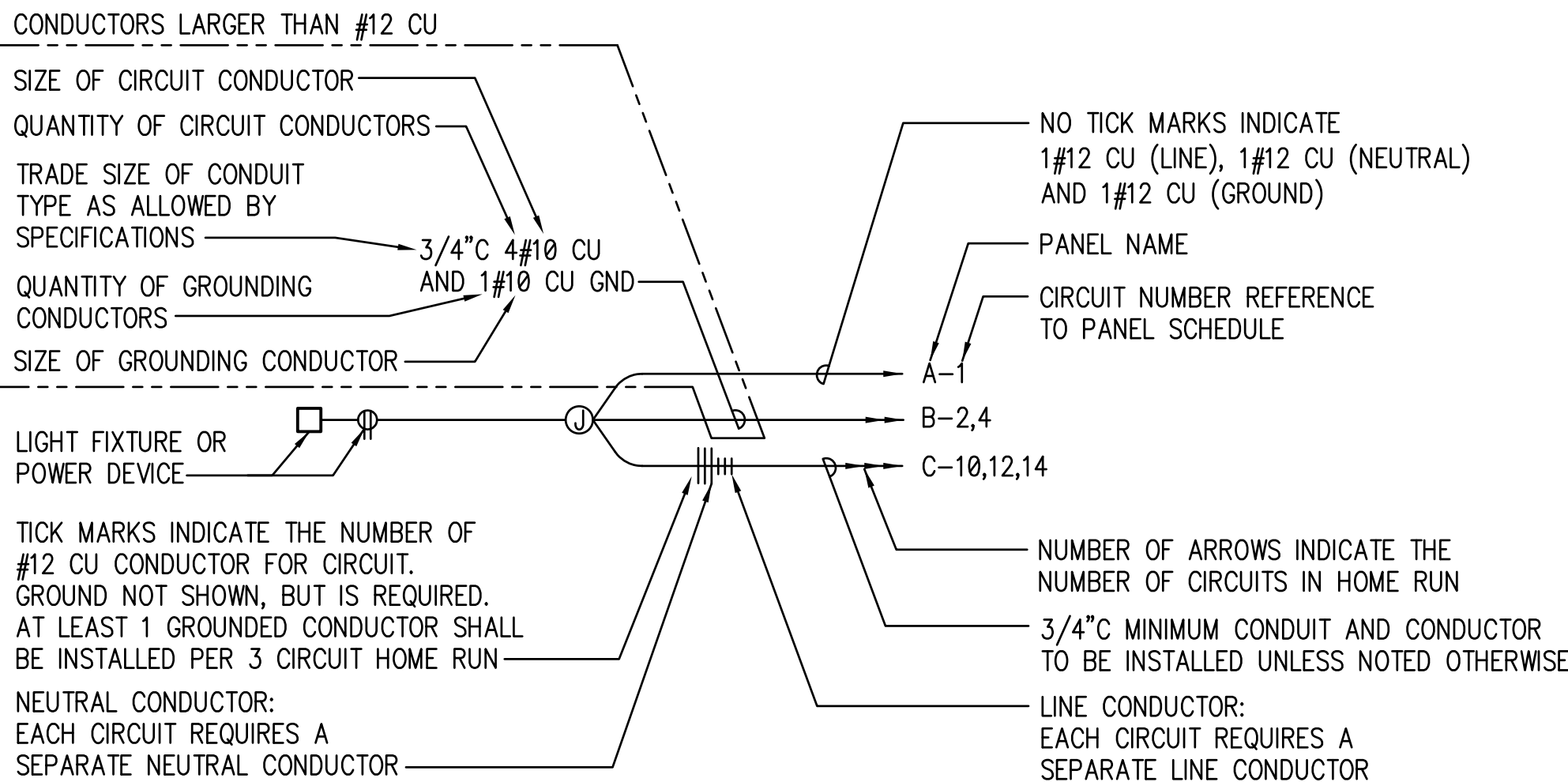


## LIGHTING LEGEND

LIGHT FIXTURE TYPE AND ZONING DESCRIPTION: UPPER CASE LETTER DESIGNATES FIXTURE TYPE AS INDICATED ON LIGHTING FIXTURE SCHEDULE LOWER CASE LETTER DESIGNATES SWITCHING ZONE			
	2' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING		LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE
	2' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH EMERGENCY BATTERY PACK		LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE WITH EMERGENCY BATTERY PACK
	2' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION		LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION
	2' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION AND WITH EMERGENCY BATTERY PACK		LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION WITH EMERGENCY BATTERY PACK
	2' X 2' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING		RECESSED CAN LIGHT LIGHT FIXTURE
	2' X 2' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH EMERGENCY BATTERY PACK		RECESSED CAN LIGHT LIGHT FIXTURE WITH EMERGENCY BATTERY PACK
	2' X 2' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION		RECESSED CAN LIGHT LIGHT FIXTURE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION
	2' X 2' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION AND WITH EMERGENCY BATTERY PACK		RECESSED CAN LIGHT LIGHT FIXTURE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION WITH EMERGENCY BATTERY PACK
	1' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING		LIGHT FIXTURE, WALL MOUNTED, SCONCE
	1' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING WITH EMERGENCY BATTERY PACK		LIGHT FIXTURE, WALL MOUNTED, SCONCE WITH EMERGENCY BATTERY PACK
	1' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING, WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION		LIGHT FIXTURE, WALL MOUNTED, SCONCE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION
	1' X 4' LIGHT FIXTURE, RECESSED IN LAY-IN CEILING, WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION AND WITH EMERGENCY BATTERY PACK		LIGHT FIXTURE, WALL MOUNTED, SCONCE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION WITH EMERGENCY BATTERY PACK
	1' X 4' LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE		EXTERIOR WALL MOUNTED FIXTURE
	1' X 4' LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE WITH EMERGENCY BATTERY PACK		EXTERIOR WALL MOUNTED FIXTURE WITH EMERGENCY BATTERY PACK
	1' X 4' LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION		WALL OR CEILING MOUNTED EXIT LIGHT ARROWS INDICATE ARROW ON LIGHT TO SHOW DIRECTION OF NEAREST EXIT
	1' X 4' LIGHT FIXTURE, SURFACE MOUNTED TO STRUCTURE WITH UNSWITCHED CONTINUOUS NIGHT LIGHT OPERATION AND WITH EMERGENCY BATTERY PACK		WALL OR CEILING MOUNTED COMBINATION EXIT LIGHT ARROWS INDICATE ARROW ON LIGHT TO SHOW DIRECTION OF NEAREST EXIT EMERGENCY EXIT LIGHT
<			

NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

## CIRCUITING LEGEND



## POWER LEGEND

	MANUAL MOTOR STARTER SWITCH
	TIMECLOCK
	CONTACTOR
	IRRIGATION CONTROL PANEL
	DISCONNECT SWITCH POLES, AMPS, AND NEMA ENCLOSURE TYPE AS NOTED
	FUSED DISCONNECT SWITCH POLES, AMPS, NEMA ENCLOSURE TYPE, AND FUSE SIZE AS NOTED
	THERMOSTAT, AT +48 INCHES
	MOTOR # INDICATES FAN (FRACTIONAL HORSEPOWER) F INDICATES MOTOR SIZE (IN HORSEPOWER)
	JUNCTION BOX
	RECESSED AUDIO SPEAKER
	ELECTRICAL PANEL
	SURFACE RACEWAY
	DUPLEX RECEPTACLE AT +18 INCHES UNLESS NOTED OTHERWISE
	GFI GROUND FAULT INTERRUPTER
	C MOUNTED ON CEILING
	S SURGE SUPPRESSION
	WP IN-USE WEATHERPROOF RATED COVER WITH WEATHER RESISTANT GFI RECEPTACLE
	DOUBLE DUPLEX RECEPTACLE AT +18 INCHES UNLESS NOTED OTHERWISE
	GFI GROUND FAULT INTERRUPTER
	C MOUNTED ON CEILING
	S SURGE SUPPRESSION
	WP IN-USE WEATHERPROOF RATED COVER WITH WEATHER RESISTANT GFI RECEPTACLE
	DATA/COMM/POWER FLOOR BOX
	RECESSED ENTERTAINMENT BOX
	TELEVISION FLOOR RECEPTACLE AND CABLE JUNCTION BOX LOCATION
	30A, 250V SPECIAL PURPOSE RECEPTACLE VERIFY NEMA PLUG TYPE REQUIRED PRIOR TO INSTALLATION
	50A, 250V SPECIAL PURPOSE RECEPTACLE VERIFY NEMA PLUG TYPE REQUIRED PRIOR TO INSTALLATION
	ELECTRICAL METER
	CURRENT TRANSFORMER CABINET SIZE AS INDICATED ON DRAWINGS
	UNIT HEATER SIZE AS INDICATED ON DRAWINGS
	FAN FORCED WALL HEATER SIZE AS INDICATED ON DRAWINGS
	WATER HEATER SIZE AND TYPE AS INDICATED ON DRAWINGS
	ELECTRIC BASEBOARD HEATER SIZE AND TYPE AS INDICATED ON DRAWINGS
	MECHANICAL EQUIPMENT CALLOUT










NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

## ONE-LINE LEGEND

	NON-FUSED SWITCH (OPEN)
	NON-FUSED SWITCH (CLOSED)
	FUSED SWITCH (OPEN)
	FUSED SWITCH (CLOSED)
	START BUTTON
	STOP BUTTON
	CIRCUIT BREAKER
	OVER LOAD HEATER
	NORMALLY OPEN SWITCH
	NORMALLY CLOSED SWITCH
	TRANSFORMER
	FUSE
	HAND/OFF/AUTO SWITCH
	CURRENT TRANSFORMER
	GROUND (EARTH GROUND)
	MOTOR F INDICATES FAN (FRACTIONAL HORSEPOWER) # INDICATES MOTOR SIZE (IN HORSEPOWER)
	ELECTRICAL PANEL
	PACKAGED EQUIPMENT a SIZE b HP, KW, KVA
	COMBINATION STARTER WITH CONTROL PANEL POWER TRANSFORMER a CIRCUIT BREAKER DISCONNECT, TYPE AS NOTED b STARTER TYPE c NEMA STARTER SIZE d OVERLOAD HEATERS

NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

## DATA/COMMUNICATIONS LEGEND

	TELEPHONE JACK, +18" UNLESS NOTED OTHERWISE # INDICATES QUANTITY OF STRUCTURED CABLES TERMINATING ON RJ45 JACK(S) AT FACEPLATE.
	TELEPHONE/COMM JACK, +18" UNLESS NOTED OTHERWISE # INDICATES QUANTITY OF STRUCTURED CABLES TERMINATING ON RJ45 JACK(S) AT FACEPLATE.
	COMMUNICATION JACK, +18" UNLESS NOTED OTHERWISE # INDICATES QUANTITY OF STRUCTURED CABLES TERMINATING ON RJ45 JACK(S) AT FACEPLATE.
	ROUGH-IN JUNCTION BOX AT +18", UNLESS NOTED OTHERWISE (ROUGH IN ONLY, NO CABLES)
	SURFACE RACEWAY
	DATA/COMM/POWER FLOOR BOX
	19" 4 POST NETWORK RACK
	19" 2 POST NETWORK RACK
	WALL MOUNTED NETWORK RACK

NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

## ABBREVIATIONS

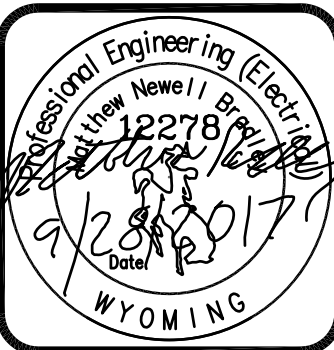
AL	ALUMINUM
AWG	AMERICAN WIRE GAUGE
A	AMPERE(S)
CKT	CIRCUIT
CB	CIRCUIT BREAKER
C	CONDUIT
CU	COPPER
CT	CURRENT TRANSFORMER
DISC	DISCONNECT
DWG	DRAWING
EMT	ELECTRICAL METALLIC TUBING
HZ	FREQUENCY IN CYCLES PER SECOND
F	FUSE
FS	FUSIBLE SWITCH
GEN	GENERATOR
GND	GROUND
GFI	GROUND FAULT INTERRUPTER
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
IMC	INTERMEDIATE METALLIC CONDUIT
INC	INCANDESCENT
KVA	KILOWATT VOLT AMPS
KW	KILOWATT(S)
MCC	MOTOR CONTROL CENTER
KCMIL	THOUSAND CIRCULAR MIL(S)
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
NIC	NOT IN CONTRACT
PNL	PANEL
PVC	POLYVINYL CHLORIDE
GRS	GALVANIZED RIGID STEEL
SWBD	SWITCHBOARD
XMFR	TRANSFORMER
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTED POWER SYSTEM
V	VOLT(S)
VA	VOLTAMP(S)
W	WATT(S)
WP	WEATHER PROOF

## ELECTRICAL DRAWING LIST

E0.0	ELECTRICAL TITLE SHEET
E1.0	ELECTRICAL DEMOLITION PLAN
E2.0	LIGHTING INSTALLATION PLAN
E3.0	POWER INSTALLATION PLAN
E4.0	MECHANICAL POWER INSTALLATION PLAN
E5.0	ONE LINE DIAGRAM
E5.1	PANEL SCHEDULES
E5.2	FIXTURE SCHEDULE AND COMCHECK
E5.3	ELECTRICAL DETAILS
E5.4	SPECIFICATIONS
E5.5	SPECIFICATIONS
E5.6	SPECIFICATIONS
E5.7	LIGHTING CUT SHEETS
FA1.0	FIRE ALARM INSTALLATION PLAN
FA1.1	FIRE ALARM RISER AND LEGEND

TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.

