

ELECTRICAL SYMBOLS LEGEND
NOT ALL SYMBOLS MAY BE REPRESENTED ON DRAWINGS

POWER SYMBOLS	LIGHTING CONTROL SYMBOLS	FIRE ALARM SYMBOLS
--- --- --- SIGNIFIES TWO(2) CONDUCTORS 2#12 + 1#12 GRND. IN 3/4" CONDUIT.	§ TOGGLE SWITCH (SINGLE-POLE)	FACP FIRE ALARM CONTROL PANEL
--- --- --- --- SIGNIFIES THREE(3) CONDUCTORS 3#12 + 1#12 GRND. IN 3/4" CONDUIT.	§ I I I V TOGGLE SWITCHES (SINGLE-POLE, GANGED)	AP FIRE ALARM REMOTE ANNUNCIATOR PANEL
--- --- --- --- --- SIGNIFIES FOUR(4) CONDUCTORS 4#12 + 1#12 GRND. IN 3/4" CONDUIT.	§3 TOGGLE SWITCH (SINGLE-POLE, 3-WAY)	F FIRE ALARM PULLSTATION - INSTALL 48" A.F.F. TO CENTER OF BOX
--- --- --- --- --- --- SIGNIFIES FIVE(5) CONDUCTORS 5#12 + 1#12 GRND. IN 3/4" CONDUIT.	§3 I I I I V TOGGLE SWITCH (SINGLE-POLE, 3-WAY, GANGED)	CM CARBON MONOXIDE DETECTOR WITH AUDIBLE BASE. WIRE INTO SUPERVISORY CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL @ FINISHED CEILING.
--- --- --- --- --- --- --- SIGNIFIES TWO(2) CONDUCTORS 2#10 + 1#10 GRND. IN 3/4" CONDUIT.	§4 TOGGLE SWITCH (SINGLE-POLE, 4-WAY)	S PHOTOELECTRIC SMOKE DETECTOR WITH STANDARD BASE. WIRE INTO INITIATING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL @ FINISHED CEILING.
--- --- --- --- --- --- --- --- SIGNIFIES THREE(3) CONDUCTORS 3#10 + 1#10 GRND. IN 1" CONDUIT.	§K KEYED SWITCH (SINGLE-POLE)	CS COMBINATION CARBON MONOXIDE / PHOTOELECTRIC SMOKE DETECTOR WITH AN AUDIBLE BASE. WIRE INTO INITIATING / SUPERVISORY / SIGNALING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL @ FINISHED CEILING.
--- --- --- --- --- --- --- --- --- SIGNIFIES TWO(2) CONDUCTORS 2#8 + 1#10 GRND. IN 3/4" CONDUIT.	§T TIME DELAY SWITCH (SINGLE-POLE)	H HEAT DETECTOR - FIXED TEMPERATURE OF 135°. WIRE INTO INITIATING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL @ FINISHED CEILING.
--- --- --- --- --- --- --- --- --- --- SIGNIFIES THREE(3) CONDUCTORS 3#8 + 1#10 GRND. IN 1" CONDUIT.	§PL PILOT LIGHT SWITCH (SINGLE-POLE)	CH COMBINATION CARBON MONOXIDE / HEAT DETECTOR, FIXED TEMPERATURE OF 135° WITH AN AUDIBLE BASE. WIRE INTO INITIATING / SUPERVISORY / SIGNALING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL @ FINISHED CEILING.
--- --- --- --- --- --- --- --- --- --- --- SIGNIFIES TWO(2) CONDUCTORS 2#6 + 1#8 GRND. IN 1" CONDUIT.	§D DIMMER (SINGLE-POLE)	DS DUCT SMOKE DETECTOR - WIRE INTO INITIATING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL WITHIN HVAC DUCTWORK.
--- --- --- --- --- --- --- --- --- --- --- --- SIGNIFIES THREE(3) CONDUCTORS 3#6 + 1#8 GRND. IN 1" CONDUIT.	§D3 I I I I V DIMMER (SINGLE-POLE, GANGED - 2, 3, 4 ETC.)	SR EMERGENCY SHUTDOWN RELAY - FOR ELEVATOR RECALL.
HOME RUN TO PANELBOARD	§M MOMENTARY CONTACT SWITCH (SINGLE-POLE)	AK AUDIO DEVICE (WALL) - WIRE INTO SIGNALING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL 80" A.F.F. TO BOTTOM OF BOX.
LOW VOLTAGE CONTROL WIRING	§PB PUSH-BUTTON, LINE-VOLTAGE, 1-CIRCUIT WALL SWITCH CONTROLLER PROVIDING ON/OFF DIMMING CONTROLS WITH WIRELESS COMMUNICATION CAPABILITY. ACUITY CONTROLS - LIGHT AIR #RPODL-DX-MVLT-WH-G2 (OR EQUAL)	V VISUAL DEVICE (WALL) - WIRE INTO SIGNALING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL 80" A.F.F. TO BOTTOM OF BOX.
JUNCTION BOX (SIZE AS REQUIRED)	~ CONDUIT/WIRE BREAK	CV COMBINATION AUDIO/VISUAL DEVICE (WALL) - WIRE INTO SIGNALING CIRCUITS OF BUILDING FIRE ALARM SYSTEM. INSTALL 80" A.F.F. TO BOTTOM OF BOX.
CONDUIT STUB OUT	• CONDUIT STUB-DOWN	OSD OCCUPANCY SENSOR DIMMING WALL SWITCH. OCCUPANCY TIME DELAY = 15 MINUTES. ON MODE = MANUAL ACUITY CONTROLS - LIGHT AIR #WSX-PDT-EZ-D-SA-WH (OR EQUAL)
CONDUIT STUB-UP	208Y/120V RECESSED OR SURFACE MOUNTED PANELBOARD	FL FLOW SWITCH - PROVIDED & INSTALLED BY SPRINKLER CONTRACTOR, WIRE INTO BUILDING FIRE ALARM SYSTEM BY ELECTRICAL CONTRACTOR.
480Y/277V RECESSED OR SURFACE MOUNTED PANELBOARD	1# POWER TERMINAL CONNECTION TO EQUIPMENT ITEM SUPPLIED BY OTHERS.	TA TAMPER SWITCH - PROVIDED & INSTALLED BY SPRINKLER CONTRACTOR, WIRE INTO BUILDING FIRE ALARM SYSTEM BY ELECTRICAL CONTRACTOR.
3# POWER TERMINAL CONNECTION TO EQUIPMENT ITEM SUPPLIED BY OTHERS.	ELECTRIC MOTOR - PROVIDED & INSTALLED BY OTHERS. WIRE BY E.C. XX = HORSE POWER RATING	MM MONITORING MODULE
RECEPTACLE (SIMPLEX)	RECEPTACLE (DUPLICATE)	CM CONTROL MODULE
RECEPTACLE (QUAD)	COMMUNICATION SYMBOLS	RTI REMOTE TEST STATION
RECEPTACLE (DUPLICATE) WITH 2 USB CHARGING PORTS) DECORATOR STYLE	TELEPHONE JACK - SEE "COMMUNICATION DEVICE SCHEDULE" FOR FURTHER INFORMATION	
RECEPTACLE (DUPLICATE) W/ GROUND FAULT PROTECTION	TELEPHONE / NETWORK DATA JACK - SEE "COMMUNICATION DEVICE SCHEDULE" FOR FURTHER INFORMATION	
RECEPTACLE (QUAD) W/ GROUND FAULT PROTECTION	MEDIA BOX - SEE "COMMUNICATION DEVICE SCHEDULE" FOR FURTHER INFORMATION	
RECEPTACLE (DUPLICATE) W/ GROUND FAULT PROTECTION & A WEATHERPROOF COVER	WIRELESS ACCESS POINT - WIRELESS ACCESS DEVICE SHALL BE SUPPLIED AND INSTALLED BY OTHERS. DEVICE SHALL CLIP TO THE CEILING GRID. SUPPLY EACH LOCATION WITH 10' OF COILED CAT. 6 CABLE TERMINATED TO AN RJ-45 CONNECTOR FOR CONNECTION TO WIRELESS ACCESS DEVICE. CABLE SHALL EMANATE FROM SERVER ROOM	
120V ELECTRONIC DOOR STRIKE, SUPPLIED & INSTALLED BY OTHERS, WIRE BY E.C.	CARD READER - SUPPLY SINGLE-GANG ELECTRICAL BOX AND INSTALL 44" A.F.F. SUPPLY 3/4" EMT CONDUIT AND ROUTE WITHIN WALL FROM ELECTRICAL BOX TO ACCESSIBLE CEILING SPACE. SUPPLY CONDUIT WITH PLASTIC BUSHINGS AND A PULLSTRING. CARD READER AND ASSOCIATED WIRING SHALL BE SUPPLIED AND INSTALLED BY OTHERS.	
RECESSED FLOOR BOX - TO BE INSTALLED FLUSH WITHIN FINISHED FLOOR	REQUEST TO EXIT DEVICE - SUPPLY A 2-GANG ELECTRICAL BOX AND INSTALL ABOVE DOOR FRAME. SUPPLY 3/4" EMT CONDUIT AND ROUTE WITHIN WALL FROM ELECTRICAL BOX TO ACCESSIBLE CEILING SPACE. SUPPLY CONDUIT WITH PLASTIC BUSHINGS AND A PULLSTRING. REQUEST TO EXIT DEVICE AND ASSOCIATED WIRING SHALL BE SUPPLIED AND INSTALLED BY OTHERS.	
POWER POLE WITH DIVIDER FOR POWER AND COMMUNICATIONS WIRING.	MANUAL MOTOR STARTER	
MAGNETIC MOTOR STARTER	MAGNETIC MOTOR STARTER	
COMBINATION MOTOR STARTER/FUSED DISCONNECT SWITCH	NON-FUSED DISCONNECT SWITCH	
FUSED DISCONNECT SWITCH		

LIGHTING FIXTURE SCHEDULE

SYMBOL	DESCRIPTION	LAMP (QTY/TYPER/COLOR)	VOLT	VA	MOUNTING	MANUFACTURER/ MODEL #
(A)	6" APERTURE LED DOWNLIGHT WITH A SEMI-SPECULAR OPEN REFLECTOR AND 0-10V DIMMING DRIVER. LISTED FOR WET LOCATIONS.	LED/3500K/1000 LUMENS	120/277V	11W	RECESSED	LITHONIA LIGHTING: LNS-35/10-LOGAR-LSS-MVLT-EZ10
(B)	2'X4' LED TROFFER WITH A CENTER "BASKET" STYLE ACRYLIC PRISMATIC RIBBED DIFFUSER AND 0-10V DIMMING DRIVER. DLC LISTED.	LED/3500K/4000 LUMEN	120/277V	32W	LAY-IN	LITHONIA LIGHTING: 2BLT4-40L-ADP-EZ1-LP835
(B1)	2'X4' LED TROFFER WITH A CENTER "BASKET" STYLE ACRYLIC PRISMATIC RIBBED DIFFUSER AND 0-10V DIMMING DRIVER. DLC LISTED.	LED/3500K/4800 LUMEN	120/277V	38W	LAY-IN	LITHONIA LIGHTING: 2BLT4-48L-ADP-EZ1-LP835
(B2)	2'X4' LED TROFFER WITH A CENTER "BASKET" STYLE ACRYLIC PRISMATIC RIBBED DIFFUSER AND 0-10V DIMMING DRIVER. DLC LISTED.	LED/3500K/6000 LUMEN	120/277V	47W	LAY-IN	LITHONIA LIGHTING: 2BLT4-60L-ADP-EZ1-LP835
(C)	2'X2' LED TROFFER WITH A CENTER "BASKET" STYLE ACRYLIC PRISMATIC RIBBED DIFFUSER AND 0-10V DIMMING DRIVER.	LED/3500K/4000 LUMENS	120/277V	32W	LAY-IN	LITHONIA LIGHTING: ZL10-48-7000LM-FST-MVLT-40K-800R-WH
(D)	4' LINEAR LED STRIP LIGHT WITH A WHITE HOUSE-FROSTED DROP LENS DIFFUSER AND 0-10V DIMMING DRIVER.	LED/4000K/7000 LUMENS	120/277V	59W	SUSPEND ±10'-0" A.F.F.	LITHONIA LIGHTING: LOM-S-W-3-R-120/277-ELN
(X1)	EXIT SIGN, UNIVERSAL MOUNT WITH CANOPY, WHITE IMPACT & SCRATCH RESISTANT THERMOPLASTIC HOUSING, 8" STENOILED RED LETTERS WITH LED LAMPS & AN INTEGRAL BATTERY PACK.	LED - FURNISHED WITH FIXTURE	120/277V	N/A	WALL ±8'-0" A.F.F. OR FINISHED CEILING	LITHONIA LIGHTING: "QUANTUM" LHM-S-W-3-R-120/277-ELN
(XZ)	COMBINATION LED EXIT SIGN / EMERGENCY LIGHTING UNIT, UNIVERSAL MOUNT WITH CANOPY, WHITE IMPACT & SCRATCH RESISTANT THERMOPLASTIC HOUSING, 8" STENOILED RED LETTERS WITH, TWIN ADJUSTABLE HEADS FOR EMERGENCY LIGHTING & AN INTEGRAL BATTERY PACK.	LED (EXIT), TWO 1.5W/LEDs FURNISHED WITH FIXTURE	120/277V	N/A	WALL ±8'-6" A.F.F.	LITHONIA LIGHTING: "QUANTUM" LHM-LED-R
(E1)	EMERGENCY LED LIGHTING UNIT WITH A WHITE IMPACT & SCRATCH RESISTANT THERMOPLASTIC HOUSING, TWIN ADJUSTABLE HEADS & AN INTEGRAL BATTERY PACK.	TWO 2.4W/220 LUMEN LEDs FURNISHED WITH FIXTURES	120/277V	N/A	WALL ±8'-6" A.F.F.	LITHONIA LIGHTING: "QUANTUM" ELM2L

GENERAL NOTES TO LIGHTING FIXTURE SCHEDULE

- ALTERNATE FIXTURE SELECTIONS MUST HAVE EQUIVALENT LUMEN OUTPUTS AND A MAXIMUM FIXTURE WATTAGE AS SPECIFIED, NO EXCEPTIONS.
 - FIXTURES WITH "EM" DESIGNATIONS SHALL BE EQUIPPED WITH AN EMERGENCY BATTERY PACK CAPABLE OF PROVIDE 1-1/2" FOR RELATED LAMP LIFE DURING A POWER OUTAGE.
 - FIXTURES WITH "NL" SHALL HAVE A CONSTANT POWER CONNECTION TO REMAIN ON AT ALL TIMES PROVIDING NIGHT LIGHTING.
- EXIT SIGN SYMBOL LEGEND**
- | | | | |
|-------------|-------------|-------------------------|-------------------------|
| SINGLE FACE | DOUBLE FACE | SINGLE FACE DIRECTIONAL | DOUBLE FACE DIRECTIONAL |
| (XF) | (XDF) | (XDF) | (XDF) |
- EXAMPLE OF THE TYPICAL LABELS FOR ALL LIGHTING FIXTURES. LABELS MAY BE REPOSITIONED ON DRAWINGS TO ACCOMMODATE A SPECIFIC LAYOUT.**
- INDICATES FIXTURE SHALL BE POWERED BY AN EMERGENCY BATTERY POWER SOURCE.
- INDICATES FIXTURE SHALL HAVE CONSTANT POWER FOR NIGHT LIGHTING PURPOSES.
- PANEL AND CIRCUIT DESIGNATION
- SWITCH / SENSOR CONTROLLING FIXTURE IDENTIFIED BY LOWER CASE LETTERS (IE: a; b; c ETC.)

GENERAL SYMBOLS & ABBREVIATION

NOT ALL ABBREVIATIONS MAY BE REPRESENTED ON DRAWINGS

SIGNIFIES EXISTING ELECTRICAL EQUIPMENT/ DEVICES TO REMAIN	GRG GALVANIZED RIGID STEEL CONDUIT
SIGNIFIES EXISTING ELECTRICAL EQUIPMENT/ DEVICES TO BE REMOVED	HOA HAND-OFF-AUTOMATIC SWITCH
KEYNOTE	HACR HEATING AIR CONDITION, REFRIGERATION C.B.
REVISION TAG	HVAC HEATING, VENTILATION, AIR CONDITIONING
PHASE	HZ HERTZ
AMPERES	IG ISOLATED GROUND
ALTERNATING CURRENT	IMC INTERMEDIATE METAL CONDUIT
AIR CONDITIONING	INT INTERLOCK
AMPERE FRAME	KCMIL THOUSAND CIRCULAR MILS
ABOVE FINISHED FLOOR	KVA KILOVOLT-AMPERES
AIR HANDLING UNIT	KVAR KILOVOLT-AMPERES REACTIVE
ALUMINUM	LC LIQUID TIGHT FLEXIBLE METAL CONDUIT
AMPERE INTERRUPTING CAPACITY	LFCM LIQUID TIGHT FLEXIBLE METAL CONDUIT
ALUMINUM	MAU MAKE-UP AIR UNIT
AMPERE TRIP	M.C. MECHANICAL CONTRACTOR
AUTOMATIC TRANSFER SWITCH	MCA MINIMUM CIRCUIT AMPS
AMERICAN WIRE GAUGE	MCB MAIN CIRCUIT BREAKER
CONDUIT	MCC MOTOR CONTROL CENTER
CABLE TELEVISION	MCP MOTOR CIRCUIT PROTECTION
CIRCUIT BREAKER	MIN MINIMUM
CIVIL CONTRACTOR	MLO MAIN LUGS ONLY
CLOSED CIRCUIT TELEVISION	NA NOT APPLICABLE
CANDELA	NAC NOTIFICATION APPLIANCE CIRCUIT
CIRCUIT	NC NORMALLY CLOSED
CURRENT LIMITING FUSE	NEC NATIONAL ELECTRICAL CODE
CEILING MOUNT	NFPA NATIONAL FIRE PROTECTION ASSOCIATION
CONTROL POWER TRANSFORMER	NL NIGHT LIGHT
CURRENT TRANSFORMER	NO NORMALLY OPEN
COPPER	NTS NOT TO SCALE
DIRECT CURRENT	OC OVER COUNTER
DIAMETER	OHE OVER HEAD ELECTRIC
ELECTRICAL CONTRACTOR	PB PULL BOX
ELECTRICAL CONTRACTOR	P.C. PLUMBING CONTRACTOR
EXHAUST FAN	PNL PANEL
ELEVATOR	PWR POWER
EMERGENCY	PT POTENTIAL TRANSFORMER
ELECTRICAL METALLIC TUBING	PVC RIGID NON-METALLIC CONDUIT
EMERGENCY POWER OFF	QTY QUANTITY
EXISTING TO REMAIN	RE REPLACE EXISTING
EXISTING	RMC RIGID METAL CONDUIT
ELECTRIC WATER COOLER	RTS REMOTE TEST STATION
FUSE	RTU ROOF TOP UNIT
FIRE ALARM ANNUNCIATOR	S.C. STRUCTURAL CONTRACTOR
FAN COIL UNIT	ST SHUNT TRIP
FULL LOAD AMPERES	TBD TO BE DETERMINED BY EC
FLEXIBLE METAL CONDUIT	UC UNDER GROUND COMMUNICATIONS
GROUND	UGE UNDER GROUND ELECTRIC
GENERAL CONTRACTOR	UL UNDERWRITERS LABORATORY
GROUND FAULT CIRCUIT INTERRUPTER	V VOLT
GROUND	VA VOLT-AMPERE
	W WATT
	WG WIRE GUARD
	WP WEATHER PROOF TRANSFORMER
	XPMR

COMMUNICATION DEVICE SCHEDULE

SYMBOL	DESCRIPTION	WALLPLATE/MEDIA BOX MODEL #S
(K4)	1-PORT, QUICKPORT WALLPLATE INSTALLED 18"A.F.F., UNLESS OTHERWISE NOTED. WALLPLATE SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTOR: *ONE(1) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6).	LEVTON: #41080-1WP
(K4)	6-PORT, QUICKPORT WALLPLATE INSTALLED 18"A.F.F., UNLESS OTHERWISE NOTED. WALLPLATE SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTOR: *ONE(1) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6). *FIVE(5) BLANK WHITE INSERTS	LEVTON: #41080-6WP
(K8)	6-PORT, QUICKPORT WALLPLATE INSTALLED 18"A.F.F., UNLESS OTHERWISE NOTED. WALLPLATE SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTOR: *TWO(2) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6). *FOUR(4) BLANK WHITE INSERTS	LEVTON: #41080-6WP
(K12)	6-PORT, QUICKPORT WALLPLATE INSTALLED 18"A.F.F., UNLESS OTHERWISE NOTED. WALLPLATE SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTOR: *THREE(3) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6). *THREE(3) BLANK WHITE INSERTS	LEVTON: #41080-6WP
(K16)	6-PORT, QUICKPORT WALLPLATE INSTALLED 18"A.F.F., UNLESS OTHERWISE NOTED. WALLPLATE SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTOR: *FOUR(4) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6). *TWO(2) BLANK WHITE INSERTS	LEVTON: #41080-6WP
(K24)	6-PORT, QUICKPORT WALLPLATE INSTALLED 18"A.F.F., UNLESS OTHERWISE NOTED. WALLPLATE SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTOR: *SIX(6) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6).	LEVTON: #41080-6WP
(M)	2-GANG RECESSED STEEL MEDIA BOX FOR INSTALLATION OF ONE(1) DUPLEX RECEPTACLE AND UP TO SIX(6) COMMUNICATION CONNECTORS. INSTALL 65"A.F.F., UNLESS OTHERWISE NOTED. SUPPLY AND INSTALL THE FOLLOWING FOR INSTALLATION IN MEDIA BOX: *ONE(1) DUPLEX RECEPTACLE WITH COVERPLATE (WHITE) *ONE(1) 6-PORT WALLPLATE (LEVTON #41080-6WP) WITH THE FOLLOWING: -ONE(1) F-CONNECTOR FEED THROUGH (LEVTON #40831-WH) -ONE(1) HDMI FEED THROUGH CONNECTOR (40834-00W), PROVIDED FOR OWNER USE AS NEEDED. -ONE(1) BLUE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RL6). -THREE(3) BLANK WHITE INSERTS INSTALL 1X" EMT CONDUIT FROM LOW-VOLTAGE SIDE OF MEDIA J-BOX TO ACCESSIBLE CEILING SPACE FOR INSTALLATION OF CURRENT AND FUTURE CABLEING.	LEGRAND-PASS & SEYMOUR: TV2MW
(FB)	FLOOR BOX COMMUNICATION COMPARTMENT SHALL RECEIVE THE FOLLOWING RJ-45 CONNECTORS: *TWO(2) WHITE CATEGORY 6 FOR VOIP NETWORK CABLE (LEVTON #61110-RW6).	SEE FLOOR BOX SCHEDULE

GENERAL NOTES TO COMMUNICATION DEVICE SCHEDULE:

- CATEGORY 6 PLENUM RATED CABLE CONTAINS FOUR TWISTED PAIRS. A 4 PRECEDING THE SYMBOL INDICATES ONE CABLE, AN 8 INDICATES TWO CABLES, ETC.
- CONTRACTOR SHALL PROVIDE COMMUNICATIONS INSTALLATION INCLUSIVE OF ALL REQUIRED ELECTRICAL BOXES, CABLE, CONDUIT, WALL PLATES, CONNECTORS, TERMINATIONS, TESTING, LABELING ETC. TO OBTAIN A 100% COMPLETE INSTALLATION.
- WHITE WALL PLATES AND ASSOCIATED CONNECTOR COLORS SHALL BE CONFIRMED WITH ARCHITECT / INTERIOR DESIGNER PRIOR TO ORDERING. FINAL COLOR SELECTION SHALL MATCH ALL ELECTRICAL DEVICES COLORS UTILIZED THROUGHOUT SPACE.

