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1. GENERAL:

A. The "General Conditions of the Contract for Construction," AIA Document A201, latest edition, and these Specifications as applicable are part of this Contract.

B. All applicable codes, laws and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these Specifications, and their provisions shall be carried out by the Contractor who shall inform the Owner, prior to submitting a Proposal, of any work or material which violates any of the above laws and regulations. Any work done by the Contractor causing such violation shall be corrected by the Contractor.

C. Investigate each space through which equipment must be moved. Where necessary, equipment shall be shipped from manufacturer in sections of size suitable for moving through available restrictive spaces. Ascertain from building Owner and Tenant at what times of day equipment may be moved through all areas.

D. Drawings are diagrammatic and indicate general arrangement of systems and work. Conduit routing is shown diagrammatically and does not show all offsets, drops and tie-ins. The Contractor shall advise in the price for routing of conduit to avoid obstructions. Coordination with existing systems, including those of other trades, is required. Maintain headroom and space conditions.

E. Install work to be readily accessible for operation, maintenance and repair. Minor deviations from drawings may be made to accomplish this, but changes that involve extra cost shall not be made without approval.

F. Removal and relocation of certain existing work may be necessary for the performance of the general work. Not all existing conditions can be completely detailed on the drawings. The Contractor shall survey the site and include all changes and charges in making up the work Proposal.

G. Connections to existing work: install new work and connect to existing work with minimum interference to existing facilities. Temporary shutdowns of existing systems shall be performed at no additional charges, at times not to interfere with normal operation of existing facilities and only with written consent of Owner. Alarm and emergency systems shall not be interrupted. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work. Connect new work to existing work in a neat and acceptable manner. Restore existing disturbed work to original condition, including maintenance of wiring continuity as required.

H. Disconnect, remove and/or relocate existing material, equipment and other work as noted or required for proper installation of new work.

I. The Contractor shall keep all equipment and materials, and all parts of the building, exterior spaces and adjacent streets, sidewalks and premises, free from material and debris resulting from the execution of this work. Excess materials will not be permitted to accumulate either on the interior or on the exterior.

J. Seal openings through partitions, walls and floors with mineral wool or other noncombustible material. All penetrations through new and existing rated fire and smoke partitions and/or floors shall be completely sealed using materials and methods described in subsequent "FIRE STOPPING" Specifications Section.

K. Provide all necessary flashing and counterflashing to maintain the waterproofing integrity of the building as required by the installation or removal of conduit and equipment.

L. Provide 4-inch high equipment pads for all floor-mounted equipment.

M. All existing material, equipment and construction debris to be removed under this contract shall become the property of the Contractor with the exception of specific equipment and apparatus requested by the building representative, Architect or as noted to be relocated on the drawings. Removed equipment shall be properly disposed of by this Contractor.

N. The Contractor's Proposal for all work shall be predicated on the performance of the work during regular working hours. When so directed, however, the Contractor shall install work during overtime hours and the additional cost to be charged therefore shall be only the "premium" portion of the wages paid.

O. Unless otherwise specifically noted or specified, include all cutting and patching of existing floors, walls, partitions and other materials in the existing building. The Contractor shall restore these areas to original condition.

P. All material and equipment shall be new unless otherwise noted and shall be in accordance with building standards.

Q. Submission of a Proposal shall be construed as evidence that a careful examination of the portions of the existing building, streets, sidewalks and premises, free from material and debris resulting from the execution of this work. The Contractor is familiar with existing conditions and difficulties that will affect the execution of the work. The Contractor is responsible to indicate any discrepancies between the contract drawings and actual field conditions prior to submittal of bid. Submission of a Proposal will be construed as evidence that such an examination has been made. Later claims shall not be made for labor, equipment or materials required because of difficulties encountered which could have been foreseen during such an examination. The on-site inspection shall verify existing conduit (sizes, clearances, etc) and conditions.

R. Insurance: in accordance with building requirements and shall include a Hold Harmless clause for Owner and Engineer.

S. All work shall be done when and as directed by the Client and in a manner satisfactory to the Building Owner. Work shall be performed so as to cause the least possible inconvenience and disturbance to other building occupants.

T. The final acceptance shall be made after the Contractor has adjusted his equipment, tested the various systems, demonstrated that it fulfills the requirements of the drawings and specifications and has furnished all the required certificates of inspection and approval.

