

SECTION 260100 – GENERAL PROVISIONS - ELECTRICAL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The work covered by Division 26 of these specifications consists of furnishing all labor, equipment, supplies, and materials, and performing all operations, including trenching, backfilling, cutting, channeling, chasing and patching necessary for the installation of complete wiring systems in accordance with the contract documents.
- B. The Contract Drawings indicate the extent and general arrangement of the electrical work. The drawings and specifications shall be considered supplementary, one to the other, so that materials and workmanship indicated, called for or implied by the one and not by the other shall be supplied and installed as though specifically called for by both. All labor and material required to perform all work in conjunction therewith whether or not indicated or specified shall be furnished and installed as part of this work.
- C. The bidding requirements, general conditions of the contract, forms, and Division 01 - General Requirements are part of Division 26 - Electrical. In addition, the following specifications from Divisions 31 and 32 are also part of the requirements for this project:
 - 1. Section 311000 – Site Clearing
 - 2. Section 312000 – Earth Moving
 - 3. Section 312500 – Erosion and Sedimentation Control
 - 4. Section 321216 – Asphalt Paving
 - 5. Section 329200 – Turf and Grasses
- D. The electrical subcontractor may also be referred to in this specification as electrical contractor. The electrical contractor may also be referred to in this specification as "this contractor", "contractor" Contractor, or "Division 26 contractor".
- E. See Section 260111 for general outline of electrical work.

1.2 DRAWINGS AND SPECIFICATIONS

- A. It is understood that while drawings shall be followed as closely as circumstances will permit, the Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. Anything not entirely clear in the Contract Documents will be fully explained if application is made to the Engineer in accordance with the General Conditions and Supplements thereto. However, should conditions arise where, in the judgment of the Contractor, certain changes will be advisable, the Contractor shall communicate with the Engineer and secure his review of these changes before proceeding with the work, provided they are of a major nature.
- B. The drawings are diagrammatic and are not intended to show each and every conductor, fitting, device, conduit, or a complete detail of all the work to be performed, but are for the purpose of illustrating the type system and special conditions necessary for the experienced electrician to

take off his material and lay out his work. The Contractor shall be responsible for making such measurements as may be necessary at the Project and adapting his work to the project conditions.

1.3 APPLICABLE SPECIFICATIONS AND STANDARDS

A. The following specifications and standards, as applicable to the materials and methods specified, shall be considered part of these specifications:

1. AEIC American Association of Edison Illuminating Companies
2. ANSI American National Standards Institute
3. ASHRAE/IES Standard 90.1
4. ASTM American Society for Testing and Materials
5. ETL Electric Testing Laboratories
6. IBC/NCSBC 2018 North Carolina State Building Code
7. ICEA Insulated Cable Engineers Association
8. IEEE Institute of Electrical and Electronic Engineers
9. NCSBC North Carolina State Building Code
10. NEC 2017 National Electrical Code
11. NEMA National Electrical Manufacturers Association
12. NESC National Electrical Safety Code
13. UL Underwriters' Laboratories Inc.
14. OSHA Occupational Safety and Health Standards
15. EIA/TIA 586 and Supplements
16. EIS/TIA 569 and Supplements
17. TIA/TSB-40 Levels (Categories) of electrical performance
18. State Telecommunications Services: STS-1000

B. All referenced manufacturer's requirements and specifications and nationally recognized and accepted standards and specifications shall be the latest edition unless specified otherwise and shall be used as they are applicable for products and craftsmanship incorporated in the Contract Drawings and this Section only. The references to these standards and specifications do not imply acceptance of any and all products described in the standards and specifications.

1.4 APPLICABLE REGULATIONS

A. The installation shall comply with the applicable rules of the 2017 National Electrical Code and rules and regulations of the NCSBC. In no case shall the materials and workmanship fail to meet the minimum requirements of the National Electrical Code.

B. Power outages shall be coordinated with the University as required by giving at least a thirty (30) day written notification.

C. The contractor shall obtain approval of the entire electrical system from the office of the State Electrical Inspector of the North Carolina Department of Administration/State Construction Office (SCO) before the work will be accepted by the Owner.

