the Contract price may be provided, subject to the applicable provisions of the Contract.

#### 1.10 ADDITIONAL CITY OF ROCKVILLE SAFETY REQUIREMENTS

- A. The Contractor shall comply with all established CITY OF ROCKVILLE Standards, Codes and Regulations and obtain appropriate approvals from the CITY OF ROCKVILLE Divisions of Safety, Health, Security and Fire Protection.
- B. No work shall be performed in any area occupied by the public or CITY OF ROCKVILLE employees unless approved by the Project Officer.
- C. In the event of an emergency in a construction site that has been secured with a chain, the CITY OF ROCKVILLE Fire Department will cut the chain to gain entry. The Contractor shall be responsible for a new chain.
- D. Accident Treatment and Records: The Contractor shall post emergency first aid information and CITY OF ROCKVILLE emergency Telephone Numbers at the work site.
- E. Safety Clearance Procedures (Lockout/Tagout Tag System). The following Lockout/Tagout procedures will be followed unless more stringent procedures are required by current laws and regulations. The following procedures do not relieve the contractor from any more stringent requirements of the applicable codes and regulations. The safety of contractor and CITY OF ROCKVILLE personnel in areas impacted by the project remains the contractor's responsibility during construction.

1. Lockout/Tagout procedures shall be in accordance with OSHA 29 CFR 1910 and OSHA 29 CFR 1926. Lockout/Tagout procedures shall be included in the Contractor's Safety and Health Plan.
2. Contractor shall ensure that each employee is familiar with and complies with these procedures.
3. The Project Officer will, at the Contractor's request, apply lockout/tagout tags and take other actions that, because of experience and knowledge, are known to be necessary to make the particular CITY OF ROCKVILLE equipment safe to work on.
4. No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout tag attached to it, nor shall such tag be removed except as provided in this section.
5. No person shall work on any equipment that requires a lockout/tagout tag unless he, his immediate supervisor, project leader, or a subordinate has in his possession the keys to the required lockout/tagout tags.
6. When work is to be performed on electrical circuits, the work shall be performed only by qualified personnel following the required safety procedures.
7. A Contractor's supervisor who is required to enter an area protected by a lockout/tagout tag will be considered a member of the protected group provided he notifies the holder of the tag stub each time he enters and departs from the protected area.
8. Identification markings on building light and power distribution circuit breakers shall not be relied on for establishing safe work conditions.
9. Before clearance will be given on any equipment other than electrical (generally referred to as mechanical apparatus), the apparatus, valves, or systems shall be secured in a passive condition with the appropriate vents, pins, and locks.
10. Pressurized or vacuum systems shall be vented to relieve differential pressure completely.
11. Vent valves shall be lockout/tagout tagged open during the course of the work.
12. Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry. See paragraph "Gas Protection."
13. Tag Placement
  - a. Lockout/tagout tags shall be completed in accordance with the regulations printed on the back thereof and attached to any device which, if operated, could cause an unsafe condition to exist.
  - b. If more than one group is to work on any circuit or equipment, the employee in charge of each group shall have a separate set of lockout/tagout tags completed and properly attached and locked.
  - c. When it is required that certain CITY OF ROCKVILLE owned and operated equipment be tagged, the CITY OF ROCKVILLE will review the characteristics of the various systems involved that affect the safety of the operations and the work to be done; take the necessary actions, including voltage and pressure checks, grounding, and venting, to make the system and equipment safe to work on; and apply such lockout/tagout tags to those switches, valves, vents, or other mechanical devices needed to preserve the safety provided. This operation is referred to as "Providing Safety Clearance."
14. Tag Removal
  - a. Lockout/tagout tags shall be removed only by those persons who initiated the lockout/tagout tag and who retain possession of the keys. Otherwise, lockout/tagout tags may be removed only with the authorization of the Project Officer.

1.11 PERSONNEL PROTECTIVE EQUIPMENT

- A. Special facilities, devices, equipment and similar items used by the Contractor in execution of the work shall comply with 29 CFR, Part 1910, Subpart I and other applicable regulations.

PART 2 - PRODUCTS

2.1 Safety and Health Programs: The Contractor shall submit copies of the written site specific project safety and health plan and emergency action procedures, as applicable to the work scope, as required as a result of the safety meeting, or as required by OSHA 29 CFR, Part 1926 including but not necessarily limited to the procedures and programs that support the requirements of the following:

- A. Designation of Safety Competent Person
- B. Occupational Noise Exposure.
- C. Fall Protection.
- D. Personnel Protective Equipment.
- E. Control of Hazardous Energy.
- F. Hazardous Materials Waste Management Plan (draft if final plan has not been accepted)
- G. Electrical Safety Related Work Practices.
- H. Lead.
- I. Asbestos.
- J. Respirator Protection.
- K. Confined spaces.
- L. Emergency evacuation and reporting

2.2 Contractor's Safety and Health Plan: In addition to specific safety and health programs applicable to the project, Contractor shall submit to the Project Officer a copy of the firm's general Safety and Health Plan listing emergency procedures and contact persons with home addresses and telephone numbers.

2.3 Permits: If hazardous materials are disposed of off-site, submit copies of shipping manifests and permits from applicable federal, state or local authorities and disposal facilities, and submit certificates that the material has been disposed of in accordance with regulations as required in Division 1 Section "Use, Handling, Storage, Transporting, Accumulation and Disposal of CITY OF ROCKVILLE Controlled Material".

2.4 Accident Reporting: The Contractor must submit to the Contracting Officer a written report within three calendar days of any accident, fire, emergency, theft or incident in which any

personal or property damage took place, regardless of any other notifications performed. Include a copy of each accident report that is submitted by the Contractor or Subcontractors to their insurance carriers, within seven calendar days after the date of the accident.

- A. Gas Test Reports: Submit copies of daily log of gas tests

## PART 3 - EXECUTION

### 3.1 EMERGENCY SUSPENSION OF WORK

- A. When the Contractor is notified by the Contracting Officer, or the Project Officer, of non-compliance with the safety or health provisions of the Contract, the Contractor shall immediately, unless otherwise instructed, correct the unsafe or unhealthy condition.
  - 1. If the Contractor fails to comply promptly, all or part of the work will be stopped by notice from the Contracting Officer.
  - 2. When, in the opinion of and by notice given by the Contracting Officer, satisfactory corrective action has been taken by the Contractor, work shall resume.
  - 3. The Contractor shall not be allowed any extension of time or compensation for damages in connection with a work stoppage for an unsafe or unhealthy condition.

### 3.2 PROTECTION OF PERSONNEL

- A. The Contractor shall take all necessary precautions to prevent injury to the public, occupants, or damage to property of others. The public and occupants includes all persons not employed by the Contractor or a subcontractor.
- B. Wherever practical, the work area shall be fenced, barricaded or otherwise blocked off from the public or occupants to prevent unauthorized entry into the work area.
  - 1. Provide traffic barricades and traffic control signage where construction activities occur in vehicular areas.
  - 2. Corridors, aisles, stairways, doors and exit ways shall not be obstructed or used in a manner to encroach upon routes of ingress or egress utilized by the public or occupants, or to present an unsafe or unhealthy condition to the public or occupants.
  - 3. Store, position and use equipment, tools, materials, scraps and trash in a manner that does not present a hazard to the public or occupants by accidental shifting, ignition or other hazardous activity.
  - 4. Store and transport refuse and debris in a manner to prevent unsafe and unhealthy conditions for the public and occupants. Cover refuse containers, and remove refuse on a frequent regular basis acceptable to the Contracting Officer. Use tarpaulins or other means to prevent loose transported materials from dropping from trucks.
- C. Alternate Precautions: When the nature of the work prevents isolation of the work area and the public or building occupants may be in or pass through, under or over the work area, alternate precautions such as the posting of signs, the use of signal persons, the erection of barricades or similar protection around particularly hazardous operations shall be used as appropriate.
- D. Public Thoroughfare: When work is to be performed over a public thoroughfare such as a sidewalk, roadway or other site access way, the thoroughfare shall be closed, if possible, or other precautions taken such as the installation of screens or barricades. When the exposure

to heavy falling objects exists, as during the erection of building walls or during demolition, special protection of the type detailed in 29 CFR, Parts 1910 and 1926 shall be provided.

### 3.3 ENVIRONMENTAL PROTECTION

- A. Dispose of solid, liquid and gaseous contaminants in accordance with local codes, laws, ordinances and regulations.
- B. Comply with applicable federal, state and local noise control laws, ordinances and regulations, including but not limited to 29 CFR, Part 1910.95 and 29 CFR, Part 1926.52.

### 3.4 HAZARDOUS MATERIALS

- A. Requirements for hazardous Materials are contained in Division 1 Section "Use, Handling, Storage, Transporting, Accumulation and Disposal of CITY OF ROCKVILLE Controlled Materials."

END OF SECTION 015950

## SECTION 016000 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project, including manufacturers' standard warranties on products and special warranties.
- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to product requirements and warranties. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Alternates"
3. Division 1 Section "Options"
4. Division 1 Section "Work Restrictions"
5. Division 1 Section "Project Management and Coordination"
6. Division 1 Section "Submittal Procedures"
7. Division 1 Section "Quality Requirements"
8. Division 1 Section "References"
9. Division 1 Section "Construction Quality Control"
10. Division 1 Section "Temporary Facilities and Controls"
11. Division 1 Section "Safety and Health"
12. Division 1 Section "Execution Requirements"
13. Division 1 Section "Cutting and Patching"
14. Division 1 Section "Selective Demolition"
15. Division 1 Section "Closeout Procedures"
16. Division 1 Section "Project Record Documents"
17. Division 1 Section "Operation and Maintenance Documentation"

#### 1.3 DEFINITIONS

- A. The following definitions are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms that are self-explanatory and have well-recognized meanings in the construction industry.
- B. "Products" are items purchased for incorporation in the work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and other terms of similar intent.

1. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.

#### 1.4 QUALITY REQUIREMENTS

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source. Equipment of the same function shall be manufactured by the same entity, unless otherwise indicated.
- B. Compatibility of Options: When the contractor is given the option of selecting between 2 or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options. Total compatibility among options is not assured by limitations within the Contract Documents, but must be provided by the contractor. Compatibility is a basic general requirement of product/material selections.
- C. Manufacturers: Specific manufacturers and models of equipment and materials sited throughout the contract documents establish the desired performance and minimum quality of equipment and materials. The contractor may propose substitute manufacturers of equipment and materials unless specifically indicated otherwise. The contractor shall bear any cost related to the proposed substitution in all respects including but not limited to cost for establishing equality of the specified product and any coincidental construction costs directly related to the substitution. Rejection by the Project Officer does not allow for additional compensation.
- D. Labels and nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on the exterior.
  1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
  2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate nameplate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information:
    - a. Name of product and manufacturer.
    - b. Model and serial numbers.
    - c. Operating data such as capacity, speed and ratings and similar essential operating data.
  3. Protection: Labels and nameplates shall be protected from defacement and other damage during the remainder of the work.

#### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.
  1. Schedule product delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.



2. Deliveries shall be addressed to the contractor and be scheduled to arrive at the worksite during normal working hours, unless otherwise authorized in writing by the Contracting Officer. The contractor shall take receipt of all deliveries. City of Rockville will not accept delivery of materials.
  3. Coordinate delivery with installation time to provide minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
  4. Deliver products to the site in an undamaged condition, in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
  5. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  6. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
  7. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.
  8. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
  9. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  10. Protect stored products from damage.
- B. If, in the opinion of the Contracting Officer, delivered or stored items are considered damaged or defective, they shall be replaced at no additional cost to the City of Rockville.
- C. Deliveries which require cranes shall be scheduled with the Project Officer a minimum of 15 working days prior to expected delivery.

## PART 2 - PRODUCTS

### 2.1 PRODUCT COMPLIANCE AND REQUIREMENTS

- A. General: The compliance requirements, for individual products as indicated in the Contract Documents, are multiple in nature and may include generic, descriptive, performance, prescriptive, compliance with standards, conformance with graphic details and other similar forms and methods of indicating requirements, all of which must be complied with.
- B. Provide products complete with accessories, trim, finish, safety guards, devices and other items needed for a complete installation and the intended use and effect.
- C. Standard Products: Products shall be essentially the standard catalogued products of manufacturers regularly engaged in production of such products and shall be the manufacturer's latest standard design that complies with the specification requirements. Equipment shall essentially duplicate items that have been in satisfactory commercial and industrial use at least two years, or more if otherwise specified, prior to award of the contract or in lieu thereof shall have been used and operated in a test installation which, in the opinion of the Project Officer, duplicate its field performance for the same period of time. The Project Officer reserves the right to require the Contractor to submit evidence to this effect for his approval. When two or more units of the same class of equipment are required, these units shall be the product of a single manufacturer; however, the component parts of the system need not be the products of the same manufacturer.

- D. Continued Availability: Products which, by nature of their application, are likely to be needed at a later date for maintenance and repair or replacement work, shall be current models for which replacement parts are available. Where specified and available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- E. Product Selection Procedures: Contractor's options for selecting products are limited by the Contract Document requirements including the Construction Contract Clauses, and governing regulations, and are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include, but are not necessarily limited to, the following for various indicated methods of specifying:
1. Where the Specifications lists manufacturers' names or product designations, the Contractor may provide any product that complies with the requirements, subject to the following conditions:
    - a. Manufacturers: Where a Specification paragraph or subparagraph titled "Manufacturers" lists manufacturers' names, provide a compliant product by one of the manufacturers named, or request a Substitution of another compliant product by another manufacturer.
    - b. Available Manufacturers: Where a Specification paragraph or subparagraph titled "Available Manufacturers" lists manufacturers' names, provide a compliant product by one of the manufacturers named or by another manufacturer.
    - c. Products: Where a Specification paragraph or subparagraph titled "Products" lists product designations, provide one of the products designated, or request a Substitution of another compliant product.
    - d. Available Products: Where a Specification paragraph or subparagraph titled "Available Products" lists product designations, provide one of the products designated or another compliant product.
    - e. Basis of Design Product: Where a Specification paragraph or subparagraph titled "Basis of Design Product" includes a product designation, provide the product designated, or request a substitution of another compliant product by one of the other manufacturers named, if any, or by another manufacturer.
  2. Descriptive Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
  3. Performance Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
  4. Prescriptive Requirements: Where Specifications require products that are produced using specified ingredients and components, including specific requirements for mixing, fabricating, curing, finishing, testing and similar operations in the manufacturing process, provide products produced in accordance with the prescriptive requirements that otherwise comply with Contract requirements.
  5. Codes, Standards and Regulations: Where Specifications require compliance with an imposed code, standard or regulation, select a product that complies with the codes, standards or regulations specified.
  6. Visual Matching: Where Specifications require matching an established sample, or matching existing conditions, the Project Officer decision will be final on whether a proposed product matches satisfactorily.
  7. Visual Selection: Where specified product requirements include the phrase "as selected from manufacturer's standard colors, patterns, textures" or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Project Officer will select the color, pattern and texture from the manufacturer's product line.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 016000



## SECTION 017000 - EXECUTION REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This section includes certain general procedural requirements governing the Contractor's execution of the work, including, but not limited to the following:
  - 1. Laying out of the work.
  - 2. General installation of products.
  - 3. Correction of Defective Work
  - 4. Progress cleaning.
  - 5. Starting and adjusting.
  - 6. Protection of installed construction.
- B. Substitutions: Changes in methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract shall comply with the procedures and conditions specified for Substitutions in the Construction Contract Clauses.
- C. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to execution requirements. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Work Restrictions"
  - 3. Division 1 Section "Project Management and Coordination"
  - 4. Division 1 Section "Submittal Procedures"
  - 5. Division 1 Section "Quality Requirements"
  - 6. Division 1 Section "References"
  - 7. Division 1 Section "Construction Quality Control"
  - 8. Division 1 Section "Temporary Facilities and Controls"
  - 9. Division 1 Section "Safety and Health"
  - 10. Division 1 Section "Product Requirements"
  - 11. Division 1 Section "Cutting and Patching"
  - 12. Division 1 Section "Selective Demolition"
  - 13. Division 1 Section "Closeout Procedures"
  - 14. Division 1 Section "Project Record Documents"
  - 15. Division 1 Section "Demonstration and Training"
- D. Additional Requirements: Refer to the individual technical specification sections for additional execution requirements.

### 1.3 SUBMITTALS

- A. Surveyor Qualification Statement: Submit for review a statement attesting to previous experience from the land surveyor or professional engineer engaged to lay out the work. Include list of completed projects, with project names and addresses, and names and addresses of architects and owners.
- B. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying that the location and elevation of improvements comply with requirements indicated.
- C. Contractor Requests for Information (RFI): The Contractor shall submit Requests for Information (RFI) to the Project Officer. Upon receipt of an RFI, the Project Officer will review and coordinate a response. The response will be provided within 14 calendar days.
- D. Manufacturer's Field Services Submissions: Where product manufacturers are required by the individual sections of the Specifications to provide qualified personnel to observe conditions of surfaces or other project conditions, installation or workmanship, start up or adjustment of equipment, tests or other activities, and to initiate instructions when necessary, the following shall be submitted to the Project Officer:
  - 1. Qualifications: For approval, submit qualifications of observer at least 30 calendar days in advance of scheduled activities.
  - 2. Report: For information, submit report of activities and findings within 15 calendar days after the successful execution of the specified work. Include logs and other documented data where applicable.

### 1.4 QUALITY REQUIREMENTS

- A. Workmanship Standards: Initiate and maintain procedures to ensure personnel performing the work are skilled and knowledgeable in the methods and craftsmanship needed to produce the required levels of workmanship in the completed work. Remove and replace work that does not comply with workmanship specified and standards recognized in the construction industry for the applications indicated. Remove and replace work damaged or deteriorated by faulty workmanship or replacement of other work.
- B. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable installation instructions and recommendations to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.
- C. Specialists: Where the individual sections of the specifications require specialists to perform the work, comply with the requirements specified in the Construction Contract Clauses. The assignment of a specialist shall not relieve the contractor from complying with applicable regulations, union jurisdictional settlements or similar conventions, and the final responsibility for fulfillment of the entire requirements remains with the Contractor.
- D. Minimum Quality and Quantity: The quality level or quantity shown or specified shall be the minimum required for the work. Except as otherwise indicated, the actual work shall comply exactly with that minimum or may be superior to that minimum within limits acceptable to the Contracting Officer. Specified numeric values are either minimums or maximums as indicated or as appropriate for the context of the requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 LAYING OUT THE WORK

- A. Before proceeding to lay out the work, verify layout information shown on the drawings, in relation to existing benchmarks. If discrepancies are discovered notify the Project Officer promptly.
- B. Establish and maintain a minimum of 2 permanent benchmarks on the site, referenced to data established by survey control points.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Make the log available for reference by the Project Officer.
- D. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
  - 1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.
  - 2. Furnish location data for work related to the project which must be performed by public utilities serving the Project site.

3.2 EXAMINATION

- A. Examine applicable substrates and conditions under which the work will be performed before starting construction operations.
- B. If unsafe or otherwise unsatisfactory conditions are encountered take corrective action before proceeding.
- C. Require installer of each major unit of work to inspect substrate to receive work, and conditions under which work will be performed, and report in writing to the Contractor any unsuitable conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- D. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

### 3.3 PREPARATION

- A. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with the Project Officer.
- B. Take field measurements as required to fit the work properly. Recheck measurements before installing each product.
- C. Verify space requirements of items shown diagrammatically on drawings.
- D. Drawing Verification: Check all drawings furnished immediately upon their receipt and promptly notify the Project Officer of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work or ordering custom furniture, equipment or material and will be responsible for any errors which might have been avoided thereby. Dimensions on drawings shall be checked for accuracy by the Contractor.

### 3.4 INSTALLATION

- A. Locate the work and components of the work accurately.
  - 1. Make vertical work plumb and horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and to maximize ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas.
- B. Install products at the time and under conditions that will produce satisfactory results.
  - 1. Maintain temperature, humidity and other weather controls for best performance.
  - 2. Isolate units of noncompatible work to prevent deterioration.
- C. Conduct construction operations so that no part of the work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- D. Tools and Equipment: Do not use tools or equipment that produce harmful levels of noise.
- E. Anchors and Fasteners: Provide anchors and fasteners as required to withstand stresses, vibration and physical distortion. Anchor each component securely in place, accurately located and aligned with other work.
  - 1. Allow for building movement, including thermal expansion and contraction.
- F. Mounting Heights: In no case shall exposed items be mounted at a height which violates the provisions of the Americans with Disabilities Act Accessibility Guidelines (ADAAG)/Uniform Federal Accessibility Standards (UFAS) for the application indicated. Refer questionable component mounting heights to the Project Officer for final decision.
- G. Joints: Make like joints of uniform width within contiguous surfaces. Where joint locations in exposed work are not indicated, arrange joints for a uniform and balanced visual effect.
- H. Adjust operating components for proper operation without binding.



### 3.5 CORRECTION OF DEFECTIVE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
- B. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and proper adjustment of operating equipment.
- C. Restore permanent facilities used during construction to their specified condition.
- D. Remove and replace damaged surfaces that are exposed to view if the surfaces cannot be repaired without visible evidence of repair.
- E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired to operate properly.
- F. Remove and replace chipped, scratched or broken surfaces.

### 3.6 PROGRESS CLEANING

- A. Maintain the project work areas free of waste material and debris.
- B. Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the work, broom- or vacuum-clean the entire work area.
- C. Keep installed work clean. Clean installed surfaces in accordance with the recommendations of the manufacturer or fabricator of the product installed, using only the cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and will not damage exposed surfaces.
- D. Remove debris from concealed spaces prior to enclosing the space.
- E. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at the time of project completion.
- F. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Enforce requirements strictly and dispose of material lawfully.
  - 1. Comply with NFPA 241 for removal of combustible waste material and debris.
  - 2. Do not hold waste materials more than 7 days during periods when the ambient temperature remains continuously less than 80 deg F or for more than 3 days when the temperature exceeds or is expected to rise above 80 deg F.
  - 3. Handle and properly containerize hazardous, dangerous or unsanitary waste materials separately from other waste.

### 3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017000

## SECTION 017310 - CUTTING AND PATCHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This section includes procedural requirements for cutting and patching.
- B. Definition: Cutting and patching includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and repair required to restore surfaces to their original condition.
- C. Refer to other sections for other requirements and limitations applicable to cutting and patching individual parts of the work.
- D. Coordinate cutting and patching with demolition requirements specified in Division 1 Section "Selective Demolition."
- E. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to cutting and patching. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Work Restrictions"
3. Division 1 Section "Project Management and Coordination"
4. Division 1 Section "Submittal Procedures"
5. Division 1 Section "Quality Requirements"
6. Division 1 Section "References"
7. Division 1 Section "Construction Quality Control"
8. Division 1 Section "Temporary Facilities and Controls"
9. Division 1 Section "Safety and Health"
10. Division 1 Section "Product Requirements"
11. Division 1 Section "Execution Requirements"
12. Division 1 Section "Selective Demolition"
13. Division 1 Section "Closeout Procedures"
14. Division 1 Section "Project Record Documents"

#### 1.3 SUBMITTALS

- A. Cutting and Patching Plan: Submit a written plan to the Project Officer through the Quality Control manager describing procedures at least 21 calendar days in advance of the time cutting and patching will initially be performed.

1. Include the following information, as applicable:

- a. Description of the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
  - b. Description of the anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in appearance and other significant visual elements.
  - c. List of products to be used and entities that will perform work.
  - d. Dates and hours of operation when cutting and patching will be performed.
  - e. List of utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
  - f. Compatibility and cohesion characteristics of patching compounds with adjacent materials.
  - g. Details and engineering calculations showing integration of reinforcement with the original structure, where cutting and patching involves adding reinforcement to structural elements.
2. Approval by the Project Officer to proceed with cutting and patching does not waive the right to later require complete removal and replacement of unsatisfactory work.
  3. Samples: Provide cutting and patching samples for the following items within 14 calendar days after notice to proceed in order that special reviews and coordination can be arranged with approval authorities.

#### 1.4 QUALITY REQUIREMENTS

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
  1. The cutting and patching plan shall include but not be necessarily limited to work required at the following structural elements:
    - a. Foundation construction.
    - b. Bearing and retaining walls.
    - c. Structural concrete.
    - d. Structural steel.
    - e. Lintels.
    - f. Timber and primary wood framing.
    - g. Structural decking.
    - h. Stair systems.
    - i. Miscellaneous structural metals.
    - j. Exterior curtain-wall construction.
    - k. Equipment supports.
    - l. Piping, ductwork, vessels, and equipment.
    - m. Structural systems of other construction.
- B. Operational Limitations: Do not cut and patch operating elements, safety related systems, or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements, safety related systems or related components in a manner that would result in increased maintenance or decreased operational life or safety. Operating elements or safety related systems include but are not limited to the following:
  1. Primary operational systems and equipment.
  2. Air or smoke barriers.
  3. Water, moisture, or vapor barriers.
  4. Membranes and flashings.

5. Fire protection systems.
6. Noise and vibration control elements and systems.
7. Control systems.
8. Communication systems.
9. Conveying systems.
10. Electrical wiring systems.
11. Operating systems of other construction.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Project Officer's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction that was previously cut and patched in a visually unsatisfactorily manner. When requested by the Contracting Officer, engage a Specialist who is specifically experienced in the work. Visual elements include but are not limited to the following:

1. Processed concrete finishes.
2. Stonework and stone masonry.
3. Ornamental metal.
4. Matched-veneer woodwork.
5. Preformed metal panels.
6. Firestopping.
7. Window wall system.
8. Stucco and ornamental plaster.
9. Acoustical ceilings.
10. Terrazzo.
11. Finished wood flooring.
12. Fluid-applied flooring.
13. Carpeting.
14. Aggregate wall coating.
15. Wall covering.
16. Mechanical system enclosures, cabinets, or covers.

## 1.5 EXISTING WARRANTIES

A. Remove, replace, patch, and repair material and surfaces cut or damaged during cutting and patching operations by methods and with materials in such a manner as not to void any existing warranties.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Comply with requirements specified in other Sections of these Specifications.
- B. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. Before cutting, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
- B. Before proceeding with cutting and patching involving two or more trades, meet at the project site with the Project Officer and the entities providing or affected by the cutting and patching. Site meeting should be incorporated into the Three Phases of Quality Control process managed by the Contractor's Quality Control Manager. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

### 3.2 PREPARATION

- A. Provide temporary support of work to be cut.
- B. Protect existing conditions during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Where existing services are required to be removed, relocated, abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

### 3.3 PERFORMANCE

- A. Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained and adjoining construction. Where possible, review proposed procedures with the original installer and comply with the original installer's recommendations.
  - 1. In general, use hand or small power tools designed for sawing or grinding, not for hammering and chopping.
  - 2. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 3. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  - 4. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
  - 5. Comply with requirements of applicable Division 2 sections where cutting and patching requires excavating and backfilling.
  - 6. After utility services are bypassed, cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
  - 2. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - 3. Where removed walls or partitions extends one finished area into another finished area, patch and repair floor and wall surfaces to provide an even surface of uniform color, finish, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 4. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface that contains the patch after the area has received primer and other undercoats.
  - 5. Patch, repair or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
  - 6. Maintain integrity of fire barriers, vapor barriers and insulation.
  - 7. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
  
- D. Perform cutting and patching work listed in Division 1 Section "Work Restrictions" during City of Rockville Unoccupied Hours.

#### 3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items.
  
- B. Thoroughly clean piping, conduit, and similar features before applying paint, restored pipe coverings, or other finishing materials.

END OF SECTION 017310





## SECTION 017320 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This section includes the following:
  - 1. Demolition and removal of selected portions of a building.
  - 2. Repair procedures for selective demolition operations.
- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to selective demolition. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Work Restrictions"
  - 3. Division 1 Section "Project Management and Coordination"
  - 4. Division 1 Section "Submittal Procedures"
  - 5. Division 1 Section "Quality Requirements"
  - 6. Division 1 Section "References"
  - 7. Division 1 Section "Construction Quality Control"
  - 8. Division 1 Section "Temporary Facilities and Controls"
  - 9. Division 1 Section "Safety and Health"
  - 10. Division 1 Section "Product Requirements"
  - 11. Division 1 Section "Execution Requirements"
  - 12. Division 1 Section "Cutting and Patching"
  - 13. Division 1 Section "Closeout Procedures"
  - 14. Division 1 Section "Project Record Documents"
  - 15. Division 15 sections for demolishing, cutting, patching, or relocating mechanical items.
  - 16. Division 16 sections for demolishing, cutting, patching, or relocating electrical items.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them.
- B. Remove and Salvage: Detach items from existing construction and deliver them to the City of Rockville.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be salvaged, reinstalled or otherwise indicated to remain the City of Rockville property, demolished materials shall be removed from the site by the Contractor, with further disposition at Contractor's option.

1.5 SUBMITTALS

- A. Qualification Data: Provide qualifications of persons or firms performing demolition which demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other amplifying information. Qualification data must conform to that required in Division 1 Section "Quality Requirements" for Specialists or Professional Engineers as appropriate to the work.
- B. Proposed noise-control or dust-control measures: Submit statement or drawing to the Contracting Officer for approval at least 14 calendar days prior to the start of demolition that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- C. Submit a proposed Demolition Plan to the Contracting Officer indicating the following:
  - 1. Detailed sequence of selective demolition work, with starting and ending dates for each activity.
  - 2. Interruption of utility services.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Locations of temporary partitions and means of egress.
  - 6. Procedures and safety precautions to be used during demolition.
  - 7. Removal, transportation, and reclamation or disposal of removed materials.
- D. Inventory: Items to be removed and salvaged.
- E. Photographs: Before work begins, submit sufficiently detailed photographs showing predemolition existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Requirements for photographs are located in Division 1 Section "Photographic Documentation."

1.6 QUALITY REQUIREMENTS

- A. Demolition Firm Qualifications: Firm shall be a specialist in demolition work of similar materials and extent to that indicated for this Project.
- B. Professional Engineer Qualifications: Comply with Division 1 Section "Quality Requirements."
- C. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Comply with all regulatory requirements of those agencies and organizations having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.

- E. Pre-Demolition Conference: Conduct conference at Project site to comply with requirements in Division 1 section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.
  - 3. Review and finalize demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review requirements of work performed by other trades that rely on substrates exposed by demolition operations.
  
- F. Demolition Plan: The Contractor shall prepare a detailed plan of the demolition work procedures and safety precautions to be used in the identification, demolition, trees and shrub protection, silt and erosion control handling, removal, transportation, and reclamation or disposal of removed materials. The plan shall be submitted to the Contracting Officer for review within 14 calendar days after receipt of the Notice to Proceed and at least 14 calendar days before the planned commencement of demolition activities.
  - 1. Review and acceptance by the City of Rockville of the Contractor's demolition plan will not relieve the Contractor of any responsibility regarding damage from any demolition activity.

#### 1.7 PROJECT CONDITIONS

- A. The City of Rockville will occupy portions of the building immediately adjacent to the selective demolition area. Refer to Division 1 Section "Work Restrictions" for additional requirements.
  - 1. Conduct selective demolition so the City of Rockville operations will not be disrupted.
  - 2. Provide the Project Officer with not less than 72 hours' notice prior to activities that will affect the City of Rockville operations. Include in the notification the expected demolition activities and expected level and duration of disturbance to the City of Rockville operations.
  
- B. Safe access to existing walkways, corridors and other adjacent occupied or used facilities must be maintained. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from the Contracting Officer.
  
- C. The Contractor shall remove and salvage the existing items so indicated on the Drawings.
  
- D. The Contractor shall remove and reinstall the existing items so indicated on the Drawings.
  
- E. Hazardous Materials: Except where noted, hazardous materials are not expected to be encountered in the work. If any material suspected of containing hazardous materials is encountered, do not disturb the material, immediately notify the Contracting Officer and the Project Officer. If suspected hazardous material is spilling out or leaking, notify the fire department immediately.
  
- F. On-site storage or sale of removed items or materials will not be permitted.
  
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  
- H. Fire Protection: Maintain fire-protection services during selective demolition operations.

- I. Use of explosives is prohibited. Explosive actuated tools (ex: nailguns, etc) shall not be used or brought to the project site without prior written approval from the Project Officer. Such approval shall not relieve the Contractor of responsibility for injury to persons or for damage to property due to the use of such explosives.
- J. Contractor dumpsters will be permitted only if a location for the dumpster is shown on the contract drawings.

## 1.8 WARRANTIES

- A. Existing Special Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials that do not void existing warranties. Verify existence of warranties with the Project Officer.

## PART 2 - PRODUCTS

### 2.1 REPAIR MATERIALS

- A. Where available and appropriate for use, provide repair materials that are identical to existing materials.
- B. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
- C. Use materials whose installed performance equals or surpasses that of existing materials.
- D. Use fireproof materials for dust barriers and other temporary enclosures. See Division 1 Section "Temporary Facilities and Controls" for additional barrier requirements.
- E. Comply with material and installation requirements specified in individual Specification Sections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities to be removed have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled, and items to be removed and salvaged.
- D. When encountering unanticipated mechanical, electrical or structural elements that conflict with the intended function or design, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Project Officer.
- E. Perform surveys as the selective demolition progresses to detect hazards resulting from the activities.

### 3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by the Project Officer. See Division 1 Section "Project Management and Coordination" for additional requirements associated with utility shutdowns.
  - 1. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities. See Division 1 Section "Temporary Facilities and Controls" for additional temporary utility information.
  - 2. Provide not less than 15 calendar days notice to the Project Officer if shutdown of service is required during changeover.
- C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving areas to be selectively demolished.
  - 1. The City of Rockville will arrange to shut off indicated utilities when requested by Contractor.
  - 2. Where utility services are required to be removed, relocated or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
  - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit after bypassing.
  - 4. Do not start selective demolition work until utility disconnection and sealing have been completed and verified.
- D. Smoke Detectors: Request a utility outage for all smoke detectors where demolition work is planned. Do not start work until smoke detectors are shut off.