ELECTRICAL TITLE SHEET



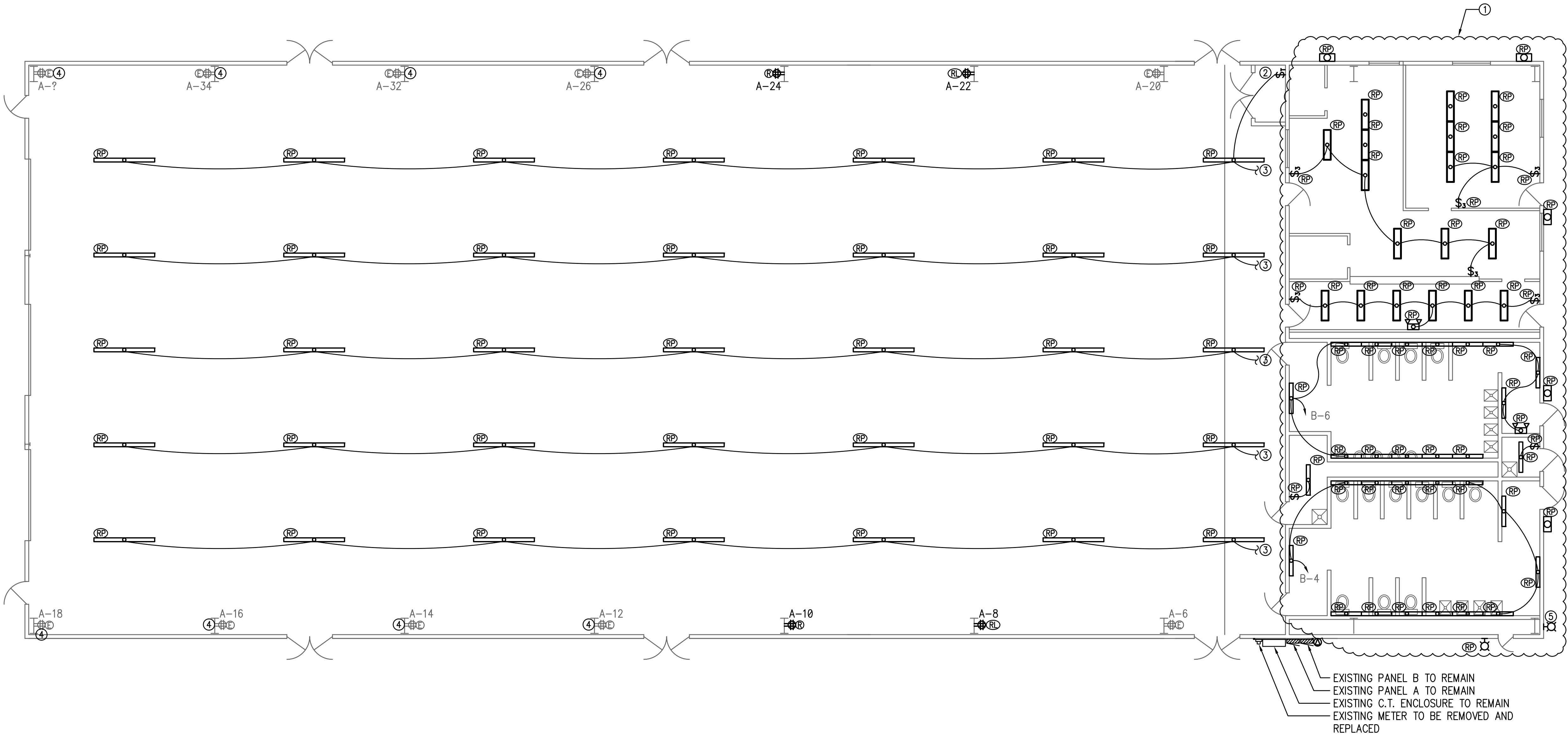
DRAWN BY  
J. BRADLEY  
CHECKED BY  
M.N. BRADLEY  
DESIGNED BY  
J. BRADLEY  
JOB NO. DATE  
17-72 AUG 28

DRAWING NO.

E0.0

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 **ELECTRICAL DEMOLITION PLAN**  
SCALE: 1/8"=1'-0"

**DEMOLITION NOTES:**

1. FIELD VERIFY ALL CIRCUITS PRIOR TO WORK ON ANY CIRCUIT.
2. (R) INDICATES ITEMS TO BE REMOVED. REMOVE DEVICE, AND ALL CONDUCTORS PERTAINING TO THE DEVICE. ABANDON, REMOVE OR REUSE CONDUITS OR RACEWAY AS IT FITS THE INTENT OF THE PROJECT. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF EQUIPMENT AND PROVIDE COVER PLATES AS REQUIRED. (R) INDICATES DEVICE TO BE RELOCATED. (R) INDICATES DEVICE TO BE REPLACED. (R) INDICATES EXISTING DEVICE TO REMAIN.

**GENERAL NOTES:**

1. ALL EXISTING LIGHT LOCATIONS SHALL BE UPGRADED WITH A 1 FOR 1 LIGHT FIXTURE REPLACEMENT.
2. RETURN ALL REMOVED LIGHT FIXTURES TO THE TOWN OF JACKSON. COORDINATE WITH FACILITIES MANAGER KEVIN MEAGHER 307-690-7432.

**DRAWING KEY NOTES:**

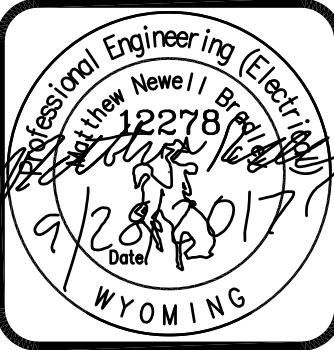
1. ALL EXISTING LIGHTING IN THIS AREA SHALL REMAIN ON EXISTING LIGHTING CIRCUITS.
2. EXISTING LIGHT TIMER SWITCH THAT CONTROLS ALL OF THE OPEN AREA LIGHTING. SWITCH TO BE REMOVED AND LIGHTING CIRCUITS TO BE REWORKED. EXISTING CONDUIT RUNS SOUTH TO NORTH ALONG BUILDING STEEL. EXISTING CIRCUITS FOR PAVILION LIGHTS ARE B-1,3,5,7,9,11. EXISTING LIGHTING CONTACTOR WAS UNABLE TO BE LOCATED. REUSE CONDUIT TO FIT THE INTENT OF THE NEW DESIGN. RETURN LIGHTING CONTACTOR TO KEVIN MEAGHER WITH THE TOWN OF JACKSON.
3. EXISTING LIGHTING CONDUIT RUNS INTO THE STORAGE SPACE ABOVE THE OFFICE. REWORK AND REUSE CONDUITS TO FIT THE INTENT OF THE NEW DESIGN. REWORK THE STORAGE LIGHTS INTO THE LIGHT SWITCH AT THE UPPER ENTRY DOOR WITH THE EXISTING LIGHT CIRCUIT.
4. EXISTING RECEPTACLE CIRCUIT TO BE REUSED. INSTALL A NEW GFI CIRCUIT BREAKER ON THIS CIRCUIT. SEE POWER INSTALLATION PLAN FOR LOCATION OF NEW RECEPTACLE CIRCUIT.
5. EXISTING FLAG LIGHT TO REMAIN.

ADDRESS: 415 W. 2nd St.  
TOWN OF JACKSON, WY 83002  
TELEPHONE: (307) 525-3662  
FAX: (307) 525-3662  
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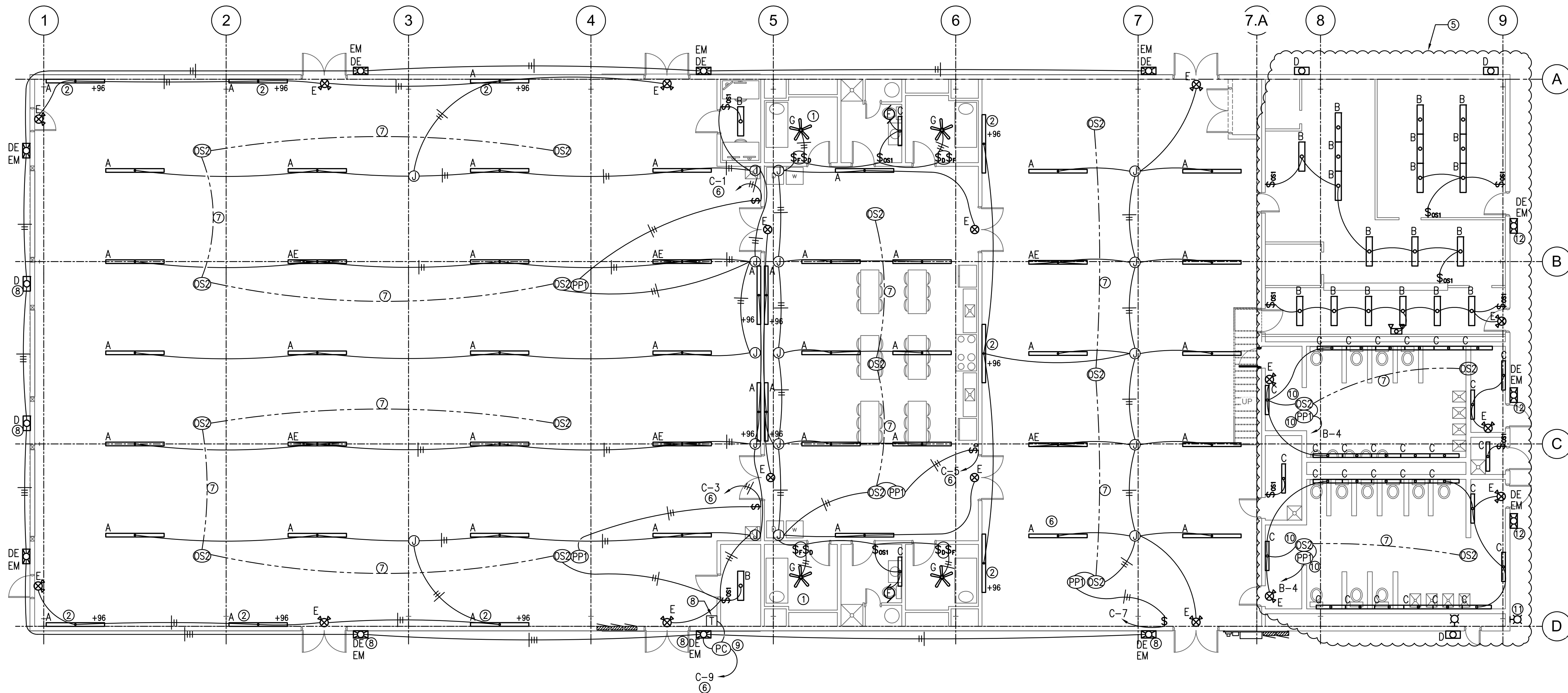
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**TEMPORARY FIRE STATION JACKSON**  
**305 W. SNOW KING AVE.**  
**ELECTRICAL DEMOLITION PLAN**



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CHECKED BY	M.N. BRADLEY
DESIGNED BY	J. BRADLEY
JOB NO.	17-72
DATE	AUG 28

DRAWING NO.  
**E1.0**



 LIGHTING INSTALLATION PLAN  
SCALE: 1/8"=1'-0"

#### SWITCH AND OCCUPANCY SENSOR LEGEND

- OS1 OCCUPANCY SENSOR - WALL MOUNT, PASSIVE INFRARED, SINGLE POLE, LINE VOLTAGE, IVORY SENSOR SWITCH WSD-IV.
- OS2 OCCUPANCY SENSOR - CEILING MOUNT, DUAL TECHNOLOGY, LOW VOLTAGE, HIGH BAY SENSOR SWITCH CM-PDT-6
- PP1 POWER PACK - 120/277V-15VDC, 20A, SINGLE POLE SENSOR SWITCH PP20

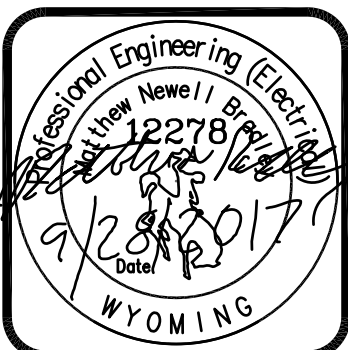
#### DRAWING KEY NOTES:

- THE BATHROOMS IN THE LIVING SPACE WILL HAVE CEILING ACCESS TO A MECHANICAL SPACE. PROVIDE A LIGHT SWITCH WITH A PORCELAIN BASE AND A SCREW IN LED LAMP AND A GFI RECEPTACLE IN THE SPACE.
- NEW LIGHT TYPES MOUNTED ON THE NEW WALL AT +96". RUN CONDUIT INSIDE OF THE NEW WALL AND SURFACE MOUNT ON THE CEILING TO THE NEW WALL.
- REWORK CONDUIT TO RUN ALONG STEEL BEAM.
- INSTALL NEW OCCUPANCY SENSOR.
- ALL EXISTING LIGHTING IN THIS AREA SHALL REMAIN ON EXISTING LIGHTING CIRCUITS.
- ALL LIGHTING ON PANEL C IS EMERGENCY GENERATOR BACKED.
- PROVIDE AND INSTALL 18/3C UTP 24 VOLT CABLE BETWEEN POWER PACK AND OCCUPANCY SENSORS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- CONNECT THIS EXTERIOR LIGHT TO THE TIMER THAT SHALL BE PROGRAMMED TO TURN OFF 30% OF THE EXTERIOR LIGHTING AT 12:00 PER TOWN OF JACKSON EXTERIOR LIGHTING REQUIREMENTS. TIMER SHALL BE INTERMATIC ST01 OR EQUAL.
- PHOTOCELL SHALL BE INTERMATIC NIGHT FOX EK4136S OR EQUAL.
- FIELD VERIFY LOCATION OF THE START OF CIRCUIT AND INSTALL POWER PACK. ROUTE LOW VOLTAGE CABLE TO OCCUPANCY SENSORS IN OPEN SPACE ADJACENT TO MEZZANINE.
- EXISTING FLAG LIGHT TO REMAIN.
- ELECTRICAL CONTRACTOR TO INSTALL UNSWITCHED HOT LEG TO POWER EMERGENCY EGRESS LIGHTS.

#### GENERAL NOTES:

- REUSE AND MODIFY THE EXISTING CONDUIT SYSTEM TO FIT THE INTENT OF THE NEW WORK.

TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.  
LIGHTING INSTALLATION PLAN



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J. BRADLEY  
CHECKED BY  
M.N. BRADLEY  
DESIGNED BY  
J. BRADLEY  
JOB NO. DATE  
17-72 AUG 28

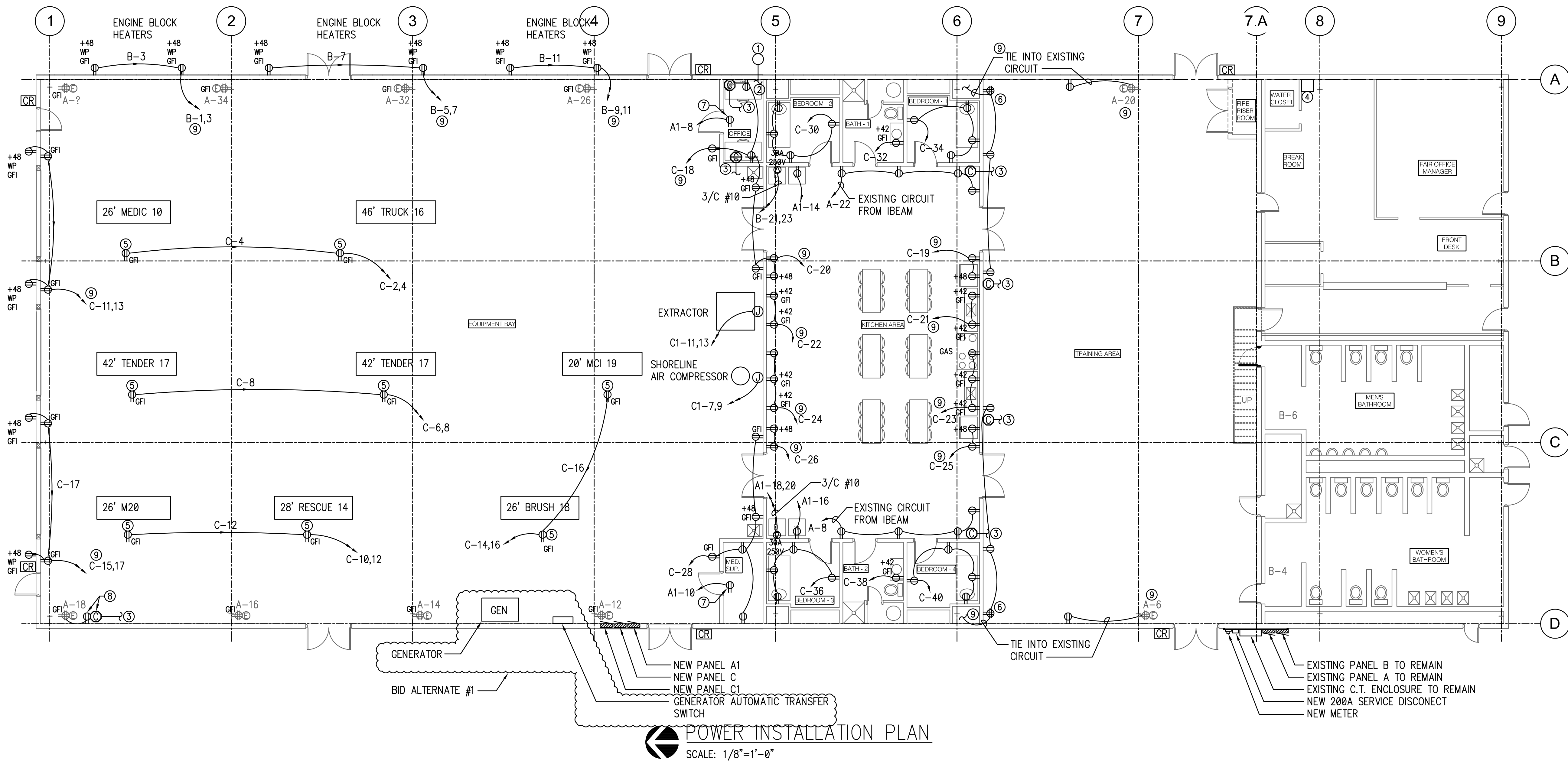
DRAWING NO.  
**E2.0**

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REV	DATE	DESCRIPTION
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## GENERAL NOTES:

- EXISTING STRUCTURE HAS A DIRT FLOOR THAT WILL BE EXCAVATED AND FILLED IN WITH A NEW CONCRETE FLOOR. INSTALL AS MANY NEW POWER CIRCUITS AND CONDUITS AS POSSIBLE UNDER THE NEW SLAB.

