

ELECTRICAL SPECIFICATIONS

1. GENERAL PROVISIONS:
- A. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, NECESSARY FOR THE COMPLETE INSTALLATION OF THE ELECTRICAL SYSTEMS OUTLINED.
- B. OBTAIN ALL PERMITS, FEES, LICENSES, INSPECTIONS, AND CERTIFICATES OF COMPLIANCE OR APPROVAL AS REQUIRED BY THE AUTHORITIES.
- C. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC), AND ALL APPLICABLE LAWS, CODES AND REGULATIONS OF THE GOVERNMENTAL BODIES HAVING JURISDICTION OVER THE SITE.
- D. ALL TESTING REQUIRED BY AUTHORITIES SHALL BE CONSIDERED PART OF THIS WORK.
- E. DURING CONSTRUCTION, ALL FIXTURES, EQUIPMENT, CONDUIT, ETC. SHALL BE COVERED, PLUGGED, OR CAPPED AS REQUIRED TO KEEP CLEAN AND UNDAMAGED. ALL DAMAGED ITEMS SHALL BE RESTORED TO ORIGINAL CONDITION OR REPLACED. ALL PROTECTIVE COVERINGS SHALL BE REMOVED BEFORE FINAL ACCEPTANCE.
- F. PROVIDE ALL NECESSARY CUTTING AND PATCHING OF WALLS, FLOORS, CEILINGS, AND ROOFS AS NECESSARY. PATCH AROUND ALL OPENINGS SHALL MATCH ADJACENT AREA. COORDINATE ALL ROOFING WORK WITH OWNER OR RESPONSIBLE PARTY, SO THAT THE EXISTING ROOFING WARRANTY WILL BE MAINTAINED.
- G. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS AGAINST DEFECTS FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE.
- H. CONTRACTOR SHALL PROVIDE ACCESS PANELS WHERE NECESSARY FOR CONCEALED ELECTRICAL COMPONENTS.
2. OPERATION AND MAINTENANCE MANUALS:
- A. DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG CUTS, LUBRICATION AND PREVENTIVE MAINTENANCE INSTRUCTIONS, PARTS LISTS, ETC. FOR ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT.
- B. ALL LITERATURE AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR INCLUSION IN THE OPERATION AND MAINTENANCE MANUALS.
- C. ALL LITERATURE LISTED ABOVE AND ALL PAPERS LISTING WARRANTIES, ETC. SHALL BE COLLATED AND LABELED WITH THE PROJECT NAME, ADDRESS, ARCHITECT, ENGINEER, CONTRACTORS, ETC. CONTRACTORS, ETC. DOCUMENTS SHALL BE COMPILED AND BOUND IN DIGITAL FILE OR 3 RING BINDER.
3. MANUFACTURERS:
- A. MANUFACTURERS, MODEL NUMBERS, ETC. INDICATED OR SCHEDULED ON THE DRAWINGS SHALL BE INTERPRETED AS HAVING ESTABLISHED A STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. ARTICLES, FIXTURES, ETC. OF EQUAL QUALITY BY MANUFACTURERS SHALL BE ACCEPTABLE, SUBJECT TO STRUCTURAL AND ELECTRICAL CONSTRAINTS OF THE PROJECT DESIGN, UNLESS NOTED OTHERWISE.
4. TESTING, AND BALANCING:
- A. ALL CIRCUITS SHALL BE TESTED FOR CONTINUITY, SHORTS, AND GROUNDS BEFORE CONNECTING TO THE PROPER PHASE AS DESIGNED TO BALANCE THE LOADS BETWEEN PHASES.
- B. POWER AND LIGHTING PANELS SHALL BE PROPERLY PHASED TO DISTRIBUTE THE LOAD AND SHALL BE CONNECTED AND ADJUSTED TO OPERATE AS SPECIFIED.
- C. ALL MOTORS AND SIMILAR EQUIPMENT SHALL BE CHECKED FOR PROPER PHASE ROTATION AND OPERATION.
5. RACEWAYS:
- A. CONDUIT INSIDE THE BUILDING SHALL BE METALLIC TUBING (EMT), BEARING THE UL LABEL, WITH COMPRESSION TYPE FITTINGS OR SCREW SET FITTINGS.
- B. CONDUIT EXPOSED TO THE WEATHER, INSTALLED UNDERGROUND, IN CONCRETE, OR USED FOR SERVICE ENTRANCE SHALL BE STANDARD RIGID CONDUIT (GALVANIZED) WITH THREADED FITTINGS.
- C. UNDERGROUND CONDUIT MAY BE POLY-VINYL CHLORIDE WITH A DEFLECTION TEMPERATURE UNDER LOAD AT 264 PSI, OF 78 DEGREES C, AND A TENSILE STRENGTH OF 5,200 PSI. JOINTS SHALL BE FLUSH SOLVENT WELDED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE EQUAL TO CARLON POWER AND COMMUNICATIONS DUCT TYPE DB (DIRECT BURIAL). CONDUIT AND FITTINGS SHALL BE PRODUCED BY THE SAME MANUFACTURER.
- D. FLEXIBLE METAL CONDUIT SHALL ONLY BE USED FOR CONNECTIONS TO MOTORS, TRANSFORMERS, AND LIGHT FIXTURES. MAXIMUM LENGTH SHALL BE 6'-0".
6. CONDUCTORS:
- A. WIRES SHALL BE CONTINUOUS WITHOUT SPLICES OR TAPS IN CONDUIT RUNS. ALL SPLICES SHALL BE MADE IN JUNCTION, PULL, OR OUTLET BOXES. ALL WIRES SHALL BE INSTALLED IN CONDUIT, WIREWAYS, OR OTHER PROTECTIVE COVER SANCTIONED BY CODES.
- B. CONDUCTORS FOR LIGHTING AND POWER SHALL BE COPPER, MINIMUM NO. 12 AWG., 600 VOLT.
- C. NO. 10 GAUGE AND SMALLER CONDUCTORS SHALL BE TYPE THIN (NET LOCATIONS) OR THIN (DRY LOCATIONS), SOLID CONDUCTOR, UNLESS OTHERWISE INDICATED.
- D. NO. 8 GAUGE AND LARGER CONDUCTORS SHALL BE TYPE THIN (NET LOCATIONS) OR THIN (DRY LOCATIONS), STRANDED, UNLESS OTHERWISE INDICATED.
- E. SERVICE ENTRANCE AND PANEL FEEDER CONDUCTORS, NO. 3 GAUGE AND LARGER SHALL BE TYPE XHHW-2 (NET LOCATIONS) OR THIN (DRY LOCATIONS), STRANDED COPPER, UNLESS OTHERWISE INDICATED.
7. MC CABLE:
- A. MC CABLE SHALL CONSIST OF INTERLOCK ARMORED CABLE MADE OF THREE OR FOUR TYPE THIN SOLID (NO ANG AND LARGER MAY BE STRANDED) COPPER CONDUCTORS RATED 600V FOR DRY LOCATIONS, WITH NYLON OR EQUIVALENT UL LISTED JACKET, PER UL STANDARD 83. THE THREE CONDUCTORS SHALL BE TWISTED TOGETHER WITH THE COPPER GROUNDING CONDUCTOR, SUITABLE FILERS, AND WRAPPED IN BINDER TAPE. THE ASSEMBLY SHALL BE ARMORED WITH SPIRALLY WRAPPED INTERLOCKED ARMOR OF ALUMINUM OR GALVANIZED STEEL.
- B. CABLES SHALL BE TESTED IN ACCORDANCE WITH UL STANDARD 1664 FOR TYPE MC CABLE AND RATED AT 600 VOLTS, 90 DEG. C FOR DRY LOCATIONS AND 75 DEG. C FOR NET LOCATIONS.
8. WIRING DEVICES:
- A. WALL SWITCHES SHALL BE SPECIFICATION GRADE, QUIET TYPE, FLUSH TOGGLE SWITCH, RATED FOR 20 AMPS, WITH THERMOPLASTIC COVER PLATES.
- 1) SINGLE POLE: HUBBELL #G51221-X, OR EQUAL.
- 2) THREE WAY: HUBBELL #G51223-X, OR EQUAL.
- 3) AS SPECIFIED ON PLANS.
- B. RECEPTACLES SHALL BE SPECIFICATION GRADE, DUPLEX, GROUNDING, THREE-WIRE TYPE, RATED FOR 20 AMPS, WITH THERMOPLASTIC COVER PLATES. HUBBELL #CR5352-X, OR EQUAL.
- C. GROUND FAULT INTERRUPTER RECEPTACLES (GFI) SHALL BE HUBBELL #GF20-XL. DEVICE COVER PLATES SHALL BE AS HEREBEFORE SPECIFIED.
- D. ISOLATED GROUND RECEPTACLES (IG) SHALL BE HUBBELL #CR5352IG, ORANGE COLOR. DEVICE COVER PLATES SHALL BE AS HEREBEFORE SPECIFIED.
- E. RECEPTACLES OUTSIDE BUILDINGS AND WHERE NOTED AS WEATHERPROOF, SHALL BE LISTED WEATHER-RESISTANT HUBBELL #GFTR20-X OR EQUAL AND SHALL BE INSTALLED IN A WEATHERPROOF ENCLOSURE WHICH SHALL BE INTERMATIC IMPT0100X2 OR IMPT0100XND DECATAL METAL WEATHERPROOF RECEPTACLE COVER. COVER SHALL BE WEATHER PROOF RATED WHILE IN USE.
- F. VERIFY DEVICES AND DEVICE COVERPLATES COLOR WITH ARCHITECT.
9. BOXES:
- A. HOT DIPPED GALVANIZED STEEL BOXES. PROVIDE TYPE TO SUIT CONDITIONS FOR INSTALLATION.
- B. ALL BOXES SHALL BE FLUSH MOUNTED, UNLESS INDICATED OTHERWISE.
10. PANELBOARDS:
- A. FURNISH AND INSTALL CIRCUIT BREAKER PANELBOARDS AS SHOWN ON THE DRAWINGS. PANELBOARDS SHALL BE LISTED BY UL AND SO LABELED, AND SHALL BE FULLY RATED FOR THE VOLTAGE AND CURRENT CAPACITY INDICATED ON THE PANEL SCHEDULE. PANELBOARDS SHALL BE EQUAL TO GENERAL ELECTRIC TYPE AS WITH BOLT IN TYPE BREAKERS. PANELBOARD LUGS SHALL BE RATED AT 75°C.
- 1) CIRCUIT BREAKER INTERRUPTING CAPACITIES SHALL MEET OR EXCEED THE AVAILABLE RMS SYMMETRICAL FAULT CURRENTS INDICATED AND AS REQUIRED TO MEET OR EXCEED THE AVAILABLE FAULT CURRENT FROM LOCAL UTILITY.
- B. CIRCUIT BREAKERS SHALL MEET APPLICABLE PORTIONS OF UL STANDARD 484 AND NEMA AB-1. CIRCUIT BREAKERS SHALL BE BOLT-ON, GROUP MOUNTED, AMBIENT MAGNETIC, WITH COMMON TRIP, UL RATED TO CARRY 80% OF NAMEPLATE RATING CONTINUOUSLY IN FREE AIR AT 40°C. CIRCUIT BREAKERS SHALL BE TRIP INDICATING AND FULLY INTERCHANGEABLE WITHOUT DISTURBING ADJACENT UNITS. WIRE TERMINALS SHALL BE RATED 75 DEGREES C. THE OPERATING MECHANISM SHALL BE TRIP-FREE SO THAT CONTACTS CANNOT BE HELD CLOSED AGAINST ANY ABNORMAL OVERCURRENT OR SHORT CIRCUIT CONDITION.
- a) BREAKERS SHALL MEET APPLICABLE NEMA AND/OR UL SPECIFICATIONS.
- C. PANELBOARD BOXES SHALL BE GALVANIZED SHEET STEEL WITH AMPLE WIRING GUTTER SPACE IN ACCORDANCE WITH NEC. FRONTS SHALL BE OF SHEET STEEL PAINTED LIGHT GREY OVER A SUITABLE RUST INHIBITOR PRIMER. PANELBOARDS SHALL BE EQUIPPED WITH ONE PIECE DOOR, CYLINDER TURNBLER TYPE LOCK, DIRECTORY CARD-HOLDER AND QUARTER-TURN ADJUSTABLE TRIM CLAMPS.
- D. PANELBOARD INTERIORS SHALL CONSIST OF REINFORCED GALVANIZED SHEET STEEL FRAMES WITH ALUMINUM BUS BARS AND CIRCUIT BREAKERS, PROPERLY SUPPORTED TO PREVENT VIBRATIONS AND BREAKAGE IN HANDLING. BUS BARS SHALL BE SEQUENCE PHASED. PANELBOARD SHALL HAVE A FULL SIZED SOLID

