
SECTION 260000 – BASIC ELECTRICAL REQUIREMENTS

Latest Update 08-06-2024. See underlined texts for Edits.

(Engineer shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Also turn off “Underlines”.)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section and all other Electrical Specification Sections.

1.2 SUMMARY

- A. This Section includes general administrative and procedural requirements, as well as the following basic electrical materials and methods:
 - 1. Referenced organizations and codes
 - 2. Site visit
 - 3. Outages
 - 4. Installers qualifications
 - 5. Work performance
 - 6. Submittals
 - 7. Quality assurance
 - 8. Delivery storage and handling
 - 9. Sequencing and scheduling
 - 10. Variances
 - 11. Guarantee/warranty
 - 12. Listed manufacturers
 - 13. Approved equal equipment layouts
 - 14. Fire stops & smoke seals for wall & floor sleeve applications
 - 15. Coordination drawings
 - 16. Construction record documents
 - 17. Operation and Maintenance manuals – electronic files
 - 18. Concrete housekeeping pads
 - 19. Grout
 - 20. Rough-ins
 - 21. Electrical installations.
 - 22. Cutting and patching.
 - 23. Cutting, welding and burning
 - 24. Concrete housekeeping pads
 - 25. Grouting
 - 26. Protection of work
 - 27. Provisions for access

28. Demonstration and instruction
29. Equipment provided under another division or by others
30. Record drawings
31. Closeout procedures
32. Inspections
33. Demolition
34. Repairs and restoration of surfaces and finishes
35. Final cleaning
36. Project punchout

B. Summary of Work:

1. Provide a complete integrated electrical system in accordance with the intent of these specifications and the accompanying drawings.

1.3 REFERENCED ORGANIZATIONS AND CODES <Edit as required for Project>

- A. The following list of abbreviations are included within the specifications and are provided as a reference.
- B. All work in Divisions 26, 27, and 28 shall comply with the latest version of following codes and regulations as adopted by the State of Maryland and the State Fire Marshal, unless otherwise specified.
 1. NFPA (National Fire Protection Association).
 2. NESC (National Electrical Safety Code).
 3. ADA (American with Disabilities Act).
 4. ANSI (American National Standards Inst.).
 5. OSHA (Occupational Safety & Health Act).
 6. COMAR (Code of Maryland Regulations).
 7. UL (Underwriters Laboratories).
 8. IBC (International Building Code).
 9. State of Maryland Fire Prevention Code.
 10. ANSI/EIA/TIA.
 11. NETA (National Electrical Testing Association).
 12. NEMA (National Electrical Manufacturer's Association).
 13. NECA (National Electrical Contractors Association).

1.4 SITE VISIT <Applicable to Renovation Projects>

- A. Prior to preparing the bid, the electrical subcontractor shall visit the site and become familiar with all existing conditions. Make all necessary investigations as to locations of utilities and all other matters which can affect the work. No additional compensation will be made to the contractor as a result of his failure to familiarize himself with the existing conditions under which the work must be performed.

1.5 OUTAGES <Delete if not applicable to project>

- A. For all work requiring an outage, the electrical contractor shall submit an outage request to the UMB Project Manager, using the UMB Standard Request for Outage Form which is available through the UMB Design and Construction Web Site at <https://www.umaryland.edu/designandconstruction/resources/contractors/>
- B. The existing mechanical/electrical systems shall remain operational unless turned off by University personnel during the construction of the project. For each electrical outage request include a photograph of the panel index schedule for each panel affected by the outage.
- C. Unless otherwise specified, outages of any services required for the performance of this contract and affecting areas other than the immediate work area shall be scheduled at least ten days (10) days in advance with the Office of Facilities Management. All such outages shall be performed on other than normal duty hours.
- D. All electrical outages which will interfere with the normal use of the building in any manner shall be done at such times as shall be mutually agreed upon by the contractor and the Office of Facilities Management.
- E. The contractor shall include in his price the cost of all premium time required for outages and other work which interferes with the normal use of the building, which will be performed, in most cases, during other than normal work time and at the convenience of the University.
- F. The operation of electrical equipment; required to achieve an outage must be accomplished by University personnel only. Prospective subcontractors under this section are cautioned that the unauthorized operation of electrical equipment or other control devices by their personnel can result in extremely serious consequences for which the contractor will be held accountable.