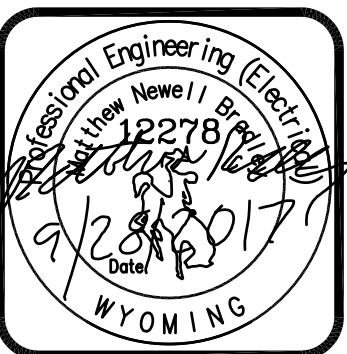
## DRAWING KEY NOTES:

- POWER POLE PROVIDED BY TOWN OF JACKSON FOR ANTENNA FOR THE FIRE STATION RADIO SYSTEM TO BE MOUNTED ON. POLE INSTALLED BY GENERAL CONTRACTOR.
- PROVIDE 1 INCH CONDUIT FOR THE ANTENNA CABLE FROM THE OFFICE TO THE NEW POLE. SEAL ALL OF THE PENETRATIONS AT THE BUILDING ENTRY POINT.
- INSTALL 3/4 INCH CONDUIT FROM THE DATA/COMM LOCATION TO THE SERVER RACK LOCATION.
- SERVER RACK LOCATION.
- MOUNT RECEPTACLE ON THE ROOF STRUCTURE FOR FIRE DEPARTMENT TO INSTALL DROP CORDS. DROP CORDS WILL BE PROVIDED AND INSTALLED BY THE OWNER, NOT IN CONTRACT.
- RELOCATE THE 4-PLEX RECEPTACLE ON THE I-BEAM COLUMN TO THIS LOCATION. REWORK CONDUIT AND CONDUCTORS. RETAIN ORIGINAL POWER CIRCUIT.
- PROVIDE A DEDICATED RECEPTACLE IN THE CEILING ACCESS SPACE ABOVE THE OFFICE AND MEDICAL SUPPLY ROOM. PROVIDE A LIGHT SWITCH AND A PORCELAIN BASE LIGHT FIXTURE. COORDINATE WITH TOWN OF JACKSON FOR THE PROVIDED LIGHT FIXTURE.
- PROVIDE POWER AND DATA MOUNTED ON THE CEILING IN THIS LOCATION FOR THE FIRE DEPARTMENT FLAT SCREEN T.V.
- CIRCUIT CONNECTED TO GROUND FAULT CIRCUIT BREAKER IN PANELBOARD

## GENERAL NOTES:

- THE 33.5 KW GENERATOR IS SUPPLIED BY THE OWNER AND IS THE EXISTING GENERATOR AT THE EXISTING FIRE STATION. THIS GENERATOR IS CONFIGURABLE FOR MULTIPLE VOLTAGES. CONFIGURE GENERATOR FOR 240/120V. PROVIDE A BID ALTERNATE #1 FOR ALL ASSOCIATED WORK WITH THE GENERATOR. PROVIDE BASE BID WITH NEW DISCONNECT AND PANEL C WITHOUT THE GENERATOR INCLUDED.

TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.  
POWER INSTALLATION PLAN

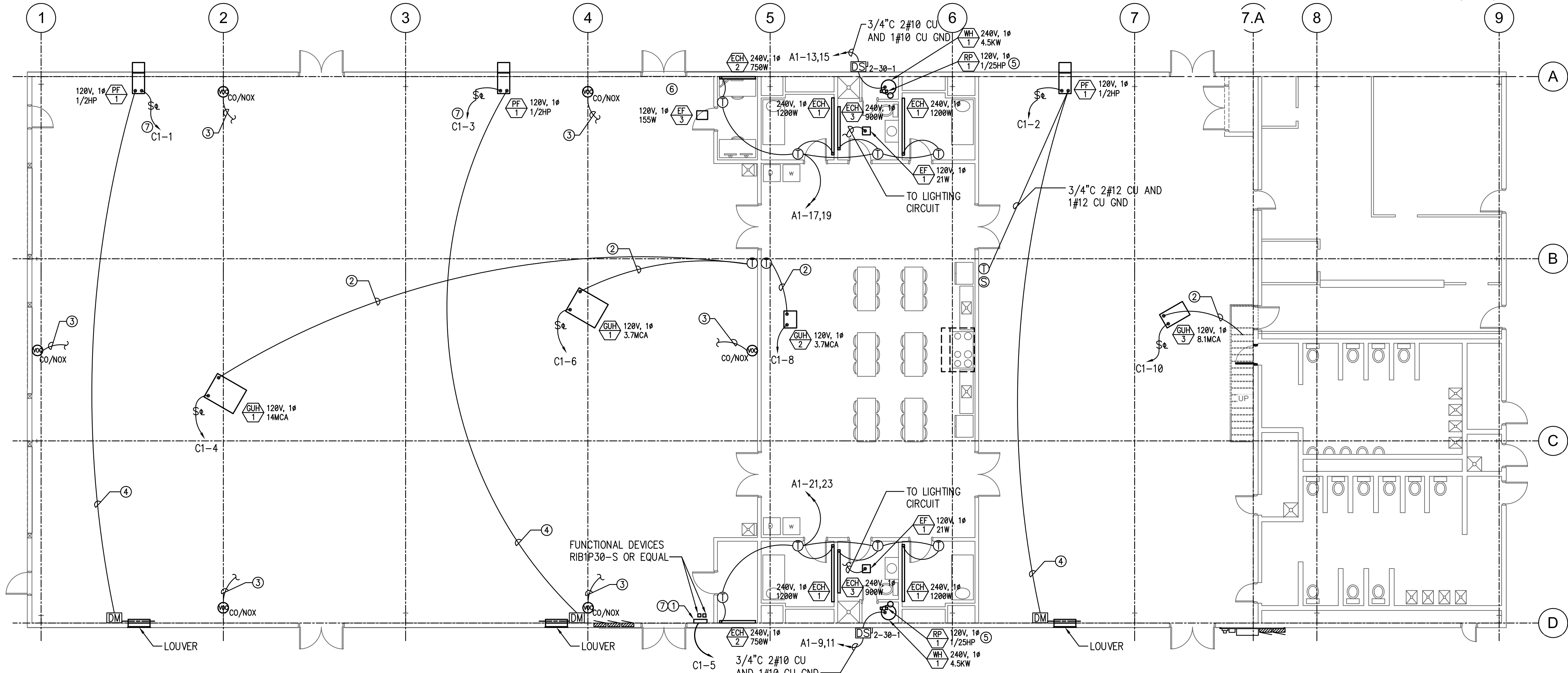


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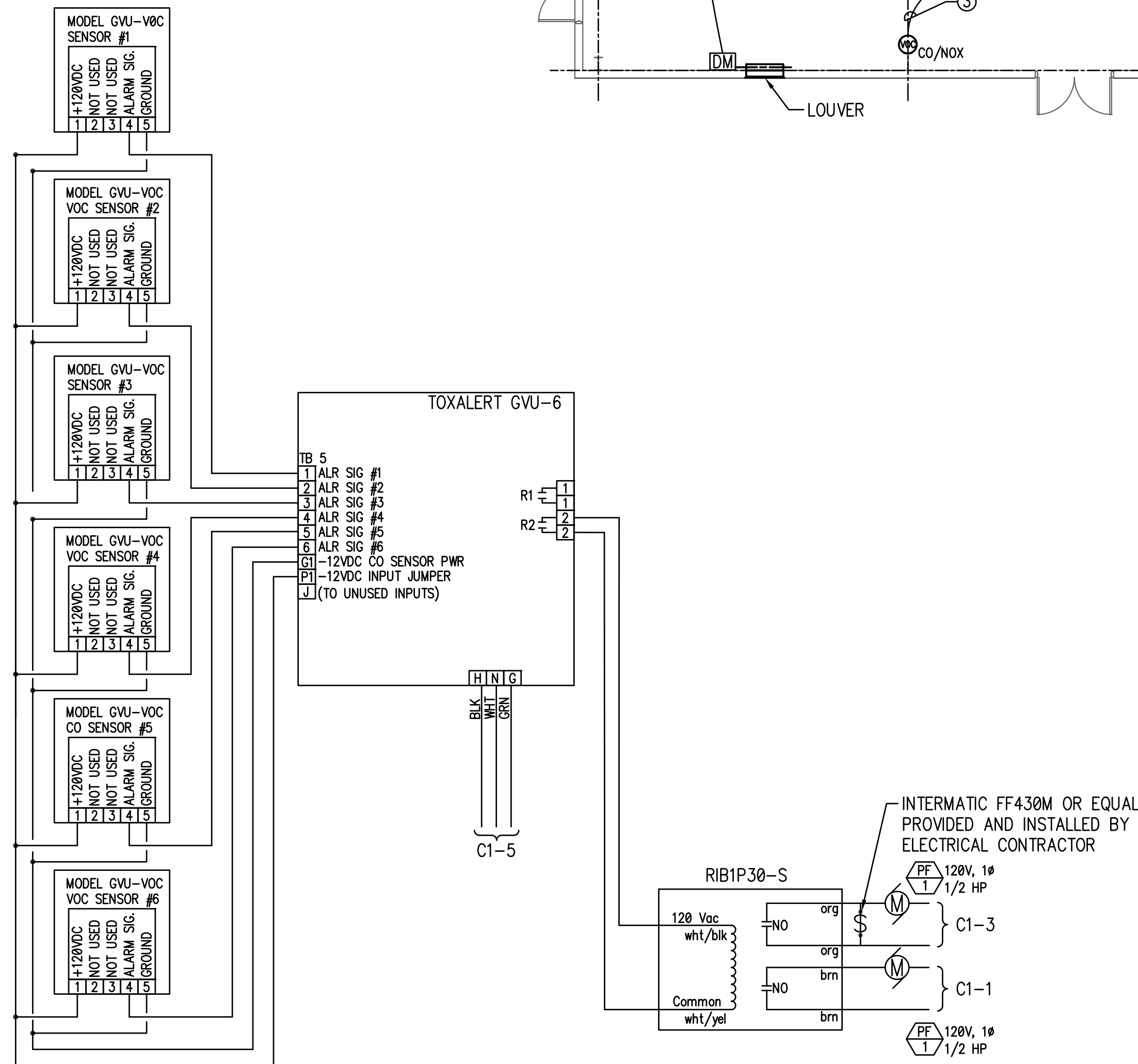


## MECHANICAL POWER INSTALLATION PLAN

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

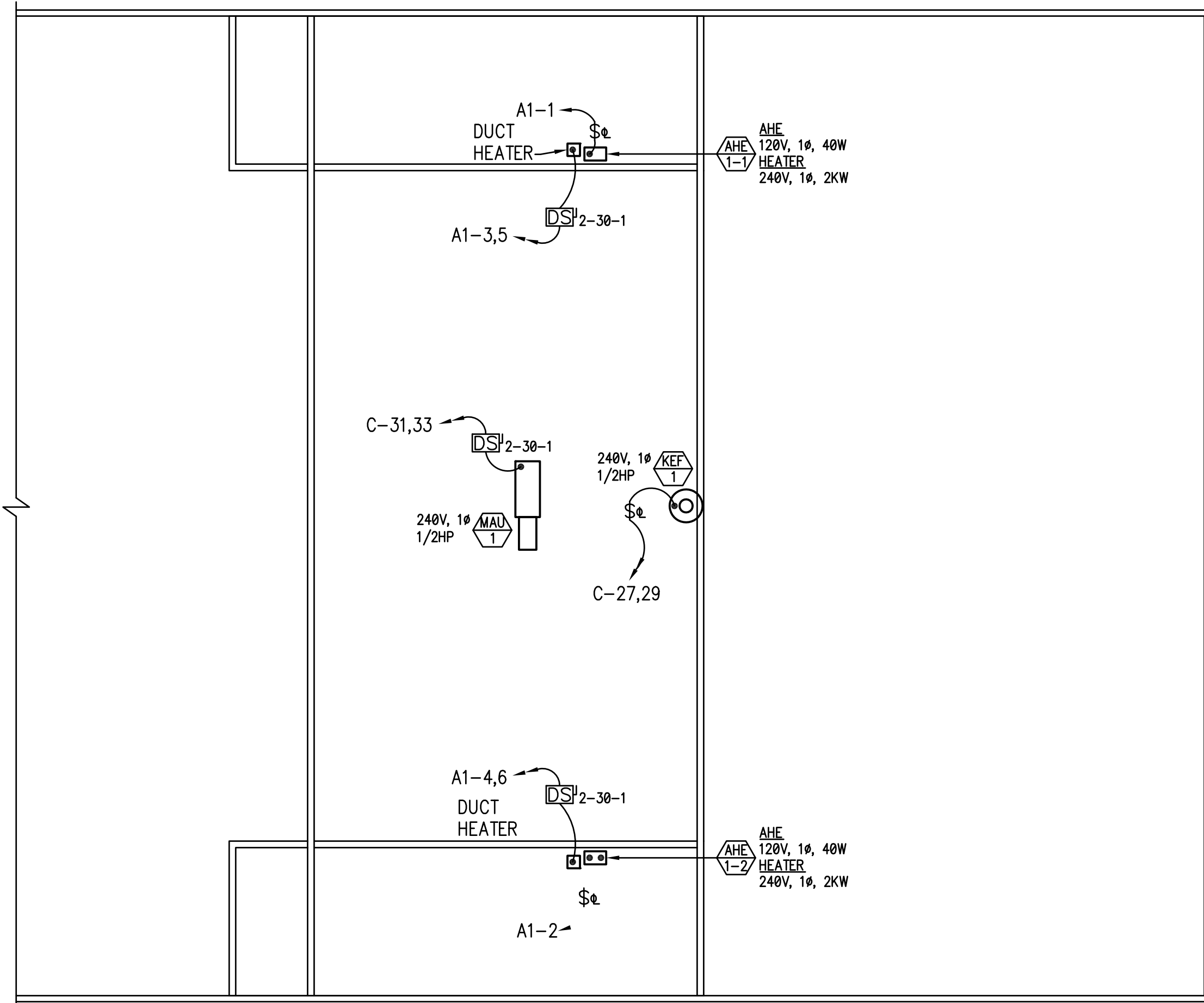
### KEY NOTES:

- 1 PROVIDE AND INSTALL TOXALERT GUV-6 INDOOR AIR QUALITY CONTROL PANEL AND CONTROL RELAY, SEE EC3.1 FOR DETAIL.
- 2 3/4" C TO THERMOSTAT. CONDUCTORS BY MECHANICAL CONTRACTOR
- 3 3/4" C 2-2/18 TO TOXALERT PANEL
- 4 3/4" C 2#12 CU & 1#12 CU GND TO INTERLOCK DAMPER MOTOR WITH EXHAUST FAN
- 5 CONNECT RECIRC PUMP RP-1 TO BATHROOM RECEPTACLE CIRCUIT
- 6 CONNECT TO NEAREST RECEPTACLE CIRCUIT. EF-3 SHALL RUN CONTINUOUS
- 7 INTERLOCK FANS WITH TOXALERT SYSTEM. SEE EXHAUST FAN CONTROL DIAGRAM ON THIS DRAWING.