ELECTRICAL SPECIFICATIONS (CONTINUED)

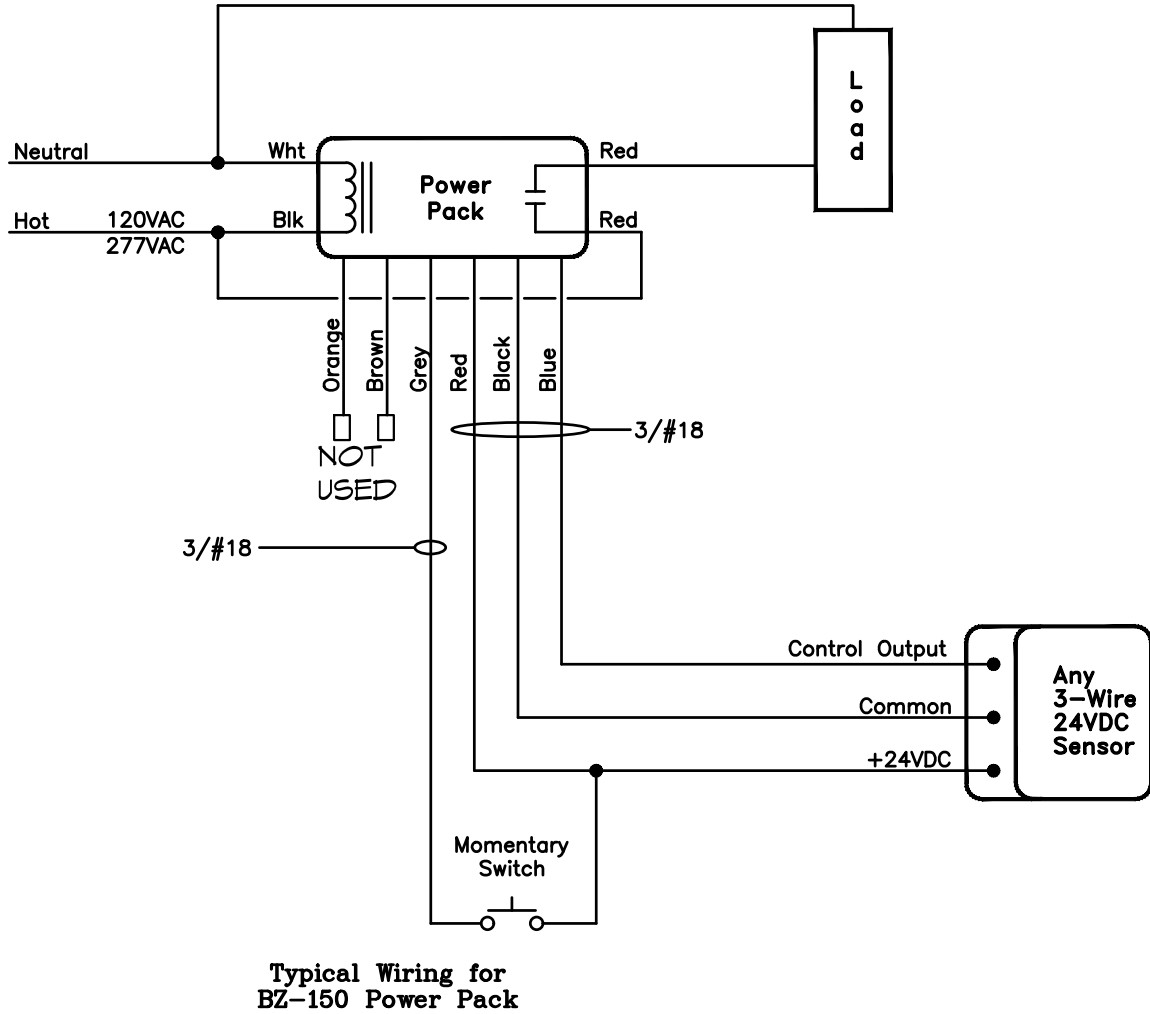
10. PANELBOARDS (CONTINUED):
- E. BUS BAR BRACING SHALL BE UL LISTED AS INDICATED ON DRAWINGS. ADDITIONAL BRACING SHALL BE PROVIDED AS REQUIRED TO MEET OR EXCEED INDICATED AVAILABLE FAULT CURRENTS.
- F. DIRECTORY CARDS SHALL BE COMPLETELY FILLED IN BY TYPEWRITER, LISTING CIRCUIT NUMBERS AND LOAD SERVED, INCLUDING EXISTING CIRCUITS. CIRCUIT BREAKERS SHALL BE IDENTIFIED BY CIRCUIT NUMBER LABELS AS HEREBEFORE SPECIFIED.
11. DISCONNECTS:
- A. DISCONNECTS SHALL BE EXTERNALLY OPERATED, QUICK-MAKE, QUICK-BREAK, SAFETY, WITH PROVISIONS FOR PAD LOCKING. FUSED AND NON-FUSED DISCONNECT SWITCHES SHALL BE PROVIDED AS INDICATED.
- B. INDOOR SWITCHES SHALL BE NEMA 1 AND OUTDOOR SWITCHES SHALL BE NEMA 3R, UNLESS INDICATED OTHERWISE.
12. FUSES:
- A. FUSES PROTECTING CIRCUIT BREAKER PANELS SHALL BE CURRENT LIMITING UL CLASS RK-1 FUSES WITH 200,000 AMPERES RMS SYM INTERRUPTING CAPACITY. FUSING ELEMENTS SHALL BE SILVER FOR RATINGS ABOVE 60 AMPERES.
- B. ALL OTHER FUSES SHALL BE UL CLASS RK-5, DUAL-ELEMENT WITH A MINIMUM TIME-DELAY OF 10 SECONDS AT 500% RATINGS. FUSES SHALL HAVE CURRENT-LIMITING SHORT-CIRCUIT LINKS AND 200,000 AMPERES RMS SYM INTERRUPTING CAPACITY. FUSING ELEMENTS SHALL BE COPPER.
13. LIGHT FIXTURES:
- A. WHERE LIGHT FIXTURES ARE MOUNTED IN A LAY-IN CEILING, PROVIDE A MINIMUM OF 2 SUPPORT WIRES ATTACHED DIRECTLY BETWEEN EACH LIGHT FIXTURE AND THE BUILDING STRUCTURE. SUPPORT WIRES SHALL BE A MINIMUM OF 12 GAUGE GALVANIZED STEEL WIRE, SOFT ANNEALED.
- B. FIXTURES ARE REQUIRED AT ALL LIGHTING OUTLETS SHOWN ON THE DRAWINGS. APPROVED LIGHTING FIXTURE WIRE IS REQUIRED IN ALL FIXTURES AND FIXTURE RACEWAYS. WEATHERPROOF WIRING IS REQUIRED FOR EXTERIOR FIXTURES. ALL PARTS OF FIXTURES AND WIRING SHALL BE IN ACCORDANCE WITH NEC REQUIREMENTS.
- C. ALL FIXTURES SHALL CARRY UL AND ETL LABELS. ALL FLUORESCENT FIXTURE BALLASTS SHALL BE HIGH FREQUENCY ELECTRONIC BALLASTS WITH A TOTAL HARMONIC DISTORTION OF LESS THAN 20%, REGARDLESS OF THE NUMBER OF LAMPS CONNECTED TO EACH BALLAST AND SHALL HAVE CBM LABEL. ALL FLUORESCENT FIXTURES INSTALLED SHALL INCORPORATE BALLAST PROTECTION. ALL FLUORESCENT BALLASTS SHALL HAVE AN AUDIBLE NOISE RATING OF "CLASS A" OR BETTER. ALL FLUORESCENT BALLASTS SHALL HAVE A STANDARD BALLAST FACTOR UNLESS SPECIFIED OTHERWISE.
14. SLEEVES:
- A. PROVIDE, SET, AND PROPERLY LOCATE PIPE SLEEVES AS REQUIRED FOR THIS WORK.
- B. INTERIOR PARTITIONS, 16 GAUGE GALVANIZED STEEL, PACK BETWEEN CONDUIT AND SLEEVE WITH FIRE SAFING AND CAULK AT EACH END WITH FIRE RESISTANT SEALANT.
- C. ROOF: PROSET OR EQUAL, MANUFACTURED PVC, SCHEDULE 40 PIPE SLEEVE WITH WEATHERPROOF SEAL. COORDINATE WITH ROOFING CONTRACTOR AND FLASH AS REQUIRED TO MAINTAIN ROOF WARRANTY.
15. GROUNDING:
- A. GROUND ALL ELECTRICAL APPARATUS IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC) 250, AND ANY LOCAL REQUIREMENTS. INSURE CONTINUOUS BOND WHERE FLEXIBLE CONDUIT IS USED. PROVIDE BONDING JUMPER INSIDE ALL FLEXIBLE CONDUIT.
- B. BOND METAL PIPING SYSTEMS IN COMPLIANCE WITH NEC 250.4(A)(4).
16. DRY TYPE TRANSFORMERS:
- A. DRY TYPE TRANSFORMERS SHALL BE ENCLOSED IN DRIPPROOF METALLIC ENCLOSURES DESIGNED TO PROVIDE FOR AIR COOLING AND PREVENT ACCIDENTAL CONTACT WITH LIVE CONDUCTORS. MATERIALS AND FINAL PERFORMANCE SHALL COMPLY WITH APPLICABLE IEEE, ANSI AND NEMA STANDARDS. TRANSFORMERS SHALL BE FULLY RATED TWO WINDING UNITS CAPABLE OF CARRYING THE LOADS INDICATED. TRANSFORMERS SHALL BE EQUAL TO SQUARE D TYPE EP.
- B. TRANSFORMERS SHALL BE CAPABLE OF OPERATING AT 100% NAMEPLATE KVA RATINGS CONTINUOUSLY WHILE IN A 40°C AMBIENT WITHOUT EXCEEDING THE RATED AVERAGE WINDING TEMPERATURE RISE OF THE ANSI INSULATION USED. INSULATION SHALL BE CLASS 155C FOR TRANSFORMERS 5 KVA TO 25 KVA AND CLASS 220C FOR TRANSFORMERS 30 KVA TO 500 KVA. TRANSFORMERS SHALL BE UL APPROVED. TRANSFORMERS SHALL HAVE OVER-LOAD CAPACITY TO COMPLY WITH ANSI C57.160L WITH NORMAL LIFE MAINTAINED. SOUND RATINGS SHALL NOT EXCEED MAXIMUM VALUES FOR KVA RATINGS AS MEASURED PER ANSI C64.1.
- C. TRANSFORMERS 30 KVA AND LARGER SHALL BE EQUIPPED WITH TWO 3-1/2% FULL CAPACITY TAPS ABOVE AND FOUR 2-1/2% TAPS BELOW NORMAL RATED VOLTAGE. IN ADDITION, TRANSFORMERS OF THESE RATINGS SHALL BE PROVIDED WITH CLAMP-TYPE SOLDERLESS CONNECTORS SUITABLE FOR USE WITH COPPER OR ALUMINUM CABLES. THE CONNECTORS SHALL BE MOUNTED ON A TERMINAL BOARD WITH HIGH-VOLTAGE AND LOW-VOLTAGE TERMINALS HELD IN A FIXED POSITION AND CLEARLY MARKED. TRANSFORMER LUGS SHALL BE RATED AT 75°C. TRANSFORMERS 30 KVA AND LARGER SHALL BE PROVIDED WITH NEOPRENE RUBBER ISOLATION PADS MOUNTED BETWEEN THE CORE AND COIL ASSEMBLY AND ENCLOSURE TO ISOLATE SOUND AND VIBRATION.
17. FIRE ALARM SYSTEM:
- A. ELECTRICAL CONTRACTOR SHALL PROVIDE DESIGN BUILD ENGINEERED SHOP DRAWINGS OF FIRE ALARM SYSTEM TO BE INSTALLED. PROVIDE DEVICES, CONDUIT, WIRES, CABLE, PROGRAMMING AND TESTING AS DIRECTED BY EQUIPMENT MANUFACTURER AND LOCAL FIRE DEPARTMENT FOR A CODE COMPLIANT FIRE ALARM/DETECTION SYSTEM. MATERIALS, EQUIPMENT, AND WORKMANSHIP SHALL MEET PREVAILING CODES. THE SYSTEM SHALL BE COMPLETE AND OPERABLE. SUBMIT ONE LINE DIAGRAM OF SYSTEM WITH SIZES AND BATTERY CALCULATIONS. EQUIPMENT TO BE NEW AND SHALL BE STAMPED, SIGNED, CALIBRATION AND TESTED BY FACTORY CERTIFIED TECHNICIAN. FIRE ALARM DEVICES ARE SHOWN FOR INTENT ONLY FOR PERMITTING PURPOSES. CONTRACTOR IS RESPONSIBLE FOR INCLUDING IN BID DESIGN ALL NECESSARY DEVICES (ANNUNCIATOR(S)), NOTIFICATION APPLIANCES, INITIATING DEVICES, AND ADDITIONAL COMPONENTS).

