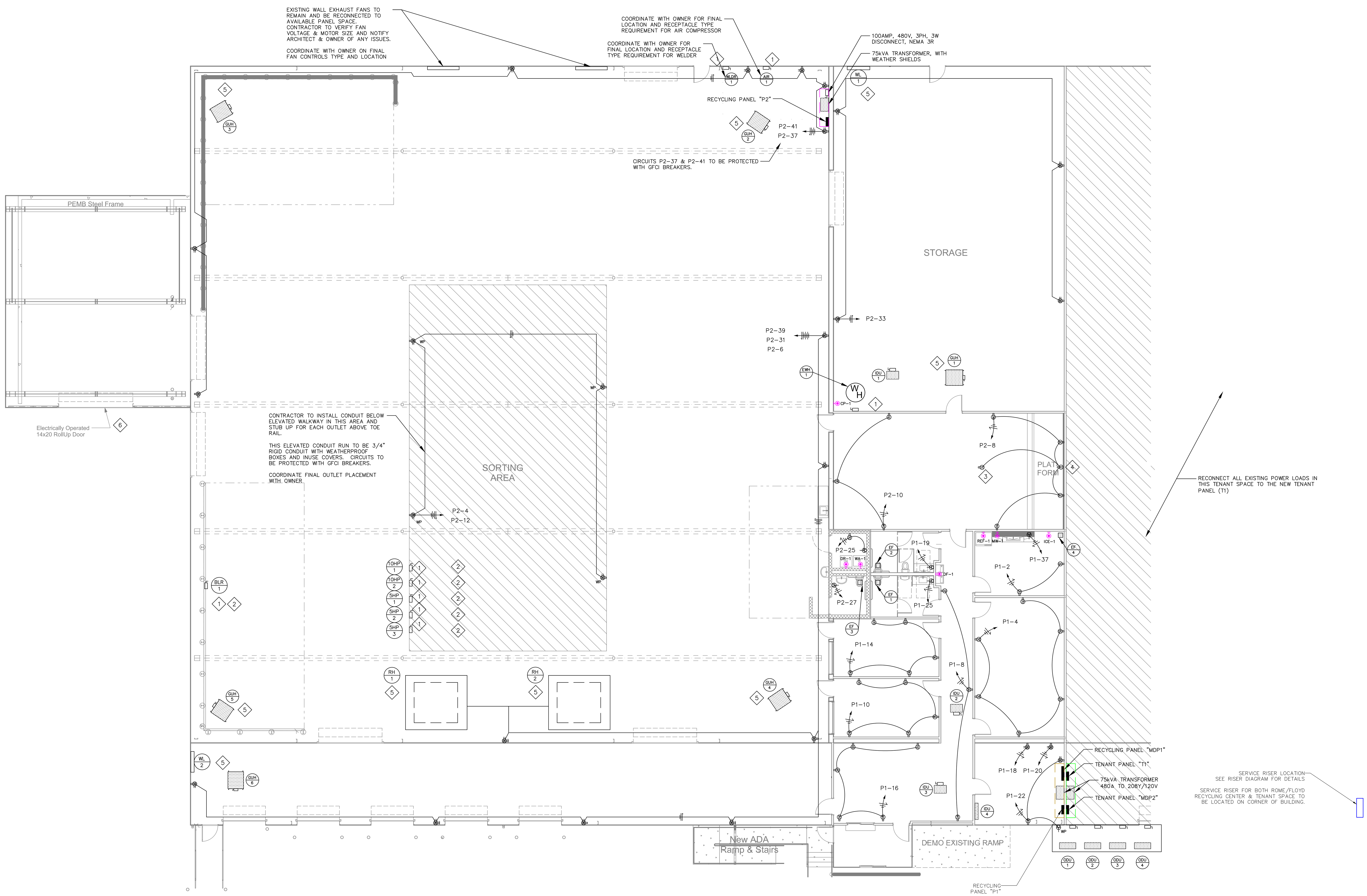

1 E1.0 **NEW POWER PLAN**
SCALE: 1/8" = 1'

KEYED POWER NOTES - THIS SHEET ONLY

1. COORDINATE DISCONNECT LOCATION WITH FINAL EQUIPMENT LOCATION
2. PROCESS EQUIPMENT LOCATIONS SHOWN FOR ILLUSTRATION ONLY. VERIFY FINAL EQUIPMENT LOCATIONS WITH OWNER PRIOR TO INSTALLATION.
3. OUTLET TO BE MOUNTED FLUSH WITH DROP CEILING. TO BE USED FOR OVERHEAD PROJECTOR. PROVIDE (1) 2" CONDUIT IN WALL FROM WALL BOX TO SPACE ABOVE DROP CEILING FOR INSTALLATION OF VIDEO/SOUND/NETWORK CABLING. COORDINATE FINAL LOCATION WITH OWNER
4. OUTLET TO BE MOUNTED ABOVE DROP CEILING TO BE USED FOR POWERED PROJECTOR SCREEN. COORDINATE FINAL LOCATION WITH OWNER AND ANY WALL SWITCHING REQUIREMENTS FOR OPERATION OF SCREEN.
5. COORDINATE INTERLOCKING OF WALL LOUVERS, GAS FURNACES, AND ROOF HOODS WITH MECHANICAL CONTRACTOR PER MECHANICAL ENGINEERS DESIGN.
6. NO DETAILS ON DOOR OPERATOR PROVIDED AT TIME OF DESIGN. COORDINATE WITH OWNER AND ARCHITECT PRIOR TO INSTALL OF OPERATOR AND CONTROL STATION AND INCORPORATE INTO PANEL P2 OR MDP1 AS OPERATOR SPECIFICATIONS REQUIRE

GENERAL POWER NOTES - THIS SHEET ONLY

- WHERE EXISTING CIRCUITS MEET CURRENT CODE REQUIREMENTS AND ARE IN GOOD CONDITION, CIRCUITS MAY BE REUSED AND CONNECTED TO THE NEW ELECTRICAL PANEL, OTHERWISE REPLACE. IN ANY CASE, ALL CIRCUITS SHOULD HAVE NEW, APPROVED/RATED, BREAKERS OF THE APPROPRIATE TYPE BASED ON THE AREA INSTALLED (EX. AFCI, ETC..)
- PROVIDE A STUB UP AND BOX AT THE SECURITY GATE CLOSEST TO BUILDING ENTRANCE WITH (2) 1" BURIED CONDUIT WITH PULL STRING BACK TO ELECTRICAL ROOM HOUSING PANEL MDP1. ONE CONDUIT FOR POWER, ONE FOR CONTROL/COMMUNICATION. VERIFY FINAL LOCATION OF SCALES WITH OWNER/ARCHITECT PRIOR TO INSTALL.
- PROVIDE A STUB UP AND BOX AT TRUCK SCALE LOCATION WITH (2) 1" BURIED CONDUITS AND PULL STRINGS BACK TO THE ELECTRICAL ROOM HOUSING PANEL MDP1. ONE CONDUIT FOR POWER, ONE FOR CONTROL/COMMUNICATION. VERIFY FINAL LOCATION OF SCALES WITH OWNER/ARCHITECT PRIOR TO INSTALL.
- ALL OUTLET FACE PLATES & EQUIPMENT DISCONNECTS TO BE PERMANENTLY MARKED WITH FINAL PANEL AND CIRCUIT NUMBER. EQUIPMENT DISCONNECTS TO ALSO BE MARKED WITH EQUIPMENT VOLTAGE.
- EQUIPMENT LOCATIONS AND CIRCUIT LOCATIONS SHOWN ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE INTENT OF THE DESIGN. COORDINATE FINAL LOCATION AND ROUTING WITH ACTUAL FIELD CONDITIONS
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT LAYOUT AND NOTIFY ARCHITECT OF ANY ITEMS NEEDING CLARIFICATION. CONTRACTOR RESPONSIBLE FOR PROVIDING ALL MATERIAL AND LABOR FOR A COMPLETE AND FULLY FUNCTIONAL ELECTRICAL SYSTEM

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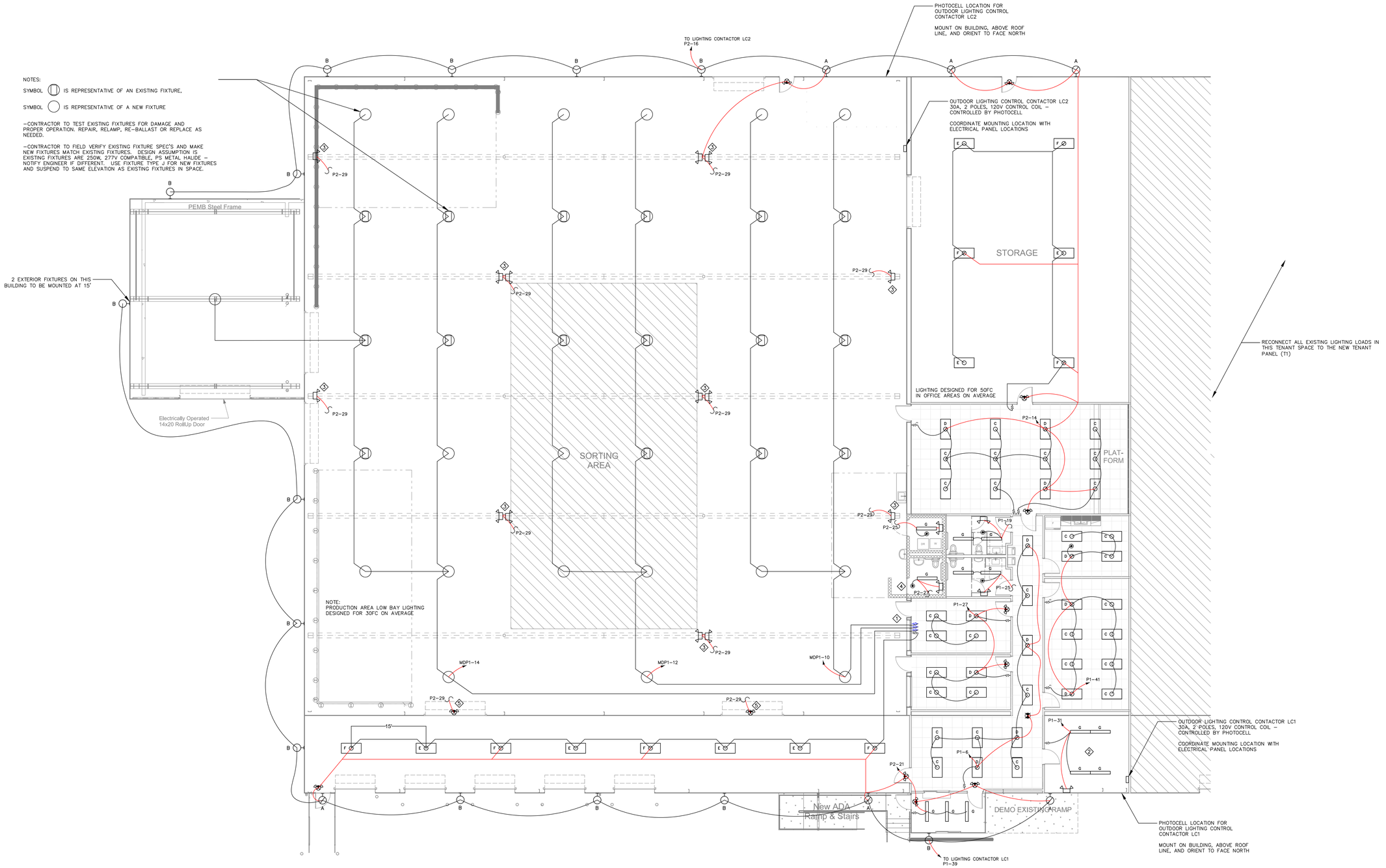
POWER

PROJECT # **1715**
DESIGNER:

DATE: **08/08/2017**
REV. DATE:

E1.0



1 NEW LIGHTING PLAN
E2.0 SCALE: 1/8" = 1'

KEYED LIGHTING NOTES - THIS SHEET ONLY

1. SWITCHES SHOWN IN BLUE ARE 20A, 2 POLE, 208V RATED SWITCHES TO BE USED FOR (3) METAL HALIDE LIGHTING CIRCUITS AS REQUESTED. SINGLE BLACK SWITCH IS STANDARD 20A, 1 POLE, 120V RATED SWITCH FOR CONTROL OF FRONT LOADING BAY LED FIXTURES
2. SUSPEND STRIP FIXTURES IN THIS AREA TO 10' AFF
3. POLE AND WALL MOUNTED EGRESS LIGHT FIXTURES TO BE MOUNTED AT 10' AFF. TYPICAL OF ALL SIMILARLY MOUNTED FIXTURES IN THIS SPACE. USE TYPE K EGRESS FIXTURE IN PRODUCTION AREA ONLY.
4. CEILING MOUNTED MOTION SWITCH TO BE BOTH PIR AND ULTRASONIC TYPE. FINAL LOCATION OF SWITCH SHOULD ENSURE GOOD COVERAGE OF AREA BEING CONTROLLED. ALL SWITCHES SHOULD BE SET FOR 10 MINUTE SHUTOFF.
5. CENTER EXIT SIGNS ABOVE OPENING IN WALL WHERE ROLLUP DOOR TO BE REMOVED.