## EXHAUST FAN CONTROL DIAGRAM

SCALE: NTS

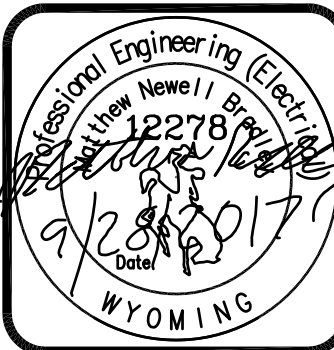


## MECHANICAL ROOFTOP POWER INSTALLATION PLAN

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

TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.

MECHANICAL POWER INSTALLATION PLANS



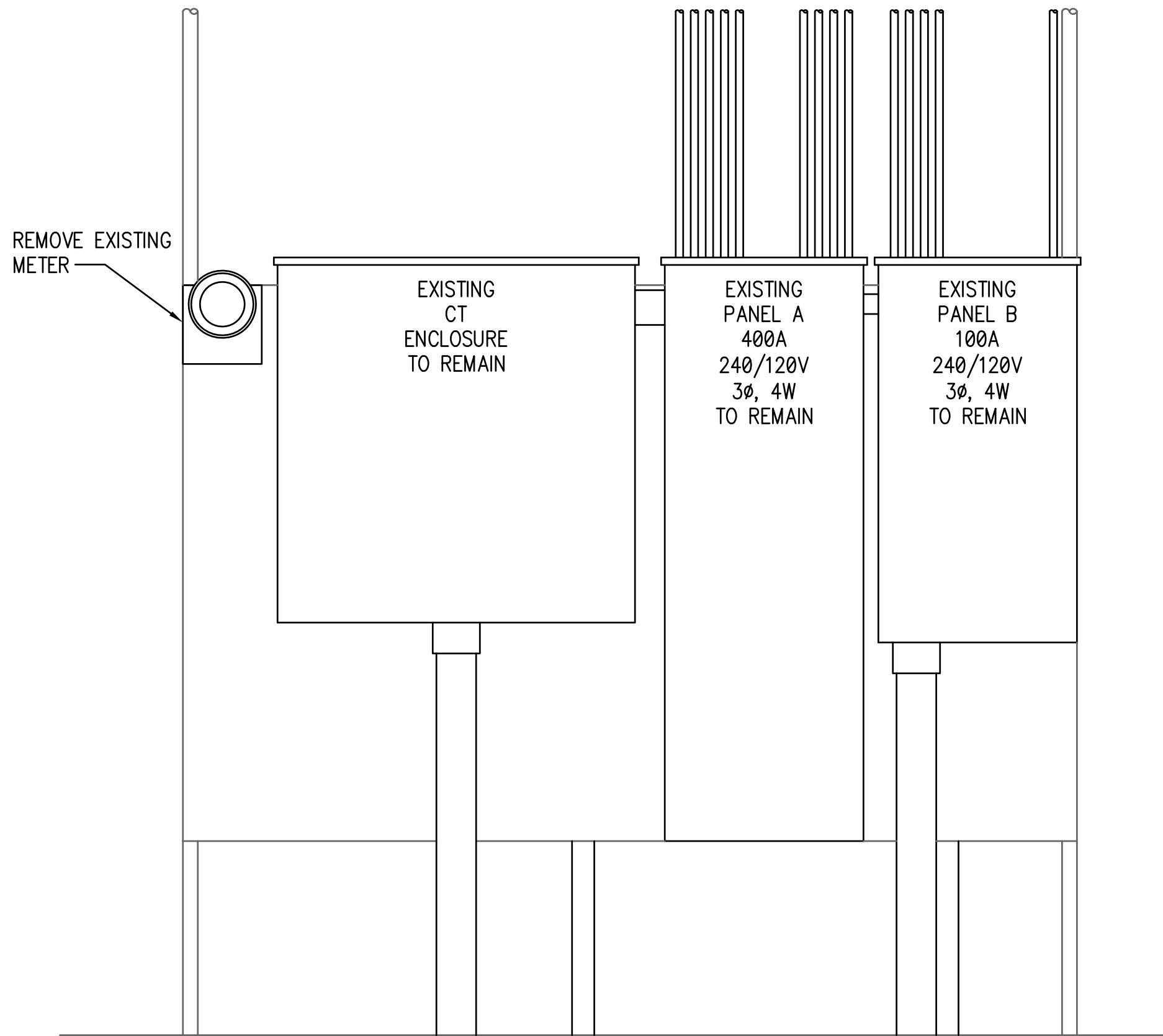
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CHECKED BY M.N. BRADLEY  
DESIGNED BY J. BRADLEY  
JOB NO. DATE  
17-72 AUG 28

DRAWING NO.

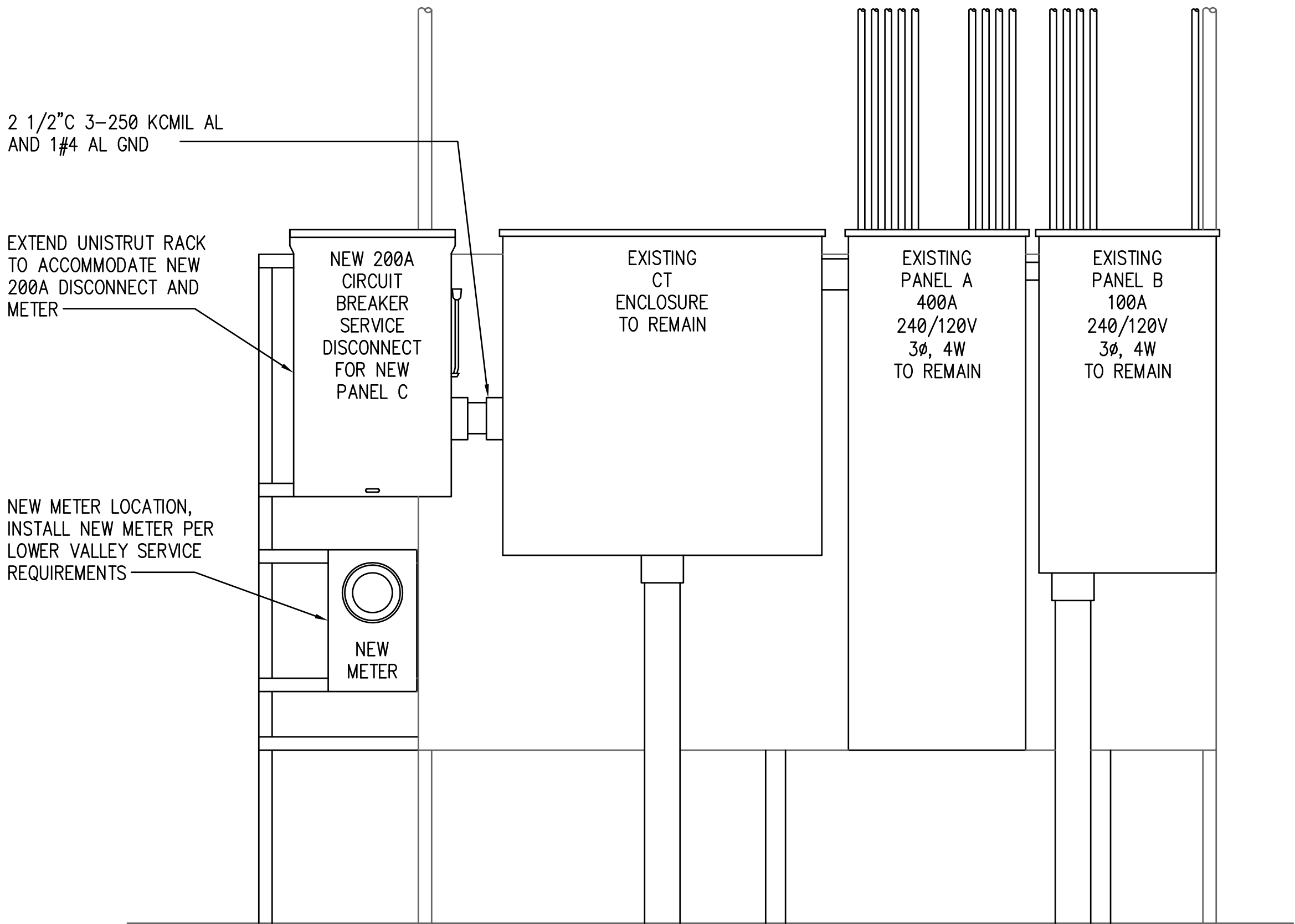
E4.0

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FAX: (918) 527-3664  
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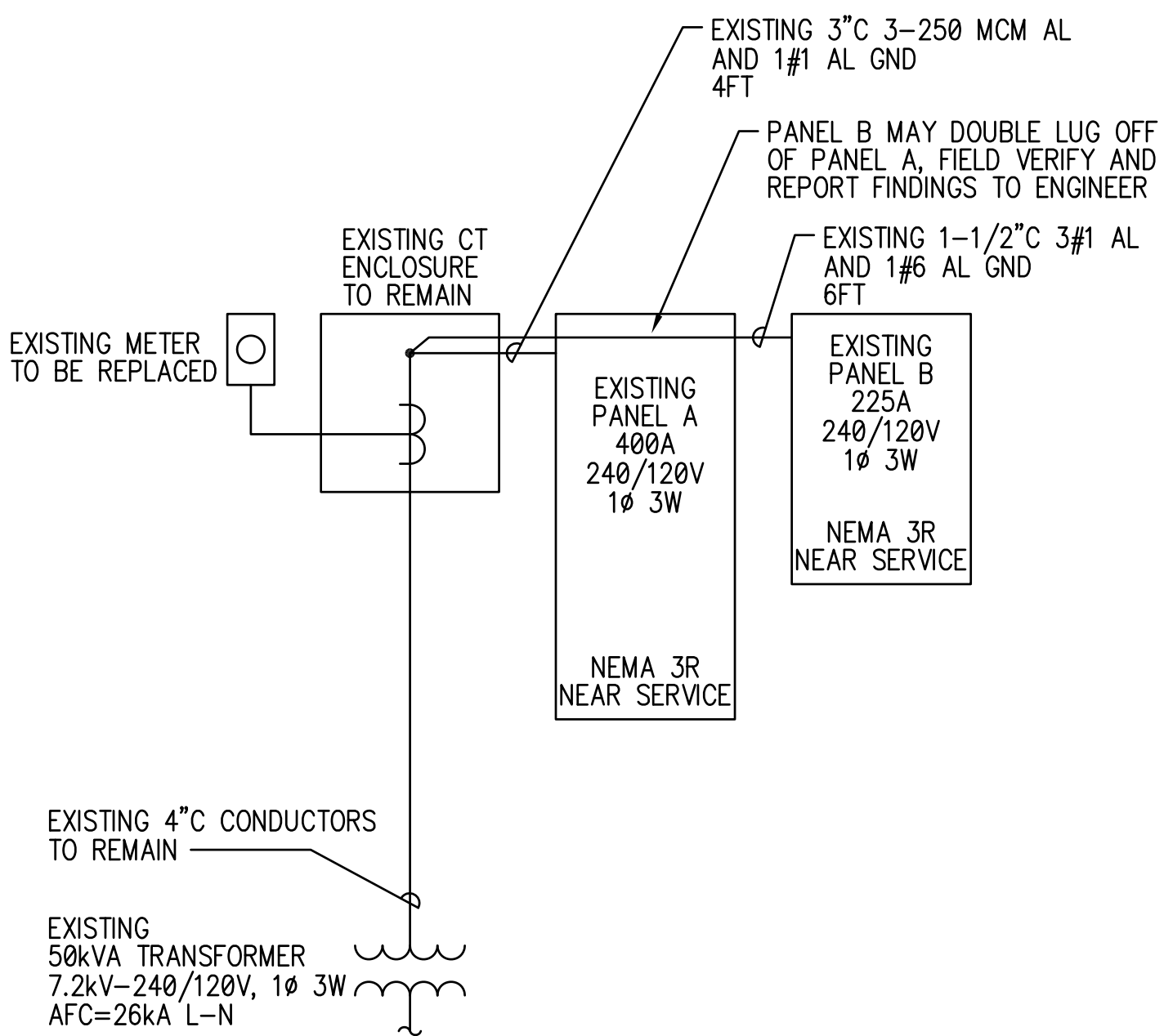
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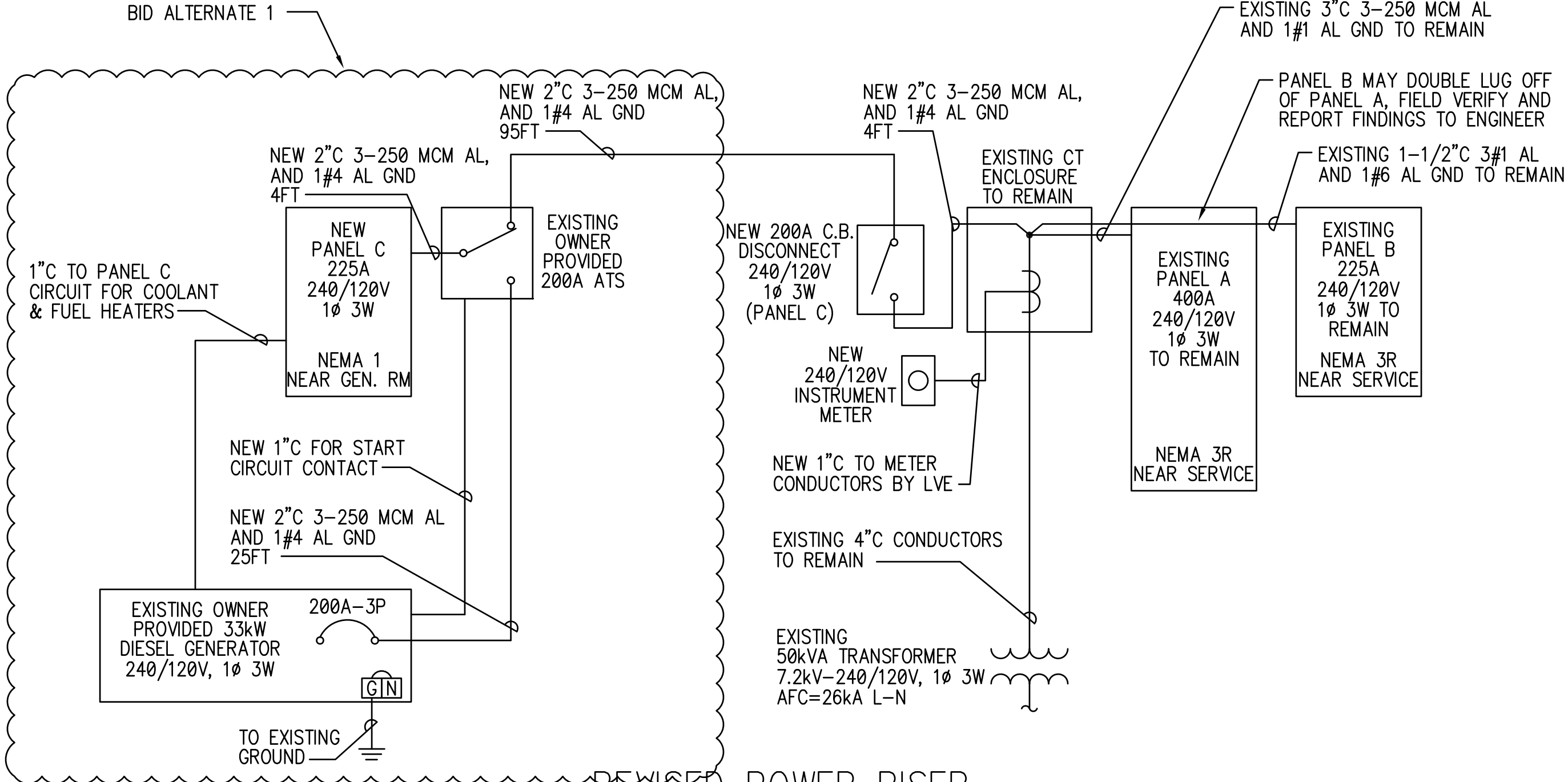
EXISTING SERVICE ELEVATION  
SCALE: 1" = 1'-0"