ELECTRICAL SYMBOLS LIST

CIRCUITING & NOTES	
146"	SPECIAL MOUNTING HEIGHT FOR ASSOCIATED DEVICE (CENTERLINE OF DEVICE)
GFI	GROUND FAULT CIRCUIT INTERRUPTER DEVICE
WP	WEATHERPROOF ENCLOSURE ON DEVICE
WR	WEATHERPROOF RESISTANT DEVICE
IG	ISOLATED GROUND DEVICE
EM	EMERGENCY BATTERY BACKUP
TR	TAMPER RESISTANT OUTLET
(TIE)	PARTIAL HOMERUN. REFER TO PLANS FOR ADDITIONAL DEVICES CONNECTED TO THIS CIRCUIT.
	ELECTRICAL FLOOR PLAN NOTE WITH DESIGNATION
	CONDUIT CONCEALED WHERE POSSIBLE OR AS NOTED, ARROWS INDICATE HOME RUN TO PANEL. CIRCUIT NUMBERS INDICATED
	#12 WIRE IN CONDUIT, UNLESS NOTED OTHERWISE ON DRAWINGS OR SPECIFICATION
	GROUNDING CONDUCTOR, #12 WIRE UNLESS NOTED OTHERWISE ON DRAWINGS OR SPECIFICATION
	CONDUIT ROUTED UNDER FLOOR/GRADE
LIGHTING	
	EMERGENCY TWIN HEAD LIGHT FIXTURE
	EXIT LIGHT WITH DIRECTIONAL ARROWS INDICATED
	STRIP FIXTURE WITH TYPE DESIGNATION
	RECESSED OR SURFACE MOUNTED FIXTURE WITH TYPE DESIGNATION
	NIGHT LIGHT, CONNECT TO UNSWITCHED CIRCUIT
	CEILING OR RECESSED FIXTURE WITH TYPE DESIGNATION
	WALL MOUNTED FIXTURE WITH TYPE DESIGNATION
POWER DEVICES	
	DUPLEX RECEPTACLE, BOTTOM OF BOX AT 16" AFF, UNLESS NOTED OTHERWISE
	FOURPLEX RECEPTACLE, BOTTOM OF BOX AT 16" AFF, UNLESS NOTED OTHERWISE
	DEVICE MOUNTED ABOVE COUNTER AND/OR SPLASH GUARD
	HEAVY DUTY OUTLET - NEMA CONFIGURATION SIZE PER EQUIPMENT MANUFACTURER'S RECOMMENDATION
	PANEL BOARD, TOP OF BOX 6'-0" AFF
	JUNCTION BOX
	NON-FUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	MOTOR WITH DESIGNATION
CONTROLS	
S	SINGLE POLE WALL SWITCH, TOP OF BOX AT 48" AFF
S _m	MANUAL MOTOR STARTER WITH OVERLOADS
OCCUPANCY SENSORS	
1. DUAL TECHNOLOGY/ULTRASONIC CEILING SENSORS SHALL BE MOUNTED 6' FROM SUPPLY/EXHAUST AIR DIFFUSERS.	
2. LOW VOLTAGE CEILING SENSORS SHALL BE PROVIDED WITH 6' SLACK CONDUCTOR COILED AT SENSOR.	
S _o	INFRARED OCCUPANCY SENSOR, WATT STOPPER #FW-100, TOP OF BOX AT 48" AFF
	DUAL TECHNOLOGY CEILING MOUNT OCCUPANCY SENSORS, WATTSTOPPER UT-300-3 HALLWAY COVERAGE PATTERN OR EQUAL
	OCCUPANCY SENSOR POWER PACK, WATTSTOPPER BZ-150 OR EQUAL, PROVIDE LOW VOLTAGE WIRING TO OCCUPANCY SENSORS AND MOMENTARY SWITCHES
COMMUNICATIONS	
	DATA/TELEPHONE OUTLET WITH 3/4" CONDUIT STUBBED UP TO ABOVE ACCESSIBLE CEILING, BOTTOM OF BOX AT 16", UNLESS NOTED OTHERWISE. PROVIDE WITH PULL STRING
FIRE ALARM	
	CEILING MOUNT SMOKE DETECTOR
	DUCT MOUNT SMOKE DETECTOR
	CEILING MOUNT HEAT DETECTOR
	FIRE ALARM PULL STATION, TOP OF BOX AT 48" AFF
	EXTERIOR FIRE ALARM BELL, CENTERLINE 11'-8" ABOVE GRADE
	WATER FLOW SWITCH
	TAMPER SWITCH
MISCELLANEOUS	
	LINE VOLTAGE THERMOSTAT PROVIDED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL WIRING

ELECTRICAL GENERAL NOTES:

1. COORDINATE ALL WORK WITH OTHER TRADES AND EXISTING CONDITIONS AS REQUIRED TO PROPERLY INSTALL ALL SYSTEMS AS INTENDED, WITHIN THE CONFINES OF THE SPACES AVAILABLE, AND WITHOUT INTERFERENCES.
2. IT IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO PROPERLY BALANCE ALL BRANCH CIRCUITS BETWEEN THE PHASES OF THE SYSTEM REGARDLESS OF CIRCUITING INDICATED.
3. ELECTRICAL CONTRACTOR TO COORDINATE MANUFACTURER ELECTRICAL REQUIREMENTS FOR HVAC EQUIPMENT BEING FURNISHED WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. EQUIPMENT DISCONNECTS TO BE PROVIDED BY ELECTRICAL CONTRACTOR UNLESS NOTED OTHERWISE IN MECHANICAL SCHEDULES.
4. ALL MATERIALS EXPOSED WITHIN PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84.
5. EACH BRANCH CIRCUIT SHALL HAVE A DEDICATED NEUTRAL PER NEC 210.4.
6. ALL BRANCH CIRCUITS SHALL BE SIZED TO ALLOW FOR A MAXIMUM OF 3% VOLTAGE DROP. ALL FEEDERS SHALL BE SIZED TO ALLOW FOR A MAXIMUM OF 2% VOLTAGE DROP. ELECTRICAL CONTRACTOR SHALL VERIFY WIRING INDICATED IS SUFFICIENT AND INCREASE CONDUCTOR SIZE AS REQUIRED BASED OFF ACTUAL INSTALLED LENGTH OF CONDUCTORS.