### 3.3 PREPARATION

- A. Dangerous Materials: If chemicals, gases, explosives, acids, flammable or other dangerous materials of unknown content or origin are found which are not shown on the drawings, contact the Project Officer immediately before proceeding with demolition.
- B. Temporary Site Control: Remove debris and conduct demolition operations in a manner to ensure minimum interference with roads, streets, walks, walkways, corridors, and other adjacent occupied or used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, corridors, or other adjacent occupied or used facilities without permission from the Project Officer.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Temporary Facilities: Conduct demolition operations in a manner to prevent injury to people and damage to adjacent building and facilities to remain. Provide for safe passage of people around selective demolition area. Provide temporary facilities in accordance with Division 1 Sections "Temporary Facilities and Controls" and "Temporary Traffic Controls" as applicable.
  - 1. Erect temporary protection, such as walks, fences, railings, canopies and covered passageways, where required by authorities having jurisdiction.

2. Provide temporary weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to prevent water leakage or damage to structure or interior areas.
  3. Protect walls, ceilings, floors and other existing finish work that are to remain and are exposed during selective demolition operations.
  4. Cover and protect furniture, furnishings and equipment that have not been removed.
- D. Temporary Enclosures: Erect and maintain smoke tight and dustproof partitions and temporary enclosures to limit dust and dirt migration into remaining spaces and to separate areas from fumes and noise. Use fire retardant materials for all temporary enclosures.

### 3.4 POLLUTION CONTROLS

- A. Dust Control: Use temporary enclosures and other suitable methods complying with governing environmental protection regulations to limit the spread of dust and dirt.
1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, pollution, or slippery conditions.
  2. Wet mop floors to eliminate trackable dirt, and wipe down walls and doors of demolition enclosure.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in accordance with applicable safety regulations.
- C. Cleaning: Clean adjacent structures and site improvements of dust, dirt and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

### 3.5 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete selective demolition within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically. Conduct work in an order that avoids transporting removed items and debris through areas with completed selective demolition work, and that allows for removal of items before supports for those items are removed in another area.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage adjoining construction to remain. Where possible, use hand or small power tools designed for sawing or grinding, not for hammering and chopping, to minimize disturbance of adjacent surfaces. Contractor is to use the correct tool for the work and operate it in accordance with the manufacturers instructions. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression

- devices during flame-cutting operations, and maintain adequate ventilation when using cutting torches. See Division 1 Section "Fire Prevention Precautions for Hot Work."
5. Maintain adequate ventilation when using cutting torches.
  6. Remove decayed, vermin-infested and other dangerous or unsuitable materials, and promptly dispose of these materials off-site.
  7. Lower removed structural framing members to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  8. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors or framing.
  9. Dispose of demolished items and materials promptly.
  10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. Existing Facilities: Comply with all regulations for using and protecting elevators, stairs, walkways, loading docks, building entries and other building facilities during selective demolition operations. Coordinate with the Project Officer for building-specific requirements.
- C. Removed and Reinstalled Items. Comply with the following:
1. Clean and repair items to functional condition adequate for intended reuse. Paint damaged or deteriorated painted surfaces of equipment to match new equipment.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Contracting Officer, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations after selective demolition operations are complete.
- E. Concrete: Demolish in small sections. Cut concrete to a depth of at least **3/4 inch ((19 mm))** at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.
- F. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- G. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- H. Resilient Floor Coverings: Remove floor coverings and adhesive, and prepare substrate for new floor covering, according to recommendations of the Resilient Floor Covering Institute (RFCI).
- I. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

### 3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
  - 1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to the manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
- E. Floor and Wall Surfaces: Patch and repair floor and wall surfaces in each space where demolished walls or partitions result in extending one finished area into another. Provide a flush and even surface of uniform color, texture and appearance.
  - 1. Closely match texture and finish of existing adjacent surface.
  - 2. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
  - 3. Where patching occurs in a painted surface, apply primer and other specified undercoats. Apply specified intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
  - 4. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
  - 5. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
- F. Ceilings: Patch, repair or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning of any materials removed during demolition is not permitted on the City of Rockville property.
- C. Disposal: Transport demolished materials off the City of Rockville property and legally dispose of them.

### 3.8 SELECTIVE DEMOLITION SCHEDULE

- A. Existing items to remain, be removed and/or be salvaged are indicated on the drawings.



END OF SECTION 017320



## SECTION 017700 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion requirements and inspection procedures
  - 2. Final Completion requirements and inspection procedures
  - 3. Project Record Documents.
  - 4. Operation and Maintenance manuals.
  - 5. Warranties.
  - 6. Instruction of the City of Rockville personnel.
  - 7. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the individual sections in Divisions 2 through 16.
- C. This specification section is related to any and all specification sections with explicit or implicit reference to closeout procedures. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Project Management and Coordination"
  - 3. Division 1 Section "Submittal Procedures"
  - 4. Division 1 Section "Quality Requirements"
  - 5. Division 1 Section "Construction Quality Control"
  - 6. Division 1 Section "Temporary Facilities and Controls"
  - 7. Division 1 Section "Safety and Health"
  - 8. Division 1 Section "Product Requirements"
  - 9. Division 1 Section "Project Record Documents"
  - 10. Division 1 Section "Operation and Maintenance Documentation"
  - 11. Division 1 Section "Demonstration and Training"
- D. Substantial Completion is defined as that state when the Contractor has complied with the Contract requirements, except for minor deviations, and the project is sufficiently complete and capable of being occupied and used by the City of Rockville for the intended purpose. Achievement of Substantial Completion is determined by the Contracting Officer.

### 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining the date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Provide supporting documentation for completion as indicated elsewhere in the Contract Documents and a statement showing an accounting of changes to the Contract Sum.
  2. Submit a list to the Project Officer, of incomplete items, the value of incomplete construction, and reasons the work is not complete.
  3. Obtain and submit any necessary releases enabling the City of Rockville unrestricted use of the project and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  4. Make final changeover of permanent locks. Use 8 bit Lockwood cylinders in the locks. Set the cylinders for blank keys and transmit two blank keys for each cylinder to the Project Officer. Advise the City of Rockville user personnel of changeover in security provisions.
  5. Complete startup testing of systems and instruction of the City of Rockville operation and maintenance personnel.
  6. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
  7. Submit Operation and Maintenance Manuals, final project photographs, and final surveys as specified.
  8. Submit draft or final warranty documents for Contracting Officer review for approval.
  9. Complete final clean-up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
  10. Record Documents (Drawings, specifications, and product data).
    - a. Initial submission shall be made to the Project Officer prior to the Pre-final Inspection.
    - b. the City of Rockville will review the submission and provide appropriate comments. If comments are significant the initial submission will be returned to the contractor for correction and re-submission incorporating the comments prior to the Final Inspection.
    - c. See Division 1 Section "Project Record Documentation" for additional requirements.
  11. Provide all required submittals to the Contracting Officer.
  12. Submit test/adjust/balance records.
  13. Submit changeover information related to the City of Rockville occupancy, use, operation, and maintenance.
  14. Outline of Instruction Program for the City of Rockville Employees shall be submitted to the Project Officer 14 calendar days prior to the Pre-final Inspection.
- B. Inspection Procedures:
1. Substantial Completion Inspection corresponds to the Pre-Final Completion Inspection described in Division 1 Section "Construction Quality Control."
  2. On receipt of a request for inspection, the Project Officer will either schedule the inspection or advise the Contractor of unfilled requirements. The Contracting Officer will prepare the Certificate of Substantial Completion following the inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
  3. The Project Officer will repeat the inspection when requested and when assured that the work is substantially complete.
  4. Results of the completed inspection will form the basis of the requirements for final completion.

#### 1.4 SUBMITTALS

- A. The following shall be submitted prior to final payment and closeout.
1. Manufacturer's cleaning instructions
  2. Posted instructions
  3. All required submittals
  4. Record Documents (Drawings, specifications, and product data).
    - a. Initial submission shall be made to the Project Officer prior to the Pre-final Inspection.
    - b. the City of Rockville will review the submission and provide appropriate comments. If comments are significant the initial submission will be returned to the contractor for correction and re-submission incorporating the comments prior to the Final Inspection.
  5. Outline of Instruction Program for the City of Rockville Employees shall be submitted to the Project Officer 14 calendar days prior to the Pre-final Inspection.
  6. Operation and Maintenance Manuals, including Preventive Maintenance, Special Tools, Repair Requirements, Parts List, Spare Parts List, and Operating Instructions.
  7. Construction progress photographs
  8. Final project warranty documents reflecting changes directed by any comments from the Contracting Officer's review of draft documents.
- B. Project Closeout Work Plan. Contractor shall submit a Project Closeout Work Plan for each phase of occupancy to the Project Officer for approval at least 30 calendar days prior to the Substantial Completion Inspection of the phase to be occupied. The plan should include all scheduled inspections, instruction classes, items to be submitted, closeout dates for all functions and the required the City of Rockville and Contractor personnel for these functions that will be taking part.

#### 1.5 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for Certification of Final Completion and Final Payment, complete the following. Note that the following are to be completed, submitted as appropriate, and approved by the City of Rockville as applicable prior to the final inspection and are not to be submitted for approval or otherwise at the final inspection unless specifically indicated. List exceptions in the request.
1. Submit final payment request with releases and supporting documentation not previously submitted and accepted.
  2. Submit an updated final statement, accounting for final additional changes to the Contract price.
  3. Verify that all required submittals have been provided to the Contracting Officer including but not limited to the following:
    - a. Manufacturer's cleaning instructions
    - b. Posted instructions
    - c. Record Documents (Drawings, specifications, and product data) incorporating any changes required by the Contracting Officer as a result of the review of the submission prior to the pre-final inspection. See Division 1 Section "Project Record Documentation" for additional requirements.

- d. Operation and Maintenance Manuals, including Preventive Maintenance, Special Tools, Repair Requirements, Parts List, Spare Parts List, and Operating Instructions.
  - e. Construction progress photographs
  - f. Final project warranty documents reflecting changes directed by any comments from the Contracting Officer's review of draft documents.
4. Submit a certified copy of the previous Substantial Completion inspection list of items to be completed or corrected. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance, and shall be endorsed and dated by the Contractor.
  5. Submit Pest management Post Construction Survey and Certification.
  6. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
  7. Submit record documents and similar final record information.
  8. Deliver tools, spare parts, extra stock and similar items.
  9. Complete final clean-up requirements including touch-up painting of marred surfaces.
  10. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date when the City of Rockville took possession of and assumed responsibility for corresponding elements of the work.
- B. Reinspection Procedure: The Project Officer will reinspect the work upon receipt of notice from the Contractor that the project work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Contracting Officer.
1. Upon completion of reinspection, the Project Officer will advise the Contracting Officer, who will prepare a Certificate of Final Completion, or the Contracting Officer will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled and are required for Final Completion.
  2. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for any additional the City of Rockville inspection costs in accordance with the Contract Clause entitled "Inspection of Construction."

#### 1.6 RECORD DOCUMENT SUBMITTALS

- A. As work progresses, prepare and maintain record documents as specified herein. Each record document shall be certified by the Contractor. Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Project Officer during normal working hours. Upon completion of the project, turn all record documents over to the Contracting Officer.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings, Shop Drawings and Fire Protection System Installation Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark the drawing that is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
  2. Mark new information not shown on Contract Drawings, Shop Drawings or Fire Protection Installation Drawings.

3. Note related Change Order numbers, alternate numbers, and similar identification numbers where applicable.
4. Organize record drawing sheets into manageable sets. Bind sets with durable paper cover sheets. Include project title and other identification as required on the cover of each set. Include a transmittal letter which contains the date, project title, Contractor's name, address and telephone number, submittal schedule reference number and Contractor's signature.
5. Failure by the Contractor to accurately reflect current information on the Record Drawings may result in a determination by the Contracting Officer that the Contractor has failed to meet his progress schedule. Payment, or a portion of the payment, including final payment, may be withheld until the Record Drawings are current, and accepted by the Contracting Officer.
6. Provide 3 complete sets of Record Drawings to the Contracting Officer.
7. If project drawings were available in electronic media, then Record Drawings shall also be provided in electronic media in AUTOCAD Release 14 or greater.

C. Record Specifications: Maintain one complete copy of the Project Specifications with addenda.

1. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to selection of options, and information about concealed construction that cannot otherwise be readily determined later by direct observation.
3. Note related record drawing information and Product Data.
4. Provide 3 complete sets of Record Specifications to the Contracting Officer.

D. Miscellaneous Record Submittals: Assemble miscellaneous records including construction photographs required by other specification sections for miscellaneous record keeping and submittals in connection with actual performance of the work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

## 1.7 OPERATION AND MAINTENANCE MANUALS

A. Provide operation and maintenance manuals for each piece of equipment and other systems and components specified in the technical sections of the specifications. Organize operation and maintenance data in suitable sets of manageable size.

B. Manuals shall have tables of contents, and be assembled to conform to tables of contents, with tab sheets covering each subject. Manuals shall be organized around the Construction Specification Institute 16-Division Master Format. Instructions shall be legible and easy to read. Bind properly indexed data in individual, heavy-duty, 3-ring, vinyl-covered loose-leaf binders, with pocket folders for folded sheet information (except drawings). Where oversize drawings are required, they shall be folded in. Include the words "Operation and Maintenance Manual," the name of the building and building number, and the project title on the cover and spine of each binder. Manuals shall include, but not be limited to, the following types of information.

1. Detailed description of each system and each of its components, including layout showing piping, valves, controls and other components, and including diagrams and illustrations where applicable.
2. Wiring and control diagrams with data to explain detailed operation and control of each piece of equipment.
3. Control sequence describing start-up, operation, and shutdown.
4. Procedure for starting
5. Procedure for operating
6. Shut-down instructions
7. Installation instructions

8. Maintenance and overhaul instructions
  9. Lubricating schedule, including type, grade, temperature range and frequency.
  10. Emergency instructions and safety precautions.
  11. Corrected shop drawings.
  12. Approved product data
  13. Copies of approved certifications and laboratory test reports (where applicable).
  14. Copies of warranties
  15. Test procedures
  16. Performance curves and rating data
  17. Parts list, including source of supply, recommended spare parts, and service organization convenient to the building site. Listing shall indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.
  18. Name, address, and telephone number of each Subcontractor who installed equipment and systems, and local representative for each type of equipment and each system.
  19. Troubleshooting data.
  20. Other pertinent data applicable to the operation and maintenance of particular systems or equipment and/or other specified in technical sections of the Specification.
    - a. Manuals for the system as a whole will not be required for outside water distribution systems or storm and sanitary sewer systems.
  21. Preventative Maintenance: Include a recommended schedule showing when each system should be retested. Schedule shall define the anticipated length of each test, test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements. Each test feature; e.g., gpm, rpm, psi, shall have a sign-off blank for the Contractor and Project Officer. A remarks column of the testing validation procedure shall include references to operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Procedures for preventative maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize corrective maintenance and repair shall be delineated.
    - a. Include load limits, speed of operation, environmental criteria and personnel hazard and safety precautions.
    - b. Repair requirements shall inform operators how to check out, troubleshoot, repair, and replace components of the system. Instructions shall include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and trouble shooting after acceptance of the system.
  22. Special Tools: Include a list of special tools required for maintaining and testing each system.
- C. Provide the Contracting Officer with two draft copies of the manuals 14 calendar days prior to testing any system involved and six final copies incorporating the City of Rockville review comments. Data shall be updated and resubmitted for final approval not later than 10 days prior to the established date for the Pre-Final Inspection.

## 1.8 WARRANTIES

- A. Standard and special warranties required by the individual sections of the Specifications and coincidental warranties shall provide guarantees in terms of time limits or rights of the City of Rockville in addition to those contained in the Construction Contract clauses.



1. Manufacturer's disclaimers and limitations on product warranties do not relieve the contractor of the warranty on the work that incorporates the products.
  2. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
  3. Standard product warranties shall be preprinted written warranties published by individual manufacturers for particular products, and shall be specifically endorsed to the City of Rockville by the manufacturer.
  4. Special project warranties shall be specifically written to incorporate particular requirements of the Contract Documents, and shall be endorsed to the City of Rockville by the entities responsible for the work, as stated in the individual section.
  5. Coincidental product warranties shall be provided where available on a product incorporated into the work by virtue of the fact that the manufacturer of the product has published a warranty in connection with purchases and uses of the product without regard for specific applications except as otherwise limited by terms of the warranty.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of the Contract Documents. The contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the City of Rockville has benefited from the use of the work through a portion of its anticipated useful service life.
- D. Rejection of Warranties: The Contracting Officer reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment for the work or part of the work, the Contracting Officer reserves the right to refuse to accept the work on behalf of the City of Rockville until the contractor presents evidence that entities required to countersign such commitments are willing to do so.
- F. Where a warranty is not specifically required by the Contract Documents but is available on a product incorporated into the work, by virtue of the fact that the manufacturer of the product has published a warranty in connection with purchases and uses of the product without regard for specific applications except as otherwise limited by terms of the warranty, that warranty shall be provided to the City of Rockville.
- G. Submit written warranties to the Contracting Officer as required by the contract documents.
1. Draft copies of required warranty documents shall be submitted to the Contracting Officer for review in the specified format prior to warranty execution and prior to the date certified for Substantial Completion, unless an earlier time of submission is specified elsewhere in the contract documents or requested by the Contracting Officer.
    - a. Submit three copies of draft warranty documents. All but one copy of the draft submission shall be returned to the Contractor for corrections and resubmission.
  2. Warranties will comply with the requirements included in the technical specification sections.
  3. Unless indicated otherwise warranties are to take effect on the date of Substantial Completion.

4. When the contract documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, provide a written document that contains the appropriate terms and identification, executed by the required parties.
    - a. Refer to Division 2 through 16 sections for specific content requirements and particular requirements for submitting special warranties.
  5. Following Contracting Officer review, correct draft warranty documents as required and submit three copies of each final warranty document properly executed by the contractor, subcontractor, supplier, or manufacturer at Final Completion.
  6. Organize the warranty documents into an orderly sequence based on the Specification Divisions and Section Numbers.
    - a. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
    - b. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
    - c. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation.
    - d. Provide a typed description of each product or installation being warranted, including the name of the product, and the name, address, and telephone number of the Installer.
  7. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty in each required manual. Refer to Division 1 Section "Operation and Maintenance Documentation" for requirements of Operation and Maintenance manuals.
- H. When a designated portion of the work is completed and occupied or used by the City of Rockville, by a separate agreement with the contractor during the construction period, submit properly executed warranties within 14 calendar days after completion of that designated portion of the work.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 INSTRUCTIONS TO the City of Rockville PERSONNEL

- A. Operation and Maintenance Instructions: Provide instructions to designated the City of Rockville Employees without additional expense to the City of Rockville, where required by the technical provisions of Divisions 2 - 16. the City of Rockville shall be given 7 calendar days written notice of scheduled instructional services and shall approve such before they are held. Instructional materials belonging to the manufacturer or vendor; e.g., lists, static exhibits, visual aids, shall be made available to the Project Officer. Instructors shall give full instruction in the care, adjustment, and operation of the systems and equipment specified in other sections of these specifications. Arrange for each installer of equipment that requires regular maintenance to meet with the the City of Rockville personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures.

- B. Submit a written outline with the written notice which describes the instruction program to include:
  - 1. Equipment being demonstrated or the focus of instructions
  - 2. Relevant specification section
  - 3. Duration of the instruction or demonstration
  - 4. Number of individuals that can be trained or demonstrated to at one time
  - 5. Level of expertise and background requirements of the City of Rockville employees to be trained
  - 6. Name of proposed instructor.
  - 7. Any special conditions required for the demonstration (Power outage, HVAC outage, work stoppage in the Laboratory, etc.)
  
- C. As part of instruction for operating equipment, demonstrate the following procedures:
  - 1. Startup
  - 2. Shutdown
  - 3. Emergency Operations
  - 4. Noise and Vibration adjustments
  - 5. Safety procedures
  - 6. Economy and efficiency adjustments
  - 7. Effective energy utilization

### 3.2 POSTED OPERATING INSTRUCTIONS

- A. Operating instructions approved by the Project Officer shall be provided for each system and each principal piece of equipment as indicated in Divisions 2-16 of the specifications for the use of operation and maintenance personnel. Include wiring and control diagrams showing the complete layout of the entire system including equipment, piping, and valves, and control sequence, framed under glass or approved laminated plastic and posted where directed by the Project Officer. Printed or engraved operating instructions for each principal piece of equipment including start-up, proper adjustment, operating, lubrication, shutdown, safety precautions, procedure in the event of equipment failure, and any other necessary items of instruction as recommended by the manufacturer of the unit shall be attached to or posted adjacent to the piece of equipment. Operating instructions exposed to the weather shall be made of weather-resisting materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

### 3.3 FINAL CLEANING

- A. General cleaning during construction is required by the General Conditions and included in Section H of the Contract.
  
- B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial cleaning and maintenance program. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces. Use only those cleaning materials and methods recommended by the manufacturer of the surface material to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer. Comply with manufacturer's instructions.
  
- C. Complete the following cleaning operations before requesting inspection for Final Completion.

1. Remove labels and stickers that are not permanent from fixtures and equipment. Do not remove permanent nameplates, equipment model numbers and ratings.
  2. Polish glossy surfaces to a clear shine.
  3. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  4. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
  5. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  6. Remove tools, construction equipment, machinery, and surplus material from Project site.
  7. Remove snow and ice to provide safe access to building.
  8. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials and substances from sight-exposed interior and exterior surfaces. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  9. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
  10. Sweep concrete floors broom clean in occupied and unoccupied spaces.
  11. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
  12. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
  13. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  14. Internally clean the entire system of piping and equipment. Open dirt pockets and strainers, completely blowing down as required and clean strainer screens of accumulated debris.
  15. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  16. Replace parts subject to unusual operating conditions.
  17. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  18. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  19. Clean ducts, blowers, and coils if units were operated without filters during construction.
  20. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  21. Leave Project clean and ready for occupancy.
- D. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the project of rodents, insects, and other pests.
- E. Dust Control: Handle materials in a controlled manner with as little dust and over spray as possible.
- F. Removal of Protection: Remove temporary protection and facilities installed for the protection of the Work during construction.

- G. Compliance: Comply with the regulations of authorities having jurisdiction and with safety standards for cleaning and disposal operations. Do not burn or bury rubbish, waste, and/or excess materials on the City of Rockville property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of it lawfully.
  
- H. Remaining Materials: Where extra materials of value are remaining after completion of associated work, they become the City of Rockville property. Arrange for disposition of these materials as directed by the Project Officer.

END OF SECTION 017700



## SECTION 017810 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This section includes administrative and procedural requirements for Project Record Documents. Required Project Record Documents include the following:
  - 1. Marked-up copies of Contract Drawings.
  - 2. Marked-up copies of Shop Drawings.
  - 3. Newly prepared drawings.
  - 4. Marked-up copies of Specifications, addenda, and Change Orders.
  - 5. Marked-up Product Data submittals.
  - 6. Construction Photographs
  - 7. Record Samples.
  - 8. Miscellaneous Record Submittals.
- B. Related Sections: This specification section is related to any and all specification sections with explicit or implicit reference to project record documents. Specific submittal requirements of these related specification sections are not included in this section. Related sections include but are not limited to the following specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Project Management and Coordination"
  - 3. Division 1 Section "Submittal Procedures"
  - 4. Division 1 Section "Quality Requirements"
  - 5. Division 1 Section "Construction Quality Control"
  - 6. Division 1 Section "Temporary Facilities and Controls"
  - 7. Division 1 Section "Safety and Health"
  - 8. Division 1 Section "Product Requirements"
  - 9. Division 1 Section "Execution Requirements"
  - 10. Division 1 Section "Closeout Procedures"
  - 11. Division 1 Section "Demonstration and Training"
  - 12. Divisions 2 through 16 sections for project record document requirements for products included in those sections.
- C. Project Record Documents and samples are to be stored by the Contractor in the field office apart from the Contract Documents used for construction. Project Record Documents are not to be used for construction purposes. Record Documents shall be maintained in good order and in a clean, dry, legible condition and available at all times for the Contracting Officer's inspection.

### 1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
1. Number of Copies: Submit one set of marked-up Record Prints to the Contracting Officer for review and approval prior to final payment.
  2. Number of Copies: Submit copies of Record Drawings as follows:
    - a. Initial Submittal: Prior to the Pre-final Acceptance Inspection, submit one set of plots from corrected Record CAD Drawings and one set of marked-up Record Prints to the Contracting Officer. Contracting Officer will initial and date each plot and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. The Contracting Officer will return plots and prints for correction and organizing into sets, printing, binding, and final submittal.
    - b. Final Submittal: Prior to final payment, submit one set of marked-up Record Prints, set of record transparencies, and three copies printed from Record Transparencies, one set of Record CAD Drawing files, one set of Record CAD Drawing plots, and three copies printed from record plots. Incorporate all comments provided with return of the initial submission. Plot and print each Drawing, whether or not changes and additional information were recorded.
      - 1) Electronic Media: CD-ROM.
- B. Record Specifications: Submit one copy of Record Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as Record Product Data.

## PART 2 - PRODUCTS

### 2.1 RECORD DRAWINGS

- A. Record Prints: During construction, maintain a set of blue or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
1. Mark Project Record Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
    - a. Dimensional changes to the Drawings.
    - b. Revisions to details shown on the Drawings.
    - c. Depths of foundations below the first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.



- j. Changes made by Change Order or Construction Change Directives.
    - k. Changes made following the Contracting Officer's written orders.
    - l. Details not on original Contract Drawings.
  2. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference to and mark Contract Drawings location.
  3. Where Contract Drawings or Shop Drawings cannot be modified to clearly indicate the actual conditions, prepare new drawings as specified in the section.
  4. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the work at the same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note alternate numbers, Change Order numbers, and similar identifications.
  7. Responsibility for Markup: The individual, installer, subcontractor or other entity who obtained the record data shall prepare the markup on record drawings.
    - a. Accurately record information in an understandable drawing technique.
    - b. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
- B. Record Transparencies: Prior to Final Acceptance, review completed marked-up record prints with the Project Officer. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
  1. The Contractor is responsible for printing original Contract Drawings and other drawings as required to produce transparencies. The Project Officer will make original Contract Drawings available to the Contractor's print shop.
  2. Review of transparencies: Before copying and distributing copies of the corrected drawings, submit corrected transparencies with the original marked-up prints to the Contracting Officer for review and acceptance of the general scope of changes, additional information recorded and quality of drafting. If acceptable, the Contracting Officer will return transparencies and the original marked-up prints to the Contractor for organizing into sets, printing, binding, and final submittal.
  3. Copies and Distribution: After completing the preparation of transparency record drawings, print three blue- or black-line prints of each drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable-paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets.
    - a. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
    - b. Organize record transparencies into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps marked with suitable identification.
    - c. Submit the marked-up record set, transparencies, and the copy sets to the Contracting Officer for the City of Rockville records.
    - d. If project drawings were available in electronic media, then record drawings shall also be provided in electronic media as specified in this section.
- C. Newly Prepared Record Drawings: Prepare new drawings instead of following procedures specified for preparing record drawings where new drawings are required when neither the original Contract Drawings nor Shop Drawings are suitable to show the actual installation. New drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

1. Provide Drawings in a scale that allows for the scope of detailing and notations required to record the actual physical installation and its relationship to other construction.
  2. When completed and accepted, integrate newly prepared Drawings with the previous procedures specified for organizing, copying, binding and submitting record drawings.
- D. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
  3. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.
    - f. Name of Project Officer.

## 2.2 RECORD SPECIFICATIONS

- A. During the construction period, maintain three copies of the Project Specifications, including addenda and other modifications issued, for Project Record Document purposes.
1. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications. Note related project record drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.
    - a. In each Specification section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
    - b. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.
  2. Upon completion of markup, submit Record Specifications to the Project Officer for the City of Rockville records.

## 2.3 RECORD PRODUCT DATA

- A. During the construction period, maintain one copy of each Product Data submittal for Project Record Document purposes.

1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.
2. Give particular attention to information about concealed products and installations that cannot be readily identified and recorded later.
3. Note related Change Orders and markup of Record Drawings, where applicable.
4. Upon completion of markup, submit a complete set of record Product Data to the Project Officer.
5. Where record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.

#### 2.4 RECORD SAMPLE SUBMITTAL

- A. Immediately prior to the date of Substantial Completion, the Contractor shall meet with the Project Officer at the site to determine which of the Samples maintained during the construction period shall be transmitted to the City of Rockville for record purposes.
- B. Comply with the Project Officer's instructions for packaging, identification marking and delivery to the City of Rockville sample storage space. Dispose of other samples in a manner specified for disposing of surplus and waste materials.

#### 2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to other specification sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Prior to Final Acceptance, assemble completed miscellaneous records and place in good order, properly identified and bound or otherwise organized to allow for use and reference.
- B. Submit to the Project Officer for the City of Rockville records.
- C. Miscellaneous records include, but are not limited to, the following:
  1. Field records on excavations and foundations.
  2. Field records on underground construction and similar work.
  3. Survey showing locations and elevations of underground lines.
  4. Invert elevations of drainage piping.
  5. Surveys establishing building lines and levels.
  6. Authorized measurements utilizing unit prices or allowances.
  7. Records of plant treatment.
  8. Ambient and substrate condition tests.
  9. Certifications received in lieu of labels on bulk products.
  10. Batch mixing and bulk delivery records.
  11. Testing and qualification of tradespersons.
  12. Documented qualification of installation firms.
  13. Load and performance testing.
  14. Inspections and certifications by governing authorities.
  15. Leakage and water-penetration tests.
  16. Fire-resistance and flame-spread test results.
  17. Construction photographs and videotapes.
  18. Certifications of final disposition/treatment /disposal of wastes.
  19. Final inspection and correction procedures.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for the Project Officer's reference during normal working hours.

END OF SECTION 017810





## SECTION 017822 - OPERATION AND MAINTENANCE DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This section includes administrative and procedural requirements for operation and maintenance manuals and instruction, including the following.

1. Preparing and submitting instruction manuals covering the care, preservation and maintenance of materials and finishes.
2. Preparing and submitting operation and maintenance manuals for equipment and building operating systems.
3. Instruction of the City of Rockville operating personnel in the operation and maintenance of building systems and equipment.

- B. This specification section is related to any and all specification sections with explicit or implicit reference to operation and maintenance documentation including but not limited to the following Division 1 specification sections:

1. Division 1 Section "Summary"
2. Division 1 Section "Project Management and Coordination"
3. Division 1 Section "Construction Progress Documentation"
4. Division 1 Section "Photographic Documentation"
5. Division 1 Section "Submittal Procedures"
6. Division 1 Section "Quality Requirements"
7. Division 1 Section "Construction Quality Control"
8. Division 1 Section "Safety and Health"
9. Division 1 Section "Product Requirements"
10. Division 1 Section "Closeout Procedures"
11. Division 1 Section "Project Record Documents"
12. Division 1 Section "Demonstration and Training"

- C. Additional Requirements: Refer to the individual Division 2-16 technical specification sections for specific operations and maintenance manual requirements for products and systems in those sections and additional requirements for the care and maintenance of materials and finishes, and for the operation and maintenance of the various pieces of equipment and operating systems.

#### 1.3 QUALIFICATIONS

- A. Operation and Maintenance Manual Preparation: In preparation of manuals, use personnel thoroughly trained and experienced in the maintenance of the material or finish involved, or in the operation and maintenance of the equipment or system involved.

1. Where manuals require written instructions, use the personnel skilled in technical writing where necessary for communication of essential data.
2. Where manuals require drawings or diagrams, use draftspersons capable of preparing drawings clearly in an understandable format.

- B. Instructions for the City of Rockville Personnel: Use instructors thoroughly trained and experienced in the operation and maintenance of the equipment or system involved to instruct the City of Rockville operation and maintenance personnel.

#### 1.4 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

#### 1.6 SUBMITTALS

- A. Initial Submittal: Submit to the Contracting Officer 2 (two) draft copies of each manual at least 14 calendar days before the Pre-final Inspection. Include a complete operation and maintenance directory. The Contracting Officer will return 1 (one) copy of draft with comments for incorporation into the final submission.
1. Should comments be extensive, the Contracting Officer may require the Initial Submission to be repeated prior to scheduling a Final Inspection.
  2. Initial submittal shall occur at the initial occupancy phase
- B. Final Submittal: Submit 2 (two) copies of each manual in final form at least two working days before the final inspection. If comments on the Initial Submittal are extensive, the Contracting Officer may require additional time in advance of the Final Inspection for the Final Submittal. Contracting Officer will provide return a copy with comments within 14 calendar days after final inspection.
1. Correct or modify each manual to comply with the Contracting Officer's comments. Submit 2 (two) copies of each corrected manual within 14 calendar days of receipt of Contracting Officer's comments.

### PART 2 - PRODUCTS

#### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Provide a comprehensive Operation and Maintenance Documentation Directory which provides a quick reference document for all the manuals provided for the project.