2. SCOPE OF WORK:

A. Scope of Work shall consist of providing labor, materials, equipment, services and fees necessary for complete and safe installation in conformity with the regulations of the State Electrical Code, Local Building Department, National Electrical Safety Code, the requirements of the Local Fire Department, Local Wiring Inspector, and all legally constituted codes/authorities having jurisdiction. Where the drawings and/or specification requirements exceed the requirements of applicable codes the requirements specified in the contract documents shall take precedence. Where the drawings and specifications are in conflict, the greater requirement shall take precedence.

B. All drawings, plans, details, specifications and specification addenda are made part of this Contract and shall apply to all work under the Contract unless otherwise amended, modified, supplemented or specified herein.

C. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred, for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or final date of actual use of equipment or occupancy of spaces by Owner, including under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

D. The Contractor shall give necessary notice, file drawings and specifications with all departments having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefor. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for the same. The Contractor shall pay all costs and points of contact to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

E. Materials and equipment shall be new and comply with the applicable standards of the following authorities, except where the contract documents prescribe more rigorous qualifications, the documents shall govern:

- Underwriters Laboratories, Inc. (UL)
- National Electrical Manufacturers Association (NEMA)
- International Association of Electrical Engineers (IAEE)
- American Society for Testing Materials (ASTM)
- American National Standards Institute (ANSI)
- National Fire Protection Association (NFPA)
- Insulated Power Cable Engineers Association (IPCEA)
- Occupational Safety and Health Administration (OSHA)
- American with Disabilities Act (ADA)
- National Electric Code (NEC)
- Facility Guidelines Institute (FGI)
- State of Maine Building Code
- International Building Code (IBC)

3. SHOP DRAWINGS

A. Prior to the installation of any work and procurement of equipment, Contractor shall provide complete sets of coordinated shop drawings of all new and existing equipment, indicating capacity, dimensions and sequence of operation for written approval by the Architect and Engineer.

B. Indicate on each shop drawings submitted:

- Project name and location
- Name of Architect and Engineer
- Item identification
- Approval stamp of prime contractor

C. Submittals:

- Submittals 11 in. x 17 in. or smaller. If the submittal is a catalog cut, then the Contractor shall submit one original and two copies. Otherwise, the shall submit three copies. The Architect will forward the original and one copy (two copies when no original is received) to the Engineer. All catalog cuts shall be complete.
- Submittals larger than 11 in. x 17 in.: Submit two prints and one paper copy to the Architect. The Architect will forward them to one print and the paper copy to the Engineer.

D. Submit shop drawings for the following:

- Switches
- Fuses
- Circuit breakers
- Raceways
- Wires and cable
- Wall switches, dimmers and occupancy sensors
- Receptacles
- Connectors and momentary contact switches
- Surface metal raceway
- Lighting fixtures and exit signs
- Fire alarm devices and wiring diagram
- Lighting control system
- Electrified furniture system
- Nurse call system
- Test Procedures and Reports.

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. Upon completion and acceptance of work, Contractor shall furnish written instructions and equipment manuals and demonstrate to the Owner the proper operation and maintenance of all equipment and apparatus furnished under the contract.

B. These instructions shall be typed on 8-1/2 in. x 11 in. paper and bound in three ring binders with clear acetate covers. Contractor shall give three copies of the instructions to the Owner and one copy to the Engineer.

C. The instruction booklet shall bear the name, address and telephone number of the project, Architect and Engineer.

D. Reconnectable "As-Built" drawings shall be provided indicating the as installed conditions of the work. "As-Built" drawings shall be provided to the Architect after completion of the installation. "As-Built" drawings shall be in AutoCAD format (Release 2002 or later).

E. Written instructions, equipment manuals, and "As-Built" drawings (in AutoCAD format) shall be given to the owner on a CD when requested.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. Specifications are of simplified form and include incomplete sentences. Words or phrases such as "the Contractor shall," "shall be," "furnish," "provide," "be," "to," and "will" have been omitted for brevity.

B. Definitions:

- "Provide": To supply, install and connect up complete and ready to use and regular operation the particular work referred to unless specifically otherwise noted.
- "Install": To erect, mount and connect complete with related accessories.
- "Furnish" or "Supply": To purchase, procure, acquire and deliver complete with related accessories.
- "Work": Labor, materials, equipment, apparatus, controls, accessories and other items required for proper installation of new work.
- "Wiring": Raceways, fittings, wire, boxes and related items.
- "Concealed": Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces, or in enclosures.
- "Exposed": Not installed underground or "concealed" as defined above.
- "Similar" or "Equal": Equal in material, weight, size, design and efficiency of specified product.