CEILING OCCUPANCY SENSOR WIRING DIAGRAM
SCALE: NONE



LAKEWOOD STORAGE
4101 NE PORT DRIVE
LEE'S SUMMIT, MO

10/26/2022



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ELECTRICAL SPEC

BC PROJECT #: 22573
MISSOURI PE COA #2009003629

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E0.0

Date: 2022/10/25
Drawn by : DS/LC
Checked by : DS/EK
Revisions :



LAKELWOOD STORAGE
4101 NE PORT DRIVE
LEE'S SUMMIT, MO

1/11/2023



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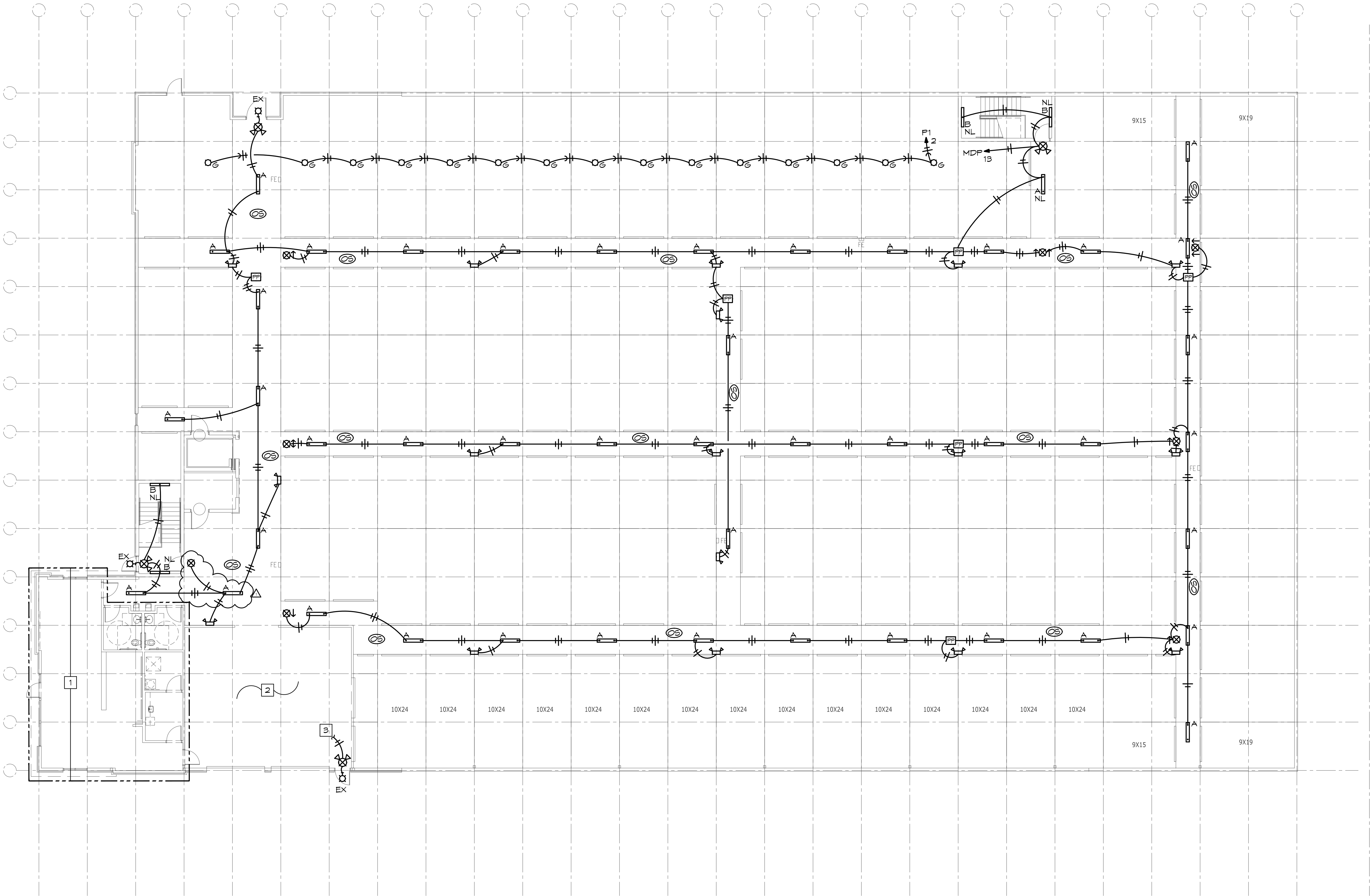
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1ST FLR LIGHTING PLAN

Date: 2022/10/25
Drawn by: DS/LC
Checked by: DS/EK
Revisions: 2023/1/2

E1.1

- ELECTRICAL PLAN NOTES:
- 1 SEE ENLARGED PLAN ON SHEET E3.1 FOR WORK IN THIS AREA
 - 2 AREA OPEN TO FLOOR ABOVE. SEE SHEET E1.2 FOR LIGHTING IN THIS AREA.
 - 3 SEE SHEET E1.2 FOR CONTINUATION.



FIRST FLOOR LIGHTING PLAN
SCALE: 3/32" = 1'-0"

BC PROJECT #: 22573
MISSOURI PE COA #2009003629
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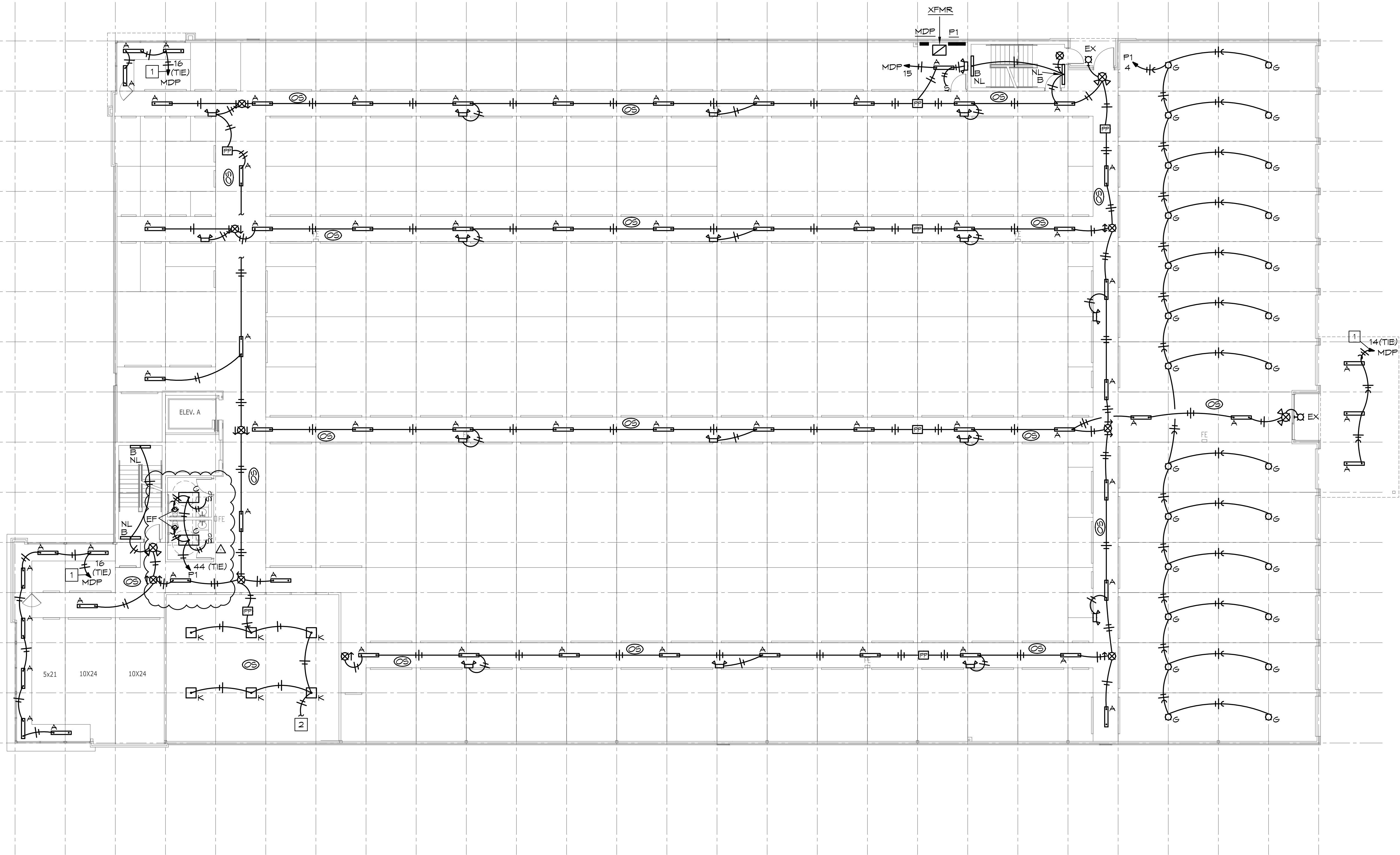
2ND FLOOR LIGHTING PLAN

Date: 2022/10/25
Drawn by: DS/LC
Checked by: DS/EK
Revisions: 2023/1/2

E1.2

ELECTRICAL PLAN NOTES:

