## SECTION 16050 - PROVISIONAL

## ELECTRICAL GENERAL REQUIREMENTS

***Provisional Specification Summary:***
*1.2.04 - Replace this section with new section as shown below.*
*1.3.01- 1.3.05 - Add subsections as shown below.*
*1.4.07 - Add section as shown below.*
*1.5.02 - 1.5.05 - Add subsections as shown below.*
*1.7 thru 1.38 – Add sections and subsections as shown below.*

1.2.04 Drawings. The electrical drawings indicate the general design and extent of the electrical systems. Follow the Drawings as closely as actual construction and the work of other trades will permit.

Examine architectural, mechanical, and other trades' drawings and specifications. Notify the Contracting Officer should any discrepancies occur between them and the electrical work.

Drawings are not intended to be scaled for roughing-in or to serve as shop drawings. Take all field measurements required for fitting the installation to the building.

1.3.01 Changes Required. Notify the Contracting Officer before submitting the proposal should any changes in Drawings or Specifications be required to conform to the above codes, rules or regulations. After entering into Contract, make all changes required to conform to above ordinances, rules and regulations without additional expense to the Owner.

1.3.02 Standards Of Materials And Workmanship. All materials shall be new. The electrical and physical properties of all materials, and the design, performance characteristics, methods of construction and testing of all items of equipment, shall be in accordance with the latest issue of the various, applicable standard specifications in Paragraph 1.3 and NETA: International Electrical Testing Association

1.3.03 All equipment of the same or similar systems shall be by the same manufacturer.

1.3.04 Resolution of Conflicts. In case of conflicts between codes, reference specifications or drawings, the code, reference specifications or drawings with more stringent requirement shall be used. To use a lesser code or reference, a written permission by the Contracting Officer must be obtained.

1.3.05 Standards. When reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.4.07 Nameplates And Directories. Panel directories shall be neatly typed, showing equipment served and location for each breaker or switch with a clear plastic protective cover.

All duplex receptacles shall be identified with the associated panelboard and circuit number.

1.5.02 Shop Drawings. Prepare layout shop drawings drawn to scale showing building floor plans and all details of electrical construction, routing of conduits, wiring, grounding, circuiting and related information necessary for the installation and future maintenance of the electrical wiring systems. Shop drawings shall include conduit and wiring schedule showing the number of wires, size of wires, size of conduit, and conduit tag number.

No apparatus or equipment shall be shipped from stock or fabricated until associated shop drawings have been reviewed by the Contracting Officer. By the review of shop drawings, the Contracting Officer does not assume responsibility for actual dimensions or for the fit of completed work in position, nor does such review relieve Electrical Contractor of full responsibility for the proper and correct execution of the work required.

Submit shop drawings with all pertinent data and with identification mark number for all equipment, devices and components specified in the specifications or scheduled on the Drawings. Include Cable and Conduit Schedules/Charts as shop drawings for Contracting Officer’s review. The cable and conduit numbering system shall be in accordance with Owner’s Standards. The cable and conduit numbering system: If owners do not have any standard, then Industry standard with DWSD Engineers approval should be used. All conduits shall be tagged on stainless steel plate and connected with stainless steel wire. Letters shall be minimum 3/16" high.

Shop drawings shall be reviewed by the Electrical Contractor for completeness and accuracy prior to submitting to the Owner/Contracting Officer for review. The shop drawings shall be dated and signed by the Electrical Contractor prior to submission.

Where the shop drawings consist of manufacturer's standard detail drawings or schedules and contain data for a variety of similar equipment, cross out the not applicable information and indicate the data pertinent to the equipment furnished for this project only. Standard detail drawings and schedules not clearly indicating which data is associated with this Project shall be returned "Rejected - Resubmit".

Where accessories and/or options are specified and do not appear as part of manufacturer's standard detail drawings, state each accessory that is to be provided with the equipment on the standard detail drawings.

Partial submittals of shop drawings for equipment will not be permitted. Where partial

submittals are transmitted to the Contracting Officer, they will be returned "Rejected - Resubmit".

Lighting Fixtures shop drawings shall be submitted as one (1) package including all fixtures intended to be used for this project.