GENERAL LIGHTING NOTES - THIS SHEET ONLY

- EXTERIOR FIXTURES TYPE A & B TO BE MOUNTED AT MINIMUM 12' ABOVE GRADE EXCEPT WHERE NOTED ON NEW ADDITION. WHERE FIXTURE IS SHOWN ABOVE MAN DOOR, CENTER LIGHT ABOVE DOOR.
- EQUIPMENT LOCATIONS AND CIRCUIT LOCATIONS SHOWN ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE INTENT OF THE DESIGN. COORDINATE FINAL LOCATION AND ROUTING WITH ACTUAL FIELD CONDITIONS
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT LAYOUT AND NOTIFY ARCHITECT OF ANY ITEMS NEEDING CLARIFICATION
- CONTRACTOR RESPONSIBLE FOR PROVIDING ALL MATERIAL AND LABOR FOR A COMPLETE AND FULLY FUNCTIONAL ELECTRICAL SYSTEM

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LIGHTING

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PROJECT # **1715**
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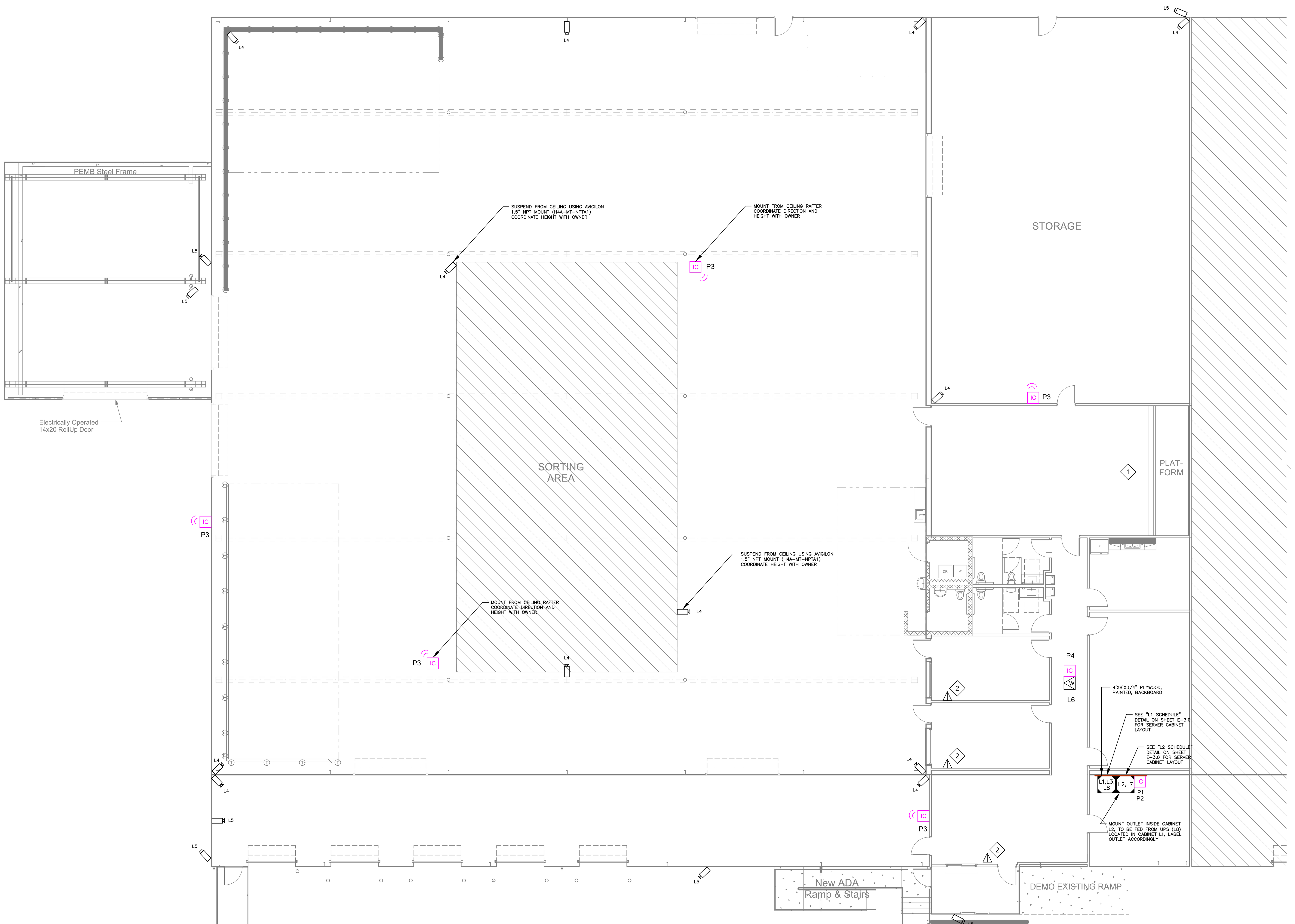


KEYED LOW VOLTAGE NOTES - THIS SHEET ONLY

1. COORDINATE LOCATION OF PROJECTOR WITH OWNER
PROJECTOR POWER AND VIDEO/AUDIO CABLES TO BE IN SEPARATE CONDUITS
CONTRACTOR TO COORDINATE WITH OWNER WHERE TO RUN VIDEO/AUDIO CABLES TO PROVIDE WALL HOOKUP
2. COORDINATE LOCATION OF TEL/DATA WALL JACKS WITH OWNER.
CONTRACTOR TO RUN 1/2" EMT CONDUIT INSIDE WALL FROM WALL BOX TO CEILING AND LEAVE ONE PULL STRING PER CONDUIT

GENERAL LOW VOLTAGE NOTES - THIS SHEET ONLY

- ALL LOW VOLTAGE WIRING TO BE IN RIGID CONDUIT ONLY
- EQUIPMENT LOCATIONS AND CIRCUIT LOCATIONS SHOWN ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE INTENT OF THE DESIGN. COORDINATE FINAL LOCATION AND ROUTING WITH ACTUAL FIELD CONDITIONS
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT LAYOUT AND NOTIFY ARCHITECT OF ANY ITEMS NEEDING CLARIFICATION
- CONTRACTOR RESPONSIBLE FOR PROVIDING ALL MATERIAL AND LABOR FOR A COMPLETE AND FULLY FUNCTIONAL ELECTRICAL SYSTEM
- MAXIMUM CABLE LENGTH FOR ANY SPEAKER RUN IS 600FT USING 70V OUTPUT OF PA SYSTEM AMPLIFIER
- COORDINATE ALL PA SYSTEM SPEAKER MOUNTING HEIGHTS AND DIRECTION WITH OWNER
- ALL DATA DROPS TO BE MARKED WITH SWITCH NAME AND PORT NUMBER.

1 / E3.0 NEW LOW VOLTAGE PLAN
SCALE: 1/8" = 1'

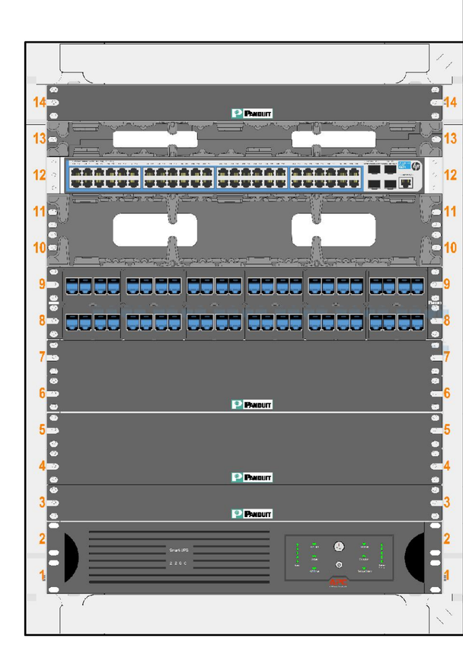
PAGING SYSTEM SCHEDULE

ITEM NUMBER	DESCRIPTION	MOUNTING	BRAND	MODEL	NOTES
P1	PAGING AMPLIFIER	WALL MOUNT	BOGEN	GS250D	RACK MOUNT AVAILABLE WITH 2RU/GSRPK PACKAGE
P2	UNIVERSAL TELEPHONE INTERFACE	WALL MOUNT	BOGEN	UTI1	RACK MOUNT AVAILABLE WITH RPKUTI1 PACKAGE
P3	PRODUCTION AREA LOUDSPEAKER	SURFACE	BOGEN	SPT15A	USE SHIELDED 18AWG WIRE COORDINATE MOUNTING HEIGHT W/ OWNER
P4	CEILING LOUDSPEAKER	RECESSED IN CEILING	QUAM	SYSTEM 21	USE SHIELDED 18AWG WIRE

LOW VOLTAGE EQUIPMENT SCHEDULE

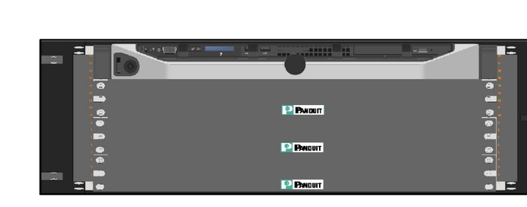
ITEM NUMBER	EQUIPMENT CATEGORY	BRAND	MODEL	NOTES
L1	WALL MOUNT RACK ENCLOSURE	CHATSWORTH PRODUCTS	11890-X24	ENCLOSED CABINET WITH TINTED FRONT
L2	WALL MOUNT RACK ENCLOSURE	CHATSWORTH PRODUCTS	13050-X22	THINLINE II WITH 4U SPACE
L3	48 PORT POE+ GIGABIT NETWORK SWITCH	HPE	JG928A	
L4	DOME POE POWERED CCTV CAMERA	AVIGILON	3.0C-H4A-DO1-IR	3 MEGAPIXEL, 98 DEG HORIZONTAL VIEW, BUILT-IN IR, USE H4A-MT-WALL1 FOR WALL MOUNT, H4A-MT-NPTA1 FOR CEILING MOUNT. COORDINATE WITH OWNER/BUILDER FOR MOUNTING HEIGHT
L5	BULLET POE POWERED CCTV CAMERA	AVIGILON	3.0C-H4A-BO1-IR	3 MEGAPIXEL, 98 DEG HORIZONTAL VIEW, BUILT-IN IR, COORDINATE WITH OWNER/BUILDER FOR MOUNTING HEIGHT
L6	POE POWERED WIFI ACCESS POINT	UBIQUITI	UAP-AC-PRO	CEILING MOUNTED
L7	NETWORK VIDEO RECORDER (NVR) SERVER	AVIGILON	HD-NVR3-VAL-18TB	18TB STORAGE
L8	UNINTERRUPTIBLE POWER SUPPLY	APC	SMT1500RM2U	

NOTES: MUST USE CAT6 GRADE CABLE WITH MINIMUM THICKNESS OF 24AWG ON ALL ETHERNET CONNECTIONS
NOTE: ALL CAMERA AND ACCESS POINT CAT6 RUNS WILL GO BACK TO SERVER CABINET (L1) AND LAND ON PATCH PANEL



L1 SCHEDULE

DESCRIPTION	BRAND	MODEL	ACCESSORIES
1U PANEL BLANK	PANDUIT	DPFP1	
1U HORIZONTAL CABLE MANAGEMENT	PANDUIT	NMF1	
1U 48 PORT POE+ SWITCH	HPE	JG928A	
2U HORIZONTAL CABLE MANAGEMENT	PANDUIT	NMF2	
2U 48 PORT CAT6 PATCH PANEL	PANDUIT	CPP48WBLY	CAT6 RJ45: CJ688TGBL
2U PANEL BLANK	PANDUIT	DPFP2	OPTIONAL: PA AMPLIFIER (P1) WITH RACK MOUNT KIT
2U PANEL BLANK	PANDUIT	DPFP2	OPTIONAL: TELEPHONE INTERFACE (P2) WITH RACK MOUNT KIT
1U PANEL BLANK	PANDUIT	DPFP1	
2U UNINTERRUPTIBLE POWER SUPPLY	APC	SMT1500RM2U	NETWORK MANAGEMENT AND ROOM TEMP MONITORING: AP9631



L2 SCHEDULE

DESCRIPTION	BRAND	MODEL	ACCESSORIES
1U NVR SERVER	AVIGILON	HD-NVR3-VAL-18TB	
1U PANEL BLANK	PANDUIT	DPFP1	
1U PANEL BLANK	PANDUIT	DPFP1	
1U PANEL BLANK	PANDUIT	DPFP1	

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LOW VOLT

PROJECT # **1715**
DESIGNER:

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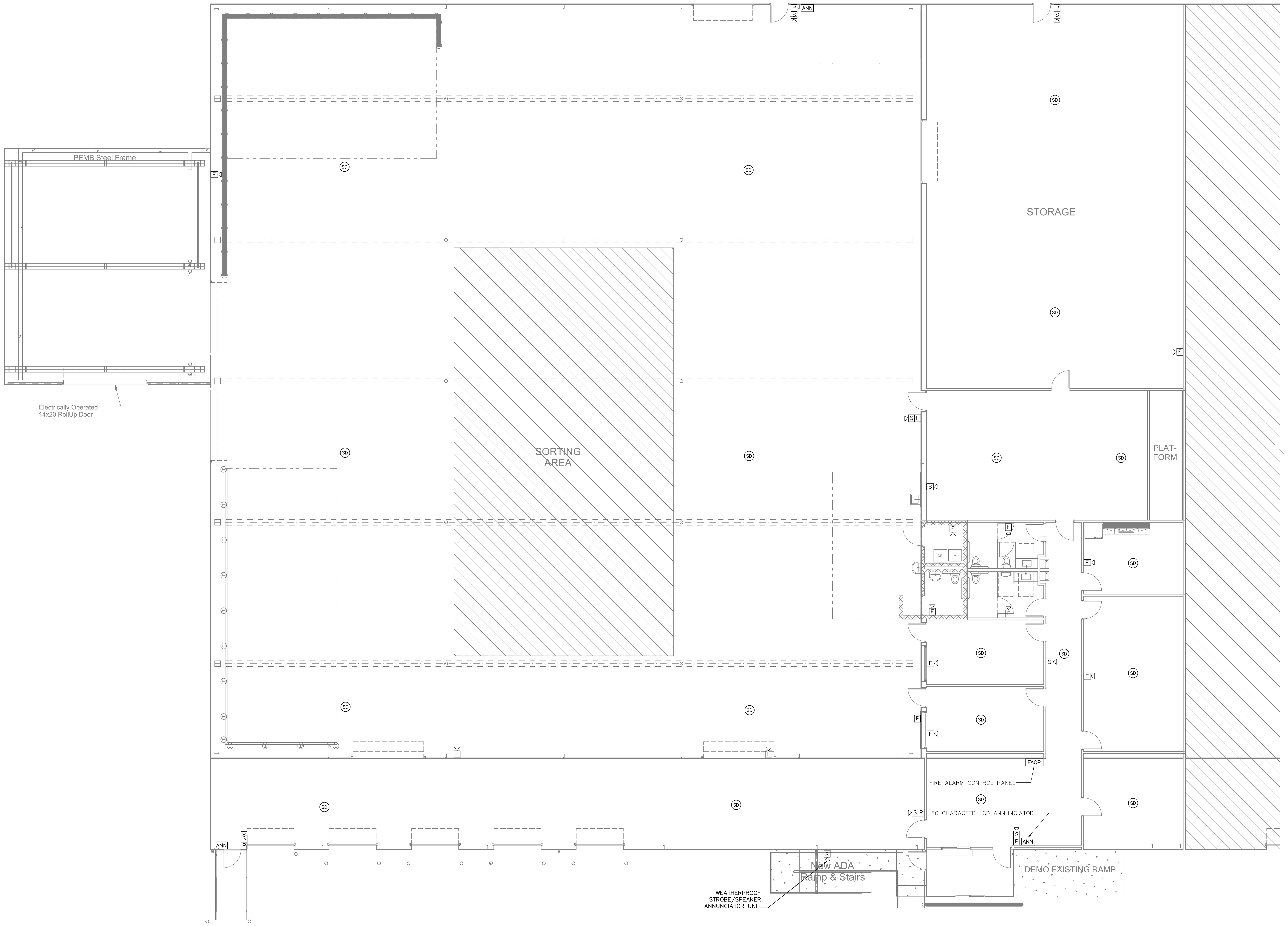

1 / E4.0 **FIRE ALARM PLAN**
SCALE: 1/8" = 1'

GENERAL FIRE ALARM NOTES - THIS SHEET ONLY

- CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE FIRE ALARM INSTALLATION AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION PRIOR TO SUBMITTING BID. CHANGE ORDERS AFTER CONTRACTING WILL NOT BE ACCEPTED
- EQUIPMENT LOCATIONS AND CIRCUIT LOCATIONS SHOWN ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE INTENT OF THE DESIGN. COORDINATE FINAL LOCATION AND ROUTING WITH ACTUAL FIELD CONDITIONS
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT LAYOUT AND NOTIFY ARCHITECT OF ANY ITEMS NEEDING CLARIFICATION
- CONTRACTOR RESPONSIBLE FOR PROVIDING ALL MATERIAL AND LABOR FOR A COMPLETE AND FULLY FUNCTIONAL ELECTRICAL SYSTEM
- INSTALLATION OF FIRE ALARM SYSTEM IS TO BE DONE IN ACCORDANCE TO NFPA 72 AND NFPA 101
- VERIFY WITH OWNER ON ANY BRAND PREFERENCE FOR FIRE ALARM SYSTEM

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FIRE ALARM

PROJECT # **1715**
DESIGNER:

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ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
B-2	STRIP LIGHTING FIXTURE. "B" INDICATES THE FIXTURE TYPE AND "2" INDICATES CIRCUIT NUMBER. HASH MARK IN FIXTURE DENOTES EMERGENCY FIXTURE. SURFACE MOUNTED UNLESS NOTED ON DRAWING OR LIGHTING FIXTURE SCHEDULE
B-2	WALL MOUNTED LIGHT FIXTURE. "B" INDICATES THE FIXTURE TYPE AND "2" INDICATES CIRCUIT NUMBER (IF NOTED). HASH MARK IN FIXTURE DENOTES EMERGENCY FIXTURE.
P1-2	HOME RUN TO PANEL BOARD – LETTER(S) INDICATE PANEL BOARD, NUMBERS INDICATE CIRCUIT NUMBERS. CROSS HATCHING REPRESENTS GROUND, NEUTRAL AND HOT RESPECTIVELY. USE #12 GAUGE, 75C, WIRE UNLESS OTHERWISE NOTED. DASHED LINE INDICATED BURIED CONDUIT RUN.
B-2	CEILING MOUNTED LIGHT FIXTURE. "B" INDICATES THE FIXTURE TYPE AND "2" INDICATES CIRCUIT NUMBER (IF NOTED). HASH MARK IN FIXTURE DENOTES EMERGENCY FIXTURE.
B 2	T-BAR CEILING LAY-IN FIXTURE, "B" INDICATES THE FIXTURE TYPE AND "2" INDICATES CIRCUIT NUMBER. HASH MARK IN FIXTURE DENOTES EMERGENCY FIXTURE.
4	RECESSED FLOOR BOX WITH 2 GANGS – DUPLEX CONVENIENCE OUTLET GANG 1 & 2 (BACK), "4" DENOTES CIRCUIT #
	EMERGENCY LIGHTING FIXTURE, WALL OR CLG. MOUNTED AS SHOWN ON DRAWINGS. FIXTURE TYPE H
	SINGLE FACE, LIGHTED EXIT SIGN W/EGRESS LIGHTS, ARROW(S), WHERE SHOWN, INDICATE DIRECTION OF EGRESS. SHADED AREA INDICATED FACE OF SIGN. FIXTURE TYPE I, MOUNT 90" AFF
	CEILING MOUNTED, LIGHTED EXIT SIGN. SHADED AREA REPRESENTS FACE(S) OF SIGN. FIXTURE TYPE I
H	WALL MOUNTED, LIGHTED EXIT SIGN. SHADED AREA INDICATED FACE(S) OF SIGN. MOUNT AT 90" AFF
4	QUADRUPLEX CONVENIENCE OUTLET, GFCI IN ONE GANG, DUPLEX OUTLET IN SECOND GANG. GFCI TO BE WIRED TO PROVIDE PROTECTION FOR DUPLEX OUTLET. +45" AFF UNLESS NOTED, "4" CIR #
4	DUPLEX CONVENIENCE OUTLET, +18" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED, "4" INDICATES THE CIRCUIT NUMBER. "WP" WHERE SHOWN INDICATES WEATHER PROOF ENCLOSURE.
4	DUPLEX CONVENIENCE OUTLET, MOUNTED ABOVE COUNTER, +45" ABOVE FINISHED FLOOR. "4" INDICATES THE CIRCUIT NUMBER. "WP" WHERE SHOWN INDICATED WEATHER PROOF ENCLOSURE.
4	QUADRUPLEX CONVENIENCE OUTLET, +45" TO CENTERLINE ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED. "4" INDICATES THE CIRCUIT NUMBER
4	DUPLEX CONVENIENCE OUTLET, GFCI TYPE. +18" ABOVE FINISHED FLOOR, "4" INDICATED THE CIRCUIT NUMBER. "WP" WHERE SHOWN INDICATES WEATHER PROOF OUTLET ENCLOSURE.
4	DUPLEX CONVENIENCE OUTLET, GFCI TYPE. +45" ABOVE FINISHED FLOOR. "4" INDICATES THE CIRCUIT NUMBER. "WP" WHERE SHOWN INDICATES WEATHER PROOF OUTLET ENCLOSURE.
WH	WATER HEATER
2	EQUIPMENT CONNECTION, "2" DENOTES EQUIPMENT ITEM NUMBER ON EQUIPMENT SCHEDULE.
	CEILING MOUNTED MOTION SWITCH. PIR/ULTRASONIC TYPE. COLOR TO BE WHITE UNLESS OTHERWISE NOTED
	EXHAUST FAN – SWITCH WITH BATHROOM LIGHT CIRCUIT UNLESS OTHERWISE NOTED
$	SINGLE POLE TOGGLE SWITCH, +48" MOUNTING HEIGHT ABOVE FINISHED FLOOR.
$M	LIGHT CONTROL, SWITCH/MOTION SENSOR WITH AUTOMATIC/MANUAL CONTROL, +48" MOUNTING HEIGHT ABOVE FINISHED FLOOR.
$3	THREE WAY SWITCH AS INDICATED. +48" MOUNTING HEIGHT ABOVE FINISHED FLOOR. "M" DENOTES MOTION SENSING TYPE WITH AUTOMATIC/MANUAL CONTROL.
$D3	DIMMER SWITCH. SINGLE POLE, THREE, OR FOUR WAY SWITCH CONFIGURATION. +48" MOUNTING HEIGHT ABOVE FINISHED FLOOR. "3" OR "4" DENOTES ANY 3WAY/4WAY SWITCHING CONFIGURATION
IC 2	INTERCOM/PA EQUIPMENT, "2" DENOTES EQUIPMENT ITEM NUMBER ON EQUIPMENT SCHEDULE. +60" MOUNTING HEIGHT AFF
	PENETRATION FOR CIRCUITS TO ROOF MOUNT UNITS AND/OR ROOF TOP RECEPTACLES.
T	1 PORT TELEPHONE WALL JACK, RJ11, +18" AFF UNLESS NOTED OTHERWISE
	PANELBOARD/CONTROL BOX – SEE NOTES & SCHEDULE.
	TWO PORT JACK – (1) DATA PORT (RJ45), (1) TELEPHONE JACK RJ11, +18" AFF, HALF SHADED REPRESENTS +48" AFF
	SIX PORT JACK – (6) DATA PORT (RJ45), +18" AFF
W 4	WIFI ACCESS POINT, CEILING MOUNTED, "4" INDICATES EQUIPMENT NUMBER ON LOW VOLTAGE EQUIPMENT SCHEDULE, PROVIDE 1 RJ45 CAT6 OUTLET
C L1	CCTV POE POWERED CAMERA, "4" INDICATES EQUIPMENT NUMBER ON LOW VOLTAGE EQUIPMENT SCHEDULE
	DISCONNECT SWITCH, SIZE AS NOTED ON DRAWINGS. FUSED PER MANUFACTURER'S NAME PLATE OF EQUIPMENT SERVED.
P	FIRE ALARM DUAL ACTION PULL STATION +48" MOUNTING HEIGHT ABOVE FINISHED FLOOR TO OPERATING HANDLE
F	FIRE ALARM STROBE/SIREN – RED HOUSING – +80" MOUNTING HEIGHT TO BOTTOM ABOVE FINISHED FLOOR
S	FIRE ALARM STROBE/SPEAKER – RED HOUSING – +80" MOUNTING HEIGHT TO BOTTOM ABOVE FINISHED FLOOR
SD	PHOTOELECTRIC SMOKE DETECTOR, CEILING MOUNTED
H	HEAT DETECTOR, CEILING MOUNTED

