ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance
Prescriptive ___X___ Performance _____ Energy Cost Budget _____

Provide a standard riser diagram which indicates designated points for check metering. Provide a standard panel schedule description which idenifies different enduse loads.

Standard riser diagram is on Sheet – E0.4
Standard panel schedules are on – E0.4

Lighting Schedule

lamp type required in fixture	SEE LIGHTING FIXTURE SCHEDULE
number of lamps in fixture	SEE LIGHTING FIXTURE SCHEDULE
ballast type used in the fixture	SEE LIGHTING FIXTURE SCHEDULE
number of ballasts in fixture	SEE LIGHTING FIXTURE SCHEDULE
total wattage per fixture	SEE LIGHTING FIXTURE SCHEDULE

total interior wattage specified vs. allowed
OPS Occupancy: gross area of 13,963.82 sq. ft.
TRUCK BAY Occupancy: gross area of 7,468.59 sq. ft.
Exterior gross area 1,058,147.45 sq ft.
Per 2018 North Carolina Energy Code:

Allowable	Specified
OFFICE (0.82 X 13,963.82 SQFT) = 11,450.33 WATTS	11,274 WATTS
WHAREHOUSE (0.66 X 7,468.82 SQFT) = 4,929.27 WATTS	+3,612 WATTS
TOTAL = 11,45033+4929.27 = 16,379.6 WATTS	14,886 WATTS

total exterior wattage specified vs. allowed
ZONE 2 (600W)
+ Parking Areas and Drives (0.06 X 320511.83 SQFT)
TOTAL = 600+320,511.83 = 19,833.11 WATTS 14,167 WATTS

Equipment schedules with motors (not used for mechanical systems)

motor horsepower	N/A
number of phases	N/A
minimum efficiency	N/A
motor type	N/A
# of poles	N/A

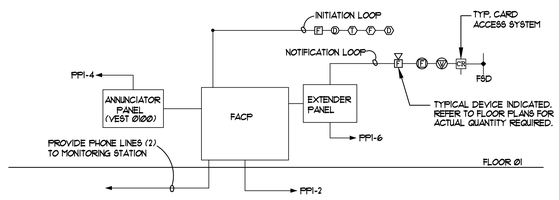
ELECTRICAL DESIGNER STATEMENT

I hereby certify that the design of this building complies with the mechanical systems, service systems and equipment requirements of the 2018 North Carolina Energy Code.

signed Jonathan F Erdmann date 05/24/2023

Name JONATHAN ERDMANN

Title Project Engineer



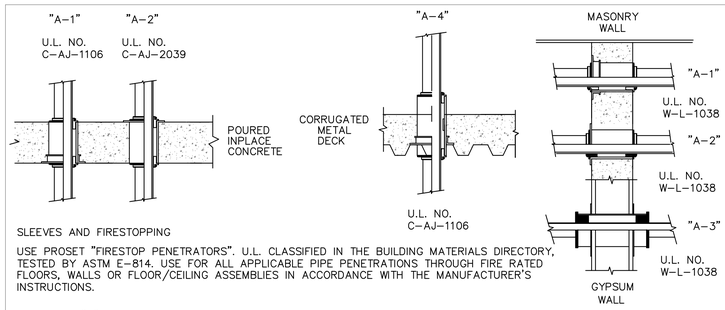
1 E-001 RISER DIAGRAM – FIRE ALARM
NOT TO SCALE

FIRE ALARM GENERAL NOTES

1. ALL WORK TO THE FIRE ALARM SYSTEM SHALL COMPLY WITH ALL LOCAL FIRE CODES, LAWS, REGULATIONS, ORDINANCES, AND THE REQUIREMENTS OF NFPA 72 – 2013 EDITION.
2. ALL FIRE ALARM DEVICES SHALL BE ADA APPROVED. COORDINATE COLOR WITH ARCHITECT. PROVIDE ANY ADDITIONAL POWER AMPLIFIERS REQUIRED FOR INSTALLATION OF ADA APPROVED DEVICES SHOWN AND ANTICIPATED FOR TENANT UPFITS.
3. ALL FIRE ALARM DEVICES, INCLUDING SPEAKERS, VISUALS, SMOKE DETECTORS, ETC... SHALL BE INSTALLED BY A LICENSED FIRE ALARM CONTRACTOR. COORDINATE CONNECTIONS WITH SYSTEM MANUFACTURER.
4. ALL DEVICES SHALL BE 110 CANDELA, UNLESS OTHERWISE NOTED.
5. THE ENTIRE LENS OF WALL MOUNTED VISUAL FIRE ALARM DEVICES SHALL BE MOUNTED AT LEAST 80" AFF.
6. ALL FIRE ALARM DEVICES SHALL BE WHITE UNLESS OTHERWISE NOTED OR REQUIRED.
7. EVACUATION SIGNAL SHALL BE 3 PULSE TEMPORAL.
8. PROVIDE ALL PROGRAMMING REQUIRED TO MAKE ALL DEVICES FUNCTIONAL AND ANY PROGRAMMING REQUIRED TO MAKE ALL OF THE VISIBLE NOTIFICATION APPLIANCES ON AN ENTIRE FLOOR FLASH IN SYNCHRONIZATION.
9. PROVIDE EMERGENCY RADIO RESPONDER SYSTEM THAT IS IN COMPLIANCE WITH IFC 510 (ENTIRE SECTION).

FIRE ALARM SYSTEM MATRIX — BUILDING SYSTEM OUTPUTS — CENTRAL COMM

	ACTIVATE COMMON ALARM SIGNAL INDICATOR	ACTIVATE AUDIBLE ALARM SIGNAL	ACTIVATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTIVATE AUDIBLE SUPERVISORY SIGNAL	ACTIVATE COMMON TROUBLE SIGNAL INDICATOR	ACTIVATE AUDIBLE TROUBLE SIGNAL	DISPLAY CHANGE OF STATUS	ACTIVATE GENERAL EVACUATION SIGNAL	ACTIVATE EXTERNAL HORNS/STROBES	TRANSMIT FIRE ALARM SIGNAL TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION	RETURN ELEVATOR TO ALTERNATE FLOOR	RETURN ELEVATOR TO FIRST FLOOR	SHUNT "RW" (FIRST ELEVATOR RECALLED) DOOR	SHUNT DOOR RELEASE RECALLED DOOR	SHOW CHANGE OF STATUS ON ANNUNCIATOR	SHOW CHANGE OF STATUS ON HVAC	TRANSMIT FIRE ALARM SIGNAL TO CENTRAL FIRE	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL FIRE	TRANSMIT TROUBLE SIGNAL TO CENTRAL FIRE	TRANSMIT FIRE ALARM SIGNAL TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION
MANUAL FIRE ALARM PULL BOXES	X	X					X	X	X	X							X	X	X					
BUILDING SMOKE DETECTOR	X	X					X	X	X	X							X	X	X					
DUCT SMOKE DETECTOR			X	X					X		X						X	X		X				
SPRINKLER WATER FLOW	X	X					X	X	X	X							X	X	X					
SPRINKLER TAMPER			X	X					X			X					X	X		X				
ELEV. EQ. ROOM SMOKE DETECTOR	X	X					X	X	X	X				X			X	X	X					
ELEV. EQ. ROOM HEAT DETECTOR	X	X					X	X	X	X					X	X	X	X	X					
ELEV. SHAFT HEAT DETECTORS	X	X					X	X	X	X					X		X	X	X					
1ST FLOOR ELEV. LOBBY SMOKE DETECTOR	X	X					X	X	X	X				X			X	X	X					
UPPER FLOOR ELEV. LOBBY SMOKE DETECTOR	X	X					X	X	X	X					X		X	X	X					
HOOD SUPPRESSION SYSTEM	X	X					X	X	X	X							X	X	X					
NOTIFICATION APPLIANCE CIRCUIT SHORT					X	X		X				X					X	X						X
OPEN CIRCUIT					X	X		X				X					X	X						X
GROUND FAULT					X	X		X				X					X	X						X
FIRE ALARM AC POWER FAILURE					X	X		X				X					X	X						X
FIRE ALARM SYSTEM LOW BATTERY					X	X		X				X					X	X						X



SLEEVES AND FIRESTOPPING

USE PROSET "FIRESTOP PENETRATORS". U.L. CLASSIFIED IN THE BUILDING MATERIALS DIRECTORY, TESTED BY ASTM E–814. USE FOR ALL APPLICABLE PIPE PENETRATIONS THROUGH FIRE RATED FLOORS, WALLS OR FLOOR/CEILING ASSEMBLIES IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

A. SYSTEM "A" PENETRATORS FOR WATER LINES, HEATING AND COOLING LINES, FIRE STANDPIPE AND SPRINKLER LINES, TEMPERATURE CONTROL, ACID WASTE GLASS PIPE AND ELECTRIC AND COMMUNICATION CONDUIT PENETRATING FLOORS OR WALLS.

1. CAST–IN–COUPLING PENETRATORS FOR POURED–IN–PLACE CONCRETE ON STEEL OR WOOD FORMS IN FLOORS OR WALLS.
2. CORED HOLE COUPLING PENETRATORS FOR CORED HOLES THROUGH PRECAST OR EXISTING CONCRETE IN FLOORS OR WALLS.
3. SPLIT WALL SLEEVE PENETRATORS FOR PIPES PASSING THROUGH GYPSUM WALLS OR FLOOR / CEILING ASSEMBLIES.
4. SLIP FLANGE CM COUPLING FOR POURED–IN–PLACE CONCRETE ON CORRUGATED METAL DECK.

FIRESTOP PENETRATOR DETAILS

ELECTRICAL GENERAL NOTES

1. ALL WORK THIS DIVISION SHALL COMPLY WITH ALL LOCAL BUILDING CODES, LAWS, REGULATIONS, ORDINANCES, AND THE REQUIREMENTS OF THE 2020 NATIONAL ELECTRICAL CODE. ALL WORK SHALL COMPLY WITH BASE BUILDING SPECIFICATIONS. OBTAIN A COPY OF SPECIFICATIONS FROM BUILDING MANAGER IF NECESSARY.
2. THE CONTRACTOR SHALL KEEP A RECORD OF THE CHANGES WHICH ARE IN CONFLICT WITH THESE DRAWINGS AND SPECIFICATIONS. AT THE COMPLETION OF HIS WORK HE SHALL SUBMIT "AS BUILT" PRINTS TO THE OWNER.
3. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND DO NOT NECESSARILY SHOW EVERY FITTING AND DETAIL. ALL WORK SHALL BE INSTALLED SO THAT JUNCTION BOXES AND COMPONENTS WILL BE ACCESSIBLE FOR SERVICE.
4. ALL SYSTEMS, EQUIPMENT, COMPONENTS, WORK, ETC. PROVIDED UNDER THIS DIVISION SHALL BE COVERED BY A ONE YEAR GUARANTEE STARTING AT THE TIME OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. ANY DEFECTS IN THE WORK, SYSTEMS, EQUIPMENT, OR COMPONENTS FOUND DURING THIS YEAR SHALL BE CORRECTED AT NO CHARGE. THE GUARANTEE SHALL INCLUDE PROVIDING ALL NECESSARY CUTTING, PATCHWORK, REPAINTING, ETC. TO MAKE THE WORK COMPLETE AND NEW.
5. ALL CONDUIT MUST BE CONCEALED IN THE WALLS OR ABOVE THE CEILING UNLESS OTHERWISE NOTED. MINIMUM CONDUIT SIZE IS 1/2".
6. ALL CONDUCTORS SHALL BE COPPER WITH TYPE "THW" OR "THHN" INSULATION AND THE MINIMUM WIRE SIZE SHALL BE #12 A.W.G. WITH A 167 DEGREE TEMPERATURE RATING.
7. ALL WORK MUST BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER ACCORDING TO GENERALLY ACCEPTED PRINCIPALS OF FIRST CLASS WORKMANSHIP.
8. FASTEN ALL RECESSED LIGHTING FIXTURES TO STRUCTURE OR GRID PER N.E.C. 410.36.
9. RECESSED INCANDESCENT FIXTURES SHALL BE SUPPORTED IN COMPLIANCE WITH N.E.C. 410.36.
10. ALL PENETRATIONS THRU RATED WALLS, FLOORS AND CEILINGS SHALL BE FIRE STOPPED PER N.E.C. 300.21.
11. PROVIDE ALL GROUNDING AS REQUIRED BY N.E.C.
12. DEVICE MOUNTING HEIGHTS ARE TO BE MEASURED TO THE DEVICE CENTERLINE.
13. ALL SWITCHES FOR FANS, LIGHTS, ETC. WHICH ARE SHOWN TO BE MOUNTED IN THE SAME GENERAL AREA SHALL SHARE A MULTI–GANG COVER PLATE AS REQUIRED.
14. ALL CONDUIT SHALL BE 1/2" EMT WITH 2#12,1#12G AWG CONDUCTORS UNLESS OTHERWISE NOTED.
15. PROVIDE #12AWG GND. FOR ALL MECHANICAL EQUIPMENT UNLESS SHOWN OTHERWISE. ALL EQUIPMENT SHALL BE GROUNDED AT THE PANEL WHICH FEEDS THE EQUIPMENT.
16. COORDINATE RECEPTACLE NEMA TYPE AND VOLTAGE WITH COPIERS AND EQUIPMENT.
17. PROVIDE A NEW DIRECTORY FOR ALL PANELS. CORRECTLY LABEL ALL CIRCUITS, SPARES AND SPACES IN ACCORDANCE WITH N.E.C. 408.4(A).
18. PROVIDE A SEPARATE GREEN, INSULATED, #12AWG EQUIPMENT GROUNDING CONDUCTOR ROUTED WITH THE BRANCH CIRCUIT HOMERUN CONDUCTORS.
19. WHERE WORK BY THE GENERAL CONTRACTOR (WALL REMOVAL, NEW OR RELOCATED WALL OPENING, ETC.) RESULTS IN THE REMOVAL, RELOCATION OF REFEEDING OF ELECTRICAL DEVICES OR LIGHTING FIXTURES, THE ELEC. CONTRACTOR SHALL DISCONNECT OR RECONNECT AS REQUIRED ALL ACTIVE DEVICES REMAINING ON THAT CIRCUIT SYSTEM.
20. DEVICE BOXES IN RATED WALLS SHALL MEET STANDARD BUILDING CODE SECTION 706.4.
21. ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE LABEL LISTED BY A NORTH CAROLINA APPROVED THIRD PARTY TESTING AGENCY.
22. ALL RECEPTACLES TO RECEIVE VISUAL DESIGNATION.
23. OUTLET BOX SHALL NOT BE MOUNTED BACK TO BACK.
24. BLANK FACEPLATES ARE NOT ALLOWED, U.N.O., ANY EXISTING OUTLET OR TELE/DATA LOCATION NOT USED OR SHOWN WITHIN THE SCOPE OF WORK IN THESE PLANS SHOULD BE REMOVED, PATCHED, AND REPAIRED.
25. MULTIWIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH A MEANS THAT WILL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS PER N.E.C. 210.4(B).
26. MULTIWIRE BRANCH CIRCUITS SUPPLYING POWER TO PERMANENTLY CONNECTED FREESTANDING PARTITIONS SHALL BE PROVIDED WITH A MEANS TO DISCONNECT SIMULTANEOUSLY ALL UNGROUNDED CONDUCTORS AT THE PANEL BOARD WHERE THE BRANCH CIRCUIT ORIGINATES PER N.E.C. 605.8.
27. ARC–FLASH HAZARD WARNING SHALL BE PROVIDED ON ALL EQUIPMENT IN AFFECTED ELECTRICAL ROOMS PER N.E.C. 110.16.
28. PROVIDE PLASTIC NAMEPLATE ON ALL PANELS (NEW AND EXISTING) INDICATING PANEL NAME AND SOURCE PER N.E.C 408.4(B).
29. ALL WIRING TERMINATIONS ARE ASSUMED TO BE 75DEG C RATED, UNLESS NOTED OTHERWISE. ALL WIRING UNDER 100A IS BASED ON A 60DEG C TERMINATION.

PROJECT TYPE

☒ New Construction (C405) ☐ Addition (C502) ☐ Alterations (C503)

When 'New Construction' is selected, indicate NCECC Section C406 method of compliance below. If project is other than 'New Construction', compliance with referenced section is 'N/A'.
Unless specifically exempt below, the contractor shall obtain the services of a NC licensed engineering professional to perform all required commissioning services of all lighting and lighting control systems in the project scope in compliance with NCECC Section C408.

NCECC 2018 SECTION C406 – COMPLIANCE STATEMENT

Method of Compliance

a. C406.1.1 More Efficient HVAC Performance	
b. C406.1.2 Reduced Lighting Power Density	X
c. C406.1.3 Enhanced Lighting Controls	
d. C406.1.4 On–Site Supply of Renewable Energy	
e. C406.1.5 Dedicated Outdoor Air System	
f. C406.1.6 Higher Efficiency Service Water Heating	

Refer to the following sheet for demonstration of compliance: N/A

NCECC 2018 SECTION C408 – SYSTEM COMMISSIONING

☐ Exempt (For Alterations only per NCECC C503.1 Exception 2.g.)

Refer to 2018 NCECC Appendix C1 for required statement of system commissioning to be presented to the AHJ at final inspections.

ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION	ON CENTER MTG. HT.
	CONCEALED CONDUIT IN CEILING OR WALL	
	CONCEALED CONDUIT IN FLOOR OR UNDERGROUND	
	CIRCUIT HOMERUN TO PANEL; EACH ARROWHEAD = 1 CIRCUIT	
	NO. OF CONDUCTORS IN CONDUIT; EACH CROSSHATCH = 1 WIRE	
	FLEXIBLE CONDUIT OR S.O. CORD	
	EXPOSED CONDUIT	
	CONDUIT STUBBED UP OR TURNED DOWN	
	PLYWOOD BACKBOARD	
	SURFACE MOUNTED RACEWAY	
	MULTI OUTLET SURFACE MOUNTED RACEWAY	
	WALL MOUNTED SINGLE RECEPTACLE OUTLET	18"
	WALL MOUNTED DUPLEX RECEPTACLE OUTLET	18"
	WALL MOUNTED DUPLEX RECEPTACLE OUTLET – ABOVE COUNTER	AS REQUIRED
	WALL MOUNTED G.F.C.I. DUPLEX RECEPTACLE OUTLET	18"
	WALL MOUNTED G.F.C.I. DUPLEX RECEPTACLE OUTLET – ABOVE COUNTER	AS REQUIRED
IG	WALL MOUNTED ISOLATED GROUND DUPLEX RECEPTACLE OUTLET	18"
	WALL MOUNTED DOUBLE DUPLEX RECEPTACLE OUTLET	18"
	WALL MOUNTED SPECIAL RECEPTACLE OUTLET	18"
J	JUNCTION BOX	
	WALL MOUNTED COMBINATION DATA/VOICE OUTLET. PROVIDE JUNCTION BOX WITH 3/4" CONDUIT TO ABOVE CEILING.	18"
	WALL MOUNTED VOICE OUTLET. PROVIDE JUNCTION BOX WITH 3/4" CONDUIT TO ABOVE CEILING.	18"
	WALL MOUNTED DATA OUTLET. PROVIDE JUNCTION BOX WITH 3/4" CONDUIT TO ABOVE CEILING.	18"
	JUNCTION BOX FOR TV. PROVIDE JUNCTION BOX WITH 3/4" CONDUIT TO ABOVE CEILING.	
	2–GANG JUNCTION BOX FOR AV, LOW–VOLTAGE WIRING BY OTHERS. PROVIDE JUNCTION BOX WITH 1–1/4" CONDUIT TO ABOVE CEILING. U.N.O.	
CR	JUNCTION BOX FOR CARD READER. PROVIDE JUNCTION BOX WITH 3/4" CONDUIT TO ABOVE CEILING.	42"
CAM	DOME CAMERA (PROVIDED BY SECURITY CONTRACTOR)	
AP	WIRELESS ACCESS POINT, CEILING MOUNTED (BY OTHERS)	
S	SPEAKER LOCATION (BY OTHERS)	
	FLOOR BOX DEVICES WITH POWER, TELE/DATA, AV PER PLANS (SEE DRAWINGS FOR MODEL#)	
	FLOOR BOX DEVICES WITH POWER AND TELE/DATA PER PLANS (SEE DRAWINGS FOR MODEL#)	
	FLOOR BOX DEVICES WITH QUAD RECEPT & TELE/DATA OUTLETS (SEE DRAWINGS FOR MODEL#)	
AV	FLOOR BOX DEVICES WITH QUAD RECEPT & TELE/DATA/AV OUTLETS (SEE DRAWINGS FOR MODEL#)	
AV	FLOOR BOX DEVICES WITH ONLY TELE/DATA/AV OUTLETS (SEE DRAWINGS FOR MODEL#)	
	FLOOR BOX DEVICE TO MODULAR FURNITURE	
PJ #	JUNCTION BOX FOR POWER CONNECTION TO MODULAR FURNITURE. COORD. EXACT LOCATION WITH ARCH. PROVIDE ALL REQ. CONNECTIONS (THE # OF WORKSTATIONS TO BE POWERED ARE DENOTED BY A NUMBER NEXT TO THE POWER JUNCTION)	18"
T/D J	JUNCTION BOX FOR TELE/DATA CONNECTION TO MODULAR FURN. COORD. EXACT LOCATION WITH ARCH. PROVIDE 1–1/4" EMPTY CONDUIT WITH PULLSTRING TO ABOVE ACCESSIBLE CEILING.	18"
J PP #	PROVIDE AND INSTALL JUNCTION BOX ABOVE CEILING TO SUPPLY POWER WHICH SHALL SUPPLY EACH WORKSTATION WITH TWO (2) DUPLEX AND ONE (1) VOICE DATA, POWER POLE TO BE SUPPLIED BY TENANT AND INSTALLED BY E.C. (THE # OF WORKSTATIONS TO BE POWERED ARE DENOTED BY A NUMBER NEXT TO THE POWER POLE)	
	120/208 VOLT PANELBOARD	
	RECESSED MOUNTED 120/208 VOLT PANELBOARD	
T	TRANSFORMER	
	LIGHT FIXTURE	
	EXIT SIGN – CEILING,WALL MT.	
	LIGHT FIXTURE ON EMERGENCY 90 MINUTE BATTERY PACK	
S	WALL MOUNTED S.P.S.T. TOGGLE SWITCH	42"
S 3	WALL MOUNTED 3–WAY TOGGLE SWITCH	42"
S 4	WALL MOUNTED 4–WAY TOGGLE SWITCH	42"
S D	WALL MOUNTED DIMMER SWITCH (WATTAGE AS REQUIRED)	42"
S T	WALL MOUNTED TIMER SWITCH	
S OV	WALL MOUNTED MANUAL OVERRIDE SWITCH (TO OVERRIDE CIRCUIT DESIGNATED AT LIGHTING CONTACTOR PANEL)	42"
	MOTION DETECTOR SWITCH W/ MANUAL OVERIDE – WALL MOUNTED.	42"
	MOTION DETECTOR – CEILING MOUNTED	
	DAYLIGHT SENSOR	
S M	MOTOR RATED TOGGLE SWITCH	AS REQ'D.
	COMBINATION MOTOR STARTER/DISCONNECT SWITCH	
S (30/3)	DISCONNECT SWITCH (FRAME/POLES/FUSE–IF REQUIRED)	
(2)	MOTOR – NUMBER INDICATES HORSEPOWER (F=FRACTIONAL)	
	FIRE ALARM ADA APPROVED VISUAL ALARM – WALL MOUNTED	80" A.F.F.
	FIRE ALARM ADA APPROVED VISUAL ALARM – CEILING MOUNTED	
	FIRE ALARM ADA APPROVED AUDIO/VISUAL ALARM – WALL MOUNTED	80" A.F.F.
	FIRE ALARM ADA APPROVED AUDIO/VISUAL ALARM – CEILING MOUNTED	
	FIRE ALARM PULL STATION	48" A.F.F.
	SMOKE DETECTOR – CEILING MOUNTED	
	DUCT MOUNTED SMOKE DETECTOR	
	MAGNETIC DOOR HOLD DEVICE TO INTERLOCK WITH FIRE ALARM SYSTEM	
	TAMPER SWITCH – FIRE ALARM	
	FLOW SWITCH – FIRE ALARM	
	HEAT DETECTOR – FIRE ALARM	
F.B.O.	FURNISHED BY OTHERS	
AFF/AFG	ABOVE FINISHED FLOOR/ABOVE FINISHED GRADE	
BC	BELOW CEILING	
AC	ABOVE COUNTER	
WP	WEATHER PROOF	
E,EX/RE/N	EXISTING/RELOCATED/NEW	
GFI	GROUND FAULT INTERRUPTING CIRCUIT	
E.C.	EMPTY CONDUIT (PROVIDE PULLSTRING IN ALL EMPTY CONDUIT)	
FPMR	FUSE PER MANUFACTURER'S RECOMMENDATION	
IG	ISOLATED GROUND	

NOTES:
1. COORDINATE LOCATION AND SPECIFIC MOUNTING HEIGHT WITH ARCHITECT.
2. MOUNTING HEIGHTS SHALL BE AS INDICATED IN THE LEGEND UNLESS OTHERWISE NOTED ON THE PLANS.

DRAWING NO.
CFD-XXX-E-001-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:
ILLNESS ZERO INJURY
Reduce Risk
Remove Exposures to Hazards
Reinforce Safe Behavior

LS3P

BW&A Barrett, Woodyard and Associates, Inc.
License # C–2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704–357–9333 (f) 704–357–9385

BWA JOB # 2022–0632

NORTH CAROLINA PROFESSIONAL SEAL 047171 ENGINEER SCOTT LOWERY
SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:
DRAWING NUMBER
CFD-XXX-E-001-XXXXX
ELECTRONIC FILE NAME:
DRAWN BY: JFE
CHK'D BY: JSL DATE:
E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
LEGENDS & DETAILS – ELECTRICAL

SHEET NO.
E-001

BW&A 26 01 00ELE.DOC 26 01 00-7
CSI MASPEX (Revised 1/13)Electrical General

SECTION 26 01 00

ELECTRICAL GENERAL

PART 1 – GENERAL

1.1 SCOPE

A. Division 26 includes all Specifications in the 260000 Series and the accompanying Electrical Drawings. Provide all labor, materials and equipment, and all necessary operations to provide the complete scope of the electrical systems intended under this Division. Division 26 is not a stand alone document, but a part of the complete Project Documents.

B. Attention is called to the fact that there are many interfaces between the work required in this Division and the work required in other Divisions. Provide the necessary interface and coordination with other Divisions to provide a complete project.

1.2 EXISTING CONDITIONS [NOT APPLICABLE]

1.3 CODES AND REGULATIONS

A. All work under this Division shall comply with all local building codes, laws, regulations, ordinances and the requirements of the 2011 National Electrical Code.

B. Where conflicts of installation requirements occur between the aforementioned codes, regulations or the Contract Documents, the most restrictive shall govern.

C. Obtain all permits and licenses and pay all fees required by local authorities. Arrange for all necessary inspections required by the authorities having jurisdiction and provide written certificates of approval to the project Owner or his designated representative.

1.4 DEFINITIONS

A. Contract Documents: The complete set of project Drawings and Specifications.

B. Provide: Furnish, install and connect.

C. Work: All materials installed, including all labor to provide complete system.

D. Wiring or Wired: All wire or cable installed in conduit from panelboard to equipment and connected at both ends with all required boxes, connectors, couplings, etc.

E. Conduit: Rigid steel conduit intermediate metal conduit (I.M.C.), electrical metallic tubing (EMT) plastic conduit (PVC), electrical non–metal tubing (ENT), or flexible steel conduit.

1.5 DRAWINGS AND SPECIFICATIONS

A. The Drawings and Specifications together are to be considered as the Contract Documents. Any work shown in one and not shown in the other, or implied by either, shall be provided to give a complete project.

B. Should any conflicts exist between the Drawings and Specifications or there is an item shown/called for which is not clearly defined, immediately submit a request for clarification. No additional monies will be granted later when a conflict is resolved or an item is more clearly defined.

C. The Drawings are schematic and are not intended to show the exact location outlets, etc. or the routing of conduit.

D. The exact location of equipment requiring electrical connections (mechanical equipment, elevators, lights, etc.) shall be as located by other Divisions of the Contract Documents. Refer to the Architectural, Structural and Mechanical Documents for dimensions and details of building construction and provide work described in this Division so that it conforms to the details of the project. The right is reserved to relocate any receptacle, switch or other outlet a maximum of 10'–0" before it is permanently installed without incurring additions to the Contract amount.

1.6 SITE VISIT

A. Visit the site and become familiar with all aspects of the site and existing conditions before submitting Contract price.

B. No allowance will be made for lack of knowledge of existing conditions.

1.7 DEVIATIONS

A. No deviations from the Contract Documents shall be made without the full knowledge and written consent of the Architect.

B. If the existing conditions make it desirable to modify the Contract Documents in regard to any item, provide a written request to the Architect.

PART 2 – PRODUCTS

2.1 STANDARDS FOR MATERIALS AND WORKMANSHIP

A. All materials used shall be new and shall be stamped with the label of Underwriters Laboratories, Inc. (UL).

B. All materials shall meet the standards of the following associations and institutes where applicable:

1. National Fire Protection Association (NFPA)
2. American Society of Testing Materials (ASTM)
3. American National Standards Institute (ANSI)
4. National Electrical Manufacturer's Association (NEMA)
5. Institute of Electrical and Electronic Engineers (IEEE)

C. Manufacturer's names and catalog numbers specified herein are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Requests for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days before bid date. All requests shall conform with the provisions of the general and supplementary conditions.

D. Samples of materials requested to be substituted shall be furnished upon the request of the Architect.

2.2 SHOP DRAWINGS AND SUBMITTAL

A. The Engineer's review of shop drawings or submittals is a cursory review to check for general compliances of submittals with the design intent of the Contract Documents. The Engineer's review does not relieve the Contractor of his responsibility of complying with the Contract Documents. All coordination of the work in strict compliance with the Contract Documents is the sole responsibility of the Contractor.

B. The following items shall be submitted for review:

1. Conduit and wire
2. Grounding system
3. Devices
4. Coverplates
5. Under floor duct
6. Metering equipment
7. Panelboards
8. Switchboards
9. Transformers
10. Fuses
11. Overcurrent devices
12. Busway
13. Ground fault system
14. Disconnect switches
15. Lighting fixtures
16. Lighting control system
17. Dimming system
18. Life safety system
19. Emergency system
20. Motor starters
21. Motor control center
22. Surge Protective Devices
23. Lightning Protection System

C. All shop drawings and submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the contractor.

D. All submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the contractor will bare all responsibility for paying for the engineer's time for additional reviews. Such payments to the engineer shall be withheld from the next monthly pay application.

2.3 RECORD (AS–BUILT) DRAWINGS AND MAINTENANCE MANUALS

A. At job completion, submit to the Architect, a set of prints showing all deviations from the Contract Documents. The Drawings shall also have dimensions locating all underground conduits.

B. At job completion, submit to the Architect, three (3) sets of maintenance and instruction manuals for all equipment furnished on the project.

PART 3 – EXECUTION

3.1 COORDINATION

A. Coordinate all space requirements with all other Divisions before installing any work. Install work such that adequate space will be allotted for all other work from other Divisions to be installed and also will allow room for future access for repair and maintenance.

B. Any work installed without proper coordination shall be relocated at the Architect's direction without increasing the Contract price.

C. During the bidding process or the pricing for a guaranteed maximum price, coordinate with all other Divisions for the total amount of work required in Division 26. Any work shown or implied in another Division requiring work in Division 26 shall be included in the Contract price regardless of whether or not it is addressed in Division 26.

3.2 PROTECTION OF MATERIALS

A. All equipment shall have the original finish when the building is turned over to the Owner.

B. Protect equipment during construction from dirt, water, chemical, mechanical damage, etc. Protect all conduit openings so that no foreign material will enter the conduit.

3.3 TESTS, DEMONSTRATION AND INSTRUCTIONS

A. Test all systems described in this Division in the presence of the Owner or a designated representative upon completion of the work. Demonstrate that the installation is in accordance with Contract Documents.

B. Any work found not to be in compliance with the Contract Documents shall be repaired or replaced without incurring any additions to the Contract price.

C. Provide to the Owner, all instruction on maintenance and operation of all systems and equipment provided under this Division. Provide all necessary tools and personnel to thoroughly present these instructions.

3.4 GUARANTEE

A. All systems, equipment, components, work, etc. provided under this Division shall be covered by a one year guarantee starting at the time of final acceptance of the work by the Owner. Any defects in the work, systems, equipment or components found during this year shall be corrected at no charge. The guarantee shall include providing all necessary cutting, patchwork, repainting, etc. to make the work complete and new.