1.5 SUBMITTALS

- A. All submittals shall be reviewed, corrected as necessary prior to submitting to Engineer and stamped "Approved" by the contractor.
1. Materials List:
- a. As soon as practicable and within 7 days after the date of award of contract and notice to begin work, and before commencement of installation of any materials or equipment, submit six copies or an electronic copy of a complete schedule of the materials and equipment proposed for installation and of names of specialty subcontractors for approval by the Engineer.
 - b. The schedule shall, as soon as possible, be supplemented by catalog cuts, diagrams, lighting fixture brochures, shop drawings, field working drawings and such descriptive data as may be required by the Engineer. In the event any items of materials or equipment contained in the schedule fail to comply with the specification requirements, such items will be rejected.
 - c. Where shop drawings are called for in other sections of the specifications, the list shall name the manufacturer and item and state "Shop Drawings to Follow."
 - d. Orders for all approved items shall be placed by the contractor within two weeks after the list is returned to him by the Engineer. The Engineer shall be notified immediately - in writing, of delivery scheduling of the material not ordered for immediate shipment. The first payment estimate will not be approved until the Engineer is satisfied that all material is ordered and delivery scheduled so that there will be no delay to the job because of getting material. The contractor may be required to remove and replace at his own expense any material installed before approval.
- B. Shop Drawings:
1. Shop drawings shall be submitted conforming to the requirements stated in Division 01 - General Requirements and supplementary general conditions for the following items:
 - a. Lighting Fixtures
 - b. Additional items as specified in technical sections
- C. Operation and Maintenance Manuals:
1. See General Conditions and Supplements thereto. The contractor shall compile and bind 3 sets including an electronic version of all operation and maintenance manuals, equipment and parts lists, instructions, and descriptive literature furnished by the manufacturers of the furnished equipment to assist in the proper maintenance and operation of equipment. These instructions shall be turned over to the Engineer with application for final payment, and final payment will not be made until received. Each brochure shall include 1 copy of each of all approved shop drawings, catalog pages, instruction sheets, operating instructions, installation and maintenance instructions, and spare parts bulletins.

D. Equipment Sizes:

1. Listing of a manufacturer as a source of acceptable equipment does not relieve the contractor and the manufacturer of this equipment from the requirement of meeting all aspects of the contract documents including that of having to fit the equipment in the space allocated.

1.6 GUARANTEE

- A. The electrical contractor shall guarantee by his acceptance of this contract that all work installed will be free from any and all defects in workmanship and/or materials and that all apparatus will develop capacities and characteristics specified.
- B. Refer to General Conditions of the Contract and Supplemental to General Conditions for guarantee period.
- C. Refer to individual sections for special guarantee for products.

1.7 SITE INSPECTION

- A. Each electrical bidder shall visit the site of the work and familiarize himself with the character and conditions of the job site. The Contractor shall not be excused from doing required work because he did not visit the site.

1.8 RECORD DRAWINGS

- A. The Contractor shall provide one set of marked plans to Engineer for his preparation of record drawings. The marked plans shall indicate all changes and deviations from the original contract documents. Each change shall be marked in a clear, legible manner with a red colored pen, keying it to the appropriate change order, clarification note, or field authorization note, as applicable.
- B. Contractor shall keep an updated set of record drawings throughout the construction period. This set shall be made available to the engineer upon request.
- C. Contractor shall provide record drawings indicating dimensioned location of new buried conduits. Dimensions shall be from fixed assets or preferable GIS locations.

1.9 TEMPORARY FACILITIES

- A. Temporary facilities shall be provided as required by the general conditions of the contract.

1.10 CONSTRUCTION UTILITIES

- A. Concrete Work: Concrete work for electrical equipment foundations, curbs, bases, pads, and pedestals shall be provided under Division 26. Concrete shall have a 3000 psi (20 kpa), 28-day strength.
- B. Metal Fabrications: Steel frames, supports and metal assemblies necessary for the installation of electrical systems shall be provided under Division 26.

1.11 PAINTING

- A. Any electrical item factory painted that has a damaged or abraded area shall be touched-up to match surrounding finish unless it is rejected by the Engineer. Touch-up painting shall be done by Division 26 subcontractor at the expense of the electrical contractor.

1.12 EXCAVATION AND BACKFILL

- A. Excavation and backfill for raceway trenches shall be performed under Division 26.
- B. Backfill shall not begin until after electrical contractor's work has been properly installed and inspected by the authority having jurisdiction and approved by the architect/engineer.
- C. Contractor shall notify University for location of all other underground utilities prior to digging.
- D. Required excavation for installation of all electrical work shall be provided by the electrical contractor and replacement and compaction shall be performed according to other specifications relating to the particular type of work. All excavations must comply with OSHA guidelines.