REVISED SERVICE ELEVATION  
SCALE: 1" = 1'-0"



EXISTING POWER RISER  
SCALE: NTS



REVISED POWER RISER  
SCALE: NTS

GENERAL NOTES:

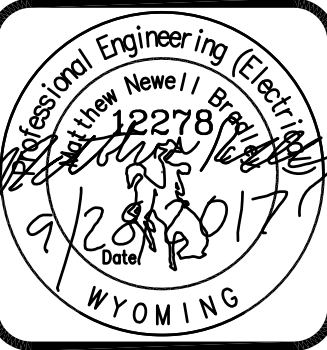
1. THE 33.5 KW GENERATOR IS SUPPLIED BY THE OWNER AND IS THE EXISTING GENERATOR AT THE EXISTING FIRE STATION. THIS GENERATOR IS CONFIGURABLE FOR MULTIPLE VOLTAGES. CONFIGURE GENERATOR FOR 240/120V. PROVIDE A BID ALTERNATE #1 FOR ALL ASSOCIATED WORK WITH THE GENERATOR. PROVIDE BASE BID WITH NEW DISCONNECT AND PANEL C WITHOUT THE GENERATOR INCLUDED.

ADDRESS:  
435 W 24th St  
PO BOX 100  
TULSA, OK 74102  
TELEPHONE:  
(918) 525-3862  
FAX:  
(918) 523-2864  
E-MAIL:  
brad@bradleyengineering.com

**BRADLEY**  
Bradley Engineering/Chld.  
Electrical Consulting & Design

REV	DESCRIPTION	DATE

**TEMPORARY FIRE STATION JACKSON**  
**305 W. SNOW KING AVE.**  
**ONE LINE DIAGRAM**



DRAWN BY  
J. BRADLEY  
CHECKED BY  
M.N. BRADLEY  
DESIGNED BY  
J. BRADLEY  
JOB NO. DATE  
17-72 AUG 28

DRAWING NO.  
**E5.0**

PANEL A (EXISTING)																	
VOLTAGE: 240 / 120 V				DIMENSION: PER NEC						LOCATION: EXISTING							
PANEL AMP RATING: 400A				WITH		400A CB		MOUNTING: SURFACE				NEMA ENCLOSURE: 1					
WIRES: 3		PHASE: 1		FEED: BOTTOM		TYPE:		SIEMENS S3									
LOAD DESCRIPTION	PH	LOAD WATT	BKR AMPS	CKT NO	LOAD		CKT NO	BKR AMPS	LOAD WATT	PH	LOAD DESCRIPTION						
					A	B											
	A		20	1		0		2	100		A						
	B		20	3		0	4	**		B	2 POLE						
	A		20	5	500		6	20	500	A	RECEPTS - STOCK AREA						
	B		20	7		500	8	20	500	B	RECEPTS - STOCK AREA						
	A		20	9	500		10	20	500	A	RECEPTS - STOCK AREA						
	B		20	11		500	12	20	500	B	RECEPTS - STOCK AREA						
	A		20	13	500		14	20	500	A	RECEPTS - STOCK AREA						
	B		20	15		500	16	20	500	B	RECEPTS - STOCK AREA						
	A		20	17	500		18	20	500	A	RECEPTS - STOCK AREA						
	B		20	19		500	20	20	500	B	RECEPTS - STOCK AREA						
	A		20	21	500		22	20	500	A	RECEPTS - STOCK AREA						
	B		20	23		500	24	20	500	B	RECEPTS - STOCK AREA						
	A		20	25	500		26	20	500	A	RECEPTS - STOCK AREA						
	B		20	27		0	28	30		B							
	A		20	29	0		30	**		A	2 POLE						
MENS HEATER	B		20	31		500	32	20	500	B	RECEPTS - STOCK AREA						
2 POLE	A		**	33	500		34	20	500	A	RECEPTS - STOCK AREA						
WOMENS HEATER	B		30	35		0	36	20		B							
2 POLE	A		**	37	0		38	**		A	2 POLE						
PANEL A1	B	11310	125	39		11310	40	20		B							
2 POLE	A	11690	**	41	11690		42	**		A	2 POLE						
FEEDER BREAKER		TOTAL LOAD PER PHASE-WATTS				15190	14310	FEED FROM:									
RATING: 400A		TOTAL LOAD PER PHASE-AMPS				127	120	PANEL ISC RATING 10,000 AVAILABLE ISC									
WIRE SIZE: 2 RUNS OF 3-250 KCMIL AL & 1#1 AL GND						CONDUIT SIZE: 2-2 1/2" C											

- NOTE:
- 1) RELOCATE 30A 2 POLE C.B. AND CIRCUIT TO PANEL A1. PROVIDE A NEW 100A, 2 POLE C.B. FOR FEEDER TO PANEL A1
  - 2) PROVIDE AND INSTALL GROUND FAULT INTERRUPTER C.B. 20 AMP, 10 KAIC, 120 VOLT SINGLE POLE SQUARE D Q0120GF1 OR EQUAL
  - 3) EXISTING CIRCUIT BREAKER IS IN USE. PANEL SCHEDULE ON SITE IS NOT ACCURATE. FIELD VERIFY EXISTING CIRCUIT AND PROVIDE NEW TYPED PANEL SCHEDULE

PANEL A1 (NEW)														
VOLTAGE: 240 / 120 V				DIMENSION: PER NEG				LOCATION: STOCK SHOW						
PANEL AMP RATING: 125A WITH 125A MLO				MOUNTING: SURFACE				NEMA ENCLOSURE: 1						
WIRES: 3		PHASE: 1		FEED: TOP		TYPE: SQUARE D		LOAD CENTER						
LOAD DESCRIPTION		PH	LOAD WATT	BKR AMPS	CKT NO	LOAD		CKT NO	BKR AMPS	LOAD WATT	PH	LOAD DESCRIPTION		
						A	B							
AHE-1-1 (EAST)		A	40	15	1	80		2	15	40	A	AHE-1-2 (WEST)		
AHE-1-1 HEATER		B	1000	20	3		2000	4	20	1000	B	AHE-1-2 HEATER		
2 POLE		A	1000	**	5	2000		6	**	1000	A	2 POLE		
FIRE ALARM CIRCUIT		B	100	20	7		280	8	20	180	B	RECEPT - ABOVE OFFICE		
WATER HEATER (WEST)		A	2250	30	9	2430		10	20	180	A	RECEPT - ABOVE MEDICAL SUPPLY		
2 POLE		B	2250	**	11		2610	12	20	360	B	RECEPTS - TRAINING AREA		
WATER HEATER (EAST)		A	2250	30	13	2750		14	20	500	A	WASHER (EAST)		
2 POLE		B	2250	**	15		2750	16	20	500	B	WASHER (WEST)		
EGH HEAT UNITS (EAST)		A	2025	20	17	4275		18	20	2250	A	DRYER (WEST)		
2 POLE		B	2025	20	19		4275	20	20	2250	B	2 POLE		
EGH HEAT UNITS (WEST)		A	2025	20	21	2025		22	20		A	SPARE		
2 POLE		B	2025	20	23		2025	24	20		B	SPARE		
FEEDER BREAKER		TOTAL LOAD PER PHASE-WATTS				13560	13940	FEED FROM: SPANEL A						
RATING: 125A		TOTAL LOAD PER PHASE-AMPS				113	117	PANEL ISC RATING 22,000 AVAILABLE ISC						
WIRE SIZE: 3#1 CU & 1#6 CU GND		CONDUIT SIZE: 1 1/2" C												

- NOTE:
- 1) PROVIDE AND INSTALL GROUND FAULT INTERRUPTER C.B. 20 AMP, 10 KAIC, 120 VOLT SINGLE POLE
  - 2) PAINT BREAKER HANDLE RED

PANEL C1 (NEW)																
VOLTAGE: 240 / 120 V					DIMENSION: PER NEC					LOCATION: BAY						
PANEL AMP RATING: 100A WITH 100A MLO					MOUNTING: SURFACE					NEMA ENCLOSURE: 1						
WIRES: 3			PHASE: 1		FEED: TOP			TYPE: SIEMENS SERIES S1								
LOAD DESCRIPTION	PH	LOAD WATT	BKR AMPS	CKT NO	LOAD		CKT NO	BKR AMPS	LOAD WATT	PH	LOAD DESCRIPTION					
					A	B					A	B	A	B		
PF-1 NORTHEAST	A	1176	20	1	2352		2	20	1176	A	PF-1 SOUTHEAST					
PF-1 CENTER	B	1176	20	3		2520	4	20	1344	B	GAS UNIT HEATER GUH-1					
TOXALERT PANEL	A	100	20	5	1444		6	20	1344	A	GAS UNIT HEATER GUH-1					
SHORELINE COMPRESSOR	B	2688	60	7		3043	8	20	355	B	GAS UNIT HEATER GUH-2					
2 POLE	A	2688	**	9	3466		10	20	778	A	GAS UNIT HEATER GUH-3					
EXTRACTOR	B	2000	30	11		2000	12	20		B	SPARE					
2 PLE	A	2000	**	13	2000		14	20		A	SPARE					
SPARE	B		20	15		0	16	20		B	SPARE					
SPARE	A		20	17	0		18			A	BLANK					
SPARE	B		20	19		0	20			B	BLANK					
SPARE	A		20	21	0		22			A	BLANK					
SPARE	B		20	23		0	24			B	BLANK					
FEEDER BREAKER		TOTAL LOAD PER PHASE-WATTS				9262	7563	FEED FROM: PANEL C								
RATING: 100A		TOTAL LOAD PER PHASE-AMPS				78	64	PANEL ISC RATING 10,000 AVAILABLE ISC 9,200								
WIRE SIZE: 3#1 AL & 1#6 AL GND						CONDUIT SIZE: 1 1/2" C										

PANEL B (EXISTING)															
VOLTAGE: 240 / 120 V				DIMENSION: PER NEC				LOCATION: EXISTING							
PANEL AMP RATING: 100A WITH 100A CB				MOUNTING: SURFACE				NEMA ENCLOSURE: 3R							
WIRES: 3		PHASE: 1		FEED: BOTTOM		TYPE: SIEMENS S1									
LOAD DESCRIPTION	PH	LOAD WATT	BKR AMPS	CKT NO	LOAD		CKT NO	BKR AMPS	LOAD WATT	PH	LOAD DESCRIPTION				
					A	B									
PAVILION LIGHTS	A		20	1	0		2	20		A	EXISTING				
PAVILION LIGHTS	B		20	3		0	4	20		B	LIGHTS MENS RR				
PAVILION LIGHTS	A		20	5	0		6	20		A	LIGHTS WOMENS RR				
PAVILION LIGHTS	B		20	7		0	8	20		B					
PAVILION LIGHTS	A		20	9	0		10	20		A					
PAVILION LIGHTS	B		20	11		0	12	20		B	FLAG LIGHT				
	A		20	13	0		14	20		A					
	B		20	15		0	16	20		B					
?	A		60	17	0		18			A	BLANK				
	B		**	19		0	20	20		B					
BLANK	A			21	0		22	20		A					
	B			23		0	24	30		B	HEAT TRACE				
PANEL DF	A		100	25	0		26	**		A	2 POLE				
	B		100	27		0	28	30		B	WATER VALVE				
SPACE	A			29	0		30	**		A	2 POLE				
FEEDER BREAKER		TOTAL LOAD PER PHASE-WATTS				0		0		FEED FROM: PANEL A CIRCUIT 2,4					
RATING: 100A		TOTAL LOAD PER PHASE-AMPS				0		0		PANEL ISC RATING 10,000 AVAILABLE ISC					
WIRE SIZE:		3#1 AL & 1#6 AL GND				CONDUIT SIZE: 1 1/2" C									





COMcheck Software Version 4.0.5.3

### Interior Lighting Compliance Certificate

#### Project Information

Energy Code: 2012 IECC  
Project Title: Temporary Fire Station Jackson  
Project Type: Addition

Construction Site:  
305 W. Snow AVE.  
Jackson, WY

Owner/Agent:

Designer/Contractor:  
Jeremy Bradley  
Bradley Engineering CHTD.  
645 W. 25th St.  
Idaho Falls, ID 83402  
208-523-2863  
bec@bradleyengineering.com

#### Allowed Interior Lighting Power

A Area Category	B Floor Area (ft <sup>2</sup> )	C Allowed Watts / ft <sup>2</sup>	D Allowed Watts (B X C)
1-Equip RM (Fire Stations:Engine room)	7570	0.80	6056
2-Dorm (Fire Stations:Sleeping quarters)	705	0.30	212
3-Kitchen Area (Common Space Types:Food preparation)	1550	1.20	1860
4-Training Area (Common Space Types:Lounge recreation)	2947	0.80	2358
Total Allowed Watts = 10485			

#### Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
<b>1-Equip RM (Fire Stations:Engine room)</b>				
LED 1: A: LED Strip Light: Other:	1	27	77	2079
LED 2: B: LED Wraparound: Other:	1	3	37	111
LED 3: C: LED Wall Strip: Other:	1	3	40	120
<b>2-Dorm (Fire Stations:Sleeping quarters)</b>				
LED 4: C: LED Wall Strip: Other:	1	2	37	74
LED 5: G: Ceiling Fan:Light: Other:	1	4	50	200
<b>3-Kitchen Area (Common Space Types:Food preparation)</b>				
LED 6: A: LED Strip Light: Other:	1	7	77	539
<b>4-Training Area (Common Space Types:Lounge recreation)</b>				
LED 7: A: LED Strip Light: Other:	1	13	77	1001
Total Proposed Watts = 4124				

Interior Lighting PASSES: Design 61% better than code

#### Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2012 IECC requirements in COMcheck Version 4.0.5.3 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Jeremy Bradley E.E. 9/1/17  
Name - Title Signature Date



COMcheck Software Version 4.0.5.3

### Exterior Lighting Compliance Certificate

#### Project Information

Energy Code: 2012 IECC  
Project Title: Temporary Fire Station Jackson  
Project Type: Addition  
Exterior Lighting Zone: 2 (Neighborhood business district)

Construction Site:  
305 W. Snow AVE.  
Jackson, WY

Owner/Agent:

Designer/Contractor:  
Jeremy Bradley  
Bradley Engineering CHTD.  
645 W. 25th St.  
Idaho Falls, ID 83402  
208-523-2863  
bec@bradleyengineering.com

#### Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
BACK DOORS (Emergency services, loading area)	200 ft <sup>2</sup>	0.5	No	100
ENTRY (Main entry)	15 ft of door	20	Yes	300
Illuminated length of facade wall or surface	300 ft	2.5	No	750
Total Tradable Watts (a) =				300
Total Allowed Watts =				1150
Total Allowed Supplemental Watts (b) =				600

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.