C. Temporary light and power: Provide temporary light and power system at earliest possible date within the construction areas for the requirements of all trades as herein described. Extend systems to new construction as soon as physically possible. Maintain system during working hours of all trades. Cost of energy will be paid for by Owner. Owner will require maintenance, including lamps and sockets.

D. Quality assurance:

- Quality and gauge of materials: New, best of their respective kinds, free from defects and listed by Underwriters Laboratories, Inc., or other nationally approved listing agency and bearing their label. Materials and equipment of similar application shall be of same manufacturer, except as noted.
- Current characteristics:
 - Distribution: 277480 volt and 120/208 volt, 3 phase, 4 wire, 60 hertz with grounded neutral.
 - Heights of outlets: Contractor shall be responsible for coordinating and confirming all mounting heights with Architect and Architectural drawings.
 - From finished floor to centerline of outlets for:
 - Receptacles and telephones: 18 1/8 in.
 - Wall switches: 48 0 in.
 - Wall fixtures: 78 0 in.
 - Motor controllers: 58 0 in.
 - Clocks: 78 1/8 in.
 - Strobe lights: 68 8 in. or 6 in. below
 - and speaker/hoops ceiling (whichever is lower)
 - Gongs and horns: 78 1/8 in.
 - Fire alarm pull stations: 48 0 in.
 - Exceptions: At junction of different wall finish materials, on mending or break or wall surface, in violation of code, or as noted or directed.
- Product delivery, storage and handling
 - Moving of equipment: Where necessary, ship in carted sections of size to permit passing through available spaces.
 - Accessibility: For operation, maintenance and repair. Minor deviations shall be permitted. Changes of magnitude or involving extra cost are not permissible without review. Group concealed electrical equipment housing enclosures with equipment being installed through access doors.

F. Materials

- Nameplates: Provide black laminated sheet with 3/4 in. white lettering, fastened with epoxy cement for each disconnect switch, circuit breaker, panel, cabinet, transformer, enclosure, motor controller and the like. Nameplates shall describe the name and number of each component.
- Cable tags: Tag each conductor passing through splice or pullbox with a white linen tag, indicating point of origin and termination of the circuit.
- Inserts and supports:
 - Inserts: Single, slotted type, factory painted.
 - Single - type similar to Conneff Fig. 281.
 - Multi-rod - similar to Fee and Mason Series 9000 with end caps and closure strips.
 - Cip form nuts flush with inserts.
 - Maximum loading 75 percent of rating.
 - Supports from building construction: Inserts, beam clamps, steel flatplates (in concrete fill only), cantilever brackets or other means. Submit for review.
 - Grouped lines and services: Trapeze hangers of coated angles or channel.
 - Where building construction is inadequate: Provide additional framing. Submit for review.

G. Paint shall be the best grade for its purpose. Deliver in original sealed containers and apply in accordance with manufacturer's instructions. Colors shall be as selected by Architect or Engineer. Utilize galvanized iron primer on panel and pull boxes, after fabrication. Utilize dip coated galvanized or dipped in zinc based primer for outlet boxes, junction boxes, conduit hangers, rods, nuts and supports. Zinc based primer with finish to match surroundings shall be used for uncoated surfaces of equipment and raceways. A field-applied zinc based prime coat shall be utilized for steel or ironwork.

H. Brush and clean work prior to concealing, painting and acceptance. Painted exposed work soiled or damaged; clean and repair to match adjoining work before final acceptance. Remove debris from inside and outside of material and equipment.

I. Final locations and mounting orientations of all switches, receptacles and light fixtures shall be verified with Architect.

J. Provide access doors when concealed electrical equipment requires access. All access door locations shall be reviewed by Architect prior to installation.

