ELECTRICAL SPECIFICATIONS

1. GENERAL PROVISIONS

A. Work included in these specifications and included on the drawings shall include furnishing all labor, materials, supplies, and equipment to perform all work required including cutting, channeling, chasing, excavating and backfilling, to install a complete and working electrical system(s) in accordance with these sections of the specifications and the accompanying drawings. This shall include all required preparation work, raceways, coordination, etc. required to install the electrical system.

B. The electrical work shall include, but in no way be limited to the following:
1. Raceways (To include raceways for conductors and cables.)
2. Electrical Distribution System.
3. Exterior Lighting Systems.

C. The contractor is responsible for including any and all work related to the electrical that is noted in any part of the specifications or any part of the drawings, including Division 1 and any other sections. The contractor will supply power to equipment at the voltage indicated on the drawings. The contractor will be held responsible for coordinating the equipment voltages, control equipment, wiring, and locations and type of terminations/connections and/or disconnects required to comply with the National Electrical Code, International Building Code, International Energy Conservation Code, all local codes, and the equipment manufacturer's requirements.

D. Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details are shown on the electrical or civil drawings. The contractor shall refer to other drawings for exact locations of equipment, building dimensions, architectural details and conditions affecting the electrical work; however, field measurements take precedence over dimensioned drawings. The Electrical Contractor shall provide all labor and materials and all incidental elements; junction and pull boxes, pull wires, connectors, support materials, fuses, and labels, to install, connect, start-up and result in a complete and working system in accordance with the drawings and specifications. The contractor is responsible for coordinating the installation of all electrical work with the work of other contractors and/or trades. The electrical drawings are such that the electrical service to equipment furnished and installed under other sections of the contract documents is coordinated for the specified equipment only. If the equipment installed under other divisions of the contract documents is not the specified equipment it is the responsibility of the contractor to coordinate the electrical service/interface requirements with the electrical contractor.

E. Provide all wiring, connectors, fittings, connections, and all accessories for the complete installation of, and final connections to, equipment furnished under other divisions of the specifications and where indicated on the drawings or otherwise specified.

F. The contractor is responsible for obtaining all required permits and complying with all National (NEC, IBC, NFPA), State, County, and Municipal codes and regulations. This shall include, but not be limited to, the following:
1. Federal Occupational Safety and Health Act (OSHA)
2. NFPA 70 (National Electrical Code)
3. Americans with Disabilities Act (ADA).
4. International Building Code (IBC).
5. International Energy Conservation Code (IECC).

F. The contractor shall keep a set of construction drawings during the length of the project on which he shall note any and all changes from the original drawings. This record set of drawings shall be updated daily.

G. Electrical Subcontractor shall submit for review by the Engineer detailed shop drawings of all material listed below. All submittal data shall be submitted at one time through the Engineer. No material or equipment for which Engineer's review is required shall be delivered to the job site or installed until the Electrical Contractor has in his possession the reviewed and approved shop drawings for the particular material and/or equipment. The Electrical Contractor shall assemble, organize, prepare and review for correctness shop drawings on all materials, equipment, fixtures and devices to be used. If material submitted is the result of "value engineering" or "prior approval" changes, the submittal must contain supporting documentation of the approved changes, otherwise it will be reviewed against the specified products on these plans. The Electrical contractor shall furnish one (1) PDF copy of shop drawings. Shop drawings that are incorrectly submitted, contain errors or omissions, or not in the form and sequence specified shall be rejected as unapproved.

Shop drawings shall contain as cover page a letter by the supplying Vendor stating that the Vendor has received full contract documents and that to the best of his or her knowledge the submittal is in compliance with the contract documents and design intent including all ancillary parts and pieces required for a complete job.

Review of shop drawings in no way relieves the Contractor of his responsibility of quantity, dimensions, weights, means and methods, safety, or coordination with others.

Failure of the Contractor to submit shop drawings to the Engineer with reasonable time for review shall not entitle the Contractor to an extension of contract time. Reasonable review time is ten working days unless otherwise specified.

At minimum shop drawings shall be submitted for

1. Lighting fixtures
2. Lighting fixture poles
3. Basic materials; wire, conduit, fittings.

H. Requests for Substitution

Submit requests for substitution to Engineer through Architect in PDF format no fewer than ten (10) working days prior to bid time. Requests shall contain cutsheets, catalog numbers, etc. Any approval will be in writing by the Engineer. Prior approval submittals for lighting shall include adequate photometric and energy use documentation for comparison to specified.

Substituted items will not result in an increase in cost to the Owner.

