2018 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - ELECTRICAL SUMMARY

C401 METHOD OF COMPLIANCE

- [x] 2018 NCECC CHAPTER 4
- [ ] NC SPECIFIC COMCHECK PROVIDED
- [ ] N/A BASED ON PROJECT SCOPE
- [ ] ASHRAE 90.1-2013

C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

- [ ] C406.1.1 EFFICIENT MECH EQUIPMENT
- [ ] C406.1.4 ON-SITE RENEWABLE ENERGY
- [x] C406.1.2 REDUCED LTG DENSITY
- [ ] C406.1.5 DEDICATED OA SYSTEM
- [ ] C406.1.3 ENHANCED DIGITAL LTG CNTLS
- [ ] C406.1.6 HI-EFF SERVICE WTR HTG
- [ ] NOT APPLICABLE BASED ON PROJECT SCOPE

C405.2 - LIGHTING CONTROLS (MANDATORY REQUIREMENTS):

- [x] LIGHTING SYSTEMS ARE PROVIDED WITH CONTROLS AS REQUIRED PER SECTION C405.2, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

C405.3 - EXIT SIGNS (MANDATORY REQUIREMENTS):

- [x] INTERNALLY ILLUMINATED EXIT SIGNS DO NOT EXCEED 5 WATTS PER SIDE.
- [ ] NOT APPLICABLE

C405.4 - INTERIOR LIGHTING POWER REQUIREMENTS (PRESCRIPTIVE) (NON-EXEMPT):

- [ ] NOT APPLICABLE PER 2018 NCECC C503.1, EXCEPTION 2.G.

C405.4.1 - TOTAL CONNECTED INTERIOR LIGHTING POWER:

7,600 WATTS SPECIFIED

49 % REDUCTION OF SPECIFIED VS. ALLOWED (APPLICABLE IF C406.1.2 IS SELECTED)

C405.4.2 - TOTAL ALLOWABLE INTERIOR LIGHTING POWER:

METHOD OF COMPLIANCE:

- [x] BUILDING AREA METHOD
- [ ] SPACE-BY-SPACE METHOD

15,140 WATTS ALLOWED

C405.5.1 - EXTERIOR BUILDING LIGHTING POWER (NON-EXEMPT):

- [ ] NOT APPLICABLE

TOTAL CONNECTED EXTERIOR LIGHTING POWER:

800 WATTS SPECIFIED

TOTAL ALLOWABLE EXTERIOR LIGHTING POWER:

860 WATTS ALLOWED

C405.6 - ELECTRICAL ENERGY CONSUMPTION (DWELLING UNITS):

- [ ] SEPARATE ELECTRICAL METERING HAS BEEN PROVIDED FOR EACH DWELLING UNIT IN GROUP R-2 BUILDINGS.
- [x] NOT APPLICABLE

C405.7 - ELECTRICAL TRANSFORMERS (MANDATORY REQUIREMENTS):

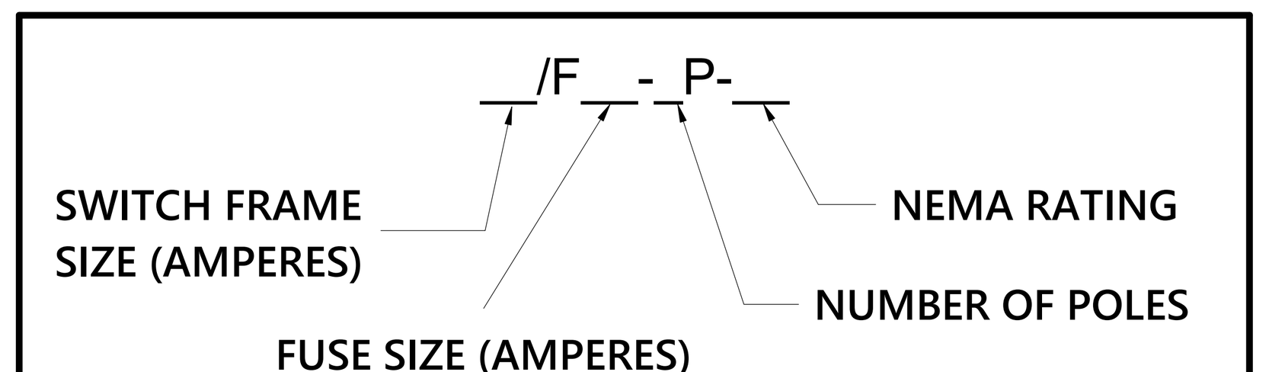
- [ ] ELECTRICAL TRANSFORMERS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.7, EXCEPT WHERE EXEMPT.
- [x] NOT APPLICABLE

C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS):

- [x] ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.8, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

C408 - SYSTEM COMMISSIONING:

- [x] PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.
- [ ] PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.



ELECTRICAL DISCONNECT SIZE DISCRIPTION

SYMBOL SCHEDULE POWER

SYMBOL	DESCRIPTION
	WIRING SYSTEM CONCEALED IN WALL OR CEILING. WHEN SHOWN, CROSS LINES INDICATE NUMBER OF WIRES. (GROUND WIRES ARE NOT SHOWN)
	WIRING SYSTEM, UNSWITCHED LEG OF LIGHTING CIRCUIT.
	WIRING SYSTEM LOW VOLTAGE.
	CONDUIT TURNED UP TO FLOOR ABOVE.
	CONDUIT TURNED DOWN TO FLOOR BELOW.
	BRANCH CIRCUIT HOMERUN TO PANEL.

SYMBOL SCHEDULE POWER LEGEND

SYMBOL	DESCRIPTION
	JUNCTION BOX WITH CONNECTION TO EQUIPMENT SERVED. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.
	208Y/120V THREE PHASE PANELBOARD. SEE SCHEDULE FOR MOUNTING. TOP OF PANEL AT 6'-6" AFF.
	480Y/277V THREE PHASE PANELBOARD. SEE SCHEDULE FOR MOUNTING. TOP OF PANEL AT 6'-6" AFF.
	480-208Y/120V TRANSFORMER. SEE RISER FOR SIZE. PROVIDE 4" HOUSEKEEPING PAD.
SPD	SURGE PROTECTION DEVICE (SPD); SEE DETAIL.
42"HD	JUNCTION BOX FOR HAND DRYER CONNECTION; SEE DETAIL 8/ SHEET E1-501.
0.3 hp XX-1	CONNECTION TO MOTOR. STARTER PROVIDED BY OTHERS UNLESS OTHERWISE NOTED. NUMBER INDICATES HORSEPOWER.
0.0 hp $M	FRACTIONAL HORSEPOWER MANUAL MOTOR STARTER, WITH OVERLOAD PROTECTION

ELECTRICAL FIXTURES LEGEND - COMMERCIAL

SYMBOL	DESCRIPTION
	TAMPER RESISTANT DUPLEX RECEPTACLE, 20 AMP, 120 VOLT
GFI	TAMPER RESISTANT GROUND FAULT RECEPTACLE. NEMA 5-20R DUPLEX. ALL RECEPTACLES INSTALLED OUTSIDE, WITHIN 6' OF A SINK OR IN A KITCHEN SHALL BE GFCI.
GFI	TAMPER RESISTANT GROUND FAULT DUPLEX RECEPTACLE, NEMA 5-20R MOUNTED ABOVE COUNTER BACKSPLASH, COORDINATE MOUNTING HEIGHTS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.
GFI WP	WEATHERPROOF RECEPTACLE. NEMA 5-20R DUPLEX, CORROSION RESISTANT COVER.
	TAMPER RESISTANT QUAD RECEPTACLE. TWO NEMA 5-20R DUPLEX RECEPTACLES. CORROSION RESISTANT COVER.
EWC	TAMPER RESISTANT GFI NEMA 5-20R QUAD RECEPTACLE FOR ELECTRIC WATER COOLER. COORDINATE LOCATION WITH PLUMBING CONTRACTOR.

TELECOM LEGEND - ELECTRICAL

SYMBOL	DESCRIPTION
	PLYWOOD TELEPHONE BACKBOARD. SIZE AS INDICATED ON RISER.
(1)	DATA OUTLET ABOVE COUNTER OR HEIGHT SPECIFIED. MIMIMUM 1 1/4" CONDUIT TO ABOVE NEAREST ACCESSIBLE CEILING FOR J-HOOK SYSTEM OR TO LOCAL CABLE TRAY (WITHIN 6") AS APPLICABLE WITH PULL STRING. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING. COORDINATE MOUNTING HEIGHTS WITH ARCHITECT. CABLIGN TO BE PROVIDED BY STRUCTURED CABLING CONTRACTOR.
	DATA OUTLET MOUNTED AT 18" AFF OR HEIGHT SPECIFIED. MINIMUM 1 1/4" CONDUIT TO ABOVE NEAREST ACCESSIBLE CEILING FOR J-HOOK SYSTEM OR TO LOCAL CABLE TRAY (WITHIN 6") AS APPLICABLE WITH PULL STRING. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING. CABLING TO BE PROVIDED BY STRUCTURED CABLING CONTRACTOR.
WAP	STRUCTURE MOUNTED JUNCTION BOX FOR WIRELESS ACCESS POINT IN OPEN CEILING APPLICATIONS. 4" SQUARE BOX WITH A TWO-GANG OPENING. STUB 1" EC FROM BOX TO J-HOOKS OR CABLE TRAY ABOVE ACCESSIBLE CEILING. CABLING TO BE PROVIDED BY STRUCTURED CABLING CONTRACTOR.
	CONDUIT SLEEVE, 4" SLEEVE UNLESS OTHERWISE NOTED. PROVIDED BY ELECTRICAL CONTRACTOR.
CABLE TRAY	CABLE TRAY - WIRE MESH 12" WIDE X 4" DEEP (8" RUNG SPACING) SUSPENDED FROM CEILING STRUCTURE UNLESS OTHERWISE NOTED CABLE TRAY SHALL BE COORDINATED WITH MECHANICAL DUCTWORK IN FIELD PRIOR TO INSTALLATION; CONTRACTOR SHALL PRODUCE COORDINATION DRAWINGS AND FIELD ADJUST AS REQUIRED TO MEET INTENT OF DRAWINGS.
TMGB	TELECOMMUNICATIONS MAIN GROUND BAR.
TV X	SUBSCRIPT 'C' INDICATES CLASSROOM INTERACTIVE LED TV. SEE DETAIL 15/ SHEET E1-501 FOR REQUIREMENTS. PROVIDE PULL STRING FOR LOW VOLTAGE CABLING TO ACCESSIBLE CEILING.
AVL	TEACHER'S DESK AUDIO/VISUAL CONNECTION LOCATION. PROVIDE SINGLE GANG JUNCTION BOX WITH 3/4" C. ROUTED ABOVE NEAREST ACCESSIBLE CEILING. SEE DETAIL #5/ SHEET E-603. CABLING BY OTHERS.

EM./LS LIGHTING FIXTURE SYMBOLS AND DEVICES

SYMBOL	DESCRIPTION
	FLUORESCENT OR LED FIXTURE WITH EMERGENCY BATTERY DRIVER. PROVIDE 1100 LUMEN INVERTER RATED FOR 90 MINUTE OPERATION. SEE FIXTURE SCHEDULE FOR FIXTURE TYPE, EMERGENCY DEVICE SHALL SUPPLEMENT FIXTURE.

LIGHTING FIXTURES SYMBOLS AND DEVICES LEGEND

SYMBOL	DESCRIPTION
	LED LIGHTING FIXTURE. SEE FIXTURE SCHEDULE. SUSPEND FOUR CORNERS WITH WIRE TO STRUCTURE. DO NOT ALLOW GRID ALONE TO SUPPORT FIXTURE.
	LED STRIP LIGHT FIXTURE
	RECESSED LED OR H.I.D. LIGHTING FIXTURE.
$3	THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, OR EQUAL BY HUBBELL, LEVITON AND PASS & SEYMOUR.
$K	KEY OPERATED SWITCH
OS DT	CEILING MOUNTED OCCUPANCY SENSOR, DUAL TECHNOLOGY. SENSOR SWITCH CM PDT 10, WATT STOPPER #DT-300, COOPER OAC-DT OR EQUAL.
OS DTC	CORNER MOUNT ADDRESSABLE OCCUPANCY SENSOR, DUAL TECHNOLOGY. HUBBELL NXOS-LODT OR EQUAL BY ACUITY NLIGHT, WATT STOPPER DLM, OR GREENGATE. CONICAL PATTERN, MOUNT AS CLOSE TO CORNER OF ROOM AS POSSIBLE. MOUNT 10' AFF OR 6" BELOW CEILING (IF LOWER THAN 10'.) PROVIDE WITH RJ45 ADAPTER TO CONNECT TO ROOM CONTROLLER
$OC	WALL MOUNTED OCCUPANCY SENSOR AND SWITCH. INFRARED TECHNOLOGY WITH NEUTRAL, 120/277V RATED. WATT STOPPER #WS-250, OR EQUAL BY SENSOR SWITCH, AND LEVITON.
$L1	WALL MOUNTED LOW VOLTAGE ADDRESSABLE LIGHT CONTROL WALL SWITCH ON/OFF FOR 1 ZONE OF LIGHTING. HUBBELL NXSW SERIES OR EQUAL BY ACUITY NLIGHT OR WATTSTOPPER DLM. PROVIDE ON/OFF LABELS FOR EACH BUTTON.
$L2	WALL MOUNTED LOW VOLTAGE ADDRESSABLE LIGHT CONTROL WALL SWITCH ON/OFF FOR 2 ZONES OF LIGHTING. HUBBELL NXSW SERIES OR EQUAL BY ACUITY NLIGHT OR WATTSTOPPER DLM. PROVIDE ON/OFF LABELS FOR EACH BUTTON.
$P2	WALL MOUNTED LOW VOLTAGE ADDRESSABLE LIGHT CONTROL WALL SWITCH ON/OFF WITH DIMMING CONTROL FOR 2 ZONES OF LIGHTING. HUBBELL NXSW SERIES OR EQUAL BY ACUITY NLIGHT OR WATTSTOPPER DLM. PROVIDE ON/OFF LABELS FOR EACH BUTTON.
PP	CEILING MOUNTED OCCUPANCY SENSOR POWER PACK. SENSOR SWITCH PP-20, WATT STOPPER #BZ-100, COOPER SP-20, OR EQUAL.
PP NX	ADDRESSABLE ROOM CONTROLLER HUBBELL NXRC OR EQUAL BY ACUITY NLIGHT, WATTSTOPPER DLM.
PP NXD	ADDRESSABLE ROOM CONTROLLER W/ 0-10V DIMMING, HUBBEL NXRC OR EQUAL BY ACUITY NLIGHT, WATTSTOPPER DLM.

SECURITY DEVICES SYMBOL LEGEND - ELECTRICAL

SYMBOL	DESCRIPTION
X	CEILING MOUNTED SECURITY CAMERA LOCATION. CAMERA PROVIDED AND INSTALLED BY OTHERS. CABLING TO BE PROVIDED BY STRUCTURED CABLING CONTRACTOR. X=WP EXTERIOR WALL MOUNTED CAMERA. REFER TO DETAIL 2 & 3/ SHEET E1-503 FOR REQUIREMENTS.
DC	DOOR CONTACT, MINIMUM 1/2" CONDUIT. PROVIDE SINGLE GANG JUNCTION BOX AND PULL STRING. COORDINATE WITH SECURITY VENDOR; SEE DETAIL 13/ SHEET E1-501.
MD	SECURITY MOTION DETECTOR. CEILING MOUNTED. PROVIDE 1-GANG JUNCTION BOX. ROUTE (1) 1/2"C. FROM JUNCTION BOX TO NEAREST J-HOOK SYSTEM. PROVIDE PULL STRING.

EXISTING/DEMOLITION LEGEND

SYMBOL	DESCRIPTION
	HALFTONE SYMBOL INDICATES EXISTING
	DASHED SYMBOL INDICATES REMOVED

SPECIAL SYSTEMS LEGEND

SYMBOL	DESCRIPTION
S	FLUSH-MOUNTED CEILING SPEAKER
S	WALL-MOUNTED SPEAKER.3/4" CONDUIT TO LOCAL ACCESSIBLE CEILING
S WP	EXTERIOR WEATHERPROOF SPEAKER; SEE DETAIL 1/ SHEET E1-503.

ELECTRICAL SHEET INDEX

SHEET NUMBER	SHEET NAME
E1-001	ELECTRICAL LEGEND AND NOTES
E1-002	ELECTRICAL NOTES
E1-011	OVERALL FIRST FLOOR POWER PLAN - DEMOLITION
E1-012	OVERALL FIRST FLOOR POWER PLAN - NEW WORK
E1-111	FIRST FLOOR POWER PLAN - NEW WORK
E1-112	MECHANICAL LOFT ELECTRICAL PLANS - NEW WORK
E1-211	FIRST FLOOR LIGHTING PLAN - NEW WORK
E1-311	FIRST FLOOR SPECIAL SYSTEMS PLAN - NEW WORK
E1-440	ENLARGED ELECTRICAL PLANS
E1-501	ELECTRICAL DETAILS
E1-502	ELECTRICAL DETAILS
E1-503	ELECTRICAL DETAILS
E1-601	ELECTRICAL PANEL SCHEDULES
E1-602	ELECTRICAL SCHEDULES AND LIGHTING SEQUENCE OF OPERATIONS
E1-901	ELECTRICAL DIAGRAMS

ELECTRICAL ABBREVIATIONS

1P	1 POLE (2P, 3P, 4P, ETC.)
A	AMPERE
AC	ABOVE COUNTER OR AIR CONDITIONER
ACLG	ABOVE CEILING
ADO	AUTOMATIC DOOR OPENER
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFI	ARC FAULT CIRCUIT INTERRUPTER
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
ALT	ALTERNATE
AMP	AMPERE
AMPL	AMPLIFIER
ARCH	ARCHITECT, ARCHITECTURAL
AS	AMP SWITCH
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BD	BOARD
BLDG	BUILDING
BMS	BUILDING MANAGEMENT SYSTEM
C	CONDUIT
CAB	CABINET
CAT	CATALOG
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CLG	CEILING
COMB	COMBINATION
CMPR	COMPRESSOR
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUATION OR CONTINUOUS
CONTR	CONTRACTOR
CONV	CONVECTOR
CP	CIRCULATING PUMP
CRT	CATHODE-RAY TUBE
CT	CURRENT TRANSFORMER
CTR	CENTER
CU	COPPER
DCP	DOMESTIC WATER CIRCULATING PUMP
DEPT	DEPARTMENT
DET	DETAIL
DIA	DIAMETER
DISC	DISCONNECT
DIST	DISTRIBUTION
DN	DOWN
DPR	DAMPER
DS	SAFETY DISCONNECT SWITCH
DT	DOUBLE THROW
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
EP	ELECTRIC PNEUMATIC
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXH	EXHAUST
EXP	EXPLOSION PROOF
FA	FIRE ALARM
FABP	FIRE ALARM BOOSTER POWER SUPPLY PANEL
FACP	FIRE ALARM CONTROL PANEL
FCU	FAN COIL UNIT
FIXT	FIXTURE
FLR	FLOOR
FLUOR	FLUORESCENT
FU	FUSE
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTOR
G	GROUND
GND	GROUND
GRS	GALVANIZED RIGID STEEL (CONDUIT)
GYP BD	GYPSUM BOARD
HOA	HANDS-OFF-AUTOMATIC SWITCH
HORIZ	HORIZONTAL
HP	HORSEPOWER
HPF	HIGH POWER FACTOR
HT	HEIGHT
HTG	HEATING
HTR	HEATER
HV	HIGH VOLTAGE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HWP	HYDRONIC WATER PUMP
IC	INTERRUPTING CAPACITY
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
IR	INFRARED
I/W	INTERLOCK WITH
J-BOX	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT-AMPERE
KVAR	KILOVOLT-AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR
LOC	LOCATE OR LOCATION
LT	LIGHT
LTG	LIGHTING
LTNG	LIGHTNING
LV	LOW VOLTAGE
MAX	MAXIMUM
MAG.S	MAGNETIC STARTER
M/C	MOMENTARY CONTACT
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDC	MAIN DISTRIBUTION CENTER
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MFS	MAIN FUSED DISCONNECT SWITCH
MH	MANHOLE
MIC	MICROPHONE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MMS	MANUAL MOTOR STARTER
MOA	MULTIOUTLET ASSEMBLY
MSP	MOTOR STARTER PANELBOARD
MSBD	MAIN SWITCHBOARD
MT	MOUNT
MT.C	EMPTY CONDUIT
MTS	MANUAL TRANSFER SWITCH
MTR	MOTOR, MOTORIZED
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NFDS	NON-FUSED SAFETY DISCONNECT SWITCH
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
N.O.	NORMALLY OPEN
NPF	NORMAL POWER FACTOR
NTS	NOT TO SCALE
OH	OVERHEAD
OL	OVERLOADS
PA	PUBLIC ADDRESS
PB	PULL BOX OR PUSHBUTTON
PE	PNEUMATIC ELECTRIC
PED	PEDESTAL
PF	POWER FACTOR
PH	PHASE
PIV	POST INDICATING VALVE
PNL	PANEL
PP	POWER POLE
PR	PAIR
PRI	PRIMARY
PROJ	PROJECTION
PRV	POWER ROOF VENTILATOR
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE (CONDUIT)
PWR	POWER
QUAN	QUANTITY
RCPT	RECEPTACLE
REQD	REQUIRED
RM	ROOM
RSC	RIGID STEEL CONDUIT
RTU	ROOF TOP UNIT
SC	SURFACE CONDUIT
SEC	SECONDARY
SHT	SHEET
SIM	SIMILAR
S/N	SOLID NEUTRAL
SPEC	SPECIFICATION
SPKR	SPEAKER
SP	SPARE
SR	SURFACE RACEWAY
SS	STAINLESS STEEL
SSW	SELECTOR SWITCH
S/S	STOP/START PUSHBUTTONS
STA	STATION
STD	STANDARD
SURF	SURFACE MOUNTED
SW	SWITCH
SWBD	SWITCHBOARD
SYM	SYMMETRICAL
SYS	SYSTEM
TEL	TELEPHONE
TERM	TERMINAL
TL	TWIST LOCK
TR	TAMPER RESISTANT
T-STAT	THERMOSTAT
TTC	TELEPHONE TERMINAL CABINET
TV	TELEVISION
TVTC	TELEVISION TERMINAL CABINET
TYP	TYPICAL
UC	UNDER COUNTER
UE	UNDERGROUND ELECTRICAL
UG	UNDERGROUND
UH	UNIT HEATER
UT	UNDERGROUND TELEPHONE
UTIL	UTILITY
UV	UNIT VENTILATOR OR ULTRAVIOLET
V	VOLT
VA	VOLT-AMPERES
VDT	VIDEO DISPLAY TERMINAL
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
W	WATT
W/	WITH
WG	WIRE GUARD
WH	WATER HEATER
W/O	WITHOUT
WP	WEATHERPROOF
XFMR	TRANSFORMER
XFR	TRANSFER

LIST OF OWNER PREFERRED ALTERNATES ALTERNATES:

Alternate 1: Provide Lithonia lay-in lighting fixtures

Alternate 2A: Provide Best locks & latches with interchangeable cores
Alternate 2B: Provide Precision exit devices
Alternate 2C: Provide LCN 4111 closers
Alternate 2D: Provide Select continuous hinges
Alternate 2E: Provide Best Grand Master Key System

Alternate 3A: Provide Zurn plumbing fixtures
Alternate 3B: Provide TOTO Ecopower flush valves
Alternate 3C: Provide Elkay water coolers

Alternate 4: Provide Special-Lite integrated door assemblies

Alternate 5: Provide BARD HVAC units for gymnasium only

Alternate 6: Provide Apollo plumbing valves

Alternate 7: (not used)

Alternate 8: Provide Square D switchgear

Alternate 9: All Work associated with Building 1

Alternate 10: All Work associated with windows and HVAC replacement in the Gymnasium Building

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01/28/2022

CONSTRUCTION DOCUMENTS

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Harnett County Schools
Johnsonville Elementary School
Addition/Renovation Phase 2
18495 NC-27, Cameron, NC 28326

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022

PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL LEGEND AND NOTES

E1-001

1/28/2022 3:01:04 PM
Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt

OPTIMA # 21-0266R

1. GENERAL:

A. THE WORK COVERED BY THESE SPECIFICATIONS CONSISTS OF FURNISHING ALL LABOR, EQUIPMENT, MATERIALS, AND SUPPLIES AS NECESSARY FOR THE COMPLETE AND SATISFACTORY OPERATING ELECTRICAL SYSTEMS AS SHOWN ON THE PLANS.

B. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NFPA, STATE BUILDING CODE, AND ANY OTHER LOCAL REQUIREMENTS THAT MAY APPLY.

C. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL ELECTRICAL PERMITS AND INSPECTION FEES.

D. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED BY THE UNDERWRITER'S LABORATORIES, INC. OR BY A STATE APPROVED THIRD PARTY TESTING AGENCY FOR THE USE INTENDED WHERE A STANDARD FOR SUCH MATERIALS AND USE EXISTS. ALL ITEMS OF THE SAME TYPE AND RATING SHALL BE IDENTICAL AND OF THE SAME MANUFACTURER.

E. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CATALOG DATA IN ELECTRONIC FORMAT (PDF) FOR ALL ELECTRICAL ITEMS IN THE SCOPE OF WORK, INCLUDING, BUT NOT LIMITED TO, RACEWAYS, BOXES, FITTINGS, CONDUCTORS, LUMINAIRES, LAMPS, BALLASTS, WIRING DEVICES, SAFETY SWITCHES, DISCONNECTS, TRANSFORMERS, PANELBOARDS, FIRE ALARM, TELECOMMUNICATIONS, ETC. FOR APPROVAL AS APPLICABLE FOR THE PROJECT. ONE COMPLETE SET OF APPROVED SUBMITTALS SHALL BE MAINTAINED AT THE JOB SITE.

F. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH THE BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, CONDUIT, WIRING, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, METHODS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COSTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED AFTER BIDS HAVE BEEN ACCEPTED AND ALL COSTS WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. CREDITS SHALL BE GIVEN TO THE OWNER WHERE SUCH EQUIPMENT AND METHODS RESULT IN LESS EXPENSE TO THE CONTRACTOR.

G. ONE COMPLETE SET OF THE LATEST CONSTRUCTION PLANS OF ALL TRADES SHALL BE MAINTAINED AT THE JOB SITE. IN ADDITION, ALL ADDENDUMS, BULLETINS, AND/OR SKETCHES SHALL BE INCORPORATED INTO THE ON-SITE CONSTRUCTION PLANS AS THE JOB PROGRESSES.

H. COMPLETELY ADEQUATE HOUSING SHALL BE PROVIDED FOR ALL MATERIALS STORED ON JOB SITE. ONLY CONDUIT MAY BE STORED OUTSIDE, BUT NOT IN CONTACT WITH THE GROUND.

I. THE CONDUIT AND NEUTRAL SYSTEM SHALL BE GROUNDED AT THE MAIN SERVICE EQUIPMENT. GROUNDING ELECTRODE SYSTEM SHALL BE INSTALLED PER NEC 250.

J. PROVIDE AN INTERSYSTEM BONDING TERMINATION DEVICE AT THE MAIN ELECTRICAL SERVICE PER NEC 250.94.

K. WIRING SHALL BE TESTED FOR CONTINUITY AND GROUNDS BEFORE BEING ENERGIZED. FAULTY WIRING SHALL BE REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER.

L. PROVIDE ALL CUTTING AND PATCHING FOR INSTALLATION OF WORK AND REPAIR ANY DAMAGE DONE.

M. THE ELECTRICAL CONTRACTOR SHALL CONNECT ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS (UNLESS OTHERWISE NOTED), EXCEPT FOR CONTROL WIRING FOR EQUIPMENT NOT PROVIDED BY THE ELECTRICAL CONTRACTOR. CONTROL WIRING FOR SUCH EQUIPMENT SHALL BE PROVIDED BY THE RESPECTIVE DISCIPLINE.

N. ALL ELECTRICAL JUNCTION BOXES, SWITCHGEAR, CABLING, VOICE/DATA OUTLETS, LOW VOLTAGE CABINETS, EMERGENCY RECEPTACLES, ETC. SHALL BE LABELED ACCORDING TO PANEL/RACK AND CIRCUIT NUMBER.

O. UPON COMPLETION OF WORK, CONTRACTOR SHALL PRESENT ENGINEER WITH CERTIFICATE OF APPROVAL FROM LOCAL INSPECTOR AND/OR AUTHORITY HAVING JURISDICTION BEFORE WORK WILL BE APPROVED FOR FINAL PAYMENT.

P. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR A PERIOD OF ONE YEAR EFFECTIVE THE DATE THE PROJECT IS ACCEPTED BY THE OWNER. ANY IMPERFECT MATERIALS OR WORKMANSHIP SHALL BE REPLACED WITHOUT ADDED COST TO THE PROJECT.

Q. IT SHALL NOT BE THE INTENT OF ISSUED PLANS AND/OR SPECIFICATIONS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE ELECTRICAL CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL NECESSARY ITEMS FOR A COMPLETE AND OPERATING SYSTEM.

R. THE WORD "PROVIDE" MEANS THAT THIS CONTRACTOR SHALL FURNISH, FABRICATE, ERECT, CONNECT, AND COMPLETELY INSTALL SYSTEMS IN PROPER OPERATING CONDITION. ALL LABOR, PRODUCT OPTIONS, ACCESSORIES AND INCIDENTAL MATERIALS REQUIRED SHALL BE INCLUDED AS PART OF THIS WORK TO COMPLETE THE INSTALLATION.

S. THE WORD "CONNECT" MEANS THAT THIS CONTRACTOR SHALL PROVIDE (SEE DEFINITION ABOVE) ALL DISCONNECTING MEANS, OVERCURRENT PROTECTION AND WIRING REQUIRED TO PLACE THE EQUIPMENT AND SYSTEMS IN PROPER OPERATING CONDITION AND TO COMPLY WITH CODE REQUIREMENTS.

T. CONTRACTOR SHALL COORDINATE THE ROUGH-IN OF ALL OUTLET LOCATIONS WITH ARCHITECTURAL FLOOR PLANS, ELEVATIONS, AND MILLWORK SHOP DRAWINGS PRIOR TO ROUGH-IN.

U. ELECTRICAL CONTRACTOR SHALL NOT SCALE PLANS. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF ALL EQUIPMENT, UNLESS OTHERWISE NOTED.

V. CONTRACTOR SHALL TEST ALL "LIFE SAFETY" EQUIPMENT AND SYSTEMS FOR PROPER FUNCTION AND OPERATION. UPON SUCCESSFUL COMPLETION OF TESTS, CONFIRMATION SHALL BE SENT TO THE ENGINEER OF RECORD IN THE FORM OF A LETTER STATING THE TESTS PERFORMED, THE RESULTS, AND THE DATE TESTS WERE SUCCESSFULLY COMPLETE. "LIFE SAFETY" EQUIPMENT AND SYSTEMS CONSIST OF THOSE AS SPECIFIED IN THE STATE BUILDING CODE, THE NATIONAL ELECTRICAL CODE, NFPA 101, AND ANY OTHER LOCAL REQUIREMENTS THAT MAY APPLY.

W. IF DURING THE COURSE OF WORK, THE CONTRACTOR DISCOVERS A PROBLEM WITH THE PERFORMANCE OF THE INSTALLATION RELATIVE TO THE PLANS AND SPECIFICATIONS, THE NEC, OR OTHER CODES OR REQUIREMENTS, THE CONTRACTOR SHALL IMMEDIATELY BRING THE PROBLEM TO THE ATTENTION OF THE ARCHITECT AND/OR ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK.

X. WHERE THERE ARE CONFLICTS BETWEEN THE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL BRING THE ISSUE TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK OR ORDERING ANY MATERIALS. NO ADDITIONAL COSTS SHALL BE WARRANTED WITHOUT A CHANGE TO THE PROJECT SCOPE.

Y. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PROVIDING TEMPORARY POWER AND LIGHTING FOR ALL TRADES. AT NO TIME SHALL EXISTING BUILDING POWER SYSTEMS BE UTILIZED WITHOUT WRITTEN PERMISSION FROM THE OWNER.

Z. COORDINATE LOCATION AND REQUIREMENTS FOR ELECTRICAL SERVICE WITH THE POWER COMPANY. WHERE MORE THAN ONE SERVICE IS SUPPLIED TO A BUILDING, PROVIDE IDENTIFICATION AT EACH SERVICE PER NEC 230-2(E).

AA. THE CONTRACTOR SHALL PROVIDE A MINIMUM TWO WEEK NOTICE FOR ANY PLANNED UTILITY OUTAGES. WRITTEN AUTHORIZATION FROM THE OWNER SHALL BE PROVIDED PRIOR TO ANY OUTAGE. ALL PLANNED UTILITY OUTAGES SHALL BE COORDINATED WITH THE OWNER TO OCCUR DURING NON-OPERATING TIMES, INCLUDING NIGHTS, WEEKENDS AND HOLIDAYS. ALL PLANNED UTILITY OUTAGES SHALL INCLUDE PROVISIONS FOR PROPER BACK-UP OF ALL LIFE-SAFETY SYSTEMS AND INCLUDE AN APPROVED FIRE-WATCH PROGRAM AS REQUIRED BY THE LOCAL FIRE MARSHALL.

BB. EACH BIDDER SHALL VISIT THE JOB SITE PRIOR TO BIDDING TO FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS AND TO ASCERTAIN THE EXTENT OF WORK REQUIRED. FAILURE TO VISIT SITE SHALL NOT EXCUSE CONTRACTOR FROM PERFORMING REQUIRED WORK NOR SHALL IT BE AN ACCEPTABLE REASON FOR REQUESTING ADDITIONS TO THE CONTRACT.