Furnish and deliver to the Owner's Representative manuals of all shop drawings when work is completed. See Specification Section 01080 for number of sets and manuals

Submit manufacturer's shop drawings on all electrical systems and/or equipment to be furnished and installed, including:

1.5.02.01 Cables, Medium and Low Voltage

1.5.02.02 Disconnect Switches

1.5.02.03 Grounding Equipment

1.5.02.04 Lighting Fixtures

1.5.02.05 Metalclad Switchgear, Medium and Low Voltage

1.5.02.06 Motor Control Centers, Medium and Low Voltage

1.5.02.07 Panelboards

1.5.02.08 Surge Suppressors (TVSS)

1.5.02.09 Telephone System

1.5.02.10 Transformers

1.5.02.11 Uninterruptible Power Supply System (UPS)

1.5.02.12 Wiring Devices

1.5.02.14 DC System Batteries and Components

1.5.03 ELECTRICAL CONDUIT AND WIRING SCHEDULE DRAWINGS. Prepare electrical drawings that include conduit and wiring schedules showing the number of wires, sizes of wires, sizes of conduits and conduit tag numbers for approval.

1.5.04 Final Issue Drawings. Revise layout shop drawings as required after construction to indicate the as-built condition.

At the completion of the Project, resubmit to the Owner's Representative the revised Mylars, Electronic Copies (diskettes) and one set of prints for Owner's record.

Submit final project record documents as described in Division 1 Specification 01150.

1.5.05 Approval of shop drawings by Contracting Officer/Owner shall not relieve the Contractor or Supplier of his responsibility for furnishing material and equipment in conformance with the specifications, nor will it invalidate any claim made by the Contracting Officer/Owner because of defective or unsatisfactory material and workmanship.

1.7 RELATED DOCUMENTS. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.8 WORK SPECIFIED IN 16000 SERIES SECTIONS. Furnish all labor, materials, equipment, technical supervision, and incidental services required to complete, test and leave ready for operation the electrical systems as specified in the 16000 Series Sections, as indicated on Electrical and Instrumentation & Control (I&C) Drawings.

1.8.01 Place equipment and accessories into proper adjustment and operating condition so that the component parts function together as workable systems.

1.9 EXAMINATION OF DRAWINGS AND PREMISES. Before submitting Proposals, examine other Trades' drawings and specifications. No extra charges will be allowed because of failure to make this examination or to include all materials and labor required to complete the work.

1.9.01 Before submitting Proposals, examine the premises to determine the existing conditions for performing the work. No extra charges will be allowed because of failure to make this examination or to include all materials and labor required to complete the work.

1.10 FEES. Obtain all permits, licenses, inspections and test reports required. Upon completion of the work, obtain and send certificates of inspection and approval to the Contracting Officer.

1.10.01 Pay all fees and expenses for permits, licenses, tests, and inspections.

1.11 HAZARDOUS AREA. Equipment, materials and installation in areas designated as hazardous on the Drawings shall comply with NEC Articles 500, 501, 502 and 503.

1.11.01 Equipment and materials installed in hazardous areas shall be UL listed for the appropriate hazardous area classification.

1.12 COORDINATION WITH OTHER TRADES. Install work so as to avoid interference with the work of other Trades. Remove and relocate any work, which in the opinion of the Owner/Contracting Officer causes interference.

1.13 CHANGES INVOLVING ELECTRICAL WORK. The design of the electrical system is based on the process, mechanical and building equipment specified and scheduled in the Project Specification and on the Project Drawings of other disciplines.

1.13.01 Where equipment changes are made that involve additional electrical work (larger size motors, additional wiring of equipment, etc.), the Mechanical or respective Contractor involved shall pay the Electrical Contractor for the cost of the additional work required.

1.14 MATERIALS LIST. Submit a complete list of all materials and equipment, and their manufacturers, for approval by the Contracting Officer within 15 days after award of contract and prior to submittal of shop drawings.

1.15 DAMAGE TO OTHER WORK. The Contractor will be held responsible for all damage to the work caused by his work or through the neglect of his workmen. All patching and repairing of any such damaged work shall be done by the Contractor who installed the work as directed by the Contracting Officer, but the cost shall be paid for by this Contractor.

1.16 PAINTING. In general, no painting is required by Electrical Contractor other than touch up of factory-finished electrical equipment.