I. Catalog numbers and names that appear in the specifications or on the plans may be incomplete or obsolete and are for descriptive purposes only. As such they may not indicate all of the parts, pieces and systems required for a complete and operating installation. It is the responsibility of the Electrical Contractor, the Vendor and the Supplier to review the plans, specifications and applications to determine the correct item(s) required to include all installation and support materials and systems for a complete and working installation.

2. RACEWAYS/CONDUITS AND ASSOCIATED EQUIPMENT

A. The work shall include all raceways, conduits, fittings, and all other equipment required to install a raceway system. This shall include, but not limited to the following:
1. Rigid metal conduit and fittings.
2. Non-metallic conduit and fittings.

B. Route all conductors in conduit.

C. Specified products and their areas of use shall be as described on drawings.

D. For PVC raceways, use slip fittings with glue joints. For rigid galvanized steel and IMC, fittings shall be threaded galvanized iron, heavy steel, concrete tight.

E. Size conduit for conductor type installed; 1 inch minimum size.

3. WIRE AND CABLE – 600 VOLTS AND LESS

A. Work shall include the furnishing and installing of all required wire and cable to complete the wiring and electrical system. This shall include, but not be limited to the following:
1. Building wire.
2. Wiring connections and terminations.

B. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, THWN-2. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation, THWN-2. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid conductor. MINIMUM SIZE SHALL BE #10 FOR ALL WIRING ABOVE 48 VOLTS.

C. All cables shall be color coded. Color coding shall be as follows:

120/208/240 Volt	Phase	277/480 Volt
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green w/ yellow stripe

D. Each wire or cable in a feeder at its terminal points, and in each pull-box, junction box, and panel gutter through which it passes shall be identified to show the circuit number of the breaker that it connects to. See General Notes.

E. All installation shall be in accordance with the NEC. All splices shall be in junction boxes and shall be electrically and mechanically secure. Place an equal number of conductors for each phase of a circuit in same raceway or cable. Splice only in junction boxes or handholes. Neatly train and lace wiring inside boxes, equipment, and panelboards. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

4. SECONDARY GROUNDING

A. Work included shall include power system grounding, communication system grounding, and electrical equipment and raceway grounding and bonding. Ground electrical work in accordance with NEC Article 250, local codes as specified herein, and as shown on the drawings.

B. Provide a grounding system that includes all connections and testing of: ground rods, ground cables, ground buses, conduits, fittings, anchors, supports, CADWELD(R) materials and equipment, and other materials as required for a complete installation. Provide ground cables composed of soft drawn, stranded bare copper of 98 percent conductivity encased in nonmetallic conduit above grade. Cable to be buried not less than 24 inches below grade. Install as required to provide sufficient mechanical protection. All copper to copper and copper to steel connections of #6 AWG and larger shall be made with the CADWELD(R).

C. Ground Rods: Copper-encased steel, 3/4 inch diameter, minimum length 10 feet U.N.O.

D. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits.

E. Install ground cables continuous between connections. Splices will not be allowed except where indicated on the drawings. Connections made by the CADWELD(R) Process are not considered splices.

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION	CATALOG NUMBER	LAMPS	WATTAGE	NOTES
P1	POLE MOUNTED LED SITE LIGHTING, SINGLE FIXTURE WITH POLE.	EVERLAST LIGHTING #EL-ES14-200-UL-**-TYPE IV-PC PROVIDE WITH 7 PIN RECEPTACLE.	LED BY MFR.	204.5W	SEE NOTES 1, 3 AND 4 BELOW.
P2	POLE MOUNTED LED SITE LIGHTING, TWO FIXTURES AT 180° WITH POLE.	EVERLAST LIGHTING TWO #EL-ES14-200-UL-**-TYPE IV-PC PROVIDE WITH 7 PIN RECEPTACLE.	LED BY MFR.	409.0W	SEE NOTES 1, 3 AND 4 BELOW.
P3	POLE MOUNTED LED SITE LIGHTING FIXTURE, USE EXISTING POLES.	EVERLAST LIGHTING #EL-LED-ESM-70-UL-**-TYPE III-PC PROVIDE WITH 7 PIN RECEPTACLE.	LED BY MFR.	72.4W	SEE NOTES 2, 3 AND 4 BELOW.

1. NEW POLES SHALL BE NAFCO #VS-SSSA-30-4040-07-AB-FP OR EQUIVALENT. PROVIDE POLE BASE AS DESCRIBED BY SITE LIGHTING POLE BASE DETAIL.
2. FIXTURE SHALL BE MOUNTED TO EXISTING POLE. DEMOLISH EXISTING FIXTURES, SAND, PRIME AND RE-PAINT EXISTING POLE. PAINT TO MATCH FIXTURE. RE-DRILL POLE AS REQUIRED FOR NEW FIXTURE(S), PROVIDE APPROPRIATE MOUNTING ADAPTER HARDWARE.
3. LAMPING COLOR TEMPERATURE PER OWNER REQUIREMENTS.
4. ALL FIXTURES AND POLES SHALL BE DARK BRONZE.