FLOOR BOX SCHEDULE

SYMBOL	DESCRIPTION	MANUFACTURER/ MODEL # FOR WALLPLATE
(FB1)	1-GANG STEEL FLOOR BOX INSTALLED FLUSH TO FINISHED FLOOR. INCLUDE 1-GANG FLANGE, 1 DUPLEX RECEPTACLE AND 1 DUPLEX COVERPLATE.	LEGRAND 880 SERIES: FLOOR BOX (1)#8180S1 FLANGE (1)#818TAL COVERPLATE (1)#828R-TCAL (OR EQUAL)
(FB2)	2-GANG STEEL FLOOR BOX INSTALLED FLUSH TO FINISHED FLOOR. INCLUDE 2-GANG FLANGE, 2 DUPLEX RECEPTACLES AND 2 DUPLEX COVERPLATES.	LEGRAND 880 SERIES: FLOOR BOX (1)#880S2 FLANGE (1)#828TAL COVERPLATE (1)#838TAL (OR EQUAL)
(FB3)	3-GANG STEEL FLOOR BOX INSTALLED FLUSH TO FINISHED FLOOR. INCLUDE 3-GANG FLANGE, 2 DUPLEX RECEPTACLES, 2 DUPLEX COVERPLATES AND 1 COMMUNICATION PLATE. INSTALL ONE RECEPTACLE IN 2 COMPARTMENTS AND COMMUNICATION PLATE IN THE REMAINING COMPARTMENT. SEE "COMMUNICATION DEVICE SCHEDULE" FOR FURTHER INFORMATION.	LEGRAND 880 SERIES: FLOOR BOX (1)#880S2 FLANGE (1)#838TAL COVERPLATE (1)#828R-TCAL AND (1)#828CMTC (OR EQUAL)

NOTE:
a. SAW-CUT AND PATCH EXISTING CONCRETE FLOOR TO FACILITATE FLOOR BOX INSTALLATIONS AS NEEDED. COORDINATE FINAL FLOOR BOX LOCATIONS WITH OWNER AND G.C. PRIOR TO ANY WORK. LOCATIONS SHOWN ON PLANS ARE SUGGESTED AND MAY VARY DEPENDING ON FINAL FURNITURE PLACEMENT AND OWNER REQUIREMENTS.

AS A REQUIREMENT FOR ALL PROSPECTIVE BIDDERS SHALL:

- VISIT THE SITE PRIOR TO BID SUBMISSION
- FIELD VERIFY ALL MEASUREMENTS
- GENERATE A COMPREHENSIVE LIST DETAILING SITE CONDITIONS FOR FIELD PERSONNEL.

THE SUCCESSFUL BIDDING CONTRACTOR SHALL:

- REVIEW ENTIRE DRAWING PACKAGE AND EFFECTIVELY COORDINATE ELECTRICAL INSTALLATION WITH ALL OTHER TRADES.
- COORDINATE ALL BUILDING INTERCONNECTIONS AND POWER SYSTEMS SHUTDOWN WITH OWNER.
- PROVIDE ONE COMPLETE SET OF AS-BUILD DRAWINGS TO THE ENGINEER OF RECORD AND ONE TO THE OWNER.

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ISSUE:
2020-05-01: ISSUED FOR BID

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TITLE:
ELECTRICAL SCHEDULES & NOTES

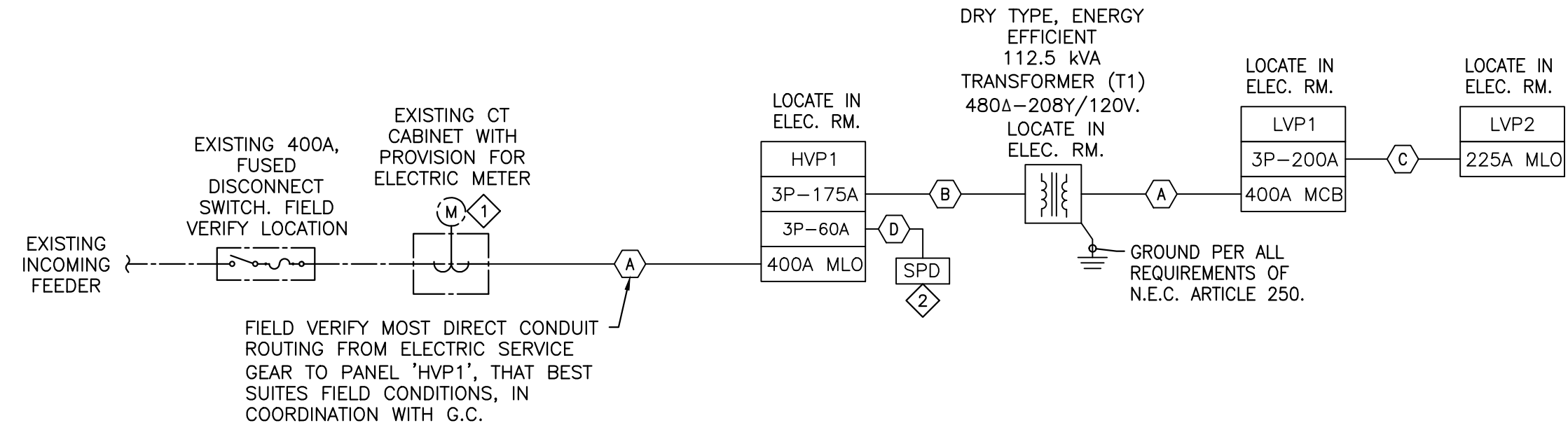


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SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-1



FEEDER SCHEDULE	
SYMBOL	DESCRIPTION
(A)	TWO(2) 4" CONDUITS EACH CONTAINING THE FOLLOWING: 4-#250 MCM THWN AL. } 2 1/2" GRC (EXTERIOR USE) 1-#1/0 GRND AL. } 2 1/2" EMT (INTERIOR USE)
(B)	3-#4/0 THHN AL. } 1 1/2" EMT C. 1-#4 Grnd. AL.
(C)	4-#250 THHN AL. } 2 1/2" EMT C. 1-#4 Grnd. AL.
(D)	4-#6 THHN CU. } 1" EMT C. 1-#8 GRND. CU.

- GENERAL NOTES:**
- EXISTING FUSED DISCONNECT SWITCH, CT CABINET AND PROVISION FOR ELECTRIC METER HAVE BEEN PROVIDED UNDER A SEPARATE SCOPE OF WORK INTENDED TO SERVE SECOND FLOOR TENANT WITH A 400A 480Y/277V ELECTRIC SERVICE. ELECTRICAL CONTRACTOR MUST ENSURE SERVICE EQUIPMENT IS INSTALLED PER ALL N.E.C. AND POWER COMPANY REQUIREMENTS.
 - PROVIDE ARC FLASH ANALYSIS WITH WARNING LABELS AFFIXED TO NEW PANELBOARDS AS REQUIRED BY NFPA 70E.

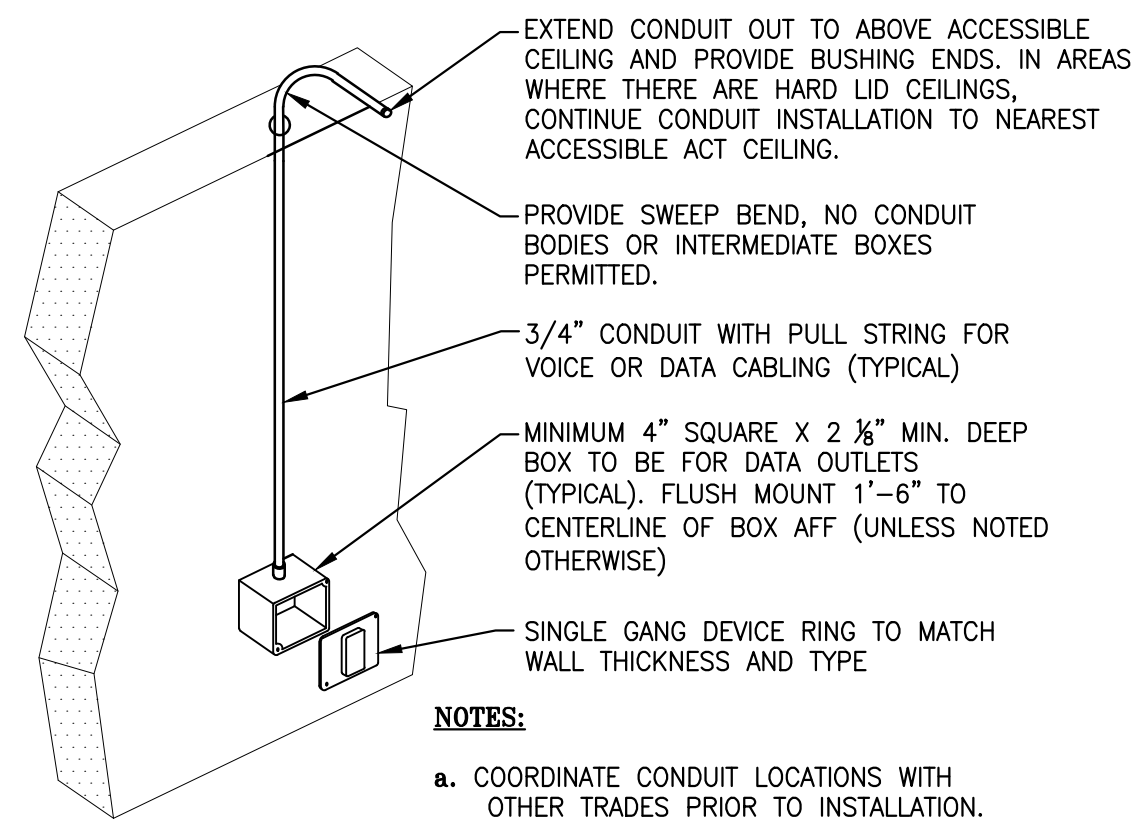
- KEYNOTES:** #
- SUPPLY AND INSTALL ELECTRIC METER AS REQUIRED. COORDINATE ALL NECESSARY WORK WITH OWNER AND POWER COMPANY.
 - PROVIDE AND INSTALL AN EXTERNALLY MOUNTED SURGE PROTECTOR DEVICE (SPD) WITH INTEGRAL DISCONNECT SWITCH. UTILIZE SQUARE D MODEL #SSP04EMA12D OR EQUAL. C.B. SIZE FEEDING SPD SHALL BE CONFIRMED WITH MANUFACTURE SPECIFICATIONS. MOUNT SPD DIRECTLY NEXT TO MDS. FIELD VERIFY LOCATION.

1 ELECTRICAL ONE-LINE DIAGRAM
E-2 SCALE: N.T.S.

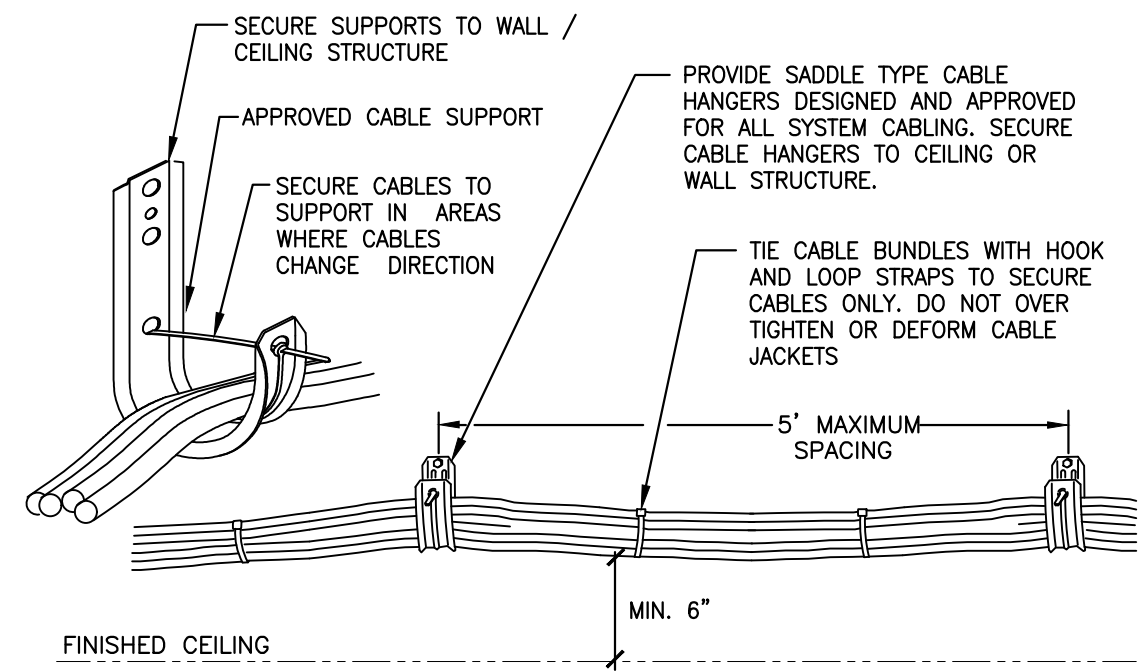
HVP1 (SURFACE MOUNT)		480Y/277V 400 Amp Mains			Three Phase Four Wire 22 kAIC (Fully Rated) 54Ckt.			MAIL LUGS ONLY MAIN BREAKER	
ckt#	DESCRIPTION	BREAKER	LOCATION: ELECTRIC RM.			BREAKER	DESCRIPTION	ckt#	DESCRIPTION
			L1	L2	L3				
1	PANEL LVP1 - VIA XFMR T1	175A-3P	133.20	14.40			25A-3P HACR	2	Roof Top Unit (RTU-4)
3								4	
5						119.20		8	
7	Roof Top Unit (RTU-1)	50A-3P HACR	36.48	24.80			35A-3P HACR	10	Roof Top Unit (RTU-5)
9								12	
11						36.48	24.80	14	
13	Roof Top Unit (RTU-2)	40A-3P HACR	26.40	23.20			30A-3P HACR	16	Roof Top Unit (RTU-6)
15								18	
17						26.40	23.20	20	
19	Roof Top Unit (RTU-3)	50A-3P HACR	36.48	19.20			25A-3P HACR	22	Roof Top Unit (RTU-7)
21								24	
23						36.48	19.20	26	
25	Reception, Lounge, Corridor Lights	20A-1P	8.92	12.80			20A-1P VAV Unit (TU-01)	28	
27	Library & Open Office Area Lights	20A-1P		6.70	12.80		20A-1P VAV Unit (TU-02)	30	
29	Lab, Classroom, Faculty, Office Lights	20A-1P			10.07	11.04	15A-1P VAV Unit (TU-03)	32	
31	Classroom, Exports, Atrium Lights	20A-1P	7.10	9.23			15A-1P VAV Unit (TU-04)	34	
33	Tit., Office, Stor. Conf. Rm., Elec. Lights	20A-1P		8.70	16.45		25A-1P VAV Unit (TU-05)	36	
35	SPARE	20A-1P			0.00	11.23	15A-1P VAV Unit (TU-06, 07)	38	
37	SPARE	20A-1P	0.00	14.65			20A-1P VAV Unit (TU-08)	40	
39	SPARE	20A-1P		0.00	3.50		15A-1P VAV Unit (TU-09 THRU 21 & 23)	42	
41	SPARE	20A-1P		0.00	1.25	1.5A	20A-1P VAV Unit (TU-24, 25, 31 32, 33)	44	
43	SPARE	20A-1P	0.00	13.04			20A-1P VAV Unit (TU-26, 27)	46	
45	SPARE	20A-1P		0.00	34.50		45A-1P VAV Unit (TU-28)	48	
47	SPARE	20A-1P			0.00	9.23	20A-1P VAV Unit (TU-29)	50	
49	SPARE	20A-1P	0.00	20.05			20A-1P VAV Unit (TU-30)	52	
51	Surge Protector (SPD)	60A-3P		0.00	12.84		20A-1P VAV Unit (TU-34)	54	
53				0.00	30.90		40A-1P VAV Unit (TU-35)	56	
TOTAL CONNECTED AMPS/LEG			399.95	413.44	373.88		TOTAL CONNECTED KVA	328.88	
							TOTAL CONNECTED AMPERES	395.76	

LVP1 (SURFACE MOUNT)		208Y/120V 400 Amp Mains			Three Phase Four Wire 10 kAIC (Fully Rated) 84Ckt.			MAIL LUGS ONLY MAIN BREAKER	
ckt#	DESCRIPTION	BREAKER	LOCATION: ELECTRIC RM.			BREAKER	DESCRIPTION	ckt#	DESCRIPTION
			L1	L2	L3				
1	PANEL LVP2	200A-3P	143.08	12.00			20A-1P	2	Corridor 242, Stor., 246 Recepts.
3						156.40	4.50	4	Program Director 253 Recepts.
5	Faculty 254 Recepts	20A-1P	6.00	4.50		117.90	6.00	6	Program Director 253 Recepts.
7								8	Learning Center Office 252 Recepts.
9	Faculty 254 Recepts	20A-1P		6.00	4.50			10	Learning Center Office 251 Recepts.
11	Faculty 254 Copier Recepts	20A-1P		6.00		10.50	6.00	12	Learning Center Office 251 Recepts.
13	Faculty 254 Recepts	20A-1P	6.00	6.00				14	Testing 247, 248 Recepts.
15						6.00	7.50	16	Testing 248, 250 Recepts.
17	Classroom 256 Recepts	20A-1P				6.00	7.50	18	Library 245 Recepts.
19	Classroom 256 Recepts	20A-1P	9.00	7.50				20	Library 245 Recepts.
21	Classroom 256 Recepts	20A-1P			9.00	4.50		22	Library 245 Recepts.
23	Classroom 257 Recepts	20A-1P				4.50	10.50	24	Lab 243 Recepts.
25	Classroom 257 Recepts	20A-1P	6.00	7.50				26	Lab 243 Recepts.
27	Classroom 257 Recepts	20A-1P			6.00	9.00		28	Lab 243 Recepts.
29	Classroom 257 Ft. Box Recepts	20A-1P				6.00	4.50	30	Lab 243 Recepts.
31	Classroom 258 Recepts	20A-1P	6.00	0.00				32	Lab 243 Fridge Recept.
33	Classroom 258 Recepts	20A-1P		6.00	7.50			34	Lab 243 Ft. Box Recepts.
35	Classroom 258 Recepts	20A-1P			6.00	7.50		36	Lab 243 Ft. Box Recepts.
37	Classroom 258 Recepts	20A-1P				6.00	7.50	38	Lecture Club Rm. 265 Recepts.
39	Classroom 258 Furniture Recepts	20A-1P	6.00	7.50		6.00	6.00	40	Lecture Club Rm. 265 Recepts.
41	Classroom 258 Furniture Recepts	20A-1P			6.00	6.00	20A-1P	42	Lecture Club Rm. 265 Recepts.
43	Classroom 258 Furniture Recepts	20A-1P	7.50	7.50				44	Classroom 266 Recepts.
45	Classroom 260 Recepts	20A-1P			7.50	6.00		46	Classroom 266 Recepts.
47	Classroom 260 Recepts	20A-1P			6.00	6.00	20A-1P	48	Classroom 266 Recepts.
49	Classroom 260 Recepts	20A-1P	6.00	7.50				50	Classroom 266 Recepts.
51	Classroom 260 Furniture Recepts	20A-1P			6.00	9.00		52	Micro Class 264 Recepts.
53	Classroom 260 Furniture Recepts	20A-1P			6.00	7.50		54	Micro Class 264 Recepts.
55	Classroom 260 Furniture Recepts	20A-1P	6.00	6.00				56	Esports 262 Recepts.
57	Drinking Fountain	20A-1P			8.33	6.00		58	Esports 262 Recepts.
59	Kithetic Office 261, Meeting 271 Recepts	20A-1P				10.50	6.00	60	Esports 262 Recepts.
61	Kithetic Office 270, Meeting 271 Recepts	20A-1P	9.00	9.00				62	Classroom 267, 268 Recepts.
63	Classroom 269 Recepts	20A-1P			7.50	9.00		64	Classroom 267 Recepts.
65	Classroom 269 Recepts	20A-1P				6.00	7.50	66	Classroom 267 Recepts.
67	Classroom 269 Recepts	20A-1P	6.00	9.00				68	Classroom 268 Recepts.
69	Classroom 269 Recepts	20A-1P			6.00	6.00		70	Classroom 268 Recepts.
71	Classroom 269 Furniture Recepts	20A-1P			6.00	0.00	20A-1P	72	Classroom 268 Recepts.
73	Classroom 269 Furniture Recepts	20A-1P	6.00	0.00				74	SPARE
75	Classroom 269 Furniture Recepts	20A-1P			6.00	0.00		76	SPARE
77	Classroom 269 Furniture Recepts	20A-1P			7.50	0.00	20A-1P	78	SPARE
79	SPARE	20A-1P	0.00	0.00				80	SPARE
81	SPARE	20A-1P			0.00	0.00		82	SPARE
83	SPARE	20A-1P			0.00	1.25	20A-1P	84	Electronic Door Strikes
TOTAL CONNECTED AMPS/LEG			307.48	316.23	275.15		TOTAL CONNECTED KVA	107.86	
							TOTAL CONNECTED AMPERES	299.62	

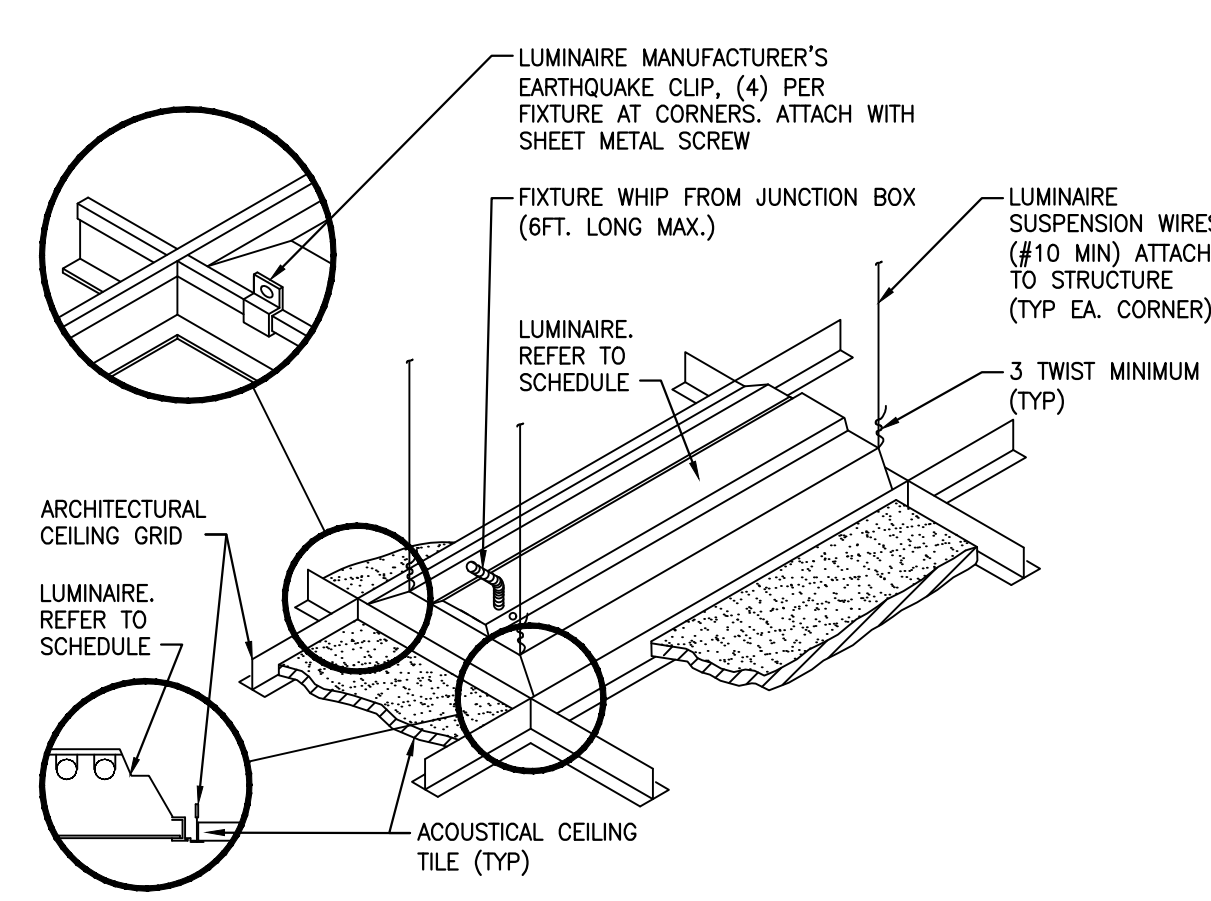
LVP2 (SURFACE MOUNT)		208Y/120V 225 Amp Mains			Three Phase Four Wire 10 kAIC (Fully Rated) 84Ckt.			MAIL LUGS ONLY MAIN BREAKER	
ckt#	DESCRIPTION	BREAKER	LOCATION: ELECTRIC RM.			BREAKER	DESCRIPTION	ckt#	DESCRIPTION
			L1	L2	L3				
1	Condensing Unit (CU-1)	30A-2P	13.90	6.00			20A-1P	2	Reception 203 Recepts.
3								4	Conference Rm. 208 Recepts.
5	Exhaust Fan (EF-2)	20A-1P				4.40	6.00	6	Financial Advisor 209 Recepts.
7	Water Heater (WH-1) & Pump (RCP-1)	20A-1P	2.25	9.00				8	Financial Advisor 209 Cubical Recepts.
9	Sener Rm. 232 Quad Recepts	20A-1P		6.00	9.00			10	Financial Advisor 209 Cubical Recepts.
11	Sener Rm. 232 Quad Recepts	20A-1P				6.00	4.50	12	Financial Advisor 209 Recepts.
13	Sener Rm. 232 Quad Recepts	20A-1P	6.00	6.00				14	Manager 210, Office 211 Recepts.
15	Sener Rm. 232 Quad Recepts	20A-1P				6.00	6.00	16	Analysis 212, Office 213 Recepts.
17	Sener Rm. 232 & Elec. Rm. Recepts	20A-1P				4.50	4.50	18	Storage, 214, Corr. 215 Recepts.
19	Corr. 207, 233 Recepts	20A-1P	10.50	6.00				20	IT Core 216
21	Drinking Fountain Recept.	20A-1P			10.50	9.00		22	Interview 205, 208 Recepts.
23	Laundry/Stor 234 Dryer Recept.	30A-2P	16.00	4.50		16.00	3.00	24	Student Lounge 204 Counter Recepts.
25								26	Student Lounge 204 Counter Recepts.
27	Laundry/Stor 234 Washer Recept.	20A-1P			10.50	6.00		28	Student Lounge 204 Fl. Box Recepts.
29	Laundry/Stor 234 Recepts	20A-1P			4.50	10.50		30	Student Lounge 204 Recepts.
31	Womens 235, Mens 237, Jan 238 Recepts	20A-1P	4.50	7.50				32	Student Lounge 204 Counter Recepts.
33	OD Office 220 Recepts	20A-1P		6.00	9.00			34	Student Lounge 204 Vend. Recept.
35	Fire Proof Storage 219 Recepts	20A-1P			6.00	9.00		36	Student Lounge 204 Vend. Recept.
37	Admission Area 218 Recepts	20A-1P	6.00	0.00				38	Student Lounge 204 Recepts.
39	Admission Area Cubicle Recepts	20A-1P			13.50	0.00		40	SPARE
41	Admission Area Cubicle Recepts	20A-1P			9.00	0.00	20A-1P	42	SPARE
43	Admission Area Cubicle Recepts	20A-1P	9.00	0.00				44	SPARE
45	Admission Area Cubicle Recepts	20A-1P			9.00	0.00		46	SPARE
47	Admissions Director 221 Recepts	20A-1P			6.00	0.00	20A-1P	48	SPARE
49	Break Rm. 222 Microwave Recept	20A-1P	8.33	0.00				50	SPARE
51	Break Rm. 222 Recepts	20A-1P			7.50	0.00		52	SPARE
53	Break Rm. 222 Recepts	20A-1P			4.50	0.00		54	SPARE
55	Registrar/223, Assoc. Dean/224 Recepts	20A-1P	9.00	0.00				56	SPARE
57	Dean of Instruction 225 Recepts	20A-1P			6.00	0.00		58	SPARE
59	Waiting 226, Advisor 227 Recepts	20A-1P			9.00	0.00	20A-1P	60	SPARE
61	Advisor 227 Cubicle Recepts	20A-1P	9.00	0.00				62	SPACE
63	Advisor 227 Cubicle Recepts	20A-1P			9.00	0.00		64	SPACE
65	Shared Waiting 228 Counter Recepts	20A-1P			3.00	0.00		66	SPACE
67	Shared Waiting 228 Copier Recept	20A-1P	10.50	0.00				68	SPACE
69	CS Office 230, Wellness 231 Recepts	20A-1P			6.00	0.00			