- 1 ROUTE CIRCUIT TO PANEL VIA EXTERIOR LIGHTING CONTROLS - SEE DETAIL, SHEET 1.3.
- 2 DOWN TO EXIT SIGN - SEE SHEET E1.1



SECOND FLOOR LIGHTING PLAN

SCALE: 3/32" = 1'-0"

BC PROJECT #: 22573
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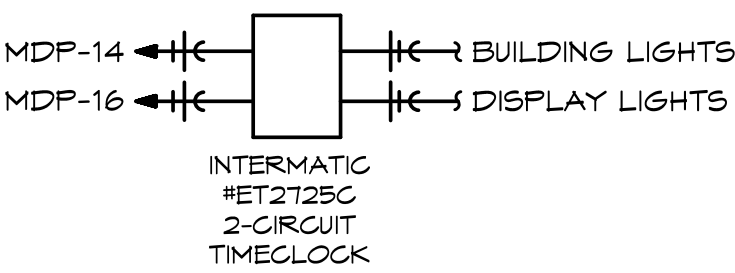
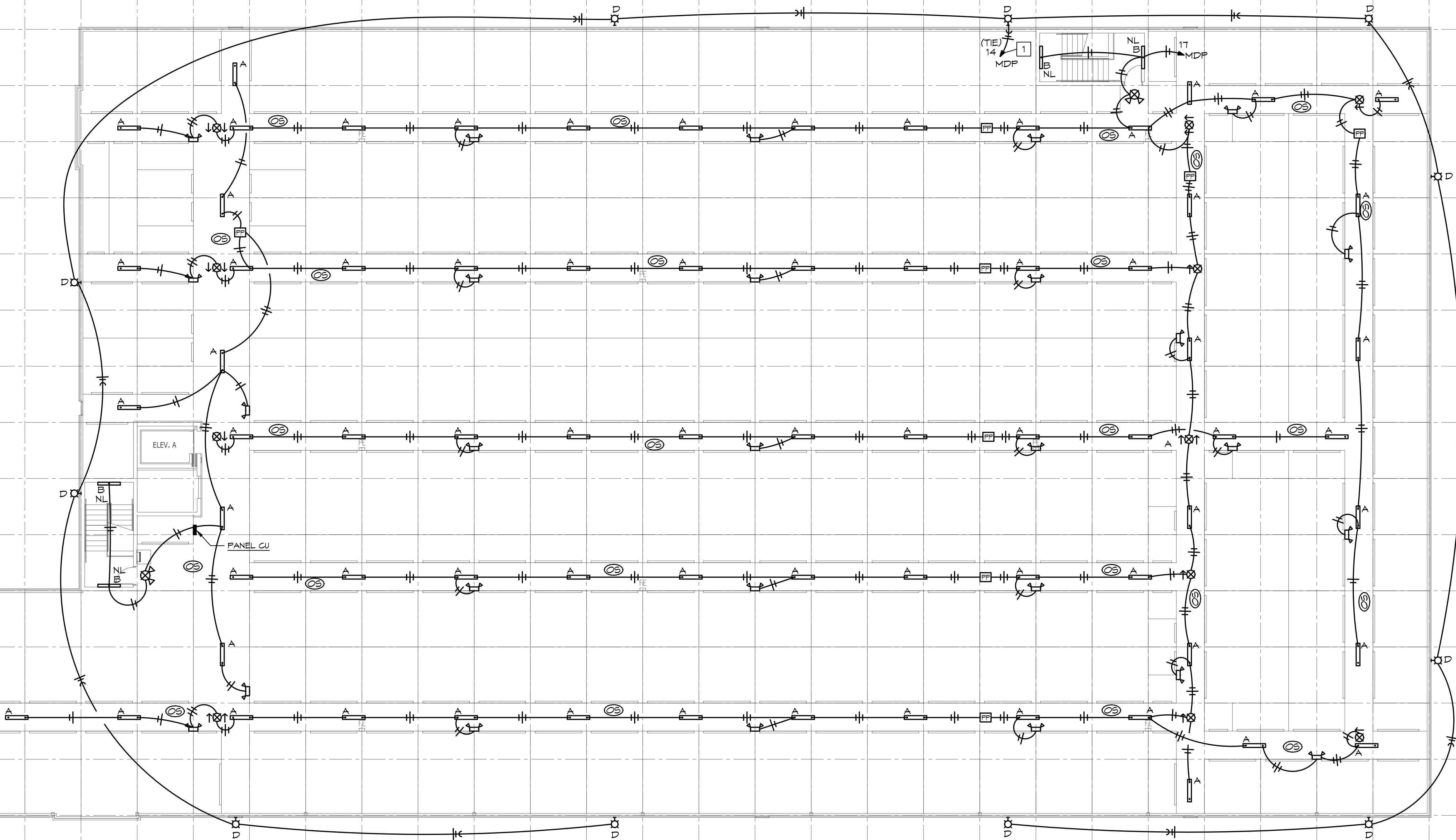
3RD FLOOR LIGHTING PLAN

Date: 2022/10/25
Drawn by: DS/LC
Checked by: DS/EK
Revisions:

E1.3

ELECTRICAL PLAN NOTES:

- 1 ROUTE CIRCUIT TO PANEL VIA EXTERIOR LIGHTING CONTROLS. INTERMATIC #ET2725C OR EQUAL PROGRAMMABLE TIMELOCK. SEE DETAIL, THIS SHEET.



EXTERIOR LIGHTING CONTROL DIAGRAM
SCALE: NONE

THIRD FLOOR LIGHTING PLAN
SCALE: 3/32" = 1'-0"

BC PROJECT #: 22573
MISSOURI PE COA #2009003629
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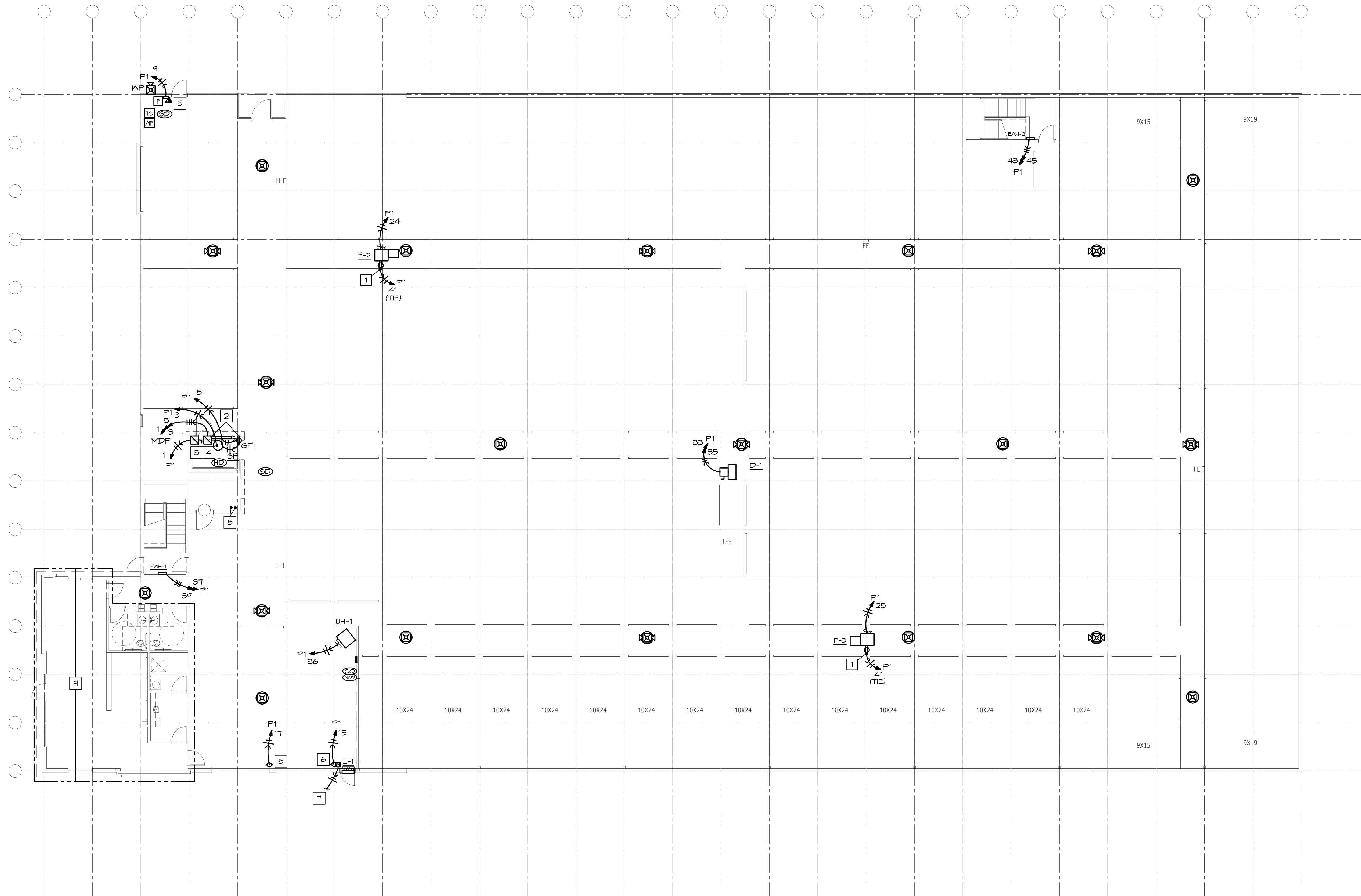
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Date: 2022/10/25
 Drawn by : DS/LC
 Checked by : DS/EK
 Revisions :

E2.1



- 1 DUPLEX RECEPTACLE MOUNTED IN JOIST SPACE WITHIN 25' OF UNIT FOR HVAC EQUIPMENT SERVICE PER NEG.
- 2 DUPLEX GFCI RECEPTACLE AND VAPOR-TIGHT LIGHT WITH SWITCH MOUNTED IN ELEVATOR PIT PER NEG.
- 3 FUSED DISCONNECT SWITCHES FOR POWER TO ELEVATOR GAB LIGHTS. COORDINATE EXACT LOCATION & REQUIREMENTS WITH ELEVATOR EQUIPMENT SUPPLIER.
- 4 BUSSMAN #F31-T48-R2-B-F1 OR EQUAL ELEVATOR POWER MODULE DISCONNECT WITH AUXILIARY CONTACTS AND SHUNT TRIP CAPABILITY. VERIFY EXACT LOCATION & REQUIREMENTS WITH ELEVATOR EQUIPMENT SUPPLIER.
- 5 POWER AND DATA FOR FIRE ALARM PANEL - VERIFY REQUIREMENTS.
- 6 CONNECT TO OVERHEAD DOOR OPERATION PER MANUFACTURER'S INSTRUCTIONS. PROVIDE CONTROL WIRING AND PUSHBUTTONS AS DIRECTED BY OWNER.
- 7 INTERLOCK WITH EXHAUST FAN - SEE 2ND FLOOR ELECTRICAL PLAN FOR LOCATION.
- 8 (1) 1" G AND (1) 2" G TO MDP FOR FUTURE SECOND ELEVATOR.
- 9 SEE ENLARGED PLAN ON SHEET E3.1 FOR WORK IN THIS AREA