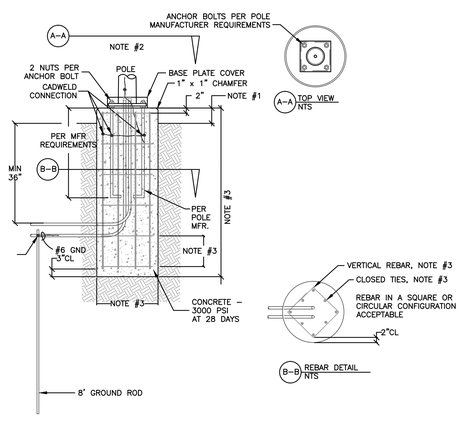
ELECTRICAL SYMBOL SCHEDULE - GENERAL

GENERAL

LP1-2,4	BRANCH CIRCUIT RACEWAY. RUN BELOW GRADE. ARROWHEAD DENOTES HOMERUN TO PANEL. TEXT DENOTES PANEL IDENTIFICATION AND CIRCUIT NUMBERS FOR HOMERUN. INSTALL GROUND WIRE IN ALL RACEWAYS. #10 AWG MINIMUM AND AS PER CODE.
	POLE MOUNTED AREA LIGHT. PROVIDE POLE BASE AND POLE/FIXTURE ASSEMBLY AS SCHEDULED AND AS INDICATED IN DETAILS. LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING BY UTILIZING 811 SERVICE. COORDINATE WITH CIVIL PLANS AND SITE CONTRACTOR TO AVOID NEW UTILITIES BEFORE BEGINNING WORK

GENERAL NOTES ALL DRAWINGS:

1. DO NOT SCALE DRAWINGS. LOCATE EQUIPMENT AS INDICATED AND COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE EXACT LIGHTING FIXTURE LOCATIONS WITH CIVIL UTILITY PLANS.
2. MINIMUM SIZE CONDUCTOR FOR POWER SHALL BE #10 AWG. PROVIDE DEDICATED NEUTRAL FOR EACH MULTI-WIRE BRANCH CIRCUIT IN COMPLIANCE WITH NEC.
3. ALL FUSES SHALL BE DUAL-ELEMENT TYPE, "FUSETRON" BY BUSSMAN, "ECON" BY ECONOMY, OR FERRAZ SHAWMUT.
4. BRANCH CIRCUIT SIZES ARE #10 AWG, 1"C. UNLESS OTHERWISE NOTED IN PANELBOARD SCHEDULES OR ON DRAWINGS.
5. ALL BRANCH CIRCUIT LOADS SHALL BE BALANCED ACROSS PANELBOARD BUSSES TO OBTAIN MINIMUM NEUTRAL CURRENT.
6. ALL FLEXIBLE CONDUIT SHALL CONTAIN A GREEN WIRE BONDED TO RIGID RACEWAY, BOX OR FIXTURE AT EACH END OF FLEX. SIZE GROUND PER NEC TABLE 250-122.
7. WHERE NOT INDICATED OTHERWISE, EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED PER NEC TABLE 250-122.
8. ALL METAL CONDUITS 1" AND LARGER SHALL HAVE A GROUNDING BUSHING BONDING CONDUIT TO ENCLOSURE.
9. AT SUBSTANTIAL COMPLETION CLEAN ALL LIGHT FIXTURES AND TOUCH UP POLES AND POLE BASES AS NEEDED..
10. ELECTRICAL WORK SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES, REQUIREMENTS AND ORDINANCES.
11. ALL CONDUCTORS #6 AWG AND SMALLER ARE TO BE COLOR CODED WITH A SOLID COLOR INSULATION. PROVIDE IDENTIFYING MARKERS AT ALL JUNCTIONS AND TERMINATIONS OF RACEWAYS FOR CONDUCTORS THAT NAME THE CONTENTS OF THE CONDUIT WITH REGARD TO CIRCUIT NUMBER, VOLTAGE AND SOURCE. IDENTIFYING MARKERS ARE TO BE YELLOW BACKGROUND WITH BLACK LETTERING.



NOTE #1 EXPOSED CONCRETE BASE SHALL BE 6" ABOVE SURROUNDING GRADE.

NOTE #2 THESE POLE LOCATIONS SHALL BE LOCATED AS DEPICTED ON THE SITE LIGHTING / CIVIL DRAWINGS.