B. Present this guarantee and any additional warranties or guarantees on furnished equipment or systems to the Architect. All equipment or system guarantees are in addition to the general guarantee.

END OF SECTION

SECTION 26 10 00

ELECTRICAL BASIC MATERIALS & METHODS

PART 1 – GENERAL

1.1 DESCRIPTION

A. All work specified in this Section shall comply with the provisions of Section 26 01 00.

B. This Section describes the basic electrical materials and installation methods that are acceptable and applicable to Division 26.

PART 2 – PRODUCTS

2.1 CONDUIT

A. Galvanized rigid steel conduit shall be low carbon, hot–dipped galvanized both inside and out with threaded joints.

B. Intermediate metal conduit (IMC) shall be steel, galvanized both inside and out with threaded joints.

C. Electrical metallic tubing (EMT) shall be steel, galvanized both inside and out.

D. Plastic conduit (PVC) shall be schedule 40 PVC heavy wall type. A grounding conductor shall be provided.

E. Electrical non–metallic tubing (ENT) shall be of such material that it is resistant to moisture, chemical atmospheres and is flame retardant. A grounding electrode conductor shall be provided.

F. Flexible metal conduit shall be flexible steel conduit tubing and shall meet Underwriters Laboratories Standard for Flexible Steel Conduit.

G. Liquid–tight flexible metal conduit and liquid–tight non–metallic conduits shall be liquid–tight and sunlight resistant.

H. Steel conduit approved manufacturers are Allied, Triangle and Republic.

I. PVC and ENT conduit approved manufacturers are Carlon and Triangle.

2.2 CONDUIT FITTINGS

A. Rigid conduit and IMC conduit fittings shall be zinc–coated, ferrous metal and taper threaded type.

B. EMT fittings shall be zinc–coated steel and hexnut compression or set–screw type. EMT connectors shall have insulated throats.

C. PVC fittings, elbows and cement shall be produced by the same manufacturer. All joints shall be solvent welded in accordance with the manufacturer's recommendations.

D. Conduit connections to switchboards, motor control centers, transformers, panel cabinets, and pull boxes shall have grounding wedge lugs between the bushing and the box or locknuts designed to bite into the metal.

E. Each conduit end shall be provided with either an insulated throat connector or separate locknut and insulated bushing. Bushing shall be installed before any wire is pulled.

F. Conduit fittings approved manufacturers are Raco, Steel City, O.Z. Gedney, Thomas & Betts and Appleton.

G. Expansion fittings shall be provided in all conduit which crosses and expansion joint.

2.3 CONDUCTORS

A. Conductors shall be copper of 98% conductivity, 600 volt insulation. Sizes specified are AWG gauge for No. 4/0 and smaller and circular mils (MCM) for all sizes larger than no. 4/0. Conductors No. 10 and smaller shall be solid and type "THHN" or "THWN" insulation. No. 8 and larger shall be stranded and type "THW" or "XHHW" insulation.

B. Aluminum conductors may be used for service lateral conductor if the same or larger capacity of the conductors specified. Aluminum conductors shall be Alcan 8000 series, Stabiloy or approved equal.

2.4 OUTLETS

A. Outlet boxes and covers shall be of such form and dimensions as to be adapted to their specified usage, locations, size and quantity of conduit, and size and quantity of conductors entering the boxes. In special "Fire Rated" partitions, outlets shall comply with ASTM No. E119.

B. Flush ceiling outlets for surface or pendant mounted lighting fixtures shall be one–piece 4" square or octagonal pressed steel boxes. Boxes for devices in unfinished masonry walls or stud walls shall be pressed steel, square corner, sectional switch boxes, or shall be 4" square box with a square cornered tile wall cover, set flush with masonry construction. Boxes in concrete ceiling slab shall be octagonal, shallow concrete boxes. Welded boxes are not acceptable.

C. All outlet boxes in plaster or masonry walls or ceiling shall be provided with plaster rings.

D. Junction boxes and all outlets not indicated as containing wiring devices or lighting fixtures shall have covers. Covers for outlets in walls shall be as specified for wall switches and receptacles.

E. Outlet boxes exposed to the weather and outlet boxes for vaportight lighting fixtures and devices shall be of cast iron corrosion resistant type.

F. Outlet box approved manufacturers are Appleton, Raco, Steel City, or Crouse–Hinds.

2.5 DISCONNECT SWITCHES

A. Disconnect switches shall be "heavy–duty" type, enclosed switches of quick–make, quick–break construction. Switches shall be horsepower rated for 600 volts AC as required. Lugs shall be UL listed for copper and aluminum.

B. Padlocking provisions shall be provided for padlocking in the OFF position.

C. Switches shall be furnished in NEMA 1 General purpose enclosure unless noted otherwise. Switches located on the exterior of the building or in "wet" locations shall have NEMA 3R enclosures.

D. Fused disconnect switches shall have rejection type fuse clips with dual element, current limiting fuses of rating shown.

E. Disconnect switches shall be mounted to structure. Disconnect switches shall not be mounted to mechanical equipment or ductwork.

2.6 NAMEPLATES

A. Nameplates shall have 3/8" high engraved letters.

B. 120 or 208 volts: white core laminated bakelite with black finish.

C. 277 or 480 or higher volts: white core laminated bakelite with red finish.

D. Nameplate shall indicate the panel name and the name of the device or equipment where the power supply/feeder originates.

2.7 WALL SWITCHES

A. Wall switches shall be plastic, totally enclosed, quiet type, self–grounding, 277 volts and 20A rating and shall match existing if possible and equal the following (or equal by Leviton, P&S, or Cooper):

1. Single Pole: Hubbell No. CS1221
2. Double Pole: Hubbell No. CS1222
3. Three–Way: Hubbell No. CS1223
4. Four–Way: Hubbell No. CS1224

B. Color shall be as selected by architect.

C. Flush motor switches with red pilot light and with overload protection for fractional horsepower motors shall be Hubbell No. HBL1221PL.

D. Key switches shall be Hubbell No. HBL1221L 20A Series or approved equal by P&S or Leviton.

2.8 WALL MOUNTED OCCUPANCY SWITCHES

A. The passive infrared sensor shall be a completely self–contained control system that replaces a standard toggle switch. Sensor shall have ground wire for safety. Switching mechanism shall be a latching air gap relay, compatible with electronic ballasts, compact fluorescent and inductive loads. Triac and other harmonic generating devices shall not be allowed.

B. Sensor shall cover up to 1000 sq. ft. for walking motion, with a field of view of 180 degrees.

C. Sensor shall have system which provides superior 180 degree coverage.

D. Sensor shall operate at 120 VAC or 277 VAC.

E. Sensor shall have no minimum load requirement and shall be capable of switching from 0 to 500 watt incandescent; 0 to 800 watts fluorescent or 1/6 hp @ 120 VAC, 60 Hz; and 0 to 1200 watts fluorescent or 1/3 hp @ 277 VAC, 60 Hz.

F. For accuracy and consistency, sensor shall have a DIP switch controlled, digital time delay adjustable from 15 seconds to 30 minutes.

G. Sensor shall have standard 5 year warranty and shall be UL and CUL listed.

H. Sensor shall be Wattstopper WI Series, Leviton Decora Series, or approved equal by engineer.

2.9 RECEPTACLES

A. Duplex receptacles shall be plastic, two–pole, three wire, self–grounding, side wired, 125 volts and 15A rating and shall match existing if possible and be equal to the following (or equal by Leviton, P&S, or Cooper):

1. Standard receptacle: Hubbell No. 5362 Series
2. Tamper resistant type:Hubbell No. CR20*TR Series
3. Isolated ground type: Hubbell No. CR5352IG Series
4. Hospital grade (HG) type: Hubbell No. HBL8300 Series
5. HG Tamper resistant type: Hubbell No. HBL8300SG Series
6. GFCI: Hubbell No. GF20*LA Series
7. GFCI HG: Hubbell No. GFR8300H*LA
8. GFCI HG tamper resistant: Hubbell No. GFR8300H*TR

B. Single receptacles shall be two–pole, three wire, self–grounding, side wired, 125 volts and 20A rating and shall be equal to the following (or equal by Leviton, P&S, or Cooper):

1. Standard receptacle: Hubbell No. HBL5361 Series
2. Isolated ground type: Hubbell No. IG5361 Series

C. Color shall be as selected by the Architect.

D. Receptacles in all patient care areas shall be hospital grade type per NEC article 517.18.

E. Receptacles in all pediatric care areas shall be tamper resistant type per NEC article 517.18(C).

2.10 COVERPLATES

A. Coverplates for flush mounted devices shall be brushed finished stainless steel standard size, Hubbell "P" Series or equal by Leviton, P&S, or Cooper.

B. Telephone and data outlet coverplates shall have same finish as above.

C. Coverplates for exterior devices shall be self–closing, die–cast aluminum Hubbell WP8M or equal by Leviton, P&S, or Cooper.

2.11 PLYWOOD BACKBOARDS

A. Provide plywood backboards where shown. Backboards shall be minimum 3/4" thick and sized as shown or to accommodate equipment indicated to be mounted thereon.

B. Secure plywood to the building structure and paint with two coats of gray paint.

2.12 SMOKE AND FIRE STOP FITTINGS

A. Smoke and Fire Stop Fittings shall be UL listed for that purpose. The fittings used to seal conduit either on the outside of the conduit, busway or cable or internally shall have heat activated intumescent material, which expands to fill all voids. Smoke and fire stop fittings shall be O.Z./Gedney "FIRE–SEAL" or Dow Corning silicone RTV foam with an hourly fire–rating equal to or higher than the rating of the floor, ceiling or wall through which the cable or conduit passes. The seals for conduit shall be of the flanged type.

2.13 FLOOR OUTLETS

A. Floor outlets shall be single gang floor boxes, Hubbell B2436 Series, complete with cast iron body, vertical angular adjustment, brushed brass frame, brushed brass floor plate and gasket. Larger than standard tappings shall be furnished where required. Adjacent boxes shall be installed on minimum 7" centers.

B. Duplex floor receptacle outlets shall have Hubbell No. S3825 floor plate, a No. SB3083 carpet plate where installed in carpeted floor and a Hubbell CR5262 Series duplex receptacle. Single floor receptacle outlets shall have a S2625 plate and Hubbell single receptacle. Equal manufacturers shall be Leviton, P&S, or Cooper.

2.14 FUSES

A. Provide all fuses. All fuses shall be of the same manufacturer. All fuses shall be of the high interrupting rating (200,000 Amps), current limiting type and manufactured by Bussmann. Fuses shall be provided for each fuse cutout and the specified quantity of fuses shall be furnished for spares.

B. Circuits 0 to 600 ampere shall be protected by rejection type, current limiting BUSSMANN LOWPEAK Dual Element Fuses LPN–RK (250 volts) or LPS–RK (600 volts). All dual–element fuses shall have separate overload and short–circuit clearing chamber. The fuse must hold 500% of rated current for a minimum of 10 seconds and be listed by Underwriter's Laboratories, Inc., with an interrupting rating of 200,000 amperes RMS symmetrical. The fuses shall be UL Class RK–1.

C. Circuits 601 to 6000 ampere shall be protected by current limiting BUSSMANN HI–CAP Time–Delay Fuses KRP–C. Fuses shall employ "0" rings as positive seals between the end bells and the glass melamine fuse barrel. The terminals shall be opened. Fuses shall be time–delay and must hold 500% of rated current for a minimum of 4 seconds, clear 20 times rated current in 0.1 seconds or less and be listed by Underwriter's Laboratories, Inc., with an interrupting rating of 200,000 amperes RMS symmetrical. The fuses shall be UL Class L.

D. Furnish and turn over to the Owner a minimum of one (1) set of spare fuses (set consisting of three fuses) for each type and rating of fuse used. When the number of fuse sets of the same type and rating actually installed exceeds five (5) sets, furnish an additional spare set of fuses for each five (5) or fraction thereof.

E. Provide a cabinet in which to store all spare fuses, Bussmann Catalog No. SFC

F. Acceptable manufacturers are Bussmann or equal by Littelfuse.

PART 3 – EXECUTION

3.1 CONDUIT

A. Rigid steel (or IMC) shall be used for service entrance and all feeders and branch circuits where exposed to damage.

B. EMT shall be used for branch circuits, fire alarm and telephone when not underground or in concrete in contact with the earth.

C. Schedule 40 PVC may be used for all underground feeders, service entrance conductors when encased in 4" of concrete on all sides, or under the lowest floor slab.

ENT may be used for branch circuits in concealed areas which is not used as an environmental air plenum.

D. Conduit shall be continuous from outlet to outlet, from outlet to cabinet, junction box and pull box. Conduit shall enter and be secured to all boxes, etc., in such a manner that each system will be electrically continuous from service to all outlets such that a good ground is provided. All conduit from cabinets and junction boxes shall terminate in approved outlet boxes or conduit fittings. Conduit connections to any box which has no threaded hub shall be double locknutted.

E. Provide junction boxes or pull boxes where shown and where necessary to avoid excessive runs or too many bends between outlets. The conduit sizes shown may increase if desired to facilitate the pulling of cables.

F. All conduit shall be concealed unless indicated otherwise. Install exposed conduit parallel with or at right angles to the building walls and support from walls or ceilings at intervals required by Code with approved galvanized iron clamps or hangers. Concealed conduit above the ceiling shall be supported independent of ceiling construction. Where ceilings of lay–in type are used, conduit must be installed high enough to permit removal of ceiling panels and lighting fixtures. Use threaded rods and hangers for supporting single conduit. Use trapeze hangers consisting of double–nutted threaded rods and "Unistrut" channels or angles of 12 gauge minimum steel for supporting multiple conduit.

G. Minimum size conduit for branch circuits shall not be smaller than 1/2". Home runs shall extend from outlets shown to panel designated. Home runs shown shall not be combined. Home run conduit shall not be smaller than 3/4".

H. At couplings, conduit ends shall be threaded so that they meet in the coupling. Right and left hand couplings shall not be used; conduit couplings of the Erikson Type shall be used at locations requiring such joints.

I. All conduit for future use, for telephone wire, or for data communication cable, shall be left with No. 16 gauge wire pulled in them or a pull line as manufactured by Ideal, and the ends securely corked or capped.

J. Expansion fittings shall be installed in all conduit which pass through the cross–sectional area of expansion joints.

DRAWING NO.
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NORTH CAROLINA PROFESSIONAL SEAL 047417 ENGINEER SCOTT LOWERY

SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-002-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:

SPECIFICATIONS - ELECTRICAL

SHEET NO.

E-002

Gardner Bender duct seal, for each conduit entering the building from outside and for each conduit passing from one space into another which is normally at a lower temperature.

L. Provide watertight conduit hubs on conduit terminating in a box or cabinet exposed to the weather.

M. Space in sleeves or around conduit that pass through fire resistive or fire rated walls, partitions, floors or ceilings shall be closed by packing with an unlabelled fire resistive material that will maintain the rating of the barrier penetrated.

3.2 FLEXIBLE CONDUIT

A. PVC extruded cover flexible conduit shall be used in making short flexible connections to rotating or vibrating machinery or equipment. The flexible conduit at these locations shall be as short as possible, but shall have a minimum length of 12".

B. A green stranded bonding jumper shall be installed outside of all flexible conduit that extends directly from a non-flex conduit to a rotating or vibrating machine. Where a junction box is used, the green stranded bonding jumper shall be installed inside the flexible conduit and attached to the junction box and to the machine. When the bonding jumper is installed outside of the flexible conduit, plastic wire straps shall be used 6" o.c. to secure the jumper to the flexible conduit.

C. Flexible metal (MC) conduit system may be utilized where concealed in walls and/or millwork only. MC Cable shall run from point of exit from wall or millwork to nearest structurally supported junction box. MC cable will not be permitted to be installed in the above ceiling space and shall not pass through a fire rated partition. Conductor colors of the MC cable shall comply with 26 10 00 3.4 D.

1. MC cable shall be constructed to have an insulated, copper ground conductor. Sheathing with a bare aluminum conductor shall not be used as the ground.

2. MC cable in patient care areas shall be hospital grade (HCF) to comply with NEC 517.13.

3.3 CONDUIT PROTECTION

A. All conduit installed in the ground outside the building exterior line (with the exception of exterior lighting circuits) shall be encased in 4" of concrete on all sides. Concrete shall be a minimum of 3000 P.S.I. mix. All threaded joints in rigid conduit that is encased in concrete shall have a U.L. listed joint compound applied. All conduit installed outside the building underground shall be buried a minimum of 30" below finished grade but in no case shall be buried deeper than 48". Where conduit is installed below the ground floor slab inside the building exterior line, the conduit shall be run between the floor slab and the vapor barrier. These conduits shall be installed in the slab itself where feasible. When a conduit duct bank must be installed then the entire duct bank shall be encased in concrete and installed per Appendix B of the NEC. Derating of conductors in the underslab duct bank shall be the responsibility of the contractor. Conduit installed in any slab, where permitted above, shall be above the bottom steel and below the top steel.

B. Conduit shall be secured in place and protected where necessary to prevent damage to work during construction. The ends of all conduit shall be plugged to avoid filling with any foreign matter. All conduit shall be blown out and swabbed clear of water and trash prior to pulling wire.

C. Provide identifying marker tape the entire length of each conduit installed in the ground outside the building. The tape shall be constructed of inert polyethylene, resistant to acids, alkalis, etc., in the soil, and shall be a minimum 4 mil thickness. The tape shall be yellow, 6" wide, and shall have the words, "CAUTION – ELECTRIC LINE BURIED BELOW," imprinted with contrasting permanent ink. The imprint shall repeat itself for the entire length of the tape. The tape shall be buried at a maximum of 18" below finished grade, above a portion of the earth fill shall be "Terra Tape" as manufactured by Reef Industries, Inc., P.O. Box 33248, Houston, Texas 77033 (1-800-231-6074).

3.4 WIRING

A. All conductors shall be installed in conduit. No conductors shall be pulled into the conduit until the conduit system is complete and plaster had dried. Wire pulling lubricants shall be Gardner-Bender "Wireaide" or Ideal "Yellow 77".

B. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with pressure type connectors, Gardner Bender "Winggard" or Ideal "Wingnut". Tape shall be "Scotch" No. 33 for indoor and No. 88 for outdoor or Gardner Bender No. 95-661. Where connection is made to any terminals of more than 30 amperes capacity and where conductors larger than No. 10 are connected to any terminal, copper terminal lugs shall be bolted to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used. Aluminum conductors, if used for service conductors, shall be made with high compression lugs as manufactured by Square D, Ideal or MAC.

C. Each conduit shall have a minimum of two (2) conductors pulled in unless that particular conduit is noted as being for systems other than electrical circuitry and/or future use or unless noted otherwise.

D. Conductors for lighting and receptacle circuits shall have color coded jackets. The wiring shall be color coded with the same color used with its respective phase through the entire job as follows:

208/120 Volt System	480/277 Volt System
Phase A – Black	Phase A – Brown
Phase B – Red	Phase B – Orange
Phase C – Blue	Phase C – Yellow
Neutral – White	Neutral – Gray
Ground – Green	Ground – Green

E. The feeder and service entrance conductors shall be color coded by the use of colored plastic tape applied within 6" of each conductor end.

F. Branch circuit conductors shall not be smaller than No. 12 and where the home run from center of load exceeds 100'-0", the conductors from home run outlet to panel shall be No. 10 minimum.

G. For branch circuits terminating in outlet without device, leave minimum of 12" of slack wire coiled for connection of equipment. All conductors shall be identified with proper circuit numbers at terminals, junction boxes at panelboards within 6" of conductor ends.

3.5 OUTLETS

A. Provide galvanized steel or cast type boxes for all outlets.

B. Where outlet boxes are used to support lighting fixtures, the outlet box shall be anchored to the structural members of the building per NEC 370-13.

C. Outlet boxes shall be flush mounted unless they are specifically shown as being used with exposed conduit or are located above a ceiling.

D. Where outlets are supplied from conduit run in or below floor slabs, the conduit shall be stubbed up at the location shown and the wall built up around the conduit.

E. Cuts for outlet boxes in masonry walls shall be made so that the coverplate will completely cover the cut. The mounting height of switch, receptacle and other outlets may be varied slightly, with the Architect's approvals, so that the outlet box, top or bottom, will occur at a masonry joint.

F. The edge of all outlet boxes shall be flush with the surface in which they are recessed. The devices that fit into the outlet boxes shall be screwed tight before the coverplate is installed and the coverplate shall not be used as a means of tightening the devices in place.

G. Where outlets are shown as being adjacent and different mounting heights are specified for each, they shall be mounted one directly over the other, on the centerline of the group.

3.6 NAMEPLATES

A. Provide specified nameplates on the main switchboard, distribution panels, feeder switches, feeder breakers, panelboards motor control centers, disconnect switches, contactors, starters, transformers, start-stop push buttons and motor switches.

B. Provide nameplates on every device in the main switchboard, distribution panels and motor control centers.

C. Nameplates for surface mounted equipment shall be installed on the exterior of equipment with sheetmetal screws. Nameplates for flush or recessed mounted equipment shall be installed on the inside of the panel door or cover with epoxy cement.

3.7 WALL SWITCHES AND RECEPTACLES

A. Where more than one device is indicated at a location, the devices shall be gang-mounted in combined multi-gang boxes and covered jointly by a common coverplate. Provide barriers as required by the devices and voltages being used.

3.8 COVERPLATES

A. All junction boxes, outlet boxes, multi-gang switch boxes, utility boxes, etc., shall be covered with a coverplate. The coverplate shall be a finished plate as specified unless designated otherwise.

B. Coverplates shall be mounted vertically unless designated otherwise.

3.9 GROUNDING

A. Ground connections shall be in accordance with the National Electrical Code.

1. Provide a grounding electrode system consisting of a minimum of three (3) copperweld rods, 3/4" x 10'-0", driven 24" below grade a minimum of 72" apart in the form of an equilateral triangle, bonded together with No. 4/0 conductors. Install rods a minimum of 36" clear of foundation walls to effect the building ground. If the resistance to ground exceeds 25 ohms, additional rods shall be driven and bonded together until a reading of 25 ohms or less to ground is obtained. After completion of the grounding system, measure the system ground resistance with a "Megger Earth Tester". Submit directly to the Architect two (2) copies of each test report certified by the testing technician and the Owner's representative.

2. Extend from the electrodes to the main service disconnect with a No. 4/0 copper insulated ground conductor in a 1" conduit and connect to the neutral bar, housing and frame.

3. Provide a No. 4/0 copper insulated conductor across the water meter with the conductor attached with clamps to the water line on each side of the meter.

4. Provide a No. 4/0 copper insulated ground conductor in a 1" conduit from cold water entrance pipe ahead of first valve to the main service disconnect and connect to the neutral bar, housing and frame.

5. Where nonmetallic insulating couplings or dielectric flanges are used in metallic water piping systems, provide a No. 4/0 copper, insulated ground conductor across the couplings with the conductor attached with clamps to the water line on each side of the coupling.

6. All ground connections in the building system ground shall be done with Cadweld.

7. All ground clamps shall be equipped with compression type cable lugs independent of the compression device clamping the pipe or rod.

8. All steel conduit entering the main service disconnect shall have threaded conduit insulated grounding bushings. All bushings shall be bonded together and bonded to the main grounding bus with a No. 4 bare conductor.

B. Provide an insulated green bonding jumper from the grounding lug of all receptacles to a Steel City "GEE" clip or a sheet metal screw in the outlet box. The ground wire installed behind the device mounting screws will not be acceptable.

C. Provide one (1) #6 AWG ground in 3/4" conduit from the system ground to the telephone company main distribution frame or service cabinet and to each telephone backboard.

D. Provide a signal reference grounding grid under the raised floor in the computer room. The signal reference grid shall be as manufactured by Cadweld and shall include the following as a minimum:

1. The signal reference grid shall be 2" wide, 26 AWG gage copper strips on 2' centers in both directions. The grid shall be laid out such that the raised floor pedestals are centered in each 2' x 2' square.

2. All crossovers shall have a welded joint.

3. The grid shall be in sections (16' wide as a maximum and rolled on tubes with the outside of the roll protected for shipment.

4. A 2" wide, 26 AWG gage x 72" copper strip with 5/16" hole in one end (for connection to the computer equipment) shall be installed for each piece of equipment and the connection to the equipment provided.

5. All ground connections shall be the Cadweld process.

6. Every sixth pedestal in each direction shall be connected to the grid using #6 AWG, 7 strand copper conductor.

7. The grid is not required to be bonded to the floor. However, if any section does not lie flat, a mastic may be used. Consider this step only after all connections are made.

8. All columns within and at the perimeter of the room shall be bonded to the grid at the shortest path using a #6 AWG, 7 strand copper conductor.

9. All conduits, pipes, ducts, miscellaneous steel, etc., shall be bonded to the grid using a #6 AWG, 7 strand copper conductor.

10. The installation of the signal reference grid shall be in compliance with Cadweld's installation recommendations.

3.10 TELEPHONE CONDUIT SYSTEM

A. Telephone service shall include wood backboards and equipment cabinets with service entrance conduit as shown.

B. Telephone service entrance cable, all branch cabling and telephone instruments shall be provided by the telephone equipment vendor.

C. Provide an outlet and conduit system for the telephones as shown and leave the same in readiness for wiring by others. Provide pull line in all telephone conduit. Terminate all conduit at a uniform height with smooth insulated bushings at the telephone wood backboards.

D. Telephone wall outlets shall be pressed steel sectional switch boxes, wall mounted at the locations indicated. Coverplate shall have a bushed hole.

E. Telephone floor outlets shall be floor boxes as specified at the locations indicated.

3.11 CONNECTION TO EQUIPMENT

A. Equipment furnished by the Owner or under other Sections, such as mechanical equipment, elevators, escalators, signs, kitchen equipment, etc., will be installed by others. Provide electrical service and make the electrical circuit connection to this equipment.

B. Provide PVC insulated flexible cord sets for all cord and plug connected building appliances and equipment. Cords shall be sized in accordance with electrical circuits indicated. Multiple conductor cords shall be "SO" cable with PVC jacket and green insulated ground conductor.

3.12 CORING, CUTTING AND PATCHING

A. Set sleeves for conduit accurately before the concrete floors are poured, or set boxes on the forms so as to leave openings in the floors in which the required sleeves can be subsequently located. Fill in the voids around the sleeves with concrete.

B. Should the performance of this preliminary work be neglected and should cutting be required in order to install conduit, then the expense of the cutting and restoring of surfaces to their original conditions shall be accomplished without incurring additions to the Contract.

3.13 EQUIPMENT ANCHORING

A. All items of electrical equipment, such as switchboards, motor control centers, transformers, standby generator, etc., shall be securely anchored to the building structure. The anchoring shall be accomplished by utilizing a minimum size of 3/8" steel anchor bolts in the structure and to the item of equipment. A minimum of two (2) anchor bolts shall be provided on each side of each item of equipment with the following exceptions:

Exception No. 1: If the equipment manufacturer includes more than two (2) anchor holes per side in the base or base frame of the equipment item, then there shall be one anchor for each anchor hole.

Exception No. 2: If the equipment manufacturer recommends a particular quantity greater than two (2) per side, then that quantity of anchors shall be provided.

END OF SECTION

SECTION 26 20 00

SERVICE AND DISTRIBUTION

PART 1 – GENERAL

1.1 DESCRIPTION

A. All work specified in this Section shall comply with the provisions of Section 26 01 00.

B. Provide a complete electrical distribution system. The system shall include the service entrance, main switchboard, feeders, transformers, distribution panels, panelboards, busway, remote control switches, contactors, etc., to provide a complete system.

C. All distribution switchgear (branch circuit panelboards, switchboard, distribution panelboards, transformers, busway, etc.) shall be the unit responsibility of one manufacturer. All component parts of the above listed items shall be of the same manufacturer except where a written request for deviation from this requirement has been approved prior to bid date.

D. Shop drawings for equipment specified in this Section shall show that all specified requirements have been incorporated.

E. Coordination studies shall be done prior to shop drawing submittals. Shop drawings shall include all breakers that meet the coordination study. If study is performed after the shop drawings are submitted, any revisions to breakers or panels shall be at no additional cost to the project.

F. All floor mounted distribution equipment shall be mounted on a 4" high concrete pad.

1.2 ELECTRICAL SERVICE (From pad mounted transformer)

A. Make all arrangements with the power company and pay all charges made by the power company for permanent electric service. In the event that the power company's charges are not available at the time the project is bid, the bids shall be qualified to notify the Owner that such charges are not included.

B. The power company will provide the underground primary service and the pad mounted transformer.

C. Provide the pad for the pad-mounted transformer in accordance with the power company specification.

D. The secondary service to the building shall be (277/480), (120/208) volts, 3 phase, 4 wire, 60 Hertz AC. Provide all conduit and wire as specified from the secondary terminals of the transformer to the main switchboard.

1.3 ELECTRICAL SERVICE (From pole, underground)

A. Make all arrangements with the power company and pay all charges made by the power company for permanent electric service. In the event that the power company's charges are not available at the time the project is bid, the bids shall be qualified to notify the Owner that such charges are not included.

B. The power company will provide the transformers on the pole and the connection of the secondary conductors to the transformers.

C. Provide the trench and backfill for the underground secondary service.

D. The secondary service to the building shall be (277/480), (120/208) volts, 3 phase, 4 wire, 60 Hertz AC. Provide all conduit and wire as specified from the secondary terminals of the transformer to the main switchboard.

1.4 ELECTRICAL SERVICE (From pole, overhead)

A. Make all arrangements with the power company and pay all charges made by the power company for permanent electric service. In the event that the power company's charges are not available at the time the project is bid, the bids shall be qualified to notify the Owner that such charges are not included.

B. The power company will provide the secondary conductors, overhead from the pole terminating at the weatherhead, and the connection of the overhead conductors to the service conductors.

C. Provide the insulated terminals for the overhead conductors, the weatherhead(s), and the conduit and wire for the service entrance, terminating at the main switchboard.

D. The secondary service to the building shall be (277/480), (120/208) volts, 3 phase, 4 wire, 60 Hertz AC.

1.5 METERING (From pole, underground)

A. Metering equipment will be by the power company. The power company will furnish the meter base for installation at a location as directed by the power company. The power company will provide meter, control wires to the meter, and the current transformers.

B. Provide the current transformers cabinet and a 1" conduit with fish-wire to the meter base. Install all equipment as directed by the power company.

1.6 METERING (From pole, overhead)

A. Provide a 1" conduit with a weather-head from the point of attachment of the service conductors to the meter base.

1.7 METERING (From pad mounted transformer)

A. Metering equipment will be by the power company. The power company will furnish the meter cabinet for installation at a location as directed by the power company and as detailed at the pad-mounted transformer.

B. Provide a 1" conduit from the transformer to the meter cabinet as shown. The power company will provide the control wires to the meter.

PART 2 – PRODUCTS

2.1 BRANCH CIRCUIT PANELBOARDS

A. Panelboards (panels) shall be general purpose enclosures and shall be surface or flush mounted as indicated. Panels shall be of the automatic circuit breaker type, factory assembled by the manufacturer of the circuit breakers. Panels shall be for the voltage indicated with the quantity of poles and ampacity of circuit breakers shown.

B. Boxes and trim shall be made from code gauge steel. Boxes shall be sufficient size to provide a minimum gutter space of 4" on all sides. Boxes shall be minimum 20" width and 5 3/4" depth.

C. Hinged door covering all device handles shall be included in all panel trim. Doors shall have flush-type cylinder lock and catch, except that doors over 48" in height shall have auxiliary fasteners at top and bottom of door in addition to flush-type cylinder lock and catch. Door hinges shall be concealed. All locks shall be keyed alike. Directory frame and card having a transparent cover shall be furnished each panel door.

D. Trims for flush panels shall overlap the box by at least 3/4" all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screwdriver without the need for special tools. After installation, trim mounting mechanism or hardware shall not be accessible when panel door is closed and locked.

E. All exterior and interior steel surfaces of the trim shall be cleaned and finished with gray paint over a rust-inhibiting phosphatized coating.

F. All interiors shall be completely factory assembled with protective devices, wire connectors, etc. All wire connectors, except screw terminals, shall be of the anti-turn solderless type and all shall be suitable for copper or aluminum wire.

G. Interiors shall be so designed that devices can be replaced without disturbing adjacent units and without removing the main bus connectors, and shall be so designed that devices may be changed without machining, drilling or tapping.

H. Bus bars for the mains shall be of copper sized in accordance with U.L. standards. Full size bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices.

I. Phase bussing shall be full height without reduction. Cross and center connectors shall be of the same material as the bus.