FIRST FLOOR POWER PLAN
SCALE: 3/32" = 1'-0"

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1/11/2023



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2ND FLOOR POWER PLAN

Date: 2022/10/25
Drawn by: DS/LC
Checked by: DS/EK
Revisions: 2023/1/2

E2.2

ELECTRICAL PLAN NOTES:

- 1 DUPLEX RECEPTACLE MOUNTED IN CEILING SPACE NEAR FURNACES FOR EQUIPMENT SERVICE.
- 2 INTERLOCK EXHAUST FAN WITH MOTORIZED LOUVER ON FIRST FLOOR. SEE SHEET E1.1
- 3 ROUTE CIRCUIT THROUGH CARBON MONOXIDE DETECTOR FOR AUTOMATIC OPERATION. SEE SHEET E1.1 FOR LOCATION AND MECHANICAL DRAWINGS FOR SEQUENCE OF OPERATION.
- 4 BUILDING MOUNTED ELECTRICAL SERVICE EQUIPMENT. SEE RISER DIAGRAM.
- 5 PROVIDE POWER AND 1" C WITH FULL STRING TO OFFICE TELEPHONE BOARD FOR MOTORIZED ACCESS GATE OPERATOR AND ACCESS CONTROL WIRING. REFER TO CIVIL PLANS FOR GATE LOCATION. COORDINATE ALL REQUIREMENTS WITH GATE SUPPLIER.
- 6 PROVIDE RELAY TO OPERATE 120V EXHAUST FAN WITH 277V RESTROOM LIGHTING.



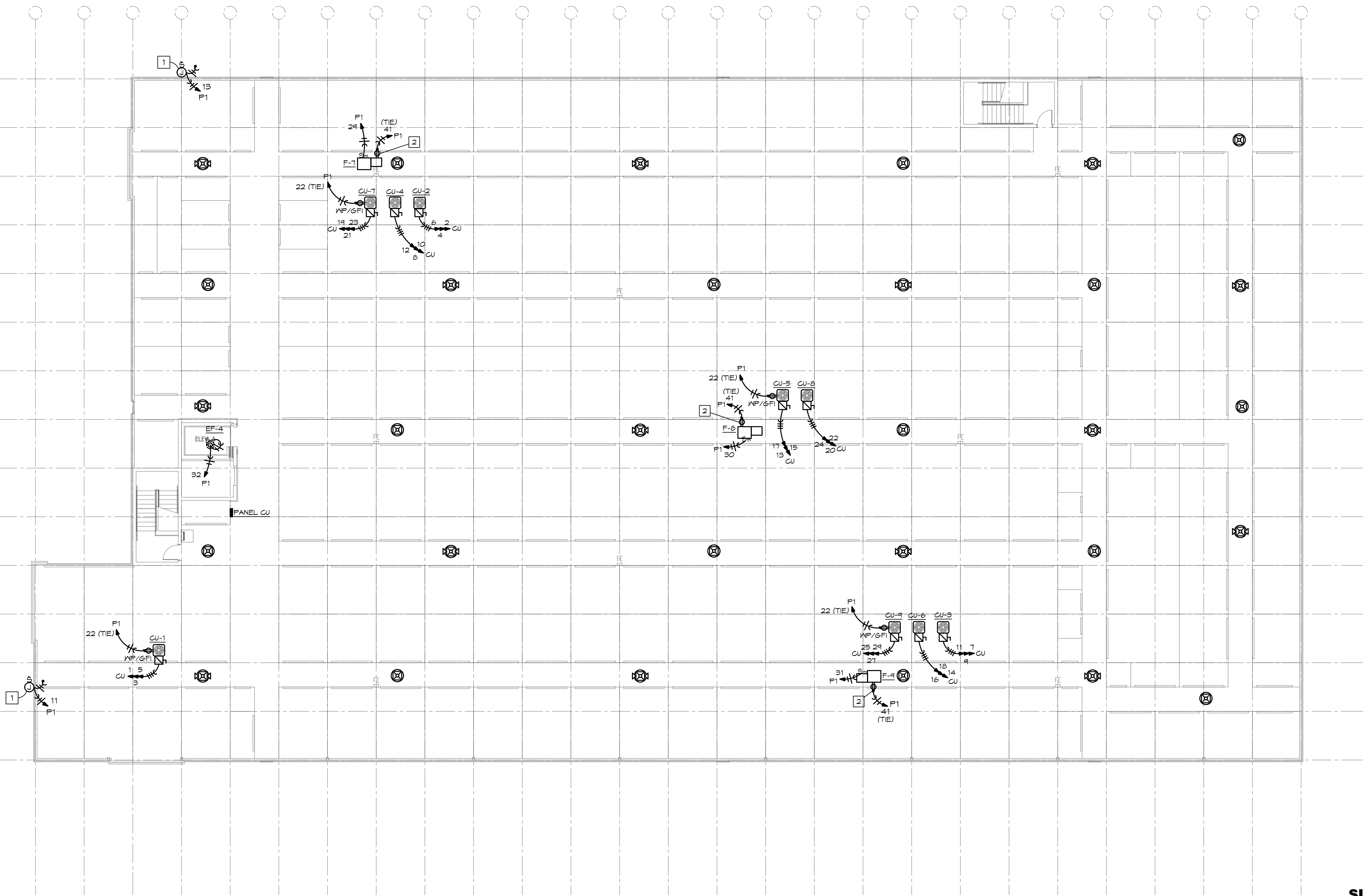
SECOND FLOOR POWER PLAN
SCALE: 3/32" = 1'-0"

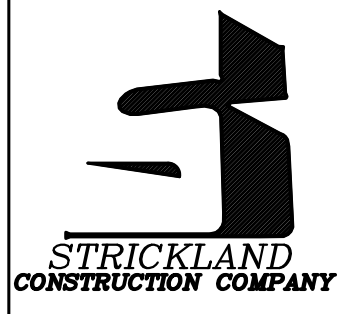
BC PROJECT #: 22573
MISSOURI PE COA #2009003629
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ELECTRICAL PLAN NOTES:

- 1 JUNCTION BOX WITH DISCONNECTING MEANS PER NEC FOR POWER TO ILLUMINATED BUILDING SIGNAGE. COORDINATE EXACT LOCATION & REQUIREMENTS WITH SIGNAGE VENDOR. ROUTE CIRCUIT TO PANEL VIA INTERMATIC #ET2125C OR EQUAL FOR AUTOMATIC CONTROL.
- 2 DUPLEX RECEPTACLE MOUNTED IN CEILING SPACE NEAR FURNACES FOR EQUIPMENT SERVICE.





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10/26/2022



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ELECTRICAL
SCHEDULES & DETAILS

Date: 2022/10/25
Drawn by: DS/LC
Checked by: DS/EK
Revisions:

E3.0

LIGHT FIXTURE SCHEDULE

MARK NO.	MANUFACTURER & CATALOG NUMBER	VOLTS WATTS	LIGHT SOURCE	DESCRIPTION	EQUIVALENT MANUFACTURERS
A	HE WILLIAMS 75-4-LSO/840-DIM-UNV	UNV 44	LED 5000 LUM 4000K	4' LED STRIP LIGHT WITH UNIVERSAL VOLTAGE DRIVER	DAY BRITE LITHONIA OR EQUAL
B	HE WILLIAMS 75-4-LSO/840-DIM-UNV-EM/10VLP	UNV 44	LED 5000 LUM 4000K	4' LED STRIP LIGHT WITH UNIVERSAL VOLTAGE DRIVER AND INTEGRAL 10A EMERGENCY BATTERY BACKUP	DAY BRITE LITHONIA OR EQUAL
C	LITHONIA EPANL-2X4-4800LM-80CRI-40K-MIN10-ZT-MVOLT	UNV 44	LED 4800LUM 4000K	2'X4' LED FLAT PANEL WITH UNIVERSAL VOLTAGE DRIVER	DAY BRITE COLUMBIA OR EQUAL
D	LITHONIA DSXW2-LED-30C-1000-30K-T2-MVOLT-DBLXD	UNV 109	LED 10,000LUM 3000K	WALL MOUNTED FULL CUTOFF LED AREA LIGHT WITH TYPE II DISTRIBUTION. WALL MOUNT 28" ABOVE GRADE - REFER TO ARCHITECTURAL ELEVATIONS.	HUBBELL KIM OR EQUAL
G	LAMP HOLDER: LEVITON 8829-CW2 LAMP SYLVANIA LED6A19F82T10YVRP4 SENSOR: FIRST ALERT FIR125	120 6	LED 450LUM 2700K	KEYLESS LIGHT FIXTURE IV/ 100W EQ LED LAMP ON MOTION SENSOR	COLUMBIA LITHONIA OR EQUAL
K	LITHONIA CPHB-18LM-MVOLT-40K	UNV 134	LED 18,000LUM 4000K	COMPACT LED HIGH-BAY WITH UNIVERSAL VOLTAGE DRIVER	HUBBELL KIM OR EQUAL
L	LITHONIA ELMLT-X-LFO6VS-LTP	UNV 1	INCL	EMERGENCY LIGHT WITH TWIN ADJUSTABLE LED HEADS AND LITHIUM IRON PHOSPHATE BATTERY. MOUNT AT T-6", TO CLEAR OBSTACLES. (PROVIDES 1 FC AVG. ON 54" CENTER FIXTURE SPACING). WHITE FINISH	SURE-LITES DUAL-LITE OR EQUAL
M	DUAL-LITE EVE-U-R-N-E	UNV 1	INCL	EXIT LIGHT WITH LED LAMPS, RED LETTERS ON WHITE BACKGROUND, UNIVERSAL MOUNT, BATTERY BACKUP	SURE-LITES LITHONIA OR EQUAL
N	LITHONIA LHQM-LED-R-HO-SD WITH ELA-TQWMP-L0309	UNV 5	INCL	COMBINATION EMERGENCY/EXIT LIGHT WITH LED LAMPS, RED LETTERS ON WHITE BACKGROUND, TWIN 6W EMERGENCY LIGHT HEADS, UNIVERSAL MOUNT, HIGH CAPACITY BATTERY BACKUP AND REMOTE TWIN HEAD OUTDOOR RATED FIXTURE	SURE-LITES DUAL LITE OR EQUAL
EX	LITHONIA AFN-DB-EXT	UNV 21	LED INCL 4000K	ARCHITECTURAL EXTERIOR LED EMERGENCY LIGHT WITH COLD WEATHER BATTERY, COORDINATE FINISH TO MATCH BUILDING	SURE-LITES DUAL LITE OR EQUAL