2. RACEWAY:

A. CONDUIT SHALL BE MANUFACTURED BY ALLIED, WHEATLAND, REPUBLIC CONDUIT, WESTERN TUBE, OR APPROVED EQUIVALENT.

B. FOR INTERIOR WORK, CONDUIT SHALL BE ZINC COATED EMT EXCEPT WHERE NOT PERMITTED BY CODE. USE SCHEDULE 40 PVC BELOW CONCRETE SLAB, IN DUCTBANKS, AND FOR EXTERIOR WORK WHERE NOT SUBJECT TO DAMAGE. USE IMC WHERE SUBJECT TO PHYSICAL DAMAGE.

C. EMT FITTINGS SHALL BE COMPRESSION GLAND TYPE, OF MALLEABLE STEEL. CONNECTORS SHALL HAVE INSULATED THROATS. CAST, SET SCREW, OR INDENTER TYPE FITTINGS ARE NOT ACCEPTABLE. ALL FITTINGS FOR EMT SHALL BE MADE OF STEEL.

D. ALL RACEWAY SHALL BE RUN CONCEALED, UNLESS OTHERWISE NOTED. FISH ALL NEW OUTLETS IN EXISTING WALLS, WHERE POSSIBLE. ALL RUNS SHALL BE NEAT AND SQUARE.

E. LOW VOLTAGE CABLING NOT SPECIFIED TO BE INSTALLED IN CONDUIT, SHALL BE INSTALLED IN A CABLE TRAY SYSTEM OR J-HOOK SYSTEM CONSISTING OF MINIMUM 2" DIAMETER HOOKS LOCATED ON 3'-0" CENTERS IN ALL ACCESSIBLE CEILINGS. WHERE THERE ARE INACCESSIBLE CEILINGS, PROVIDE CONDUIT FOR ENTIRE LENGTH OF INACCESSIBILITY.

F. RACEWAYS USED FOR LOW VOLTAGE SYSTEMS SUCH AS TELECOMMUNICATIONS, FIRE ALARM, SECURITY, CCTV, CONTROLS, AND SIMILAR CONDUITS ABOVE THE CEILING AND BACKBOARD(S) SHALL BE PROVIDED WITH INSULATED THROAT BUSHINGS AT EACH CONDUIT TERMINATION. THESE BUSHINGS SHALL BE BE INSTALLED PRIOR TO PULLING LOW-VOLTAGE CABLES.

G. RACEWAY PENETRATIONS THROUGH FLOOR SLABS AND FIRE-RATED WALLS SHALL BE FILLED WITH IMPERVIOUS, NON-SHRINK GROUT SUFFICIENTLY TIGHT TO PREVENT THE TRANSFER OF SMOKE, WATER, AND DUST. ROOF PENETRATIONS SHALL BE WITHIN THE EQUIPMENT ROOF CURB.

H. SUPPORT ALL CONDUIT WITH STRAPS AND CLAMPS.

I. ALL CONDUIT SHALL BE RUN PARALLEL OR PERPENDICULAR TO BUILDING LINES, WHETHER EXPOSED OR NOT AND SUPPORTED FROM STRUCTURE AND PROPERLY SECURED.

J. WHERE CONDUITS PASS THROUGH A BUILDING EXPANSION JOINT, PROVIDE GALVANIZED EXPANSION FITTINGS WITH BONDING JUMPERS.

K. MINIMUM CONDUIT SIZE SHALL BE 3/4" FOR INTERIOR WORK, 1" FOR EXTERIOR WORK.

L. PROVIDE MINIMUM 210# TEST NYLON PULL CORD AND NYLON BUSHINGS IN ALL EMPTY RACEWAYS.

M. LIQUID-TIGHT METAL CONDUIT SHALL ONLY BE USED FOR FINAL CONNECTIONS TO EQUIPMENT AND ALL OTHER ROTATING AND VIBRATING EQUIPMENT, MAXIMUM LENGTH OF 3'-0".

N. FLEXIBLE METAL CONDUIT, MINIMUM SIZE 3/8", SHALL ONLY BE USED FOR FINAL CONNECTION TO LIGHTING FIXTURES, MAXIMUM LENGTH OF 6'-0".

O. PROVIDE PULL BOXES, SUCH THAT NO SINGLE CONDUIT RUN HAS BENDS IN EXCESS OF 360°. PULL BOXES SHALL BE SUITABLE AND APPROVED FOR THE INTENDED USE. WHERE CONDUITS PASS UNDER PAVED AREAS, THEY SHALL BE RGS.

P. ALL CONDUIT BENDS/ELBOWS EMERGING FROM UNDERGROUND SHALL BE IMC AND SHALL EXTEND A MINIMUM OF 18" BELOW GRADE.

Q. ALL UNDERGROUND RACEWAYS SHALL BE THOROUGHLY COATED WITH TWO COATS OF ASPHALTUM BITUMASTIC.

R. ALL CONDUITS INSTALLED UNDERGROUND OR IN CONCRETE SHALL HAVE JOINTS MADE WATERTIGHT BY USE OF POLYETRA-FLUOROETHYLENE TAPE.

S. THE USE OF AC OR NM CABLE IS NOT PERMITTED.

T. MC CABLE IS NOT ALLOWED, EXCEPT FOR FINAL CONNECTION TO LIGHT FIXTURES. PER NOT 2,N.

3. OUTLET BOXES:

A. JUNCTION AND PULL BOXES SHALL BE CODE GAUGE GALVANIZED STEEL. ACCEPTED MANUFACTURERS SHALL BE STEEL CITY (THOMAS & BETTS), RACO, CROUSE-HINDS, APPLETON (EMERSON), OR APPROVED EQUIVALENT.

B. OUTLET BOXES SHALL NOT BE MOUNTED BACK TO BACK IN COMMON WALLS.

C. ATTACH EMT WITH CONNECTORS HAVING INSULATED THROAT.

D. ATTACH BOXES TO STUD WORK USING CADDY BAR STRAPS THAT CONNECT TO TWO ADJACENT STUDS TO PREVENT TWISTING OF BOX IN WALL.

E. ALL OUTLET BOXES (INCLUDING TELEPHONE, CABLE TV, AND COMPUTER) SHALL HAVE COVER PLATES, BLANK IF NOT USED.

F. ALL EXTERIOR BOXES SHALL BE WATER-TIGHT.

4. CONDUCTORS:

A. CONDUCTORS SHALL BE MANUFACTURED BY SOUTHWIRE (SIMPULL), ENCORE (SUPERSLICK), UNITED COPPER (SLK), CERRO (SLP), OR APPROVED EQUAL, "PRE-LUBRICATED" BY THE MANUFACTURER.

B. ALL CONDUCTORS SHALL BE COPPER, RATED 75° C WET/DRY EXCEPT WHERE OTHERWISE NOTED OR REQUIRED BY U.L. OR OTHER CODES. ALUMINUM CONDUCTOR MAY ONLY BE UTILIZED WHERE NOTED IN THE DRAWINGS.

C. ALL CONDUCTORS SHALL BE SINGLE INSULATED CONDUCTOR, THHN/THWN-2. SIZES #10 AWG AND SMALLER SHALL BE SOLID, SIZES #8 AWG AND LARGER SHALL BE STRANDED.

D. BRANCH CIRCUITS SHALL NOT BE SMALLER THAN #12 AWG. CONTROL WIRING MAY BE #14 AWG.

E. CONDUCTORS SHALL BE COLOR CODED BLACK/RED/BLUE FOR 120/208 VOLT SYSTEMS FOR A, B, AND C PHASES, RESPECTIVELY. NEUTRAL SHALL BE WHITE FOR 120/208 VOLT SYSTEMS. GROUND CONDUCTOR SHALL BE GREEN ON ALL SYSTEMS. ALL CONDUCTOR SIZES SHALL HAVE COLOR-CODED INSULATION. THE USE OF COLORED TAPE ON LARGER WIRE SIZES SHALL NOT BE ALLOWED.

F. INSULATION SHALL BE DUAL RATED TYPE THHN/THWN-2 FOR FEEDERS AND BRANCH CIRCUITS. FIXTURE TAPS SHALL BE #12 THHN/THWN-2 IN FLEX WITH GREEN #12 AWG GROUNDING CONDUCTOR.

G. ALL CONDUCTORS SHALL BE IN CONDUIT.

H. WIRING TO LIGHTING FIXTURES SHALL BE AS REQUIRED BY UL LABEL.

I. MULTI-WIRE BRANCH CIRCUITS SHALL NOT BE ALLOWED.

J. JOINTS IN #10 AWG AND SMALLER SHALL BE MADE UP WITH CRIMPED CONNECTORS WITH INSULATING CAPS (NO TAPE) OR WIRENUTS (MAXIMUM OF 3 CONDUCTORS UNDER ANY CONNECTOR OR WIRENUT). LARGER WIRE SHALL USE SPLIT BOLTS OR BOLTED CLAMPS.

K. ALL WIRING LUGS THROUGHOUT THE PROJECT, INCLUDING, BUT NOT LIMITED TO, BREAKERS, PANELBOARD/SWITCHBOARD LUGS, SAFETY SWITCH LUGS, MOTOR STARTER LUGS, TRANSFORMERS LUGS, WIRING DEVICE TERMINALS, AND ALL EQUIPMENT LUGS/TERMINALS SHALL BE RATED FOR USE WITH 75 DEGREE INSULATED CONDUCTORS AT THEIR 75 DEGREE AMPACITY AND SHALL BE SIZED AND SELECTED TO MATCH THE CONDUCTOR SIZE AND MATERIAL.

L. CIRCUIT JOINTS SHALL NOT BE MADE ON DEVICE TERMINALS.

M. WIRE WITHIN PANELBOARDS SHALL BE NEATLY TRAINED, SQUARED, BUNCHED, AND TAGGED.

N. ALL SYSTEM FURNITURE CONNECTIONS SHALL COMPLY WITH NEC 605.

O. GROUND ALL EQUIPMENT PER NEC ARTICLE 250. BOND WHERE CONDUITS ENTER ENCLOSURES THROUGH CONCENTRIC KNOCKOUTS. ALL FLEX, INCLUDING FIXTURE TAPS, SHALL INCLUDE GREEN GROUNDING CONDUCTOR, #12 AWG MINIMUM. PROVIDE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN EACH CONDUIT AND FOR EACH CIRCUIT, SIZED PER NEC 250-122.

P. ALL CONDUCTORS INSTALLED IN VERTICAL RACEWAYS SHALL BE SUPPORTED AT INTERVALS AS REQUIRED PER NEC 300-19.

Q. THE ELECTRICAL CONTRACTOR SHALL FOLLOW AND APPLY THE TABLE BELOW, REGARDLESS WHAT THE PANEL SCHEDULE INDICATES, FOR SIZING ALL 120V, 20 AMP BRANCH CIRCUITS (COPPER CONDUCTORS) TO ALLOW A MAXIMUM OF 3% VOLTAGE DROP FROM THE CIRCUIT BREAKER TO THE FIRST DEVICE ON THE BRANCH CIRCUIT AND ACHIEVE A MAXIMUM OF 5% VOLTAGE DROP ACROSS THE ENTIRE BRANCH CIRCUIT:

VOLTAGE	CONDUCTOR LENGTH *	BRANCH CIRCUIT
120	0' - 50'	#12
120	51' - 90'	#10
120	91' - 140'	#8
120	141' - 255'	#6
277	0' - 125'	#12
277	126' - 200'	#10
277	201' - 330'	#8
277	331' - 525'	#6

* - THE LENGTH IS MEASURED FROM THE CIRCUIT BREAKER TO THE FIRST DEVICE WHICH THE BRANCH CIRCUIT SERVES. WHERE THE DISTANCE EXCEEDS ABOVE, CONSULT WITH THE ENGINEER.

5. WIRING DEVICES:

A. WIRING DEVICES SHALL BE SPECIFICATION GRADE, MINIMUM, EQUAL TO COOPER QUALITY INDICATED BELOW OR AS MANUFACTURED BY HUBBELL, LEGRAND-PASS & SEYMOUR, LEVITON, OR APPROVED EQUAL, UNLESS OTHERWISE NOTED:

SWITCHES (120V) SHALL BE AS FOLLOWS:

SINGLE-POLE 20 AMP	SEE SPECIFICATIONS
THREE-WAY 20 AMP	SEE SPECIFICATIONS
FOUR-WAY 20 AMP	SEE SPECIFICATIONS
SINGLE-POLE-KEY 20 AMP	SEE SPECIFICATIONS

DUPLEX RECEPTACLES SHALL HAVE A NYLON FACE AND SHALL BE AS FOLLOWS:

20 AMP DUPLEX	SEE SPECIFICATIONS
20 AMP DUPLEX GFCI	SEE SPECIFICATIONS
20 AMP DUPLEX TAMPER	SEE SPECIFICATIONS
20 AMP DUPLEX GFCI-TAMPER	SEE SPECIFICATIONS

THE PART NUMBERS ABOVE ARE FOR WIRING DEVICE TYPE ONLY. SEE BELOW FOR WIRING DEVICE COLOR AND PLATE MATERIAL/COLOR.

B. SEE MOUNTING HEIGHT ELEVATION DETAIL FOR STANDARD MOUNTING HEIGHTS OF ALL DEVICES, UNLESS OTHERWISE NOTED.

C. THE COLOR OF ALL WIRING DEVICES (SWITCHES AND RECEPTACLES) SHALL BE AS DIRECTED BY THE ARCHITECT, UNLESS OTHERWISE NOTED. ALL COVER PLATES SHALL BE 302 STAINLESS STEEL. COVER PLATES IN MASONRY WALLS SHALL BE OVERSIZE TYPE.

D. EACH DUPLEX RECEPTACLE INDICATED TO BE ON A DEDICATED CIRCUIT SHALL BE 20 AMP TYPE.

E. ADJACENT DEVICES SHALL HAVE A COMMON WALL PLATE.

F. WEATHERPROOF COVERS SHALL BE "WHILE-IN-USE" SO PLUGS MAY BE INSTALLED WITHOUT COMPROMISING THE WP FUNCTION. COOPER #WIU-2 DOUBLE-GANG WITH CLEAR COVER OR APPROVED EQUAL.

G. A MAXIMUM OF 10 GENERAL PURPOSE RECEPTACLES SHALL BE ON EACH BRANCH CIRCUIT.

H. ALL WALL MOUNTED OCCUPANCY/VACANCY SENSORS/SWITCHES SHALL BE INSTALLED WITH AN EQUIPMENT GROUNDING CONDUCTOR.

I. GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI) PROTECTION FOR PERSONNEL SHALL BE PROVIDED FOR ALL LOCATIONS PER NEC 210.8, INSTALLED IN A READILY ACCESSIBLE LOCATION. WHERE A DEVICE LOCATION IS NOT ACCESSIBLE, THE GFCI PROTECTION SHALL BE PROVIDED WITH THE BREAKER SERVING THE DEVICE.

J. ALL GFCI RECEPTACLES SHALL HAVE AUTO-MONITORING / SELF-TEST FUNCTION AND REVERSE LINE-LOAD MISFIRE FUNCTION AND MEET ALL REQUIREMENTS OF UL 943 (LATEST EDITION).

K. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING DWELLING UNITS, GUEST ROOMS AND GUEST SUITES OF HOTELS AND MOTELS, CHILD-CARE FACILITIES, PRESCHOOL AND ELEMENTARY EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS/WAITING ROOMS AND THE LIKE IN CLINICS/MEDICAL/DENTAL OFFICES AND OUTPATIENT FACILITIES, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIUMS/SKATING RINKS/AUDITORIUMS, AND DORMITORIES/STUDENT HOUSING.

6. SUPPORTS:

A. ALL EQUIPMENT SHALL BE ADEQUATELY SUPPORTED FROM STRUCTURE.

B. INSERTS IN MASONRY SHALL BE LEAD OR FIBER IN DRILLED HOLES, OR CAST IN PLACE.

C. NAILS OR POWDER ACTUATED FASTENERS SHALL NOT BE USED.

D. EMT/IMC/RGS SUPPORTS SHALL BE A MAXIMUM OF 8'-0" APART AND A MAXIMUM OF 3'-0" FROM BOXES.

E. LIGHTING FIXTURES MOUNTED IN OR ON CEILING SHALL BE SUPPORTED FROM STRUCTURE VIA 12 GAUGE STEEL WIRE. PROVIDE A MINIMUM OF FOUR WIRES, ONE ATTACHED TO EACH CORNER OF LAY-IN FIXTURES. RECESSED DOWNLIGHT FIXTURES SHALL BE SUPPORTED THE SAME. DO NOT SUPPORT RACEWAY OR FIXTURES FROM CEILING GRID OR DUCT WORK. USE U.L. LISTED GRID CLIPS ON ALL LAY-IN FIXTURES.

7. PAINTING:

A. SUITABLE FINISH COAT SHALL BE PROVIDED FOR ALL EQUIPMENT. PANEL TUBS, COVERS, ETC. SHALL BE PRIMED AND ENAMELED TO BLEND WITH ADJACENT SURFACES, OR SHALL BE MANUFACTURER'S STANDARD COLOR BAKED ENAMEL FINISH, OR AS DIRECTED BY THE ARCHITECT.

B. CONTRACTOR TO PAINT WHERE EXISTING EXPOSED PANELBOARDS, SURFACE RACEWAY, SURFACE BOXES, ETC. HAVE BEEN REMOVED DURING THE DEMOLITION PHASE, EITHER FOR TEMPORARY WORK OR PERMANENTLY.

8. TELECOMMUNICATIONS:

A. FURNISH A COMPLETE TELEPHONE CONDUIT SYSTEM AS INDICATED ON THE DRAWINGS.

B. TELECOMMUNICATION OUTLETS SHALL CONSIST OF A 4" SQUARE DEEP BOX WITH SINGLE GANG PLASTER RING. PROVIDE BLANK PLATE WITH KNOCKOUTS FOR OUTLETS, AS PERMANENT COVERS WILL BE PROVIDED BY A SEPARATE INSTALLER.

C. PROVIDE MINIMUM 1" RACEWAY, UNLESS OTHERWISE NOTED, FROM EACH BOX TO ABOVE NEAREST ACCESSIBLE CEILING SPACE FOR J-HOOK SYSTEM OR TO CABLE TRAY AS APPLICABLE. PROVIDE MINIMUM 210# TEST NYLON PULL CORD AND NYLON BUSHINGS IN ALL EMPTY RACEWAYS.

D. PROVIDE RACEWAYS FOR ALL EXTERIOR AND/OR EXPOSED LOCATIONS.

E. PROVIDE GROUNDING FOR ALL TELEPHONE/DATA SYSTEMS AND EQUIPMENT PER REQUIREMENTS AND SPECIFICATIONS PROVIDED BY THE OWNERS DESIGNATED VENDOR.

F. ALL LOW-VOLTAGE CABLING SHALL BE PLENUM-RATED.

G. CONTRACTOR SHALL FURNISH AND INSTALL A #6 AWG GREEN INSULATED COPPER WIRE IN CONDUIT FROM THE MAIN ELECTRICAL GROUNDING BAR TO TELECOMMUNICATIONS GROUNDING BUS BAR.

H. PROVIDE MOUNTING BACKBOARDS FOR COMMUNICATIONS EQUIPMENT. BACKBOARDS SHALL BE OF 3/4" TYPE AC, EXTERIOR PLYWOOD, PAINTED BOTH SIDES AND ALL EDGES WITH 2 COATS OF GRAY FLAME RETARDANT PAINT.

9. LIGHTING FIXTURES:

A. TYPES AND MANUFACTURERS ARE SCHEDULED ON THE PLANS. EQUIVALENT FIXTURES BY OTHERS MAY BE SUBMITTED ONLY AS INDICATED ON THE PLANS AND ARE SUBJECT TO THE APPROVAL OF THE OWNER AND ENGINEER.

B. ALL FIXTURES SHALL BE U.L. LISTED AND LABELED.

C. DRIVERS SHALL BE AS INDICATED IN THE LIGHTING FIXTURE SCHEDULE OR AS OTHERWISE NOTED.

D. ALL FIXTURES SHALL BE PROVIDED FOR PROPER VOLTAGE BASED ON THE CIRCUIT ASSIGNMENT INDICATED ON THE PLANS.

E. CATALOG NUMBERS ARE FOR GENERAL IDENTIFICATION OF FIXTURES ONLY. ALL RELATED PARTS, SUCH AS PLASTER RINGS, JUNCTION BOXES, LOUVERS, SHIELDS, MOUNTING STEMS, CANOPIES, CONNECTORS, STRAPS, NIPPLES, HARDWARE, ACCESSORIES, ETC., TO FIT THEM PROPERLY TO THE CONSTRUCTION, SHALL BE FURNISHED AND INSTALLED BY THIS CONTRACTOR. CONTRACTOR SHALL PROVIDE SUITABLE TRIM AND APPURTENANCES TO MOUNT FIXTURES IN TYPE OF CEILING OR WALL AS SPECIFIED IN ARCHITECTURAL FINISH SCHEDULES REGARDLESS OF CATALOG NUMBER GIVEN.

F. ALL FIXTURES SHALL BE GROUNDED PER THE NEC.

G. FIXTURES CONNECTED WITH FLEX TO THE RIGID RACEWAY PORTION OF THE WIRING SYSTEM SHALL CARRY A GREEN BONDING JUMPER WITHIN THE FLEX. THE JUMPER SHALL BE FASTENED TO BOTH THE FIXTURE AND THE RACEWAY SYSTEM WITH A STEEL CITY "G" CLIP OR APPROVED EQUIVALENT. PHASE AND GROUND CONDUCTORS RUN IN FLEX SHALL BE #12 AWG MINIMUM. MAXIMUM FLEX LENGTH SHALL BE 6'-0".

H. MOUNT ALL FIXTURES PLUMB AND SQUARE WITH ROWS ALIGNED.

I. SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF FIXTURES.

J. CONTRACTOR SHALL COORDINATE FIXTURE TYPE AND TRIM WITH CEILING CONSTRUCTION AND ADJUST ACCORDINGLY WITHOUT ADDITIONAL EXPENSE.

K. ALL LIGHTING FIXTURES SHALL BE THERMALLY PROTECTED PER THE NEC.

L. FIXTURES IN CONTACT WITH INSULATION SHALL BE IC RATED.

10. LIGHTING CONTROLS:

A. FURNISH AND INSTALL WHERE SHOWN AN ELECTRONIC TIME CONTROLLER AS MANUFACTURED BY TORK (NSI), PARAGON, INTERMATIC, OR APPROVED EQUAL. CONTACTS SHALL BE SPST OR AS INDICATED, RATED 120V AT 20A BALLAST LOAD, AND MINIMUM 30,000 SWITCHING CYCLES. PROVIDE WITH THE NUMBER OF CHANNELS INDICATED (MINIMUM 2 CHANNELS) OR AS REQUIRED TO MEET THE INTENT OF THE DRAWINGS. EACH CHANNEL SHALL BE INDIVIDUALLY PROGRAMMABLE WITH 128 ON-OFF OPERATIONS PER WEEK PLUS FOUR SEASONAL SCHEDULES TO MODIFY THE BASIC PROGRAM AND A HOLIDAY SCHEDULE THAT OVERRIDES THE WEEKLY OPERATION. THE CONTROLLER SHALL BE PROVIDED WITH A PHOTOELECTRIC SENSOR, ASTRONOMIC DIAL, AND A BATTERY BACKED-UP, NON-VOLITILE MEMORY FOR SCHEDULES AND TIME CLOCK.

B. LIGHTING CONTACTORS SHALL SWITCH LOADS AT THE VOLTAGE AND AMPERE RATING INDICATED AND SHALL HAVE THE NUMBER OF POLES INDICATED ON THE DRAWINGS OR AS REQUIRED. THE CONTACTOR AND CONTACTS SHALL BE CONTINUOUSLY RATED FOR THE LOAD SERVED, INCLUDING TUNGSTEN FILAMENT, INDUCTIVE, AND HIGH-INRUSH BALLAST LOADS.

C. ALL LIGHTING CONTACTORS SHALL BE ELECTRICALLY HELD AND BE INSTALLED IN A NEMA 1 ENCLOSURE, UNLESS OTHERWISE NOTED.

11. EQUIPMENT IDENTIFICATION:

A. PROVIDE ENGRAVED PHENOLIC NAMEPLATES FOR ALL ELECTRICAL EQUIPMENT SUPPLIED FOR THE PROJECT, INCLUDING BUT NOT LIMITED TO, WIRING TROUGHS, SAFETY SWITCHES, DISCONNECTS, TRANSFORMERS, PANELBOARDS, SWITCHBOARDS, SWITCHGEARS, MOTOR CONTROL CENTERS (MCC), BUSWAYS, GENERATORS, AUTOMATIC TRANSFER SWITCHES (ATS), UNINTERRUPTIBLE POWER SUPPLY (UPS), POWER DISTRIBUTION UNITS (PDU), FLOOR/REMOTE DISTRIBUTION CABINETS (FDC/RDC), STATIC TRANSFER SWITCHES (STS), ETC. NAMEPLATE SHALL INDICATE THE DEVICE NAME, SYSTEM VOLTAGE (VOLTAGE/PHASE/WIRE), AND UPSTREAM DEVICE AND CIRCUIT. PROVIDE NAMEPLATES FOR CIRCUIT BREAKERS IN SWITCHGEARS, SWITCHBOARDS AND DISTRIBUTION PANELS.

B. NAMEPLATE COLORS SHALL BE AS FOLLOWS:

120/208V EQUIPMENT	BLUE SURFACE WITH WHITE CORE
277/480 EQUIPMENT	BLACK SURFACE WITH WHITE CORE
FIRE ALARM SYSTEMS	BRIGHT RED SURFACE WITH WHITE CORE
SECURITY SYSTEMS	BURGUNDY SURFACE WITH WHITE CORE
TELEPHONE SYSTEMS	ORANGE SURFACE WITH WHITE CORE
DATA SYSTEMS	BROWN SURFACE WITH WHITE CORE

C. NAMEPLATES UP TO 8 SQUARE INCHES SHALL NOT BE LESS THAN 1/16" THICK. NAMEPLATES LARGER THAN 8 SQUARE INCHES SHALL NOT LESS THAN 1/8" THICK.

D. LETTERING HEIGHT SHALL BE 1/2" MINIMUM.

E. NAMEPLATES SHALL BE ATTACHED WITH SELF-DRILLING/SELF-TAPPING SCREWS, EXCEPT RIVETS SHALL BE USED WHERE END OF SCREW IS NOT PROTECTED. QUANTITY AS FOLLOWS:

UP TO 5 SQUARE INCHES:	2 SCREWS
5 TO 12 SQUARE INCHES:	4 SCREWS
ABOVE 12 SQUARE INCHES:	6 SCREWS

12. DISCONNECTS:

A. DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE IN NEMA 1 ENCLOSURES, UNLESS OTHERWISE NOTED, FUSED OR NON-FUSED AS INDICATED. SWITCHES SHALL HAVE REJECTION-TYPE FUSE CLIPS. SWITCHES SHALL BE BY EATON, SQUARE-D, GENERAL ELECTRIC, OR APPROVED EQUAL. WHERE FED FROM A LOAD CENTER, GENERAL-DUTY SWITCHES SHALL BE PERMITTED.

B. FUSES LESS THAN 60A SHALL BE CLASS RK5, DUAL-ELEMENT, TIME-DELAY WITH INDICATION

C. FUSES GREATER THAN 60A SHALL BE CLASS J, DUAL-ELEMENT, TIME-DELAY WITH INDICATION.

D. A SET OF 3 SPARE FUSES OF EACH SIZE AND TYPE SHALL BE FURNISHED TO THE OWNER

13. PANELBOARDS:

A. PANELBOARDS SHALL BE PROVIDED AS MANUFACTURED BY EATON, SQUARE-D, GENERAL ELECTRIC, OR APPROVED EQUAL. ALL NEW EQUIPMENT FOR THE PROJECT SHALL BE BY THE SAME MANUFACTURER. LOAD CENTER TYPE PANELBOARDS SHALL BE USED WHERE THE PANELBOARD SERVES A DWELLING UNIT.

B. ALL BUSSING, INCLUDING NEUTRAL AND GROUND, SHALL BE COPPER.

C. ALL BREAKERS SHALL BE AUTOMATIC THERMAL-MAGNETIC TYPE MOLDED CASE BOLT-ON TYPE, CALIBRATED FOR 40 DEGREE C, OR AMBIENT COMPENSATION, UNLESS OTHERWISE NOTED.

D. PANELS SHALL BE FULLY RATED (AIC). NO SERIES AIC RATINGS ARE ALLOWED.

E. PANELS SHALL HAVE FULL SIZE EQUIPMENT GROUNDING BARS AND NEUTRAL BARS, EXCEPT WHERE INDICATED TO BE 200%.

F. ALL PANELBOARD AND BREAKER LUGS SHALL BE SIZED AND RATED PER THE CONDUCTOR SIZE AND MATERIAL.

G. LIGHTING AND APPLIANCE PANELS (100A-600A) SHALL HAVE FRONT ACCESSIBLE HINGED DOOR-IN-DOOR COVERS WITH DEAD FRONT, SHALL BE 20" WIDE MINIMUM WITH MINIMUM 4" WIDE WIRING GUTTERS.

H. DISTRIBUTION PANELS (600A-1200A) SHALL HAVE FRONT ACCESSIBLE DEAD FRONT COVERS.

I. PROVIDE HANDLE LOCK-ON DEVICES FOR ALL CIRCUIT BREAKERS CONNECTED TO EMERGENCY, EXIT, NIGHT LIGHTING, FIRE ALARM, TELEPHONE BOARDS, AND SECURITY SYSTEMS.

J. BREAKERS USED FOR SWITCHING SHALL BE SWITCHING DUTY (SWD) RATED.

K. BREAKERS USED FOR HEATING, AIR-CONDITIONING AND/OR REFRIGERATION SHALL BE HACR RATED.

L. GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI) PROTECTION FOR PERSONNEL SHALL BE PROVIDED FOR ALL LOCATIONS PER NEC 210.8, INSTALLED IN A READILY ACCESSIBLE LOCATION. WHERE A DEVICE LOCATION IS NOT ACCESSIBLE, THE GFCI PROTECTION SHALL BE PROVIDED WITH THE BREAKER SERVING THE DEVICE.

M. ALL OVERCURRENT DEVICES WHICH COMPRISE THE EMERGENCY SYSTEM OR LEGALLY REQUIRED STANDBY SYSTEM SHALL BE SELECTIVELY COORDINATED. THE ELECTRICAL CONTRACTOR SHALL PROVIDE MANUFACTURER DOCUMENTATION INDICATING COMPLIANCE WITH THE SELECTIVE COORDINATION REQUIREMENTS PER THE NEC.

O. ALL PANELBOARDS SHALL HAVE METAL DIRECTORY FRAME. FOR EACH PANELBOARD, PROVIDE TYPED CIRCUIT DIRECTORY PER NEC 408.4. SPARE CIRCUIT BREAKERS SHALL BE LABELED SPARE AND IN THE OFF POSITION.

P. ALL CIRCUIT BREAKERS RATED 1200A OR HIGHER, OR CAPABLE OF BEING RATED 1200A OR HIGHER (I.E. ADJUSTABLE LONG-TIME PICKUP OR REPLACEABLE TRIP/RATING PLUG), SHALL BE PROVIDED WITH AN ENERGY-REDUCING MAINTENANCE SWITCH WITH LOCAL STATUS INDICATOR PER NEC 240.87(B).

Q. ALL GROUNDING TERMINAL BUSSES OF PANELBOARDS SERVING THE SAME PATIENT VICINITY SHALL BE BONDED TOGETHER WITH 1#10 AWG GREEN INSULATED COPPER GROUNDING CONDUCTOR. THE CONDUCTOR SHALL BE CONTINUOUS EXCEPT THAT IT MAY BE BROKEN AT THE PANELBOARD GROUND BAR IN ORDER TO TERMINATE.

14. FIRE STOPPING:

A. ALL PENETRATIONS OF RATED ASSEMBLIES SHALL BE SEALED WITH RATED MATERIALS MEETING ASTM E-814.

B. PROVIDE FIRESTOPPING DEVICE(S) OR SYSTEM(S) WHICH HAVE BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814. INSTALL THE DEVICE(S) OR SYSTEM(S) IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE THE APPROPRIATE DEVICE(S) OR SYSTEM(S) WITH AN 'F' RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED.

C. DEVICE(S) AND/OR SYSTEM(S) SHALL BE BY HILTI, 3M OR EQUIVALENT.

15. SEISMIC:

A. THE ELECTRICAL CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR PROVIDING SEISMIC SUPPORT AND BRACING OF ELECTRICAL COMPONENTS TO RESIST THE EFFECTS OF EARTHQUAKES ON THE ELECTRICAL SYSTEM AS WELL AS ANY REQUIRED SPECIAL INSPECTIONS BASED ON THE SPECIFIC GEOGRAPHIC LOCATION AS REQUIRED. THE SEISMIC RESTRAINTS AND SPECIAL INSPECTIONS SHALL MEET ALL APPLICABLE STATE AND LOCAL BUILDING CODE REQUIREMENTS AS WELL AS ASCE-7 REQUIREMENTS.

16. ELECTRICAL COORDINATION WITH OTHER TRADES:

A. THE ELECTRICAL CONTRACTOR SHALL CONNECT AND/OR PROVIDE FINAL CONNECTIONS TO ALL EQUIPMENT SUPPLIED BY OTHERS APPLICABLE TO THE PROJECT, INCLUDING BUT NOT LIMITED TO, MECHANICAL, PLUMBING, FIRE PROTECTION AND SUPPRESSION, OWNER FURNISHED, KITCHEN, LABORATORY, ETC. UNLESS OTHERWISE NOTED.

B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONNECTIONS PRIOR TO ROUGH-IN USING APPROVED CATALOG SHEETS AND SHOP DRAWINGS.

C. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANUAL MOTOR STARTER SWITCHES, DISCONNECT SWITCHES, RECEPTACLES, ETC. TO MECHANICAL AND PLUMBING EQUIPMENT. ALL STARTERS, OTHER THAN MANUAL STARTER SWITCHES, SHALL BE PROVIDED BY OTHERS, BUT INSTALLED BY THE ELECTRICAL CONTRACTOR.