6. DEMOLITION

"Selective Demolition" is hereby defined to include but is not necessarily limited to the removal of the following existing materials, items and equipment:

- Refer to electrical demolition plan and related notes for extent of demolition.
- Refer to existing drawings and site conditions for all removal of work necessary for completion of new work as shown. Each bidder shall carefully examine the premises and documents during the bidding period and ascertain the extent of removal of existing work. If additional work is noted by the Contractor, call it to the attention of the Architect prior to submitting bid. By submitting a bid, the Contractor will have deemed to have made such examination, to accept such conditions, and to have made allowances in preparing his bid.
- Items of salvage shall be carefully removed without damage; nails and other fasteners removed that are not integral to their construction; and stored and protected at locations directed by the Owner. Identify and tag all salvage materials regarding location in existing building and relationship of parts.
- Demolished and/or removed materials not required by Owner shall become the property of the Contractor and shall be removed from the premises, and shall be properly disposed of in a legal manner, off-site.
- Care must be taken not to disturb existing wiring, which is not effected by demolition. Restore all circuits and equipment disrupted or disturbed by the removal of only parts of existing systems. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work. Alarm and emergency systems shall not be interrupted.
- Plan installation of new work and connections to existing work to insure minimum interference with regular operation of existing facilities. Temporary shutdowns when required are to be made only with written consent of Owner at times not to interfere with normal operation and no additional charge.
- Connect new work to existing in a neat and approved manner. Restore existing work disturbed while installing new work to acceptable condition as determined by building Owner.
- All raceways to be abandoned shall be removed as defined by the demolition notes. Where it is impractical to remove raceway back to source, disconnect wiring to load (equipment) and all side, out, and cup, flush to surface. Remove conductors from existing raceways to be removed. Clean raceways as required prior to reusing.
- Exposed raceways shall be run parallel to or at right angles to raceway. Provide clearance with wire, steam or other piping (minimum 3 in. separation from steam and hot water pipes, except 1 in. from pipe cover at crossings and 18 in. for hung ceiling outlets, run in hung ceiling and connect to lighting support channels. In masonry and poured concrete, run vertically only.

7. CUTTING AND PATCHING

A. The Contractor shall be responsible for all cutting and patching of the existing and new construction work, which may be required for the proper installation of the electrical work. All patching shall be of the same materials, workmanship, and finish, and shall accurately match all surrounding work.

B. Core boring of concrete floors and/or walls if required, shall be provided by the Electrical Contractor.

8. COORDINATION

A. The Contractor shall verify locations of all equipment with architectural drawings. In ventilating outlets and louvers and outlets, allow for overhead pipes, ducts, and mechanical equipment, variations in fire rating and plastering, window and door trim, paneling, hung ceilings, and the like, and correct any inaccuracy resulting from failure to do so without exception to the Owner.

9. EQUIPMENT FURNISHED BY OTHERS

A. The Contractor shall furnish and install wiring for equipment furnished by others, as shown on drawings. Coordinate with other trades or details for installation. The term "wiring" used herein includes, but is not limited to, limiting and installing conduit, wire, junction boxes, disconnects and making connections. Contractor shall check architectural, mechanical, and plumbing, drawing and specifications for equipment to be installed by others. Contractor shall be responsible for proper wiring and necessary electrical adjustments to equipment to conform to specified requirements of the equipment.

10. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

A. Provide complete equipment including: Switches, fuses, circuit breakers, panels and transformers, etc.

B. All equipment shall conform to NEMA, ANSI and IEEE standards.

C. Disconnect switches shall be fused or nonfused as noted. Voltage shall be as required. Switches shall be heavy duty, except as noted, and horsepower rated for motor loads.

D. Disconnect switches shall be fused or nonfused as noted. Voltage shall be as required. Switches shall be heavy duty, except as noted, and horsepower rated for motor loads.

- Toggle type switches shall be nonfused, load break, utilized with a maximum ratings of 20 amp at 600 volts and 30 amp at 240 volts. Two-pole switches shall be similar to Leviton NS 302. Three-pole switches shall be similar to Leviton MS 303.
- Knife-blade type switches shall be load break, quick-make-quick-break with arc quenchers, UL Class R up to 600 amp. Switches shall be similar to General Electric OMR. All switch enclosures shall be dead front, NEMA Type 1, except as noted.

D. Fuses:

- Circuits to 600 amperes shall be protected by fuses similar to current limiting BUSSMAN LOW-PEAK Dual-Element Time-Delay LPA-RK, SP UL class RK1 or class J in restricted space only, and be listed by UL with an interrupting rating of 200,000 amperes RMS symmetrical.
- Motor Circuits - All individual motor circuits with full load amperage ratings (FLA) of 480 amperes or less shall be protected by fuses similar to current limiting BUSSMAN LOW-PEAK Dual-Element Time-Delay LPA-RK, SP 250 (UL Class RK1 or Class J in restricted space only, and be listed by UL with an interrupting rating of 200,000 amperes RMS symmetrical.
- All fuses shall be provided by same manufacturer.
- Provide 1 spare matching fuse for each set of 3 and a minimum of 3 spare per size and type.