1.6 INSTALLER'S QUALIFICATIONS

- A. Electrical Installer shall submit the following evidence:
 - 1. Five (5) comparable completed projects.
 - 2. Reference letters from minimum of three (3) registered professional engineers, general contractors, building owners, explaining proficiency, quality of work, or other attribute on projects of similar size or substance.
 - 3. Copy of Maryland Master Electrician's License.
 - 4. Local or State license where required.
 - 5. BICSI and NICET certification, where required by these specifications.
- B. The electrical installer shall utilize a full time project foreman in charge of all electrical work.

1. Fully qualified and experienced in such work.
2. Available, on site, at all times during construction.
3. All communication shall be through this person.

C. Installer of specialized systems such as Fire Alarms, telecommunication systems, etc. shall meet the requirements of the associated spec section(s).

1.7 WORK PERFORMANCE

A. All electrical work must comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by the contract.

B. Before initiating any work, a job specific work plan must be developed by the contractor. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, and safety equipment to be used and exit pathways.

C. Job site and worker safety are the responsibility of the contractor. Compliance with the requirements of NFPA 70E is subject to ongoing inspection by University personnel and failure to comply will result in an immediate Stop Work order being issued and enforced at the contractor's expense.

D. Energized electrical conductors and circuit parts to which an employee might be exposed shall be put into an electrically safe work condition before an employee performs work any time the employee is within the limited approach boundary or, where an increased risk of injury from an exposure to an arc flash hazard exists.

E. Outages should be scheduled a minimum of ten (10) days in advance.

F. Mandatory Requirements: The following requirements are mandatory:

1. Protective Equipment: Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.
2. UMB Energized Work Permit: A UMB Energized Work Permit is required for any work on energized circuits or equipment. Permit must be approved by UMB Department of Operations and Maintenance prior to performing energized work. Submit the work permit with the outage request.

1.8 SUBMITTALS

A. General: For general requirements see Architectural Specification Division 01 Section "Submittal Procedures".

- B. Product data as specified in the electrical specifications unless otherwise noted:
 - 1. Warranties and maintenance instructions shall be included in the O & M Manual only. Do not include this data in the Product Submittals.
- C. Shop drawings detailing fabrication and installation requirements for electrical equipment.
- D. In addition to the following list, submit other shop drawings as may be requested by UMB:
 - 1. Divisions 26, 27, & 28:
 - a. Compression Wire Connectors
 - b. Fire Resistant Sealant
 - c. Ground Wire
 - d. Surface Raceway
 - e. Wireways
 - f. Raceway, Boxes and Cabinets
 - g. Wires and Cables
 - h. Fire Alarm System: Refer to Division 28 Section “Digital, Addressable Fire Alarm System” for submittal requirements
- E. In instances of complex field wired systems, including but not limited to: fire alarm system, the contractor shall submit:
 - 1. Cut sheets of every component such as control panels, fire alarm devices, wire, etc.
 - 2. The contractor shall submit detailed riser diagrams detailing point-by-point connections. Diagrams shall indicate cable on raceway between points.
 - 3. Corresponding floor plans showing only this particular system with conduit and wire runs between points.
 - 4. Both riser and floor plan shall indicate address of devices where applicable.
 - 5. Calculations for battery capacity and voltage drop.
 - 6. Preliminary programming information.
- F. Submittal File Format: File formats for each submittal shall be electronically as follows:
 - 1. Product Data: “pdf” file format.
 - 2. Shop Drawings: “pdf” file format.
 - 3. Coordinated Drawings: “pdf” or “dwg” file formats.

1.9 QUALITY ASSURANCE

- A. Comply with NFPA 70 for components and installation.
- B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.

1. The Terms “Listed and Labeled”: As defined in the National Electrical Code, Article 100.
 2. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing Laboratory” (NRTL) as defined in OSHA Regulation 1910.7.
- C. Install all components and equipment per manufacturer’s written instructions.
- D. Provide installation in accordance with recognized trade organizations and standards:
1. NEMA.
 2. NECA “Standards of Installation”

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

1.11 SEQUENCING AND SCHEDULING

- A. Coordinate electrical equipment installation with other building components.
- B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations.
- C. Coordinate the installation of required supporting devices and set sleeves in poured in place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
- E. Coordinate connection of electrical services.
- F. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- G. Coordinate requirements for access panels and doors where electrical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in the Architectural Specifications.
- H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

1.12 VARIANCES

- A. Where variances occur between the drawings and specifications or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the contract price. The Engineer shall decide on the item and manner in which the work shall be provided.