J. The neutral bus shall utilize setscrews to bond the neutral wire to the neutral bus through holes drilled in the neutral bar. A sheet copper neutral bus utilizing flathead screws to hold the neutral wires will not be acceptable.

K. Spaces for future devices shall be included as indicated and shall be bussed for the maximum rated device that can be fitted into them.

L. All circuit breakers (except as listed below) shall be manually operated, thermal-magnetic, automatic, of the ampacity and poles as indicated. They shall be quick-make, quick-break, both on manual and automatic operation. Breakers shall be over-the-center toggle operating type, with the handle going to a position between ON and OFF to indicate automatic tripping. All multi-pole breakers shall have internal common trip. The minimum interrupting capacity of the breakers furnished shall be 10,000 amperes RMS symmetrical for 120/208 volt and 14,000 amperes RMS symmetrical for 480/277 volt unless indicated otherwise on the riser diagram. The breakers furnished shall be determined by the specifications and by the minimum U.L. labeled RMS symmetrical amperes interrupting capacity at circuit voltage. All circuit breakers shall be bolted on and rigidly braced.

M All circuit breakers feeding an emergency panel or main breaker for an emergency panel shall have solid state trip units that are insensitive to changes in ambient temperature and a push-to-trip button to mechanically check the trip mechanism or for the use under emergency trip conditions. Interchangeable rating plugs shall establish the continuous current rating of each breaker. An interlock in the rating plug shall trip the breaker if an attempt is made to remove the plug with the breaker in the ON position. With the plug removed, it shall not be possible to close the breaker.

N. The solid state trip breakers shall provide long delay and magnetic tripping similar to thermal magnetic breakers. In addition, the magnetic trip shall include a short time delay permitting coordination and selective tripping with downstream devices. It shall be possible to check the breaker electrically and mechanically while in service without dismantling equipment and with minimum down time.

O. Provide arc-fault circuit breakers for all branch circuits supply areas defined by NEC 210.12 in all dwelling units.

P. Panels having sub-feed lugs for feeding through shall have 8" minimum extra gutter space at the lug end and on one side.

Q. Each panel as a complete unit shall have a short-circuit current rating equal to or greater than the equipment rating indicated.

R. All circuit breakers serving the fire alarm system shall include red marking and a listed locking mechanism per NFPA 72.

S. Panels shall be as manufactured by ABB – General Electric, Square D, Siemens, or Eaton.

2.2 DISTRIBUTION PANELBOARDS

A. Distribution panelboards (panels) shall be of the circuit breaker type, factory assembled by the manufacturer of the circuit breakers, complete with front door cover. The main breaker and the branch circuit breakers shall be as indicated. The main bus shall be 98% conductivity silver plated copper, rated as and of capacity equal to or greater than the rating or setting of the over-current protective device next back in the line. Panel shall be suitable for the voltage and phase indicated. Provide 25% ground bus.

B. Panels shall be flush or surface mounted as indicated, with baked-on enamel trim, adjustable trim clamps and door with chromium plated combination cylinder lock and catch, all locks keyed alike. Provide a specified nameplate for each device and a blank (not engraved) nameplate for each spare breaker or space.

C. Provide energy reducing active arc flash mitigation system to comply with NEC 240.87 for all breakers rated 1200 amps or can be adjusted to 1200 amps or higher.

D. The neutral bus shall utilize setscrews to bond the neutral bus through holes drilled in the neutral bar. A sheet copper neutral bus utilizing flathead screws to hold the neutral wires will not be acceptable.

E. All circuit breakers shall be manually operated, thermal-magnetic, automatic, of the ampacity and poles as indicated. They shall be quick-make, quick-break both on manual and on automatic operation. Breakers shall be over-the-center toggle operating type, with the handle going to a position between "ON" and "OFF" to indicate automatic tripping. All multi-pole breakers shall have internal common trip.

F. The minimum interrupting capacity of the breakers furnished shall be 10,000 amperes RMS symmetrical for 120/208 volt and 14,000 amperes RMS symmetrical for 480/277 volt unless indicated otherwise on the riser diagram.

G. All main circuit breakers (except as listed below) shall be molded case and vertically mounted. All vertically mounted molded case circuit breakers shall be mounted so that the handle is up for "ON" and down for "OFF", when viewed from the normal standing position. All vertically mounted molded case main circuit breakers shall be UL approved for feeding in the bottom and out the top.

H. All circuit breakers feeding an emergency panel or main breaker for an emergency panel shall have solid state trip units that are insensitive to changes in ambient temperature and a push-to-trip button to mechanically check the trip mechanism or for the use under emergency trip conditions. Interchangeable rating plugs shall establish the continuous current rating of each breaker. An interlock in the rating plug shall trip the breaker if an attempt is made to remove the plug with the breaker in the ON position. With the plug removed, it shall not be possible to close the breaker.

I. The solid state trip breakers shall provide long delay and magnetic tripping similar to thermal magnetic breakers. In addition, the magnetic trip shall include a short time delay permitting coordination and selective tripping with downstream devices. It shall be possible to check the breaker electrically and mechanically while in service without dismantling equipment and with minimum down time.

J. All circuit breakers, including any connectors to the main bus, shall be bolted and rigidly braced.

K. Spaces for future installation of molded case circuit breakers are specifically by range of trip rather than a single trip size or frame size. The spaces so scheduled shall be complete with all bus and required bus connectors such that future breakers can be installed without adding or changing bus connectors on the main bus and without using a larger (frame size) or more expensive breaker than the trip size and interrupting capacity would require. If the bus connectors furnished on the main bus will not cover the trip range specified, then duplicate sets of connectors shall be furnished on the main bus for each frame size required.

L. Distribution panels shall be as manufactured by ABB – General Electric, Square D, Siemens, or Eaton.

2.3 TRANSFORMERS

A. Branch circuit and distribution transformers shall be the dry type and shall have the ratings indicated.

B. Single phase transformers shall be 480 volt primary and 120/208 volt secondary. Three phase transformers shall be 480 volt delta primary and 120/208 volt grounded type secondary. Transformers 25 kVA and larger shall have a minimum of four (4) 2.5% full capacity primary taps.

C. Transformers shall have a U.L. recognized 220 degree insulation system and shall be designed so that under full load, the average conductor temperature rise does not exceed 115 degree C. rise above a 40 degree C. ambient and the enclosure does not exceed a 50 degree C. rise at any point.

D. Transformer coils shall be of the continuous wound construction and shall be impregnated with non-hygroscopic, thermosetting varnish. All cores to be constructed of high grade, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities shall be kept well below the saturation point. The core laminations shall be clamped together

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 24171 SCOTT LOWERY

SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-003-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
SPECIFICATIONS - ELECTRICAL

SHEET NO.
E-003

with structural steel angles. The completed core and coil shall then be bolted to the base of the enclosure but isolated therefrom by means of rubber, vibration-absorbing mounts. There shall be no metal-to-metal contact between the core and coil and the enclosure. On transformers 500 kVA and smaller, the vibration isolating system shall be designed to provide a permanent fastening of the core and coil to the enclosure. Sound isolating systems requiring the complete removal of all fastening devices will not be acceptable. Sound levels shall be guaranteed by the manufacturer not to exceed the following: 25 to 50 kVA – 45 DB; 51 to 150 kVA – 50 DB; 151 to 300 kVA – 55 DB; 301 to 500 kVA – 60 DB.

E. Transformers 24 kVA and larger shall be in a heavy gauge, sheet steel, ventilated enclosure. The ventilating openings shall be designed to prevent accidental access to live parts in accordance with UL, NEMA, and National Electrical Code standard for ventilated enclosures. Transformers 25 kVA through 112.5 kVA shall be designed so that they can be either floor or wall mounted. Above 112.5 kVA, they shall be floor-mounted design. The entire transformer enclosure shall be degreased, cleaned, phosphatized, primed and finished with a gray, baked enamel..

F. Transformers shall be compliant with the 2016 DOE efficiency standards:

Table I.6--Electrical Efficiencies for All Low-Voltage Dry-Type Distribution Transformer Equipment Classes

Equipment Class 3 (Single-Phase)		Equipment Class 4 (Three-Phase)	
kVA	%	kVA	%
15	97.70	15	97.89
25	98.00	30	98.23
37.5	98.20	45	98.40
50	98.30	75	98.60
75	98.50	112.5	98.74
100	98.60	150	98.83
167	98.70	225	98.94
250	98.80	300	99.02
333	98.90	500	99.14
		750	99.23
			1,000	99.28

G. Transformers that are of the floor-mounted type shall be mounted on Korfund Vibration Eliminators of the pad type.

H. Transformers shall be as manufactured by ABB – General Electric, Square D, Siemens, or Eaton.

2.4 MAIN SWITCHBOARD

A. General

1. Provide where indicated, a front and rear accessible dead front type, completely metal enclosed, self-supporting structure independent of wall supports. It shall consist of the required number of vertical sections bolted together to form one rigid switchboard approximately 90" high incorporating switching and protective devices of the number, ratings and type noted herein or shown with necessary interconnections, instrumentation and control wiring. The sides, top and rear shall be covered with removable screw-on plates. Front plates shall be sectionalized and removable. All covers shall be secured by self-tapping screws. Ventilation openings shall be provided where required. The switchboard shall be vermin proof.
2. All sections of the switchboard shall be 20 inches deep except service sections containing large ampacity main circuit breaker or pressure contact type main fusible switch which may be deeper. All section of the switchboard shall align so that the back of the complete structure may be placed flush against a wall. Construction shall allow maintenance of incoming line terminations, main device connections and all main bus bolted connections to be performed with front and rear access.
3. The feeder or branch devices shall be removable from the front and shall be panel mounted with the necessary device line and load connections front accessible.
4. All exterior and interior steel surfaces of the switchboard shall be cleaned and finished with gray hard dried enamel over a rust-inhibiting phosphatized coating.
5. Small wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished when required. All groups of control wires leaving the switchboard shall be provided with terminal blocks with numbering strips.

B. Bussing

1. The bus shall be tin plated aluminum or silver plated copper adequately braced and supported to withstand mechanical forces exerted during short circuit conditions. The main horizontal bus bars shall be mounted on glass polyester insulators with all three phases arranged in the same vertical plane. The main bus shall be braced for short circuits up to the RMS ampere value as shown.
2. A ground bus shall be provided firmly secured to each vertical structure and shall extend the entire length of the switchboard. A ground lug shall be furnished attached to the ground bus in an accessible location.
3. Provide a removable link (solid bar) in the neutral bus where the main disconnect device is provided.
4. Provide a bonding strap from the neutral bus to the switchboard frame. The bonding strap shall be located on the line side of the removable neutral link.

C. Main Circuit Breaker

1. Circuit breaker shall be draw-out type [manually] [electrically] operated. Acceptable manufacturers are Square D Masterpact or equal by GE, Siemens, or Eaton.
2. The case of the circuit breaker shall be a polyester thermoset material providing high dielectric strength.
3. Interrupting rating shall be available up to 200,000 amperes RMS symmetrical without fuses.
4. All circuit breaker operating mechanisms are to be two-step, fully-stored energy devices for quick-make, quick-break operation with a maximum of a five-cycle closing time. Open-close-open (O-C-O) cycle shall be possible without recharging. Motor operator shall automatically charge when circuit breaker is closed. Actuation of the operating handle or an operation cycle of the circuit breaker motor is to charge the closing springs (step one) and operation of a local "close" button is to close the circuit breaker contact (step two). Closing the circuit breaker contacts shall automatically charge the opening springs.
5. Current-carrying components shall be completely isolated from the accessory mounting area and double insulated from the operator with accessory cover in place.
6. Each phase inside the circuit breaker shall be completely isolated from other phases and ground by polyester thermoset material.
7. Padlocking provisions shall be furnished to receive up to three padlocks when circuit breaker is in the disconnected position, positively preventing unauthorized closing of the circuit breaker contacts.
8. Provisions for up to two key locks shall be furnished allowing locking in the disconnected position. Provisions for locking in the connected, test and disconnected positions by padlock or key lock shall be available as an option.
9. Located on the face of the circuit breaker shall be buttons, with optional lockable clear cover, to open and close the circuit breaker and indicators to show the position of the circuit breaker contacts, status of the closing springs, and circuit breaker position in the cell. An indicator shall show "charged-not OK to close" if closing springs are charged but circuit breaker is not ready to close. Circuit breaker racking system must have positive stops at the connected, test, disconnected and withdrawn positions.
10. Circuit breaker must be equipped with an interlock to discharge the stored energy spring before the circuit breaker can be withdrawn from its cell. Circuit breaker must provide a positive ground contact check between the circuit breaker and cell when the accessory cover is removed while the circuit breaker is in the connected, test or disconnected positions.
11. Primary connectors that can be rotated to provide flexible vertical or horizontal connections shall be available as an option. Front connections shall also be available for shallow depth equipment designs.
12. Ready-to-close contact must be available to indicate remotely that the circuit breaker is "ready to close." The circuit breaker is ready to close when it is open, spring mechanism is charged, a maintained closing order is not present, a maintained opening order is not present, and the circuit breaker is in an operational position.
13. Secondary wiring shall be front accessible and available in cage clamp or ring terminal connections. Secondary wiring must not be accessible when switchgear door is closed.
14. Circuit breaker shall provide long service life. The 3200 A circuit breaker frame and those of lower ratings must be certified to perform a minimum of 10,000 operations without maintenance. The 4000 A and 5000 A frames must be certified to 5,000 operations without maintenance.
15. Circuit breaker shall be equipped with a visual contact wear indicator.
16. Low-voltage power circuit breaker arc chutes containing asbestos will NOT be accepted.
17. Circuit breaker trip system shall be an electronic trip unit.
18. All trip units shall be removable to allow for field upgrades.
19. Trip Units shall incorporate "True RMS Sensing", and have LED long-time pickup indications.
20. Trip unit functions shall consist of adjustable long-time pickup and delay, optional short-time pickup and delay, instantaneous and ground-fault pickup and delay.
21. Adjustable long-time pickup (Ir) and delay shall be available in an adjustable rating plug that is UL Listed as field-replaceable. Adjustable rating plug shall allow for nine long-time pickup settings from 0.4 to 1 times the sensor plug (In). Other adjustable rating plugs shall be available for more precise settings to match the application. Long-time delay settings shall be in nine bands from 0.5-24 seconds at six times Ir.
22. Short-time pickup shall allow for nine settings from 1.5 to 10 times Ir. Short-time delay shall be in nine bands from 0.1-0.4 I 2/ t ON and 0-0.4 I 2/ t OFF.
23. Instantaneous settings on the trip units with LSI protection shall be available in nine bands from 2 to 15 times In. The instantaneous setting shall also have an OFF setting when short-time pick-up is provided.
24. All trip units shall have the capability for the adjustments to be set and read locally by rotating a switch.
25. Trip unit shall provide local trip indication.
26. Ground-fault protection shall be available for solidly grounded three-phase, three-wire or three-phase, four-wire systems. Trip unit shall be capable of the following types of ground-fault protection: residual, source ground return, and modified differential. Ground-fault sensing systems may be changed in the field.
27. Ground-fault settings for circuit breaker sensor sizes 1200 A or below shall be in nine bands from 0.2 to 1.0 times In. The ground-fault settings for circuit breakers above 1200 A shall be nine bands from 500 to 1200 A.
28. Trip units shall be available to provide real time metering. Metering functions include current, voltage, power and frequency. Metering accuracy shall be 1.5% current, 0.5% voltage, and 2% power. These accuracy's shall be total system including CT and meter and shall be of reading not full scale in a range of 5 – 500%.
29. Provide energy reducing active arc flash mitigation system to comply with NEC 240.87 for all breakers rated 1200 amps or can be adjusted to 1200 amps or higher.

E. Distribution Circuit Breakers

1. Electrical circuits shall be protected by molded case circuit breakers. Each pole shall provide inverse time delay and instantaneous circuit protection.
2. Circuit breakers shall be operated by a toggle type handle and shall have a quick-make, quick-break overcenter switching mechanism that is mechanically trip free from the handle so that the contacts cannot be held closed against short circuits and abnormal circuits. Tripping due to overload or short circuit shall be indicated by the handle automatically assuming a position midway between ON and OFF positions.
3. Breakers must be completely enclosed in a molded case. Non-interchangeable trip breakers shall have the trip unit sealed to prevent tampering. Ampere ratings shall be clearly visible. Contacts shall be of the non-welding silver alloy. Arc extinction must be accomplished by means of arc chutes.
4. All circuit breakers with frame sized 600 amps and larger shall have solid state trip units that are insensitive to changes in ambient temperature and a push-to-trip button to mechanically check the trip mechanism or for the use under emergency trip conditions. Interchangeable rating plugs shall establish the continuous current rating of each breaker. An interlock in the rating plug shall trip the breaker if an attempt is made to remove the plug with the breaker in the ON position. With the plug removed, it shall not be possible to close the breaker.
5. The solid state trip breakers shall provide long delay and magnetic tripping similar to thermal magnetic breakers. In addition, the magnetic trip shall include a short time delay permitting coordination and selective tripping with downstream devices. It shall be possible to check the breaker electrically and mechanically while in service without dismantling equipment and with minimum down time.
6. Provide energy reducing active arc flash mitigation system to comply with NEC 240.87 for all breakers rated 1200 amps or can be adjusted to 1200 amps or higher.

F. Ground Fault Protection

1. An adjustable ground fault protection system shall be provided as an integral part of the main circuit breaker or main fused switch, designated feeder breakers and fused switches.
2. The ground fault protection system shall consist of a current sensor enclosing all phase and neutral conductors of the circuits to be monitored, appropriate relaying equipment to provide the desired ground current sensitivity and time-current response characteristics, and equipped to function in conjunction with the other elements of the system.
3. The current sensor shall be of sufficient size to encircle the phase and neutral conductors of the circuit to be monitored. Current sensor output shall be coordinated with the required input to the delay. The current sensor shall have a ground fault current pick-up range of 200 to 1200 amperes. A test winding shall be included to simulate the flow of ground fault current through the sensor to test the operation of the ground fault protection system. The frame of the current sensor shall be constructed so that one leg can be opened to allow removal or installation around cable without disturbing that cable.
4. The ground fault relay shall be solid state construction, except that a coil operated output relay may be provided to control 120 volt power to operate a fusible bolted pressure contact switch. The relay shall have an adjustable current sensitivity for ground fault pick-up currents from 200 amperes to 1200 amperes.
5. Provide a monitor panel on the switchboard, including a push-to-test button for the test circuit and a red ground fault indicator light to indicate the circuit interrupter has opened due to a ground fault condition. The unit shall operate on a 120 volt AC source.
6. Provide a pulsating audible horn that is activated when a ground fault condition occurs. Horn shall stop when ground fault protection system is reset. Horn shall operate during testing of ground fault protection system.

G. Short Circuit Current Rating

1. The switchboard as a complete unit shall be given a single short circuit current by the manufacturer of the rating as shown. Such a rating shall be established by actual test in accordance with U.L. specifications.

H. Provide integral digital meter in the switchboard to display at a minimum the following measured values: Real-Time readings, Energy Readings, Demand Readings, and Harmonics. The meter shall have an Ethernet Communications device.

I. Provide ammeter with selector switch and voltmeter with selector switch and all associated internal wiring. Ammeter, voltmeter and associated selector switches shall be flush mounted on front of switchboard.

J. Main switchboards shall be as manufactured by ABB – General Electric, Square D, Siemens, or Eaton.

2.5 BUSWAY

A. Provide aluminum, totally enclosed, non-ventilated plug-in or feeder busway as shown, three-phase, of the ratings scheduled or shown. When a neutral bus is specified, the neutral shall be full size unless designated otherwise. Busway shall be of the low impedance type. The busway shop drawings shall show in detail the design of the totally enclosed busway including in detail, the design of the joint connection. Perforated ventilating housings will not be acceptable.

B. When a ground bus is specified, it shall be sized in accordance with the National Electrical Code based on the overcurrent protective device.

C. The aluminum bus bars shall be tin plated over their entire surface. All bolted connections shall be equipped with Belleville type spring washers. The temperature rise at full rated amperage at any point in the duct shall not exceed 55 degrees C. above ambient temperature.

D. Access shall be required to only one side of the busway for tightening joint bolts. It shall be possible to remove any one length without disturbing the two lengths to which it connects. On feeder busway, tap-offs shall be made with sections specifically designed for that purpose. In these cases, plug-in busway sections shall not be used.

E. The ampere ratings, approximate footage, fittings, etc., are shown. Final field measurements shall be made prior to release of the busway for fabrication. The responsibility for routing the duct as shown shall be included in this Section.

F. The busway shall be securely supported at intervals not exceeding 10'-0". The busway shall be complete with all elbows connectors, expansion joints, floor and wall flanges and offsets shown or required to meet job conditions. Wall flanges shall be provided at each wall and floor flanges at each floor where busway passes through. The openings between the flanges and the floor or wall should be caulked with suitable insulation material. Expansion joints shall be provided at building expansion joints, at least one in each horizontal run of 100'-0" and a maximum of 150'-0" apart throughout the busway length.

G. The busway shall be Underwriter's Laboratories approved for mounting in any position with derating. The short circuit stress bracing shall be 100,000 amperes RMS symmetrical.

H. Busway shall be of the same manufacturer as the main switchboard where connected to switchboard. Busway not connected to switchboard shall be ABB – General Electric, Square D, Siemens, or Eaton.

2.6 SINGLE PHASE PROTECTION

A. Provide Taylor Electronics Model #PND-3, 6, 9, 12 ADJ-REM LED's, or equal, single phase relay behind hinged panel in switchboard. Provide green and amber LED's on a plug in cable for mounting on face of switchboard. Provide snap on lenses and labels identifying the green LED as "SYSTEM NORMAL" and the amber LED as "SINGLE PHASE CONDITION".

B. Provide shunt trip coils on all main devices, operated by the phase failure relay.

C. Provide capacitive trip unit to guarantee relay and shunt trip operation during a single phase occurrence.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Provide a typewritten directory under plastic for all panelboards with spares marked in pencil. Circuit identification shall include sufficient detail to allow each circuit to be distinguished from all others. Include specific tenant suite numbers in multi-tenant buildings in the circuit description. Provide a label on each breaker in a switchboard or distribution panelboard with the same level of circuit identification details.

B. Provide all necessary hardware to level and secure the switchgear as required by the manufacturer's instructions. Make all electrical connections for supply and load circuits and leave in operating condition.

C. Clean enclosure of all switchgear of all foreign matter, including dust.

D. Remove all rust marks and repaint to leave switchgear in new condition.

3.2 STUDIES

A. As a requirement for the project documents to be delivered by the contractor, provide a complete short circuit and selective coordination study from the service entrance to all end devices. The study shall be provided by the switchgear manufacturer or their vendor and shall utilize time current curves that are developed by the gear manufacturer selected for use in the building. The study shall be made available for review by the engineer and local code enforcement authorities no later than at the times they deem necessary for certificates of occupancy to be issued. Obtain critical dates from the inspections department of the local code enforcement department during the inspection process to determine when presentation of the selective coordination study to the inspections department is necessary for timely issuance of the certificate of occupancy.

B. The selective coordination study shall be broken into parts where the systems described in NEC Articles 700.27, 701.18, 708.54 and 620.62 are isolated in the report to simplify the review of those isolated systems.

C. As a minimum requirement for the details that are necessary in the selective coordination study, refer to the requirements for selective coordination in the NEC Articles 700.28, 701.27, 708.54 and 620.62.

D. The minimum NEC requirement for the selective coordination study is applicable to the systems described in NEC Articles 700.28, 701.27, 708.54, 620.62, and as indirectly referenced for essential electrical systems in Article 517. The minimum project requirement described in A. above shall not be scaled back to the minimum NEC code requirement unless agreed to by all parties associated with the construction of the project including, but not limited to, the owner, architect, engineer, developer, etc.

END OF SECTION

SECTION 26 30 00

LIGHTING

PART 1 – GENERAL

1.1 DESCRIPTION

A. All work in this Section shall comply with the provisions of Section 26 01 00.

B. Provide all lighting fixtures and lamps as specified herein and as shown.

C. All lamps shall be operating at the time of the final inspection and for a period of six (6) months after the final acceptance of the project by the Owner.

D. Confirm exact locations of all lighting fixtures by coordination with the Architects Reflected Ceiling Plans and mechanical equipment above or on the ceiling.

E. Confirm all ceiling types before ordering lighting fixtures.

F. Each lighting fixture shall have been tested and certified for proper operation by the fixture manufacturer for the type mounting and ceiling on/in, which it is installed.

PART 2 – PRODUCTS

2.1 LIGHTING FIXTURES

A. Each lighting fixture shall be as specified in the Lighting Fixture Schedule corresponding with its fixture type indication (letter).

B. Most lighting outlets are lettered or groups of outlets are indicated by a letter.

C. Each lighting fixture shall have a manufacturer's label affixed and shall comply with the requirements of all authorities having jurisdiction.

D. The lighting fixtures that are indicated by the letters shall be as indicated on the Lighting Fixture Schedule.

2.2 LAMPS

A. The type lamps shall be as specified for each lighting fixture in the lighting fixture schedule.

B. The lamp catalog number is the catalog number is generally for Sylvania Lighting and is given as a standard of the quality and performance required. Equal lamps by General Electric or Philips will be acceptable. When a lamp manufacturer's name is used along with the catalog number in the lighting fixture schedule, it is considered unequaled by any other lamp and shall not be substituted for. The lamp performance with energy conserving ballasts furnished under this Section shall be certified by a nationally recognized independent testing laboratory.

C. Fluorescent lamps shall be as specified in the Lighting Fixture Schedule.

D. Incandescent lamps shall be as specified in Lighting Fixture Schedule.

E. All incandescent lamps, except quartz tubes, shall be rated for 130 volt operation.

F. High Intensity Discharge (HID) lamps shall be as specified in the Lighting Fixture Schedule.

2.3 BALLASTS

A. Fluorescent ballast shall be electronic type manufactured by Motorola, Magnetek or Advance.

B. Ballast shall operate lamps at a frequency or 25 KHz or higher with less than 2% lamp flicker.

C. Ballast shall operate at an input voltage of 108 – 132 Vac (120V line) or 249 – 305 Vac (277V line) at an input frequency of 60 Hz. Light output shall remain constant for line voltage fluctuation of + 5%.

D. Ballast shall comply with EMI and RFI limits set by the FCC (CFR 47 part 18) for non-residential applications and not interfere with normal electrical equipment.

E. Ballast shall withstand transients as specified by ANSI C.62.41 for location category A3 in the normal mode and location category A1 in the common mode.

F. Ballast shall meet applicable ANSI standards.

G. Ballast shall have a minimum power factor of 0.99.

H. Ballast shall not be potted or weigh more than 1.3 pounds.

I. Ballast shall have less than 10% Total Harmonic Distortion.

J. Ballast shall have less than 6% Third Harmonic Distortion.

K. Ballast height shall be less than or equal to 1.5 inches.

L. Ballast shall have a poke-in wiretrap connector.

M. Ballast shall meet sound rating "A".

N. Ballast must be Underwriters Laboratories (UL) listed Class P, Type 1 Outdoor.

O. Ballast shall provide normal rated lamp life as stated by lamp manufacturers.

P. Rapid start ballasts are series wired and shall maintain full cathode heat during operation.

Q. Rapid start ballast shall have less than a 1.5 Lamp Current Crest Factor (LCCF) and instant start ballasts have less than a 1.7 LCCF.

R. Instant start ballast shall have parallel lamp operation.

S. Ballast factor standard is .875+0.025 on all normal light output products.

T. Ballasts for "PL" fluorescent lamps shall be coordinated with lamps and 2-pin or 4-pin configuration ballasts shall be provided to match lamps. Manufacturer for "PL" fluorescent fixtures shall be Advance, Roberson, Lightolier or Lutron.

U. Ballasts for High Intensity Discharge (HID) lamps shall be Constant Wattage Autotransformer (CWA) type or equal type with minimum power factor of 0.9.

2.4 DIFFUSERS

A. Unless specified otherwise, all prismatic diffusers for fluorescent lighting fixtures shall be prismatic acrylic KSH K12 with a thickness of 0.125", measured from the back side to the peak of the prism.

B. All wraparound lenses shall be virgin acrylic, one-piece and injection molded.

2.5 EMERGENCY BATTERY LIGHTING

A. Lighting fixtures indicated on the drawings to be provided with an emergency battery ballast shall provide emergency lighting by using a standard fluorescent lamp or lamps and an emergency battery ballast. The ballast shall consist of a field replaceable high temperature, maintenance free nickel cadmium battery, charger and electronic circuitry contained in one metal case. Provide a solid state charging indicator light to monitor the charger and battery, double pole test switch and installation hardware. The battery ballast shall provide power to the fluorescent lamp upon failure of the normal supply to the fixture.

B. The test button and indicator light shall be integral in the fixture reflector and shall be positioned within or on the surface of the fixture so as to be accessible and identifiable.

C. Under normal mode the battery ballast shall keep the batteries at full charge. Upon loss of normal power the battery ballast shall operate the fluorescent lamp or lamps for 90 minutes.

D. Battery recharge time shall not exceed 16 hours to fully recharge and shall not exceed 225 milliamperes charging current

E. The lumen output of the lamp or lamps powered by battery unit shall be not less than 1,100 lumens initially for a four-foot fluorescent lamp.

F. The battery ballast shall meet or exceed all the requirements set forth in UL924 "Emergency Lighting and Power Equipment" and shall be UL listed for installation on top of or remote from the fixture. Emergency illumination shall meet or exceed the requirements set forth in the National Electric Code, Life Safety Code and UL 90-Minute Requirements.

2.6 LIGHT FIXTURE TRIM

A. Each recessed lighting fixture shall have a trim to match the type of ceiling (plaster, exposed grid, concealed spline, exposed panel, etc.) in which it is being installed, regardless of catalog number given. Coordinate with the Architect's reflected ceiling plan to provide the right trim for the type of ceiling the fixture is to be installed in.

B. Each lighting fixture recessed in a plastered ceiling of any type shall have a plaster frame.

2.7 RECESSED INCANDESCENT FIXTURES

A. All recessed incandescent fixtures shall comply with Article 410-65, C of the N.E.C.

2.8 FLUORESCENT FIXTURES

A. All indoor fluorescent fixtures utilizing double ended lamps or that are supplied from multi-wire branch circuits, shall have a disconnecting means that complies with Article 410-73, G of the N.E.C.

PART 3 – EXECUTION

3.1 SUPPORT OF LIGHTING FIXTURES

A. All lighting shall be supported from the building structure. The fixtures shall be supported in a manner that will insure the fixture weight being equally distributed from each support and the fixture remaining in a level position.

B. Fluorescent fixtures installed recessed in a suspended ceiling system shall be supported from the building structure with four (4) 12 gauge wires on each corner of the fixture. In addition, the fixture shall be clipped to members of the ceiling suspension system.

C. Fluorescent fixtures installed in or on any ceiling other than a suspended ceiling system specifically mentioned above shall be supported with concealed steel rods. Rods shall be 1/4" diameter minimum and shall be located where recommended by the fixture manufacturer. Provide a minimum of two (2) supports for each 4' or 8' fixture chassis. Supports shall be maximum of 48" centers. For incandescent fixtures, steel hanging wire may be used by attaching the wire to the fixture mounting frame.

D. Pendant mounted incandescent fixtures shall be stem supported by a fixture stud mounted in the outlet box. Suspended fluorescent fixtures shall have mounting stems located as per the manufacturer's recommendations, but in no case shall have less than two (2) stems per chassis.

3.2 AIMING OF ADJUSTABLE LIGHT FIXTURES

A. All fixtures with lamp position, tilt, shutters, rotation, or other types of adjustments during the final inspection. Fixtures serving areas where day lighting is predominant will be adjusted after sunset.

3.3 LIGHTING FIXTURES IN MILLWORK

A. Special attention shall be given to lighting fixtures indicated to be mounted within, under, on or otherwise incorporated into millwork or cabinetry.

B. Refer to the Architectural drawings and details for specific dimensions. This coordination shall occur prior to ordering fixtures to assure fixtures will fit the space limitations of the millwork.

C. This requirement is intended to preclude incurring additions to the Contract due to fixtures being too small or too large for the space.

3.4 FINAL PREPARATION

A. All plastic covers shall be removed from fluorescent fixtures.

B. Clean all lens and reflectors from debris, fingerprints, dust, etc.

END OF SECTION

SECTION 26 35 00

DIMMING SYSTEM

PART 1 – GENERAL

1.1 SCOPE

A. The Electrical Contractor as part of the work of this section, shall coordinate, receive, mount, connect and place into operation all equipment. The Electrical Contractor shall furnish all conduit, wire, connectors, hardware, and other incidental items necessary for the complete and properly functioning lighting control and dimming system as described herein and shown on the plans.