- B. Organization: Include a section in the directory for each of the following:
1. Systems and Subsystems.
    - a. List systems and subsystems alphabetically. Include references to operation and maintenance manuals that contain information about each system and subsystem.
  2. Equipment.
    - a. List equipment for each system and subsystem, organized alphabetically by system. For pieces of equipment not part of system or subsystem, list alphabetically in separate list.
  3. Tables of contents.
    - a. Include a copy of the table of contents for each emergency, operation, and maintenance manual.
- C. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the contract documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 2.2 MANUALS, GENERAL

- A. Organization and Content: Organize each manual into separate sections for each related product or piece of equipment. To the extent applicable, each manual shall contain a title page, table of contents, general information, copies of Product Data, written text, drawings and copies of each warranty and service contract issued.
1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. As a minimum, provide the following information:
    - a. Subject matter covered by the manual.
    - b. Name and address of the Project.
    - c. Date of submittal.
    - d. Name, address, and telephone number of the Contractor.
    - e. Cross-reference to related products in other operation and maintenance manuals, if applicable.
  2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically by specification section according to the specifications format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume. Where more than one volume is required to accommodate the data, provide a comprehensive table of contents for all volumes in each volume of the set.
  3. General Information: Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or installer and the maintenance contractor. Clearly delineate the extent of responsibility for each of these entities. Include a local source for replacement parts for equipment.
  4. Product Data: Where the manuals include manufacturer's standard printed data, include only those sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the project includes more

- than one item contained in the product data, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
5. **Written Text:** Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper maintenance of materials or finishes, or for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included elsewhere in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
  6. **Drawings:** Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation.
  7. **Warranties, and Service Contracts:** Provide a copy of each warranty or service contract in the appropriate manual for the information of the City of Rockville operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect the validity of warranty.
  8. Where required for full understanding, include a copy of applicable Project Record Drawings. Do not use original Project Record Documents as part of operation and maintenance manuals.
- B. **Format:** Prepare operation and maintenance manuals in the form of an instructional manual for use by operating and maintenance personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar products into a single binder.
1. **Binders:** For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
    - a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Specifications table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the product.
    - b. Identify each binder on front and spine, with the printed type of manual (OPERATION MANUAL, MAINTENANCE MANUAL, EMERGENCY MANUAL, etc.), Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
  2. **Dividers:** Provide heavy paper dividers with celluloid-covered tabs for each separate section. Mark each tab to indicate contents. Provide a typed description of the product or major parts of equipment included in the section on each divider.
  3. **Protective Plastic Jackets:** Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
  4. **Text Material:** Where maintenance manuals require written material, use the manufacturer's standard printed materials, where available. If manufacturer's standard printed materials are not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch (115-by-280-mm), 20-lb/sq. ft. (75-g/sq. m) white bond paper.
  5. **Drawings:** Where manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
    - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.

- b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in the front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents and reference to the applicable location in the manual.

- C. **Optional Format of Final Manuals:** If specifically approved by the Contracting Officer, written and graphic portions of final manuals may be submitted in a CD ROM electronic format acceptable to the City of Rockville. Manual content and specific information to be included in each type of manual shall comply as specified for bound manuals. Content that is not included in CD ROM electronic format shall be assembled into binders with dividers and other requirements specified for bound manuals. CD ROM disks and binders shall be fully and clearly labeled, with disks and associated binders for each manual boxed or otherwise packaged for accessible storage together.

## 2.3 EMERGENCY MANUALS

- A. **Content:** Organize manual into a separate section for each type of emergency with subordinate sections including Emergency Instructions and Emergency Procedures.
  1. **Type of Emergency:** Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
    - a. Fire.
    - b. Flood.
    - c. Gas leak.
    - d. Water leak.
    - e. Power failure.
    - f. Water outage.
    - g. System, subsystem, or equipment failure.
    - h. Chemical release or spill.
  2. **Emergency Instructions:** Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of the City of Rockville operating personnel for notification of installer, supplier, and manufacturer to maintain warranties.
  3. **Emergency Procedures:** Include the following, as applicable:
    - a. Instructions on stopping.
    - b. Shutdown instructions for each type of emergency.
    - c. Operating instructions for conditions outside normal operating limits.
    - d. Required sequences for electric or electronic systems.
    - e. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

- A. **Content:** Provide information needed for daily operations and management of systems and equipment. In addition to requirements in this section, include operation data required in individual Division 2-16 technical specification sections and the following information:
  1. System, subsystem, and equipment descriptions.
    - a. Product name and model number.

- b. Manufacturer's name.
  - c. Equipment identification with serial number of each component.
  - d. Equipment function.
  - e. Operating characteristics.
  - f. Limiting conditions.
  - g. Performance curves.
  - h. Engineering data and tests.
  - i. Complete nomenclature and number of replacement parts.
2. Performance and design criteria if contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
  - a. Emergency Shutdown procedures
  - b. Startup procedures.
  - c. Equipment or system break-in procedures.
  - d. Routine and normal operating instructions.
  - e. Regulation and control procedures.
  - f. Instructions on stopping.
  - g. Normal shutdown instructions.
  - h. Seasonal and weekend operating instructions.
  - i. Required sequences for electric or electronic systems.
  - j. Special operating instructions and procedures.
5. Operating logs.
6. Wiring diagrams.
7. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panel boards, including the following, as applicable:
  - a. Electric service.
  - b. Controls.
  - c. Communication.
8. Systems and Equipment Controls. Describe the sequence of operation, and diagram controls as installed
9. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification. Provide charts of valve-tag numbers, with the location and function of each valve.
10. Precautions against improper use.
11. License requirements including inspection and renewal dates.

## 2.5 PRODUCT MAINTENANCE MANUAL

- A. Content and Organization: Organize manual into a separate section for each product, material, and finish. Order manual by specification section of the applicable product. Include the following for each product:
  1. Source information. List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list :
    - a. Name, Address, Telephone number of Installer or supplier and maintenance service agent.
    - b. Cross-reference to Specification Section number and title in Project Manual.

2. Product information, Include the following, as applicable:
  - a. Product name and model number.
  - b. Manufacturer's name.
  - c. Color, pattern, and texture.
  - d. Material and chemical composition.
  - e. Reordering information for specially manufactured products.
3. Maintenance procedures: Include manufacturer's written recommendations and the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Schedule for routine cleaning and maintenance.
  - e. Repair instructions.
4. Repair materials and sources: Include lists of materials and local sources of materials and related services.
5. Warranties and bonds, Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - a. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content and Organization: Organize manual into a separate section for each system, subsystem, and piece of equipment not part of a system ordered by specification section. Include the following information in each section:
  1. Source information. List each system, subsystem, and piece of equipment included in the manual identified by product name and arranged to match manual's table of contents. For each item provide:
    - a. Name, address, and telephone number of Installer or supplier and maintenance service agent
    - b. Cross-reference Specification Section number and title in Project Manual.
  2. Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
    - a. Standard printed maintenance instructions and bulletins.
    - b. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
    - c. Identification and nomenclature of parts and components.
    - d. List of items recommended to be stocked as spare parts.
  3. Maintenance procedures: Include the following information and items that detail essential maintenance procedures:
    - a. Test and inspection instructions.
    - b. Troubleshooting guide.
    - c. Precautions against improper maintenance.

- d. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - e. Aligning, adjusting, and checking instructions.
  - f. Demonstration and training videotape, if available.
4. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
    - a. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
    - b. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
  5. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
  6. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
  7. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds. This requirement is in addition to the requirement for Warranty Manuals included in Division 1 Section "Product Requirements and Warranties."

## 2.7 INSTRUCTIONS FOR the City of Rockville PERSONNEL

- A. Prior to the Substantial Completion inspection, instruct the City of Rockville personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed times.
- B. Use operation and maintenance manuals for each product, piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.
- C. Posted Logs and Instructions: Place operating logs and instructions in see-through vinyl or other weather protective sleeves or framed enclosures, and post for use by the City of Rockville personnel in locations approved by the Project Officer.
  1. Post operating log sheets with spares at or near the applicable equipment.
  2. Post flow schematics, wiring diagrams, valve lists, control sequences, start-up and shut-down instructions, and similar information and instructions in the appropriate equipment rooms.

## PART 3 - EXECUTION

### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original Project Record Documents as part of operation and maintenance manuals. If Record drawings must be used, copies are to be included in the manuals.
  - 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- G. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting operation and maintenance documentation.

END OF SECTION 017822





## SECTION 018200 - DEMONSTRATION AND TRAINING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing the City of Rockville operation and maintenance personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. This specification section is related to any and all specification sections with explicit or implicit reference to demonstration and training including but not limited to the following Division 1 specification sections:
  - 1. Division 1 Section "Summary"
  - 2. Division 1 Section "Project Management and Coordination"
  - 3. Division 1 Section "Construction Progress Documentation"
  - 4. Division 1 Section "Project Management and Coordination"
  - 5. Division 1 Section "Photographic Documentation"
  - 6. Division 1 Section "Quality Requirements"
  - 7. Division 1 Section "Construction Quality Control"
  - 8. Division 1 Section "Safety and Health"
  - 9. Division 1 Section "Closeout Procedures"
  - 10. Division 1 Section "Project Record Documents"
  - 11. Division 1 Section "Operation and Maintenance Documents"

#### 1.3 SUBMITTALS

- A. Instruction Program: Prior to the Pre-final Inspection, submit 2 copies of the outline of the proposed instructional program for demonstration and training to the Project Officer. Including training modules to be included, a schedule of proposed dates, times, length of instruction time, instructors' names for each training module, and learning objective and outline for each training module.
  - 1. At completion of training, submit 2 complete training manuals for the City of Rockville use.
- B. Qualification Data: For facilitator and instructors, to demonstrate their capabilities and experience, include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.



## 14 24 23 – HYDRAULIC PASSENGER ELEVATORS

### PART 1 - GENERAL

#### 1.1 SUMMARY AND DEFINITIONS

##### A. Intent

1. This section includes:
  - a. Hydraulic passenger
2. The following outlines the scope of work covered to provide turnkey elevator modernization of one (1) hydraulic passenger elevators located at 50 Monroe Street, Rockville, MD (including all work necessary to return elevators to automatic operation with local Code authority approval).
3. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
4. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design, quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
5. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
6. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
7. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
8. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.
9. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
  - a. Apparatus shall conform to the design and construction standards referenced herein, and shall be rated the best commercial grade suitable for this application.

- b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
  - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years, and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
10. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.
- a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
  - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
11. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
12. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
13. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
14. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.
15. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.

B. Termination of Existing Agreement(s)

- 1. By submitting a bid, the existing maintenance provider agrees that any service contract(s) in effect shall be terminated by the Owner should the project be awarded to another vendor upon thirty (30)-day written notice to the Contractor by the Owner.
  - a. The contract(s) shall be terminated with no penalty to the Owner or Contractor.

- b. Owner will be responsible for money owed the Contractor for services provided and work performed up until the date of cancellation.

C. Abbreviations and Symbols

- 1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

D. Codes and Ordinances / Regulatory Agencies

- 1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
  - a. Local and/or State laws applicable for logistical area of project work.
  - b. Building Code applicable to the AHJ.
  - c. Elevator Code applicable to the AHJ.
  - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
  - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
  - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
  - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
  - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
  - i. National Electrical Code (ANSI/NFPA 70).
  - j. American with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
  - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
  - l. ECC (Energy Conservation Code) as may be applicable to the AHJ.
- 2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

E. Definitions

- 1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

## 1.2 PERMITS AND SUBMITTALS

### A. Permits

1. Comply with the requirements of Division 01.
2. Prior to commencing work specified by the Contract Documents, the Contractor shall, at its own expense, obtain all permits or variances as may be required by the AHJ and provide satisfactory evidence of having obtained said permits and variances to both the Owner's Representative and Consultant.
3. File necessary drawings for approval of all Authorities Having Jurisdiction.
4. The Elevator Contractor shall undertake the necessary review and search procedure to identify open applications and/or outstanding violations for this property; and, close-out such applications and/or expunge such violations relative to the project scope as required for final acceptance by the AHJ.
  - a. Outstanding applications and violations must be indicated on the request for permit filing for this procedure to ensure such applications and/or violations are dismissed accordingly.
  - b. All relative costs shall be included in the base bid proposal with the understanding that corrective actions are covered under the specified scope of work.

### B. Submittals

1. Prior to beginning the work, the Contractor shall submit and have approved copies of layout drawings, shop drawings and standard cuts. These items shall include:
  - a. A plan view of the hoistway and machine room.
  - b. Elevation of the pit and hoistway.
  - c. Power Confirmation Information: Design for existing conditions.
  - d. Shop drawings and samples (if required) of all car and hall fixtures.
  - e. Equipment and accessories to include but not limited to door operators, hoist way door equipment roller guides, safety edges, cartop equipment, wiring, etc.
2. The Consultant and the Owner's Representative shall pass on the submittals with reasonable promptness and the Contractor shall be responsible to ensure that there will be no delay in their work or that of any other trade involved.
3. Approved filing and submittal requirements must be completed before equipment and related materials are ordered.
4. Copies of Department of Buildings' permits and/or governing authority's documents will be posted at the job site with copies issued to the Owner's Agent, Owner's Representative and Consultant.
5. Samples of wood, metal, plastic, paint or other architectural finish material applicable to this project shall be submitted for approval by the Owner's designee.
6. It shall be understood that approval of the drawings and cuts by Owner's designee, Architect and/or Consultant shall be for general arrangement only and does not include measurements which are the Contractor's responsibility or approval of variations from the contract documents required by the AHJ.
7. The Contractor shall prepare a record log and maintain all submittals, shop drawings, catalog cuts and samples.

8. All submittals shall be prepared as single submittal in PDF form to include all the above items. Multiple PDF submittals will not be accepted unless previously discussed and agreed upon by the consultant and Ownerships Representative.
9. All submittals must be sent in electronic form. Scanned or copied shop drawings, plan views, design requirements and cut sheets will not be accepted.

C. Measurements and Drawings

1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

D. Substitutions

1. Substitutions, if approved, shall be submitted as a separate quotation with Contractors bid.
2. Requests for substitutions will be considered under the following time limitations and situations:
  - a. Not less than ten (10) calendar days before bids are due.
  - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood or bankruptcy.
3. Requested substitutions will be reviewed and adjudged. Failure of the Consultant to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
4. Request for substitutions shall include complete data with drawings and samples as required, including the following:
  - a. Quality Comparison - Proposed substitution versus the specified product.
  - b. Changes required in other work because of the substitution.
  - c. Effect on the construction schedule.
  - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
5. When proposing a substitution, the Contractor represents that:
  - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
  - b. They will guarantee the substitution in the same manner as the product specified.
  - c. They will coordinate and make other changes as required in the work as a result of the substitution.
  - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
6. The Consultant will be sole judge of the acceptability of the proposed substitution.
7. The Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Consultant to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering the perform the work.

E. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
  - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.
  - b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
  - c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

F. Keys

1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

G. Diagnostic Tools

1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
  - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
  - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.
  - c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.

H. Service Support Requirements / Spare Parts

1. Software / Firmware Updates
  - a. During the life of the equipment and subject to the term of the maintenance agreement, where revisions to firmware and/or software are issued by the control manufacturer or manufacturer of solid state and microprocessor based subsystems subsequent to the beneficial use of the equipment, updates shall be provided so that the installation and spare circuit boards are current with respect to software and firmware versions.



I. Wiring Diagrams, Operating Manuals and Maintenance Data

1. Comply with the requirements of Division 01.
2. Deliver to the Owner, four (4) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
3. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats.
4. Manuals, as well as electronic copies, shall contain the following:
  - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
  - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
  - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
  - d. Method of control and operation.
5. Provide four (4) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
  - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
  - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
  - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
6. Furnish four (4) bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants.
7. Manuals or photographs showing controller repair parts with part numbers listed.

J. Training

1. Prior to seeking final acceptance of the project, the Contractor shall conduct a training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
  - a. Instructions on proper safety procedures and who to contact for the purpose of assisting passengers that may become entrapped inside an elevator car.
  - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but, not be limited to:
  - a. Independent Service Operation.
  - b. Emergency Fire Recall Operation - Phase I.
  - c. Emergency In-car Operation - Phase II.
  - d. Emergency Power Operation.
  - e. Emergency Communications Equipment.
  - f. Security Operating Features.

K. Patents

1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.

2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

L. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.3 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.
  - a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
  - b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Mechanical Design Requirements (General)

1. The following typical requirements shall apply to all parts of the work where applicable and are supplementary to other requirements noted under the respective headings.
  - a. All bearings, pivots, guides, guide shoes, gearing, door hanger sheaves, door hanger tracks and similar elements subject to friction or rolling wear in the entire elevator installation shall be accurately and smoothly finished and shall be arranged and equipped for adequate and convenient lubrication. Means shall be provided for flushing and draining the larger bearings and gear case. All oiling holes shall have dustproof, self-cleaning caps.
  - b. Bearings of governor and governor sheaves and important supporting bearings of other parts in motion when the elevator is traveling shall, unless otherwise specified or approved, be of ball or roller bearing type.
  - c. Bearings for brake levers and similar uses where the amount of movement under load is light and the wear negligible may be unlined.
  - d. All plain bearings shall be liberally sized in accordance with the best commercial elevator usages which have proved entirely satisfactory on heavy-duty installations.
  - e. Bearings of motors shall be arranged and equipped for adequate automatic lubrication. Ring or chain oilers, spring-fed grease cups and equivalent devices properly used in accordance with the best commercial elevator practice will be acceptable. Approved means shall be provided for visibly checking the amount of

lubricant contained and for flushing and draining. Means shall also be provided for preventing leakage of lubricant when the reservoirs or grease cups are filled to proper levels.

- f. Ball and roller bearings shall be of liberal size and of a type and make which have been extensively and successfully used on other similar, heavy-duty elevator installations. They shall be fully enclosed. Loading, lubrication, support and all other conditions of use shall be in accordance with the recommendations of the bearing manufacturer based on previous extensive and satisfactory elevator usage.
- g. All armature spiders and similar items intended to rotate with their shafts shall be keyed and/or firm press or shrunk fit on the shafts. Set screw fastening will be permitted only for minor items not subject to hoisting loads and where means for field adjustment is required.
- h. All bolts used to connect moving parts, bolts carrying hoisting stresses and all other bolts, except guide rail bolts, subject to vibration or shock shall be fitted with adequate means to prevent loosening of the nuts and bolts. Bolts transmitting important shearing stresses between machine parts shall have tight body fit in drilling holes.
- i. All machine work, assembling and installing shall be done by skilled and experienced mechanics using first-class, modern equipment and tools. All work shall be thoroughly high grade in every respect. All parts will be manufactured to high precision standards so that wearing parts will be readily interchangeable with stock repair parts with a minimum of field fitting.
- j. All bearing and sliding surfaces of shafts, pins, bearings, bushings, guides, etc., shall be smoothly and accurately finished. They shall be assembled and installed in accurate alignment and with working clearance most suitable for the load, speed, lubrication and other conditions of use.
- k. Structural steel used for supporting and securing equipment and for the construction of car slings, etc., shall conform to the A.S.T.M. specification for Structural Steel for Buildings. Design stresses shall not exceed those specified in the local Building Code.
- l. Castings of motor frames, sheaves, gear casings, etc., shall be of the best quality metallurgically controlled, hard, close grained gray machinery cast iron, free from blow holes, sand holes, or shrinkage cracks, ground to remove overruns, sanded and machined so as to leave a finish suitable for its particular application. Surfaces of sheaves and brake drums shall be entirely free from defects and shall show a hardness of not less than 220 Brinell.

C. Electrical Design Requirements (General)

- 1. The following typical requirements shall apply to all parts of the work and are supplementary to other requirements noted under the respective headings.
  - a. The design and construction of the motors shall conform to the requirements of these specifications and to the ASME Standards for Rotating Electrical Machinery with revisions issued to the first day when the work of this Contract was advertised.
    - 1) Motors shall operate successfully under all loads and speeds and during acceleration and deceleration.
    - 2) Motors shall be designed for quiet operation without excessive heat.
    - 3) Insulation on motor coils and windings and on all insulated switch, relay, brake and other coils shall conform to the requirements of minimum Class "F" insulation, as defined in ANSI Standards for Rotating Electrical Machinery. All motors shall be impregnated twice.
    - 4) Switches, relays, etc., on controller, starter and signal panels and similar items on other parts of the equipment shall be the latest improved type for the condition of use. They shall function properly in full accordance with the

requirements of the machines controlled and with the specified operating requirements of the elevator. Any of these parts showing wear or other injurious effects during the guarantee period to the extent that abnormal maintenance is required or indicated shall be replaced with proper and adequate parts by the Contractor.

- 5) Contacts in elevator motor circuits which are intended to be opened by governors or other safety devices shall be copper to carbon or other approved non-fusing type.
- 6) Where required, controllers and other component parts of the installation shall be labeled in accordance with the latest codes and standards as adopted and/or otherwise modified by the AHJ.
- 7) Electrical equipment, motors, controllers, etc., installed under this contract shall have necessary CSA/US or UL/US listing as may be required by the AHJ. Equipment shall be labeled or tagged accordingly.

D. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

E. Accessibility Requirements

1. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
2. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
3. The centerline of new hall push button shall be 42" above the finished floor.
4. The hall arrival lanterns or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
5. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
6. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
7. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
8. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
9. Provide visual call acknowledgment signal for car emergency intercommunication device.

1.4 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of Division 01.
2. Delivery, Storage and Handling:
  - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
  - b. Store materials under cover in a dry and clean location, off the ground.
  - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.
5. Should it be determined that there is not a suitable storage area at the onsite location the contractor will be responsible for storing material offsite or providing an outdoor storage container at no additional cost to Ownership.

B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis or as directed, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.5 RELATED WORK

- a. Installation of new fully enclosed, externally operated, fused main line and/or auxiliary disconnect switch, with 4<sup>th</sup> wire ground, properly located in accordance with local law that can be locked in the open (off) position.
  - b. Installation of new electrical conduit and power feeders between the load side of new main line disconnect switches and new elevator control equipment.
  - c. Where there is an increase in HP of the elevator pump motor, Contractor shall conduct an investigation to determine if existing feeder wires and conduit / piping to the elevator machine room are adequate in size to supply the new pump motor. Where they are not adequate in size, or where power supply from the building distribution panel is not large enough for feeder size / motor HP rating, Contractor shall include in their Base Bid proposal the cost to provide new building distribution electrical distribution supply connections, feeder wires and conduit / piping to elevator machine room.
  - d. Installation of battery lowering control interface provisions to interlock the mainline disconnect to prevent application of battery lowering operation when disconnect switch is turned to the "off" position. Provide auxiliary contacts and associated wiring and hardware in the existing or new mainline disconnect switch enclosure as required per Code.
  - e. Provide auxiliary power feeds with required distribution load center (circuit breaker panel) for intercommunication, CCTV systems, cab lighting or other specialty devices existing or to be provided by the Elevator Contractor.
    - 1) Voltage shall be 120 VAC with one 15 Amp circuit breaker or fuse for lighting of each individual elevator car enclosure.
    - 2) Voltage shall be 120 VAC with one 20 Amp circuit breaker or fuse for battery power lowering system.
    - 3) Circuit breakers and/or fused disconnects shall be lockable in the "OFF" position in accordance with applicable code.
2. Properly label all electrical devices with source of power.

3. Provide additional lighting outside of the machine room door as required by code.
4. Provide to enclose, remove and/or reroute any non-elevator related equipment in or ran through elevator related spaces.
5. The top surface of any setback or projection in the hoistway that measures 2" or more in width shall be beveled at an angle of not less than 75 degrees from horizontal. Each bevel plate shall be constructed from prime painted 14 gauge cold-rolled steel and installed so as to conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.
6. Installation of new permanent lighting fixtures with protective guards and 110-volt duplex GFI receptacles inside the machine room. Illumination shall be no less than 19 foot-candles at floor level. A light control switch shall be provided immediately adjacent to the machine room entrance door. Provide necessary receptacles as required to supply power to auxiliary elevator equipment and/or remotely located monitors.
7. Provide each elevator pit with a 110-volt GFI duplex receptacle and a permanent lighting fixture equipped with protective guard. Illumination shall be no less than 10 foot-candles at pit floor level. A light control switch must be provided and so positioned as to be readily accessible from the pit entrance door or ladder. Provide additional lighting below pit grating as required by code.
8. Provide to replace and upgrade lighting at both landings where the lighting does not reach 10 ft candles.
9. Provide the following signage, plates and tags:
  - a. Provide access doors to each electrical control room, secondary or machinery space with signs that read "ELEVATOR MACHINE ROOM". Letters shall be not less than 2" high.
  - b. Provide all required manufacturer data plates and installation-specific tags and signs of the types and styles containing information as required by applicable Codes and Standards as adopted and/or modified by the AHJ.
10. Where the pit extends more than 3 feet below the sill of the pit access door, provide a permanent fixed metal ladder.
  - a. Ladder shall extend no less than 48" above the sill of the access door. Handgrips shall extend from the ladder to a point no less than 48" above the sill of the access door where the ladder does not comply.
  - b. The rungs shall be a minimum of 16" wide. Where prevailing conditions prevent a 16" wide rung, the rung may be reduced to no less than 9".
  - c. The rungs shall be spaced 12" on center.
  - d. A clear distance of no less than 4 1/2" from the centerline of the rungs and handgrips to the nearest permanent object in back of the ladder shall be provided.
    - 1) Where prevailing conditions prohibit the installation of the required ladder as specified above, the Elevator Contractor shall coordinate requirements necessary for compliance with the Authority Having Jurisdiction.
11. Provide a standard railing conforming to Code on the outside perimeter of the car top on all sides where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 300 mm (12 in.) horizontal clearance or as otherwise required by the Authority Having Jurisdiction.
12. Provide necessary patching, repairing and installation of dry wall for smooth and legal elevator hoistways.
13. Provide patching and fire-stopping in hoistways and machine room as required to meet code.
14. Removal of existing intake and relief vents/fans from the machine room and infill/cover wall openings with proper fire-retardant sealant.

15. Installation of HVAC provisions inside the machine room so as to maintain ambient temperature and humidity levels that are within the range specified by the microprocessor-control equipment manufacturers.
16. Provide new or modify existing smoke detector and/or smoke detector alarm system meeting the requirements of A17.1 and/or the Local Governing Authority.
17. Where sprinkler fire protective systems are provided inside any elevator hoistway, machine room or associated machinery space, provisions shall be made for the disconnecting of the main line power supply from the affected elevator prior to activation. This means of disconnect shall be manually reset in accordance with code.
18. Provide a class "ABC" fire extinguisher in electrical machinery and control spaces.
19. Provide necessary telephone wiring with connection to local telephone service for remote elevator monitoring and/or two-way voice emergency communications systems.
  - a. Terminate the telephone wiring in junction boxes or standard phone jack terminals in the machine room.
  - b. Coordinate the quantity and termination method of individual phone connections with the Elevator Contractor. Please note: Provide one (1) telephone line per elevator.
  - c. Identify each phone line for connection by the Elevator Contractor to the appropriate elevator device(s).
  - d. Telephone wiring, where required by applicable codes, shall be installed in conduit.
20. The plexiglass lining the inside of the hoistway should be removed and hoistway should be made code compliant.
  - a. Remove all plexiglass and associated aluminum framing currently in place.
  - b. Patch existing steel framing where aluminum framing support brackets were previously installed and paint patching to match existing finish.
    - 1) Patch and paint shall have a professional appearance and be approved by consultant and/or engineer.
  - c. Support brackets should be installed at steel or concrete supporting members so that code required cants can be installed where necessary.
    - 1) Cants material should be sheet steel painted to match existing hoistway support steel and meet any code required specifications.
  - d. Protective measures should be made at the meeting edge of sheet steel and glass so that steel cants do not damage the glass.
21. Provide to demo existing sill supports and install new for the installation of new hoistway sills and entrances at all landings.
22. Demo the existing hoistway entrance frames and provide barricades that span the entire length of the opening to eliminate safety hazards to the public and the possibility of water intrusion to the elevator hoistway.

## 1.6 WARRANTY / MAINTENANCE SERVICES

### A. Contract Close-Out, Guarantee and Warranties

1. The Contractor agrees to certify that work performed in accordance with the Contract Documents shall remain free of defects in materials and quality of work for a period of one (1) year after final acceptance of the completed project, or acceptance thereof by beneficial use on a unit by unit basis, whichever occurs first.



2. The sole duty of the Contractor under this warranty is to correct any non-conformance or defect and all damages caused by such defect without any additional cost to the Owner and within fifteen (15) days of notification.
3. The express warranty contained herein is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.
4. In the event the Contractor fails to fulfill its obligations defined herein, the Owner shall have the express right to perform the Contractor's obligations and to charge the Contractor the cost of such performance or deduct an equal amount from any monies due the Contractor.

B. The following maintenance coverage apply:

a. Interim Maintenance

- 1) Provide full protective maintenance services and equipment coverage for one (1) hydraulic passenger elevators prior to the commencement of work, and during the work implementation procedure, until final acceptance of the finished project.
- 2) Interim full comprehensive maintenance services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to interim maintenance shall be included in the base bid quotation indicated on the bid form provided with a deduction for unit(s) out of service for upgrading.

b. Guarantee Maintenance

- 1) Provide full comprehensive preventative maintenance services for a period of twelve (12) months after the final completion and acceptance of the project.
- 2) Guarantee maintenance and related services shall be provided in accordance with Section 14 01 20, Owner's Form of Agreement issued with the modernization documents for subsequent services.
- 3) Costs related to guarantee maintenance shall be included in the base bid quotation indicated on the bid form in the space provided.

1.7 ALTERNATES AND VALUE ENGINEERING:

The following alternatives are elective upgrades which constitute changes to the base scope of work specified. Pricing for each alternate upgrade is requested from the bidder with costs indicated in the appropriate space in the Request for Proposal (RFP). Contractor shall take into consideration, as part of the alternative pricing, alternate work that is required either in lieu of, or in addition to, work specified in the base scope and shall not duplicate costs.

A. Contractor's Value Engineering Options

1. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability or performance of the elevator systems.
2. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.

1.8 ALTERNATES / ALLOWANCES

A. Allowances

1. Carry the following allowances for Elevator No 1.:
  - a. Cab Enclosure/Interior/Flooring: \$40,000.00
2. The above allowances are exclusive of any handling charge, applicable sales and/or use taxes. Wiring, installation and coordination of allowance items shall be included in the base contract. Please include a breakout of the hours

B. Alternates

1. Alternate No. 1 – Valued Engineering
  - a. This alternative is provided for individual contractors to propose optional equipment or otherwise offer cost saving suggestions that will provide the same desired results or further enhance the safety, durability or performance of the elevator systems.
  - b. Each suggestion must be fully detailed on the contractor's own letterhead with the associated price change specified on the form of proposal provided.
2. Alternate No. 2 – Jack Assembly, Jack Hole, Casing and Buffers (New/Replacement):

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

A. Elevator – PE1

1.	Quantity	One (1) scenic direct lift hydraulic
2.	Type	Passenger
3.	Capacity (lbs.)	2,500
4.	Speed (fpm)	100
5.	Travel in Feet	Existing
6.	Number of Landings	Two (2)
7.	Number of Openings	Two (2)
8.	Front Opening	One (1)
9.	Rear Opening	One (1)
10.	Operation	Simplex two-button collective
11.	Control	New - Microprocessor
12.	Fireman's Control	Phase I and II
13.	Number of Push Button Risers	One (1)
14.	Platform Size	Existing
15.	Guide Rails	Steel tees- Reuse
16.	Buffers	Spring
17.	Cab	\$40,000.00 allowance
18.	Entrance Size	42" wide x 84" high
19.	Door Operation	Single Speed Center Opening
20.	Machine Type	Submersible
21.	Pump Location	Below Adjacent
22.	Power Supply	208 – 3 – 60 (Contractor to verify)

2.2 MANUFACTURERS

A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved for use on this project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
  - a. Controller - GAL (GALaxy), Motion Control Engineering, Elevator Controls Corporation, Elevator Systems, Inc., Smartrise
  - b. Tracks, Hangers, Interlocks and Door Operators - G.A.L., ECI, Wittur
  - c. Fixtures - G.A.L., Adams, EPCO, Monitor, E-Motive USA, C.E. Electronics, Innovation, PTL, MAD, National.
  - d. Door Protective Device - Janus, Adams, G.A.L., T.L. Jones, Tri-Tronics, CEDES,
  - e. Cabs and Entrances/Entrance Door Panels - Accurate Elevator Door Corp, CEC Elevator Cab, EDI/ECI, Elite Elevator Cab, National Cab & Door, Tyler, Velis, Gunderlin, Premier, Prestige, Regency, Columbia Elevator Products, United Cabs.
  - f. Motors - Imperial Electric, General Electric, Baldor, Reuland Electric.
  - g. Emergency Power Systems - MCE, Reynolds & Reynolds Electronics.
  - h. Electrical Traveling Cables - Draka, James Monroe.
  - i. Hydraulic Systems/Components - Canton, ECS Corporation, Elevator Equipment Corporation, Mongrain Vertical Transport (MVT), MEI, Schumacher.
  - j. Guide Shoes/Rollers – ELSCO, Hollister Whitney

- k. Intercommunications/Telephones - Webb Electronics, K-Tec, Ring, Wurtec, Janus, Wrath approved equal.

## 2.3 CONTROL FEATURES / OPERATION

### A. Motion Control

1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.
3. Acceleration, deceleration, jerk, maximum velocity, leveling accuracy and elapsed flight time, for a typical elevator one floor run, shall not exceed values as further specified.

### B. Two Stop Collective Operation

1. A car call or hall call registration will allow the car to proceed to the destination after the hoistway door and car door automatically close and the door and gate circuits are made.
2. Upon arrival at the landing, the doors will open automatically.
3. When the car is traveling away from a registered hall call, the call shall remain registered and the car shall respond on the next trip.
4. Car and hall calls shall cancel automatically as the car stops at the respective call.

### C. Independent Service Operation

1. The car operating station shall be equipped with a key-operated switch labeled "IND SER".
2. Locate the switch in the locked service compartment.
3. When placed in the "on" position the following shall occur:
  - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.
  - b. Simplex elevator - existing hall call registrations shall extinguish and hall buttons shall remain inoperative as an indication to passengers that there is no elevator service.
4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

### D. Inspection Service Operation

1. Provide a key operated switch in the main car operating panel locked service panel that, when turned to the 'ON' position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.

3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
  - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

E. Hoistway Access Operation

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall and car doors in the open position to obtain access to the top of the car or climb-in pit.
3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

F. Firefighters' Emergency Operation

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.
  - a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
  - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.
3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
  - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the "OFF" position.