1.13 GUARANTEE/WARRANTY:

- A. All materials, equipment, etc. provided by the general contractor and/or his subcontractors shall be guaranteed and warranted to be free from defects in workmanship and materials for a period of two (2) years after date of certificate of completion and acceptance of work by UMB. Any defects in workmanship, materials, or performance which appear within the guarantee period shall be corrected by the contractor without cost to the owner, within a reasonable time, to be specified by UMB. In default thereof, owner may have such work done and charge the cost of same to the contractor. In addition to the above statement the Guarantee/Warranty Period shall include all labor cost related to all warranty work. For compressorized equipment include an additional three (3) year Guarantee/Warranty Period.

PART 2 - PRODUCTS

2.1 LISTED MANUFACTURERS:

- A. Listed Manufacturers: The manufacturers indicated in Part 2 represent the basis for design and identify the minimum level of quality for materials and equipment, specified in this Division, that are acceptable to UMB. Unless “or equal” is included as an option, substitutions are not allowed, except under the following condition. During bid phase, contractors may submit material and equipment by non-listed manufacturers provided said submittals meet the requirements of these specifications. All submitted materials and equipment are subject to approval by the A/E and UMB. Reference: Division 1 Substitution Section.

2.2 APPROVED EQUAL EQUIPMENT LAYOUTS

- A. Approved Equal Equipment Layouts: The equipment layouts and the related mechanical and electrical service connections, access space and supports indicated on the construction documents represent equipment provided by the specified basis of design manufacturer and model number. When the successful bidder chooses to provide “or approved equal” equipment by one (1) of the other listed manufacturers in the specifications, the bidder shall be responsible for providing all adjustments and modifications to the services necessary to make connections to the equipment, the bidder shall be responsible for installing the equipment such that all required clear access space is maintained, and the bidder shall be responsible for providing all adjustments and modifications to the equipment mounting and supports. All adjustments and modifications shall be provided by the bidder and appropriate subcontractors at no additional cost to the project.

2.3 FIRE STOPS & SMOKE SEALS FOR WALL & FLOOR SLEEVE APPLICATIONS

<Delete if Section 280000 is used for the Project>

- A. General: Provide fire stops, and smoke sealant materials for all electrical services penetrating through rated assemblies. See Architectural Specification Division 07, Section “Penetration Firestopping” for sealant material requirements. Services include:
 - 1. Electrical penetrations include conduits and cables.
- B. New Construction: All new penetrations shall be provided with a pipe sleeve and sealant materials.
- C. Existing Construction: All new service penetrations through existing rated assemblies shall be provided with a pipe sleeve and sealant materials. All existing unsealed penetrations for services passing through existing rated assemblies within the project area shall be provided with sealant materials.
- D. Project Area: The project area shall include the finished spaces and related sections of the utility shafts within the project area footprint.
- E. Wall Pipe Sleeve Applications: Pipe sleeves shall be required for all new conduit penetrations through rated wall assemblies and non-rated CMU walls. Where pipe sleeves are installed in non-rated CMU walls fire rated sealant materials are not required. Provide acoustical caulking to seal the annular spaces between the sleeve and the bare pipe or pipe insulation on each end with one half (1/2) inch caulking all around the annular space.
- F. Floor Pipe Sleeves Applications: Pipe sleeves are required for all new conduit risers passing through floor slabs.

2.4 COORDINATION DRAWINGS <Delete if size of project does not warrant.>

- A. General: When required participate in the preparation of the coordinated drawing effort for the project. See Specification Division 01 for general requirements.
- B. Coordination Drawings: In addition to the requirements of the Specification Division 01 prepare the plumbing part for the coordination drawing effort. Work with the other trades to ensure the material and equipment installed as part on the electrical system will not be in conflict with the installation of material and equipment by the other trade contractors. Unless otherwise indicated the coordination drawings, including plans, sections, and elevations shall be prepared at a scale of not less than 1/4 inch = 1 foot- 0 inches. At a minimum, prepare coordination drawings for all mechanical rooms, electrical rooms and substation rooms.
- C. File Format: Coordination drawings shall be in a layered structure form as CAD Files or PDF Files for each floor with searchable text as follows:
 - 1. File Structure: The “pdf” or “dwg” files shall have separate layered structure for:

