GENERAL ELECTRICAL REQUIREMENTS

GENERAL INFORMATION

1.1 These Design/Construction Standards are prepared to assist Design Professionals in understanding the minimum standard requirements for all Columbia University Projects and to assist the design team in selecting systems and equipment that have performed well for the University in recent past projects.

Nothing in these design guidelines shall relieve the Design Professional from their contractual requirements.

1.2 Any proposed deviation from these design Requirements shall be made in writing to the Project Manager.

1.3 Refer to list of Preferred Manufacturers.

1.4 See Utilities Section 33 00 00 for Metering Requirements and section 23 08 00 for Commissioning Requirements.

DESIGN REQUIREMENTS

1.5 Design facilities to minimize annual operating costs and future repair and replacement costs.

1.6 Electrical rooms must be large enough to house the equipment and provide adequately sized access pathways for the repair, maintenance and eventual replacement of the equipment.

1.7 Sustainable design, efficient operation and ease of maintenance are key elements of the Engineering Design.

1.8 Routing of utilities shall be done with future growth and renovations in mind. Coordinate with all trades to ensure unimpeded access to items requiring maintenance.

1.9 Design systems and components with maximum reliability, flexibility and minimum operation and maintenance costs. Give full consideration for future system alterations with a minimum of system shutdowns. Preventative maintenance should be accomplished without a major building shutdown. Maintenance accessibility is of extreme importance. Group items requiring maintenance around platforms for ease of maintenance. Lifts or removable ladders shall not be relied upon for access unless approved in writing by CU Facilities.

1.10 Mount equipment (eg. Switchgear, Motor Control Centers and transformers) on a concrete housekeeping pad secured to the structural slab. Housekeeping pads shall be sized larger than the equipment and shall extend at least ten times the diameter of the mounting bolts past the equipment. Coordinate with Structural Engineer for final design.

1.11 Include in the Engineering Specifications a statement that all components of the electrical systems are to be kept clean and dry as well as undamaged as manufactured, delivered, stored

and installed before operating. The contractor is responsible for inspecting all equipment upon delivery for damage. Additionally, equipment shall be cleaned prior to start-up.

1.12 Electrical Design shall incorporate the best available energy saving devices and strategies. Electrical Engineer shall work with the University to provide the best energy savings to meet Utility and Carbon Footprint reductions for new work.

1.13 An electrical coordination study is required for all projects. Provide a complete system analysis showing device coordination curves and charts showing that all equipment (e.g. primary fuses, secondary main breakers and secondary feeder breakers) are selectively coordinated. Set all circuit breakers in accordance with this study. Submit the protection study report along with complete current characteristic curves for each overcurrent protective device as part of the turnover process.

1.14 Connection To Existing Panels

a. Panels shall be FIELD VERIFIED back to their source substation or breaker. All feeds to panels shall be clearly identified on drawings including location and floor (if applicable).

b. Existing panels shall be amp metered and logged for a period of no less than 7 days to ensure power consumption is accurately understood.

c. Existing and new panels shall maintain no less than 20% spare capacity. If tying into an existing panel will reduce its spare capacity to less than 20%, a different source of power must be provided.

d. Engineer shall ensure that loads are balanced on all phases in a panel.

1.15 Coordination

a. Coordinate the electrical work with other disciplines to ensure proper footprint and clearances are accommodated in the floor plan layout.

b. Equipment located in ceilings shall be accessible for all maintenance activities required. This includes changing filters and motor / belt adjustments. Equipment located above ceilings shall be placed in hallways or corridors, NOT in offices, classrooms or lab spaces.

c. Coordinate with the Mechanical Engineer for equipment motors, motor starters, disconnect switches, thermal overload switches and mechanical controls for all mechanical equipment including AHUs, exhaust fans and pumps.

1.16 Record Drawings

a. Record drawings are available for most buildings on campus and provided upon request as a courtesy. The Consultant shall field verify all drawings provided by the University.

CONSTRUCTION REQUIREMENTS

1.17 Temporary Power - Temporary light and power may not impede the normal operation of the existing building. Separate temporary electric service shall be provided for all cases where existing service is insufficient or where existing service does not exists. In such cases, the Contractor is required to apply to the utility Company to obtain temporary electric service and to determine the service size required by the project.

1.18 Removals and Relocations

a. Conduits, outlets, circuit work, feeders, etc., laid bare by the removal of floors, ceilings, walls, and partitions, and which are required to remain active, shall be rearranged, rerouted and reinstalled.

b. All removed devices, plates, wire, outlet boxes shall not be reused.

c. All wire and cable to be demolished in any impacted location shall be removed back to the source.

1.19 Coordinate all shutdowns with the Project Manager. Minimize disruption to ongoing operations.

1.20 Protect all mechanical and electrical equipment from construction dust.

1.21 Operations And Maintenance Manuals/Turnover Documents

a. Four (4) hardcopy sets of CU Facilities approved job specific operating and maintenance (O&M) manuals shall be provided for each project. These manuals shall be collected in indexed three ring binders and contain manufacturer's operating and maintenance literature for every equipment item furnished for the project. Typical wiring or piping schematics are NOT acceptable; they must reflect the actual furnished equipment, including all options and interfaces with other equipment or systems.

b. A single copy of each job specific O&M manual shall be submitted immediately after all shop drawings have been approved. This copy will be reviewed by the A/E and University personnel, then sent back to the contractor for corrections. All corrected copies must be received by the University two weeks prior to any scheduled training.