4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
  - a. The "Standardized Fire Recall Key" shall apply to both Phase I and Phase II Operation.
5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
  - a. The cover of the locked access panel shall be engraved as required by local or State law.
  - b. The locked access panel shall contain:
    - 1) Phase II key switch.
    - 2) Fire indicator light.
    - 3) Call cancel push button.
    - 4) Door open push button.
    - 5) Door close push button.
    - 6) Run/Stop switch.
    - 7) Other devices as may be required by local law.
  - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.

G. Floor Lockout Feature / Keyless - Card Reader Control / Wiring Provisions

1. Wiring: Provide six (6) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
  - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
  - b. Terminate the cable to dual screw barrier terminal strips on each end.
2. Card Reader Space: Allocate card reader space in each main car station as directed by the Consultant. Provide a flush Lexan lens and mounting provisions for the card reader unit which is provided by others.
3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.
  - a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
  - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
  - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.
  - d. Coordinate system requirements with the manufacturer of the issued card key system.
  - e. Provide adequate standby time to assist installation and testing of equipment with vendor.

4. The card reader operation shall bypass floor cut-out switches.
5. Firefighters' Service Operation shall override Floor Lockout Feature.

H. CCTV Camera / Wiring Provisions (New)

1. Wiring: Provide two (2), RG-59U stranded center conductor coax cables and one (1) CAT6 be for CCTV Camera interface. Should traveling cable manufacturer not offer CAT6 cable provide five (5) pair of 20-gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface and a CAT6 converter.
  - a. The cables for the CCTV camera shall extend from the elevator / security interface terminal cabinet in the elevator machine room to the top of the elevator cab. Provide an excess loop of 10 feet of cable at each end.
  - b. Provide one (1) 120V duplex unswitched outlet dedicated to security on top of each elevator.
2. Provide adequate standby time to assist installation and testing of equipment with vendor.  
Bypass Key Switch Override
3. Conduit, Power and Wiring
  - a. Provide all conduit, power and wiring required for the installation of the terminal cabinet, traveling cables and interfacing to the elevator control system.
  - b. Provide one (1) 120V duplex unswitched outlet dedicated to security on top of each elevator equipped with CCTV camera.
  - c. The security contractor shall provide all wiring from the interface terminal cabinet to the security system.
4. Automatic Bypass of Card Reader Control of Elevators
  - a. The card reader control of elevators shall be automatically bypassed by the security system upon a fire alarm condition.
  - b. To provide for automatic bypass, the fire alarm contractor shall provide a normally closed dry output contact from the fire alarm system.
    - 1) Upon a fire alarm condition, the contact shall open and the elevator system shall bypass the card reader control of elevators.
    - 2) The contact shall remain open until the fire alarm system is manually reset.

I. Low Oil Protection and Protective Device

1. Provide low oil protection operation and appropriate device(s) that will discontinue operation of the hydraulic elevator pump when:
  - a. The elevator stalls due to a low oil condition.
  - b. Fails to reach the landing in the up direction.
2. Pressure Switch:
  - a. Where the top of the cylinder head is above the top of the tank, provide a pressure switch between the cylinder and the valve which shall be activated by the loss of pressure at the top of the cylinder, and control the operation of the elevator as required by Code.

3. Provide an additional protective device that shall automatically return the elevator to the bottom landing, open the door and shut down the system.
4. The protective device shall be an integral part of the control system.

J. Hydraulic Auto Lowering

1. Provide automatic battery powered lowering feature for the hydraulic elevator.
  - a. In the case of normal power outage, the elevator shall be automatically lowered to the Main Lobby level.
  - b. The door shall open automatically to discharge passengers.
  - c. The elevator shall remain parked with its door closed and door open button operative until normal power is restored.
2. The control panel shall be located in the machine room or be an integral part of the control system.
  - a. It shall include necessary batteries, solid-state controls, charger, monitor lights and a test button.
3. Provide necessary circuitry within the controller to determine the difference between an "intentional" loss of power and an "actual" loss of power in order to prevent operation of the auto lowering unit when the main line disconnect has been opened for elevator servicing.
4. Provide necessary terminals for connection to an auxiliary switch in main line disconnect provided by others.

K. Door Operation

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
  - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of 1.0 foot per second in accordance with governing code.
  - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed thirty (30) lbf. This force shall be measured on the leading edge of the door with the door at any point between one-third and two-thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
  - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.



6. The operation of the door protective device by interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired, and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a "door open" and "door close" push button.
  - a. Pressure on the "door open" button shall cause doors in the full open position to remain so and doors engaged in the close cycle to reverse direction and assume the full open position so long as pressure remains applied to the button.
  - b. The "door open" buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
  - c. The "door close" push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
  - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

## 2.4 MACHINE ROOM

### A. Control Equipment (New)

1. Provide a microprocessor-based elevator control system.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
  - a. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
  - b. The motor drive may be located in its own cabinet where the physical size of the drive prohibits installation within the elevator signal controller cabinet.
  - c. Mechanical ventilation the cabinet shall be provided and shall be adequate to dispose of the full load heat losses without exceeding 40° C (104° F) ambient temperature.

- 1) Control equipment cabinets shall be provided with forced air ventilation to prevent overheating of the electrical components housed therein
  - d. All electrical wiring inside the control equipment cabinet shall be performed in a neat manner with field wiring terminated at stud blocks provided inside the control cabinet.
  - e. Each wiring terminal shall be clearly identified according to the nomenclature used on the "as built" wiring diagrams. No more than two (2) field wires may be connected to any single terminal stud.
  - f. Spare wires shall be tagged according to their point of termination, bundled, and placed at the bottom of the control equipment cabinet.
  - g. Each electrical component within the cabinet shall be permanently identified with symbols, identical to those used on the "as-built" wiring diagrams.
  - h. A data plate that indicates the edition of the Code in effect at the time of installation and/or alteration shall be provided in accordance with applicable code and requirements of ASME A17.1 Code. The data plate shall be in plain view and securely attached on the mainline disconnect or on the controller.
  - i. Control equipment shall comply with requirements of all applicable Sections of the ASME A17.1 Code as approved and adopted by the AHJ.
  - j. The manufacturer's standard on-board "LCD" display shall be incorporated on the main processor board and/or otherwise incorporated in the controller cabinet. The "LCD" shall be capable of providing alpha-numeric characters to view the operational status of the elevator and/or group functions depending on the application. The display shall provide the user with necessary information for troubleshooting and reprogramming of the basic system parameters.
    - 1) Where the "LCD" is not an integral part of the controller and troubleshooting/reprogramming requires the use of a separate tool, the tool shall be maintained in the machine room and accessible to service personnel. This tool, along with all technical documentation for the correct use of the tool, shall remain the property of the Owner.
    - 2) Password protection of critical programming features is required to prevent accidental changes to life-safety and other non-typical control settings.
    - 3) Where a separate dispatch or group control panel is provided, a separate "LCD" display shall be provided to view group functions.
5. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
- a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
  - b. Maintain and calibrate the diagnostic tools, and update the associated instructions and other related documents under the service agreement.
    - 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
    - 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.
    - 3) The established cost-plus profit, as previously specified, shall be applicable for the life of the system.

- a) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate detachable device, that device shall be furnished to the Owner as part of this installation.
- b) Such device shall be in possession of and become property of the Owner.

B. Equipment Isolation (New)

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state pump motor starter, and pump unit
2. The elements shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
4. New isolation pads between the car sling and the jack assembly plate shall be provided.

C. Sound Reducing Protection (New)

1. When operating in accordance with plans and specifications, the elevator equipment shall not generate noise levels in excess of NC-40 in occupied tenant spaces and shall be free of pure tones.
  - a. For the purpose of this specification, a pure tone shall be defined as a sound level in any one-third octave band which is greater than 5 dB above both adjacent one-third octave bands, in the range 45 to 11,200 Hz.
2. Provide the following treatments as a minimum.
  - a. Mount sound insulating panels, manufactured of reinforced 16 gauge steel panels with a 1" thick 1-1/2 lbs. core of fiberglass affixed to interior, on all four open sides of the power unit frame to isolate airborne noise from belt driven motor-pump assembly.
  - b. Install a minimum of two (2) sound isolating couplings in the oil line in the machine room between pump and jack.
    - 1) Each coupling shall consist of two (2) machined flanges separated by two (2) neoprene seals to absorb vibration and to positively prevent metal-to-metal contact in the oil line.
    - 2) Build coupling in such a manner that they will be absolutely blow-out proof.
  - c. Install an oil-hydraulic muffler in oil line near or within power unit.
    - 1) The mufflers contain pulsation absorbing material inserted in a blow-out proof housing.
    - 2) Rubber hose without blow-out proof features will not be acceptable.
  - d. Provide sound reducing vibration isolation elements at all support points of elevator controllers and pump units.
    - 1) The elements shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries.
    - 2) All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.

- e. Locate the power unit at least one inch (1") from any walls.
- f. Use flexible conduit with ground wire for pump unit connections.

D. Hydraulic Power Unit / Motor (New)

1. Provide a self-contained power unit which includes:
  - a. Structural steel outer base.
  - b. Tank support.
  - c. Oil tight drip pan.
  - d. Floating inner base to prevent metallic contact for mounting the motor pump assembly.
  - e. Sound isolation panels to enclose the unit and reduce airborne noise.
2. Provide a reinforced overhead oil reservoir with a tight fitting tank over the oil control unit which includes:
  - a. An oil fill strainer with air filter.
  - b. An oil level gauge assembly.
  - c. A self-cleaning strainer in the suction line.
3. The pump shall be for oil hydraulic elevator service with positive displacement screw type design for steady discharge with minimum vibration.
4. The drive shall be by multiple V-Belts and sheaves or directly driven by a submersible pump depending on the HP requirements of the system.
  - a. The use of submersible pumps having more than a 40 HP motor is unacceptable.
5. Pump drive motor control shall utilize solid state motor starter circuitry to provide reduced current starting and maximum protection of the motor.
6. The oil control unit shall be of the manufacturer's own design but shall include relief, safety check, start and slow down valves.
  - a. Use lowering and leveling valves for drop away speed, lowering speed, leveling speed and stopping speed to ensure smooth down starts and stops.
  - b. Provide a valve for manual lowering of the elevator car in event of power failure and for use in servicing and adjusting the elevator mechanism.
  - c. Design the tank shut-off valve for isolating oil in the power unit tank to ensure servicing and adjusting the elevator mechanism without removing oil from the tank.
  - d. All valves shall be accessible for adjustment without removing the assembly from the oil line.
  - e. and adjusting the elevator mechanism without removing oil from the tank.
7. Manufacture the unit to operate under 600 psi (for dry units) / 700 psi (for submersible units) working pressure.
8. When the oil reservoir thermostat registers 50 degrees F, the car shall "exercise" until the oil temperature reaches 75 degrees F.

2.5 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Reuse)

1. Car guide rails, fishplates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
    - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
  2. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
  3. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.
- B. Roller Guides (New)
1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
    - a. Roller guides shall consist of a set of sound reducing neoprene or polyurethane wheels in precision bearings held in contact with the three (3) finished rail surfaces by adjustable stabilizing springs.
    - b. The bearings shall be sealed or provided with grease fittings for lubrication.
    - c. Equip roller guides with adjustable stops to control postwise float.
    - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.
- C. Electrical Conduit / Wiring / Traveling Cable
1. Electrical wiring shall be provided.
    - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
    - b. Electrical wiring provided for hoistway interlock shall be of a flame retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
    - c. Each run of electrical conduit or duct shall contain no less than 10% spare wires and, in any case, no fewer than two (2) spare wires.
    - d. Crimp-on type wire terminals shall be used where possible.
  2. Traveling cable shall be provided.
    - a. Each traveling cable shall be provided with a flame and water resistant polyvinyl chloride jacket.
    - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
    - c. Each traveling cable shall contain no less than 10% spare wires.
    - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
    - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.

- f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20 gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
  - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
    - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
  - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of 30x the cable diameter is provided.
  - i. Pre-hang the cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting during operation.
3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.
- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
    - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
  - b. The use of flexible metal conduit shall be limited to runs not greater than three feet (3') in length.
  - c. All abandoned or unused electrical conduit shall be removed from the hoistway.
  - d. Existing conduit and wiring duct may be reused if suitable for the application.
    - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

D. Normal and Final Terminal Stopping Devices

- 1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
- 2. Provide final terminal stopping devices to stop the car] automatically from the speed specified within the top clearance and bottom overtravel.
- 3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
  - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
- 4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

2.6 PIT EQUIPMENT

A. Jack Unit (Reuse)

1. The existing jack shall be reused.
  2. The jack shall undergo the following work:
    - a. Check plunger for smooth surface and eliminate burrs where necessary.
    - b. Verify plunger sections are securely attached with minimum seam.
    - c. Check stop-ring for proper fit.
    - d. Renew internal babbitt-lined, guide bearing, packing or seals where necessary.
    - e. Clean drip ring around cylinder top to provide adequate drainage.
    - f. Check mounting hardware and welds where applicable.
    - g. Check secure attachment of head.
    - h. Remove rust and apply rust inhibiting paint.
    - i. Replace packing
  3. Perform static load test of the jack unit to determine if there are any failures of the cylinder wall.
  4. Where double-walled cylinders are not provided, and where prevailing conditions allow, install a plunger gripper to prevent freefall of the elevator in the event of a catastrophic failure of the hydraulic jack.
- B. Jack Assembly, Jack Hole and Casing (New/Replacement) – Alternate No. 2
1. Existing hydraulic cylinder, piston and pit channels shall be removed.
    - a. Contractor shall be responsible for drilling of the jack hole and removal of resultant debris should the existing jack hole collapse.
  2. The jack hole shall be fitted with a schedule 40 waterproof PVC casing.
  3. The jack assembly shall be of sufficient size to lift the gross load at the rated speed to the height specified and shall be factory tested to ensure adequate strength and freedom from leakage.
    - a. No brittle material, such as grey cast iron, shall be used in the jack construction.
  4. The base components of this assembly shall be a cylinder, cylinder head and plunger.
  5. Installation shall be plumb and at the exact center of the car guide rail DBG.
  6. Channel iron pit structure shall be provided as a means of support and attachment.
  7. The hydraulic cylinder shall be constructed from heavy steel pipe meeting ASTM-A53, grade B standards with a forged seamless end cap, threaded inlet fitting and brackets for pit channel attachment.
    - a. Outside walls of the cylinder shall receive no less than three (3) applications of an approved corrosion inhibiting compound.
  8. The cylinder head and flange shall be machined from carbon steel and designed to provide a collision point for the plunger stop ring.
    - a. The head shall be equipped with two (2) packing rings separated by a single lantern ring, an oil wiper ring, a bronze guide ring, and an air bleed port.
    - b. The flange shall be arc welded to the upper end of the cylinder to provide a means of attachment and mating surface for the head.
    - c. Immediately prior to seeking final acceptance of the completed project as specified herein, the Contractor shall renew both packing rings in the cylinder head.
  9. The plunger shall be constructed from precision ground steel pipe meeting ASTM-A53, grade B standards.

- a. In cases where multiple plunger sections are necessary, threaded coupling with neoprene O-ring seals shall be provided.
  - b. The upper end of the plunger shall be fitted with an inset steel plate that is fillet welded to the inner walls of the plunger and then drilled and tapped for platen plate attachment.
  - c. A heavy steel stop ring shall be arc welded outside the plunger near the bottom end.
10. Contractor shall be responsible for extra costs necessary to overcome underground rocks, solid debris or water and complete satisfactory drilling of the jack hole.
  11. Should the existing well hole and or casing diameter be inadequate for installation of new cylinder and PVC liner, Contractor shall drill a larger well hole of sufficient diameter to accommodate the new equipment.
- C. Scavenger Pump (New)
1. Provide a positive displacement, rotary type pump for the hydraulic elevator.
    - a. The pump shall have a 1/3 HP motor capable of pumping 100 ft. vertically.
    - b. The pump shall be self-priming and self-lubricating.
    - c. The pump shall be equipped with a 100 mesh screen strainer.
    - d. The pump housing shall be constructed of brass with stainless steel internal parts, and shall have a 3.5-gallon reservoir.
  2. Mount oil return pump off the pit floor and connect it to the jack unit and the oil tank with copper tubing.
- D. Overspeed (Rupture) Valve (New)
1. Where required by Code, an overspeed valve shall be provided and installed so that it will cause the flow of oil from the hydraulic jack through the pressure piping to cease when such flow exceeds a preset value relative to car speed in accordance with applicable codes.
- E. Hydraulic Piping (New)
1. Provide all necessary pipes and fittings to connect the power unit to the jack.
    - a. Provide a shut off valve in the machine room for maintenance service.
  2. Adequately support the full run of pipe with isolation type support.
  3. Where flexible hose and fitting assemblies, and flexible couplings are used for hydraulic connections, flexible hose and fitting assemblies shall:
    - a. Not be installed within the hoistway, nor project into or through any wall.
    - b. Installation shall be accomplished without introducing twist in the hose, and shall conform with the minimum bending radius of SAE 100 R2 type, high pressure, steel wire reinforced, rubber covered hydraulic hose specified in SAE J517.
    - c. Have a bursting strength sufficient to withstand not less than ten (10) times the working pressure.
    - d. Be permanently marked indicating:
      - 1) Manufacturer of the hose and fittings.
      - 2) Type of hose and fitting.
      - 3) Minimum factory test pressure.
      - 4) Minimum bending radius of the hose.



- 5) Date of installation.
- 6) Inspection procedure.
- 7) Name of elevator contractor.

## 2.7 HOISTWAY ENTRANCES

### A. Hoistway Entrance Structure

1. Frames - The frames shall be constructed of 14-gauge stainless sheet steel.
2. Doors - The doors shall be constructed of 16-gauge stainless sheet steel, not less than 1-1/4" thick, reinforced to accept hangers, interlocks or door closers.
3. Equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
4. Entrances shall bear 1 ½ hour label of Underwriters Laboratories, Inc.
5. Provide each door panel with two removable laminated plastic composition guides, arranged to run in sill grooves with a minimum clearance, replaceable without removing the door from the hangers and incorporating a steel fire stop.
6. Provide the leading edge of door panels with continuous black rubber astragal bumper strips.
  - a. The strips shall be relatively inconspicuous when the doors are closed and shall be easily replaced.
7. Sills - Provide narrow-type, extruded sills with the nosing approximately one (1) inch deep and running the full length of door travel.
  - a. The sills shall be at least 3/8 inch thick.
  - b. The wearing surface shall be of a non-slip type.
  - c. Rigidly secure the sills to the building construction by means of steel sill support brackets or blocking with necessary metal shimming or adjustments.
  - d. Provide and rigidly secure sill support members to the building structure after blocking and leveling them with necessary metal shimming.
    - 1) Use 4" x 4" x 1/4" angle for single speed entrances and 5" x 5" x 3/8" angle for two speed entrances.
    - 2) If formed sheet steel sill support members are used, the structural properties of these members shall match or exceed the structural properties of 4" x 4" x 1/4" angle for single speed entrances, and 5"x 5" x 3/8" angle for two speed entrances.
8. Struts - Provide 3" x 3" x 1/4" hot rolled steel angle struts.
  - a. If formed sheet steel struts are used, the structural properties of formed struts shall match or exceed the structural properties of 3" x 3"x 1/4" steel angle.
  - b. Extend the struts from top of sill to either the bottom of floor beam or intermediate framing above.
  - c. Bolt struts in place with not less than two (2) bolts at each end.
  - d. Strut clip angles or brackets shall have a thickness not less than the thickness of the supported strut.
9. Track Support - 3/16-inch-thick steel track support plate shall extend between and be bolted to the vertical steel struts with no less than two (2) bolts at each end.
10. Track Covers – 14 gauge steel cover plates shall extend the full travel of the doors.

- a. Covers shall be made in sections for service access to hangers, sheaves, tracks and interlocks.
  - b. The sections above the door opening shall be movable from within the elevator car.
  - c. Cover fastening devices shall be non-removable from the cover.
11. Fascias – 16 gauge steel fascia plates shall extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
- a. Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
12. Toe Guards - Provide 16 gauge steel toe guards to extend twelve (12) inches below any sill not protected by fascia.
- a. The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
13. Dust Covers - Provide 16 gauge steel dust covers to extend six (6) inches above any header not protected by fascia.
- a. The dust covers shall extend to a full width of travel of the doors, return to the hoistway wall at a 15-degree angle and be firmly fastened.
- B. Slide Type Hoistway Door
1. Provide a new elevator hoistway entrance door.
  2. Each new door shall be as follows:
    - a. Hollow metal construction.
    - b. 1-1/2-hour fire-rated test approved with required label.
    - c. Manufactured of cold rolled furniture steel.
    - d. Flush design both sides.
    - e. Rigidly reinforced.
    - f. Sound deadened.
    - g. Finish all door panels with no. 4 stainless cladding.
  3. Where conditions warrant, and where otherwise required by code, equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
  4. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in sill grooves with a minimum clearance.
    - a. The guide mounting shall permit their replacement without removing the door from the hangers.
    - b. A steel fire stop shall be enclosed in each guide.
  5. Provide each side sliding type hoistway door panel with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
    - a. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area twelve (12) inches x twelve (12) inches at the approximate center of the door panel.

6. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
  - a. Astragal shall be relatively inconspicuous when the doors are closed.
  - b. Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
7. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
  - a. The key hole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
  - b. Escutcheon shall be brushed stainless steel to match door panels where required.
8. Where conditions require, provide necessary new masonry around existing entrance frames to maintain fire rating. Painting or other wall surface decorating will be by Others.

C. Tracks / Hangers / Closers / Related Equipment

1. Formed or extruded steel landing door hanger tracks shall be provided.
2. Each landing door panel shall be suspended from a pair of door hanger assemblies that are compatible with the hanger tracks.
  - a. Hanger assemblies shall be directly mounted to the door panel using 3/8" diameter or better hardware.
  - b. Solid steel blocks shall be used where job-site conditions dictate the use of spacers between hanger assemblies and the landing door panel.
  - c. Hanger assemblies shall be adjusted or shimmed so that door panels are suspended in a plumb manner with no more than 3/8" vertical clearance to the cab entrance threshold.
  - d. Upthrust rollers shall be adjusted for minimal operating clearance against the bottom edge of the hanger track.
  - e. Means shall be provided to prevent hangers from jumping the track.
  - f. Blocks shall be provided to prevent rollers from overrunning the end of the track.
3. Each set of center opening landing doors shall be provided with a cable driven relating mechanism which is compatible for use with the door hanger assemblies.
  - a. The relating mechanism shall be properly tensioned and adjusted so as to equalize the relationship between the door panels and the hoistway entrance.

D. Interlocks / Unlocking Devices

1. Each set of landing doors shall be provided with a complete electromechanical interlock assembly.
  - a. Each interlock assembly shall consist of:
    - 1) A switch housing with contacts.
    - 2) Lock keeper.
    - 3) Clutch engagement/release subassembly.
    - 4) Associated linkages.
  - b. Arrange the lock so that individual leading door panels (side slide or center opening) are locked when in the closed position.

2. Non-typical mounting arrangements for interlocks and/or related mechanisms must receive prior approval from the Consultant.

E. Hoistway Entrance Sill

1. Provide an entrance sill with the nosing approximately one (1) inch deep and running the full length of door travel.
  - a. Sill shall be at least 3/8 inch thick.
  - b. The wearing surface shall be of a non-slip type with the door guide grooves providing a minimum clearance for the guides.
  - c. Rigidly secure the sills to the building construction by means of steel sill support brackets or blocking with necessary metal shimming or adjustments.
  - d. The sills shall be extruded aluminum.
  - e. New sill supports shall be provided and be back filled under load bearing portion with pre-shrink grout.
2. Provide new steel fascia plates and toe guards.

2.8 CAR EQUIPMENT / FRAME

A. Platform (New)

1. The car platform shall consist of a steel frame with necessary steel stringers, all securely welded together.
2. Passenger Elevators
  - a. Provide platform with two (2) layers of 3/4" thick marine grade plywood.
  - b. Cover the underside of the car platform with sheet steel.
  - c. Provide extruded aluminum car door entrance saddles having non-slip surface, guide grooves.
  - d. Recess the platform to receive finished flooring as selected by the architect and specified under another section of their specification.

B. Car Frame (Reuse)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
  - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.

C. Automatic Leveling / Releveling / Positioning Device

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
  - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
  - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.

D. Top-of-Car Inspection Operating Station

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
  - a. A push/pull or toggle switch designated "EMERGENCY STOP" shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the "off" position.
  - b. A toggle switch designated "INSPECTION" and "NORMAL" to activate the top of car Inspection Service Operation.
  - c. Push button designated "Up", "Down" and "Enable" to operate the elevator on Inspection Service (the "Enable" button shall be arranged to operate in conjunction with either the "Up" or "Down" button).
  - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

E. Car Enclosure Work Light / Receptacle

1. The top and bottom of each car shall be provided with a permanent lighting fixture and 110 volt GFI receptacle.
2. Light control switches shall be located for easy accessibility from the hoistway entrance.
3. Where sufficient overhead clearance exists, the car top lighting fixture shall be extended no less than 24" above the crosshead member of the car frame.
4. Light bulbs shall be guarded so as to prevent breakage or accidental contact.

F. Emergency Exits / Top

1. Provide new emergency exit switches that operate per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.

G. Master Door Power Operator System – VVVF/AC

1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
2. The operator may be of the belted linear drive type.

3. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
  - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
4. The type of system shall be designated as a high speed operator, designed for door panel opening at an average speed of two (2.0) feet per second and closing at approximately one (1.0) foot per second.
  - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.
5. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.
  - a. Provide controls to automatically compensate for load changes such as:
    - 1) Wind conditions (stack effect).
    - 2) Use of different weight door panels on multiple landings.
    - 3) Other unique prevailing conditions that could cause variations in operational speeds.
  - b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
6. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
  - a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.
  - b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
  - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
7. Construct all door operating levers of heavy steel or reinforced extruded aluminum members.
8. Belts shall be designed for long life and operate noise free.
9. All components shall be designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
  - a. All pivot points, pulleys and motors shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
10. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.

H. Car Door Panel(s)

1. Provide standard 1" thick, 14-gauge hollow metal flush construction panel(s), with satin stainless-steel No.4 finish, reinforced for power operation and insulated for sound deadening.
2. Paint the hoistway side of each panel black and face the cab side with 16-gauge sheet steel matching the existing returns or in selected material and finish as otherwise directed by Owner/Architect.
3. The panels shall have no binder angles and welds shall be continuous, ground smooth and invisible.
4. Drill and reinforce panels for installation of door operator hardware, door protective device, door gibs, etc.
  - a. Provide each door panel with two (2) removable laminated plastic composition guides, arranged to run in the sill grooves with minimum clearance.
  - b. The guide mounting shall permit their replacement without removing the door from the hangers.
5. Provide the meeting edge of center opening doors with necessary continuous rubber astragal bumper strips.
  - a. These strips shall be relatively inconspicuous when the doors are closed.

I. Door Reopening Device / "3D" (New)

1. Provide a combination infrared curtain and 3D door protection system.
2. The door shall be prevented from closing and will reopen when closing if any one of the curtain light rays is interrupted or should an object enter the 3D detection zone.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain and 3D zone protective system shall provide:
  - a. Protective curtain field not less than 71" above the sill.
  - b. 3D protective zone field not less than 61" above the sill.
  - c. Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
  - d. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
  - e. Self-contained, selectable 3D zone timeout feature to allow for closing at nudging speed with audible signal.
  - f. Automatic turning-off of the 3D zone in the event of three (3) consecutive 3D triggers.
    - 1) Light curtain shall continue to operate after 3D system timeout.
  - g. Selectable control of the 3D zone operation on an "always-on" or "as doors close" basis.
  - h. Controls to shut down the elevator when the unit fails to operate properly.
  - i. Provide audible and visual notification of pending door close.

2.9 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

2. Finishes

- a. Stainless Steel
  - 1) Satin Finish: No. 4 satin, long grain.
- b. Sheet Steel:
  - 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer.
  - 2) Finish Paint: Two (2) coats of low sheen baked enamel, color as selected by the Architect.
  - 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

3. Painting

- a. Apply two (2) coats of paint to the machine room floor.
- b. Apply two (2) coats of clear lacquer to bronze or similar non-ferrous materials to prevent tarnishing during a period of not less than twelve (12) months after initial acceptance by the Owner or Agent.
- c. Identify all equipment including buffers, car apron, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- d. Paint floor designation not less than four (4) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of paint used shall contrast with the color of the surface to which it is applied.

B. Hoistway Entrances

- 1. Entrance Frames:
  - a. Passenger Elevators - Provide stainless steel with No. 4 finished frame with welded and mitered corners ground smooth, 2" wide square profile.
- 2. Door Panels:



- a. Passenger Elevators – All Floors: Stainless steel with No.4 finish.
- 3. Entrance Sills:
  - a. Passenger Elevators – All Floors: Extruded aluminum.
- C. Car Interior Finishes
  - 1. Car interior finishes shall be as selected by Owner and/or Architect.
  - 2. Contractor shall provide samples of finishes as required for approval prior to fabrication.
  - 3. Refer to specifications for other design requirements where provided.
  - 4. Special attention shall be given to flooring materials and suitability for intended duty.

## 2.10 FIXTURES / SIGNAL EQUIPMENT

### A. General - Design and Finish

- 1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG and local requirements of the AHJ.
- 2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
- 3. Custom designed operating and signaling fixtures shall be as shown on the drawings or as approved by the Owner.
- 4. The layout of the fixtures including all associated signage and engraving shall be as approved by the Owner .
- 5. Where no special design is shown on the drawings, the buttons shall be as follows:
  - a. Stainless steel convex type as selected by the Owner from the manufacturer's premium line of push buttons.
  - b. The button shall have a collar with LED call registered light.
- 6. Where no special design is shown on the drawings, the faceplates shall be as follows:
  - a. Passenger Elevators
    - 1) Typical Floors: 1/8" thick stainless steel faceplate with No.4 finish.
- 7. Mount passenger elevator fixtures with tamperproof fasteners. The screw/fastener and key switch cylinder finishes shall match faceplate finish.
- 8. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four (4) keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
- 9. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy in code required colors.

### B. Main Car Operating Panel

- 1. Provide a main car operating push button panel on the inside front return panel of the car.
- 2. Car operating panel shall be incorporated in the swing-front return of the elevator cab.
  - a. Coordination with car front manufacturer shall be the responsibility of the Elevator Contractor.
- 3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.

4. The operating panel shall include:
    - a. A call button for each floor served, located not more than 48" above the cab floor.
    - b. "Door open" / "Door close" buttons.
    - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
    - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
    - e. Self-dialing, hands-free emergency communication system actuation button with call acknowledging feature and ASME A17.1. design provisions.
    - f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
  5. Locked Firemen's Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
    - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
  6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
    - a. Independent service switch.
    - b. Light switch.
    - c. Fan switch.
    - d. G. F. I. duplex receptacle.
    - e. Emergency light test button and indicator.
    - f. Inspection Service Operation key switch.
    - g. Dimmer for cab interior lighting.
  7. Car operating panel shall incorporate:
    - a. An integral (no separate faceplate) digital L.E.D. floor position indicator.
    - b. Black-filled engraved unit I.D. number or other nomenclature, as approved by Owner.
    - c. A "No Smoking" advisory.
    - d. The rated passenger load capacity in pounds.
  8. Equip the car operating panel with proximity card reader provisions.
    - a. Provide a 3" x 5" cut-out with smoked gray Plexiglas lens in the car operating panel.
    - b. Security system shall be overridden by Phase II Firefighter's Emergency Operations in accordance with code.
  9. Post Inspection Certificate behind a cutout that is to be integral to the locked service cabinet and fitted to a flush-mounted clear Plexiglas (No Frame).
- C. Rear Car Operating Panel
1. Provide an auxiliary car operating panel that contains the following:
    - a. Car call registration buttons.
    - b. Door open and close buttons.
    - c. Emergency stop switch.

- d. Illuminated alarm button.
  2. Operating devices shall be of the same design, material and finish as the main operating panel.
  3. Design this station so as to duplicate the layout of the main operating panel.
  4. Provide a digital position indicator, Elevator ID engraving to match the main car operating panel.
- D. Car Position Indicator
1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
    - a. Provide 2" high, 10-segment LED type position indicator with direction arrows, integral with the car operating panel.
    - b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
    - c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
    - d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.
- E. Voice Annunciator
1. Provide a voice annunciator in each elevator.
  2. The device features shall comply with the requirements of ADAAG and local accessibility requirements.
  3. Coordinate size, shape and design with Designer and other trades.
  4. The system shall include, but not limited to:
    - a. Solid state digital speech annunciator.
    - b. A recording feature for customized messages.
    - c. Playback option.
    - d. Built-in voice amplifier.
    - e. Master volume control.
    - f. Audible indication for selected floor, floor status or position, direction of travel, floor stop, seismic operation, firefighter service and nudging.
  5. Locate all associated equipment in a single, clearly labeled enclosure located either in the machine room and/or on car top.
- F. In Car Video Display
1. Provisions shall be made for the installation of a video display panel if required by code.
    - a. Display shall be flush mounted.
    - b. Contractor shall coordinate and assist in the installation of the panel within the car enclosure and/or car front return with the manufacturer of the display and Owner as part of the base scope of work.
    - c. Costs associated with necessary wiring to support the display, such as power and data, shall be included in the base price.
- G. Corridor Push Button Stations / Remove Back Boxes
1. Push button signal fixtures shall be provided on each landing.

2. Each signal fixture shall consist of:
  - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
  - b. A recessed mounting box, electrical conduit and wiring.
3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
4. Include firefighter key, phone line loss indicator and related required componentry switch in the main lobby level station or other designated recall landing fixture.
5. Where existing fixtures are located greater than 48" above the floor:
  - a. The existing back boxes shall be removed.
  - b. New back boxes shall be installed to provide a new centerline to buttons of 42" above the floor.
  - c. Standardize the new centerline on each floor.
6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
  - a. Finished painting or decorating of wall surfaces shall be by Others.

