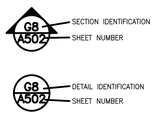
ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR
A.H.U.	AIR HANDLING UNIT
ALUM.	ALUMINUM
ALT.	ALTERNATE
APPROX.	APPROXIMATE
BD.	BOARD
BLDG.	BUILDING
BLK.	BLOCK
BLKG.	BLOCKING
BLT.	BUILT
BRK.	BRICK
BRKR.	BREAKER
BSMT.	BASEMENT
C.J.	CONTROL JOINT
CLG.	CEILING
CLR.	CLEAR
CMU.	CONCRETE MASONRY UNIT
C.O.	CLEAN OUT
CONC.	CONCRETE
CU.	COPPER
CU. FT.	CUBIC FOOT
CU. IN.	CUBIC INCH
CU. YD.	CUBIC YARD
DIA./Ø.	DIAMETER
DIM.	DIVIDE
DBT.	DRY-BULB TEMPERATURE
DEG.	DEGREE
DEPT.	DEPARTMENT
DF.	DRINKING FOUNTAIN
DISC.	DISCONNECT
DL.	DEAD LOAD
DN.	DOWN
D.S.	DOWN SPOUT
DWG.	DRAWING
E.F.	EXHAUST FAN
EXH.	EXHAUST
EXP. JT.	EXPANSION JOINT
EXT.	EXTERIOR
FIN.	FINISH
FL.	FLOOR
FLUOR.	FLUORESCENT
FR.	FIREPLACE
FR.	FIRE RATING
FT.	FOOT/FEET
FTG.	FOOTING
GALV.	GALVANIZED
GFI.	GROUND FAULT CIRCUIT INTERRUPT
GOVT.	GOVERNMENT
GR.FL.	GROUND FLOOR
GYP.	GYPSUM
H.C.	HOLLOW CORE
H.D.G.	HOT DIPPED GALVANIZED
HDR.	HEADER
HDWR.	HARDWARE
H.P.	HORSEPOWER
HT.	HEIGHT
HTR.	HEATER
HV.	HIGH VOLTAGE
HVAC.	HEATING, VENTILATING AND AIR CONDITIONING
HWY.	HIGHWAY
ID.	INSIDE DIAMETER
IN.	INCH
INCAND.	INCANDESCENT
INCL.	INCLUDED
INSUL.	INSULATION
INT.	INTERIOR
INV. EL.	INVERT ELEVATION
JST.	JOIST
KD.	KILN DRIED
KW.	KILOWATT
KWH.	KILOWATT HOUR
LAM.	LAMINATED
LAV.	LAVATORY
LB.	POUND
LTG.	LIGHTING
LGTH.	LENGTH
LIN.	LINEAR
LL.	LIVE LOAD
MANUF.	MANUFACTURE
MAX.	MAXIMUM
MF.	MILL FINISH
MIN.	MINIMUM
MLDG.	MOLDING
MHW.	MEAN HIGH WATER
MHHW.	MEAN HIGHER HIGH WATER
MLW.	MEAN LOW WATER
MLLW.	MEAN LOWER LOW WATER
MSL.	MEAN SEA LEVEL
MOD.	MODIFICATION
NTS.	NOT TO SCALE
NO./#.	NUMBER
OA.	OVERALL
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
OFC.	OFFICE
O/H.	OVER HEAD
OPP.	OPPOSITE
PARTN.	PARTITION
PC.	PORTLAND CEMENT
PCF.	POUNDS PER CUBIC FOOT
P.E.	PROFESSIONAL ENGINEER
PERF.	PERFORATE
PERP.	PERPENDICULAR
PL.	PLATE
PLG.	PILING
PLYWD.	PLYWOOD
PNL.	PANEL
PREFAB.	PREFABRICATED
PRELIM.	PRELIMINARY
PSF.	POUNDS PER SQUARE FOOT
PSI.	POUNDS PER SQUARE INCH
P.T.	PRESSURE TREATED
QS.	QUARTER SAWN
R.	RADIUS
RCPT.	RECEPTACLE
REBAR.	REINFORCING BAR
REFRIG.	REFRIGERATION
REINF.	REINFORCING
RFG.	ROOFING
RGH.	ROUGH
RM.	ROOM
R.O.	ROUGH OPENING
RS.	ROUGH SAWN
S.C.	SOLID CORE
SCH.	SCHEDULE
SDG.	SIDING
SECT.	SECTION
SFTWD.	SOFTWOOD
SGD.	SLIDING GLASS DOOR
SH.	SHINGLES
SPEC.	SPECIFICATION
SPR.	SPRUCE
SQ.	SQUARE
SQ. FT.	SQUARE FOOT
SQ. IN.	SQUARE INCH
SQ. YD.	SQUARE YARD
SS.	STAINLESS STEEL
ST.	STEEL
SUB. FL.	SUBFLOOR
SUP.	SUPPLY
SW.	SWITCH
SYM.	SYMMETRICAL
S.Y.P.	SOUTHERN YELLOW PINE
SYS.	SYSTEM
S4S.	SURFACED FOUR SIDES
TEL.	TELEPHONE
T&G.	TONGUE-AND-GROOVE
TYP.	TYPICAL
U.E.	UNDERGROUND ELECTRIC
U.G.	UNDER GROUND
UL.	UNDERWRITERS LABORATORIES, INC.
V.	VOLT
VENT.	VENTILATOR
VERT.	VERTICAL
VIF.	VERIFY IN FIELD
VOL.	VOLUME
VP.	VENT PIPE
VTR.	VENT THRU ROOF
W.	WATER
WBT.	WET BULB TEMPERATURE
WC.	WATER CLOSET
WD.	WOOD
WP.	WATERPROOF
WWF.	WELDED WIRE FABRIC
YD.	YARD

REFERENCE LEGEND



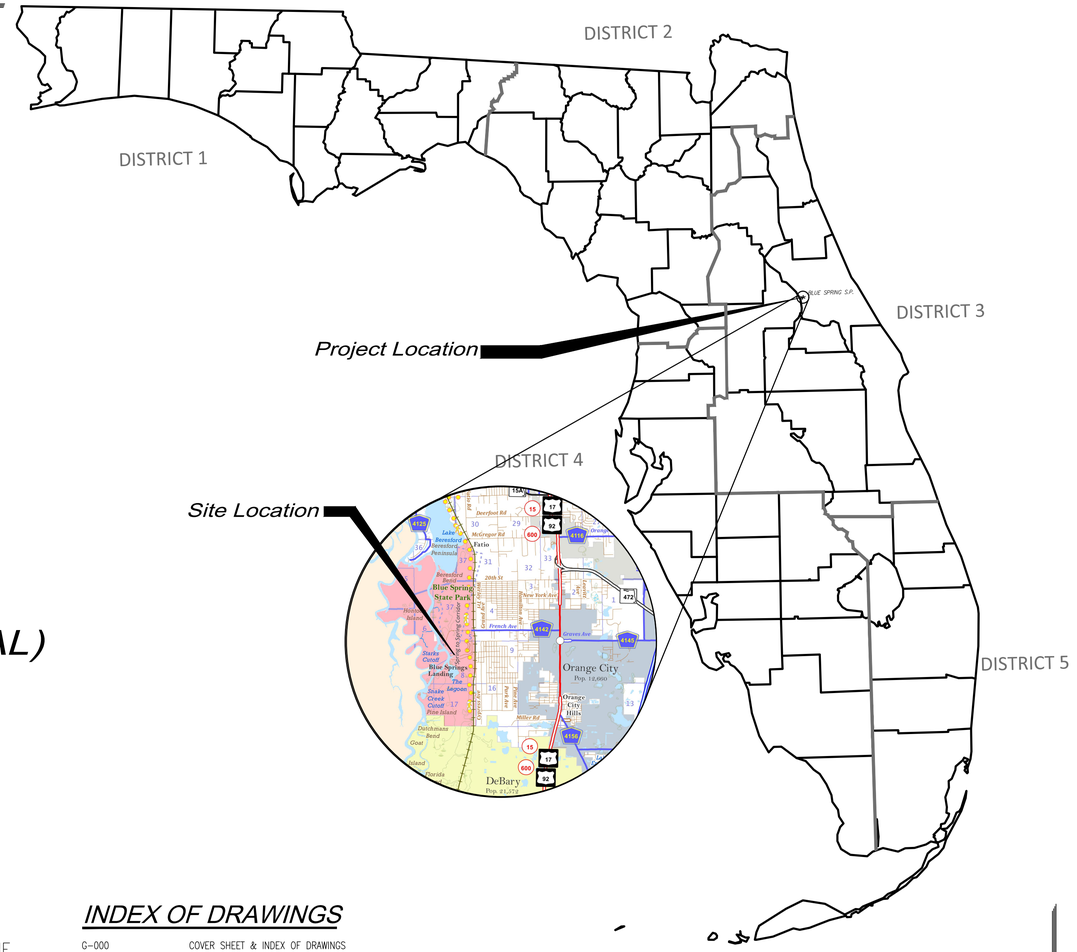
BLUE SPRING STATE PARK

DISTRICT 3

VOLUSIA

RESTROOM REPLACEMENT

PROJECT # 61565C (100% SUBMITTAL)



APPLICABLE CODES AND DESIGN DATA

CODE LIST

FLORIDA BUILDING CODE, BUILDING (FBC-B)	2023 Edition
FLORIDA BUILDING CODE, FUEL GAS (FBC-FG)	2023 Edition
FLORIDA BUILDING CODE, MECHANICAL (FBC-M)	2023 Edition
FLORIDA BUILDING CODE, PLUMBING (FBC-P)	2023 Edition
FLORIDA BUILDING CODE, EXISTING BUILDING (FBC-EB)	2023 Edition
FLORIDA BUILDING CODE, RESIDENTIAL (FBC-R)	2023 Edition
FLORIDA FIRE PREVENTION CODE (FFPC)	2023 Edition
NATIONAL ELECTRICAL CODE NFPA-70	2020 Edition
FDOT STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONST.	Latest Edition
FDOT DESIGN STANDARDS	Latest Edition
FLORIDA ACCESSIBILITY CODE	2023 Edition

DESIGN DATA

CONSTRUCTION TYPE:	V-B NONSPRINKLERED	TOTAL BUILDING AREA PER FLOOR: 1,048 SF
OCCUPANCY CLASS:	UTILITY	BUILDING HEIGHT/NUMBER OF STORIES: 15'-6" ONE STORY
OCCUPANT LOAD:	NOT OCCUPIABLE SPACE	REQUIRED SPRINKLER OR ALARM SYSTEM: No
TOTAL EXITS:	ONE	NUMBER OF BEDROOMS: _____
SQ FT ALTERED AREA	_____	LEVEL OF ALTERATION: _____

DESIGN LOADS (FBC-B CHAPTER 16):

WIND LOADS (FBC-B SECTION 1609):

LIFE SAFETY PLAN:

SCOPE OF PROJECT

REPLACE RESTROOM IN ORDER TO INCREASE THE LONGEVITY OF THE FACILITY.

INDEX OF DRAWINGS

FRANCISCO CABRAL
DESIGNER

CN824
CONSULTANT CONTRACT No.

05/06/25
INITIAL ISSUE DATE

Francisco J Cabral

Digitally signed by Francisco J Cabral
Date: 2026.07.06 15:41:27-04'00'

Francisco Cabral, P.E. #87110
LICENSED PROFESSIONAL ENGINEER

This item has been electronically signed by Francisco Cabral, PE on 07/06/2026 using a Digital Signature.

Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

BLUE SPRING
RESTROOM REPLACEMENT

Florida Department of Environmental Protection

Division of Recreation and Parks Bureau of Design and Construction

Lighting Control Requirements and Programming

AREAS	CONTROL TYPE	CONTROL SCHEME
Enclosed Offices, Copy/Print, Open office<300ft, Conference, Meeting, Multipuporse Room, Classroom, lecture hall, Training Room, Gym, Janitor, Control Room, Kitchen, Media Center	Stand-Alone Lighting Control or Control Relay Panel	1. ON: Manual ON through local switches. 2. OFF: When no occupancy for 20 minutes of no occupancy. 3. Local Switches: For manual ON/OFF control. 4. Daylight Sensor: For automatic control for dimming fixtures based on daylight levels for rooms on the building perimeter. Once daylight sensor calibrates in the room, set the sensor to dim to 15% and fast dimming rate.
Mechanical, Electrical, and Technology Rooms	Stand-Alone Lighting Control	1. ON/OFF by local switch
Restrooms, Non-Exit stairwells		1. ON: Automatic on through occupancy sensors. 2. OFF: Automatic off through occupancy sensor(s) within 20 minutes of no occupancy.
Corridors and Lobbies	Control Replay Panel	1. ON: Automatic on through time of day schedule during programmed operating hours. Provide ceiling occupancy sensors every 24ft to 30ft for override. Consult sensor supplier for required spacing. Or provide 2-hr timer for coverage area<5000sqft. 2. OFF: Automatic off after programmed normal operating hours, and via vacancy sensors. 3. Local switches A. Corridor: override switches for maintenance after programmed normal operating hours. Lights shall stay on for a maximum of 2 hours. B. Lobby: override switches for reducing to <20% of full power 4. Daylight Sensor: For automatic control for dimming fixtures based on daylight levels for rooms on the building perimeter. Once daylight sensor calibrates in the room, set the sensor to dim to 15% and fast dimming rate.
Exterior of buildings, Exterior pathways Parking Lots		1. ON: Automatic on through lighting control relay panel photocell at dusk. 2. OFF: Automatic off throught lighting control relay panel photocell at dawn. 3. Parking lot and Non-facade site lighting: Photocell. Fixtures shall be provided with integral motion sensor to dim to 50% from one hour after and prior to normal business hours when activity has not been detected for 15 minutes.
Parking Garage		1. ON/OFF: Time switch with Occupant sensors for dimming. 2. Sensor control zone to no exceed 3600 sqft. 3. Sensor to dim lights to 50% when no occupant in control zone.
Warehouse and Storage		1. ON: Auto on on occupancy or time switch control. 2. OFF: Automatic off after programmed normal operating hours, and via vacancy sensors. 3. Local switch for manual override. 4. Daylight Sensor: For automatic control for dimming fixtures based on daylight levels for rooms on the building perimeter. Once daylight sensor calibrates in the room, set the sensor to dim to 15% and fast dimming rate.

Programming Notes:
1. Timeclock lighting contactor shall be programmed for the time-of-day schedule for normal operating hours. Verify operating hours with owner prior to programming. All other days and times shall be considered "after normal operatign hours".
2. All requirements must be met for each space type. Consult lighting controller provider for programming instructions. Where requried, the contractor shall add sensors to each space per area programming requirements.
3. All control sensors may not be shown on plans for clarity. Sensors shown may be relocated to meet the control requirements based on the specific sensor and control system procured.

Abbreviations
AFCI: ARC FAULT CIRCUIT INTERRUPTER
AFF: ABOVE FINISHED FLOOR
AHU: AIR HANDLER UNIT (HVAC)
AHJ: AUTHORITY HAVING JURISDICTION
AIC: AMPERE INTERRUPTING CAPACITY
BKR: BREAKER
CB: CIRCUIT BREAKER
CU: CONDENSING UNIT (HVAC), COPPER
EF: EXHAUST FAN
EWH: ELECTRIC WATER HEATER
GBB: GROUNDING BUSBAR
GND: GROUND (ELECTRICAL)
GEN: GENERATOR
GFI: GROUND FAULT INTERRUPTER
GWH: GAS WATER HEATER
HH: HAND HOLE
HP: HORSEPOWER
JB: JUNCTION BOX
LTG: LIGHT, LIGHTING
MCB: MAIN CIRCUIT BREAKER
MDP: MAIN DISTRIBUTION PANEL
MH=X: MOUNTING HEIGHT, X IS HEIGHT IN FEET
MLO: MAIN LUGS ONLY
P: POLE
PB: PULL BOX
PH: PHASE (ELECTRICAL)
PNL: PANEL
PWR: POWER (ELECTRICAL)
RTU: ROOF TOP UNIT (HVAC)
SD: SMOKE DETECTOR
SWBD: SWITCHBOARD
TTB: TELEPHONE TERMINAL BOARD
UON: UNLESS OTHERWISE NOTED
V, VAC: VOLT, VOLT AC
WP: WEATHERPROOF-RESISTANT ELEMENT INSTALLED IN A WEATHERPROOF ENCLOSURE

NOT ALL ABBREVIATIONS ARE USED IN EVERY DESIGN

POWER LEGEND

- DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT 18" AFF UON
- DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT 42" AFF OR ABOVE COUNTER
- DUPLEX RECEPTACLE, NEMA 5-20R, FLUSH CEILING MOUNT UON
- QUAD RECEPTACLE: 18" AFF
- QUAD COUNTER RECEPTACLE. 42"AFF OR ABOVE COUNTER
- SPECIAL PURPOSE OUTLET
- GFI DUPLEX GFI RECEPTACLE, NEMA 5-20R, MOUNT 18" AFF UON
- GFI DUPLEX GFI RECEPTACLE, NEMA 5-20R MOUNT 42" AFF OR ABOVE COUNTER
- JUNCTION BOX WITH A DISCONNECT FOR HARDWIRED EQUIPMENT. DISCONNECT MEANS SHALL COMPLY WITH NEC ARTICLE 422.31. SHALL BE WEATHERPROOF AND WATER RESISTANT WHEN LOCATED IN EXTERIOR, IN A WET ENVIRONMENT, OR IF WITHIN 6 FT OF A WATER SOURCE. COORDINATE THE INSTALLATION WITH EQUIPMENT BEING SERVED TO PROVIDE THE NEC REQUIRED CLEARANCE.
- PANELBOARD
- 3/4" PLYWOOD TELEPHONE BACKBOARD
- X = FUSE RATING. USE ALL RK-1 FUSES. WITH OWNER'S APPROVAL, CONTRACTOR MAY SUBSTITUTE WITH A NON-FUSED DISCONNECT IF ALLOWED BY THE EQUIPMENT SPEC SHEET AND IF AND ADEQUATE SERIES-RATED SCCR CAN BE ACHIEVED FOR THE DISCONNECT PROCURED.
- X SAFETY (DISCONNECT) SWITCH, NON-FUSED NUMBER = DISCONNECT RATING

VOICE/DATA LEGEND

- x▷ VOICE/DATA OUTLET, FLUSH-MOUNTED. 18" AFF UON. INSTALL A 1" CONDUIT ROUTED TO THE NEAREST ACCESSIBLE CEILING AREA IN ROOM SERVED. "X" = NUMBER OF JACKS (UP TO 6) WITH ONE CAT6/6A CABLE FOR EACH JACK. ALL EIGHT CONDUCTORS OF EACH CABLE TO BE PROPERLY TERMINATED. LEAVE A MINIMUM OF 12" OF SLACK COILED INSIDE AND 15' OF SLACK IN COMMUNICATIONS ROOM. INSTALL TO MAINTAIN CABLE BEND RADIUS, JACKET REMOVAL, AND PAIR UNTWISTING REQUIREMENTS PER EIA/TIA.

LIGHTING LEGEND

- A-a PNL-X LIGHT FIXTURE. A=FIXTURE TYPE, a=SWITCH SYSTEM PNL=PANEL, X=CIRCUIT#
- LED STRIP LIGHTING FIXTURE
- CEILING MOUNTED DOWNLIGHT FIXTURE (UON IN LIGHT FIXTURE SCHEDULE)
- CEILING MOUNTED WALL WASHER TYPE LIGHT FIXTURE OR SPOT LIGHT. (UON IN LIGHT FIXTURE SCHEDULE)
- SUSPENDED PENDANT FIXTURE (UON IN LIGHT FIXTURE SCHEDULE)
- WALL MOUNTED LIGHTING FIXTURE
- TRACK LIGHT & TRACK
- WALL WASH LIGHT FIXTURE
- PENDANT LIGHT
- FULL CUT-OFF WALL MOUNTED EXTERIOR WALL FIXTURE
- STRIPED/SHADING INDICATES FIXTURE HAS DUAL POWER SOURCE FOR EMERGENCY EGRESS.
- EXIT LIGHT

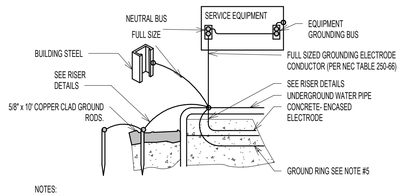
LIGHTING CONTROL LEGEND

Notes:
1. Lower case letter denotes switch system.
2. "pc"=photocell control.
3. "tc"=time switch control.
   A. For override, provide occupancy sensors or a 2-hour manual override switch with Dimming for every 5,000 sqft of controlled space.
   B. Consult owner/architect for desired location of override switch prior to rough-in.
   C. The time switch Control, and the overrides, shall meet all requirements of the latest edition of the 2023 FL Energy Code.
4. "t"=timer control.
5. x,x,y= Logic AND Gate. Both "x" and "y" controls must be true for ON.
6. Consult Lighting Control programming matrix for all required functions based on switch type and space type. All control must meet the requirement of the latest edition of the Energy Code.

- x WALL SWITCH, SINGLE POLE, 120/277VAC, 48" AFF UON. x=SYSTEM
- x D WALL SWITCH, DIMMER, 120/277VAC, 48" AFF UON, x=SYSTEM ON=MANUAL, OFF=MANUAL.
- x M MANUAL MOTOR STARTER, 120/277VAC, AMPS AS REQUIRED, 48" AFF UON. x=SYSTEM ON=MANUAL, OFF=MANUAL.
- x OS WALL SWITCH WITH SELECTABLE OCCUPANCY/VACANCY SENSOR, 48" AFF UON. x=SYSTEM FOR OS, ON=OCCUPANCY, OFF=VACANCY. FOR V, ON=MANUAL, OFF=VACANCY.
- x V
- x OS CEILING-MOUNTED SENSOR WITH SELECTABLE OCCUPANCY/VACANCY SENSOR. x=SYSTEM FOR OS, ON=OCCUPANCY, OFF=VACANCY. FOR V, ON=MANUAL, OFF=VACANCY.
- x V
- LC LIGHTING CONTACTOR OR RELAY PANEL

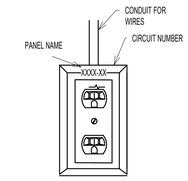
NOT ALL SYMBOLS ARE USED IN EVERY DESIGN

ELECTRICAL SHEET LIST	
Sheet Number	Sheet Name
E-001	ELECTRICAL - GENERAL
E-002	ELECTRICAL - GENERAL
E-201	ELECTRICAL PLANS
E-801	ELECTRICAL SCHEDULES AND DIAGRAMS
FA-001	FIRE ALARM PLAN

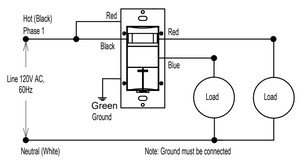


NOTES:
1. FULL SIZE GROUND MEANS THAT THE GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED AS SHOWN FOR THE SERVICE EQUIPMENT ON THE POWER RISER DIAGRAM.
2. AFTER THE GROUNDING SYSTEM IS INSTALLED, GROUND RESISTANCE SHALL BE MEASURED. WHERE THE RESISTANCE TO EARTH OF A SINGLE ROD, PIPE, OR PLATE ELECTRODE EXCEEDS 25 OHMS, PROVIDE A SUPPLEMENTAL ELECTRODE. PROVIDE ADDITIONAL ELECTRODES WHERE REQUIRED BY PROJECT REQUIREMENTS, AHJ, OR UTILITY.
3. ALL CONNECTIONS TO GROUND RODS SHALL BE EXOTHERMIC WELD CONNECTIONS.
4. THE GROUNDING ELECTRODE CONDUCTOR FOR A CONCRETE-ENCASED ELECTRODE SHALL BE LOCATED WITHIN OR NEAR THE BOTTOM OF THE CONCRETE FOUNDATION OR FOOTING THAT IS IN DIRECT CONTACT WITH THE EARTH, AND SHALL CONSIST OF AT LEAST 20 FEET OF ONE OR MORE STEEL REINFORCING BARS OR RODS NOT LESS THAN 1/2 INCH IN DIAMETER, OR AT LEAST 20 FEET OF BARE COPPER CONDUCTOR.
5. A GROUND RING ENCIRCLING THE BUILDING OR STRUCTURE, IN DIRECT CONTACT WITH THE EARTH, CONSISTING OF AT LEAST 20 FEET OF BARE COPPER CONDUCTOR NOT SMALLER THAN 2 AWG, SHALL BE INSTALLED PER NEC 250.52(A)(4).
6. WHEN SERVICE EQUIPMENT IS NOT INSTALLED ON OR AT A BUILDING/STRUCTURE, PROVIDE A GROUNDING ELECTRODE SYSTEM PER NEC 250.50. WHERE ROD ELECTRODES ARE USED, INSTALL NOT LESS THAN TWO 5/8-IN. COPPER-CLAD GROUND RODS, 10 FT MINIMUM LENGTH, SPACED NOT LESS THAN 6 FT APART. IF A SINGLE ROD, PIPE, OR PLATE ELECTRODE DOES NOT HAVE A RESISTANCE TO EARTH OF 25 OHMS OR LESS, PROVIDE A SUPPLEMENTAL ELECTRODE PER NEC 250.53(A)(2). PROVIDE ADDITIONAL RODS AS REQUIRED BY PROJECT REQUIREMENTS, AHJ, OR UTILITY.