GENERAL ELECTRICAL NOTES

1. ALL MECHANICAL AND ELECTRICAL EQUIPMENT AND INSTALLATIONS SHALL CONFORM WITH THE REQUIREMENTS OF THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE, THE INTERNATIONAL BLDG. CODE, THE STATE ENERGY CODE AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
2. PRIOR TO PURCHASING ANY MATERIALS OR STARTING ANY WORK, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, EQUIPMENT LOCATIONS, DIMENSIONS, ETC. SHOWN ON THE DRAWINGS OR AFFECTING THIS WORK AND SHALL REPORT ANY DEVIATIONS TO THE ARCHITECT.
3. DO NOT SCALE DRAWINGS TO LOCATE EQUIPMENT OR OUTLETS.
4. MOUNTING HEIGHTS AS INDICATED ON THE LEGEND SHALL BE FROM THE FINISHED FLOOR TO THE CENTER LINE OF THE OUTLET BOX.
5. THE ELECTRICAL DRAWINGS ARE ONE COMPONENT OF THE CONTRACT DOCUMENTS FOR THE PROJECT. ALL OF THE DRAWINGS AND SPECIFICATIONS MUST BE PREVIEWED FOR THE INTERRELATIONSHIP AND REQUIRED COORDINATION BETWEEN DISCIPLINES.
6. PRIOR TO PROJECT COMPLETION, ELECTRICAL CONTRACTOR SHALL OBTAIN FINAL SPACE NUMBERS FROM OWNER AND/OR ARCHITECT. TYPEWRITTEN PANELBOARD DIRECTORIES SHALL REFLECT SPACE DESIGNATION OF EACH CIRCUIT. NO EXCEPTIONS.
7. ALL CONDUIT ROUTED FROM SLAB UP TO PANELS AND EXPOSED CONDUIT ROUTED BELOW +84" A.F.F. SHALL BE GALVANIZED RIGID STEEL UNLESS OTHERWISE NOTED ON SPECIFIC LAYOUT NOTES.
8. PROVIDE CONCRETE HOUSEKEEPING CURB AT ALL TRANSFORMERS.
9. PRIOR TO ROUGH-IN OF OUTLETS, COORDINATE AN ON SITE MEETING TO REVIEW EXACT LOCATION WITH FURNITURE PLAN.
10. ALL LOW VOLTAGE CABLING ROUTED UNDERGROUND SHALL BE WEST PENN "AQUASEAL" OR EQUIVALENT. ALL CABLING NOT IN CONDUIT SHALL BE PLENUM RATED.
11. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULL STRINGS.
13. THERE SHALL BE NO BACK TO BACK RECEPTACLES, SWITCHES, DATA/TELECOMMUNICATION OUTLETS, ETC
14. NO PIPING, DUCT, OR EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION SHALL BE INSTALLED ABOVE ANY ELECTRICAL PANEL BOARD, MOTOR CONTROL CENTER, OR SWITCHBOARD. PER NEC ARTICLE 110-23 (A) (3)
15. ALL 120V SINGLE PHASE CIRCUITS SHALL HAVE DEDICATED NEUTRALS. NO SHARED NEUTRALS SHALL BE ALLOWED. ALL CIRCUITS SHOULD CONTAIN A DEDICATED GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH THE NEC
16. INCREASE HOMERUN CONDUCTOR SIZE TO #10 GAUGE FOR LIGHTING AND RECEPTACLE CIRCUITS WHICH ARE SERVED AT 120 VOLTS AND ARE MORE THAN 100 FEET IN LENGTH OR SERVED AT 277 VOLTS AND MORE THAN 150 FEET IN LENGTH.
17. ALL FEEDER CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER, AWG SIZE AS NOTED, XHHW INSULATION, 600V RATED, UNLESS OTHERWISE NOTED.
18. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER, MINIMUM #12 AWG SIZE, THWN/THHN, WITH DUAL RATED 75/90 DEG C INSULATION, 600V RATED. UNLESS OTHERWISE NOTED, 120V CIRCUITS MORE THAN 125FT FROM CENTER OF LOAD TO PANEL SHALL BE #10 AWG
19. AFCI PROTECTION TO BE INSTALLED AS REQUIRED PER THE NEC AND ANY OTHER APPLICABLE CODES
20. ALL CONDUITS SHALL CONTAIN AN INSULATED, GREEN, COPPER EQUIPMENT GROUND WIRE SIZED IN ACCORDANCE WITH TABLE 250-122(NEC)
21. THE CONTRACTOR SHALL PROVIDE CONDUCTORS, CONDUIT, AND CIRCUIT ALL EQUIPMENT, MOTORS, AND OTHER ITEMS NOT EXPLICITLY SHOWN, BUT INDICATED, IN CONTRACT DOCUMENTS OR IN SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF SAID ITEMS BETWEEN TRADES, PROVIDE CONDUIT AND BOXES FOR CONTROL WIRING WHERE REQUIRED FOR PROTECTION OR BY EQUIPMENT MANUFACTURER.
22. THE CONTRACTOR SHALL PROVIDE A WRITTEN RECORD OF THE GROUND-FAULT PERFORMANCE TEST RESULTS TO THE CHIEF ELECTRICAL INSPECTOR HAVING JURISDICTION AND THE ELECTRICAL PLANS EXAMINER PRIOR TO THE FINAL ELECTRICAL INSPECTION PER NEC ARTICLE 230-95 (C)
23. ALL CIRCUITS SHOWN WITH GFCI RECEPTACLES ARE TO BE WIRED SO AS THE GFCI OUTLET IS THE FIRST CONNECTED OUTLET FROM THE PANEL, THUS PROVIDING GFCI PROTECTION FOR ALL DOWNSTREAM OUTLETS
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIAL AND LABOR FOR A COMPLETE AND FULLY FUNCTIONAL ELECTRICAL SYSTEM.

THROUGH-PENETRATION FIRE STOP SYSTEMS

THROUGH-PENETRATIONS	VERTICAL FLOOR/CEILING PENETRATION		HORIZONTAL INTERIOR WALL PENETRATION		CEILING PENETRATION AT ROOF ASSEMBLY		HORIZONTAL EXTERIOR WALL PENETRATION	
	RATING	SYSTEM	RATING	SYSTEM	RATING	SYSTEM	RATING	SYSTEM
SOIL, WASTE, AND VENT PIPING – SCH. 40 CAST IRON	1 HR.	FC1006 FC2013 FC2026	1 HR.	WL1052	1 HR.	FC1010	1 HR.	WL1039
			2 HR.		2 HR.		2 HR.	
WATER PIPING (COPPER) AND ELECTRICAL CONDUIT (EMT)	1 HR.	FC1006	1 HR.	WL1052	1 HR.	FC1010	1 HR.	WL1039
			2 HR.		2 HR.		2 HR.	
TOILET EXHAUST SUB-DUCT (24 GA.)	——	——	1 HR.	WL7001	——	——	——	——
			2 HR.					
PVC PIPE	1 HR.	FC2007 FC2011 FC2012 FC2013 FC2026 FC2027	1 HR.	WL2083	1 HR.	FC2020	1 HR.	WL2036
			2 HR.		2 HR.		2 HR.	
ROMEX	1 HR.	NS0058D1E OR NS006801E			——	——	——	——

SCHEDULE NOTES

1. ALL DUCT PENETRATIONS OF FIRE AND/OR SMOKE RATED ASSEMBLIES NOT ADDRESSED IN SCHEDULE ABOVE SHALL BE FIRESTOPPED AS REQUIRED TO RESTORE ASSEMBLY TO ORIGINAL INTEGRITY.
2. FIRE BARRIER PRODUCTS SHALL BE MANUFACTURED BY 3M CO. (OR COMPANY WITH EQUAL PRODUCTS). PRODUCTS SHALL BE CP25 CAULK, CS195 COMPOSITE PANEL, FSWRAP/STRIP.
3. PSS 7900 SERIES SYSTEM. INSTALL AS RECOMMENDED BY THE MANUFACTURER FOR THE PARTICULAR APPLICATION OR EQUIVALENT SYSTEM AS RECOMMENDED BY LOCAL CODE OFFICIALS.

EQUIPMENT SCHEDULE

EQUIPMENT TAG	DESCRIPTION	EQUIPMENT CHARCTERISTICS					CIRCUIT	FEEDER	DISCONNECT SWITCH				REMARKS
		VOLTS	PH	KW	HP	FLA			SIZE (AMPS)	POLE	FUSE	FEATURES	
BLR-1	BAILER #1	480	3	60.31		75.7	MDP1-2,4,6 - 150A, 3 POLE	3#1/0 + 1#6G - 2"C	200	3	NOT FUSED	NEMA 1	VERIFY FINAL ELECTRICAL SPECS WITH OWNER PRIOR TO INSTALL
10HP-1	10HP FOR EQUIPMENT #1	480	3		10	14	MDP1-13,15,17 - 35A, 3 POLE	3#8 + 1#10G - 3/4"C	30	3	NOT FUSED	NEMA 1	BASIS OF DESIGN IS 10HP/3PH/480V VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
10HP-2	10HP FOR EQUIPMENT #2	480	3		10	14	MDP1-19,21,23 - 35A, 3 POLE	3#8 + 1#10G - 3/4"C	30	3	NOT FUSED	NEMA 1	BASIS OF DESIGN IS 10HP/3PH/480V VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
5HP-1	5HP FOR EQUIPMENT #1	480	3		5	7.6	MDP1-25,27,29 - 20A, 3 POLE	3#10 + 1#10G - 3/4"C	30	3	NOT FUSED	NEMA 1	BASIS OF DESIGN IS 5HP/3PH/480V VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
5HP-2	5HP FOR EQUIPMENT #2	480	3		5	7.6	MDP1-31,33,35 - 20A, 3 POLE	3#10 + 1#10G - 3/4"C	30	3	NOT FUSED	NEMA 1	BASIS OF DESIGN IS 5HP/3PH/480V VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
5HP-3	5HP FOR EQUIPMENT #3	480	3		5	7.6	MDP1-37,39,41 - 20A, 3 POLE	3#10 + 1#10G - 3/4"C	30	3	NOT FUSED	NEMA 1	BASIS OF DESIGN IS 5HP/3PH/480V VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
EWH-1	ELECTRIC WATER HEATER	277	1	4.49		16.2	MDP1-8 - 25A, 1 POLE	2#10 + 1#10G - 3/4"C	30	1	NOT FUSED	NEMA 1	277V, (2) NON-SIMULTANEOUS 4.5KW ELEMENTS
MW-1	MICROWAVE	120	1	1.44		12	P1-23 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	-	-	-	-	BASIS OF DESIGN IS FRIGIDAIRE MODEL FFCE2238L. VERIFY WITH OWNER
REF-1	REFRIGERATOR	120	1	1.02		8.5	P1-29 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	-	-	-	-	BASIS OF DESIGN IS FRIGIDAIRE MODEL FFSS2614Q. VERIFY WITH OWNER
WA-1	WASHER	120	1	1.50		0.0	P2-9 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	-	-	-	-	BASIS OF DESIGN IS SPEED QUEEN MODEL AWNE82. VERIFY WITH OWNER
DR-1	DRYER	208	1	5.60		26.9	P2-5,7 - 30A, 2 POLE	3#10 + 1#10G - 3/4"C	-	-	-	-	BASIS OF DESIGN IS SPEED QUEEN MODEL ADEE8R. VERIFY WITH OWNER
WLDR-1	WELDER	208	1	6.24		30.0	P2-1,3 - 30A, 2 POLE	3#10 + 1#10G - 3/4"C	60	2	NOT FUSED	NEMA 3R	VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
ICE-1	ICE MACHINE	120	1	1.50		12.5	P2-18 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	-	-	-	-	BASIS OF DESIGN IS 120V/1PH/12.5A ICE MACHINE. VERIFY WITH OWNER
ODU-1	OUTDOOR HVAC UNIT 1	208	1	3.24		15.6	P1,7,9 - 30A, 2 POLE	3#12 + 1#12G - 3/4"C	30		NOT FUSED	NEMA 3R	
ODU-2	OUTDOOR HVAC UNIT 2	208	1	5.32		25.6	P1-11,13 - 50A, 2 POLE	3#8 + 1#10G - 3/4"C	60		NOT FUSED	NEMA 3R	
ODU-3	OUTDOOR HVAC UNIT 3	208	1	1.96		9.4	P1-15,17 - 20A,2 POLE	3#12 + 1#12G - 3/4"C	30		NOT FUSED	NEMA 3R	
IDU-1	INDOOR HVAC UNIT 1	208	1	8.95		43.0	P1-28,30 - 60A, 2 POLE	3#6 + 1#8G - 1"C	60		NOT FUSED	NEMA 1	
IDU-2/1	INDOOR HVAC UNIT 2	208	1	8.95		43.0	P1-32,34 - 60A,2 POLE	3#6 + 1#8G - 1"C	60		NOT FUSED	NEMA 1	
IDU-2/2	INDOOR HVAC UNIT 2	208	1	3.78		18.2	P1-36,38 - 25A,2 POLE	3#10 + 1#10G - 3/4"C	30		NOT FUSED	NEMA 1	
IDU-3	INDOOR HVAC UNIT 3	208	1	7.44		35.8	P1-40,42 - 45A,2 POLE	3#8 + 1#10G - 3/4"C	60		NOT FUSED	NEMA 1	
ODU-IDU-4	MINI SPLIT #4	208	1	4.99		24.0	P1-24,26 - 30A, 2 POLE	3#10 + 1#10G - 3/4"C	30		NOT FUSED	NEMA 3R	
CP-1	CIRCULATION PUMP	120	1	0.13		1.1	P1-12 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	-	-	-	-	VERIFY CONNECTION TYPE WITH MECHAINCAL CONTRACTOR PRIOR TO INSTALL
DF-1	DRINKING FOUNTAIN	120	1	0.60		5.0	P1-5 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	-	-	-	-	
EF-1	EXHAUST FAN	120	1	0.17		1.4	P1-25	-	-	-	-	-	SWITCH WITH LIGHT
EF-2	EXHAUST FAN	120	1	0.17		1.4	P1-19	-	-	-	-	-	SWITCH WITH LIGHT
EF-3	EXHAUST FAN	120	1	0.08		0.7	P2-27	-	-	-	-	-	SWITCH WITH LIGHT
EF-4	EXHAUST FAN	120	1	0.08		0.7	P1-2	-	-	-	-	-	PROVIDE WALL SWITCH FOR OPERATION AS SHOWN ON MECHANICAL PLAN
AIR-1	AIR COMPRESSOR	208	1	8.32		40.0	P2-17,19 - 40A, 2 POLE	3#8 + 1#10G - 3/4"C	60	2	NOT FUSED	NEMA 1	BASIS OF DESIGN IS 208V/40A AIR COMPRESSOR. VERIFY FINAL EQUIPMENT SPECS WITH OWNER PRIOR TO INSTALL
GUH-1	GAS HEATER 1	120	1	0.47		3.9	P2-23 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 1	DISCONNECT MOUNTED AT UNIT
GUH-2	GAS HEATER 2	120	1	0.55		4.6	P2-35 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 1	DISCONNECT MOUNTED AT UNIT
GUH-3	GAS HEATER 3	120	1	0.55		4.6	P2-15 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 1	DISCONNECT MOUNTED AT UNIT
GUH-4	GAS HEATER 4	120	1	0.55		4.6	P2-38 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 1	DISCONNECT MOUNTED AT UNIT
GUH-5	GAS HEATER 5	120	1	0.55		4.6	P2-40 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 1	DISCONNECT MOUNTED AT UNIT
GUH-6	GAS HEATER 6	120	1	0.47		3.9	P2-42 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 1	DISCONNECT MOUNTED AT UNIT
RH-1	ROOF HOOD 1	120	1	0.24		2.0	P2-31 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 3R	VERIFY FINAL ELECTRICAL SPECS WITH MECHANICAL CONTRACTOR PRIOR TO INSTALL
RH-2	ROOF HOOD 2	120	1	0.24		2.0	P2-31 - 20A, 1 POLE	2#12 + 1#12G - 1/2"C	30	1	NOT FUSED	NEMA 3R	VERIFY FINAL ELECTRICAL SPECS WITH MECHANICAL CONTRACTOR PRIOR TO INSTALL