D. ALL DISCONNECT SWITCHES AND FUSE SIZES SHALL BE COORDINATED WITH SHOP DRAWINGS PRIOR TO ORDERING OR INSTALLING. ANY EQUIPMENT INSTALLED INCORRECTLY BECAUSE OF LACK OF COORDINATION WILL BE REMOVED AND INSTALLED CORRECTLY AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR.

E. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT RUNS AND LIGHT FIXTURE LOCATIONS ABOVE THE CEILING WITH OTHER TRADES PRIOR TO INSTALLATION.

F. ALL DUCT SMOKE DETECTORS SHALL BE PROVIDED AND CONNECTED BY THE ELECTRICAL CONTRACTOR, BUT INSTALLED BY THE MECHANICAL CONTRACTOR.

G. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY OUTLETS FOR HEAT TAPE CONNECTIONS FOR MECHANICAL SYSTEMS. PROVIDE CLASS B (30mA) GFCI PROTECTION ON THE BREAKER SUPPLYING THE HEAT TAPE.

H. THE ELECTRICAL CONTRACTOR SHALL PROVIDE 120V POWER AT EACH HVAC UNIT HAVING A CONTROLS POWER SUPPLY. CIRCUIT(S) SHALL BE DEDICATED 20A SERVING A MAXIMUM OF 10 HVAC UNITS PER CIRCUIT. COORDINATE ALL LOCATIONS WITH THE MECHANICAL CONTRACTOR.

17. DEMOLITION NOTES:

A. PARTIAL AND TOTAL DEMOLITION OF PORTIONS SHALL BE PERFORMED ALONG WITH ALL NECESSARY MODIFICATIONS TO THAT PORTION OF THE EXISTING BUILDING WHICH SHALL REMAIN SO THAT IT CONTINUES TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION.

B. WHERE INCLUDED AS PART OF THE CONTRACT DOCUMENTS, THE DRAWINGS INDICATE THE GENERAL AREAS OF WORK INVOLVED. HOWEVER, THE ELECTRICAL CONTRACTOR SHALL PERFORM WORK OUTSIDE THOSE AREAS SHOWN AS IS NECESSARY TO COMPLY WITH THE INTENT OF THIS SECTION.

C. THE ELECTRICAL CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE EXISTING BUILDING AND WITH THE WORK OF ALL OTHER TRADES AND INCLUDE ALL WORK NECESSARY TO COMPLY WITH THE INTENT OF THE DEMOLITION.

D. IT SHALL BE UNDERSTOOD THAT FIELD CONDITIONS MAY BE ENCOUNTERED DURING THE EXECUTION OF THIS CONTRACT WHICH WILL REQUIRE EXTENSION OR RELOCATION OF EXISTING SYSTEMS OR EQUIPMENT WHICH ARE NOT SPECIFICALLY SHOWN ON THE DRAWINGS, BUT WHICH ARE REQUIRED TO MEET THE STATED INTENT THAT THE BUILDING CONTINUE TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION. THE ELECTRICAL CONTRACTOR SHALL INCLUDE SUCH WORK AS WOULD NORMALLY BE EXPECTED IN AN EXISTING BUILDING OF THIS AGE AND TYPE.

E. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TOOLS, EQUIPMENT, LABOR, ETC. IN ORDER TO ACCOMPLISH THE DEMOLITION PORTION OF THE PROJECT.

F. THE DEMOLITION OF CERTAIN AREAS OF THE EXISTING BUILDING SHALL BE PERFORMED BY THE GENERAL CONTRACTOR. IT SHALL BE THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE GENERAL CONTRACTOR TO DIFFERENTIATE THE SCOPE OF WORK BETWEEN SEPARATE TRADES.

G. THE ELECTRICAL CONTRACTOR SHALL INCLUDE COORDINATION WITH THE GENERAL CONTRACTOR AND SUCH DEMOLITION OF THE EXISTING ELECTRICAL SYSTEMS AS IS NECESSARY SO THAT THE DEMOLITION WORK OF THE GENERAL CONTRACTOR SHALL NOT DAMAGE THOSE PORTIONS OF THE ELECTRICAL SYSTEMS WHICH ARE TO REMAIN IN SERVICE, ARE TO BE REUSED, OR ARE TO BECOME THE PROPERTY OF THE OWNER.

H. TURN OVER TO OWNER, UPON REQUEST OR AS NOTED, ITEMS SHOWN AS BEING REMOVED AND NOT REINSTALLED. ITEMS NOT DIRECTED OR REQUESTED TO BE TURNED OVER TO THE OWNER SHALL BE DISPOSED OF BY THE ELECTRICAL CONTRACTOR.

I. EQUIPMENT OR MATERIALS WHICH ARE TO BE REUSED OR TURNED OVER TO THE OWNER SHALL BE CAREFULLY REMOVED, CLEANED, AND STORED IN A CLEAN AND DRY AREA. SHOULD THE ELECTRICAL CONTRACTOR ENCOUNTER SUCH EQUIPMENT WHICH IS NOT IN SATISFACTORY CONDITION FOR REUSE AND NOT IN WORKING ORDER, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY.

J. DISCONNECT ELECTRICAL SERVICES TO ALL EQUIPMENT REQUIRING REMOVAL. CONDUIT SHALL BE REMOVED BACK TO THE POINT WHERE IT WILL BE CONCEALED AT THE COMPLETION OF THIS CONTRACT. WIRE AND CABLE SHALL BE REMOVED BACK TO THE FIRST OUTLET BOX, CABINET, OR TERMINATION POINT WHICH IS TO REMAIN. CIRCUITS WHICH ARE NOT REUSED SHALL BE REMOVED BACK TO THE SOURCE IN THEIR ENTIRETY.

K. REMOVE AND REINSTALL CEILINGS IN THE EXISTING BUILDING AS REQUIRED FOR THE WORK. COORDINATE WITH THE GENERAL CONTRACTOR. IN SUCH AREAS, REMOVE AND REINSTALL ALL ELECTRICAL DEVICES WHICH ARE TO REMAIN IN OR ON THE CEILING.

L. WHERE NEW CEILINGS CONFLICT WITH EXISTING ELECTRICAL WORK WHICH IS TO REMAIN, RELOCATE THE ELECTRICAL WORK INVOLVED TO CLEAR THE NEW CONSTRUCTION.

M. WHERE NEW WALL OR FLOOR FINISHES CONFLICT WITH EXISTING ELECTRICAL WORK WHICH IS TO REMAIN, RELOCATE THE ELECTRICAL WORK INVOLVED OR PROVIDE BOX EXTENSIONS OR SIMILAR DEVICES AND REINSTALL ON THE NEW FINISH.

N. WHERE EXISTING BRANCH CIRCUITS AND SYSTEMS ARE INTERRUPTED BY NEW WORK OR SYSTEMS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, ETC.), EXTEND AND RECONNECT THOSE EXECUTION OF THIS CONTRACT, PROVIDE TEMPORARY CONNECTIONS UNTIL FINAL CONNECTIONS ARE COMPLETE.

18. COORDINATION DRAWINGS:

A. THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, SECURITY AND GENERAL). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA (INCLUDING CABLE TRAY), SECURITY, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO PURCHASE, FABRICATION OR INSTALLATION OF EQUIPMENT AND/OR SYSTEMS. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS FOR SHOP DRAWINGS AND COORDINATION DRAWINGS:

1. ALL SHOP AND COORDINATION DRAWINGS WILL BE 1/4"=1'-0" SCALE.
2. DRAWINGS WILL BE ORIGINAL DRAWINGS AND NOT OVERLAYS OF THE CONTRACT/DESIGN DRAWINGS.
3. COORDINATION DRAWINGS WILL BE DRAWN ON REPRODUCIBLE MATERIAL 48"x36".
4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
5. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

19. TESTING AND DOCUMENTATION:

A. TESTING AND DOCUMENTATION SHALL BE PROVIDED AS FOLLOWS:

1. GFCI EQUIPPED BREAKERS SHALL BE PERFORMANCE TESTED.
2. LIGHTING CONTROL SYSTEMS SHALL BE TESTED FOR PROPER OPERATION OF SETPOINTS.

20. COMMISSIONING:

A. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR EQUIPMENT/SYSTEM START-UP AND TESTING. THE ELECTRICAL CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR EQUIPMENT/SYSTEM COMMISSIONING AS DIRECTED BY THE COMMISSIONING AUTHORITY (CxA). THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE COMMISSIONING AUTHORITY AND PROVIDE ALL NECESSARY TIME, EQUIPMENT, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

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MORGAN K. GUNTER
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Johnsonville Elementary School
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18495 NC-27, Cameron, NC 28326

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022

PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL NOTES

E1-002

Sheet No. 2 of 15

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt

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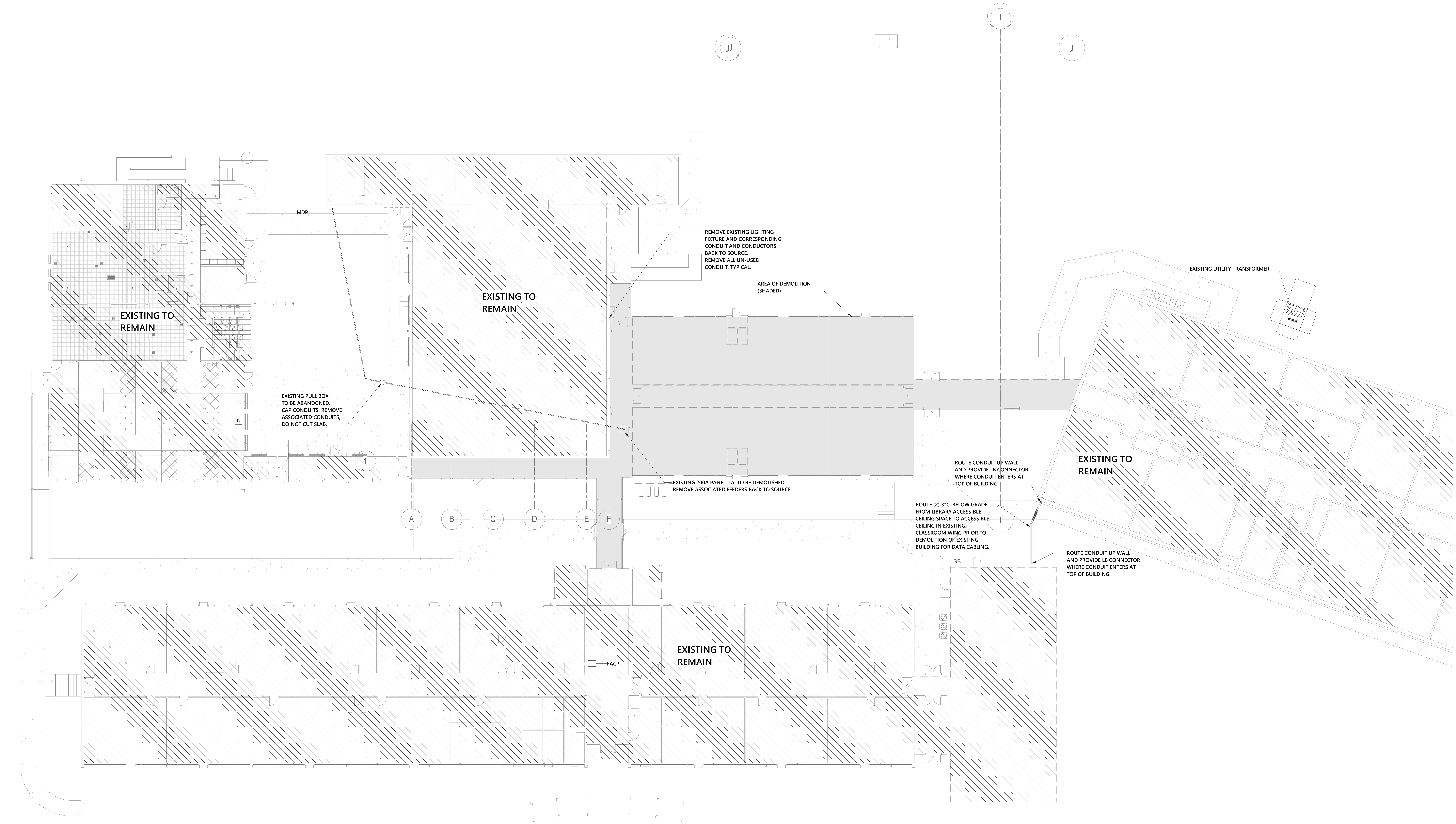
OPTIMA # 21-0266R

GENERAL NOTES

A. SWITCHBOARDS, PANELBOARDS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT.
B. FOR ALL RELOCATED MECHANICAL EQUIPMENT, RELOCATE ASSOCIATED ELECTRICAL CONNECTIONS AND EXTEND FEEDERS AS REQUIRED TO NEW EQUIPMENT LOCATIONS. SEE NEW WORK PLAN FOR NEW LOCATIONS.
C. DASHED ARCHITECTURAL LINES INDICATE DEMOLITION. DISCONNECT AND REMOVE EXISTING ELECTRICAL DEVICES IN WALLS AND CEILINGS. TYPICAL IN ALL AREAS UNLESS OTHERWISE NOTED. COORDINATE WITH OTHER TRADES AS REQUIRED TO FACILITATE COMPLETE DEMOLITION.
D. CONTRACTOR SHALL MAKE SURE TO MAINTAIN CONTINUITY OF ELECTRICAL DEVICES THAT ARE OUTSIDE AREA OF WORK THAT ARE INTENDED TO REMAIN ENERGIZED.
E. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHT FIXTURES TO REMAIN.
F. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL FIRE ALARM DEVICES TO REMAIN.
G. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING POWER DEVICES TO REMAIN.
H. HATCHED AREAS ARE NOT IN SCOPE OF WORK.



1 OVERALL ELECTRICAL PLAN - DEMOLITION - PHASE 2
1/16" = 1'-0"

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CHECKED BY: MKG

OVERALL FIRST FLOOR POWER PLAN - DEMOLITION

E1-011

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
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GENERAL NOTES

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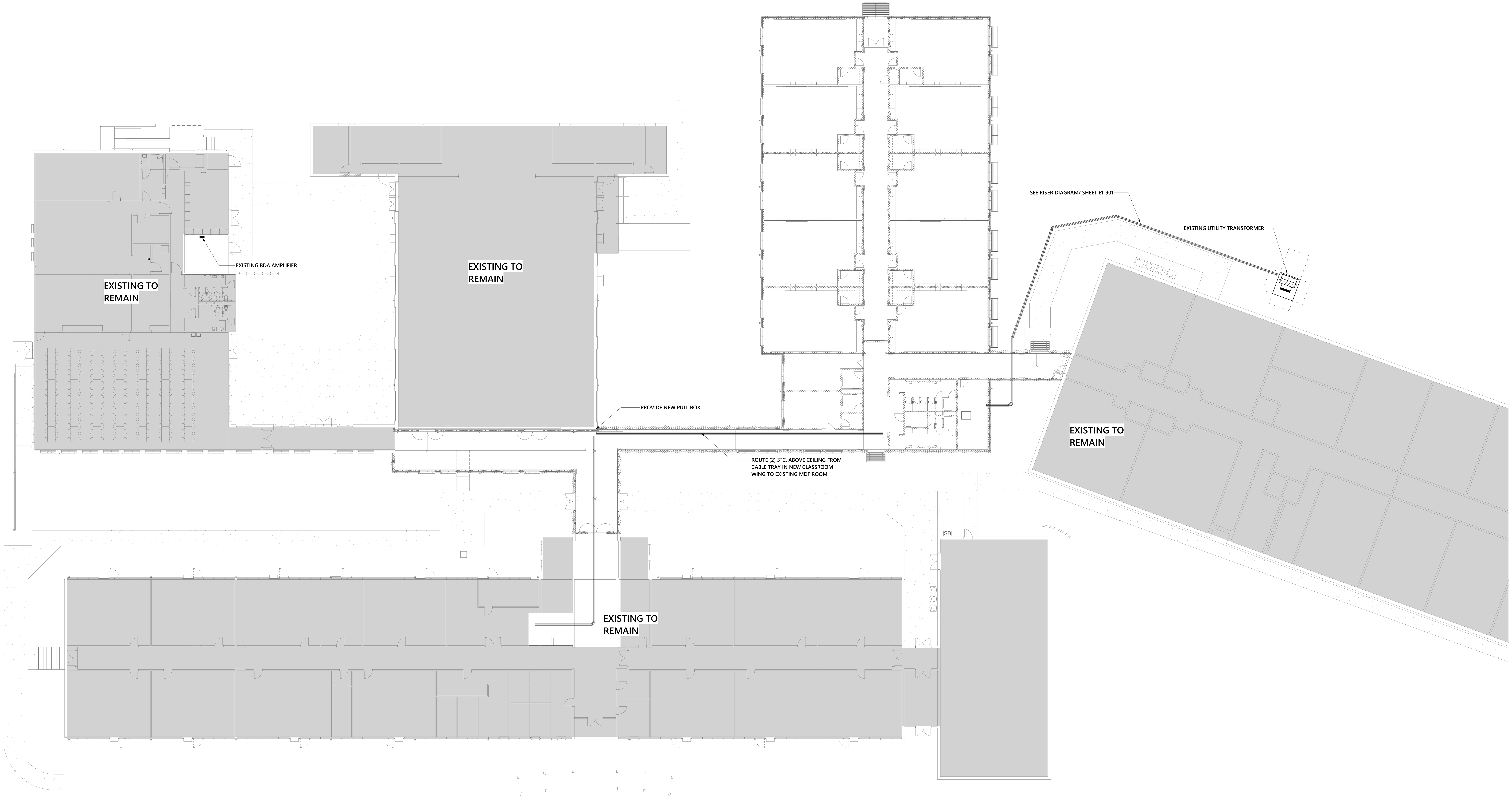

1 OVERALL ELECTRICAL PLAN - PHASE 2
1/16" = 1'-0"

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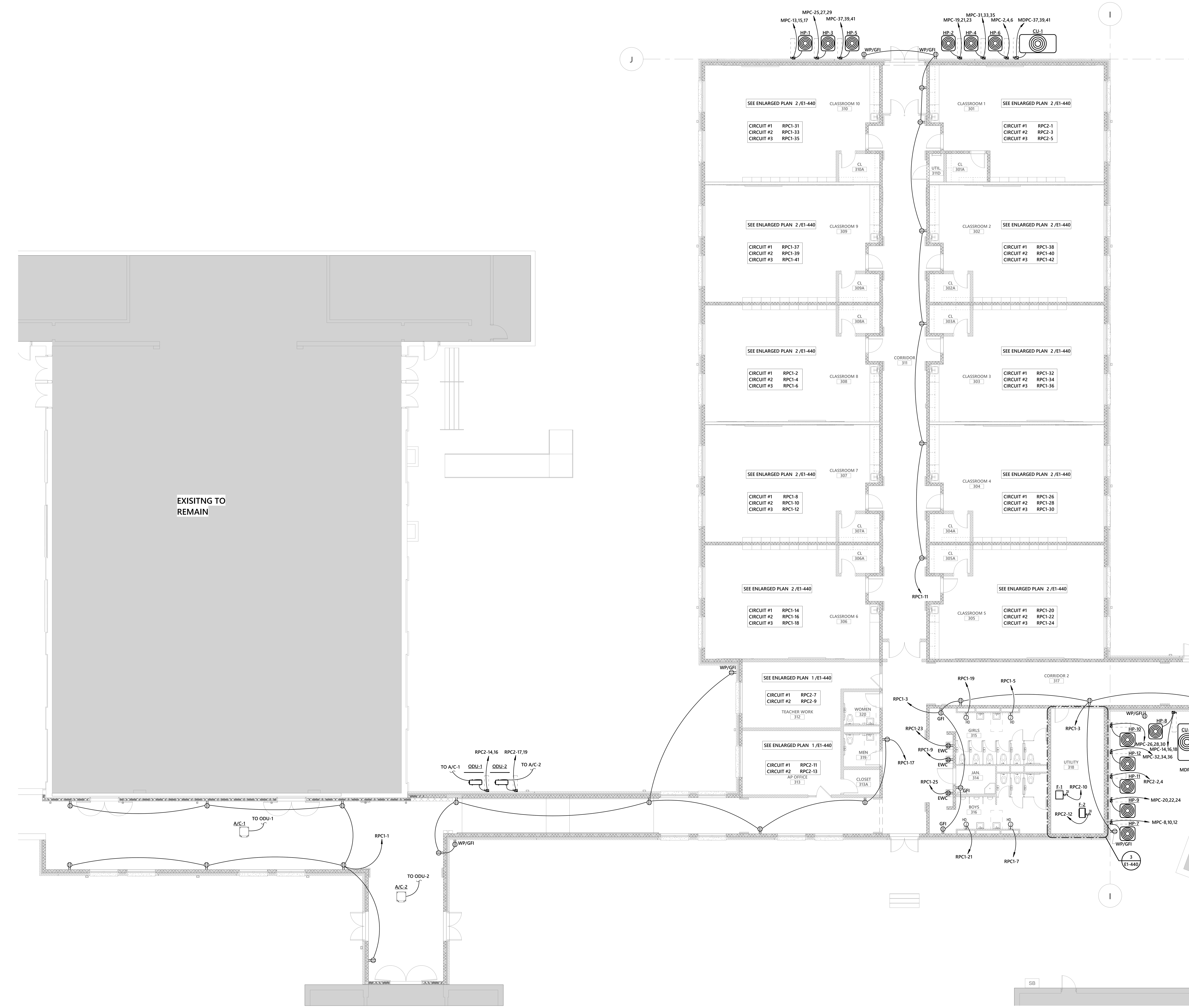
OVERALL FIRST FLOOR POWER PLAN - NEW WORK

E1-012

GENERAL NOTES

A. RECEPTACLES AND DATA OUTLETS SHALL NOT BE MOUNTED IN TRIM OF WINDOWS. LOCATE IN WHERE FULL WALL IS AVAILABLE.
B. COORDINATE LOCATION OF ALL FLOOR BOXES IN THE SAME AREA SHALL BE NEATLY ALIGNED AND PARALLEL TO BUILDING LINES.
C. CIRCUIT NUMBERS ARE DIAGRAMMATIC. EXACT NUMBERS SHALL BE DETERMINED IN THE FIELD AND REFLECTED ON AS-BUILT DOCUMENTATION BY THE ELECTRICAL CONTRACTOR. THE ASSOCIATED CIRCUIT NUMBERS THAT ARE APPLIED TO EACH DEVICE AND PIECE OF EQUIPMENT INFERS INTERCONNECTING BRANCH CIRCUITRY.
D. WHERE CONNECTED TO A 20A BRANCH CIRCUIT SUPPLYING AN INDIVIDUAL RECEPTACLE (SIMPLEX OR DUPLEX), THE RECEPTACLE SHALL BE RATED AT 20A.
E. PROVIDE HOUSEKEEPING PADS FOR ALL FLOOR MOUNTED AND GRADE MOUNTED ELECTRICAL EQUIPMENT. MINIMUM REQUIREMENTS: 4" HIGH, 4% AIR ENTRAINED, POLYFIBER REINFORCED CONCRETE, 4" WIDER AND 4" LONGER THAN EQUIPMENT TO BE PLACED ON IT. REFER TO ELECTRICAL DETAIL DRAWINGS FOR TRANSFORMER OR SWITCHGEAR PADS THAT MAY EXCEED THESE REQUIREMENTS.
F. REFER TO SECTION 26 0519 FOR MINIMUM CONDUCTOR SIZE ADJUSTMENTS FOR VOLTAGE DROP.
G. WIRE COUNTS FOR CIRCUIT CONDUCTORS ARE NOT SHOWN. PROVIDE PROPER NUMBER OF CONDUCTORS TO ACHIEVE CIRCUIT AND SWITCHING CONNECTIONS SHOWN.
H. MODIFICATIONS TO NUMBER OF CONDUCTORS IN HOME RUNS IN ADDITION TO CIRCUIT INDICATED ON THIS DRAWING ARE PROHIBITED.
I. COORDINATE EXACT LOCATION OF ALL FLOOR BOXES WITH ARCHITECT AND FURNITURE VENDOR.



1 FIRST FLOOR POWER PLAN - PHASE 2
1/8" = 1'-0"

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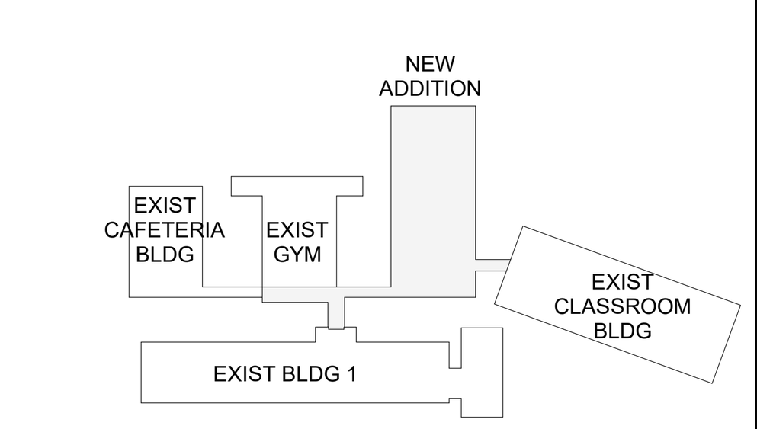
FIRST FLOOR POWER PLAN - NEW WORK



KEYPLAN

E1-111

OPTIMA # 21-0266R

GENERAL NOTES

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B. COORDINATE LOCATION OF ALL FLOOR BOXES IN THE SAME AREA SHALL BE NEATLY ALIGNED AND PARALLEL TO BUILDING LINES.
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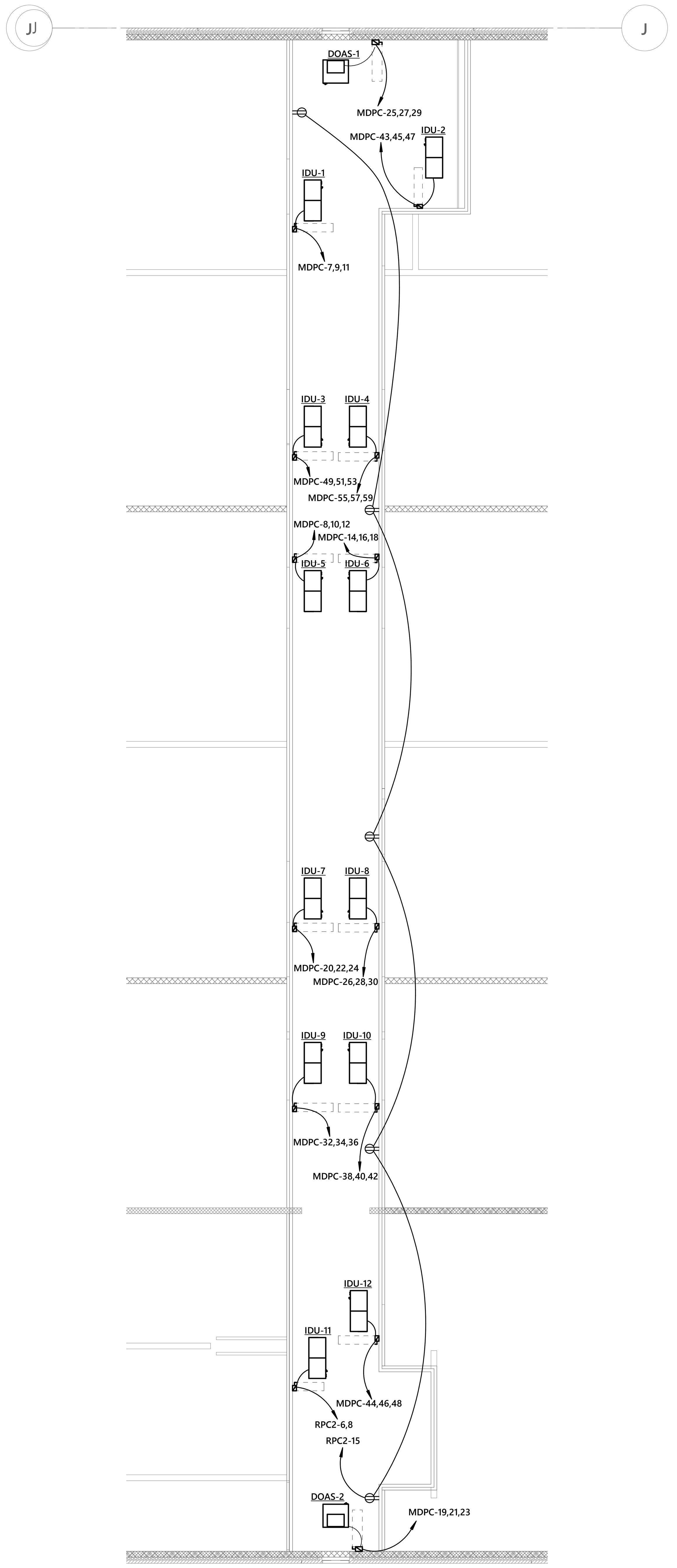
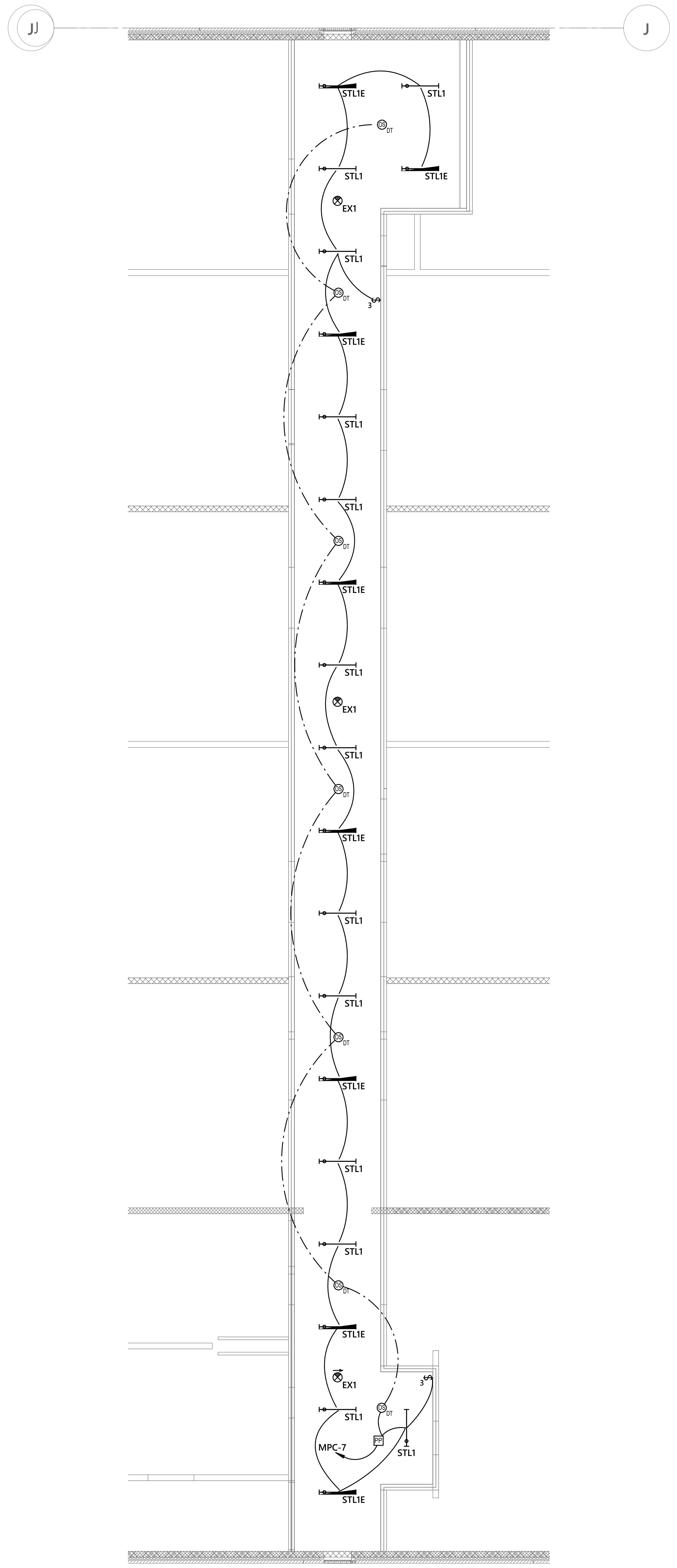
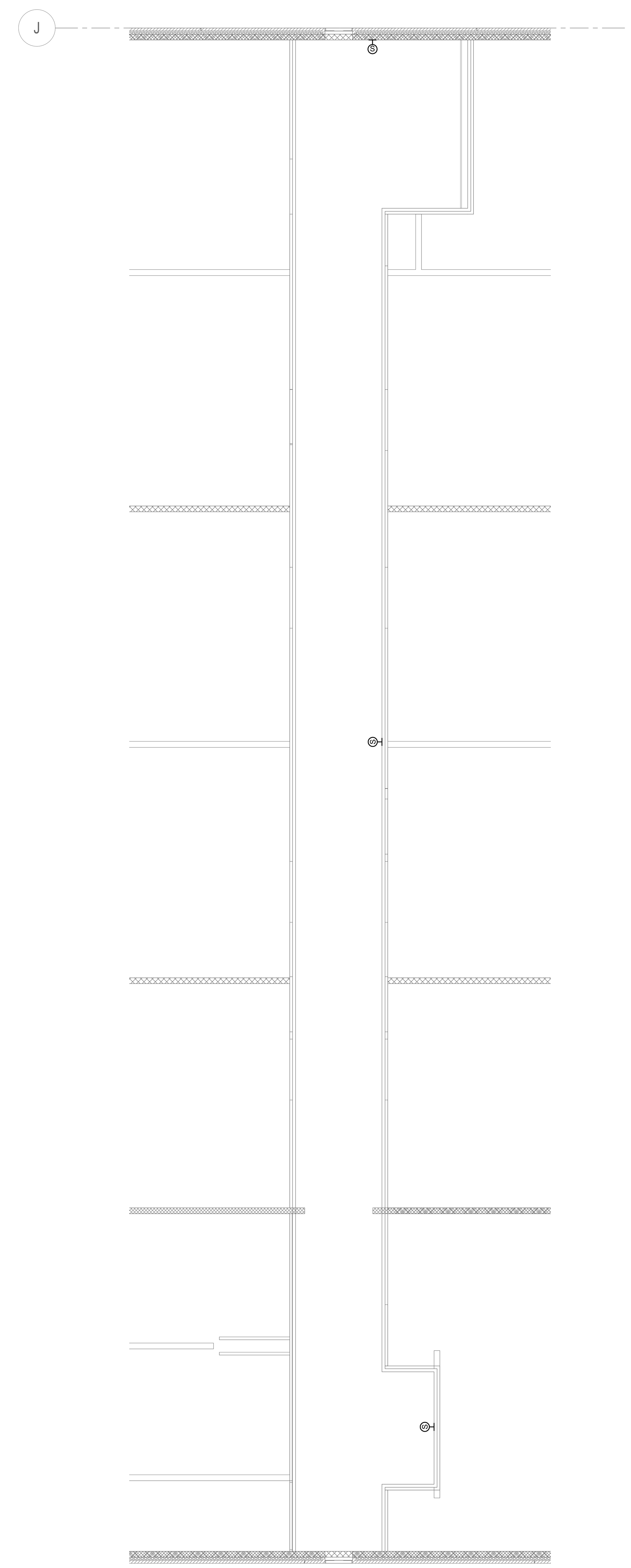


1 MECHANICAL LOFT POWER PLAN - PHASE 2
1/8" = 1'-0"



2 MECHANICAL LOFT LIGHTING PLAN - PHASE 2
1/8" = 1'-0"



3 MECHANICAL LOFT SYSTEMS PLAN - PHASE 2
1/8" = 1'-0"

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MECHANICAL LOFT ELECTRICAL PLANS - NEW WORK

E1-112

OPTIMA # 21-0266R

GENERAL NOTES

A. ALL RECESSED LIGHTING FIXTURES IN LAY-IN CEILING SHALL BE INSTALLED WITH 6'-0" LONG FLEXIBLE METAL CONDUIT.
B. SEE ARCHITECTURAL EXTERIOR ELEVATIONS FOR MOUNTING HEIGHTS OF EXTERIOR LIGHTING FIXTURES.
C. CONNECT EMERGENCY EXIT SIGNS AND THE UNSWITCHED INPUT OF BATTERY PACKS TO LOCAL LIGHTING CIRCUIT, AHEAD OF SWITCHING.
D. CONTRACTOR SHALL MAKE SURE TO MAINTAIN CONTINUITY OF ELECTRICAL DEVICES THAT ARE OUTSIDE AREA OF WORK THAT ARE INTENDED TO REMAIN ENERGIZED.
E. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHT FIXTURES TO REMAIN.
F. HATCHED AREAS ARE NOT IN SCOPE OF WORK.