1.16.01 All factory finished electrical equipment shall be cleaned at completion of the job. Equipment showing rust or marks shall be thoroughly cleaned and sanded, prime coated and touched up with enamel of color to match original finish.

1.17 CONSTRUCTION DIFFICULTIES. Should construction conditions prevent the installation of conduit, junction boxes, conductors, and/or other related equipment at locations if shown on the Drawings, minor deviations may be permitted with the prior approval of the Contracting Officer and shall be as directed by the Contracting Officer, and shall be made without additional cost to Owner.

1.18 SLEEVES. Provide conduit sleeves where conduits pass through concrete floors, pads, per NEC requirements.

1.18.01 Sleeves shall be galvanized rigid steel conduits. Do not use aluminum conduit.

1.18.02 Where specific sizes are not indicated on the Drawings, sleeves shall be sized to provide one-half (½) inch clearance around the outside surface of the item for which they were installed. They shall be cut flush with wall surfaces, and shall extend one

inch, or as directed through floor. Sleeves shall be packed with approved non-combustible packing material and sealed to prevent passage of air, liquid or fumes from one area to another. The filler materials used shall be rated at least equal in fire resistance to the construction material being penetrated.

1.19 SEALING OF OPENINGS. Seal openings around electrical materials (conduits, raceways, cable trays, panels, etc.) where floors, explosion-proof areas, fire rated walls and smoke barriers are penetrated. (Fiberglass is not acceptable.) Fire and/or smoke barriers shall be UL Listed fire and smoke stop fittings and shall have fire rating equal to or greater than the penetrated barrier.

1.20 EXCAVATING AND BACKFILLING. Furnish excavating and back filling to install work specified in the Electrical Division. Refer to electrical drawings and/or Division 2 Series Sections for methods and materials.

1.21 EQUIPMENT FOUNDATIONS AND SUPPORTS. Furnish foundations and supports for electrical equipment and materials as required by codes, as listed hereinafter and shown or noted on the Drawings.

1.21.01 Provide necessary inserts, rods, structural steel frames, brackets, platforms, etc., for equipment suspended from ceilings or walls, such as conduits, transformers, panels, etc.

1.21.02 Inserts for equipment support shall be lead shield anchors for small work and expansion shields for large work. Wooden plugs will not be allowed. Do not use metal roof decking and cellular floors for supporting equipment.

1.21.03 Provide and install concrete bases 6" thick above finished floor, with leveling channels. Where noted, for floor-mounted equipment such as unit substations, transformers, switchboards, distribution panels, motor control centers, etc. Provide 45° chamfer at the top of the pads.

1.22 CONCRETE. Provide concrete work required for the electrical installation. Concrete work shall include envelopes for underground service conduits, ducts, and housekeeping pads beneath equipment. Concrete work shall be in conformance with the Division 3 Series Sections or as indicated.

1.23 EQUIPMENT CONNECTIONS. Connections to equipment, motors, etc., shall be made in accordance with the shop drawings and rough-in measurements provided by the manufacturers of the particular equipment furnished. Any and all additional connections not shown on the Drawings but called for by the equipment manufacturer's shop drawings or required for the successful operation of the particular equipment furnished shall be installed as part of this Contract at no additional charge to the Owner.

1.24 ASSEMBLY OF EQUIPMENT. The Project Drawings and Specifications indicate

items to be purchased and installed, which are noted by a manufacturer's name, catalog number and/or brief description.

1.24.01 The catalog number may not designate all the necessary parts and appurtenances required for the particular use or function.

1.24.02 Arrange with the manufacturer for the purchase of all items required for the complete installation and efficient operation.

1.25 USE OF EQUIPMENT. The use of any equipment, or any part thereof for purposes other than testing even with the Owner's consent, shall not be construed to be an acceptance of the work on the part of the Owner, nor be construed to obligate the Owner in any way to accept improper work or defective materials.

1.25.01 Do not use Owners lamps for temporary lighting except as allowed and directed by Owner. Equip lighting fixtures with new lamps when the project is turned over to the Owner.

1.26 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS. The Contractor shall be responsible for the care and protection of electrical equipment until it has been fully tested and accepted.