DRAWING NO.
CFD-XXX-E-004-XXXXX

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NORTH CAROLINA PROFESSIONAL SEAL 047171 ENGINEER J. SCOTT LOWERY
SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
A	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:
DRAWING NUMBER
CFD-XXX-E-004-XXXXX

ELECTRONIC FILE NAME:
DRAWN BY: JFE
CHK'D BY: JSL DATE:
E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
SPECIFICATIONS - ELECTRICAL

SHEET NO.
E-004

1.2 RELATED DOCUMENTS

A. General Conditions

B. Electrical Section General Provisions

C. Conduit

D. Wire and Cable

1.3 MANUFACTURER'S SERVICES

A. Shop drawings shall be submitted for approval within 30 days after receipt of contract. No fabrication of equipment is to proceed prior to approval of these drawings. Submittal package shall contain (6) six sets of the following:

1. Complete bill of materials.

2. Sets of catalog cut sheets for standard equipment.

3. Sets of shop drawings detailing all mechanical and electrical equipment including on line diagrams, wire counts, internal wiring, and physical dimensions of each item. Marked up catalog cut sheets are unacceptable.

B. Upon completion of all line, load and interconnection wiring, and after all fixtures are installed and lamped, a qualified factory representative shall completely check the installation prior to energizing the system. At the time of the checkout and testing, the owner's representative shall be thoroughly instructed in the proper operation to the system.

C. Within two weeks after the system turn–on is completed, the manufacturer is to provide three (3) sets of as–built drawings and three (3) sets of operations and maintenance manuals for the dimming systems.

1.4 QUALITY ASSURANCE

A. Manufacturer's products shall be listed by Underwriters Laboratories, Inc. (U.L.) and comply with the National Electrical Code (NEC) and local building codes that apply.

B. The equipment specified herein shall be the coordinated product of a single manufacturer. All dimmer and cabinet fabrication must take place in the manufacturer's plant. The use of subcontracted component assemblers is not acceptable.

C. The manufacturer shall be one who has been continuously engaged in the manufacture of architectural lighting controls and dimmers for a minimum of ten years.

D. All equipment shall be 100% tested as a complete system. Manufacturers using sample testing methods are not acceptable.

1.5 WARRANTY

A. All equipment shall be warranted free of defects in materials and workmanship for a period of eighteen (18) months from date of shipment or twelve (12) months from date to turn–on, whichever occurs first.

PART 2 – PRODUCTS

2.1 MANUFACTURER'S REQUIREMENTS.

A. The equipment herein specified is manufactured by Macro Electronics Corporation of Austin, Texas, (512) 837–5100 and shall serve to indicate the quality of equipment required. Base bid shall be for equipment by Macro Electronics Corporation. If alternate equipment is proposed, it shall be shown as an add or deduct from the base bid price and shall be subject to approval.

B. Other manufacturers who wish to bid must submit a complete bill of materials with company information listing qualifications and experience to the Architect ten days prior to bid date for permission to bid. All manufacturers must comply with the specifications herein in every detail.

2.2 SYSTEM TESTING

A. All dimmers shall be assembled into the dimmer cabinets and all interwiring completed at the factory prior to shipment. All dimmers shall be simultaneously connected at load banks, all control stations shall be connected to the dimmer cabinet (or cabinets) and testing shall be done as a complete system under power at the factory prior to shipment. This testing shall include exercising all functions, such as take control, transferring, mastering, fading, or other special control provisions, and this shall be done for each individual control and control station included in this system. Dimming systems shipped as components for job site assembly or that are not completely tested as a system at the factory prior to shipping shall not be acceptable. Sample testing methods are not acceptable.

2.3 DIMMER CABINETS

A. The cabinets shall contain all dimmer modules, controls, circuitry, relays, contactors, power supplies, primary and secondary circuit breakers, barriered section for power separation of emergency lighting circuits, and all wiring as required for lighting areas to be controlled from the dimmer cabinet. The dimmer cabinet shall contain main lugs for termination of input feeders and a neutral block for termination of all branch circuits. The dimmer systems shall be fed from 120/208 volt or 277/480 volt, three phase, four wire service plus equipment ground or 120/240 single phase, 3 wire service plus equipment ground. Emergency feeds shall be as shown on dimming schedules.

B. This system shall have a dimmer cabinet constructed of #14 U.S. gauge steel, welded, and painted in a textured medium blue color two part epoxy type paint. Dimmer cabinet shall be dead front, dead rear, wall mount or floor standing, and so arranged that all dimmers and related components are serviceable and removable from the front of the cabinet.

C. Internal power wiring shall be U.L. Listed (UL3173), 125 degree centigrade rated, and shall be neatly placed and bundled with suitable tie wraps. Control wiring and power wiring shall be separate and all wiring shall be terminated in compression type terminals for installation of job site contractor's wiring. The complete system shall be a U.L. Listed switchboard.

D. Dimmer cabinets shall be convection cooled. In very large systems with floor– mounted cabinets, fans are permitted only if they are controlled by a thermal sensor located in the top of the dimmer cabinet. Dimmers shall operate in 0 to 40 degrees Centigrade (32 to 104 degree Fahrenheit) ambient air temperature. Heat load generated by the dimmers shall not exceed 2% of connected load.

E. The dimmer cabinets and controls shall be stored in their original cartons or crates in a dry location free from dirt and dust until ready to install. Dimmers shall not be used to furnish any temporary light or power for construction activities.

2.4 DIMMING MODULES

A. The dimming modules shall be 100% solid state electronic employing U.L. Recognized line isolated silicon Controlled Rectifiers (SCR) as power handling devices. SCR power devices shall have a single cycle surge rating of 600 amps or greater. Dimmers using Triac Thryistors, air gap relays or special bypass jumpers for system installation are not acceptable.

B. The Silicon Controlled Rectifiers, along with the filter inductor and control printed circuit board, shall be mounted in modular dimming units. The dimmer module shall be constructed on a heavy–duty finned aluminum heat sink with aluminum wrap–around. Each module shall be connectorized to plug in, requiring no bolting or unbolting of electrical connections to remove or replace a module.

C. Each dimmer power module shall incorporate on its face a finned aluminum extrusion to dissipate to the air the heat generated by the silicon controlled rectifiers. These finned extrusions shall be directly exposed to ambient air, and operation in ambient air temperatures up to 104 degrees Fahrenheit shall not require fans for cooling.

D. Dimmer module control circuitry shall be contained on plug–in printed circuit cards. Control cards shall be of U.L. listed fire retardant epoxy glass material. Control cards shall employ silicon type integrated circuit and transistor type active elements and shall employ feedbacks techniques to assure long term stability with no periodic calibrations or adjustments being required. Control circuitry shall incorporate voltage compensation to reduce the effect of line voltage changes.

E. The dimmer power circuit shall contain a high inductance toroidal filter choke to minimize radio frequency interference (R.F.I.) and reduce filament noise. Filter chokes shall have a minimum rise time of 350 microseconds from 0% to 90% measured under full load at 90 degree conduction angle. Filter chokes shall be securely mounted and adequately ventilated.

F. Dimmer efficiency shall be 98% at full output and full load.

G. Dimmer control voltage shall be 0 to 10 volts DC.

H. All dimmer modules shall be U.L. listed to control the lighting loads connected to it.

I. All dimmer types shall be available in capacity ratings from 1440 watts to 12,000 watts at 120 volts and 5500 watts to 27,700 watts at 277 volts. Dimmer ratings shall be full capacity, no derating required. Primary and secondary circuit breakers shall be at least 20% over–rated. All breakers shall be rated not less than 10,000 AIC at 120 volts and 14,000 AIC at 277 volts.

2.5 DIMMER MODULE TYPES

A. Each dimmer system may require one or more types of dimmers. Provide the quantity and capacity of the following dimmer types as shown on the drawings or in dimmer schedules.

1. Incandescent dimmers

a. Incandescent dimmers shall be available to operate tungsten lamps including quartz and halogen varieties at 120 volts, 240 volts, and 277 volts. Dimming range shall be from 0% to 100%. All lighting intensity changes shall be instantaneous in response to control changes. Dimming shall be visually smooth without flicker or stepping.

2.6 EIGHT SCENE PRESET CONTROL

A. The master station shall consist of eight Preset Select switches, Maximum (full on), Off and Manual select switches, integral Infrared Receiver for preset recall, Record and station Enable key switch, and up to sixteen manual control channel sliders and a programmable fade rate controller.

B. Each slide controller shall be a 30mm linear potentiometer with an integral LED indicator in the handle. This LED shall light and remain lit whenever the slide controller has taken control of channel intensity from preset level or when station is in manual mode. Systems suing thumbwheels or Raise/Lower switches with LED bar graph indicators shall not be acceptable.

C. The flush wall mounted master station shall be constructed of machined aluminum with a hinged latching cover of machined aluminum, not plastic. Station shall be supplied with a back box.

D. Systems shall be available with multiple remote options including remote preset select stations, portable wireless infrared controls, Audio Visual (s/v) interface, and motion sensors. Provide optional accessories as indicated on drawings.

PART 3 – EXECUTION

3.1 INSTALLATION

A. It shall be the responsibility of the Electrical Contractor to receive and store the necessary materials and equipment for dimming system. It is the intent of these specifications and plans to include everything required for proper and complete installation and operation of the dimming system, even though every item may not be specifically mentioned, the contractor shall timely deliver to other trades any equipment that must be installed during construction.

B. The Electrical Contractor shall be responsible for field measurements and coordinating the physical size of all equipment with the architectural requirements of the spaces into which they are to be installed.

C. The Electrical Contractor shall install all lighting control dimming equipment in accordance with the manufacturer's shop drawings.

D. All branch load circuits shall be live tested by the Electrical Contractor before connecting the loads to the dimmer system load terminals.

3.2 MANUFACTURER'S SERVICES

A. Upon completion of the installation, including testing of load circuits, the contractor shall notify the dimming system manufacturer that the system is available for formal checkout. This notification is to be given in writing two weeks prior to the time factory trained personnel are needed on the job site. At the manufacturer's discretion, formal turn–on can be waived. No power is applied to the dimming system unless specifically authorized by written instructions from the manufacturer.

END OF SECTION

SECTION 26 61 00

EMERGENCY SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION

A. All work specified in this Section shall comply with the provisions of Section 26 01 00.

B. Provide all labor and material necessary to install a standby diesel engine–generator set in a complete and operating condition.

C. The engine–generator set shall be suitable for outdoor use and complete with weather–protective enclosure and components.

1.2 SUBMITTALS

A. Furnish information showing manufacturers' model numbers, dimensions and weights for the engine, generator and major auxiliary equipment.

B. Submit copies of pertinent drawings and schematic diagrams for approval and include the following:

1. Engine generator set including plans and elevations clearly indicating entrance points for each of the interconnections required.

2. Engine generator/exciter control cubicle.

3. Fuel consumption rate at various loads, ventilation and combustion CFM requirements.

4. Exhaust mufflers and vibration isolators.

5. Battery charger, battery and battery racks.

6. Day tank fuel connection points.

7. Automatic load transfer control switch.

8. Actual electrical diagrams including schematic diagrams and inter–connection wiring diagrams for all equipment to be provided.

9. Legends for all devices on all diagrams.

10. Weather–protective housing.

C. The specified standby KW shall be for continuous electrical service during interruption of the normal utility source and shall be certified by the manufacturer for the actual unit supplied.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. The equipment shall be as manufactured by Cummins's, Detroit Diesel Caterpillar/Olympian or Kohler of the size and ratings indicated.

B. Equipment shall include weather–protective housing for outdoor use.

2.2 ENGINE

A. The engine shall be water cooled in–line or vee–type two or four stroke cycle compression ignition diesel. It shall meet specifications when operation on Number 2 domestic burner oil. Diesel engines requiring premium fuels will not be considered. The engine shall be equipped with fuel, lube oil, intake air filters, lube oil cooler, fuel transfer pump, fuel priming pump, engine driven water pump and unit mounted instruments, water temperature gauge, lubrication oil pressure gauge and battery charging ammeter.

B. A gear driven hydraulic governor shall maintain frequency regulation not to exceed 3% to 5% from no load to full rated load. Generator sets above 150KW shall have an electronic isochronous type governor.

C. The unit shall be mounted on a structural steel sub–base and shall be provided with suitable isolators.

D. Safety shut–off for high water temperature, low oil pressure overspeed and engine overcrank, with alarm for low water temperature shall be provided. Alarms per NFPA–110 Level 1.

E. Guards shall be provided over all exposed moving parts as required by OSHA.

2.3 GENERATOR

A. The generator shall be rated for continuous standby service at ratings indicated with 0.8 power factor, 277/480 volts, three–phase, four wire, 60 hertz, 1800 RPM.

B. The generator shall be a three phase, 60 hertz, single bearing, rotating field, synchronous type built to NEMA standards. A voltage regulator shall be provided to match the characteristics of the generator and engine. Voltage regulation shall be +/– 2% from no load to full rated load. Readily accessible voltage droop, voltage level and voltage gain controls shall be provided. Voltage level adjustment shall be a minimum of +/– 5%. Generator and exciter shall be inherently capable of parallel operation with other power sources of equivalent electrical characteristics, and stator shall include a twelve lead, reconnectable bus system for each load reconnection. Generator shall be brushless permanent magnet, and shall sustain short circuit current at 300% of rated current up to 10 seconds.

2.4 COOLING SYSTEM

A. A radiator with blower type fan shall be provided to maintain safe operation at 110 degrees F. ambient temperature. Air flow restriction from the radiator shall not exceed 0.5" H20. Provide ductwork with flexible connecting section between radiator and discharge louver frame. Provide an engine coolant heater with thermostat to maintain coolant temperature at not lower than 60 degrees F. Heater shall operate on 120 VAC. Heater shall have an oil pressure disconnect to turn heater off when engine is operating.

B. The engine cooling system shall be pretreated by the system supplier for the inhibition of internal corrosion and freezing. Obtain necessary connection to heater from base building panel in core (HM or L as necessitated by voltage required).

2.5 FUEL SYSTEM

A. Provide a diesel skid mounted fuel tank with all required black iron fuel oil piping. Provide a low fuel indicator and alarm. Tank shall be double wall, closed top dike, UL labeled, sized as required by local code. ***(24 hour)*** run time minimum based on GPH rating of manufacturing engine.

2.6 OUTDOOR HOUSING AND EXHAUST MUFFLER

A. Housing shall consist of an enclosure to completely enclose the engine generator and accessories. Housing shall protect the engine generator from the environment, yet be conducive to easy maintenance. Housing shall have removable swing doors on each side and lockable rear door for access to meters and controls. Side doors shall have a means to lock. Construction of housing shall be of a minimum 14 gauge sheet steel and painted manufacturers' standard color.

B. Exhaust muffler shall be mounted on top of housing. The exhaust muffler shall be a critical grade muffler. Muffler shall be factory installed so that its weight is not supported by the engine. A flexible exhaust fitting shall be supplied and installed between the muffler and exhaust manifold. All accessories shall be factory installed. This includes flanges, muffler, tail pipe and raincap.

2.7 INDOOR UNIT EXHAUST SYSTEM

A. A critical type silencer/muffler, companion flanges and flexible stainless steel exhaust fittings shall be provided according to the manufacturer's recommendations. Mounting shall be supported by building structure. The silencer shall be mounted so that its weight is not supported by the engine. Exhaust pipe size shall be sufficient to ensure that exhaust back–pressure does not exceed the maximum limitations specified by the engine manufacturer.

B. The muffler and all indoor exhaust piping shall be lagged to maintain a surface temperature not to exceed 150 degrees F. The insulation shall be installed so that it does not cover or interfere with the functioning of the flexible exhaust fitting. Insulation shall be supplied under Division 15.

2.8 AUTOMATIC STARTING SYSTEM

A. A DC electric starting system with positive engagement shall be provided. The motor voltage shall be as recommended by the engine manufacturer.

B. Fully automatic generator set start–stop controls in the generator control panel shall be provided. Controls shall provide shutdown for low oil pressure, high water temperature, overspeed and overcrank. Controls shall include a 45 second single cranking cycle limit with lockout.

C. A belt driven battery charging alternator shall be provided with transistorized voltage regulator. Voltage shall match the electric starting system.

D. A lead–acid storage battery set of the heavy duty starting type shall be provided. Battery voltage shall be compatible with the starting system. The battery set shall be rated as required by generator manufacturer in amp hours. Necessary cables and clamps shall be provided.

E. Battery racks shall be provided for each battery and shall conform to NEC 480–7,a,1. They shall be constructed of metal and so treated as to be resistant to deteriorating action by battery electrolyte. Further, construction shall be such that nonconducting insulation material directly supports the cells.

F. A current limiting battery charger shall be provided to automatically recharge batteries. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressor, DC ammeter, DC voltmeter, equalize timer and fused AC input. AC input voltage shall be 120 volts, single phase. Amperage output shall be no less than 10 amperes. Alarm shall be provided for low–battery voltage and battery charger fault in the charger. Control circuit shall be wired from charger to generator control panel by electrical contractor for indication on control panel. Obtain power for battery charger from base building panel in core (HM or L as necessitated by voltage requried).

2.9 GENERATOR CONTROL PANEL

A. A generator mounted NEMA 1 type vibration isolation control panel shall be provided. Panel shall contain, but shall not be limited to, the following equipment:

1. Frequency Meter, 3 1/2", dial type.

2. Voltmeter, 3 1/2", 2% accuracy.

3. Ammeter, 3 1/2", 2% accuracy.

4. Ammeter/Voltmeter phase selector switch.

5. Automatic starting controls as specified.

6. Voltage level adjustment rheostat.

7. Contacts for remote alarms wired to terminal strips.

8. Individual fault indicator lights for low oil pressure, high water temperature, overspeed, overcrank and low water temperature.

9. Three position function switch marked, RUN–STOP and REMOTE.

10. Running time meter, oil pressure, battery charging ammeter and water temperature gauges.

2.10 MAIN LINE CIRCUIT BREAKERS

A. Provide main–line, molded case circuit breakers sized as shown and mounted upon the generator. The outputs of the generator shall be protected by load circuit interrupting and protection devices. They shall operate both manually for normal switching functions and automatically during overload and short–circuit conditions.

B. The trip unit for each pole shall have elements providing inverse time delay during overload conditions and instantaneous magnetic tripping for short circuit protection. The circuit breaker shall meet standards as established by U.L., NEMA and the N.E.C.

2.11 AUTOMATIC LOAD TRANSFER SWITCHES

A. The amperage rating of the automatic load transfer switch shall be as shown.

B. The automatic transfer switch shall be mechanically held on both the emergency and the normal side. The switch shall be double throw with the main contacts rigidly and mechanically interlocked to insure only two possible positions: Normal or Emergency. A manual operator must be provided to enable manual operation without having to assemble the handle.

C. The automatic load transfer control shall be rated for continuous duty when enclosed in a non–ventilated NEMA 1 enclosure. It shall be rated for all classes of load, including inductive and noninductive, at 600 volts and tungsten lamp load at 250 volts. The transfer switch portion of the control shall be designed, built and tested to close on an inrush current up to and including twenty (20) times the continuous rating of the switch without welding or excessive burning of the contacts. The transfer switch shall be capable of enduring six thousand (6000) cycles of operation, at rated current, at a rate of six (6) cycles per minute, without failure. One cycle shall consist of one complete opening and closure of both sets of contacts on an inrush current of ten (10) times the continuous rating of the switch.

D. The transfer switch shall be as listed under U.L. 1008. Switch utilizing reversing contactor mechanisms as a means to transfer load are disallowed and will not be considered.

E. The automatic load transfer switch shall include the following accessories:

1. Engine starting contacts to provide for generator starting.

2. Full phase protection. Three–phase relays shall be field adjustable, close differential type with 92–95% pickup and 82–85% drop out. Relays are to be connected across live lines.

3. Test switch, to simulate a power outage.

4. Adjustable time delay on engine starting to override momentary outages and nuisance voltage dips.

5. Adjustable time delay on transfer of load to emergency source. Adjustable time delay to open transfer switch contact to allow motor loads to decay.

6. Adjustable time delay on retransfer of load to normal with 5 minute cool–down timer wherein the generator set runs unloaded after transfer to line.

7. Plant exerciser to start and run the generator set with or without load each 168 hours for a 30 minute interval. Selector switch will be provided for with–load or without–load testing.

8. One auxiliary contact closed on emergency and one auxiliary contact open on emergency.

9. Pilot lights to indicate the normal and emergency position of the transfer switch.

10. Isolated (underground) neutral bar.

11. Disconnect plug.

2.12 WEATHER–PROTECTIVE ENCLOSURE

A. Enclosure and all other items to be designed and built by manufacturer as an integral part of the entire generator set and be designed to perform without overheating in the ambient temperature of the area installed. Constructed of 14– and 18– gauge sheet metal, suitably reinforced to be vibration free in the operating mode. Four hinged doors provide complete access without their removal. Each door to have at least two latch–bearing points. Side and rear panels to be completely and simply removable to major service access. Roof to be peaked to allow drainage of rain water. Enclosure doors shall be lockable from the enclosure manufacturer.

B. Provide baked enamel finish with primer and finish coat to be painted before assembly. All fasteners to be rust resistant. Unit shall have sufficient guards to prevent entrance by small animals. Batteries to fit inside enclosure and alongside the engine. Batteries under the generator are not acceptable.

C. Unit shall have coolant and oil drains outside the unit to facilitate maintenance. Each drain line is to have a high quality valve located near the fluid source. Fuel filter must be inside the base perimeter and located so spilled fuel cannot fall on hot parts of engine or generator. A cleanable primary fuel strainer shall be used to collect water and sediment between tank and main engine fuel filter. Crankcase fumes disposal shall terminate in front of the radiator to prevent oil from collecting on the radiator core and reducing cooling capacity.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Mount generator on 4 inch thick re–enforced 3000 psi concrete pad. Concrete shall be 1 foot larger in all directions than footprint of generator.

3.2 MANUFACTURING

A. The unit shall be shipped to the job by the manufacturer's authorized dealer having a parts and service facility within a 120 mile radius of the job. In addition, and in order not to penalize the Owner for unnecessary or prolonged periods of time for service or repairs to the emergency system, the bidding generator set supplier must have replacement parts in stock at all times. Certified proof of this requirement shall be available from the dealer and a personal inspection of the dealer's facilities may be made by the Architect or his appointed representative to substantiate claims made by the generator set supplier.

3.3 TESTING

A. Prior to acceptance of the installation, equipment shall be tested to show it is free of any defects and will start automatically and be subjected to full load test through the use of portable, dry–type load banks supplied for this purpose at the job by the generator set supplier.

B. The load bank shall be capable of definite and precise incremental loading and shall not be dependent on the generator control instrumentation to read amperage and voltage of each phase. Rather, the test instrumentation will serve as a check of the generator set meters.

C. Saltwater brine tanks or those load banks requiring water as a source for cooling are not acceptable for this purpose and are disallowed and shall not be utilized for this test.

D. Load bank testing shall be done in the presence of the Owner or his appointed representative only after the unit is permanently installed in accordance with the Contract Documents. Testing shall be for a period of four (4) hours under full load.

3.4 START UP AND INSTRUCTIONS

A. On completion of the installation, start up shall be performed by the engine manufacturers' trained dealer service representative.

B. Operating and maintenance instruction manual shall be furnished and procedures explained to operating personnel.

3.5 SYSTEM SERVICE CONTRACT

A. The supplier of the standby power system must furnish a copy of, and make available to the Owner, his standard service contract which, at the Owner's option, may be accepted or refused. This contract will accompany any documents, drawings, catalog cuts, specification sheets, wiring or outline drawings, etc. submitted for approval. This contract shall be for the complete power system.

3.6 GUARANTEE

A. Equipment provided under this Section shall be guaranteed against defective parts and workmanship under terms of the manufacturer's and dealer's standard warranty. But in no event shall it be for a period of less than five (5) years from date of initial start up of the system and shall include labor and travel time for necessary repairs at the job.

END OF SECTION

SECTION 26 65 00

SURGE PROTECTION DEVICES

DRAWING NO.
CFD-XXX-E-005-XXXXX

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BWA JOB # 2022–0632

NORTH CAROLINA PROFESSIONAL SEAL 041471 ENGINEER J. SCOTT LOWERY

SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD,
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-005-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
SPECIFICATIONS - ELECTRICAL

SHEET NO.
E-005

PART 1 – GENERAL

1.1 DESCRIPTION

A. All work in this Section shall comply with the provisions of Section 260100.

1.2 DEFINITIONS

A. I/nominal: Nominal discharge current

B. MCOV: Maximum continuous operating voltage

C. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies

D. MOV: Metal–oxide varistor; an electronic component with a significant non–ohmic current–voltage characteristic

E. OCPD: Overcurrent protective device

F. SCCR: Short–circuit current rating

G. SPD: Surge protective device

H. VPR: Voltage protection rating

1.3 CODES AND REGULATIONS

A. The following codes and regulations shall govern the design of the surge protection device:

1. Underwriters Laboratories, Inc. Standard No. 1449 – Third Edition

2. Underwriters Laboratories, Inc. Standard No. 1283

3. National Electrical Manufacturers Association (NEMA LS1)

4. IEEE 587 A&B Waveforms, IEEE C62.41

5. National Electrical Code – NFPA 70

a. Article 110.9 – Interrupting Capacity
b. Article 240.21 – Equipment complying with tap conductor rules
c. [Only applies to NEC 2014]Article 700.8 – Required SPD for Emergency Systems

1.4 SUBMITTALS

A. For each different model of device to be used, submit the following:

1. Dimensional drawings and installation instructions for the specified parallel connected unit.

2. The rated capacities, operational characteristics, electrical characteristics, and all furnished accessories and options.

3. Copy of the UL Category Code certification, listing the tested values for VPRs, I/nominal ratings, MCOVs, type designations, any OPCD requirements, model numbers, system voltage, and modes of protection.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to replace or replace SPDs that fail in materials or workmanship within specified warranty period of each Type of device.

1. Warranty period for all Type 1 SPDs shall be twenty (20) years.

2. Warranty period for all Type 2 SPDs shall be fifteen (15) years.

1.6 MANUFACTURERS

A. The surge protection system shall be manufactured by Current Technology.

B. The specific series of surge protection device shall be as defined by the application or as defined on the drawing.

PART 2 – PRODUCTS

2.1 GENERAL

A. All units shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. The MCOV of the SPD shall be the nominal voltage of the system to which it is connected. The MCOV of the device shall be a tested value per section 37.7.3 of UL 1449.

2.2 SERVICE ENTRANCE [AND TRANSFER SWITCH] SURGE PROTECTION

A. Unit shall be listed as a Type I surge protection device per UL 1449, 3rd/ edition.

B. Unit shall have the following features:

1. It shall consist of parallel connections only. Series elements shall not be used.

2. Integral disconnect switch – unit shall not require disconnection of power to customer equipment for testing and/or maintenance.

3. The primary suppression path shall not be to ground.

4. The unit shall not short or crowbar the power flow resulting in an interruption to the load.

5. Internal thermal protection that disconnects the unit before damaging internal suppressor components.

6. Indicator LED light display for power and protection status. Lights indicating only internal component failure while continuing to allow the main power flow are NOT acceptable.

7. Form–C contacts, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current–limiting device. [Coordinate connection requirements with building power monitoring and control system.]

8. Compression lugs that can accept up to #2 AWG wire.

9. A low impedance cabling system shall be provided with unit, thereby improving the connection of the SPD to the electrical system. Cabling system shall utilize a minimum wire size of #6 AWG.

C. Unit shall have a maximum attenuation of 54dB based on 50 ohm insertion loss test per MIL–STD–220B.

D. Unit shall have a minimum single–phase pulse surge current rating of [150 or 200] kA per mode. The peak surge current rating shall not be the arithmetic sum of the ratings of the individual MOVs in a given mode. Manufacturer shall provide independent 3rd/ party testing, validating that unit is capable of surviving a single surge at the specified rating.

E. Protection modes and UL 1449 VPR for grounded wye circuits with [480Y/277 V] [208Y/120 V], three–phase, four–wire circuits shall not exceed the following:

1. Line to Neutral: [1200 V for 480Y/277 V] [700 V for 208Y/120 V]
2. Line to Ground: [1200 V for 480Y/277 V] [700 V for 208Y/120 V]

3. Line to Line: [1800 V for 480Y/277 V] [1200 V for 208Y/120 V]

F. Protection modes and UL 1449 VPR for 240/120 V, single–phase, three–wire circuits shall not exceed the following:

1. Line to Neutral: 700V
2. Line to Ground: 700 V
3. Line to Line: 1200V

G. Unit shall have a short–circuit current rating of 200 kA.

H. Unit shall have an I/nominal rating of 20 kA and shall comply with all UL96A requirements for ac surge protection.

I. Unit shall survive a minimum of 14,000 repetitive category C3 (20kV/10kA) surges with no more than 10% deterioration. Calculated repetitive surge values will not be accepted. Manufacturer shall provide repetitive surge test report.

J. Unit shall be able to withstand a minimum of 100 temporary over voltage events, defined as: 30A available fault current, 30 cycles duration, 10 second interval between events.

K. Unit shall be able to prevent common temporary over voltages from damaging the MOVs. Voltages shall be limited per the following:

L. The basis of design for this unit is the Select SL3 series.

2.3 DISTRIBUTION PANELBOARD SURGE PROTECTION

A. Unit shall be listed as a Type I or Type II surge protection device per UL 1449, 3rd/ edition.

B. Unit shall have the following features:

1. It shall consist of parallel connections only. Series elements shall not be used.

2. The primary suppression path shall not be to ground.

3. The unit shall not short or crowbar the power flow resulting in an interruption to the load.

4. Internal thermal protection that disconnects the unit before damaging internal suppressor components.

5. Indicator LED light display for power and protection status. Lights indicating only internal component failure while continuing to allow the main power flow are NOT acceptable.

6. Form–C contacts, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current–limiting device. [Coordinate connection requirements with building power monitoring and control system.]

7. Compression lugs that can accept up to #2 AWG wire,

8. A low impedance cabling system shall be provided with unit, thereby improving the connection of the SPD to the electrical system. Cabling system shall utilize a minimum wire size of #6 AWG.

C. Unit shall have a maximum attenuation of 34dB based on 50 ohm insertion loss test per MIL–STD–220B.

D. Unit shall have a minimum single–phase pulse surge current rating of [50 or 100] kA per mode. The peak surge current rating shall not be the arithmetic sum of the ratings of the individual MOVs in a given mode. Manufacturer shall provide independent 3rd/ party testing, validating that unit is capable of surviving a single surge at the specified rating.

E. Protection modes and UL 1449 VPR for grounded wye circuits with [480Y/277 V] [208Y/120 V], three–phase, four–wire circuits shall not exceed the following:

1. Line to Neutral: [1200 V for 480Y/277 V] [700 V for 208Y/120 V]
2. Line to Ground: [1200 V for 480Y/277 V] [700 V for 208Y/120 V]
3. Neutral to Ground: [1000 V for 480Y/277 V] [700 V for 208Y/120 V]
4. Line to Line: [2000 V for 480Y/277 V] [1200 V for 208Y/120 V]

F. Protection modes and UL 1449 VPR for 240/120 V, single–phase, three–wire circuits shall not exceed the following:

1. Line to Neutral: 700V
2. Line to Ground: 700 V
3. Neutral to Ground: 700V
4. Line to Line: 1200V

G. Unit shall have a short–circuit current rating of 200 kA.

H. Unit shall have an I/nominal rating of 20 kA.

I. The basis of design for this unit is the Currentguard series.

2.4 PHYSICAL REQUIREMENTS

A. Interior installations shall have a NEMA 250, Type 1 enclosure.

B. Exterior installations shall have a NEMA 250, Type 4X enclosure.

2.5 ENVIRONMENTAL REQUIREMENTS

A. The unit shall not add appreciably to air conditioning load. Heat load shall not exceed 0.2 kVA (0.682 BTU/hr.).

B. Average power consumption shall be less than 0.2 kVA. Average power factor inefficiencies or harmonic distortion shall not result from use (THD – 0%).

C. No audible noise shall be generated.

D. No appreciable magnetic fields shall be generated. All units shall be capable of use in any location (in a computer room) without danger to disc units, disc packs or tapes.

E. Operating Conditions:

1. –40 – 185 degrees F

2. 5% – 95% humidity non–condensing

PART 3 – EXECUTION

3.1 INSTALLATION

A. The unit must be installed in accordance with the manufacturer's printed instruction to maintain warranty. All local and national codes must be observed.

B. For service entrance units, wiring harness shall be connected to the line side bussing of the service entrance electrical equipment as shown on the drawings.