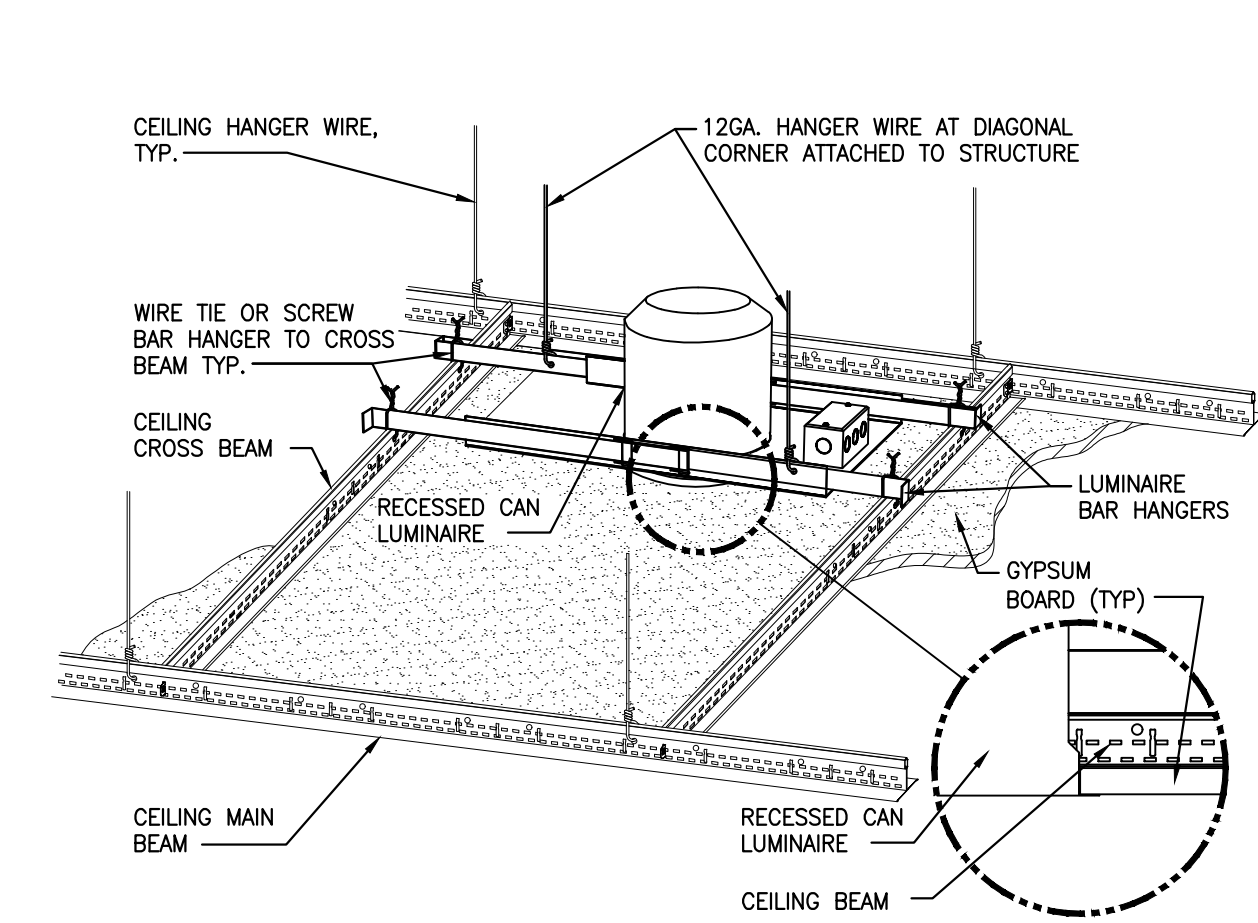
1
E-3
COMMUNICATIONS (DATA/TELEPHONE) BOX AND CONDUIT INSTALLATION DETAIL
SCALE: N.T.S. Electrical Detail



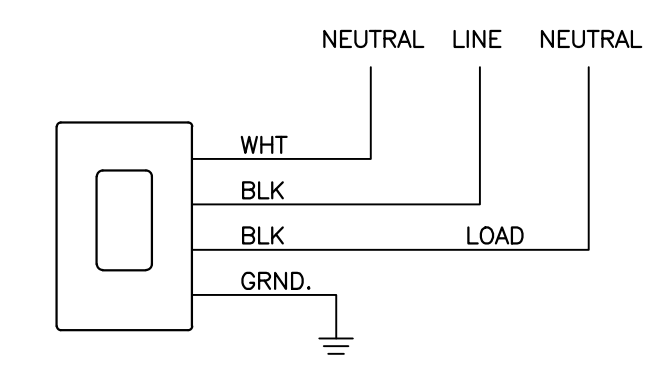
2
E-3
TYPICAL J-HOOK INSTALLATION
SCALE: N.T.S. Electrical Detail



3
E-3
LUMINAIRE MOUNTING - LAY-IN CEILING
SCALE: N.T.S. Electrical Detail

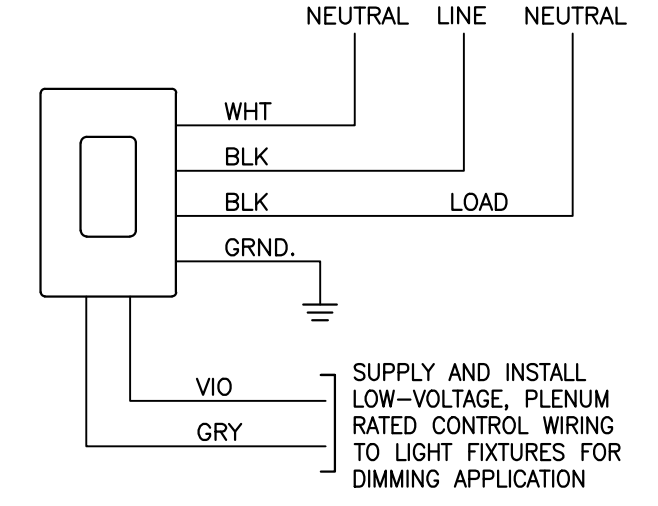


4
E-3
DOWNLIGHT MOUNTING -GYP. CEILING
SCALE: N.T.S. Electrical Detail



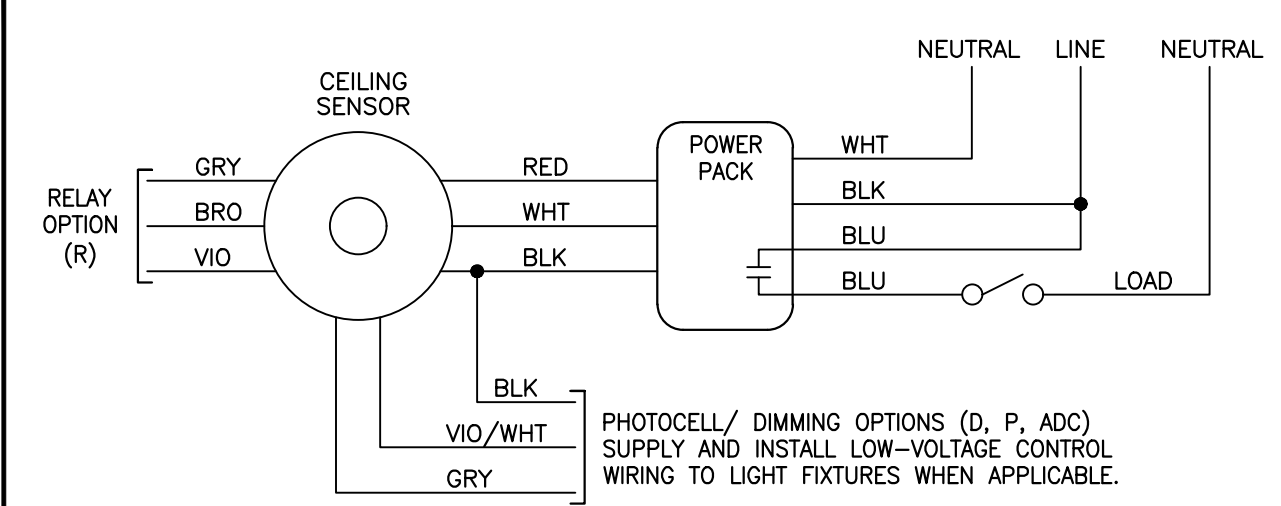
NOTES:
a. DETAIL SHOWN FOR REFERENCE ONLY. INSTALL AND WIRE PER MANUFACTURE INSTRUCTIONS.
b. PROGRAMMING FUNCTIONS SHALL REMAIN AT DEFAULT SETTING EXCEPT FOR THE FOLLOWING:
-OCCUPANCY TIME DELAY = 20 MINUTES
-ON MODE = SET FOR MANUAL ON CONTROL (OFFICES, JANITOR CLOSETS, STORAGE RMS, ETC. PER IECC)
-ON MODE = SET FOR AUTO ON CONTROL (PUBLIC SPACES, I.E. RESTROOMS, CONFERENCE ROOMS, ETC. PER IECC)

5
E-3
TYPICAL 1-POLE WALL SWITCH / OCCUPANY SENSOR
SCALE: N.T.S. Electrical Detail



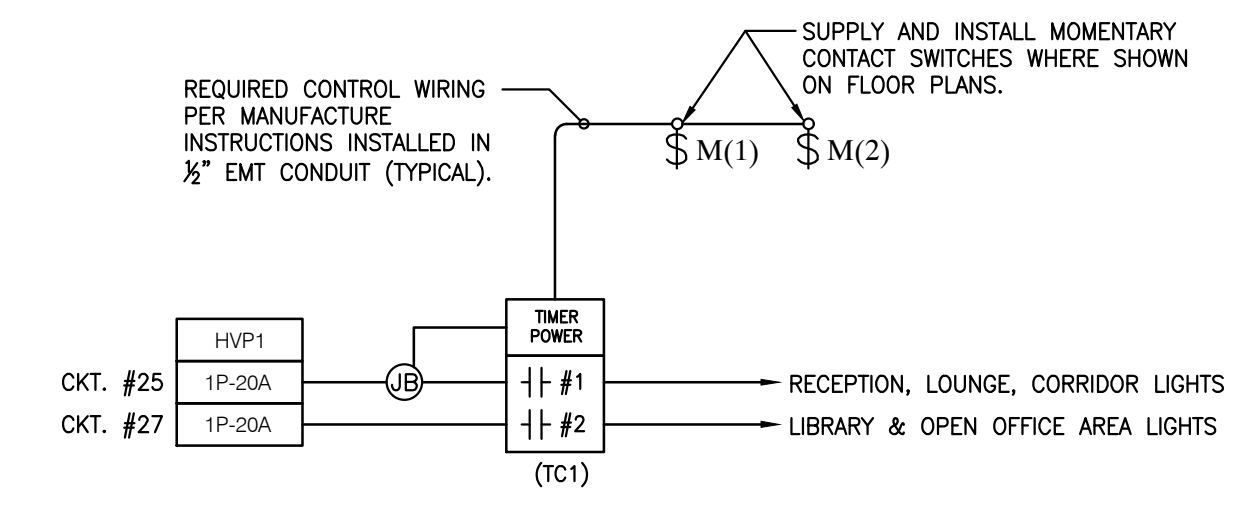
NOTES:
a. DETAIL SHOWN FOR REFERENCE ONLY. INSTALL AND WIRE PER MANUFACTURE INSTRUCTIONS.
b. PROGRAMMING FUNCTIONS SHALL REMAIN AT DEFAULT SETTING EXCEPT FOR THE FOLLOWING:
-OCCUPANCY TIME DELAY = 20 MINUTES
-ON MODE = SET FOR MANUAL ON CONTROL

6
E-3
TYPICAL 0-10V DIMMING SWITCH/CONTROLLER
SCALE: N.T.S. Electrical Detail



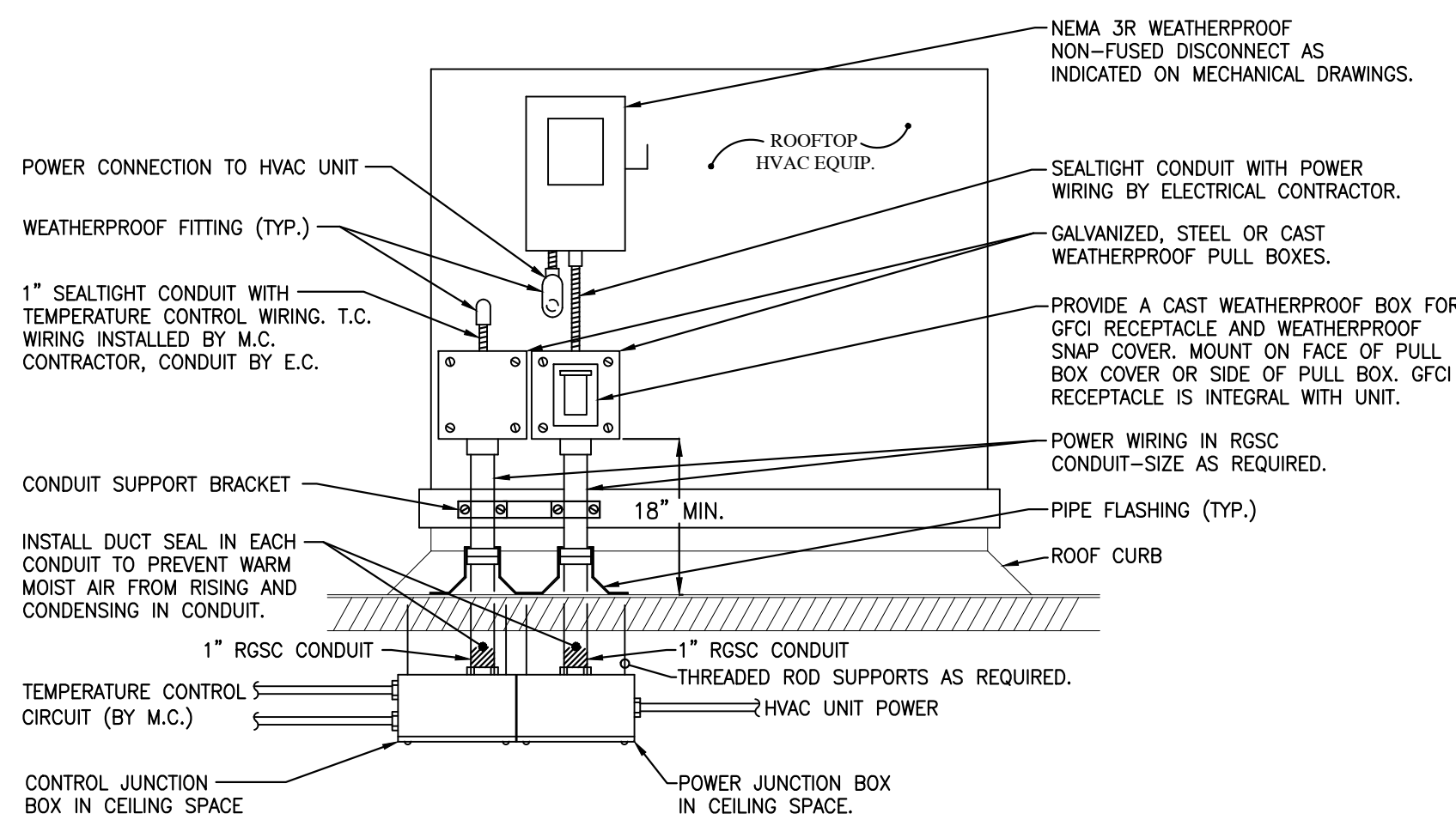
NOTES:
a. DETAIL SHOWN FOR REFERENCE ONLY. INSTALL AND WIRE PER MANUFACTURE INSTRUCTIONS.
b. PROGRAMMING FUNCTIONS SHALL REMAIN AT DEFAULT SETTING EXCEPT FOR AS FOLLOWS:
-OCCUPANCY TIME DELAY = 30 MINUTES
-PHOTOCELL MODE = DIM ONLY, NO OFF
-DIMMING RANGE = 10V HIGH, 3V LOW

7
E-3
TYPICAL LOW-VOLTAGE CEILING MOUNT OCCUPANY SENSOR
SCALE: N.T.S. Electrical Detail



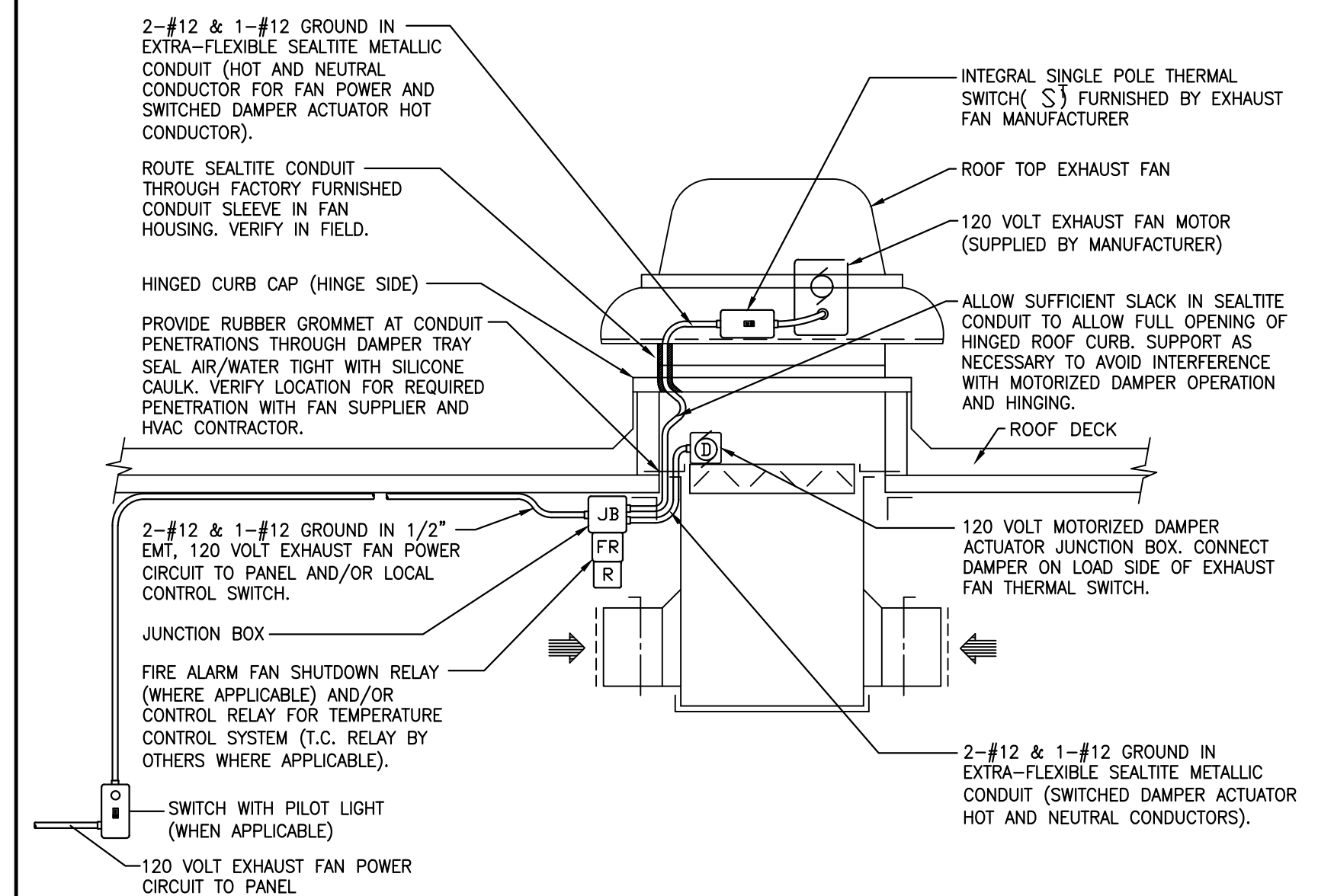
GENERAL NOTES:
a. PROVIDE 365-DAY ASTRONOMIC TIME CLOCK WITH (2) RELAYS, DIGITAL TIME DISPLAY, KEYPAD, INTEGRAL BATTERY BACK UP, REMOTE OVERRIDE CAPABLE WITH A NEMA 1 ENCLOSURE WITH DAY-LIGHT SAVINGS TIME. INTERMATIC MODEL #ET90215C (OR EQUAL).
b. PROGRAM TIME CLOCK TO TURN DESIGNATED LIGHTING ON/OFF AUTOMATICALLY AT TIMES GIVEN BY OWNER. MOMENTARY CONTACT SWITCH SHALL BE SUPPLIED, INSTALLED, WIRED AND PROGRAMMED TO OVERRIDE RELAYS SUPPLYING 1-HOUR OF ADDITIONAL LIGHTING AFTER NORMAL BUSINESS HOURS AS NEEDED. SUPPLY LABEL FOR SWITCH COVERPLATE STATING "LIGHTING OVERRIDE".
c. ENSURE OWNER/TENANT IS FULLY TRAINED ON TIME CLOCK OPERATION AND CONTROL BY END OF CONSTRUCTION.