H. Floor Position Indicator

1. Remove existing floor position indicator at each landing and provide new digital LED type unit.
2. New plate shall completely cover the present cutout and provide 2" numerals located on center.
3. Provide integral direction arrows that will indicate the direction in which the elevator is traveling.

I. Hall Direction Lanterns

1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
  - a. Design the lantern with up and down indication at intermediate landings and a single indication at terminal landings.
  - b. Lanterns shall sound once for the up direction and twice for the down direction.
    - 1) Provide an electronic chime with adjustable sound volume.
  - c. Provide adjustable signal time (three [3] to ten [10] seconds, with one [1] second increments) to notify passengers which car shall answer the hall call and preset per ADAAG notification standards.
2. Locate the lantern at the existing location.

J. Hoistway Access Switch

1. Install a cylindrical type keyed switch at top terminal in order to permit the car to be moved at slow speed with the doors open to allow authorized persons to obtain access to the top of the car.
2. Where there is no separate pit access door, a similar switch shall be installed at the lowest landing in order to permit the car to be moved away from the landing with the doors open in order to gain access to the pit.
3. Locate the switch in the hall call push button station at the top and bottom terminal landings where required if allowed by the Authority Having Jurisdiction.
4. This switch is to be of the continuous pressure spring-return type and shall be operated by a cylinder type lock having not less than a five (5) pin or five (5) disc combination with the key removable only in the "OFF" position.
  - a. The lock shall not be operable by any key which operates locks or devices used for other purposes in the building and shall be available to and used only by inspectors, maintenance men and repairmen in accordance with A17.1 applicable Security Group.
5. Existing provisions that meet the aforementioned criteria may be updated with keyed switches to match new apparatus provided for uniformity of systems within the building.

2.11 CAR ENCLOSURES

- A. Elevator Cab Enclosure (Shell) and Cab Interior (\$40,000.00 total net allowance for passenger elevators.)
1. It is understood that if the selected manufacturer of the equipment may not be the same as the Elevator Supplier, all cab material will be constructed in a manner to accommodate the elevator manufacturer's associated equipment, such as operator, hangers, interlocks, etc., as purchased by the Owner or Owner's Agent.
  2. The net allowance for the elevator is to be exclusive of:
    - a. Handling charges.
    - b. Applicable sales and/or use taxes.
    - c. Car door hangers, interlocks, exit contact locks.
    - d. Car door sill.
    - e. Car doors.
    - f. Ventilation and fan.
    - g. Car installation, cut-outs, operating equipment, and such items are to be included by the Elevator Supplier in the base contract.
  3. The net allowance covering the elevator cars of a design and material as selected shall include:
    - a. Code Compliant Glass Cab Enclosure
    - b. Cab Interior drop ceiling lighting.
    - c. Base wainscoting.
    - d. Handrails.
    - e. Entrance columns.
    - f. Transoms.
    - g. Necessary cutouts.
    - h. All necessary cutouts and cab associated appurtenances that may be designed or required.
    - i. Flooring
    - j. Decorative shroud/cladding at cartops and below platforms
  4. The Owner or Owner's authorized representative reserves the right to deduct the net allowances from the Elevator Contract.
  5. The Owner retains the right to assign this purchase to the Elevator Supplier for coordination and receive the necessary credits or make the installation by an authorized representative of the Architect and/or Owner.
  6. Contractor shall include all costs associated with coordination of cab related work in the base modernization bid including static and dynamic balance of the system.
  7. Should portions of the work covered under the allowance be deemed not necessary the contractor shall reimburse the portion of the work not performed. Additionally, the associated labor that is included in the base price will be reimbursed for the work not performed at an agreed upon timeframe that the work would have taken to be complete. Labor rates included in the RFP form shall apply for any labor reimbursement.

B. Cab Door (New)

1. Standard 1" thick, 14-gauge hollow metal flush construction with stainless steel No.4 finish, reinforced for power operation and insulated for sound deadening. Paint hatch side of doors black and face cab side with 16-gauge sheet steel in selected material and finish.
  - a. The door panels shall have no binder angles. All welds shall be continuous, ground smooth and invisible.
  - b. Drill and reinforce doors for installation of door operator hardware, door protective device, door gibs, etc.

C. Protective Pads and Button Hooks (New)

1. Provide pad hooks at locations as directed by the Owner/Consultant. Protective pads shall cover the front return panels, and the side and rear walls. Provide cutouts in pads for access to the cab operating and signaling devices. Pads shall be fire-resistant canvas with two (2) layers of cotton batting padding.
  - a. Identify each pad by elevator number and wall location.
  - b. Provide one (1) set of protection pads.

D. Elevator Cab Enclosure Fan

1. Provide an exhaust type two (2)-speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
  - a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
2. Provide a key switch in the elevator cab enclosure for control of fan unit.
3. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

2.12 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING

A. Battery Back Up Emergency Lighting Fixture and Alarm

1. Provide a self-powered emergency light unit.
  - a. Arrange two (2) of the cab light fixtures to operate as the emergency light system.
  - b. Where cab lighting is utilized for emergency lighting, Contractor shall coordinate the battery back-up equipment so that it is compatible with the type of cab lighting specified by the Owner or Architect.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
  - a. The battery shall be rechargeable nickel cadmium with a ten (10)-year minimum life expectancy. Mount the power pack on the top of the car.
  - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.

- c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
        - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station.
        - 2) The alarm button shall illuminate when pressed.
    3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
    4. The operation shall be completely automatic upon failure of normal power supply.
    5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times so it automatically recharges battery after use.
- B. Emergency Voice Communication / Telephone
  1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
    - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
    - b. 120V power shall be provided to power the hands-free device.
  2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
    - a. Engraving shall be provided next to the indicator which says "When lit help is on the way".
  3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
    - a. The telephone must not shut off if the activating button is pushed more than once.
    - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
    - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
  4. The system shall be compatible with ring down equipment and PBX switchboards.
  5. The system shall be capable of serving as the audio output for an external voice annunciation system.
    - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
    - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
  6. The phone shall be able to:
    - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
    - b. Receive incoming calls from other off-site locations via the public telephone system.



- c. Acknowledge incoming calls and automatically establishing hands-free two way communications.
  - 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to six (6) elevators to be called individually from outside the building over a single telephone line and up to eighty (80) elevators if an On-Site Rescue Station is provided.
- 7. The emergency elevator communication system shall require a maximum of one (1) telephone line.
  - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
  - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
- 8. The system shall provide its own four-hour backup power supply in case of a loss of regular AC power.
- 9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
- 10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
  - a. If the on-site call is not picked up within thirty (30) seconds, the call will be automatically forwarded to a twenty-four (24)-hour off-site monitoring service.
  - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
- 11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
- 12. New telephone lines, where required, shall be provided and interfaced by others.
- 13. All electrical work shall conform to Division 16 requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

### 3.2 INSTALLATION / PROJECT PHASING

#### A. Installation

1. Modernize the elevator, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1 ¼" at all landings served.
7. Set entrance plumb in hoistway and in alignment with guide rails prior to erection of the front walls.
8. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
9. Reinforce hoistway fascias to allow not more than 1/2" of deflection.
10. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
11. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
12. Isolate cab fan from canopy to minimize vibration and noise.
13. Remove oil, dirt and impurities and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.
14. Prehang traveling cables for at least twenty-four (24) hours with ends suitably weighted to eliminate twisting after installation.
15. Pack openings around oil line with fire resistant, sound isolating glass or mineral wool.
16. Set jack unit plumb in waterproof hole and bolt it to mounting channels in the pit.
17. Sound isolate pump units and controllers from building structure.
18. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.

19. Lubricate operating parts of system as recommended by the manufacturer.

B. Project Phasing

1. Phase I - Final design development and contractors' preliminary work procedures to be completed within four (4) weeks from date of contract award.
  - a. Prevailing conditions review and layout.
  - b. Selection meeting for aesthetic design and finishes with Owners' designee.
  - c. Filing for required permits or other governing authorities work procedure requirements.
2. Phase II - Submittal approvals and confirmations shall be completed within eight (8) weeks from date of contract award.
  - a. Selection confirmations.
  - b. Manufacturer's shop drawings applicable, i.e., fixtures, cab, machine room layouts, doors, etc.
  - c. Engineering data acknowledgment applicable, i.e., power, heat, structural loads.
  - d. Delivery dates for major component suppliers, i.e., controls, machinery, fixtures, cabs, etc.
  - e. Posting of permits or other governing agency authorizations to proceed.
  - f. Proposed work implementation schedule based on the aforementioned procedures/confirmations.
3. Phase III - Mobilization of Final Design Approvals
  - a. Revision confirmations. (Equipment, etc.)
  - b. Preliminary work procedures.
  - c. Schedule confirmations.
4. Phase IV – Implementation
  - a. Personnel mobilization.
  - b. Material delivery.
  - c. Modernization
    - 1) The contractor is expected to provide weekly progress photos throughout the duration of the modernization.
  - d. Final punch out and walk through.
5. Contractor shall provide a project schedule as part of the Bid based on the following:
  - a. Include one (1) day of simulated operation, with or without door operation, while not allowing passenger use.
  - b. Consultant punch list inspection report shall be performed after acceptance testing by the AHJ for each individual elevator.
  - c. Contractor shall complete all punch list items issued by both the AJH and the Consultant prior to turn-over for beneficial use by the Owner and removal of the next elevator for modernization.

C. Removal of Elevator

1. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
2. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.

### 3.3 FIELD QUALITY CONTROL

#### A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

#### B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

#### C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:
  - a. Speed within 5% of rated speed in the up direction under any loading condition.
  - b. Leveling: within  $\pm 1/4"$  as measured between the car entrance threshold and the landing sill on any given floor under any loading condition.
  - c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one floor until they are 3/4 open at the next floor) under various loading conditions:

14.0 – 16.0 seconds

d. Door Operating Times

Door Type	Opening	Closing
42" Single-speed Center Opening	2.5 sec.	3.0 sec.
e. Door dwell time for hall calls:	5.0 sec without Advance lantern signals.	
f. Door dwell time for car calls:	3.0 seconds.	
g. Reduced non-interference dwell time:	1.0 seconds.	

2. Maintain the following ride quality requirements for the passenger elevators:
  - a. Noise levels inside the car shall not exceed the following:

- 1) Car at rest with doors closed and fan off - 40 dba.
- 2) Car at rest with doors closed, fan running - 55 dba.
- 3) Car running at high speed, fan off - 50 dba.
- 4) Door in operation - 60 dba.

b. Vertical accelerations shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.

- 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s<sup>2</sup> (1 milli-g) in the range of 0-2 m/s<sup>2</sup> over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPA (8.7psi).

B. Acceptance Testing

1. Comply with the requirements of Division 01.
2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
  - a. Operation of safety devices.
  - b. Sustained high-speed velocity of the elevator in either direction of travel.
  - c. Floor-to-floor time between adjacent floors.
  - d. Floor leveling accuracy.
  - e. Door opening/closing and dwell times.
  - f. Ride quality inside the elevator car.
  - g. Communication system.
5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:
  - a. Battery lowering operation.
  - b. Firefighter and independent service operations.
  - c. Restricted access security features and card reader controls.
  - d. Floor parking assignments.
7. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION



- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.
- E. Demonstration and Training Videotape: Submit 2 copies at end of each training module to the Contracting Officer for approval.

#### 1.4 QUALIFICATIONS

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that required for this project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, experienced in operation and maintenance procedures and training.
  - 1. Instructor shall meet or exceed any specific qualifications or experience requirements indicated in the Division 2-16 technical specification sections for the specific system, subsystem, or equipment that is the subject of the training or demonstration.

#### 1.5 COORDINATION

- A. Coordinate instruction schedule with the Project Officer. Be prepared to adjust schedule as required to minimize disrupting the City of Rockville operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program module until operation and maintenance data or manual(s) as required for the equipment in the module have been reviewed and approved by the Contracting Officer.

### PART 2 - PRODUCTS

#### 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Division 2-16 technical specification sections and as follows:
  - 1. Motorized doors
  - 2. Fire-protection Systems
  - 3. Intrusion Detection Systems
  - 4. Conveying systems
  - 5. Laboratory equipment
  - 6. HVAC Equipment and controls
  - 7. Lighting systems



- B. Training Modules: Develop and submit written learning objective and teaching outlines for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project Record Documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.
    - h. Normal shutdown instructions.
    - i. Operating procedures for emergencies.
    - j. Operating procedures for system, subsystem, or equipment failure.
    - k. Seasonal and weekend operating instructions.
    - l. Required sequences for electric or electronic systems.
    - m. Special operating instructions and procedures.
  5. Adjustments: Include the following:
    - a. Alignments.
    - b. Checking adjustments.
    - c. Noise and vibration adjustments.

- d. Economy and efficiency adjustments.
  - 6. Troubleshooting: Include the following:
    - a. Diagnostic instructions.
    - b. Test and inspection procedures.
  - 7. Maintenance: Include the following:
    - a. Inspection procedures.
    - b. Types of cleaning agents to be used and methods of cleaning.
    - c. List of cleaning agents and methods of cleaning detrimental to product.
    - d. Procedures for routine cleaning
    - e. Procedures for preventive maintenance.
    - f. Procedures for routine maintenance.
    - g. Instruction on use of special tools.
  - 8. Repairs: Include the following:
    - a. Diagnosis instructions.
    - b. Repair instructions.
    - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    - d. Instructions for identifying parts and components.
    - e. Review of spare parts needed for operation and maintenance.
- C. Training modules can be developed and submitted separately however they must be designed to be compiled into a comprehensive training program. The training program submission will not be complete until the final module has been submitted, reviewed, and approved.

## 2.2 VIDEO TAPES

- A. Video Format: High quality VHS color videotape in full-size cassettes.
- B. Video Identification: Each copy shall be labeled with an applied label containing the following information:
  - 1. Project name.
  - 2. Name, address and telephone number of photographer.
  - 3. Name of Contractor.
  - 4. Date video was recorded.
  - 5. Subject of demonstration or Training
  - 6. Model Number and building location of Equipment being demonstrated

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and the City of Rockville for number of participants, instruction times, and location.
- B. Contractor provided Instruction: Engage qualified instructors to instruct the City of Rockville personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. The City of Rockville Provided Instruction:
  - 1. The City of Rockville will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. The City of Rockville will furnish an instructor to describe operational philosophy.
- D. The Contracting Officer will furnish the Contractor with the names and positions of the City of Rockville participants.
- E. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with the Project Officer at least 7 days' in advance.
- F. Evaluation: At conclusion of each training module, assess and document each participant's mastery of the module by use of an oral, written or demonstration performance-based test.
- G. Demonstration and Training Videotape: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
  - 2. All videos must be close captioned.
- H. Cleanup: Collect and remove used and leftover educational materials. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 018200



50 Monroe Street Elevator Modernization

SECTION 515120 - PREFABRICATED ALUMINUM RAMPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Modular Aluminum Ramps.
- B. Precast Concrete Ballast Bases.

1.2 REFERENCES

- A. ASTM B 209 - Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
- C. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2002.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
- E. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- F. ADA - ADA Standards for Accessibility Design.

1.3 DESIGN / PERFORMANCE REQUIREMENTS

- A. Design shall conform to ADA Standards for Accessibility Design and applicable local codes and standards.
- B. Design landings and ramps for a minimum uniform live load of 100 lbs/sf and a concentrated vertical load of 400 lbs distributed uniformly over an area of 1 sf.
- C. Handrails and Guardrails: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:
  - 1. Handrails and guardrails shall be designed and constructed to resist a single concentrated load of 200 lbs applied at any point and in any direction at the top of the handrail or guardrail.
  - 2. Handrails and guardrails shall be designed and constructed for a load of 50 lbs/lf applied horizontally at the required guardrail height and a simultaneous load of 100 lbs/lf applied vertically downward at the top of the guardrail.
- D. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.

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- B. Shop Drawings: Drawings showing plans, elevations, sections and details of components. Show member sizes and part identification, fasteners, anchor requirements, fittings, anchorage to precast concrete ballast sections and evidence of compliance with structural performance requirements.
- C. Design under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and adjustment of all components.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Installer Qualifications: All products listed in this section shall be installed by a single installer with demonstrated experience in installing products of the same type and scope as specified.
- C. Contractor shall field verify on site conditions to confirm configurations for ramps shown on drawings.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in good condition and adequately protected against damage as handrails are a finished product.
- B. Inspect ramp and rail sections for damage before signing the receipt from the trucking company. Truck driver must note damaged goods on the bill of lading if damaged product is found
- C. Store products in manufacturer's unopened packaging until ready for installation.

## 1.7 SEQUENCING

- A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

## 1.8 PROJECT CONDITIONS

- A. Field Measurements: Where ramps and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication.

## 1.9 WARRANTY

- A. Provide with manufacturer's three-year limited warranty on the modular ramp system against manufacturers defects.

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## PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. Basis of Design: Amramp Pro as manufactured by AmRamp, 358 North Street, Randolph, MA 02368; 888-715-7598 ; <https://www.amramp.com/commercial/>; E-mail [info@amramp.com](mailto:info@amramp.com)
- B. Subject to compliance with requirements, other manufacturers of comparable products that may be used include the following:
1. American Access, Inc.: 3150 Stage Post Dr. Suite 101; Bartlett, TN 38133; 888-790-9269 ; <http://www.aaramps.com>; Email: [requestinfo \(sales@aaramps.com\)](mailto:requestinfo@sales@aaramps.com)
  2. EZ Access Aluminum Ramps: 700 Milwaukee Avenue North; Algona, WA 98001; 800-4513-1903; <https://www.ezaccess.com/>; Email: [customerservices@ezaccess.com](mailto:customerservices@ezaccess.com)

## 2.2 MATERIALS

- A. Extruded aluminum Bars, Rods, Wire, Shapes and Tubes shall be 6063-T6 alloy and temper with a minimum ultimate tensile strength of 22,000 psi. Comply with ASTM B 221.
- B. Sheet and Plate Aluminum: ASTM B 209; 5005 alloy.
- C. Extruded Aluminum-Alloy Structural Pipe and Tube. Comply with ASTM B 429.
- D. Mechanical Fasteners: Aluminum, stainless steel or other non-corrosive materials compatible with aluminum members, trim, hardware, anchors and other components of the modular system.

## 2.3 MODULAR RAMP SYSTEM

- A. All components shall be universal so that system can be easily relocated and assembled into many different configurations.
- B. Ramp Sections: Ramp sections are prefabricated aluminum shapes.
1. Length:
    - a. 5 foot
    - b. 4 foot
    - c. Configure lengths as indicated on drawings.
  2. Width: As indicated on drawings
  3. Height: Variable as indicated on drawings.
  4. Walking surface shall be continuous, without gaps and aluminum deck with extruded slip resistant surface.
  5. Ramp sections have a wheelchair guard 3 inches plus or minus 1 inch from decking surface.
- C. Landings: Fabricated of aluminum shapes and deck.
1. Prefabricated in sizes as indicated on the Drawings.
  2. Landings shall be designed for variable heights
  3. Walking surface of the landing shall be continuous, without gaps, knurled or cross-hatched, aluminum deck with extruded slip resistant surface.

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- D. Legs: Fabricated of aluminum shapes and plate.
  - 1. Lengths as required to fit site conditions.
  - 2. Provide with 4 inch by 4 inch foot pads.
  - 3. Legs telescope into the ramps and landings and shall allow for height and slope adjustments.
  - 4. Design to be independent each side, perpendicular to the ground and allow for adjustment without additional foundation systems.
  - 5. Legs shall not protrude outside the footprint of the walking surface, eliminating tripping hazards.
  - 6. Provide bracing for leg extensions as required to meet structural requirements noted in this section.
  
- E. Handrail and Guardrail: Fabricated of aluminum tubing and fittings.
  - 1. Handrail shall have outside diameter of 1.5 inches.
  - 2. Handrail gripping surface shall be smooth and continuous throughout ramp sections, steps and landings.
  - 3. Guardrails shall form a protective barrier of a minimum of 42 inches high and designed such that a 4 inch sphere can not pass through any opening.
  - 4. Pickets, balusters will be minimum aluminum 3/4 inch by 3/4 inch, 4 inches o.c.
  - 5. Inside handrail to be attached to guardrail 34 inches to 38 inches above walking surface.

## 2.4 FINISHES

- A. Shop finish ramp components as follows"
  - 1. Preparation: Brush Off Blast SSPC-SP10.
    - a. Remove all oil, grease, dirt, mill scale, corrosion products, oxides or other foreign from the surface by abrasive blasting, except for very light shadows, very slight streaks or slight discolorations caused by mill scale oxides.
    - b. At least 95 percent of each square inch of surface area shall be free of all visible residues, and the remainder shall be limited to the light discolorations. Final blast profile should not exceed 0.7mils.
  - 2. Powder Coat:
    - a. Electrostatically applied Thermosetting Powder Coating, Polyester Powder Coating, meeting performance requirements of AAMA 2603.
    - b. Color:
      - 1) Low Gloss Architectural Bronze

## 2.5 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Furnish spigots and sleeves to accommodate site assembly and installation.
- C. Exposed Mechanical Fastenings: Screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, and flush. Ease exposed edges to small uniform radius.
- E. Accurately form components to suit stairs and landings, to each other and to building structure as applicable.



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## 2.6 ACCESORIES

- A. Concrete Ballast Base: Provide prefabricated concrete ballast base. Basis of design is 8'-0" standard precast parking bumper, 6000 PSI, 450 lbs per each 8'-0" base, as manufactured by RediRock, PO Box 370, Laurel, MD 20725; 301.776.7840; <https://www.redi-rock.com>, or approved equal.
- B. Where required, cut to lengths indicated on drawings.
- C. Provide ½" neoprene pad between ballast base and existing plaza stair surface, complying with ASTM D 2240, D412, D573, D395, D1149, D624 (Die C0 and D746, as manufactured by GRM custom products or approved equal

## PART 3

## 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify field conditions are acceptable and are ready to receive work
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

## 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

## 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Conceal bolts and screws whenever possible.
- D. All legs should land on a precast concrete paver.
- E. Anchor assembly using expansion anchors as selected by ramp manufacturer.

## 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

50 Monroe Street Elevator Modernization

## SECTION 096516 - RESILIENT SHEET FLOORING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Rubber sheet flooring with backing.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color, texture, and pattern specified, in manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections.
  - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.
- C. Samples for Initial Selection: For each type of resilient sheet flooring indicated.
- D. Samples for Verification: For each type of resilient sheet flooring, in manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections of each color, texture, and pattern required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store rolls upright.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive resilient sheet flooring during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

2.2 RUBBER SHEET FLOORING WITH BACKING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Nora by Interface.
- B. Product Standard: ASTM F1860.
  - 1. Type: Type I, homogeneous rubber sheet floor covering with backing.
  - 2. Wear-Layer Thickness: As standard with manufacturer.
  - 3. Overall Thickness: As standard with manufacturer.
  - 4. Interlayer Material: As standard with manufacturer.
  - 5. Backing: Fibrous.
  - 6. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D2240.

- C. Wearing Surface: Textured, raised round dimple surface.
- D. Sheet Width: [**As standard with manufacturer**] [**3.3 feet (1.0 m)**] <Insert width>.
- E. Seamless-Installation Method: Heat welded.
- F. Colors and Patterns: norament 926/825 round, color 0176 "Slate Grey" or approved equal.

### 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
- C. Seamless-Installation Accessories:
  - 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
    - a. Colors: Match flooring.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- B. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

- C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

### 3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
  - 1. Maintain uniformity of flooring direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (152 mm) away from parallel joints in flooring substrates.
  - 3. Match edges of flooring for color shading at seams.
  - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.
- H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
  - 1. Heat-Welded Seams: Comply with ASTM F1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
  - 2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:

1. Remove adhesive and other blemishes from surfaces.
  2. Sweep and vacuum surfaces thoroughly.
  3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
1. Apply two coat(s).
- E. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516





## SECTION 230500 - BASIC MECHANICAL MATERIALS AND METHODS

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. Requirements of this Section are applicable to work in Divisions 22 and 23.
- B. Contract Documents
  - 1. Unless otherwise modified, drawings and general provisions of the Contract, including provisions of General Conditions and Division 01 govern work under Divisions 22 and 23.
  - 2. Contract drawings for mechanical work are diagrammatic, intended to convey scope and general arrangement.
  - 3. Refer questions involving document interpretation or discrepancies to Contracting Officer's Representative (COR) for review and direction.
  - 4. Specifications establish quality of materials, equipment, workmanship and methods of construction.
  - 5. Follow drawings and specifications in laying out work. Consult other applicable contract drawings and specifications, become familiar with conditions affecting work.
- C. Scope
  - 1. The work in Divisions 22 and 23 includes furnishing and installing the mechanical work complete and ready for satisfactory service.
  - 2. Requirements specified govern work in all sections of Divisions 22 and 23.

#### 1.2 RELATED DIVISIONS

- A. Division 01 – General Requirements
- B. Division 05 – Metals
- C. Division 09 – Finishes
- D. Division 14 – Conveying Equipment
- E. Division 23 – Heating, Ventilating, and Air Conditioning
- F. Division 26 – Electrical
- G. Division 28 – Electronic Safety and Security

#### 1.3 QUALITY ASSURANCE

- A. Regulations: Comply with regulations of NFPA, state, and municipal building ordinances, and other applicable codes and regulations.
- B. Provide UL label on electric powered equipment or certification that equipment has been tested by a testing agency approved by the local authority as equivalent in safety to UL labeled equipment.
- C. Material and Equipment Requirements

1. Use products of one manufacturer where two or more items of same kind of equipment are required.
2. Materials and equipment shall have a record of one-year successful field use.
3. For certain items of equipment, the specification and the project design are based upon the specified manufacturer's product. Other manufacturers' names are listed. Contractor may purchase, conditional upon meeting project requirements, equipment from the listed manufacturers.
4. Only the manufacturer's equipment upon which, the specification and the project design has been based, has been checked for this project. Check allocated space and structure for suitability of equipment of other listed manufacturers, including parts replacement and servicing.

D. Workmanship

1. Remove and replace, at no extra cost, work not in conformance with contract requirements.
2. Coordinate work and cooperate with other trades to facilitate execution of work.

E. Coordination with Other Trades

1. Contractor shall give full cooperation and coordination with other trades and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily with the least possible interference or delay.
2. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans and shop details for the proper installation of the work and for the purpose of coordination adjacent work.

F. Asbestos or asbestos-containing materials shall not be utilized or allowed on this project. The Contractor shall be rigorous in assuring that all materials, equipment, systems, and components do not contain asbestos. Any deviations from this exclusion shall be remedied at the Contractor's expense without regard to prior submittal approvals.

G. Access: The Contractor shall specifically consider all materials and equipment installations and shall coordinate with the work of all trades to ensure easy and unobstructed accessibility of all systems for operations, maintenance, repairs, and replacement. Installation of all specified materials and equipment including but not limited to, equipment, supports, pipe, electrical conduit and controls shall be in a manner which will allow complete unobstructed access to all panels, access doors, filter racks, control boxes, controls actuators, sensors, valves, tube bundles and all other items requiring access for operations and maintenance. All items such as controls, actuators and valves which require servicing or manual operations for system use shall be located such as to be accessible without standing on other equipment, whenever it is possible or practical. Any installation of new equipment or materials which causes problems related to access of new or existing equipment will be disapproved by the COR and Contractor shall correct the Work.

1.4 SUBMITTALS

A. Manufacturer's technical product data, installation instructions and description of accessories for each type to be used and system designation:

1. Motors (submit under section specifying related equipment).
2. Pipe penetration seals.
3. Identification.
4. Charts for shutoff valve and fire alarm device locations.
5. Operating and maintenance manuals.
6. Statement of field instruction completion.

1.5 APPLICABLE PUBLICATIONS

The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

## 1.6 PROJECT CONDITIONS

### A. References

1. References to standards, codes, catalogs and recommendations are latest edition in effect on date of invitation to bid.
2. Refer to applicable contract drawings and specifications pertaining to other Divisions for conditions affecting work.

### B. Definitions: The following are definitions of terms and expressions used in Divisions 22 and 23:

1. "Approve" - To permit use of material, equipment or methods conditional upon compliance with contract document requirements.
2. "Concealed" - Hidden from normal sight; includes work in crawl spaces, above ceilings, and in building shafts.
3. "Directed" - directed by the COR.
4. "Ductwork" - includes ducts, fittings, housings, dampers, supports and accessories comprising a system.
5. "Equal, equivalent" - possessing the same performance qualities and characteristics and fulfilling the same utilitarian function.
6. "Exposed" - not concealed.
7. "Furnish" - Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.
8. "Indicated" - indicated in Contract Documents.
9. "Install" - Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning and similar operations.
10. "Piping" - includes pipe, fittings, valves, supports and accessories comprising a system.
11. "Provide" - furnish and install, complete and ready for the intended use.
12. "Removable" - detachable from the structure or system without physical alteration of materials or equipment and without disturbance to other construction.
13. "Review" - limited observation or checking to ascertain general conformance with design concept of the work and with information given in contract documents. Such action does not constitute a waiver or alteration of the contract requirements.

### C. Definitions: Refer to Section 014200, "References " Section for additional definition of terms

## 1.7 WARRANTY

Deliver to the COR certificates of equipment warranty extending beyond the guarantee period.

## PART 2 - PRODUCTS

### 2.1 FLASHING

#### A. Flashing Material:

1. 4-pound sheet lead.
2. Chloroloy 240.
3. 16-ounce soft sheet copper.
4. Lead-coated copper.

#### B. Counterflashing: 26 gage galvanized steel or 16-ounce soft sheet copper.

## 2.2 MOTORS AND ELECTRICALLY OPERATED EQUIPMENT

### A. References, Characteristics and Ratings

1. Refer to Division 26 for requirements of electrical work.
2. Provide motors and other equipment requiring electrical power or control service suitable for the electrical characteristics indicated on the Electrical Drawings.
3. Horsepower indicated is for manufacturer's equipment upon which the specification is based. Submit proposed deviations from these ratings for review by the COR. Pay costs incurred by deviations, which are permitted.
4. Provide motor rated for 200 volts for 208-volt service. Provide 460 volt rated motors for 480 volt service.
5. Brake horsepower rating at specified duty shall not exceed 85 percent of nameplate horsepower rating times NEMA service factor for motors with 1.15 service factor except where other limits are stated for certain equipment, i.e. fans and pumps, the maximum load percentage shall be as stated under that equipment times the 1.15 service factor.

### B. Overload Protection

1. Protect each motor, either individually mounted or in unitary equipment, with overload devices such as fuses, thermal cutouts, or thermal protectors installed in each ungrounded conductor serving each motor. Mount these overload devices in the motor controller or in a control panel in unitary equipment.
2. For equipment that requires the use of fuses, provide the proper size and type of fuses mounted on accessible fuse blocks, integral to the equipment, wired in accordance with applicable codes.

### C. Construction

1. Construct motors in accordance with NEMA Standard Publication MG-1, latest edition, and the applicable IEEE standards.
2. Frame sizes in accordance with NEMA Standard MG-1 and MG-13, latest editions.
3. Starting torque, NEMA Design B, 2-4 percent slip.
4. Starting (locked rotor) kVA as required by the driven equipment. On motors with a locked rotor indicating code letter of "F" or higher, the manufacturer shall notify the electrical contractor for circuit breaker adjustment in accordance with Division 26, "Electrical."
5. Indoor, General Use: Open drip proof construction, 1.15 service factor.

### D. Insulation: NEMA Insulation Class B for operation in 40 degrees C ambient; except motors used in conjunction with variable speed drive controllers shall be NEMA Class F insulation with horsepower rating based on Class B rise.

### E. Three Phase Motors:

1. Premium efficiency polyphase induction type.
2. Minimum full load power factor before power factor correction of horizontal and vertical shaft motors shall be as follows:

HP	RPM	POWER FACTOR
1/2	3600 and 1800	70 percent
3/4	3600 and 1800	70 Percent
1, 1-1/2, and 2	3600 and 1800	79 Percent
3 to 10	3600 and 1800	85 Percent

3. Minimum efficiency (in percent) of horizontal and vertical shaft motors shall be follows:

Open Drip proof (ODP) Motors

HP	1200 RPM	1800 RPM	3600 RPM
	Minimum Nominal Efficiency (%)	Minimum Nominal Efficiency (%)	Minimum Nominal Efficiency (%)
1	82.5	85.5	77.0
1-1/2	86.5	86.5	84.0
2	87.5	86.5	85.5
3	88.5	89.5	85.5
5	89.5	89.5	86.5
7-1/2	90.2	91.0	88.5
10	91.7	91.7	89.5

NOTE: Efficiencies are nameplate ratings and must be tested in accordance with IEEE Standard 112, Method B.

Measure motor efficiencies as tested in accordance with ANSI/IEEE Standard 112, Test Method B. Do not extrapolate efficiencies from other data. Measure each horsepower size. Submit test data from certified independent testing laboratory of standard manufacturer run per horsepower size.

F. Bearings and Bases

1. Motors 1/2 through 2 Horsepower: Sealed "life-time" ball bearing or regreaseable ball bearing type with minimum life of 25,000 hours under "V" belt load conditions.
2. Motors 3 through 10 Horsepower: Anti-friction bearings sized for a minimum life of 25,000 hours under "V" belt load conditions or a minimum life of 100,000 hours for a direct connected load. House bearings in a regreaseable race with provision for purging old grease. Preload bearings with a bearing load spring to minimize noise and increase bearing life.
3. Motors for Belt Drive: Cast iron or steel base with slide rails having screw adjustments.

2.3 HANGER ATTACHMENT - Application and Type

- A. Concrete (Existing): Double plated expander type anchors. Phillips, Hilti or approved equivalent. Loads shall not exceed 1/4 of tested pullout (or shear) strength.
- B. Steel Beams: Iron or steel beam clamps.
- C. Brick or Block Walls: Brackets fastened with self-drilling anchors or toggle bolts, light duty; or through bolts with backplates, heavy duty.