- a. Building Elements: Indicate each building element on separate layers, such as:
 - 1) Walls.
 - 2) Reflected ceiling plan.
 - 3) Room numbers.
 - b. Systems and Sub Systems: Indicate each system or sub system as warranted by congestion or complexity on separate layers such as:
 - 1) Examples of Systems:
 - a) Lighting System.
 - b) Power Distribution System.
 - c) IT System.
 - 2) Examples of Sub Systems:
 - a) Normal Power.
 - b) Emergency Power.
2. The layered electronic files shall allow building elements, building systems and sub systems to be viewed in isolation or in combinations that are user selectable when the drawing files are being displayed.
- D. Coordination Effort: This coordination effort shall include detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
1. Indicate the proposed locations of electrical equipment, and materials. Include the following:
 - a. Planned electrical systems layout, including conduit elbow radii and accessories.
 - b. Clearances for servicing and maintaining electrical equipment.
 - c. Exterior wall and foundation penetrations.
 - d. Fire rated wall and floor penetrations.
 - e. Sizes and location of required concrete pads and bases.
 - f. Size and location of all electrical panels.
 - g. Access doors.
 2. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
 3. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Show all access doors for concealed junction boxes devices.

4. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, cable trays, sprinklers, access doors and other ceiling mounted items.

2.5 CONSTRUCTION RECORD DOCUMENTS

- A. The electrical contractor shall maintain a set of construction record documents during the construction period in accordance with Specification Division 01 Section “Project Closeout”. In addition to the requirements specified in Division 01, indicate the following installed conditions:
 1. Conduit and wire runs between the points
 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 3. Approved substitutions, Contract Modifications, RFI responses and actual equipment and materials installed.

2.6 PROJECT OPERATION AND MAINTENANCE MANUAL – ELECTRONIC FILES

- A. Project O & M Manual File: The project OM Manual shall include one (1) electronic copy of each approved submittal and any manufacturer’s maintenance manuals, and all warranty certificates included in Divisions 26, 27, & 28. Also include the address, phone number and contact person for each supplier. Using the UMB Standard O&M Manual Template referenced in Division 01 Closeout Procedures insert the submittal files include both a bookmark and tree structure for accessing each submittal file in the manual.
- A. Provide service and operating manuals for the following:
 1. Division 28 Section “Digital, Addressable Fire Alarm System”.

2.7 CONCRETE HOUSEKEEPING PADS

- A. Provide concrete required for housekeeping pads under Division 23 unless otherwise noted.
- B. Concrete shall be 3,500 psi twenty-eight (28) day compressive strength concrete and reinforcement bars as specified in the architectural specifications.

2.8 GROUT

- A. Grout shall be non-shrink, high strength type, free of iron or chlorides and suitable for use in contact with all metals, without caps or other protective finishes complying with ASTM C 1107, Grade B and the following:
 1. Characteristics: Post hardening, volume adjusting, dry, hydraulic cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

2. Design Mix: 5,000-psi (34.50MPa), twenty eight (28) day compressive strength.
3. Packaging: Premixed and factory-packaged.

PART 3 – EXECUTION

3.1 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. For equipment rough-in requirements see specifications for electrical equipment.

3.2 ELECTRICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
 2. Coordinate electrical systems, equipment, and materials installation with other building components.
 3. Verify all dimensions by field measurements.
 4. Install systems, materials, and equipment to conform with approved submittal data, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to UMB.
 5. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 6. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
 7. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.3 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 1 Section "Cutting and Patching." In addition to the requirements specified in Division 1, the following requirements apply:
 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- B. Perform cutting, fitting, and patching of electrical equipment and materials required to:
 1. Uncover Work to provide for installation of ill timed Work.