8
E-3
DIGITAL TIME CLOCK WIRING DIAGRAM (TC1)
SCALE: N.T.S. Electrical Detail

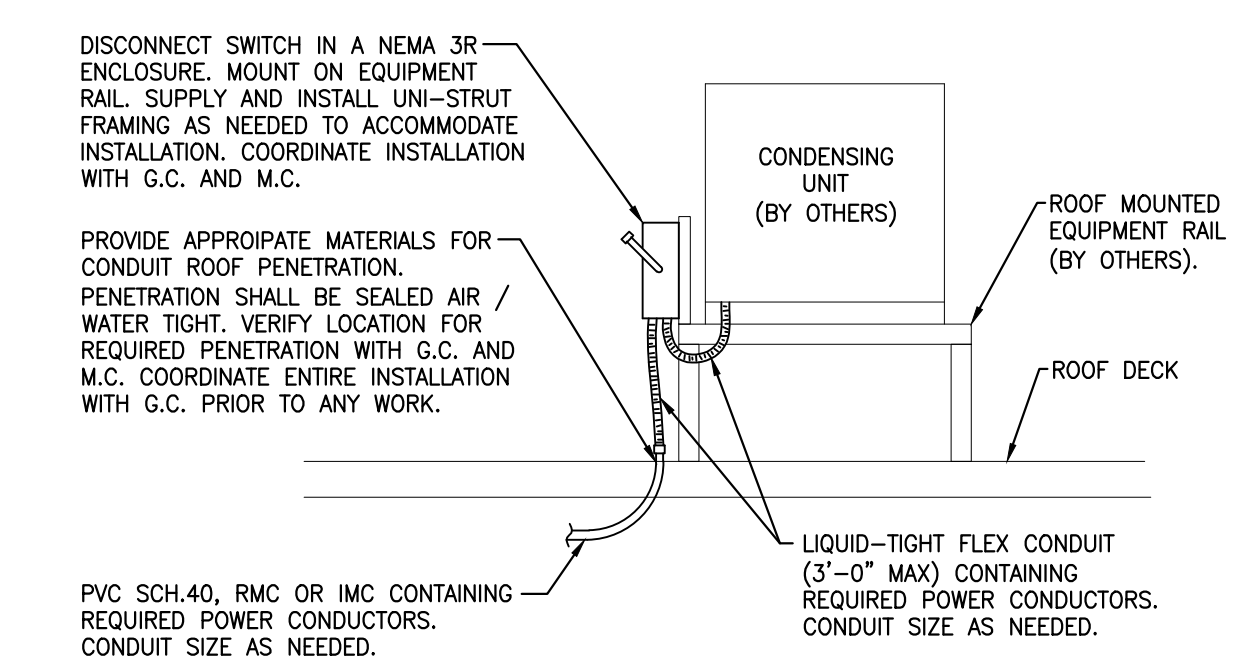


NOTES:
a. WIRING TO THE ROOFTOP HVAC EQUIPMENT SHALL EXTEND THROUGH THE ROOF IN CONDUITS LOCATED OUTSIDE OF THE EQUIPMENT ROOF CURB AS SHOWN, UNLESS OTHERWISE SPECIFICALLY ALLOWED BY THE UNIT MANUFACTURER.
b. WIRE RUN INSIDE HVAC EQUIPMENT SHALL BE ACCOMPLISHED IN A MANNER ACCEPTABLE WITH THE UNIT MANUFACTURER AND SHALL MEET ALL REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
c. COORDINATE CONTROL WIRING RACEWAY INSTALLATION WITH THE MECHANICAL CONTRACTOR. TEMPERATURE CONTROL WIRING BY MECHANICAL CONTRACTOR.
d. REFER TO MECHANICAL DRAWINGS FOR EQUIPMENT SUPPLIED (IE. DISCONNECT SWITCHES, STARTERS ETC.) UNDER THE MECHANICAL CONTRACT AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

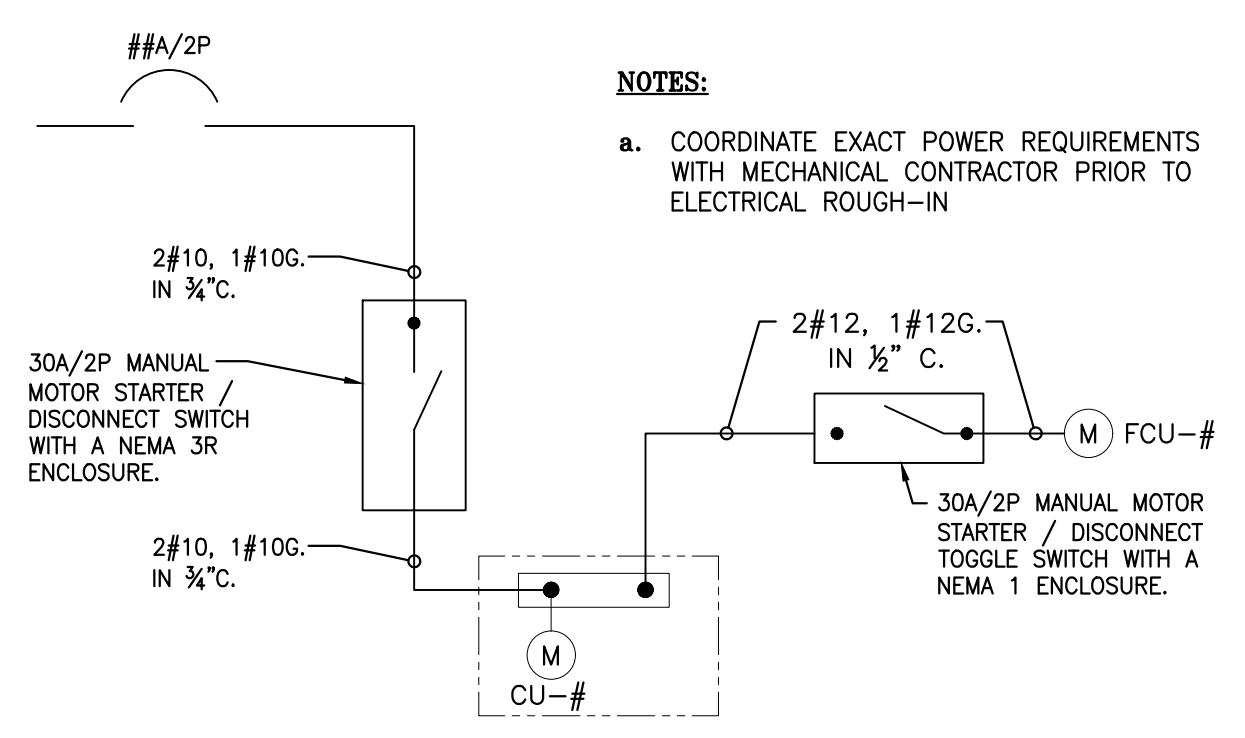
9
E-3
TYPICAL ROOFTOP HVAC UNIT
SCALE: N.T.S. Electrical Detail



10
E-3
TYPICAL 120V ROOFTOP EXHAUST FAN
SCALE: N.T.S. Electrical Detail



11
E-3
TYPICAL ROOF MOUNT CONDENSING UNIT
SCALE: N.T.S. Electrical Detail



12
E-3
AIR CONDITIONER / FAN COIL UNIT WIRING DIAGRAM
SCALE: N.T.S. Electrical Detail

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ISSUE:
2020-05-01: ISSUED FOR BID

SA PROJECT TEAM: PRINCIPAL P.Silvestri
PROJ. ARCH. S.Hunt DRAFTER _____
JOB CAPT. _____ INTERIORS N.Catuzza

SEAL:

TITLE:
ELECTRICAL & DETAILS

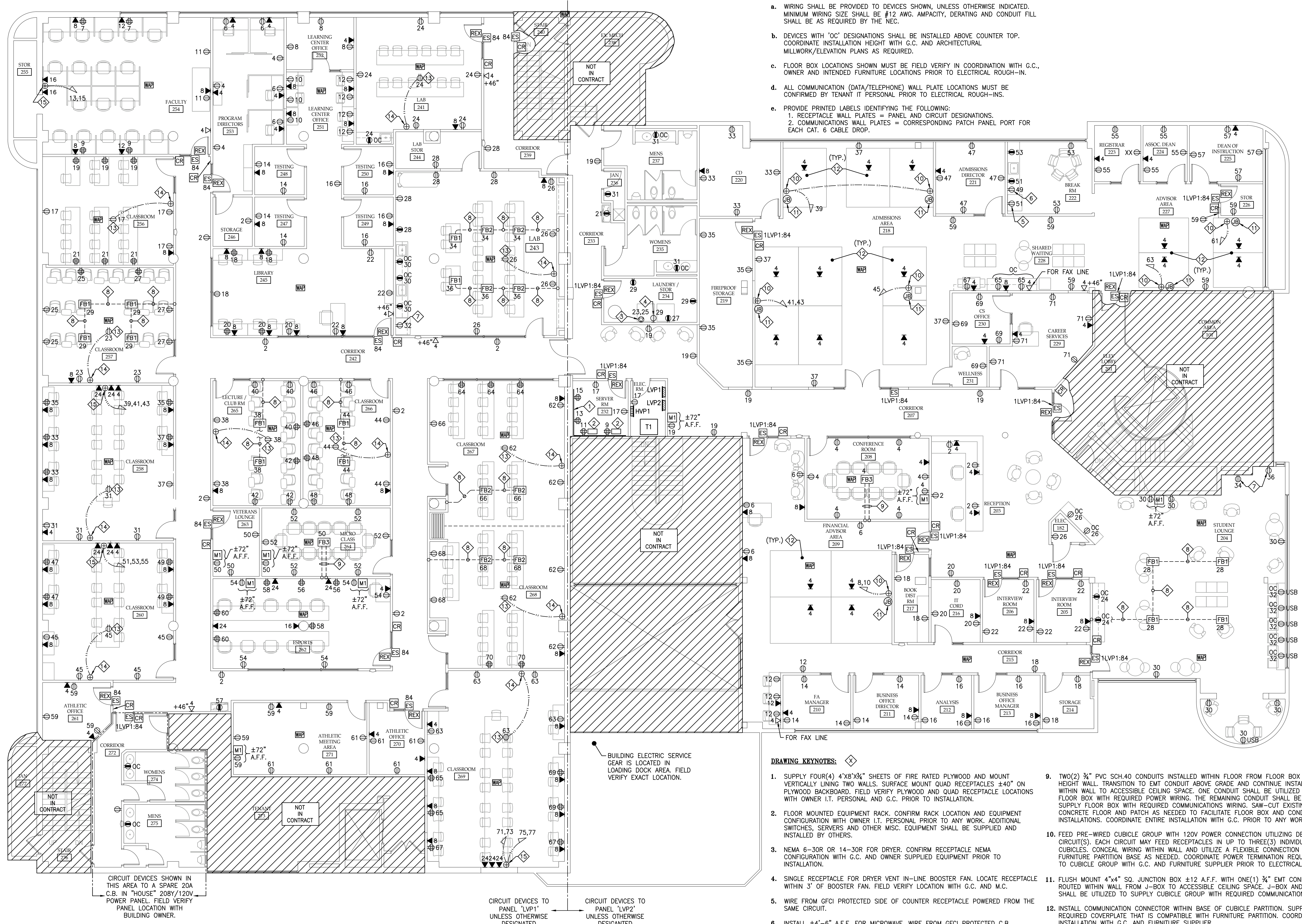


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SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-3



- GENERAL DRAWING NOTES:**
- WIRING SHALL BE PROVIDED TO DEVICES SHOWN, UNLESS OTHERWISE INDICATED. MINIMUM WIRING SIZE SHALL BE #12 AWG. AMPACITY, DERATING AND CONDUIT FILL SHALL BE AS REQUIRED BY THE NEC.
 - DEVICES WITH 'OC' DESIGNATIONS SHALL BE INSTALLED ABOVE COUNTER TOP. COORDINATE INSTALLATION HEIGHT WITH G.C. AND ARCHITECTURAL MILLWORK/ELEVATION PLANS AS REQUIRED.
 - FLOOR BOX LOCATIONS SHOWN MUST BE FIELD VERIFY IN COORDINATION WITH G.C., OWNER AND INTENDED FURNITURE LOCATIONS PRIOR TO ELECTRICAL ROUGH-IN.
 - ALL COMMUNICATION (DATA/TELEPHONE) WALL PLATE LOCATIONS MUST BE CONFIRMED BY TENANT IF PERSONAL PRIOR TO ELECTRICAL ROUGH-INS.
 - PROVIDE PRINTED LABELS IDENTIFYING THE FOLLOWING:
 - RECEPTACLE WALL PLATES = PANEL AND CIRCUIT DESIGNATIONS.
 - COMMUNICATIONS WALL PLATES = CORRESPONDING PATCH PANEL PORT FOR EACH CAT. 6 CABLE DROP.

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ISSUE:
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SA PROJECT TEAM: PRINCIPAL P.Silvestri
 PROJ. ARCH. S.Hunt DRAFTER
 JOB CAPT. INTERIORS N.Catuzza

SEAL:

TITLE:
ELECTRICAL POWER & SYSTEMS - 2ND FL. PLAN



SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-4

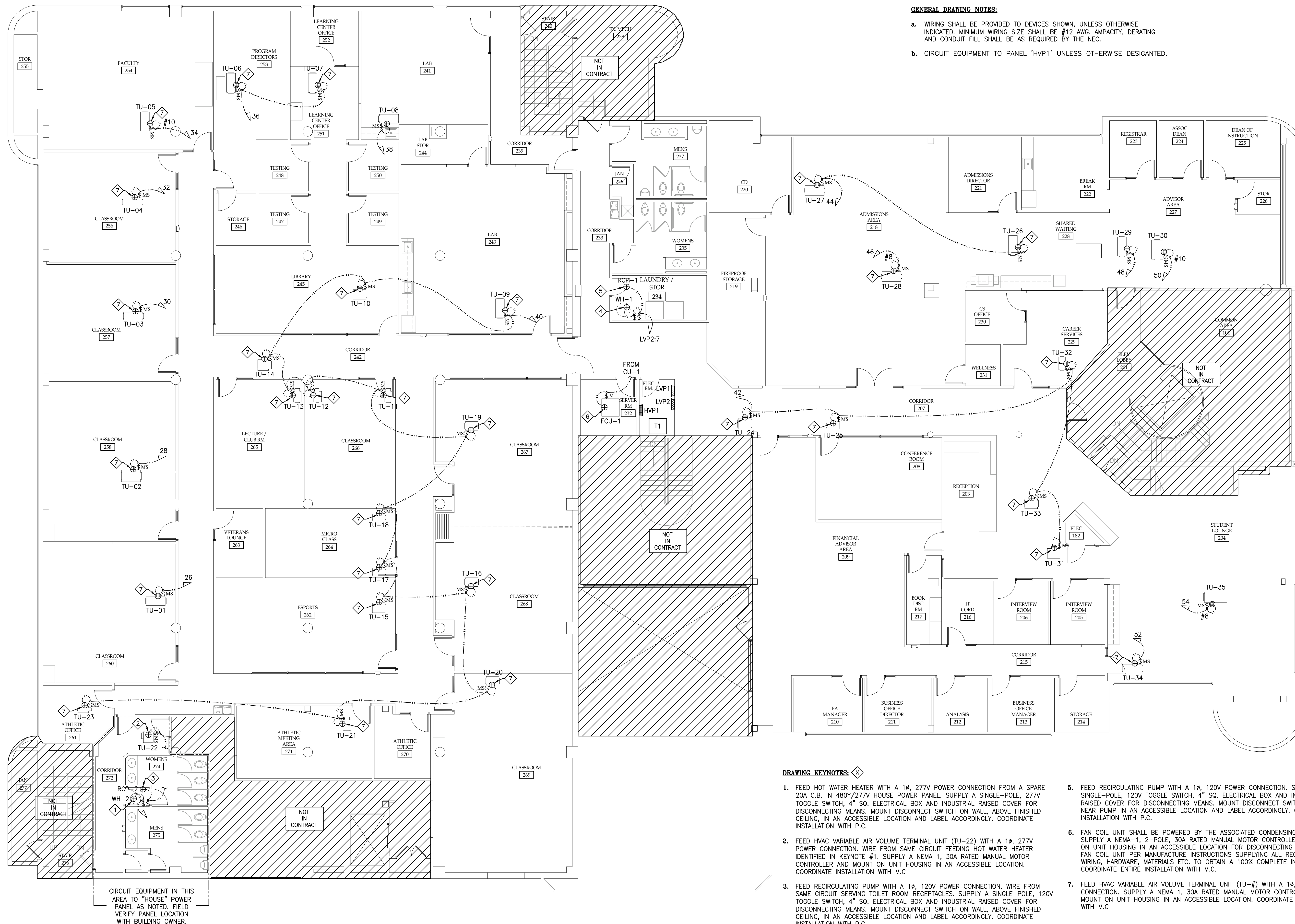
ELECTRICAL POWER AND SYSTEMS
2ND FLOOR PLAN
 SCALE: 1/8" = 1'-0"

- DRAWING KEYNOTES:**
- SUPPLY FOUR(4) 4"x8"x3/4" SHEETS OF FIRE RATED PLYWOOD AND MOUNT VERTICALLY LINING TWO WALLS. SURFACE MOUNT QUAD RECEPTACLES ±40" ON PLYWOOD BACKBOARD. FIELD VERIFY PLYWOOD AND QUAD RECEPTACLE LOCATIONS WITH OWNER I.T. PERSONAL AND G.C. PRIOR TO INSTALLATION.
 - FLOOR MOUNTED EQUIPMENT RACK. CONFIRM RACK LOCATION AND EQUIPMENT CONFIGURATION WITH OWNER I.T. PERSONAL PRIOR TO ANY WORK. ADDITIONAL SWITCHES, SERVERS AND OTHER MISC. EQUIPMENT SHALL BE SUPPLIED AND INSTALLED BY OTHERS.
 - NEMA 6-30R OR 14-30R FOR DRYER. CONFIRM RECEPTACLE NEMA CONFIGURATION WITH G.C. AND OWNER SUPPLIED EQUIPMENT PRIOR TO INSTALLATION.
 - SINGLE RECEPTACLE FOR DRYER VENT IN-LINE BOOSTER FAN. LOCATE RECEPTACLE WITHIN 3' OF BOOSTER FAN. FIELD VERIFY LOCATION WITH G.C. AND M.C.
 - WIRE FROM GFCI PROTECTED SIDE OF COUNTER RECEPTACLE POWERED FROM THE SAME CIRCUIT.
 - INSTALL ±4'-6" A.F.F. FOR MICROWAVE. WIRE FROM GFCI PROTECTED C.B.
 - WIRE FROM GFCI PROTECTED C.B.
 - 3/4" PVC SCH.40 CONDUIT INSTALLED WITHIN FLOOR FROM FLOOR BOX TO FULL HEIGHT WALL. TRANSITION TO EMT CONDUIT ABOVE GRADE AND CONTINUE INSTALLATIONS WITHIN WALL TO ACCESSIBLE CEILING SPACE. ALSO USE 3/4" PVC SCH.40 CONDUIT INSTALLED WITHIN FLOOR INTERCONNECTING FLOOR BOXES AS SHOWN. CONDUIT SHALL BE UTILIZED TO SUPPLY FLOOR BOX RECEPTACLES WITH REQUIRED POWER WIRING. SAW-CUT EXISTING CONCRETE FLOOR AND PATCH AS NEEDED TO FACILITATE FLOOR BOX AND CONDUIT INSTALLATIONS. COORDINATE ENTIRE INSTALLATION WITH G.C. PRIOR TO ANY WORK.
 - TWO(2) 3/4" PVC SCH.40 CONDUITS INSTALLED WITHIN FLOOR FROM FLOOR BOX TO FULL HEIGHT WALL. TRANSITION TO EMT CONDUIT ABOVE GRADE AND CONTINUE INSTALLATIONS WITHIN WALL TO ACCESSIBLE CEILING SPACE. ONE CONDUIT SHALL BE UTILIZED TO SUPPLY FLOOR BOX WITH REQUIRED POWER WIRING. THE REMAINING CONDUIT SHALL BE UTILIZE TO SUPPLY FLOOR BOX WITH REQUIRED COMMUNICATIONS WIRING. SAW-CUT EXISTING CONCRETE FLOOR AND PATCH AS NEEDED TO FACILITATE FLOOR BOX AND CONDUIT INSTALLATIONS. COORDINATE ENTIRE INSTALLATION WITH G.C. PRIOR TO ANY WORK.
 - FEED PRE-WIRED CUBICLE GROUP WITH 120V POWER CONNECTION UTILIZING DESIGNATED CIRCUIT(S). EACH CIRCUIT MAY FEED RECEPTACLES IN UP TO THREE(3) INDIVIDUAL CUBICLES. CONCEAL WIRING WITHIN WALL AND UTILIZE A FLEXIBLE CONNECTION TO FURNITURE PARTITION BASE AS NEEDED. COORDINATE POWER TERMINATION REQUIREMENTS TO CUBICLE GROUP WITH G.C. AND FURNITURE SUPPLIER PRIOR TO ELECTRICAL ROUGH-IN.
 - FLUSH MOUNT 4"x4" SQ. JUNCTION BOX ±12 A.F.F. WITH ONE(1) 3/4" EMT CONDUIT ROUTED WITHIN WALL FROM J-BOX TO ACCESSIBLE CEILING SPACE. J-BOX AND CONDUIT SHALL BE UTILIZED TO SUPPLY CUBICLE GROUP WITH REQUIRED COMMUNICATIONS CABLING.
 - INSTALL COMMUNICATION CONNECTOR WITHIN BASE OF CUBICLE PARTITION. SUPPLY REQUIRED COVERPLATE THAT IS COMPATIBLE WITH FURNITURE PARTITION. COORDINATE INSTALLATION WITH G.C. AND FURNITURE SUPPLIER.
 - INSTALL FLUSH TO FINISHED CEILING FOR CEILING MOUNTED PROJECTOR. CONFIRM LOCATION WITH G.C. AND OWNER I.T. PERSONAL PRIOR TO ELECTRICAL ROUGH-IN.
 - 120V POWER CONNECTION TO RETRACTABLE POWERED SCREEN. SCREEN SHALL BE EQUIPPED WITH REMOTE CONTROL FOR OPERATION. FIELD VERIFY POWER TERMINATION REQUIREMENTS AND COORDINATE ENTIRE INSTALLATION WITH G.C. PRIOR TO ELECTRICAL ROUGH-IN.
 - FEED PRE-WIRED FURNITURE WITH 120V POWER CONNECTION UTILIZING DESIGNATED CIRCUITS. EACH CIRCUIT MAY FEED UP TO SIX(6) RECEPTACLES. CONCEAL WIRING WITHIN WALL AND UTILIZE A FLEXIBLE CONNECTION TO FURNITURE AS NEEDED. COORDINATE POWER TERMINATION REQUIREMENTS TO FURNITURE GROUP WITH G.C. AND FURNITURE SUPPLIER PRIOR TO ELECTRICAL ROUGH-IN.

CIRCUIT DEVICES SHOWN IN THIS AREA TO A SPARE 20A C.B. IN "HOUSE" 208Y/120V POWER PANEL. FIELD VERIFY PANEL LOCATION WITH BUILDING OWNER.

BUILDING ELECTRIC SERVICE GEAR IS LOCATED IN LOADING DOCK AREA. FIELD VERIFY EXACT LOCATION.

CIRCUIT DEVICES TO PANEL 'LVP1' UNLESS OTHERWISE DESIGNATED
 CIRCUIT DEVICES TO PANEL 'LVP2' UNLESS OTHERWISE DESIGNATED



GENERAL DRAWING NOTES:

- a. WIRING SHALL BE PROVIDED TO DEVICES SHOWN, UNLESS OTHERWISE INDICATED. MINIMUM WIRING SIZE SHALL BE #12 AWG. AMPACITY, DERATING AND CONDUIT FILL SHALL BE AS REQUIRED BY THE NEC.
- b. CIRCUIT EQUIPMENT TO PANEL 'HVP1' UNLESS OTHERWISE DESIGNATED.