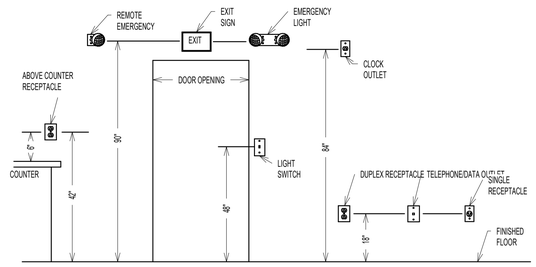
1 GROUNDING DETAIL
N.T.S.



3 POWER OUTLET DETAIL
N.T.S.



4 WALL-SWITCH OCCUPANCY SENSORS
N.T.S.



2 MOUNTING HEIGHT
N.T.S.

George F. Young, Inc.
Since 1919
Department of Environmental Protection
Division of Recreation and Parks
Bureau of Design and Construction
3800 Commonwealth Blvd., Tallahassee, FL 32399 (850) 245-2157

DESIGNER:
DRAWN BY: FC
REVIEWED BY: MC/FA
Consultant:

Cabral Engineering Inc
Engineering - Consulting - Project Management
1058 Palm Cove Dr, Orlando, FL 32835
(321) 246 - 4041 C.A. No.: 33227
CEI Project #24.115

PROFESSIONAL REGISTRATION

Francisco Cabral, P.E. #87110
LICENSED PROFESSIONAL ENGINEER

ISSUE	DATE	COMP. FILE No.:	STATE PROJECT No.:
FC	03/27/2026	(24-069)	

DATE	REVISION	SYMBOL	DATE	REVISION	SYMBOL

PROJECT TITLE: PHASE 100% CD SET
SHEET TITLE: ELECTRICAL - GENERAL
BLUE SPRING STATE PARK RESTROOM REPLACEMENT

SHEET NO.
E-001

GENERAL ELECTRICAL REQUIREMENTS AND SPECIFICATIONS

1. GOVERNING REQUIREMENTS / ORDER OF PRECEDENCE: THE MOST STRINGENT REQUIREMENT GOVERNS. IF OWNER OR AHJ CRITERIA EXCEED CODE, INDUSTRY STANDARDS, OR THESE SPECS, APPLY THE HIGHER STANDARD. CONTRACTOR SHALL OBTAIN CURRENT OWNER STANDARDS BEFORE PRICING AND USE THEM THROUGH SUBMITTALS, PROCUREMENT, AND INSTALLATION. RESOLVE CONFLICTS WITH THE AHJ BEFORE WORK PROCEEDS AND DOCUMENT THE RESOLUTION.
2. EQUIPMENT LISTINGS AND ENVIRONMENTAL RATINGS: PROVIDE PRODUCTS LISTED/LABELED FOR THE APPLICATION AND INSTALLED PER THE LISTING AND MANUFACTURER INSTRUCTIONS (NEC 110.3(B)). SELECT ENCLOSURES/MATERIALS FOR SITE CONDITIONS PER NEC 110.11 AND NEC 110.28 (NEMA/IP AS SCHEDULED). COMPLY WITH APPLICABLE NEMA/UL/IEC STANDARDS AND FURNISH DATA CONFIRMING RATINGS. FIELD MODIFICATIONS SHALL NOT COMPROMISE THE LISTING OR ENCLOSURE INTEGRITY.
3. PLENUMS / ENVIRONMENTAL-AIR SPACES. WHERE ANY CLOSET, CEILING CAVITY, SHAFT, OR RETURN PATH IS USED AS AN ENVIRONMENTAL-AIR SPACE, WIRING METHODS AND EQUIPMENT SHALL COMPLY WITH NEC 300.22(C). USE ONLY WIRING METHODS PERMITTED BY 300.22(C)(1); EQUIPMENT IN THESE SPACES SHALL MEET 300.22(C)(2). LOW-VOLTAGE / FIRE ALARM (BY SEPARATE FA PERMIT) / COMM / FIBER CABLING IN THESE SPACES SHALL BE PLENUM-LISTED PER THE APPLICABLE ARTICLES (E.G., 725.154, 760.154, 770.154, 800.179). NON-PLENUM CABLE TYPES ARE PROHIBITED IN THESE SPACES UNLESS INSTALLED IN A WIRING METHOD PERMITTED BY 300.22(C). COORDINATE WITH MECHANICAL PLANS TO IDENTIFY LOCATIONS.
4. SUBMITTALS AND DEVIATIONS: SUBMIT COMPLETE SHOP DRAWINGS WITH REQUIRED TECHNICAL DATA (RATINGS, SCCR, ENCLOSURES, WIRING/ONE-LINES, DEVICE CHARACTERISTICS, COORDINATION INFO). IDENTIFY ALL VARIANCES ON THE COVER IN A "DEVIATION LOG" WITH REASON/IMPACT; CLOUD AFFECTED PAGES. INCOMPLETE SUBMITTALS WILL BE RETURNED WITHOUT ACTION. EOR REVIEW IS FOR GENERAL CONFORMANCE ONLY; DEVIATIONS REQUIRE WRITTEN APPROVAL. CONTRACTOR REMAINS RESPONSIBLE FOR FULL COMPLIANCE AND CORRECTION OF NONCONFORMING WORK AT NO COST TO OWNER.
5. ITEMS NOT REQUIRING SUBMITTAL FOR APPROVAL: ANCILLARY AND MISCELLANEOUS ITEMS/MATERIALS SUCH AS FACEPLATES, CABLE TIES, CAPS, SCREWS, WIRE, BOXES, CONDUIT, SUPPORTS, WIRE CONNECTORS, CONDUIT FITTINGS, BUSHINGS, GLUE, BONDING COMPOUND, COATING COMPOUND, COMPRESSION KITS, METAL COVERS, GROUND RODS, GROUND BARS, STRAPS, CHANNEL STRUT, WASHERS, CLAMPS, AND OTHER COMPONENTS THAT ARE STANDARD AND NECESSARY FOR THE COMPLETE INSTALLATION OF THE ELECTRICAL SYSTEM DO NOT REQUIRE ENGINEER OF RECORD (EOR) APPROVAL. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL REQUIRED COMPONENTS, AND FOR ENSURING THAT EACH ITEM COMPLIES WITH ALL APPLICABLE CODES AND STANDARDS, AND IS APPROPRIATE FOR THE INSTALLATION ENVIRONMENT.
6. THE COMPLETE ELECTRICAL INSTALLATION SHALL COMPLY WITH THE LATEST ADOPTED EDITION OF THE FOLLOWING CODES & STANDARDS:
   1. NFPA 70: NATIONAL ELECTRICAL CODE 2020 EDITION.
   2. NFPA 72: NATIONAL FIRE ALARM CODE.
   3. NFPA 780: LIGHTNING PROTECTION CODE.
   4. NFPA 101: LIFE SAFETY CODE.
   5. NFPA 110: STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS.
   6. ANSI A17.1: ELEVATOR CODE.
   7. ANSI A117.1: ACCESSIBILITY CODE.
   8. FLORIDA AMERICANS WITH DISABILITIES ACCESSIBILITY IMPLEMENTATION ACT AS DESCRIBED IN ACCESSIBILITY REQUIREMENTS MANUAL, DEPARTMENT OF COMMUNITY AFFAIRS.
   9. AMERICANS WITH DISABILITIES ACT.
   10. FLORIDA BUILDING CODE 2023 EDITION AND FLORIDA FIRE PREVENTION CODE 2023 EDITION.
7. 'FURNISH', 'INSTALL' AND 'PROVIDE' ARE EQUIVALENT TERMS WHICH INDICATE MATERIAL AND/OR EQUIPMENT SUPPLIED AND INSTALLED BY THIS CONTRACTOR.
8. ALL ITEMS SHOWN AS "TBD," "BY OTHERS," OR OTHERWISE UNDEFINED—INCLUDING BUT NOT LIMITED TO LIGHTING FIXTURES, ACCESSORIES, DRIVERS, FINISHES, VOLTAGES, CONTROL OPTIONS, AND MOUNTING DETAILS—SHALL BE RESOLVED, DOCUMENTED, AND PRICED BY THE CONTRACTOR PRIOR TO BID SUBMISSION. INCLUDE ALL COSTS NECESSARY FOR A COMPLETE AND FUNCTIONING INSTALLATION.
9. THE ELECTRICAL DRAWINGS REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF THE SYSTEMS HEREIN AND ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. CONTRACTOR SHALL COORDINATE THE INSTALLATION WITH THE OTHER TRADES AND PROVIDE A SYSTEM THAT MEETS THE REQUIREMENTS OF THESE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL PROVIDE SYSTEMS AND COMPONENTS THAT ARE FULLY COMPLETE, OPERATIONAL, AND FULLY SUITABLE FOR THEIR INTENDED USE. INCIDENTAL DETAILS NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER INSTALLATION AND OPERATION, ARE INCLUDED IN THE CONTRACTOR'S SCOPE.
10. ALL ELECTRICAL, FIRE ALARM, AND COMMUNICATIONS WORK IN OR CROSSING HAZARDOUS (CLASSIFIED) AREAS SHALL COMPLY WITH NEC 500–516 AND APPLICABLE NFPA STANDARDS. COORDINATE WITH THE OWNER/ARCHITECT TO CONFIRM PROCESSES AND CLASSIFICATION.
11. THE CONTRACTOR SCOPE SHALL INCLUDE ALL CUTTING AND PATCHING REQUIRED FOR THE COMPLETE INSTALLATION OF THE SYSTEMS HEREIN.
12. DRAWINGS ARE DIAGRAMMATIC. VERIFY ALL LOCATIONS AND REQUIREMENTS OF EQUIPMENT FURNISHED AND/OR INSTALLED BY OTHERS BEFORE ROUGHING IN.
13. THOROUGHLY REVIEW GENERAL CONDITIONS, SPECIFICATIONS, AND DRAWINGS, INCLUDING OTHER DIVISIONS, TO UNDERSTAND THEIR IMPACT ON ELECTRICAL WORK. CONTRACT COST INCREASES DUE TO UNINSPECTED CONDITIONS WILL NOT BE PERMITTED.
14. THE CONTRACTOR SHALL SURVEY THE JOBSITE PRIOR TO SUBMITTING THEIR BID TO DETERMINE AREAS REQUIRING DEMOLITION, TEMPORARY POWER, RELOCATING, ETC., WHICH ARE INADVERTENTLY NOT SHOWN ON THE DRAWINGS, AND PROBLEMS WITH WORK SEQUENCE. ANY UNUSUAL CONDITIONS NOT SHOWN ON THE DRAWINGS SHALL BE REPORTED TO THE ENGINEER PRIOR TO BIDDING.
15. UPON COMPLETION OF THE WORK, BUT BEFORE FINAL ACCEPTANCE OF THE SYSTEM AND REQUEST FOR FINAL PAYMENT, FURNISH THE OWNER, FOR APPROVAL, OPERATION AND MAINTENANCE MANUALS IN LOOSE-LEAF BINDERS. PROVIDE A MINIMUM OF SIX SETS. MANUALS SHALL INCLUDE: SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE, CLEARLY IDENTIFIED. NAMES AND ADDRESSES OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
16. PROVIDE OWNER WITH A RECORD SET OF AS-BUILT DRAWINGS WITHIN 30 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE FROM A DESIGNATED MARKED-UP SET OF BLUELINES, INCLUDING: A SINGLE-LINE DIAGRAM OF THE BUILDING ELECTRICAL DISTRIBUTION SYSTEM. FLOOR PLANS INDICATING LOCATION AND AREA SERVED FOR ALL DISTRIBUTION. FIRE ALARM RECORD DRAWINGS (AS-BUILTS) SHALL BE PROVIDED BY THE FIRE ALARM CONTRACTOR/ENGINEER UNDER THE SEPARATE FIRE ALARM PERMIT.
17. PROVIDE TEMPORARY ELECTRICAL POWER TO JOBSITE FOR THE DURATION OF THE PROJECT.
18. PROVIDE 4" HIGH CONCRETE HOUSEKEEPING PADS FOR ALL FLOOR-MOUNTED ELECTRICAL EQUIPMENT (SWITCHBOARDS, TRANSFORMERS, ETC.).
19. DIVISION 26/16 SUBCONTRACTORS SHALL REVIEW ALL MECHANICAL/PLUMBING DRAWINGS AND VERIFY EQUIPMENT VOLTAGE, PHASE, AND AMPS PRIOR TO ROUGH-IN OF ALL EQUIPMENT.
20. ALL EQUIPMENT, DEVICES, ETC., FURNISHED BY THE ELECTRICAL CONTRACTOR SHALL BE U.L. LISTED (OR EQUIVALENT NATIONAL TESTING AGENCY) FOR ITS INTENDED PURPOSE. INFORM THE OWNER THAT ALL OWNER-FURNISHED EQUIPMENT, DEVICES, ETC., MUST ALSO HAVE A U.L. LISTING (OR EQUIVALENT LISTING).
21. ALL ELECTRICAL COMPONENTS (CONDUIT, WIRE, FITTINGS, SUPPORTS, CIRCUIT BREAKERS, LAMPS, ETC.) PROVIDED AND INSTALLED IN THIS PROJECT SHALL BE BRAND NEW.
22. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF CONSTRUCTION DOCUMENTS TO THE UTILITY COMPANY IMMEDIATELY AFTER RECEIVING NOTICE TO PROCEED OR PRIOR TO ANY SITE OR BUILDING ROUGH-IN.
23. WHERE REQURIED, AFFIX PERMANENT ARC-FLASH AND AVAILABLE FAULT CURRENT LABELS TO ALL APPLICABLE ELECTRICAL EQUIPMENT IN COMPLIANCE WITH 2014 NEC ARTICLE 110.
24. PROVIDE AVAILABLE FAULT CURRENT MARKINGS AT SERVICE EQUIPMENT PER NEC 110.24. PROVIDE FIELD-APPLIED HAZARD WARNING LABELS PER NEC 110.21(B). ARC-FLASH AND SHOCK HAZARD WARNING LABELS, WHERE REQUIRED, SHALL BE BASED ON FINAL INSTALLED CONDITIONS AND EQUIPMENT DATA.
25. ALL FEEDERS AND/OR BRANCH CIRCUITS FOR A FIRE PUMP, AND ALL UNPROTECTED SERVICE CONDUCTORS, SHALL BE CONCRETE-ENCASED (2" MINIMUM).
26. WHERE REQUIRED, THE CONTRACTOR SHALL PROVIDE THE FOLLOWING STUDIES, BASED ON AS-BUILT INFORMATION, AND TO MEET ALL APPLICABLE CODES AND AHJ REQUIREMENTS: A. SHORT-CIRCUIT STUDY. B. PROTECTIVE DEVICE COORDINATION STUDY. C. ARC-FLASH STUDY (INCLUDING LABELS).
27. ELECTRICAL DISTRIBUTION EQUIPMENT TESTING: PERFORM INSULATION RESISTANCE TEST OF BUSES AND PORTIONS OF CONTROL WIRING THAT DISCONNECTED FROM SOLID-STATE DEVICES. INSULATION RESISTANCE LESS THAN 100 MEGOHMS IS NOT ACCEPTABLE. PERFORM GROUND RESISTANCE TEST ON SYSTEM AND EQUIPMENT GROUND CONNECTIONS. TEST MAIN AND SUB FEED OVERCURRENT PROTECTIVE DEVICES.
28. ALL ELECTRIC MOTORS AND DRY-TYPE TRANSFORMERS MUST MEET THE EFFICIENCY REQUIREMENTS LISTED ON THE FLORIDA ENERGY CODE.
29. CONTRACTOR SHALL CONSULT ARCHITECT AND/OR OWNER FOR ALL COLOR/FINISH SELECTIONS ON ALL VISIBLE ELECTRICAL ELEMENTS (I.E. LIGHT FIXTURES, FACE PLATES, RECEPTACLES, SWITCHES, ETC.)
30. SELECTIVE COORDINATION:
   A. ALL OVERCURRENT PROTECTIVE DEVICES SERVING EMERGENCY (NEC 700) AND LEGALLY REQUIRED STANDBY (NEC 701) LOADS SHALL BE SELECTIVELY COORDINATED WITH ALL SUPPLY-SIDE OVERCURRENT PROTECTIVE DEVICES IN ACCORDANCE WITH NEC 700.32 AND 701.27. SELECTIVE COORDINATION SHALL BE DEMONSTRATED BY THE CONTRACTOR USING MANUFACTURER-PUBLISHED COORDINATION TABLES OR CERTIFIED TEST DATA. TIME-CURRENT CURVE OVERLAYS ALONE ARE NOT ACCEPTABLE. CONTRACTOR SHALL PROVIDE SUBMITTALS VERIFYING COMPLIANCE; ANY SUBSTITUTIONS THAT DO NOT ACHIEVE COORDINATION SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
   B. FOR CENTRAL LIGHTING INVERTER SYSTEMS, INTEGRAL INVERTER BREAKERS SHALL BE COORDINATED WITH INVERTER PROTECTIVE DEVICES PER UL 924 LISTING. CONTRACTOR SHALL PROVIDE MANUFACTURER DOCUMENTATION WITH SUBMITTALS TO DEMONSTRATE COMPLIANCE.
31. FREESTANDING ELECTRICAL SUPPORTS AND PAD FOUNDATIONS — DELEGATED STRUCTURAL (USE WHEN NOT SHOWN ON STRUCTURAL/CIVIL)
   A. APPLIES TO FREESTANDING POSTS/RACKS/FRAMES AND TO CONCRETE PADS OR PEDESTALS FOR CT CABINETS, METERS, SWITCHBOARDS, COMPANY SWITCH/CAM-LOCK CABINETS, MOBILE PANELS, TIMECLOCKS, AND SIMILAR EQUIPMENT WHEN NOT DETAILED ON STRUCTURAL OR CIVIL DRAWINGS.
   B. CONTRACTOR SHALL RETAIN A PE LICENSED IN THE PROJECT STATE TO DESIGN AND SEAL THE COMPLETE SUPPORT OR PAD, INCLUDING BASE PLATES/FOOTINGS, ANCHORS, UPLIFT/OVERTURNING, AND DOOR-SWING/MAINTENANCE LOADS PER ASCE 7. FIELD-POURED PADS WITHOUT SEALED DESIGN ARE PROHIBITED.
   C. DESIGN TO THE ADOPTED BUILDING CODE, ASCE 7, AND ACI 318 INCLUDING CHAPTER 17 ANCHORAGE; USE PROJECT GEOTECH IF AVAILABLE, OTHERWISE ESTABLISH AND OWN DESIGN ASSUMPTIONS (BEARING, FROST, SETTLEMENT).
   D. VEHICLE IMPACT / BREAK-AWAY. WHERE THE INSTALLATION IS WITHIN OR ADJACENT TO VEHICLE TRAVEL/PARKING AREAS OR CLEAR ZONES (DRIVE AISLES, LOADING AREAS, ROADWAYS, OR SIMILAR), THE DELEGATED DESIGN SHALL:
      a. PROVIDE FRANGIBLE/BREAK-AWAY SUPPORTS OR BASES AND SETBACKS CONSISTENT WITH GOOD ROADSIDE SAFETY PRACTICE (E.G., AASHTO ROADSIDE DESIGN GUIDE) AND APPLICABLE OWNER/AGENCY CRITERIA (E.G., FDOT STANDARD PLANS WHERE REFERENCED BY THE SITE WORK).
      b. WHERE BREAK-AWAY CONSTRUCTION IS NOT FEASIBLE DUE TO EQUIPMENT MASS, FAULT-CURRENT/GROUNDING NEEDS, OR OPERATIONAL CONSTRAINTS, PROVIDE PROTECTIVE BARRIERS/BOLLARDS/CURBING DESIGNED BY THE DELEGATED STRUCTURAL/CIVIL ENGINEER TO PREVENT VEHICLE IMPACT, WHILE MAINTAINING ELECTRICAL CLEARANCES, WORKING SPACE, AND EGRESS.
      c. WHERE THE INSTALLATION IS ON OR NEAR PUBLIC ROW OR OTHERWISE SUBJECT TO AGENCY CRASHWORTHINESS CRITERIA, SELECT BREAK-AWAY HARDWARE LISTED/QUALIFIED TO THE CURRENT FHWA CRASH-TEST STANDARD (E.G., MASH/LEGACY NCHRP 350 WHERE ACCEPTED BY THE AHJ).
   E. DO NOT SUBMIT STRUCTURAL CALCULATIONS OR DRAWINGS TO THE ELECTRICAL ENGINEER. SUBMIT SEALED STRUCTURAL DOCUMENTS DIRECTLY TO THE AHJ AND, WHERE REQUIRED, THE OWNER/PRIME CONSULTANT OR SEOR. KEEP ONE SEALED SET ON SITE AND PROVIDE UPON WRITTEN REQUEST.
   F. PROVIDE CORROSION-RESISTANT MATERIALS (HOT-DIP GALVANIZED OR STAINLESS OUTDOORS) WITH COMPATIBLE HARDWARE; REPAIR COATINGS; TORQUE ANCHORS PER MANUFACTURER.
   G. BOND METALLIC SUPPORTS TO THE SERVICE GROUNDING ELECTRODE SYSTEM PER NEC AND MAINTAIN NEC 110.26 AND SERVING-UTILITY CLEARANCE/HEIGHT REQUIREMENTS.
   H. COORDINATE CONDUIT STUB-UPS, SLEEVES, BLOCKOUTS, ANCHOR BOLT TEMPLATES, AND BOLT PATTERNS WITH THE EQUIPMENT SUPPLIER BEFORE PLACEMENT.
   I. MEET SERVING-UTILITY STANDARDS AND MEET OR EXCEED MANUFACTURER MINIMUM PAD SIZES AND ANCHOR DATA.
   J. NO SUBSTITUTIONS THAT REDUCE CAPACITY OR CLEARANCES WITHOUT WRITTEN APPROVAL OF THE DELEGATED PE AND ACCEPTANCE BY AHJ/SEOR/UTILITY AS APPLICABLE.
32. COASTAL CORROSION RESISTANCE: ALL EXTERIOR ELECTRICAL EQUIPMENT WITHIN COASTAL EXPOSURE SHALL BE LISTED AND SUITABLE FOR CORROSIVE ENVIRONMENTS PER NEC 110.11/110.28. PROVIDE UL TYPE 4X FOR DISCONNECTS, TERMINAL BOXES, AND CONTROL ENCLOSURES; SCHEDULE 80 PVC OR PVC-COATED RMC/IMC RACEWAYS WITH PROTECTED THREADS PER NEC 300.6(A); ALL EXTERIOR FASTENERS/SUPPORTS STAINLESS STEEL. COORDINATE UTILITY APPROVED METER ENCLOSURES WITH FPL.