KEYED NOTES

1 LOCATE POWER PACK IN UTILITY ROOM.
2 CONNECT MANUAL OVERRIDE SWITCH IN PARALLEL WITH OCCUPANCY SENSOR SO THAT OCCUPANCY SENSOR MAY BE OVERRIDDEN FOR PERSONAL SAFETY.

1 FIRST FLOOR LIGHTING PLAN - NEW WORK - PHASE 2
1/8" = 1'-0"

KEYPLAN

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048210
MORGAN K. GUNTER
01/28/2022

CONSTRUCTION
DOCUMENTS

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North Carolina License Number C-0914

Harnett County Schools
Johnsonville Elementary School
Addition/Renovation Phase 2
18495 NC-27, Cameron, NC 28326

ENERGY
STAR
PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022
PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

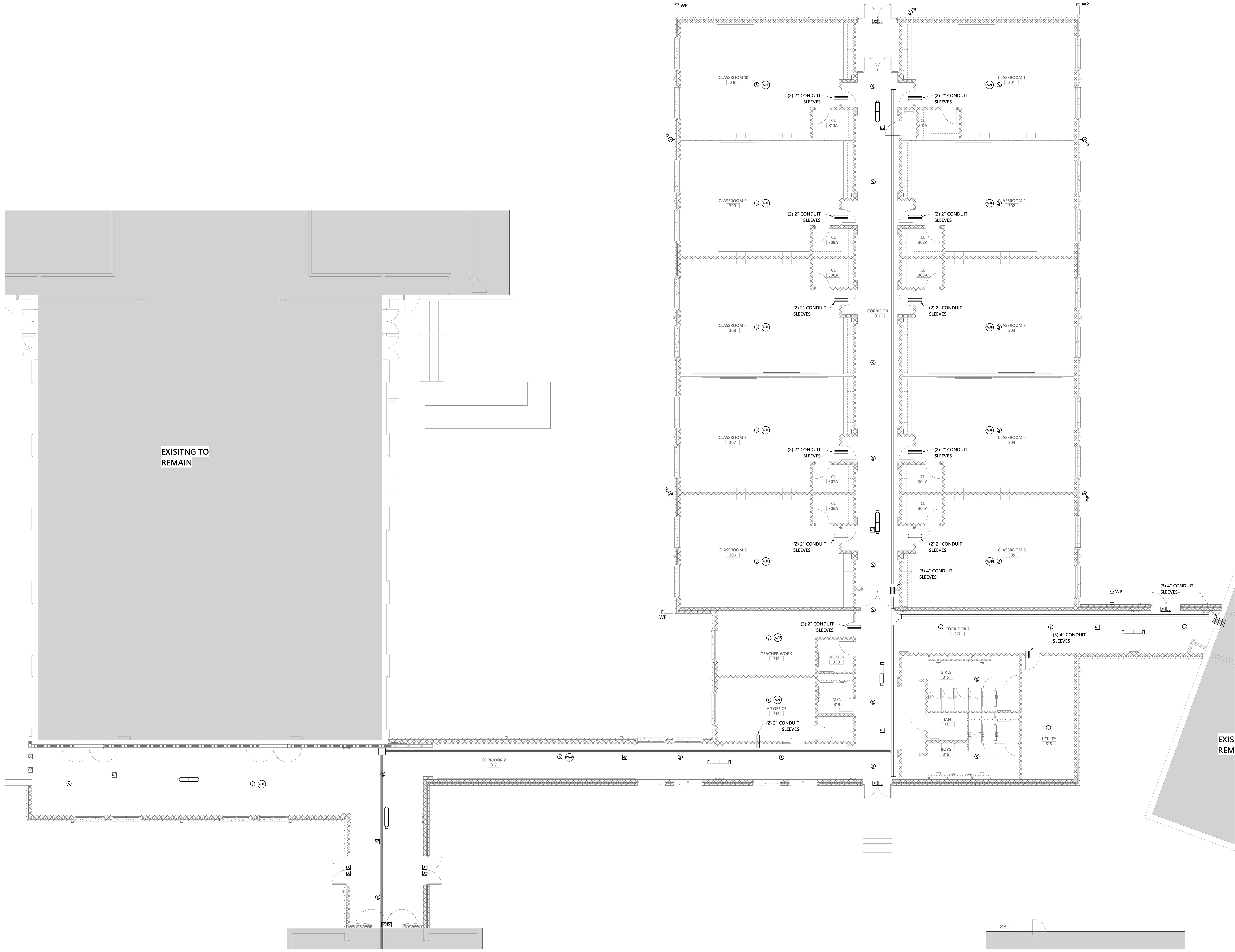
FIRST FLOOR
LIGHTING PLAN -
NEW WORK

E1-211

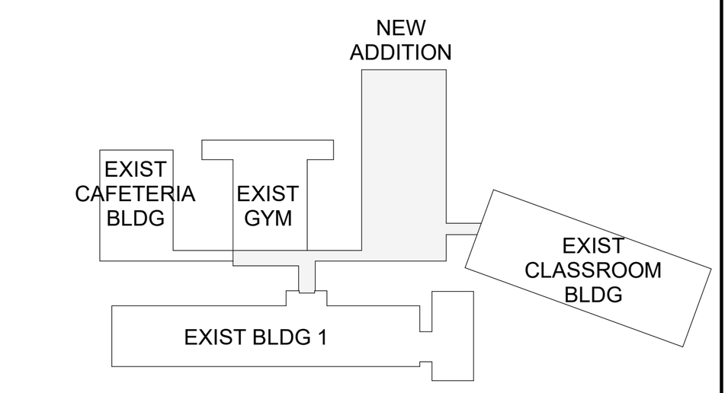
ADA AND LEGAL DISCLAIMER: This document is intended to comply with the requirements of the Americans with Disabilities Act (ADA). However architects and engineers are not licensed to interpret laws or give advice concerning laws. The owner should have this document reviewed by his attorney to determine if it complies with ADA and other laws.

GENERAL NOTES

A. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL FIRE ALARM DEVICES TO REMAIN.
B. HATCHED AREAS ARE NOT IN SCOPE OF WORK.



1 FIRST FLOOR SYSTEMS PLAN - PHASE 2
1/8" = 1'-0"



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FIRST FLOOR SPECIAL SYSTEMS PLAN - NEW WORK

E1-311

OPTIMA # 21-0266R

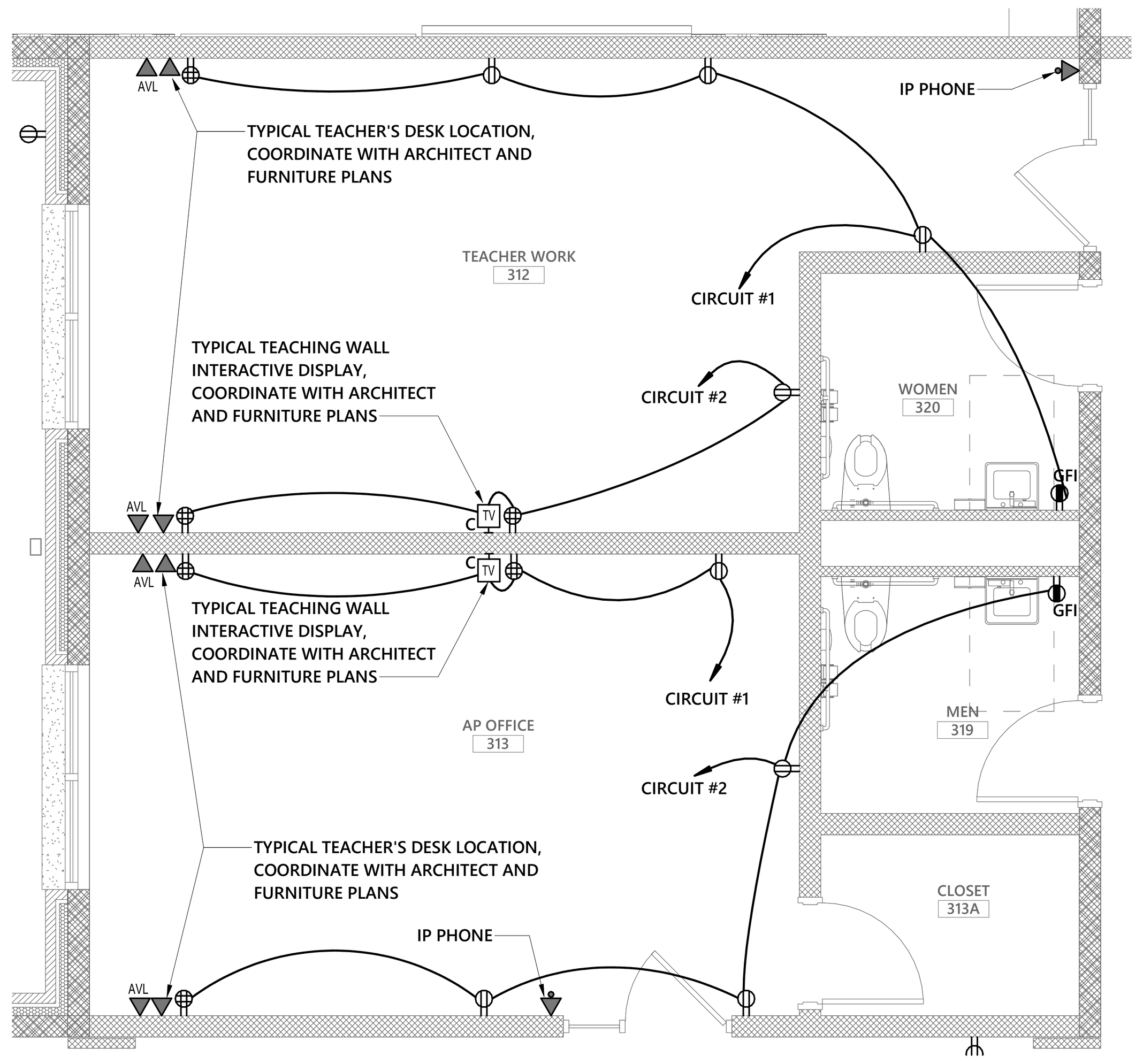
1/28/2022 3:01:33 PM
Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt

GENERAL NOTES

A. SEE SHEET E1-001 FOR SYMBOLS AND ABBREVIATIONS.

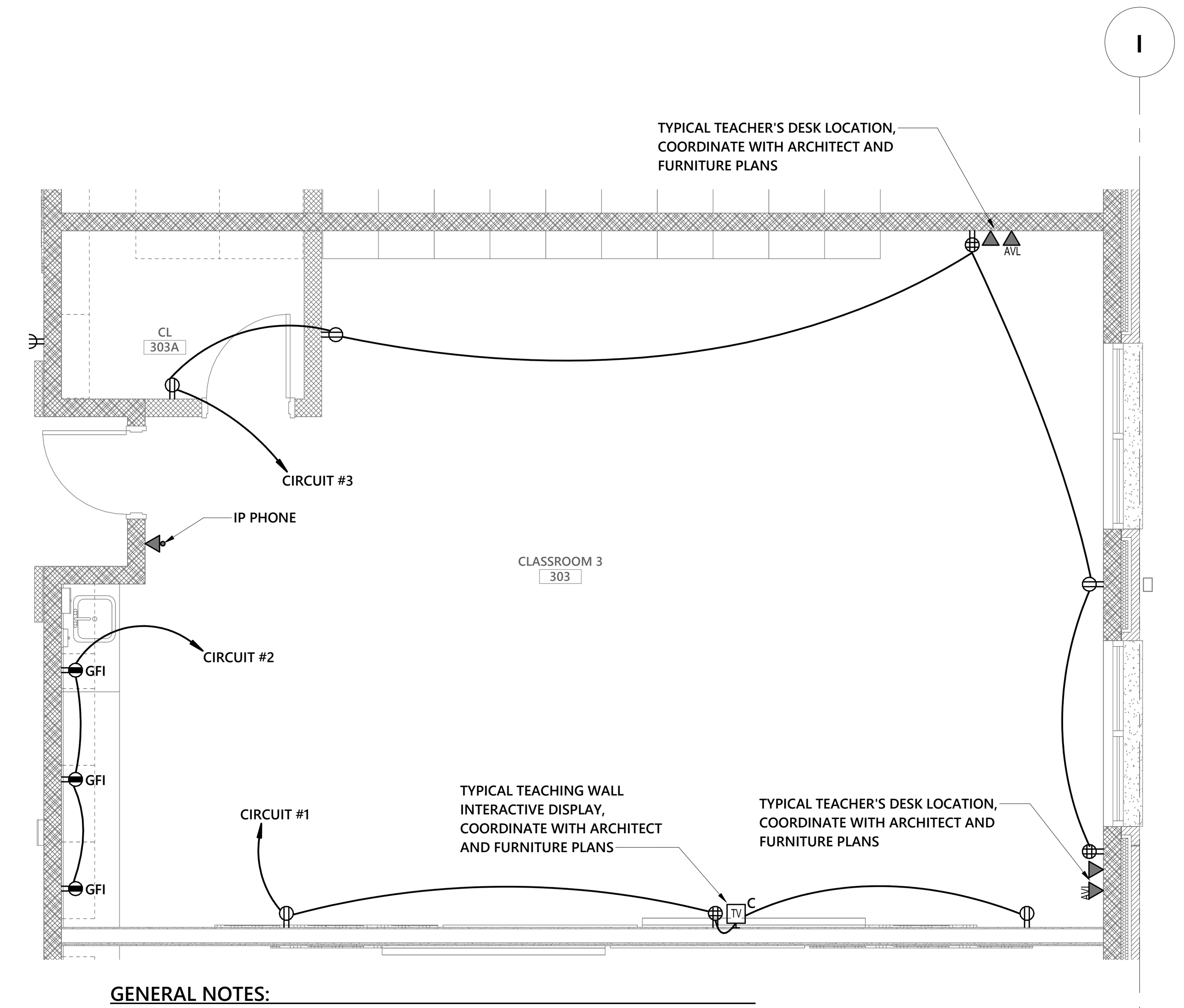
KEYED NOTES

1 PROVIDE 3/4" FIRE RETARDANT PLYWOOD BACKBOARD FROM FLOOR TO CEILING INSTALLED VERTICALLY STARTING AT 6"AFF. PAINT WITH TWO COATS OF COLOR WHITE FIRE RETARDANT PAINT.
2 PROVIDE 120V CONNECTION FOR MECHANICAL CONTROLS. COORDINATE WITH MECHANICAL CONTROLS CONTRACTOR PRIOR TO ROUGH-IN.



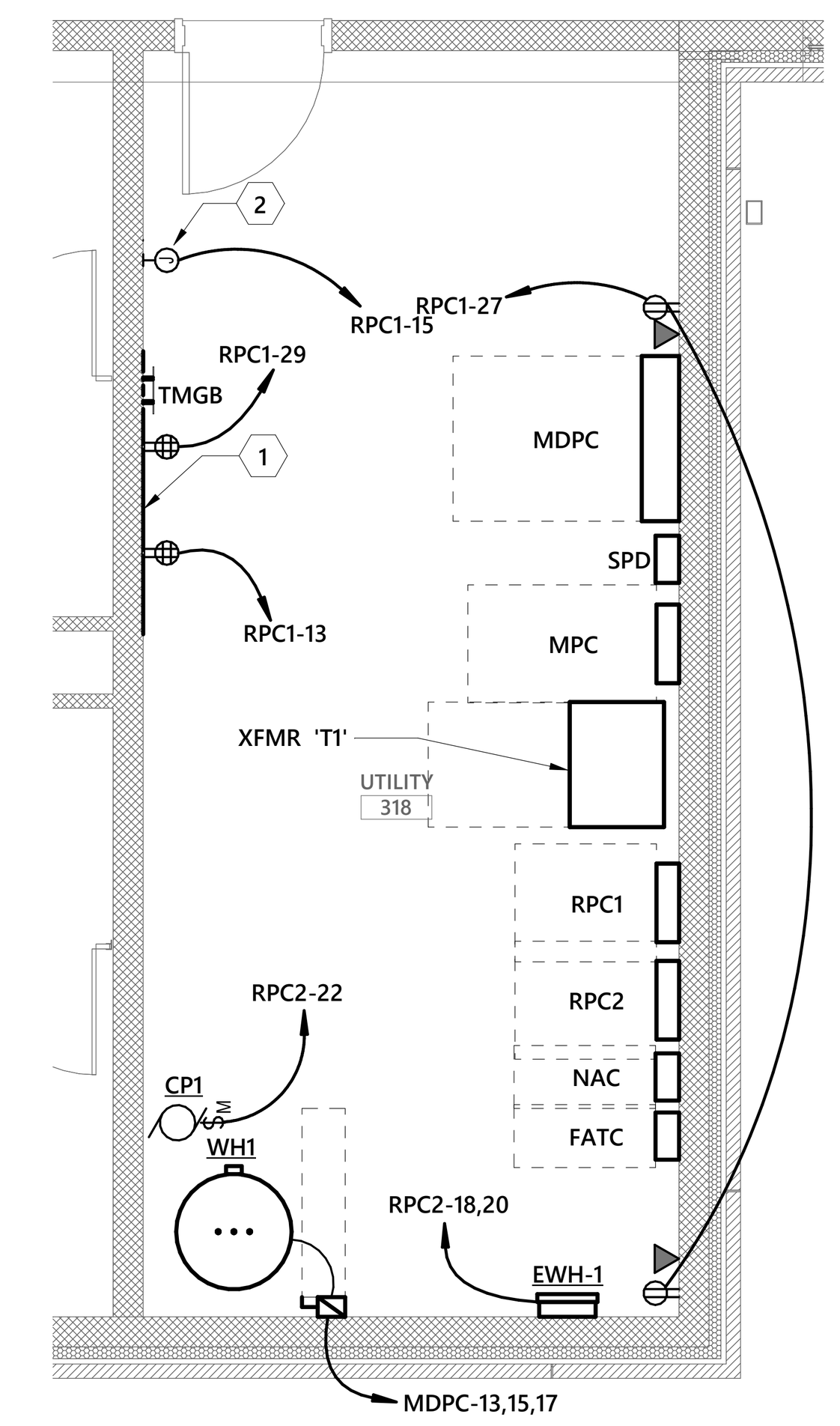
GENERAL NOTES:
1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.

1 ENLARGED AP & TEACHER WORK ROOM PLAN - POWER - PHASE 2
1/4" = 1'-0"

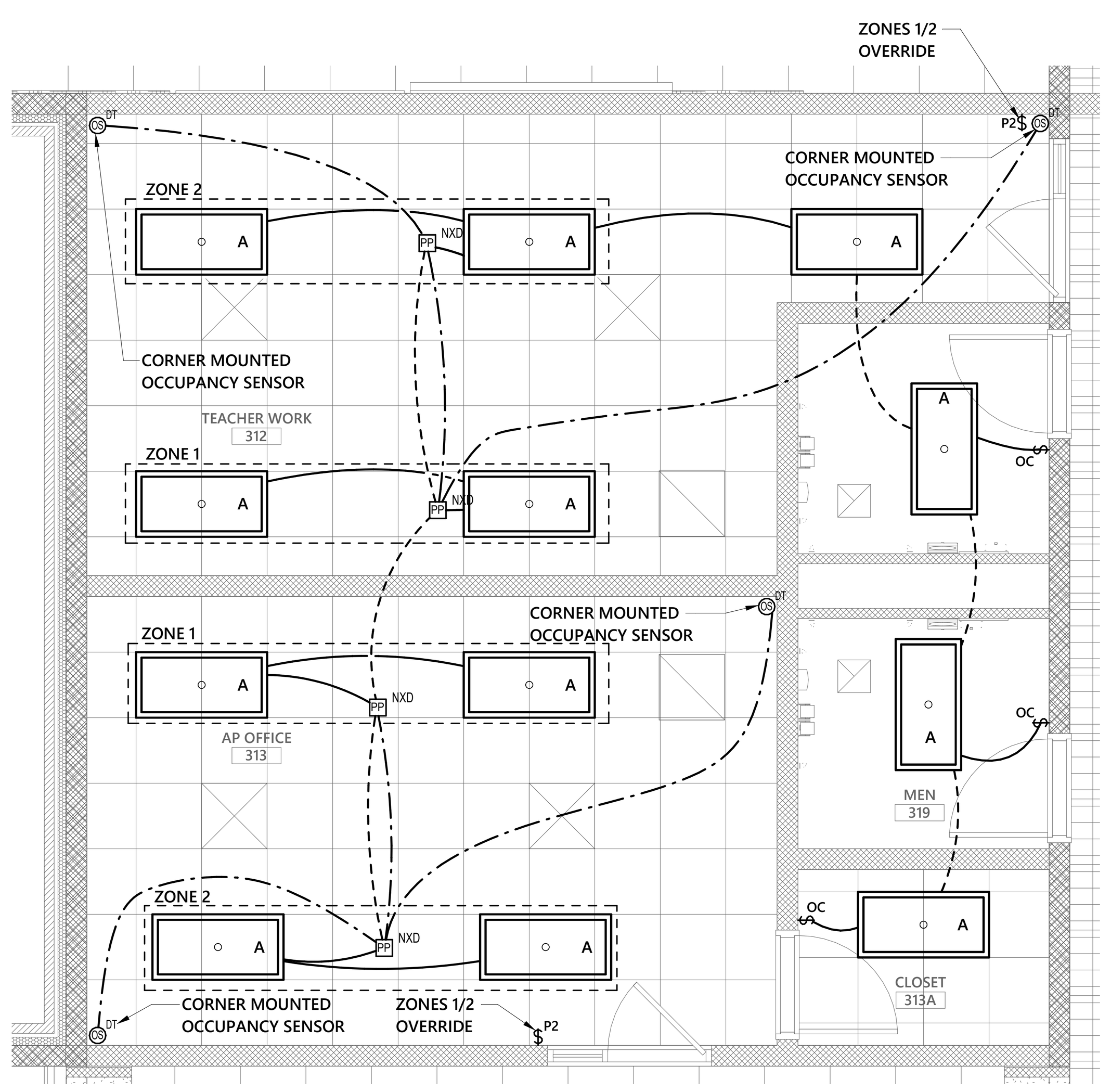


GENERAL NOTES:
1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.

2 ENLARGED TYPICAL CLASSROOM PLAN - POWER - PHASE 2
1/4" = 1'-0"

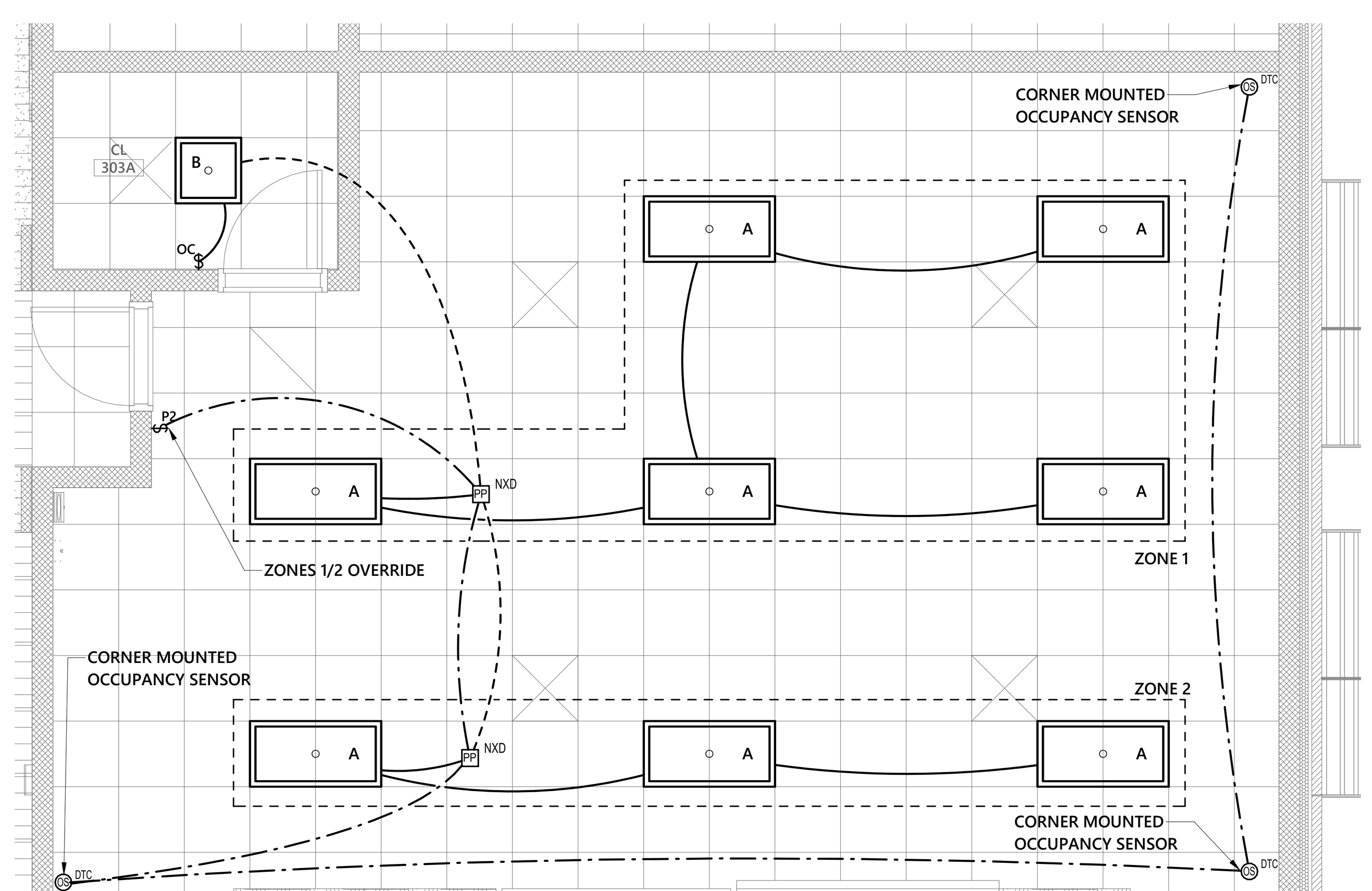


3 ENLARGED UTILITY ROOM PLAN - ELECTRICAL - PHASE 2
1/4" = 1'-0"



4 ENLARGED AP & TEACHER'S WORK ROOM PLAN - LIGHTING - PHASE 2
1/4" = 1'-0"

GENERAL NOTES:
1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS.
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.
3. CLASSROOM ZONES:
   A. ZONE 1
   B. ZONE 2



5 ENLARGED TYPICAL CLASSROOM PLAN - LIGHTING - PHASE 2
1/4" = 1'-0"

GENERAL NOTES:
1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS.
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.
3. CLASSROOM ZONES:
   A. ZONE 1: CLASSROOM ZONE
   B. ZONE 2: TEACHING WALL ZONE

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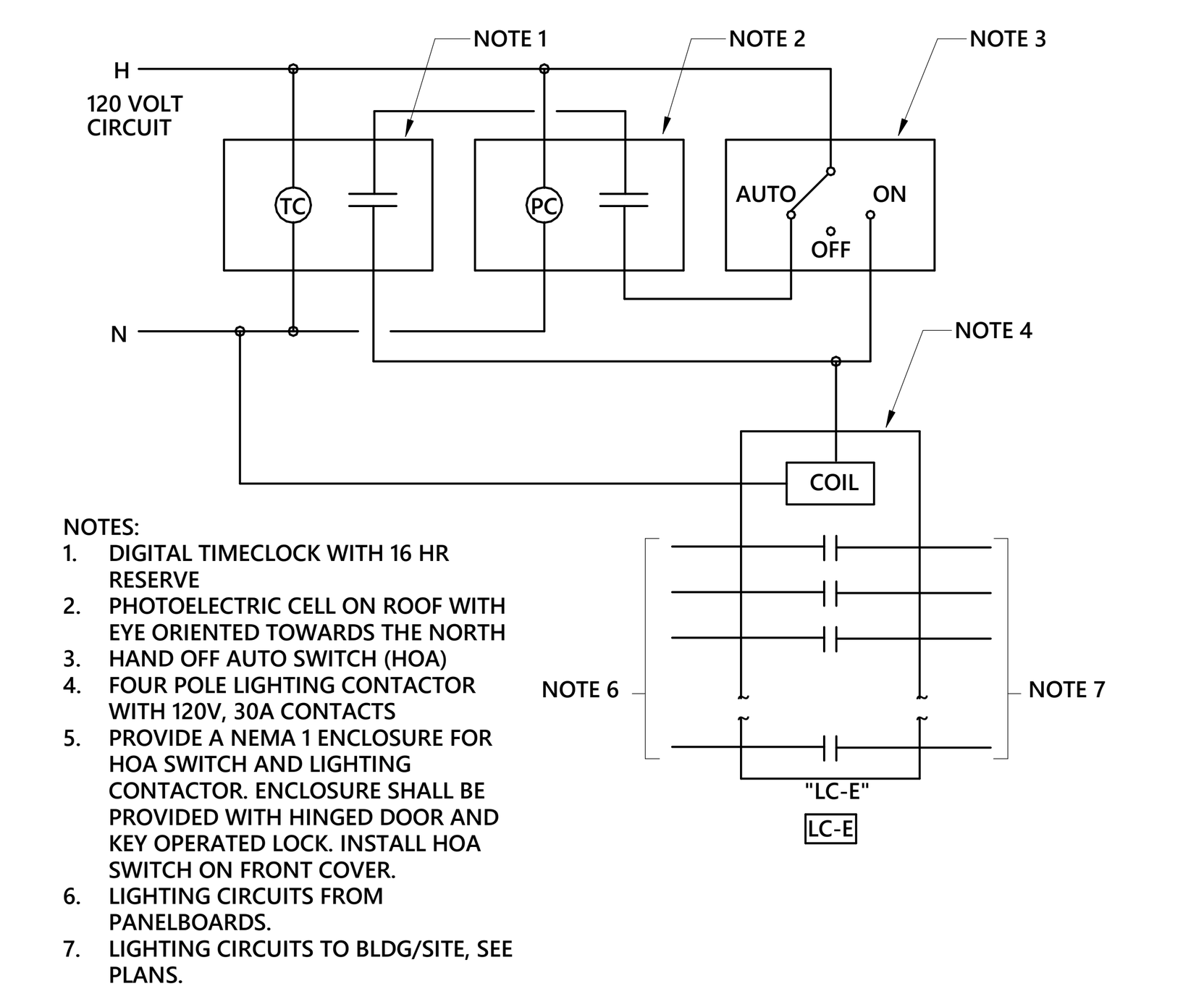
ENLARGED ELECTRICAL PLANS