E. Circuit breakers: Molded case breakers shall be thermal-magnetic, quick-make-quick-break, hot-top type, manually operated with insulated trip-free handle. Multi-pole type breakers shall contain internal trip bar. Terminals shall be suitable for copper or aluminum cable. Provide interrupting trip for 225A frame and above. Furnish auxiliary devices where required for shunt tripping, open and close motor operator and alarm indication. Enclosures shall be dead front, NEMA Type 1, except as noted. Frame ARC Fuly-rated, series rating not permitted; rating shall meet or exceed full amp and equipment at the point of installation.

F. Test: Open and close load break switching devices under load.

11. RACEWAYS:

A. Provide raceways complete with boxes, fittings and accessories. Conduit or tubing sizes referred to in specifications and on drawings are nominal diameters. Minimum diameter shall be 3/4 in. Raceways shall run concealed, except as noted.

B. Materials

- Raceways:
 - Rigid steel: Full-weight pipe, galvanized, threaded, conforming to UL Standard No. 6 as manufactured by Republic Steel, Allied Tube or equal.
 - Electrical Metallic Tubing (EMT): thin wall pipe, galvanized, threadless, conforming to UL Standard 787 as manufactured by Republic Steel, Allied Tube or equal.
 - Flexible Metal Conduit: Flexible metal conduit shall be single strip, continuous, flexible, interlocked double wrapped steel, galvanized inside and outside, forming smooth wiring channel. Flexible metal conduit shall be as manufactured by Pyre-National, American Flexible Conduit or equal.
 - Liquidtight Flexible Metal Conduit: shall be similar to flexible metal conduit, but with extruded moisture and air-proof/inflatable resistant outer jacket of polyvinyl chloride plastic, with a flexible metal core and be as manufactured by Liquitite, Ansoledo or equal.
- Wireways: Wireways shall be of the totally enclosed type constructed of cold galvanized steel, minimum No. 16 gauge, with ground continuity and hinged cover. Provide all fittings, ties, elbows, wire retainers, closure plates, hangers and component parts for a complete installation. Wireways shall be manufactured by Hoffman or equal.
- Cable tray shall be of the aluminum ladder type. Cable tray shall be a complete continuous system with all fittings supports and accessories. Cable tray shall be as manufactured by Thomas & Betts, B-Line Systems or equal.
- Surface Metal Raceway: Size as noted. Base 0.04 inch, cover 0.25 inch. Material shall be steel. Finish shall be baked enamel. Covers shall be screw-on.

- Fittings and accessories:
- Rigid steel: Rigid steel and intermediate metal conduit fittings, couplings, bushings, locknuts and connectors shall be threaded and galvanized or cadmium plated and shall be as manufactured by OZ Gedney, Thomas & Betts or equal. Zinc or cad. not used for steel.
- Electrical Metallic Tubing (EMT): shall be galvanized steel compression type with insulated thread and shall be as manufactured by OZ Gedney, Thomas & Betts or equal. Galvanized rigid steel elbows, 2 in. or larger.
- Flexible metal conduit: shall be steel or malleable iron zinc plated with center stop & wedge type with insulated thread as manufactured by OZ Gedney, Thomas & Betts or equal.
- Bushings: Metallic insulated type.
- Liquidtight Flexible Metal Conduit: shall be malleable iron zinc plated suitable for grounding with sealing ring and insulated thread as manufactured by OZ Gedney, Thomas & Betts or equal.
- Surface metal, raceway, fittings, couplings, supports and boxes shall be manufactured by Wernick.

A. An equipment grounding conductor commonly described as a "green wire" shall be provided for all branch circuits protected by overcurrent devices except for lighting branch circuits. Green wire ground branch circuits will be provided for flexible conduit and motor circuits. Metallic raceway continuity shall be maintained with a bare No. 6 wire. Where isolated grounding branch circuits are used, provide a separate and distinctly marked green ground wire. Each grounding conductor shall serve a maximum of three circuit/loops.