NOTES:

LIGHTING FIXTURE SCHEDULE

FIXTURE	DESCRIPTION	MOUNTING	MANUFACTURER	PART NUMBER	LAMP	NOTES
A	PERIMETER LIGHTING (LED) W/BATT BACKUP	SURFACE	LITHONIA	WST LED P3 50K VF MVOLT E20WH WG DDBXD	INTEGRAL TO FIXTURE	120V, 50W, 5000K, 6000LM, 20W EGRESS BATTERY PACK, WIRE GUARD MOUNT AT 12' AFF UNLESS OTHERWISE NOTED
B	PERIMETER LIGHTING (LED)	SURFACE	LITHONIA	WST LED P3 50K VF MVOLT WG DDBXD	INTEGRAL TO FIXTURE	120V, 50W, 5000K, 6000LM, WIRE GUARD MOUNT AT 12' AFF UNLESS OTHERWISE NOTED
C	2'X4' TROFFER (LED)	GRID	LITHONIA	2GTL 4 48L EZ1 LP840	INTEGRAL TO FIXTURE	120V, 47W, 4000K, 5000LM
D	2'X4' TROFFER (LED) W/BATT BACKUP	GRID	LITHONIA	2GTL 4 48L EZ1 LP840 EL14L	INTEGRAL TO FIXTURE	120V, 47W, 4000K, 5000LM , 1400LM EMERGENCY BATTERY PACK
E	LOW BAY PANEL (LED)	SUSPEND	LITHONIA	IBL 15L WD LP740, WGX	INTEGRAL TO FIXTURE	120V, 125W, 4000K, 15000 LM, WIRE GUARD SUSPEND TO 12' AFF UNLESS OTHERWISE NOTED
F	LOW BAY PANEL (LED), W/BATT BACKUP	SUSPEND	LITHONIA	IBL 15L WD LP740, WGX, I2412	INTEGRAL TO FIXTURE	120V, 125W, 4000K, 15000 LM, WIRE GUARD SUSPEND TO 12' AFF UNLESS OTHERWISE NOTED
G	4' STRIP FIXTURE (LED)	SURFACE	LITHONIA	ZL2N L48 3000LM MDD MVOLT 40K 80CRI WH	INTEGRAL TO FIXTURE	120V, 42W, 4000K, 3000LM
H	EGRESS LIGHT FIXTURE	SURFACE	LITHONIA	ELM6 LED W LP03VS	INTEGRAL TO FIXTURE	120V, 6W, 537LM - WALL MOUNT
I	EXIT SIGN/EGRESS LIGHT COMBO	SURFACE	LITHONIA	LHQM LED R	INTEGRAL TO FIXTURE	120V, 4.3W
J	250W LOW BAY	SUSPEND	LITHONIA	TX 250MP PA25D MVOLT SCWA WG	250W, PS METAL HALIDE, MOGUL BASE	277V, 250W, 22000 LM, WIRE GUARD SUSPEND TO SAME ELEVATION AS OTHER FIXTURES IN SPACE
K	PRODUCTION EGRESS LIGHT FIXTURE	SURFACE	LITHONIA	INDX1236 H3512S ELAWG4/8	35W, HALOGEN SEALED BEAM	120V, SURFACE MOUNT W/ WIRE GUARD, 10' MOUNTING AFF

PANEL SCHEDULE "MDP1"

MAINS: 600A MLO		VOLTAGE: 480Y/277		PHASE: 3 / WIRE: 4		MOUNTING: SURFACE		
CIRCUIT NO.	TRIP/ POLE	DESCRIPTION	CONNECTED LOAD (KVA) PHASE A	PHASE B	PHASE C	DESCRIPTION	TRIP/ POLE	CIRCUIT NO.
1	125/3	FEED TO XFMR2 FOR PANEL P1	20.06 / 20.98			BAILER #1	150/3	2
3	-	FEED TO XFMR2 FOR PANEL P1		20.22 / 20.98		BAILER #1	-	4
5	-	FEED TO XFMR2 FOR PANEL P1			21.07 / 20.1	BAILER #1	-	6
7	125/3	FEED TO XFMR3 FOR PANEL P2	15.57 / 4.5			ELECTRIC WATER HEATER	25/1	8
9	-	FEED TO XFMR3 FOR PANEL P2		12.66 / 3.44		PRODUCTION LIGHTING 1	20/1	10
11	-	FEED TO XFMR3 FOR PANEL P2			13.64 / 3.44	PRODUCTION LIGHTING 2	20/1	12
13	35/3	10HP-1	3.88 / 3.75			PRODUCTION LIGHTING 3	20/1	14
15	-	10HP-1		3.88 / 0		-	-	16
17	-	10HP-1			3.88 / 0	-	-	18
19	35/3	10HP-2	3.88 / 0			-	-	20
21	-	10HP-2		3.88 / 0		-	-	22
23	-	10HP-2			3.88 / 0	-	-	24
25	20/3	5HP-1	2.11 / 0			-	-	26
27	-	5HP-1		2.11 / 0		-	-	28
29	-	5HP-1			2.11 / 0	-	-	30
31	20/3	5HP-2	2.11 / 0			-	-	32
33	-	5HP-2		2.11 / 0		-	-	34
35	-	5HP-2			2.11 / 0	-	-	36
37	20/3	5HP-3	2.11 / 0			-	-	38
39	-	5HP-3		2.11 / 0		-	-	40
41	-	5HP-3			2.11 / 0	-	-	42
PHASE A - 78.95, PHASE B - 71.39, PHASE C - 72.34								
MINIMUM BREAKER AIC: 22,000 AIC					NOTES			
NOTES: PROVIDE COPPER GROUND BUS, LOCKING COVER, NEMA 1					TOTAL LOAD : 222.7kVA (267.8 AMPS)			

PANEL SCHEDULE "P1"

MAINS: 225A MCB		VOLTAGE: 208Y/120		PHASE: 3 / WIRE: 4		MOUNTING: SURFACE		
CIRCUIT NO.	TRIP/ POLE	DESCRIPTION	CONNECTED LOAD (KVA) PHASE A	PHASE B	PHASE C	DESCRIPTION	TRIP/ POLE	CIRCUIT NO.
1	-	SPARE	0 / 0.36			BREAKROOM OUTLETS	20/1	2
3	-	SPARE		0 / 1.08		CONFERENCE RM OUTLETS	20/1	4
5	20/1	DF-1			0.6 / 0.59	RECEPTION LIGHTS	20/1	6
7	30/2	ODU-1	1.62 / 0.54			HALLWAY OUTLETS	20/1	8
9	-	ODU-1		1.62 / 0.9		OFFICE 2 OUTLETS	20/1	10
11	50/2	ODU-2			2.66 / 0.13	CP-1	20/1	12
13	-	ODU-2	2.66 / 0.72			OFFICE 1 OUTLETS	20/1	14
15	20/2	ODU-3		0.98 / 0.9		RECEPTION OUTLETS	20/1	16
17	-	ODU-3			0.98 / 0.36	UTILITY OUTLETS	20/1	18
19	20/1	WOMENS RESTROOM	1.61 / 0.36			UTILITY OUTLETS	20/1	20
21	-	SPARE		0 / 0.72		UTILITY OUTLETS	20/1	22
23	20/1	MW-1			1.44 / 2.5	ODU/IDU-4	30/2	24
25	20/1	MENS RESTROOM	1.61 / 2.5			ODU/IDU-4	-	26
27	20/1	OFFICE LIGHTS		0.48 / 4.48		IDU-1	60/2	28
29	20/1	REF-1			1.02 / 4.48	IDU-1	-	30
31	20/1	UTILITY LIGHTS	0.21 / 4.48			IDU-2 (CIRCUIT 1)	60/2	32
33	-	SPARE		0 / 4.48		IDU-2 (CIRCUIT 1)	-	34
35	-	SPARE			0 / 1.89	IDU-2 (CIRCUIT 2)	25/2	36
37	20/1	BREAKROOM OUTLETS	1.5 / 1.89			IDU-2 (CIRCUIT 2)	-	38
39	20/1	OUTDOOR LIGHTING		0.86 / 3.72		IDU-3	45/2	40
41	20/1	CONFERENCE LIGHTS			0.7 / 3.72	IDU-3	-	42
PHASE A - 20.06, PHASE B - 20.22, PHASE C - 21.07								
MINIMUM BREAKER AIC: 10,000 AMPS					NOTES			
NOTES: PROVIDE COPPER GROUND BUS, LOCKING COVER, NEMA 1					TOTAL LOAD : 61.35kVA (170.5 AMPS)			

PANEL SCHEDULE "P2"

MAINS: 225A MCB		VOLTAGE: 208Y/120		PHASE: 3 / WIRE: 4		MOUNTING: SURFACE		
CIRCUIT NO.	TRIP/ POLE	DESCRIPTION	CONNECTED LOAD (KVA) PHASE A	PHASE B	PHASE C	DESCRIPTION	TRIP/ POLE	CIRCUIT NO.
1	30/2	WLDR-1	3.12 / 0			SPARE	-	2
3	-	WLDR-1		3.12 / 0.72		SORTING OUTLETS	20/1	4
5	30/2	DR-1			2.8 / 1.08	WAREHOUSE OUTLETS	20/1	6
7	-	DR-1	2.8 / 0.72			EDUCATION OUTLETS	20/1	8
9	20/1	WA-1		1.5 / 0.54		EDUCATION OUTLETS	20/1	10
11	-	SPARE			0 / 0.72	SORTING OUTLETS	20/1	12
13	-	SPARE	0 / 1.65			EDUCATION LIGHTS	20/1	14
15	20/1	GUH-3		0.55 / 0.7		OUTDOOR LIGHTING	20/1	16
17	40/2	AIR-1			4.16 / 1.5	ICE-1	20/1	18
19	-	AIR-1	4.16 / 0			SPARE	-	20
21	20/1	BAY ENTRNACE LIGHTS		1.27 / 0		SPARE	-	22
23	20/1	GUH-1			0.47 / 0	SPARE	-	24
25	20/1	LAUNDRY OUTLETS	0.41 / 0			SPARE	-	26
27	20/1	BATHROOM OUTLETS		1.55 / 0		SPARE	-	28
29	20/1	WAREHOUSE EMER LIGHT			0.45 / 0	SPARE	-	30
31	20/1	WAREHOUSE OUTLETS	1.08 / 0			SPARE	-	32
33	20/1	STORAGE OUTLETS		1.44 / 0		SPARE	-	34
35	20/1	GUH-2			0.55 / 0	SPARE	-	36
37	20/1	MAINT OUTLETS	1.08 / 0.55			GUH-4	20/1	38
39	20/1	WAREHOUSE OUTLETS		0.72 / 0.55		GUH-5	20/1	40
41	20/1	MAINT OUTLETS			1.44 / 0.47	GUH-6	20/1	42
PHASE A - 15.57, PHASE B - 12.66, PHASE C - 13.64								
MINIMUM BREAKER AIC: 10,000 AMPS					NOTES			
NOTES: PROVIDE COPPER GROUND BUS, LOCKING COVER, NEMA 3R					TOTAL LOAD : 41.87kVA (116.4 AMPS)			