2. Remove and replace defective Work.
 3. Remove and replace Work not conforming to requirements of the Contract Documents.
 4. Disconnect installed work as specified for testing.
 5. Install equipment and materials in existing structures.
 6. Upon written instructions from UMB, uncover and restore Work to provide for UMB observation of concealed Work.
- C. Cut, remove and legally dispose of selected electrical equipment, components, and materials as indicated, including but not limited to removal of electrical systems and equipment as indicated on the drawings and specifications and other electrical items made obsolete by the new Work.
- D. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
- E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
1. Patch existing finished surfaces and building components using new materials matching existing materials and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 01 Section "Definitions and Standards" for definition of "experienced Installer."
 2. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 01 Section "Definitions and Standards" for definition of "experienced Installer."
- 3.4 CUTTING, WELDING, BURNING <Edit for project or delete if not required>
- A. Before the contractor and/or any sub-contractor commences any cutting, welding, burning or other type of hot work at UMB, the contractor must request a Hot Work Permit from the UMB Office of the Fire Marshal. Hot Work Permits must be requested online at <https://www.umaryland.edu/fire-marshal/hot-work-permits/> at least one (1) day before beginning hot work.
- B. The hot work permit copy shall remain on the job site at the hot work location until such work is completed.
- 3.5 CONCRETE HOUSEKEEPING PADS
COORDINATE CONCRETE WORK WITH DIVISION 3.

- A. General: Construct concrete housekeeping pads to support mechanical equipment were indicated and as detailed on the drawings and as specified herein. Engage the services of the Structural or General Contractor, and pay for them, to provide the concrete housekeeping pads. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations.
- B. Housekeeping Pads: Set all floor-mounted equipment on four (4) inch high concrete housekeeping pads, unless otherwise shown or specified.
 - 1. Housekeeping Pads: Pads shall be minimum of four (4) inches wider and longer than structural base of equipment being set on pad.

3.6 GROUTING

- A. Install nonmetallic nonshrink grout for electrical equipment base bearing surfaces and anchors. Mix grout according to manufacturer's printed instructions.
- B. Clean surfaces that come into contact with grout.
- C. Provide forms for placement of grout, as required.
- D. Avoid air entrapment when placing grout.
- E. Place grout to completely fill equipment bases.
- F. Place grout on concrete bases to provide a smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout according to manufacturer's printed instructions.

3.7 PROTECTION OF WORK

- A. Protect work, material and equipment from weather and construction operations before and after installation.
- B. Properly store and handle all materials and equipment.
- C. Cover temporary openings for electrical equipment to prevent the entrance of water, dirt, debris, and other foreign matter.

3.8 PROVISIONS FOR ACCESS

- A. Furnish and install adequate access to all electrical components. The following list shall be used as a guide only:

1. Equipment such as transformers, generators, etc.
2. Distribution panels.
3. Switch Gear.
4. Disconnects.
5. Variable frequency drives.

B. Access shall be as required by code and/or as determined by the Architect and Engineer.

C. Refer to contract drawings where access panels have been specifically located.

D. Where access is by means of lift out ceiling tiles or panels mark access each panel using small color coded or numbered tabs. Provide an index chart for identification. Place markers in corner of tile.

3.9 DEMONSTRATION AND INSTRUCTIONS <Edit for project or delete if not required>

A. Demonstrate operation and maintenance of equipment and systems to Owner's personnel a minimum two (2) weeks prior to date of final inspection.

1. For equipment requiring seasonal operation, perform instructions for other seasons at the same time.
2. Training period shall be performed within one (1), two (2) week period.

B. Use operation and maintenance manuals and video as basis of instruction. Review contents of manual and video with personnel in detail to explain all aspects of operation and maintenance.

C. Demonstrate the following:

1. Start up.
2. Operation.
3. Control.
4. Adjustment.
5. Trouble shooting.
6. Servicing.
7. Maintenance.
8. Shutdown.

D. Provide at least forty (40) hours straight time instruction to the operating personnel.

1. This instruction period shall consist of not less than five (5) eight (8) hour days.
2. Time of instruction shall be designated by the Owner.
3. This instruction shall be in addition to instructional requirements of specific equipment specified elsewhere in the mechanical specifications.

3.10 EQUIPMENT PROVIDED UNDER ANOTHER DIVISION AND BY OTHERS

- A. The Installer of products under Divisions 26, 27, & 28 shall make all system connections required to equipment furnished and installed under another division and by others.
- B. It shall be the responsibility of the Installer to obtain all necessary data from the equipment supplied under other Divisions.