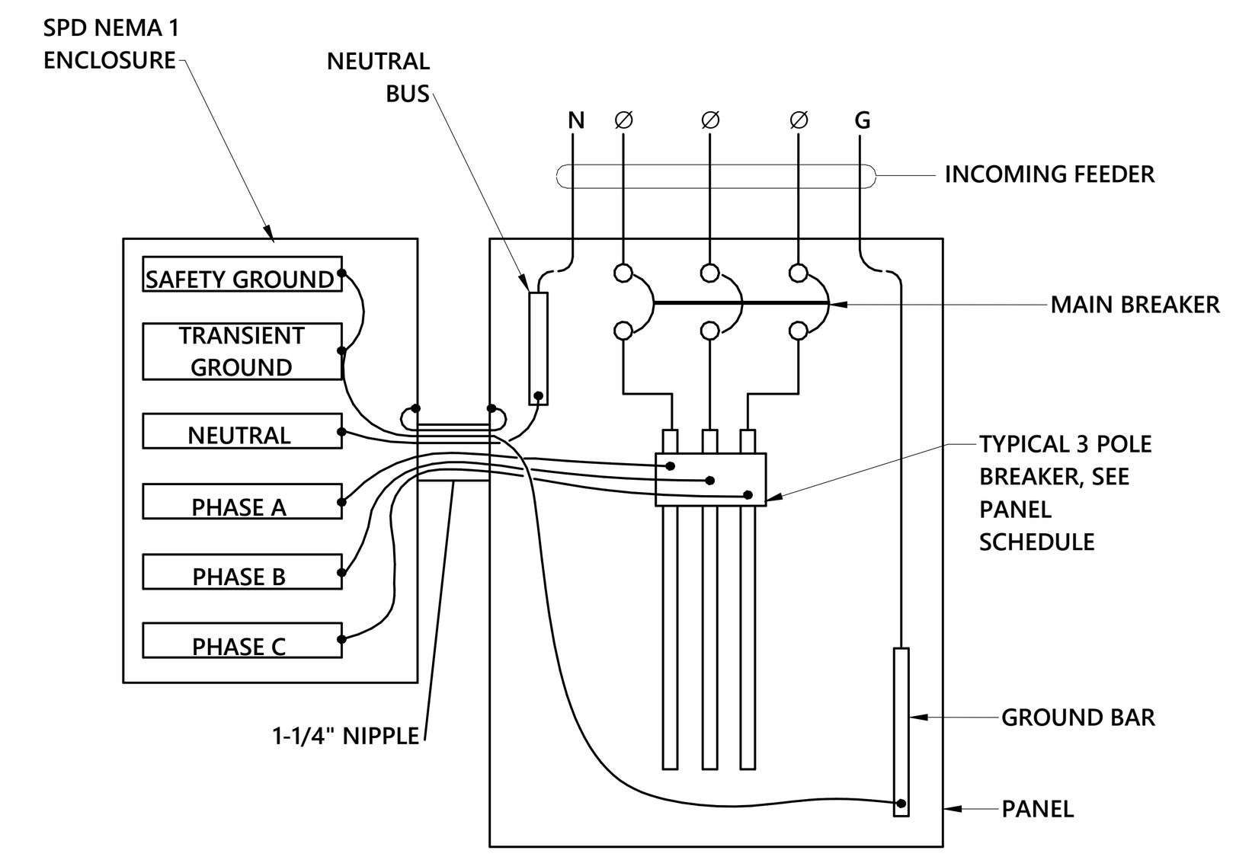
E1-440

OPTIMA # 21-0266R



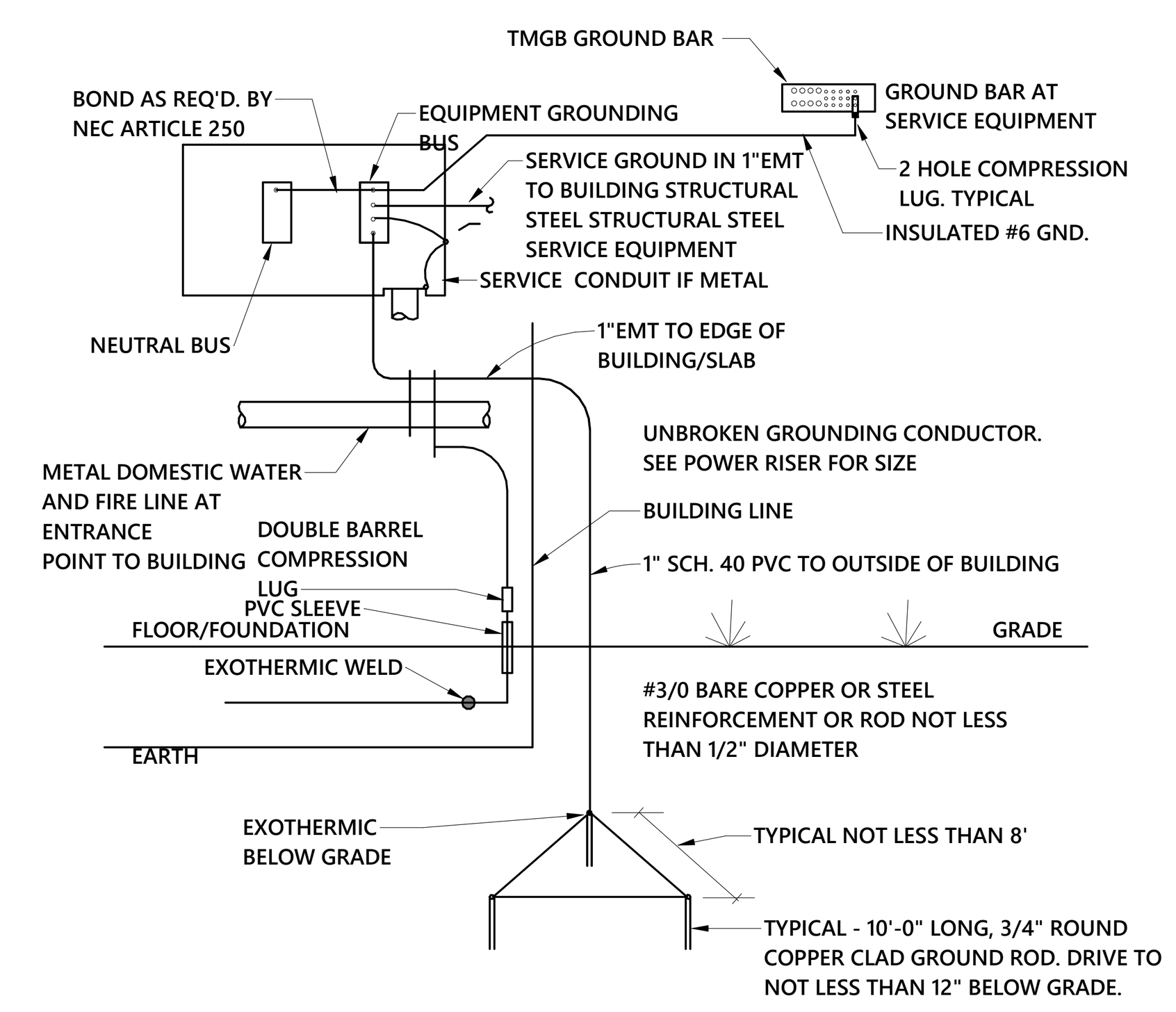
NOTES:
1. DIGITAL TIMECLOCK WITH 16 HR RESERVE
2. PHOTOELECTRIC CELL ON ROOF WITH EYE ORIENTED TOWARDS THE NORTH
3. HAND OFF AUTO SWITCH (HOA)
4. FOUR POLE LIGHTING CONTACTOR WITH 120V, 30A CONTACTS
5. PROVIDE A NEMA 1 ENCLOSURE FOR HOA SWITCH AND LIGHTING CONTACTOR. ENCLOSURE SHALL BE PROVIDED WITH HINGED DOOR AND KEY OPERATED LOCK. INSTALL HOA SWITCH ON FRONT COVER.
6. LIGHTING CIRCUITS FROM PANELBOARDS.
7. LIGHTING CIRCUITS TO BLDG/SITE, SEE PLANS.

4 EXTERIOR LIGHTING CONTROL DIAGRAM
NOT TO SCALE

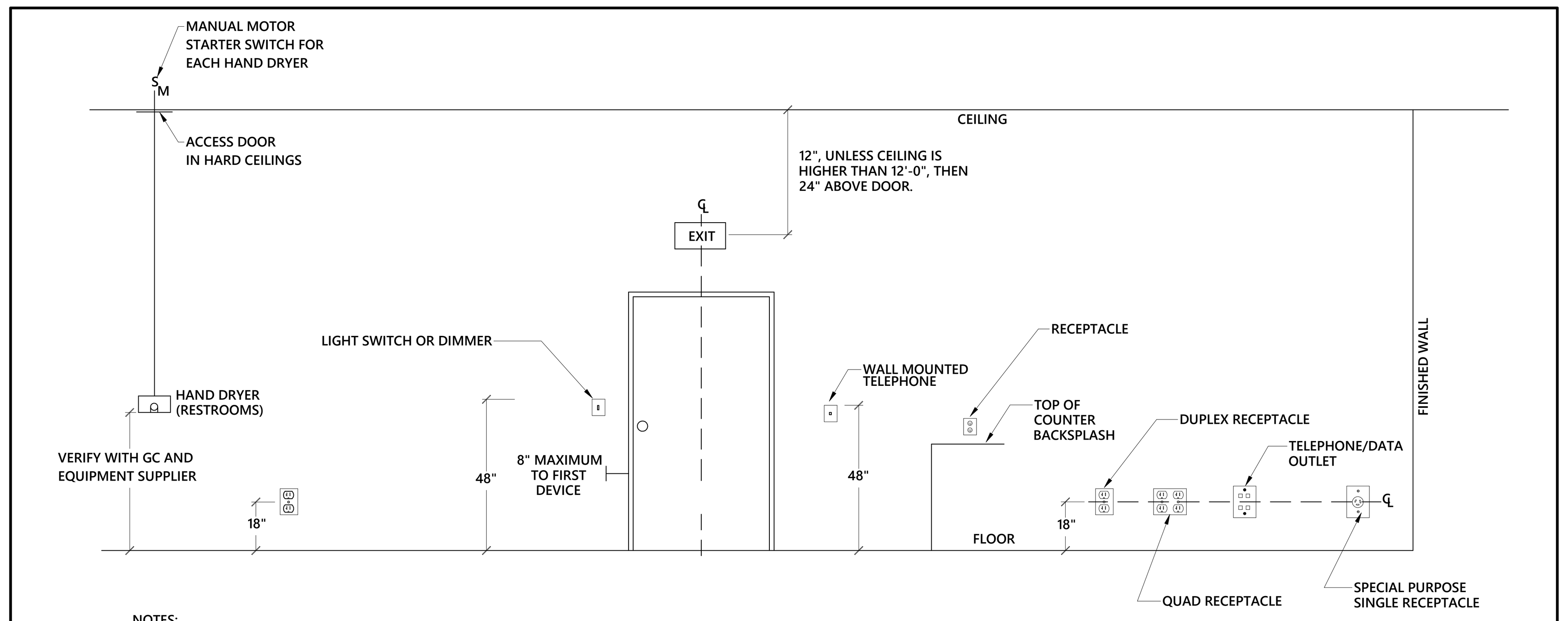


NOTES:
1. ALL WIRING SHALL BE #6 AWG.
2. AVOID SHARP BENDS IN WIRES. ALL WIRE LENGTHS SHALL NOT EXCEED 18" (WHERE POSSIBLE).
3. SEE SPD SPECIFICATION FOR TYPE (H1,H2,L1,L2) FOR LOCATION AS INDICATED ON THE POWER RISER DIAGRAM.

3 SPD CONNECTION DETAIL
NOT TO SCALE

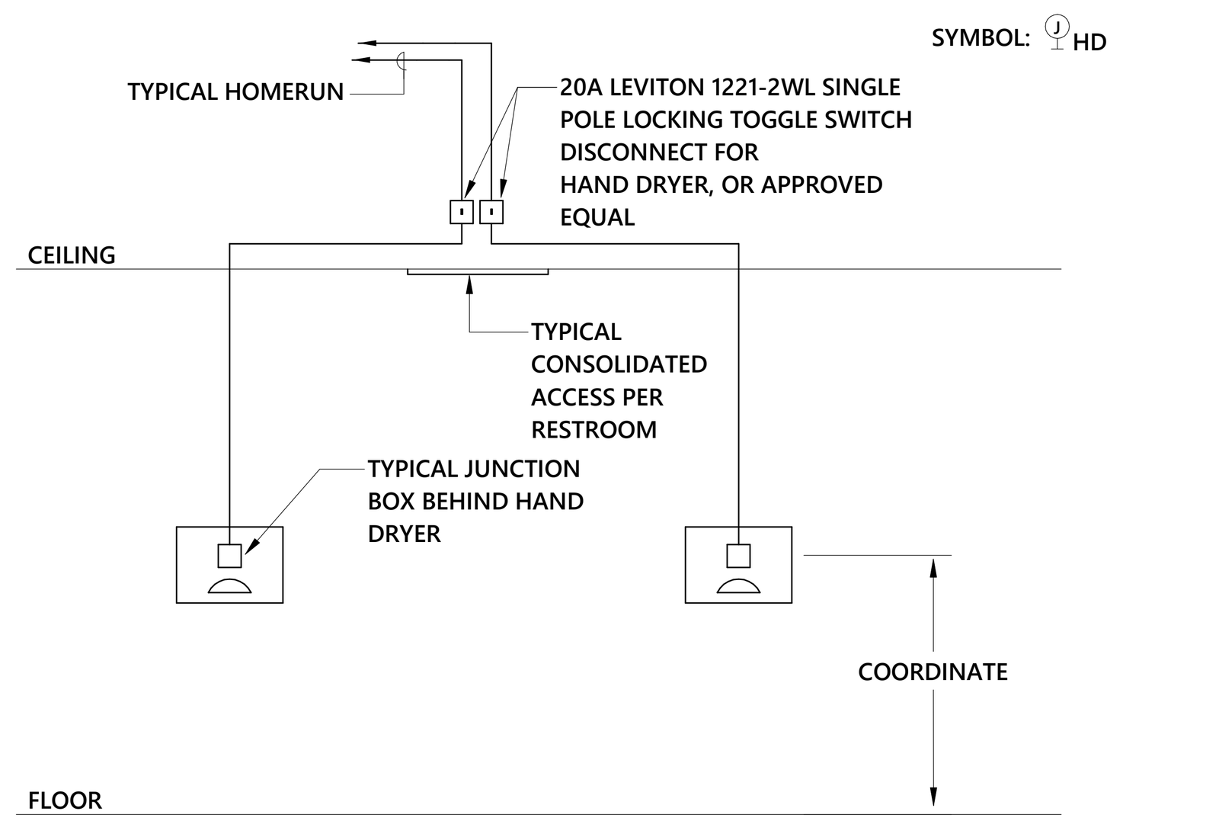


2 SERVICE GROUND DIAGRAM
NOT TO SCALE



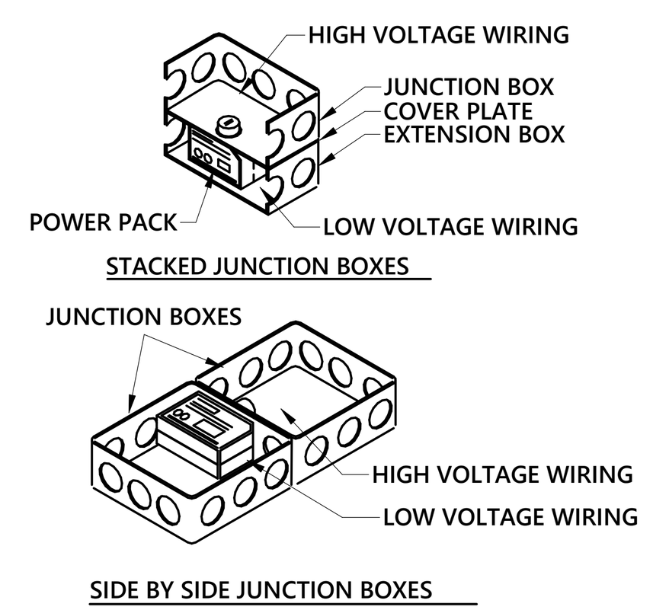
NOTES:
1. LOCATIONS WHERE TV MOUNT IS BACK TO BACK ON SAME WALL, AN OFFSET OF 8-12" WILL BE NEEDED FOR INSTALLATION OF JACK/RECEPTACLE.
2. DEVICES ABOVE COUNTER TOPS SHALL BE A MAXIMUM OF 48" TO TOP OF DEVICE.
3. DEVICES NEXT TO DOOR EXIT SHALL BE WITHIN 8" (MAXIMUM) TYPICAL OF DOOR UNLESS OBSTACLES SUCH AS SIDELITES, ETC.

1 MOUNTING HEIGHTS OF DEVICES - ELEVATION
NOT TO SCALE



NOTES:
1. MOUNT TOGGLE SWITCHES WITHIN 8" OF ACCESS/LAY-IN TILE. LEAVE ROOM FOR FLOOR TILE/ACCESS PANEL MOVEMENT.
2. PROVIDE ACCESS PANEL FOR NON-ACCESSIBLE CEILING TYPES. COORDINATE WITH G.C. FOR TYPE (MATCH PROJECT ACCESS PANEL TYPES WHEN PROVIDED.) COORDINATE EXACT LOCATION WITH ARCHITECT IN FIELD PRIOR TO CONDUIT ROUGH-IN.
3. TOGGLE SWITCHES TO BE CONSOLIDATED INTO ONE ACCESS LOCATION.3. TOGGLE SWITCHES TO BE CONSOLIDATED INTO ONE ACCESS LOCATION.
4. SEE PLANS FOR HAND DRYER QUANTITIES AND LOCATIONS.SEE PLANS FOR HAND DRYER QUANTITIES AND LOCATIONS.
5. HAND DRYER HEIGHTS AND ASSOCIATED JUNCTION BOXES ARE TO BE COORDINATED WITH ARCHITECTURAL ELEVATIONS.

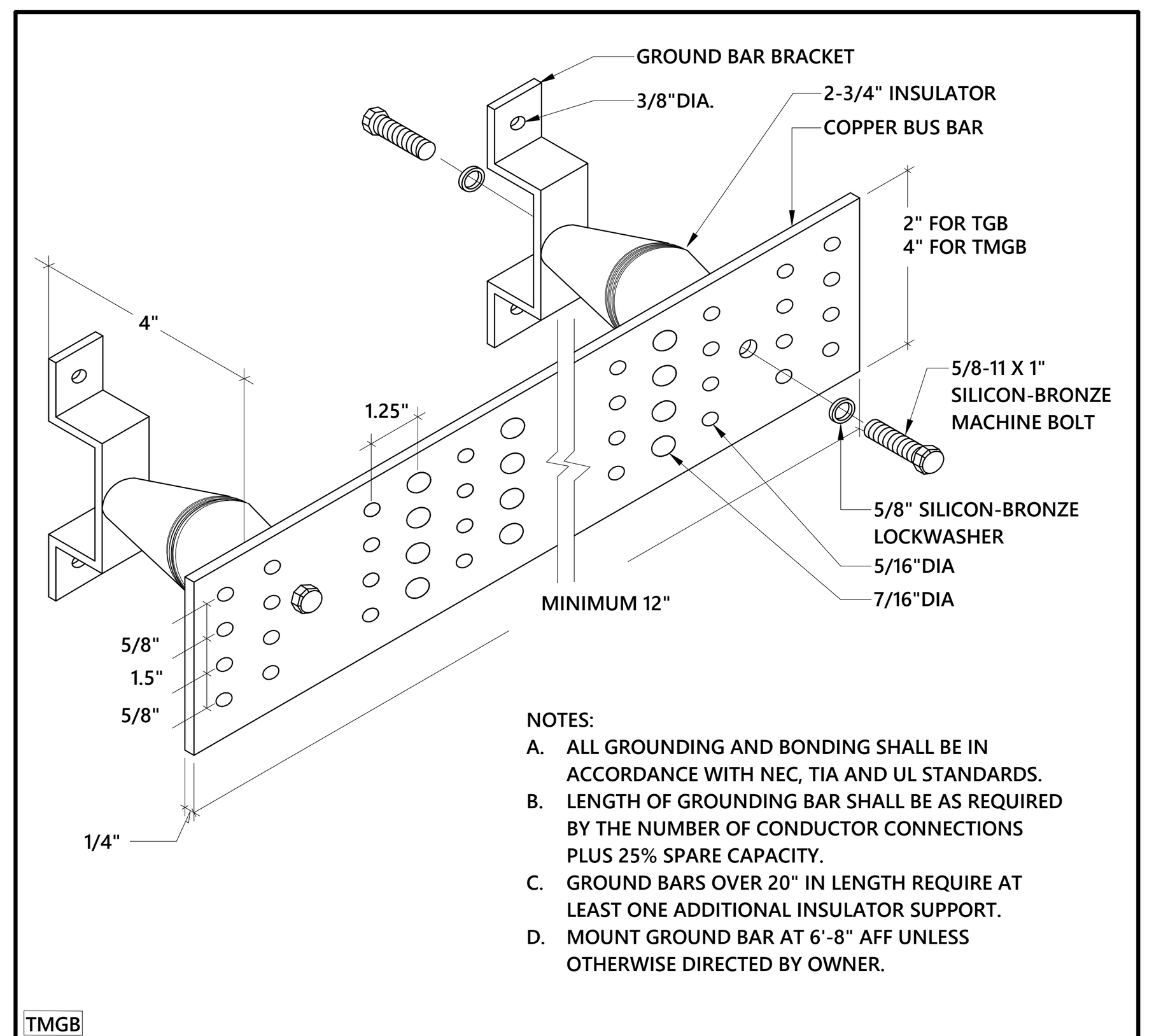
8 HAND DRYER LAYOUT DETAIL
NO SCALE



NOTE:
DO NOT MOUNT POWER PACKS CLOSER THAN 6-12 INCHES FROM SENSOR. PROVIDE DOUBLE STACKED JUNCTION BOX FOR MAXIMUM VENTILATION OF POWER PACK. PROVIDE BLANK COVER. WHERE PERMITTED BY CODE AND AHJ, LEAVE (2) OPENINGS IN CONDUIT KNOCKOUT FOR VENTING OF POWER PACK. VERIFY WITH AHJ PRIOR TO KNOCKOUT REMOVAL.

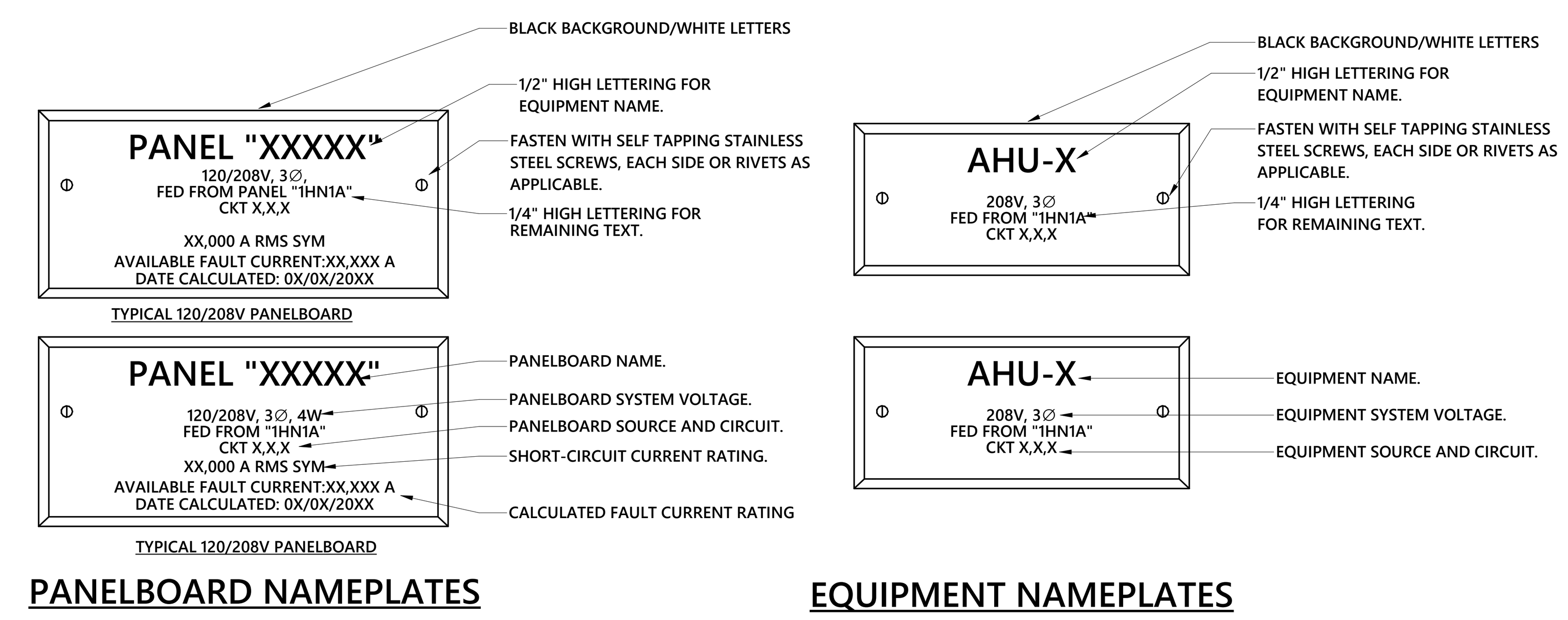
POWER PACK INSTALLED IN J-BOX

7 POWER PACK INSTALLATION
NOT TO SCALE



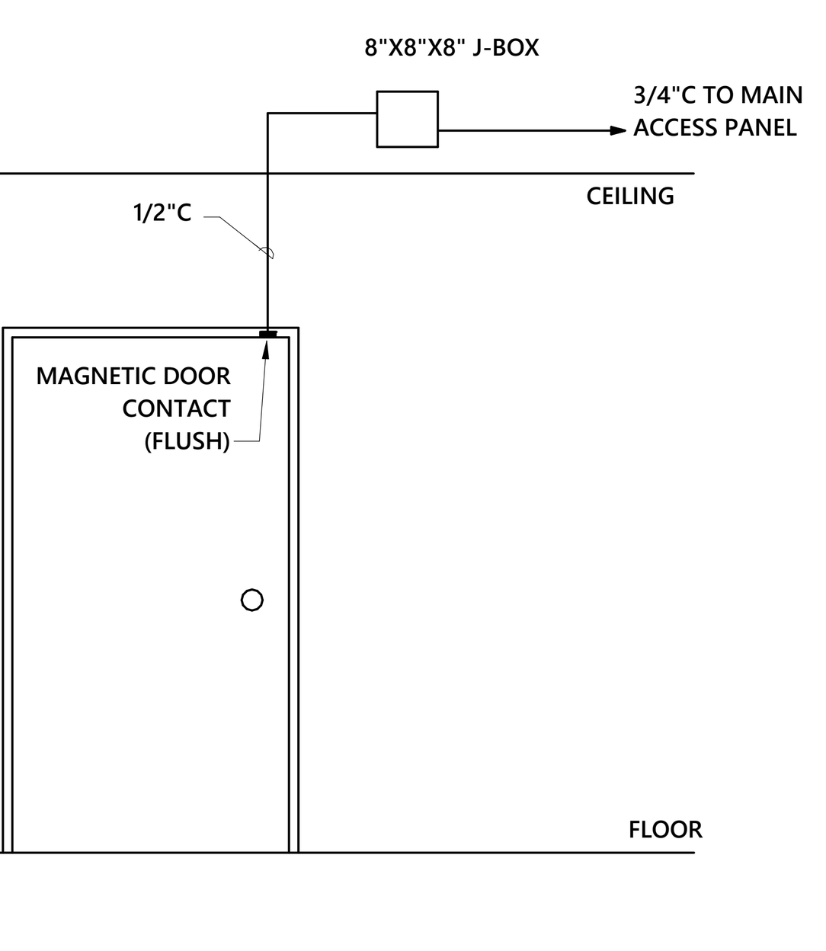
NOTES:
A. ALL GROUNDING AND BONDING SHALL BE IN ACCORDANCE WITH NEC, TIA AND UL STANDARDS.
B. LENGTH OF GROUNDING BAR SHALL BE AS REQUIRED BY THE NUMBER OF CONDUCTOR CONNECTIONS PLUS 25% SPARE CAPACITY.
C. GROUNDING BARS OVER 20" IN LENGTH REQUIRE AT LEAST ONE ADDITIONAL INSULATOR SUPPORT.
D. MOUNT GROUND BAR AT 6'-8" AFF UNLESS OTHERWISE DIRECTED BY OWNER.

6 TELECOMMUNICATIONS GROUNDING BAR DETAIL
NO SCALE

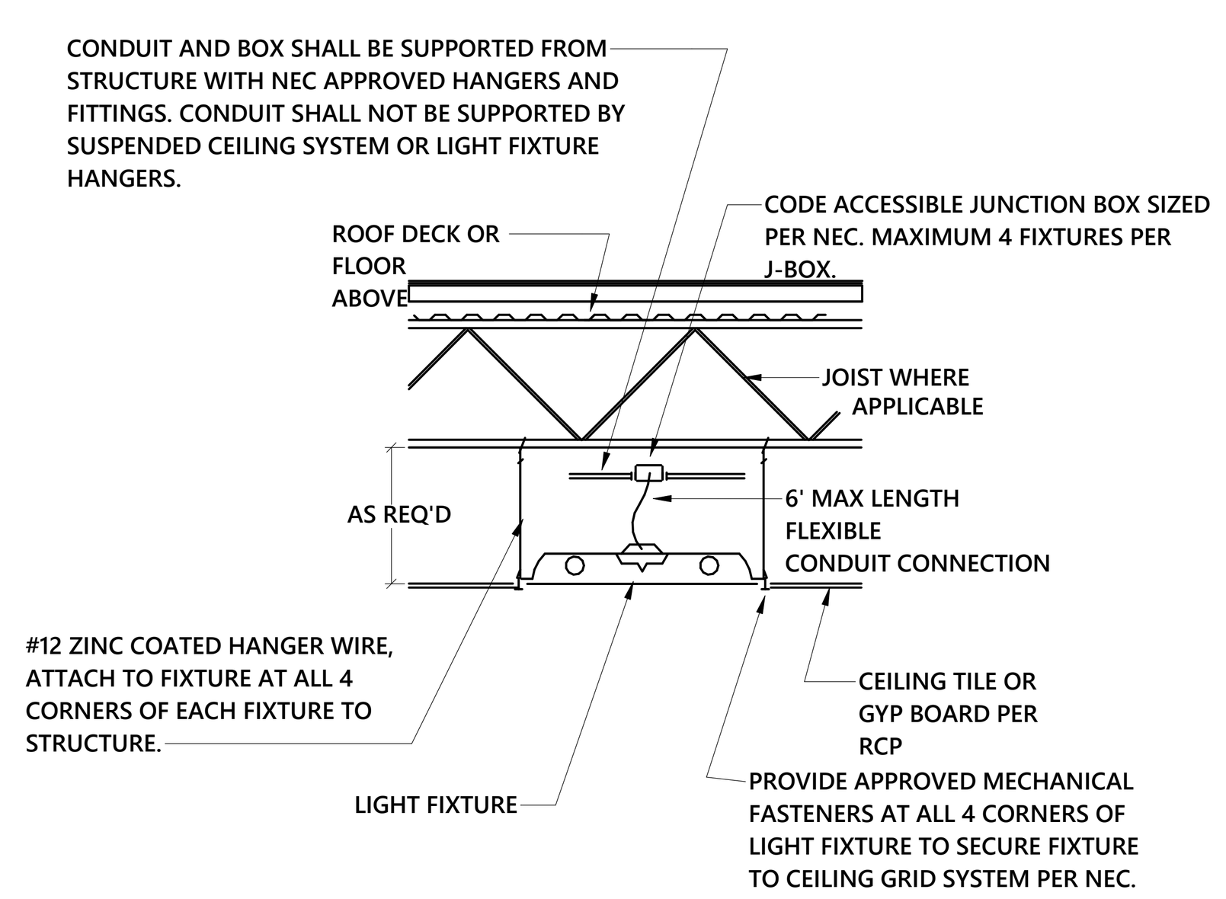


NOTES:
1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS, COLORS, ETC.
2. PROVIDE SHORT-CIRCUIT CURRENT RATING AND AVAILABLE FAULT CURRENT ON EACH NON-DWELLING SERVICE EQUIPMENT NAMEPLATE.