WHITE BACKGROUND WITH BLACK LETTERS ENGRAVED 1/4" HIGH

PANEL-___ — PANEL NAME
120/208V, 1PH, 3W — PANEL VOLTAGE, PHASE & WIRE
FED FROM – — WHERE PANEL IS FED FROM

1 / E5.0 TYPICAL PANEL LABEL

SCALE: NOT SCALED

ROBERT NOBLE ARCHITECT A.I.A.
119 SOUTH BROAD ST.
ROME, GA 30161
PH: (706) 295-2700
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GEORGIA REGISTERED NO. 011918 PROFESSIONAL ENGINEER WESLEY F. TURNER

FLOYD COUNTY PUBLIC WORKS
FLOYD RECYCLE CENTER

LAVENDER DRIVE
Rome, Georgia 30165

SCHEDULES

WESLEY F. TURNER, PE
ELECTRICAL ENGINEER

176 CHULIO ROAD SE
ROME,GA 30161
PH: (770) 547-3551

PROJECT # **1715**
DESIGNER:

DATE: **08/08/2017**
REV. DATE:

E5.0

TRANSFORMER SCHEDULE			
DEVICE NAME	SIZE	PRIMARY VOLTAGE	SECONDARY VOLTAGE
XFM1	75kVA	480 Δ	208Y/120
XFM2	75kVA	480 Δ	208Y/120
XFM3	75kVA	480 Δ	208Y/120

NOTES:
- ALL TRANSFORMERS ARE 3 PHASE PRIMARY AND SECONDARY
- BASIS OF DESIGN FOR 75kVA TRANSFORMERS: SQUARE-D MODEL EX75T3K
- MAINTAIN 6" CLEARANCE AROUND ALL VENTILATED TRANSFORMERS FOR PROPER COOLING

FEEDER CONDUIT/CABLE SCHEDULE								
NOTE	CONDUITS	CONDUCTORS	GROUND	PHASE	WIRE	VOLTAGE	FED FROM	FEED TO
1	(1) 1-1/2"	(3) #1	(1) #6	3	3	480Δ	MDP1 OR MDP2	XFM1, XFM2, OR XFM3
2	(1) 2-1/2"	(4) 4/0	(1) #4	3	4	208Y/120	XFM1, XFM2, OR XFM3	P1, P2, OR T1
3	(1) 2-1/2"	(4) 4/0	(1) #4	3	4	480Y/277	FUSED DISCONNECT	MDP2
4	(2) 3"	(4) 350kCM IN EACH CONDUIT	(1) #1	3	4	480Y/277	FUSED DISCONNECT	MDP1

NOTES: SIZING BASED ON COPPER CONDUCTORS

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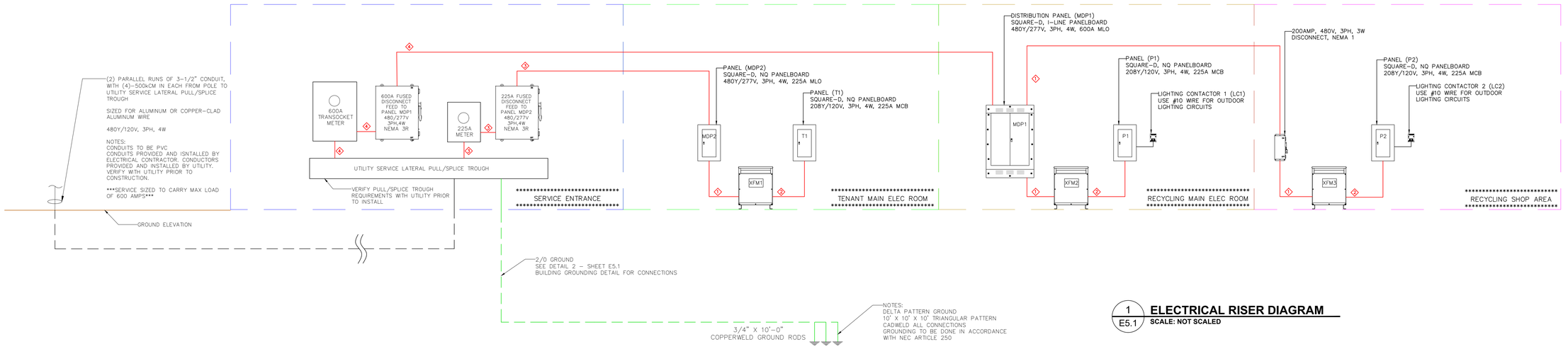
CALCULATED LOADS FOR SERVICE

-CALCULATED LOADING FOR DISTRIBUTION PANELS-

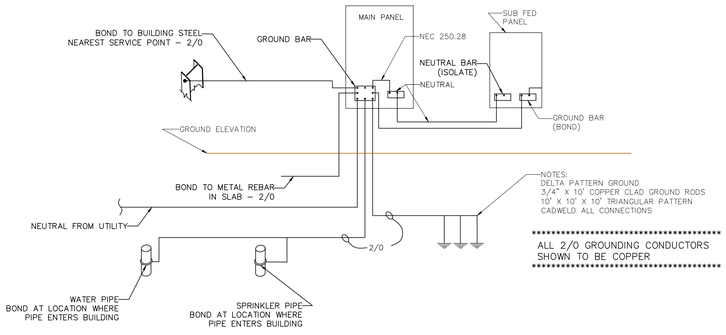
(FLOYD RECYCLING) – PANEL MDP1(480Y/277V) – 267.8 AMPS
(FLOYD RECYCLING) – PANEL P1(208Y/120V) – 170.5 AMPS
(FLOYD RECYCLING) – PANEL P2(208Y/120V) – 116.4 AMPS

(TENANT) – PANEL MDP2(480Y/277V) – 68.3 AMPS
(TENANT) – PANEL T1(208Y/120V) – 157.5 AMPS

TOTAL – 336.1 AMPS @ 480Y/277V UTILITY SERVICE LATERAL
****



1 E5.1 **ELECTRICAL RISER DIAGRAM**
SCALE: NOT SCALED



2 E5.1 **BUILDING GROUNDING DETAIL**
SCALE: NOT SCALED

GENERAL POWER NOTES - THIS SHEET ONLY

- LOADS FOR EXISTING TENANT SPACE TO BE SERVED ON NEW PANEL "T1" ARE ASSUMED TO BE ALL 208Y/120V LOADS AND NO MORE THAN 70% OF THE NEW 225A, 208Y/120V PANEL (157.5A) CAPACITY. ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR VERIFYING TENANT SPACE EXISTING EQUIPMENT LOADS AND RECONNECTING THEM TO THE NEW PANEL "T1". NOTIFY OWNER AND ARCHITECT IF LOADS ARE FOUND TO EXCEED 70% CAPACITY OF PANEL "T1". IT IS ALSO ASSUMED THERE ARE NO 480Y/277V CONNECTIONS REQUIRED IN THIS SPACE, OTHER THAN THE NEW STEP-DOWN TRANSFORMER REQUIRED FOR PANEL "T1".
- EQUIPMENT LOCATIONS AND CIRCUIT LOCATIONS SHOWN ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE INTENT OF THE DESIGN. COORDINATE FINAL LOCATION AND ROUTING WITH ACTUAL FIELD CONDITIONS
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT LAYOUT AND NOTIFY ARCHITECT OF ANY ITEMS NEEDING CLARIFICATION
- CONTRACTOR RESPONSIBLE FOR PROVIDING ALL MATERIAL AND LABOR FOR A COMPLETE AND FULLY FUNCTIONAL ELECTRICAL SYSTEM

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ELECTRICAL RISER

PROJECT # **1715**
DESIGNER:
DATE: **08/08/2017**
REV. DATE:

E5.1

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SECTION 16050 - ELECTRICAL GENERAL

PART 1 - GENERAL

1.1 SUMMARY

A. Description:
   1. Provide all materials, tools, and labor for a complete electrical installation as shown on the contract documents and indicated in the specifications
   2. Procure all permits and licenses
   3. Coordinate the electrical installation with the following:
      a. Architect
      b. Contractors of other trades
      c. Local Electrical and Building Inspectors, or the authority having jurisdiction
      d. Local Utility companies serving the project

B. Related Documents:
   1. Electrical, "E-", drawings
   2. All working drawings included in the contract documents
   3. Specifications of the following divisions/sections:
      a. Division 1: General Requirements
      b. Division 3: Concrete
      c. Section 07840: Fire stopping
      d. Division 11: Equipment
      e. Division 15: Mechanical

1.2 ABBREVIATIONS:

A. The following abbreviations are used throughout Division 16 specifications:
   1. AFF: Above Finished Floor
   2. ANSI: American National Standards Institute
   3. ASTM: American Society for Testing and Materials
   4. HVAC: Heating, Ventilating and Air Conditioning
   5. IEEE: Institute of Electrical and Electronic Engineers
   6. IES: Illuminating Engineering Society
   7. ITL: Independent Testing Laboratories
   8. NEC: National Electrical Code
   9. NECA: National Electrical Contractor Association
   10. NEMA: National Electrical Manufacturers Association
   11. NFPA: National Fire Protection Association
   12. NIC: Not in contract
   13. UL: Underwriters Laboratories, Inc.
   14. WP: Weatherproof
   15. ADA: Americans with Disabilities Act

1.3 DEFINITIONS:

A. "Provide" means to furnish and install, complete with all accessories so that component is functional

1.4 CODES AND STANDARDS:

A. Comply with the following codes and published standards which are applicable to the electrical installation of this project:
   1. NFPA 70 - National Electrical Code, latest applicable edition with Georgia Amendments
   2. International Fire Code, latest applicable edition with Georgia Amendments
   3. International Building Code, latest applicable edition with Georgia Amendments
   4. Underwriters Laboratories Electrical Construction Directory ("green book")
   5. Underwriters Laboratories Electrical General Information ("white book")
   6. NFPA 72, latest applicable edition
   7. Georgia Accessibility Code
   8. Americans with Disabilities Act

1.5 STANDARDS FOR MATERIALS AND WORKMANSHIP:

A. Use material that are new and, where UL or ITL has established standards, listed and/or labeled
B. Organize and execute work so that finished appearance is neat; mechanical, plumb when vertical and level when horizontal.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Provide equipment, products and materials shown on the drawings, as specified in the specifications or added by addendum.

2.2 SUBSTITUTION OF MATERIALS:

A. Refer to Contract Conditions.

2.3 CONCRETE:

A. Refer to Division 3 specifications.

2.4 PLYWOOD BACKBOARDS:

A. ¾" x size indicated on the drawings, A/D grade, paint two coats gray enamel.

PART 3 - EXECUTION

3.1 PROTECTION OF MATERIALS:

A. Cover fixtures, equipment and apparatus for protection against dirt, water, chemical or mechanical damage before and during construction.
B. Keep all conduit and other openings protected against entry of foreign matter.
C. Restore the original finish, including chop coat, of fixtures, apparatus or equipment that has been damaged prior to substantial completion.

3.2 COORDINATION:

A. Prior to rough-in of any materials, coordinate with subcontractors the physical clearances for and sequencing of Division 16 work as it interfaces with and relates to architectural, structural, plumbing and HVAC systems.

3.3 OPERATIONAL TEST

A. At the time of the substantial completion job observation, perform a test of all light fixtures, electrical systems, equipment, machinery and appliances, in the presence of the Architect or his representative, which demonstrates that all of Division 16 systems are operational.

3.4 OWNER INSTRUCTION AND ASSISTANCE:

A. At substantial job completion job observation, instruct the Owner's operating personnel in the operation, sequencing, maintenance, and safety/emergency provisions of the electrical systems.

3.5 AS-BUILT DRAWINGS:

A. Record on one set of electrical drawings all changes, deviations and underground conduits.
   Deliver same to architect as per Division 1.

END OF SECTION 16050

SECTION 16450 - GROUNDING

PART 1 - GENERAL

1.1 SUMMARY

A. Description:
   1. Provide a grounding system for each feeder, separately derived system, panelboard, and radiating to every electrical power controlling and consuming device in the system.

B. Related sections:
   1. Section 16050: Electrical General
   2. Section 16110: Raceways
   3. Section 16120: Conductors
   4. Section 16460: Transformers

1.2 SUBMITTALS:

A. Manufacturers Product Data Sheets

PART 2 - PRODUCTS

2.1 GROUND CLAMPS:

A. Bronze, UL listed, with configuration to match application

B. Acceptable Manufacturers:
   1. Burndy
   2. Ilsco
   3. Thomas & Betts
   4. O.Z. Gedney

PART 3 - EXECUTION

3.1 EQUIPMENT GROUNDING CONDUCTOR:

A. General: Install a separate insulated copper conductor, color coded green, form respective switchboard or panelboard ground bus to controller and/or device. Provide an additional equipment grounding conductor to insolated grounding receptacles. The isolated ground conductor shall be green with a yellow tracer.

3.2 ADDITIONAL EQUIPMENT GROUNDING CONDUCTORS:

A. Wiring Devices: At both switches and receptacles, provide a grounding jumper from the device to a screw on the device box.

3.3 EQUIPMENT GROUNDING CONDUCTOR ROUTING:

A. Route equipment grounding conductor with respective feeder or branch circuit conductors (within the same conduit).

3.4 CONDUITS:

A. All grounding electrode conductors, equipment grounding conductors and bonds where not internal to equipment enclosures shall be install in conduit to within 6" of terminating clamp or exothermic weld.

END OF SECTION

SECTION 16130 - BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Description:
   1. Provide electrical boxes or, where prescribed, conduit bodies for devices, outlets, splice connection points, raceway junction and conductor pulling points complete with supports, covers and accessories.