WIRES, CABLES, AND CONNECTORS

1. SAFETY SWITCH DUTY & STANDARDS: HEAVY-DUTY, VISIBLE-BLADE (UL 98) WHERE USED AS SERVICE EQUIPMENT, FOR 600-V CLASS, OR FREQUENT OPERATION; GENERAL-DUTY ACCEPTABLE ONLY AT ≤240 V, NON-SERVICE, LIGHT-DUTY WHEN CODE-PERMITTED. HORSEPOWER-RATED AND LOCKABLE OFF (NEC 110.25).
2. LOCATION / "WITHIN SIGHT": PROVIDE A LOCKABLE DISCONNECT WITHIN SIGHT (≤50 FT, VISIBLE) OF EACH MOTOR/CONTROLLER (NEC 430.102(B)) AND HARD-WIRED APPLIANCE (NEC 422.31). FIELD-LABEL EQUIPMENT WITH SOURCE PANEL/BREAKER (NEC 110.22).
3. ENCLOSURES & HUBS (EXTERIOR/HARSH): ENCLOSURES PER ENVIRONMENT (NEC 110.11, 110.28): NEMA 3R OUTDOORS; NEMA 4/4X FOR WASH-DOWN/CORROSIVES. USE LISTED WATERTIGHT HUBS FOR TOP ENTRIES.
4. FUSES: INTERRUPTING RATING ≥ AVAILABLE FAULT CURRENT. HVAC: CLASS RK1 TIME-DELAY UNLESS NOTED. ACCEPTABLE: BUSSMANN, LITTELFUSE, MERSEN. MATCH FUSE CLASS WITHIN A SWITCH.
5. CIRCUIT BREAKERS (COMPATIBILITY & AIC): BREAKERS IN EXISTING GEAR SHALL BE LISTED FOR THAT EQUIPMENT AND MEET/EXCEED AIC; SERIES RATINGS PER NEC 240.86 WITH DOCUMENTATION. UL 489.
6. MOTOR / INRUSH PROTECTION: SIZE OCPD/CONTROLLERS PER NEC 430/440 AND NAMEPLATE FLA/LRA. FOR IEC MCBS, USE CURVE C (5–10× IN) OR CURVE D (10–20× IN) AS SUPPORTED BY EQUIPMENT DATA. MAINTAIN EQUIPMENT LISTING AND CONTROLLER SCCR.
7. WATER HEATERS – LOCKABLE MEANS: BRANCH BREAKER MAY SERVE AS DISCONNECT WHEN FITTED WITH A LISTED LOCKABLE-OPEN DEVICE (NEC 422.31(B), 110.25). LABEL PANEL/BREAKER AT THE UNIT (NEC 110.22).
8. AFCI: PROVIDE WHERE REQUIRED BY NEC 210.12 (AND 406.4(D)(4) FOR REPLACEMENTS). COORDINATE WITH OCCUPANCY/CIRCUIT USE.
9. SHUNT-TRIP / LIFE-SAFETY INTERLOCKS: PROVIDE SHUNT-TRIP WHERE SHOWN OR REQUIRED BY CODE/AHJ (E.G., ELEVATORS PER ASME A17.1/NFPA 72 INTERFACES). COORDINATE CONTROL POWER, INTERLOCKS, AND FAIL-SAFE LOGIC; LABEL "ST" WHERE PROVIDED.
10. COMMERCIAL KITCHEN HOODS: PROVIDE INTERLOCK TO DE-ENERGIZE ALL ELECTRICAL POWER TO COOKING APPLIANCES UNDER THE HOOD UPON AUTOMATIC OR MANUAL ACTUATION OF THE FIRE-EXTINGUISHING SYSTEM, WHILE MAINTAINING EXHAUST FAN OPERATION AND SHUTTING DOWN SUPPLY/MAKE-UP AIR AS REQUIRED. IMPLEMENT VIA LISTED SHUNT-TRIP BREAKER OR LISTED CONTACTOR/RELAY ARRANGEMENT. PROVIDE MANUAL RESET AFTER ACTUATION. COORDINATE WIRING AND SUPERVISION WITH THE FIRE ALARM AND MECHANICAL TRADES PER NFPA 96 AND LOCAL AMENDMENTS.
11. HVAC BRANCH DEVICES: OCPD SUITABLE FOR HVAC PER NEC 440 AND EQUIPMENT INSTRUCTIONS (NOTE: SEPARATE "HACR" MARKING NOT REQUIRED FOR UL 489 BREAKERS).
12. SERVICE DISCONNECTS: SERVICE DISCONNECTS: HEAVY-DUTY (UL 98), SUITABLE AS SERVICE EQUIPMENT, SHORT-CIRCUIT RATING COORDINATED TO AVAILABLE FAULT CURRENT/UTILITY REQUIREMENTS. SERVICE DISCONNECTS IDENTIFIED FOR "SHUNT-TRIP" OR WITH "ST" SHALL BE SHUNT-TRIP CAPABLE OR ENCLOSED CIRCUIT BREAKERS WITH SHUNT-TRIP CAPABILITY.

PANELBOARDS

1. BASIS OF DESIGN: SQUARE D "HOMELINE" PANELBOARDS SHALL BE UL 67 LISTED AND INSTALLED PER NEMA PB 1/PB 1.1.
2. CONSTRUCTION: DEAD-FRONT, BOLT-ON CIRCUIT BREAKERS; FULL-SIZE NEUTRAL AND EQUIPMENT GROUNDING BAR; COPPER BUS (UNLESS NOTED OTHERWISE) WITH SCCR ≥ AVAILABLE FAULT CURRENT. PROVIDE MAIN LUGS OR MAIN BREAKER AS SCHEDULED; FACTORY DOOR-IN-DOOR FRONTS FOR RECESSED/SURFACE AS INDICATED.
3. MOUNTING & WORKING HEIGHT: MOUNT PLUMB AND RIGID. THE HIGHEST BREAKER OPERATING HANDLE SHALL BE ≤ 6 FT 7 IN (2.0 M) ABOVE FINISHED FLOOR PER NEC 240.24(A). MAINTAIN WORKING SPACE AND ILLUMINATION PER NEC 110.26.
4. GROUNDING & BONDING: BOND EQUIPMENT GROUNDING BAR TO ENCLOSURE; DO NOT BOND THE NEUTRAL IN SUB-FED PANELS (NEUTRAL ISOLATED). PROVIDE GROUNDING ELECTRODE/BONDING CONDUCTORS PER NEC 250 AND CONNECT TO THE BUILDING GROUNDING SYSTEM (ALIGNS WITH YOUR GROUNDING SECTION).
5. PHASE BALANCING & CONDUCTOR MANAGEMENT: ARRANGE AND PHASE CIRCUITS TO KEEP PANEL LOAD PHASE IMBALANCE ≤ 10% AT DESIGN LOADS. TRAIN CONDUCTORS NEATLY IN GUTTERS; MAINTAIN BEND RADII; SECURE WITH LISTED, HEAT-RESISTANT TIES (NO TWINE).
6. DIRECTORIES & IDENTIFICATION: PROVIDE TYPEWRITTEN DIRECTORIES PER NEC 408.4 WITH CLEAR ROOM/EQUIPMENT DESCRIPTIONS (NO "SPARE/MISC."). LABEL PANEL NAME, VOLTAGE, AIC, SOURCE, AND ARC-FLASH LABEL WHERE REQUIRED (ALIGNS WITH YOUR IDENTIFICATION SECTION).
7. SPARE CONDUITS FOR FUTURE: FOR RECESSED PANELS, PROVIDE SPARE RACEWAYS TO THE ACCESSIBLE CEILING CAVITY: (1) ¾-IN EMT PER THREE SPARE SPACES (MINIMUM ONE), CAPPED AND LABELED FOR FUTURE USE.
8. SHUNT-TRIP / CONTROL POWER COORDINATION: WHERE SHUNT-TRIP BREAKERS ARE REQUIRED (E.G., ELEVATOR, HOOD, LIFE-SAFETY INTERLOCKS), PROVIDE CONTROL POWER AS INDICATED ON DRAWINGS AND PER COORDINATING TRADES. DO NOT DERIVE CONTROL POWER FROM A CIRCUIT THAT WOULD BE DE-ENERGIZED BY THE SHUNT ACTION. COORDINATE VOLTAGE (OFTEN 120 V) WITH FA/MECHANICAL INTERLOCKS AND PROVIDE SUPERVISION WHERE REQUIRED (CONSISTENT WITH YOUR SHUNT-TRIP SECTION).
9. LOAD CENTERS (WHEN SPECIFIED): WHERE "LOAD CENTER" IS INDICATED, PROVIDE DEAD-FRONT ASSEMBLIES WITH FULL-SIZE NEUTRAL/GROUND BARS. IF REQUIRED RATINGS, AIC, OR FEATURES CANNOT BE MET WITH A LOAD CENTER, FURNISH A UL 67 PANELBOARD WITH BOLT-ON BREAKERS MEETING THE PROJECT REQUIREMENTS.
10. INSTALLATION & TORQUE: MAKE TERMINATIONS WITH LISTED LUGS; APPLY MANUFACTURER TORQUE VALUES USING A CALIBRATED TOOL PER NEC 110.14(D). PROVIDE BARRIERS/FILLER PLATES FOR ALL UNUSED SPACES.

SURGE SUPPRESSION EQUIPMENT

1. SCOPE & LOCATIONS:
   A. SERVICES 3,000A AND LARGER: PROVIDE UL 1449 4TH EDITION LISTED SPD, RATED 300KA SCR PER PHASE, 20KA IN, 200KAIC, TYPE 1/2 AT EACH SERVICE ENTRANCE, EMERGENCY AND CRITICAL OPERATION PANEL. INCLUDE SURGE COUNTER, AUDIBLE ALARM, REDUNDANT MODULES, AND INDICATOR LIGHTS PER MODE AND PHASE. CONNECT TO A 3-POLE, 30A DEDICATED BREAKER—SUPPLIED BY PANEL MANUFACTURER (E.G., PQ PROTECTION PQS400).
   B. SERVICES BELOW 3,000A: PROVIDE UL 1449 4TH EDITION LISTED SPD, RATED 200KA SCR PER PHASE, 20KA IN, 200KAIC, TYPE 1/2 AT EACH SERVICE, EMERGENCY, AND CRITICAL OPERATION PANEL. INCLUDE SURGE COUNTER, AUDIBLE ALARM, REDUNDANT MODULES, AND INDICATOR LIGHTS. CONNECT TO A 3-POLE, 30A DEDICATED BREAKER—SUPPLIED BY PANEL MANUFACTURER (E.G., PQ PROTECTION PQS300, PQM200).
2. AT SERVICE EQUIPMENT: TYPE 1 SPD.
3. DISTRIBUTION & DOWNSTREAM PROTECTION: PANELBOARDS/MAIN DISTRIBUTION: PROVIDE TYPE 2 SPD OF MATCHING OR GREATER RATING AT MAIN DISTRIBUTION AND BRANCH PANELS.
4. COORDINATION: WHERE APPLICABLE, COORDINATE POINT-OF-USE SPDS (TYPE 3) TO COMPLEMENT, NOT REPLACE, SERVICE/DISTRIBUTION SPDS.
5. STANDARDS, RATINGS & PERFORMANCE:
   A. UL 1449, 4TH EDITION. NOMINAL SYSTEM VOLTAGES/CONFIGURATIONS AS INSTALLED.
   B. SCCR: SPD SCR PER PHASE EQUAL OR GREATER THAN AVAILABLE FAULT CURRENT, MATCHED TO SWITCHBOARD/PANEL AIC.
   C. MCOV: MINIMUM RATED FOR SYSTEM, INCLUDING HIGH-LEG DELTA IF APPLICABLE.
   D. MODES: L-N, L-G, N-G, L-L AS REQUIRED PER SYSTEM.
   E. PERFORMANCE: 100KA OR 200KA PER PHASE (PER RATING ABOVE), 20KA IN MINIMUM, 200KAIC. LOW LET-THROUGH VOLTAGE (UL 1449 MEASURED LIMITING VOLTAGE PER LATEST EDITION).
   F. ENCLOSURES: NEMA 1 INDOORS, NEMA 3R/4 FOR OUTDOOR/CORROSIVE.
6. COMPATIBILITY: SPD COMPATIBILITY WITH SWITCHBOARD/PANEL AND SCCR VIA MANUFACTURER LISTING OR DOCUMENTED EVALUATION.
7. INSTALLATION: DEDICATED BREAKER/BUS CONNECTION PER MANUFACTURE INSTRUCTIONS. LEADS AS SHORT/STRAIGHT AS POSSIBLE (TARGET ≤18" TOTAL). BOND PER NEC 250; VERIFY NEUTRAL-GROUND BOND ONLY AT SERVICE/SDS.
8. MONITORING & ALARMS: REQUIRED FRONT-PANEL LEDS, AUDIBLE/VISIBLE ALARMS, SURGE COUNTERS, AND REPLACEABLE/REDUNTANT MODULE INDICATORS FOR EACH PHASE/MODE. FORM C DRY CONTACTS FOR REMOTE INDICATION.
9. LABELING & DOCUMENTATION: FIELD LABEL EACH SPD WITH: SOURCE, SYSTEM VOLTAGE, SCCR, MCOV, INSTALLATION DATE, LISTING, CONNECTION METHOD, ENCLOSURE. SUBMIT: CUT SHEETS, ONE-LINE SHOWING SPD LOCATIONS, WARRANTY INFO.
10. ELEVATOR DISCONNECTS & SPECIAL EQUIPMENT:
   A. ELEVATOR: TYPE 1/2 SPD AT EACH ELEVATOR FEEDER/DISCONNECT, RATED 100KA/PHASE, 20KA IN, 200KAIC (E.G., PQ PROTECTION PQC200). SPD PROVIDED BY PANEL MANUFACTURER.
   B. FIRE PUMP CONTROLLERS: SPD PER UL 1449, COMPATIBLE WITH PUMP CONTROLLER MANUFACTURER AND NEC.
   C. AHCA FACILITIES: TYPE 1/2 SPD MEETING ALL ABOVE, RATED FOR ENTRY/EXIT CIRCUITS.
11. EXTERIOR LIGHTING/REMOTE PANELS: FOR SITE/OUTBUILDING LIGHTING OR REMOTE CONTROL PANELS, PROVIDE TYPE 1/2 SPD RATED FOR SERVICE/ENVIRONMENT, COORDINATED WITH RELAY AND CONTROL PANELS.

WIRING DEVICES

1. MANUFACTURERS / QUALITY: DEVICES, SENSORS, AND SWITCHES: HUBBELL OR LEVITON (BASIS OF DESIGN); EQUALS BY LUTRON/LEGRAND/WATTSTOPPER ACCEPTABLE WHERE COORDINATED WITH CONTROLS. MATCH DEVICE AND COVER PLATE SERIES ACROSS A SPACE FOR UNIFORM APPEARANCE.
2. RATINGS, LISTINGS, AND USE: DEVICES SHALL BE UL 498 (RECEPTACLES), UL 20 (SWITCHES), AND SUITABLE FOR THE VOLTAGE/CURRENT AND ENVIRONMENT (WR FOR OUTDOORS PER NEC 406.9; GASKETED/IN-USE COVERS WHERE REQUIRED). PROVIDE SPECIFICATION-GRADE (A.K.A. COMMERCIAL GRADE) DEVICES UNLESS NOTED OTHERWISE; HOSPITAL/INDUSTRIAL GRADE WHERE SCHEDULED.
3. CONDUCTOR LENGTH & TERMINATIONS: PROVIDE ≥12 IN. SERVICE LOOP AT EACH DEVICE WHERE SPACE PERMITS; NOT LESS THAN 6 IN. FREE CONDUCTOR PER NEC 300.14. USE CONNECTORS AND TORQUE PER MANUFACTURER (NEC 110.14(D)); USE BACK-WIRE/CLAMP OR SIDE-WIRE TERMINALS LISTED FOR THE CONDUCTOR TYPE/SIZE.
4. IDENTIFICATION & LABELS (ALIGNED WITH BOXES SECTION): MARK THE PANEL AND CIRCUIT ON THE DEVICE PLATE USING MACHINE-PRINTED, ABRASION-RESISTANT LABELS (NEC 110.22). PROVIDE DURABLE WIRE MARKERS INSIDE THE BOX. COORDINATE DIRECTORY MARKINGS PER NEC 408.4.
5. CODE-DRIVEN PROTECTION: AFCI / GFCI / DUAL-FUNCTION: PROVIDE PROTECTION AS REQUIRED BY CODE; SEE DWELLING-UNIT CIRCUIT BREAKERS & RECEPTACLE PROTECTION SECTION FOR DETAILS (NEC 210.8, 210.12, 406.4(D)). WHERE EQUIPMENT NAMEPLATE/LISTING CONFLICTS WITH UPSTREAM GFCI/AFCI, NOTIFY EOR AND AHJ FOR A COMPLIANT SOLUTION.
6. ISOLATED GROUND (IG): IG RECEPTACLES/CONNECTIONS SHALL NOT BE PROVIDED BY DEFAULT. PROVIDE IG ONLY WHEN EXPLICITLY REQUIRED BY THE EQUIPMENT MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS/LISTING, WARRANTY CONDITIONS, OR BY AHJ DIRECTIVE. CONTRACTOR SHALL INCLUDE THE APPLICABLE EQUIPMENT DOCUMENT (PAGE/SECTION CALLOUT) IN THE SUBMITTAL. IF UNCLEAR, SUBMIT AN RFI.
7. TAMPER-RESISTANT / SPECIAL MARKINGS: PROVIDE TAMPER-RESISTANT (TR) RECEPTACLES WHERE REQUIRED BY NEC 406.12. PROVIDE WR MARKING OUTDOORS AND IG (ISOLATED GROUND) ONLY WHERE SHOWN/SPECIFIED; USE LISTED ORANGE IG DEVICES AND WIRING METHOD WHEN APPLICABLE.
8. RECEPTACLE TYPE & RATING: STANDARD DUPLEX: 20 A, 125 V, 2-POLE, 3-WIRE, GROUNDING, SPEC-GRADE, SUITABLE FOR SIDE AND BACK-WIRE.
9. SURGE-PROTECTED RECEPTACLES (POINT-OF-USE): WHERE ADJACENT TO DATA/IT OUTLETS OR SENSITIVE ELECTRONICS, PROVIDE TYPE 3 SPD RECEPTACLES (SURGE-SUPPRESSED). COORDINATE WITH SERVICE/FEEDER SPD IN THE SURGE PROTECTION SECTION TO AVOID REDUNDANT DEVICES THAT COMPROMISE PERFORMANCE.
10. SWITCHES & SENSORS: WALL SWITCHES AND VACANCY/OCCUPANCY SENSORS SHALL BE COMPATIBLE WITH THE LIGHTING CONTROL SEQUENCE (SEE LIGHTING CONTROLS SECTION). PROVIDE NEUTRAL-REQUIRED SENSORS WHERE NEEDED; COORDINATE LOW-LEVEL DIMMING, 0-10 V, OR NETWORKED CONTROL REQUIREMENTS WITH THE LIGHTING CONTROLS SUBMITTAL.
11. FLOOR BOXES: PROVIDE UL-LISTED FLOOR BOXES AND COVERS SUITABLE FOR THE FLOORING TYPE; DUAL-SERVICE WITH BARRIER-SEPARATED POWER AND COMMUNICATIONS COMPARTMENTS. USE DIE-CAST OR STAINLESS HOUSINGS AS SCHEDULED; OBTAIN ARCHITECT/OWNER FINISH APPROVAL. POWER DEVICES TYPICALLY NEMA 5-20R; PROVIDE BLANK/BRUSH OPENING FOR DATA UNLESS NOTED OTHERWISE.
12. INDUSTRIAL / CLASSIFIED AREAS: INDUSTRIAL/HEAVY-DUTY DEVICES WHERE SCHEDULED; COORDINATE NEMA/NFPA RATINGS WITH ENVIRONMENT. IN HAZARDOUS (CLASSIFIED) LOCATIONS, PROVIDE DEVICES/ENCLOSURES LISTED FOR THE LOCATION PER NEC 500–516 AND THE EQUIPMENT'S UL LISTING (E.G., EXPLOSIONPROOF OR DUST-IGNITIONPROOF AS APPLICABLE). COORDINATE WITH THE CONDUIT AND RACEWAYS SECTION FOR FITTINGS/SEAL-OFFS.
13. KITCHEN / WET LOCATIONS: PROVIDE DEVICE TYPES AND COVERS SUITED TO MOISTURE, OILS, AND CLEANING PRACTICES; GFCI PROTECTION WHERE REQUIRED BY NEC 210.8 (REFERENCED ABOVE). FOR CORD-AND-PLUG EQUIPMENT WITH INTEGRAL GFCI, COORDINATE TO PREVENT NUISANCE TRIPPING AND MAINTAIN LISTING.

ELECTRICAL IDENTIFICATION

1. GENERAL & CODE: PROVIDE IDENTIFICATION PER NEC 110.22, 408.4, 210.5(C), 230.2(E), 700.10, AND ANSI Z535 FOR SAFETY SIGNAGE. WORDING SHALL BE CLEAR, DURABLE, AND PERMANENT.
2. EQUIPMENT NAMEPLATES (ENGRAVED): PROVIDE LAMINATED, ENGRAVED PHENOLIC NAMEPLATES (MIN 1/16", BEVELED EDGE). WHITE-ON-BLACK INDOORS; UV-STABLE EXTERIOR-GRADE FOR OUTDOORS (BLACK-ON-WHITE OR AS SCHEDULED). FASTEN WITH STAINLESS SCREWS/RIVETS ON EQUIPMENT; ADHESIVE-ONLY ALLOWED ON SMALL INTERIORS WHERE SCREWS AREN'T PRACTICAL. CONTENT (AS APPLICABLE): EQUIPMENT TAG, SERVICE/SOURCE, VOLTAGE, PHASE/WIRE (E.G., 208Y/120 V, 3Ø, 4W), AIC/SCCR, ARC-FLASH LABEL PRESENT, AND SPECIAL FUNCTIONS (E.G., SHUNT-TRIP, EMERGENCY, IG).
3. PANELS / SWITCHBOARDS / MCCS: PERMANENT NAMEPLATE WITH PANEL/SWITCHBOARD/MCC DESIGNATION, VOLTAGE SYSTEM, AND SOURCE. TYPEWRITTEN DIRECTORIES PER NEC 408.4 WITH PRECISE LOADS/ROOMS (NO "MISC."). MATCH CIRCUIT NAMES WITH DEVICE LABELS IN THE FIELD.
4. BOXES (JUNCTION, PULL, DEVICE)
   A. EXPOSED BOXES: MACHINE-PRINTED, ABRASION-RESISTANT LABELS ON COVER INDICATING PANEL–CIRCUIT (E.G., L1-23,25), AND SYSTEM VOLTAGE WHERE NOT OBVIOUS.
   B. CONCEALED BOXES: DURABLE CARD/TAG INSIDE BOX WITH PANEL–CIRCUIT AND DATE.
   C. DEVICE PLATES (AS COORDINATED IN WIRING DEVICES): MACHINE-PRINTED LABEL WITH PANEL–CIRCUIT; MATCH FINISH/COLOR OF PLATES WHERE VISIBLE.
5. CONDUCTORS, CABLES, AND WIREWAY: PROVIDE WRAPAROUND, HEAT-RESISTANT WIRE MARKERS (E.G., BRADY/PANDUIT) AT BOTH ENDS OF FEEDERS AND BRANCH HOMERUNS IN PANELS, GUTTERS, AND CONTROL ENCLOSURES. IDENTIFY PHASE/NEUTRAL/EGC PER YOUR COLOR SCHEME; MARK HIGH-LEG ORANGE IF PRESENT (NEC 110.15). LABEL CABLE TRAYS AND WIREWAYS AT ENTRIES/EXITS AND EVERY ~30 FT WITH SERVED SYSTEMS/VOLTAGES.
6. RACEWAYS & FEEDERS: LABEL FEEDERS AT FIRST AND LAST ACCESSIBLE POINTS AND AT PENETRATIONS WITH SOURCE → DESTINATION, VOLTAGE, AND CIRCUIT/FEEDER ID.
7. PROVIDE DIRECTIONAL FLOW ARROWS WHERE HELPFUL (E.G., DC/UPS). IDENTIFY MULTIPLE SERVICES OR SYSTEMS IN A BUILDING PER NEC 230.2(E).
8. EMERGENCY / STANDBY SYSTEMS: MARK EQUIPMENT AND RACEWAYS FOR ARTICLE 700 EMERGENCY, 701 LEGALLY REQUIRED, AND 702 OPTIONAL STANDBY DISTINCTLY (E.G., RED LABELS "EMERGENCY—DO NOT DE-ENERGIZE" WHERE REQUIRED). COORDINATE WITH UL 924 DEVICES AND FIRE-ALARM INTERFACES.
9. ARC-FLASH / AVAILABLE FAULT CURRENT: APPLY FIELD ARC-FLASH/AFR LABELS PER THE PROJECT STUDY (NFPA 70E PRACTICE). AT SERVICE EQUIPMENT, APPLY AVAILABLE FAULT CURRENT LABEL AND DATE PER NEC 110.24.
10. SURGE PROTECTION: LABEL SERVICE/FEEDER SPDS WITH TYPE, MCOV, AND SCCR, AND INDICATE THE CIRCUITS/EQUIPMENT PROTECTED. COORDINATE WITH POINT-OF-USE SPD RECEPTACLES TO AVOID CONFUSION.
11. UNDERGROUND WARNING & TRACING: PROVIDE CONTINUOUS WARNING TAPE (ELECTRIC—RED) 12 IN. ABOVE THE UPPERMOST UNDERGROUND RACEWAY ALONG ITS FULL LENGTH. WHERE NONMETALLIC RACEWAYS ARE USED FOR FEEDERS, PROVIDE TRACER WIRE AND TAG PULL BOXES/HANDHOLES WITH SOURCE/DESTINATION.
12. FINISH & AESTHETICS: COORDINATE PLATE/DEVICE SERIES AND COLORS WITH ARCHITECTURAL FINISHES. USE CONSISTENT FONT/SIZE; NO HAND-WRITTEN LABELS EXCEPT FOR TEMPORARY TESTING.

SUPPORTING DEVICES

1. LUMINAIRES: SUPPORT LUMINAIRES FROM THE BUILDING STRUCTURE, NOT FROM LAY-IN GRID ALONE. PROVIDE INDEPENDENT SUPPORT AT TWO OPPOSITE CORNERS (WIRE OR CHAIN) OR PER FIXTURE LISTING; USE LISTED GRID-TETHER KITS WHERE ALLOWED. PROVIDE SEISMIC BRACING WHERE REQUIRED BY CODE/JURISDICTION.
2. RACEWAYS & CABLE: FASTEN CONDUIT TO STRUCTURAL MEMBERS WITH CORROSION-RESISTANT SUPPORTS AT INTERVALS PER THE APPLICABLE ARTICLE (EMT 358.30, RMC/IMC 342/344.30, PVC 352.30). DO NOT SUPPORT RACEWAYS FROM CEILING GRID.