PANEL: CU		VOLTS: 277/480V		PH: 3Ø		WIRE: 4W		LOCATION:			3RD FLOOR		MOUNTING: SURFACE						
BUS: 125A		MAIN: 100A MLO		IG: 14,000		RMS SYM AMPS					FEEDER:		SEE RISER DIAGRAM						
CKT	DESCRIPTION	AMPS	POLE	WIRE	ØA	ØB	ØC	ØA	ØB	ØC	WIRE	POLE	AMPS	DESCRIPTION	CKT NO				
1	CU-1	15	3	12	2,25Ø			2,25Ø			12	3	15	CU-2	2				
3						2,25Ø			2,25Ø							4			
5							2,25Ø			2,25Ø							6		
7	CU-3	15	3	12	2,25Ø			2,25Ø			12	3	15	CU-4	8				
9						2,25Ø			2,25Ø							10			
11							2,25Ø			2,25Ø							12		
13	CU-5	15	3	12	2,25Ø			2,25Ø			12	3	15	CU-6	14				
15						2,25Ø			2,25Ø							16			
17							2,25Ø			2,25Ø							18		
19	CU-7	15	3	12	2,25Ø			2,25Ø			12	3	15	CU-8	20				
21						2,25Ø			2,25Ø							22			
23							2,25Ø			2,25Ø							24		
25	CU-9	15	3	12	2,25Ø							1	20	SPARE	26				
27						2,25Ø										1	20	SPARE	28
29							2,25Ø									1	20	SPARE	30
31	SPARE	20	1									1	20	SPARE	32				
33	SPARE	20	1									1	20	SPARE	34				
35	SPARE	20	1									1	20	SPARE	36				
37	SPARE	20	1									1	20	SPARE	38				
39	SPARE	20	1									1	20	SPARE	40				
41	SPARE	20	1									1	20	SPARE	42				

NOTES:	11,280	11,280	11,280	9,024	9,024	9,024
	20,304		20,304		20,304	
TOTAL CONNECTED LOAD:						60,912 VA
NEG DEMAND LOAD:						60,912 VA
DEMAND AMPS @ 480 VOLT / 3Ø:						73.21 A

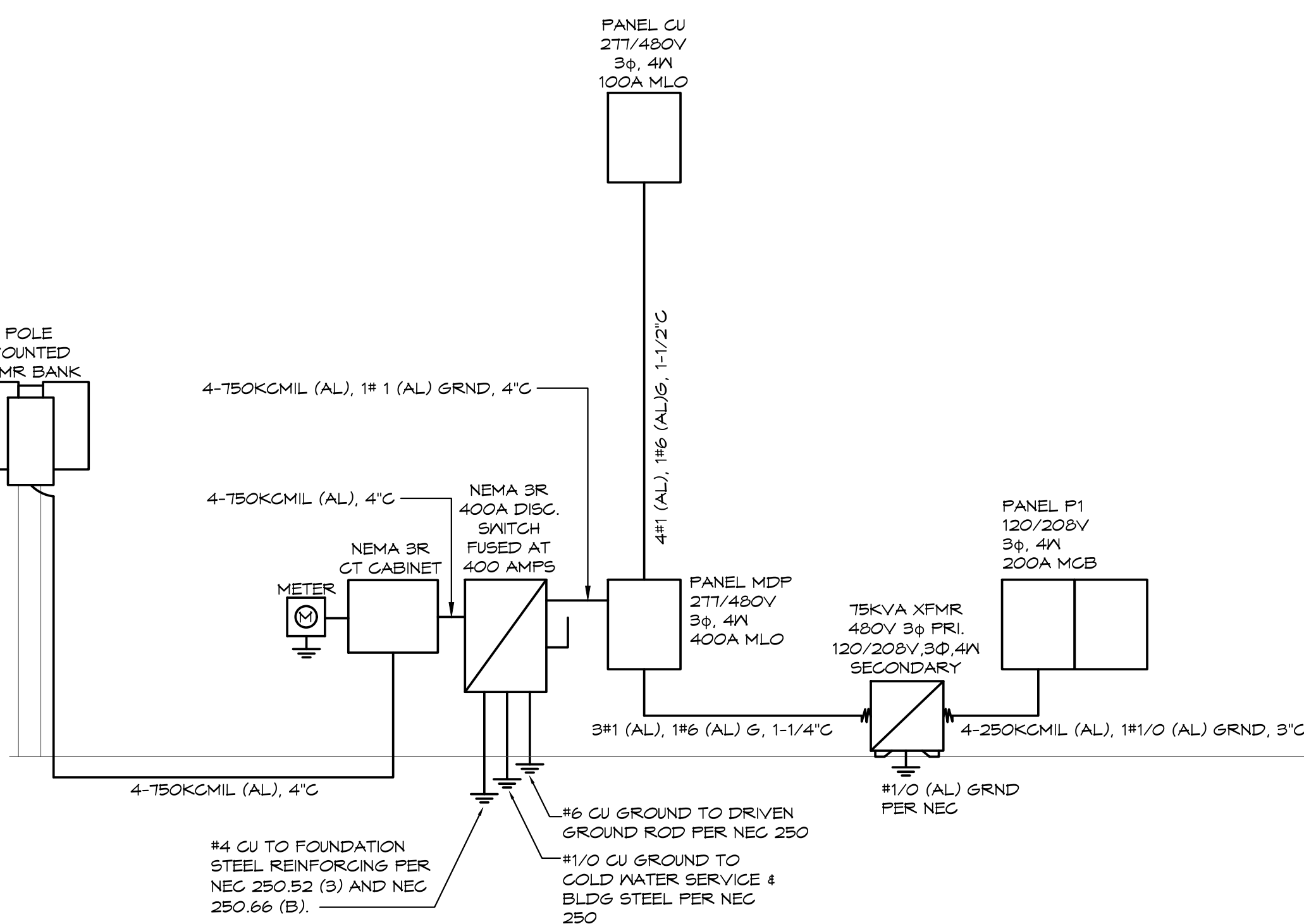
PANEL: MDP		VOLTS: 277/480V		PH: 3Ø	WIRE: 4W	LOCATION:		ELEC RM		MOUNTING: SURFACE						
BUS: 400A		MAIN: 400A MLO		IG: 35,000	RMS SYM AMPS				FEEDER: SEE RISER DIAGRAM							
CKT	DESCRIPTION	AMPS	POLE	WIRE	ØA	ØB	ØC	ØA	ØB	ØC	WIRE	POLE	AMPS	DESCRIPTION	CKT NO	
1	ELEVATOR	100	3	3	18,864						3	100	SPARE (FUTURE ELEVATOR)		2	
3					18,864										4	
5						18,864										6
7																8
9	XFMR / PANEL P1	100	3	3	14,264			20,304			3	3	100	PANEL CU	10	
11																
13	1ST FLOOR LIGHTS	20	1	12	2,196			1,199			10	1	20	EXTERIOR LIGHTS	14	
15	2ND FLOOR LIGHTS	20	1	12	3,288				440		12	1	20	DISPLAY LIGHTS	16	
17	3RD FLOOR LIGHTS	20	1	12			3,300					1	20	SPARE	18	
19	SPARE	20	1									1	20	SPARE	20	
21	SPARE	20	1									1	20	SPARE	22	
23	SPARE	20	1									1	20	SPARE	24	
25	SPARE	20	1									1	20	SPARE	26	
27	SPARE	20	1									1	20	SPARE	28	
29	SPARE	20	1									1	20	SPARE	30	

NOTES:	35,284	35,082	35,184	21,503	20,744	20,304
	56,181		55,826		55,488	
TOTAL CONNECTED LOAD:						171,101 VA
NEG DEMAND LOAD:						166,650 VA
DEMAND AMPS @ 480 VOLT / 3Ø:						200.45 A

PANEL: P1		VOLTS: 120/208V		PH: 3Ø		WIRE: 4W		LOCATION:		ELEC RM		MOUNTING: SURFACE			
BUS: 225A		MAIN: 200A MCB		IG: 10,000		RMS SYM AMPS						FEEDER: SEE RISER DIAGRAM			
CKT	DESCRIPTION	AMPS	POLE	WIRE	ØA	ØB	ØC	ØA	ØB	ØC	WIRE	POLE	AMPS	DESCRIPTION	CKT NO
1	ELEVATOR CAB LTS	20	1	12	500			150			12	1	20	DOOR/UNIT LIGHTS	2
3	ELEV SUMP PUMP	20	1	12		1,200			260		12	1	20	RV UNIT LIGHTS	4
5	ELEVATOR PIT LTS/REG	20	1	12			180			540	12	1	20	RESTRM/FOUNTAIN REG	6
7	OFFICE/RESTRM LTS	20	1	12	484				540		12	1	20	DISPLAY WINDOW REG	8
9	FACP (HL)	20	1	12		500				720	12	1	20	RECEPTION DESK	10
11	BLDG SIGNAGE	20	1	12			1,200			1,260	12	1	20	OFFICE RECEPITS	12
13	BLDG SIGNAGE	20	1	12	1,200				1,200		12	1	20	BREAK RM REG	14
15	OVERHEAD DOOR OPENER	20	1	10		1,200				1,200	12	1	20	BREAK RM REG	16
17	OVERHEAD DOOR OPENER	20	1	10			1,200			600	12	1	20	REFRIGERATOR (SF)	18
19	SITE ACCESS GATE	20	1	10	500				360		12	1	20	TELECOMM BD 4PLEX	20
21	SITE ACCESS GATE	20	1	10		500				720	10	1	20	WP/GFI RECEPITACLES	22
23	F-1	15	1	12			1,200			1,200	12	1	15	F-2	24
25	F-3	15	1	12	1,200			1,200			12	1	15	F-4	26
27	F-5	15	1	12		1,200				1,200	12	1	15	F-6	28
29	F-7	15	1	12			1,200			1,200	12	1	15	F-8	30