C. For distribution panelboard units, install OCPD as required to comply with the UL listing of the SPD.

D. Install SPDs with cabling system between suppressor and points of attachment as short and straight as possible. In panelboard applications, adjust circuit–breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

E. Use crimped connectors and splices only. Wire nuts are not acceptable.

3.2 STARTUP SERVICES

A. Complete startup checks according to manufacturer's written instructions.

B. Do not perform insulation–resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation–resistance tests, and reconnect them immediately after the testing is over.

C. Energize SPDs after power system has been energized, stabilized, and tested.

D. Train owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION

SECTION 26 92 00

MOTOR CONTROLS AND WIRING

PART 1 – GENERAL

1.1 SCOPE

A. All work specified in this Section shall comply with the provisions of Section 26 01 00.

B. All motors shall be provided under Division 23.

C. A motor starter shall be provided under this Section for each motor except for those specified in Division 23 to be furnished with integral starters. Motor starters shall be installed either in a Motor Control Center or separately mounted adjacent to the motor served.

D. Motor power wiring is defined as those conductors between the energy source and the motor. This power wiring shall be terminated at the motor terminals.

E. All control wiring required for automatic starting and stopping of motors shall be provided under Division 23 unless specifically shown on the electrical drawings.

F. Power wiring shall be connected through all line voltage control devices such as fire–stats and thermostats.

PART 2 – PRODUCTS

2.1 MOTOR STARTERS

A. Starters for motors 1/3 horsepower or smaller shall be manual unless remote or automatic starting is required, in which case the starters shall be magnetic, full voltage, non–reversing, single–speed, unless otherwise indicated. All other starters shall be magnetic.

B. Each starter for a three–phase motor shall be furnished with three (3) overload relays sized for the full load running current of the motor actually provided. Provide an external "HAND–OFF–AUTO" selector switch with green "RUNNING" light. Provide a red pilot light to indicate motor "STOPPED". Each pilot light shall have a legend plate indicating reason for signal.

C. Each overload relay shall have a normally open alarm contact which will close only when actuated by an overload (not to be confused with N.O. or N.C. auxiliary contacts). These contacts shall be properly wired to their respective blue pilot light provided on the starter front cover and having a "TRIPPED" legend plate.

D. Individually mounted motor starters shall be in a NEMA Type 1 general purpose enclosure in unfinished areas and shall be flush mounted in all finished areas. All starters mounted in exterior areas shall have a NEMA 3R enclosure. Each starter shall have a laminated nameplate to indicate Division 23 unit number, function and circuit number.

E. A control power transformer shall be provided at each motor starter for connection to the controls provided under Division 23. The control power transformer shall be mounted inside the motor starter enclosure. All control transformers at 50 VA or greater shall have primary fusing. Coordinate all control equipments with Division 23 and equipment manufacturers.

F. All motor starters, push buttons and pilot lights shall be of the same manufacturer as the switchboard and shall be General Electric, Square D, Siemens, Joslyn Clark Controls, or Eaton.

2.2 COMBINATION STARTERS

A. Combination starters shall consist of a circuit breaker and a motor starter mounted in a common NEMA Type 1 general purpose enclosure.

B. The motor starter components shall be as specified in paragraph 2.01 for motor starters.

C. The circuit breaker component shall be a minimum 22,000 amperes RMS interrupting capacity and shall be as required in Section 26 20 00.

2.3 MOTOR CONTROL CENTER

A. The Motor Control Center shall consist of a combination starter for each motor, plus other associated equipment. Combination starters shall be plug–in circuit breaker or switch and fuse type, as scheduled, with voidable cover interlock, provision for padlocking the cover closed and provision for padlocking the operating handle in either the open or closed position. Switches shall be quick–make, quick–break type of quantity, size and poles as scheduled. All switches shall be rated at 600 volts, fused as scheduled. Circuit breakers shall have the interrupting capacity scheduled with 22,000 amperes RMS minimum.

B. Motor starters shall be mounted in individual steel compartment immediately below the breaker or the switch and fuse associated with it. A mechanical interlock shall prevent opening the starter compartment door unless the device is in the off position.

C. Each section in the Motor Control Center shall include an individual 480/120 volt control circuit transformer, with fused secondary.

D. Provide a control terminal strip in the Motor Control Center. The control wiring from these terminal strips, external to the Motor Control Center, to the respective control device, shall be included in Division 23.

E. All circuit breakers, motor starters, push buttons and pilot lights shall be of the same manufacturer as the main switchboard.

F. Each starter shall have a laminated nameplate engraved to indicate Division 23 unit number, function and Motor Control Center circuit number.

G. The Motor Control Center shall be General Electric, Square D, Siemens, or Eaton.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Provide power wiring to and install all motor starters, unless integrally factory mounted on a piece of equipment.

B. Provide power wiring to all motors except packaged units that are prewired between the starter and motor.

C. Where line voltage control devices are mounted at, on or inside a unit, such as aqua–stats, fire–stat for single phase devices, etc., the power wiring to the unit shall be connected through such a control device.

D. On final inspection, it shall be demonstrated to the Architect or his representative, that each overload relay control circuit is properly wired and functioning correctly by manually tripping each overload relay individually, one at a time. This inspection procedure shall not involve removing any wiring or disconnecting any current carrying parts.

END OF SECTION

SECTION 28 72 10

LIFE SAFETY SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section of the specification includes the furnishing, installation, connection and testing of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, and coordinated system.

B. The fire alarm system shall comply with requirements of the NFPA Standard 72 for Protected Premises Signaling Systems and all local codes and regulations. The system shall be electrically supervised and monitor the integrity of all conductors. The manufacturer shall confirm all codes have been met and all necessary devices provided prior to submitting price.

C. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto the Signaling Line Circuits.

D. The system shall be an active/interrogative type system where each transponder is repetitively scanned, causing a signal to be transmitted to the local fire alarm control panel/node indicating that the transponder and its associated initiating device and notification appliance circuit wiring is functional. Loss of this signal at the local FACP shall result in a trouble indication on both the FACP display and at the network display, as specified hereinafter for the particular input.

E. The system shall be arranged such that not less than 20 percent additional transponders may be inserted into any network communication loop.

F. The FACP and peripheral devices shall be manufactured by Notifier, Edwards, or Siemens.

G. The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site. To guide the final checkout and to ensure the systems integrity, the submitting company shall employ NICET Level IV minimum managers and engineers. Proof of NICET level training shall be included as part of submittal package and kept on site with personnel.

H. The installing company shall be UL listed for fire alarm installations. UL certificate shall accompany submittal package. The certification listing category shall be UUJJ and shall be indicated in the project submittal.

I. The Contractor shall make arrangements and pay all fees in connection with the testing of the Life Safety System. All system devices shall be tested for their correct operation, except non–restorable type heat detectors which shall be sample tested. All tests carried out shall meet the requirements of the local authority having jurisdiction.

J. The system shall have proper listing and/or approval from the following nationally recognized agencies:

1. Factory Mutual Systems
2. Underwriters Laboratories

1.2 SCOPE

A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings.

B. Basic Performance

1. Each SLC loop shall be wired NFPA 72 Class B, Survivability Level 1.

2. Initiation Device Circuits (IDC) shall be wired NFPA Class B, Survivability Level 1 as part of an addressable device connected by the SLC circuit.

3. Notification Appliance Circuits (NAC) shall be wired NFPA Class B, Survivability Level 1 as part of an addressable device connected by the SLC circuit or a panel circuit.

4. NAC speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone, which ever is greater.

5. NAC speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.

C. Basic System Functional Operation

1. As part of the fire alarm; when a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

a. FACP will sound and display the alarm condition showing the device address, location, zone information, time/date, and device type.

b. The remote annunciator will sound and display the same information as shown on the FACP display unit.

c. Via system programming, the horn/bell outputs for all zones will activate and sound in temporal 3–3 pattern in synchronized fashion until silenced from FACP panel.

d. All strobes on floors with activated horn/bell outputs shall flash in a synchronized pattern per floor until silenced from the FACP panel.

e. Automatic functions including, but not limited to: elevator(s) recall, smoke evacuation, smoke door release and supply/return fan shutdown shall be activated via system programming as directed by codes and/or drawings.

f. Release all magnetically held smoke doors.

g. Provide signals to the mechanical controls including smoke dampers to shut down or reroute air–handling systems to prevent the recirculation of smoke.

h. Provide a DACT (Digital Alarm Communicator Transmitter) and a signal via DACT for connection to a central station or local municipal fire department (connection and leased line, if required, shall be provided by building owner).

i. Initiate a preprogrammed timing sequence.

j. Additionally, actuation of a lobby elevator smoke detector shall cause immediate non–stop return of all automatic elevators served by that lobby to the primary discharge level; except that, when the alarm has been initiated on the primary discharge level, the elevators, shall be returned to the designated alternate discharge level per the requirements of ANSI ASME A17.1.

k. Additionally, actuation of any elevator equipment room or shaft smoke detector shall cause immediate non–stop return of all automatic elevators served by that equipment room or shaft, to the primary discharge level per the requirements of ANSI ASME A17.1. Provide all required signals from FACP to elevator controls for smoke detector in elevator machine room per the requirements of ANSI ASME A17.1

l. Additionally, actuation of any smoke detector located in the air handling units and/or equipment rooms shall activate signals to the mechanical controls indicating the floor of occurrence.

m. It shall be possible to silence the alarm signals by operating the signal silence switch. However, the activation of another zone shall repeat the entire alarm process, thus causing the signals to resound.

n. Silencing the alarm shall cause all speakers to silence. Firelights will continue to flash.

o. Fire pump (if applicable) normal power availability, fire pump phase reversal and fire pump run status shall be monitored. Loss of normal power, phase reversal shall annunciate as supervisory alarms and pump running shall annunciate as an alarm.

p. Provide a signal to activate the elevator shunt trip breaker upon activation of the heat detector(s) in the elevator shaft or elevator machine rooms.

DRAWING NO.
CFD-XXX-E-006-XXXXX

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NORTH CAROLINA PROFESSIONAL SEAL 041471 ENGINEER SCOTT LOWERY

SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
A	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-006-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
SPECIFICATIONS - ELECTRICAL

SHEET NO.
E-006

2. General Operation

a. Power failures, opens, grounds or any disarrangement of the system wiring or components shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced, however, the trouble LED shall remain lit until the system has been returned to normal operating condition.

1.3 SUBMITTALS

A. General

1. Copies of all submittals shall be submitted to the Architect/Engineer for review prior to acceptance of system.

2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.

3. The authority having jurisdiction shall be notified prior to installation of equipment and wiring. Complete information regarding the system including specifications, wiring diagrams, battery and power supply calculations, floor plans and graphics shall be submitted for approval.

4. If submittals, upon review by the Owner and/or the Owners Representative, are found not to conform with the performance, type and quality of products as well as all other requirements of these specifications; the Contractor shall be required to resubmit. The Contractor shall be responsible for the Owner's extra expenses for subsequent review(s) of rejected submittals. Such extra fees shall be deducted from payments by the Owner to the Contractor. Approval of the submittals by the Owner shall, in no case, relieve the Contractor of the responsibility to meet the requirements of this specification.

B. Shop Drawings

1. Drawings shall include the following minimum requirements for submittal:

a. Point-to-point wiring/conduit layout for all devices on 1/8" scale plans.

b. Device placement showing all addresses and device ID.

c. All panel and equipment terminations.

d. All circuit voltage drop and current calculations spread sheets.

e. All battery calculation spreadsheets.

f. Legend reflecting device description, manufacturer, model number, and back-box requirement.

g. Wiring legend reflecting wire function, type, and recommended manufacturer's part number.

h. Full sequence of operations.

i. Power supply and amplifier calculations.

2. Specification data sheets on each individual system component.

C. Data Sheets

1. Submit simultaneously with the shop drawings, complete manufacturer's technical data sheets showing product description, listings, and specs.

2. Copies of NICET II and IV certifications.

3. Copy of company UL listing certificate.

1.4 APPLICABLE STANDARDS AND SPECIFICATIONS:

A. The specifications and standards listed below form a part of this specification. The system shall comply with the latest standards.

1. National Fire Protection Association (NFPA), 2000 Edition – USA:

No. 13 Sprinkler Systems
No. 13A Halon 1301 Extinguishing Systems
No. 17 Dry Chemical Extinguishing Systems
No. 17A Wet Chemical Extinguishing Systems
Clean Agent Extinguishing Systems
No. 70 National Electrical Code
Specifically Article 760
No. 72 National Fire Alarm Code
No. 101 Life Safety Code

2. International Building Code

3. American National Standard A17.1–1980

4. Underwriter's Laboratories Fire Resistance Directory

5. Local and State Building Codes

6. ADA Public Law 101–336

7. All requirements of the Authority Having Jurisdiction (AHJ)

1.5 APPROVALS

A. The system shall have proper listing, approval and labeling from the following nationally recognized agencies:

FM Factory Mutual Systems
UL Underwriters Laboratories

1.6 SYSTEM FEATURES

A. The system shall include the following features as a minimum:

1. During an alarm condition, the LCD annunciator shall display the activated alarm until acknowledged. This shall allow determination of where the last alarm has taken place.

2. Ground fault detection in wiring on either plus or minus side.

3. Separate alarm and trouble shall be displayed on the LCD annunciator.

4. Resound feature.

5. Dead Front" design control panel with all LED alarm trouble and power on indicators and all switches located behind a locked tempered glass door.

6. Solid state construction.

7. All alarm initiating circuit wiring, signal circuit wiring, speaker circuit wiring shall be supervised.

8. Automatic transfer to standby batteries upon power failure.

9. Lightning and surge protection.

PART 2 – PRODUCTS

2.1 CONDUIT AND WIRE

A. All fire alarm wiring shall be installed in conduit. Conduit shall be installed as required by specification Section 26 10 00.

B. Wiring shall be in accordance with local, state and National codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system.

C. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

D. The fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes from the 120 volt normal power source or from a generator powered source if available.

E. All junction boxes and conduit utilized for fire alarm system cabling shall be painted red.

F. All circuit breakers serving the fire alarm system shall include red marking and a listed locking mechanism per NFPA 72.

2.2 MAIN FIRE ALARM CONTROL PANEL:

A. The FACP shall be completely microprocessor based.

B. System Capacity and General Operation:

1. Configure size of panel to operate number of SLC circuits in a fashion so that each circuit handles no greater than 70% load of capacity or a maximum of 5 floors per circuit.

2. The fire alarm control panel shall include a full-featured operator interface and backlit 80-character Liquid Crystal Display (LCD).

3. The system shall be fully field programmable from the display panel. Panels requiring the use of external keyboards for programming and changes are not acceptable.

4. The FACP shall provide the minimum following features:

a. Drift compensation to extend detector accuracy over life.

b. Detector sensitivity test, per NFPA 72, Chapter 7.

c. Maintenance alert, to warn of excessive smoke detector dirt or dust accumulation.

d. Multiple sensitivity levels for alarm, selected by detector.

e. System status reports to display and printer. Provide printer.

f. Alarm verification, with verification counters.

g. Cross zoning with the capability of counting two detectors in alarm.

h. Walk test.

i. UL–1076 security monitor points.

j. Control-by-time with holiday schedules.

k. Day/night automatic adjustment of detector sensitivity.

l. Device blink control for sleeping areas.

m. Releasing capability.

n. Pre-Alarm.

o. Selectable sensitivity levels, three minimum.

p. History Storage, with a minimum of 400 events.

q. Point Enable/Disable.

r. Point Read (status and level of obscuration).

s. Output point for connection to any building EMS.

C. Signaling Line Circuits (SLC)

1. Each SLC interface shall provide power to communicate with 99 intelligent detectors (ionization, photoelectric or thermal) and 99 intelligent modules (monitor or control).

2. Each SLC circuit shall not exceed 70%, load capacity or cover more than 5 floors.

D. Serial Interface

1. The system shall include two serial EIA-232 interfaces. Each interface shall be a means of connecting UL Listed Electronic Data Processing (EDP) peripherals.

a. One serial port shall support a serial printer.

b. One serial port shall support a CRT/NRT device.

c. The system shall include an EIA-485 port for the serial. connection of annunciators and remote LCD displays.

E. Field Charging Power Supply (FCPS): The FCPS is a device designed for use as either a remote 24-volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24-volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries. Provide batteries to support 60-hour standby with ten minutes of alarm indication at the end of this period. Battery charger shall be capable of recharging all batteries to seventy percent capacity in twelve hours.

2. The Field Charging Power Supply shall have four outputs (Survivability Level 1) and shall be available for connection to the Notification devices.

3. Provide 20-watt spare capacity in each electrical room on each floor for tenant audible circuits. Locate in a junction box clearly labeled "tenant fire alarm audible circuits".

4. Provide 1ea. Field Charging Power Supply (DC) per floor to allow for tenant build-out expansion of NAC devices. At no time shall there exceed 70% load capacity of any FCPS on any of the common levels. Provide power capacity as follows:

Floor Size	Capacity
<25,000 gross sq. ft.	6 amps DC
25,001 to 35,000 gross sq. ft.	10 amps DC
35,001 gross sq. ft. and greaterconsult engineer	

5. Locate audible (where required) and visual power supplies adjacent to one another and in a location within each room approved by the engineer.

6. Provide battery capacity and amplifier capacity in the main fire control panel for addition of tenant devices described above.

F. Provide and install ceiling mounted smoke detector within 5 horizontal feet of FACP.

2.3 SYSTEM COMPONENTS

A. Horns/Bells

1. All Horns/Bells shall be installed as shown on drawings and in accordance with NFPA 72 and local codes.

2. Horns in corridors and all public spaces shall produce a nominal sound output of 15 dBA above average ambient noise levels with a minimum sound output of 15 dBA.

3. Horns shall be UL–464 listed for fire evacuation and operate on 12 or 24 voltage in a temporal 3–3 pattern.

4. The back of each speaker shall be sealed to protect the speaker cone from damage and dust.

5. Speakers shall be bone white in color.

6. Provide a unit cost to add 2 speakers per 25,000 sq.ft. This unit cost shall be applied to additional speakers that may be required at the request of the Fire Marshal during field inspections.

B. Strobe Lights

1. All strobe lights shall meet the requirements of the ADA, UL Standard 1971.

2. Strobe intensity and flash rate shall meet the requirements of UL 1971, ADA and NFPA 72.

3. Combination horn/strobe devices shall meet all above requirements as well as horn/bell requirements listed herein.

4. Strobe unit shall mount to a four inch square electrical outlet box. The strobe light shall have a white lens with red "FIRE" imprinted on it. When the unit is combination speaker/strobe, the speaker portion shall comply with the requirements stated in A. above.

5. All strobes shall have selectable output intensities from 15 to 110 cd. The intensity selected shall meet NFPA 72 requirements for the layout shown on the drawings.

6. Strobe spacing shall be as follows:

a. Strobes shall be spaced a maximum of 100' apart in corridors and within 15' of the end of every corridor to comply with the requirements of NFPA 72.

b. Strobes in open areas shall be provided to comply with NFPA 72.

c. Provide strobes in public spaces such as restrooms, kitchens, breakrooms, cafeterias, conference rooms, training rooms and any other space where six or more people are likely to gather.

7. Provide a unit cost to add 5 strobes including required signal circuits per 25,000 sq.ft. This unit cost shall be applied to additional strobes that may be required at the request of the fire marshal during field inspections.

C. Manual Fire Alarm Stations

1. Manual fire alarm stations shall be dual-action, non-coded, non-break glass type, equipped with key lock so that they may be tested without operating the handle.

2. Stations must be designed such that after an actual activation, they cannot be restored to normal except by key reset. Units shall be master keyed with control equipment.

3. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of 100 feet (30.5 m) front or side. This shall be achieved with the pull lever remaining at a right angle to the station body until reset.

4. The station body shall be constructed so that chips and scratches will not expose metal.

5. Manual fire alarm stations shall be located as required by NFPA 101 and the International Building Code.

D. Duct Smoke Detectors

1. Duct smoke detectors shall be addressable type with visual alarm and power indicators. Provide remote LED/test stations where duct detectors are mounted in non-visible areas such as above ceiling.

2. Each detector shall be installed upon the composite supply/return air ducts(s), with properly sized air sampling tubes where required. Provide smoke detectors in each return air path of any mechanical equipment that moves air in excess of 2000 CFM to meet the requirements of NFPA 72 and 90A. Provide smoke detectors in each supply and return air path of any mechanical equipment that moves air in excess of 15,000 CFM to meet the requirements of NFPA 72 and 90A. Confirm quantities of smoke detectors required for mechanical equipment with Division 23. Room detectors may be used to accomplish smoke detection in the supply/return air paths if the application permits.

3. Each duct detector shall be installed along with addressable control module as needed for fan shutdown and/or smoke control. Detectors zoned with other devices shall be capable of operating its control module even if all other devices on their circuit have gone into alarm.

4. Duct detectors shall be provided by this division, installed by the mechanical contractor and electrically connected to the fire alarm system by the electrical contractor.

E. Smoke Dampers

1. Smoke dampers shall be provided by Division 23.

2. Provide a smoke detector at each smoke damper location to meet the requirements of NFPA 72. Confirm quantities and locations of smoke detectors required for smoke dampers with Division 23. Provide 120 volt power as required for operation of smoke dampers.

F. LCD Alphanumeric Display Remote Annunciator

1. The alphanumeric display annunciator shall be a supervised, backlit LCD display containing a minimum of eighty, (80) characters for alarm annunciation in clear English text. Annunciator shall be located as shown on the drawings or at the location selected by the local fire department.

2. The LCD annunciator shall display all alarm, supervisory, and trouble conditions from the FACP via the serial card.

2.4 SYSTEM COMPONENTS – ADDRESSABLE DEVICES

A. Addressable Devices – General

1. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel signaling line circuits.

2. Addressable photoelectric smoke and thermal detectors shall provide alarm and power/polling LEDs. LED(s) shall flash under normal conditions and LED(s) shall be placed into steady illumination by the control panel, indicating an alarm condition.

3. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system.

4. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values. The FACP software, not the detector, shall make the alarm/normal decision, thereby allowing the sensitivity of each detector to be set in the FACP program and allowing the system operator to view the current analog value of each detector.

5. All field wiring is to be terminated on the detector base, not on the sensor head. Addressing of detectors shall be via integral decade switches built into sensor. Devices requiring separate addressing means will not be accepted.

6. Any additional equipment required to program devices are not acceptable.

B. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

2. Provide photoelectric smoke detector heads with bases as required. Detectors shall be of the solid state photoelectric type utilizing a stable LED light source and a silicone photo diode as the receiving element to form a highly accurate means of smoke detection. Internal detector circuits shall be shielded against electrical interference and resistant to transients, noise and, RF interference. Detector shall be low profile, the complete unit including base shall not exceed 1.875 inches in depth. Detector shall have a dual purpose red LED that flashes continuously to show that the device is operating and, that comes on steady to show that the device is in alarm.

3. Nominal detector sensitivity shall be 1.4% per foot obscuration with a range of 1% to 1.84%. Regardless of sensitivity settings, the detector's stability shall be unaffected by high air velocity. No radioactive materials shall be used.

4. Provide smoke detectors in elevator lobbies, at stairwell doors, in telephone rooms, electrical rooms, mechanical rooms, elevator pits, the top of the elevator shaft, adjacent to the fire alarm control panel, fire pump room, computer rooms as defined by NFPA 90, chiller plants, pump rooms, UPS rooms and elevator machine rooms.

C. Linear Beam Smoke Detector

1. Each beam shall be comprised of a solid state infrared (IR) transmitter, photodiode receiver and microprocessor based control module. Should IR output be attenuated below the desired alarm obscuration level as a result of smoke interference an alarm will be annunciated. Total obscuration of the beam is annunciated as a beam blockage trouble signal. All wiring from the control module to the transmitter and receiver heads is supervised.

2. The projected beam smoke detector system shall have an operating range of 10M. (33 ft.) to 100M. (330 ft.) and be listed for spacing the beam 30 ft. from a wall and 60 ft. on center. The transmitter and receiver optical elements shall be adjustable +/– 90 degrees horizontally and +/– 30 degrees vertically. The sensitivity shall be field selectable from 7% to 50% obscuration.

D. Intelligent Thermal Detectors

1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

E. Addressable Dry Contact Monitor Module

1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device such as flow, tamper, release systems, etc.) to one of the fire alarm control panel SLCs.

2. The IDC zone shall be suitable for Survivability Level 1 operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

3. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include an LED.

4. Monitor module shall be provided for all sprinkler flow and tamper switches. Switches are furnished and installed by others and electrically connected to the fire alarm system by the electrical contractor. Verify quantities and locations and coordinate installation of devices required with fire protection shop drawings. Provide connections to devices per fire protection shop drawings.

F. Addressable Control Module:

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay. Each relay shall have a red LED mounted on its cover to indicate if that relay has been activated.

2. The control module NAC may be wired for Class (A/B) Survivability Level 1 with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to ensure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

G. Door Holders

1. Provide door holders for wall mounting and for floor mounting. Door holders shall operate on 24 volt dc power and each holder shall not draw more than 70 milliamps of power.

2. Coordinate quantities of door holders required with architect's door schedule.

2.5 BATTERIES

A. The batteries shall be sealed, 12 volt nominal (two required).

B. The battery shall have sufficient capacity to power the fire alarm system for the time required in NFPA 72. This time shall be based on the type of system installed. At the end of this period the system shall be capable of operating all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for 5 minutes upon a normal AC power failure.

2.6 ELEVATOR VISUAL SIGNAL (NC & FLA)

A. Provide 1/8" diameter minimum red LED mounted in a single gang polished stainless steel coverplate. Engrave nameplate "DO NOT USE ELEVATOR" with 1/8" high black filled letters. Coordinate installation of this device with the architect prior to rough-in to assure this component is integrated into the architecture of all elevator lobbies.

B. Provide gasketed coverplate for elevator lobbies in parking decks and similar damp locations.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Provide all equipment, wiring, conduit and outlet boxes required for the erection of a complete and operating system in accordance with applicable local, state and national codes, the manufacturer's recommendations, these plans and specifications. Color code shall be used throughout.

3.2 TEST

A. The manufacturer's authorized representative shall provide supervision of final system panel connections, perform a complete functional test of the system and submit a written report to the contractor attesting to the proper operation of the system.

3.3 FINAL INSPECTION

A. Upon completion of the installation, the electrical contractor shall provide to the architect, with a copy to the manufacturer's representative, a signed written statement attesting that all system equipment was installed in accordance with these specifications and in accordance with wiring diagrams, instructions and directions provided to the contractor by the manufacturer.

3.4 INSTRUCTION

A. Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components shall be provided and shall include one session for a period of 8 hours. Additional time that may be required for end-user training will be at added cost to owner.

3.5 GUARANTEE

A. All equipment and wiring shall be guaranteed against defects in materials and workmanship for a two year period from the start up and beneficial use of the system. Warranty service for the equipment shall be provided by the manufacturer's factory trained representative during normal working hours, Monday through Friday excluding holidays. Emergency service provided at times other than as stipulated above shall be available from the same source at additional cost to the owner.

3.6 INSPECTIONS

A. Upon satisfactory completion of the system test, the manufacturer's representative shall present for the owner's consideration, a proposal to provide semi-annual inspection and tests of the system.

END OF SECTION

DRAWING NO.
CFD-XXX-E-007-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

Reduce Risk
Remove Exposures to Hazards
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LS3P

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(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 047171 ENGINEER SCOTT LOWERY

SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-007-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:

SPECIFICATIONS - ELECTRICAL

SHEET NO.

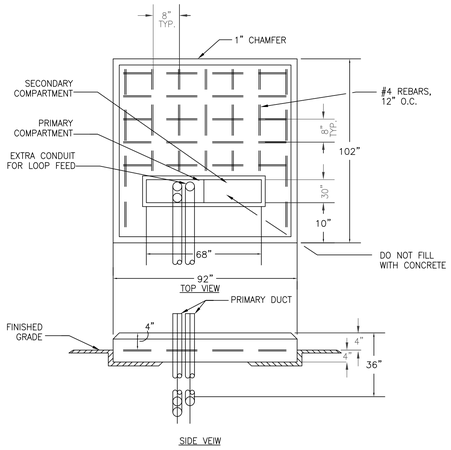
E-007

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	MANUFACTURER AND CATALOG INFORMATION	LAMPS QTY.	LAMPS TYPE	LAMPS WATTS	BALLAST/DRIVER QTY.	BALLAST/DRIVER TYPE	BALLAST/DRIVER WATTS	TOTAL WATTS	INPUT VOLTAGE	DESCRIPTION	MOUNTING
	MANUFACTURER: METALUX MODEL#: CRUZE ST 24CZ2	–	LED 5500LUM 4000K 80+CRI	50.1W	1	LED DRIVER 0–10V DIMMING	50.1W	50.1W	UNIVERSAL	RECESSED 2X4 LED TROFFER. REFER TO ARCHITECT RCP PLAN FOR MOUNTING LOCATIONS.	RECESSED/SURFACE
	SAME AS TYPE ABOVE EXCEPT PROVIDED WITH A 90 MIN EMERGENCY BATTERY.										
	MANUFACTURER: METALUX MODEL#: CRUZE ST 22CZ2	–	LED 5500LUM 4000K 80+CRI	39.4W	1	LED DRIVER 0–10V DIMMING	39.4W	39.4W	UNIVERSAL	RECESSED 2X2 LED TROFFER	RECESSED
	SAME AS TYPE ABOVE EXCEPT PROVIDED WITH A 90 MIN EMERGENCY BATTERY.										
▪	MANUFACTURER: LUMENWERX MODEL#: VIOLA 4" DOWNLIGHT	–	LED 1849LUM 4000K 80+CRI	19.7W	1	LED DRIVER 0–10V DIMMING	19.7W	19.7W	UNIVERSAL	RECESSED 4" SQUARE DOWNLIGHT.	RECESSED
●	SAME AS TYPE ABOVE EXCEPT PROVIDED WITH A 90 MIN EMERGENCY BATTERY.										
	MANUFACTURER: AXIS LIGHITNG MODEL#: BEAM SQUARE 2	–	LED 1200LUM/FT 4000K 80+CRI	10W/FT	1	LED DRIVER 0–10V DIMMING	10W/FT	10W/FT	UNIVERSAL	PENDNAT AND RECESSED LINEAR LED. REFER TO ARCHITECT RCP PLAN FOR MOUNTING LOCATIONS.	PENDANT/RECESSED
	SAME AS TYPE ABOVE EXCEPT PROVIDED WITH A 90 MIN EMERGENCY BATTERY.										
	MANUFACTURER: LIGHT ART MODEL: COIL PENDANT	–	LED 2000LUM	25W	1	DRIVER 0–10V DIMMING	25W	25W	120V	LINEAR LED PENDANT. 120V. REFER TO ARCHITECTURAL DETAILS FOR MOUNTING HEIGHT.	PENDANT
○	MANUFACTURER: METALUX MODEL#: UHB	–	LED 24000LUM 4000K	197W	1	DRIVER 0–10V	197W	197W	UNIVERSAL	LED HIGH BAY FIXTURE. UNIVERSAL VOLTAGE. REFER TO ARCHITECTURAL DETAILS FOR MOUNTING HEIGHT. PROVIDE INTEGRAL OCCUPANCY SENSORS IN FIXTURE.	SUSPENDED
◉	SAME AS ABOVE EXCEPT EQUIPPED WITH AN EMERGENCY BATTERY PACK.										
⊙	WET LOCATION LISTED DOWNLIGHT. MANUFACTURER TO BE DETERMINED.	–	LED 2000LUM	60W	1	DRIVER 0–10V	60W	60W	UNIVERSAL	WET LOCATION LISTED.	CEILING
	EXTERIOR WALL PACK. COOPER LUMARK WP LED SERIES. OR APPROVED EQUAL.	–	LED 2000LUM	60W	1	DRIVER 0–10V	60W	60W	UNIVERSAL	WET LOCATION LISTED.	WALL
	SAME AS ABOVE EXCEPT EQUIPPED WITH AN EMERGENCY BATTERY PACK.										
	MANUFACTURER: LUMARK MODEL#: PREVAIL DISCRETE LED	–	LED 52086LUM 4000K	366W	1	LED DRIVER 0–10V DIMMING	366W	366W	UNIVERSAL	POLE LIGHT.	RECESSED
	MANUFACTURER: LUMARK MODEL#: PREVAIL DISCRETE LED	–	LED 52086LUM 4000K	732W	1	LED DRIVER 0–10V DIMMING	732W	732W	UNIVERSAL	POLE LIGHT. TWO HEADS.	RECESSED
	RECESSED EMERGENCY FIXTURE. COOPER AEL2 SERIES OR APPROVED EQUAL. PROVIDED WITH 90 MINUTE BATTERY PACK.	–	LED	5W	1	LED DRIVER	5W	5W	UNIVERSAL	RECESSED EMERGENCY FIXTURE ABOVE DOOR MULLION. UNIVERSAL VOLTAGE.	AS REQUIRED.
	MANUFACTURER: SURE–LITES MODEL#: ES SERIES	–	LED	5W	1	LED DRIVER	5W	5W	UNIVERSAL	EXISTING AND NEW EXIT SIGNS. RED LETTERING. CONFIRM FINISH WITH ARCHITECT. EQUIPPED WITH 90 MIN BATTERY BACKUP.	AS REQUIRED.