2.4 SLEEVES AND ESCUTCHEON PLATES

- A. Escutcheon Plates for Piping: Chromeplated brass.
- B. Sealant
  1. One-part polysulfide, equivalent to Pecora Synthacaulk GC-9 or Proseal Ultratite 102 for general use.
  2. Acoustical sealant is specified in Division 07.
- C. Pipe Penetration Seals

1. Modular interlocking EPDM or silicone rubber links, dielectrically sealed to pipe and wall opening with pressure plates and bolts.
2. Link sealing elements shall be rated for pipe fluid and steam temperature for each application.
3. Pressure plates shall be Delrin plastic or equivalent electrical insulating material.
4. Bolts and nuts shall be zinc phosphated low-carbon steel.

## 2.5 IDENTIFICATION

- A. Labels: WH Brady B-946 vinyl cloth pipe markers or approved equal, 3/4-inch pipe banding tape with 1/2-inch wide tape to wrap the circumference of the pipe. Match color of tape with marker.
- B. Nameplates: Laminated phenolic plates, 1/8-inch thick, with beveled edges and engraved 1/4-inch high block, capital white letters on a black background. Provide laminated plates, 1/8-inch thick, with beveled edges and engraved 1/4-inch high white letters on red background for emergency instructions on sprinkler protection, fire protection, emergency generator starting, and other emergency operating instructions.
- C. Tags: Polished, lacquered, 1-1/2-inch diameter 18 gage solid polished brass tags with stamped letters or numerals 1/2-inch high, filled with black paint and fastened with brass "S" hooks or chains.
- D. Wire Markers: Self-sticking W. H. Brady Co. Perma Code wire markers.
- E. Flow Arrows: Pipe Marker arrows to identify the direction of flow in the pipe. Match color with service marker for the system. One-inch arrow tape for marker Style 4; two-inch arrow tape for marker Style 1; four-inch arrow tape for marker Style 1HV; and Style 3C arrow tape for marker Style 3C.

## PART 3 - EXECUTION

### 3.1 FLASHING

- A. Flash pipes projecting through roof or outside walls. Extend flashing 12 inches into roofing materials. Make watertight seal to roof material and pipe or conduit.
- B. Protect sleeve packing and flashing joints with counterflashing. Solder or weld counterflashing to pipe or conduit. Clean joint and coat with zinc dust paint.

### 3.2 MOTORS AND ELECTRICALLY OPERATED EQUIPMENT

- A. Align motor, drives, and driven equipment to avoid excessive strain or wear.
- B. Check belt tension with a tension tester for the deflection force recommended by the manufacturer. Check and adjust tension after several minutes' operation and then after eight hours of operation.

### 3.3 HANGER ATTACHMENT

Select and install structural attachments for hangers supporting pipes, conduit and equipment adequately for stresses to which they may be subject and for proper distribution of load to building structural members.

### 3.4 SLEEVES AND ESCUTCHEON PLATES

- A. Sleeves are not required for core-drilled holes except where sleeves are specified and required to extend above the floor.
- B. Install sleeves for pipes and conduits passing through roofs, floors, plaster ceilings, gypsum board ceilings, walls, partitions, air handling unit casings, structural members, and other building parts. Install sleeves in time to permit construction progress as scheduled.
- C. Install sleeves with length to pass through full thickness of construction.
- D. Provide 1/2-inch minimum clearance between sleeve and conduit, pipe, or covering. Center conduit or pipe in sleeve unless otherwise indicated. Insulation thickness specified for use through sleeves requiring vermin proofing shall be as specified but not less than 1-inch minimum thickness. Refer to Section 230700, "Mechanical Insulation."
- E. Install ends of sleeves flush with finished wall surfaces.
- F. Cut sleeves to length for mounting flush with both surfaces
- G. Reinforce sleeves temporarily, if necessary, to preserve accurate shape without distortion during construction.
- H. Grout sleeves in concrete walls into building structure to make joint watertight.
- I. Install escutcheon plates for pipes and conduits at floors, ceilings, walls, and partitions in finished areas unless otherwise indicated.
  - 1. Fit escutcheons around insulation, uninsulated pipe, or conduit.
  - 2. Outside diameter shall cover sleeve.
  - 3. Where sleeve extends above finished floor, cover sleeve extension with escutcheon.
- K. Pack annular space between sleeve and conduit or pipe, and voids between building construction and conduit, pipe, or sleeves as follows:
  - 1. Firestop equal to U.S. Gypsum Thermafiber, caulked at both ends to manufacturer's recommended depth with sealant, for the following sleeve locations:
    - a. Where vermin control is indicated.
    - b. Walls and partitions enclosing elevator equipment rooms.
    - c. Roof and walls with waterproofing.
  - 2. For the following locations, pack annular space between sleeve and conduit, or pipe and voids between building construction and conduit or pipe sleeves with industrial felt fire material equal to U.S. Gypsum Thermafiber, caulked at both ends to manufacturer's recommended depth with sealant, or code approved firestopping foam, caulk, or putty that meets ASTM E-814 with UL classification. Sealants shall not contain toxic or flammable solvents and shall not produce toxic or flammable outgassing during any stage of application, curing, drying or fire conditions.
    - a. Fire rated walls
- L. Prime surfaces prior to caulking to obtain good adhesion where recommended by sealant manufacturer.
- M. Vermin Control: Provide vermin control for conduits and pipes passing through ceilings, walls, and partitions.

- N. Install pipe penetration seals on pipes passing through underground walls and floors as recommended by the manufacturer. Installation shall result in a watertight and electrically insulated seal.

3.5 IDENTIFICATION

- A. Surfaces shall be cleaned and painted if specified, before applying markings.
- B. Place markings so that they are visible from the floor.
- C. Protect finished identification to ensure that markings are clear and legible when project is turned over to the Government.
- D. Piping
  - 1. Apply labels and flow direction arrows on mains and principal branches of piping. Wrap the circumference of pipe, overlapping both ends of each marker to give 360-degree identification. Mark each type of service every 25 feet with a minimum of one marking per room and additionally, at each side of penetration of walls, partitions and floors within one foot of penetration.
  - 2. Identify piping with Marker Number as follows:

<b>PIPING SERVICE</b>	<b>TEXT/BACKGROUND COLOR</b>	<b>MARKER NO. FOR PIPES</b>
Condensate Drain	White/Green	7063
Refrigerant Liquid	Black/Yellow	7235
Refrigerant Suction	Black/Yellow	7236

- a. Provide circumferential tape around both ends of marker to keep it in place.

- F. Equipment
  - 1. Identify as to nature, services, system number or other designation by stenciling with letters 1-inch high and colored to contrast with background. Designate which items are main or standby.
  - 2. Equipment requiring identification.

Air Conditioning Units

Air Cooled Condensing Unit

- G. Secure nameplates to devices or adjacent surface.
- H. Valves, Regulators and Controls: Identify valves, regulators, controls, dampers and similar items, with tags. Valves adjacent to equipment they serve need not be tagged.
- I. Electrical Items
  - 1. Identify disconnect switches, starting devices, controls, control switches, pushbutton stations with nameplates. Secure nameplate to device or adjacent surface with screws.
  - 2. Identify control wires with wire markers.
- J. Charts, Diagrams



1. Provide charts or diagrams of size and type as approved to enable quick identification, designating number, service or function, and location of each valve and fire alarm.
  - a. Include normal operating position (open, closed, or modulating).
2. Include outline plan of building indicating location and number of each riser, with its control valve.
3. Frame charts, and diagrams in approved wood or metal frames with clear glass front, secure to walls in location as directed.
4. Bind one copy of this information in the Operating and Maintenance Manual.

### 3.6 PROJECT RECORD DOCUMENTS

- A. The record set of drawings required by the General Conditions to be maintained at the site shall be black and white prints with changes marked in red ink as soon as the changes are made. Documents shall be submitted to GSA at project closeout.
- B. Locate by dimension from the building walls, the exact location of piping, cable and other work that is buried before trenches are backfilled.

### 3.7 SHOP DRAWINGS AND DESCRIPTIVE DATA

- A. Refer to "GENERAL CONDITIONS" for requirements.
- B. Establish that the physical and functional character of each item including, size, type and required service access is suited for its intended location and use.
- C. Coordinate drawings and data before submitting and certify that provisions of the contract documents have been met.
- D. Call attention, in writing, to deviations from contract requirements.
- E. Do not fabricate, deliver to site, or install items requiring shop drawing review, until the review has been completed by the COR and the shop drawing has been marked to indicate "No Exception Noted" or "Make Corrections Noted."
- F. Specifically identify pertinent project data on the shop drawings.
- G. Include Operation and Maintenance Data.
- H. Use only final or corrected drawings and data for construction.
- I. The AE's and COR's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

### 3.8 PERMITS

Contractor shall obtain and pay for required permits.

### 3.9 CUTTING AND PATCHING

- A. Unless otherwise directed, do cutting and patching. Repair damaged fireproofing and waterproofing to original or better condition.
- B. Do not cut walls, floors, reinforced concrete or structural steel without COR's permission. Install services without affecting reinforcing steel.

### 3.10 CLEANING UP

- A. Keep premises free from accumulation of debris.
- B. Remove tools, scaffolding, surplus material, debris, and leave premises broom clean.
- C. On discontinuance of part of the work, place debris in containers and promptly remove them from the Government's property.

### 3.11 WORK IN EXISTING BUILDINGS

#### A. Conditions of Occupancy

1. This building will be occupied during the life of this contract. Execute work in a manner to impose minimal interference with the normal functioning of the building and its occupants. When interference is unavoidable, schedule work 14 days in advance with the Government.
2. Make temporary connections where necessary to maintain uninterrupted electrical, plumbing, and heating service.
3. Provide adequate protection for the building, its contents, and occupants.
4. Perform work as quietly as possible to avoid unnecessary disturbance. Unusual precaution may be necessary in the conduct or work in some areas to achieve satisfactory compliance. Refer to Section 01 14 00 "Work Restriction" for working hours and time allowance for noisy work.
5. Comply with regulations of the Government pertaining to circulation, sanitation, and behavior of Contractor's personnel.

- B. Temporary Use of Elevators is specified in Section "015000" Temporary Facility and Controls. Refer to section for requirements and allowances for use of elevators during construction.

#### C. Field Office, Storage, and Loading Facilities

1. Provide office and storage facilities where designated by the Government.
2. Provide adequate furnishings including file space, lighting, telephone, and heat where necessary.
3. Use only those toilet facilities designated by the Government for use by Contractor's personnel.
4. Store equipment and materials in areas designated by the Government in a manner which will not (a) cause concentrations of weight potentially damaging to building structure, (b) impede normal building traffic, or (c) be a hazard to occupants.
5. Use only the entrance designated by the Government for delivery and removal of materials. Schedule deliveries and removals with the Government in advance. Unscheduled traffic must give precedence to the Government's usage. Do not impede access through doorways and corridors with materials, containers, or parked conveyances.
6. Use only rubber wheeled wheelbarrows, dollies, or carts over finished floors.
7. Keep office, storage, and loading areas neat and clean.

#### D. Barricades

1. Erect temporary barriers for protection of occupants, building, and building contents.

2. Where partitions separating occupied areas must be cut, close hole with tight fitting temporary plywood closure panel, 1/2-inch minimum thickness, to form visual and acoustical barrier.
3. Protect exposed holes in floors in accordance with applicable codes and regulations.
4. Enclose dust-producing operations with plastic sheets or drop cloths to prevent the spread of dust into occupied areas. Maintain a negative pressure environment relative to the surrounding spaces.
  - a. Take the necessary precautions to prevent the spread of dust and dirt through the existing HVAC system, including outdoor intakes. Protect return and exhaust air openings.

E. Alterations

1. Cut, alter, remove or temporarily remove and replace existing work necessary for installation of mechanical and electrical work. Maintain the necessary clearances for accessibility or compliance with code around existing equipment, devices, etc., that are to remain.
2. Verify dimensions of existing building elements pertaining to the installation of new work to assure physical compatibility prior to fabrication or installation.
3. Where the installation of new services or the extension of existing services requires cutting of existing floors, walls, partitions, etc., check for the presence of existing mechanical and electrical services within or immediately beneath construction and exercise necessary precautions to prevent damage to the service or injury to personnel due to contact with same. Where practical, temporarily disconnect such existing service during the cutting operation. Schedule such outages in service with the Government, 14 days in advance.

F. Removal of Materials and Equipment

1. Remove promptly from the site, materials and equipment specified to be removed and not reinstalled or stored.
2. Unless otherwise indicated, removal of pipes, ducts, and equipment includes removal of accessories such as hangers, air outlets, piping connections, junction boxes, starters, etc. Remove to source or, if concealed, to point of concealment, connections to mechanical equipment required to be removed or disconnected. Terminate connections behind finished surfaces and, if subject to movement, clear of building construction. Cap connections extending from ducts or piping remaining in service.

G. Connections to Existing Systems

1. Connect to existing systems as indicated.
2. Obtain permission from Owner 14 days in advance if outage of service is necessary to make connections. See the Article titled, "Outages."
3. Repair insulation damaged at points of connection. Restore integrity of vapor barriers and surface finish.

3.12 PROTECTION

- A. Protect mechanical and electrical material and equipment from the elements or other injury as soon as delivered on premises.
- B. Cap or plug openings in equipment, piping, duct, and conduit systems, to exclude dirt and other foreign material. Do not use rags, wool, cotton, paper, waste or similar materials for plugging.
- C. Existing components of the building and its systems shall be protected from damage. Any damage to these components shall be repaired or replaced to the satisfaction of the Government. Special care shall be taken with regards to insulation on existing piping and ductwork. Damaged insulation

shall be replaced so that the vapor barrier and insulating characteristics of the material match those prior to damage taking place.

### 3.13 CLEANING OF SYSTEMS

- A. Thoroughly clean systems after satisfactory completion of pressure tests and before permanently connecting fixtures, equipment, traps, strainers, and other accessory items. Blow out and flush piping until interior are free of foreign matter.
- B. Leave systems clean, and in complete running order.

### 3.14 ASBESTOS REMOVAL AND DISPOSAL

Removal and disposal of asbestos containing materials is not a part of this contract. Should material resembling asbestos-containing materials be encountered during execution of work, immediately notify COR for instructions before proceeding.

### 3.15 EQUIPMENT SUPPORTS

- A. Provide equipment supports consisting of cradles, structural members, hangers, rods, racks, and incidental materials.
- B. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected and to properly distribute the load and impact over building areas.
- C. Ceiling Suspended Platforms: Construct with steel hangers. Brace and fasten to building structure.

### 3.16 OPERATING AND MAINTENANCE MANUAL

- A. Furnish manual bound and indexed containing:
  - 1. Brief description of each system and components.
  - 2. Starting and stopping procedures.
  - 3. Day/night changeover.
  - 4. Special operating instructions.
  - 5. Routine maintenance procedures.
  - 6. Schedule for periodic servicing and lubrication.
  - 7. Manufacturers' printed operating and maintenance instructions, parts lists, illustrations and diagrams.
  - 8. Manufacturers' Data Report Form U-1 certifying code compliance for equipment specified to be constructed in accordance with ASME Code for Unfired Pressure Vessels.
  - 9. One final or corrected reviewed copy of each shop drawing and Contractor's drawings.
  - 10. One copy of each wiring and piping diagram.
  - 11. One reviewed copy of certified test reports.
  - 12. Air and water balancing report.
  - 13. Product warranty information.
  - 14. Completed start-up report for the following equipment: ACU-1 and ACCU-1.
- B. Submit to COR for review at least 30 days prior to date it is expected system will be turned over to the Government.
- C. After review by COR, submit electronic copies per Division 01.

### 3.17 FIELD INSTRUCTION

- A. Upon completion of work, instruct Government's representatives in the proper operation and maintenance of the mechanical and electrical systems.
- B. Instruction periods specified below shall be in addition to instructions specified for certain items elsewhere in the specifications.
- C. Instructions shall be given by persons expert in the operation and maintenance and shall be for a period of not less than one eight-hour day.
- D. Prepare statement(s) for signing by the Government's representative indicating date of completion of instructions and hours expended. Furnish copy of signed statement to the COR.
- E. The Contractor shall submit, 14 days prior to the instruction period, a written description on the procedures and systems to be demonstrated subject to the approval of the Government. The system shall be fully tested by the Contractor and operational prior to the instruction period. The Contractor shall submit written documentation that the systems have been fully tested and operational by the Contractor prior to the Government's demonstration period. Final acceptance prior to the issuance of Substantial Completion will be subject to the approval of the systems by the Government.

### 3.19 OUTAGES

- A. The purpose of this article is to establish standard procedures for requesting an outage for mechanical, electrical, or operational systems or services associated at Cahn Federal Building.
- B. An outage is defined as prohibiting or restricting a mechanical, electrical or operational service from routine operation (see attached outage request for service included). For purposes of repair, replacement or connection to an existing system, this standard shall be followed.
- C. All persons requesting an outage shall complete an "Outage Request Form" included at the end of this Section.
- D. Contractor shall submit, in writing with the "Outage Request Forms" a plan on the work to be performed during the outage, including length of time and reason the utility system must be shutdown. Contractor, in conjunction with the Government, shall research and identify all systems affected by Outage as well as locating and listing all components by tag or facility equipment number, and all the action required at each to achieve the outage. Submit written Plan and Outage Form 14 days in advance of requested outage to the Government.
- E. All "Outage Request Forms" and the Outage Plan shall be reviewed by the construction foreman or superintendent for feasibility and necessity.
- F. All "Outage Request Forms" and the Outage Plan shall be forwarded to the "Plant Operations and Maintenance Manager" for review and approval prior to scheduling. Contractor shall attend weekly Outage Review Meetings and be prepared to answer questions and discuss the plan.
- G. After approval by the Plant Operations and Maintenance Manager, the outage shall be scheduled by either the Buildings or Utilities Superintendent (according to the services requested for outage). Government's representative will notify the Contractor, in writing, to proceed. No outage shall proceed prior to written notification from the Owner's Representative.
- H. All systems, when shutdown, shall be tagged in accordance with GSA lock-out/tag-out procedures
- I. The number and duration of all outages shall be minimized.

- J. A master outage list, with the approximate required dates, shall be submitted to the Government within 14 days from the commencement of work

Attachments: Outage Request Form

END OF SECTION 230500

**OUTAGE REQUEST FORM**

DATE: \_\_\_\_\_

OUTAGE REQUESTED BY: \_\_\_\_\_

DEPARTMENT/COMPANY NAME: \_\_\_\_\_

PURPOSE OF OUTAGE: \_\_\_\_\_

DATE NEEDED: \_\_\_\_\_

BUILDING AFFECTED: \_\_\_\_\_

AREA WITHIN BUILDING TO BE AFFECTED: \_\_\_\_\_

THE FOLLOWING SERVICES ARE REQUESTED TO BE REMOVED FROM SERVICE:

\_\_\_\_\_ HOURS

- |    |                              |                                   |
|----|------------------------------|-----------------------------------|
| a. | ___ FIRE PROTECTION          | ___ SPRINKLER                     |
|    |                              | ___ HOSE CABINET/STANDPIPE SYSTEM |
| b. | ___ COLD WATER (DOMESTIC)    |                                   |
| c. | ___ SANITARY SEWER           |                                   |
| d. | ___ HOT WATER (DOMESTIC)     |                                   |
| i. | ___ AIR HANDLING SYSTEMS     |                                   |
| j. | ___ ELEVATOR                 |                                   |
| k. | ___ NORMAL ELECTRIC POWER    | ___ LIGHTING                      |
|    |                              | ___ POWER                         |
| l. | ___ EMERGENCY ELECTRIC POWER |                                   |
| m. | ___ ASBESTOS REMOVAL         |                                   |
| n. | ___ NATURAL GAS              |                                   |





## SECTION 230548 - MECHANICAL SOUND AND VIBRATION CONTROL

### PART 1 – GENERAL

#### 1.1 DESCRIPTION OF WORK

Vibration isolation devices, accessories, and supports to prevent transmission of vibration from mechanical equipment and distribution systems to building structure.

#### 1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 – General Requirements
- B. Section 230500 – Basic Mechanical Materials and Methods
- C. Section 232000 – Building Services Piping
- D. Section 238126 – Split System Air Conditioners
- E. Division 26 – Electrical

#### 1.3 QUALITY ASSURANCE

- A. The vibration isolator manufacturer's representative shall determine spring sizes and mountings, and shall provide field supervision and inspection to assure proper installation, adjustment and performance. The representative shall notify the Contracting Officer's Representative (COR) of any isolator selections, which may experience resonance with the approved equipment, and upgrade any isolators that are found to resonate with the installed and operating supported equipment.
- B. Contractor Responsibility Statement: When a quality assurance plan is required by the applicable building code, the Contractor's responsibility statement is required. Contractor shall submit a written statement with copies to the authority having jurisdiction and the Government indicating acknowledgement of the requirements of the quality assurance plan; methods and frequency of reporting and the distribution of reports; and identification, qualifications, and position of individual(s) responsible for maintaining conformance to quality assurance plan within the Contractor's organization.
- C. Vibration isolation mounts, hangers, and equipment bases for Division 23 work shall be from the product line of a single manufacturer or products represented by the same manufacturer's representative.
- D. Work shall be performed by skilled workers who are experienced in the necessary workmanship to meet the requirements of this Section.

#### 1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500.
- B. Vibration Isolation Product Data:
  - 1. Manufacturer's technical project data for each type of vibration isolation, including installation instructions, accessories, supports, bases, fittings, finishes, construction details and dimensions of components.
  - 2. System application for each type of vibration isolation.
  - 3. Operation and Maintenance Data.

C. Operation and Maintenance Data

1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

1.6 PROJECT CONDITIONS

A. Schedule of Equipment Isolation is included in this Section.

B. Wind-Restraint Loading

1. Three-second Wind Gust Speed: 112 mph.
2. Building Occupancy Category: II.
3. Exposure Category: B.
4. Minimum 10 lb/sq. ft. multiplied by maximum area of the HVAC component projected on a vertical plane that is normal to the wind direction, and 45 degrees either side of normal.

1.7 CONTRACT CLOSEOUT

A. Provide the following in the Operating and Maintenance Manuals:

1. Letter certifying that Contracting Officer's Representative (COR) has been advised of all overstressed condition information.
2. Record of special inspections and periodic special inspections.
3. Final inspection report from manufacturer's representative.

PART 2 – PRODUCTS

2.1 VIBRATION ISOLATION DEVICES

A. Select isolators for uniform static deflections according to distribution of weight and to meet requirements shown elsewhere in the Contract Documents.

B. Select isolators for not less than the deflections indicated on the Schedule.

C. Select vibration isolation for stable operation during starting and stopping of equipment without excessive movement of equipment.

D. Bases

1. Provide rectangular bases, unless indicated otherwise.
2. Provide perimeter side mounted unhoused isolators with brackets arranged for 1-1/2-inch clearance beneath base.

E. Corrosion Resistance: All springs and associated metal hardware shall be designed or treated for resistance to corrosion. Steel components shall be PVC coated, or phosphated and painted with industrial grade enamel. All nuts, bolts and washers shall be zinc electroplated. Structural steel bases and exposed steel components of concrete inertia bases shall be cleaned of welding slag and primed with zinc-chromate or metal etching primer. A finish coat of industrial grade enamel shall be applied over the primer.

F. Outdoor Locations: Steel parts PVC coated, hot-dip galvanized, zinc-electroplated plus coating of neoprene, bitumastic paint, or powdered coating. Aluminum components for outdoor installation shall be etched and painted with industrial grade enamel. Nuts, bolts, and washers may be zinc-electroplated.

## 2.2 MOUNTINGS

- A. Type B: Springs, free standing, laterally stable, without housing, 1/4-inch minimum thickness neoprene pads between baseplate and supports sized for deflection of 10-20 percent of unloaded pad height; leveling bolts. Spring diameters not less than 0.8 times compressed spring height at operating load. Springs shall have minimum additional travel to solid equal to 50 percent of operating deflection. Springs shall be designed so that the ratio of horizontal stiffness to vertical stiffness is approximately one. Mason Industries Type SLF or equal.

If the mount baseplate is to be bolted to structure or framework rigidly connected to the structure, elastomeric grommets shall be used as specified under Paragraph 3.2.

- B. Type C: Springs, same as Type B except with non-captive housing with vertical travel limit stops to prevent upward movement due to weight change or wind loading. Use housing as blocking during erection; installed and operating heights shall be the same; 1/2-inch clearance around restraining bolts and between housing and spring. Limit stops shall be out of contact during normal operation. Mason Industries Type SLR or equal.

## 2.6 MANUFACTURERS

- A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include but are not limited to the following for Mountings, Bases, Hangers, Resilient Supports, and Resilient Sleeves: Amber-Booth, Kinetics Noise Control, Inc. Korfund, Mason Industries, Vibration Eliminator, Vibration Mountings and Controls, Vibrex.

## PART 3 – EXECUTION

### 3.1 VIBRATION ISOLATION DEVICES

- A. Install in accordance with manufacturer's recommendations. Corrosion coatings damaged during installation shall be repaired.
- B. Install isolators in locations to permit inspection and adjustment, and to provide proper operation. Install isolators as high as possible in hanger rod assembly, but clear of structure. Maintain 2-inch clearance between isolated equipment and walls, ceilings and other equipment. Maintain side clearance for hanger housings to allow a full 360-degree hanger rotation about the rod axis without contacting any object. Isolated systems shall be independently supported.
- C. Adjust leveling bolts and hanger rod bolts so that isolated equipment is level and in proper alignment with connecting pipes. All vibration isolators shall be aligned squarely above or below mounting points of supported equipment.
- D. Install isolators to provide 1-1/2-inch clearance between inertia base or frame and housekeeping pad. Keep clearance space completely clear of debris. Limit stops shall be out of contact during normal operation.
- E. Provide structural base plate under isolator where isolator is wider than supporting structural member. Tack weld plate to structural member.
- F. Where necessary, provide lateral snubber or Type J thrust restraint isolation, which will not interfere with main isolator performance, to prevent movement in excess of 1/4-inch due to dynamic forces.
- G. Mount equipment on steel base of adequate structural rigidity when equipment or frame is not structurally suitable for the type of isolation specified. Spring and rail and spring supports are specified on the basis that the equipment is structurally built or supported on a rigid frame.

Isolators for equipment with bases shall be located on sides of the base, which are parallel to the equipment shaft.

3.2 EQUIPMENT ISOLATION SCHEDULE

- A. If the mount baseplate is bolted to structure or framework rigidly connected to the structure, Type U elastomeric grommets shall be used between each bolt and the baseplate to prevent rigid connection. These additional neoprene washers and bushings may be omitted if the baseplate and friction pad incorporate neoprene elements that eliminate rigid contact between bolts and the baseplate. Bolt holes shall be properly sized to allow for bushing sleeve. The anchor bolt shall incorporate steel washers to distribute load evenly over neoprene washers.
- B. Isolation Schedule

TYPE OF EQUIPMENT	SUPPORTING STRUCTURE			
	FLOOR SLAB ON EARTH		OTHER FLOOR AND ROOF	
	ISOLATION BASE TYPE	MIN. STATIC DEFLECTION IN INCHES	ISOLATION BASE TYPE	MIN. STATIC DEFLECTION IN INCHES
<b>Air Cooled Condensers</b>				
225-349 rpm	-	-	C	3.5
350-499 rpm	-	-	C	2.5
500 rpm and Over	-	-	C	1.5

3.3 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust active height of spring isolators.
- C. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.5 INSTRUCTIONS, TESTS AND INSPECTION REPORT

- A. Notify the isolation manufacturer’s representative prior to the general installation of vibration isolation devices and seismic restraints so that the isolation manufacturer’s representative can instruct and demonstrate the proper installation procedures with the Contractor’s foremen.
- B. Obtain written and/or oral instructions from the isolation manufacturer’s representative as to the proper installation and adjustment of vibration isolation devices and seismic restraints.
- C. Where special inspection and periodic special inspection of seismic restraints is required by the referenced building code, Contractor must submit a written statement of responsibility including identification of components, control procedures for all inspection and testing including frequency and method of reporting, and list of qualified personnel responsible for certifying seismic restraints.
- D. Tests
  - 1. Schedule test five days in advance with the Government before connecting anchorage device to restrained component (unless post-connection testing has been approved).
  - 2. Obtain COR’s approval before transmitting test loads to structure. Provide temporary load-spreading members.
  - 3. Test all types and sizes of installed anchors and fasteners selected by the COR.
  - 4. Test to 90 percent of rated proof load of device.
  - 5. Measure isolator restraint clearance.

6. Measure isolator deflection.
  7. Verify snubber minimum clearances.
  8. Remove and replace malfunctioning units and retest.
- E. After the installation is complete and all systems are operating, the manufacturer's representative shall make a final inspection and submit a written report certifying the correctness of installation and compliance with approved submittal data. The report shall include a tabulation of the static deflection expected under design load and the actual measured static deflection. Perform all work and make adjustments as directed by the installation manufacturer's representative as a result of the inspection.

END OF SECTION 230548



## SECTION 230700 - MECHANICAL INSULATION

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

Insulation for piping specified in Division 23.

#### 1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 – General Requirements
- B. Section 230500 – Basic Mechanical Materials and Methods
- C. Section 232000 – Building Services Piping
- D. Section 238126 – Split System Air Conditioners

#### 1.3 QUALITY ASSURANCE

- A. Unless otherwise noted, pipe insulation shall have a K value insulation conductivity Btu inch/hour-ft<sup>2</sup> degrees F in accordance with ASHRAE 90.1.
- B. Insulation on pipes through fire rated walls and smoke barriers shall be UL listed fire-stop insulation to maintain fire resistance of the floor, fire rated wall, or smoke barrier in accordance with NFPA 101.
- C. Canvas covering shall be flame and mildew proof.

#### 1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500.
- B. Each type of insulation: Manufacturer and product designation, surface burning characteristics, thickness, density in pounds in accordance with cubic foot, conductivity or R-value, jackets (factory and field applied), and accessories.
- C. System application for each type of insulation.
- D. Statement of compliance with ASHRAE 90.1.
- E. Statement of compliance with NFPA 90A, flame spread index and smoke developed index requirements.
- F. Statement of compliance with National Architectural and Industrial Maintenance Rule for VOC levels on Adhesives, Mastics, and Coatings for the State of Maryland.
- G. Statement of compliance with Ozone Transport Commission for VOC levels on Adhesives, Mastics, and Coatings for the State of Maryland.

#### 1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

## 1.6 PROJECT CONDITIONS

- A. Where insulation must be stored outdoors, provide polyethylene film cover for protection. Insulation that becomes wet shall be replaced; drying of insulation is not acceptable.
- B. Coordinate clearance requirements for insulation application with pipe and equipment installation.

## PART 2 - PRODUCTS

### 2.1 GENERAL MATERIAL REQUIREMENTS

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- B. Products shall comply with the National Architectural and Industrial Maintenance (AIM) Rule for VOC levels for the State of Maryland.
- C. Products shall comply with the Ozone Transport Commission limits for VOC levels for the State of Maryland.

### 2.2 INSULATION TYPES

- A. Type C
  - 1. Insulation: Flexible, closed-cell elastomeric pipe insulation equal to AP Armaflex or AP Armaflex SS, ASTM C534 Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form. Minimum Density - 5 pounds in accordance with cubic foot.
  - 2. Material shall have a flame spread index of 25 or less and a smoke developed index of 50 or less as tested by ASTM E84.
  - 3. Suitable for temperatures 0 to 220 degrees F.
  - 4. Maximum moisture vapor transmission of 0.08 perms.
  - 5. Manufacturers, included but not limited to: Aerocell, Armacell, K-flex.
  - 6. Polyguard RG-CW or approved equal mineralization coating for application to the interior surface of the insulation

## PART 3 - EXECUTION

### 3.1 GENERAL PREPARATION AND APPLICATION REQUIREMENTS

- A. Complete piping and equipment tests before insulation is applied.
- B. Clean and dry surfaces to be insulated of loose scale, dirt, oil, water and other foreign matter.
- C. Insulate completely metal surfaces of piping other than hangers as delineated under Extent of Insulation.
- D. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- E. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- F. Install insulation with least number of joints practical.
- G. Permit expansion and contraction without causing damage to insulation or surface finish.



- H. Extend surface finish to protect surfaces, ends, and raw edges of insulation.
- I. Fire-stop insulation shall be continuous to 6 inches on either side of barrier. Seal jacket seam and end joints to adjacent sections of insulation for continuous vapor barrier. Annular space between insulation and sleeve shall be sealed as specified in Section 23 05 00, "Basic Mechanical Materials and Methods," in the Article titled, "Sleeves and Escutcheon Plates."
- J. Provide vapor retarding barriers continuous and uninterrupted throughout the system, where specified.
- K. Mix insulating cements with clean potable water.
- L. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- M. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- N. Install multiple layers of insulation with longitudinal and end seams staggered.
- O. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- P. Keep insulation materials dry during application and finishing.
- Q. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.
- R. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- S. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- T. Penetrations
  - 1. Roof and Aboveground Exterior Wall Penetrations: Install insulation continuously through penetrations.
    - a. Seal penetrations with flashing sealant.
    - b. For applications requiring only indoor insulation, terminate insulation above roof surface for roof penetrations, and at inside wall surface for wall penetrations. Seal with joint sealant.
    - c. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
    - d. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing for roof penetrations, and outside wall flashing for wall penetrations and overlap wall flashing at least 2 inches.
    - e. Seal jacket to roof flashing with flashing sealant.
  - 2. Non-Fire Rated Interior Floor, Wall and Partition Penetrations: Install insulation continuously through floors, walls and partitions.
  - 3. Fire-Rated Floor, Wall and Partition Penetrations: Install insulation continuously through penetrations.

- a. Seal penetrations through fire-rated assemblies in accordance with Division 07, Penetration Firestopping.

U. Piping

- 1. Insulate valves, strainers and fittings, including unions and flanges. For the purpose of this specification, fittings include unions and flanges. Install insulation with continuous thermal and vapor retardant integrity, unless otherwise noted. Use premolded material where available.
- 2. Insulate valve bodies and flanges up to and including bonnets.
- 3. Insulate strainers in a manner to permit removal of the basket without disturbing the insulation of the strainer.
- 4. Fill hollow interior of protection saddles with insulating cement.