DRAWING KEYNOTES:

1. FEED HOT WATER HEATER WITH A 1Ø, 277V POWER CONNECTION FROM A SPARE 20A C.B. IN 480Y/277V HOUSE POWER PANEL. SUPPLY A SINGLE-POLE, 277V TOGGLE SWITCH, 4" SQ. ELECTRICAL BOX AND INDUSTRIAL RAISED COVER FOR DISCONNECTING MEANS. MOUNT DISCONNECT SWITCH ON WALL, ABOVE FINISHED CEILING, IN AN ACCESSIBLE LOCATION AND LABEL ACCORDINGLY. COORDINATE INSTALLATION WITH P.C.
2. FEED HVAC VARIABLE AIR VOLUME TERMINAL UNIT (TU-22) WITH A 1Ø, 277V POWER CONNECTION. WIRE FROM SAME CIRCUIT FEEDING HOT WATER HEATER IDENTIFIED IN KEYNOTE #1. SUPPLY A NEMA 1, 30A RATED MANUAL MOTOR CONTROLLER AND MOUNT ON UNIT HOUSING IN AN ACCESSIBLE LOCATION. COORDINATE INSTALLATION WITH M.C.
3. FEED RECIRCULATING PUMP WITH A 1Ø, 120V POWER CONNECTION. WIRE FROM SAME CIRCUIT SERVING TOILET ROOM RECEPTACLES. SUPPLY A SINGLE-POLE, 120V TOGGLE SWITCH, 4" SQ. ELECTRICAL BOX AND INDUSTRIAL RAISED COVER FOR DISCONNECTING MEANS. MOUNT DISCONNECT SWITCH ON WALL, ABOVE FINISHED CEILING, IN AN ACCESSIBLE LOCATION AND LABEL ACCORDINGLY. COORDINATE INSTALLATION WITH P.C.
4. FEED HOT WATER HEATER WITH A 1Ø, 120V POWER CONNECTION. SUPPLY A SINGLE-POLE, 120V TOGGLE SWITCH, 4" SQ. ELECTRICAL BOX AND INDUSTRIAL RAISED COVER FOR DISCONNECTING MEANS. MOUNT DISCONNECT SWITCH ON WALL ADJACENT TO WATER HEATER IN AN ACCESSIBLE LOCATION AND LABEL ACCORDINGLY. COORDINATE INSTALLATION WITH P.C.
5. FEED RECIRCULATING PUMP WITH A 1Ø, 120V POWER CONNECTION. SUPPLY A SINGLE-POLE, 120V TOGGLE SWITCH, 4" SQ. ELECTRICAL BOX AND INDUSTRIAL RAISED COVER FOR DISCONNECTING MEANS. MOUNT DISCONNECT SWITCH ON WALL NEAR PUMP IN AN ACCESSIBLE LOCATION AND LABEL ACCORDINGLY. COORDINATE INSTALLATION WITH P.C.
6. FAN COIL UNIT SHALL BE POWERED BY THE ASSOCIATED CONDENSING UNIT. SUPPLY A NEMA-1, 2-POLE, 30A RATED MANUAL MOTOR CONTROLLER AND MOUNT ON UNIT HOUSING IN AN ACCESSIBLE LOCATION FOR DISCONNECTING MEANS. WIRE FAN COIL UNIT PER MANUFACTURE INSTRUCTIONS SUPPLYING ALL REQUIRED WIRING, HARDWARE, MATERIALS ETC. TO OBTAIN A 100% COMPLETE INSTALLATION. COORDINATE ENTIRE INSTALLATION WITH M.C.
7. FEED HVAC VARIABLE AIR VOLUME TERMINAL UNIT (TU-#) WITH A 1Ø, 277V POWER CONNECTION. SUPPLY A NEMA 1, 30A RATED MANUAL MOTOR CONTROLLER AND MOUNT ON UNIT HOUSING IN AN ACCESSIBLE LOCATION. COORDINATE INSTALLATION WITH M.C.

CIRCUIT EQUIPMENT IN THIS AREA TO "HOUSE" POWER PANEL AS NOTED. FIELD VERIFY PANEL LOCATION WITH BUILDING OWNER.

**HVAC AND PLUMBING POWER
2ND FLOOR PLAN**
SCALE: 1/8" = 1'-0"

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ISSUE:
2020-05-01: ISSUED FOR BID

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JOB CAPT. _____ INTERIORS N.Catuzza

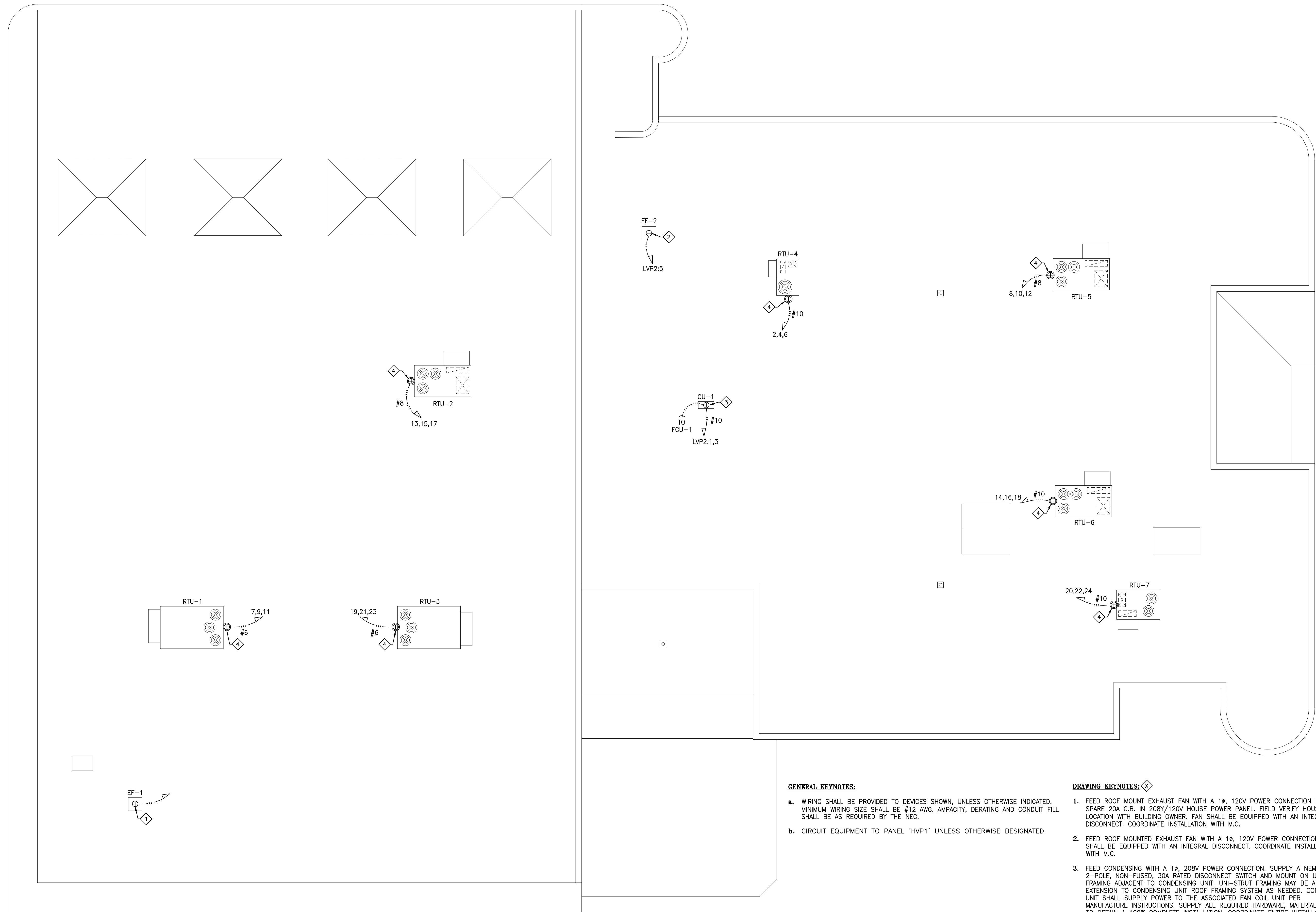
SEAL:

TITLE:
**HVAC AND
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POWER
2ND FL. PLAN**

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SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-5



1 HVAC POWER - ROOF PLAN
E-6 SCALE: 1/8" = 1'-0"

GENERAL KEYNOTES:

- a. WIRING SHALL BE PROVIDED TO DEVICES SHOWN, UNLESS OTHERWISE INDICATED. MINIMUM WIRING SIZE SHALL BE #12 AWG. AMPACITY, DERATING AND CONDUIT FILL SHALL BE AS REQUIRED BY THE NEC.
- b. CIRCUIT EQUIPMENT TO PANEL 'HVP1' UNLESS OTHERWISE DESIGNATED.

DRAWING KEYNOTES:

1. FEED ROOF MOUNT EXHAUST FAN WITH A 1Ø, 120V POWER CONNECTION FROM A SPARE 20A C.B. IN 208Y/120V HOUSE POWER PANEL. FIELD VERIFY HOUSE PANEL LOCATION WITH BUILDING OWNER. FAN SHALL BE EQUIPPED WITH AN INTEGRAL DISCONNECT. COORDINATE INSTALLATION WITH M.C.
2. FEED ROOF MOUNTED EXHAUST FAN WITH A 1Ø, 120V POWER CONNECTION. FAN SHALL BE EQUIPPED WITH AN INTEGRAL DISCONNECT. COORDINATE INSTALLATION WITH M.C.
3. FEED CONDENSING WITH A 1Ø, 208V POWER CONNECTION. SUPPLY A NEMA-3R, 2-POLE, NON-FUSED, 30A RATED DISCONNECT SWITCH AND MOUNT ON UNI-STRUT FRAMING ADJACENT TO CONDENSING UNIT. UNI-STRUT FRAMING MAY BE AN EXTENSION TO CONDENSING UNIT ROOF FRAMING SYSTEM AS NEEDED. CONDENSING UNIT SHALL SUPPLY POWER TO THE ASSOCIATED FAN COIL UNIT PER MANUFACTURE INSTRUCTIONS. SUPPLY ALL REQUIRED HARDWARE, MATERIALS ETC. TO OBTAIN A 100% COMPLETE INSTALLATION. COORDINATE ENTIRE INSTALLATION WITH M.C.
4. FEED ROOF TOP UNIT WITH A 3Ø, 480V POWER CONNECTION. UNIT SHALL BE EQUIPPED WITH AN INTEGRAL PRE-WIRED, NON-FUSED DISCONNECT SWITCH AND GFCI RECEPTACLE. COORDINATE INSTALLATION WITH M.C.

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ISSUE:
 2020-05-01: ISSUED FOR BID

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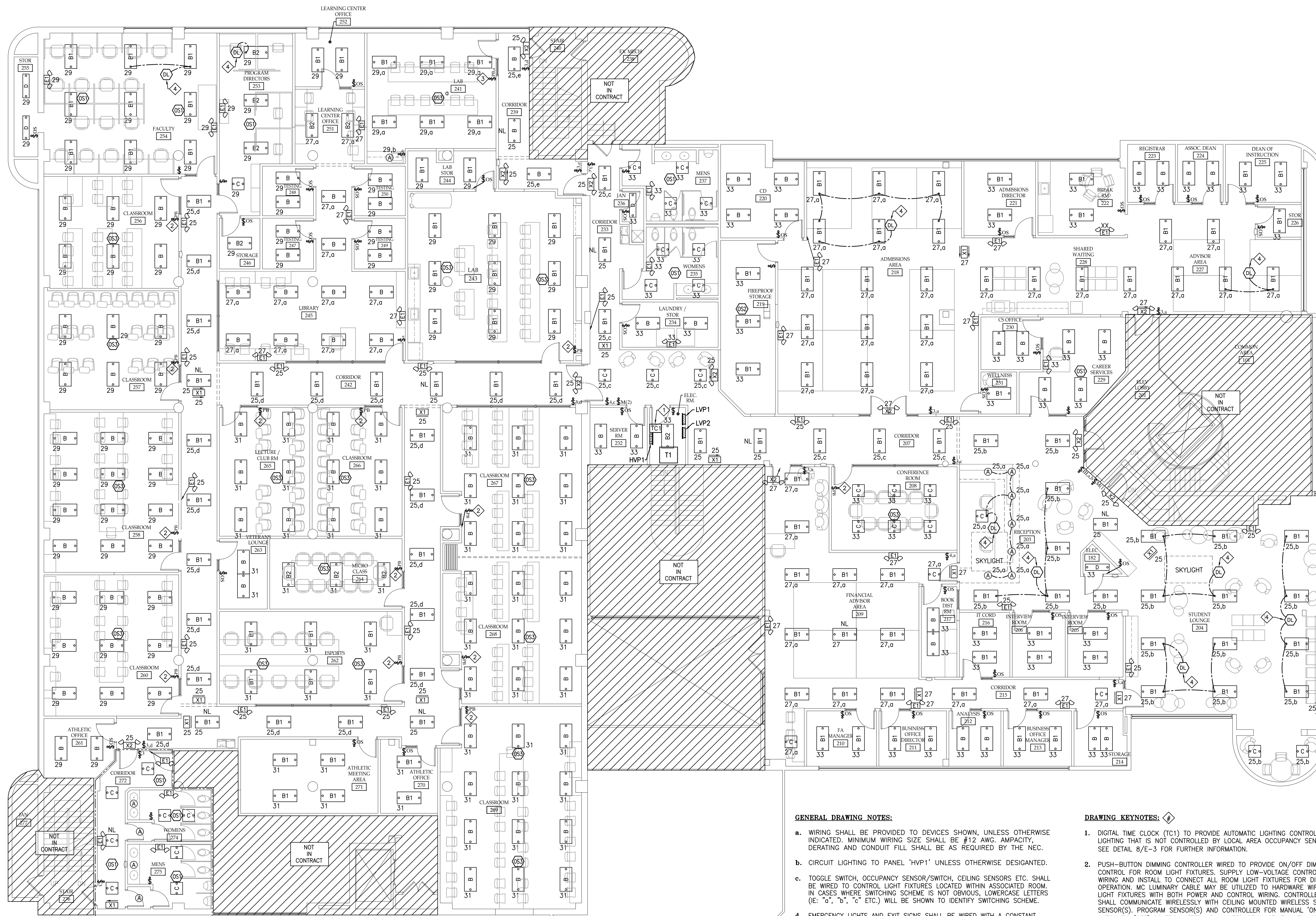
SEAL:

TITLE:
**HVAC
 POWER
 ROOF PLAN**

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SA JOB #: 19099.02 DATE: 4-6-2020

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CIRCUIT LIGHTING SHOWN IN THIS AREA TO A SPARE 20A C.B. IN "HOUSE" 480Y/277V POWER PANEL. FIELD VERIFY PANEL LOCATION WITH BUILDING OWNER.

**ELECTRICAL LIGHTING
2ND FLOOR PLAN**

1
E-7
SCALE: 1/8" = 1'-0"

GENERAL DRAWING NOTES:

- WIRING SHALL BE PROVIDED TO DEVICES SHOWN, UNLESS OTHERWISE INDICATED. MINIMUM WIRING SIZE SHALL BE #12 AWG. AMPACITY, DERATING AND CONDUIT FILL SHALL BE AS REQUIRED BY THE NEC.
- CIRCUIT LIGHTING TO PANEL "HVP1" UNLESS OTHERWISE DESIGNATED.
- TOGGLE SWITCH, OCCUPANCY SENSOR/SWITCH, CEILING SENSORS ETC. SHALL BE WIRED TO CONTROL LIGHT FIXTURES LOCATED WITHIN ASSOCIATED ROOM. IN CASES WHERE SWITCHING SCHEME IS NOT OBVIOUS, LOWERCASE LETTERS (IE: "a", "b", "c" ETC.) WILL BE SHOWN TO IDENTIFY SWITCHING SCHEME.
- EMERGENCY LIGHTS AND EXIT SIGNS SHALL BE WIRED WITH A CONSTANT 277V POWER CONNECTION FROM LOCAL AREA LIGHTING CIRCUIT BYPASSING ALL LIGHTING CONTROLS.
- FIXTURES WITH "NL" DESIGNATIONS SHALL BE WIRED WITH A CONSTANT 277V POWER CONNECTION FROM LOCAL AREA LIGHTING CIRCUIT BYPASSING ALL LIGHTING CONTROLS TO SERVE AS NIGHT LIGHTS.
- ROOMS WITH WIRELESS LIGHTING CONTROLS SHALL BE INSTALLED, POWERED AND PROGRAMMED PER MANUFACTURE REQUIREMENTS AND SPECIFICATIONS.

DRAWING KEYNOTES:

- DIGITAL TIME CLOCK (TC1) TO PROVIDE AUTOMATIC LIGHTING CONTROL FOR LIGHTING THAT IS NOT CONTROLLED BY LOCAL AREA OCCUPANCY SENSORS. SEE DETAIL 8/E-3 FOR FURTHER INFORMATION.
- PUSH-BUTTON DIMMING CONTROLLER WIRED TO PROVIDE ON/OFF DIMMING CONTROL FOR ROOM LIGHT FIXTURES. SUPPLY LOW-VOLTAGE CONTROL WIRING AND INSTALL TO CONNECT ALL ROOM LIGHT FIXTURES FOR DIMMING OPERATION. MC LUMINARY CABLE MAY BE UTILIZED TO HARDWARE WIRE LIGHT FIXTURES WITH BOTH POWER AND CONTROL WIRING. CONTROLLER SHALL COMMUNICATE WIRELESSLY WITH CEILING MOUNTED WIRELESS SMART SENSOR(S). PROGRAM SENSOR(S) AND CONTROLLER FOR MANUAL "ON" AND AUTOMATIC "OFF" CONTROL AFTER 15 MINUTES OF INACTIVITY WITH NO DAYLIGHT SENSING.
- PUSH-BUTTON DIMMING CONTROLLER WIRED TO PROVIDE ON/OFF DIMMING CONTROL OF ROOM LIGHT FIXTURES. SUPPLY AND INSTALL LOW-VOLTAGE CONTROL WIRING TO ROOM LIGHT FIXTURES FOR DIMMING OPERATION. MC LUMINARY CABLE MAY BE UTILIZED TO HARDWARE WIRE LIGHT FIXTURES WITH BOTH POWER AND CONTROL WIRING. CONTROLLER SHALL COMMUNICATE WIRELESSLY WITH CEILING MOUNTED WIRELESS SMART SENSOR(S). PROGRAM SENSOR(S) AND CONTROLLER FOR MANUAL "ON" AND AUTOMATIC "OFF" CONTROL AFTER 15 MINUTES OF INACTIVITY WITH DAYLIGHT SENSING ACTIVATED.
- DAYLIGHT HARVESTING SENSOR SHALL BE WIRED TO CONTROL FIXTURES INTERCONNECT BY LOW VOLTAGE WIRING AS SHOWN.

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ISSUE:
2020-05-01: ISSUED FOR BID

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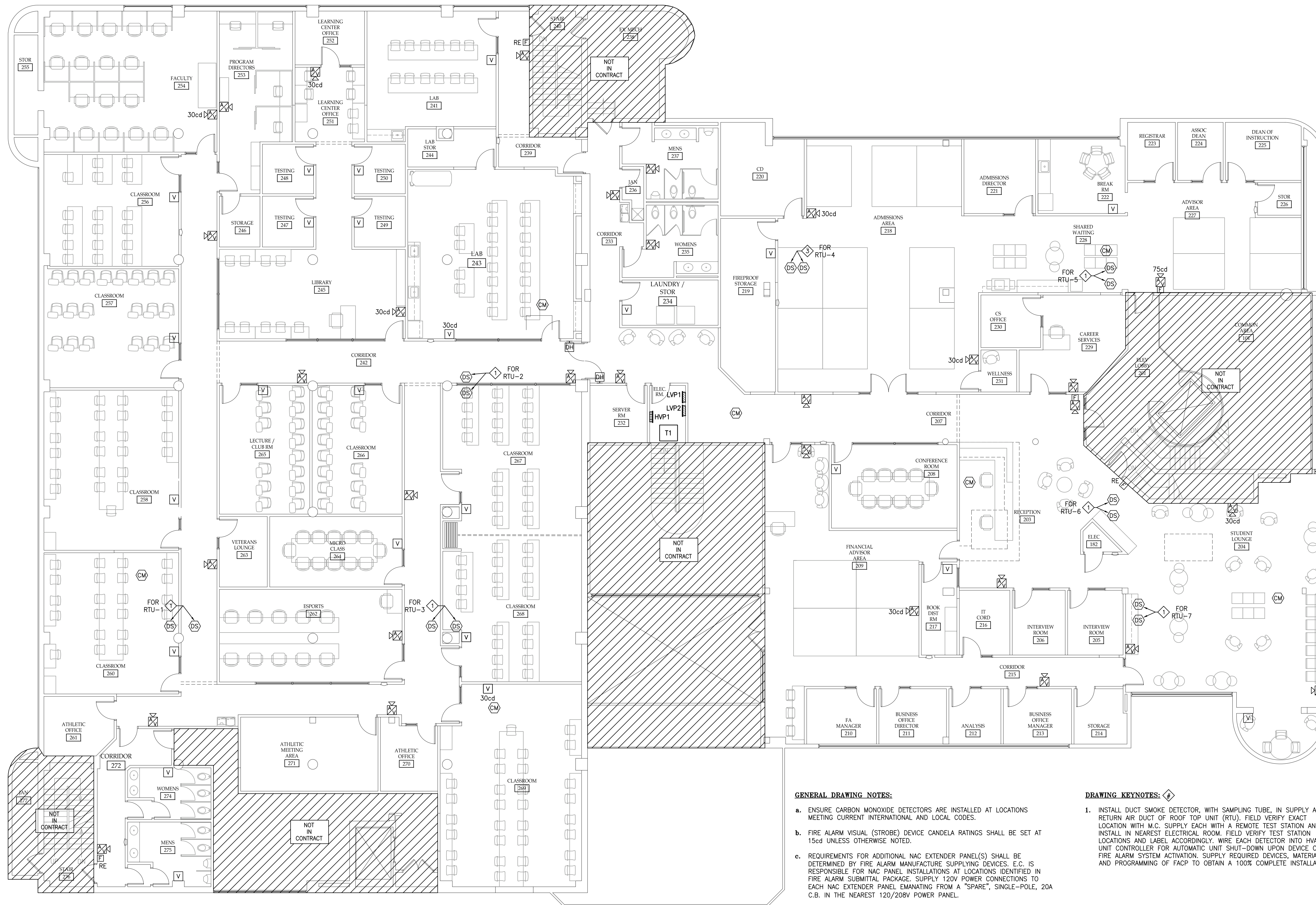
SEAL:

TITLE:
**ELECTRICAL LIGHTING
2ND FL. PLAN**

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SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-7



**FIRE ALARM SYSTEM
2ND FLOOR PLAN**
SCALE: 1/8" = 1'-0"

- GENERAL DRAWING NOTES:**
- ENSURE CARBON MONOXIDE DETECTORS ARE INSTALLED AT LOCATIONS MEETING CURRENT INTERNATIONAL AND LOCAL CODES.
 - FIRE ALARM VISUAL (STROBE) DEVICE CANDELA RATINGS SHALL BE SET AT 15cd UNLESS OTHERWISE NOTED.
 - REQUIREMENTS FOR ADDITIONAL NAC EXTENDER PANEL(S) SHALL BE DETERMINED BY FIRE ALARM MANUFACTURE SUPPLYING DEVICES. E.C. IS RESPONSIBLE FOR NAC PANEL INSTALLATIONS AT LOCATIONS IDENTIFIED IN FIRE ALARM SUBMITTAL PACKAGE. SUPPLY 120V POWER CONNECTIONS TO EACH NAC EXTENDER PANEL EMANATING FROM A "SPARE", SINGLE-POLE, 20A C.B. IN THE NEAREST 120/208V POWER PANEL.

- DRAWING KEYNOTES:**
- INSTALL DUCT SMOKE DETECTOR, WITH SAMPLING TUBE, IN SUPPLY AND RETURN AIR DUCT OF ROOF TOP UNIT (RTU). FIELD VERIFY EXACT LOCATION WITH M.C. SUPPLY EACH WITH A REMOTE TEST STATION AND INSTALL IN NEAREST ELECTRICAL ROOM. FIELD VERIFY TEST STATION LOCATIONS AND LABEL ACCORDINGLY. WIRE EACH DETECTOR INTO HVAC UNIT CONTROLLER FOR AUTOMATIC UNIT SHUT-DOWN UPON DEVICE OR FIRE ALARM SYSTEM ACTIVATION. SUPPLY REQUIRED DEVICES, MATERIALS AND PROGRAMMING OF FACP TO OBTAIN A 100% COMPLETE INSTALLATION.