LIGHT FIXTURE SCHEDULE NOTES:

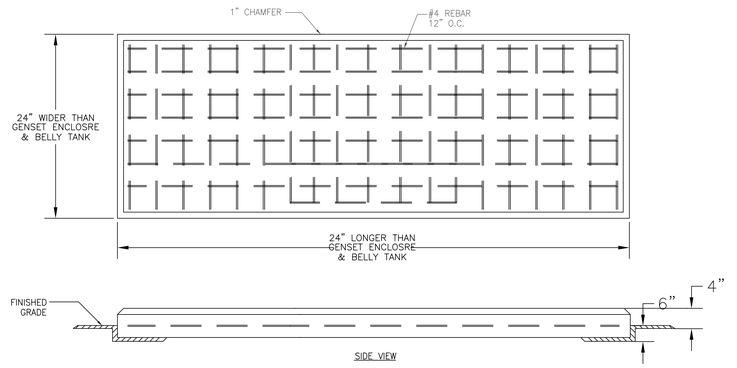
1. ALL FINISH TYPES SHOULD BE COORDINATED WITH THE ARCHITECT/INTERIOR DESIGNER(S).
2. ALL TRIMS AND INSTALLATION REQUIREMENTS SHALL BE COORDINATED WITH THE CEILING TYPE IN WHICH IT IS TO BE INSTALLED. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT CEILING TYPE FOR WHICH THE FIXTURE IS TO BE INSTALLED.
3. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS AND MILLWORK DETAILS, WHERE APPLICABLE, FOR THE INTENDED MOUNTING LOCATION OF ALL LIGHT FIXTURES WITHIN.
4. ALL FLUORESCENT FIXTURES TO BE PROVIDED WITH INTERNAL BALLAST DISCONNECTING MEANS.
5. FIXTURE TYPES NOTED ON PLAN WITH SUFFIX 'E' INDICATES FIXTURE TO BE PROVIDED WITH 90 MINUTE MINIMUM BATTERY BACK–UP. (E.G. L1E, L2E, ETC...). ALL EXIT AND EMERGENCY FIXTURES SHALL BE FED FROM LOCAL LIGHTING BRANCH CIRCUIT PER NEC 700.12(I)(2).
6. ANY LOW–VOLTAGE CLASS 2 WIRING OUTSIDE THE LIGHT FIXTURE HOUSING SHALL BE PLENUM RATED, I.E. TYPE CL–2P, IN COMPLIANCE WITH NEC ARTICLE 725.179. THIS APPLIES TO POWER WIRING AND CONTROL WIRING.



2 TRANSFORMER PAD DETAIL
E–008 NOT TO SCALE

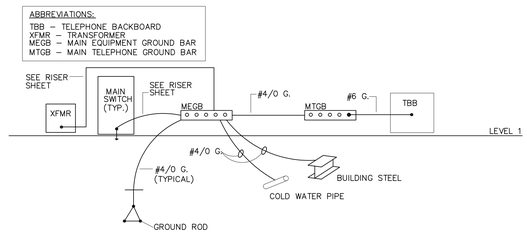
GENERAL NOTES:
(APPLIES ONLY TO THIS DETAIL 2/E–002)

1. CONFIRM DIMENSIONS WITH POWER COMPANY, DUKE ENERGY.
2. SERVICE DUCT SHALL BE LOCATED IN THE EXTREME RIGHT SIDE OF THE SECONDARY COMPARTMENT
3. PRIMARY DUCT SHALL EXTEND BEYOND EDGE OF PAD IN DIRECTION OF INCOMING CABLES.
4. MATERIAL FOR PRIMARY DUCT SHALL BE FURNISHED BY POWER COMPANY.
5. THE PAD SHALL HAVE A MINIMUM CLEARANCE OF 10' FROM ALL BUILDINGS.
6. CONCRETE SHALL HAVE A MINIMUM ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 POUNDS. PAD SHALL BE CURED NOT LESS THAN 72 HOURS.
7. SOIL UNDERNEATH PADS SHALL BE FREE OF ROOTS AND OTHER ORGANIC MATERIALS AND BE THOROUGHLY TAMPED TO PREVENT WASHING. EXCERSISE CARE IN BACKFILLING AND GRADING AROUND PAD.
8. USE FIRE ANT CONTROL (CN 9220092158) UNDER ENTIRE PAD INCLUDING OPENINGS.
9. OTHER UTILITIES ARE NOT TO BE INSTALLED UNDER TRANSFORMER PAD.



3 GENERATOR PAD DETAIL
E–008 NOT TO SCALE

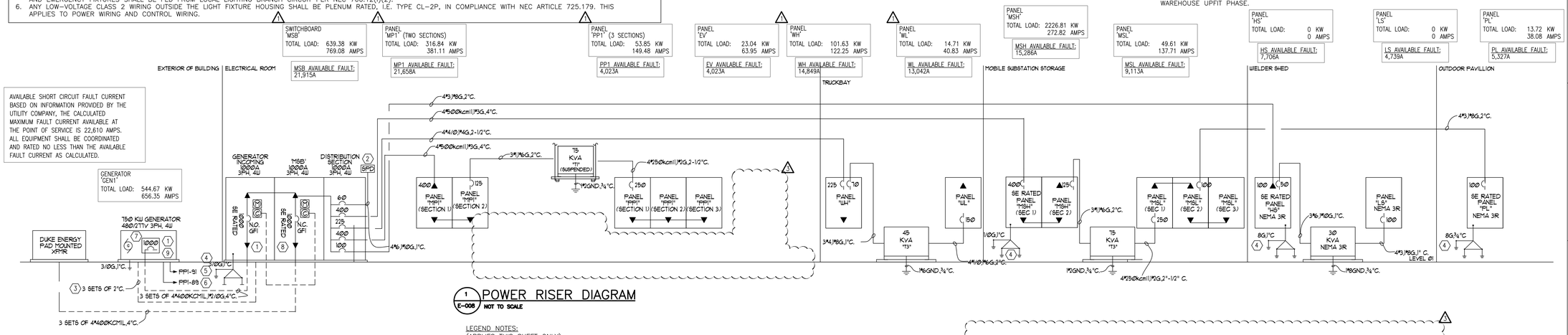
ABBREVIATIONS:
TBB – TELEPHONE BACKBOARD
XFMR – TRANSFORMER
MEGB – MAIN EQUIPMENT GROUND BAR
MTGB – MAIN TELEPHONE GROUND BAR



4 GROUNDING RISER DETAIL
E–008 NOT TO SCALE

GENERAL NOTE:
(APPLY THIS DETAIL ONLY 4/E–002)

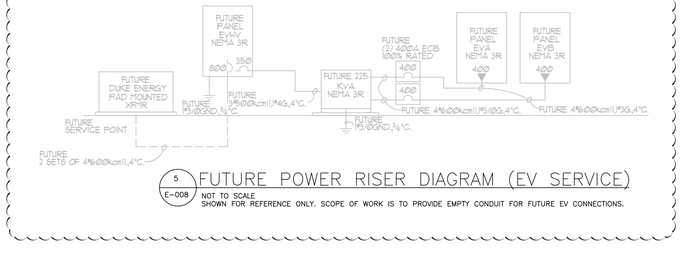
1. GROUNDING RISER DETAIL PER SPECIFICATIONS 261000 SECTION 3.08.
2. ALL CONDUCTORS SHALL BE CONTINUOUS. PROVIDE AN EXOTHERIC WELD AT ALL JOINTS AND SPLICES.
3. MTGB AND TBB LOCATION TO BE DETERMINED IN THE WAREHOUSE UPFIT PHASE.



1 POWER RISER DIAGRAM
E–008 NOT TO SCALE

LEGEND NOTES:
(APPLIES THIS SHEET ONLY)

1. GENERATOR WILL NOT BE PARALLELED TO THE UTILITY. PROVIDE SENSING AND CONTROLS FOR AUTOMATIC SYNCHRONIZING. PROVIDE RELAYS FOR SYNC CHECK CONTROL POWER FOR CPT'S WILL BE DELIVERED BY BUILDING UTILITY POWER. PROVIDE A SWITCHING PAIR OF BREAKERS AS SHOWN WITH AUTO–THROW–OVER CONTROLS WITH SELECTABLE AUTOMATIC OR MANUAL CONTROL. PROVIDE ADJUSTABLE TIME DELAY FOR AUTOMATIC MODE OPERATION. THE SPECIFICATIONS FOR THE SWITCHBOARD SHALL BE COORDINATED WITH THE UPFIT.
2. SURGE PROTECTIVE DEVICE SHALL BE SSI SHLA3Y2 OR APPROVED EQUAL.
3. (3) SETS 2" CONDUIT FOR POWER, CONTROL CABLING, AND ONE SPARE FROM GENERATOR TO BUILDING MAIN ELECTRICAL ROOM.
4. GROUND PER N.E.C. 250.
5. PROVIDE POWER TO BLOCK HEATER.
6. PROVIDE POWER TO BATTERY CHARGER.
7. GENERATOR SHALL BE GENERAC 'SD750' SERIES 750KW INDUSTRIAL DIESEL GENERATOR. PROVIDE WITH UL142 2,233 GALLON SUB–BASE TANK RATED FOR 32 HOUR RUNTIME AT 100% LOAD, LEVEL 1 SOUND ATTENUATION WEATHERPROOF ENCLOSURE RATED 80DBA @ 23FT, AND VERTICAL DISCHARGE SECTION. PROVIDE ALL CONTROL WIRING FOR INTEGRATED FUNCTION WITH THE BUILDING SWITCHBOARD.
8. LABEL PER NEC 110.16.
9. THE EMERGENCY SYSTEM SHALL BE NON–SEPARATELY DERIVED. THE BREAKERS THAT TRANSFER FROM UTILITY TO EMERGENCY SHALL BE THREE POLE. REMOVE THE BOND STRAP AT THE GENERATOR FOR THE 3 POLE SWITCHING.



5 FUTURE POWER RISER DIAGRAM (EV SERVICE)
E–008 NOT TO SCALE
SHOWN FOR REFERENCE ONLY. SCOPE OF WORK IS TO PROVIDE EMPTY CONDUIT FOR FUTURE EV CONNECTIONS.

DRAWING NO.
CFD-XXX-E-008-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

Reduce Risk
Remove Exposures to Hazards
Reinforce Safe Behavior

LS3P

BW &A Barrett, Woodyard and Associates, Inc.
License # C–2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704–357–9333 (f) 704–357–9385

BWA JOB # 2022–0632

NORTH CAROLINA PROFESSIONAL SEAL 047417 ENGINEER J. SCOTT LOWERY

SEAL 04/30/2024

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	04.30.24		SD1.03 – VFC CHANGES
2	02.14.24		LIGHTING UPDATE
3	09.22.23		67%PT
4	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-008-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
POWER RISER DIAGRAM & DETAILS

SHEET NO.
E-008

NEW PANEL MSB — SECTION 1

AIC 42K
SE RATED

VOLTAGE: 277/480 | AMP: 1000
PHASE: 3 | MAIN: MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
MP1	91.898	400/3	1	A	2	–/3	0	SPACE
-----	90.44	---	3	B	4	---	0	-----
-----	97.235	---	5	C	6	---	0	-----
MSH	80.177	400/3	7	A	8	–/3	0	SPACE
-----	79.237	---	9	B	10	---	0	-----
-----	74.685	---	11	C	12	---	0	-----
WH	35.562	225/3	13	A	14	–/3	0	SPACE
-----	32.974	---	15	B	16	---	0	-----
-----	32.194	---	17	C	18	---	0	-----
PANEL HS	0	100/3	19	A	20	–/3	0	SPACE
-----	0	---	21	B	22	---	0	-----
-----	0	---	23	C	24	---	0	-----
SPD	0	60/3	25	A	26	–/3	0	SPACE
-----	0	---	27	B	28	---	0	-----
-----	0	---	29	C	30	---	0	-----
SPACE	0	–/3	31	A	32	–/3	0	SPACE
-----	0	---	33	B	34	---	0	-----
-----	0	---	35	C	36	---	0	-----
SPACE	0	–/3	37	A	38	–/3	0	SPACE
-----	0	---	39	B	40	---	0	-----
-----	0	---	41	C	42	---	0	-----

		VLL	PH
A TOTAL	207.64	480	3
B TOTAL	202.65		
C TOTAL	204.11		
CONN. kW	614.40		
CONN. Amps	739.03		

70.90	RECEPTACLES
236.39	HEATING
250.47	AC/MOTORS
22.21	LIGHTING
19.24	MISC.
15.20	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	40.45 KVA
HEAT: 100% :	=	236.385 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	250.468 KVA
LIGHTING: 125%:	=	27.76125 KVA
MISC: 100%:	=	19.24 KVA
WATER HEATER: 125%:	=	19 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	593.30425 KVA
TOTAL DEMAND LOAD AMPS:	=	713.66 AMP

NEW PANEL MP1 — SECTION 1

AIC 22K

VOLTAGE: 277/480 | AMP: 400
PHASE: 3 | MAIN: MLO

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
HALLWAY LTS	2.983	20/1	1	A	2	20/3	2	P-5
CREW ROOM & STORAGE LTS	2.87	20/1	3	B	4	---	2	-----
OFFICE AND BATHROOM LTS	3.025	20/1	5	C	6	---	2	-----
TEAM MEETING & BREAK RM LTS	2.585	20/1	7	A	8	20/3	2	P-6
EXTERIOR LTS	1.38	20/1	9	B	10	---	2	-----
RTU 1	27.33	125/3	11	C	12	---	2	-----
-----	27.33	---	13	A	14	20/1	2.5	P-7
-----	27.33	---	15	B	16	20/3	1.67	P-8
RTU 2	5.8	25/3	17	C	18	---	1.67	-----
-----	5.8	---	19	A	20	---	1.67	-----
-----	5.8	---	21	B	22	20/3	1.83	P-9
WH-A	12.2	60/1	23	C	24	---	1.83	-----
PANEL PP1	23.18	125/3	25	A	26	---	1.83	-----
-----	22.28	---	27	B	28	20/3	2	P-10
-----	20.56	---	29	C	30	35/3	4.67	P-11
P-1	4	25/1	31	A	32	---	4.67	-----
P-2	4	25/1	33	B	34	---	4.67	-----
P-3	1.83	20/3	35	C	36	40/3	5.33	P-12
-----	1.83	---	37	A	38	---	5.33	-----
-----	1.83	---	39	B	40	---	5.33	-----
P-4	4	20/1	41	C	42	20/1	0	SPARE

		VLL	PH
A TOTAL	87.71	480	3
B TOTAL	84.99		
C TOTAL	92.25		
SECTION 2 TOTAL kW	46.08		
CONN. kW	311.02		
CONN. Amps	374.11		

40.68	RECEPTACLES
0.00	HEATING
181.78	AC/MOTORS
12.84	LIGHTING
17.44	MISC.
12.20	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	25.34 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	181.78 KVA
LIGHTING: 125%:	=	16.05375 KVA
MISC: 100%:	=	63.52 KVA
WATER HEATER: 125%:	=	15.25 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	301.94375 KVA
TOTAL DEMAND LOAD AMPS:	=	363.19 AMP

NEW PANEL MP1 — SECTION 2

AIC 42K

VOLTAGE: 277/480 | AMP: 400
PHASE: 3 | MAIN: MLO

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
SPARE	0	20/1	43	A	44	20/1	0	SPARE
SPARE	0	20/1	45	B	46	20/1	0	SPARE
SPARE	0	20/1	47	C	48	20/1	0	SPARE
UH-B	1.67	20/3	49	A	50	20/1	0	SPARE
-----	1.67	---	51	B	52	20/1	0	SPARE
-----	1.67	---	53	C	54	20/1	0	SPARE
UH-B	1.67	20/3	55	A	56	20/1	0	SPARE
-----	1.67	---	57	B	58	20/1	0	SPARE
-----	1.67	---	59	C	60	20/1	0	SPARE
UH-B	1.67	20/3	61	A	62	20/1	0	SPARE
-----	1.67	---	63	B	64	20/1	0	SPARE
-----	1.67	---	65	C	66	20/1	0	SPARE
UH-B	1.67	20/3	67	A	68	20/1	0	SPARE
-----	1.67	---	69	B	70	20/1	0	SPARE
-----	1.67	---	71	C	72	20/1	0	SPARE
P-13	2.7	20/3	73	A	74	20/1	0	SPARE
-----	2.7	---	75	B	76	20/1	0	SPARE
-----	2.7	---	77	C	78	20/1	0	SPARE
SPARE	0	20/1	79	A	80	20/1	0	SPARE
SPARE	0	20/1	81	B	82	20/1	0	SPARE
SPARE	0	20/1	83	C	84	20/1	0	SPARE

		VLL	PH
A TOTAL	9.38	480	3
B TOTAL	9.38		
C TOTAL	9.38		
CONN. kw	28.14		
CONN. amps	33.85		

0.00	RECEPTACLES
20.04	HEATING
8.10	AC/MOTORS
0.00	LIGHTING
0.00	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

NEW PANEL PP1 — SECTION 1

AIC 10K

VOLTAGE: 120/208 | AMP: 250
PHASE: 3 | MAIN: MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
DED REC BREAKROOM	0.18	20/1	1	A	2	20/1	0.72	FLOORBOX TOWNHALL
DED REC BREAKROOM	0.18	20/1	3	B	4	20/1	0.72	FLOORBOX TOWNHALL
DED REC BREAKROOM	0.18	20/1	5	C	6	20/1	0.72	FLOORBOX TOWNHALL
DED REC BREAKROOM	0.18	20/1	7	A	8	20/1	0	SPARE
DED REC BREAKROOM	0.18	20/1	9	B	10	20/1	0.72	FLOORBOX TOWNHALL
DED REC BREAKROOM	0.18	20/1	11	C	12	20/1	0.72	FLOORBOX TOWNHALL
DED REC BREAKROOM	0.18	20/1	13	A	14	20/1	0.72	REC TOWNHALL CLOSET & CLOSET
DED REC FRIDGE	0.6	20/1	15	B	16	20/1	0.18	DED REC AV CLOSET
DED REC FRIDGE	0.6	20/1	17	C	18	20/1	0.18	DED REC AV CLOSET
REC BREAKROOM	0.72	20/1	19	A	20	20/1	0.18	DED REC WATER FOUNTAIN
REC OFFICE	0.9	20/1	21	B	22	20/1	0.36	REC BATHROOMS
REC OFFICE	0.9	20/1	23	C	24	20/1	1.08	REC OFFICES
MOD FURN OPEN AREA	0.9	20/3	25	A	26	20/1	1.08	REC OFFICES
-----	0.9	---	27	B	28	20/1	1.08	REC OFFICES
-----	0.9	---	29	C	30	20/1	0.9	DED REC COPIER
MOD FURN OPEN AREA	0.9	20/1	31	A	32	20/1	0.9	DEC REC PLOTTER
REC CONFERENCE & PHONE RM	1.08	20/1	33	B	34	20/1	0.18	DED REC COPY
REC CONFERENCE	0.9	20/1	35	C	36	20/1	0.18	DED REC COPY
REC TOWN HALL	0.72	20/1	37	A	38	20/1	0.18	DED REC WELLNESS
DED REC TOWNHALL	0.18	20/1	39	B	40	20/1	0.18	DED REC WELLNESS
DED REC TOWNHALL	0.18	20/1	41	C	42	20/1	0.18	DED REC WELLNESS

		VLL	PH
A TOTAL	7.56	208	3
B TOTAL	7.44		
C TOTAL	7.80		
SECTION 2 TOTAL kW	35.87		
SECTION 3 TOTAL kW	10.25		
CONN. kW	68.92		
CONN. Amps	191.31		

18.18	RECEPTACLES
0.00	HEATING
0.00	AC/MOTORS
0.00	LIGHTING
4.62	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	25.16 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	10.8 KVA
LIGHTING: 125%:	=	0.45 KVA
MISC: 100%:	=	17.44 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	53.85 KVA
TOTAL DEMAND LOAD AMPS:	=	149.48 AMP

NEW PANEL PP1 — SECTION 2

AIC 10K

VOLTAGE: 120/208 | AMP: 250
PHASE: 3 | MAIN: MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
DED REC IT	0.36	20/1	43	A	44	20/3	0.9	MOD FURN TEAM RM
JBOX SECURITY PANEL	0.5	20/1	45	B	46	---	0.9	-----
DED REC IT	0.36	20/1	47	C	48	---	0.9	-----
DED REC IT	0.36	20/1	49	A	50	20/1	0.9	MOD FURN TEAM RM
DED REC IT	0.36	20/1	51	B	52	20/1	0.9	MOD FURN TEAM RM
JBOX SECURITY PANEL	0.5	20/1	53	C	54	20/3	0.9	MOD FURN TEAM RM
DED REC IT	0.36	20/1	55	A	56	---	0.9	-----
DED REC IT	0.36	20/1	57	B	58	---	0.9	-----
REC HALLS & ADA BATHROOM & JAN CLOSET	1.08	20/1	59	C	60	20/1	0.9	REC TEAM RM
MOD FURN TEAM RM	0.9	20/3	61	A	62	20/1	0.9	MOD FURN TEAM RM
-----	0.9	---	63	B	64	20/3	0.9	MOD FURN TEAM RM
-----	0.9	---	65	C	66	---	0.9	-----
MOD FURN TEAM RM	0.9	20/1	67	A	68	---	0.9	-----
REC TEAM RM	0.9	20/1	69	B	70	20/1	0.9	MOD FURN TEAM RM
REC TEAM RM	0.72	20/1	71	C	72	20/1	0.72	REC STORAGE
MOD FURN TEAM RM	0.9	20/1	73	A	74	20/1	1.08	REC STORAGE & HALLWAY
MOD FURN TEAM RM	0.9	20/1	75	B	76	20/1	1.08	REC STORAGE & HALLWAY
MOD FURN TEAM RM	0.9	20/3	77	C	78	20/1	1.08	REC STORAGE & HALLWAY
-----	0.9	---	79	A	80	25/2	1.98	CU-2
-----	0.9	---	81	B	82	---	1.97	-----
REC TEAM RM	0.9	20/1	83	C	84	20/1	0.5	RP-A

		VLL	PH
A TOTAL	12.24	208	3
B TOTAL	12.37		
C TOTAL	11.26		
CONN. kw	35.87		
CONN. amps	99.57		

21.60	RECEPTACLES
0.00	HEATING
3.95	AC/MOTORS
0.00	LIGHTING
10.32	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

NEW PANEL PP1 — SECTION 3

AIC 10K

VOLTAGE: 120/208 | AMP: 250
PHASE: 3 | MAIN: MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
CU-1	1.98	25/2	85	A	86	20/1	0	SPARE
-----	1.97	---	87	B	88	20/1	0	SPARE
BATTERY CHARGER	0.5	20/1	89	C	90	20/1	0	SPARE
BATTERY HEATER	0.5	20/1	91	A	92	20/1	0	SPARE
FIRE ANNUNCIATOR	0.5	20/1	93	B	94	20/1	0	SPARE
PROJECTOR MOTOR	1	20/1	95	C	96	20/1	0	SPARE
PROJECTOR	0.18	20/1	97	A	98	20/1	0	SPARE
BREAK RM LTS	0.36	20/1	99	B	100	20/1	0	SPARE
RTU1 MAINTENANCE OUTLET	0.18	20/1	101	C	102	20/1	0	SPARE
SPARE	0	20/1	103	A	104	20/1	0	SPARE
MAINTENANCE OUTLET	0.18	20/1	105	B	106	20/1	0	SPARE
VEHICLE BAY DOORS	0.35	20/2	107	C	108	20/1	0	SPARE
-----	0.35	---	109	A	110	20/1	0	SPARE
VEHICLE BAY DOORS	0.35	20/2	111	B	112	20/1	0	SPARE
-----	0.35	---	113	C	114	20/1	0	SPARE
EF-B	0.65	20/1	115	A	116	20/1	0	SPARE
TEF-1	0.65	20/1	117	B	118	20/1	0	SPARE
MOD CONTROLLER	0.2	20/1	119	C	120	20/1	0	SPARE
SPARE	0	20/1	121	A	122	20/1	0	SPARE
SPARE	0	20/1	123	B	124	20/1	0	SPARE
SPARE	0	20/1	125	C	126	20/1	0	SPARE

		VLL	PH
A TOTAL	3.66	208	3
B TOTAL	4.01		
C TOTAL	2.58		
CONN. kw	10.25		
CONN. amps	28.45		

0.54	RECEPTACLES
0.00	HEATING
6.85	AC/MOTORS
0.36	LIGHTING
2.50	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

NEW PANEL WH — SECTION 1

AIC 22K

VOLTAGE: 277/480 | AMP: 225
PHASE: 3 | MAIN: MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
FAN	1.67	20/3	1	A	2	20/3	4.3	UH-A
-----	1.67	---	3	B	4	---	4.3	-----
-----	1.67	---	5	C	6	---	4.3	-----
LTS	3.612	20/1	7	A	8	20/3	4.3	UH-A
UH-A	4.3	20/3	9	B	10	---	4.3	-----
-----	4.3	---	11	C	12	---	4.3	-----
-----	4.3	---	13	A	14	20/1	0	SPARE
UH-A	4.3	20/3	15	B	16	20/1	0	SPARE
-----	4.3	---	17	C	18	20/1	0	SPARE
-----	4.3	---	19	A	20	20/1	0	SPARE
UH-A	4.3	20/3	21	B	22	20/1	0	SPARE
-----	4.3	---	23	C	24	20/1	0	SPARE
-----	4.3	---	25	A	26	20/1	0	SPARE
UH-A	4.3	20/3	27	B	28	20/1	0	SPARE
-----	4.3	---	29	C	30	20/1	0	SPARE
-----	4.3	---	31	A	32	20/1	0	SPARE
SPARE	0	20/1	33	B	34	20/1	0	SPARE
SPARE	0	20/1	35	C	36	20/1	0	SPARE
PANEL WL	4.48	70/3	37	A	38	20/1	0	SPARE
-----	5.504	---	39	B	40	20/1	0	SPARE
-----	4.724	---	41	C	42	20/1	0	SPARE

		VLL	PH
A TOTAL	35.56	480	3
B TOTAL	32.97		
C TOTAL	32.19		
CONN. kW	100.73		
CONN. Amps	121.16		

1.80	RECEPTACLES
77.40	HEATING
17.72	AC/MOTORS
3.61	LIGHTING
0.20	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	1.8 KVA
HEAT: 100% :	=	77.4 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	17.718 KVA
LIGHTING: 125%:	=	4.515 KVA
MISC: 100%:	=	0.2 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	101.633 KVA
TOTAL DEMAND LOAD AMPS:	=	122.25 AMP

NEW PANEL WL — SECTION 1

AIC 10K

VOLTAGE: 120/208 | AMP: 150
PHASE: 3 | MAIN: MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
VEHICLE BAY DOORS	0.35	20/2	1	A	2	20/2	0.35	VEHICLE BAY DOORS
-----	0.35	---	3	B	4	---	0.35	-----
VEHICLE BAY DOORS	0.35	20/2	5	C	6	20/2	0.35	VEHICLE BAY DOORS
-----	0.35	---	7	A	8	---	0.35	-----
VEHICLE BAY DOORS	0.35	20/2	9	B	10	20/1	0.72	REC CEILING
-----	0.35	---	11	C	12	20/1	0.72	REC CEILING
VEHICLE BAY DOORS	0.35	20/2	13	A	14	20/1	0.18	DED REC
-----	0.35	---	15	B	16	20/1	0.18	DED REC
VEHICLE BAY DOORS	0.35	20/2	17	C	18	20/1	0.1	LOUVER CONTROL
-----	0.35	---	19	A	20	20/1	0.1	LOUVER CONTROL
VEHICLE BAY DOORS	0.35	20/2	21	B	22	20/2	0.754	EF-A
-----	0.35	---	23	C	24	---	0.754	-----
VEHICLE BAY DOORS	0.35	20/2	25	A	26	20/2	0.35	VEHICLE BAY DOORS
-----	0.35	---	27	B	28	---	0.35	-----
VEHICLE BAY DOORS	0.35	20/2	29	C	30	20/2	0.35	VEHICLE BAY DOORS
-----	0.35	---	31	A	32	---	0.35	-----
VEHICLE BAY DOORS	0.35	20/2	33	B	34	20/2	0.35	VEHICLE BAY DOORS
-----	0.35	---	35	C	36	---	0.35	-----
VEHICLE BAY DOORS	0.35	20/2	37	A	38	20/2	0.35	VEHICLE BAY DOORS
-----	0.35	---	39	B	40	---	0.35	-----
-----	0	20/1	41	C	42	20/1	0	SPARE

		VLL	PH
A TOTAL	4.48	208	3
B TOTAL	5.50		
C TOTAL	4.72		
CONN. kW	14.71		
CONN. Amps	40.83		

1.80	RECEPTACLES
0.00	HEATING
12.71	AC/MOTORS
0.00	LIGHTING
0.20	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	1.8 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	12.708 KVA
LIGHTING: 125%:	=	0 KVA
MISC: 100%:	=	0.2 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	14.708 KVA
TOTAL DEMAND LOAD AMPS:	=	40.83 AMP

1

DRAWING NO.
CFD-XXX-E-009-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

Reduce Risk
Remove Exposures to Hazards
Reinforce Safe Behavior

LS3P

BW &A Barrett, Woodyard and Associates, Inc.
license # C-2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 21614 ENGINEER J. SCOTT LOWERY

SEAL 04/30/2024

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	04.30.24	JFE	ASI 03 - VE CHANGES
2	09.22.23	JFE	START
3	05.24.23	JFE	ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-009-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
PANEL SCHEDULES - ELECTRICAL

SHEET NO.
E-009

AIC 22K
SE RATED

NEW PANEL MSH
SECTION 1

VOLTAGE: 277/480
PHASE: 3

AMP:
MAIN: 400 MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
WAREHOUSE LTS	3.612	20/1	1	A	2	15/3	0.663	EF-A
WAREHOUSE LTS	1.422	20/1	3	B	4	---	0.663	------
FAN	1.67	20/3	5	C	6	---	0.663	------
-----	1.67	---	7	A	8	15/3	0.663	EF-A
-----	1.67	---	9	B	10	---	0.663	------
10 TON CRANE	7.59	40/3	11	C	12	---	0.663	------
-----	7.58	---	13	A	14	15/3	0.663	EF-A
-----	7.58	---	15	B	16	---	0.663	------
UH-A	4.3	20/3	17	C	18	---	0.663	------
-----	4.3	---	19	A	20	15/3	0.663	EF-A
-----	4.3	---	21	B	22	---	0.663	------
WALLPACK LTS	1.62	20/1	23	C	24	---	0.663	------
UH-A	4.3	20/3	25	A	26	20/1	3	WATER HEATER
-----	4.3	---	27	B	28	20/1	3.2	SITE LIGHTING
-----	4.3	---	29	C	30	20/1	3.2	SITE LIGHTING
UH-A	4.3	20/3	31	A	32	20/1	3.2	SITE LIGHTING
-----	4.3	---	33	B	34	20/1	0	SPARE
-----	4.3	---	35	C	36	20/1	0	SPARE
UH-A	4.3	20/3	37	A	38	20/1	0	SPARE
-----	4.3	---	39	B	40	20/1	0	SPARE
-----	4.3	---	41	C	42	20/1	0	SPARE
75KVA	18.42	125/3	SUB	A				
XFMR TO	22.07	---	FE-	B				
PANEL MSL	18.39	---	ED	C				

A TOTAL	57.33
B TOTAL	55.79
C TOTAL	52.32
SECTION 2 TOTAL kW	79.39
CONN. kW	244.84
CONN. Amps	294.50

VLL	PH
480	3

0.00	RECEPTACLES
59.56	HEATING
27.76	AC/MOTORS
16.25	LIGHTING
0.00	MISC.
3.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	19.03 KVA
HEAT: 100% :	=	138.945 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	56.38 KVA
LIGHTING: 125%:	=	20.3175 KVA
MISC: 100%:	=	2.2 KVA
WATER HEATER: 125%:	=	3.75 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	240.6225 KVA
TOTAL DEMAND LOAD AMPS:	=	289.43 AMP