5 TYPICAL NAMEPLATE DIAGRAM
NOT TO SCALE

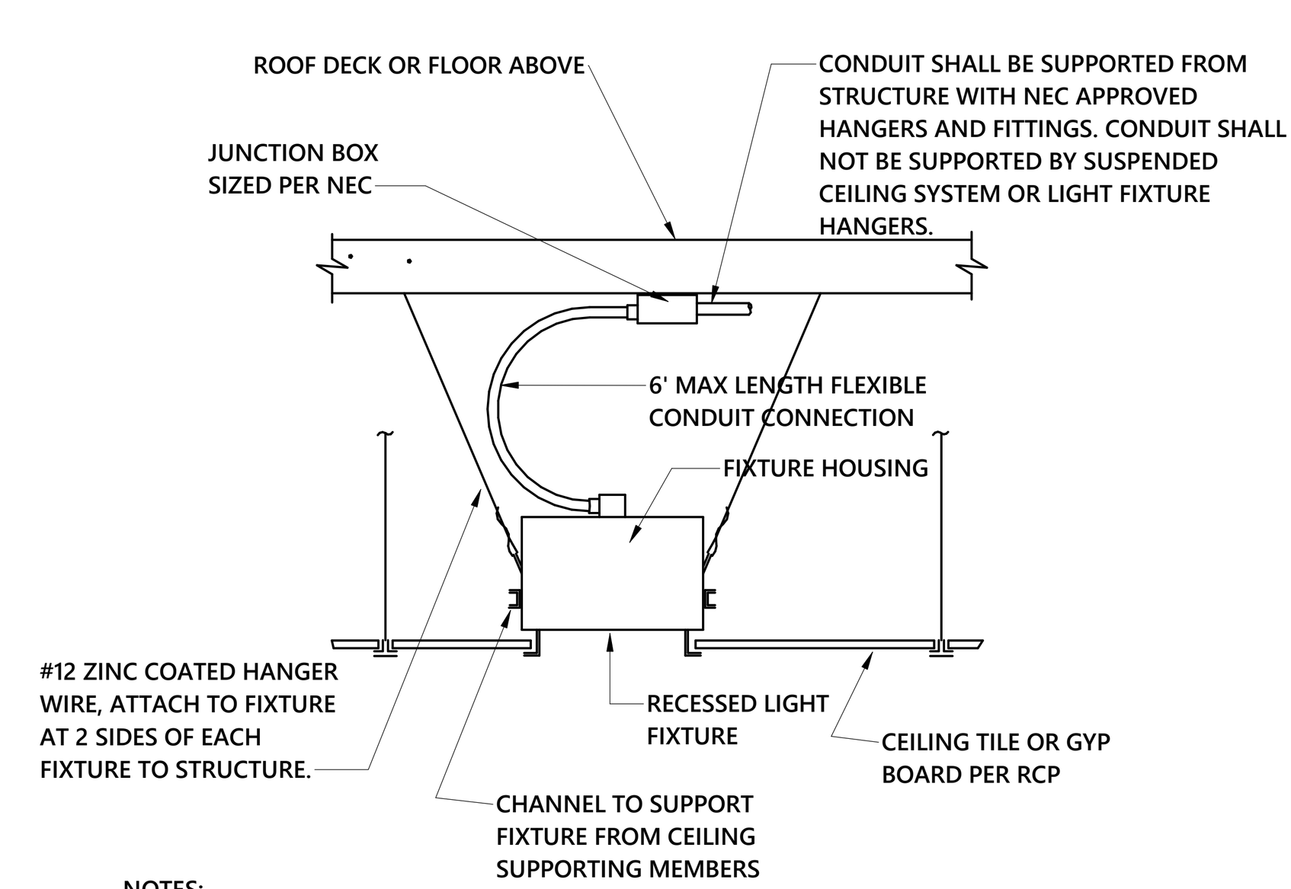


13 DOOR CONTACT ONLY
NOT TO SCALE



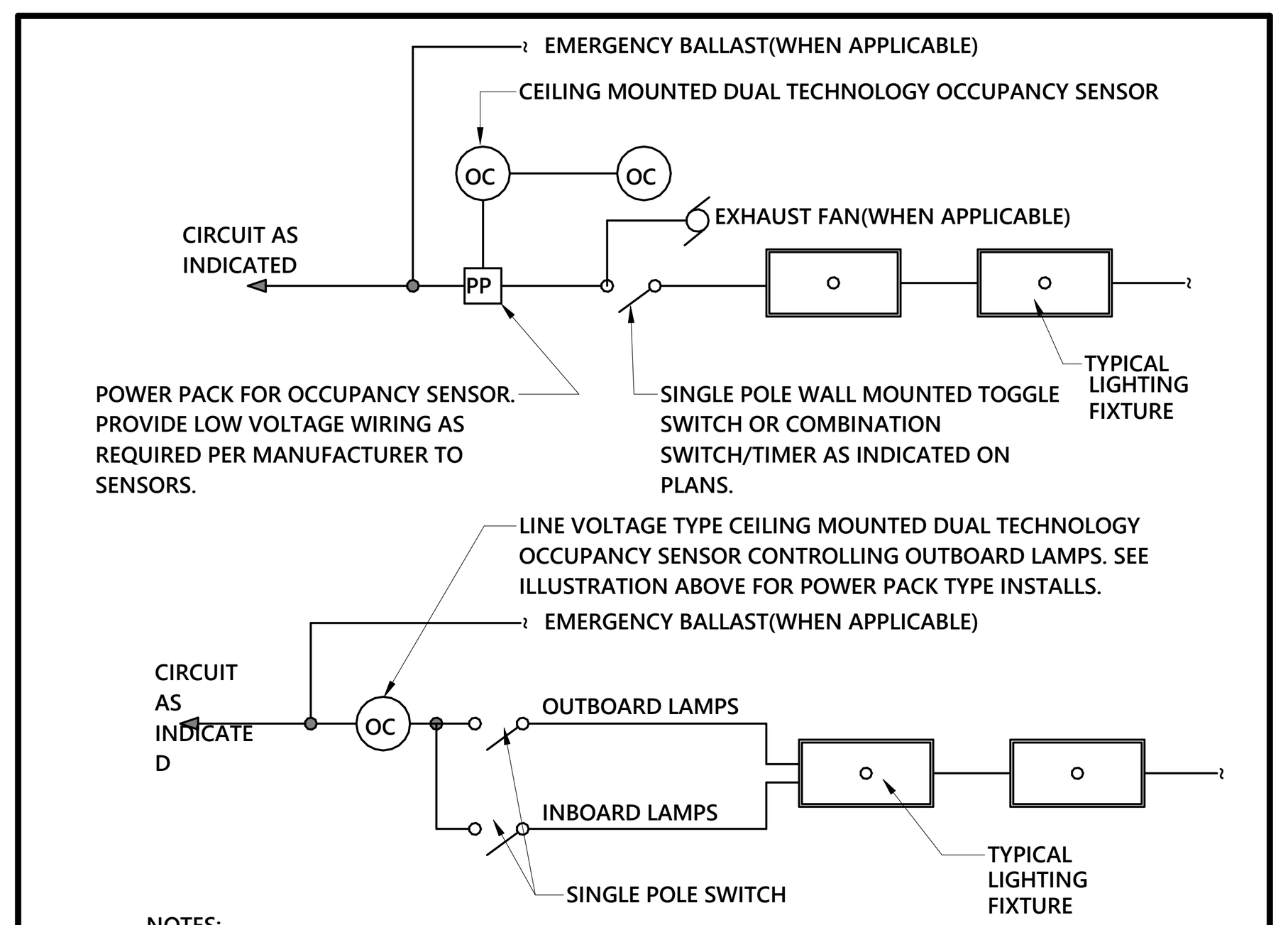
NOTES:
1. WHERE ROOF DECKING IS THE IS THE ALLOWABLE SUPPORT STRUCTURE, AND PATHWAY SYSTEM IS NOT IMC OR RMC, THE MINIMUM DISTANCE FROM ROOF DECKING SHALL BE 1.5" FOR ALL BOXES AND CONDUIT.

12 TYPICAL LAY-IN FIXTURE DIAGRAM
NOT TO SCALE



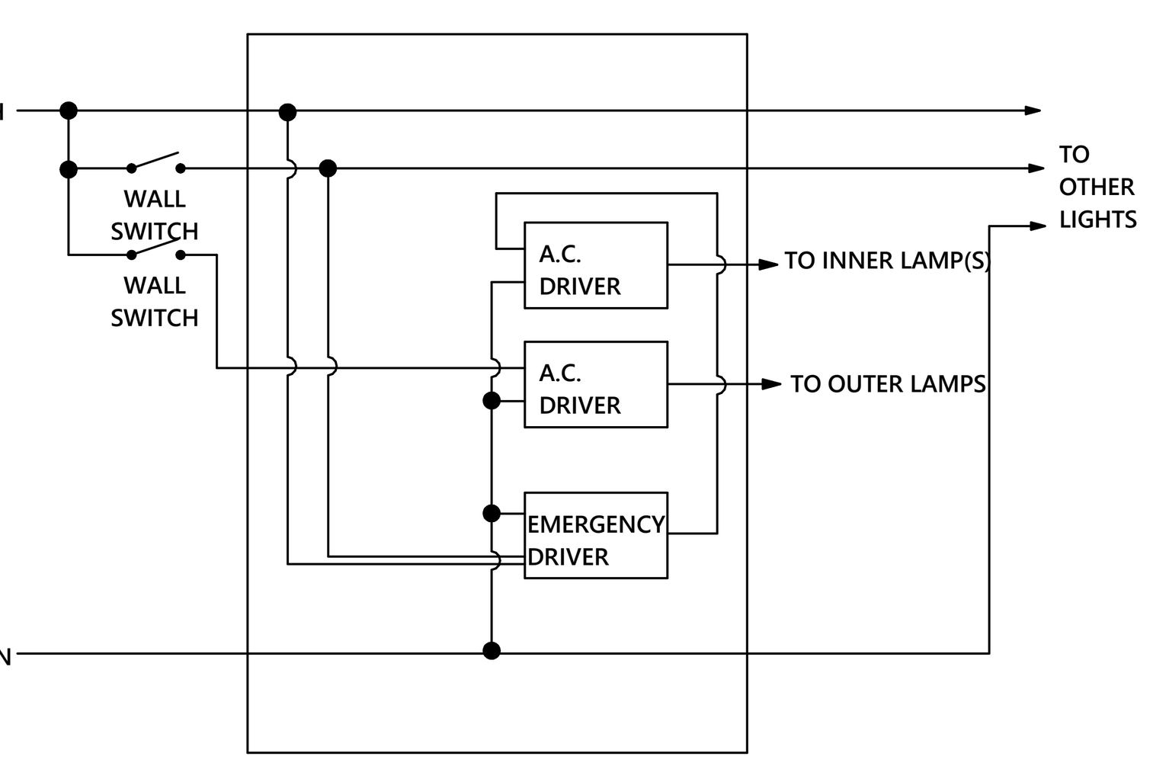
NOTES:
1. WHERE ROOF DECKING IS THE IS THE ALLOWABLE SUPPORT STRUCTURE, AND PATHWAY SYSTEM IS NOT IMC OR RMC, THE MINIMUM DISTANCE FROM ROOF DECKING SHALL BE 1.5" FOR ALL BOXES AND CONDUIT.

11 TYPICAL RECESSED DOWN LIGHT FIXTURE INSTALLATION DIAGRAM
NOT TO SCALE

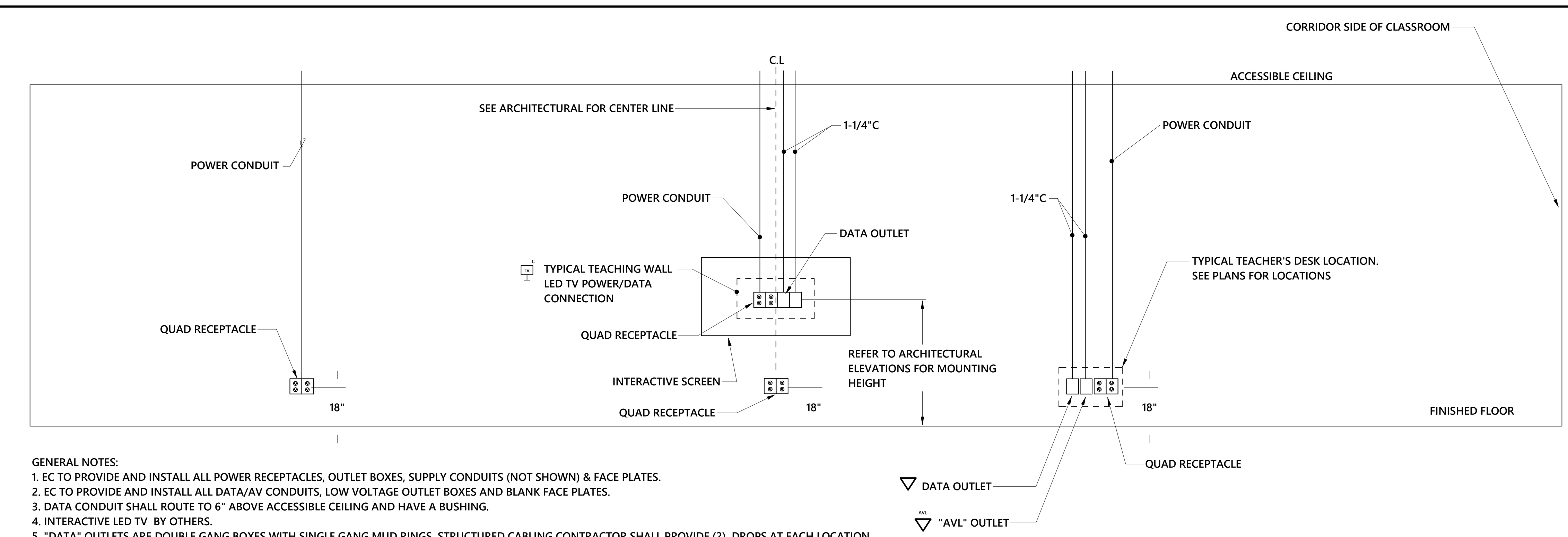


NOTES:
1. OCCUPANCY SENSORS SHALL BE SET TO TIME OUT AFTER 15 MINUTES AND THE TRIM POTENTIOMETER IS SET TO 90% FOR SENSITIVITY.
2. OCCUPANCY SENSORS SHALL BE PLACED AS TO NOT FUNCTION UPON SOMEONE JUST PASSING BY THE ROOM DOOR BUT BY ACTUALLY ENTERING THE ROOM IN AS MUCH AS POSSIBLE.

10 TYPICAL CEILING MOUNTED OCCUPANCY SENSOR WIRING DIAGRAMS
NOT TO SCALE



9 SWITCHED EMERGENCY LIGHTING WIRING
NOT TO SCALE



GENERAL NOTES:
1. EC TO PROVIDE AND INSTALL ALL POWER RECEPTACLES, OUTLET BOXES, SUPPLY CONDUITS (NOT SHOWN) & FACE PLATES.
2. EC TO PROVIDE AND INSTALL ALL DATA/AV CONDUITS, LOW VOLTAGE OUTLET BOXES AND BLANK FACE PLATES.
3. DATA CONDUIT SHALL ROUTE TO 6" ABOVE ACCESSIBLE CEILING AND HAVE A BUSHING.
4. INTERACTIVE LED TV BY OTHERS.
5. "DATA" OUTLETS ARE DOUBLE GANG BOXES WITH SINGLE GANG MUD RINGS. STRUCTURED CABLING CONTRACTOR SHALL PROVIDE (2) DROPS AT EACH LOCATION.
6. DO NOT INSTALL BACKBOXES BACK TO BACK. WHERE BACK TO BACK INSTALLATIONS ARE SHOWN, OFF SET EACH INSTRUCTIONAL WALL.

14 INSTRUCTIONAL WALL ELEVATION
NO SCALE

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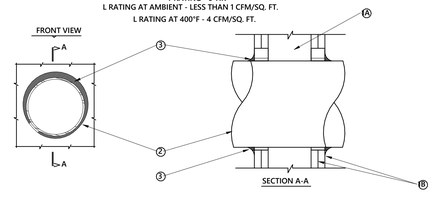
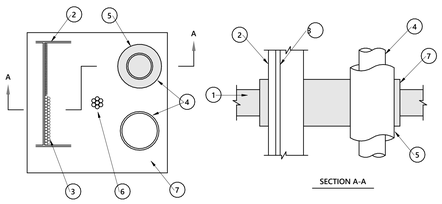
ELECTRICAL DETAILS

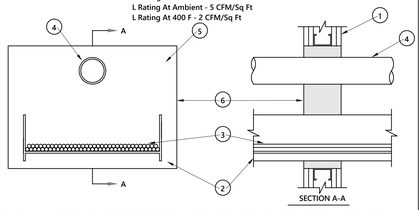
E1-501

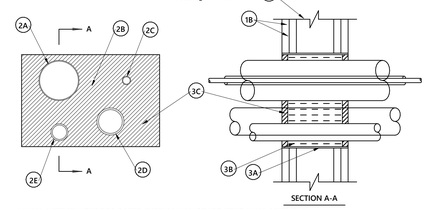
OPTIMA # 21-0266R

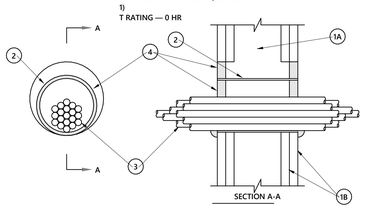
1/28/2022 3:01:37 PM

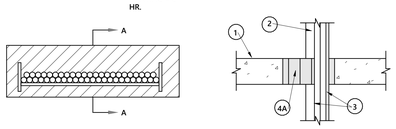












U.L. SYSTEM NO. W-L-1085
F RATING - 1-HR OR 2-HR (SEE ITEM 1B)
T RATING - 0-HR
L RATING AT AMBIENT - LESS THAN 1 CFM/SQ. FT.
L RATING AT 400°F - 4 CFM/SQ. FT.

1. WALL ASSEMBLY - THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

A. STUDS - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC.

B. GYPSUM BOARD* - 5/8 IN. THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIA OF OPENING IS 13-1/4 IN.

DIA OF CIRCULAR OPENING CUT THROUGH GYPSUM WALLBOARD OF EACH SIDE OF WALL ASSEMBLY TO BE MIN 1/4 IN. TO MAX 1/2 IN. LARGER THAN OUTSIDE DIA OF THROUGH PENETRANT (ITEM 2). THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.

2. THROUGH PENETRANTS - ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE ANNUIAR SPACE BETWEEN THE THROUGH-PENETRANT AND THE PERIPHERY OF THE OPENING SHALL BE MIN 0 IN. TO MAX 1/4 IN. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:

A. STEEL PIPE - NOM 12 IN. DIA (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE - NOM 12 IN. DIA (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. CONDUIT - NOM 6 IN. DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT.
D. COPPER TUBING - NOM 5 IN. DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. COPPER TUBING - NOM 6 IN. DIA (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FILL, VOID, OR CAVITY MATERIAL* - SEALANT - FILL MATERIAL TO BE FORCED INTO THE ANNULUS TO MAXIMUM EXTENT POSSIBLE. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/2 IN. CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1/4 IN. BEYOND THE PERIPHERY OF THE OPENING.

HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC - FS-ONE SEALANT
*BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

System No. C-AJ-8056
F Rating -- 3 Hr
T Rating -- 0 Hr
L Rating At Ambient -- 5 CFM/sq ft
L Rating At 400 F -- 2 CFM/sq ft

1. FLOOR OR WALL ASSEMBLY -- 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX AREA OF OPENING IS 1296 IN. SQ WITH MAX DIMENSION OF 36 IN. SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. CABLE TRAY* -- MAX 18 IN. WIDE BY MAX 6 IN. DEEP OPEN-LADDER OR SOLID-BACK CABLE TRAY WITH CHANNEL-SHAPED SIDE RAILS FORMED OF 0.060 IN. THICK ALUMINUM OR STEEL AND WITH 1-1/2 IN. WIDE BY 1 IN. CHANNEL SHAPE RUNGS SPACED 9 IN. OC OR A 0.029 IN. THICK STEEL SOLID BACK, RESPECTIVELY. ONE CABLE TRAY TO BE INSTALLED IN THE OPENING. THE MAX ANNULAR SPACE BETWEEN THE CABLE TRAYS IS 9 IN. AND BETWEEN THE PERIPHERY OF THE OPENING SHALL BE MIN 1-1/2 IN. TO MAX 4-1/2 IN. CABLE TRAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. CABLES -- AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY TO BE MAX 30 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY BASED ON A MAX 3 IN. CABLE LOADING DEPTH WITHIN THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR OR FIBER OPTIC CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND PVC JACKET.
B. 300 PAIR - NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 1/C, 350 KCMIL WITH CROSS-LINKED POLYETHYLENE (XLPE) INSULATION AND JACKET.
D. 1/C, 500 KCMIL WITH THERMO PLASTIC INSULATION AND POLYVINYL CHLORIDE (PVC) JACKET.
E. TWENTY FOUR FIBER OPTIC CABLE WITH PVC SUB UNIT AND JACKET.
4. THROUGH-PENETRANTS -- ONE OR MORE PIPE, CONDUIT OR TUBE TO BE INSTALLED WITHIN THE OPENING. THE TOTAL NUMBER OF THROUGH-PENETRANTS IS DEPENDENT ON THE SIZE OF THE OPENING AND TYPES AND SIZES OF THE PENETRANTS. ANY COMBINATION OF THE PENETRANTS DESCRIBED BELOW MAY BE USED PROVIDED THAT THE FOLLOWING PARAMETERS RELATIVE TO THE ANNULAR SPACES AND THE SPACING BETWEEN THE PIPES ARE MAINTAINED. THE SPACE BETWEEN PIPES, CONDUITS OR TUBING AND BETWEEN THE PERIPHERY OF THE OPENING AND THE PIPES OR CONDUITS SHALL BE MIN 1 IN. TO MAX 4-1/2 IN. PIPE, CONDUIT OR TUBE TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
A. NOM 6 IN. DIA (OR SMALLER) RIGID GALV STEEL CONDUIT.
B. NOM 4 IN. DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.
C. NOM 4 IN. DIA (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
D. NOM 4 IN. DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBE.
E. NOM 6 IN. DIA (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
F. NOM 6 IN. DIA (OR SMALLER) CAST OR DUCTILE IRON PIPE.
5. PIPE COVERING -- NOM 1-1/2 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT.
SEE PIPE AND EQUIPMENT COVERING AND MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 MAY BE USED.
6. CABLES -- MAX 2 IN. DIA TIGHT BUNDLE OF CABLES CENTERED IN OPENING AND RIGIDLY SUPPORTED ON BOTH SURFACES OF FLOOR AND WALL. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND PVC JACKET.
B. 25 PAIR - NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 2/C NO. 10 AWG WITH PVC INSULATION AND JACKET.
D. 3/C NO. 8 AWG ALUMINUM CLAD CABLE WITH CROSS-LINKED POLYETHYLENE (XLPE) INSULATION AND PVC JACKET.
E. TYPE RC - 62 A/U COAXIAL CABLE WITH AIR CORE AND PVC JACKET.
F. 24 FIBER OPTIC CABLE WITH PVC SUB UNIT AND OUTER JACKET.
7. FIRESTOP SYSTEM -- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. FILL, VOID OR CAVITY MATERIAL* -- FIRE BLOCKS INSTALLED WITH LONG DIMENSION PASSED THROUGH THE OPENING EXTENDING MIN 1-1/2 IN. FROM EACH SURFACE. BLOCKS TO COMPLETELY FILL THE ENTIRE OPENING.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-FIRE BLOCK
B. FILL, VOID OR CAVITY MATERIAL* -- FILL MATERIAL TO BE FORCED INTO INTERSTICES OF CABLES AND BETWEEN CABLES AND CABLE TRAYS TO MAX EXTENT POSSIBLE ON BOTH SURFACES OF THE PENETRATION.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE SEALANT
C. WIRE MESH (NOT SHOWN) -- WHEN THE ANNULAR SPACE EXCEEDS 4-1/2 IN. TO THE PERIPHERY, A NOM 2 IN. SQ WIRE FENCING SHALL BE USED TO KEEP THE FIRE BLOCKS IN PLACE. THE WIRE FENCING IS FABRICATED FROM MIN NO. 16 SWG (0.060 IN.) GALV STEEL WIRE. THE WIRE IS CUT TO FIT THE CONTOUR OF THE PENETRATING ITEM WITH A MIN 3 IN. LAP BEYOND THE PERIPHERY OF THE OPENING. WIRE FENCING SECURED TO TOP SURFACE OF FLOOR AND BOTH SURFACES OF WALL ASSEMBLY BY MEANS OF 1/4 IN. DIA BY 1 IN. LONG CONCRETE ANCHORS AND 1/4 IN. BY 1-1/2 IN. DIA FENDER WASHERS SPACED MAX 8 IN. OC.
*BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

System No. W-L-8013
F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr
L Rating At Ambient - 5 CFM/Sq Ft
L Rating At 400 F - 2 CFM/Sq Ft

1. WALL ASSEMBLY — THE 1 OR 2 HR FIRE-RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS — WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 IN. (51 MM) BY 4 IN. (102 MM) LUMBER SPACED 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 2-1/2 IN. (64 MM) WIDE AND SPACED MAX 24 IN. (610 MM) OC. ADDITIONAL STUDS INSTALLED TO COMPLETELY FRAME THE OPENING.
B. GYPSUM BOARD* — 5/8 IN. (16 MM) THICK, 4 FT (1219 MM) WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX AREA OF OPENING IS 352 SQ IN. (2271 SQ CM) WITH MAX DIMENSION OF 22 IN. (559 MM) WIDE. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.
2. CABLE TRAY* — MAX 18 IN. (457 MM) WIDE BY MAX 6 IN. (152 MM) DEEP OPEN-LADDER OR SOLID-BACK CABLE TRAY WITH CHANNEL-SHAPED SIDE RAILS FORMED OF 0.065 IN. (1.65 MM) THICK ALUMINUM OR 0.060 IN. (1.52 MM) THICK STEEL AND WITH 1-1/2 IN. (38 MM) WIDE BY 1 IN. (25 MM) CHANNEL SHAPE RUNGS SPACED 9 IN. (229 MM) OC OR A 0.029 IN. (0.74 MM) THICK STEEL SOLID BACK, RESPECTIVELY. ONE CABLE TRAY TO BE INSTALLED IN THE OPENING. THE MAX ANNULAR SPACE BETWEEN THE CABLE TRAY AND THE PERIPHERY OF THE OPENING SHALL BE MIN 1 IN. (25 MM) TO MAX 7 IN. (178 MM) CABLE TRAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. CABLES — AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY TO BE MAX 30 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND PVC JACKET.
B. 100 PAIR - NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 1/C, 750 KCMIL (OR SMALLER) WITH PVC INSULATION AND JACKET.
4. THROUGH-PENETRANTS — ONE OR MORE PIPE OR TUBE TO BE INSTALLED WITHIN THE OPENING. THE TOTAL NUMBER OF THROUGH-PENETRANTS IS DEPENDENT ON THE SIZE OF THE OPENING AND TYPES AND SIZES OF THE PENETRANTS. ANY COMBINATION OF THE PENETRANTS DESCRIBED BELOW MAY BE USED PROVIDED THAT THE FOLLOWING PARAMETERS RELATIVE TO THE ANNULAR SPACES AND THE SPACING BETWEEN THE PIPES ARE MAINTAINED. THE SPACE BETWEEN THE PIPE OR TUBE AND THE PERIPHERY OF THE OPENING SHALL BE MIN 1-1/2 IN. (38 MM) TO MAX 9-1/4 IN. (235 MM). PIPE OR TUBE TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF NON-METALLIC OR METALLIC PIPES, OR TUBES MAY BE USED:
A. POLYVINYL CHLORIDE (PVC) PIPE — MAX 3 IN. (76 MM) DIA SCHEDULE 40 SOLID CORE PVC PIPE (OR SMALLER) FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.
B. STEEL PIPE — NOM 6 IN. (152 MM) DIA (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL PIPE.
C. CONDUIT — NOM 4 IN. (102 MM) DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR 6 IN. (152 MM) DIA STEEL CONDUIT.
D. COPPER PIPE — NOM 4 IN. (102 MM) DIA (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
E. COPPER TUBE — NOM 4 IN. (102 MM) DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBE.
4A. PIPE COVERING — (NOT SHOWN) NOM 1-1/2 IN. (38 MM) THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) (56KG/M3) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT. SEE PIPE AND EQUIPMENT COVERING AND MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 MAY BE USED.
5. CABLES — MAX 1-1/2 IN. (38 MM) DIA TIGHT BUNDLE OF CABLES INSTALLED WITHIN THE OPENING AND RIGIDLY SUPPORTED ON BOTH SURFACES OF WALL. THE SPACE BETWEEN THE CABLES AND PERIPHERY OF THE OPENING SHALL RANGE FROM 1-3/16 IN. (30.2 MM) MIN TO A MAX OF 1-1/2 IN. (38 MM). ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKET.
B. 25 PAIR — NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. TYPE R GU/59 COAXIAL CABLE WITH PVC OUTER JACKET.
D. 24 FIBER OPTIC CABLE WITH PVC SUB UNIT AND OUTER JACKET.
6. FIRESTOP SYSTEM — THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. FILL, VOID OR CAVITY MATERIAL* FIRE BLOCKS FOR WALLS INCORPORATING MAX 3-5/8 IN. (92 MM) STEEL STUDS OR MAX 2 (51 MM) BY 4 IN. (102 MM) WOOD STUDS, FIRE BLOCK INSTALLED WITH 5 IN. (127 MM) DIMENSION PROJECTING THROUGH AND CENTERED IN OPENING. FOR WALLS CONSTRUCTED OF LARGER STEEL OR WOOD STUDS, FIRE BLOCK INSTALLED WITH LONG DIMENSION PASSING THROUGH AND CENTERED IN OPENING. BLOCKS MAY OR MAY NOT BE CUT FLUSH WITH BOTH SURFACES OF WALL. WHEN MULTIPLE LAYERS OF GYPSUM BOARD ARE USED, BLOCKS MAY BE RECESSED 1/2 IN. (13 MM) FROM SURFACE OF WALL. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS 657 FIRE BLOCK
B. FILL, VOID OR CAVITY MATERIAL* — SEALANT OR PUTTY - FILL MATERIAL TO BE FORCED INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAYS, AROUND EACH PENETRANT AND WHERE OBVIOUS VOIDS ARE OBSERVED TO MAX EXTENT POSSIBLE ON BOTH SURFACES OF THE PENETRATION. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE SEALANT, CP 618 PUTTY STICK OR CP620 FIRE FOAM *BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

System No. W-L-8004
F Rating - 2 Hr
T Rating - 1/4 Hr

1. WALL ASSEMBLY THE FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC. ADDITIONAL FRAMING (NOT SHOWN) MAY BE INSTALLED AROUND THE PERIMETER OF THE OPENING IN LIEU OF THE STEEL WIRE MESH (ITEM NO. 3A).
B. GYPSUM BOARD* TWO LAYERS OF NOM 5/8 IN. THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX AREA OF OPENING IS 96 SQ IN. WITH MAX DIMENSION OF 12 IN. MAX WIDTH OF OPENING IN WOOD STUD WALLS IS LIMITED TO 12 IN.
2. THROUGH PENETRANTS THE FOLLOWING TYPES AND SIZES OF PIPES, CONDUITS, TUBING OR CABLES MAY BE USED:
A. NOM 3 IN. DIA (OR SMALLER) ELECTRICAL METALLIC TUBING (EMT).
B. MAX 25 PAIR -- NO. 24 AWG (OR SMALLER) TELEPHONE CABLE WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKET.
C. MAX 3/C WITH GROUND -- NO. 10 AWG (OR SMALLER) TYPE NM CABLE WITH PVC INSULATION AND JACKET.
D. NOM 2 IN. DIA (OR SMALLER) SCHEDULE 40 PVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) PIPING SYSTEMS ONLY.
E. MAX 300 KCMIL (OR SMALLER) POWER CABLE WITH PVC INSULATION AND NYLON JACKET. THE THROUGH PENETRATING ITEMS TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY AND LOCATED AS SHOWN IN THE TABLE BELOW:

ITEM NO.	MAX DISTANCE BETWEEN ADJACENT PEN. ITEM IN.	MIN DISTANCE BETWEEN ADJACENT PEN. ITEM IN.	MAX DISTANCE FROM THROUGH OPENING IN.	MIN DISTANCE FROM THROUGH OPENING IN.
2A	7-7/16	1-11/16	7-7/16	1/2
2B	7-7/16	1-11/16	7-7/16	1/2
2C	7-7/16	1-11/16	7-7/16	1/2
2D	7-7/16	1-11/16	7-7/16	1/2
2E	7-7/16	1-11/16	7-7/16	1-1/2

3. FIRESTOP SYSTEM THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. STEEL WIRE MESH NO. 8 STEEL WIRE MESH HAVING A MIN 1 IN. LAP ALONG THE LONGITUDINAL SEAM. LENGTH OF STEEL WIRE MESH TO BE 4-3/4 IN., CENTERED AND FORMED TO FIT PERIPHERY OF THROUGH OPENING. STEEL WIRE MESH IS NOT REQUIRED WHEN ADDITIONAL FRAMING MEMBERS (ITEM NO. 1A) ARE USED.
B. PACKING MATERIAL MIN 4.0 IN. THICKNESS OF MIN 3.5 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
C. FILL, VOID OR CAVITY MATERIAL* - SEALANT MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL.
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC - FS-ONE SEALANT
*BEARING THE UL CLASSIFICATION MARKING

HILTI FIRESTOP SYSTEMS

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

SYSTEM NO. W-L-3065
F RATINGS — 1 AND 2 HR (SEE ITEM 1)
T RATING — 0 HR

1. WALL ASSEMBLY — THE 1 OR 2 FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300, U400 OR V400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS — WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. (51 BY 102 MM) LUMBER SPACED 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 2-1/2 IN. (64 MM) WIDE AND SPACED MAX 24 IN. (610 MM) OC.
B. GYPSUM BOARD* — NOM 5/8 IN. (16 MM) THICK GYPSUM BOARD, WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300, U400 OR V400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIA OF OPENING IS 5-1/2 IN. (138 MM) WHEN SLEEVE (ITEM 2) IS EMPLOYED. MAX DIA OF OPENING IS 4 IN. (102 MM) WHEN SLEEVE (ITEM 2) IS NOT EMPLOYED.
THE F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE FIRE RATING OF THE WALL ASSEMBLY.
2. METALLIC SLEEVE — (OPTIONAL) - NOM 4 IN. (102 MM) DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR SCHEDULE 5 (OR HEAVIER) STEEL PIPE OR MIN 0.016 IN. THICK (0.41 MM, NO. 28 GA) GALV STEEL SLEEVE INSTALLED FLUSH WITH WALL SURFACES. THE ANNULAR SPACE BETWEEN STEEL SLEEVE AND PERIPHERY OF OPENING SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25MM). WHEN SCHEDULE 5 STEEL PIPE OR EMT IS USED, SLEEVE MAY EXTEND UP TO 18 IN. (457 MM) BEYOND THE WALL SURFACES.
3. CABLES — AGGREGATE CROSS-SECTIONAL AREA OF CABLE IN OPENING TO BE MAX 45 PERCENT OF THE CROSS-SECTIONAL AREA OF THE OPENING. THE ANNULAR SPACE BETWEEN THE CABLE BUNDLE AND THE PERIPHERY OF THE OPENING TO BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM) CABLES TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE WALL ASSEMBLY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR CABLES MAY BE USED:
A. MAX 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKET.
B. MAX 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC INSULATION AND JACKET.
B1. MAX 4 PR NO. 22 AWG CAT 5 OR CAT 6 COMPUTER CABLES.
C. TYPE RG/U COAXIAL CABLE WITH POLYETHYLENE (PE) INSULATION AND PVC JACKET HAVING A MAX OUTSIDE DIAMETER OF ½ IN. (13 MM).
C1. MAX RG 6/U COAXIAL CABLE WITH FLUORINATED ETHYLENE INSULATION AND JACKETING.
D. MULTIPLE FIBER OPTICAL COMMUNICATION CABLE JACKETED WITH PVC AND HAVING A MAX OD OF 5/8 IN. (16 MM).
E. THROUGH PENETRATING PRODUCTS*— MAX THREE COPPER CONDUCTOR NO. 8 AWG . METAL-CLAD CABLE+. AFC CABLE SYSTEMS INC
F. MAX 3/C (WITH GROUND)(OR SMALLER) NO. 8 AWG COPPER CONDUCTOR CABLE WITH PVC INSULATION AND JACKETING.
G. MAX 3/4 IN. (19 MM) DIA COPPER GROUND CABLE WITH OR WITHOUT A PVC JACKET.
H. FIRE RESISTIVE CABLES* - MAX 1-1/4 IN. (32 MM) DIA SINGLE CONDUCTOR OR MULTI CONDUCTOR TYPE MI CABLE. A MIN 1/8 IN. (3 MM) SEPARATION SHALL BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE.
I. MAX 4/C WITH GROUND 300KCMIL (OR SMALLER) ALUMINUM SER CABLE WITH PVC INSULATION AND JACKET.
J. THROUGH PENETRATING PRODUCT* - ANY CABLES, METAL-CLAD CABLE+ OR ARMORED CABLE+ CURRENTLY CLASSIFIED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
SEE THROUGH PENETRATING PRODUCT (XHLY) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
4. FILL, VOID OR CAVITY MATERIAL*— SEALANT OR PUTTY — FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH EACH END OF THE STEEL SLEEVE OR WALL SURFACE. FILL MATERIAL INSTALLED SYMMETRICALLY ON BOTH SIDES OF THE WALL. A MIN 5/8 IN. (16 MM) THICKNESS OF SEALANT IS REQUIRED FOR THE 1 OR 2 HR F RATING . AN ADDITIONAL 1/2 IN. (13 MM) DIA BEAD OF FILL MATERIAL SHALL BE APPLIED AROUND THE PERIMETER OF SLEEVE ON BOTH SIDES OF THE WALL WHEN SLEEVE EXTENDS BEYOND SURFACE OF WALL.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S, CP606, FS-ONE SEALANTS OR CP618 PUTTY
*BEARING THE UL CLASSIFICATION MARK
+BEARING THE UL LISTING MARK

HILTI FIRESTOP SYSTEMS
DRAWING ORIGINATION DATE: 03-21, 2011

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

SYSTEM NO. C-AJ-4035
F RATING - 3 HR.
T RATING = 0 HR.