B. Related Sections:
   1. Section 16050: Electrical General

C. Standards:
   1. Underwriters Laboratories labeled and listed for application specified.

1.2 SUBMITTALS:

A. Manufacturers Product Data Sheets

PART 2 - PRODUCTS

2.1 INTERIOR OUTLET BOXES AND EXTENSIONS:

A. Galvanized steel, UL listed for application with conduit knockouts and threaded holes for mounting devices and/or coverplates:

B. Minimum Sizes:
   a. Single Device: 3"Hx2"Wx2"D
   b. Gang Device: 3"Hx2"W(per gang)x2"D
   c. Octagonal: 4"Wx1-1/2"D
   d. Square: 4" Squarex1-1/2"D

C. Acceptable Manufacturers:
   1. Appleton
   2. Raco
   3. Steel City
   4. American Electric

2.2 CONCRETE BOXES

A. Galvanized steel for encasing in concrete with conduit knockouts and threaded holes for mounting devices and/or coverplates.

B. Acceptable Manufacturers:
   1. Appleton
   2. Crouse Hinds
   3. Raco
   4. Steel City

2.3 MASONRY BOXES:

A. Galvanized steel for mounting in masonry walls with conduit knockouts and threaded holes for mounting devices and/or coverplates.

B. Acceptable Manufacturers:
   1. Appleton
   2. Crouse Hinds
   3. Raco
   4. Steel City

2.4 CAST BOXES:

A. Cast malleable iron, cadmium/zinc plated finish, NEMA 3R, threaded conduit entries, neoprene coverplates gasket and threaded holes for mounting devices and/or coverplates.

B. Acceptable Manufacturers:
   1. Appleton
   2. Crouse Hinds
   3. Raco
   4. Steel City

2.5 JUNCTION AND PULL BOXES:

A. Dry Locations: Galvanized sheet steel, NEMA 1, welded seams and cover held by stainless steel screws or bolts.

B. Damp or Wet Locations: Cast malleable iron with corrosion-resistant finish, NEMA 3R, threaded conduit entries, neoprene coverplate gasket, and coverplate held by stainless steel bolts.

C. Acceptable Manufacturers:
   1. Appleton
   2. Crouse Hinds
   3. Raco
   4. Steel City

2.6 FLOOR BOXES:

A. As specified on the drawings for a particular application

PART 3 - EXECUTION

3.1 DEVICE APPLICATIONS

A. Boxes for switches, receptacles, dimmers (designed for device box mounting) and future devices:
   1. For dry locations:
      a. When recessed:
         1) For construction other than concrete or masonry, use interior outlet box
         2) For concrete: Concrete box
         3) For masonry: Masonry box or square interior box with masonry extension
      b. When surface: Cast box
   2. For damp or wet locations:
      a. When recessed:
         1) For concrete: Concrete box
         2) For masonry: Masonry box or square interior box with masonry extension
      b. When surface: Cast box
   3. For hazardous areas: Hazardous area boxes

3.2 GENERAL APPLICATIONS

A. For lighting fixtures, equipment connedtions, pullboxes for conduit 1" and smaller, and junction boxes for conduits 1" and smaller.
   1. Recessed Interior Box:
      a. For construction other than concrete or masonry, use octagonal or square interior outlet box
      b. For concrete: Concrete box
      c. For masonry: Concrete box or square interior box with masonry extension
   2. Box above an accessible ceiling: Octagonal or square interior outlet box
   3. Exposed interior box:
      a. Above 7'-0": Octagonal or square interior outlet box or conduit body.
      b. 7'-0" and below: Cast box or conduit body.
   4. Exterior Box:
      a. When recessed in vertical element or ceiling:
         1) For concrete: Concrete box.
         2) For masonry: Concrete box or square interior box with masonry extension.
         3) For construction other than concrete of masonry, provide square interior box.
      b. Flush mounted in ground: Cast junction box.
      c. Exposed: Cast box or conduit body.

B. Hazardous Locations: Hazardous are box

C. Integrally Mounted Boxes: Boxes which are an integral part of an equipment assembly from the manufacturer and UL listed for the application may be used in liew of the boxes prescribed above.

3.3 JUNCTION BOXES AND PULL BOXES (conduit larger that 1"):

A. Junction boxes re conduit bodies where junction is exposed.

3.4 SUPPORT

A. General: Support each box from the building structure independently of conduit as follows, utilizing a support system capable of carrying 300% of load.
   1. Surface:
      a. Structural steel: Bolted directly to steel member or bolted to spring clip which is clipped to steel member.
      b. Concrete: Power driven fastener or bolt to expansion anchor set in drilled hole.
      c. Wood: Screw or bolt to wood.
   2. Suspended: Bolted to engineered spring clip which is clipped to suspended ceiling system.
   3. Recessed:
      a. Concrete: Set in concrete prior to pour.
      b. Masonry: Set or cut into masonry during masonry erection. Grout in around box.
      c. Drywall: Attach directly to stud or joist by screw or bolt; or directly to a galvanized steel support which is attached directly at each end to stud or joist by screw or bolt.
      d. Earth: Compact earth around box.

3.5 INSTALLATION:

A. Outlet locations indicated on the plans are approximate. Coordinate and determine the exact location at the building. The architect reserves the right to shift the exact location of any outlet 10 feet before it is permanently installed.

B. Install boxes plumb when vertical, level when horizontal and flush adjacent surface when recessed.

C. Where an outlet occurs in an architectural feature, center the outlet in same.

D. Where the mounting height of a wall outlet is not shown, mount at height directed by Architect. Mounting heights are from finished floor to box centerline.

E. The contractor may, with Architect's approval, slightly vary an outlet's mounting height so that the box's top or bottom occurs at a masonry joint.

F. Where outlets at different levels are shown adjacent, install them on the same vertical line.

G. Space wall switch outlets with the first gang box 4" from door trim on the installed strike side.

H. Locate boxes and conduit bodies so that covers are accessible and removable.

I. Limit masonry cuts from outlet boxes so that coverplate covers the cut.

J. Provide plaster rings for all boxes set in plaster walls or ceilings.

K. Match configuration to application.

L. Utilize box size (capacity) based upon NEC.

M. For devices, utilized boxes designed to support the device independently of coverplate and so install.

N. Cover unused conduit openings with metal covers for sheet steel boxes and threaded plugs for cast boxes.

O. Prior to pulling conductors or installing devices, clean boxes of dirt, debris and water.

P. Cover all boxes and secure with screws or bolts.

Q. Install pull boxes to limit pulling distance and/or pulling bends.

END OF SECTION

SECTION 16120 - CONDUCTORS

PART 1 - GENERAL

1.1 SUMMARY

A. Description:
   1. Provide continuous color coded conductors beginning at service point to distribution equipment and to each outlet and each piece of electrical energy consuming equipment

B. Related Sections:
   1. Section 16050: Electrical General
   2. Section 16420: Service Entrance

1.2 SUBMITTALS:

A. Manufacturers Product Data Sheets

PART 2 - PRODUCTS

2.1 CONDUCTORS:

A. Copper Conductors:
   1. Soft drawn annealed copper, 98% conductivity, without weld, splice or joint throughout its length; uniform in cross section without flaws, scales, or other imperfections with THHN/THWN or XHHW insulation.
   2. Acceptable Manufacturers:
      a. Anaconda
      b. Phelps Dodge
      c. Pirelli Cable
      d. Senator
      e. Southwire
      f. Triangle

B. Aluminum Conductors:
   1. Soft drawn, compacted construction, XHHW insulation, 250 kcmil and larger
   2. Acceptable Products:
      a. Alcan "STABILOY"
      b. Pirelli "XLPE"
      c. Southwire

C. Configuration:
   1. No. 10 and smaller: Solid
   2. No. 8 and larger: Stranded

D. Insulation - 600 Volts:
   1. No. 6 and smaller: THHN, THWN
   2. No. 4 and larger: XHHW

E. Jacket Color:
   1. No. 8 and smaller: Uniform colored jacket
   2. No. 6 and larger: Black

F. Jacket Markings:
   1. Voltage
   2. Insulation type
   3. Conductor size
   4. Conductor type

2.2 COLOR CODING TAPE:

A. Vinyl ¾" wide with uniform color and adhesive backing.

B. Acceptable Manufacturers:
   1. Brady
   2. 3M
   3. Plymouth
   4. Thomas & Betts

2.3 SPLICE AND TAP MATERIALS:

A. No. 10 and smaller:
   1. Crimp type: Cylindrically shaped conductor sleeve for crimping copper conductors. Insulated with nylon or plastic cover.
   2. Twist on: Inner spiral spring or threads for holding and making electrical contact between copper conductors and with outer long skirted insulated cover of nylon or plastic.

B. No. 8 and larger
   1. Set-screw or bolted type: Metal connector for joining copper to copper, with bolts or set-screws to apply pressure to conductors. Insulate with nylon or plastic cover or with electrical tape.
   2. Pressure type: Metal connectors for joining copper to copper, copper to aluminum, or aluminum to aluminum with power operated crimping tool. Insulate with nylon or plastic cover or with electrical tape.

C. Acceptable Manufacturers:
   1. AMP
   2. Burndy
   3. Ideal
   4. Ilsco
   5. Panduit
   6. 3M
   7. Thomas & Betts

2.4 CONDUCTOR TERMINALS:

A. Copper conductors: High conductivity copper terminals designed to hold conductor and make electrical contact by bolt, setscrew or power crimp and with spade to match equipment receiving conductor.

B. Aluminum conductors: High conductivity terminal designed to hold aluminum conductor and make electrical contact by crimping and with spade to match equipment receiving conductor in physical shape, physical size and material.

C. Acceptable Manufacturers:
   1. Burndy
   2. Ideal
   3. Ilsco
   4. Panduit
   5. Thomas & Betts

2.5 CONDUCTOR HARNESS:

A. Plastic or nylon self-locking straps (commonly referred to as zip-ties or tie-wraps).

B. Acceptable Manufacturers:
   1. Panduit
   2. Thomas & Betts

2.6 WIRE PULLING LUBRICANTS:

A. Lubricating, insulating and chemically neutral to conductors, conductor insulation and conduits.

B. Acceptable Manufacturers:
   1. Greenlee
   2. Ideal
   3. Polywater

2.7 ELECTRICAL TAPE:

A. Vinyl plastic; moisture tight, resistant to ultraviolet radiation, alkalis, acids and corrosion; chemically neutral to conductors and conductor insulation: fire retardant; and single thickness dielectric strength equal to or greater than 10,000V.

B. Acceptable Manufacturers:
   1. Scotch
   2. 3M
   3. Plymouth

2.8 ALUMINUM OXIDE INHIBITING COMPOUND:

A. Compound shall inhibit the formation of aluminum oxide on clean aluminum conductors without deteriorating the conductors.

B. Acceptable Manufacturers:
   1. Burndy
   2. Thomas & Betts

END OF SECTION

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SPECIFICATIONS

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E5.2

SECTION 16440 - DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Description
   1. Provide disconnect switches in configurations as indicated on the drawings complete with enclosures and accessories.

B. Related Sections
   1. Section 16050: Electrical General
   2. Section 01330: Submittals
   3. Section 16170: Motor and Equipment Connections

1.2 SUBMITTALS

A. Manufacturers Product Data Sheets

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers as follows:
   1. General Electric
   2. Siemens/ITE
   3. Square D
   4. Cutler Hammer

2.2 DISCONNECT SWITCHES:

A. Disconnect switches shall be heavy duty (NEMA Type HD) and Underwriters Laboratories Listed.

B. All switches shall have blades which are fully visible in the "OFF" position when the switch door is open. All current carrying parts shall be plated to resist corrosion and promote cool operation. Switches shall have removable arc suppressors where necessary to permit easy access to the line side lugs. Lugs shall be front removable and UL listed for 60 degrees C or 75 degrees C, aluminum or copper wires.

C. Switches shall be quick-make, quick-break such that, during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operation handle after the closing or opening action of the contacts has started. The operating handle shall be an integral part of the box, not the cover. Provisions for padlocking the switch in the "OFF" position with at least three locks shall be provided. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door when the handle is in the "ON" position, and to prevent closing of the switch mechanism with the door open. The handle position shall indicate whether the switch is ON or OFF.

D. Switches shall be furnished in NEMA 1 general purpose enclosures unless specified as NEMA 3R on the plans. Covers on NEMA 1 enclosures shall be attached with pin type hinges, NEMA 3R covers shall be securable in the open position. NEMA 3R enclosures for switches thru 200 amperes shall have provisions for interchangeable bolt-on hubs. Hubs shall be as indicated on the plans. NEMA 3R enclosures shall be manufactured from galvanized steel. Enclosures shall have a gray baked enamel finish, electrodeposited on cleaned, phosphatize steel.

E. Switches shall be horsepower rated for as and/or dc as indicated by the plans. All fusible switches rated 100 thru 600 amperes at 240 volts and 30 thru 600 amperes at 600 volts shall have a UL approved method of field conversion from standard Class H fuse spacing to Class J fuse spacing. The switch also must accept Class R fuses and have provisions for field installation of UL listed rejection scheme. The UP listed short circuit rating of the switch, when equipped with Class H fuses, shall be 10,000 rms symmetrical amperes. 800 and 1200 ampere switches shall have provisions for Class L fuses and shall have a UP listed short circuit rating of 200,000 rms symmetrical amperes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switch adjacent to equipment it serves or as located on the plans.