1.13 ABBREVIATIONS

- A. The following abbreviations may be found in this specification and in the drawings.

1.	A	Ampere
2.	AC	Alternating Current
3.	A/E	Engineer
4.	AEIC	Association of Edison Illuminating Companies
5.	ANSI	American National Standards Institutes, Inc.
6.	ASTM	American Society for Testing and Materials
7.	ASYMM	Asymmetrical
8.	AV	Audiovisual Systems
9.	AWG	American Wire Gauge
10.	C	Conduit
11.	CBM	Certified Ballast Manufacturers
12.	CFM	Cubic Feet per Minute
13.	DB	Decibel
14.	DC	Direct Current
15.	EMT	Electric Metallic Tubing

16.	ETL	Electric Testing Laboratories
17.	F	Fuse or Farenheight, as applicable
18.	GFI	Ground Fault Interrupter
19.	HZ	Hertz
20.	IEEE	Institute of Electrical and Electronic Engineers
21.	IMC	Intermediate Metal Conduit
22.	KV	Kilovolt (1000-volt)
23.	KVA	Kilovolt Ampere
24.	MA	Milliampere
25.	MCM	Thousand Circular Mil or KCMil
26.	NEC	National Electrical Code
27.	NEMA	National Electrical Manufacturers Association
28.	NFPA	National Fire Protection Association
29.	NOC	Normally Open Contact
30.	NCC	Normally Closed Contact
31.	PDU	Power Distribution Unit
32.	PVC	Polyvinyl Chloride
33.	RMC or GRC	Rigid Metal Conduit
34.	RMS	Root Mean Square
35.	RNMC	Rigid Non-Metallic Conduit
36.	RS	Rapid Start
37.	SYMM	Symmetrical
38.	UL	Underwriters' Laboratories, Inc.
39.	UPS	Uninterruptible Power Supply System

1.14 CONTRACT ALTERNATES

- A. Not applicable.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials used in this work shall be new except as otherwise noted for existing light poles and emergency blue phones being relocated. All materials used on this project shall be UL listed and labeled, where they have established a standard for the material to be installed. Any material installed that is not labeled shall be subject to a field evaluation by one of the third party agencies which have been approved by the North Carolina Building Code Council at the contractor's expense, if authorized by the authority having jurisdiction and the Architect/Engineer. Otherwise, any item not listed and labeled by UL or other approved agency shall be replaced by the contractor at his expense. It shall be the contractor's responsibility to verify that materials specified or used on the project are listed and labeled. Materials are all items other than labor that are part of the electrical contract, including, but not limited to, devices, appliances and equipment.

- B. Catalog numbers and trade names in these specifications and noted on the drawings are intended to describe the material, devices or apparatus wanted and not to limit competition.
- C. Where "or equivalent as accepted by the Engineer" is specifically noted in the specifications, reference to any article, device, product, material, fixture, or type of construction by name, make or catalog number, such reference shall be interpreted only as establishing a standard of quality and shall not be construed as limited competition. The Contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the Engineer expressed in writing is acceptable as equivalent to that specified.
- D. The contractor shall immediately upon request present samples and test data from a recognized independent testing laboratory of the proposed substitute items so that the Engineer's judgment may be based upon comparison of actual items rather than just catalog cuts.
- E. The Engineer may request that the Contractor provide full sized model of the proposed material or assembly, at a location convenient to the Engineer for a complete evaluation. All presentations shall be made by the Contractor's representative and not by the representative of the manufacturer of the equipment.
- F. The contractor, through the manufacturer of the equipment specified here shall review the use, details, and methods of installation of this product as indicated and shall disclose to the Engineer any and all deviations from his recommended use and method of installation and shall also disclose to the Engineer his recommendations for the use and method of installation of his product to achieve the intended purpose and result. Such disclosure shall be made within the time stipulated for submission of shop drawings.