1. FLOOR OR WALL ASSEMBLY MIN 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX AREA OF OPENING IS 270 SQ IN WITH MAX DIMENSION OF 30 IN.
SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. CABLE TRAY* MAX 24 IN. WIDE BY MAX 4 IN. DEEP OPEN-LADDER OR SOLID-BACK CABLE TRAY WITH CHANNEL-SHAPED SIDE RAILS FORMED OF 0.10 IN. THICK ALUMINUM OR 0.060 IN. THICK GALV STEEL AND WITH 1-1/2 IN. WIDE BY 1 IN. CHANNEL SHAPE RUNGS SPACED 9 IN. OC OR A 0.029 IN. THICK STEEL SOLID BACK, RESPECTIVELY. THE ANNULAR SPACE BETWEEN THE CABLE TRAY AND THE PERIPHERY OF THE OPENING SHALL BE MIN 1 IN. TO MAX 4 IN. CABLE TRAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. CABLES AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY TO BE MAX 40 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR OR FIBER OPTIC CABLES MAY BE USED:
A. 1/C, 500 KCMIL WITH THERMOPLASTIC INSULATION AND PVC JACKET.
B. 300 PAIR -- NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 24 FIBEROPTIC CABLE WITH PVC SUBUNIT AND JACKET.
D. THREE 1/C NO. 12 AWG WIRE, INSULATED WITH POLYVINYL CHLORIDE, IN A NOMINAL 3/4 IN. FLEXIBLE METAL CONDUIT.
4. FIRESTOP SYSTEM THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. FILL, VOID OR CAVITY MATERIAL* FIRE BLOCKS INSTALLED WITH THE LONG DIMENSION PLACED HORIZONTALLY WITHIN THE OPENING, FLUSH WITH BOTTOM OF FLOOR ASSEMBLIES. BLOCKS TO COMPLETELY FILL THE ENTIRE WIDTH OF OPENING OF WALL ASSEMBLIES.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-FIRE BLOCK
B. FILL, VOID OR CAVITY MATERIAL* -SEALANT ON PUTTY- NOT SHOWN FILL MATERIAL TO BE FORCED INTO INTERSTICES OF CABLES AND BETWEEN CABLES AND CABLE TRAYS TO MAX EXTENT POSSIBLE ON BOTH SURFACES OF THE PENETRATION.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE SEALANT OR CP618 FIRESTOP PUTTY STICK (NOTE: L RATING ONLY WHEN FS-ONE SEALANT IS USED)
*BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

SYSTEM NO. W-J-1088

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F RATING - 1 AND 2 HR (SEE ITEM 3)	F RATING - 1 AND 2 HR (SEE ITEM 3)
T RATING - 0 HR	FT RATING - 0 HR
	FH RATING - 1 AND 2 HR (SEE ITEM 3)
	FTH RATING - 0 HR

1. WALL ASSEMBLY — MIN 3-3/4 IN. (95 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAMETER OF OPENING 10-1/2 IN. (267 MM). SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. THROUGH-PENETRANTS — ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. AN ANNULAR SPACE OF MIN 1/4 IN. TO MAX 1-5/8 IN. (41 MM) IS REQUIRED WITHIN FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
A. STEEL PIPE — NOM 8 IN. (203 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE — NOM 8 IN. (203 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. CONDUIT — NOM 4 IN. (102 MM) DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR 6 IN. DIAM STEEL CONDUIT.
D. COPPER TUBING — NOM 4 IN. (102 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. COPPER PIPE — NOM 4 IN. (102 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
F. FLEXIBLE STEEL CONDUIT+ — NOM 2 IN. (51 MM) DIAM (OR SMALLER) FLEXIBLE STEEL CONDUIT.
SEE FLEXIBLE METAL CONDUIT (DXUZ) CATEGORY IN THE ELECTRICAL CONSTRUCTION EQUIPMENT DIRECTORY FOR NAMES OF MANUFACTURERS.

HILTI FIRESTOP SYSTEMS

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

CABLE TRAY WALL INTERSECTION DETAIL

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048210
MORGAN K. GUNTER
01/28/2022

CONSTRUCTION
DOCUMENTS

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150 Fayetteville St., Suite 520, Raleigh, NC 27601
1927 South Tryon St., Suite 300, Charlotte NC 28203
Phone: 919-926-2200 - www.optimaengineering.com
North Carolina License Number C-0914

Harnett County Schools
Johnsonville Elementary School
Addition/Renovation Phase 2
18495 NC-27, Cameron, NC 28326

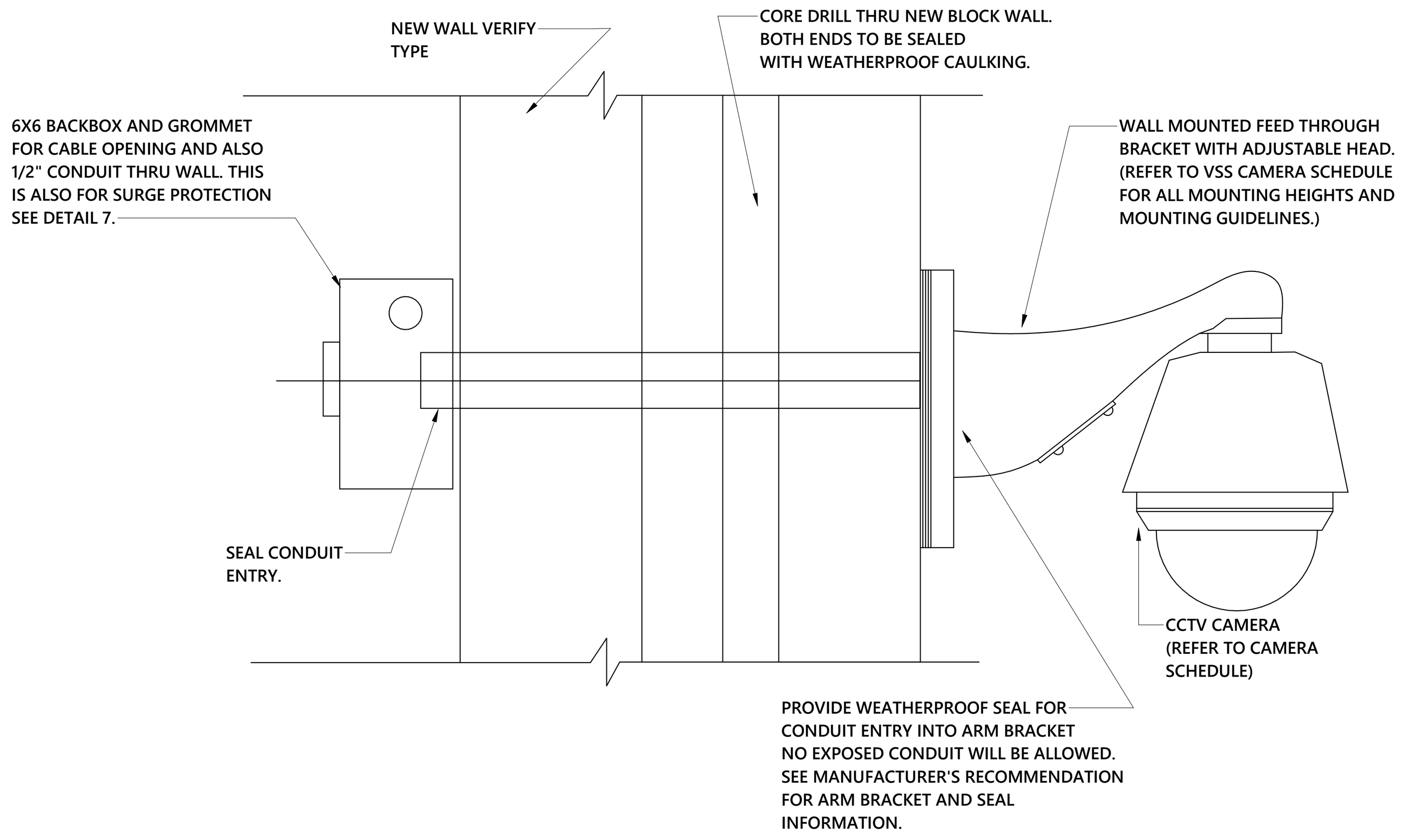
ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022
PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

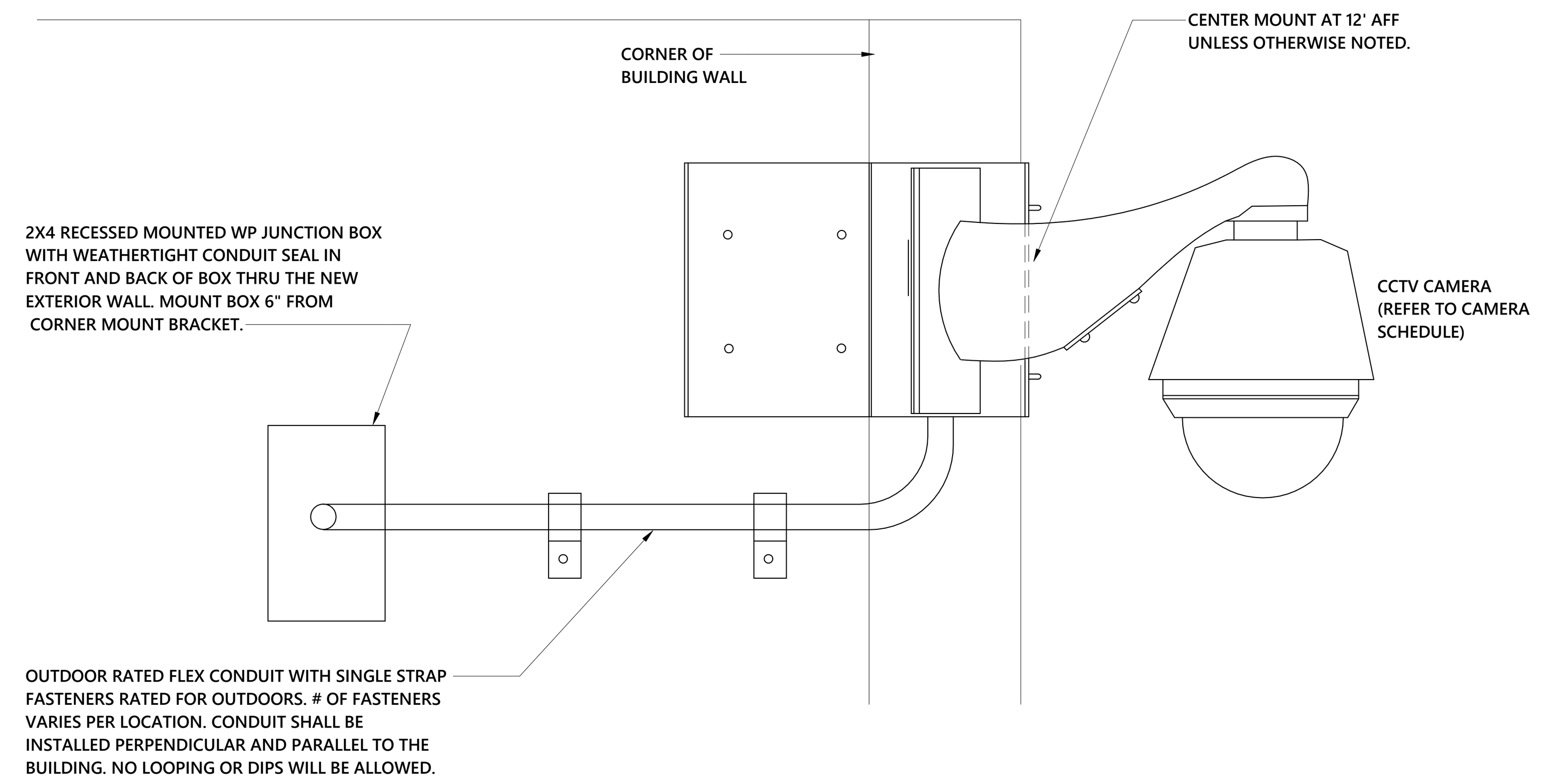
ELECTRICAL
DETAILS

E1-502



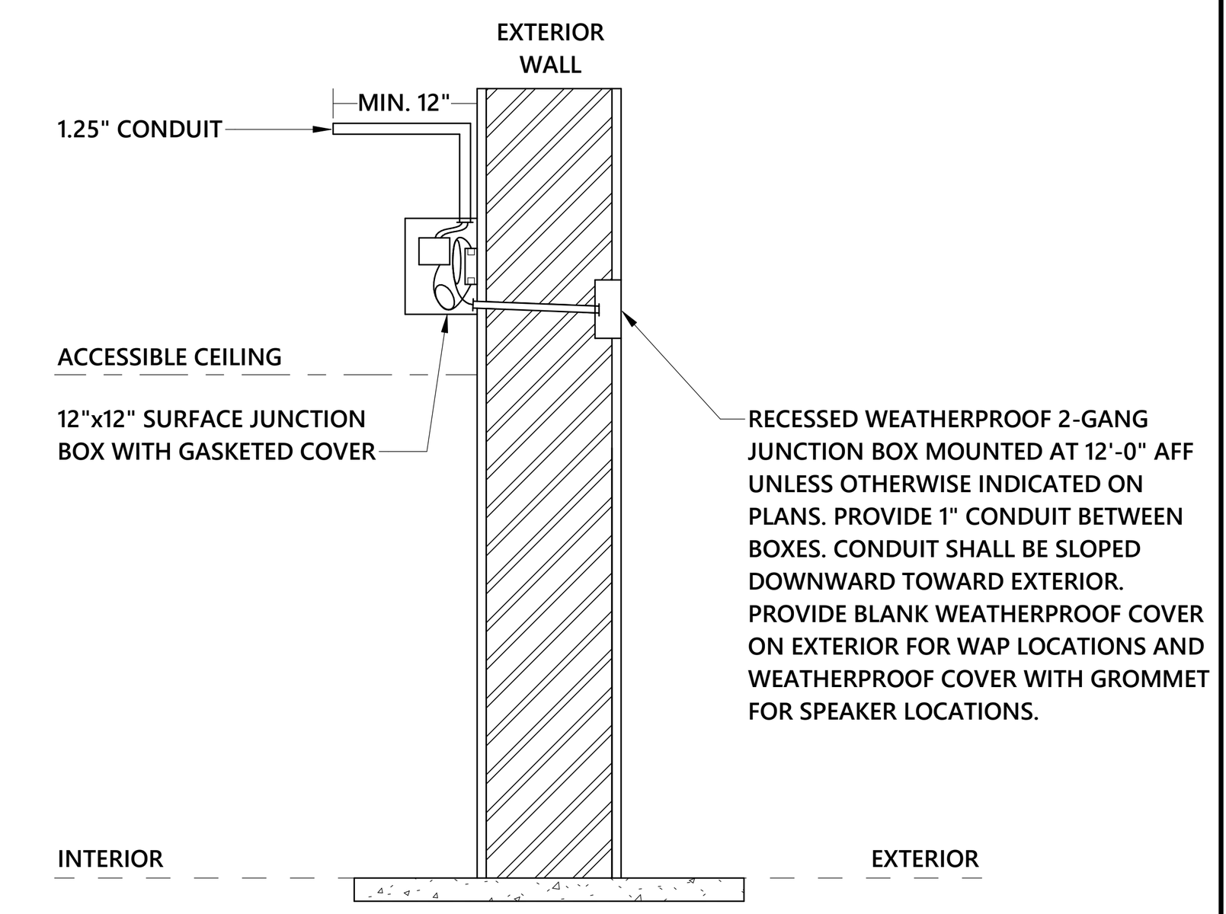
3 CAMERA MOUNT EXTERIOR WALL

NO SCALE



2 CAMERA MOUNTING FOR EXTERIOR CORNER MOUNT

NO SCALE



GENERAL NOTES:

A. SURFACE JUNCTION BOX SHALL BE LOCATED ABOVE ACCESSIBLE CEILING SPACE.
B. ALL DEVICES SHALL BE SECURED INSIDE JUNCTION BOX.

1 EXTERIOR NETWORK DEVICE DETAIL (ACCESSIBLE CEILING)

NOT TO SCALE

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Harnett County Schools

Johnsonville Elementary School Addition/Renovation Phase 2

18495 NC-27, Cameron, NC 28326

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022

PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL DETAILS

E1-503

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
1/28/2022 3:01:37 PM

PANEL: MDPC

VOLTAGE: 480Y/277 3Ø — FED FROM:
MOUNTING: SURFACE — MAIN TYPE: MCB — MFR: SQUARE D
ENCLOSURE: NEMA1 — PHASE: 3 — TYPE: I-LINE
MAIN: 600 A — WIRE: 4 — AIC: 42 KAIC

LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	A	B	B	C	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
F	PANEL 'LPC'	NOTE 9	100 A	1	3	22.55	27.14					3	2	125 A	NOTE 9	TRANSFORMER 'T2'	F
				3				24.24	15.91				4				
				5						21.58	23.66		6				
H	IDU-1	NOTE 10	25 A	7	3	5.27	5.27					3	8	25 A	NOTE 10	IDU-5	H
				9				5.27	5.27				10				
				11						5.27	5.27		12				
WH	WATER HEATER WH1	NOTE 10	30 A	13	3	5.00	6.16					3	14	25 A	NOTE 10	IDU-6	H
				15				5.00	6.16				16				
				17						5.00	6.16		18				
H	DOAS-2	NOTE 10	40 A	19	3	7.95	5.27					3	20	25 A	NOTE 10	IDU-7	H
				21				7.95	5.27				22				
				23						7.95	5.27		24				
H	DOAS-1	NOTE 10	50 A	25	3	10.45	5.27					3	26	25 A	NOTE 10	IDU-8	H
				27				10.45	5.27				28				
				29						10.45	5.27		30				
C	CU-2	NOTE 10	25 A	31	3	4.71	5.27					3	32	25 A	NOTE 10	IDU-9	H
				33				4.71	5.27				34				
				35						4.71	5.27		36				
C	CU-1	NOTE 10	35 A	37	3	6.65	5.27					3	38	25 A	NOTE 10	IDU-10	H
				39				6.65	5.27				40				
				41						6.65	5.27		42				
H	IDU-2	NOTE 10	25 A	43	3	5.27	5.27					3	44	25 A	NOTE 10	IDU-12	H
				45				5.27	5.27				46				
				47						5.27	5.27		48				
H	IDU-3	NOTE 10	25 A	49	3	5.27	--					3	50	--	-	SPACE ONLY	
				51				5.27	--				52				
				53						5.27	--		54				
H	IDU-4	NOTE 10	25 A	55	3	6.16	--					3	56	--	-	SPACE ONLY	
				57				6.16	--				58				
				59						6.16	--		60				
	SPACE ONLY	-	--	61	1	--	--					1	62	--	-	SPACE ONLY	
	SPACE ONLY	-	--	63	1			--	--			1	64	--	-	SPACE ONLY	

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	7.8 kVA	125.00%	9.7 kVA
LE	LIGHTING - EXTERIOR	0.9 kVA	125.00%	1.1 kVA
H	HEATING	313.5 kVA	100.00%	313.5 kVA
C	COOLING	39.2 kVA	100.00%	39.2 kVA
V	VENTILATION	0.0 kVA	0.00%	0.0 kVA
M	MOTORS	2.1 kVA	113.65%	2.4 kVA
K	KITCHEN	0.0 kVA	0.00%	0.0 kVA
R	RECEPTACLES	34.2 kVA	64.62%	22.1 kVA
WH	WATER HEATER	15.0 kVA	100.00%	15.0 kVA
MS	MISC.	6.0 kVA	100.00%	6.0 kVA
S	Spare	0.0 kVA	0.00%	0.0 kVA
E	ELEVATOR	0.0 kVA	0.00%	0.0 kVA
LD	LAUNDRY	0.0 kVA	0.00%	0.0 kVA

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. THIS PANEL SHALL BE U.L. LISTED FOR USE AS S.E. EQUIP.
8. PROVIDE "ALL MODES" SPD (40kA / MODE, 80kA / PHASE).
9. SEE RISER DIAGRAM/ SHEET E1-901 FOR FEEDER SIZE.
10. REFER TO MECHANICAL SCHEDULE SHEET E1.602 FOR WIRE SIZE.

		TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA...	418.61 kVA			
TOTAL KVA (DEMAND):	408.96 kVA	523.4 A	486.1 A	507.3 A
TOTAL AMP....	504 A			
TOTAL AMP. (DEMAND):	492 A			

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)
F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

PANEL: MPC

VOLTAGE: 480Y/277 3Ø — FED FROM: MDPC
MOUNTING: SURFACE — MAIN TYPE: MLO — MFR: SQUARE D
ENCLOSURE: NEMA1 — PHASE: 3 — TYPE: NF
MAIN: 400 A — WIRE: 4 — AIC: 42 KAIC

LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	A	B	B	C	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
L	CLASSROOM LIGHTS	12	20 A	1	1	1.77	1.99					3	2	20 A	NOTE 7	HP-6	H
L	CLASSROOM/WORKROOM LIGHTS	12	20 A	3	1			2.25	1.99				4				
LE	EXTERIOR LIGHTS	12	20 A	5	1					0.87	1.99		6				
L	MECHANICAL PLATFORM LTS	12	20 A	7	1	0.87	1.77					3	8	20 A	NOTE 7	HP-7	H
L	CORRIDOR LIGHTS	12	20 A	9	1			2.08	1.77				10				
L	CORRIDOR 311 LIGHTS	12	20 A	11	1					0.80	1.77		12				
H	HP-1	NOTE 7	20 A	13	3	1.77	1.77					3	14	20 A	NOTE 7	HP-8	H
				15				1.77	1.77				16				
				17						1.77	1.77		18				
H	HP-2	NOTE 7	20 A	19	3	1.77	1.77					3	20	20 A	NOTE 7	HP-9	H
				21				1.77	1.77				22				
				23						1.77	1.77		24				
H	HP-3	NOTE 7	20 A	25	3	1.77	1.77					3	26	20 A	NOTE 7	HP-10	H
				27				1.77	1.77				28				
				29						1.77	1.77		30				
H	HP-4	NOTE 7	20 A	31	3	1.99	1.77					3	32	20 A	NOTE 7	HP-12	H
				33				1.99	1.77				34				
				35						1.99	1.77		36				
H	HP-5	NOTE 7	20 A	37	3	1.77	--					3	38	--	-	SPACE ONLY	
				39				1.77	--				40				
				41						1.77	--		42				

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	7.8 kVA	125.00%	9.7 kVA
LE	LIGHTING - EXTERIOR	0.9 kVA	125.00%	1.1 kVA
H	HEATING	59.7 kVA	100.00%	59.7 kVA
C	COOLING	0.0 kVA	0.00%	0.0 kVA
V	VENTILATION	0.0 kVA	0.00%	0.0 kVA
M	MOTORS	0.0 kVA	0.00%	0.0 kVA
K	KITCHEN	0.0 kVA	0.00%	0.0 kVA
R	RECEPTACLES	0.0 kVA	0.00%	0.0 kVA
WH	WATER HEATER	0.0 kVA	0.00%	0.0 kVA
MS	MISC.	0.0 kVA	0.00%	0.0 kVA
S	Spare	0.0 kVA	0.00%	0.0 kVA
E	ELEVATOR	0.0 kVA	0.00%	0.0 kVA
LD	LAUNDRY	0.0 kVA	0.00%	0.0 kVA

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. REFER TO MECHANICAL SCHEDULE SHEET E1.602 FOR WIRE SIZE.

		TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA...	68.37 kVA			
TOTAL KVA (DEMAND):	70.53 kVA	81.9 A	88.1 A	77.9 A
TOTAL AMP....	82 A			
TOTAL AMP. (DEMAND):	85 A			

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)
F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

PANEL: RPC1

VOLTAGE: 208Y/120 3Ø — FED FROM: T1
MOUNTING: SURFACE — MAIN TYPE: MCB — MFR: SQUARE D
ENCLOSURE: NEMA1 — PHASE: 3 — TYPE: NQOD
MAIN: 225 A — WIRE: 4 — AIC: 10 KAIC

LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	A	B	B	C	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
R	CORRIDOR REC.	12	20 A	1	1	1.26	0.90					1	2	20 A	12	CLASSROOM 8 REC.	R
R	COR/RR/EXT. REC.	12	20 A	3	1			1.26	0.54			1	4	20 A	12	CLASSROOM 8 REC.	R
MS	HAND DRYER GRILS 315 (NOTE 7)	12	20 A	5	1					1.00	0.90	1	6	20 A	12	CLASSROOM 8 REC.	R
MS	HAND DRYER BOYS 316 (NOTE 7)	12	20 A	7	1	1.00	0.90					1	8	20 A	12	CLASSROOM 7 REC.	R
MS	EWC CORRIDOR 317 (NOTE 7)	12	20 A	9	1			0.50	0.54			1	10	20 A	12	CLASSROOM 7 REC.	R
R	CORRIDOR 311 REC.	12	20 A	11	1					1.44	0.90	1	12	20 A	12	CLASSROOM 7 REC.	R
R	TBB REC.	12	20 A	13	1	0.18	0.90					1	14	20 A	12	CLASSROOM 6 REC.	R
MS	BAS CONTROL PANEL	12	20 A	15	1			0.50	0.54			1	16	20 A	12	CLASSROOM 6 REC.	R
R	CORRIDOR/EXT. REC.	12	20 A	17	1					1.26	0.90	1	18	20 A	12	CLASSROOM 6 REC.	R
MS	HAND DRYER GRILS 315 (NOTE 7)	12	20 A	19	1	1.00	0.90					1	20	20 A	12	CLASSROOM 5 REC.	R
MS	HAND DRYER BOYS 316 (NOTE 7)	12	20 A	21	1			1.00	0.54			1	22	20 A	12	CLASSROOM 5 REC.	R
MS	EWC CORRIDOR 317 (NOTE 7)	12	20 A	23	1					0.50	0.90	1	24	20 A	12	CLASSROOM 5 REC.	R
MS	EWC CORRIDOR 317 (NOTE 7)	12	20 A	25	1	0.50	0.90					1	26	20 A	12	CLASSROOM 4 REC.	R
R	UTILITY RM REC.	12	20 A	27	1			0.36	0.54			1	28	20 A	12	CLASSROOM 4 REC.	R
R	TBB REC.	12	20 A	29	1					0.18	0.90	1	30	20 A	12	CLASSROOM 4 REC.	R
R	CLASSROOM 10 REC.	12	20 A	31	1	0.90	0.90					1	32	20 A	12	CLASSROOM 3 REC.	R
R	CLASSROOM 10 REC.	12	20 A	33	1			0.54	0.54			1	34	20 A	12	CLASSROOM 3 REC.	R
R	CLASSROOM 10 REC.	12	20 A	35	1					0.90	0.90	1	36	20 A	12	CLASSROOM 3 REC.	R
R	CLASSROOM 9 REC.	12	20 A	37	1	0.90	0.90					1	38	20 A	12	CLASSROOM 2 REC.	R
R	CLASSROOM 9 REC.	12	20 A	39	1			0.54	0.54			1	40	20 A	12	CLASSROOM 2 REC.	R
R	CLASSROOM 9 REC.	12	20 A	41	1					0.90	0.90	1	42	20 A	12	CLASSROOM 2 REC.	R

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	0.0 kVA	0.00%	0.0 kVA
LE	LIGHTING - EXTERIOR	0.0 kVA	0.00%	0.0 kVA
H	HEATING	19.3 kVA	100.00%	19.3 kVA
C	COOLING	5.2 kVA	100.00%	5.2 kVA
V	VENTILATION	0.0 kVA	0.00%	0.0 kVA
M	MOTORS	2.1 kVA	113.65%	2.4 kVA
K	KITCHEN	0.0 kVA	0.00%	0.0 kVA
R	RECEPTACLES	34.2 kVA	64.62%	22.1 kVA
WH	WATER HEATER	0.0 kVA	0.00%	0.0 kVA
MS	MISC.	6.0 kVA	100.00%	6.0 kVA
S	Spare	0.0 kVA	0.00%	0.0 kVA
E	ELEVATOR	0.0 kVA	0.00%	0.0 kVA
LD	LAUNDRY	0.0 kVA	0.00%	0.0 kVA

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. PROVIDE CLASS A GFI (6mA PERSONNEL) BRKR (250' MAX).
8. PROVIDE FEED-THRU LUGS.
9. LOAD TOTAL INCLUDES FEED-THRU SECTIONS.

		TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA...	66.71 kVA			
TOTAL KVA (DEMAND):	54.89 kVA	236.1 A	132.6 A	207.1 A
TOTAL AMP....	185 A			
TOTAL AMP. (DEMAND):	152 A			

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)
F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

PANEL: RPC2

VOLTAGE: 208Y/120 3Ø — FED FROM: RPC1
MOUNTING: SURFACE — MAIN TYPE: MLO — MFR: SQUARE D
ENCLOSURE: NEMA1 — PHASE: 3 — TYPE: NQ
MAIN: 225 A — WIRE: 4 — AIC: 10 KAIC

LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A	A	B	B	C	C	Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
R	CLASSROOM 1 REC.	12	20 A	1	1	0.90	1.99					2	2	25 A	NOTE 8	HP-11	H
R	CLASSROOM 1 REC.	12	20 A	3	1			0.54	1.99				4				
R	CLASSROOM 1 REC.	12	20 A	5	1					0.90	5.65	2	6	50 A	NOTE 8	IDU-11	H
R	TEACHER WORK REC.	12	20 A	7	1	0.90	5.65						8				
R	TEACHER WORK REC.	12	20 A	9	1			1.08	1.13			1	10	15 A	NOTE 8	F-1	M
R	TEACHER WORK REC.	12	20 A	11	1					0.90	0.44	1	12	15 A	NOTE 8	F-2	M
R	TEACHER WORK REC.	12	20 A	13	1	1.08	1.29					2	14	30 A	NOTE 8	ODU-1	C
R	MECHANICAL PLATFORM REC.	12	20 A	15	1			0.90	1.29				16				
C	ODU-2	NOTE 8	30 A	17	2					1.29	2.00	2	18	25 A	NOTE 8	EWH-1	H
				19		1.29	2.00						20				
S...	SPARE	12	20 A	21	1			0.00	0.50			1	22	15 A	NOTE 8	CP1	M
S...	SPARE	12	20 A	23	1					0.00	0.00	1	24	20 A	12	SPARE	S...
S...	SPARE	12	20 A	25	1	0.00	0.00					1	26	20 A	12	SPARE	S...
S...	SPARE	12	20 A	27	1			0.00	0.00			1	28	20 A	12	SPARE	S...
S...	SPARE	12	20 A	29	1					0.00	0.00	1	30	20 A	12	SPARE	S...
S...	SPARE	12	20 A	31	1	0.00	0.00					1	32	20 A	12	SPARE	S...
S...	SPARE	12	20 A	33	1			0.00	0.00			1	34	20 A	12	SPARE	S...
S...	SPARE	12	20 A	35	1					0.00	0.00	1	36	20 A	12	SPARE	S...
S...	SPARE	12	20 A	37	1	0.00	0.00					1	38	20 A	12	SPARE	S...
S...	SPARE	12	20 A	39	1			0.00	0.00			1	40	20 A	12	SPARE	S...
S...	SPARE	12	20 A	41	1					0.00	0.00	1	42	20 A	12	SPARE	S...