- V. Vermin Proofing: Wherever insulated piping pass through sleeves or openings which are required to be vermin proof, provide sections of foamed glass insulation equal in length to length of sleeves. Refer to Section 230500, "Basic Mechanical Materials and Methods," in the Article titled, "Sleeves and Escutcheon Plates" for details and extent of vermin proofing.

3.2 INSULATION TYPES

A. Type C

- 1. Pipe: Slip the insulation over the pipe wherever possible or slit the insulation sections and apply around the pipe. Seal seams and joints with insulation manufacturer's adhesive.
- 2. Fittings, Valves: Fabricate segments of insulation, miter joints. Seal with special adhesive.
- 3. Outdoors:
  - a. Apply two coats of WB Armaflex finish, or equal, in accordance with manufacturer's instructions and recommendations.
  - b. Locate seams on lower half of the pipe.
- 5. Refrigerant Piping: Coat inside of insulation with mineralization coating. Apply coating to inside core of the insulation simultaneously with the installation of the insulation and rotate onto the pipe

3.3 INSTALLATION SCHEDULE

A. Piping

PIPING SYSTEM	MATERIAL TYPE	INSULATION THICKNESS IN INCHES FOR PIPE SIZE				
		Less than 1"	1 to less than 1-1/2"	1-1/2 to less than 4"	4 to less than 8"	8" & Larger
Refrigerant Piping (Note 1)	C	2	2	2	2	2-1/2
Air Conditioning Condensate and Pumped Discharge	C	3/4	3/4	1	1	1

Note 1: Locate hangers outside of insulation with saddles or thermal shields specified under another section. In the saddle, provide a half section of calcium silicate or foam glass equal in thickness to adjoining insulation, sized to carry load without crushing, and vapor sealed. Insulate supports and anchors in contact with pipe the same as piping.

#### 3.4 EXTENT OF INSULATION

Piping: Insulate as designated in Installation Schedule.

END OF SECTION 230700



## SECTION 230923 - HVAC INSTRUMENTATION AND CONTROLS

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

Complete automatic control system as required for automatic operation of heating, ventilating and air conditioning systems.

#### 1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 – General Requirements
- B. Section 230500 – Basic Mechanical Materials and Methods
- C. Section 238126 – Split System Air Conditioners
- D. Section 260500 – Common Work Results for Electrical
- E. Section 283111 – Addressable Fire Alarm Systems

#### 1.3 QUALITY ASSURANCE

- A. Electrical work shall comply with NFPA 70, National Electrical Code.
- B. Digital Control System
  - 1. The automatic control system shall be a modification and extension of the existing system.
  - 2. Digital system controller shall be a UL approved signaling system and shall comply with the latest Federal Communications Commission regulations.
  - 3. The automatic control system subcontractor shall be responsible for quantity and type of controllers to make the DDC system fully operational.
- C. Automatic control system subcontractor shall be responsible for providing quantity and type of transformers to make their system operational.

#### 1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Sections 230500.
- B. Schematic wiring and control diagrams including graphic system representation, operating sequences, and control description for entire system.

#### 1.5 APPLICABLE PUBLICATIONS

The publications form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

### PART 2 - PRODUCTS

#### 2.1 AUTOMATIC CONTROL SYSTEM

- A. Automatic control system shall be an extension of the existing systems and modifications of the existing system and shall be direct digital control with pneumatic or electronic actuation complete with necessary electrical interlocks, protective devices and associated control wiring.

- B. Control shall be performed by a field programmable Digital System Controller (DSC), microprocessor based, which incorporates direct digital control, energy management functions, and provides for digital display and local adjustments of desired variables at the control cabinet.
- C. Controllers, shall generally be the standard product of one manufacturer.
- D. Manufacturer: Honeywell.

## 2.2 CONTROLLERS

- A. Type: Proportional or positive action (for on-off control) with adjustable set point and modulating range or differential.
- B. Controllers for air handling unit supply air temperature shall be PID adjusted for stable modulating range, yet limiting deviation from control point of 1 degree F.
- C. Room Temperature Sensors:
  - 1. Adjustable Range:
    - a. Cooling Control: 70 to 85 degrees F.
  - 2. Provide specific features as indicated:
    - a. Single setpoint temperature sensors shall have a 10 degrees F adjustable bandwidth with sensitivity capable of holding the setpoint at plus or minus 1/2 degrees F with bandwidth set at minimum position.
    - b. Equip temperature sensors with digital display.

## 2.3 ELECTRIC WIRING AND CONTROL

- A. Electrical work shall conform to the Electric Division requirements except as modified below.
- B. Minimum wire size shall conform to National Electric Code requirements.
- C. Minimum Conduits Size: 3/4-inch, conduit mounted outdoors or in damp areas shall be rigid.
- D. Class 1 Wiring (Greater than 30 volts): Install in conduit in accordance with Article 725 of the National Electric Code.
- E. Class 2 Wiring (30 volts or less): Remote control and signal wiring may be run in multi-conductor cable with PVC insulation, Mylar binder and PVC jacket. Digital transmission shall be through twisted, shielded pair. Entire installation shall be in accordance with Article 725 of the National Electric Code, and shall meet additional requirements noted.
- F. Cables carrying AC circuits sensitive to external fields shall be shielded.
- G. Furnish control transformers with steel enclosures with separate primary and secondary compartments, each with conduit connections.
- H. Secondary side of control transformer shall be fused.
- I. Controllers

1. All controls shall be designed to function properly with a power source voltage variation of plus or minus 10 percent.
2. Operators shall be hydraulic, thermal or gear type, totally enclosed with oil immersed gear.
3. Select speed of operation to prevent hunting.

#### 2.4 CONTROL CENTER

None required.

#### 2.5 DIRECT DIGITAL SYSTEM

##### A. Application Specific Controllers

1. Controllers shall provide both standalone and networked direct digital control of items listed in input/output (I/O) Summary.
2. A dedicated controller shall be configured and provided for each ACU-1.
3. Each controller shall retain program, control algorithms, and setpoint information for at least 72 hours in the event of a power failure and shall return to normal operation upon stable restoration of normal line power.
4. Each controller shall report its communication status to the DSC. The DSC shall provide a system advisory upon communication failure and restoration.
5. For each primary HVAC system, provide means of indication of system performance and setpoints at the controller.
6. For each primary HVAC system, provide a means to adjust setpoints and start/stop equipment through the controller.
7. Provide a means to prevent unauthorized personnel from accessing setpoint adjustments and equipment control definitions.
8. The controller shall provide the functionality to download and upload configuration data, both locally at the controller and via the communications Network.

##### B. Trending

1. Trend and store all items listed in the I/O Summary charts.
2. Store for a period of seven calendar days.
3. Store data in a manner that allows custom queries and reports to be produced using industry-standard software tools.

### PART 3 - EXECUTION

#### 3.1 AUTOMATIC CONTROL SYSTEM

- A. Automatic control system subcontractor shall install and adjust entire control system and supervise initial operation with mechanics or subcontractors in his employ.
- B. Identify gages and controls. Note normal conditions with permanent markings.
- C. Control Diagrams
  1. Submit in accordance with Section 23 05 00, "Basic Mechanical Materials and Methods," black line schematic wiring and control piping diagrams including graphic system representation, operating sequence and control description for entire system.
  2. Upon completion of work, mount one "as built" set of diagrams in control panel associated with diagram.

3.2 CONTROLLERS

- A. Mount all controllers securely at accessible, vibration free locations.
- B. Field check calibration and adjustment of all controllers.
- C. Sensing Elements: Locate where responsive to representative temperatures or minimum temperature for low limit or freeze protection temperature sensors.
- D. Room Temperature Sensors: Provide temperature sensors in accordance with the following schedule:

SPACE	DIGITAL DISPLAY	EXTERNAL ADJUSTMENT	SINGLE SETPOINT	DEADBAND
Elevator Machine Room				X

- 1. Mount unit type thermostats centered below access door.

- E. Safety Controls: All safety controls and control interlocks shall be active with the motor start H-O-A switch in the "Hand," "Off," and "Automatic" positions.

3.3 ELECTRIC WIRING AND CONTROL

- A. Obtain control power from panel indicated on electrical drawings. Provide breaker in empty space in panel properly sized for load.
- B. Control power may be derived from line side of a starter provided circuit is fused and all controls so energized are associated only with this starter and motor.
- C. Control transformer furnished as an integral part of a starter shall not be used as a power source for additional control.
- D. Starter disconnect or separate switch immediately adjacent to starter shall disconnect power from all line voltage or 120-volt control wiring entering starter.

3.5 CONTROL CENTER (GRAPHIC USER INTERFACE)

None required.

3.6 DIRECT DIGITAL CONTROL SYSTEM

Control of the primary equipment including Air Cooled Condensing Unit (ACCU) and Air Conditioning Unit (ACU) items listed in the Input/Output (I/O) Summary Charts shall be performed by the Direct Digital Control System.

3.7 INPUT/OUTPUT (I/O) SUMMARY CHARTS

The control points on I/O Summary Charts are shown on the drawings.

END OF SECTION 230923



## SECTION 232000 - BUILDING SERVICES PIPING

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

Piping, fittings, and joints for Division 23.

#### 1.2 RELATED DIVISIONS AND SECTIONS

- A. Section 230500 – Basic Mechanical Materials and Methods
- B. Section 230548 – Mechanical Sound and Vibration Control
- C. Section 230700 – Mechanical Insulation
- D. Section 238126 – Split System Air Conditioners

#### 1.3 QUALITY ASSURANCE

- A. Valves shall conform to ASME Boiler and Pressure Vessel Code Specifications where indicated or required by state or local code.
- B. Comply with ASME B31.9, "Building Services Piping" for materials, products, and installation for steam and steam condensate piping.

#### 1.4 SUBMITTALS

- A. Submit in accordance with Division 01 and Section 230500.
- B. Statement of piping and fitting material, and type of joint to be used for each piping system.
- C. Manufacturer's technical product data, installation instructions and description of accessories for each type to be used and system designation:
  - 1. Pipe Supports
  - 2. Insulation protection
- D. Test reports for refrigeration and piping.

#### 1.5 APPLICABLE PUBLICATIONS

The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation.

#### 1.6 PROJECT CONDITIONS

- A. Workmanship
  - 3. Cut pipes accurately to measurements established at structure.
  - 4. Install without springing or forcing.
  - 5. Clear windows, doors, and other openings.
  - 6. Permit expansion and contraction without misalignment or damage.
  - 7. During construction, close openings in piping and equipment to keep out foreign matter and to prevent leakage.
  - 8. Piping shall be concealed unless otherwise indicated.

- 9. Provide offsets required to avoid structural or other interference without extra cost to the Government.
- B. Drainage
  - 1. Grade to low points.
  - 2. Provide hose end drain valves at bottom of risers, low points, and where indicated.
- C. Access: All valves, unions, flanges, expansion joints, and flow measurement devices shall be installed in accessible locations.

**PART 2 - PRODUCTS**

**2.1 FITTINGS AND ACCESSORIES**

- A. Welding Branch Fittings: Welding tees, Bonney Weldolets, or Thredolets, Allied Piping Products Type 1 fittings.
- B. Reducers: Reducing fittings, eccentric type where required to prevent pocketing of air and water.
- C. Unions, Flanges, Mechanical Couplings, and Gaskets
  - 1. Suitable for intended duty and rated for not less than system test pressure.
  - 2. Dielectric (insulating) type in water piping systems, suitable for intended service.

**2.2 PIPE, FITTINGS AND JOINTS**

A. Pipe

TYPE	REFERENCE
L	Seamless Copper Water Tube: ASTM B88, Type "L" hard temper; ASTM B280 for Type ACR .

B. Fittings

TYPE	REFERENCE
BB	Wrought Copper Solder Joint Fittings: ANSI/ASME B16.22.

C. Joints

TYPE	REFERENCE
7	Soldered: ASTM B32; Tin-antimony, 95-5, tin silver 96-4, or tin silver 94-6.
9	Brazed-Silver Alloy Brazing equal to Sil-Fos and Easy-Flow by Handy and Harman.

**2.3 VALVES**

- A. Manufacturer's Tests: Each valve shall be given shell and seat tests by the manufacturer and shall carry a permanently affixed indication that tests have been successfully completed.
- B. ASME Boiler Code Compliance: Provide valves, which conform to ASME Boiler Code Specifications, where indicated, or where required by state or local code.
- C. Silent Check Valves: Equivalent to Mueller Steam Company figure numbers as follows:

1. Two-inch and Larger:
  - a. Figure 105M, globe type, flanged. Body: Cast iron, ASTM QA126, Class B or carbon steel ASTM A216, Class WCB.
2. Manufacturers, included but not limited to: Milwaukee, NIBCO, Williams-Hager, APCO Valve and Primer Co., Hammond, Mueller Steam, Miller Valve Co.

D. Ball Valves

1. Ball valves shall have stem extension to place handle outside the insulation when valve is to be installed in insulated piping.
2. Type A: Bronze or brass body, bronze or brass ball and stem, reinforced Teflon seats and seals, full port size, threaded or solder end as required scheduled through 2-inch size. Valve shall be three-piece or shall have removable cartridge to permit complete access removal, and replacement of components without removal of the valve from the piping system and without disturbing the piping system. NIBCO 595-Y.
3. Manufacturers, included but not limited to: Unless otherwise indicated, Apollo, Contromatics, Crane, Dynaquip, Fairbanks, Hammond, ITT Grinnell, Jamesbury, MarPac, Milwaukee, NIBCO, Powell, Watts, Webstone, Worcester for the types listed in Schedule of Services.

E. Schedule of Services: Unless otherwise indicated, valves are for aboveground service. Size range indicated is size of pipe where valves are required. Valves shall be pipe size or larger.

REFRIGERANT				
TYPE	SIZE RANGE	SPECIFIC REQUIREMENTS	STYLE	FIGURE NO.
Packless Globe	1/4-1-1/8-inch ODS	-	-	Henry 626 or equal
Wing Cap	1-3/8 - 4-3/8-inch ODS	-	-	Henry 203 or equal

2.4 PIPE SUPPORTS

- A. General: Supports shall be plastic coated for plastic pipe, copper plated for copper tubing and brass pipe, galvanized for uninsulated galvanized steel pipe, and black steel for other metallic piping. Outdoor supports shall be copper plated for copper tubing and brass piping, and galvanized for all other piping.
- B. Horizontal Piping
  1. Clevis Hangers: Adjustable wrought steel clevis hangers.
  2. Under Supports:
    - a. Where no provision for expansion and contraction is required:
      - (1) Floor Mounted: Adjustable cast iron saddle with floor flanges secured to floor and pipe nipple of suitable length.
      - (2) Trapeze or Metal Frame Mounted: Inverted U bolts with saddle supports for insulated pipe.
      - (3) Wall Mounted: Steel J hooks for pipes 3-inch and smaller; welded steel brackets for larger pipes with hanger or support same as for trapeze.

- b. Where provision for expansion and contraction is required provide adjustable pipe roller and base secured to support. For floor mounting provide concrete pier under base; for wall mounting provide welded steel bracket.
  - 3. Metal Frame Supports:
    - a. Provide as required, vertical and horizontal 12 gage galvanized steel channels and fittings bolted together to form a multiple pipe rack secured to the building structure with post bases and brackets. Equal to Grinnell Power-Struct, ASTM A-446, Grade A, hot dipped zinc coated steel with safety end enclosures.
    - b. Manufacturers: B-Line, Steel City, Unistrut, Grinnell.
  - 4. Lateral Movement: Provide dual movement type rollers where undersupports are required and where expansion and contraction will cause lateral movement.
- C. Vertical Piping
- 1. Steel extension pipe clamps for piping not subject to vertical movement by expansion or contraction.
  - 2. Variable spring supports for piping subject to vertical movement by expansion or contraction.
  - 3. Base fitting set on concrete, brick pier or pipe stand where necessary at bottom of piping risers.
- D. Insulation Protection
- 1. Saddle: 18 gage galvanized sheet metal.
  - 2. Roller Saddle: Curved steel with protecting lugs or turned up edges.
  - 3. Thermal Shield: 360 degree insert of waterproofed calcium silicate insulation with 100 psi compressive strength encased in galvanized steel jacket equivalent to Model A1000 (CS) or equal for other insulated lines. Use Model A4000 (CSX-CW) and Model A3000 (CSX) or equal wherever pipe hanger span exceeds 10 feet and for pipe roller applications. Insert shall be same thickness as adjoining pipe insulation. Shield length and minimum sheet metal gages as indicated. Where pipe hanger spacing exceeds 10 feet and where pipe rollers are used, provide double layer shield on bearing surface.
- Manufacturers, included but not limited to: B-Line, Pipe Shields, Inc., Value Engineered Products.

PIPE SIZE IN INCHES	SHIELD LENGTH IN INCHES	MINIMUM GAGE
1/2 – 1-1/2	4	26
2 – 6	6	20

2.5 EQUIPMENT RAILS

- A. Furnish equipment rails equal to Roof Products and Systems Corporation, Model ER-4B, where indicated on the drawings.
- B. Equipment rails shall be manufactured of 18 gage galvanized steel, fully mitered and welded corners, 3-inch cant. Equipment rails shall be internally reinforced with integral baseplate and factory installed 2 by 8-inch wood nailer. Height shall be 18 inches above finished roof.
- C. Manufacturers, included but not limited to: Pate, Roof Products and Systems Corp.

## 2.6 PIPE PEDESTALS

- A. Furnish pipe mounting pedestals equal to Roof Products and System Corp., Model ER-4A, where indicated on the drawings. The pipe mounting pedestal shall include equipment rail, sized for the number of pipes and specified in this section, as associated galvanized steel slide channel attached to "U" shaped mounting brackets and secured to side of equipment rails with lag bolts supplied. The pipe roller assembly shall have galvanized 18-inch long continuous threaded rod to give 12-inch vertical adjustment, galvanized removable pipe retainer bracket for 12-inch horizontal adjustment. All pipe mounting pedestals shall be factory assembled.
- B. Manufacturers: Pate, Roof Products and Systems Corporation.

## 2.7 PIPE PORTALS

- A. Furnish pipe portals equal to Roof Products and Systems Corporation, where indicated on the drawings. The pipe portal shall include an 18-gage galvanized steel roof curb, equal to Model RC-4A, with integral baseplate, continuously welded corner seams, factory-installed wood nailer and 1-1/2-inch, 3 pound density rigid fiberglass insulation.
- B. The pipe portal shall be provided with a laminated acrylic-coated ABS plastic curb cover with prepunched holes and molded sealing ring on an 8-inch collared opening, and an EPDM compression molded cap with stainless steel snaplock clamps.
- C. Curb covers shall be resistant to ozone and ultraviolet rays and shall have a serviceable temperature range of minus 40 to 350 degrees F. The protective rubber caps shall have a serviceable temperature range of minus 60 to 250 degrees F and shall be resistant to ozone and ultraviolet rays. The conical shaped steps of the nipple shall provide a weatherproof seal around the penetration. The stainless steel snaplock clamps shall provide added protection to guarantee the seal.
- D. Manufacturers, included but not limited to: Pate, Roof Products and Systems Corporation.

## 2.8 PRESSURE GAGES AND TEST CONNECTIONS

- A. Type: General purpose bronze bourdon tube, bronze bushed movement mounted on socket independent of case, 1 percent minimum accuracy at mid-range, 4-1/2-inch white face equal to Ashcroft Catalog No. P2070A.
- B. Ranges: Approximately twice the maximum operating pressure. Provide compound gages wherever negative pressures can occur.
- C. Accessories: Provide gages with Trerice No. 735 or 740 valve or equal suitable for intended pressure, temperature and service and, for steam, brass siphon tubes. For pump and compressor suction and discharge, provide porous core snubbers.
- D. Manufacturers, included but not limited to: Ashcroft, Marsh, Marshalltown, Moeller, Taylor, Tel-Tru, Trerice, U.S. Gage, Weiss, Weksler, Weston, Winters.

## PART 3 - EXECUTION

### 3.1 FITTINGS AND ACCESSORIES

- A. Reducers: Use reducing fittings to make changes in pipe sizes.

B. Unions, Flanges, Mechanical Couplings, and Gaskets

1. Install at each piece of equipment, in bypasses, and long piping runs to permit disassembly for alteration and repairs.
2. Equipment Connections: Provide piping connections which conform to indicated sizes, details, reviewed shop drawings, and printed installation instructions furnished by manufacturer.
3. Dielectric (Insulating) Type: Install in water piping systems where pipes of dissimilar metals are joined and where unions are required by contract documents.
4. Contractor shall install tongue and recess mechanical couplings with a torque wrench in accordance with manufacturer's recommendations. Use of an impact wrench is not permitted on tongue and recess mechanical couplings.

C. Threads: Remove burrs and ream to full inside diameter.

3.2 PIPE, FITTINGS AND JOINTS

A. Schedule

SYSTEM	PIPE	FITTINGS	JOINTS
<b>Air Conditioning Condensate</b>			
1. Aboveground: 2-inch and smaller	L	BB	7
<b>Refrigeration Piping *Type ACR</b>	L	BB	9

NOTES:

- (1) Provide connections to equipment with 12-inch long sections of flexible teflon hose.

3.3 VALVES

- A. Adjust for smooth and easy operation.
- B. Install in locations where valve can easily be adjusted.
- C. Install valves full size of pipe before reducing size to make connection to equipment and controls.
- D. Remove excess solder and other foreign matter from valve interior after installation before operating valve.
- E. Preset Balancing valve to be preset to indicated pressure drop.
- F. Silent Check Valves: Install in pump discharge piping where check valves are indicated.
- G. Set field adjustable flow set point of balancing valves.

3.4 PIPE SUPPORTS

A. Preparation and Application

1. Provide supports to maintain required slope and alignment.
2. Secure hangers to rods with double nuts.
3. Make allowance for expansion and contraction.
4. Do not support pipes from other pipes.
5. Use trapeze hangers for parallel runs of pipe with same slope.
6. Provide bracing to prevent lateral motion of horizontal or vertical piping.
7. Provide supports at or near changes in direction.

8. Provide strength and rigidity suitable for loads imposed.
9. Support piping so there is no strain on the connection to pumps and other equipment.
10. Support piping using mechanical couplings in accordance with manufacturer's instructions and recommendations.

B. Horizontal Piping

1. Adjustment: Provide vertical adjustment of supports for horizontal piping after installation.
2. Maximum Support Spacing:
  - a. Steel Lines: 1-1/2-inch and smaller, 6 feet; 2-inch and larger, 10 feet.
  - b. Copper Lines: 1-1/2-inch and smaller, 5 feet; 2-inch and larger, 8 feet.

C. Vertical Piping: Where supports are necessary at bottom of risers, provide a base fitting set on either concrete or brick pier or a pipe stand. In lieu of using a base fitting, a hanger at bottom horizontal connection may be used. Locate hanger as close to riser as possible, but permitting sufficient free offset where allowance for expansion and contraction is necessary.

D. Insulation Protection

1. Roller Saddle: Provide where are supported on rollers. Weld lugs to pipe.

3.5 EQUIPMENT RAILS

- A. Install in accordance with manufacturer's instructions and recommendations.
- B. Height to bottom of rails shall be 18 inches above finished roof.

3.6 PIPE PEDESTALS

Install in accordance with manufacturer's instructions and recommendations.

3.7 PIPE PORTALS

Install in accordance with manufacturer's instructions and recommendations.

3.8 PIPE TESTING

A. Preparation and Application

1. Test piping to prove tightness.
2. Test concealed piping before enclosing.
3. Replace and re-test pipe or fittings broken or damaged under test.
4. Remove or protect from damage items not designed to withstand testing pressure; e.g., control devices, air vents, boilers, and thermostatic trap elements.
5. Advise COR prior to tests.

B. Pressure Testing

1. Test pressures shall be 1-1/2 times the system working pressures and a minimum of 100-psi, unless otherwise indicated.
2. Blind flanges, or the equivalent, shall be used instead of valves for dead-end shutoff.
3. Inspect each joint for leakage while under test.
4. Apply soapsuds to joints under air pressure test.
5. Maintain pressure tests for a minimum of four hours.

6. Perform refrigeration-piping tests in compliance with the American Standard Safety Code for Mechanical Refrigeration, ASA B9.1.
7. Maintain applicable safety methods while performing tests. These methods shall include but shall not be limited to applying pressure at increments of 25 psi, providing sufficient time to allow the piping to equalize strains, until specified test pressure is attained. The piping system shall be examined only when the pressure in it is not increasing.

END OF SECTION 23 20 00



## SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

#### 1.2 RELATED DIVISIONS AND SECTIONS

- A. Division 01 – General Requirements
- B. Section 230500 – Basic Mechanical Materials and Methods
- C. Section 230548 – Mechanical Sound and Vibration Control
- D. Section 230700 – Mechanical Insulation
- E. Section 230923 – HVAC Instrumentation and Controls
- F. Section 232000 – Building Services Piping

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. ASHRAE Compliance:
  - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
  - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- E. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.

#### 1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set for each air-handling unit.
2. Gaskets: One set for each access door.
3. Fan Belts: One set for each air-handling unit fan.

#### 1.4 COORDINATION

Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

#### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
1. Warranty Period:
    - a. For Compressor: Five years from date of Substantial Completion.
    - b. For Parts: One year from date of Substantial Completion.
    - c. For Labor: One year from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

Including but not limited to: Carrier, Daikin-McQuay, Trane/Mitsubishi, York.

#### 2.2 AIR CONDITIONING UNIT (ACU) - INDOOR

- A. The indoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. Both liquid and suction lines must be individually insulated between the outdoor and indoor units. Refer to mechanical schedules for unit capacities.
1. Unit Cabinet:
    - a. The indoor unit shall have a white, "wipe-clean" finish.
    - b. The drain and refrigerant piping shall be accessible from six (6) positions for flexible installation (right side, right back, and right bottom; and left side, left back, and left bottom).
    - c. The cabinet shall be supplied with a mounting plate to be installed onto a wall for securely mounting the cabinet.
    - d. The cabinet includes:
      - 1) Indoor unit ON/OFF switch, capable of being used when the remote controller is missing. When switch is used, the default setting is AUTO mode, 77°F temperature setting, and AUTO airflow rate.
      - 2) Motion sensor capable of setting back the set point temperature for energy savings. This feature may be disengaged on the wireless remote controller.
      - 3) OPERATION lamp that turns green when activated
      - 4) TIMER lamp that turns orange when activated
      - 5) Hard-wired thermostat

2. Fan:
  - a. The evaporator fan shall be an assembly consisting of a direct-driven fan by a single motor.
  - b. The fan shall be statically and dynamically balanced and operate on a motor with permanent lubricated bearings.
  - c. An auto-swing louver for adjustable air flow (both vertically and horizontally) is standard via the wireless remote control furnished with each system.
  - d. The indoor fan shall offer a choice of five speeds, plus quiet and auto settings.
  - e. The fan shall have a delayed start when initially put into HEAT operation, giving time for the evaporator coil to heat up and preventing a cold draft from entering the room.
3. Filter: The return air filter provided will be a mildew resistant, removable and washable filter.
4. Coil:
  - a. The evaporator coil shall be a nonferrous, aluminum fin on copper tube heat exchanger.
  - b. All tube joints shall be brazed with silver alloy or phoscopper.
  - c. All coils will be factory pressure tested.
  - d. A condensate pan shall be provided under the coil with a drain connection.
5. Electrical:
  - a. The outdoor unit shall be powered with 208-230 volts, 1 phase, and 60 hertz power. The indoor unit shall receive 208-230 volt, 1 phase, 60 hertz power from the outdoor unit.
  - b. The allowable voltage range shall be 187 volts to 253 volts.
6. Control:
  - a. The unit shall have a backlit, wired thermostat capable to operate the system. It shall have Cooling Operation, Heating Operation, Auto Operation, Dry Operation and Fan Only Operation.
  - b. The controller shall consist of an On/Off Power switch, Mode Selector, Quiet Button (for outdoor unit), Fan Setting, Swing Louver, On/Off Timer Setting, Temperature Adjustment, °C or °F Temperature Display, Motion Sensor, Weekly Timer, Night Set Mode, Comfort Mode, Econo Mode, and Powerful Operation.
    - 1) On/Off switch powers the system on or off.
    - 2) Mode selector shall operate the system in cool, heat, auto fan, or dry operation.
    - 3) Quiet button for outdoor unit lowers the noise level by changing frequency and fan speed of the outdoor unit.
    - 4) Fan setting shall provide five fan speeds, plus quiet and auto settings.
    - 5) Swing louver shall adjust the airflow (horizontal and vertical) blades.
      - a) Vertical & horizontal positions can be manually adjusted, or placed into auto swing or 3-D airflow settings.

- 6) On/Off timer is used for automatically switching the unit on or off.
    - a) Night Set mode automatically engaged with Off Timer is set. This setting automatically adjusts the temperature setting 0.9°F up in COOL, 3.6°F down in HEAT to prevent excessive cooling or heating during sleeping hours.
  - 7) Temperature adjustment allows for the increase or decrease of the desired temperature.
  - 8) Weekly timer allows for programming the temperature setting and on/off times of up to four settings per day for each day of the week.
  - 9) Powerful operation allows quick cool down or heating up in the desired space to achieve maximum desired temperature in the shortest allowable time period.
- c. The controller shall be able to display two-digit fault codes extracted from the indoor unit to aid in troubleshooting.
  - d. Temperature range on the remote control shall be 64°F to 90°F in COOL mode, 50°F to 86°F in HEAT, and 64°F to 86°F in AUTO. The temperature shall be controlled in 1° increments.
  - e. The indoor unit microprocessor has the capability to receive and process commands via return air temperature and indoor coil temperature sensors enabled by commands from the remote control.
  - f. Provide inline condensate pump.

### 2.3 OUTDOOR UNIT

- A. General: The outdoor unit shall be specifically matched to the corresponding indoor unit size. The outdoor unit shall be completely factory assembled and pre-wired with all necessary electronic and refrigerant controls. The outdoor unit shall be controlled by a microprocessor and dedicated EEV's shall be provided for capacity control during part load of the indoor unit. Refer to mechanical schedules for unit capacities.
  - 1. Unit Cabinet:
    - a. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
    - b. The outdoor unit will come furnished with four (4) mounting feet, mounted across the base pan, to allow bolting to a cement pad or optionally supplied mounting bracket.
  - 2. Fan:
    - a. The fan shall be a direct drive, propeller type fan.
    - b. The motor shall be inverter driven, permanently lubricated type bearings, inherent.
    - c. A fan guard is provided on the outdoor unit to prevent contact with fan operation.
  - 3. Coil:
    - a. The outdoor coil shall be nonferrous construction with corrugated fin tube.
    - b. The fins are to be covered with an anti-corrosion, rated for up to 1000 hours salt spray.

- c. Refrigerant flow from the condenser will be controlled via a metering device.
  - d. Automatic defrost will remove any frost from the outdoor unit allowing the system to maintain heating capacity.
4. Compressor:
- a. The outdoor compressor shall be a variable speed swing inverter-driven compressor. The one-piece action reduces noise, extends life, boasts higher efficiency and reduces energy consumption.
  - b. The outdoor unit shall have an accumulator and four-way reversing valve.
  - c. The compressor shall have an internal thermal overload.
  - d. The outdoor unit can operate with a maximum vertical height difference of 65-5/8 feet and overall maximum length of 98-1/2 feet without any oil traps or additional components.
  - e. The compressor shall have a quick-warming function to prevent pumping liquid refrigerant in low-ambient conditions.
5. Electrical:
- a. The electrical power requirement is 208-230 volt, 1-phase, and 60 Hz power.
  - b. The voltage range limitations shall be a minimum of 187 volts and a maximum of 253 volts.

## 2.3 MANUFACTURERS

Including but not limited to: Daikin, Carrier, York, Trane/Mitsubishi.

## PART 3 – EXECUTION

### 3.1 INSTALLATION REQUIREMENTS

Installation must comply with installation manual. It is recommended the system be installed by a contractor/dealer who has been through manufacturer training programs.

END OF SECTION 238126



## SECTION 260050 - COMMON WORK RESULTS FOR ELECTRICAL

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Electrical equipment coordination and installation.
2. Common electrical installation requirements.

#### 1.2 DESCRIPTION OF WORK

##### A. Requirements of this Section are applicable to work in Division 26.

##### B. Contract Documents

1. Unless otherwise modified, drawings and general provisions of the Contract, including provisions of General Conditions, Supplementary Conditions, Division 00, and Division 01 govern work under Division 26.
2. Contract drawings for electrical work are diagrammatic, intended to convey scope and general arrangement.
3. Refer questions involving document interpretation or discrepancies to Engineer for review and direction.
4. Correct faulty work due to resolving discrepancies without proper approval.
5. Specifications establish quality of materials, equipment, workmanship and methods of construction.
6. Follow drawings and specifications in laying out work. Consult other applicable contract drawings and specifications, become familiar with conditions affecting work.

##### C. Scope

1. The work in Division 26 includes furnishing and installing the electrical work complete and ready for satisfactory service.
2. Requirements specified govern work in all sections of Divisions 26.

##### D. Definitions: The following are definitions of terms and expressions used in Divisions 26.

1. "Approve" - To permit use of material, equipment or methods conditional upon compliance with contract document requirements.
2. "Concealed" - Hidden from normal sight; includes work in crawl spaces, above ceilings, and in building shafts.
3. "Directed" - directed by Engineer.
4. "Equal, equivalent" - possessing the same performance qualities and characteristics and fulfilling the same utilitarian function.
5. "Exposed" - not concealed.
6. "Furnish" - Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.
7. "Indicated" - indicated in Contract Documents.
8. "Install" - Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning and similar operations.
9. "Provide" - furnish and install, complete and ready for the intended use.