B. Service and equipment:

- For separately derived services or service switches, ground the neutral conductor through disconnecting link and ground terminal to water service ground clamp and building steel or driven ground rods in exterior installations.
- Ground the center tap of Y-connected transformers through secondary neutral and ground bus to water service ground clamp or building steel.
- Ground clamps shall be bronze, solderless type with bronze screws, suitable for receiving nested conductors. Mount ground clamp on water service at street side of main service valve. Provide jumper to bypass water meter.
- Run insulated ground conductors in rigid steel conduit or EMT with conductor connected to conduit, through ground fitting at each end.
- Ground noncurrent carrying metal parts of distribution panels, switchboards, transformer enclosures, raceways, busway enclosures, controller enclosures, motor frames and other electrical equipment.

E. Miscellaneous:

- Ground the following:
 - Telephone system.
 - Fire alarm system.
 - Emergency distribution system.

14. POWER WIRING

Provide all power wiring to all motors and motor connections furnished under all contracts on the project. Include extensions from controllers to motors and motor connections. Mount and wire all motor and power devices furnished under all contracts.

15. CONTROL WIRING

Provide all control wiring for motors and equipment furnished under all contracts and as specifically shown on the drawings, except as noted for mechanical/plumbing equipment. Include mounting and wiring of all control devices furnished with equipment.

Control wiring less than 120 volts for motors, alarm equipment furnished under all contracts and mechanical/plumbing will be provided under mechanical/plumbing specifications.

16. DEVICES:

A. Provide complete material and accessories as noted by Leviton, Hubbell, or equal.

B. Local wall switches shall be specification grade, totally enclosed, toggle, quiet type, rated 20 amp, 120/277 volt, AC. All switches shall be ganged with multi device plates, in areas where dimmers are specified with wall switches. All switches shall match dimmer series and shall be ganged together. Switches shall have screw terminals and shall be of the white phenolic compound finish, unless otherwise directed by the Architect (coordinate with Architect prior to bid). Toggle switches shall be manufactured as follows:

HUBBELL

- 20A 120/277V Single Pole, Hubbell No. HBL 12211
- 20A 120/277V Double Pole, Hubbell No. HBL 12221
- 20A 120/277V Three Way, Hubbell No. HBL 12231
- 20A 120/277V Four Way, Hubbell No. HBL 12241
- DIMMER SWITCHES: LUTRON DIVA/MASTRO SERIES

C. Receptacles shall be minimum horsepower type duplex enclosure 125 volts, 2 pole, 3 wire. Ground slot. Grounded, except as noted. Meeting NEMA standards, publication WD-6. Receptacle finish shall be of the white phenolic compound type unless otherwise directed by the Architect (coordinate with Architect prior to bid). Receptacles shall be recognized as follows:

PASS BY YOUR LOCAL ELECTRICAL SUPPLIER

- 20A 120V Standard Duplex Normal Power, Pass & Seymour No. 8300
- 20A 120V Standard Duplex Critical Power, Pass & Seymour No. TR800PRED

D. Device plates: Coordinate with Architect for type. For receptacles other than 120 volt, inscribed voltage available.

- Reinforced thermoplastic by same manufacturer of device.
- All emergency receptacles shall be hospital grade & red in color.
- All device plates shall be an approved local (Dymo or equal) with its panelboard of origin and label attached to the device plate and make receptacle box.

E. Colors: Coordinate colors with Architect.

F. Mounting orientation of receptacles (horizontal or vertical): Coordinate with Architect.

17. LIGHTING FIXTURES:

A. Provide Lighting Fixtures, lamps and components as per lighting fixture schedule. Fixtures shall be completely factory assembled, wired and equipped with approved sockets, ballasts, supporting hardware, plaster rings, backboxes, conduit, etc. as required for a complete and satisfactory assembly. Listed catalog numbers do not necessarily denote required mounting equipment or accessories.

B. Fixtures shall be completely wired and constructed to comply with all Local Codes and Underwriters Laboratories Standards for electrical lighting fixtures and the State and Local Energy Codes.

C. All fixtures shall be independently mounted from black iron or building structure by a minimum of (2) independent mounting chains as required and not from ceiling grid. Electrical contractor shall be responsible for coordination of ceiling construction type with lighting fixtures. Fixtures shall be provided for operation with proper voltage characteristics. Refer to plans for information.

D. Refer to Architectural plans for exact locations and quantities of lighting fixtures.

E. Fluorescent lighting fixtures shall comply with IES standards RP-1 and RP-24 and NEMA Standard Publication LE-1. Industrial fixtures shall comply with RLM standards Institute and shall bear the RLM label.