CONDUIT AND RACEWAYS

1. MINIMUM SIZE: CONDUIT NOMINAL TRADE SIZE ½-INCH MINIMUM UNLESS NOTED OTHERWISE.
2. UNDERGROUND WORK – CODE & UTILITY: INSTALL ALL DIRECT-BURIED AND ENCASED RACEWAYS TO THE AHJ, UTILITY COMPANY STANDARDS, AND NEC REQUIREMENTS. MAINTAIN CLEAR UTILITY SEPARATIONS REQUIRED BY THE UTILITY.
3. RACEWAY TYPE (UNDERGROUND): USE PVC SCHEDULE 80 FOR BURIED RUNS AND WHERE SUBJECT TO PHYSICAL DAMAGE (NEC 352.10). PROVIDE LISTED RED WARNING TAPE 12 IN. ABOVE THE UPPERMOST RACEWAY. WHERE NONMETALLIC RACEWAY IS USED, PROVIDE A TRACER WIRE (NO. 12 CU, INSULATED) CONTINUOUS WITH ACCESSIBLE TERMINATIONS.
4. CONDUIT BANKS & SEPARATION: UNLESS NOTED OTHERWISE, MAINTAIN 7.5 IN. CENTER-TO-CENTER SPACING BETWEEN PARALLEL UNDERGROUND RACEWAYS. FOR BANKS OF 4 OR MORE CONDUITS, PROVIDE CONCRETE ENCASEMENT (P = 55 Ω·CM) WITH MINIMUM 3 IN. COVER ALL SIDES.
5. COVER DEPTH: PROVIDE MINIMUM COVER PER NEC 300.5 (RACEWAYS) AND 300.50 (DIRECT-BURIAL CONDUCTORS), AS APPLICABLE. INCREASE COVER WHERE REQUIRED UNDER DRIVES, ROADWAYS, OR LANDSCAPING PER AHJ/UTILITY.
6. RACEWAY SELECTION (GENERAL): UNLESS NOTED OTHERWISE, RACEWAY MAY BE ANY NEC-PERMITTED TYPE SUITED TO THE ENVIRONMENT (E.G., EMT IN DRY, NONCORROSIVE LOCATIONS; GRC/IMC WHERE EXPOSED TO DAMAGE/CORROSION; RNC WHERE PERMITTED). INSTALL PER THE SPECIFIC ARTICLE FOR THAT RACEWAY AND MANUFACTURER'S INSTRUCTIONS.
7. COORDINATION / ROUTING: COORDINATE RACEWAY ROUTING WITH HVAC DUCTWORK, PLUMBING, AND FIRE PROTECTION TO AVOID CONFLICTS AND MAINTAIN SERVICE CLEARANCES. USE ORTHOGONAL ROUTING AND MAINTAIN REQUIRED WORKING SPACES.
8. SUPPORT & CORROSION PROTECTION: SECURE RACEWAYS TO THE BUILDING STRUCTURE WITH CORROSION-RESISTANT STRAPS, HANGERS, AND HARDWARE AT INTERVALS PER THE APPLICABLE NEC ARTICLE (E.G., 358.30, 352.30, 344.30). PROVIDE CORROSION PROTECTION PER NEC 300.6 WHERE REQUIRED.
9. FLEXIBLE CONNECTIONS (VIBRATION): PROVIDE FLEXIBLE STEEL CONDUIT (FMC), MAXIMUM 3 FT, TO MOTORS, TRANSFORMERS, AND OTHER VIBRATION-PRONE EQUIPMENT IN DRY LOCATIONS. BOND PER NEC 250; PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN THE FLEX WHERE REQUIRED.
10. WET / WASHDOWN AREAS: PROVIDE LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC), MAXIMUM 3 FT, WHERE SUBJECT TO MOISTURE, OILS, OR WASHDOWN; USE LISTED LIQUIDTIGHT FITTINGS. USE LFNC-B ONLY WHERE SPECIFICALLY PERMITTED AND SUPPORTED BY THE ENVIRONMENT AND AHJ.
11. SLAB PENETRATIONS: MINIMIZE SLAB PENETRATIONS; GROUP SLEEVES WHERE FEASIBLE AND COORDINATE LOCATIONS PRIOR TO POUR.
12. CABLE TYPES: TYPE NM ("ROMEX") NOT PERMITTED IN THIS PROJECT.
13. FIRESTOPPING OF RATED PENETRATIONS (INCLUDING EXISTING CONDITIONS): FOR PENETRATIONS OF FIRE-RESISTANCE-RATED AND/OR SMOKE-RATED WALLS, PARTITIONS, FLOORS, AND CEILINGS BY ELECTRICAL RACEWAYS, SLEEVES, CABLES, BOXES, AND RELATED ITEMS, PROVIDE A LISTED AND LABELED FIRESTOP SYSTEM (UL, INTERTEK, OR OTHER APPROVED AGENCY) INSTALLED IN ACCORDANCE WITH THE TESTED SYSTEM LISTING AND MANUFACTURER'S WRITTEN INSTRUCTIONS FOR THE ACTUAL FIELD CONDITION. FIRESTOP SYSTEM SELECTION SHALL MATCH THE ASSEMBLY TYPE/RATING, PENETRANT TYPE/SIZE/MATERIAL, ANNULAR SPACE, AND PENETRANT QUANTITY, AND SHALL MAINTAIN THE REQUIRED RATING OF THE ASSEMBLY PENETRATED. EXISTING ASSEMBLY RATINGS ARE NOT VERIFIED UNDER THE ELECTRICAL SCOPE UNLESS SPECIFICALLY INDICATED. PRIOR TO PENETRATION OF EXISTING CONSTRUCTION, CONTRACTOR SHALL FIELD VERIFY WHETHER THE ASSEMBLY IS FIRE/SMOKE RATED USING AVAILABLE DOCUMENTS AND/OR OWNER/AHJ DIRECTION. IF RATING CANNOT BE VERIFIED, STOP WORK AT THAT LOCATION AND SUBMIT RFI/NOTIFICATION THROUGH GC (OR DIRECTLY TO OWNER IF NO GC) FOR RATING DETERMINATION PRIOR TO PENETRATION. NO FIRESTOP SYSTEM SUBMITTAL TO EOR IS REQUIRED UNLESS SPECIFICALLY REQUESTED; CONTRACTOR REMAINS FULLY RESPONSIBLE FOR SELECTING AND INSTALLING A COMPLIANT LISTED SYSTEM FOR ACTUAL FIELD CONDITIONS AND FOR SATISFYING AHJ INSPECTION/DOCUMENTATION REQUIREMENTS. CONTRACTOR SHALL MAINTAIN FIRESTOP SYSTEM LISTING DOCUMENTATION AT THE PROJECT SITE AND PROVIDE TO AHJ/INSPECTOR UPON REQUEST.
14. PENETRATION INSTALLATION / COORDINATION: COORDINATE PENETRATION LOCATIONS AND SIZES WITH OTHER TRADES AND AVOID UNNECESSARY OPENINGS IN RATED ASSEMBLIES. WHERE RATED PENETRATIONS ARE REQUIRED, INSTALL SLEEVES, BACKING MATERIALS, MINERAL WOOL/SAFING, SEALANTS, COLLARS/WRAP STRIPS, AND ACCESSORIES ONLY AS REQUIRED BY THE SELECTED LISTED FIRESTOP SYSTEM. ROUTE RACEWAYS PERPENDICULAR THROUGH RATED ASSEMBLIES WHERE PRACTICABLE AND MAINTAIN ANNULAR SPACE/CONSTRUCTION CONDITIONS REQUIRED BY THE LISTED SYSTEM. DO NOT CORE/CUT/PENETRATE STRUCTURAL OR RATED ASSEMBLIES UNTIL LOCATIONS AND REQUIREMENTS ARE COORDINATED AND VERIFIED.

LIGHTING RELAY PANELS

1. BASIS OF DESIGN: HUBBELL, LEVITON, OR LITHONIA/ACUITY (OR EQUAL). PANELS AND RELAY DEVICES SHALL BE LISTED FOR THE INTENDED USE (UL 916 ENERGY MANAGEMENT, RELAYS/CONTACTORS UL 508 OR UL 60730 AS APPLICABLE). PROVIDE SHORT-CIRCUIT RATINGS COMPATIBLE WITH THE SERVING PANEL.
2. RELAY HARDWARE: PROVIDE LATCHING OR MECHANICALLY HELD RELAYS RATED 20 A MINIMUM AT THE CIRCUIT VOLTAGE (BALLAST/LED DRIVER LOADS), WITH PLUG-IN REPLACEMENT, ARC SUPPRESSION, AND MANUAL OVERRIDE AT EACH RELAY. USE NORMALLY-OPEN CONTACTS UNLESS SEQUENCE REQUIRES OTHERWISE. COORDINATE ANY 0–10 V DIMMING WITH SEPARATE, LISTED CONTROL MODULES; DO NOT SWITCH THE 0–10 V PAIR WITH POWER.
3. EMERGENCY / LIFE-SAFETY COORDINATION: DO NOT PLACE ARTICLE 700 EMERGENCY EGRESS LIGHTING ON NON-EMERGENCY RELAYS. WHERE AUTOMATIC CONTROL OF EMERGENCY LUMINAIRES IS REQUIRED, PROVIDE LISTED UL 924 BYPASS/TRANSFER DEVICES SO EMERGENCY CIRCUITS GO TO FULL ON UPON NORMAL POWER LOSS OR FIRE ALARM INPUT. COORDINATE WITH FA/MTS.
4. AUTOMATIC SHUTOFF & OVERRIDES (ENERGY CODE)
   A. PROVIDE ASTRONOMICAL TIME-CLOCK SCHEDULING WITH AFTER-HOURS SWEEP AND BLINK-WARN.
   B. PROVIDE LOCAL OVERRIDE STATIONS (LOW-VOLTAGE, CLASS 2) FOR EACH CONTROLLED AREA; OVERRIDE TIME-OUT ≤ 2 HOURS (PER ENERGY CODE).
   C. PROVIDE HOLIDAY AND OWNER SCHEDULE PROFILES (MIN. 365-DAY CALENDAR).
5. PHOTOSENSOR CONTROL (EXTERIOR / DAYLIGHT-BASED)
   A. EXTERIOR LIGHTING: CONTROL VIA ASTRONOMIC SCHEDULE + PHOTOSENSOR; PHOTOSENSOR LOCATED PER MANUFACTURER GUIDANCE, ORIENTED AWAY FROM ARTIFICIAL LIGHT AND ADJUSTABLE FOR SETPOINT/HYSTERESIS.
   B. INTERIOR DAYLIGHT-RESPONSIVE ZONES : INTEGRATE OPEN-LOOP OR CLOSED-LOOP SENSORS COMPATIBLE WITH THE PANEL OR THE DEDICATED LIGHTING CONTROL SYSTEM.
6. TIME-SWITCH CONTROLS FOR EXTERIOR LIGHTING SHALL COMPLY WITH THE FOLLOWING:
   A. THEY SHALL HAVE A CLOCK THAT IS NOT LESS THAN 7 DAYS.
   B. THEY SHALL BE CAPABLE OF BEING SET FOR SEVEN DIFFERENT DAY TYPES PER WEEK.
   C. THEY SHALL INCORPORATE AN AUTOMATIC HOLIDAY SETBACK FEATURE.
   D. THEY SHALL HAVE PROGRAM BACKUP CAPABILITIES THAT PREVENT THE LOSS OF PROGRAM AND TIME SETTINGS FOR NOT LESS THAN 10 HOURS, IF POWER IS INTERRUPTED.
7. LOW-VOLTAGE CONTROL WIRING: USE CLASS 2 CONTROL WIRING PER NEC 725; SEGREGATE FROM BRANCH-CIRCUIT CONDUCTORS (NO SHARING OF RACEWAYS/BOXES WITHOUT LISTED BARRIERS). PROVIDE LABELED HOMERUNS FROM SWITCHES/SENSORS TO THE PANEL; LAND ON REMOVABLE, LABELED TERMINALS.
8. INPUTS / INTEGRATION: PROVIDE INPUTS FOR DEMAND RESPONSE (DR), FIRE ALARM, AND SECURITY AS SHOWN. DR INPUT SHALL ACCEPT A DRY CONTACT OR BACNET POINT TO ENACT PREDEFINED LOAD-SHED SCENES (E.G., REDUCE NONCRITICAL LOADS, DIM TO SETPOINT). WHERE SPECIFIED, PROVIDE BACNET/IP OR MS/TP GATEWAY (OR MODBUS) FOR BMS MONITORING OF STATUS, SCHEDULES, AND OVERRIDES.
9. ENCLOSURES & POWER: PROVIDE STEEL ENCLOSURES (SURFACE OR FLUSH AS SHOWN) WITH LOCKABLE DOOR, DIRECTORY CARD, AND INTEGRAL CONTROL POWER SUPPLY. PROVIDE SURGE PROTECTION ON CONTROL POWER WHERE OFFERED BY MANUFACTURER. IDENTIFY PANEL NAME, VOLTAGE, AND SOURCE.
10. NUMBER OF POLES / CIRCUITING: CONFIRM REQUIRED RELAY COUNT AND POLE ASSIGNMENTS FROM THE LIGHTING PLANS AND PANEL SCHEDULES; INCLUDE 10% SPARE RELAYS (MIN. 2) AND 20% SPARE LOW-VOLTAGE INPUTS FOR FUTURE. CIRCUITS SHARING A NEUTRAL SHALL BE SWITCHED ON THE SAME RELAY GROUP OR USE 2-POLE/3-POLE RELAYS AS REQUIRED TO AVOID OBJECTIONABLE NEUTRAL CURRENTS.
11. PROGRAMMING & COMMISSIONING: PROGRAM PER THE OWNER'S OCCUPANCY SCHEDULE: WORKDAY ON, AFTER-HOURS SWEEP, AREA OVERRIDES, HOLIDAY TABLE, DR SCENES, AND EXTERIOR DUSK/DAWN. FIELD-VERIFY DEVICE ADDRESSING, SENSOR SETPOINTS, TIME SYNCHRONIZATION, AND FAIL-SAFE BEHAVIOR (UL 924 WHERE APPLICABLE). PROVIDE AS-BUILT SEQUENCE PRINTOUT AND EXPORTED SCHEDULES.
12. TRAINING & CLOSEOUT: PROVIDE UP TO 4 HOURS OF OWNER TRAINING COVERING SCHEDULE EDITS, OVERRIDES, HOLIDAYS, DR, AND MAINTENANCE. SUBMIT O&M INCLUDING WIRING DIAGRAMS, I/O MAPS, RELAY SCHEDULES, PROGRAMMING BACKUPS, AND SENSOR LOCATIONS.
13. LABELING: MACHINE-PRINTED LABELS AT DOOR AND INTERIOR TERMINALS IDENTIFYING PANEL NAME, CIRCUIT/RELAY NUMBERS, CONTROLLED AREAS, AND LOW-VOLTAGE INPUT POINTS. COORDINATE CIRCUIT NAMES WITH THE PANEL DIRECTORY (SEE PANELBOARDS SECTION).

LIGHTING

1. U.L. LABELS MUST APPEAR ON ALL NEW LIGHTING FIXTURES.
2. PROVIDE PROPER TRIM PER REFLECTED CEILING PLAN OR ACTUAL CEILING INSTALLED.
3. PROVIDE NEW LAMPS IN ALL NEW FIXTURES.
4. PROVIDE FOUNDATIONS FOR ALL SITE LIGHTING FIXTURES/POLES AS RECOMMENDED BY THE MANUFACTURER.
5. EXTERIOR LIGHTING SHALL HAVE A MAXIMUM KELVIN (K) RATING OF 3000K. CONSULT ENGINEER PRIOR TO BIDDING, PROCUREMENT AND INSTALLATION IF DRAWINGS SPECIFY A HIGHER K RATING FOR ANY EXTERIOR LIGHTING.
6. SITE LIGHTING FIXTURES LOCATED BETWEEN PARKING SPACES OR SUBJECT TO BEING DAMAGED BY VEHICLES SHALL BE PROVIDED WITH 2' HIGH X 2' DIAMETER CONCRETE BASES.
7. LIGHTING FIXTURES IN MECHANICAL ROOMS, ETC., SHALL BE COORDINATED WITH EQUIPMENT.
8. ALL RECESSED LIGHT FIXTURES INSTALLED IN FIRE-RATED CEILING OR WALL ASSEMBLIES SHALL BE PROVIDED WITH A UL-CLASSIFIED FIRE-RATED ENCLOSURE OR INTUMESCENT COVER TO MAINTAIN THE FIRE-RESISTANCE RATING OF THE ASSEMBLY. PROVIDE PROTECTION EQUAL TO TENMAT FF SERIES ARE APPROVED EQUIVALENT , INSTALLED PER MANUFACTURED INSTRUCTIONS AND THE UL LISTING OF THE FIRE-RATED ASSEMBLY. COVER SHALL BE COMPATIBLE WITH THE FIXTURE TYPE (IC OR NON-IC) AND MAINTAIN REQUIRED CLERANCES. FIRESTOP ALL PENETRATIONS IN ACCORDANCE WITH UL SYSTEMS AND LOCAL CODE REQUIREMENTS. CONTRACTOR SHALL COORDINATE WITH ARCHITECTURAL PLANS FOR FIRE-RATED ASSEMBLY LOCATIONS AND OBTAIN APPROVAL FROM THE AUTHORITY HAVING JURISDICTION (AHJ) PRIOR TO INSTALLATION. REFER TO UL FIRE-RESISTANCE DIRECTORY FOR APPLICABLE ASSEMBLY DESIGNS.
9. PROVIDE A COMPLETE, CODE-COMPLIANT LIGHTING CONTROL SYSTEM MEETING THE APPLICABLE ENERGY CODE REQUIREMENTS, INCLUDING SIDELIT AND TOPLIT DAYLIGHT HARVESTING WITH INDEPENDENT CONTROL OF PRIMARY VS. SECONDARY ZONES WHERE APPLICABLE. CONTRACTOR SHALL RETAIN A QUALIFIED LIGHTING-CONTROL SUPPLIER TO FURNISH CONTROLS, SENSORS, NETWORKS, DEVICES, PROGRAMMING, AND COMMISSIONING TO ACHIEVE REQUIRED PERFORMANCE. ASSIGN LUMINAIRES TO DAYLIGHT ZONES PER THE ENERGY CODE; WHERE ONLY A PORTION OF FIXTURES IN A SPACE FALL WITHIN DAYLIGHT ZONES, CONSULT OWNER TO DETERMINE WHETHER ALL LUMINAIRES IN THE SPACE SHALL DIM TOGETHER AS A SCENE. IF SELECTED, SCENE BEHAVIOR SHALL NOT DEFEAT ENERGY-CODE REQUIREMENTS: DAYLIGHT ZONES MUST REMAIN INDEPENDENTLY CONTROLLABLE AND ADJUSTABLE (SETPOINTS, HIGH-END TRIM, RESPONSE CURVES) AND SATISFY FUNCTIONAL TESTING. PROVIDE START-UP AND FUNCTIONAL TESTING; DELIVER FINAL SETTINGS AND AS-BUILT ZONING TO THE OWNER. COORDINATE SENSOR PLACEMENT AND CALIBRATION WITH LIGHTING LAYOUTS AND FENESTRATION. WHERE SPACES INCLUDE MOVABLE PARTITIONS, PROVIDE LIGHTING CONTROLS WITH AUTOMATIC PARTITION-SENSING/ROOM-COMBINE FUNCTIONALITY SO THAT DAYLIGHT-RESPONSIVE ZONES AND SEQUENCES MEET FBC C405.2.4 IN ALL PARTITION STATES (JOINED OR SEPARATED), WITH INDEPENDENT CONTROL OF PRIMARY VS. SECONDARY ZONES IN EACH STATE (WHERE SECONDARY ZONE APPLIES).
10. CONTRACTOR SHALL PROVIDE A CODE-COMPLIANT CONTROL SYSTEM THAT:
   A. IMPLEMENTS INDEPENDENT DAYLIGHT-RESPONSIVE CONTROL FOR SIDELIT ZONES AND TOPLIT, WHILE ALLOWING A SINGLE WALL VACANCY/OCCUPANCY DEVICE TO ENABLE/DISABLE THE ROOM.
   B. INCLUDES REQUIRED PHOTOSENSORS, PROGRAMMING, HIGH-END TRIM, SETPOINTS, AND FUNCTIONAL TESTING PER FBC C405.
   C. PROVIDES A SEQUENCE OF OPERATIONS AND AS-BUILT CONTROL ZONING WITH DEVICE LOCATIONS AND WIRING.
11. CONTROL EMERGENCY/EGRESS LUMINAIRES VIA LISTED UL 924 DEVICES OR KEEP UNSWITCHED AS REQUIRED; NORMAL CONTROLS SHALL NOT DEFEAT EMERGENCY ILLUMINATION.
12. LIGHTING CONTROL SUBMITTALS: CONTROL RISER/ONE-LINE, ZONE PLAN, DEVICE SCHEDULE, SEQUENCES, AND COMMISSIONING REPORT.
13. MEASURE DAYLIGHT ZONES FROM GLASS PLANE; ASSIGN FIXTURES TO A DAYLIGHT ZONE WHEN ≥50% OF THE LUMINAIRE (AREA FOR TROFFERS/DOWNLIGHTS; LENGTH FOR CONTINUOUS LINEAR) LIES WITHIN THE ZONE.
14. THE LIGHTING FIXTURE SCHEDULE IS PROVIDED TO ESTABLISH THE STANDARD PERFORMANCE LEVEL AND SPECIFICATIONS. FINAL FIXTURE SELECTIONS (MANUFACTURER, SERIES, OPTIONS, FINISHES) SHALL BE MADE BY, OR OTHERWISE COORDINATED WITH, THE ARCHITECT/OWNER. THE CONTRACTOR SHALL COORDINATE WITH ARCHITECT/OWNER DURING BIDDING AND CARRY AN ALLOWANCE SUFFICIENT TO MEET THE SPECIFIED PERFORMANCE AND QUALITY. NO SUBSTITUTIONS ARE PERMITTED WITHOUT WRITTEN ARCHITECT/OWNER APPROVAL. PROVIDE COMPLETE CUT SHEETS IDENTIFYING CATALOG NUMBERS, OPTICS, DRIVERS, CONTROL READINESS, FINISHES, AND MOUNTING; NOTE ANY DEVIATIONS. COORDINATE LEAD TIMES AND PROCUREMENT SO THAT FINAL SELECTIONS DO NOT DELAY PROJECT SCHEDULE.

BOXES

1. TYPE & SIZE: PROVIDE 4-IN. SQUARE, GALVANIZED, NEMA OS-1 PRESSED-STEEL BOXES WITH PLASTER RINGS UNLESS NOTED OTHERWISE. STANDARD DEPTH 1-1/2 IN.; TOTAL INSTALLED DEPTH ≤ 2-1/2 IN. UNLESS SCHEDULED. SIZE/VOLUME SHALL SATISFY NEC 314.16 CONDUCTOR AND DEVICE FILL (BOX VOLUME MARKED).
2. MULTI-DEVICE LOCATIONS: WHERE MORE THAN TWO DEVICES OCCUR AT ONE LOCATION, USE GANGED BOXES AND MATCHING GANG COVERS/RINGS; PROVIDE BARRIERS WHERE REQUIRED.
3. COVERS: ALL EQUIPMENT, OUTLET, AND JUNCTION BOXES SHALL HAVE LISTED COVERS INSTALLED PER NEC 314.25; USE GASKETED/WEATHERPROOF COVERS IN DAMP/WET LOCATIONS (NEC 314.15).
4. BACK-TO-BACK INSTALLATIONS: AVOID BACK-TO-BACK BOXES IN COMMON PARTITIONS. OFFSET BOXES ON OPPOSITE SIDES ≥ 24 IN., OR PLACE ON OPPOSITE SIDES OF A STUD. WHERE OFFSET IS NOT FEASIBLE IN RATED OR ACOUSTICAL ASSEMBLIES, USE LISTED PROTECTIVE SYSTEMS AND COMPLY WITH THE ASSEMBLY'S SPACING LIMITS.
5. FIRE-RATED ASSEMBLIES: IN RATED WALLS/CEILINGS, MAINTAIN THE FIRE-RESISTANCE RATING: USE UL-CLASSIFIED PUTTY PADS, FIRE-RATED BOX ENCLOSURES, OR PRE-RATED BOXES LISTED FOR THE SPECIFIC UL DESIGN. FOLLOW UL DESIGN LIMITS ON BOX SIZE, QUANTITY, SPACING, AND BACK-TO-BACK USE. FIRESTOP ALL PENETRATIONS WITH LISTED SYSTEMS TO RESTORE RATINGS.
6. SUPPORT & FLUSH: SUPPORT BOXES PER NEC 314.23 (STUDS, FRAMING, OR INDEPENDENT SUPPORTS). SET PLASTER RINGS TO FINISH FLUSH WITH THE FINAL SURFACE; PROTECT CUT EDGES.
7. ENVIRONMENT & SEPARATION: USE BOX/ENCLOSURE TYPES SUITABLE FOR THE ENVIRONMENT (NEC 110.11, 110.28). DO NOT MIX POWER AND CLASS 2/LOW-VOLTAGE DEVICES IN THE SAME BOX UNLESS A LISTED BARRIER IS PROVIDED AND PERMITTED BY CODE AND LISTINGS.
8. GROUNDING & BONDING: PROVIDE EQUIPMENT GROUNDING CONDUCTORS AND LISTED BONDING MEANS PER NEC 250; BOND METAL BOXES AND RINGS WHERE REQUIRED.
9. DEVICE/CONDUCTOR FILL: CALCULATE BOX/RING FILL PER NEC 314.16 INCLUDING ALLOWANCES FOR DEVICES, PIGTAILS, INTERNAL CLAMPS, FITTINGS, AND BARRIERS. UPSIZE BOXES/RINGS AS NEEDED—NO FIELD CRAMMING.
10. KNOCKOUTS & EXTENSION RINGS: WHERE A KNOCKOUT IN THE BASE BOX IS USED, NO TERMINATIONS ARE PERMITTED IN EXTENSION RINGS. MAKE TERMINATIONS IN THE BASE BOX OR PROVIDE A DEEPER BOX SIZED FOR FILL.
11. COORDINATION: COORDINATE BOX LOCATIONS WITH ARCHITECTURAL FINISHES AND MEP TRADES TO AVOID CONFLICTS WITH STUDS, DUCTS, PIPING, AND CEILING SYSTEMS; MAINTAIN CLEARANCES AND ACCESSIBILITY.