AIC 22K
SE RATED

NEW PANEL MSH
SECTION 2

VOLTAGE: 277/480
PHASE: 3

AMP:
MAIN: 400 MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
UH-A	4.3	20/3	43	A	44	-/1	0	SPACE
-----	4.3	---	45	B	46	-/1	0	SPACE
-----	4.3	---	47	C	48	-/1	0	SPACE
UH-A	4.3	20/3	49	A	50	-/1	0	SPACE
-----	4.3	---	51	B	52	-/1	0	SPACE
-----	4.3	---	53	C	54	-/1	0	SPACE
UH-A	4.3	20/3	55	A	56	-/1	0	SPACE
-----	4.3	---	57	B	58	-/1	0	SPACE
-----	4.3	---	59	C	60	-/1	0	SPACE
UH-A	4.3	20/3	61	A	62	-/1	0	SPACE
-----	4.3	---	63	B	64	-/1	0	SPACE
-----	4.3	---	65	C	66	-/1	0	SPACE
UH-A	4.3	20/3	67	A	68	-/1	0	SPACE
-----	4.3	---	69	B	70	-/1	0	SPACE
-----	4.3	---	71	C	72	-/1	0	SPACE
UH-A	4.3	20/3	73	A	74	-/1	0	SPACE
-----	4.3	---	75	B	76	-/1	0	SPACE
-----	4.3	---	77	C	78	-/1	0	SPACE
EF-A	0.663	15/3	79	A	80	-/1	0	SPACE
-----	0.663	---	81	B	82	-/1	0	SPACE
-----	0.663	---	83	C	84	-/1	0	SPACE

A TOTAL	26.46
B TOTAL	26.46
C TOTAL	26.46
CONN. kw	79.389
CONN. amps	95.49

VLL	PH
480	3

0.00	RECEPTACLES
79.39	HEATING
0.00	AC/MOTORS
0.00	LIGHTING
0.00	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

NEMA 3R
AIC 10K
SE RATED

NEW PANEL PL
SECTION 1

VOLTAGE: 120/208
PHASE: 3

AMP:
MAIN: 100 MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
PAVILLION REC	0.18	20/1	1	A	2	20/1	0	SPARE
208 PAVILLION REC	1	20/2	3	B	4	20/1	0.18	PAVILLION REC
-----	1	---	5	C	6	20/2	1	208 PAVILLION REC
208 PAVILLION REC	1	20/2	7	A	8	---	1	------
-----	1	---	9	B	10	20/1	0	SPARE
PAVILLION REC	0.18	20/1	11	C	12	20/1	0	SPARE
PAVILLION REC	0.18	20/1	13	A	14	20/1	0	SPARE
208 PAVILLION REC	1	20/2	15	B	16	20/1	0	SPARE
-----	1	---	17	C	18	20/1	0	SPARE
208 PAVILLION REC	1	20/2	19	A	20	20/1	0	SPARE
-----	1	---	21	B	22	-/1	0	SPACE
PAVILLION REC	0.18	20/1	23	C	24	-/1	0	SPACE
PAVILLION REC	0.18	20/1	25	A	26	-/1	0	SPACE
208 PAVILLION REC	1	20/2	27	B	28	-/1	0	SPACE
-----	1	---	29	C	30	-/1	0	SPACE
208 PAVILLION REC	1	20/2	31	A	32	-/1	0	SPACE
-----	1	---	33	B	34	-/1	0	SPACE
PAVILLION REC	0.18	20/1	35	C	36	-/1	0	SPACE
PAVILLION REC	0.18	20/1	37	A	38	-/1	0	SPACE
208 PAVILLION REC	1	20/2	39	B	40	-/1	0	SPACE
-----	1	---	41	C	42	-/1	0	SPACE

A TOTAL	4.72
B TOTAL	7.18
C TOTAL	5.54
CONN. kW	17.44
CONN. Amps	48.41

VLL	PH
208	3

17.44	RECEPTACLES
0.00	HEATING
0.00	AC/MOTORS
0.00	LIGHTING
0.00	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	13.72 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	0 KVA
LIGHTING: 125%:	=	0 KVA
MISC: 100%:	=	0 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	13.72 KVA
TOTAL DEMAND LOAD AMPS:	=	38.08 AMP

AIC 10K

NEW PANEL MSL
SECTION 1

VOLTAGE: 120/208
PHASE: 3

AMP:
MAIN: 250 MLO

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
VEHICLE BAY DOORS	0.35	20/2	1	A	2	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	3	B	4	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	5	C	6	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	7	A	8	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	9	B	10	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	11	C	12	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	13	A	14	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	15	B	16	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	17	C	18	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	19	A	20	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	21	B	22	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	23	C	24	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	25	A	26	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	27	B	28	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	29	C	30	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	31	A	32	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	33	B	34	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	35	C	36	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	37	A	38	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	39	B	40	---	0.35	------
CEILING REC	0.9	20/1	41	C	42	20/1	0.72	CEILING REC

A TOTAL	4.90
B TOTAL	4.90
C TOTAL	5.82
SECTION 2 TOTAL kW	35.60
SECTION 3 TOTAL kW	7.66
CONN. kW	58.88
CONN. Amps	163.44

VLL	PH
208	3

1.62	RECEPTACLES
0.00	HEATING
14.00	AC/MOTORS
0.00	LIGHTING
0.00	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	19.03 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	28.62 KVA
LIGHTING: 125%:	=	0 KVA
MISC: 100%:	=	2.2 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	49.85 KVA
TOTAL DEMAND LOAD AMPS:	=	138.37 AMP

AIC 10K

NEW PANEL MSL
SECTION 2

VOLTAGE: 120/208
PHASE: 3

AMP:
MAIN: 250 MLO

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
VEHICLE BAY DOORS	0.35	20/2	43	A	44	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	45	B	46	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	47	C	48	20/2	0.35	VEHICLE BAY DOORS
------	0.35	---	49	A	50	---	0.35	------
VEHICLE BAY DOORS	0.35	20/2	51	B	52	20/1	0.54	CEILING REC
------	0.35	---	53	C	54	20/1	0.9	CEILING REC
VEHICLE BAY DOORS	0.35	20/2	55	A	56	20/1	0.72	CEILING REC
------	0.35	---	57	B	58	20/1	0.72	CEILING REC
VEHICLE BAY DOORS	0.35	20/2	59	C	60	20/1	0.54	CEILING REC
------	0.35	---	61	A	62	20/1	1.08	WALL REC
VEHICLE BAY DOORS	0.35	20/2	63	B	64	20/1	1.08	OFFICE REC
------	0.35	---	65	C	66	20/1	0.72	OFFICE REC
VEHICLE BAY DOORS	0.35	20/2	67	A	68	20/1	0.72	OFFICE REC
------	0.35	---	69	B	70	20/1	0.54	BATHROOM REC
VEHICLE BAY DOORS	0.35	20/2	71	C	72	20/1	0.18	DED REC
------	0.35	---	73	A	74	100/3	4.72	PANEL PL
VEHICLE BAY DOORS	0.35	20/2	75	B	76	---	7.18	------
------	0.35	---	77	C	78	---	5.54	------
VEHICLE BAY DOORS	0.35	20/2	79	A	80	20/1	0.6	TEF-A
------	0.35	---	81	B	82	20/1	0.6	TEF-A
CEILING REC	0.72	20/1	83	C	84	20/1	0.1	LOUVER CONTROL

A TOTAL	10.99
B TOTAL	13.46
C TOTAL	11.15
CONN. kw	35.6
CONN. amps	98.82

VLL	PH
208	3

25.90	RECEPTACLES
0.00	HEATING
8.40	AC/MOTORS
0.00	LIGHTING
1.30	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

AIC 10K

NEW PANEL MSL
SECTION 3

VOLTAGE: 120/208
PHASE: 3

AMP:
MAIN: 250 MLO

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
LOUVER CONTROL	0.1	20/1	85	A	86	-/1	0	SPACE
LOUVER CONTROL	0.1	20/1	87	B	88	-/1	0	SPACE
LOUVER CONTROL	0.1	20/1	89	C	90	-/1	0	SPACE
LOUVER CONTROL	0.1	20/1	91	A	92	-/1	0	SPACE
CU-1	1.14	15/2	93	B	94	-/1	0	SPACE
------	1.14	---	95	C	96	-/1	0	SPACE
CU-2	1.97	25/2	97	A	98	-/1	0	SPACE
------	1.97	---	99	B	100	-/1	0	SPACE
WATER COP	0.18	20/1	101	C	102	-/1	0	SPACE
DED REC IT	0.36	20/1	103	A	104	-/1	0	SPACE
FIRE ANNUNCIATOR	0.5	20/1	105	B	106	-/1	0	SPACE
SPARE	0	20/1	107	C	108	-/1	0	SPACE
SPARE	0	20/1	109	A	110	-/1	0	SPACE
SPARE	0	20/1	111	B	112	-/1	0	SPACE
SPACE	0	-/1	113	C	114	-/1	0	SPACE
SPACE	0	-/1	115	A	116	-/1	0	SPACE
SPACE	0	-/1	117	B	118	-/1	0	SPACE
SPACE	0	-/1	119	C	120	-/1	0	SPACE
SPACE	0	-/1	121	A	122	-/1	0	SPACE
SPACE	0	-/1	123	B	124	-/1	0	SPACE
SPACE	0	-/1	125	C	126	-/1	0	SPACE

A TOTAL	2.53
B TOTAL	3.71
C TOTAL	1.42
CONN. kW	7.66
CONN. Amps	21.26

VLL	PH
208	3

0.54	RECEPTACLES
0.00	HEATING
6.22	AC/MOTORS
0.00	LIGHTING
0.90	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

AIC 10K
SE RATED

NEW PANEL HS
SECTION 1

VOLTAGE: 277/480
PHASE: 3

AMP:
MAIN: 100 MLO

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
SPARE	0	20/1	1	A	2	50/3	0	PANEL LS
SPARE	0	20/1	3	B	4	---	0	------
SPARE	0	20/1	5	C	6	---	0	------
SPARE	0	20/1	7	A	8	20/1	0	SPARE
SPARE	0	20/1	9	B	10	20/1	0	SPARE
SPARE	0	20/1	11	C	12	20/1	0	SPARE
SPARE	0	20/1	13	A	14	20/1	0	SPARE
SPARE	0	20/1	15	B	16	20/1	0	SPARE
SPARE	0	20/1	17	C	18	20/1	0	SPARE
SPARE	0	20/1	19	A	20	20/1	0	SPARE
SPARE	0	20/1	21	B	22	20/1	0	SPARE
SPARE	0	20/1	23	C	24	20/1	0	SPARE
SPARE	0	20/1	25	A	26	20/1	0	SPARE
SPARE	0	20/1	27	B	28	20/1	0	SPARE
SPARE	0	20/1	29	C	30	20/1	0	SPARE
SPARE	0	20/1	31	A	32	20/1	0	SPARE
SPARE	0	20/1	33	B	34	20/1	0	SPARE
SPARE	0	20/1	35	C	36	20/1	0	SPARE
SPARE	0	20/1	37	A	38	20/1	0	SPARE
SPARE	0	20/1	39	B	40	20/1	0	SPARE
SPARE	0	20/1	41	C	42	20/1	0	SPARE

A TOTAL	0.00
B TOTAL	0.00
C TOTAL	0.00
CONN. kW	0.00
CONN. Amps	0.00

VLL	PH
480	3

0.00	RECEPTACLES
0.00	HEATING
0.00	AC/MOTORS
0.00	LIGHTING
0.00	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	0 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	0 KVA
LIGHTING: 125%:	=	0 KVA
MISC: 100%:	=	0 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	0 KVA
TOTAL DEMAND LOAD AMPS:	=	0.00 AMP

AIC 10K

NEW PANEL LS
SECTION 1

VOLTAGE: 120/208
PHASE: 3

AMP:
MAIN: 100 MCB

DESCRIPTION	KW	BKR	CK	PH	CK	BKR	KW	DESCRIPTION
SPARE	0	20/1	1	A	2	20/1	0	SPARE
SPARE	0	20/1	3	B	4	20/1	0	SPARE
SPARE	0	20/1	5	C	6	20/1	0	SPARE
SPARE	0	20/1	7	A	8	20/1	0	SPARE
SPARE	0	20/1	9	B	10	20/1	0	SPARE
SPARE	0	20/1	11	C	12	20/1	0	SPARE
SPARE	0	20/1	13	A	14	20/1	0	SPARE
SPARE	0	20/1	15	B	16	20/1	0	SPARE
SPARE	0	20/1	17	C	18	20/1	0	SPARE
SPARE	0	20/1	19	A	20	20/1	0	SPARE
SPARE	0	20/1	21	B	22	20/1	0	SPARE
SPARE	0	20/1	23	C	24	20/1	0	SPARE
SPARE	0	20/1	25	A	26	20/1	0	SPARE
SPARE	0	20/1	27	B	28	20/1	0	SPARE
SPARE	0	20/1	29	C	30	20/1	0	SPARE
SPARE	0	20/1	31	A	32	20/1	0	SPARE
SPARE	0	20/1	33	B	34	20/1	0	SPARE
SPARE	0	20/1	35	C	36	20/1	0	SPARE
SPARE	0	20/1	37	A	38	20/1	0	SPARE
SPARE	0	20/1	39	B	40	20/1	0	SPARE
SPARE	0	20/1	41	C	42	20/1	0	SPARE

A TOTAL	0.00
B TOTAL	0.00
C TOTAL	0.00
CONN. kW	0.00
CONN. Amps	0.00

VLL	PH
208	3

0.00	RECEPTACLES
0.00	HEATING
0.00	AC/MOTORS
0.00	LIGHTING
0.00	MISC.
0.00	WATER HEATERS
0.00	ELEVATORS
0.00	KITCHEN EQUIP

TOTAL DEMAND LOAD

RECEPTS: 100% 1ST 10 KW + 50% REMAINING:	=	0 KVA
HEAT: 100% :	=	0 KVA
AC/MOTORS: 125% LARGEST + 100% REMAINING:	=	0 KVA
LIGHTING: 125%:	=	0 KVA
MISC: 100%:	=	0 KVA
WATER HEATER: 125%:	=	0 KVA
ELEVATORS: PER NEC:	=	0 KVA
KITCHEN EQUIP: PER NEC :		0 KVA
TOTAL DEMAND LOAD KW:	=	0 KVA
TOTAL DEMAND LOAD AMPS:	=	0.00 AMP

DRAWING NO.
CFD-XXX-E-010-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

BW &A Barrett, Woodyard and Associates, Inc.
License # C-2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 21417 ENGINEER SCOTT LOWERY

SEAL 05/24/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-010-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
PANEL SCHEDULES - ELECTRICAL

SHEET NO.
E-010

1 SITE PLAN – ELECTRICAL
E-100 1" = 70'-0"

LEGEND NOTES:
(APPLY TO THIS SHEET ONLY)

1. FEEDER FROM BUILDING MAIN ELECTRICAL ROOM TO GENERATOR PAD STUB-UP LOCATION. REFER TO RISER DIAGRAM ON SHEET E0.2 FOR EXACT QUALITY AND SIZE OF CONDUITS.
2. SERVICE LATERAL FROM BUILDING MAIN ELECTRICAL ROOM TO UTILITY TRANSFORMER STUB-UP LOCATION. REFER TO RISER DIAGRAM ON SHEET E-0002 FOR EXACT QUANTITY AND SIZE OF CONDUITS.
3. PROVIDE AND INSTALL (4) 4" EMPTY CONDUIT WITH PULL-STRING FROM BUILDING TELECOM ROOM TO TELEPHONE COMPANY MANHOLE. COORDINATE EXACT LOCATION WITH GENERAL CONTRACTOR AND TELEPHONE COMPANY.
4. FUTURE EV CHARGING INFRASTRUCTURE LOCATION. CONTRACTOR TO REFER TO FUTURE EV CHARGER RISER DIAGRAM FOR CONDUIT REQUIREMENTS. CONTRACTOR TO INSTALL CONDUIT FOR FUTURE INSTALLATION OF EV CHARGERS. COORDINATE EXACT LOCATIONS OF FUTURE EV SERVICE UTILITY TRANSFORMER AND ELECTRICAL GEAR AS SHOWN ON FUTURE RISER DIAGRAM WITH OWNER IN FIELD PRIOR TO INSTALLATION.
5. PROVIDE 2" EMPTY CONDUIT WITH PULLSTRING FROM BUILDING TELCOM ROOM TO MOBILE SUBSTATION TELECOM ROOM.
6. PROVIDE WEATHER PROOF OUTLET
7. PROVIDE WEATHER PROOF NEMA L5-20R

DRAWING NO.
CFD-XXX-E-100-XXXXX

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047171 ENGINEER J. SCOTT LOWERY

SEAL 04/30/2024

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	04.30.24		ASI 03 - VE CHANGES
2	09.22.23		RTAP
3	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-100-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
SITE PLAN - ELECTRICAL

SHEET NO.
E-100

1 SITE PLAN – ELECTRICAL
1" = 70'-0"

LEGEND NOTES:
(APPLY TO THIS SHEET ONLY)

1. (2) 30"x48"x36" TIER 22 RATED HANDHOLE FOR TELECOM/FIBER CONDUIT. COORDINATE EXACT LOCATION WITH DUKE TELECOM IN FIELD PRIOR TO INSTALLATION.
2. (3) 4" EMPTY CONDUIT WITH PULLSTRING FROM TELECOM ROOM TO HANDHOLE. (1) 4" CONDUIT WILL BE ROUTED TO THE "B" HANDHOLE AND THE OTHER (2) 4" CONDUITS WILL BE ROUTED TO THE "A" HANDHOLE. ALL 90° TURNS SHALL BE SWEEPING. COORDINATE EXACT STUB-UP LOCATION IN TELECOM ROOM AND ROUTING WITH TELECOM AND CIVIL DRAWINGS.
3. (1) 4" EMPTY CONDUIT WITH PULLSTRING FROM TELECOM ROOM TO CADMIUM POLE LOCATION IN YARD. COORDINATE EXACT STUB-UP LOCATION IN TELECOM ROOM AND ROUTING WITH CIVIL DRAWINGS. COORDINATE EXACT LOCATION OF CADMIUM POLE IN YARD WITH DUKE TELECOM PRIOR TO INSTALLATION.

DRAWING NO.
CFD-XXX-E-100-XXXXX

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

Reduce Risk
Remove Exposures to Hazards
Reinforce Safe Behavior

NORTH CAROLINA PROFESSIONAL SEAL 049141 ENGINEER J. SCOTT LOWERY

SEAL 04/30/2024

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	04.30.24		ASI 03 - VE CHANGES
0	09.22.23		90%
0	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-100-XXXXX

ELECTRONIC FILE NAME:

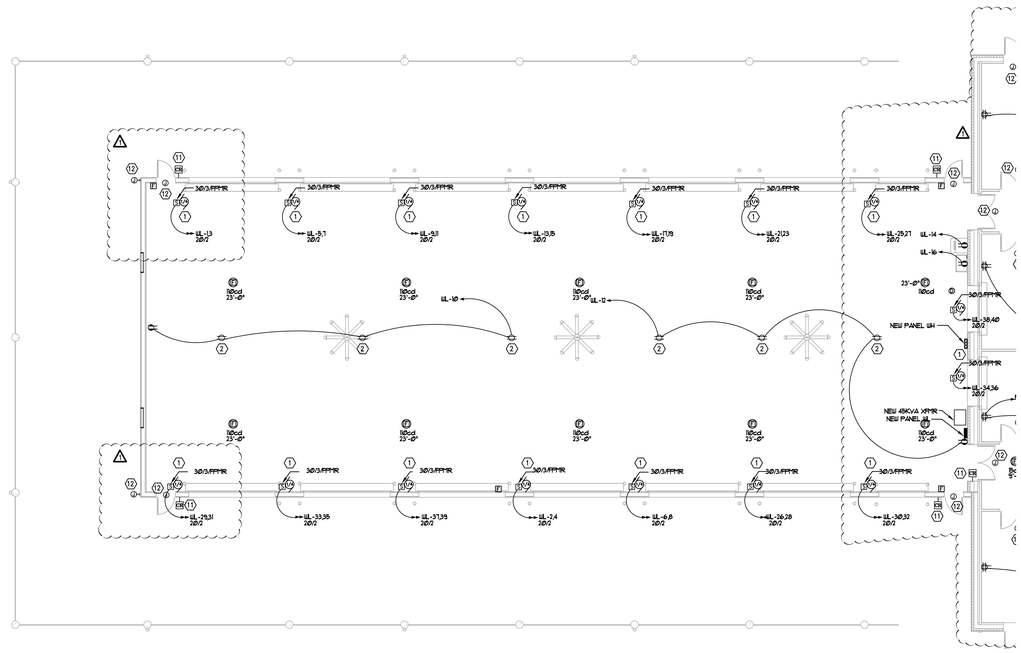
DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
SITE PLAN - FIBER-TELCO CONDUIT

SHEET NO.
E-100.1



1 E-101A TRUCK BAY FLOOR PLAN – ELECTRICAL
1/8"=1'-0"

LEGEND NOTES:
(APPLY THIS SHEET ONLY)

1. MOTORIZED DOOR LOCATION. CONTRACTOR TO PROVIDE AND INSTALL DISCONNECT TO SERVE AS DISCONNECTING MEANS FOR DOOR MOTOR. COORDINATE EXACT LOCATION WITH DOOR INSTALLER. COORDINATE EXACT REQUIREMENTS WITH EQUIPMENT MANUFACTURER. PROVIDE ALL PARTS FOR A COMPLETE AND OPERATIONAL SYSTEM INCLUDING JUNCTION BOXES, CONDUIT, AND WIRING. ALL CONTROLS PROVIDED AND INSTALLED BY DOOR INSTALLER.
2. DROP CORD LOCATION. CONTRACTOR TO PROVIDE CEILING MOUNTED CORD REEL RECEPTACLE WITH 5–20R RECEPTACLE. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE ALL DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH THE ARCHITECT & FURNITURE VENDOR PRIOR TO INSTALLATION.
2. HATCHED AREA NOT IN THIS SCOPE OF WORK.
3. 'E' DENOTES EXISTING DEVICE TO REMAIN. 'R' DENOTES EXISTING DEVICE TO BE RELOCATED.
4. VERIFY PROPER FUNCTIONALITY OF ALL EXISTING AND RELOCATED ELECTRICAL DEVICES, INCLUDING THEIR COVERPLATES. PROVIDE REPLACEMENTS AS REQUIRED IF ANY ARE NOT OPERATING AS INTENDED OR HAVE ABOVE NORMAL WEAR OR DEFECTS.
5. ALL ACCESS CONTROLLED EGRESS DOORS SHALL BE PROVIDED PER 2018 NCBC SECTION 1010.1.9.7, 1010.1.9.8, & 1010.1.9.9 (WHERE APPLICABLE) TO ALLOW FREE EGRESS AT ALL TIMES. DELAYED EGRESS SHALL NOT BE MORE THAN 15 SECONDS. REFER TO ARCHITECTURAL AND SECURITY DRAWINGS FOR COMPLIANCE WITH THIS CODE SECTION. SEE THE FIRE ALARM SEQUENCE OF OPERATION ON SHEET EXX1 FOR FURTHER DETAILS.
6. DEDICATED OUTLETS SHALL BE 20A RATED, U.N.O.
7. A 3+1 WIRING CONFIGURATION HAS BEEN ASSUMED FOR THE MODULAR FURNITURE. NO ISOLATED GROUND (IG) RECEPTACLE PROVISIONS HAVE BEEN PROVIDED. IF A DIFFERENT CONNECTION IS REQUIRED PLEASE NOTIFY ENGINEER AND ARCHITECT AS SOON AS POSSIBLE. THE BRANCH CIRCUIT BREAKER CONFIGURATIONS WOULD NEED TO BE REVISED TO MATCH.
8. COORDINATE ALL CORE DRILL LOCATIONS THROUGH SLAB WITH THE ARCHITECT AND LANDLORD PRIOR TO DRILLING. FOR ANY SLAB WITH POST–TENSION CABLING A SCAN SHALL BE PROVIDED TO LOCATE ANY OBSTRUCTIONS.
9. RECEPTACLES SHALL BE INSTALLED PER ANSI A117.1.
10. LABEL ALL OUTLETS AND JUNCTION BOXES WITH THE CORRESPONDING CIRCUIT DESIGNATION. LABEL TO BE TYPEWRITTEN; BLACK LETTERS ON WHITE BACKGROUND.
11. CIRCUIT HOMERUN DESIGNATIONS ARE NOTED FOR DESIGN INTENT ONLY BASED ON FIELD OBSERVATIONS OF EXISTING PANEL SCHEDULES. WHERE AVAILABLE, CONTRACTOR TO CONFIRM ALL SPARE CIRCUIT BREAKERS AND THOSE MADE AVAILABLE DUE TO DEMOLITION.
12. PROVIDE PULL STRINGS FOR ALL EMPTY CONDUIT. EACH NON–TERMINATED CONDUIT END SHALL BE PROVIDED WITH A BUSHING.
13. DIVISION 26 CONTRACTOR SHALL COORDINATE WITH DIVISION 23 TO MAKE SURE RETURN AIR OPENINGS ARE KEPT CLEAR OF ANY CONDUITS.
14. ALL RECEPTACLES WITHIN 6'–0" OF ANY WATER SOURCE SHALL BE 'GFCI' TYPE.

DRAWING NO.
CFD-XXX-E-101A-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

BW &A Barrett, Woodyard and Associates, Inc.
License # C–2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704–357–9333 (f) 704–357–9385

BWA JOB # 2022–0632

NORTH CAROLINA PROFESSIONAL SEAL 049171 ENGINEER J. SCOTT LOWERY

SEAL 09/22/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	09.22.23	RTAP	ISSUED FOR CONSTRUCTION
2	05.24.23		

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-101A-XXXXX

ELECTRONIC FILE NAME:

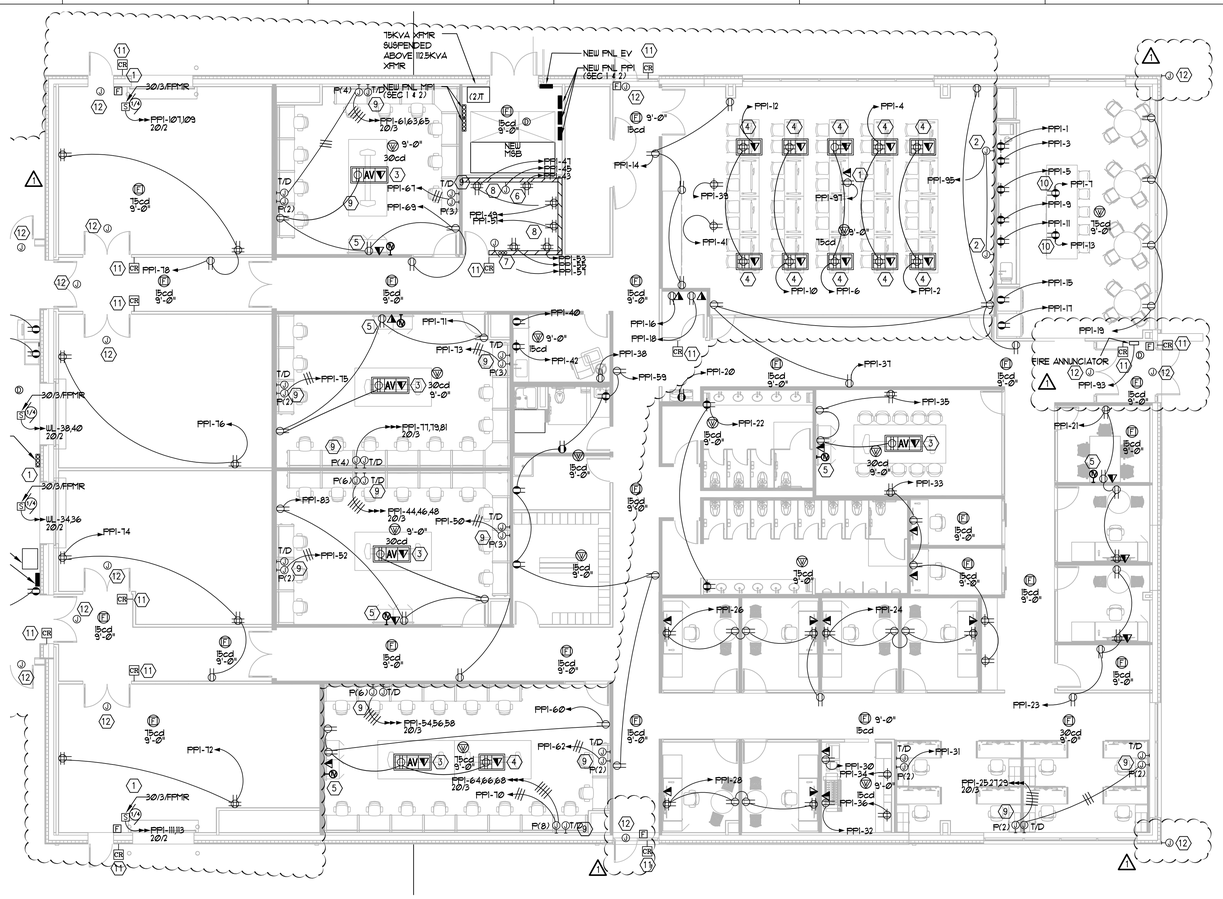
DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
TRUCK BAY FLOOR PLAN - ELECTRICAL

SHEET NO.
E-101A



OPS CENTER FLOOR PLAN – ELECTRICAL

1 / E-101B — 1/8"=1'-0"

LEGEND NOTES:
(APPLY THIS SHEET ONLY)

1. CEILING MOUNTED RECEPTACLE AND DATA JACK FOR PROJECTOR. COORDINATE EXACT LOCATION WITH AV VENDOR.
2. JUNCTION BOX FOR MOTORIZED PROJECTION SCREEN. COORDINATE EXACT LOCATION WITH AV VENDOR.
3. FLOOR BOX LOCATION. CONTRACTOR TO PROVIDE WIREMOLD RFBA SERIES FLOOR BOX WITH 4 GANGS. TWO GANGS FOR (2) RECEPTACLES, ONE GANG FOR TELE/DATA CABLING, AND ONE GANG FOR A/V. CONTRACTOR TO PROVIDE (2) 2" EMPTY CONDUIT WITH PULLSTRING TO NEAREST WALL OR COLUMN FOR LOW-VOLTAGE CABLING. COORDINATE EXACT LOCATION WITH ARCHITECT/FURNTURE VENDOR.
4. FLOOR BOX LOCATION. CONTRACTOR TO PROVIDE WIREMOLD RFBA SERIES FLOOR BOX WITH 4 GANGS. TWO GANGS FOR (2) RECEPTACLES, ONE GANG FOR TELE/DATA CABLING, AND ONE GANG FOR FUTURE LOW VOLTAGE CONNECTIONS. CONTRACTOR TO PROVIDE (2) 2" EMPTY CONDUITS WITH PULLSTRING TO NEAREST WALL OR COLUMN FOR LOW-VOLTAGE CABLING. COORDINATE EXACT LOCATION WITH ARCHITECT/FURNTURE VENDOR.
5. TV LOCATION. PROVIDE DUPLEX POWER, DATA, AND A/V BOXES APPROXIMATELY 80" AFF. COORDINATE EXACT DEVICE MOUNTING HEIGHT WITH ARCHITECT AND A/V VENDOR. PROVIDE (1) 1-1/4" EMPTY CONDUIT WITH PULLSTRING TO ABOVE ACCESSIBLE CEILING FOR A/V CABLING. RECEPTACLE BEHIND TV SHALL BE LEVITON '689' SERIES RECESSED TYPE OR APPROVED EQUAL TO FACILITATE A FLUSH INSTALLATION OF EQUIPMENT.
6. PROVIDE AND INSTALL 8'x3/4" FIRE RESISTANT PLYWOOD BACKBOARD ON EACH WALL SHOWN. PROVIDE 12" GROUND BAR (0.5 OHMS TO GROUND) 6" UP FROM BOTTOM OF PLYWOOD BACKBOARD WITH #6 STRANDED COPPER GROUND TO NEAREST BUILDING GROUNDING ELECTRODE SYSTEM.
7. (3) 4" EMPTY TELECOM CONDUIT STUB UP LOCATION. REFER TO SITE PLAN FOR ADDITIONAL INFORMATION. COORDINATE EXACT LOCATION WITH DUKE TELECOM.
8. JUNCTION BOX FOR HARD WIRED CONNECTION TO SECURITY PANELS. COORDINATE EXACT LOCATION WITH SECURITY DRAWINGS AND DUKE TELECOM.
9. BASEFEED LOCATION. PROVIDE (1) 2" EMPTY CONDUIT WITH PULLSTRING TO ABOVE ACCESSIBLE CEILING FOR LOW-VOLTAGE CABLING. PROVIDE STEEL 90° STRAIN RELIEF CORD CONNECTOR WITH FACEPLATE TO DIRECT CABLE TO FLOOR ALLOWING FOR CLOSE PLACEMENT OF FURNITURE SYSTEM. COORDINATE EXACT LOCATION WITH ARCHITECT AND FURNITURE VENDOR.
10. STUB UP LOCATION FOR RECEPTACLE PLACED IN MILLWORK. PROVIDE CONDUIT FOR POWER AND PROVIDE 3/4" EMPTY CONDUIT WITH PULLSTRING FOR TELE/DATA CABLING. CONTRACTOR TO UTILIZE MC CABLE FROM STUB UP LOCATION TO RECEPTACLE LOCATION IN MILLWORK. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF RECEPTACLE WITH ARCHITECT/MILLWORK PROVIDER. ENSURE MC CABLE IS NOT VISIBLE.
11. CARD READER LOCATION. PROVIDE EMPTY JUNCTION BOX WITH 3/4" EMPTY CONDUIT STUBBED UP TO ABOVE ACCESSIBLE CEILING. COORDINATE EXACT LOCATION WITH SECURITY VENDOR.
12. SECURITY LOCATION. PROVIDE EMPTY JUNCTION BOX WITH 3/4" EMPTY CONDUIT STUBBED UP TO ABOVE ACCESSIBLE CEILING. COORDINATE EXACT LOCATION WITH SECURITY VENDOR.