10. "Removable" - detachable from the structure or system without physical alteration of materials or equipment and without disturbance to other construction.
11. "Review" - limited observation or checking to ascertain general conformance with design concept of the work and with information given in contract documents. Such action does not constitute a waiver or alteration of the contract requirements.

### 1.3 QUALITY ASSURANCE

- A. Regulations: Comply with regulations of NFPA, state, county, and municipal building ordinances, and other applicable codes and regulations.
- B. Provide UL label on electric powered equipment or certification that equipment has been tested by a testing agency approved by the local authority as equivalent in safety to UL labeled equipment.
- C. Material and Equipment Requirements
  1. Use products of one manufacturer where two or more items of same kind of equipment are required.
  2. For certain items of equipment the specification and the project design are based upon the specified manufacturer's product. Other manufacturers' names are listed. Contractor may purchase, conditional upon meeting project requirements, equipment from the listed manufacturers.
  3. Only the manufacturer's equipment upon which, the specification and the project design has been based, has been checked for this project. Check allocated space and structure for suitability of equipment of other listed manufacturers, including parts replacement and servicing.
- D. Workmanship
  1. Remove and replace, at no extra cost, work not in conformance with contract requirements.
  2. Coordination with Other Trades
    - a. Coordinate work and cooperate with other trades to facilitate execution of work.
    - b. Contractor shall give full cooperation and coordination with other trades and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily with the least possible interference or delay.
    - c. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans and shop details for the proper installation of the work and for the purpose of coordination adjacent work.
  3. Access: The Contractor shall specifically consider all materials and equipment installations and shall coordinate with the work of all trades to insure easy and unobstructed accessibility of all systems for operations, maintenance, repairs, and replacement. Installation of all specified materials and equipment including but not limited to, equipment, supports, electrical conduit shall be in a manner which will allow complete unobstructed access to all panels, transformers, and all other items requiring access for operations or maintenance. Any installation of new equipment or materials which causes problems related to access of new or existing equipment shall be disapproved by the Engineer and reaccomplished by the Contractor.



#### 1.4 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - 3. To allow right of way for piping and conduit installed at required slope.
  - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

#### 1.5 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 Operation and Maintenance Manuals.

#### 1.6 SHOP DRAWINGS AND SUBMITTALS

- A. Refer to Division 01 for complete requirements.
- B. Submit all products for a single specification section as a complete submittal. All products specified within a division shall be included, otherwise submittal will be returned as incomplete.
- C. Submittals shall be clearly marked indicating actual products intended to be utilized. Marks may include highlighting, circling, boxing, checking, etc. Do not provide submittal data which lists multiple product's data without clearly indicating which data applies to the products intended to be used on project.
- D. Coordinate drawings and data before submitting and certify that provisions of the contract documents have been met.
- E. Call attention, in writing, to deviations from contract requirements.
- F. Do not fabricate, deliver to site, or install items requiring shop drawing review, until the review has been completed by the Engineer and the shop drawing has been marked to indicate "No Exception Taken" or "Make Corrections Noted."
- G. Use only final or corrected drawings and data for construction. This includes all Addendums, Architectural Supplemental Information (ASIs), and Change Bulletins.
- H. The Engineer's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.
- F. Conditions of Occupancy
  - 1. This building will be occupied during the life of this contract. Execute work in a manner to impose minimal interference with the normal functioning of the building and its occupants. When interference is unavoidable, schedule work 14 days in advance with the Owner.
  - 2. Make temporary connections where necessary to maintain uninterrupted electrical service.
  - 3. Provide adequate protection for the building, its contents, and occupants.
  - 4. Perform work as quietly as possible to avoid unnecessary disturbance. Unusual precaution may be necessary in the conduct or work in some areas to achieve satisfactory compliance.
  - 5. Coordinate with Owner to Perform work producing high noise levels, dust, or hazards to occupants in occupied during non-business hours of the facility.
  - 6. Comply with regulations of Owner pertaining to circulation, sanitation, and behavior of Contractor's personnel.
- G. Provide O&M staff demonstration and training in accordance with section 017900 Demonstration and Training. Provide a walking tour demonstrating all new electrical work, equipment, system layout, routing, and labeling."

END OF SECTION 260050

## SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Copper building wire rated 600 V or less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

#### 1.2 ACTION SUBMITTALS

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

#### 1.3 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

### PART 2 - PRODUCTS

#### 2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Alpha Wire Company.
  - 2. American Bare Conductor.
  - 3. Belden Inc.
  - 4. Cerro Wire LLC.
  - 5. Encore Wire Corporation.
  - 6. General Cable Technologies Corporation.
  - 7. Okonite Company (The).
  - 8. Service Wire Co.
  - 9. Southwire Company.
  - 10. WESCO.
- C. Standards:
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
  - 2. RoHS compliant.
  - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.

## 2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Feeders: Type THHN/THWN-2, single conductors in raceway.
- B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

END OF SECTION 260519



## SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

#### 1.2 ACTION SUBMITTALS

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

#### 1.3 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 Operation and Maintenance Manuals.

### PART 2 - PRODUCTS

#### 2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

#### 2.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

#### 2.3 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Connections to Structural Steel: Welded connectors.

### 3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.

### 3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- C. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
  - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
  - 2. Make connections with clean, bare metal at points of contact.
  - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
  - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

END OF SECTION 260526



## SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
4. Fabricated metal equipment support assemblies.

#### 1.3 O & M REQUIREMENTS

- ##### A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

### PART 2 - PRODUCTS

#### 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- ##### A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
  2. Material for Channel, Fittings, and Accessories: Galvanized steel.
  3. Channel Width: Selected for applicable load criteria.
  4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  5. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- ##### B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- ##### C. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- ##### D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
  2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
  3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
  4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
  5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
  6. Toggle Bolts: Stainless-steel springhead type.

7. Hanger Rods: Threaded steel.

## 2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
  1. NECA 1.
  2. NECA 101
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  1. To Wood: Fasten with lag screws or through bolts.
  2. To New Concrete: Bolt to concrete inserts.
  3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  4. To Existing Concrete: Expansion anchor fasteners.
  5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69, or Spring-tension clamps.
  7. To Light Steel: Sheet metal screws.

- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

### 3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529



## SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Metal conduits and fittings.
  - 2. Boxes.

#### 1.2 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.

#### 1.3 ACTION SUBMITTALS

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

#### 1.4 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

### PART 2 - PRODUCTS

#### 2.1 METAL CONDUITS AND FITTINGS

- A. Metal Conduit:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. AFC Cable Systems; a part of Atkore International.
    - b. Allied Tube & Conduit; a part of Atkore International.
    - c. Anamet Electrical, Inc.
    - d. Calconduit.
    - e. Electri-Flex Company.
    - f. FSR Inc.
    - g. Korkap.
    - h. NEC, Inc.
    - i. Opti-Com Manufacturing Network, Inc (OMNI).
    - j. O-Z/Gedney; a brand of Emerson Industrial Automation.
    - k. Patriot Aluminum Products, LLC.
    - l. Perma-Cote.
    - m. Picoma Industries, Inc.
    - n. Plasti-Bond.
    - o. Republic Conduit.
    - p. Southwire Company.
    - q. Thomas & Betts Corporation; A Member of the ABB Group.
    - r. Topaz Electric; a division of Topaz Lighting Corp.

- s. Western Tube and Conduit Corporation.
  - t. Wheatland Tube Company.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  3. GRC: Comply with ANSI C80.1 and UL 6.
  4. ARC: Comply with ANSI C80.5 and UL 6A.
  5. EMT: Comply with ANSI C80.3 and UL 797.
  6. FMC: Comply with UL 1; zinc-coated steel.
  7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Metal Fittings:
1. Comply with NEMA FB 1 and UL 514B.
  2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  3. Fittings, General: Listed and labeled for type of conduit, location, and use.
  4. Fittings for EMT:
    - a. Material: Steel or die cast.
    - b. Type: Compression.
- C. Joint Compound for ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Adalet.
  2. Crouse-Hinds, an Eaton business.
  3. EGS/Appleton Electric.
  4. Erickson Electrical Equipment Company.
  5. FSR Inc.
  6. Hoffman; a brand of Pentair Equipment Protection.
  7. Hubbell Incorporated.
  8. Hubbell Incorporated; Wiring Device-Kellems.
  9. Kraloy.
  10. Milbank Manufacturing Co.
  11. MonoSystems, Inc.
  12. Oldcastle Enclosure Solutions.
  13. O-Z/Gedney; a brand of Emerson Industrial Automation.
  14. Plasti-Bond.
  15. RACO; Hubbell.
  16. Spring City Electrical Manufacturing Company.
  17. Stahlin Non-Metallic Enclosures.
  18. Thomas & Betts Corporation; A Member of the ABB Group.
  19. Topaz Electric; a division of Topaz Lighting Corp.
  20. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast aluminum with gasketed cover.
- G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- I. Gangable boxes are prohibited.

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed Conduit: ARC.
  - 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 3. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
  - 1. Exposed: GRC.
  - 2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 4. Boxes and Enclosures: NEMA 250, Type 1.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 1. GRC: Use threaded rigid steel conduit fittings. Comply with FB 2.10.
  - 2. EMT: Use compression, steel or cast-metal fittings. Comply with NEMA FB 2.10.
  - 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Where aluminum raceways pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

#### 3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not fasten conduits onto the bottom side of a metal deck roof.
- D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- E. Complete raceway installation before starting conductor installation.
- F. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- G. Support conduit within 12 inches of enclosures to which attached.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- J. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- L. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- N. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- O. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
  - 1. Conduit extending from interior to exterior of building.
  - 2. Where otherwise required by NFPA 70.



- P. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC.
- Q. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- R. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

### 3.3 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

### 3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

### 3.5 CLEANING

- A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION 260533



## SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.

#### 1.2 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70.
- B. Comply with ANSI Z535.4 for safety signs and labels.
- C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

#### 2.2 COLOR AND LEGEND REQUIREMENTS

- A. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
1. Color shall be factory applied.
  2. Colors for 208/120-V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
    - d. Neutral: White.
  3. Colors for 480/277-V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.
    - d. Neutral: Gray.
  4. Color for Equipment Grounds: Green.

B. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

- A. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
  2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Equipment Identification Labels:
1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
  2. Outdoor Equipment: Laminated acrylic or melamine sign.
  3. Equipment to Be Labeled:

- a. Enclosures and electrical cabinets.
- b. Motor-control centers.
- c. Enclosed switches.
- d. Enclosed circuit breakers.
- e. Enclosed controllers.
- f. Variable-speed controllers.

END OF SECTION 260553



## SECTION 262726 - WIRING DEVICES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Toggle switches, 120/277 V, 20 A.
  - 2. GFCI receptacles, 125 V, 20 A.

#### 1.2 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

#### 1.3 ACTION SUBMITTALS

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

#### 1.4 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

### PART 2 - PRODUCTS

#### 2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Device Color:
  - 1. Black unless otherwise indicated or required by NFPA 70 or device listing.
- F. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

#### 2.2 TOGGLE SWITCHES, 120/277 V, 20 A

- A. Single-Pole Switches, 120/277 V, 20 A, Drawing Designation \$p:
  - 1. Standards: Comply with UL 20 and FS W-S-896.
  - 2. Specification Grade minimum.
  - 3. Equipped with integral pilot light.

B. Single-Pole Switches, 120/277 V, 20 A, Drawing Designation \$WP:

1. Standards: Comply with UL 20 and FS W-S-896.
2. Weatherproof device in weatherproof cover/housing.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Weather-Resistant, GFCI Duplex Receptacles, 125 V, 20 A:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Eaton (Arrow Hart).
  - b. Hubbell Incorporated; Wiring Device-Kellems.
  - c. Leviton Manufacturing Co., Inc.
  - d. Pass & Seymour/Legrand (Pass & Seymour).
2. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
3. Configuration: NEMA WD 6, Configuration 5-15R.
4. Type: Non-feed through.
5. Standards: Comply with UL 498 and UL 943 Class A.
6. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" articles.

2.4 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch-thick, satin-finished, Type 302 stainless steel.
3. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable while-in-use cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.



2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
  - a. Cut back and pigtail, or replace all damaged conductors.
  - b. Straighten conductors that remain and remove corrosion and foreign matter.
  - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

### 3.2 GFCI RECEPTACLES

- A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

### 3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.4 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Perform the following tests and inspections:
  - 1. Test Instruments: Use instruments that comply with UL 1436.
  - 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- D. Tests for Receptacles:
  - 1. Line Voltage: Acceptable range is 105 to 132 V.
  - 2. Ground Impedance: Values of up to 2 ohms are acceptable.
  - 3. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  - 4. Using the test plug, verify that the device and its outlet box are securely mounted.
  - 5. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION 262726

## SECTION 262813 - FUSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Cartridge fuses rated 600 V ac and less for use in the following:
    - a. Enclosed controllers.
    - b. Enclosed switches.
  - 2. Spare-fuse cabinets.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
  - 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
    - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
    - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
  - 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
  - 3. Current-limitation curves for fuses with current-limiting characteristics.
  - 4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in PDF format.
  - 5. Coordination charts and tables and related data.
  - 6. Fuse sizes for elevator disconnect switches.
  - 7. Fuse sizes for ductless split systems and heat pumps.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017700 "Closeout Procedures," Section 017823 "Operation and Maintenance Data," include the following:
  - 1. Ambient temperature adjustment information.
  - 2. Current-limitation curves for fuses with current-limiting characteristics.

3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in PDF format.
4. Coordination charts and tables and related data.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

#### 1.6 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Cooper Bussmann; a division of Cooper Industries.
  2. Edison; a brand of Cooper Bussmann; a division of Cooper Industries.
  3. Littelfuse, Inc.
  4. Mersen USA.

#### 2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
  1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC, time delay.
  2. Type RK-1: 250-V, zero- to 600-A rating, 200 kAIC, time delay.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

### 2.3 SPARE-FUSE CABINET

- A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
  - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
  - 2. Finish: Gray, baked enamel.
  - 3. Identification: "SPARE FUSES" in 1-1/2-inch- high letters on exterior of door.
  - 4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
  - 1. Feeders: Class RK1, time delay.
  - 2. Motor Branch Circuits: Class RK1, time delay.

### 3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Owner.

### 3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

## SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Fusible and non-fusible switches.
  - 2. Enclosures.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Include wiring diagrams for power, signal, and control wiring.

#### 1.3 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

### PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- C. Comply with NFPA 70.

#### 2.2 FUSIBLE AND NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton.
  - 2. General Electric Company.
  - 3. SIEMENS Industry, Inc.; Energy Management Division.
  - 4. Square D; by Schneider Electric.
- B. Type HD, Heavy Duty:
  - 1. Single throw.
  - 2. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses.
  - 3. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Contact rating – Coordinate voltage of contact with Variable Speed Drive to be interlocked with.
5. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.3 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Install fuses in fusible devices.
- D. Comply with NFPA 70 and NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  2. Label each enclosure with engraved metal or laminated-plastic nameplate.

END OF SECTION 262816

## SECTION 262820 - ELEVATOR SHUNT-TRIP FUSED DISCONNECT SWITCHES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Furnish and install shunt-trip fused disconnect switch and accessories for elevator feeders.

#### 1.2 RELATED SECTIONS

- A. Section 262813 - Fuses
- B. Section 283111 - "Digital Addressable Fire Alarm System"
- C. Division 14 Section(s) - "Elevators"

#### 1.3 REFERENCES

- A. Fused Power Module Switch shall comply with the following standards and codes:
  - 1. UL 98 - Enclosed and Dead-Front Switches
  - 2. UL 248 - Low-Voltage Fuses
  - 3. NEMA KS 11 - Heavy Duty Enclosed and Dead-Front Switches
  - 4. NEMA FU 1 - Low Voltage Cartridge Fuses
  - 5. ANSI/ASME 17.1 - Safety Code for Elevators and Escalators
  - 6. NFPA 70 – National Electrical Code
  - 7. NFPA 72 – National Fire Alarm and Signaling Code

#### 1.4 SUBMITTALS

- A. Shop Drawings:
  - 1. Submit detailed dimensional outline and conduit entry/exit locations.
  - 2. Control circuit and accessory wiring diagram
- B. Product Data: Submit manufacturer's product data sheets including:
  - 1. Assembly (including shunt-trip switch, control wiring and accessories) ratings (voltage, current, horsepower, and short-circuit current rating)
  - 2. Conductor termination ratings
  - 3. Fuse ratings and type

#### 1.5 CLOSEOUT SUBMITTALS

- A. Final product data information.
- B. Operation and maintenance manuals including replacement parts list.

#### 1.6 QUALIFICATIONS

- A. The equipment manufacturer shall have a minimum five years experience in producing UL 98 listed shunt-trip fused disconnect switches with integral control wiring for elevator circuits.



1.7 DELIVERY, STORAGE AND HANDLING

- A. Handle and store equipment in a manner that avoids damage.
- B. Inspect equipment for damage prior to installation. Do not install damaged equipment.

1.8 MAINTENANCE MATERIALS

- A. Furnish two sets of fuse pullers.

1.9 ADDITIONAL MATERIALS

- A. Furnish three sets of each rating and type of fuse installed.
- B. Furnish spare fuse cabinet where not already provided.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturers: Basis-of-Design Product - Subject to compliance with requirements, provide Cooper Bussmann, Inc. Model - Power Module Switch Model PS or a comparable product by Ferraz Shawmut or Littelfuse or approved equal.
- B. The shunt-trip disconnect switch shall not incorporate an instantaneous trip mechanism.
- C. Feeders for multiple elevator installations shall be selectively coordinated and fed from a Cooper Bussmann LPJ, LPN-RK/LPS-RK, or KRP-C fuse sized at a minimum of 2:1 (compared to the largest branch circuit fuse in the elevator shunt-trip fused disconnect switch) in accordance with NEC 620.62.

2.2 CONSTRUCTION

- A. Provide shunt-trip fused disconnect switch with all necessary relay(s), control transformer and other options, as shown on drawings and listed below:
  - 1. Ampere rating of the switch shall be based upon the elevator manufacturer requirements for Cooper Bussmann LPJ fuses.
  - 2. Short-circuit current rating of 200,000A with Cooper Bussmann LPJ fuses.
  - 3. Interlocks to prevent the opening of the cover when the switch is in the ON position. Interlock shall be defeatable for testing purposes.
  - 4. Handle lockable in OFF position.
  - 5. 100VA control power transformer with primary and secondary fuses. The primary voltage rating shall be 208 volts with a 120V secondary.
  - 6. Isolation relay (3PDT, 10amp, 120V). The coil of the isolation relay shall be 120V. A normally open dry contact shall be provided by the Fire Alarm Safety System to energize the isolation relay and activate the shunt trip solenoid (140VA inrush at 120V). (Note: if 24V DC coil is selected, a separate 24V DC source and contact must be provided by the Fire Alarm Safety System.)
  - 7. Provide additional options as indicated on drawings or below:
    - a. Key to Test Switch
    - b. "On" Pilot Light (Green, Red or White)
    - c. Isolated Full Capacity Neutral Lug
    - d. 1P NC Mechanical Interlock (required for hydraulic elevators with automatic recall).

- e. Mechanically interlocked auxiliary contact for hydraulic elevators with battery backup lowering (automatically lowers car to bottom landing in event of mainline power failure).
  - f. Fire Alarm Voltage Monitoring Relay (Comply with NFPA 72)
  - g. Enclosure: NEMA 1
8. Entire assembly (including shunt-trip switch, control wiring and accessories) shall have a short-circuit rating of 200,000A.
- B. Coordinate complete catalog number for the Power Module Switch with approved elevator submittal.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Handle and install equipment in accordance with the manufacturer's published instructions.
- B. Equipment shall have a nameplate installed and mounted to the front cover and indicate switch type, ampere rating, voltage rating, short-circuit rating, and load served.
- C. Install fuses. Refer to Section 262813, "Fuses" for product requirements. Install labeling that identifies replacement fuse type/class and rating.

END OF SECTION 262820

## SECTION 265119 - LED INTERIOR LIGHTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes LED luminaires:

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
  - 2. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- B. Shop Drawings: For nonstandard or custom luminaires.
  - 1. Include plans, elevations, sections, and mounting and attachment details.
  - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Include diagrams for power, signal, and control wiring.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

#### 1.4 O & M REQUIREMENTS

- A. Provide Operation and Maintenance Manuals in accordance with section 017823 "Operation and Maintenance Manuals."

#### 1.5 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

#### 1.6 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Ambient Temperature: 41 to 104 degrees F.
  - 1. Relative Humidity: Zero to 95 percent.
- B. Altitude: Sea level to 1000 feet.

### 2.2 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
  - 1. Label shall include the following lamp characteristics:
    - a. "USE ONLY" and include specific lamp type.
    - b. Lamp diameter, shape, size, wattage, and coating.
    - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.
- D. Nominal Operating Voltage: As scheduled.
- E. CRI: As scheduled
- F. Color Temperature: As Schedule
- G. Rated lamp life: As Scheduled
- H. Internal driver
- I. Housings:
  - 1. Extruded aluminum or steel housing and heat sink.
  - 2. Powder-coat finish.
  - 3. Integral junction box with conduit fittings.
- J. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- K. Diffusers and Globes:
  - 1. Prismatic acrylic.
  - 2. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
  - 3. Lens Thickness: At least 0.125-inch minimum unless otherwise indicated.

L. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.3 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Steel:

1. ASTM A 36/A 36M for carbon structural steel.
2. ASTM A 568/A 568M for sheet steel.

C. Stainless Steel:

1. Manufacturer's standard grade.
2. Manufacturer's standard type, ASTM A 240/240 M.

D. Galvanized Steel: ASTM A 653/A 653M.

E. Aluminum: ASTM B 209.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.

- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Provide support for luminaire without causing deflection of ceiling or wall.
  - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

### 3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### 3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 265119

## SECTION 265619 - LED EXTERIOR LIGHTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.

#### 1.2 DEFINITIONS

- A. Fixture: See "Luminaire."
- B. Lumen: Measured output of lamp and luminaire, or both.
- C. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of luminaire.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

#### 1.5 FIELD CONDITIONS

- A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

#### 1.6 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

### PART 2 - PRODUCTS

#### 2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. UL Compliance: Comply with UL 1598 and listed for wet location.
- D. Lamp base complying with ANSI C81.61 or IEC 60061-1.
- E. L70 lamp life of 50,000 hours in the submitted luminaire for the normal range of environmental conditions.

- F. Lamp Rating: Lamp marked for outdoor use and in enclosed locations.
- G. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

## 2.2 LUMINAIRE TYPES

- A. See Luminaire Schedule on drawings.

## 2.3 MATERIALS

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- C. Diffusers and Globes:
  - 1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
  - 2. Glass: Annealed crystal glass unless otherwise indicated.
  - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- D. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- E. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
  - 1. White Surfaces: 85 percent.
  - 2. Specular Surfaces: 83 percent.
  - 3. Diffusing Specular Surfaces: 75 percent.
- F. Housings:
  - 1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
  - 2. Provide filter/breather for enclosed luminaires.

## 2.4 FINISHES

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Luminaire Finish: Manufacturer's standard applied to factory-assembled and -tested luminaire before shipping. Match finish process and color to pole or support materials.

## 2.5 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.



## PART 3 – EXECUTION

### 3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with NECA 1.
- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Install lamps in each luminaire.
- D. Fasten luminaire to structural support.
- E. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Support luminaires without causing deflection of finished surface.
  - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. Wall-Mounted Luminaire Support:
  - 1. Attached to structural members in walls or to a minimum 1/8 inch backing plate attached to wall structural members.
  - 2. Wiring Method: Install cables in raceways. Conceal raceways and cables.
  - 3. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
  - 4. Coordinate layout and installation of luminaires with other construction.
  - 5. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.
  - 6. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

### 3.2 INSTALLATION OF INDIVIDUAL LUMINAIRES

- A. Install as indicated on Drawings.

### 3.3 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

### 3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### 3.5 FIELD QUALITY CONTROL

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  2. Verify operation of controls.
- C. Luminaire will be considered defective if it does not pass tests and inspections.
- D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.
- 3.6 DEMONSTRATION
- A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

END OF SECTION 265619

## SECTION 283111 - FIRE ALARM SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes the installation of the following devices for connection to the existing fire alarm control panel:
  - 1. Initiating devices.
  - 2. Notification appliances.
  - 3. Interface devices.
- B. The installation of new fire alarm devices will be limited to the Work required for the elevator upgrades.
- C. Modify existing fire-alarm system to accommodate new initiating devices and notification appliances indicated on the drawings.
- D. Related Requirements:
  - 1. Division 14 "Conveying Systems" for fire alarm interface requirements with elevator controllers and cars.
- E. Obtain and pay for permits required for the installation of the fire alarm system.
  - 1. Fire alarm contractor shall provide shop drawing submittal documents to the AHJ to obtain permit. Submittal shall include, but not be limited to all of the following:
    - a. Fire alarm device and cable symbol legend.
    - b. Locations, including mounting heights of alarm-initiating and notification appliances.
    - c. Battery calculations.
    - d. Size, type and number of conductors.
    - e. Voltage drop calculations.
    - f. Manufacturer's data sheets including model numbers and listing information for equipment, devices and materials.
    - g. Fire alarm system riser diagram.
    - h. Device to device wiring.
    - i. Loudness and candela settings for new notification appliances.

#### 1.2 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. HLI: High Level Interface.
- D. NICET: National Institute for Certification in Engineering Technologies.
- E. PC: Personal computer.
- F. VRLA: Valve Regulated Lead Acid.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including furnished options and accessories.
  - 1. Include construction details, material descriptions, dimensions, profiles, and finishes.
  - 2. Include rated capacities, operating characteristics, and electrical characteristics.
- B. Shop Drawings: For fire-alarm system.
  - 1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
  - 2. Include voltage drop calculations for notification-appliance circuits.
  - 3. Include battery-size calculations.
  - 4. Include input/output matrix.
  - 5. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
  - 6. Include performance parameters and installation details for each detector.
- C. General Submittal Requirements:
  - 1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Engineer.
  - 2. Shop Drawings shall be prepared by persons with the following qualifications:
    - a. NICET-certified, fire-alarm technician; Level IV minimum or a Licensed Fire Protection Engineer.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.

### 1.5 Sample Warranty: For special warranty.

### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
  - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
    - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
    - b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
    - c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
    - d. Riser diagram.
    - e. Device list.
    - f. Record copy of site-specific software.

B. Software and Firmware Operational Documentation:

1. Program Software Backup: On magnetic media or compact disk, complete with data files.
2. Device list.
3. Printout of software application and graphic screens.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Fire alarm and emergency communications system shall be installed under the supervision of persons with the following minimum qualifications:

1. Trained and certified by manufacturer in fire-alarm system design or certified by NICET as fire-alarm Level III technician.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Construction Manager and Owner no fewer than seven days in advance of proposed interruption of fire-alarm service.
2. Do not proceed with interruption of fire-alarm service without Owner's written permission.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Existing conventional system, with multiplexed signal transmission and tone evacuation.
- B. Automatic sensitivity control of certain smoke detectors.
- C. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with and operate as an extension of existing system. Provide system manufacturer's certification that all components provided have been tested, and will operate as a system.
- D. Noncoded system dedicated to fire-alarm service only.
- E. All components provided shall be listed for use with the selected system.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
1. Smoke detectors.
  2. Heat detectors.
- B. Fire-alarm signal shall initiate the following actions:
1. Continuously operate alarm notification appliances.
  2. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.
  3. Transmit an alarm signal to the remote alarm receiving station.
  4. Activate alarm communication system.
  5. Close smoke dampers in air ducts of designated air-conditioning duct systems.
  6. Recall elevators to primary or alternate recall floors.
  7. Activate emergency lighting control.
  8. Record events in the system memory.
  9. Indicate device in alarm on the annunciator.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.
  2. User disabling of zones or individual devices.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
  2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
  3. Loss of communication with any sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
  4. Loss of primary power at fire-alarm control unit.
  5. Ground or a single break in internal circuits of fire-alarm control unit.
  6. Abnormal ac voltage at fire-alarm control unit.
  7. Break in standby battery circuitry.
  8. Failure of battery charging.
  9. Abnormal position of any switch at fire-alarm control unit or annunciator.
- E. System Supervisory Signal Actions:
1. Initiate notification appliances.
  2. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
  3. Transmit a trouble or supervisory signal to the remote alarm receiving station.
  4. Display system status on graphic annunciator and remote annunciator.
  5. Record the event in system memory.
- F. System Trouble Signal Actions:
1. Identify specific device initiating the event at fire-alarm control unit, connected network control panels, and remote annunciators.
  2. Transmit trouble signal to the remote alarm receiving station.
  3. Display system status on LCD annunciator.

4. Record the event in system memory.

G. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:

1. Pathway Class Designations: NFPA 72, Class B.
2. Pathway Survivability: Level 1.
3. Install no more than 159 detectors and 159 monitor, control, or relay devices on each signaling-line circuit.

H. Notification-Appliance Circuit:

1. Fire alarm signal shall continuously operate alarm audible and visual appliances.

I. Elevator Recall:

1. Elevator recall shall be initiated only by one of the following alarm-initiating devices:
  - a. Elevator lobby detectors except the lobby detector on the designated floor.
  - b. Heat detector in elevator machine room.
  - c. Heat detectors in elevator hoistway.
2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.
3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
  - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

J. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

## 2.3 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visual devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Visual Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "ALERT" is engraved in minimum 1-inch high letters on the lens.

1. Rated Light Output:

- a. 15/30/75/110 cd, selectable in the field.
2. Mounting: Wall mounted unless otherwise indicated.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be in a temporal pattern, synchronized with other units.

5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, white.

#### 2.4 INTERFACE DEVICE

- A. General:
  1. Store an internal identifying code for control panel use to identify the module type.
  2. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic module for alarm-initiating devices for wired applications with normally open contacts.
- C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall, and to circuit-breaker shunt trip for power shutdown.
  1. Allow the control panel to switch the relay contacts on command.
  2. Have a minimum of two normally open and two normally closed contacts available for field wiring.
- D. Control Module:
  1. Operate notification devices.

#### 2.5 WIRE AND CABLE

- A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
  1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, IBC, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
  1. Devices placed in service before all other trades have completed cleanup shall be replaced.



2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor.
- C. Manual Fire-Alarm Boxes:
1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway.
  2. Mount manual fire-alarm box on a background of a contrasting color.
  3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- D. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
  2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
  3. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B in NFPA 72.
  4. HVAC: Locate detectors not closer than 36 inches from air-supply diffuser or return-air opening.
  5. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- E. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches long shall be supported at both ends.
- G. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location, if any. Do not install smoke detectors in sprinklered elevator shafts.
- H. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- I. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- J. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- 3.3 PATHWAYS
- A. Pathways shall be installed in EMT.
- B. Exposed EMT installed in unfinished spaces shall be painted red enamel.

### 3.4 CONNECTIONS

- A. Make connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches from the device controlled. Make a confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Alarm-initiating connection to elevator recall system and components.
  - 2. Alarm-initiating connection to activate emergency lighting controls.
  - 3. Supervisory connections at elevator shunt-trip breaker.

### 3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.
- C. Provide fire alarm control panel circuit breaker with red marking in accordance with NFPA 72. Fasten phenolic nameplate at circuit breaker. Nameplate shall read: "FIRE ALARM CIRCUIT."
- D. Identify power source and location of branch circuit disconnect serving fire alarm equipment. Provide engraved phenolic sign fastened to FACP "THIS PANEL FED FROM PANEL \_\_\_\_ , CIRCUIT NO. \_\_\_\_\_.LOCATED IN \_\_\_\_\_"

### 3.6 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

### 3.7 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
  - 1. Prepare for final test. Ensure all components of the project's fire protection systems are inspected and pre-tested prior to requesting a final inspection visit by the AHJ. Inspection deficiencies will be referenced to NFPA requirements, and/or Contract Specification requirements. Use, as a minimum, the following pre-commissioning check list:

- NFPA 72" Fire Alarm System Record of Completion" form completed by contractor.
- System meets contract specification requirements
- O&M Manuals provided
- System has been inspected and pre-tested
- Proper batteries installed

- Circuit breaker location identified at fire alarm panel, and properly identified at breaker panel location
  - System is free of all trouble conditions
  - System has been programmed to meet specification requirements
  - System device text programming has been coordinated with the Owner to ensure proper device identity and location.
  - Operating instructions provided at fire alarm control panel location
  - All devices and components installed per approved shop drawings
  - All devices properly labeled and properly identified on as-builts
  - All conduit box covers in place
  - No T-Tap connections or splices in circuits
  - All T-Bar hangers in place where devices are installed on drop ceilings
  - No flexible conduit exceeds 6 feet in length
  - All concealed devices have remote lamps in visible areas
  - All control relays located within 3 feet of controlled equipment
  - All required surge suppressors properly installed (including required suppressors for F/A circuits leaving and entering buildings)
  - Elevator recall functions per Code and contract documents
  - Elevator shunt trip functions per Code and contract documents
  - Sprinkler system interface per NFPA 72 requirements
  - Fire alarm network per contract requirements
  - Fire alarm communicating properly to Owner designated monitor station
  - Two telephone lines arranged for F/A communications to monitor station. (one required to be dedicated and one can be shared with fire alarm line capture)
  - Spare parts provided
  - Systems training provided to Owner's personnel (could be done at final acceptance)
2. Visual Inspection: Conduct visual inspection prior to testing.
- a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
  - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
3. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
4. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
5. Perform the following tests in all zones and rooms.
- a. Perform indoor sound tests in a single test location in rooms less than 20 ft. by 20 ft. Tests shall be made on a 20 ft. by 20 ft. grid for larger rooms.
  - b. Sound test measurements shall be taken at a worst case location within each room or grid, not near any speaker.
  - c. Operational Test: Perform tests that include originating messages at microphone outlets, prerecorded messages, and other inputs. Verify proper routing and volume levels and that system is free of noise and distortion.

6. Intelligibility Test: Test for intelligibility in accordance with ANSI/ASA S3.2.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

### 3.8 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

END OF SECTION 283111