NOTE #3 24" DIAMETER BY 66" AUGER FOOTING WITH (8) #7 VERTICAL REBAR AND (6) #3 CLOSED TIES AT EQUAL SPACING.

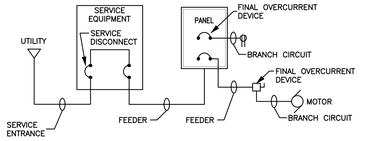
NOTE #4 PROVIDE IN-LINE FUSING FOR ALL CURRENT CARRYING CONDUCTORS. FUSES SHALL BE TYPE BY FERRAZ SHAWMUT OR EQUIVALENT WHICH SAFELY DISCONNECTS LOAD SO THAT FUSES WILL NOT BE "HOT" WHEN DISCONNECTED.

SITE LIGHTING POLE BASE DETAIL
NO SCALE

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AF	ARC FAULT CIRCUIT INTERRUPTER
BKR	BREAKER
C	CONDUIT
CATV	CABLE TELEVISION
CKT	CIRCUIT
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EMT	ELECTRICAL METALLIC TUBING
FCU	FAN COIL UNIT
GC	GENERAL CONTRACTOR
GF	GROUND FAULT CIRCUIT INTERRUPTER
GRS	GALVANIZED RIGID STEEL CONDUIT
HID	HIGH INTENSITY DISCHARGE
IG	DEVICE SHALL HAVE ISOLATED GROUND
IMC	INTERMEDIATE METALLIC CONDUIT
JB or J-BOX	JUNCTION BOX
KVA	KILOVOLT AMPERES
KW	KILOWATT
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
MFR	MANUFACTURER
NMC	NONMETALLIC-SHEATHED CABLE
V	VOLT
NEC	2017 NATIONAL ELECTRICAL CODE, (NFPA 70)
SWBD	SWITCHBOARD
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
WC	WATER COOLER
XFMR	TRANSFORMER

RACEWAY MATERIAL SCHEDULE



RACEWAY MATERIALS:

OUTDOORS BELOW GRADE: IMC, GRS. IMC AND GRS TO HAVE BITUMINOUS COATING IF INSTALLED BELOW GRADE. IN GROUND RATED HPDE CONDUIT MAY BE USED BELOW GRADE WITH COATED GRS ELBOWS BEFORE TRANSITIONING TO FIXTURES AND CONCRETE BASES.

OUTDOORS EXPOSED: IMC, GRS

ENGINEERING, LLC
5725 Bush River Road
Columbia, SC 29212
803.233.9396 (Phone)
803.233.4371 (Fax)

Project Manager:
Bryson Tucker PE, x101

ETi #2003-40504

SOUTH CAROLINA — ETi ENGINEERING, LLC No. C02936 — CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA — No. 23558 — REGISTERED PROFESSIONAL ENGINEER — BRYSON D. TUCKER

07/06/2020

CHAPIN ELEM. PARKING LIGHTING
LOCATION, SC

ELEC. SYMBOLS, DETAILS & SPECS.

DRAWN BY: TMD
CHECKED BY: BDT
REVISIONS:

E-1

DATE: 07/06/2020

EXISTING BUILDING
CHAPIN ELEMENTARY SCHOOL
FFE = 399.76

P3 P3 P3 P3 P3

CONNECT P2 TO EXISTING LIGHITNG CIRCUIT SERVING P2 FIXTURES, MINIMUM #10 CONDUCTORS, #10 GROUND AND 1"C.

P2

P1 P1

#10 CONDUCTORS, #10 GND – 1"C BETWEEN POLES.

TO 20A/2P CIRCUIT IN SIGN PANEL ADJACENT TO ROAD. MINIMUM #8 CONDUCTORS, #10 GROUND AND 1"C. PROVIDE CIRCUIT BREAKER WITH AIC RATING TO MATCH EXISTING. PROVIDE DITEK DS0-120/2401 SPD AND 30A/2P CIRCUIT BREAKER AT EXISTING PANEL.

1 E-2 ELECTRICAL SITE LIGHTING PLAN
APPROXIMATE SCALE: 1" = 10'-0"

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SOUTH CAROLINA — ETi ENGINEERING, LLC No. C02936 — CERTIFICATE OF AUTHORIZATION

STATE OF SOUTH CAROLINA — No. 23558 — BRYSON D. TUCKER — REGISTERED PROFESSIONAL ENGINEER
07/06/2020

CHAPIN ELEM. PARKING LIGHTING
LOCATION, SC

ELECTRICAL SITE LIGHTING PLAN

DRAWN BY: TMD
CHECKED BY: BDT
REVISIONS:

E-2

DATE: 07/06/2020