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	0.0 kVA	0.00%	0.0 kVA
LE	LIGHTING - EXTERIOR	0.0 kVA	0.00%	0.0 kVA
H	HEATING	19.3 kVA	100.00%	19.3 kVA
C	COOLING	5.2 kVA	100.00%	5.2 kVA
V	VENTILATION	0.0 kVA	0.00%	0.0 kVA
M	MOTORS	2.1 kVA	113.65%	2.4 kVA
K	KITCHEN	0.0 kVA	0.00%	0.0 kVA
R	RECEPTACLES	7.2 kVA	100.00%	7.2 kVA
WH	WATER HEATER	0.0 kVA	0.00%	0.0 kVA
MS	MISC.	0.0 kVA	0.00%	0.0 kVA
S	Spare	0.0 kVA	0.00%	0.0 kVA
E	ELEVATOR	0.0 kVA	0.00%	0.0 kVA
LD	LAUNDRY	0.0 kVA	0.00%	0.0 kVA

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. PROVIDE CLASS A GFI (6mA PERSONNEL) BRKR (250' MAX).
8. REFER TO MECHANICAL SCHEDULE SHEET E1.602 FOR WIRE SIZE.

		TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA...	33.71 kVA			
TOTAL KVA (DEMAND):	33.99 kVA	130.6 A	61.9 A	98.0 A
TOTAL AMP....	94 A			
TOTAL AMP. (DEMAND):	94 A			

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)
F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

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01/28/2022

CONSTRUCTION DOCUMENTS

optima engineering
150 Fayetteville St., Suite 520, Raleigh, NC 27601
1927 South Tryon St., Suite 300, Charlotte NC 28203
Phone: 919-926-2200 - www.optimaengineering.com
North Carolina License Number C-0914

Harnett County Schools
Johnsonville Elementary School
Addition/Renovation Phase 2
18495 NC-27, Cameron, NC 28326

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022
PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL PANEL SCHEDULES

E1-601

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
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LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP	BALLAST/DRIVER	WATTAGE	VOLTAGE	MFR	CATALOG SERIES	NOTE
D	6" RECESSED LED DOWNLIGHT	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	25 W	UNIV	GOTHAM PATHWAY JUNO SPECTRUM	EVO 20 6AR LS MVOLT 6VLED 2000 INDY L6 20 U G2 L600P SGE6LEDGI 20W MD	6" APERATURE MINIMUM 3000 LUMEN PACKAGE MINIMUM 10% DIMMING CLEAR SEMI-SPECULAR WET LOCATION LISTED
DE	SAME AS TYPE 'D' EXCEPT PROVIDE WITH 90 MINUTE BATTERY BACKUP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	25 W	UNIV	GOTHAM PATHWAY JUNO SPECTRUM	EVO 20 6AR LS MVOLT 6VLED 2000 INDY L6 20 U G2 L600P SGE6LEDGI 20W MD	6" APERATURE MINIMUM 4000 LUMEN PACKAGE MINIMUM 10% DIMMING CLEAR SEMI-SPECULAR WET LOCATION LISTED PROVIDE WITH 90 MINUTE BATTERY BACKUP
EX1	EDGE-LIT EXIT SIGN	LED	INTEGRAL LED DRIVER	5 W	UNIV	LITHONIA HUBBELL JUNO PHILLIPS	QUANTUM LQM S W R 120/277 EL N APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	NICKEL CADMIUM BATTERY EXIT SIGN 90 MINUTE OPERATION;RED TEST SWITCH PROVIDED UL LISTED FOR DAMP LOCATIONS
EX1B	CLEAR EDGE-LIT EXIT SIGN	LED	INTEGRAL LED DRIVER	5 W	UNIV	LITHONA HUBBELL JUNO PHILIPS	LRP 1RMR/RC 120/277 DUAL LITE NAVILLITE CHLORIDE	NICKEL CADMIUM BATTERY EXIT SIGN 90 MINUTE OPERATION;RED TEST SWITCH PROVIDED UL LISTED FOR DAMP LOCATIONS
OWL1	WALL PACK TRAPEZOID LED	LED	INTEGRAL LED DRIVER	50 W	UNIV	LITHONIA HUBBELL JUNO COOPER PHILLIPS	WST LED P3 VF MVOLT APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	COORDINATE FINISH WITH ARCHITECT; MINIMUM 6000 LUMENS; WET LOCATION LISTED
OWL2	WALL MOUNTED EXTERIOR WEDGE LIGHT	LED	INTEGRAL LED DRIVER	20 W	UNIV	LITHONIA HUBBELL JUNO COOPER PHILLIPS	WDGE1 LED P2 80CRI VW MVOLT APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	COLOR CHOSEN BY ARCHITECT; WET LOCATION LISTED; VISUAL COMFORT WIDE THROW; MINIMUM 2000 LUMENS
OWL2E	SAME AS TYPE 'OWL2' EXCEPT PROVIDE WITH 90 MINUTE EMERGENCY BATTERY BACKUP	LED	INTEGRAL LED DRIVER	20 W	UNIV	LITHONIA HUBBELL JUNO COOPER PHILLIPS	WDGE1 LED P2 80CRI VW MVOLT E4WH APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	COLOR CHOSEN BY ARCHITECT; WET LOCATION LISTED; VISUAL COMFORT WIDE THROW; MINIMUM 2000 LUMENS
STL1	4 FT. LED STRIP	LED	INTEGRAL LED DRIVER	40 W	UNIV	LITHONIA COLUMBIA CREE COOPER DAY-BRITE	CLX LED L48 5000LM SEF FDL MVOLT GZ10 35K 80CRI APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	PROVIDE CHAIN FOR PENDANT MOUNTING PROVIDE WIRE GUARD 4000 MINIMUM LUMENS LENSED
STL1E	SAME AS TYPE 'STL1' EXCEPT PROVIDE WITH 90 MINUTE BATTERY BACKUP	LED	INTEGRAL LED DRIVER	40 W	UNIV	LITHONIA COLUMBIA CREE COOPER DAY-BRITE	CLX LED L48 5000LM SEF FDL MVOLT GZ10 35K 80CRI APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	PROVIDE CHAIN FOR PENDANT MOUNTING PROVIDE WIRE GUARD 4000 MINIMUM LUMENS LENSED PROVIDE WITH 10W CONSTANT POWER EMERGENCY DRIVER

LIGHTING FIXTURE SCHEDULE - PREFFERED BRAND ALT.

TYPE	DESCRIPTION	LAMP	BALLAST/DRIVER	WATTAGE	VOLTAGE	MFR	CATALOG SERIES	NOTE
A	2X4 LED FLAT PANEL	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	40 W	277V	PREFERRED BRAND ALTERNATE: LITHONIA WILLIAMS CORONET	CPX 2X4 4000LM MIN10 APPROVED EQUAL APPROVED EQUAL	4000 MINIMUM LUMENS UL LISTED DAMP LOCATIONS PROVIDE FLANGE KIT FOR GYPSUM BOARD CEILINGS
AE	2X4 LED FLAT PANEL SAME AS TYPE 'A' EXCEPT PROVIDE WITH 90 MINUTE BATTERY BACKUP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	40 W	277V	PREFERRED BRAND ALTERNATE: LITHONIA WILLIAMS CORONET	CPX 2X4 4000LM MIN10 E10WLCP APPROVED EQUAL APPROVED EQUAL	4000 MINIMUM LUMENS UL LISTED DAMP LOCATIONS PROVIDE FLANGE KIT FOR GYPSUM BOARD CEILINGS PROVIDE WITH 10W CONSTANT POWER EMERGENCY DRIVER
B	2X2 LED FLAT PANEL	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	30 W	277V	PREFERRED BRAND ALTERNATE: LITHONIA WILLIAMS CORONET	CPX 2X2 3200LM MIN10 APPROVED EQUAL APPROVED EQUAL	3200 MINIMUM LUMENS UL LISTED DAMP LOCATIONS PROVIDE FLANGE KIT FOR GYPSUM BOARD CEILINGS

LIGHTING FIXTURE NOTES

1. LIGHTING FIXTURES, AS SPECIFIED, HAVE BEEN SO SELECTED TO ACHIEVE REQUIRED/DESIRED FOOT CANDLE LEVELS OF ILLUMINATION IN THEIR RESPECTIVE AREA, HENCE SPECIFIC FIXTURE CHARACTERISTICS WHICH MAY CREATE PARTICULAR ILLUMINATION RESULTS ARE ESSENTIAL. ANY DEVIATIONS FROM SPECIFIED FIXTURES SHALL DEEM THE SUBMITTING AGENT AND CONTRACTOR RESPONSIBLE IN PROVING SUCH DEVIATION WILL PROVIDE THE EXACT LIGHTING RESULT IN DUPLICATION TO THE DESIGN HEREIN.
2. SUBSTITUTIONS APPROVED BY THE ENGINEER PREVIOUS TO BID ARE ACCEPTABLE AS LONG AS THEY ARE EQUAL TO FIXTURE SPECIFIED. UNLESS OTHERWISE NOTED. THIS INCLUDES LENS, COLORS, REFLECTORS, PHOTOMETRICS, HOUSING MATERIALS, FINISHES, ETC. ANY SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER WITH COMPLETE CUT SHEETS FOR APPROVAL 10 WORKING DAYS PRIOR TO BID. SUBSTITUTE FIXTURES SHALL BE PRICED WITH THE SPECIFIED FIXTURE AND LISTED SEPARATELY FOR THE ENGINEER AND OWNER TO MAKE AN INFORMED DECISION.
3. CONTRACTOR SHALL PROVIDE SUITABLE TRIM AND APPURTENANCES TO MOUNT FIXTURES IN TYPE OF CEILING OR WALL AS SPECIFIED IN ARCHITECTURAL FINISH SCHEDULES REGARDLESS OF CATALOG NUMBER GIVEN. ONTRACTOR SHALL VERIFY TYPE OF CEILING OR WALL BY REVIEWING ARCHITECTURAL FINISH SCHEDULES PRIOR TO ORDERING FIXTURES.
4. CONFIRM FINAL FIXTURE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS.
5. PROVIDE LOW TEMPERATURE (0 DEGREE F) DRIVER FOR ANY FIXTURE INSTALLED ON EXTERIOR OR OTHER AREAS SUBJECT TO LOW TEMPERATURES.
6. DURING THE BIDDING PROCESS, THE CONTRACTOR SHALL INFORM ARCHITECT AND ENGINEER OF ANY DELIVERY OR SCHEDULING ISSUES THAT MAY IMPACT THE PROJECT CRITICAL PATH SCHEDULING. CONTRACTORS SHOULD CONFIRM AND EXPECT AN 8 TO 10 WEEK DELIVERY UNLESS SELECTED FIXTURES ARE CONSIDERED TO BE A 'QUICK SHIP' PRODUCT.
7. NO FIXTURE SUBSTITUTIONS WILL BE CONSIDERED DUE TO LACK OF COORDINATION OF DELIVERY DATES AND CONSTRUCTION SCHEDULE AFTER TIME OF BID.
8. ALL MATERIAL EXPEDITING EXPENSES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. ANY FIXTURES BEING INSTALLED IN CEILING, INDICATED BY THE ARCHITECT AS HAVING INSULATION IN CONTACT WITH THE CEILING SURFACE, SHALL BE IC RATED AND LABELED SUCH FROM THE MANUFACTURER.
10. ACCEPTABLE DRIVER MANUFACTURERS FOR SUBMISSION ARE OSRAM/SYLVANIA, ADVANCE, GE, PHILLIPS OR UNIVERSAL TRIAD PROVIDED THEY MEET INTENDED CRITERIA AS LISTED IN THIS SCHEDULE AND PROJECT SPECIFICATIONS.
11. SUPPORT RECESSED TROFFERS AT ALL FOUR CORNERS FROM STRUCTURE. CEILING GRID SUPPORT IS NOT ACCEPTABLE.
12. COMPLETELY EXAMINE LIGHTING PLANS TO COORDINATE SWITCHING, DIMMING AND ANY SPECIAL DRIVER CONTROLS THAT MAY BE PART OF THE DESIGN INTENT.
13. COORDINATE CLOSELY FIXTURES CONTROLLED VIA AUTOMATIC OR DIMMING CONTROLS TO ASSURE FIXTURE APPENDAGES ARE ORDERED PROPERLY TO MEET DESIGN INTENT.
14. CONTRACTOR SHALL FURNISH A COMPLETE SET OF PLANS TO HIS SUPPLIER TO ASSURE LIGHTING PACKAGE IS COMPLETE.
15. PROVIDE DIMMING DRIVER/MODULE FOR FIXTURES INDICATED ON PLANS AS BEING CONTROLLED VIA DIMMING DEVICE.
16. ELECTRICAL VALUE ENGINEERING SHALL BE BILLED AT AN HOURLY RATE BY ENGINEERING FOR SUBMITTAL REVIEWS.
17. ANY FIXTURES BEING DIMMED THAT WILL REQUIRE SPECIAL LEVELS OF DIMMING SHALL HAVE THIS REQUIREMENT BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO ISSUE OF FINAL PLANS. WITHOUT SPECIFIC REQUIREMENTS, ENGINEER SHALL UTILIZE BEST JUDGEMENT AND LATER CHANGES WILL BE AT THE EXPENSE OF THE OWNER. LIGHTING FIXTURE NOTES
18. THE COLOR TEMPERATURE OF ALL INTERIOR FIXTURES SHALL BE 4000K. THE COLOR TEMPERATURE OF ALL EXTERIOR FIXTURES SHALL BE 4000K.
19. COORDINATE THE MOUNTING HEIGHT OF ALL PENDANT MOUNTED FIXTURES WITH ARCHITECT.

LIGHTING SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL LIGHTING CONTROL SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 260923 AND 260943) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 260923 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY.

SYSTEM DESCRIPTION:
LIGHTING CONTROLS ARE BASED ON ETHERNET CONNECTED DEVICES THAT HAVE INDIVIDUAL ADDRESS LOCATIONS FOR PROGRAMMING AND CONTROL. INDEPENDENT OF THE ETHERNET BASED CONTROLS ARE STAND ALONE OCCUPANCY SENSORS. THESE SHALL BE INDEPENDENT AND NOT TIED INTO THE BAS/SYSTEM SOFTWARE.

SENSORS
1. CEILING MOUNTED OCCUPANCY AND VACANCY SENSORS SHALL OPERATE AS PART OF THE ETHERNET BASED SYSTEM AND AS STAND ALONE CONTROLS AS SHOWN ON THE PLANS.
2. WALL MOUNTED NON SWITCH TYPE OCCUPANCY/VACANCY SENSORS SHALL OPERATE AS PART OF THE ETHERNET BASED SYSTEM.
3. ALL OCCUPANCY SENSORS SHALL BE PROGRAMMED FOR AUTOMATIC ON (FULL LEVELS) AND AUTOMATIC OFF.
4. ALL VACANCY SENSORS SHALL BE PROGRAMMED FOR MANUAL ON AND AUTOMATIC OFF.
5. LARGE PUBLIC SPACES SHALL BE OCCUPANCY BASED WHERE PROVIDED WITH A SENSOR.

TIMER SETTINGS:
A. WALL SWITCH PASSIVE INFRARED: 2 MINUTES FOR INDIVIDUAL RESTROOMS AND STORAGE ROOMS.
B. CLASSROOMS VACANCY: 15 MINUTES.
C. WALL SWITCH VACANCY SENSORS OFFICES: 5 MINUTES.
D. OTHER SPACES NOT LISTED: 30 MINS.

BAS INTEGRATION:
A. EXTERIOR LIGHTING ZONES, TIME SCHEDULE AND PHOTOCELL CONTROL.
B. INTERIOR LIGHTING:
- CORRIDORS
- CLASSROOMS
- OFFICES

COMMISSIONING AND COORDINATION OF BAS:
1. BAS CONTROL SHALL BE THE PRIORITY SYSTEM WITH LOCAL OVERRIDES.
2. LIGHTING SYSTEM SHALL ALSO BE INDEPENDENTLY CONTROLLED BY A SOFTWARE BASED SYSTEM.
3. LIGHTING SYSTEM IS CONNECTED TO THE BAS VIA BACNET PROTOCOL OR EQUAL. COORDINATE LANGUAGE REQUIREMENTS WITH MECHANICAL CONTROLS CONTRACTOR SUPPLYING BUILDING AUTOMATION SYSTEM.

LIGHTING COORDINATION AND QUALITY CONTROL:
1. ELECTRICAL CONTRACTOR SHALL HAVE A PRE-CONSTRUCTION MEETING WITH CONTROLS SUPPLIER PRIOR TO CONDUIT ROUGH-IN TO VERIFY BOXES, CONDUIT PATHS, AND GENERAL LIGHTING CONTROL STRATEGY FOR INSTALLATION.
2. ELECTRICAL CONTRACTOR SHALL HAVE A POST-SUBMITTAL MEETING WITH CONTROLS SUPPLIER TO IDENTIFY LINE AND LOW VOLTAGE ROUTING, INTENT OF LIGHTING CONTROL DESIGN, AND GENERAL CONSTRUCTION STRATEGIES.

EXTERIOR LIGHTING CONTROL:
A. EXTERIOR LIGHTING CONTROL IS VIA SCHEDULED TIME CONTROL AND PHOTOCELL.

OTHER SYSTEM INTEGRATION:
1. UPON A FIRE ALARM EVENT, ALL CORRIDOR ZONES SHALL SWEEP ON.

TIME SCHEDULES:
A. TIME SCHEDULES ARE TO BE DETERMINED BY THE OWNER. THIS SHALL BE COORDINATED AND DIRECTED BY OWNER AND INPUT BY THE LIGHTING PROGRAMMER AND THE BAS PROGRAMMER. SEE THE BELOW INITIAL SETTING UNTIL OWNER HAS GIVEN INPUT.
B. INITIAL TIME SCHEDULES SHALL BE:
MONDAY - FRIDAY: 6AM ON, 7 PM OFF
SATURDAY 8AM ON, 4 PM OFF
SUNDAY: OFF

INDIVIDUAL AREAS INTENT OF CONTROL:
- MAIN CORRIDORS/HALLWAYS: TIME SCHEDULE ZONED. MANUAL LOW VOLTAGE OVERRIDE IN LOCAL CORRIDOR. CORRIDOR SWITCHES SHALL BE LOCKED OUT (PUBLIC AREAS) DURING "NORMAL OPERATING HOURS."
- GROUP RESTROOMS: ON/OFF WALL SWITCH VACANCY SENSORS (PASSIVE INFRARED.)OCCUPANCY SENSORS SHALL OPERATE NORMAL AND EMERGENCY FIXTURES IN THIS AREA.
- INDIVIDUAL RESTROOMS: ON/OFF WALL SWITCH VACANCY SENSORS (PASSIVE INFRARED.)
- UTILITY ROOMS, ETC.: ON/OFF WALL SWITCH OCCUPANCY SENSORS WITH MANUAL OVERRIDE FOR PERSONNEL SAFETY. SEE PLANS
- STORAGE ROOMS: ON/OFF WALL SWITCH VACANCY SENSORS (PASSIVE INFRARED.)
- CLASSROOMS: 2 ZONES. ZONE ONE IS ON/OFF WITH FULL DIMMING, ZONE TWO IS ON/OFF WITH FULL DIMMING. ZONES WORK INDEPENDENTLY OF EACH OTHER.

LIGHTING SYSTEM NOTES:
1. SYSTEM ARCHITECTURE SHALL BE DESIGNED BY RESPECTIVE CONTROLS PROVIDER.
2. SYSTEM IS BASED ON NX DISTRIBUTED INTELLIGENCE, BY HUBBELL. ALL ALTERNATE MANUFACTURERS SHALL PROVIDE EQUIPMENT TO MEET THE DESIGN INTENT. (GRAPHIC WALL PODS FOR EXAMPLE.) APPROVED EQUALS: WATTSTOPPER DLM, COOPER GREENGATE, OR ACUITY NLIGHT.
3. SEE VENDOR DRAWINGS/DETAILS FOR ALL 0-10V DIMMING WIRING.
4. PROVIDE DEVICE LAYOUT AS PART OF LIGHTING CONTROL SUBMITTAL. INCLUDE ALL DEVICE LOCATIONS, CABLING, EQUIPMENT, ETC.

FIXTURE NOTES:
A. ARCHITECT TO APPROVE ALL EXTERIOR FIXTURE LOCATIONS. E.C. TO MARK OFF LOCATIONS WITH TEMPORARY "CHALK" OUTLINE AND PLAN FOR ARCHITECT ON-SITE APPROVAL OF LOCATIONS BEFORE INSTALLATION. E.C. TO CONTACT ARCHITECT WITH (1) WEEK PRIOR NOTICE.

ELECTRIC WALL HEATER SCHEDULE

_EL	LOCATION	KW	MOTOR VOLT	MOTOR PH	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
EWH-1	UTILITY 318	4.0	208 V	1	PROVIDED BY M.C.	3#10, 1#10 G, 3/4"C.

STORAGE ELECTRIC WATER HEATER SCHEDULE

MARK	DESCRIPTION	ELECTRICAL DATA					
		KW	V	PH	HZ	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
WH1	ELECTRIC, VERTICAL STORAGE	15	480	3	60	30A/F25A-3P-1	4#10,1#10G., 3/4"C.

PUMP SCHEDULE

MARK	DESCRIPTION	ELECTRICAL DATA					
		HP	V	PH	HZ	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
CP1	INLINE CIRCULATION PUMP SERVING WH1	1/8	120	1	60	MOTOR RATED SWITCH	2#12,1#12G., 3/4"C.

HEAT PUMP SCHEDULE (AIR COOLED)

ID	NOMINAL TONNAGE	COMPRESSOR LRA	COMPRESSOR RLA	FAN FLA	ELECTRICAL DATA MCA	FUSE	VOLTAGE	PH	MATCHING INDOOR UNIT	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
HP-1	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-1	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-2	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-2	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-3	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-3	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-4	4.0	41.0	6.4	0.6	9.0	15.0	480 V	3	IDU-4	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-5	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-5	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-6	4.0	41.0	6.4	0.6	9.0	15.0	480 V	3	IDU-6	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-7	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-7	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-8	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-8	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-9	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-9	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-10	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-10	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.
HP-11	2.5	67.8	12.8	0.7	17.0	25.0	208 V	1	IDU-11	30A/F25A-3P-3R	4#10,1#10G, 3/4"C.
HP-12	3.0	38.0	5.7	0.6	8.0	15.0	480 V	3	IDU-12	30A/F15A-3P-3R	4#12, 1#12 G, 3/4"C.

DUCTLESS A/C CONDENSING UNIT SCHEDULE

ID	NOMINAL TONNAGE	ELECTRICAL DATA MCA	MOCP	VOLTAGE	PH	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
ODU-1	1.5	11.0	28.0	208 V	1	30A/F30A-2P-3R	3#10, 1#10 G, 3/4"C.
ODU-2	1.5	11.0	28.0	208 V	1	30A/F30A-2P-3R	3#10, 1#10 G, 3/4"C.

DUCTLESS A/C INDOOR UNIT SCHEDULE

ID	MANUFACTURER	MODEL NO.	QTY	COOLING CAPACITY NOMINAL	TOTAL (BTUH)	SENSIBLE (BTUH)	HEATING CAPACITY (BTUH)	CONDUIT AND CONDUCTOR SIZE	DISCONNECT SIZE
A/C-1	MITSUBISHI	PLA-A18EA7	1	1.5 ton	18000	15300	19000	3#10, 1#10 G, 3/4"C.	PROVIDED BY M.C.
A/C-2	MITSUBISHI	PLA-A18EA7	1	1.5 ton	18000	15300	19000	3#10, 1#10 G, 3/4"C.	PROVIDED BY M.C.

INDOOR UNIT SCHEDULE

SYMBOL	NOMINAL TONNAGE	ELECTRIC HEAT KW	STAGES	VOLTAGE	PH	FAN MOTOR FLA	ELECRICAL DATA MCA	MOCP	VOLTAGE	PH	MATCHING OUTDOOR UNIT	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
IDU-1	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-1	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-2	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-2	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-3	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-3	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-4	4	14.4	1	480	3	0.9	24.8	25.0	480 V	3	HP-4	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-5	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-5	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-6	4	14.4	1	480	3	0.9	24.8	25.0	480 V	3	HP-6	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-7	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-7	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-8	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-8	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-9	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-9	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-10	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-10	30A/F25A-3P-1	4#10,1#10G, 3/4"C.
IDU-11	2.5	7.2	1	208	1	3.5	48.0	50.0	208 V	1	HP-11	60A/F50A-3P-1	3#6, 1#10G, 1"C.
IDU-12	3	14.4	1	480	3	0.6	23.8	25.0	480 V	3	HP-12	30A/F25A-3P-1	4#10,1#10G, 3/4"C.

EXHAUST FAN SCHEDULE

SYMBOL	LOCATION	ELECTRICAL DATA WATTS	HP	VOLTAGE	PH	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
F-1	UTILITY 318	1127	0.50 hp	115 V	1	PROVIDED BY M.C.	2#12, 1#12 G, 3/4"C.
F-2	UTILITY 318	438	0.00 hp	115 V	1	PROVIDED BY M.C.	2#12, 1#12 G, 3/4"C.

DOAS CONDENSING UNIT SCHEDULE

SYMBOL	COMPRESSOR QTY	RLA-1	RLA-2	ELECTRICAL DATA FLA	MCA	FUSE	VOLTAGE	PH	MATCHING INDOOR UNIT	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
CU-1	2	9.7	10.6	24.0	27.0	35.0	460 V	3	DOAS-1	60A/F35A-3P-3R	4#8,1#10G., 3/4"C.
CU-2	2	7.8	6.2	17.0	19.0	25.0	460 V	3	DOAS-2	30A/F25A-3P-3R	4#10,1#10G, 3/4"C.

DOAS INDOOR UNIT SCHEDULE

SYMBOL	ELECTRIC HEAT KW	STAGES	FLA	VOLTAGE	PH	ELECRICAL DATA FLA	MCA	MOCP	VOLTAGE	PH	MATCHING OUTDOOR UNIT	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
DOAS-1	30.0	4	36.1	460	3	37.7	47.0	50.0	460 V	3	CU-1	60A/F50A-3P-1	4#6,1#10G., 1"C.
DOAS-2	22.5	3	27.1	460	3	28.7	36.0	40.0	460 V	3	CU-2	60A/F40A-3P-1	4#8,1#10G., 3/4"C.

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SFL+A ARCHITECTS

NORTH CAROLINA PROFESSIONAL SEAL 048210 ENGINEER MORGAN K. GUNTER 01/28/2022

CONSTRUCTION DOCUMENTS

optima engineering
150 Fayetteville St., Suite 520, Raleigh, NC 27601
1927 South Tryon St., Suite 300, Charlotte NC 28203
Phone: 919-926-2200 - www.optimaengineering.com
North Carolina License Number C-0914

Harnett County Schools
Johnsonville Elementary School Addition/Renovation Phase 2
18495 NC-27, Cameron, NC 28326

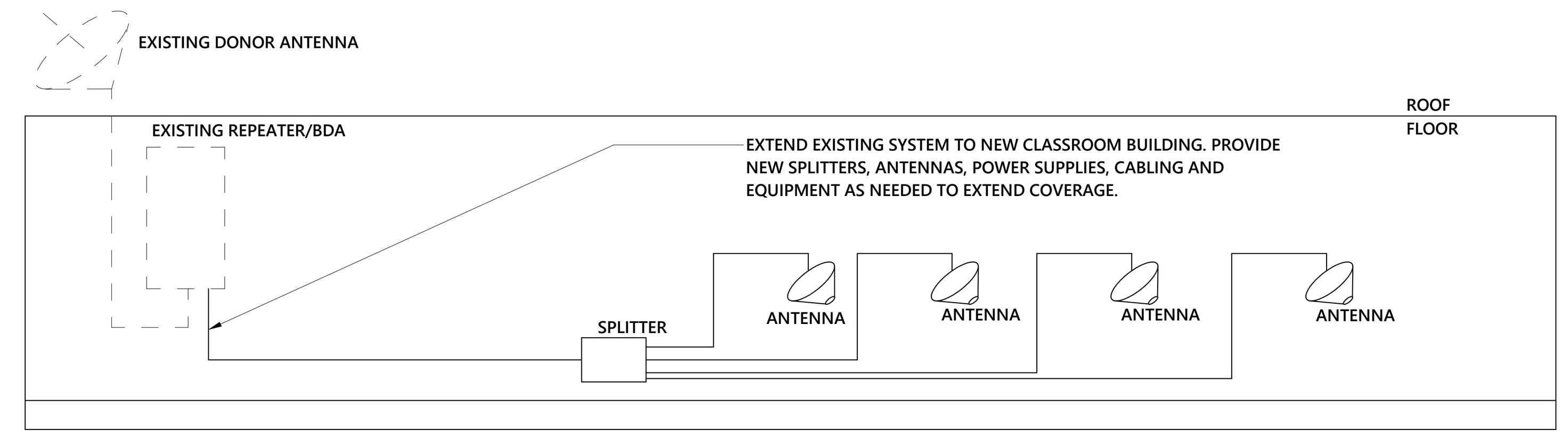
ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022
PROJECT #: 02103.000
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL SCHEDULES AND LIGHTING SEQUENCE OF OPERATIONS

E1-602



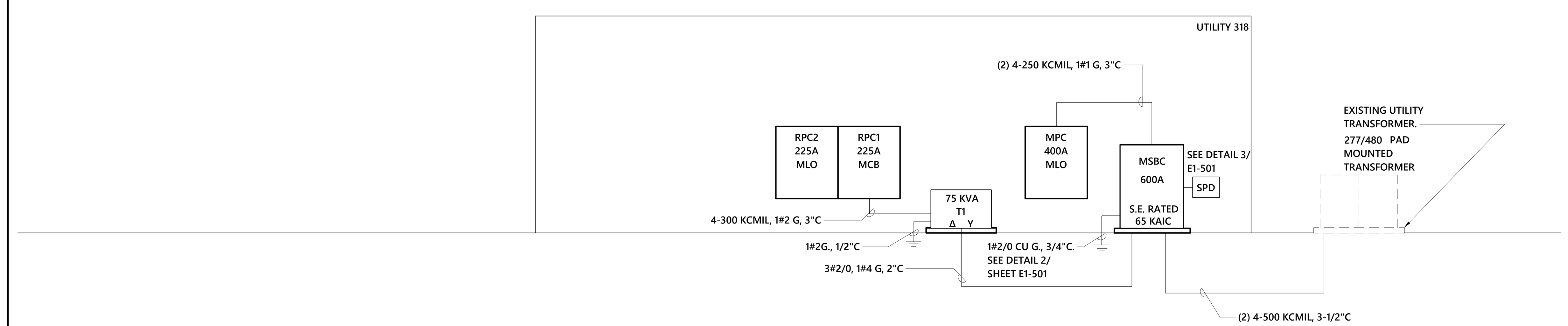
1 EMERGENCY RESPONDER SYSTEM BOOSTING RISER

NO SCALE

SYSTEM NOTES

NOTES:

1. SYSTEM IS BASED ON 800Mhz. COORDINATE WITH LOCAL EMERGENCY RESPONDERS FOR NECESSARY FREQUENCY RFEQUIRED
2. SEE SPECIFICATIONS FOR ALL EQUIPMENT AND CABLING REQUIREMENTS.
3. ALL CABLING TO BE INSTALLED IN 1 1/2" CONDUIT.
4. SYSTEM SUPPLIER SHALL PROVIDE A SYSTEM SURVEY REPORT PRIOR TO PROVIDING THE SYSTEM. THIS SHALL BE CONSIDERED BASE BID FOR THE PROJECT. SIGNAL SURVEY REPORT SHALL BE TAKEN TO THE LOCAL FIRE CODE OFFICIAL AND THE LOCAL FIRE CODE OFFICIAL SHALL DETERMINE IF THE SYSTEM NEEDS TO BE INSTALLED. SIGNAL STRENGTH MEASUREMENTS SHALL BE MEASURED IN 95% OF ALL AREAS ON EACH FLOOR (100% OF ALL EGRESS AND CRITICAL AREAS). A MINIMUM SIGNAL STRENGTH OF -95dBM IS REQUIRED.
5. PROVIDE A DEDUCTIVE ALTERNATE FOR THE EMERGENCY RESPONDER SYSTEM INCLUDING ALL DEVICES, CABLING, CONDUIT, AND EQUIPMENT. SUBMITTAL AND SURVEY REPORT SHALL BE CONSIDERED BASE BID.
6. BASED ON SURVEY REPORT, DEVICES SHALL BE LOCATED TO MAXIMIZE BOOSTING SIGNAL. LOCATIONS SHALL BE COORDINATED WITH GENERAL CONTRACTOR.
7. DASHED ITEMS ARE EXISTING.



NOTES:

1. ALL FEES ASSOCIATED WITH UTILITY COMPANY COORDINATION, INCLUDING PURCHASE/LEASE OF UTILITY TRANSFORMER, TRANSFORMER PRIMARY FEES, PAD, AND ALL ADMINISTRATIVE FEES SHALL BE INCLUDED AS PART OF THE E.C. CONTRACT.
2. ELECTRICAL FEEDERS SIZES SHOWN ON RISER ARE SIZED ALUMINUM MATERIAL, UNLESS NOTED OTHERWISE.
3. DASHED ITEMS ARE EXISTING TO REMAIN.
4. X-OUT ITEMS ARE EXISTING TO BE DEMOLISHED.

2 POWER RISER DIAGRAM

NOT TO SCALE

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ELECTRICAL DIAGRAMS

E1-901

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
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