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ISSUE:
2020-05-01: ISSUED FOR BID

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SEAL:

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2ND FL. PLAN**

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SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-8

GENERAL PROVISIONS

- A. GENERAL: 1. REQUIREMENTS SPECIFIED ON COVER SHEET, ALONG WITH ELECTRICAL SPECIFICATIONS AND ALL ITS SECTIONS, CONSTITUTE THE CONTRACT DOCUMENTS FOR THE ELECTRICAL CONTRACT... 2. THE ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING AND EQUIPMENT DRAWINGS AND SPECIFICATIONS ARE INCORPORATED INTO, AND BECOME A PART OF THIS DIVISION... 3. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC... 4. UNTIL THE TIME OF INSTALLATION, THE ARCHITECT RESERVES THE RIGHT TO MAKE MINOR CHANGES... 5. THE ELECTRICAL DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER... 6. ARRANGE ALL EQUIPMENT SUBSTANTIALLY AS SHOWN ON THE DRAWINGS... 7. EXAMINE THE WORK OF OTHER TRADES INSOFAR AS THEIR WORK COMES IN CONTACT WITH OR IS COVERED BY THIS WORK... 8. ELECTRICAL CONTRACTOR SHALL VERIFY WITH OTHER TRADES ALL ELECTRICAL CHARACTERISTICS OF EQUIPMENT... 9. IT IS THE INTENT OF THESE DRAWINGS THAT THIS BE A COMPLETE ELECTRICAL JOB... B. VISIT TO THE SITE: 1. THIS CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING HIS PROGRESS... C. CODE AND PERMITS: 1. INSTALLATION SHALL BE IN FULL ACCORDANCE WITH ALL CODES, RULES AND REGULATIONS OF MUNICIPALITY, CITY, COUNTY, STATE AND PUBLIC UTILITIES AND ALL OTHER AUTHORITIES... D. ELECTRICAL INSPECTION: 1. ALL ELECTRICAL INSPECTIONS SHALL BE BY A 3RD PARTY AGENCY APPROVED BY THE LOCAL TOWN... E. RECORD DRAWINGS: 1. IMMEDIATELY AFTER THE CONTRACT IS SIGNED, THE CONTRACTOR SHALL OBTAIN A COMPLETE SET OF REPRODUCTIONS OF THE CONTRACT DRAWINGS... F. STANDARDS AND SUBSTITUTIONS: 1. WHEREVER THE WORDS "APPROVED BY", "APPROVED EQUAL", "AS DIRECTED" OR SIMILAR PHRASES ARE USED... G. TESTING AND PLACING IN SERVICE: 1. ANY MATERIAL OR EQUIPMENT FAILING A TEST SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE... H. INTERFERENCES: 1. BEFORE THE INSTALLATION OF ANY ITEM BEGINS, THE ELECTRICAL CONTRACTOR SHALL CAREFULLY ASCERTAIN THAT IT DOES NOT INTERFERE WITH CLEARANCES FOR THE ERECTION OF FINISH BEAMS, COLUMNS, PILASTERS, WALLS OR OTHER STRUCTURAL OR ARCHITECTURAL MEMBERS... I. QUALITY ASSURANCE: 1. ALL PRODUCTS SHALL BE NEW AND OF THE TYPE AND QUALITY SPECIFIED...

- J. LABOR: 1. THE ELECTRICAL CONTRACTOR SHALL HAVE COMPETENT SUPERVISION IN RESPONSIBLE CHARGE OF THE WORK, WHO SHALL BE ON THE SITE DURING THE ERECTION OF THE MATERIAL FURNISHED UNDER THESE SPECIFICATIONS... K. STORAGE AND PROTECTION: 1. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LOSS OR DAMAGE TO THE BUILDING AND ITS CONTENTS CAUSED BY HIS EMPLOYEES OR EQUIPMENT... L. VERIFICATION OF MEASUREMENTS: 1. BEFORE ORDERING ANY MATERIAL OR DOING ANY WORK, THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS AT THE BUILDING AND SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF SAME... M. MAINTENANCE AND OPERATION MANUALS: 1. UPON COMPLETION OF THE WORK AND BEFORE REQUEST FOR FINAL PAYMENT, THE CONTRACTOR SHALL DELIVER TO THE ARCHITECT'S ENGINEER, FOUR (4) SETS OF FULL AND COMPLETE DIRECTIONS PERTAINING TO THE OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND SYSTEMS INSTALLED UNDER THIS CONTRACT...

BASIC ELECTRICAL MATERIALS AND METHODS

- A. NAMEPLATES: 1. GENERAL: FURNISH AND MOUNT ON EACH PANELBOARD, SWITCHBOARD (INCLUDING BRANCH SWITCHES), LARGE JUNCTION BOX, SAFETY SWITCH, STARTER, REMOTE CONTROL, PUSH BUTTON STATION, AND ALL SIMILAR CONTROLS, A NAMEPLATE DESCRIPTIVE OF THE EQUIPMENT OR EQUIPMENT CONTROLLED... B. MOUNTING ACCESSORIES: 1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ANGLE IRON, CHANNEL IRON, RODS, SUPPORTS, HANGERS, CONCRETE OR PLYWOOD REQUIRED TO INSTALL, MOUNT AND SUPPORT ANY ELECTRICAL EQUIPMENT OR DEVICE CALLED FOR ON THE PLANS... C. EXECUTION: 1. THE ELECTRICAL WORK FOR CONSTRUCTION PROPOSED SHALL CONFORM TO ALL FEDERAL (OSHA), STATE, ALL SPECIFIC SAFETY REQUIREMENTS AND THE REQUIREMENTS OF THE CURRENT EDITION OF THE NEC... D. OPENINGS AND CHASES: 1. DETERMINE AND BE RESPONSIBLE FOR PROPER SIZE AND LOCATION OF OPENINGS AND CHASES REQUIRED. INSTALL ALL SLEEVES NECESSARY FOR THE WORK...

- E. MATERIALS AND WORKMANSHIP: 1. ALL WORK SHALL BE INSTALLED IN A PRACTICAL AND WORKMANLIKE MANNER, BY MECHANICS SKILLED IN THE SEVERAL TRADES NECESSARY... F. FIRE STOPPING: 1. FIRE-STOPPING FOR OPENINGS THROUGH FIRE AND SMOKE RATED WALLS AND ALL FLOOR ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REVISIONS AND CONSTRUCTION INCLUDING COST OF ALL ALLIED TRADES INVOLVED...

SCOPE OF WORK:

- 1. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, STORAGE, UNPACKING AND PLACEMENT; TO INCLUDE BUT NOT BE LIMITED TO, THE FOLLOWING ITEMS: a. COMPLETE POWER AND LIGHTING DISTRIBUTION SYSTEM INCLUDING ALL PANELS AND FEEDERS. b. COMPLETE BRANCH CIRCUIT WIRING SYSTEM. c. COMPLETE POWER WIRING FOR ALL AIR CONDITIONING EQUIPMENT, PLUMBING SYSTEM, HEATING EQUIPMENT, VENTILATING AND EXHAUST EQUIPMENT. d. GALVANIZED, HEAVY WALL TYPE. e. COMPLETE LIGHTING FIXTURE INSTALLATION INCLUDING ALL REQUIRED LAMPS. f. ILLUMINATED EXIT LIGHT SYSTEM. g. LIGHTING CONTROLS. h. OUTDOOR LIGHTING AND CONTROLS. i. FIRE ALARM SYSTEM. j. GROUNDING OF THE ELECTRICAL SYSTEM. k. TESTING OF ALL CABLES AND CIRCUIT WIRING AFTER INSTALLATION. l. TELEPHONE AND COMMUNICATION CONDUIT SYSTEM INCLUDING BOXES SHOWN ON THE DRAWINGS AND REQUIRED BY THE LOCAL TELEPHONE COMPANY AND/OR OWNER. m. TELEPHONE AND ELECTRIC SERVICES. n. UNDERGROUND WARNING TAPE: PERMANENT, BRIGHT-COLORED, CONTINUOUS-PRINTED, VINYL TAPE NOT LESS THAN 6 INCHES WIDE BY 4 MILS THICK WITH EMBEDDED CONTINUOUS METALLIC STRIP OR CORE AND PRINTED LEGEND THAT INDICATES TYPE OF UNDERGROUND LINE. o. IDENTIFY RACEWAYS AND CABLES WITH COLOR BANDING AS FOLLOWS: a). FIRE ALARM SYSTEM: RED b). SECURITY SYSTEM: BLUE AND YELLOW. c). TELECOMMUNICATION SYSTEM: GREEN AND YELLOW. p. TEMPORARY ELECTRICAL POWER AND LIGHTING AS REQUIRED FOR CONSTRUCTION.

TEMPORARY SERVICE:

- 1. THE ELECTRICAL CONTRACTOR SHALL FURNISH, INSTALL AND REMOVE AS REQUIRED ALL TEMPORARY POWER AND TEMPORARY LIGHTING IN ALL AREAS AND INDIVIDUAL ROOMS WHEN NEEDED BY THE INDIVIDUAL TRADES IN THE PERFORMANCE OF THEIR WORK... 2. NEW LIGHT FIXTURES SHALL NOT BE USED FOR TEMPORARY LIGHTING.

ELECTRIC SERVICE:

- 1. EXISTING ELECTRICAL SERVICE IS SCHEDULED TO REMAIN AS-IS. 2. ENSURE EXISTING ELECTRICAL METER AND MAIN DISCONNECT FOR NEW TENANT MEETS ALL POWER COMPANY AND N.E.C. REQUIREMENTS. 3. PAY THE COST OF ALL POWER COMPANY CHARGES CONNECTED WITH PERMANENT ELECTRIC SERVICE FOR NEW TENANT. 4. COORDINATE ALL WORK WITH THE POWER COMPANY AND PERFORM ANY WORK NECESSARY TO ASSURE A COMPLETE WORKING INSTALLATION. THE ENTIRE SERVICE INSTALLATION SHALL BE IN COMPLETE CONFORMANCE WITH THE POWER COMPANY'S REQUIREMENTS.

WIRE AND CABLE:

- 1. UNLESS OTHERWISE SPECIFIED, MC CABLE MAY BE UTILIZED FOR BRANCH WRING WHEN CONCEALED WITHIN WALLS OR ABOVE FINISHED CEILINGS. EXPOSED INSTALLATIONS ARE NOT PERMITTED. 2. CONDUCTORS SHALL BE ANNEALED COPPER, STRANDED 98% CONDUCTIVITY, 600 V RATED FOR FEEDERS AND BRANCH CIRCUITS, TYPE THHN/THWN INSULATION, MINIMUM #12 AWG SIZE FOR BRANCH CIRCUITS... 3. COLOR CODE CONDUCTORS (EXCEPT CONTROL AND INSTRUMENTATION CONDUCTORS) AS FOLLOWS: a. 240/120V 1Ø SYSTEM PHASE A-BLACK; PHASE B-RED; NEUTRAL-WHITE; GROUND-GREEN b. 208/120V 3Ø SYSTEM PHASE A-BLACK; PHASE B-RED; PHASE C-BLUE; NEUTRAL-WHITE; GROUND-GREEN c. 480/277V 3Ø SYSTEM PHASE A-BROWN; PHASE B-ORANGE; PHASE C-YELLOW; NEUTRAL-GREY; GROUND-GREEN d. #12 AND #10 CONDUCTORS SHALL HAVE CONTINUOUS INSULATION COLOR, AS LISTED ABOVE. 5. COLOR CODE CONDUCTORS LARGER THAN ABOVE, WHICH DO NOT HAVE CONTINUOUS INSULATION COLOR BY APPLICATION OF AT LEAST TWO LAPS OF COLORED TAPE ON EACH CONDUCTOR AT ALL POINTS OF ACCESS INCLUDING JUNCTION BOXES. COLOR TAPE SHALL BE THE EQUAL OF 3M PRODUCTS SCOTCH #35. 6. FLEXIBLE CORD SHALL BE HEAVY DUTY TYPE SO WITH AN EQUIPMENT GROUND CONDUCTOR IN ADDITION TO THE CURRENT CARRYING CONDUCTORS. 7. CONTROL CONDUCTORS SHALL BE #14 MINIMUM FOR NEC CLASS I AND #16 FOR NEC CLASS II. 8. CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED. 9. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID. 10. INSTALL SEPARATE NEUTRALS FOR EACH SINGLE PHASE BRANCH CIRCUIT. 11. CONNECT #10 AND SMALLER WIRES WITH CONSTANT PRESSURE EXPANDABLE SPRING TYPE CONNECTORS "SCOTCHLOK" BY 3M OR B-CAP BY BUCHANAN. 12. CONNECT #8 AND LARGER WIRES WITH COMPRESSION CONNECTORS OR SPLICES AS MANUFACTURED BY BURNDY AND T&B. 13. INSULATE SPLICING CONNECTORS TO AT LEAST 200% OF THE WIRE INSULATION. USE PRE-STRETCHED TUBING CONNECTOR INSULATORS, 3M PST FOR #2 AND LARGER CONDUCTORS. 14. PULL CONDUCTORS USING RECOGNIZED METHODS AND EQUIPMENT LEAVING AT LEAST 6" WIRE AT ALL JUNCTION BOXES FOR CONNECTIONS. 15. CLEANOUT EACH CONDUIT SYSTEM BEFORE PULLING WIRE. 16. PULL CONDUCTORS USING RECOGNIZED METHODS AND EQUIPMENT LEAVING AT LEAST 6" WIRE AT ALL JUNCTION BOXES FOR CONNECTIONS. 17. FORM AND TIE ALL WIRING IN PANELBOARDS. 18. THERE SHALL BE NO WIREJUNT JOINTS OR SPLICES MADE INSIDE SWITCHBOARDS/PANELBOARDS. 19. MAKE ALL CONNECTIONS TO DISCONNECT SWITCHES, MOTOR CONTROLLERS, MOTORS AND OTHER EQUIPMENT SHOWN ON THE PLANS. EXIT LIGHTS, FIRE ALARM AND EMERGENCY CIRCUITS SHALL BE INSTALLED IN SEPARATE CONDUIT SYSTEMS. INSTALL A MAXIMUM OF 3 SINGLE PHASE CIRCUITS IN A SINGLE RACEWAY, UNLESS OTHERWISE SPECIFICALLY CALLED FOR (SIX (6) CURRENT CARRYING CONDUCTORS MAXIMUM PLUS GROUND). 20. INSTALL MULTIWIRE BRANCH CIRCUITS PER ALL REQUIREMENTS OF N.E.C. ARTICLE 210.4. HANDLE TIES MUST BE INSTALLED TO IDENTIFY SINGLE-POLE, MULTIWIRE BRANCH CIRCUITS PER ALL REQUIREMENTS OF N.E.C. ARTICLE 240.15(B). 21. BRANCH CIRCUIT WIRE SIZES (AND CONDUITS) SHALL BE INCREASED FROM THOSE INDICATED ON THE PLANS TO PREVENT EXCESSIVE VOLTAGE DROP. BRANCH CIRCUITS SHALL BE INSTALLED WITH WIRES OF SUFFICIENT SIZE SO THAT VOLTAGE DROP BETWEEN THE PANEL AND THE LOADS DOES NOT EXCEED LIMIT OF 3%.

RACEWAYS AND BOXES

- A. RACEWAYS: 1. ALL WIRE SHALL BE RUN IN ACCORDANCE WITH CODE IN CORROSION RESISTANT, RIGID, THREADED, METAL CONDUIT OR ELECTRICAL METALLIC TUBING (E.M.T.) UNLESS OTHERWISE SPECIFICALLY STATED HEREIN. g. CONDUIT IN EXTERIOR WALLS, BELOW FLOOR SLAB, OR UNDERGROUND SHALL BE RIGID, THREADED, GALVANIZED, HEAVY WALL TYPE. b. CARLON PVC TYPE 40 HEAVY WALL CONDUIT WITH GROUND WIRE MAY BE USED BELOW FLOOR SLAB OR UNDERGROUND IN LIEU OF RIGID, THREADED, GALVANIZED CONDUIT. PVC CONDUIT SHALL TERMINATE BELOW FLOOR SLAB WITH RIGID, THREADED METAL CONDUIT ADAPTER. CONDUIT ABOVE SLAB SHALL BE METAL. c. CONDUIT RUN EXPOSED TO THE WEATHER SHALL BE HEAVY WALL, METAL THREADED TYPE. 2. CONDUIT SIZE SHALL BE 1/2" MINIMUM. 3. CONDUIT SHALL BE SECURELY FASTENED IN PLACE. 4. ALL CONDUIT SHALL BE CONCEALED IN WALLS, FLOOR AND CEILINGS WHEREVER POSSIBLE. EXPOSED CONDUIT IN FINISHED AREAS WILL NOT BE PERMITTED. EXPOSED CONDUIT WILL BE PERMITTED IN UNFINISHED AREAS WITH THE SPECIFIC APPROVAL OF THE ARCHITECT. 5. USE FLEXIBLE CONDUIT FOR THE CONNECTION TO RECESSED OR SEMI-RECESSED LIGHTING FIXTURES (6" LENGTH MAXIMUM) USE LIQUIDTIGHT METAL CONDUIT FOR ALL CONNECTIONS TO MOTORS AND OTHER EQUIPMENT SUBJECT TO VIBRATION AND IN AREAS SUBJECT TO MOISTURE. 6. USE WATER TIGHT JOINTS WITH BURIED AND CONCRETE ENCASED CONDUIT. ALL BURIED CONDUITS OUTSIDE OF BUILDINGS SHALL HAVE A MINIMUM OF 24" OF COVER UNLESS SHOWN OTHERWISE. METAL CONDUITS BURIED IN EARTH SHALL BE PAINTED (TWO COATS) WITH HEAVY ASPHALTUM PAINT. 7. SUPPORT RUNS OF CONDUIT AS DETAILED IN THE APPROPRIATE TABLE OF THE NATIONAL ELECTRICAL CODE (NEC). 8. INSTALL EXPOSED RUNS OF CONDUIT AND CONDUIT ABOVE LAY-IN CEILINGS PARALLEL OR PERPENDICULAR TO THE WALLS, STRUCUTURAL MEMBERS OF INTERSECTIONS OF VERTICAL PLANES AND CEILINGS. PROVIDE RIGHT ANGLE TURNS USING FITTINGS OR SYMMETRICAL BENDS. SUPPORT CONDUITS WITHIN 1" OF ALL CHANGES IN DIRECTION. 9. IF CONDUIT IS SUSPENDED, IT SHALL BE SUPPORTED ON TRAPEZE HANGERS WHICH USE "ALL-THREAD" RODS FROM THE STRUCTURAL STEEL. THE USE OF CEILING SUPPORT WIRE OR SIMILAR MATERIAL WILL NOT BE ACCEPTED. 10. INSTALL EMPTY CONDUIT FOR FUTURE USE AS INDICATED ON THE DRAWINGS. CONDUIT SHALL BE COMPLETE WITH JETLINE OR PULL ROPE, JUNCTION/OUTLET BOXES, TILE RINGS AND APPROPRIATE COVER PLATES. 11. PROVIDE PITCHPOCKETS WHERE CONDUITS PENETRATE THE ROOF. 12. THREAD LUBRICATION/SEALANT IS REQUIRED ON OUTDOOR AND UNDERGROUND THREADED METAL JOINTS. 13. INSTALL FIRE SEAL FITTINGS WHERE CONDUITS PENETRATE CONCRETE FLOOR SLABS OR MASONRY WALLS REQUIRED TO BE FIRE RATED. 14. HORIZONTAL PORTION OF CONDUIT EXPOSED ON THE ROOF AND FEEDING EQUIPMENT SHALL NOT BE MORE THAN 5'-0" UNLESS THE WRITTEN APPROVAL FROM ARCHITECT OR ENGINEER IS OBTAINED.

SURFACE RACEWAYS:

- 1. IN FINISHED AREAS WHERE BRANCH CIRCUITS CANNOT BE CONCEALED DUE TO EXISTING CONDITIONS, THE USE OF SURFACE MOUNTED RACEWAYS MAY BE PERMITTED. USE SURFACE METAL RACEWAY, CONSTRUCTED OF ENAMELED, SHEET METAL CHANNEL WITH FITTED COVER, COLOR & FINISH BY ARCHITECT. FURNISH STANDED COUPLERS, FITTINGS, BOXES, CONNECTORS, ELBOWS AND OTHER ACCESSORIES FOR A 100% COMPLETE INSTALLATION. EQUAL TO WIREMOLD OR APPROVED.

PULL & JUNCTION BOXES:

- 1. INSTALL PULL AND JUNCTION BOXES WHERE SHOWN ON THE DRAWINGS, AND WHERE REQUIRED FOR CHANGES IN DIRECTION, AT JUNCTION POINTS, AND TO FACILITATE WIRE PULLING. FURNISH BOX SIZES IN ACCORDANCE WITH NEC UNLESS LARGER BOXES ARE INDICATED. 2. PROVIDE STEEL BOXES AND COVER WITH CODE GAGE, HOT ROLLED SHEET STEEL, HOT DIPPED GALVANIZED INSIDE AND OUTSIDE FOR ABOVE GROUND WORK. FURNISH WEATHERPROOF BOXES WHEN INSTALLED ABOVE GROUND OUTSIDE. 3. PROVIDE CAST IRON BOXES, HOT DIPPED GALVANIZED INSIDE AND OUTSIDE WHERE SHOWN ON THE DRAWINGS. FURNISH REMOVABLE COVERS WITH GASKETS AND STAINLESS STEEL, BRASS OR BRONZE SCREWS. 4. PROVIDE CONCRETE BOXES FOR UNDERGROUND WORK UNLESS OTHERWISE INDICATED ON THE DRAWINGS. FURNISH STEEL FRAMES AND COVERS WITH THE COVER ATTACHED TO THE FRAME WITH HEXAGON HEAD, BRASS OR BRONZE CAP SCREWS, 3/8" DIAMETER. PROVIDE A RUBBER GASKET FOR SEALING BETWEEN THE COVER AND THE FRAME. PAINT THE COVER WITH TWO COATS OF HEAVY ASPHALTUM. 5. PROVIDE SIZE AS REQUIRED FOR NUMBER AND SIZE OF CONDUIT AND CONDUCTORS. COORDINATE DEPTH TO SUIT WALL DEPTH AND CONSTRUCTION. MAXIMUM NUMBER OF CONDUCTORS PERMITTED IN STANDARD BOXES SHALL BE AS LISTED IN N.E.C. INSTALL FLUSH RECESSED WHEREVER POSSIBLE AND SECURELY SUPPORTED FROM BUILDING CONSTRUCTION, O.Z./GEDNEY, CROUSE HINDS, T&B, STEEL CITY, RACO OR ACCEPTED EQUAL.

GROUNDING AND BONDING

- A. GENERAL: 1. ALL GROUNDING AND GROUNDING CIRCUITRY SHALL MEET OR EXCEED THE REQUIREMENTS OF NEC 2017, ARTICLE 250. RACEWAY SYSTEMS WHICH INCLUDES ALL METAL CONDUIT, PULLBOXES, JUNCTION BOXES, ENCLOSURES, MOTOR FRAMES, ETC. SHALL BE MADE TO FORM A CONTINUOUS CONDUCTING, PERMANENT GROUND CIRCUIT OF THE LOWEST PRACTICAL IMPEDANCE TO ENHANCE THE SAFE CONDUCTION OF GROUND FAULT CURRENTS AND TO PREVENT OBJECTIONABLE DIFFERENCES IN VOLTAGE BETWEEN METAL CURRENT CARRYING PARTS OF THE ELECTRICAL SYSTEM. PROVIDE A GREEN GROUNDING CONDUCTOR IN ALL CIRCUITS. CONDUIT SYSTEM SHALL NOT BE USED AS THE EQUIPMENT GROUNDING CONDUCTOR. CONDUCTOR SIZE SHALL BE AS REQUIRED BY NEC, ARTICLE 250. ALL EQUIPMENT GROUND BUS, GROUND PADS, FRAMES, ENCLOSURES, ETC SHALL HAVE SURFACES AT THE POINT OF CONNECTION THOROUGHLY CLEANED AND BRIGHTENED JUST PRIOR TO ACTUALLY MAKING THE CONNECTION. TOUCH-UP DAMAGED PAINTED SURFACES. SPLICES IN WIRE OR CABLE GROUNDING CONDUCTORS ARE PROHIBITED. SOLDER PROHIBITED FOR CONNECTIONS. 2. ALL CONDUITS SHALL CONTAIN A CODE-SIZED GROUND WIRE SIZE PER N.E.C. IN ADDITION TO THE CONDUCTORS SHOWN ON THE PLANS. WHERE CIRCUIT CONDUCTORS ARE INCREASED IN SIZE FOR VOLTAGE DROP, THE GROUND WIRE SIZE SHALL BE INCREASED PROPORTIONATELY. 3. ALL GROUNDING SYSTEMS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. ALL METHODS OF CONSTRUCTION THAT ARE NOT SPECIFICALLY DESCRIBED OR INDICATED IN THE CONTRACT DOCUMENTS SHALL BE SUBJECT TO THE CONTROL AND APPROVAL OF THE OWNER'S REPRESENTATIVE. 4. GROUND EACH OUTSIDE LIGHTING POLE SEPARATELY. 5. SEE CONTRACT DOCUMENTS FOR ADDITIONAL GROUNDING INFORMATION SPECIFIC TO THIS PROJECT.

CONDUCTORS:

- 1. EXPOSED GROUNDING CONDUCTORS SUCH AS BARS, STRAPS, CABLES, FLEXIBLE JUMPERS, BRAIDS, SHUNTS, ETC., SHALL BE BARE COPPER UNLESS OTHERWISE CALLED FOR. 2. CONDUCTORS SHALL BE COPPER. 3. PROVIDE CONDUCTORS WITH THHN/THWN INSULATION. SIZES #10 AWG AND SMALLER SHALL BE GREEN IN COLOR. CONDUCTOR SIZES #8 AWG AND LARGER MAY HAVE GREEN TAPED BANDS AT EACH END AND IN ALL PULLBOXES.