GROUNDING AND BONDING

1. GENERAL — PROVIDE GROUNDING AND BONDING PER NEC ARTICLE 250 (INCLUDING 250.24, 250.30, 250.52–250.68, 250.92, 250.96, 250.102(C), 250.118) AND OTHER APPLICABLE ARTICLES. WHERE DRAWINGS/SPECS REQUIRE LARGER CONDUCTORS OR ADDITIONAL GROUNDS, THEY SHALL GOVERN.
2. EQUIPMENT GROUNDING CONDUCTORS (EGC) — SIZE AND TYPE PER NEC. PROVIDE SEPARATE INSULATED EGCS WITH ALL FEEDERS AND BRANCH CIRCUITS, INCLUDING LIGHTING, RECEPTACLES, AND SINGLE-PHASE MOTORS/APPLIANCES. PROVIDE INSULATED EGCS IN NONMETALLIC RACEWAYS AND FOR COMPUTER/IT PANEL BRANCH CIRCUITS.
3. UNDERGROUND/BURIED — USE BARE, TINNED, STRANDED COPPER UNLESS NOTED OTHERWISE. PROVIDE TEST WELLS WHERE SHOWN.
4. COMMUNICATIONS/SIGNAL BONDING — RUN A MIN. #6 AWG GREEN INSULATED COPPER IN RACEWAY FROM THE GROUNDING ELECTRODE SYSTEM (GES) TO EACH TELECOM/ALARM/COMMUNICATIONS TERMINAL CABINET OR CENTRAL EQUIPMENT LOCATION; BOND PER NEC 800/805/820/830 AS APPLICABLE.
5. SEPARATELY DERIVED SYSTEMS — GROUND AND BOND PER NEC 250.30 (SYSTEM BONDING JUMPER, GEC, RACEWAY BONDING). IDENTIFY XO POINT AND PROVIDE ACCESSIBLE BONDING/GROUNDING HARDWARE.
6. POLES & EXTERIOR EQUIPMENT — BOND EQUIPMENT AND GROUND EACH POLE TO A LOCAL ELECTRODE (ROD/OTHER) AND RUN AN EGC WITH THE SUPPLY CIRCUIT; BOND ALL METAL PARTS PER NEC 250.148/250.52.
7. LIGHTNING PROTECTION INTERFACE — COMMON-BOND THE ELECTRICAL GES TO THE LPS GROUNDING NETWORK AT THE CLOSEST PRACTICAL POINT TO THE SERVICE ELECTRODE SYSTEM. BONDING JUMPER SIZE NOT LESS THAN THE SERVICE GEC; INSTALL IN RACEWAY WHERE EXPOSED.
8. RACEWAY TERMINATIONS — PROVIDE GROUNDING BUSHINGS ON FEEDER RACEWAYS AND WHERE REQUIRED TO MAINTAIN EQUIPMENT BONDING CONTINUITY. INSTALL BONDING JUMPERS TO THE ENCLOSURE GROUND BAR. BOND NON-CONTINUOUS METALLIC RACEWAYS AT BOTH ENDS.
9. TRANSFORMERS — BOND/GROUND PER NEC 250.30. PROVIDE EXOTHERMIC OR LISTED COMPRESSION CONNECTIONS TO BUILDING STEEL WHERE USED AS AN ELECTRODE/BONDING PATH; ENSURE STEEL IS PART OF THE GES.
10. GROUNDING ELECTRODE RESISTANCE (SPECIFIER REQUIREMENT) — MEASURE SERVICE ELECTRODE RESISTANCE INDEPENDENT OF WATER PIPING. TARGET ≤ 25 Ω (≤ 5 Ω WHERE LIGHTNING PROTECTION IS PROVIDED). IF HIGHER, ADD RODS/ELECTRODES AND INTERCONNECT TO ACHIEVE THE TARGET.
11. DISSIMILAR METALS — USE GALVANICALLY COMPATIBLE CONNECTORS AND HARDWARE; TIN-PLATED OR EQUIVALENT. CLEAN TO BRIGHT METAL; TREAT AND SEAL TO PREVENT MOISTURE INTRUSION. USE STAINLESS STEEL SEPARATORS FOR ALUMINUM-TO-STEEL; TIN-PLATED COPPER JUMPERS FOR ALUMINUM-TO-GALVANIZED.
12. CONNECTION METHODS — USE EXOTHERMIC WELDS FOR STRUCTURAL STEEL AND BELOW-GRADE/ROD/PLATE ELECTRODE CONNECTIONS (EXCEPT AT TEST WELLS). ELSEWHERE USE LISTED COMPRESSION CONNECTORS WITH MANUFACTURER-MATCHED TOOLS/DIES AND VISIBLE DIE MARKS.
13. TORQUE — TIGHTEN ALL GROUNDING/BONDING LUGS, SCREWS, AND BOLTS TO MANUFACTURER'S VALUES; WHERE NOT PROVIDED, USE UL 486A-486B TORQUE TABLES.
14. MOISTURE PROTECTION — AT INSULATED-TO-GROUND-BAR/ROD TERMINATIONS, FULLY INSULATE AND SEAL TO PREVENT MOISTURE WICKING INTO INSULATION/CABLE.
15. EXISTING SYSTEMS — WHERE CONNECTING TO AN EXISTING GES, MAKE TIES WITH EXOTHERMIC WELDS OR LISTED IRREVERSIBLE CONNECTORS; VERIFY CONTINUITY OF THE COMBINED SYSTEM.

MOTOR AND CIRCUIT DISCONNECTS

1. SAFETY SWITCH DUTY & STANDARDS: HEAVY-DUTY, VISIBLE-BLADE (UL 98) WHERE USED AS SERVICE EQUIPMENT, FOR 600-V CLASS, OR FREQUENT OPERATION; GENERAL-DUTY ACCEPTABLE ONLY AT ≤240 V, NON-SERVICE, LIGHT-DUTY WHEN CODE-PERMITTED. HORSEPOWER-RATED AND LOCKABLE OFF (NEC 110.25).
2. LOCATION / "WITHIN SIGHT": PROVIDE A LOCKABLE DISCONNECT WITHIN SIGHT (≤50 FT, VISIBLE) OF EACH MOTOR/CONTROLLER (NEC 430.102(B)) AND HARD-WIRED APPLIANCE (NEC 422.31). FIELD-LABEL EQUIPMENT WITH SOURCE PANEL/BREAKER (NEC 110.22).
3. ENCLOSURES & HUBS (EXTERIOR/HARSH): ENCLOSURES PER ENVIRONMENT (NEC 110.11, 110.28): NEMA 3R OUTDOORS; NEMA 4/4X FOR WASH-DOWN/CORROSIVES. USE LISTED WATERTIGHT HUBS FOR TOP ENTRIES.
4. FUSES: INTERRUPTING RATING ≥ AVAILABLE FAULT CURRENT. HVAC: CLASS RK1 TIME-DELAY UNLESS NOTED. ACCEPTABLE: BUSSMANN, LITTELFUSE, MERSEN. MATCH FUSE CLASS WITHIN A SWITCH.
5. CIRCUIT BREAKERS (COMPATIBILITY & AIC): BREAKERS IN EXISTING GEAR SHALL BE LISTED FOR THAT EQUIPMENT AND MEET/EXCEED AIC; SERIES RATINGS PER NEC 240.86 WITH DOCUMENTATION. UL 489.
6. MOTOR / INRUSH PROTECTION: SIZE OCPD/CONTROLLERS PER NEC 430/440 AND NAMEPLATE FLA/LRA. FOR IEC MCBS, USE CURVE C (5–10× IN) OR CURVE D (10–20× IN) AS SUPPORTED BY EQUIPMENT DATA. MAINTAIN EQUIPMENT LISTING AND CONTROLLER SCCR.
7. WATER HEATERS – LOCKABLE MEANS: BRANCH BREAKER MAY SERVE AS DISCONNECT WHEN FITTED WITH A LISTED LOCKABLE-OPEN DEVICE (NEC 422.31(B), 110.25). LABEL PANEL/BREAKER AT THE UNIT (NEC 110.22).
8. AFCI: PROVIDE WHERE REQUIRED BY NEC 210.12 (AND 406.4(D)(4) FOR REPLACEMENTS). COORDINATE WITH OCCUPANCY/CIRCUIT USE.
9. SHUNT-TRIP / LIFE-SAFETY INTERLOCKS: PROVIDE SHUNT-TRIP WHERE SHOWN OR REQUIRED BY CODE/AHJ (E.G., ELEVATORS PER ASME A17.1/NFPA 72 INTERFACES). COORDINATE CONTROL POWER, INTERLOCKS, AND FAIL-SAFE LOGIC; LABEL "ST" WHERE PROVIDED.
10. COMMERCIAL KITCHEN HOODS: PROVIDE INTERLOCK TO DE-ENERGIZE ALL ELECTRICAL POWER TO COOKING APPLIANCES UNDER THE HOOD UPON AUTOMATIC OR MANUAL ACTUATION OF THE FIRE-EXTINGUISHING SYSTEM, WHILE MAINTAINING EXHAUST FAN OPERATION AND SHUTTING DOWN SUPPLY/MAKE-UP AIR AS REQUIRED. IMPLEMENT VIA LISTED SHUNT-TRIP BREAKER OR LISTED CONTACTOR/RELAY ARRANGEMENT. PROVIDE MANUAL RESET AFTER ACTUATION. COORDINATE WIRING AND SUPERVISION WITH THE FIRE ALARM AND MECHANICAL TRADES PER NFPA 96 AND LOCAL AMENDMENTS.
11. HVAC BRANCH DEVICES: OCPD SUITABLE FOR HVAC PER NEC 440 AND EQUIPMENT INSTRUCTIONS.
12. SERVICE DISCONNECTS: SERVICE DISCONNECTS: HEAVY-DUTY (UL 98), SUITABLE AS SERVICE EQUIPMENT, SHORT-CIRCUIT RATING COORDINATED TO AVAILABLE FAULT CURRENT/UTILITY REQUIREMENTS. SERVICE DISCONNECTS IDENTIFIED FOR "SHUNT-TRIP" OR WITH "ST" SHALL BE SHUNT-TRIP CAPABLE OR ENCLOSED CIRCUIT BREAKERS WITH SHUNT-TRIP CAPABILITY.
13. ALL 120-VOLT, SINGLE-PHASE, 15- AND 20-AMP BRANCH CIRCUITS SUPPLYING OUTLETS OR DEVICES IN HABITABLE SPACES—INCLUDING BUT NOT LIMITED TO BEDROOMS, LIVING ROOMS, DINING ROOMS, KITCHENS, LAUNDRY AREAS, HALLWAYS, AND SIMILAR ROOMS—SHALL BE PROVIDED WITH ARC-FAULT CIRCUIT-INTERRUPTER (AFCI) PROTECTION AS SPECIFIED BY NEC ARTICLE 210.12. WHERE BOTH AFCI AND GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI) PROTECTION ARE REQUIRED (SUCH AS LAUNDRY AREAS OR OTHER APPLICABLE LOCATIONS), CIRCUITS SHALL BE PROTECTED BY LISTED DUAL-FUNCTION (COMBINATION AFCI/GFCI) CIRCUIT BREAKERS OR OTHER CODE-COMPLIANT METHODS PER NEC 210.8 AND 210.12.

DATE	REVISION	SYMBOL	DATE	REVISION	SYMBOL
		C			A
		D			B

ISSUE DATE: 03/27/2026 — DESIGNER: FC
COMP. FILE No.: (24-069) — DRAWN BY: MC/EA
STATE PROJECT No.: — REVIEWED BY: FC

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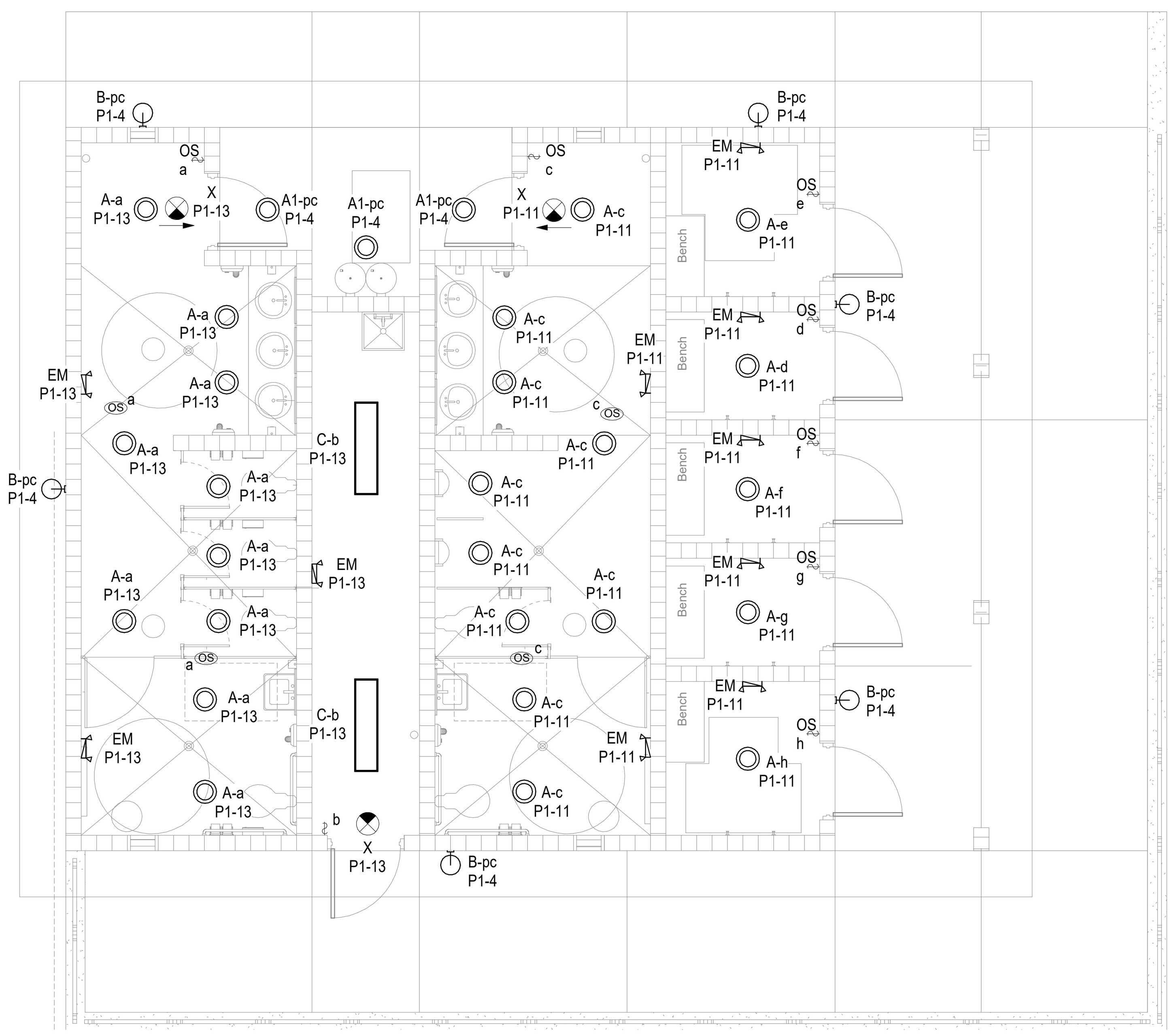
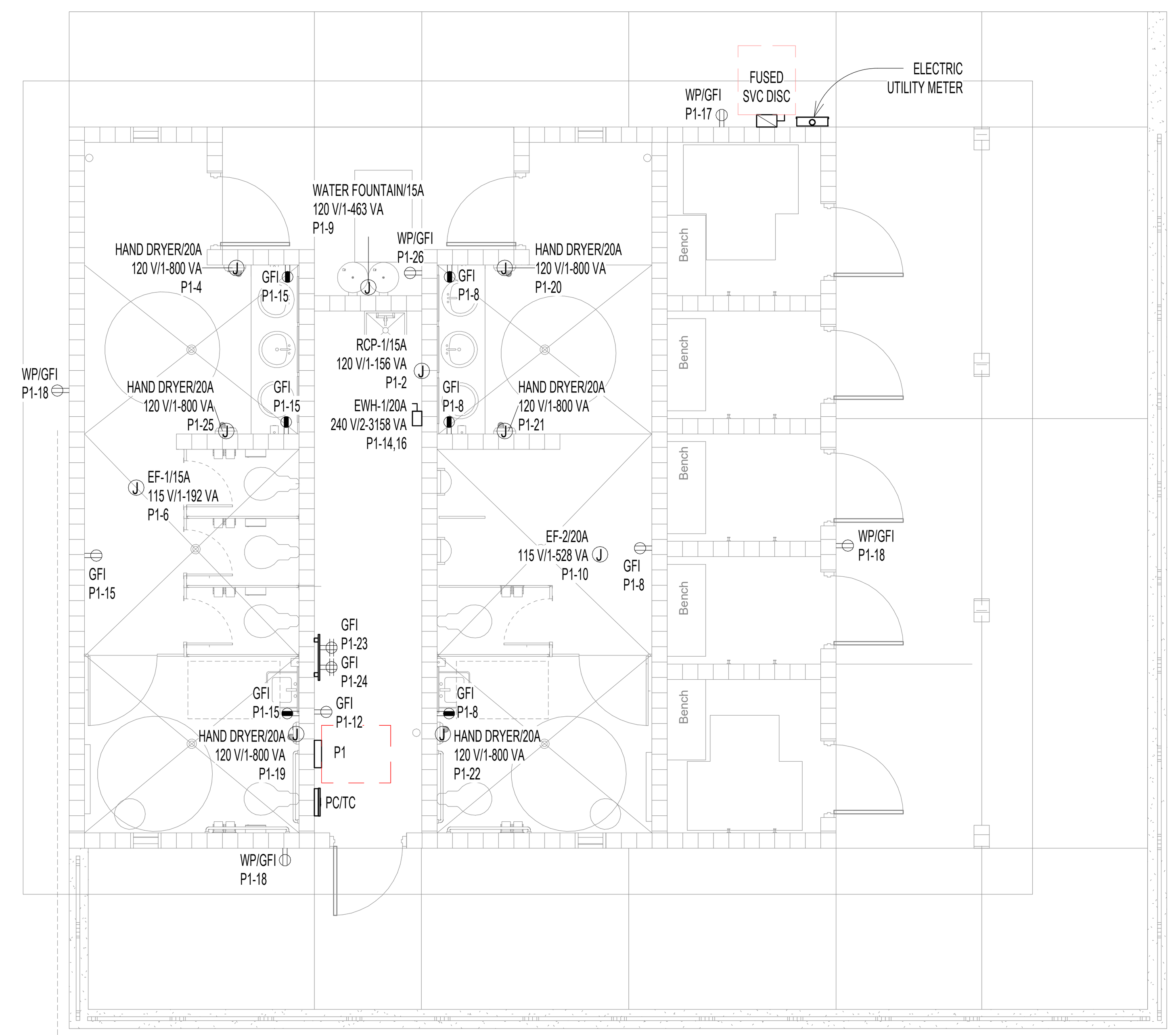
PHASE 100% CD SET
SHEET TITLE: ELECTRICAL – GENERAL
PROJECT TITLE: BLUE SPRING STATE PARK RESTROOM REPLACEMENT
SHEET NO. E-002

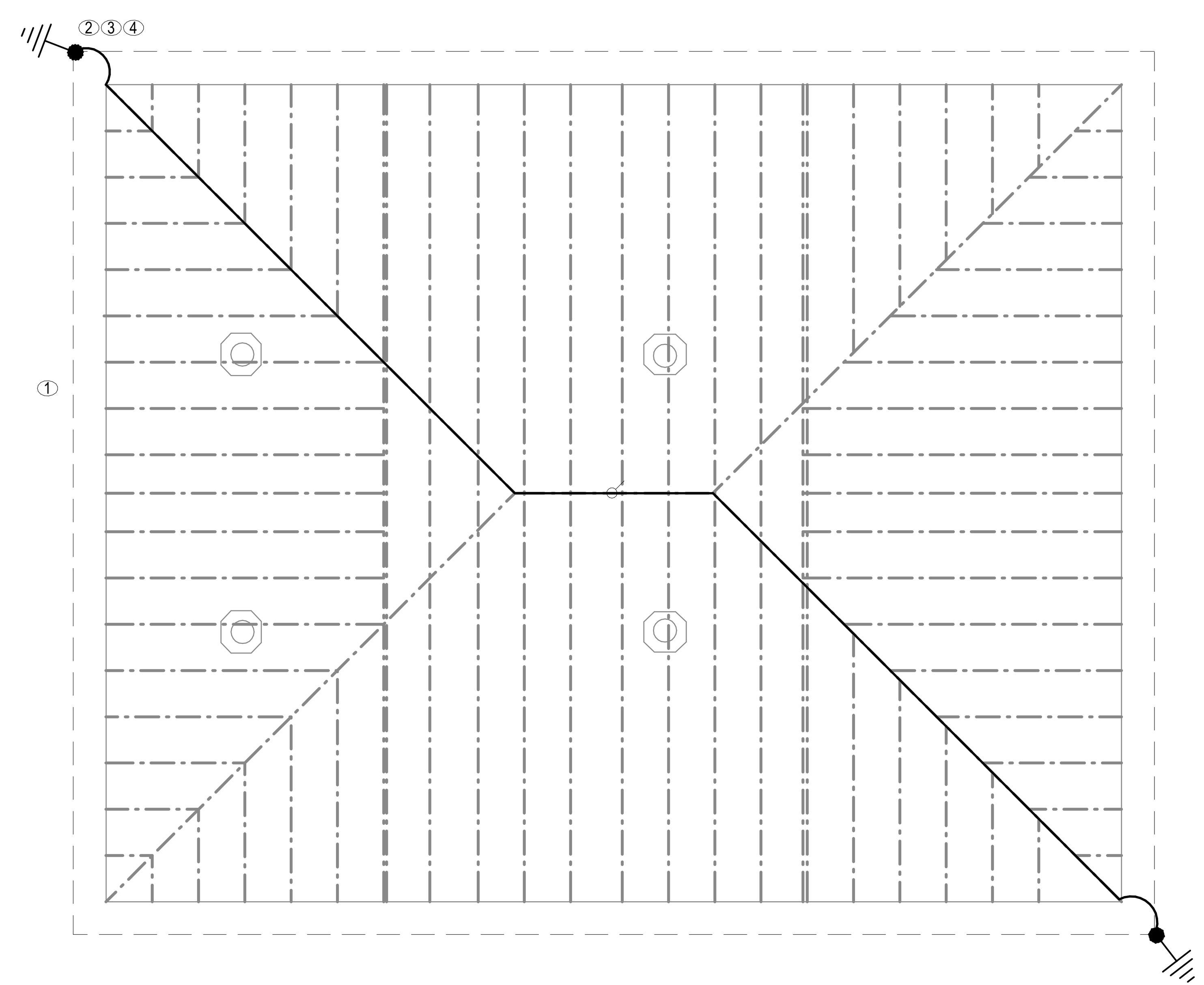


(2) REFLECTED CEILING PLAN
3/16" = 1'-0"



(1) POWER AND SYSTEMS PLAN
3/16" = 1'-0"

(4) SITE ELECTRICAL PLAN
1" = 20'-0"



(3) POWER PLAN - ROOF
3/16" = 1'-0"

GENERAL ELECTRICAL NOTES:

1. PROVIDE BRANCH CIRCUIT, BOXES, CONDUIT STUBS, DEVICES AND EQUIPMENT FOR SECURITY, ACCESS CONTROL, SOUND SYSTEMS, REFER TO SPECIFICATIONS. DEVICES AND EQUIPMENT ARE PROVIDED BY OWNER. DEVICES SHOWN ON PLANSARE FOR REFERENCE ONLY, COORDINATE EXACT REQUIREMENTS WITH OWNER AND SYSTEM VENDORS.
2. EXACT LOCATIONS AND REQUREMENTS FOR ALL EQUIPMENT SHALL BE VERIFIED WITH ARCHITECT/OWNER AND EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
3. COORDINATE EXACT LOCATIONS, MOUNTING HEIGHTS & REQUIREMENTS FOR ALL DEVICES WITH LATEST ARCHITECTURAL FURNITURE & EQUIPMENT LAYOUTS & ELEVATIONS.
4. COORDINATE EXACT LOCATIONS FOR ALL ELECTRICAL EQUIPMENT, PANELBOARDS, DISCONNECTS, STARTERS, CONTROL PANELS, ETC WITH ALL ARCHITECTURAL PLANS AND ALL OTHER TRADES INCLUDING MECHANICAL TO MAINTAIN REQUIRED WORKING CVLEARANCES AND DEDICATED EQUIPMENT SPACE. DETERMINE EXACT LOCATIONS AND VERIFY WITH ALL OTHER TRADES PRIOR TO BEGINNING OF CONSTRUCTION TO AVOID INTERFERENCES WITH MECHANICAL, STRUCTURAL, ETC.
5. MAINTAIN A MINUMUM OF 24" HORIZONTAL SEPARATION BETWEEN BOXES INSTALLED ON APPOSITE SIDES OF FIRE RATEED WALLS TO COMPLY WITH NEC 300.21.
6. ALL WIRING DEVICES SHALL BE OF TAMPER RESISTANT CONSTRUCTION.
7. ALL DEVICES AT COUNTER LOCATIONS TO BE MOUNTED ABOVE THE COUNTER AT +42"AFF OR ASNOTED ON THESE PLANS. COORDINATE WITH ARCHITECT/OWNER AND MILLWORK CONTRACTORFOR EXACT LOCATIONS.
8. LOCATE DISCONNECT SWITCHES FOR MECHANICAL AND BUILDING EQUIPMENT TO MAINTAIN WORKING CLEARANCES. LOCATIONS ONTHESE PLANS ARE FOR REFERENCE ONLY.
9. PROVIDE GROUND FAULT INTERRUPTER TYPE RECEPTACLES FOR ALL RECEPTACLES WITHIN 6'-0" OF WATER SOURCES AND SINKS, INCLUDING ALL RECEPTACLES AT MILLWORK, KITCHEN, BARS AND SIMILAR. FOR ALL LOCATIONS THAT ARE NOT READILY ACCESSIBLE PROVIDE GFCI TYPE BRANCH BREAKER IN PANELBOARD OR BLANK FACE GFCI AT AN ACCESSIBLE LOCATION NEAR THE RECEPTACLE. GROUND FAULT PROTECTION TO BE PROVIDED FOR ALL RECEPTACLES 120V AND 50A OR LESS AND 250V SINGLE AND 3 PHASE 100A OR LESS.
10. WHERE GFCI PROTECTION IS REQUIRED BY THE NEC AND A LISTED GFCI RECEPTACLE IS NOT AVAILABLE FOR THE CIRCUIT CONFIGURATION (INCLUDING MULTI-POLE OR HIGHER-AMPACITY CIRCUITS), THE CONTRACTOR SHALL PROVIDE GFCI PROTECTION VIA A LISTED GFCI CIRCUIT BREAKER. WHERE PERMITTED BY CODE, GFCI PROTECTION MAY ALTERNATIVELY BE PROVIDED BY A LISTED, CODE-COMPLIANT UPSTREAM OR IN-LINE DEVICE SUITABLE FOR THE APPLICATION. THE CONTRACTOR SHALL ENSURE THE PANELBOARD AND PROTECTIVE DEVICE MANUFACTURER SELECTED OFFERS A CODE-COMPLIANT, LISTED SOLUTION. COORDINATE WITH EQUIPMENT MANUFACTURER REQUIREMENTS AND THE AUTHORITY HAVING JURISDICTION. INSTALL PER NEC 110.3(B).
11. OUTDOOR RECEPTACLE COVERS SHALL BE SUITABLE FOR USE IN WET LOCATIONS.
12. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS TO COORDINATE EXACT PLACEMENT OF ALL DEVICES, EQUIPMENT, FIXTURES, SWITCHES AND OUTLETS. AS NECESSARY PRIOR TO ROUGH-IN.
13. WIRE ALL BATTERY PACK FIXTURES AS RECOMMENDED BY MANUFACTURER FOR EMERGENCY LIGHTING USE.
14. PROVIDE APPROVED FIRE-RATED ENCLOSURES FOR ALL LIGHTS FIXTURES LOCATED IN FIRE-RATED CEILINGS.
15. CONTRACTOR SCOPE SHALL INCLUDE ALL ITEMS AND HARDWARE REQUIRED FOR THE COMPLETE INSTALLATION OF ALL LIGHT FIXTURES.
16. LIGHT FIXTURE LOCATIONS SHOWN ARE DIAGRAMMATICAL. EXACT INSTALLATION LOCATION OF ALL FIXTURES SHALL BE IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS AND ELEVATIONS. CONTRACTOR SHALL COORDINATE WITH ARCHITECT PRIOR TO ROUGH-IN TO ENSURE DESIGN INTENT IS MET.

KEY NOTES (X)

1. #4/0 BARE COPPER GROUND SHALL BE BURIED 36" BELOW GRADE AND PLACED A MINIMUM OF 24" OUTSIDE OF BUILDING FOUNDATION.
2. 3/4" DIA X 20'-0" VERTICALLY DRIVEN CU CLAD GROUND ROD SUCH IN COMPLIANCE WITH NEC 250.53(G) (TYP.).
3. GROUNDING TEST WELL WITH A GROUND ROD.
4. #4/0 COPPER DOWN CONDUCTOR IN NON-METALLIC CONDUIT (TYP).

VANDAL-RESISTANT ELECTRICAL CONSTRUCTION NOTES

1. GENERAL: ALL ELECTRICAL WORK IN PUBLICLY ACCESSIBLE AREAS SHALL BE VANDAL-RESISTANT. CONCEAL WIRING WHEREVER POSSIBLE; WHERE EXPOSED, PROVIDE MATERIALS AND METHODS SUITABLE FOR PHYSICAL ABUSE (NEC 110.27(A), 300.4).
2. LUMINAIRES: PROVIDE VANDAL-RESISTANT LUMINAIRES WITH IMPACT-RESISTANT LENSES (POLYCARBONATE OR EQUAL), TAMPER-RESISTANT FASTENERS, AND LISTED FOR THE ENVIRONMENT (WET/DAMP AS APPLICABLE). USE WIRE GUARDS OR CAGES WHERE SUBJECT TO IMPACT; AVOID EXPOSED GLASS.
3. RECEPTACLES: PROVIDE GFCI WHERE REQUIRED (NEC 210.8(B)). IN DAMP/WET OR EXTERIOR LOCATIONS, PROVIDE WR-RATED DEVICES WITH IN-USE, GASKETED COVERS (NEC 406.9(B)). PROVIDE TAMPER-RESISTANT (TR) RECEPTACLES WHERE REQUIRED BY CODE (NEC 406.12); OTHERWISE USE HEAVY-DUTY, LOCKING/IN-USE COVERS IN PUBLIC AREAS.
4. SWITCHES AND CONTROLS: USE HEAVY-DUTY, VANDAL-RESISTANT DEVICES WITH TAMPER-RESISTANT PLATES AND SECURITY SCREWS; LOCATE CONTROLS INSIDE STAFF AREAS WHERE FEASIBLE.
5. RACEWAYS: CONCEAL IN WALLS/CEILINGS OR BURY OUTDOORS. WHERE SURFACE-MOUNTED IN PUBLIC AREAS, USE STEEL RMC/IMC (OR EMT ONLY WHERE NOT SUBJECT TO PHYSICAL DAMAGE) WITH COMPRESSION FITTINGS; NO FLEXIBLE CONDUIT EXPOSED TO PUBLIC. PROVIDE GUARDS WHERE SUBJECT TO DAMAGE (NEC 300.4, 300.5).
6. ENCLOSURES AND BOXES: PROVIDE LOCKABLE, GASKETED ENCLOSURES; NEMA 3R MINIMUM OUTDOORS, NEMA 4/4X WHERE HOSE-DOWN OR CORROSIVE. USE TAMPER-RESISTANT HARDWARE ON COVERS AND HASPS.
7. PANELS AND DISCONNECTS: LOCATE IN SECURED ROOMS WHERE POSSIBLE. IF EXPOSED TO THE PUBLIC, PROVIDE LOCKABLE, LISTED ENCLOSURES AND PHYSICAL PROTECTION (BOLLARDS/GUARDS AS REQUIRED) WHILE MAINTAINING WORKING CLEARANCES (NEC 110.26).
8. HARDWARE AND LABELING: USE SECURITY (TAMPER-RESISTANT) FASTENERS ON COVERS/GUARDS. PROVIDE DURABLE, MECHANICALLY FASTENED NAMEPLATES; NO ADHESIVE LABELS IN PUBLIC AREAS.
9. COORDINATION: COORDINATE DEVICE LOCATIONS WITH THE OWNER TO REDUCE PUBLIC ACCESS; MOUNT EQUIPMENT AT HEIGHTS THAT REDUCE TAMPERING WHILE MEETING ACCESSIBILITY REQUIREMENTS.

GENERAL LIGHTNING PROTECTION NOTES

1. ALL LIGHTNING PROTECTION CABLES AND DOWN CONDUCTORS SHALL BE CONCEALED TO THE GREATEST EXTENT PRACTICAL. WHERE CONCEALMENT IS NOT PRACTICAL, EXPOSED CONDUCTORS SHALL BE INSTALLED NEATLY AND PROTECTED AGAINST MECHANICAL DAMAGE IN ACCORDANCE WITH NFPA 780.
2. THE COMPLETED INSTALLATION SHALL COMPLY WITH NFPA 780, "STANDARD FOR THE INSTALLATION OF LIGHTNING PROTECTION SYSTEMS," AND UL 96A, AS ADOPTED BY THE AHJ. PROVIDE THIRD-PARTY CERTIFICATION (UL MASTER LABEL OR LPI INSPECTION CERTIFICATE) TO THE OWNER UPON COMPLETION.
3. METAL BODIES WITHIN 6'-0" OF ANY LIGHTNING PROTECTION CONDUCTOR OR STRIKE TERMINATION DEVICE SHALL BE BONDED TO THE LIGHTNING PROTECTION SYSTEM TO MAINTAIN EQUIPOTENTIAL, IN ACCORDANCE WITH NFPA 780.
4. DESIGN SHOWN IS SCHEMATIC AND IS INTENDED ONLY TO INDICATE BASIC SYSTEM LAYOUT. LIGHTNING PROTECTION CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS, PERFORM ANY REQUIRED NFPA 780 RISK ASSESSMENT, AND FURNISH A COMPLETE UL-LISTED SYSTEM CAPABLE OF ACHIEVING A MASTER LABEL.
5. ALL LIGHTNING PROTECTION MAIN CONDUCTORS SHALL MAINTAIN A HORIZONTAL OR DOWNWARD PATH. ALL BENDS IN THE CONDUCTOR SHALL HAVE A MINIMUM INSIDE RADIUS OF 8" AND SHALL NOT FORM AN ANGLE OF LESS THAN 90 DEGREES, IN ACCORDANCE WITH NFPA 780.
6. LIGHTNING PROTECTION CONDUCTORS SHALL BE CLASS I OR CLASS II SIZE, AS REQUIRED BY STRUCTURE HEIGHT, PER NFPA 780 TABLES 4.1.1.1.1 AND 4.1.1.1.2. USE CLASS I FOR STRUCTURES UP TO 75'-0" IN HEIGHT AND CLASS II FOR STRUCTURES TALLER THAN 75'-0". MATERIALS SHALL BE LISTED COPPER OR ALUMINUM AS PERMITTED BY NFPA 780.
7. ALL METALLIC PIPE STACKS, STRUCTURAL STEEL, AND OTHER METALLIC APPURTENANCES (WHERE APPLICABLE) SHALL BE BONDED TO THE LIGHTNING PROTECTION SYSTEM IN ACCORDANCE WITH NFPA 780.
8. WHERE STRUCTURAL STEEL COLUMNS OR FRAMING MEMBERS ARE USED AS DOWN CONDUCTORS, PROVIDE LISTED BONDING DEVICES AND GROUND TERMINALS AT THEIR BASES IN COMPLIANCE WITH NFPA 780 AND NEC ARTICLE 250.
9. BI-METALLIC LIGHTNING PROTECTION SYSTEM COMPONENTS SHALL BE USED WHERE COPPER AND ALUMINUM COMPONENTS INTERCONNECT OR WHERE REQUIRED TO MITIGATE ELECTROLYTIC CORROSION, IN ACCORDANCE WITH NFPA 780.
10. UNDERGROUND METALLIC PIPING AND OTHER METAL UTILITIES ENTERING THE BUILDING SHALL BE BONDED TO THE LIGHTNING PROTECTION SYSTEM AND TO THE BUILDING GROUNDING ELECTRODE SYSTEM AT OR NEAR THEIR POINT OF ENTRY, IN ACCORDANCE WITH NFPA 780 AND NEC 250.104.
11. ADHESIVES, SEALANTS, AND FASTENERS USED WITH AIR TERMINAL BASES AND CONDUCTORS SHALL BE COMPATIBLE WITH THE ROOFING MEMBRANE AND SHALL NOT VOID THE ROOF WARRANTY. COORDINATE ALL PRODUCTS AND DETAILS WITH THE ROOFING CONTRACTOR AND ROOF MANUFACTURER.
12. AIR TERMINALS SHALL BE LOCATED WITHIN 24" OF ROOF EDGES, OUTSIDE CORNERS, AND RIDGE ENDS, SHALL PROJECT A MINIMUM OF 10" ABOVE THE SURFACE PROTECTED, AND SHALL BE SPACED NOT MORE THAN 20'-0" APART. WHERE AIR TERMINALS PROJECT 24" OR MORE ABOVE THE PROTECTED EDGE, SPACING MAY BE INCREASED UP TO 25'-0". MID-ROOF AIR TERMINALS SHALL NOT EXCEED 50'-0" SPACING. VERIFY THAT STRIKE TERMINATION DEVICE AND DOWN CONDUCTOR SPACING COMPLY WITH NFPA 780.
13. CONTRACTOR SHALL BOND ALL LIGHTNING PROTECTION GROUND TERMINALS TO THE BUILDING GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NFPA 780 AND NEC ARTICLE 250.
14. ALL ROOF-MOUNTED EQUIPMENT LOCATED OUTSIDE THE ZONE OF PROTECTION SHALL BE PROVIDED WITH EQUIPMENT AIR TERMINALS OR OTHERWISE PROTECTED AND BONDED AS REQUIRED BY NFPA 780.
15. PROVIDE TEST WELLS AND REMOVABLE OR DISCONNECTABLE CONNECTIONS AT SELECTED LIGHTNING GROUND TERMINALS TO PERMIT PERIODIC RESISTANCE TESTING OF INDIVIDUAL ELECTRODES, WHERE SITE CONDITIONS PERMIT. LOCATE TEST WELLS FLUSH WITH FINISHED GRADE (TRAFFIC RATED WHERE APPLICABLE) AND COORDINATE LOCATIONS WITH CIVIL/LANDSCAPE.

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DESIGNER: FC
DRAWN BY: MC/EA
REVIEWED BY: FC
ISSUE DATE: 03/27/2026

PHASE 100% CD SET

SHEET TITLE: ELECTRICAL PLANS

PROJECT TITLE: BLUE SPRING STATE PARK RESTROOM REPLACEMENT

SHEET NO. E-201

CIRCUIT LENGTH TABLES NOTES

1. UON, CIRCUIT MAXIMUM DISTANCE IS BASED ON NEC CHAPTER 9, TABLE 8 CONDUCTOR PROPERTIES FOR COATED COPPER CONDUCTORS AT 75 DEGREES CELSIUS. CONTRACTOR SHALL RECALCULATE AMPACITIES AND CIRCUIT LENGTHS WHEN USING ALUMINUM OR IF TEMPERATURE RATINGS ARE DIFFERENT.
2. BASED OF MAX VD=3%.
3. BASED ON UP TO 3 CURRENT-CARRYING CONDUCTORS IN A RACEWAY. CONTRACTOR SHALL DE-RATE PER NEC AS REQUIRED WHEN INSTALLING MORE THAN 3 CURRENT-CARRYING CONDUCTORS IN A SINGLE RACEWAY.
4. SIZE CONDUIT BASED ON TYPE FOR A MAX 40% FILL.
5. CONTRACTOR SHALL SIZE GROUND CONDUCTOR PER NEC AND INCREASE AS REQUIRED FOR VOLTAGE DROP.
6. CONTRACTOR SHALL USE CABLE REDUCERS WHEN REQUIRED TO CONNECT UPSIZED CONDUCTORS.
7. USE COPPER GROUND. SIZE GROUND CONDUCTOR PER NEC 250.122.
8. SIZE CONDUIT PER NEC ANNEX C TABLES. BASED ON CONDUIT TYPE, NUMBER OF CONDUCTORS AND INSTALLATION ENVIRONMENT.

BREAKER AMPACITY (AMPS)	MAX CIRCUIT LOAD (AMPS)	MAX LENGTH (FT)				
		#12 AWG	#10 AWG	#8 AWG	#6 AWG	#4 AWG
20	4	220	340	540	870	-
20	8	110	170	270	430	690
20	12	70	110	180	290	450
20	16	50	80	130	210	340
30	24	-	50	90	140	230
40	32	-	-	70	110	170
50	40	-	-	50	80	140
60	48	-	-	-	70	110
70	56	-	-	-	-	100

208V SINGLE PHASE CIRCUIT LENGTH

BREAKER AMPACITY (AMPS)	MAX CIRCUIT LOAD (AMPS)	MAX LENGTH (FT)											
		#12 AWG	#10 AWG	#8 AWG	#6 AWG	#4 AWG	#3 AWG	#2 AWG	#1 AWG	1/O	2/O	3/O	4/O
20	4	360	580	920	1400	-	-	-	-	-	-	-	-
20	8	180	290	460	730	-	-	-	-	-	-	-	-
20	12	120	180	300	490	770	-	-	-	-	-	-	-
20	16	80	130	220	350	580	-	-	-	-	-	-	-
30	24	-	80	150	230	390	490	-	-	-	-	-	-
40	32	-	-	110	180	290	360	450	560	-	-	-	-
50	40	-	-	80	130	240	290	350	460	590	-	-	-
60	48	-	-	-	110	180	240	300	360	490	500	700	-
70	56	-	-	-	-	170	200	250	310	410	470	600	700
80	64	-	-	-	-	140	180	220	270	360	410	510	600
90	72	-	-	-	-	-	170	200	240	320	360	450	590
100	80	-	-	-	-	-	140	180	210	290	320	410	540
110	88	-	-	-	-	-	-	160	190	260	290	360	430
125	100	-	-	-	-	-	-	-	160	220	250	310	370
150	120	-	-	-	-	-	-	-	-	180	200	260	310

NOTE:
1. FOR 240V SINGLE PHASE, MULTIPLY LENGTH BY 1.15.
2. FOR 277V SINGLE PAHSE, MULTIPLY LENGTH BY 1.32.
3. FOR 480V SINGLE PHASE, MULTIPLY LENGTH BY 2.3.

P1

Location:
Supplied From:

Volts: 120/240 Single
Phases: 1
Wires: 3

A.I.C. Rating: See Fault Schedule
Mains Type: MLO
Mains Rating: 100 A

#	Circuit Description	Class	Brkr	P	A (A)		B (A)		P	Brkr	Class	Circuit Description	#
1	SPD	--	20 A	2	--	1.3			1	15 A	M	RCP-1	2
3							--	1.5	1	20 A	L	Ltg - Exterior Lighting	4
5	PC/TC	--	20 A	1	1.0	1.6			1	15 A	H	EF-1	6
7	FACP	--	20 A	1			1.0	6.0	1	20 A	R	Rec - Women 101	8
9	Water Fountain	M	15 A	1	3.9	4.4			1	15 A	LM	EF-2	10
11	Ltg - Men 102, Dressing	L	20 A	1			3.0	1.5	1	20 A	R	Rec - Panel Service	12
13	Ltg - Women 101, Chase	L	20 A	1	2.3	13.2			2	20 A	WH	EWH-1	14
15	Rec - Men 102	R	20 A	1			6.0	13.2					16
17	Rec - Exterior Service	R	20 A	1	1.5	4.5			1	20 A	R	Rec - Exterior	18
19	Hand Dryer Men 102	M	20 A	1			6.7	6.7	1	20 A	M	Hand Dryer Women 101	20
21	Hand Dryer Women 101	M	20 A	1	6.7	6.7			1	20 A	M	Hand Dryer Women 101	22
23	Rec - Comm Board	R	20 A	1			3.0	3.0	1	20 A	R	Rec - Comm Board	24
25	Hand Dryer Men 102	M	20 A	1	6.7	1.5			1	20 A	R	Rec - Water Fountain Service	26
27													28
29													30
31													32

Subfeeds and Feed-Through

#	Description		Poles	A (A)	B (A)	Trip (A)		Remarks
				0 A	0 A			
			Total Load	6599 VA	6953 VA			
			Total Amps	55 A	58 A			

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Spare	240 VA	125.00%	300 VA		
HVAC (H)	192 VA	100.00%	192 VA	Total Conn. Load:	13551 VA
Largest Motor (LM)	528 VA	125.00%	660 VA	Total Est. Demand:	14726 VA
Lighting (L)	810 VA	125.00%	1013 VA	Total Conn.:	56 A
MOTOR (M)	5419 VA	100.00%	5419 VA	Total Est. Demand:	61 A
RECEPTACLE (R)	3240 VA	100.00%	3240 VA		
Water Heating (WH)	3158 VA	125.00%	3947 VA		

LIGHTING FIXTURE SCHEDULE

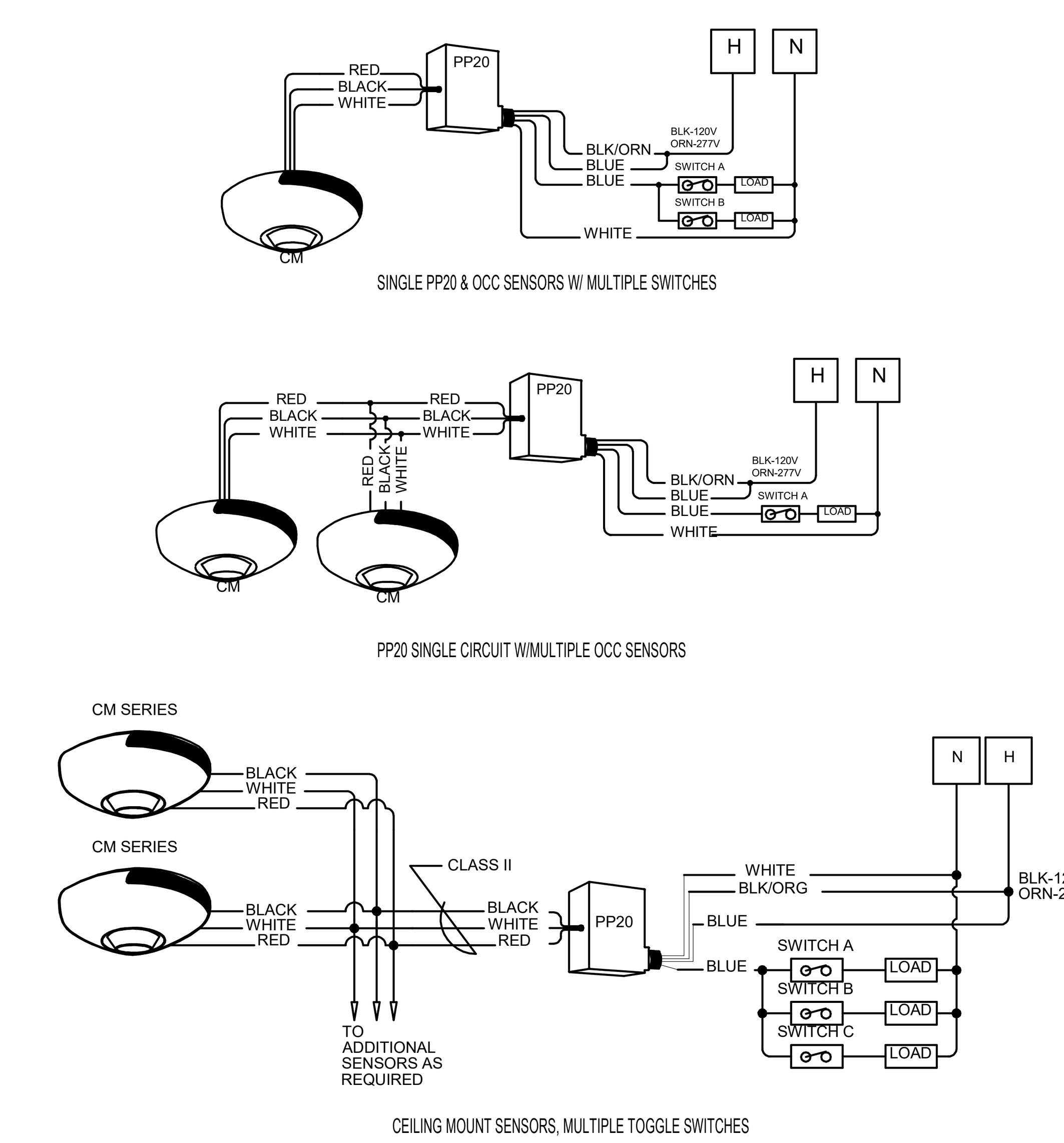
Type Mark	Model	Watts	Apparent Load	Electrical Data	Notes
A	LIGHTOLIER / 6RN/ P6R-DL-15-940-(BEAM)-CD-F-Z10-U / C6RVPWH	14.5 W	16 VA	120 V/1-16 VA	WET-RATED FIXTURE
A1	LIGHTOLIER / 6RN/ P6R-DL-15-930-(BEAM)-CD-F-Z10-U / C6RVPWH	14.5 W	16 VA	120 V/1-16 VA	WET-RATED FIXTURE
B	HEW / WLRD-C-L22-8-30-FINISH-OCC-S2X-EM/6W-DIM-UNV	20 W	22 VA	120 V/1-22 VA	WET-RATED FIXTURE WITH BATTERY BACKUP. SET TO 50% POWER WHEN NO ACTIVITY.
C	KENALL / MLHA3-48-R-MW-XX(LENS)-800LF-40K8-DV	24 W	27 VA	120 V/1-27 VA	WET-RATED FIXTURE
EM	BEGHELLI / BRV-12-42-2MR167WLED-NC	14 W	16 VA	120 V/1-16 VA	WET RATED EMERGENCY/EGRESS LIGHT WITH BACKUP
X	BEGHELLI / FTZ-SA-LR-U-U-(FINISH)	5 W	6 VA	120 V/1-6 VA	WET RATED EMERGENCY/EGRESS LIGHT WITH BACKUP

LIGHTING FIXTURE SCHEUDLE NOTES

1. EXTERIOR LIGHTING SHAL HAVE A MAXIUM TEMPERATURE RATIGN OF 3000K. VERIFY ANY DISCREPANCIES WITH ENGINEER PRIOR TO BIDDING, PROCUREMENT AND CONSTRUCTION.
2. PROVIDE ALL ELEMENTS REQUIRED FOR A COMPLETE INSTALLATION. CONSULT LIGHTING PROVIDER FOR ADDITIONAL REQUIREMENTS BASED ON INSTALLATION ENVIRONMENT.
3. WHEN NOT BACKED UP BY LIGHTING INVERTER OR GENERATOR, ALL TYPES EM, X, AND W LIGHT FIXTURES SHALL BE PROCURED WITH INTEGRATED BATTERY TO MEET EGRESS LIGHTING REQUIREMENTS. CONSULT LIGHTING PROVIDER FOR REQURIED OPTION SELECTION.
4. ALL EXTERIOR LIGHTING SHALL BE PROVIDED WITH INTEGRATED MOTION, OR IR, SENSOR. AND SET TO DIM TO 50% WHEN NO ACTIVITY IS DETECTED. CONSULT LIGITNG PROVIDER FOR REQUIRED OPTION SELECTION.