2.2 PRODUCT REFERENCES

- A. Electrical products preferred by the University of North Carolina Charlotte due to compatibility with existing materials are as follows:
 - 1. Panelboards: Eaton, GE, Square D, Siemens
 - 2. Conduit (Steel): Armco Steel, National Steel, Republic Steel, Triangle, Wheeling Steel, Youngstown Sheet & Tube Co., Allied Tube & Conduit Co., Wheatland
 - 3. Liquidtight Conduit: American Brass Co., Columbia Cable&Electric, International Metal Hose
 - 4. Outlet Boxes: Appleton Electric, General Electric, National Electric Products, Steel City, Thomas and Betts; Masonry boxes = Raco
 - 5. Cable Supports: OZ Electric Mfg. Company
 - 6. Insulation Bushings: OZ Electric Mfg. Company
 - 7. Conduit Bodies and Fittings: Appleton Electric, Crouse-Hinds, Thomas & Betts, Steel City
 - 8. Power Wire and Cable: 600 Volts and Below: Anaconda, Cerro de Pasco, General Cable, GE, Kerite Co., Phelps Dodge, Rome Cable, Triangle Conduit & Wire, Okonite
 - 9. 600 Volt Conductors: as specified under Section 260519
 - 10. Solderless Connectors and Lugs: Burndy, Thomas & Betts, Dosert, OZ Electric Mfg Co.
 - 11. Wiring Devices: Arrow-Hart, Leviton, Pass & Seymour, Hubbel
 - 12. Safety Switches: S&C (for high voltage), Siemens, GE, Square D, Eaton
 - 13. Lamps: Westinghouse, GE, Sylvania, Phillips

14. Circuit Breakers: Westinghouse, GE, Siemens, Square D, Eaton
15. Fuses: S&C (for high voltage) Bussman, Chase-Shawmut, CEFCO

PART 3 - EXECUTION

3.1 DIMENSIONS

- A. Electrical equipment, fixtures and plans are not to be scaled. Necessary dimensions shall be obtained from architectural and structural drawings. If work is being done within existing buildings or structures, verify by field measurements all dimensions and plans shown on drawings.

3.2 INSPECTIONS:

- A. This contractor shall secure all inspections and certificates required. It is the responsibility of this contractor to notify the office of the SCO Electrical Inspector, North Carolina Department of Administration, to schedule required inspections. Coordinate electrical inspections with State Electrical Inspector for Monday through Friday. Electrical work shall not be covered until approved by the SCO Electrical Inspector and reviewed by the Engineer. The contractor shall obtain approved certificate of completion from North Carolina Department of Administration as a condition for acceptance of the electrical work.

3.3 SUPERVISION AND COORDINATION

- A. Installation of electrical conduits, boxes and equipment shall be located at accessible locations complying with NEC.
- B. Relocation of equipment, conduit, boxes, system connections or rough-in locations up to twenty feet in any direction, if necessary, to avoid conflicts with new or existing utilities or obstructions shall be done at no additional cost to the Owner or his agents if done before roughing-in.
- C. This Contractor shall coordinate the work under his contract as to avoid conflicts between his work and the work of other trades. This Contractor shall carefully examine the drawings prior to running any conduit and shall be responsible for the proper fittings of materials and equipment into the space provided prior to installing any conduit or equipment in accordance with requirements of the National Electric Code. If any departures from the contract drawings are deemed necessary by this Contractor, detail drawings of such departures and the reasons therefore shall be submitted as soon as practicable to the Engineer for his review. No such departures shall be made without this review and written clarification or change order.
- D. This Contractor shall have in charge of the work at all times during construction a thoroughly competent foreman with extensive experience in the work to be performed under this contract. Anyone deemed not capable by the Engineer shall be replaced immediately upon request, and after a satisfactory foreman has been assigned, he shall not be withdrawn without the written consent of the Engineer.

- E. Electrical Contractor shall cooperate with other contractors and subcontractors to allow for the installation of their work as well as his own.
- F. This Contractor shall be responsible for his work fitting in place without conflict with the other trades, where proper planning could avoid interference. Any work installed by this Contractor without regard for the work of others, or if a conflict results, must be changed as directed by the Engineer without additional cost to the Owner.

3.4 OBSERVATIONS

- A. The Engineer reserves the right of observing all concealed work, before being covered. This Contractor shall notify the Engineer of the need of a job observation at least five working days prior to concealment of work.

3.5 WASTE MATERIALS

- A. This Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by his employees or work. At the completion of the work he shall remove all leftover materials, equipment and debris resulting from the work done under this Division.

3.6 FIELD PAINTING

- A. All exposed metal parts installed under this contract shall be painted with two coats of exterior paint over the application of suitable primer. Paint shall be oil-based. Primer shall be as recommended by paint manufacturer. Color(s) to be coordinated and approved by the Architect and the University.

END OF SECTION 260100