3.11 RECORD DRAWINGS (As Built)

- A. Upon completion of the electrical installations, the Installer shall deliver to the Architect one (1) complete set of marked-up blueprints of the electrical contract drawings.
 - 1. The mark-ups shall be legibly marked in red pencil to show all changes and departures of the installation as compared with the original design.
 - 2. Refer to General Requirements of Division 01 for additional requirements pertaining to Submittals and Record Drawings.

3.12 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Submit Complete Package At Least Two (2) Months Prior To Substantial Completion. Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
 - 1. Maintenance manuals, including a customized list of preventive maintenance items and annual schedule for maintenance.
 - 2. Record documents.
 - 3. Complete inventory of spare parts and materials.
 - 4. Tools.
 - 5. Identification systems.
 - 6. Control sequences.
 - 7. Hazards.
 - 8. Cleaning.
 - 9. Warranties and bonds.
 - 10. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
<Edit for project or delete if not required>
 - 1. Start up.
 - 2. Shut down.
 - 3. Emergency operations.
 - 4. Noise and vibration adjustments.
 - 5. Safety procedures.

6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.13 INSPECTIONS

- A. Contractor shall:
 1. Schedule, pay for (as applicable) and attend all inspections required by the Authorities Having Jurisdiction.
 2. Deliver all certificates to the Owner prior to final acceptance of work.
- B. Notify UMB in advance of scheduled inspections.
- C. An electrical foreman, superintendent or other supervisor familiar with the project shall be in attendance for all scheduled electrical inspections.
- D. Electrical inspection shall be by the [third (3rd) Party Inspector approved by the Maryland State Fire Marshall] [UMB inspection department personnel]. <Coordinate with UMB and Edit for Project>
- E. Schedule the preliminary and rough-in inspections in a timely manner. Any work covered prior to any inspection in a manner which, in the inspector's opinion, precludes a complete inspection shall be uncovered at the installer's cost.

3.14 DEMOLITION:

- A. Remove and dispose of all existing materials not required for re-use or re-installation.
- B. Deliver on the premises, where directed, existing material and equipment which is to be salvaged and remain property of Owner.
- C. All other materials removed shall become the property of the Contractor and shall be removed from the premises.
- D. Remove conduit, hangers, supports, etc. to a point below the finished floors or behind finished walls and cap. Cut such items flush with masonry surfaces.
- E. Remove wiring and conduit back to source panelboard or switch, or to last remaining device on the circuit. Remove conduit, hangers, supports, etc. unless otherwise noted. Conduit may remain to be reused for new work provided it is of the specified size and type and in condition acceptable to UMB.
- F. Any conduit abandoned in concrete slabs, walls, or other inaccessible locations shall be left with a nylon pull wire. Ends shall be capped with push plugs for future use.

3.15 REPAIRS & RESTORATION OF SURFACES AND FINISHES:

- A. Restore all finishes, equipment and surfaces to original condition, where affected by the work. Provide the following, where applicable, in accordance with accepted trade standards and to Owner's satisfaction:
 - 1. Replace damaged ceiling tiles.
 - 2. Replace ceiling tiles where removal has left holes or cuts in original tiles.
 - 3. Patch, repair and repaint all walls and surfaces cut, penetrated or otherwise disturbed by the work.
 - 4. Patch holes and penetrations in wood, masonry and plaster.
 - 5. Provide suitable cover plates for all recessed back boxes of equipment removed and not covered by new devices.
 - 6. Provide larger trim or cover plates for new devices, where old back boxes, holes, etc. are not concealed by new work.

3.16 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in Section Temporary Facilities.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- C. Remove all electrical clippings, wiring, nuts, bolts, etc. left on top of ceilings and ceiling tiles.

3.17 PROJECT PUNCH OUT

- A. Architect/Engineer will perform punch out reviews and will provide the Contractor with a list of punch list items to be completed before contract close out. Each and every punch list item shall be initialed and dated by the Contractor when the work is complete. The Architect/ Engineer will not perform any punch list verification until all items have been completed, initialed, dated and the list returned to the Architect/Engineer. If any items have been initialed as being completed by the Contractor and the Architect/Engineer determines that the work is not complete, the Architect/Engineer shall be reimbursed by the Contractor at his regular hourly rate for any and all items requiring revisiting of the site by the Architect/Engineer. Reimbursement shall be made by deducting the Architect/Engineer fee from the Contractor's final payment.

END OF SECTION 260000