(b) A supplemental allowance equal to 600 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

#### Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
<b>BACK DOORS ( Emergency services, loading area 200 ft<sup>2</sup>): Non-tradable Wattage</b>				
LED 1: LED Linear 33W:	1	4	27	108
<b>ENTRY ( Main entry, 15 ft of door width): Tradable Wattage</b>				
LED 2: LED Linear 33W:	1	4	27	108
<b>Illuminated length of facade wall or surface (300 ft): Non-tradable Wattage</b>				
LED 3: LED Linear 33W:	1	9	27	243
Total Tradable Proposed Watts = 108				

Exterior Lighting PASSES: Design 88% better than code

#### Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2012 IECC requirements in COMcheck Version 4.0.5.3 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Jeremy Bradley E.E. 9/1/17  
Name - Title Signature Date

### FIXTURE SCHEDULE

SYMBOL	NAME	MANUFACTURER CAT. NO.	FIXT WATTS	LAMP TYPE	MOUNTING	REMARKS
A	L I T H O N I A	CDS-L96-MVOLT-DM-40K-90CRI-WH	77	LED	SURFACE	LED STRIP LIGHT 96" LONG
				400K	EXISTING	MULTIVOLTAGE BALLAST, 0-10V DIMMING
					LOCATION	9010 LUMEN, 4000K, WHITE
AE	L I T H O N I A	CLX-96-10000LM-RDL-MVOLT-GZ10-40K-80CRI-WH-PS1050	77	LED	SURFACE	LED LINEAR 96" LONG
				400K	EXISTING	MULTIVOLTAGE BALLAST, 0-10V DIMMING
					LOCATION	1000 LUMEN, 4000K, WHITE, 700LUMEN BATTERY
B	L I T H O N I A	LBL4-LP840	32	LED	SURFACE	LED WRAPAROUND
				4000K	EXISTING	4,253 LUMEN, 4000K, PATTERNED #A12 ACRYLIC
					LOCATION	0-10V DIMMING
C	L I T H O N I A	WL4-40L-EZ1-LP840	40	LED	WALL	WALL BRACKET SURFACE MOUNT LED
				4000K	EXISTING	3927 LUMEN, 4000K
					LOCATION	48", WHITE
CE	L I T H O N I A	WL4-40L-EZ1-LP840-EL7L	40	LED	WALL	WALL BRACKET SURFACE MOUNT LED
				4000K	EXISTING	3927 LUMEN, 4000K
					LOCATION	48", WHITE, 700 LUMEN BATTERY PACK
D	L I T H O N I A	DSXW1-10C-700-40K-TFMT-MVOLT-ELCW-DBXT	27	LED	WALL	LED WALL LUMINAIRE DARK SKY COMPLIANT
				4000K	EXISTING	10 LED'S ONE DRIVE ENGINE, 4000K
						MVOLT, DARK BRONZE FINISH, MATCH EXISTING F
DE	L I T H O N I A	DSXW1-10C-700-40K-TFMT-MVOLT-ELCW-DBXT-ELCW	27	LED	WALL	LED WALL LUMINAIRE DARK SKY COMPLIANT
				4000K	EXISTING	10 LED'S ONE DRIVE ENGINE, 4000K, MVOLT, I
						W/ BATTERY PACK MATCH EXISTING HEIGHTS
E	L I T H O N I A	ECB6-LED-M6	3	INTEGRAL	WALL	COMBINATION EMERGENCY/EXIT LIGHT
				LED	8'-6"	GREEN LETTERS, WHITE THERMOPLASTIC FINISH
F	HUNTER	59301	18	LED	SURFACE	HUNTER AKER 36" CEILING FAN
				300K		2-9 W DIMMABLE LED BULBS INCLUDED
						WHITE, OR EQUAL FAN LIGHT COMBO

### NOTE

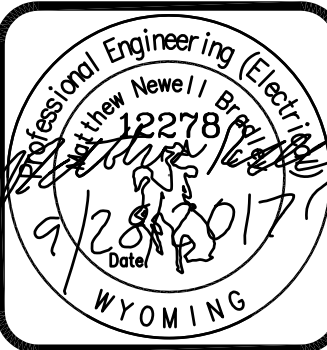
SEE DRAWING E5.7 FOR LIGHT FIXTURE CUT SHEETS

ADDRESS:  
145 24th St  
Idaho Falls, ID 83402  
TELEPHONE:  
(208) 523-2862  
FAX:  
(208) 523-2864  
E-MAIL:  
bec@bradleyengineering.com



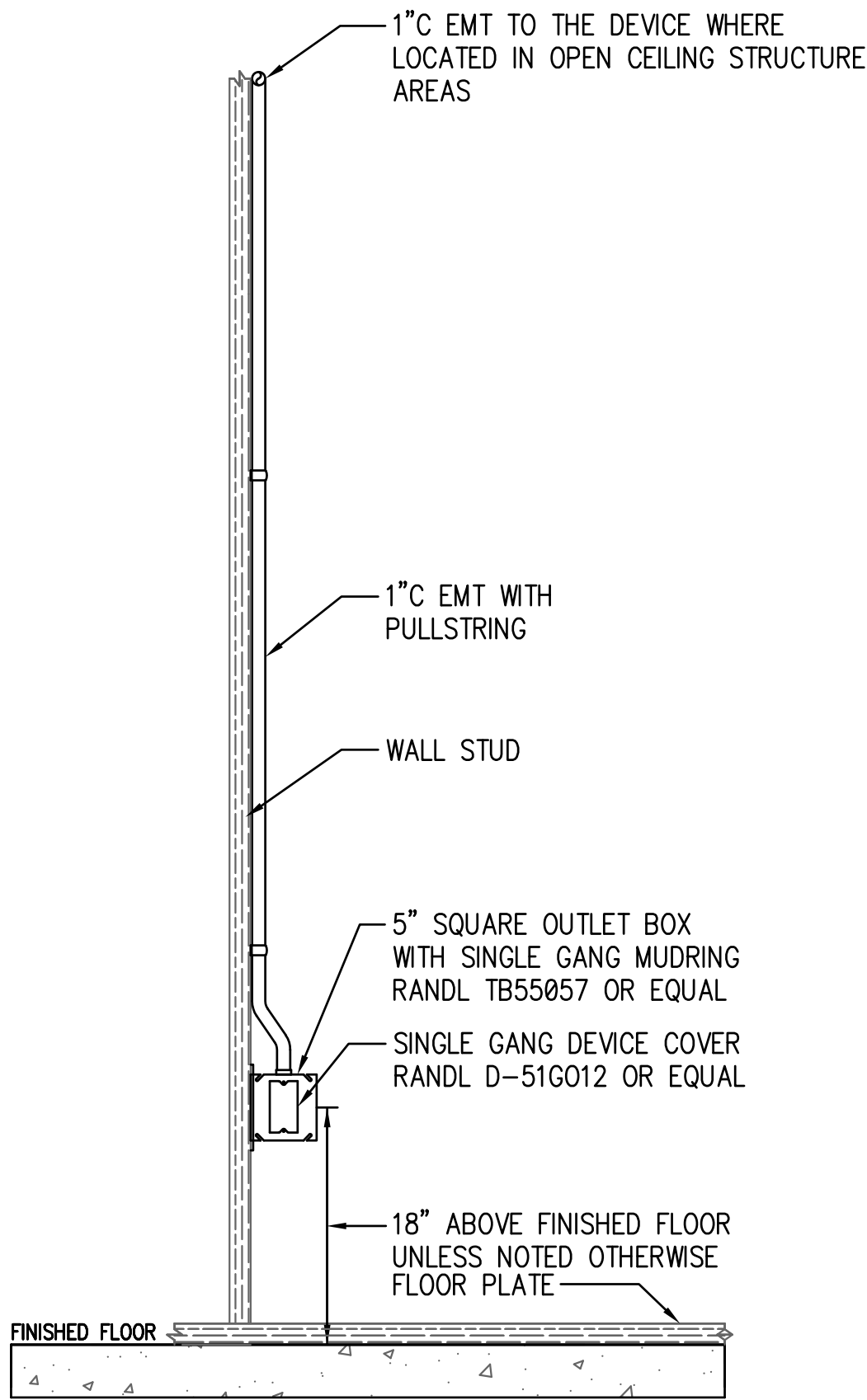
REV	DATE	DESCRIPTION
1		
2		
3		
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TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.  
FIXTURE SCHEDULE AND COMCHECK



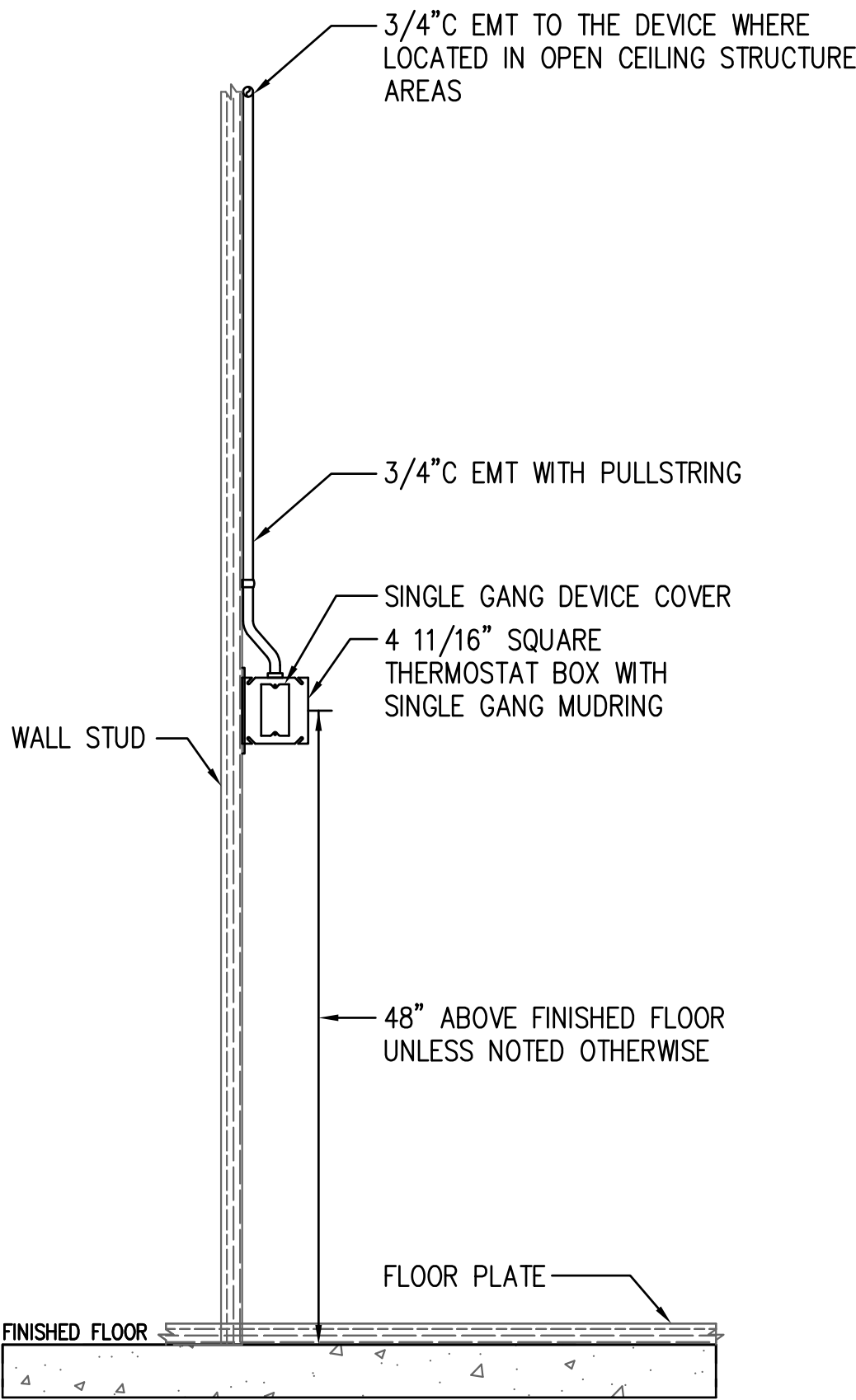
DRAWN BY  
J. BRADLEY  
CHECKED BY  
M.N. BRADLEY  
DESIGNED BY  
J. BRADLEY  
JOB NO. 17-72  
DATE AUG 28