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE ALL DEVICE LOCATIONS AND MOUNTING HEIGHTS WITH THE ARCHITECT & FURNITURE VENDOR PRIOR TO INSTALLATION.
2. HATCHED AREA NOT IN THIS SCOPE OF WORK.
3. 'E' DENOTES EXISTING DEVICE TO REMAIN. 'R' DENOTES EXISTING DEVICE TO BE RELOCATED.
4. VERIFY PROPER FUNCTIONALITY OF ALL EXISTING AND RELOCATED ELECTRICAL DEVICES, INCLUDING THEIR COVERPLATES. PROVIDE REPLACEMENTS AS REQUIRED IF ANY ARE NOT OPERATING AS INTENDED OR HAVE ABOVE NORMAL WEAR OR DEFECTS.
5. ALL ACCESS CONTROLLED EGRESS DOORS SHALL BE PROVIDED PER 2018 NCBC SECTION 1010.1.9.7, 1010.1.9.8, & 1010.1.9.9 (WHERE APPLICABLE) TO ALLOW FREE EGRESS AT ALL TIMES. DELAYED EGRESS SHALL NOT BE MORE THAN 15 SECONDS. REFER TO ARCHITECTURAL AND SECURITY DRAWINGS FOR COMPLIANCE WITH THIS CODE SECTION. SEE THE FIRE ALARM SEQUENCE OF OPERATION ON SHEET EXX1 FOR FURTHER DETAILS.
6. DEDICATED OUTLETS SHALL BE 20A RATED, U.N.O.
7. A 3+1 WIRING CONFIGURATION HAS BEEN ASSUMED FOR THE MODULAR FURNITURE. NO ISOLATED GROUND (IG) RECEPTACLE PROVISIONS HAVE BEEN PROVIDED. IF A DIFFERENT CONNECTION IS REQUIRED PLEASE NOTIFY ENGINEER AND ARCHITECT AS SOON AS POSSIBLE. THE BRANCH CIRCUIT BREAKER CONFIGURATIONS WOULD NEED TO BE REVISED TO MATCH.
8. COORDINATE ALL CORE DRILL LOCATIONS THROUGH SLAB WITH THE ARCHITECT AND LANDLORD PRIOR TO DRILLING. FOR ANY SLAB WITH POST-TENSION CABLING A SCAN SHALL BE PROVIDED TO LOCATE ANY OBSTRUCTIONS.
9. RECEPTACLES SHALL BE INSTALLED PER ANSI A117.1.
10. LABEL ALL OUTLETS AND JUNCTION BOXES WITH THE CORRESPONDING CIRCUIT DESIGNATION. LABEL TO BE TYPEWRITTEN; BLACK LETTERS ON WHITE BACKGROUND.
11. CIRCUIT HOMERUN DESIGNATIONS ARE NOTED FOR DESIGN INTENT ONLY BASED ON FIELD OBSERVATIONS OF EXISTING PANEL SCHEDULES, WHERE AVAILABLE. CONTRACTOR TO CONFIRM ALL SPARE CIRCUIT BREAKERS AND THOSE MADE AVAILABLE DUE TO DEMOLITION.
12. PROVIDE PULL STRINGS FOR ALL EMPTY CONDUIT. EACH NON-TERMINATED CONDUIT END SHALL BE PROVIDED WITH A BUSHING.
13. DIVISION 26 CONTRACTOR SHALL COORDINATE WITH DIVISION 23 TO MAKE SURE RETURN AIR OPENINGS ARE KEPT CLEAR OF ANY CONDUITS.
14. ALL RECEPTACLES WITHIN 6'-0" OF ANY WATER SOURCE SHALL BE 'GFCI' TYPE.

DRAWING NO.
CFD-XXX-E-101B-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

BW&A Barrett, Woodyard and Associates, Inc.
License # C-2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 047174 ENGINEER J. SCOTT LOWERY

SEAL 09/22/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	09.22.23	RYAP	ISSUED FOR CONSTRUCTION
2	05.24.23		

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-101B-XXXXX

ELECTRONIC FILE NAME:

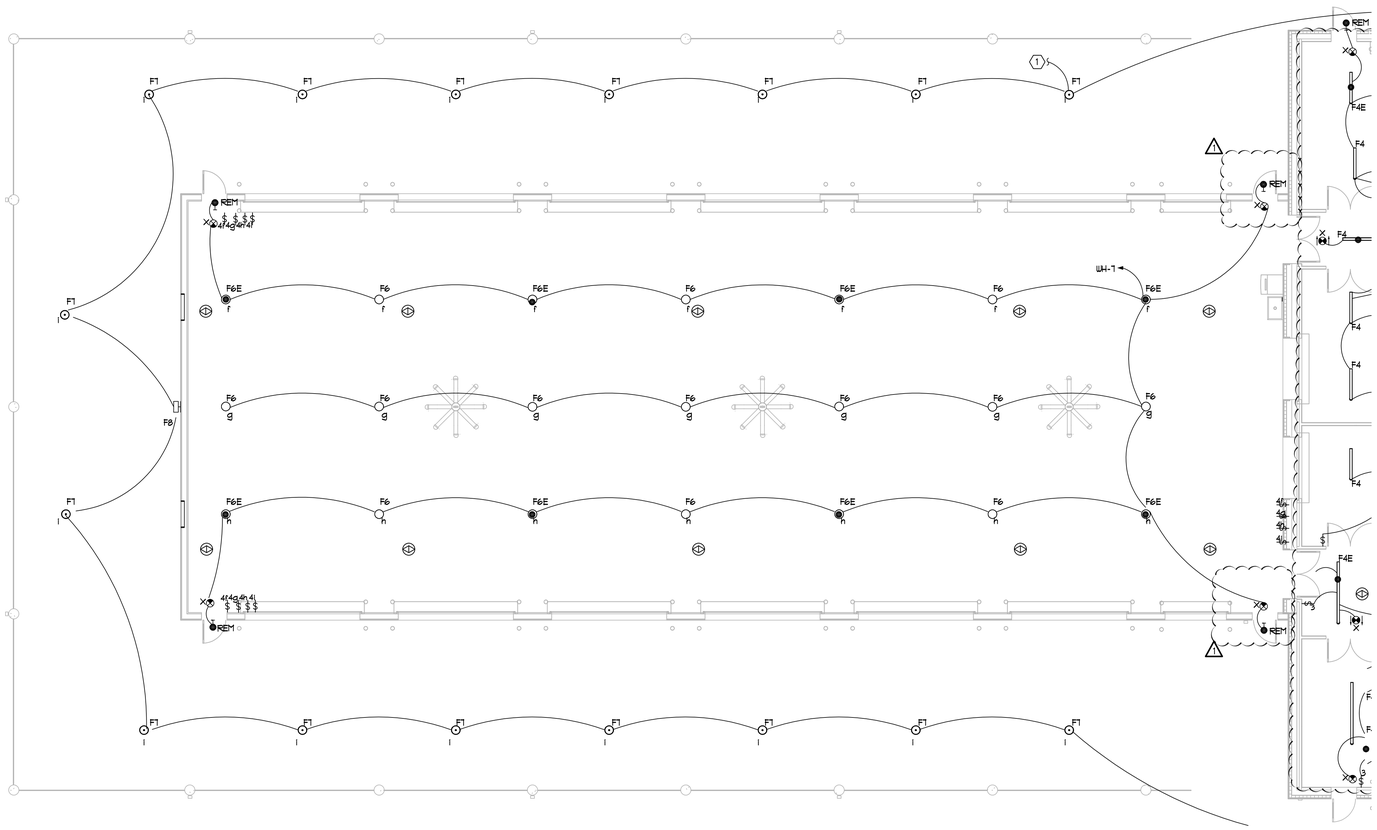
DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
OPS CENTER FLOOR PLAN - ELECTRICAL

SHEET NO.
E-101B



1 / E-201A TRUCK BAY FLOOR PLAN – LIGHTING

1/8"=1'-0"

LEGEND NOTES:
(APPLY TO THIS SHEET ONLY)

1. EXTERIOR LIGHTS ARE CONNECTED VIA ONE CIRCUIT. HOME RUN IS LOCATED ON SHEET E-20B.

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE EXACT LOCATION AND MOUNTING HEIGHTS WITH ARCHITECTURAL PLANS. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS, DETAILS, AND LIGHTING NOTES FOR FURTHER INFORMATION OF DEVICE PLACEMENT AND OTHER RELEVANT INFORMATION.
2. ALL SWITCHES FOR LIGHTS, SHADES, ETC. WHICH ARE SHOWN TO BE MOUNTED IN THE SAME GENERAL AREA SHALL BE GANGED TOGETHER AND SHARE A MULTI-GANG COVER PLATE WHERE POSSIBLE.
3. REFER TO SHEET E-101B FOR LOCATION OF ELECTRICAL DISTRIBUTION PANELS.
4. ALL EXIT SIGNS ARE TYPE 'X' UNLESS OTHERWISE NOTED.
5. WALL MOUNTED OCCUPANCY SENSORS W/ SINGLE OVERRIDE SHALL BE LUTRON #MS-OPS6M2-DV-WH. WALL MOUNTED OCCUPANCY SENSORS W/ DUAL OVERRIDE SHALL BE LUTRON #MS-OPS6-DDV-WH.
6. THE CEILING MOUNTED OCCUPANCY SENSOR IS TO BE LUTRON LOS-CDT-2000-WH OR APPROVED EQUAL. PROVIDE POWER PACK AS REQUIRED TO COMPLETE SYSTEM. CONNECT TO THE SUPPLY SIDE OF THE SWITCH IN THIS SPACE. DEVICE SHALL CONTROL ALL SWITCHES IN THIS SPACE (I.E. SWITCHES SHALL BE ON THE LOAD SIDE OF THE SENSOR).
7. CONTRACTOR TO CLEAN AND RE-LAMP ALL EXISTING AND/OR RELOCATED FIXTURES.
8. PROVIDE NEW DISCONNECTING MEANS AS REQUIRED FOR ALL DISCONNECTED/ RECONNECTED RELOCATED FLUORESCENT LIGHT FIXTURES PER NEC 410.130.G.
9. LOWER CASE LETTERS IN LIGHTING FIXTURES AND ADJACENT TO SWITCHES IN EACH INDIVIDUAL ROOM/AREA INDICATE WHICH LIGHT FIXTURE IS TO BE CONTROLLED FROM EACH CORRESPONDING SWITCH IN THAT ROOM/AREA.
10. ALL CONTROL CABLING PROVIDED AS A PART OF ANY LIGHTING CONTROL SYSTEM SHALL BE PLENUM RATED.
11. CIRCUIT HOMERUN DESIGNATIONS ARE NOTED FOR DESIGN INTENT ONLY BASED ON FIELD OBSERVATIONS OF EXISTING PANEL SCHEDULES, WHERE AVAILABLE. CONTRACTOR TO CONFIRM ALL SPARE CIRCUIT BREAKERS AND THOSE MADE AVAILABLE DUE TO DEMOLITION.

DRAWING NO.
CFD-XXX-E-201A-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

BW &A Barrett, Woodyard and Associates, Inc.
License # C-2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 24617 ENGINEER J. SCOTT LOWERY

SEAL 09/22/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	05.24.23		
2	09.22.23		
			ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-201A-XXXXX

ELECTRONIC FILE NAME:

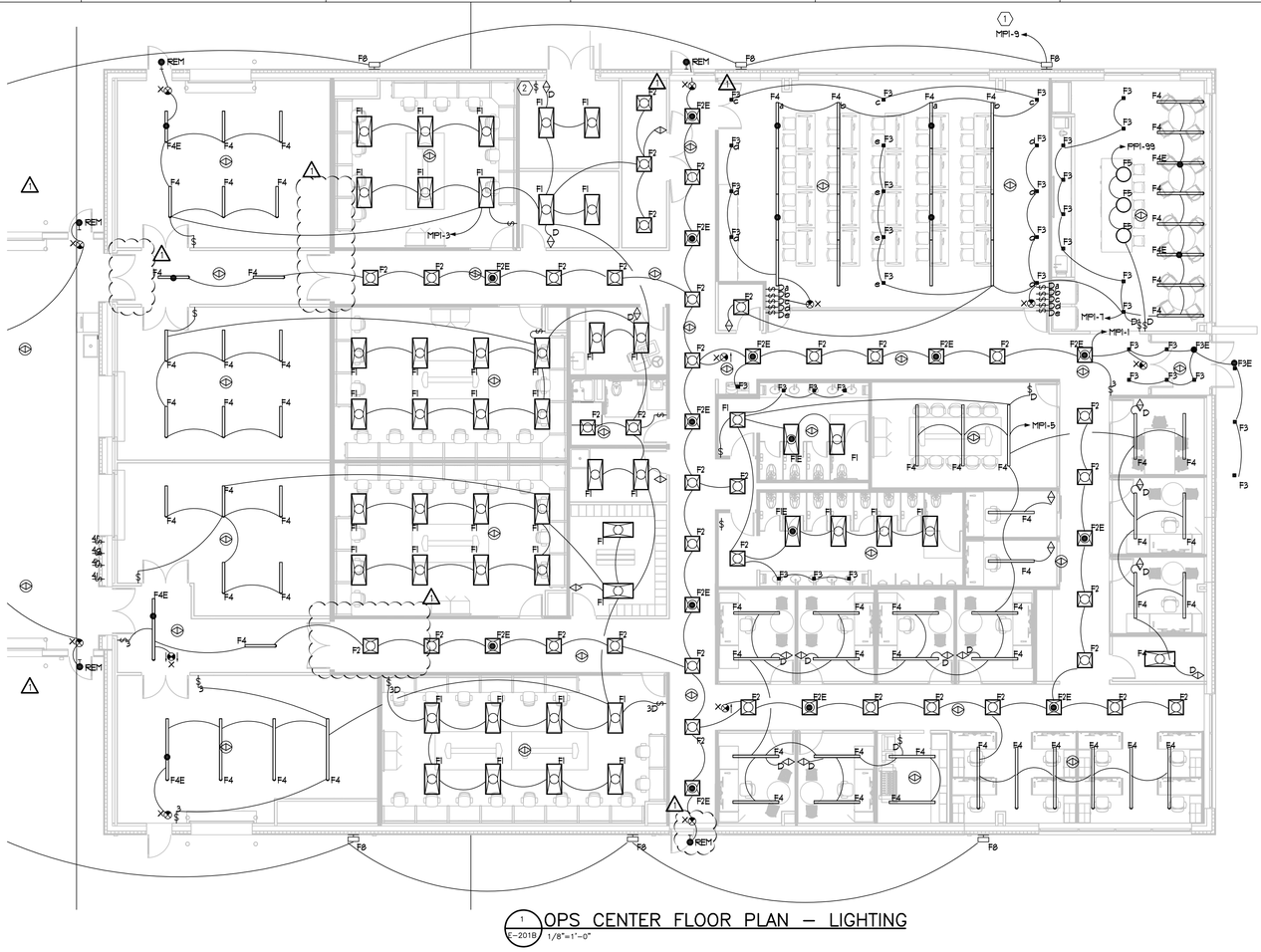
DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
TRUCK BAY FLOOR PLAN - LIGHTING

SHEET NO.
E-201A



1 E-2018 OPS CENTER FLOOR PLAN – LIGHTING
1/8"=1'-0"

LEGEND NOTES:
(APPLY TO THIS SHEET ONLY)

1. PROVIDE PHOTO CELL FOR CONTROL.
2. OVERRIDE FOR EXTERIOR LIGHTS.

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE EXACT LOCATION AND MOUNTING HEIGHTS WITH ARCHITECTURAL PLANS. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS, DETAILS, AND LIGHTING NOTES FOR FURTHER INFORMATION OF DEVICE PLACEMENT AND OTHER RELEVANT INFORMATION.
2. ALL SWITCHES FOR LIGHTS, SHADES, ETC. WHICH ARE SHOWN TO BE MOUNTED IN THE SAME GENERAL AREA SHALL BE GANGED TOGETHER AND SHARE A MULTI-GANG COVER PLATE WHERE POSSIBLE.
3. REFER TO SHEET E-101B FOR LOCATION OF ELECTRICAL DISTRIBUTION PANELS.
4. ALL EXIT SIGNS ARE TYPE 'X' UNLESS OTHERWISE NOTED.
5. WALL MOUNTED OCCUPANCY SENSORS W/ SINGLE OVERRIDE SHALL BE LUTRON #MS-OPS6M2-DV-WH. WALL MOUNTED OCCUPANCY SENSORS W/ DUAL OVERRIDE SHALL BE LUTRON #MS-OPS6-DDV-WH.
6. THE CEILING MOUNTED OCCUPANCY SENSOR IS TO BE LUTRON LOS-CDT-2000-WH OR APPROVED EQUAL. PROVIDE POWER PACK AS REQUIRED TO COMPLETE SYSTEM. CONNECT TO THE SUPPLY SIDE OF THE SWITCH IN THIS SPACE. DEVICE SHALL CONTROL ALL SWITCHES IN THIS SPACE (I.E. SWITCHES SHALL BE ON THE LOAD SIDE OF THE SENSOR).
7. CONTRACTOR TO CLEAN AND RE-LAMP ALL EXISTING AND/OR RELOCATED FIXTURES.
8. PROVIDE NEW DISCONNECTING MEANS AS REQUIRED FOR ALL DISCONNECTED/ RECONNECTED RELOCATED FLUORESCENT LIGHT FIXTURES PER NEC 410.130.G.
9. LOWER CASE LETTERS IN LIGHTING FIXTURES AND ADJACENT TO SWITCHES IN EACH INDIVIDUAL ROOM/AREA INDICATE WHICH LIGHT FIXTURE IS TO BE CONTROLLED FROM EACH CORRESPONDING SWITCH IN THAT ROOM/AREA.
10. ALL CONTROL CABLING PROVIDED AS A PART OF ANY LIGHTING CONTROL SYSTEM SHALL BE PLENUM RATED.
11. CIRCUIT HOMERUN DESIGNATIONS ARE NOTED FOR DESIGN INTENT ONLY BASED ON FIELD OBSERVATIONS OF EXISTING PANEL SCHEDULES, WHERE AVAILABLE. CONTRACTOR TO CONFIRM ALL SPARE CIRCUIT BREAKERS AND THOSE MADE AVAILABLE DUE TO DEMOLITION.

DRAWING NO.
CFD-XXX-E-201B-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

BW &A Barrett, Woodyard and Associates, Inc.
License # C-2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 047141 ENGINEER J. SCOTT LOWERY

SEAL 10/02/24

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	10.02.24		PERMIT COMMENTS
2	09.22.23		RFAP
3	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-201B-XXXXX

ELECTRONIC FILE NAME:

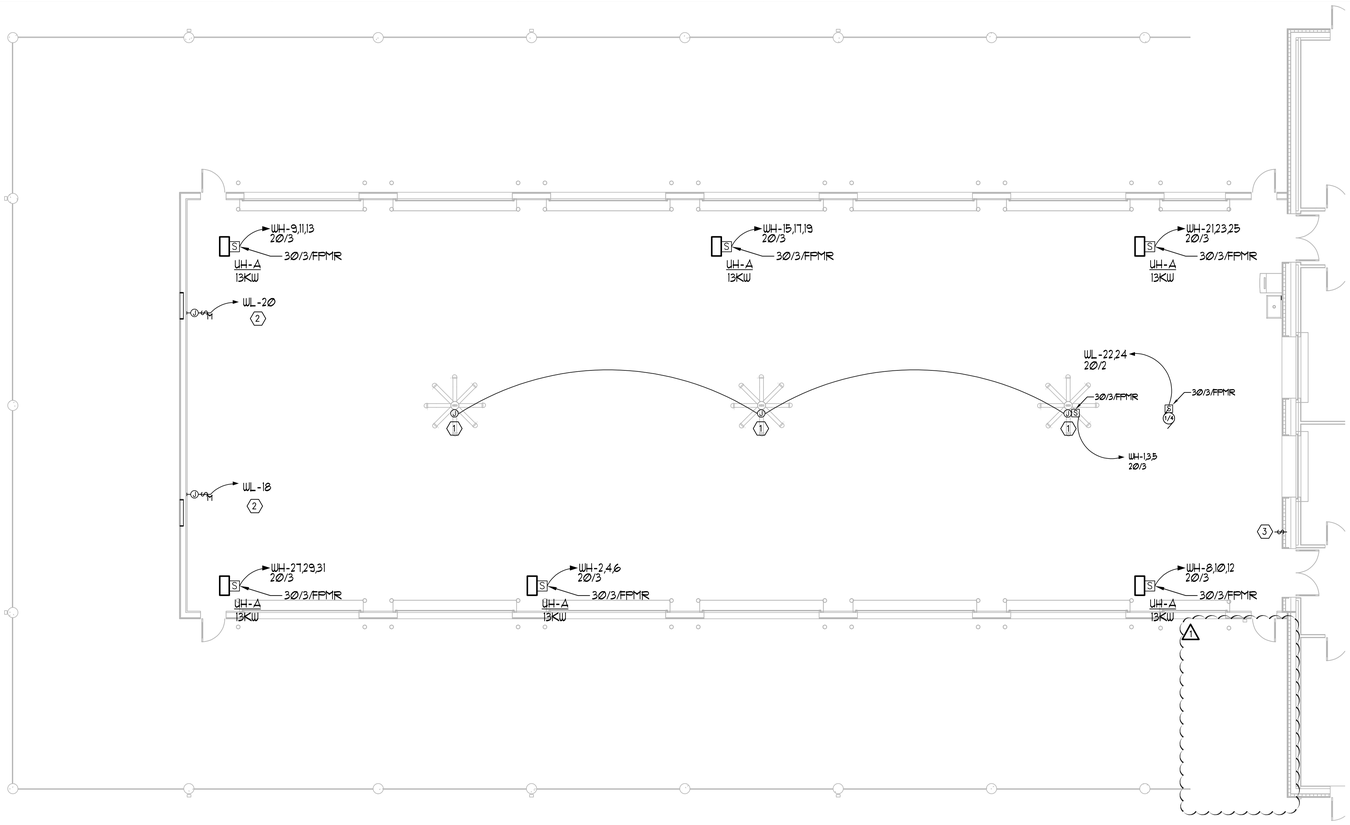
DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
OPS CENTER PLAN - LIGHTING

SHEET NO.
E-201B



1 E-301A TRUCK BAY FLOOR PLAN – MECHANICAL CONNECTIONS

1/8"=1'-0"

LEGEND NOTES:
(APPLY THIS SHEET ONLY)

1. PROVIDE JUNCTION BOX FOR CEILING FAN.
2. LOUVER MOTOR. PROVIDE 120V CONNECTION AND JUNCTION BOX. COORDINATE WITH HVAC CONTRACTOR.
3. FAN CONTROL SWITCH. COORDINATE EXACT REQUIREMENTS WITH FAN MANUFACTURER.

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE ALL EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS WITH THE HVAC CONTRACTOR (DIV23) AND/OR PLUMBING CONTRACTOR (DIV22) PRIOR TO INSTALLATION.
2. HATCHED AREA NOT IN THIS SCOPE OF WORK.
3. 'E' DENOTES EXISTING DEVICE TO REMAIN. 'R' DENOTES EXISTING DEVICE TO BE RELOCATED.
4. CIRCUIT HOMERUN DESIGNATIONS ARE NOTED FOR DESIGN INTENT ONLY BASED ON FIELD OBSERVATIONS OF EXISTING PANEL SCHEDULES, WHERE AVAILABLE. CONTRACTOR TO CONFIRM ALL SPARE CIRCUIT BREAKERS AND THOSE MADE AVAILABLE DUE TO DEMOLITION.
5. REFER TO SHEET E-101A FOR LOCATION OF ELECTRICAL DISTRIBUTION PANELS.

DRAWING NO.
CFD-XXX-E-301A-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

BW&A Barrett, Woodyard and Associates, Inc.
License # C-2226
420 Minuet LN.
Charlotte, North Carolina 28217
(p) 704-357-9333 (f) 704-357-9385

BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 34614 ENGINEER J. SCOTT LOWERY

SEAL 09/22/23

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	05.24.23		
2	09.22.23		
			RFAP
			ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-301A-XXXXX

ELECTRONIC FILE NAME:

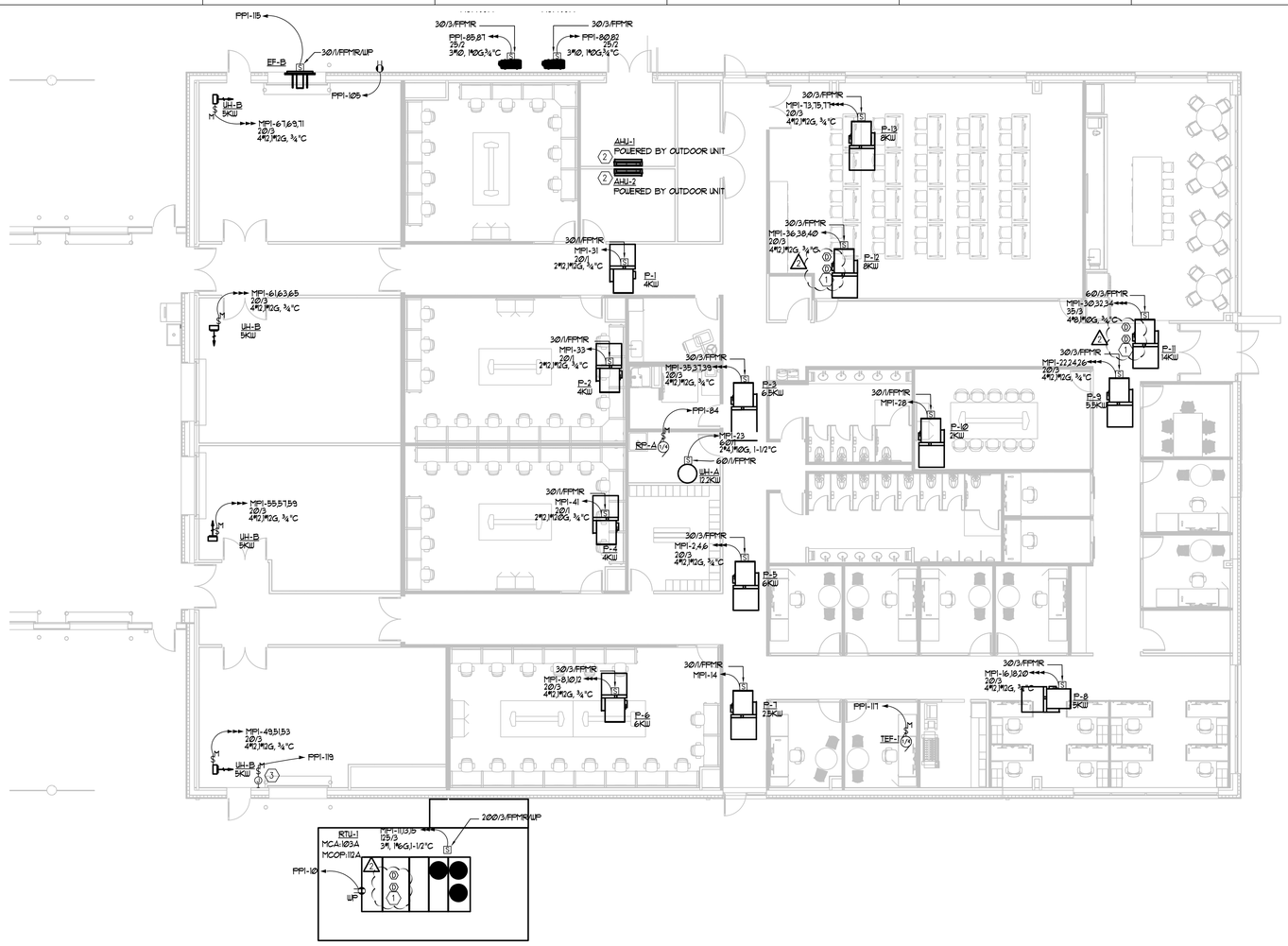
DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
TRUCK BAY FLOOR PLAN - MECHANICAL CONNECTIONS

SHEET NO.
E-301A



1 E301B OPS CENTER FLOOR PLAN – MECHANICAL CONNECTIONS

1/8"=1'-0"

LEGEND NOTES:
(APPLY THIS SHEET ONLY)

1. CONTRACTOR TO PROVIDE DUCT MOUNTED SMOKE DETECTOR IN SUPPLY AND RETURN. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
2. INDOOR UNIT POWERED BY OUTDOOR UNIT. COORDINATE AND PROVIDE ALL NEEDED COMPONENTS PER MANUFACTURER SPECIFICATIONS.
3. LOUVER MOTOR. PROVIDE 120V CONNECTION AND JUNCTION BOX. COORDINATE WITH HVAC CONTRACTOR.

GENERAL NOTES:
(APPLY THIS SHEET ONLY)

1. COORDINATE ALL EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS WITH THE HVAC CONTRACTOR (DIV23) AND/OR PLUMBING CONTRACTOR (DIV22) PRIOR TO INSTALLATION.
2. HATCHED AREA NOT IN THIS SCOPE OF WORK.
3. 'E' DENOTES EXISTING DEVICE TO REMAIN. 'R' DENOTES EXISTING DEVICE TO BE RELOCATED.
4. CIRCUIT HOMERUN DESIGNATIONS ARE NOTED FOR DESIGN INTENT ONLY BASED ON FIELD OBSERVATIONS OF EXISTING PANEL SCHEDULES, WHERE AVAILABLE. CONTRACTOR TO CONFIRM ALL SPARE CIRCUIT BREAKERS AND THOSE MADE AVAILABLE DUE TO DEMOLITION.
5. REFER TO SHEET E-101B FOR LOCATION OF ELECTRICAL DISTRIBUTION PANELS.

DRAWING NO.
CFD-XXX-E-301B-XXXXX

DUKE ENERGY®

MAILING ADDRESS:
P.O. BOX 1007
CHARLOTTE, NC 28201

Safety Expectations:

ILLNESS ZERO INJURY

- Reduce Risk
- Remove Exposures to Hazards
- Reinforce Safe Behavior

LS3P

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BWA JOB # 2022-0632

NORTH CAROLINA PROFESSIONAL SEAL 24871 ENGINEER SCOTT LOWERY

SEAL 10/02/24

DUNN OPERATIONS CENTER

1269 JONESBORO RD.
HARNETT COUNTY, NC 28334

OPERATIONS BUILDING

MARK	DATE	DRN BY	REVISION
1	10.02.24		PERMIT COMMENTS
2	09.22.23		90% AP
3	05.24.23		ISSUED FOR CONSTRUCTION

PROJECT NO:

DRAWING NUMBER
CFD-XXX-E-301B-XXXXX

ELECTRONIC FILE NAME:

DRAWN BY: JFE

CHK'D BY: JSL DATE:

E-MAIL: SLOWERY@BARRETTWOODYARD.COM

SHEET TITLE:
OPS FLOOR PLAN - MECHANICAL CONNECTIONS

SHEET NO.
E-301B