1.26.01 Provide proper covering to protect materials with permanent factory finish from damage.

1.26.02 Protect conduit openings with temporary plugs or caps.

1.26.03 Provide adequate security and storage space for all electrical equipment, conduit and materials delivered to the job site under a weather protected enclosure. Location of the space will be designated by the Contracting Officer's Field Representative. Equipment set in place in unprotected areas must be provided with temporary protection.

1.27 ACCESS DOORS. Furnish access doors for installation where required by code. Doors shall be a minimum of 12" by 12". Plaster or acoustical inserts shall be provided by the appropriate Trade Contractor.

1.27.01 Door provided for fire resistant walls or a ceiling, shall be the Underwriters’

1.27.02 Laboratories label with item design rating to match that of wall or ceiling assembly.

1.28 EXPANSIONS. Provide expansion fittings in all conduits, cable trays, and feeder bus duct runs that cross building expansion joints, both in concrete slabs and where exposed.

1.29 TEMPORARY SERVICES. Provide temporary electric and telephone services as described in Division 1 Series Sections.

1.30 TESTING AND ACCEPTANCES. When the systems are completed, operate equipment as directed by Contracting Officer. Replace all faulty equipment. Make necessary adjustments before final acceptance.

Tests shall include but not be limited to electrical equipment, control cabinets, lighting fixtures, receptacles, branch circuits, etc.

Provide a letter to the Contracting Officer stating that all equipment has been tested and adjusted properly with test report.

Perform all tests required by State, City, County and/or other agencies having jurisdiction.

Provide all materials, equipment, etc., and labor required for tests.

1.31 PHASING. Identify general power and lighting feeder and branch circuits with a visual color code as an integral part of the outer jacket, or as a printed color coding the entire length of the insulation in accordance with the NEC.

1.32 TESTING DUCTS AND CONDUITS FOR OBSTRUCTIONS. Ducts and conduits which are installed underground or concealed in concrete floor slab, foundations, etc., shall be cleared of foreign material and obstructions after installation and before conductors or pull wires are drawn-in, by wire brushing, swabbing and employing an iron or hardwood mandrel which is 1/4" smaller in diameter than the internal diameter of the duct or conduit. Pulling wires shall be left in all empty conduits.

1.33 PARTS RECEIPT. Retain all portable and detachable portions of the installation, such as keys, tools, manuals, etc., until the completion of the work and then turn them over to the Owner and obtain itemized receipt. This receipt shall be attached to the "Final Application" for payment.

1.34 MANUFACTURERS' INSTRUCTIONS. Retain operating instructions, service instructions, part lists, etc., which are shipped with electrical equipment. On completion of the work, give these items to the Contracting Officer, for the Owner's use. If this information is not shipped with the equipment, obtain from the manufacturer.

1.34.01 Furnish sets of bound operating instructions to the Contracting Officer. See Specification Section 01080 for number of sets to be furnished. Each set shall include:

1.34.01.01 One (1) copy of all shop drawings.

1.34.01.02 Operation and maintenance instructions.

1.34.01.03 As-Built Drawings.

1.35 CLEANUP. Keep sites free from accumulation of waste materials and rubbish. At completion of work, remove all rubbish from and about the site and leave the area clean and ready for use. The site shall be cleaned periodically as requested by plant O&M.

1.35.01 Final clean up shall include cleaning control cabinets and components inside the panels and remove shipping and/or construction dust and debris.

1.36 GUARANTEE. Provide a one-year minimum parts and labor guarantee for all equipment and installation. Comply with requirements of the General Conditions, Division 1. One year from date of acceptance by plant O&M. Provide the cost for extended additional 3-5 years warranty.

1.37 SUBSTITUTIONS. The Contractor's Base Bid shall be in accordance with the material or products specified. Any exceptions to this must be approved in writing by the Contracting Officer ten (10) days or more prior to bidding.

1.37.01 Voluntary alternates may be submitted for consideration on the Electrical Proposal, with listed addition or deduction to the Base Bid, but will not affect the awarding of the Contract.

1.38 ENVIRONMENTAL CLASSIFICATIONS. Materials, equipment, components and incidentals installed in various locations shall comply with NEC and NEMA requirements for the classification. All outdoor equipment shall be in NEMA 4X stainless steel enclosures and indoor enclosures shall be minimum NEMA 1A gasketed and high humidity and corrosive areas shall be NEMA 4X.

End of Provisional Section

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