DRAWING NO.  
**E5.2**



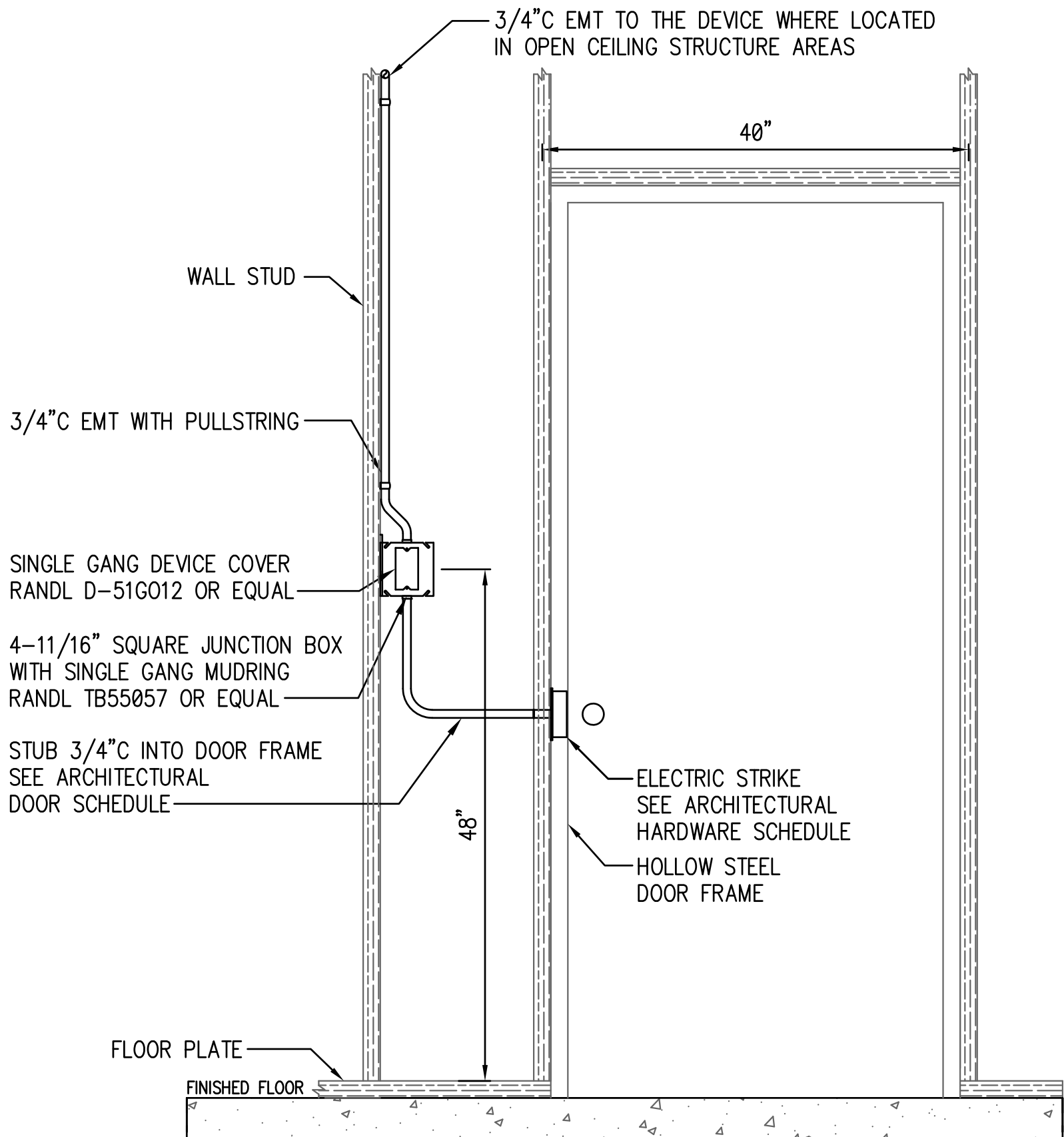
ELECTRICAL CONTRACTOR RESPONSIBLE FOR  
INSTALLATION OF DATA/TELEPHONE ROUGH-IN  
TYPICAL DETAIL - ACTUAL INSTALLATION MAY VARY

Ⓒ DATA/TELEPHONE ROUGH-IN ELEVATION  
SCALE: 1" = 1'-0"



ELECTRICAL CONTRACTOR RESPONSIBLE FOR  
INSTALLATION OF THERMOSTAT BOX ROUGH-IN  
TYPICAL DETAIL - ACTUAL INSTALLATION MAY VARY

Ⓓ THERMOSTAT ROUGH-IN ELEVATION  
SCALE: 1" = 1'-0"



ELECTRICAL CONTRACTOR RESPONSIBLE FOR  
INSTALLATION OF THE CARD READER ROUGH-IN

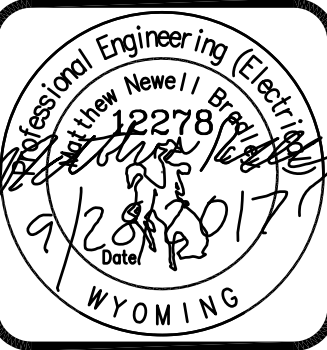
Ⓔ CARD READER ROUGH-IN ELEVATION  
SCALE: 1" = 1'-0"

ADDRESS:  
305 W. SNOW KING AVE.  
JACKSON, WY 83402  
PHONE: (307) 523-2862  
FAX: (307) 523-2864  
E-MAIL: [brad@bradleyengineering.com](mailto:brad@bradleyengineering.com)

**BRADLEY**  
Bradley Engineering/Chd.  
Electrical Consulting & Design

REV	DESCRIPTION	DATE

**TEMPORARY FIRE STATION JACKSON**  
**305 W. SNOW KING AVE.**  
**ELECTRICAL DETAILS**



DRAWN BY  
J. BRADLEY  
CHECKED BY  
M.N. BRADLEY  
DESIGNED BY  
J. BRADLEY  
JOB NO. DATE  
17-72 AUG 28

DRAWING NO.  
**E5.3**



DIVISION 16 ELECTRICAL  
SECTION 16000 GENERAL

PART 1 GENERAL

1.1 General Conditions And Division 01 Apply To This Division.

1.2 Description:

- A. Includes But Not Limited To -
1. Provide labor, materials, and equipment necessary for completion of this Division as described in Contract Documents.

1.3 Quality Assurance:

- A. Requirements of Regulatory Agencies -
1. NEC and local ordinances and regulations shall govern.
- B. Source Quality Control -
1. Material and equipment provided shall be new, meet standards of NEMA or UL, and bear their label wherever standards have been established and label service is available.

1.4 Prior Approval:

- A. General:
1. Catalog and manufacturer's numbers are for the purpose of establishing standards of quality and types of materials to be used. Products of other manufacturers may be used if equal in quality and design in the opinion of the Engineer and are specifically approved by the Engineer in writing. All submittals for "or equal" approval shall be made no less than ten days prior to bidding.
  2. Any conflict arising from the use of substituted equipment shall be the responsibility of the supplier of that equipment. The contractor and his supplier shall bear all costs required to make equipment comply with the intent of the plans and specifications.

1.5 Submittals:

- A. Record Drawings:
1. Provide as required by Division 01.
- B. Shop Drawings:
1. Prepare submittal for each item of equipment and attach written approval to each indicating that Section 01300 has been complied with and that shop drawings are correct.
  2. Dimensioned plans and sections or elevation layouts of electricity-metering equipment.
  3. Do not purchase equipment before completion of shop drawing review.
  4. Engineer will not review shop drawings before the contractor has reviewed the shop drawings. The contractor shall stamp all drawings with a statement that he has reviewed all shop drawings and that they conform to the intent of the drawings and specifications.
- C. Submittals shall contain:
1. The first section of the manual shall contain:
    - a. Names, addresses, and telephone numbers of Electrical Engineer, General Contractor, and any other contractors involved.
  2. Date of submission and dates of any previous submissions.
  3. Project title and number.
  4. Contract identification.
  5. The names of Contractor, Supplier, and Manufacturer.
  6. Identification of the product, with the Specification Section number.
  7. Field dimensions, clearly identified as such.
  8. Relation to adjacent or critical features of the Work or materials.
  9. Applicable standards, such as ASTM or Federal Specification numbers.
  10. Identification of deviations from Contract Documents.
  11. Identification of revisions on resubmittals.
  12. An 8"x3" space for Engineer's and Contractors stamps.
  13. Contractor stamp, Initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of the Contract Documents.
  14. Submittals shall be furnished on the following equipment:
    - a. Service Switchgear
    - b. Panelboards
    - c. Disconnect Switches
    - d. Overcurrent Protective Devices
    - e. Motor Starters
    - f. Light Fixtures
    - g. Emergency Lighting Battery Systems
    - h. Light Dimmers
    - i. Motion Sensors
    - j. Lighting Control Relay Panel
    - k. Time Switches
    - l. Air Quality System
    - m. Receptacles
    - n. Switches
    - o. Fire Alarm System
      - 1) Monitor modules
      - 2) Audible/visual alarms
      - 3) Notification appliances
      - 4) Manual pull stations
      - 5) Auxiliary power supplies
      - 6) Fire control panel
      - 7) Remote annunciator
      - 8) Review drawings

- D. O & M Manuals:
1. Provide 3 copies of O & M manual with data for all equipment furnished. Submittals shall be furnished on the following equipment:
    - a. Service Switchgear
    - b. Panelboards
    - c. Disconnect Switches
    - d. Overcurrent Protective Devices
    - e. Motor Starters
    - f. Light Fixtures
    - g. Emergency Lighting Battery Systems
    - h. Light Dimmers
    - i. Motion Sensors
    - j. Lighting Control Relay Panel
    - k. Time Switches
    - l. Air Quality System
    - m. Receptacles
    - n. Switches
    - o. Fire Alarm System
      - 1) Monitor modules
      - 2) Audible/visual alarms
      - 3) Notification appliances
      - 4) Manual pull stations
      - 5) Auxiliary power supplies
      - 6) Fire control panel
      - 7) Remote annunciator
      - 8) Review drawings
  2. Provide one copy of contractor's written warranty in each manual.

1.6 Workmanship:

- A. All workmanship shall meet "NECA Standards of Installation".

1.7 Fees And Permits:

- A. All permits, fees and charges for inspections required by public authorities shall be paid for by the contractor.

PART 2 PRODUCTS

2.1 Material:

- A. Where Manufacturer's names appear, other Manufacturers may be substituted upon obtaining written approval of Architect or Engineer at least 10 days prior to opening of bids.

PART 3 EXECUTION

3.1 Preparation:

- A. Confirm dimensions, ratings, and specification of equipment to be installed and coordinate these with site dimensions and with other Section.

3.2 Equipment Identification:

- A. Properly identify panelboards, convertible circuit breakers in panelboards, motor disconnect switches, starters, other apparatus used for operation of, or control of, circuits, appliances or equipment by means of engraved laminated plastic descriptive nameplates mounted on apparatus using round head brass machine screws, pop rivets and contact cement. Cardholders in any form are not acceptable.
- B. All panelboards, switchboards, transformers, and motor control centers in mechanical areas shall have black and yellow warning tape installed on the floor three feet in front of equipment and along sides to identify 3 feet clearances in front of equipment.
- C. All pull boxes and splice boxes shall identify circuits that are inside pull and splice boxes. Label outside of box cover with black ink markers.
- D. Label inside of all switch plates and cover plates with panel and circuit numbers.
- E. Label all disconnect switches with circuit number and equipment served inside disconnect switch as well as outside of switch.

3.3 Equipment Final Cleaning:

- A. At completion of project contractor shall clean all panels which includes vacuuming inside of panel and wiping down all panels.

- B. Clean all light fixtures and lamps and remove all dirt, dust, fingerprints, packing etc.

3.4 Field Quality Control:

- A. Test systems in presence of Engineer and demonstrate equipment as working and operating properly. Rectify defects at no cost to Owner.

SECTION 16060 MOUNTING HEIGHTS

PART 1 GENERAL

1.1 Related Documents:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

PART 2 PRODUCTS

2.1 Not used

PART 3 EXECUTION

3.1 Installation:

- A. Match existing mounting heights in rooms with existing equipment. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor.
- |                               |                                |
|-------------------------------|--------------------------------|
| Receptacles                   | 18"                            |
| Telephones (desk type)        | 18"                            |
| Telephones (wall type)        | 5' 10"                         |
| Computer Outlet               | 18"                            |
| Switches                      | 4' 0"                          |
| Wall-Mounted Exit Lights      | 7' 6" or as shown              |
| Wall-Mounted Emergency Lights | 7' 0" or as shown              |
| Thermostats                   | 4' 0" to top                   |
| ATC Junction Boxes            | 5' 6" to top                   |
| Remote Sensor Outlet          | 4' 8" to top                   |
| Distribution Panels           | 8' 0" to top                   |
| Condensing Unit Disconnects   | 5' 0" or even with top of unit |
| Motor Disconnects             | 5' 0" to top                   |
| Telephone Board               | 8' 6" to top                   |
| Bell                          | 7' 6"                          |
| Push Buttons                  | 6' 2"                          |
| Sound System                  |                                |
| Volume Controls               | 6' 2"                          |
| Wall Speakers                 | 7' 6" to top                   |
| Switches                      | 6' 2"                          |
| Fire Alarm System             |                                |
| Manual Pull Station           | 4' 0"                          |
| Alarm Devices                 | 7' 0"                          |
- B. Refer special conditions to Architect or Engineer and locate outlet under his direction

SECTION 16110 RACEWAYS

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -
1. Quality of material and installation procedures for all conduit and fittings used on Project, except as excluded below.
- B. Related Work Specified Elsewhere -
1. See Sections relating to power, lighting, telephone, and temperature control systems for additional requirements.

PART 2 PRODUCTS

2.1 Material:

- A. Conduit -
1. 3/4 inch unless indicated otherwise and use restricted as indicated by product.
  2. Galvanized rigid steel (Type RMC) -
    - a. May be used in all areas.
  3. Galvanized Intermediate Metallic Conduit (Type IMC) -
    - a. May be used in indoor locations not in contact with earth.
  4. Galvanized Electrical Metallic Tubing (Type EMT) -
    - a. May be used in indoor dry locations where it is -
      - 1) Not subject to damage.
      - 2) Not in contact with earth.
      - 3) Not in concrete slabs on grade.
  5. Schedule 40 Polyvinyl Chloride (PVC) (Type RNC) 3/4 inch minimum -
    - a. May be used -
      - 1) Underground.
      - 2) In or below concrete.
  6. Flexible Metal Conduit (Type FMC) - 1/2 inch minimum
    - a. Use in indoor final connections to -
      - 1) Mechanical equipment, not to exceed 36 inches.
      - 2) Recessed fluorescent lighting fixtures, not to exceed 72 inches with ground wire.
      - 3) FMC shall not be used in wet locations.
  7. Liquid-tight steel conduit (Type LFMC) -
    - a. Use in outdoor final connections to mechanical equipment, not to exceed 36 inches.
  8. Type MC cable may be used for branch circuit wiring
- B. Fittings -
1. Compression or set-screw steel housing type for EMT, flexible steel, and liquid-tight flexible steel conduits.
  2. PVC -
    - a. PVC fittings shall be PVC type. Use PVC adapters at all boxes.
    - b. Brush apply PVC cement.
    - c. All PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
- C. Use of the following is prohibited -
1. Aluminum conduit.
  2. Electrical non-metallic tubing.
  3. EMT crimp-on, tap-on, indenter type fittings.
  4. Malleable iron or cast set-screw fittings.
  5. Spray (aerosol) PVC cement.
  6. PVC 90 degree bends.