CONNECTORS, CLAMPS, TERMINALS:

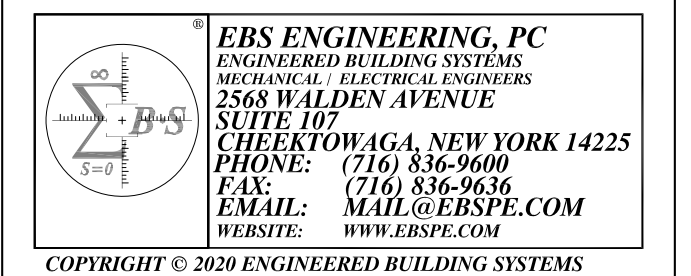
- 1. PROVIDE BRONZE MECHANICAL CONNECTORS AND CLAMPS. SOLDERLESS COMPRESSION TERMINALS SHALL BE COPPER, LONG BARREL, NEMA TWO BOLT.

TESTS:

- 1. GROUNDS AND GROUNDING SYSTEM SHALL HAVE A RESISTANCE TO SOLID EARTH GROUND NOT TO EXCEED THE FOLLOWING VALUES: a. FOR GROUNDING SECONDARY SERVICE NEUTRAL; 25 OHMS b. FOR GROUNDING NON-CURRENT CARRYING METAL PARTS ASSOCIATED WITH SECONDARY DISTRIBUTION SYSTEM; 25 OHMS. 2. PROVIDING GROUNDING TESTS TO VERIFY THE ABOVE VALUES. WHERE THESE VALUES ARE NOT MET, ADD ADDITIONAL GROUND RODS OR CONNECTIONS IN ORDER TO MEET THESE VALUES.

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ISSUE: 2020-05-01: ISSUED FOR BID

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SEAL:

ELECTRICAL SPECIFICATIONS



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SA JOB #: 19099.02 DATE: 4-6-2020

DRAWING #: E-9

WIRING DEVICES

A. GENERAL:

- PROVIDE WIRING DEVICES, IN TYPES, CHARACTERISTICS, GRADES AND ELECTRICAL RATINGS FOR APPLICATIONS INDICATED WHICH ARE UL LISTED AND WHICH COMPLY WITH NEMA WD 1 AND OTHER APPLICABLE UL AND NEMA STANDARDS.
- WIRING DEVICE COLOR SHALL BE SELECTED BY ARCHITECT, UNLESS OTHERWISE INDICATED.
- PROVIDE COVER OR DEVICE PLATES FOR OUTLET BOXES AS FOLLOWS UNLESS OTHERWISE NOTED:
 - FINISHED AREAS: THERMOPLASTIC – COLOR TO MATCH DEVICE.
 - UNFINISHED AREAS: ZINC COATED SHEET METAL, ALUMINUM, OR CAST METAL, AS APPROPRIATE FOR THE TYPE OF BOX.
 - EXTERIOR AREAS: COPPER FREE ALUMINUM WITH GRAY, POWDER EPOXY FINISH, GASKET, WEATHERPROOF, CROUSE-HINDS "WLRD" FOR DUPLEX RECEPTABLES AND "WLR3" FOR SINGLE RECEPTABLES OR EQUAL.
 - TELEPHONE, COMMUNICATION, AND SIGNAL OUTLET PLATES, SHALL MATCH THOSE USED FOR RECEPTABLES AND SWITCHES. ALL OUTLET AND/OR JUNCTION BOXES SHALL BE COMPLETE WITH A COVER PLATE BY THIS CONTRACTOR.
 - WHERE DEVICES ARE GANGED, THEY SHALL BE INSTALLED UNDER A COMMON COVERPLATE.
- LOCATE SWITCHES AND WALL SWITCH SENSORS AT A MAXIMUM HEIGHT OF 4'-0" A.F.F., MEASURED TO CENTER OF BOX, OR NEAREST BLOCK COURSE (WITHIN A.D.A. REQUIREMENTS) UNLESS OTHERWISE INDICATED. THE LONG DIMENSION OF THE SWITCHES SHALL BE VERTICAL. INSTALL ALL SWITCHES ON STRIKE SIDE OF DOOR.
- LOCATE RECEPTABLES AT A MINIMUM HEIGHT OF 1'-6" A.F.F., MEASURED TO CENTER OF BOX, OR NEAREST BLOCK COURSE (WITHIN A.D.A. REQUIREMENTS), UNLESS NOTED OTHERWISE. THE LONG DIMENSION OF RECEPTABLES SHALL BE VERTICAL.
- ALL WIRING DEVICES SHALL BE INSTALLED NEATLY AND PARALLEL WITH BUILDING LINES.

B. SUBMITTALS:

- SUBMIT DEVICE PRODUCT DATA SHEETS IDENTIFYING MANUFACTURE AND MODEL NUMBERS.

C. RECEPTABLES:

- PROVIDE NEMA CONFIGURATION 5-20R DUPLEX 125 VOLT GROUNDING TYPE RECEPTABLES RATED FOR 20 AMPERES UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- STANDARD RECEPTABLES SHALL BE SPECIFICATION GRADE.
- GFI RECEPTABLES SHALL BE SPECIFICATION GRADE.
- RECEPTABLES REQUIRING AMPERAGES, VOLTAGES OR CONFIGURATIONS DIFFERENT FROM THE DUPLEX CONVENIENCE RECEPTABLES ABOVE SHALL BE AS INDICATED ON THE DRAWINGS OR AS REQUIRED FOR EQUIPMENT SUPPLIED BY OTHERS.
- CONNECT WIRING DEVICE GROUNDING TERMINAL TO BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.
- PROVIDE OTHER RECEPTABLES OF A QUALITY, MATERIAL AND WORKMANSHIP EQUAL TO THAT OF ABOVE DESCRIPTIONS.
- ACCEPTABLE MANUFACTURES INCLUDED EATON/ARROW HART, LEGRAND (P&S), LUTRON, LEVITON OR APPROVED EQUAL. ALL DEVICES SELECTED FOR PROJECT SHALL BE SUPPLIED BY THE SAME MANUFACTURE.

D. WALL SWITCHES:

- PROVIDE SINGLE-POLE, THREE-WAY, AND FOUR-WAY 20A, 120/277 VOLT HEAVY-DUTY SPECIFICATION GRADE DEVICES WITH COPPER ALLOY CONTACT ARM, HEAVY DUTY BUMPER PADS FOR QUIET, SMOOTH OPERATION, HIGH STRENGTH THERMOPLASTIC POLYCARBONATE TOGGLE, AND SILVER ALLOY CONTACTS.
- ACCEPTABLE MANUFACTURES INCLUDE EATON/ARROW HART, LUTRON, LEVITON, LEGRAND OR APPROVED EQUAL. ALL DEVICES SELECTED FOR PROJECT SHALL BE SUPPLIED BY THE SAME MANUFACTURE.

E. WALL DIMMER / SWITCHES:

- PROVIDE SINGLE-POLE, THREE-WAY 120/277 VOLT SPECIFICATION GRADE 0-10V LED DIMMER DEVICES WITH THERMOPLASTIC POLYCARBONATE CONSTRUCTION. INCLUDE LOW-VOLTAGE CONTROL WIRING INSTALLED FROM CONTROLLER TO DESIGNATED LIGHT FIXTURES FOR DIMMING OPERATION.
- ACCEPTABLE MANUFACTURERS INCLUDE EATON/ARROW HART, LUTRON, LEVITON, LEGRAND OR APPROVED EQUAL. ALL DEVICES SELECTED FOR PROJECT SHALL BE SUPPLIED BY THE SAME MANUFACTURE.

F. AUTOMATIC LIGHTING CONTROL DEVICES:

- ALL LIGHTING CONTROL DEVICES MUST BE SELECTED, INSTALLED AND WIRED TO MEET CURRENT LOCAL AND STATE ENERGY CODE REQUIREMENTS. WHEN LOCAL AND STATE CODES ARE NOT APPLICABLE THE 2015 IECC (INTERNATIONAL ENERGY CONSERVATION CODE) SHALL BE APPLIED. ANY DISCREPANCIES BETWEEN THESE DESIGN DOCUMENTS AND CURRENT ENERGY CODES MUST BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO BID SUBMISSION.
- PROVIDE SINGLE RELAY, DUAL TECHNOLOGY, 120/277 VOLT, OCCUPANCY SENSOR WALL SWITCH, UNLESS OTHERWISE INDICATED IN DESIGN DOCUMENTS. BASIC PROGRAMMING SHALL INCLUDE MANUAL ON, AUTOMATIC OFF WITH THE OCCUPANCY SENSOR TIME DELAY SET FOR 15 MINUTES IN OFFICES, JANITOR CLOSETS, STORAGE RMS ETC. PER IECC. ALTERNATE PROGRAMMING SHALL INCLUDE AUTOMATIC ON, AUTOMATIC OFF WITH THE OCCUPANCY SENSOR TIME DELAY SET FOR 15 MINUTES IN RESTROOMS, CONFERENCE ROOMS, ETC. PER IECC. REMAINING PROGRAMMING OPTIONS SHALL BE FACTORY DEFAULT UNLESS OTHERWISE INDICATED OR REQUIRED.
- PROVIDE SINGLE ZONE, DUAL TECHNOLOGY 120/277V CEILING MOUNT DIMMING AND PHOTOCONTROL OCCUPANCY SENSOR WITH 360 DEGREE VIEWING ANGLE, UNLESS OTHERWISE INDICATED IN DESIGN DOCUMENTS. PROVIDE ALL REQUIRED POWER PACKS, SLAVE POWER PACKS, CONTROL UNITS, RELAYS, BACKBOXES, MOUNTING PLATES AND OTHER EQUIPMENT NECESSARY FOR PROPER SYSTEM OPERATION. BASIC PROGRAMMING SHALL INCLUDE OCCUPANCY SENSOR TIME DELAY SET FOR 15 MINUTES AND DIMMING SET TO 3V. REMAINING PROGRAMMING OPTIONS SHALL BE FACTORY DEFAULT UNLESS OTHERWISE INDICATED.
- ACCEPTABLE MANUFACTURERS INCLUDE SENSOR SWITCH, WATTSTOPPER, EATON/ARROW HART, LUTRON, LEVITON, LEGRAND OR APPROVED EQUAL. ALL DEVICES SELECTED FOR PROJECT SHALL BE SUPPLIED BY THE SAME MANUFACTURE.

LIGHTING

A. GENERAL:

- SEE SHEET E-1 FOR PROJECT LIGHT FIXTURE SPECIFICATIONS.
- ALL LIGHTING FIXTURES SHALL BE UL LISTED AND BARE THE UL LABEL OF APPROVAL
- LIGHT FIXTURE HOUSINGS RECESSED WITHIN FIRE RATED CEILINGS MUST BE SUPPLIED WITH FIRE RATED COVERS. UTILIZE TENMAT PRODUCTS OR EQUAL. CONFIRM FIRE RATED CEILING LOCATIONS AND TYPES WITH ARCHITECTURAL DRAWINGS.
- SET LEVEL, PLUMB, AND SQUARE WITH CEILINGS AND WALLS UNLESS OTHERWISE INDICATED.
- INSTALL LAMPS IN EACH LUMINAIRE AS NEEDED.
- FIXTURES SHALL BE SUPPORTED FROM BUILDING STRUCTURE.
- WHERE FIXTURES ARE INSTALLED ON DRYWALL CEILINGS, THEY SHALL BE SUPPORTED FROM THE CEILING FRAMING SYSTEM OR THE BUILDING STRUCTURE. SUPPORT FROM DRYWALL IS NOT ACCEPTABLE.
- NFPA 70 REQUIRES MINIMUM SUPPORT FOR FIXTURES. REFER TO "LAY-IN CEILING LIGHTING FIXTURES SUPPORTS" PARAGRAPH BELOW FOR MORE SPECIFIC SUPPORT REQUIREMENTS AND FOR REQUIREMENTS EXCEEDING CODE MINIMUMS. FOR PROJECTS REQUIRING SEISMIC DESIGN, ADDITIONAL SUPPORTS, AND RESTRAINING DEVICES BEYOND THOSE SPECIFIED HERE MAY BE REQUIRED.

B. SUBMITTALS:

- SUBMIT LIGHT FIXTURE DATA SHEETS IDENTIFYING MANUFACTURE AND MODEL NUMBERS.

C. LAY-IN CEILING LIGHTING FIXTURES SUPPORTS:

- USE GRID AS A SUPPORT ELEMENT.
- INSTALL CEILING SUPPORT SYSTEM RODS OR WIRES FOR EACH FIXTURE. LOCATE NOT MORE THAN 6 INCHES FROM LIGHTING FIXTURE CORNERS.
- SUPPORT CLIPS: FASTEN TO LIGHTING FIXTURES AND TO CEILING GRID MEMBERS AT OR NEAR EACH FIXTURE CORNER WITH CLIPS THAT ARE UL LISTED FOR THE APPLICATION.
- FIXTURES OF SIZES LESS THAN CEILING GRID: INSTALL AS INDICATED ON REFLECTED CEILING PLANS OR CENTER IN ACOUSTICAL PANEL, AND SUPPORT FIXTURES INDEPENDENTLY WITH AT LEAST TWO 3/4-INCH METAL CHANNELS SPANNING AND SECURED TO CEILING TEES.

D. SUSPENDED LIGHTING FIXTURE SUPPORT:

- PENDANTS AND RODS: WHERE LONGER THAN 48 INCHES (1200 MM), BRACE TO LIMIT SWINGING.
- STEM-MOUNTED, SINGLE-UNIT FIXTURES: SUSPEND WITH TWIN-STEM HANGERS.
- CONTINUOUS ROWS: USE TUBING OR STEM FOR WIRING AT ONE POINT AND TUBING OR ROD FOR SUSPENSION FOR EACH UNIT LENGTH OF FIXTURE CHASSIS, INCLUDING ONE AT EACH END.
- DO NOT USE GRID AS SUPPORT FOR PENDANT LUMINAIRES. CONNECT SUPPORT WIRES OR RODS TO BUILDING STRUCTURE.

E. GYPSUM CEILING LIGHTING FIXTURE SUPPORT

- USE CEILING BEAMS AS SUPPORT ELEMENT.
- INSTALL CEILING SUPPORT SYSTEM WIRES FOR EACH FIXTURE. LOCATE NOT MORE THAN 6 INCHES FROM LIGHTING FIXTURE CORN.
- SUPPORT SCREWS / WIRE TIES: FASTEN TO LIGHTING FIXTURES AND TO CEILING BEAMS AT OR NEAR FIXTURE CORNER

- IMMEDIATELY PRIOR TO OCCUPANCY, DAMP CLEAN ALL DIFFUSERS, GLASSWARE, FIXTURE TRIMS, REFLECTORS, LAMPS AND REPLACE BURNED OUT LAMPS.

SAFETY SWITCHES & FUSES

A. SWITCHES:

- SAFETY SWITCHES SHALL BE THE ENCLOSED HEAVY-DUTY TYPE (TYPE HD) WITH QUICK-MAKE, QUICK-BREAK MECHANISM AND EXTERNAL PAD LOCKABLE OPERATING HANDLE.
- SAFETY SWITCHES SHALL BE RATED FOR 240 OR 600 VOLTS AS APPLICABLE. THEY SHALL BE HORSEPOWER RATED WHEN USED IN MOTOR CIRCUITS.
- SAFETY SWITCHES SHALL BE FUSIBLE OR NON-FUSIBLE, 2, 3, OR 4 POLE AS INDICATED ON THE DRAWINGS.
- SAFETY SWITCHES SHALL BE SINGLE THROW UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- ENCLOSURES SHALL BE NEMA 1 INDOORS AND NEMA 3R OUTDOORS UNLESS OTHERWISE INDICATED ON DRAWINGS.
- MANUFACTURER SHALL BE SQUARE D, SIEMENS, OR CUTLER-HAMMER. ALL SAFETY SWITCHES SHALL BE BY ONE MANUFACTURER.
- MOUNT THE SAFETY SWITCHES SECURELY BETWEEN 3' X 6' LEVELS ABOVE THE FLOOR UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- SWITCHES ON BLOCK WALLS SHALL BE MOUNTED ON A 3/4" PLYWOOD BACKBOARD, WHERE LOCATED INDOORS.

B. FUSES:

- THE CONTRACTOR SHALL FURNISH A COMPLETE SET OF FUSES FOR ALL SWITCHES, PLUS FUSIBLE EQUIPMENT FURNISHED BY OTHER TRADES. UNLESS INDICATED OTHERWISE ON PLANS, THE FUSES SHALL BE OF THE FOLLOWING TYPES:
 - FUSES 601 TO 6000 AMPS SHALL BE UL CLASS. TRADE TYPE SHALL BE KRP-C AS MANUFACTURED BY THE BUSSMANN COMPANY.
 - FUSES 1/10 TO 600 AMPS SHALL BE UL CLASS RK1. TRADE TYPE SHALL BE LOW PEAK LPS-RK (600V) AND LPN-RK (250V) AS MANUFACTURED BY BUSSMANN COMPANY.
 - ALL OTHER FUSES SHALL BE DUAL-ELEMENT CURRENT-LIMITING TYPE WITH 200,000 AMPERES SYMMETRICAL INTERRUPTING CAPACITY.
 - FUSES SHALL BE MANUFACTURED BY BUSSMANN, GOULD-SHALMUTT, OR RELJANCE.
 - SPARE FUSES AMOUNTING TO A DUPLICATE SET OF EACH SIZE INSTALLED SHALL BE TURNED OVER TO THE OWNER UPON COMPLETION OF THE PROJECT. PROVIDE AND PLACE IN A SPARE FUSE CABINET SIMILAR TO BUSSMANN # SFC.
 - THIS CONTRACTOR SHALL REPLACE ALL FUSES BLOWN DURING CONSTRUCTION.

C. MOTOR CONTROLLERS:

- TYPE A (FULL VOLTAGE, NON-MAGNETIC, SINGLE PHASE): TOGGLE SWITCH, STAINLESS STEEL ENCLOSURE, THERMOPLASTIC COVERPLATE; SIEMENS CLASS SMF SERIES, OR ACCEPTED EQUAL.
- TYPE A1 (FULL VOLTAGE, NON-MAGNETIC SINGLE PHASE): SIMILAR TO TYPE A ABOVE, EXCEPT WITH RED PILOT LIGHT; SIEMENS CLASS SMF SERIES, OR ACCEPTED EQUAL.
- TYPE B (FULL VOLTAGE MAGNETIC): NEMA 1 ENCLOSURE WITH PILOT LIGHT; SIEMENS CLASS 14 SERIES WITH AUXILIARY CONTACTS, OR ACCEPTED EQUAL.
- TYPE B1 (FULL VOLTAGE, COMBINATION MAGNETIC): FUSIBLE DISCONNECT SWITCH TYPE, NEMA 1 ENCLOSURE, PILOT LIGHT AND HOA IN COVER; SIEMENS CLASS 17 SERIES WITH AUXILIARY CONTACTS, OR ACCEPTED EQUAL.

PANELBOARDS

A. MANUFACTURER:

- ALL EQUIPMENT IDENTIFIED IN THIS SECTION, AND THROUGHOUT DESIGN DOCUMENTS, IS BASED ON THE MANUFACTURER OF SQUARE-D. ACCEPTABLE ALTERNATE MANUFACTURES INCLUDE CUTLER-HAMMER, SIEMENS OR EQUAL PROVIDED EQUIPMENT MEETS ALL DESIGN CRITERIA AND PHYSICAL CHARACTERISTICS OF THE PROJECT.

B. SUBMITTALS:

- SUBMIT EQUIPMENT DATA SHEETS INCLUDING CIRCUIT BREAKERS AND ALL ASSOCIATED ACCESSORIES. INFORMATION SHALL INCLUDE EQUIPMENT MANUFACTURE, MODEL NUMBERS AND APPLICABLE SHOP DRAWINGS.

C. GENERAL:

- MAIN DISTRIBUTION PANEL SHALL BE FULLY RATED TO INTERRUPT SYMMETRICAL SHORT CIRCUIT AT THE TERMINALS.
- PANELBOARDS SHALL BE LABELED WITH PHENOLIC NAMEPLATES INSCRIBED AS INDICATED ON THE DRAWINGS. PROVIDE ARC FLASH ANALYSIS WITH WARNING LABELS AFFIXED TO PANELBOARDS AS REQUIRED BY NFPA 70 AND 70E.
- PANELBOARDS SHALL BE ENCLOSED DEAD FRONT SAFETY TYPE WITH FEATURES AND RATINGS AS SCHEDULED ON THE DRAWINGS.
- PANELBOARDS SHALL HAVE COPPER OR ALUMINUM (SEE #5 BELOW) BUS WITH BOLTED BREAKERS, FULLY RATED NEUTRAL BUS AND FULLY RATED INTERRUPTING CAPACITY; NO SERIES RATED SYSTEM PERMITTED. PROVIDE WITH BLANK END WALLS (NO PRE-PUNCHED BOXES), DOOR-IN-DOOR OR HINGED TRIM, INTERRUPTING RATING AS CALLED FOR, 24 CIRCUIT MINIMUM PANEL SIZE, FLUSH OR SURFACE MOUNTED AS INDICATED.
- ALL BUS BARS SHALL BE RECTANGULAR SOLID COPPER. ALUMINUM BUS BARS ARE ACCEPTABLE WHEN ALUMINUM FEEDERS ARE SPECIFIED.
- PANELS KNOWN AS "LOAD CENTERS" ARE UNACCEPTABLE.
- SPACES, AS IDENTIFIED IN PANEL SCHEDULES, FOR FUTURE PROTECTIVE DEVICES SHALL INCLUDE BUS AND SUPPORT.
- INSTALL CABINETS SO THAT CENTER OF THE TOP BREAKER DOES NOT EXCEED 6'-6" ABOVE THE FINISHED FLOOR. APARTMENT UNIT LOAD CENTERS SHALL BE INSTALLED AT HEIGHTS TO MEET ADA REQUIREMENTS.
- MOLDED CASE CIRCUIT BREAKERS SHALL BE AS SCHEDULED ON THE DRAWINGS AND SPECIFIED IN THIS DIVISION.
- ALL BREAKERS SHALL BE BOLT-ON TYPE. PUSH-ON TYPE ARE ONLY ACCEPTABLE FOR USE IN "LOAD CENTERS".
- ALL BOLTED CONNECTIONS SHALL BE TORQUED IN ACCORDANCE WITH MANUFACTURER'S STANDARDS.
- ELECTRICAL CONTRACTOR SHALL ARRANGE CIRCUITS AS NEAR AS POSSIBLE TO CIRCUIT NUMBERS ON THE DRAWINGS. AT COMPLETION OF JOB, ELECTRICAL CONTRACTOR SHALL TAKE CURRENT READING CHECKS OF RESPECTIVE PHASES. A MINIMUM OF CIRCUIT CONNECTIONS SHALL BE REARRANGED TO BALANCE, AS CLOSELY AS POSSIBLE, THE LOAD IN THE PANEL.
- GFCI CIRCUIT BREAKERS: SINGLE-POLE AND TWO-POLE CONFIGURATIONS WITH CLASS A GROUND-FAULT PROTECTION (6-MA TRIP).
- GROUND-FAULT EQUIPMENT PROTECTION (GFEP) CIRCUIT BREAKERS: CLASS B GROUND-FAULT PROTECTION (30-MA TRIP).
- ARC-FAULT CIRCUIT INTERRUPTER (AFCI) CIRCUIT BREAKERS: COMPLY WITH UL 1699; 120/240-V, SINGLE-POLE CONFIGURATION.
- PROVIDE (3) SPARE 1" CONDUITS INTO ACCESSIBLE CEILING SPACE WHERE PANELS ARE FLUSH-MOUNTED. PROVIDE REMOVABLE CAP OR PLUG AT CONDUIT AND ABOVE CEILING.
- ENTRIES ON DIRECTORY CARDS SHALL BE TYPED, COMPLETE AND ACCURATE.

LOW-VOLTAGE TRANSFORMERS

PART 1 – GENERAL

A. RELATED DOCUMENTS:

- DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

B. SUMMARY:

- THIS SECTION INCLUDES THE FOLLOWING TYPES OF DRY-TYPE TRANSFORMERS RATED 600 V AND LESS, WITH CAPACITIES UP TO 1000 KVA:
 - DISTRIBUTION TRANSFORMERS.