F. Furnish all fluorescent, incandescent, HID and tungsten halogen lamps as indicated on lighting fixture schedule and as required for each fixture. All fluorescent lamps shall be T8, SPX55 RS, 16in. CR 800 or unless otherwise noted. All HID lamps shall be color corrected. Lamps shall be color by Philips, General Electric, Osram/Sylvania.

G. Ballasts shall be RTC Gold Label, indicating approved integral ballast protection. High ballast factor (90% or greater), Type "E" (ballast efficiency factor) with internally protected capacitors shall be utilized. Fluorescent ballast shall be quiet operating ETL and CIB certified electronic ballasts with THD<10% as manufactured by Universal, Advance, EBT or Valmont with a min. 3 year warranty against any defects in workmanship and/or material and shall include payment of all labor charges for replacement of any ballast. Ballasts for each fixture within a fixture type shall be identical. Where differences are shown on plans, fixtures shall be provided with compatible dimming ballast equal to Lutron "W" dimming ballast or central dimming system.

H. Emergency battery shall be capable of operating (2) lamps for 20 lamp, battery shall be Bondine #850 for compact fluorescent lamps - 4 pin battery shall be Bondine #894C.

I. Refer to architectural documents for Lighting Fixture Specifications.

J. Continuous row fixtures shall have lamps staggered.

18. TELEPHONE/DATA CONDUIT SYSTEM:

A. Provide complete system of: empty conduit, pull boxes, outlets, shelves and fish wires.

B. Equipment and installation shall conform to requirements of Telephone Company and telecommunication specifications.

1) Outlets shall be:

- Wall: 4 in. square with reducer ring. Cover plate provided integral with outlet device. Blank off where no device is installed.
- Floor: In-floor cast iron with low-tension fitting or as specified for poke thru floor assemblies.

C. Provide fishwires, in raceways over 10 ft long and at all drops to outlets.

D. Provide riser pull boxes at a minimum of 50 feet intervals.

E. Conduit shall be 3/4 in. minimum. Furnish empty conduit from outlet to nearest accessible hung ceiling or as noted. Terminate open end with insulated bushing.

19. FIRE ALARM SYSTEM

A. The building is served by a base building fire alarm system. (Hereinafter) The system will remain and be expanded to accommodate the renovations to the building. During the construction phase the existing system shall be protected from damage.

B. Work included:

- Work under this section includes the installation of components to form a complete and operative fire alarm system, including removal of the existing fire alarm system devices that are not to be retained.
- Work shall include, but not be limited to, the following:
 - Installation of new Fire Alarm System components and associated equipment.
 - Disconnection, removal and disposal of existing fire alarm equipment and wiring.
 - Testing.
- Furnish and install Fire Alarm System components to work in conjunction with the existing base building fire alarm system as described herein and as shown on the plans to be wired, connected, and left in test-clear operating condition. The system shall include manual stations (fire alarm bases), automatic fire detectors, audio-visual devices, strobes, beacon, door holders, electric door strikes, all wiring, conduit, connectors to devices, connections to sprinkler flow and tamper switches, zone modules, SNAc panels, outlet boxes, junction boxes and all other necessary materials for a complete operating system. The new fire alarm system components will be as manufactured by the base building system manufacturer.
- The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials and performance of all operations in connection with the installation of the Fire Alarm System as shown on the drawings and as herein specified.

20. ELECTRICAL TESTING

A. Provide all necessary meters, instruments, temporary wiring and labor to test and adjust all equipment and wiring installed and/or connected under this contract, including electrical equipment furnished by others, to determine proper polarity, phasing, freedom from grounds and shorts and operation of equipment. All measuring instruments must be properly calibrated.

B. Wherever the authorities having jurisdiction require that any work be tested or approved, Contractor shall provide proper facilities for access for inspection.

C. Check all lighting fixtures and receptacles for proper operation.

D. Motors:

- Make the following tests on the motors before starting up:
 - Check the motor temperature for horsepower; phase and voltage.
- Make the following tests on all motors during or immediately after start up:
 - Check shaft rotation; Check bearing temperature; Check motor for smooth operation.
 - Take a current reading of full load using a clamp on ammeter. If ammeter reading is over the rated full load, current, determine the reason for the discrepancy, and take the necessary corrective action.
 - Following established procedures equipment shall be energized after certification by the Contractor that the installer's satisfactory. All motors and equipment shall be tested for proper operation.

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DRIFT - PROGRESS PRINT
NOT FOR CONSTRUCTION

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