B. Anchor enclosures firmly to wall and/or structural surfaces. Coordinate mounting of disconnect to roof top mechanical equipment with supplier/installer.

END OF SECTION

SECTION 16110 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Description:
   1. Provide continuous conduit systems - beginning at the service point, to all distribution equipment and to every outlet and piece of electrical equipment with conduits, couplers, supports, hangers, fittings, bushings and accessories.

B. Related Sections:
   1. Section 16050: Electrical General

1.2 SUBMITTALS

A. Manufacturers' Product Data Sheets.

PART 2 - PRODUCTS

2.1 RIGID STEEL AND INTERMEDIATE METALLIC CONDUIT

A. Conduit:
   1. Rigid ferrous steel pipe, hot-dipped galvanized or sherardized with smooth interior.
   2. Acceptable Manufacturers:
      a. Allied
      b. Triangle
      c. Wheatland

B. Couplings and Connectors:
   1. Couplings:
      a. Hot-dipped galvanized or sherardized ferrous steel, threaded.
   2. Connectors:
      a. Steel or malleable iron, threaded with throat bushings, lock nuts and, where prescribed, grounding lugs
   3. Erickson:
      a. Malleable iron, concrete tight
   4. Acceptable Manufacturers:
      a. Appleton
      b. Crouse Hinds
      c. Steel City
      d. Thomas & Betts

C. Joint Compound:
   1. Anti-seize lubricant with rust and corrosion inhibitors and colloidal copper
   2. Acceptable Manufacturers:
      a. Thomas & Betts

D. Expansion Fittings:
   1. Steel with three cap nuts, phenolic bushing, packing ring, metallic copper grounding ring and copper bonding jumper
   2. Acceptable Products:
      a. Crouse Hinds "XJ"
      b. O. Z. Gedney "AX" or "DX"
      c. Appleton "XJ"

2.2 ELECTRICAL METALLIC TUBING

A. Conduit:
   1. Thin wall ferrous steel tubing, hot-dipped galvanized, smooth interior, square and reamed ends
   2. Acceptable Manufacturers:
      a. Allied
      b. Wheatland
      c. Triangle

B. Couplings and Connectors:
   1. Couplings:
      a. Steel, compression type, installed where exposed to moisture
      b. Steel, setscrew type, when installed indoors
   2. Connectors:
      a. Steel, compression type with nylon insulated bushings, locknuts, and where prescribed, grounding lugs, installed where exposed to moisture
      b. Steel, setscrew type with nylon insulated bushings, locknuts, and where prescribed, grounding lugs, installed indoors.

C. Expansion Fittings:
   1. Steel with three cap nuts, phenolic bushings, packing ring, metallic copper grounding ring and copper bonding jumper.
   2. Acceptable Products:
      a. Crouse Hinds "XJ"
      b. O.Z. Gedney "AX" or "DX"
      c. Appleton "XJ"

2.3 RIDGID NONMETALLIC CONDUIT:

A. Conduit:
   1. Schedule 40 Polyvinyl Chloride (PVC), resistant to crushing, moisture, low temperature, and corrosive agents in standard trade sizes

B. Couplings and Connectors:
   1. Couplings: Schedule 40 PVC
   2. Connectors: Schedule 40 PVC

C. Expansion Fittings:
   1. Schedule 40 PVC with grommet inner cylinder and outer sleeve

D. Joint Cement:
   1. PVC solvent
   2. Acceptable Manufacturers:
      a. Carlon
      b. Wheatland
      c. Allied

2.4 LIQUIDTIGHT FLEXIBLE CONDUIT:

A. Conduit:
   1. Galvanized steel single strip, interlocked, smooth inside and out, with liquid-tight flexible polyvinyl chloride outer jacket
   2. Acceptable Manufacturers:
      a. Carlon
      b. Wheatland
      c. Allied

B. Fittings:
   1. Threaded corrosion-resistant steel or malleable iron with insulated throat bushing, liquid tight, locknuts and external Ground lugs
   2. Acceptable Manufacturers:
      a. Appleton
      b. O.Z. Gedney
      c. Thomas & Betts

2.5 FLEXIBLE METAL CONDUIT:

A. Conduit:
   1. Galvanized steel single strip, interlocked, smooth inside and out
   2. Acceptable Manufacturers:
      a. AFC
      b. Alflex
      c. General Cable

B. Fittings:
   1. Threaded corrosion-resistant steel or malleable iron with insulated throat bushing and lock nuts
   2. Acceptable Manufacturers:
      a. Appleton
      b. O.Z. Gedney
      c. Thomas & Betts

PART 3 - EXECUTION

3.1 APPLICATIONS:

A. Provide Rigid Metal Conduit or Intermediate Metallic Conduit for service entrance, feeders, in slab on grade, areas where exposed to moisture, exposed on exterior surfaces, and exposed interior from floor to 10'-0" or where exposed to physical abuse.

B. Provide Electrical Metallic Tubing (EMT) for interior power circuits, branch circuits and system circuits in walls, elevated concrete slabs (those not on grade), plenums, attics or exposed above 10'-0", where not exposed to moisture.

C. Provide Rigid Nonmetallic Conduit for service ground, in slab on grade, in direct contact with earth, exposed in corrosive environments above 10'-0" above floor, or service entrance when encased in concrete.

D. Provide Liquid-tight Flexible Metal Conduit for final connecting link (minimum of 12", maximum of 36") to the following:
   1. Plumbing equipment
   2. Kitchen equipment
   3. Exterior Mechanical equipment

E. Provide Flexible Metal Conduit for:
   1. Final connection link (minimum of 12", maximum of 36") to:
      a. Motors
      b. Transformers
      c. Mechanical equipment
   2. Connections between junction boxes and accessible recessed lighting fixtures.

3.2 CONDUIT SUPPORT

A. Intervals: Maximum 10 feet on center and within 3 feet of each outlet box, junction box, cabinet or fitting.

B. Conduits ¾" and smaller
   1. Method
      a. When single conduit: Attach directly to building structure of suspend with ¼" rod
      b. When multiple parallel and adjacent conduits and:
         1) When horizontal at structure: Attach directly to structure or to support framing attached to structure
         2) When horizontal suspended: Attach to support framing, suspended from building structure
         3) When vertical: Attach to support framing attached to building structure, wall structure or suspended from building structure
   2. Conduit attachment:
      a. When direct to structure or single conduit suspended: Spring steel friction, spring steel latching or clamped with bolts or screws
      b. When on support framing: Two section bolted conduit clamp
   3. Structural steel attachment
      a. When single conduit: Spring steel friction, clamp with bolt or bolted
      b. When hanger rod: Clamp with bolt or bolted
   4. Concrete attachment: Steel preformed conduit clamp. Attach clamp with expansion anchor installed in drilled hole or with power fastening anchor designed to meet concrete specification. In either case, design support of 300% or greater of load
   5. Wood attachment: Wood screws or bolted with design support of 300% or greater of load

C. For 1" or larger:
   1. Method:
      a. When single conduit: Attach directly to building structure or suspend with threaded rod
      b. When multiple parallel and adjacent conduits: Attach to support framing attached to building structure, wall structure or suspended from building structure
   2. Conduit attachment:
      a. When single conduit: Bolted Clamp
      b. When on support framing: Two section bolted conduit clamp
   3. Structural steel attachment: Beam clamps with bolted or bolted directly to steel
   4. Concrete attachment: Provide preset insert prior to concrete pour or coordinate drill location with Architect. When drilling provide expansion anchors. In either case, maintain design support of 300% or greater of load.
   5. Wood attachment: Wood screws or bolted with design support of 300% or greater of load

D. Framing:
   1. Attachment, suspension and bearing members capable of supporting 300% of load

3.3 INSTALLATION:

A. For conduit layout follow, generally, the diagrammatic layout shown on plans. Provide offsets and routing changes to avoid structural, architectural or equipment elements.

B. Provide ½" minimum size conduit.

C. Conceal all conduit except where shown to be exposed. Install conduit concealed above a lay-in ceiling with clearance to allow easy removal of ceiling panels.

D. Install exposed conduit parallel with or perpendicular to building walls at greatest height possible. Paint exposed conduit two coats of color directed by Architect.

E. Extend homeruns from outlets shown to panel designated. Do not combine homeruns.

F. Use benders designed for the size and type of conduit. Limit each bend to 90 degrees or less with a radius 10 time conduit diameter or greater for telephone system and 6 times conduit diameter or greater for all other systems.

G. Provide insulated bushings at each end of every conduit run.

H. Provide joint compound on rigid steel conduit and intermediate metallic conduit joints.

I. Provide an Erickson type coupling where two segments of a conduit run must be joined and neither can be rotated.

J. Close all conduit ends during construction with plastic conduit plugs.

K. Install conduit no greater than 1" trade size in concreter slabs. Route conduit between top and bottom reinforcing steel and space parallel runs a minimum of 3" apart.

L. Install conduit above water and steam piping where possible.

M. Maintain grounding of metallic raceways with clean and tight connections. Provide grounding conductor in plastic and flexible conduit.

N. Provide ground lugs on all conduit connectors to service equipment enclosures.

O. Provide grounding wedge lugs or locknuts designed to bite metal on conduit connections to panel cabinet or pull boxes.

P. Seal all conduits which extend from the interior to the exterior of the building to prevent the circulation of air.

Q. Provide a thru wall waterproof seal on each conduit that penetrates a wall at a below grade level.

R. Provide an expansion fitting in each conduit crossing a building expansion joint and locate the fitting at the joint. Also provide expansion fitting in building conduits exceeding 100 feet at intervals of 100 feet.

S. Where liquids are present, form drip loops in liquid-tight flexible conduit to prevent liquid from running into connections.

T. Blow out and swab all conduit clear of trash and water prior to pulling wire.

U. Provide a nylon pull cord in all empty conduits.

V. In mechanical equipment room where a piece of equipment is located more than 2 feet away from walls or columns, serve equipment from underfloor or provide a vertical conduit, minimum 1", attached to floor and ceiling with conductors entering and exiting conduit through conduit bodies.

W. Coordinate conduit supports in precast or cast-in-place concrete prior to pour.

3.4 UNDERGROUND INSTALLATION

A. Where exterior of building bury conduit a minimum of 30" below finished grade.

B. Encase conduit in 3" concrete envelope where it passes under driveway, roadways or entrances to PCHing lots.

C. When under interior slab on grade seal vapor barrier around conduit penetrations.

END OF SECTION

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 Summary:

A. Description:
   1. Identify the following electrical equipment with a nameplate or directory indicating load served or equipment name:
      a. Panelboards, Main and Branch Breakers
      b. Disconnect Switches and Motor Starters
      c. Contactors, Time Switches and Relays

1.2 Submittals:

A. Sample of Nameplate.

PART 2 - PRODUCTS

2.1 Nameplates:

A. 120 Volts, 208 Volts, and 240 Volts - Bakelite label, black face, white core.

B. 277 Volts and 480 Volts - Bakelite label, red face, white core.

C. Lettering:
   1. Main Service Disconnect - ½" high letters.
   2. All others - ¼" high letters.

2.2 Panelboard directory:

A. Panelboard manufacturers directory in plastic sleeve on inside of panel cover door.

PART 3 - EXECUTION

3.1 Installation:

A. Securely mount each nameplate to its respective equipment with screws or epoxy type cement. Double sided foam core type tape is not acceptable.

B. Type in the branch breaker load information onto the manufacturers' panel directory. Mark all spares in pencil. Install in plastic sleeve on inside of panel cover door.

C. Label all junction box covers with the circuit number installed in the box with a permanent marker.

END OF SECTION

SECTION 16170 - MOTOR AND EQUIPMENT CONNECTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Description:
   1. Provide power wiring to each motor, all mechanical equipment, all kitchen equipment, and all miscellaneous equipment included in the contract documents. Power wiring is the system of conductors from the energy source to the equipment that conducts the electrical energy which does work or provides heat.
   2. Provide a disconnect switch, fused where prescribed, for each motor or piece of equipment.

B. Related Sections:
   1. Section 16440: Disconnect switches
   2. Section 16050: Electrical General

PART 2 - PRODUCTS

2.1 STARTERS:

A. Provided under other divisions except where specifically prescribed in Division 16 documents.

2.2 MOTORS AND EQUIPMENT:

A. Motors, mechanical equipment, kitchen equipment, etc., provided under other divisions.

2.3 CONTROL AND INTERLOCK WIRING:

A. Control wiring, (i.e., HVAC controls, remote pushbutton stations, thermostats, etc.), is excluded except where specifically prescribed in Division 16 documents.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate all rough-in and final power wiring and equipment connection with other subcontractors
B. Install and connect individually mounted starters provided by other subcontractors
C. Label each disconnect switch and starter with name of equipment it serves. Refer to Section 16195
D. Coordinate over-current device rating with nameplate or motor or equipment.

END OF SECTION

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SPECIFICATIONS

PROJECT # **1715**
DESIGNER:
DATE: **08/08/2017**
REV. DATE:

E5.3

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