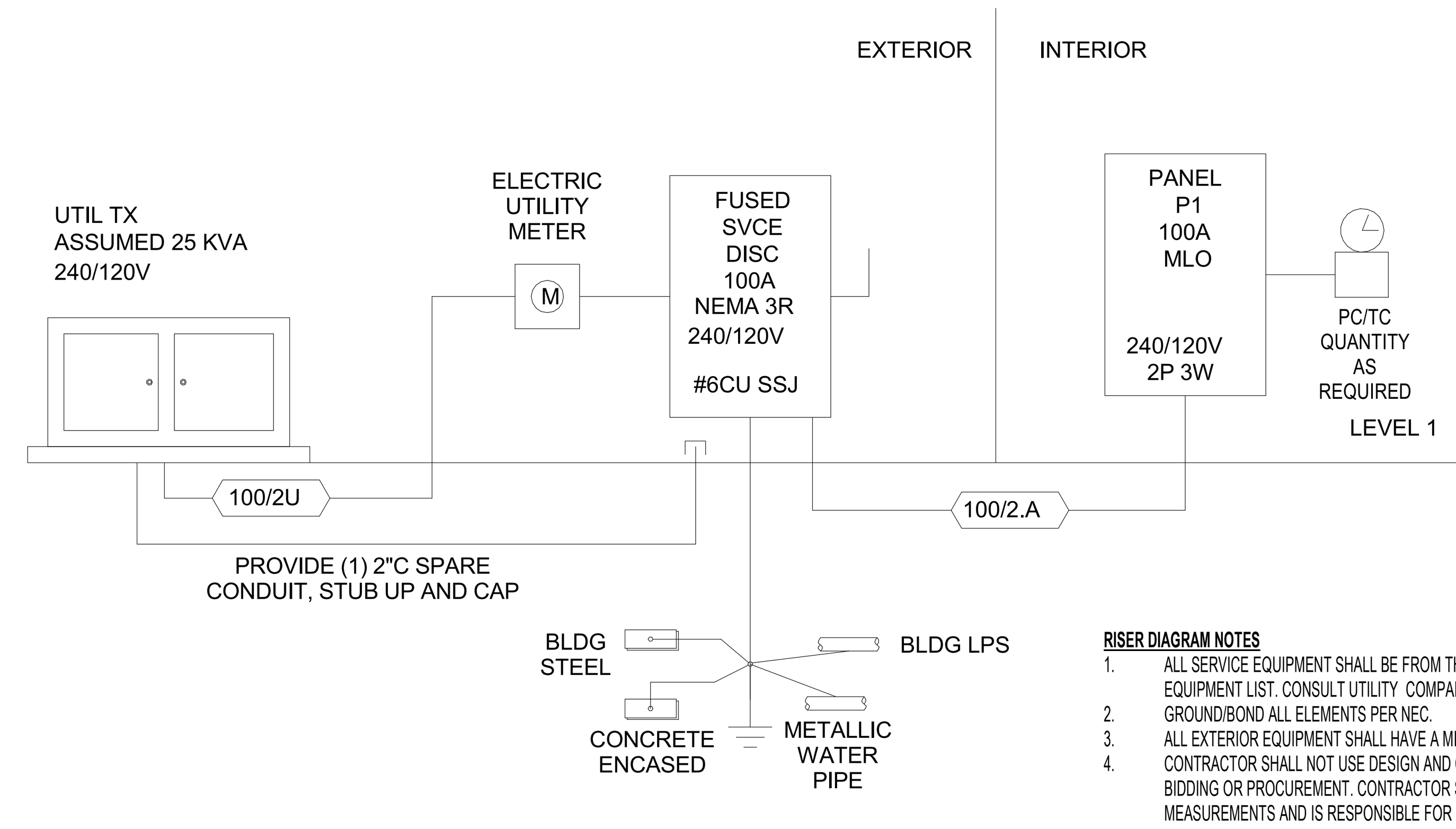
VANDAL-RESISTANT NOTES

1. CONTRACTOR SHALL PROVIDE ALL LIGHT FIXTURES WITH VANDAL-RESISTANT OPTIONS. CONSULT LIGHTING SUPPLIER FOR OPTIONS REQUIRED.
2. WHERE VR OPTIONS ARE NOT AVAILABLE FOR A FIXTURE TYPE, PROVIDE A WIRE GUARD, OR ADD A TAMPER-RESISTANT SHIELD. CONSULT LIGHTING SUPPLIER FOR SUITABLE OPTIONS.



NOTE: CONTRACTOR SHALL CONSULT LIGHTING CONTROL PROVIDER FOR WIRING DIAGRAMS OF SPECIFIC ELEMENTS PROCURED.

3 TYPICAL LIGHTING CONTROL WIRING DIAGRAMS - BATTERY-PACK PROJECT
N.T.S.



RISER DIAGRAM NOTES

1. ALL SERVICE EQUIPMENT SHALL BE FROM THE UTIITY-APPROVED EQUIPMENT LIST. CONSULT UTILITY COMPANY FOR REQUIREMENTS.
2. GROUND/BOND ALL ELEMENTS PER NEC.
3. ALL EXTERIOR EQUIPMENT SHALL HAVE A MINIMUM RATING OF NEMA 3R.
4. CONTRACTOR SHALL NOT USE DESIGN AND CALCULATION LENGTHS FOR BIDDING OR PROCUREMENT. CONTRACTOR SHALL PERFORM FIELD MEASUREMENTS AND IS RESPONSIBLE FOR PROVIDING ENOUGH MATERIAL FOR A SAFE AND COMPLETE INSTALLATION.

1 ELECTRICAL RISER DIAGRAM
N.T.S.

CONDUCTOR SCHEDULE

ID	CONDUCTORS AND CONDUIT
100/2.A	2#1,#1N,#8G,2"C
100/2U	2#1,#1N,2"C

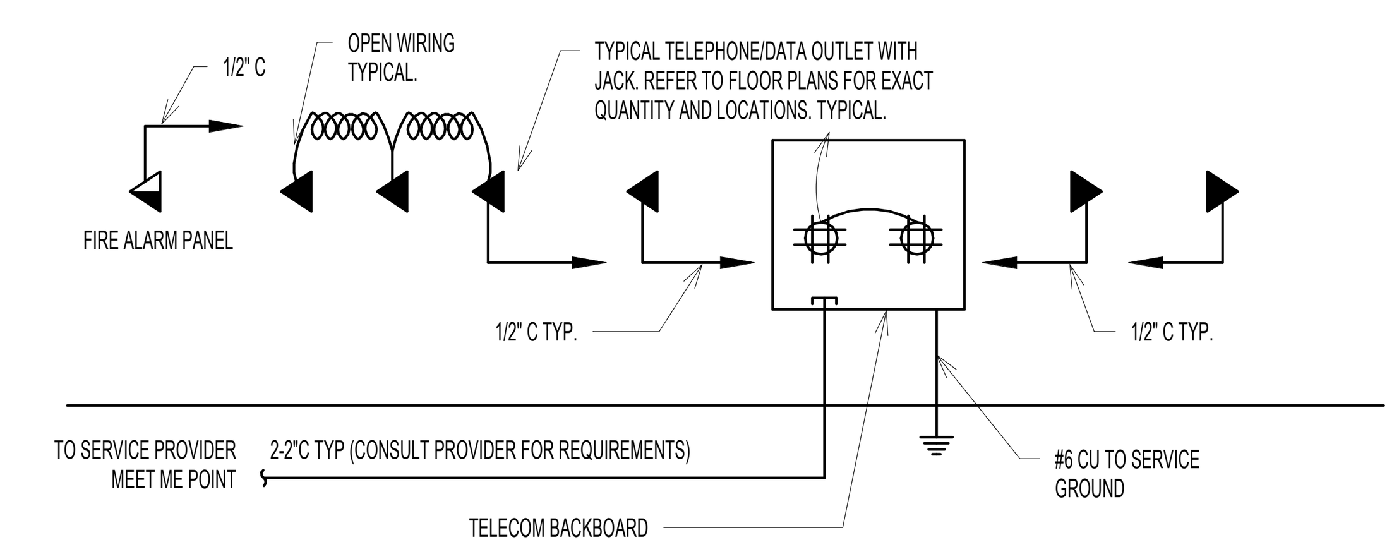
1. USE CU GROUNDS
2. PARENTHESIS (X) DENOTES THE NUMBER OF PARALLEL SETS
3. ALL CONDUCTORS ARE CU UNLESS IDENTIFIED AS AL

VOLTAGE DROP SCHEDULE

DEVICE	FEEDER		
	VOLTAGE DROP	WIRE SIZE	LENGTH
FUSED SVCE DISC	1.52%	#1	150'
P1	2.02%	#1	50'

FAULT CURRENT SCHEDULE

DEVICE	FAULT	AIC RATING	L-L VOLTS	TRANSFORMER		
				KVA	Z%	FAULT AT PRIMARY
UTIL TX	10,400	-	240V	25	1.75	UTILITY
FUSED SVCE DISC	3,904	10,000	240V			
P1	3,139	10,000	240V			



NOTES

1. THE TELECOM/DATA RISER DIAGRAM IS PROVIDED TO COMMUNICATE THE OVERALL PROJECT SCOPE. THE ENGINEER HAS SHOWN SUGGESTED LOCATIONS FOR TELECOM/DATA DROPS THAT ALLOW FOR MINIMUM OPERABILITY OF A TELECOM/DATA SYSTEM. THE CONTRACTOR AND/OR LOW VOLTAGE CONSULTANT SHALL CONSULT THE OWNER TO DETERMINE ACTUAL TELECOM/DATA SYSTEM NEEDS PRIOR TO ROUGH-IN AND SYSTEM PROCUREMENT.
2. USE CAT 6 CONDUCTORS. PROVIDE ONE CAT 6 TELEPHONE CONDUCTOR AND ONE CAT 6 DATA CONDUCTOR TO EACH DATA/TELEPHONE OUTLET. HOMERUN EACH DATA/TELEPHONE PORT TO THE TELECOM BACKBOARD. CONSULT OWNER FOR BACKBOARD LOCATION.
3. CONTRACTOR SHALL TERMINATE ALL TELEPHONE/DATA OUTLETS THROUGHOUT SCOPE AREA.

2 TYPICAL TELECOM/DATA RISER DIAGRAM
N.T.S.

Department of Environmental Protection
Division of Recreation and Parks
Bureau of Design and Construction
3800 Commonwealth Blvd., Tallahassee, FL 32399 (850) 245-2157

DATE	REVISION	SYMBOL	DATE	REVISION	SYMBOL
		C			A
		D			B

DESIGNER: FC ISSUE DATE: 03/27/2026
DRAWN BY: MC/EA COMP. FILE No.: (24-069)
REVIEWED BY: FC STATE PROJECT No.:

Consultant: George F. Young, Inc. Since 1919

Consultant: Cabral Engineering Inc
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1058 Palm Cover Dr. Orlando, FL 32835
(321) 246 - 4041 C.A. No. 33227
CEI Project #24.115

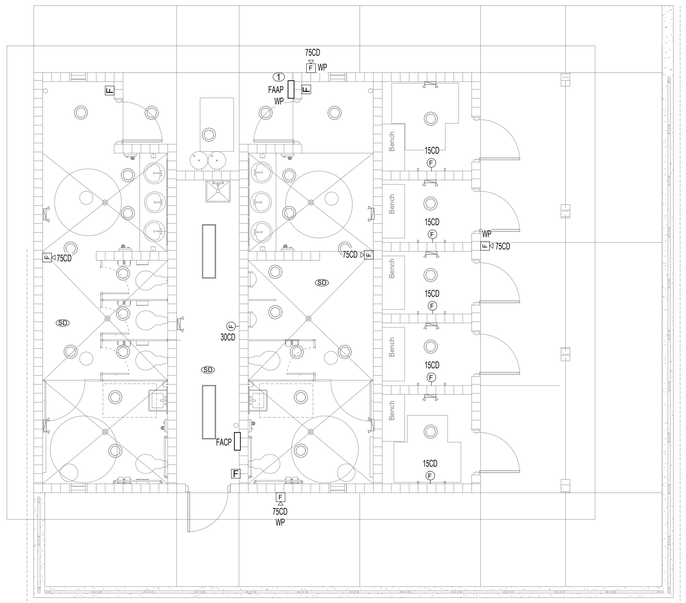
PROFESSIONAL REGISTRATION
FRANCISCO J CABRAL LICENSE No. 87110 STATE OF FLORIDA PROFESSIONAL ENGINEER
Francisco Cabral, P.E. #87110
LICENSED PROFESSIONAL ENGINEER

PHASE 100% CD SET

SHEET TITLE: ELECTRICAL SCHEDULES AND DIAGRAMS

PROJECT TITLE: BLUE SPRING STATE PARK RESTROOM REPLACEMENT

SHEET NO. E-801



1 FIRE ALARM PLAN
3/16" = 1'-0"

FIRE ALARM LEGEND

F	MANUAL PULL STATION.
F	COMBINATION AUDIBLE VISUAL SIGNALING UNIT- HORN/FLASHING "FIRE" LIGHT WALL MOUNTED. MUST FIELD SELECTABLE 15CD THRU 177CD. FOR SLEEPING AREAS: PROVIDE 110CD OR 177CD BASED ON MOUNTING IN RELATION TO CEILING, AND SHALL BE 520HZ LF.
FC	CEILING MOUNTED COMBINATION HORN/VISUAL SIGNALING UNIT. MUST FIELD SELECTABLE 15CD THRU 177CD. FOR SLEEPING AREAS, PROVIDE 177CD AND 520HZ LF.
F	VISUAL SIGNALING UNIT, WALL MOUNTED - FLASHING "FIRE" LIGHT ONLY (NO AUDIO DEVICE). MUST FIELD SELECTABLE 15CD THRU 177CD.
DSD	PHOTOELECTRIC DUCT SMOKE DETECTOR. SEE MECHANICAL DRAWINGS FOR LOCATIONS.
R WP	EMERGENCY BYPASS SHUNT TRIP RELAY. WP = WEATHERPROOF ENCLOSURE.
RTI	DUCT DETECTOR REMOTE TROUBLE INDICATOR MOUNT ADJACENT TO UNIT.
H	FIRE ALARM HEAT DETECTOR
SD	CEILING MOUNTED SYSTEM SMOKE DETECTOR. ADDRESSABLE. PROVIDE DUAL RATED CONVERTIBLE CONTACT FOR ELEVATOR RECALL WHEN REQUIRED. SHALL BE ADDRESSABLE WITH 520HZ SOUNDER BASE IN SLEEPING AREAS. VERIFY SPACE USAGE WITH OWNER/ARCHITECT PRIOR TO BIDDING AND PROCUREMENT.
CO	CO DETECTOR
DH	MAGNETIC DOOR HOLDER. SEE LV DRAWINGS FOR LOCATIONS.
FACP	FIRE ALARM CONTROL PANEL.
EVAC	EMERGENCY VOICE EVACUATION PANEL.
FAJB	FIRE ALARM JUNCTION BOX.
FAAP	REMOTE FIRE ALARM ANNUNCIATOR PANEL.
TS	WP SPRINKLER TAMPER SWITCH CONNECTION.
FS	WP SPRINKLER WATERFLOW SWITCH CONNECTION.
FSD	FIRE/SMOKE DAMPER WITH FIRE ALARM RELAY. SEE MECHANICAL SET FOR REQUIREMENTS AND LOCATION.
KB	FIRE DEPARTMENT KNOX BOX AT 7'-0" AFF / WEATHERPROOF HOUSING.

NOT ALL SYMBOLS ARE USED IN EVERY DESIGN

KEYED NOTES (X)

1. COORDINATE EXACT LOCATION OF FAAP WITH FIRE MARSHALL. LOCATION SHOWN AS PLACEHOLDER ONLY.

FIRE ALARM NOTES

1. NOTIFICATION APPLIANCE SETTINGS: CANDELA SETTINGS SHOWN ARE INTENDED DEVICE SETTINGS AND SHALL BE FIELD-SET ACCORDINGLY. FINAL MOUNTING HEIGHTS/LOCATIONS SHALL COMPLY WITH LISTING AND NFPA 72 CH. 18 BASED ON ACTUAL CEILING CONDITIONS AND ROOM GEOMETRY.
2. CIRCUIT/PATHWAY CLASSES (SLC/NAC/IDC) SHALL BE AS IDENTIFIED ON FINAL RISER DIAGRAM AND SHOP DRAWINGS PER NFPA 72.
3. PROVIDE DEDICATED LOCKABLE BRANCH CIRCUIT FOR FIRE ALARM CONTROL EQUIPMENT IN ACCORDANCE WITH NEC AND NFPA 72 REQUIREMENTS. CIRCUIT SHALL BE PERMANENTLY IDENTIFIED AT THE OVERCURRENT DEVICE AND AT THE EQUIPMENT. FINAL EQUIPMENT LOAD, ANCILLARY POWER SUPPLIES, BOOSTERS, BATTERIES, AND ALL OTHER FIRE ALARM SYSTEM POWER REQUIREMENTS SHALL BE COORDINATED BY FIRE ALARM CONTRACTOR.
4. SPOT-TYPE SMOKE DETECTORS ON SMOOTH CEILINGS ARE LAID OUT USING THE NFPA 72 "0.7S" METHOD WITH SELECTED SPACING S = 30 FT (MAXIMUM DISTANCE FROM ANY POINT ON THE CEILING TO A DETECTOR ≤ 0.7S = 21 FT), PER NFPA 72 (2019) 17.7.4.2.3.1(C).
5. CONTRACTOR SHALL VERIFY FINAL EQUIPMENT SELECTION AND PROVIDE A COMPLETE, CODE-COMPLIANT LAYOUT; ADJUST LOCATIONS AND QUANTITIES AS REQUIRED BY THE DEVICE LISTING/MANUFACTURER'S PUBLISHED INSTRUCTIONS AND FIELD CONDITIONS, INCLUDING IMPACTS OF CEILINGS/OBSTRUCTIONS/HVAC AIR MOVEMENT, AS WELL AS AHJ FINAL DIRECTION.
6. LOCATIONS INDICATED ARE DIAGRAMMATIC FOR INITIAL BUILDING PERMIT/COORDINATION ONLY AND SHALL NOT BE USED FOR BIDDING OR FOR FINAL DEVICE COUNTS; THE CONTRACTOR SHALL FIELD VERIFY AND PROVIDE ALL DEVICES, BASES, BACKBOXES, ACCESSORIES, AND ADDITIONAL INITIATING DEVICES REQUIRED FOR A COMPLETE COMPLIANT INSTALLATION.
7. DUCT SMOKE DETECTORS (DSDS): DSDS ARE NOT SHOWN ON THE FIRE ALARM DRAWINGS, AND SHALL BE FURNISHED AND INSTALLED BY THE HVAC CONTRACTOR. FIRE ALARM CONTRACTOR SHALL CONSULT THE LATEST MECHANICAL/HVAC DRAWINGS FOR ALL DSD LOCATIONS AND COORDINATE WITH THE HVAC CONTRACTOR. FIRE ALARM CONTRACTOR SHALL PROVIDE AND INSTALL ALL FIRE ALARM MODULES AND WIRING REQUIRED FOR DSD MONITORING/ANNUNCIATION AT THE FACP AND FOR THE FAN SHUTDOWN INTERFACE (AS APPLICABLE). HVAC CONTRACTOR SHALL PROVIDE INTERNAL UNIT WIRING AND TERMINATION POINTS. COORDINATE ALL INTERCONNECTIONS, RELAYS, AND SEQUENCE OF OPERATION REQUIREMENTS. INCLUDE A BUDGET ALLOWANCE IN THE BID FOR ALL REQUIRED INTERFACES DESCRIBED HEREIN.
8. DOOR HOLDERS / MAGNETIC HOLD-OPEN DEVICES: DOOR HOLDERS ARE NOT SHOWN ON THE FIRE ALARM DRAWINGS AND ARE UNDER THE DOOR/HARDWARE SCOPE. FIRE ALARM CONTRACTOR SHALL CONSULT THE LATEST ARCHITECTURAL/DOOR/HARDWARE DRAWINGS FOR ALL DOOR HOLDER LOCATIONS AND COORDINATE WITH THE DOOR/HARDWARE CONTRACTOR. FIRE ALARM CONTRACTOR SHALL PROVIDE AND INSTALL ALL FIRE ALARM CONTROL MODULES/RELAYS AND WIRING REQUIRED TO RELEASE DOOR HOLDERS UPON FIRE ALARM ACTIVATION, AND SHALL COORDINATE POWER SOURCE/VOLTAGE, CONTROL INTERFACE, AND SEQUENCE OF OPERATION REQUIREMENTS. INCLUDE A BUDGET ALLOWANCE IN THE BID FOR ALL REQUIRED INTERFACES DESCRIBED HEREIN.
9. ACCESS CONTROL / ELECTRIFIED DOOR HARDWARE: ACCESS CONTROL DEVICES AND ELECTRIFIED DOOR HARDWARE ARE NOT SHOWN ON THE FIRE ALARM DRAWINGS AND ARE UNDER THE ACCESS CONTROL/LOW-VOLTAGE SCOPE. FIRE ALARM CONTRACTOR SHALL CONSULT THE LATEST ARCHITECTURAL AND ACCESS CONTROL/LSHOP DRAWINGS FOR DEVICE LOCATIONS AND COORDINATE WITH THE ACCESS CONTROL CONTRACTOR. FIRE ALARM CONTRACTOR SHALL PROVIDE AND INSTALL ALL FIRE ALARM CONTROL MODULES/RELAYS AND WIRING REQUIRED FOR ANY FIRE ALARM-INITIATED DOOR RELEASE/UNLOCK FUNCTIONS (WHERE REQUIRED BY CODE/AHJ), AND SHALL COORDINATE ALL INTERCONNECTIONS, POWER/INTERFACE REQUIREMENTS, AND SEQUENCE OF OPERATION WITH THE ACCESS CONTROL CONTRACTOR. INCLUDE A BUDGET ALLOWANCE IN THE BID FOR ALL REQUIRED INTERFACES DESCRIBED HEREIN

FIRE ALARM DETECTION SYSTEM (FAC 61G15-32.008)