C. SUBMITTALS:

- PRODUCT DATA: INCLUDE RATED NAMEPLATE DATA, CAPACITIES, WEIGHTS, DIMENSIONS, MINIMUM CLEARANCES, INSTALLED DEVICES AND FEATURES, AND PERFORMANCE FOR EACH TYPE AND SIZE OF TRANSFORMER INDICATED.
- SHOP DRAWINGS: DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, WEIGHTS, LOADS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATION AND SIZE OF EACH FIELD CONNECTION.
 - WIRING DIAGRAMS: POWER, SIGNAL, AND CONTROL WIRING.

D. QUALITY ASSURANCE:

- TESTING AGENCY QUALIFICATIONS: AN INDEPENDENT AGENCY, WITH THE EXPERIENCE AND CAPABILITY TO CONDUCT THE TESTING INDICATED, THAT IS A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AS DEFINED BY OSHA IN 29 CFR 1910.7.
- SOURCE LIMITATIONS: OBTAIN EACH TRANSFORMER TYPE THROUGH ONE SOURCE FROM A SINGLE MANUFACTURER.
- ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
- COMPLY WITH IEEE C57.12.91, "TEST CODE FOR DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS."

E. DELIVERY, STORAGE, AND HANDLING:

- TEMPORARY HEATING: APPLY TEMPORARY HEAT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS WITHIN THE ENCLOSURE OF EACH VENTILATED-TYPE UNIT, THROUGHOUT PERIODS DURING WHICH EQUIPMENT IS NOT ENERGIZED AND WHEN TRANSFORMER IS NOT IN A SPACE THAT IS CONTINUOUSLY UNDER NORMAL CONTROL OF TEMPERATURE AND HUMIDITY.

F. COORDINATION:

- COORDINATE SIZE AND LOCATION OF CONCRETE BASES WITH ACTUAL TRANSFORMER PROVIDED. CAST ANCHOR-BOLT INSERTS INTO BASES. CONCRETE, REINFORCEMENT, AND FORMWORK REQUIREMENTS ARE SPECIFIED WITH CONCRETE.
- COORDINATE INSTALLATION OF WALL-MOUNTING AND STRUCTURE-HANGING SUPPORTS WITH ACTUAL TRANSFORMER PROVIDED.

PART 2 – PRODUCTS

A. MANUFACTURERS:

- AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - EATON ELECTRICAL SECTOR: EATON CORPORATION; CUTLER-HAMMER PRODUCTS.
 - FEDERAL PACIFIC TRANSFORMER COMPANY.
 - GENERAL ELECTRIC COMPANY.
 - SIEMENS ENERGY & AUTOMATION, INC.
 - SQUARE D CO./GRUPEL SCHNEIDER NA; SCHNEIDER ELECTRIC.

B. GENERAL TRANSFORMER REQUIREMENTS:

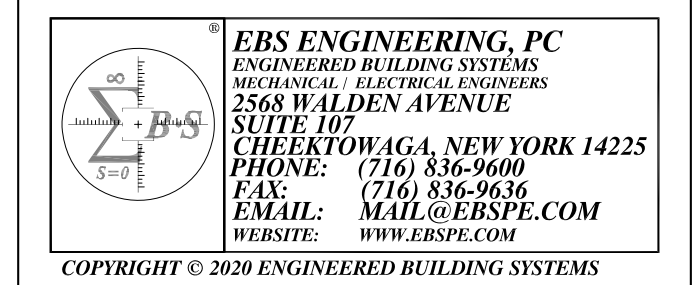
- DESCRIPTION: FACTORY-ASSEMBLED AND -TESTED, AIR-COOLED UNITS FOR 60-HZ SERVICE.
- CORES: GRAIN-ORIENTED, NON-AGING SILICON STEEL.
- COILS: CONTINUOUS WINDINGS WITHOUT SPLICES EXCEPT FOR TAPS.
 - INTERNAL COIL CONNECTIONS: BRAZED OR PRESSURE TYPE.
 - COIL MATERIAL: ALUMINUM.

C. DISTRIBUTION TRANSFORMERS:

- COMPLY WITH NEMA ST 20, AND LIST AND LABEL AS COMPLYING WITH UL 1561.
- CORES: ONE LEG PER PHASE.
- ENCLOSURE: VENTILATED, NEMA 250, TYPE 2.
 - CORE AND COIL SHALL BE ENCAPSULATED WITHIN RESIN COMPOUND, SEALING OUT MOISTURE AND AIR.
- TRANSFORMER ENCLOSURE FINISH: COMPLY WITH NEMA 250.
 - FINISH COLOR: GRAY.
- TAPS FOR TRANSFORMERS SMALLER THAN 3KVA: NONE.
- TAPS FOR TRANSFORMERS 7.5 TO 24KVA: ONE 5 PERCENT TAP ABOVE AND ONE 5 PERCENT TAP BELOW NORMAL FULL CAPACITY.
- TAPS FOR TRANSFORMERS 25KVA AND LARGER: TWO 2.5 PERCENT TAPS ABOVE AND TWO 2.5 PERCENT TAPS BELOW NORMAL FULL CAPACITY.
- INSULATION CLASS: 220 DEG. C, UL-COMPONENT-RECOGNIZED INSULATION SYSTEM WITH A MAXIMUM OF 115 DEG. C RISE ABOVE 40 DEG. C AMBIENT TEMPERATURE.
- ENERGY EFFICIENCY FOR TRANSFORMERS RATED 15 KVA AND LARGER:
 - COMPLYING WITH THE ENERGY POLICY ACT BASED ON DOE 10 CFR431.
 - COMPLYING WITH NEMA TP 1, CLASS 1 EFFICIENCY LEVELS.
 - TESTED ACCORDING TO NEMA TP 2.
- K-FACTOR RATING: TRANSFORMERS INDICATED TO BE K-FACTOR RATED SHALL COMPLY WITH UL 1561 REQUIREMENTS FOR NONSINUSOIDAL LOAD CURRENT-HANDLING CAPABILITY TO THE DEGREE DEFINED BY DESIGNATED K-FACTOR.
 - UNIT SHALL NOT OVERHEAT WHEN CARRYING FULL-LOAD CURRENT WITH HARMONIC DISTORTION CORRESPONDING TO DESIGNATED K-FACTOR.
 - INDICATE VALUE OF K-FACTOR ON TRANSFORMER NAMEPLATE.
- ELECTROSTATIC SHIELDING: EACH WINDING SHALL HAVE AN INDEPENDENT, SINGLE, FULL-WIDTH COPPER ELECTROSTATIC SHIELD ARRANGED TO MINIMIZE INTERWINDING CAPACITANCE.
 - ARRANGE COIL LEADS AND TERMINAL STRIPS TO MINIMIZE CAPACITIVE COUPLING BETWEEN INPUT AND OUTPUT TERMINALS.
 - INCLUDE SPECIAL TERMINAL FOR GROUNDING THE SHIELD.
 - SHIELD EFFECTIVENESS:
 - CAPACITANCE BETWEEN PRIMARY AND SECONDARY WINDINGS: NOT TO EXCEED 33 PICOFARADS OVER A FREQUENCY RANGE OF 20 HZ TO 1 MHZ.
 - COMMON-MODE NOISE ATTENUATION: MINIMUM OF MINUS 120 DBA AT 0.5 TO 1.5 KHZ; MINIMUM OF MINUS 85 DBA AT 1.5 TO 100 KHZ.
 - NORMAL-MODE NOISE ATTENUATION: MINIMUM OF MINUS 52 DBA AT 1.5 TO 10 KHZ.
- WALL BRACKETS: MANUFACTURER'S STANDARD BRACKETS.
- LOW-SOUND-LEVEL REQUIREMENTS: MINIMUM OF 3 DBA LESS THAN NEMA ST 20 STANDARD SOUND LEVELS WHEN FACTORY TESTED ACCORDING TO IEEE C57.12.91.

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ISSUE:

2020-05-01: ISSUED FOR BID

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PROJ. ARCH. S.Hunt DRAFTER _____

JOB CAPT. _____ INTERIORS N.Catuzza

SEAL:

TITLE:

**ELECTRICAL
SPECIFICATIONS**



**SILVESTRI
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SA JOB #:

19099.02

DATE:

4-6-2020

DRAWING #:

E-10

FIRE ALARM SYSTEM SPECIFICATION

- A. GENERAL:**
1. THE FIRE ALARM SYSTEM IS EXISTING ADDRESSABLE TYPE. FIELD VERIFY, MANUFACTURE AND MODEL. NEW DEVICES IDENTIFIED IN DESIGN DOCUMENTS MUST BE COMPATIBLE WITH EXISTING SYSTEM.
- B. SUBMITTALS:**
1. INCLUDE THE FOLLOWING ITEMS FOR REVIEW BY THE ENGINEER OF RECORD AND LOCAL BUILDING DEPARTMENT.
a. DEVICE DATA SHEETS, INFORMATION SHALL INCLUDE EQUIPMENT MANUFACTURE AND MODEL NUMBERS.
b. BATTERY CALCULATIONS.
c. RISER DIAGRAM IDENTIFYING DEVICES, CONDUCTOR TYPES / SIZES, CANDELA RATINGS AND REQUIRED POWER SUPPLIES TO FACILITATE ENTIRE SYSTEM INSTALLATION.
d. SHOP DRAWINGS INDICATING THE USE OF ALL ROOMS WITH LOCATIONS OF ALARM AND INITIATING DEVICES IN COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS.
NOTE: CAD FILES OF THE FIRE ALARM DESIGN DOCUMENTS WILL BE PROVIDED UPON REQUEST.
- C. COMPLIANCE:**
1. SYSTEM AND INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE STANDARDS AND REQUIREMENTS OF THE NFPA INCLUDING:
a. NFPA 70 – INCLUDING ARTICLE 760 (NEC)
b. NFPA 72 – COMPLETE
c. NFPA 101
d. APPLICABLE REQUIREMENTS OF THE LOCAL TOWN
2. ALL EQUIPMENT SHALL BE "UL" LISTED UNDER THE FIRE PROTECTION DIRECTORY AND SUPPLEMENTS.
- D. INSTALLATION:**
1. STEEL OUTLET OR METAL BACK BOXES SHALL BE PROVIDED FOR ALL COMPONENTS OF THE SYSTEM.
2. ALL WIRING FOR THIS SYSTEM SHALL BE CONCEALED WITHIN THE BUILDING STRUCTURE AND FINISHES.
3. "UL" LISTED AND APPROVED FIRE ALARM CABLE MAY BE EMPLOYED FOR THE COMPLETE SYSTEM AND SHALL BE FULLY CONCEALED. FIRE ALARM CABLE SHALL BE "PLENUM" RATED CONSISTING OF #14 (MINIMUM SIZE) COPPER CONDUCTORS WITH HYPALON OR TEFLON INSULATION AND JACKET. THE OUTER JACKET SHALL BE RED IN COLOR. WHERE EXPOSED, FIRE ALARM CABLE SHALL BE INSTALLED IN EMT CONDUIT, SIZE AS REQUIRED.
4. FIRE ALARM WIRING SYSTEM SHALL BE CONFIGURED AS CLASS "B".
5. PROVIDE GALVANIZED CHASE NIPPLE (OR SIMILAR PLASTIC FITTING) WHERE CABLES ENTER OUTLET BOXES, BACKBOXES, PANELS ETC.
- E. CONTROL PANEL**
1. EXISTING ADDRESSABLE TYPE.
- F. DEVICES:**
1. PULLSTATIONS SHALL BE DUAL ACTION, RED IN COLOR LABELED "FIRE".
2. AUDIO/VISUAL (HORN/STROBE) SHALL BE RED IN COLOR LABELED "FIRE" WITH FIELD SELECTABLE CANDELA RATINGS (15, 30, 75, 95, 110) AS REQUIRED FOR SPACES COVERED.
3. VISUAL (STROBE) DEVICES SHALL BE RED IN COLOR LABELED "FIRE", WITH FIELD SELECTABLE CANDELA RATINGS (15, 30, 75, 95, 110) AS REQUIRED FOR SPACES COVERED.
4. SMOKE DETECTORS SHALL BE PHOTOELECTRIC TYPE WITH STANDARD BASE UNLESS OTHERWISE INDICATED.
5. HEAT DETECTORS SHALL BE 190° FIXED TEMPERATURE WITH STANDARD BASE UNLESS OTHERWISE INDICATED.
6. CO DETECTORS SHALL HAVE AN AUDIBLE BASE PROVIDING A TEMPORAL 4 NOTIFICATION TONE.
7. SEE "FIRE ALARM SYSTEM SCHEDULE" ON SHEET E-1 FOR FURTHER INFORMATION ON SYSTEM DEVICES.
- G. COMMISSIONING**
1. THE COMPLETED FIRE ALARM SYSTEM SHALL BE FULLY TESTED IN THE PRESENCE OF: THE OWNER'S REPRESENTATIVE, CITY REPRESENTATIVE, THE ARCHITECT/ENGINEER, THE CONTRACTOR AND THE FACTORY AUTHORIZED REPRESENTATIVE OF THE MANUFACTURER. UPON COMPLETION OF A SUCCESSFUL TEST, THE CONTRACTOR SHALL SO CERTIFY, IN WRITING, TO THE JURISDICTION HAVING AUTHORITY, OWNER, ARCHITECT AND THE ENGINEER.
2. THE CONTRACTOR SHALL WARRANTY THE COMPLETED FIRE ALARM SYSTEM EQUIPMENT, WIRING AND INSTALLATION, TO BE FREE FROM INHERENT DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE CERTIFIED TEST.

COMMUNICATIONS SPECIFICATIONS (TELEPHONE / DATA)

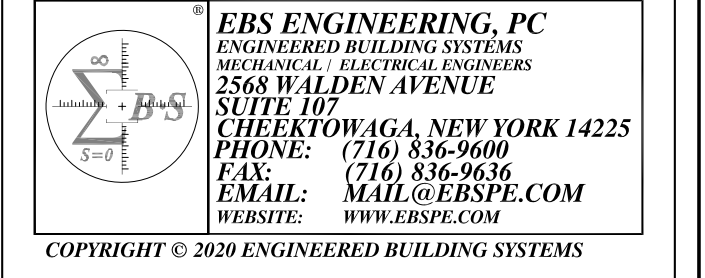
- A. GENERAL**
1. THIS SPECIFICATION OUTLINES REQUIREMENTS FOR TELEPHONE / DATA NETWORK SYSTEM (VoIP).
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND SERVICE REQUIRED TO PERFORM THE WORK DESIGNATED IN THIS SPECIFICATION. ALL TOOLS, LADDERS, TEST EQUIPMENT AND OTHER ITEMS USED IN THE PERFORMANCE OF THIS WORK SHALL BE PROVIDED BY THE CONTRACTOR.
- B. SUBMITTALS**
1. SUBMIT PRODUCT DATA SHEETS.
- C. SITE PREPARATION – SERVER ROOM**
1. THE CONTRACTOR SHALL SUPPLY AND INSTALL FOUR(4) 3/4" THICK INTERIOR GRADE PLYWOOD BOARDS, MEASURING 4' X 8'. PLACE AS INDICATE ON THE DRAWINGS UNLESS OTHERWISE DIRECTED BY OWNER I.T. PERSONAL.
2. THE BOARDS SHALL FIRE RATED.
3. THE BOARDS ARE TO BE FIXED TO THE WALL IN A MANNER THAT IT WILL BE ABLE TO SUPPORT APPROXIMATELY 300 LBS OF EQUIPMENT.
4. SUPPLY 12" LONG COPPER BUS BAR AND MOUNT ON PLYWOOD BACK BOARD USING 1" STANDOFFS. GROUND TO BUILDING GROUNDING SYSTEM USING #6 AWG. CU.
- D. SERVER ROOM EQUIPMENT RACKS**
1. THE CONTRACTOR SHALL SUPPLY AND INSTALL TWO ALUMINUM 7 FOOT (84") HIGH 19" WIDE EQUIPMENT RACKS.
2. THE EQUIPMENT RACKS ARE TO BE PLACED AS SHOWN ON THE DRAWING UNLESS OTHERWISE DIRECTED BY OWNER I.T. PERSONAL. FINAL LOCATIONS MUST BE CONFIRMED BY OWNER PRIOR TO INSTALLATION.
3. EACH EQUIPMENT RACK IS TO HAVE PANDUIT OR TYTON STYLE FINGER DUCTWORK WIRE MANAGER INSTALLED ON BOTH SIDES.
4. THIS DUCTWORK IS TO RUN THE FULL LENGTH OF BOTH SIDES OF EACH EQUIPMENT RACK.
5. THE DUCTWORK WILL CONSIST OF TWO SEPARATE CAVITIES; THE FRONT BEING FOR PATCH CORDS WITH THE REAR BEING DEDICATED FOR STATION CABLING.
6. CABLE LADDER IS TO BE INSTALLED ABOVE EACH RACK FOR USE OF A CABLE GUIDE. CONTRACTOR SHALL FIELD VERIFY LADDER REQUIREMENTS AND PROVIDE AN INSTALLATION THAT BEST SUITS THE APPLICATION.
7. EQUIPMENT RACKS WILL BE CONFIGURED AS DIRECTED BY OWNER I.T. PERSONAL. THE CONTRACTOR IS TO PROVIDE ALL OF THE FOLLOWING LISTED EQUIPMENT FOR EACH EQUIPMENT RACK;
a.) FOUR(4) FINGER DUCT WIRE MANGER, 2 UNIT HEIGHT, DUCTWORK MINIMUM FRONT CAVITY DEPTH 5" WITH A MINIMUM REAR CAVITY OF AT LEAST 3" (EXAMPLE PANDUIT MODEL WMF1E).
b.) FOUR(4) 48 PORT CAT.6 PATCH PANELS WITH 110 REAR WIRED TO 568B WIRING STANDARD; PREFERABLY WITH CENTERED OR SLANTED FACE FOR EASE OF DISTRIBUTION OF PATCH CORDS.
8. HORIZONTAL CABLING WILL BE RUN INTO THE REAR OF THE PATCH PANELS AND EQUIPMENT RACKS SO THAT THE CABLE IS SPLIT, ENTERING AND BEING DISTRIBUTED FROM BOTH SIDES OF THE REAR OF THE RACK. THIS ALLOWS FOR BOTH SIDES OF THE REAR DUCTWORK TO BE UTILIZED FOR CABLE PATHWAY.
9. THE CABLING IS TO EGRESS FROM THE CEILING AND ENTER THE REAR DUCT CAVITIES IN THE MOST DIRECT MANNER.
10. A MINIMUM OF 3' AND NOT MORE THAN 6' OF CABLE SLACK IS TO BE LEFT WITHIN THE DUCTWORK OF EACH RACK AND AN ADDITIONAL 15' SHOULD BE LEFT NEATLY COILED ABOVE THE CEILING TO PROVIDE FOR LIMITED MOVES, ADDS AND CHANGES.
11. ALL CABLE IS TO BE DRESSED AS NEATLY AS POSSIBLE.
- E. CABLING:**
1. THE CONTRACTOR SHALL PROVIDE CATEGORY 6 PLENUM RATED CABLING WITH BLUE OUTER JACKET.
- F. GENERAL HORIZONTAL CABLING:**
1. THE CONTRACTOR SHALL NUMBER AND LABEL ALL DATA DROPS TO MEET OWNER REQUIREMENTS. VERIFY WITH OWNER I.T. REPRESENTATIVE IF A SPECIFIC NUMBERING SYSTEM IS TO BE APPLIED.
2. ALL CONNECTORS ARE TO BE PLACED IN FLUSH MOUNTED WALL PLATES. SEE SHEET E-1 FOR FURTHER WALL PLATE SPECIFICATIONS.
3. TEN(10) FEET OF SLACK IS TO BE LEFT NEATLY COILED IN THE CEILING DIRECTLY ABOVE THE WALL OUTLETS. THIS IS TO PROVIDE SUFFICIENT SLACK ON CABLING FOR LIMITED FUTURE MOVES, ADDS AND CHANGES.
4. ALL CABLE IS TO BE RUN THROUGH THE OFFICE SPACE IN A SYSTEMATIC MANNER IN WHICH THE CABLE PATH FOLLOWS THAT OF THE EXTERIOR WALLS, HALLWAYS UNTIL THE CABLE IS TO BREAK OUT FROM THE GROUP HEADING TOWARDS THE INDIVIDUAL OUTLETS.
5. ALL CABLES SHALL EMANATE FROM PATCH PANELS IN SERVER ROOM UNLESS OTHERWISE INDICATED.
6. CABLING IS TO BE SUPPORTED BY DEDICATED CABLE HANGERS OR LADDERS AND IS TO BE RUN THROUGHOUT THE OFFICE SPACE USING.
7. ALL CABLES IN GROUPS OF MORE THAN 6 CABLES MUST BE SUPPORTED BY THIS DEDICATED NETWORK OF HANGERS OR LADDERS.
8. IF HANGERS ARE TO BE USED, ALL HANGERS ARE TO BE PLACED AT INTERNALS OF BETWEEN 3 TO 6 FEET APART.
9. ANY CABLE GROUP LESS THAN 6 CABLES CAN BE SUPPORTED BY THE EXISTING STRUCTURES SUCH AS CEILING GRID HANGERS.
10. AVOID LAYING CABLING DIRECTLY ON CEILING GRID / TILE SYSTEM.
- G. MANUFACTURE**
1. UTILIZE LEVITON PRODUCTS. ALTERNATE MANUFACTURE MUST BE APPROVED BY BOTH THE OWNER AND ENGINEER PRIOR TO SUBMITTAL PHASE.

CABLE TELEVISION SPECIFICATIONS (CATV)

- A. GENERAL:**
1. THIS SPECIFICATION OUTLINES REQUIREMENTS FOR CATV CABLING INFRASTRUCTURES.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND SERVICE REQUIRED TO PERFORM THE WORK DESIGNATED IN THIS SPECIFICATION. ALL TOOLS, LADDERS, TEST EQUIPMENT AND OTHER ITEMS USED IN THE PERFORMANCE OF THIS WORK SHALL BE PROVIDED BY THE CONTRACTOR.
- B. SUBMITTALS**
1. SUBMIT PRODUCT DATA SHEETS.
- C. SERVER ROOM:**
1. UNLESS OTHERWISE SUPPLIED BY LOCAL CATV PROVIDER, THE CONTRACTOR SHALL SUPPLY AND INSTALL A CABLE TELEVISION DISTRIBUTION BLOCK TO SUPPORT TENANT F-CONNECTOR WALL PLATES. MOUNT ON PLYWOOD BACKBOARD IN SERVER ROOM. COORDINATE LOCATION WITH OTHER EQUIPMENT ITEMS MOUNTED ON BACKBOARD.
2. ROUTE INCOMING CATV SERVICE TO DISTRIBUTION BLOCK. COORDINATE INSTALLATION WITH OWNER, G.C. AND LOCAL CATV PROVIDER. AN ADDITIONAL 15' OF CABLE SHOULD BE LEFT NEATLY COILED ABOVE THE CEILING TO PROVIDE FOR LIMITED MOVES, ADDS AND CHANGES.
- D. CABLING:**
1. THE CONTRACTOR SHALL PROVIDE RG-6 PLENUM RATED CABLING WITH BLACK OUTER JACKET.
- E. GENERAL HORIZONTAL CABLE RUNS:**
1. TEN(10) FEET OF SLACK IS TO BE LEFT NEATLY COILED IN THE CEILING DIRECTLY ABOVE THE WALL OUTLETS AND DISTRIBUTION BLOCK. THIS IS TO PROVIDE SUFFICIENT SLACK ON CABLING FOR LIMITED FUTURE MOVES, ADDS AND CHANGES.
2. ALL CABLE IS TO BE RUN THROUGH THE OFFICE SPACE IN A SYSTEMATIC MANNER IN WHICH THE CABLE PATH FOLLOWS THAT OF THE EXTERIOR WALLS, HALLWAYS UNTIL THE CABLE IS TO BREAK OUT FROM THE GROUP HEADING TOWARDS THE INDIVIDUAL OUTLETS.
3. ALL CABLES SHALL EMANATE FROM DISTRIBUTION BLOCK IN SERVER ROOM.
4. CABLING SHALL SHARE SUPPORTS WITH COMMUNICATIONS CABLING TO BE RUN THROUGHOUT THE OFFICE SPACE.
5. ANY CABLE GROUP LESS THAN 6 CABLES CAN BE SUPPORTED BY THE EXISTING STRUCTURES SUCH AS CEILING GRID HANGERS.
6. AVOID LAYING CABLING DIRECTLY ON CEILING GRID / TILE SYSTEM.
- F. MANUFACTURE**
1. UTILIZE LEVITON PRODUCTS. ALTERNATE MANUFACTURE MUST BE APPROVED BY BOTH THE OWNER AND ENGINEER PRIOR TO SUBMITTAL PHASE.

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ISSUE:
2020-05-01: ISSUED FOR BID

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SEAL:

TITLE:
**FIRE ALARM &
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SA JOB #: **19099.02** DATE: **4-6-2020**

DRAWING #: **E-11**