SECTION 2						
31	F-4	15	1	12		32
33	D-1	15	2	12		34
35						36
37	ENH-1	20	2	12		38
39						40
41	SERVICE RECEPTACLES	20	1	10		42
43	ENH-2	20	2	12		44
45						46
47	SPARE	20	1			48
49	SPARE	20	1			50
51	SPARE	20	1			52
53	SPARE	20	1			54
55	SPARE	20	1			56
57	SPARE	20	1			58
59	SPARE	20	1			60

NOTES:	8,084	9,100	7,560	6,180	6,830	5,460
HL-HANDLE LOCK, (GF)-GFCI BRKR 5mA	14,264		15,130		13,020	
TOTAL CONNECTED LOAD:						49,214 VA
NEG DEMAND LOAD:						36,168 VA
DEMAND AMPS @ 208 VOLT / 3Ø:						100.39 A



ELECTRICAL RISER DIAGRAM

SCALE: NONE

BC PROJECT #: 22573
MISSOURI PE COA #2009003629
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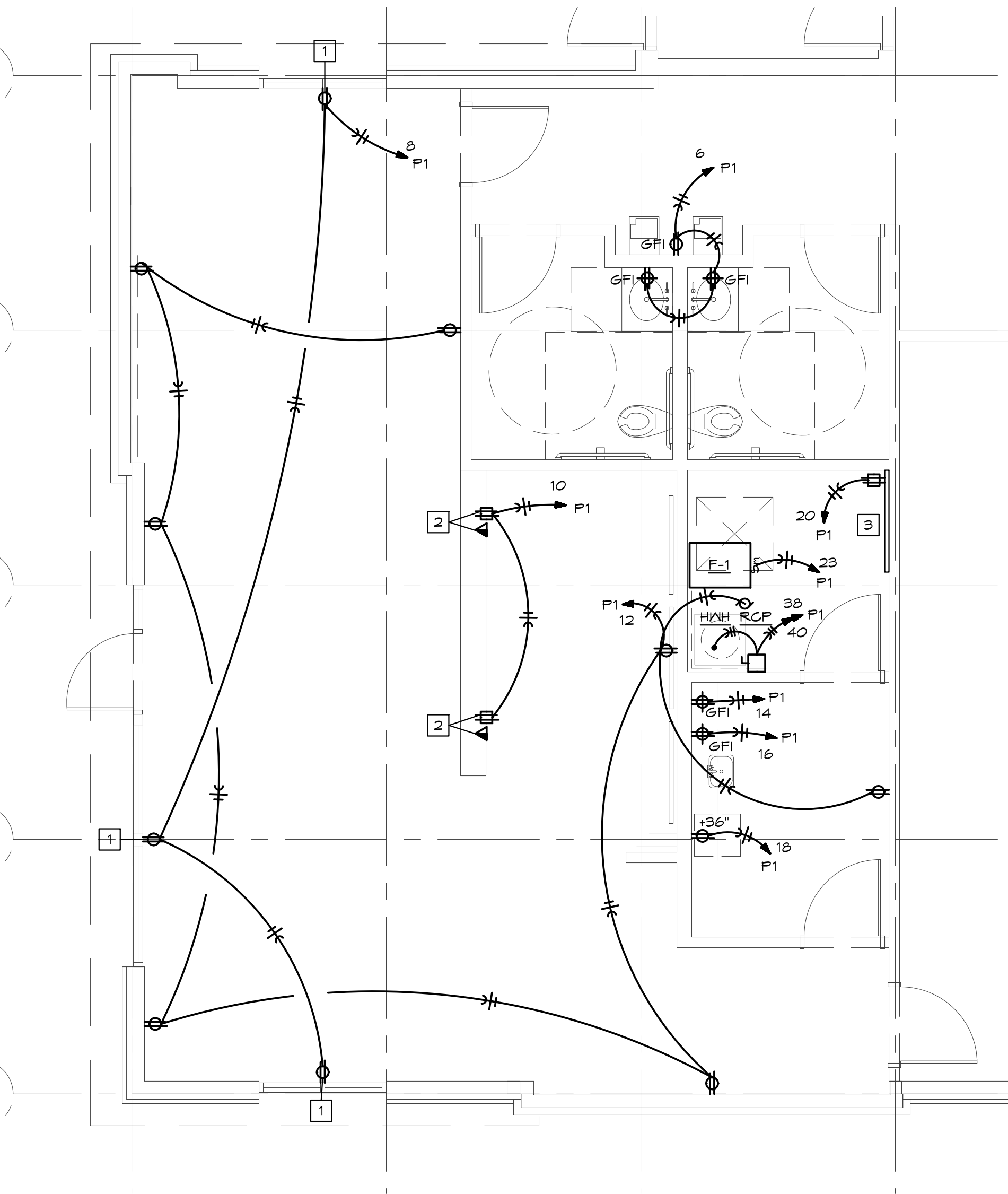
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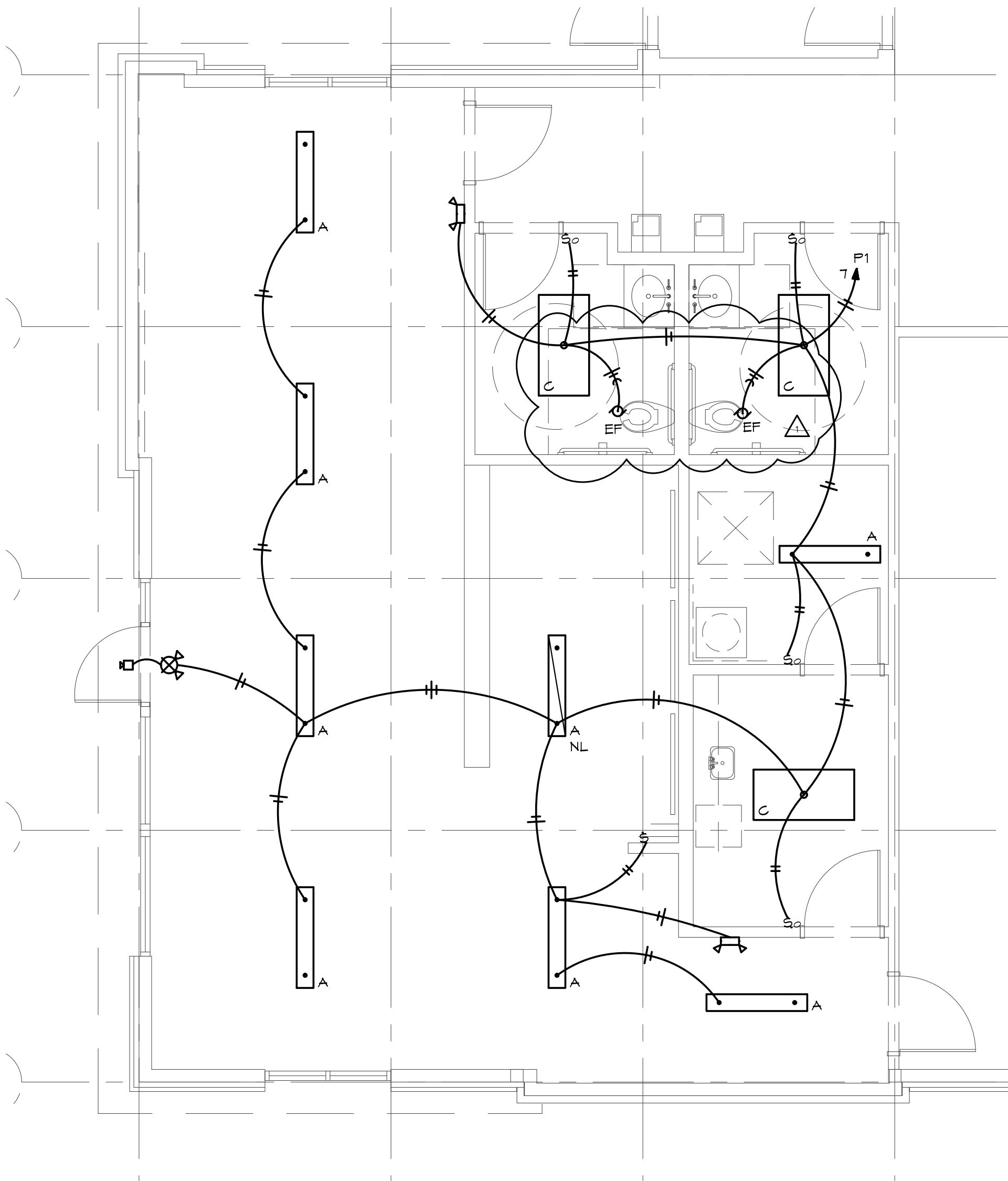
ENLARGED ELECTRICAL
PLANS

Date: 2022/10/25
Drawn by: DS/LC
Checked by: DS/EK
Revisions: 2023/1/2

E3.1



OFFICE ELECTRICAL POWER PLAN
SCALE: 1/4" = 1'-0"



OFFICE ELECTRICAL LIGHTING PLAN
SCALE: 1/4" = 1'-0"

- ELECTRICAL PLAN NOTES:**
- 1 DUPLEX RECEPTACLE MOUNTED ABOVE STOREFRONT GLASS FOR DISPLAY WINDOW SIGNAGE PER NEG.
 - 2 DEVICES MOUNTED IN RECEPTION DESK CASEWORK. COORDINATE LOCATIONS WITH CASEWORK VENDOR. ROUTE ALL WIRING CONCEALED.
 - 3 4'X8'X3/4" FIRE-RETARDANT PLYWOOD TELECOMM BACKBOARD WITH GROUND BAR AND #6CU BOND TO BUILDING ELECTRODE SYSTEM. PROVIDE (2) 4" TO PROPERTY LINE FOR TELECOMM & INTERNET SERVICE. TERMINATE CONDUITS AS DIRECTED BY LOCAL SERVICE PROVIDER.

BC PROJECT #: 22573
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