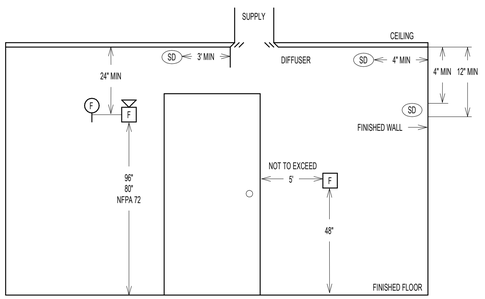
1. SCOPE & CODES — PROVIDE A COMPLETE, LISTED ADDRESSABLE FIRE ALARM SYSTEM PER NFPA 72, NFPA 70 (NEC), NFPA 101, NFPA 90A, NFPA 13/20 AS APPLICABLE, FLORIDA FIRE PREVENTION CODE, FLORIDA BUILDING CODE (CURRENT EDITION), FAC 61G15, AND FLORIDA STATUTES 489/633. OBTAIN AHJ APPROVALS AND OFFICE OF THE STATE FIRE MARSHAL APPROVAL WHERE REQUIRED. PROVIDE PE-SIGNED/SEALED SHOP DRAWINGS.
2. THE FIRE ALARM CONTRACTOR SHALL EVALUATE ALL PROJECT AREAS FOR HAZARDOUS (CLASSIFIED) LOCATIONS PER NEC ARTICLES 500, 505, AND 506; NFPA 72; AND ANY APPLICABLE PROCESS STANDARD (E.G., NFPA 33 SPRAY FINISHING, NFPA 30/30A FLAMMABLE/COMBUSTIBLE LIQUIDS, NFPA 820 WASTEWATER). PROVIDE DOCUMENTATION IN THE SHOP DRAWINGS. DEVICES, APPLIANCES, ENCLOSURES, AND WIRING METHODS LOCATED IN OR PASSING THROUGH CLASSIFIED LOCATIONS SHALL BE LISTED AND INSTALLED FOR THE APPLICABLE CLASS/DIVISION/ZONE AND GROUP. PROVIDE SEALING FITTINGS, INTRINSIC SAFETY BARRIERS, AND SUPERVISION AS REQUIRED BY NEC 500/505/506 AND NFPA 72. WHERE PERMITTED BY CODE, LOCATE NOTIFICATION APPLIANCES OUTSIDE CLASSIFIED VOLUMES; APPLIANCES WITHIN THE CLASSIFIED VOLUME SHALL BE LISTED FOR THE AREA CLASSIFICATION. SUBMITTALS FOR PERMIT SHALL INCLUDE: (A) A HAZARDOUS-LOCATION REVIEW/PLAN OR WRITTEN CONFIRMATION OF "NO CLASSIFIED AREAS," (B) PRODUCT DATA SHOWING LISTINGS FOR THE CLASSIFICATION, AND (C) ANY REQUIRED AHJ COORDINATION/APPROVALS. RESPONSIBILITY FOR CODE COMPLIANCE OF THE FIRE ALARM SCOPE RESTS WITH THE FIRE ALARM CONTRACTOR UNDER THEIR PERMIT; ENGINEERING NOTES DO NOT RELIEVE THIS RESPONSIBILITY.
3. OCCUPANCY — COORDINATE AND CONFIRM PROTECTED OCCUPANCY TYPE WITH ARCHITECT; DESIGN DETECTION/NOTIFICATION ACCORDINGLY.
4. CIRCUIT CLASSES — PROVIDE SURVIVABILITY BY USE:
   A. CLASS A: HEALTHCARE, DETENTION, HIGH-RISE, LARGE ASSEMBLY, RESIDENTIAL CARE, EDUCATION, OR WHERE EVACUATION IS DIFFICULT.
   B. CLASS B: STANDARD COMMERCIAL/NON-HIGH-RISE WHERE CLASS A NOT MANDATED.
   C. CLASS X: CRITICAL/COMPLEX AREAS REQUIRING FAULT ISOLATION WHILE MAINTAINING OPERATION ELSEWHERE.
5. LISTING — SYSTEM AND COMPONENTS SHALL BE UL LISTED FOR FIRE PROTECTIVE SIGNALING (UL 864, UL 268, UL 1480, AND OTHER PRODUCT-SPECIFIC LISTINGS).
6. WIRING — INSTALL PER NEC AND MANUFACTURER REQUIREMENTS (SHIELDING/SEPARATION AS SPECIFIED); ALL WIRING IN CONDUIT. SIZE CONDUCTORS TO MEET VOLTAGE-DROP LIMITS TO THE MOST REMOTE DEVICE UNDER WORST-CASE LOAD. COLOR CODING PERMISSIBLE BUT NOT MANDATORY IF ALL CONDUCTORS ARE PERMANENTLY IDENTIFIED.
7. SYSTEM TYPE — ADDRESSABLE MULTIPLEX; EACH DEVICE INDIVIDUALLY ANNUNCIATED AT THE FACP.
8. SIGNAL TRANSMISSION / MONITORING — PROVIDE ALARM, SUPERVISORY, AND TROUBLE SIGNAL TRANSMISSION/ANNUNCIATION FUNCTIONS AS REQUIRED BY CODE/AHJ AND COORDINATED WITH THE EXISTING/BASE-BUILDING FIRE ALARM SYSTEM AND SUPERVISING STATION. INDICATE COMMUNICATOR/INTERFACE METHOD ON SHOP DRAWINGS AND RISER.
9. ZONING — IDENTIFY ALL ALARM, SUPERVISORY, AND NOTIFICATION ZONES (OR ADDRESSABLE POINT GROUPINGS/NAC ZONES AS APPLICABLE) ON SHOP DRAWINGS AND PROGRAMMING DOCUMENTS CONSISTENT WITH THE SEQUENCE OF OPERATIONS.
   UNDERGROUND/CAMPUS WIRING (WHERE APPLICABLE) — WHERE FIRE ALARM CIRCUITS ARE ROUTED UNDERGROUND OR BETWEEN BUILDINGS/STRUCTURES, INDICATE WIRING METHOD, WET-LOCATION CONDUCTOR REQUIREMENTS, PHYSICAL PROTECTION, BURIAL DEPTH, AND PATHWAY PROTECTION AGAINST DAMAGE ON PERMIT/SHOP DRAWINGS.
10. DESIGN BASIS METHOD — FIRE ALARM DESIGN IS PRESCRIPTIVE UNLESS SPECIFICALLY IDENTIFIED OTHERWISE. PERFORMANCE-BASED CRITERIA, IF USED, SHALL BE IDENTIFIED AND REFERENCED TO AHJ-APPROVED STANDARDS/GUIDES.
11. APPLIANCE MOUNTING — MOUNT HORNS/STROBES PER NFPA 72 CH. 18; TYPICAL WALL STROBES CENTERED AT 80" IN. AFF UNLESS OTHERWISE REQUIRED BY LISTING/GEOMETRY.
12. EOL/SUPERVISION — PROVIDE END-OF-LINE ELEMENTS WHERE REQUIRED TO SUPERVISE IDC/NAC/SLC CIRCUITS PER NFPA 72.
13. AIR HANDLER SHUTDOWN / DUCT SMOKE DETECTOR INTERFACE — DUCT SMOKE DETECTORS (DSDS) ARE BY THE HVAC CONTRACTOR AND ARE NOT SHOWN ON THE FIRE ALARM DRAWINGS. FIRE ALARM CONTRACTOR SHALL CONSULT THE LATEST MECHANICAL/HVAC DRAWINGS FOR THE LOCATIONS OF ALL DSDS AND SHALL COORDINATE WITH THE HVAC CONTRACTOR. FIRE ALARM CONTRACTOR SHALL PROVIDE AND INSTALL ALL FIRE ALARM MODULES AND WIRING REQUIRED FOR DSD MONITORING/ANNUNCIATION AT THE FACP AND FOR THE FAN SHUTDOWN INTERFACE (AS APPLICABLE). HVAC CONTRACTOR SHALL PROVIDE ALL INTERNAL UNIT WIRING/TERMINATION POINTS. COORDINATE ALL INTERCONNECTIONS, RELAYS, AND SEQUENCE OF OPERATION REQUIREMENTS.
14. TESTING — PERFORM/RECORD TESTING PER NFPA 72 CH. 14. NEW SYSTEMS: ACCEPTANCE TESTING PER 14.4.1 AND ESTABLISH PERIODIC TESTING PER TABLE 14.3.1. EXISTING SYSTEMS: RE-ACCEPTANCE PER 14.4.2. PERFORM SMOKE SENSITIVITY AND DUCT DIFFERENTIAL PRESSURE TESTS.
15. ANCILLARY INTERFACES — PROVIDE CONNECTIONS TO DOOR HOLDERS/EGRESS LOCKS, MONITORED EXTINGUISHERS (AS TROUBLE), ELEVATORS, FANS, AND OTHER REQUIRED SYSTEMS.
   A. INTERFACED SYSTEMS BY OTHERS (COORDINATION/ALLOWANCE) — CERTAIN DEVICES/SYSTEMS REQUIRING FIRE ALARM INTERFACE MAY BE PROVIDED UNDER OTHER DIVISIONS AND/OR MAY NOT BE SHOWN ON THE FIRE ALARM DRAWINGS (INCLUDING DUCT SMOKE DETECTORS, DOOR HOLDERS, AND ACCESS CONTROL DOOR RELEASE FUNCTIONS). FIRE ALARM CONTRACTOR SHALL CONSULT THE LATEST APPLICABLE DOCUMENTS (MECHANICAL, ARCHITECTURAL/DOOR HARDWARE, AND ACCESS CONTROL) FOR LOCATIONS AND REQUIREMENTS, AND SHALL COORDINATE WITH THE RESPONSIBLE CONTRACTORS. INCLUDE IN BASE BID A BUDGET ALLOWANCE FOR ALL REQUIRED INTERFACE MODULES/RELAYS, WIRING/TERMINATIONS, PROGRAMMING, LABELING, AND ACCEPTANCE TESTING NECESSARY TO ACHIEVE THE SPECIFIED SEQUENCES OF OPERATION AND AHJ REQUIREMENTS.
   B. WHERE ACCESS CONTROL, ELECTRIFIED LOCKING HARDWARE, AND/OR DOOR HOLD-OPEN DEVICES ARE PROVIDED UNDER SEPARATE LOW-VOLTAGE/DOOR HARDWARE SCOPE, FIRE ALARM CONTRACTOR SHALL COORDINATE WITH THE LOW-VOLTAGE DRAWINGS/SPECIFICATIONS AND FURNISH REQUIRED FIRE ALARM INTERFACE MODULES/RELAYS, WIRING TERMINATIONS, PROGRAMMING, AND ACCEPTANCE TESTING TO ACHIEVE REQUIRED LIFE-SAFETY OPERATION UPON ALARM (RELEASE/ALLOW FREE EGRESS/CLOSE HOLD-OPENS AS APPLICABLE). ACCESS CONTROL PANELS, LOCKS, AND POWER SUPPLIES ARE BY OTHERS UNLESS NOTED OTHERWISE.
   C. BDA / ERRCS INTERFACE (WHERE REQUIRED) — WHERE REQUIRED BY THE AHJ/CODE AND PROVIDED UNDER SEPARATE SPECIALTY SCOPE. THE FIRE ALARM CONTRACTOR SHALL COORDINATE WITH THE BDA VENDOR AND FURNISH THE FIRE ALARM INTERFACE REQUIRED TO MONITOR BDA/ERRCS "COMMON TROUBLE" AS A SUPERVISORY CONDITION AT THE FACP (AND REMOTE ANNUNCIATOR IF PROVIDED). PROVIDE LISTED INTERFACE MODULE(S), CIRCUIT IDENTIFICATION/LABELING, PROGRAMMING, POINT-TO-POINT WIRING ON SHOP DRAWINGS, AND ACCEPTANCE TESTING OF SUPERVISORY ANNUNCIATION. COORDINATE THE REQUIRED NUMBER OF MONITORED POINTS (COMMON TROUBLE MINIMUM; ADDITIONAL POINTS SUCH AS POWER FAIL/BATTERY TROUBLE WHERE REQUIRED) AND REQUIRED CONTACT TYPE (NO/NC) WITH THE AHJ AND BDA VENDOR. BDA/ERRCS EQUIPMENT, ANTENNAS, AMPLIFIERS, AND STANDBY POWER SYSTEM ARE BY OTHERS UNLESS SPECIFICALLY INDICATED.
16. EXTERIOR DEVICES — WEATHERPROOF ALL EXTERIOR ELEMENTS; PROVIDE GASKETS BETWEEN DEVICE AND WALL SURFACE. IDENTIFY DEVICES AND PATHWAYS SUBJECT TO EXTERIOR/WET/DAMP, HIGH HUMIDITY, CORROSIVE ATMOSPHERES, WASHDOWN, OR COASTAL SALT-AIR EXPOSURE. PROVIDE LISTED DEVICES/ENCLOSURES, GASKETS, COATINGS, TEMPERATURE RATINGS, AND PROTECTION METHODS SUITABLE FOR THE ENVIRONMENT PER MANUFACTURER LISTING, NFPA 72, AND NEC.
17. CAPACITY FOR TI — PROVIDE CONTROL PANEL MODULES, POWER SUPPLIES, AND BATTERY CAPACITY TO SUPPORT INDICATED TENANT BUILD-OUT ALLOWANCES (PULLS, DUCT SMOKE DETECTOR (DSD) INTERFACE/MONITORING AND HVAC SHUTDOWN RELAYS, AND A/V DEVICES PER TENANT).
18. PLACEMENT LIMITS — LOCATE SMOKE ALARMS/DETECTORS PER NFPA 72 17.7.3 AND 29.8.3.4; AVOID LOCATIONS WITH ADVERSE TEMPERATURE/HUMIDITY; NOT IN UNFINISHED ATTICS/GARAGES; MAINTAIN SEPARATIONS FROM COOKING APPLIANCES (10 FT UNLESS LISTED), BATHROOMS (3 FT), SUPPLY REGISTERS (3 FT), AND PADDLE FAN BLADES (3 FT).
19. MOUNTING SHALL BE AS REQUIRED BY NFPA 72. SEE BELOW FOR GENERAL GUIDANCE.
   A. MANUAL FIRE ALARM BOXES (PULL STATIONS): MOUNT THE OPERABLE PART 42"-48" AFF, KEEP CONSPICUOUS, UNOBSTRUCTED, ACCESSIBLE, AND PLACE PER LOCATION RULES (E.G., WITHIN 5 FT OF EXIT DOORS, TRAVEL DISTANCE LIMITS).
   B. VISIBLE NOTIFICATION (WALL STROBES): MOUNT SO THE ENTIRE LENS IS 80"-96" AFF; WHERE CEILINGS ARE <80", MOUNT WITHIN 6" OF CEILING AND APPLY REDUCED ROOM SIZE PER CODE.
   C. AUDIBLE NOTIFICATION (HORNS / HORN-STROBES): INSTALL TO MEET REQUIRED SOUND LEVELS.
20. NOTIFICATION APPLIANCE RATINGS
   A. AUDIBLE (GENERAL AREAS): PROVIDE SOUND LEVELS ≥ 15 DB ABOVE AVERAGE AMBIENT OR ≥ 5 DB ABOVE MAXIMUM AMBIENT WITH A ≥ 60-SECOND DURATION, WHICHEVER IS GREATER, MEASURED AT OCCUPANT LOCATIONS PER NFPA 72 18.4.
   B. AUDIBLE (SLEEPING AREAS): PROVIDE LOW-FREQUENCY ALARM (NOMINAL 520 HZ) APPLIANCES COMPLIANT WITH NFPA 72 18.4.5.3; VERIFY LEVELS AT THE PILLOW.
   C. VISIBLE: PROVIDE APPLIANCES WITH LISTED CANDELA OUTPUT MEETING ROOM GEOMETRY PER NFPA 72 CH. 18. IN SLEEPING AREAS:
      a. 110 CD IF THE TOP OF LENS IS ≥ 24 IN. BELOW CEILING;
      b. 177 CD IF THE TOP OF LENS IS < 24 IN. BELOW CEILING; LOCATE ≤ 16 FT FROM PILLOW.
   D. SHOW CANDELA SETTINGS ON PLANS; FIELD-SET TO MATCH DRAWINGS AND AS-BUILT GEOMETRY.
21. TRAINING (O&M) — PROVIDE MINIMUM 4 HOURS FACTORY-AUTHORIZED TRAINING COVERING DEVICE LOCATIONS, JB/SURGE LOCATIONS, OPERATION, TROUBLESHOOTING, AND PM. SCHEDULE ≥ 7 WORKDAYS IN ADVANCE.
22. SUBMITTALS: BATTERY & VOLTAGE-DROP CALCULATIONS
23. PROVIDE COMPLETE SHOP DRAWINGS AND EQUIPMENT SUBMITTALS INCLUDING: POINT-TO-POINT WIRING, CIRCUIT CLASS, CONDUCTOR SIZES, NAC LOAD TABLES, VOLTAGE-DROP CALCULATIONS TO THE WORST-CASE END DEVICE AT MAXIMUM CANDELA LOAD, AND BATTERY STANDBY/ALARM CALCULATIONS USING MANUFACTURER DATA AND NFPA 72 CH. 10 & 14 METHODS.
24. BATTERY SIZING: STANDBY AND ALARM DURATIONS PER NFPA 72 (TYP. 24 HR STANDBY + 5 MIN ALARM FOR EVACUATION SYSTEMS UNLESS AHJ REQUIRES OTHERWISE), ACCOUNT FOR ALL PANEL LOADS (FACP, SLCS, NACS, BOOSTERS, INTERFACES).
25. VOLTAGE-DROP LIMITS: DEMONSTRATE THAT EACH NOTIFICATION CIRCUIT DELIVERS NOT LESS THAN THE DEVICE'S MINIMUM OPERATING VOLTAGE UNDER WORST-CASE LOAD AND TEMPERATURE (USE MANUFACTURER MIN-VOLTAGE RATINGS; DOCUMENT CONDUCTOR LENGTH, GAUGE, AND DIVERSITY).
26. REVIEW & RESPONSIBILITY: ENGINEER'S REVIEW IS FOR GENERAL CONFORMANCE ONLY. FINAL COMPLIANCE/ADEQUACY OF EQUIPMENT SELECTION, CIRCUITING, AND CALCULATIONS RESTS SOLELY WITH THE FIRE ALARM CONTRACTOR.
27. EGRESS-LIGHTING OVERRIDE INTEGRATION
   A. FUNCTION: PROVIDE A SUPERVISED, NORMALLY-OPEN DRY CONTACT AT THE FACP (OR NAC/RELAY MODULE) THAT CLOSES ON ANY ALARM AND REMAINS ACTIVE UNTIL SYSTEM RESET, TO ENERGIZE REQUIRED EGRESS LIGHTING PER NFPA 101 §7.9.2.3 AND NEC 700.24. LOSS OF FACP POWER SHALL FAIL SAFE TO MAINTAIN REQUIRED ILLUMINATION VIA UNIT EQUIPMENT/INVERTERS/GENERATOR LOGIC.
   B. COORDINATION: FIRE ALARM, LIGHTING CONTROLS VENDOR, AND ELECTRICAL CONTRACTOR SHALL COORDINATE TERMINATIONS, CONTROL LOGIC, AND POINT-TO-POINT DIAGRAMS. PROVIDE I/O SUMMARY AND TEST PROCEDURES.
   C. IMPLEMENTATIONS (AS APPLICABLE):
      a. UNIT EQUIPMENT (BUG-EYES): FACP DRIVES A SHUNT-TRIP/TRANSFER RELAY TO SIMULATE LOSS OF NORMAL ON THE BRANCH, FORCING UNITS INTO EMERGENCY MODE. SUPERVISE THE CONTROL CIRCUIT.
      b. UL 924 INVERTERS: FACP DRY CONTACT INTO INVERTER EMERGENCY INPUT TO BYPASS NORMAL CONTROLS AND DRIVE CONNECTED CIRCUITS FULL BRIGHT. VERIFY INPUT TYPE (DRY VS. POWERED) AND SUPERVISE PER MANUFACTURER.
      c. GENERATOR-FED LIFE-SAFETY CIRCUITS: USE UL 924 ALCRS ON AFFECTED BRANCHES TO BYPASS SENSORS/DIMMERS/TIMECLOCKS UPON FACP ALARM, ENSURING CONTINUOUS FULL OUTPUT OF REQUIRED EGRESS LUMINAIRES. PROVIDE STATUS FEEDBACK WHERE AVAILABLE.
28. TESTING/DOCUMENTATION: DEMONSTRATE SEQUENCE DURING ACCEPTANCE: ALARM → CONTACT CLOSURE → EMERGENCY ILLUMINATION FOR ALL THREE CASES ABOVE; INCLUDE IN O&M AND RECORD DRAWINGS.
29. MISCELLANEOUS — PROVIDE LOCKBOX WITH MONITORED TAMPER MODULE AS REQUIRED BY AHJ. PROVIDE ADDITIONAL CODE-REQUIRED DEVICES/ACCESSORIES FOR A COMPLETE, COMPLIANT SYSTEM.

TYPICAL FIRE ALARM SEQUENCE OF OPERATIONS

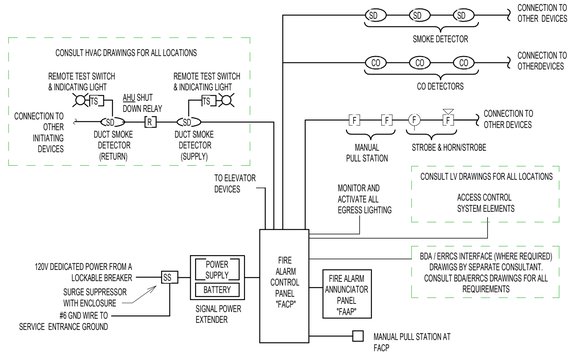
TYPICAL PARK SMALL RESTROOM BUILDING

INITIATING EVENT	ALARM HORN/STROBES	SUPERV. INDICATOR	HVAC SHUTDOWN	DOOR UNLOCKS	SIGNAL TO MONITORING STATION
MANUAL PULL STATION	ON	—	—	—	ALARM
HEAT DETECTOR	ON	—	—	✓	ALARM
SPRINKLER WATERFLOW (WET SYSTEM)	ON	—	—	✓	ALARM
SPRINKLER TAMPER SWITCH	—	—	—	—	SUPERVISORY

✓ = FUNCTION ACTIVATED



3 FIRE ALARM DEVICES MOUNTING HEIGHTS
N.T.S.



2 TYPICAL FIRE ALARM DIAGRAM
N.T.S.

FIRE ALARM RISER NOTES (FA 61G / AHJ COORDINATION)

1. RISER DIAGRAM IS DIAGRAMMATIC FOR DESIGN INTENT. FIRE ALARM CONTRACTOR SHALL FURNISH A COMPLETE, CODE-COMPLIANT SYSTEM AND SHALL NOT OMIT REQUIRED DEVICES, MODULES, OR FUNCTIONS DUE TO COORDINATION/DIAGRAM LIMITATIONS.
2. PROVIDE FIRE ALARM PERMIT AND PE-SIGNED/SEALED SHOP DRAWINGS INCLUDING DEVICE LAYOUT PLANS, RISER, POINT-TO-POINT WIRING, SLC/NAC LOADING, BATTERY CALCULATIONS, AND VOLTAGE-DROP CALCULATIONS (AS APPLICABLE). SUBMIT TO AHJ/FIRE MARSHAL AND OBTAIN APPROVAL PRIOR TO INSTALLATION.
3. COORDINATE WITH HVAC DRAWINGS/SPECIFICATIONS FOR ALL DUCT SMOKE DETECTOR LOCATIONS, AHU/RTU SHUTDOWN REQUIREMENTS, REMOTE TEST/INDICATION, AND REQUIRED RELAYS/MODULES; PROVIDE ALL REQUIRED INTERCONNECTIONS AND SUPERVISION AS APPLICABLE.
4. WHERE ACCESS CONTROL, ELECTRIFIED DOOR HARDWARE, AND/OR DOOR HOLD-OPEN DEVICES ARE PROVIDED (BY OTHERS), PROVIDE REQUIRED FIRE ALARM INTERFACE(S) FOR LIFE-SAFETY OPERATION ON ALARM. COORDINATE EXACT INTERFACE POINTS WITH THE LOW-VOLTAGE/ACCESS CONTROL DRAWINGS AND EQUIPMENT BY OTHERS.
5. PROVIDE THE SPECIFIED DMP CELLULAR COMMUNICATOR (OR APPROVED EQUAL) AS REQUIRED BY THE PERMIT DOCUMENTS/AHJ.
6. BDA/ERRCS INTERFACE (WHERE REQUIRED): WHERE AN EMERGENCY RESPONDER RADIO COVERAGE / ENHANCEMENT SYSTEM (BDA/ERRCS) IS REQUIRED BY THE AHJ/CODE, PROVIDE FIRE ALARM INTERFACE TO MONITOR AND ANNUNCIATE BDA/ERRCS SYSTEM "COMMON TROUBLE" (SUPERVISORY) AT THE FACP/REMOTE ANNUNCIATOR. PROVIDE REQUIRED LISTED MONITOR MODULE(S), LABELING, PROGRAMMING, AND TESTING. COORDINATE EXACT MONITORING POINTS, CONTACT TYPE (NO/NC), AND ANY ADDITIONAL REQUIRED SIGNALS (POWER FAIL/BATTERY TROUBLE) WITH THE BDA VENDOR AND AHJ. WIRING SHALL BE INSTALLED IN CONDUIT AND SUPERVISED PER NFPA 72.

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