PART 3 EXECUTION

3.1 Installation:

- A. Conceal raceways within ceilings, walls and floors except where exposed raceways are specifically permitted.
- B. Keep raceway runs a minimum distance of six inches from hot water pipes.
- C. Support conduit and boxes in an approved manner by -
1. Expansion shields in concrete or solid masonry.
  2. Toggle bolts on hollow masonry units.
  3. Wood screws on wood.
  4. Metal screws on metal.
- D. Secure conduit with approved supports within three feet of every bend, outlet box, junction box, gutter, panel, fitting, etc. Do not space supports further apart than ten feet. (MC cable shall be supported and anchored in accordance with the NEC.)
- E. Cap conduit ends during construction.
- F. Clean or replace conduits in which water or foreign matter have accumulated.
- G. Install grounding type insulated bushings on each end of conduit 1-1/4 inch and larger.
- H. Install grounding conductor in PVC conduit.
- I. Bending of PVC shall be by hot box bender and for PVC two inches in diameter and larger, expanding plugs.
- J. Install conduits into the bottom of panels with adequate space between all conduits to install locknuts and bushings.
- K. The following are prohibited -
1. Use of wooden plugs inserted in concrete or masonry units as base for fastening conduits, tubing, boxes, cabinets, or other equipment.
  2. Installation of conduit or tubing which has been crushed or deformed.
  3. Torches for bending PVC conduit.
- L. All 90 degree bends in power and communication conduit systems shall be rigid steel conduit. No PVC 90 degree bends from floor slab up to first outlet box allowed.
- M. Run two 3/4 inch spare conduits from each panel to ceiling access area and cap so no foreign matter will enter conduit while not in use.
- N. Run conduit in concrete slabs under but encased in slab. Conduits shall have outside diameter less than 1/3 slab thickness. See Division 03 for additional conduit emplacement requirements.

SECTION 16120 WIRE AND CABLE

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -
1. All conductors as required to complete project.
  2. Cables for data systems and telephone system are to be installed by electrical.
  3. Cables for fire alarm system.

PART 2 PRODUCTS

2.1 Material:

- A. Conductors -
1. Copper except where aluminum is allowed to be used.
  2. Minimum size shall be No. 12 except where specified otherwise.
  3. Conductor size No. 8 and larger shall be stranded.
- B. Aluminum conductors may be used for service and feeder conductors unless otherwise indicated on the plans and specifications. Conductors shall bear the UL marking. Aluminum conductor installation shall meet the following requirements:
1. Aluminum conductor size shall be determined in accordance with the NEC ampacity tables. Aluminum conductor size shall meet the same intent of the design in terms of ampacity and voltage drop as the copper conductors specified for services and feeders. Conduits shall be sized in accordance with the aluminum wire size selected.
  2. Splices and terminals shall be made in an approved manner with connectors specially designed and approved for use with aluminum conductors.
  3. All conductor ends shall be stripped of insulation being careful to avoid nicking the metal. Approved types of oxide-inhibiting compounds containing abrasive conducting particles shall be applied to the conductor and shall thoroughly penetrate space between strands.
  4. At lugs in all panels a terminating adaptor shall be installed. Adaptor shall be a Burndy "Hyplug" or equal.
  5. Where bolted, pressure-type connectors are used, they shall be of a type specially designed and approved for use with aluminum conductors. They shall be of exact size to fit the conductors and shall be drawn up tight to manufacturer's recommendations.
  6. Where high-compression-type connectors are used, they shall be of a type specially designed and approved for use with aluminum conductors. They shall be of exact size to fit the conductors and shall be drawn up tight to manufacturer's recommendations.
  7. Where connections are made between aluminum and copper (two dissimilar metals), provision shall be made to prevent electrolytic action, and all connectors used for this purpose shall be approved.
  8. Conductor size shall be determined in accordance with NEC ampacity tables and shall meet the intent in terms of ampacity and voltage drop.
- C. Insulation -
1. Local codes shall apply.
  2. Conductor size No. 10 and smaller -
    - a. Type THWN/THHN. Branch circuit conductors which run through ballast compartments of lighting fixtures shall be code approved for such use.
  3. Conductor Size No. 8 and larger - Type THWN/THHN or XHHW.
- D. Steel spring wire connectors or pressure type terminal lugs as specified.
1. Connectors shall only be used as specified by manufacturer.
  2. Spring type pressure connectors such as "Scotchlock," shall be used for splicing No. 8 and smaller.
  3. Splitbolt and/or lug type connectors such as "Burndy," shall be used for splicing No. 6 and larger.
  4. Crimp on spade or ring tongue lug connectors for connection to terminal boards such as Thomas & Betts, ASta-Kon, etc shall be used.

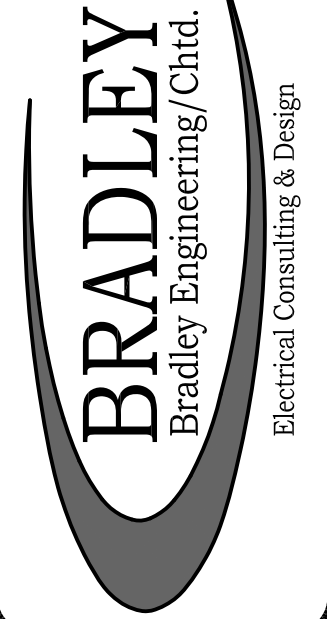
PART 3 EXECUTION

3.1 Performance:

- A. Install conductors in raceway unless indicated otherwise.
- B. Pulling Conductors -
1. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
  2. Do not use heavy mechanical means for pulling conductors.
  3. Only wire pulling lubricant may be used.
- C. Conductors shall be routed in panels in a neat and orderly manner with adequate wiring length to route to all breakers. Wiring shall be routed with 90 degree bends into circuit breakers and shall be tied at points to keep wiring neatly dressed.
- D. Conductors shall be continuous from outlet to outlet.
- E. Make splices for conductors No. 8 and smaller with steel spring wire connections. Splice larger conductors with pressure type terminal lugs.
- F. Route circuits at own discretion, however, circuit numbers shall be according to drawings.
- G. All circuits shall have a separate neutral installed.
- H. Run conductors of same circuit in same conduit.
- I. Run conductors of different voltage system in separate conduits.
- J. Color code conductors as follows -

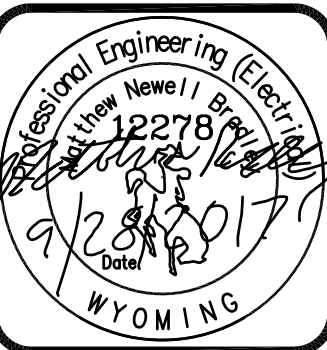
	208/120V Three Phase	480/277V Three Phase	240/120V Single Phase	240/120V Three phase
1. Phase A -	Black	Brown	Black	Black
2. Phase B -	Red	Orange	Red	Red
3. Phase C -	Blue	Yellow	Blue	Blue
4. Neutral -	White	Gray	White	White
5. Ground -	Green	Green w/ yellow stripe	Green	Green

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REV	DESCRIPTION	DATE

TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.  
SPECIFICATIONS



DRAWN BY J. BRADLEY  
CHECKED BY M.N. BRADLEY  
DESIGNED BY J. BRADLEY  
JOB NO. 17-72  
DATE AUG 28

DRAWING NO.  
**E5.4**



SECTION 16121 WIRE CONNECTIONS AND CONNECTING DEVICES

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Furnish and install wiring devices complete with plates as described in Contract Documents.

PART 2 PRODUCTS

2.1 Material:

- A. Switches & Receptacles -  
1. Switches and receptacles listed are 15 ampere and switches are single pole. Where three-way, four-way, two pole, or higher ampere switches are required, they shall be of same series as those listed. Devices of a similar type shall be of same Manufacturer.  
2. Color shall be same as plate.  
3. Approved Manufacturers for Switches -

	15A Switches	20A Switches	15A Three-Way Switches
a. Cooper Wiring Devices	1201	AH1221	1203
b. Hubbell	HBLL1201	HBLL1221	HBLL1203
c. Leviton	1201	1202	1203
d. Pass & Seymour	15AC-1	20AC-1	15AC-3

4. Approved Manufacturers for Receptacles -

	15A Receptacles	20A Receptacles	15A GFCI Receptacles	15A Surge Protected
a. Cooper Wiring Devices	5262	5362	GF15A/X/GF15A	5250/1208
b. Hubbell	5262	5362	GF5262	5262S
c. Leviton	5262	5362	6596	
d. Pass & Seymour	5262	5362	1597-I	

5. Approved manufacturers for tamper resistant, weather resistant GFCI receptacles

	15A GFCI Tamper/Weather Resistant	20A GFCI Tamper/Weather Resistant
a. Cooper Wiring Devices	TWRVGF15W	TWRVG20W
b. Hubbell	GFTR15W	GFTR20W
c. Leviton	W7596-TW	W7899-TW
d. Pass & Seymour	1597TRWRW	2097TRWRW

6. Approved Manufacturers for occupancy sensors:

- a. See occupancy sensor schedule on drawings

B. In Use Weatherproof Covers -

1. Approved Manufacturer -  
a. TeyMac MX3200 Extra Heavy Duty  
b. Intermatic WPS110MXD, WP1030MXD, WP1010MXD, WP1010HMXD  
c. Engineer approved equal

C. Plates -

1. Nylon, fiberglass, or high impact resistant plastic nylon.  
2. Regular heavy plastic may be used only for gang plates more than two gang.  
3. Device, telephone, and switch plates shall be smooth style and ivory in color where located on light colored walls and brown on dark walls unless directed otherwise by Architect.  
4. Gang switches shall have gang plates.  
5. Do not use metal plates.  
6. Label inside of all switch plates and cover plates with panel and circuit numbers.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install wire connections and connecting devices as indicated, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that the devices comply with requirements. Comply with NEC and NEMA standards for installation of wire connections and connecting devices.  
B. Coordinate with other work as necessary.

SECTION 16134 OUTLET BOXES

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Furnish and install outlet boxes at outlet locations described in Contract Documents.

1.2 Job Conditions:

- A. Coordination -  
1. Coordinate location of outlets which are intended to be above or adjacent to millwork with Division 06.

PART 2 PRODUCTS

2.1 Material:

- A. Outlet Boxes -  
1. Galvanized steel, and correct size and shape.  
2. Provide metal supports and other accessories for installation of each box.  
3. Equip ceiling and bracket fixture boxes with fixture studs where required.  
4. Equip outlets with extensions as required to bring box flush with finish surface.

- B. Floor Outlets - Where shown on drawings with all associated hardware.  
1. Hubbell B-2536  
2. Engineer approved equal.

PART 3 EXECUTION

3.1 Installation:

- A. Boxes shall be readily accessible and installed with approved cover.  
B. Sectional boxes shall not be used in concrete.  
C. Locate boxes so outlets are not obstructed by pipes, ducts, or other items.  
D. Install outlets flush or not more than 1/4 inch behind finished surface and level and plumb.  
E. Boxes for switches shall generally be located within six inches of door jamb.  
F. Properly center single outlets in each room. Where two or more outlets occur, space them uniformly and in straight lines with each other.  
G. All outlets on J-Boxes not used shall have blank covers installed.

SECTION 16155 MOTOR STARTERS

PART 1 GENERAL

1.1 Description:

- A. Provide and install motor starters with starters of types, grades, and sizes as shown on the drawings. Install complete assembly including, but not necessarily limited to enclosures, thermal magnetic circuit breaker, motor starter, fuses, heaters, control transformer, control switch, and other components, accessories and mounting hardware as needed for a complete system.

PART 2 PRODUCTS

2.1 Materials:

- A. Motor Starters:  
1. Provide and install motor starters and auxiliary components; of types, sizes, rating and electrical characteristics as shown on the drawings, which comply with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation.  
B. Approved Manufacturers:  
1. Cutler Hammer  
2. General Electric  
3. Siemens  
4. Square D

PART 3 EXECUTION

3.1 Installation:

- A. Install motor starters as indicated on the drawings and in accordance with manufacturer's written instructions and complying with recognized industry practices to ensure that products serve intended functions.  
B. Install fuses in fusible holders for control transformer. Install heater elements in overload relays. Terminate all wiring in starter enclosure.  
C. Install mounting supports as shown on the drawings.  
D. Identify motor control center cubicles with black laminated plastic nameplates with white 1/8 inch engraved letters. Attach with screws.

SECTION 16170 MOTOR AND CIRCUIT DISCONNECTS

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Furnish and install disconnects as described in Contract Documents.

PART 2 PRODUCTS

2.1 Material:

- A. General duty quick-make, quick-break type, non-fused safety switch with visible knife blade unless indicated otherwise.  
B. Motor circuit disconnects shall be horsepower rated.  
C. Enclosures shall be NEMA Type 1 or, where indicated as weatherproof, NEMA Type 3R.  
D. Approved Manufacturers:  
1. Cutler Hammer  
2. General Electric  
3. Siemens  
4. Square D

PART 3 EXECUTION

3.1 Installation:

- A. Identify all disconnect switch nameplates with panel, circuit number and device served. Nameplates shall be black laminated plastic with 1/8 inch white engraved letters. Attach with screws.

SECTION 16180 OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.1 Division 16000 General applies to this Section.

1.2 Description:

- A. Includes But Not Limited To -  
1. Extent of overcurrent protective device work is indicated by project plans and schedules. Overcurrent protective devices specified herein are for installation as individual components in separate enclosures; and for installation as integral components of switchboards and panelboards. See Section 16470, Panelboards.  
2. Types of overcurrent protective devices in this section include the following for operation at 600 volts and below:  
a. Molded case circuit breakers.

1.3 Quality Assurance:

- A. Comply with NEC requirements and NEMA and ANSI standards as applicable to construction and installation of overcurrent protective devices.

PART 2 PRODUCTS

2.1 Acceptable Manufacturers:

- A. Subject to compliance with requirements, provide products of one of the following (main and branch device manufacturer must be same as panelboard and/or switchboard manufacturer):  
1. Cutler Hammer  
2. General Electric  
3. Square D  
4. Siemens

2.2 Molded Case Circuit Breakers:

- A. Provide factory-assembled, molded case circuit breakers for power distribution panelboards and switchboards; and for individual mounting, as indicated. Provide breakers for ampere voltage, and RMS interrupting rating shown, with permanent thermal trip and adjustable instantaneous magnetic trip in each pole. Construct with overcenter, trip free toggle type operating mechanisms with quick-make, quick-break action and positive handle indication. Construct breakers for mounting and operating in any physical position and in ambient temperature of 40 degrees C. Provide with mechanical screw type removable connector lugs, AL/CU rated.

2.3 Maintenance Stock, Fuses:

- A. For types and ratings required, furnish additional fuses, amounting to one unit for every 5 installed units, but not less than two units of each size and type.

PART 3 EXECUTION

3.1 Installation of Overcurrent Protective Devices:

- A. Install overcurrent protective devices as indicated, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with NEC and NEMA standards for installation of overcurrent protective devices.  
B. Coordinate with other work as necessary to interface installation of overcurrent protective devices with other work.  
C. Set field-adjustable circuit breakers for trip settings as indicated, subsequent to installation of devices.  
D. Install fuses in overcurrent protective devices.

- E. Field test all ground fault protective devices for proper operation; test to be performed by representative of the manufacturer. Include verification of complete time current trip characteristics.

3.2 Field Quality Control

- A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.

SECTION 16405 ELECTRIC SERVICE

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Furnish and install service as described in Contract Documents and as required by local serving agency.  
2. Cost of completion of service shall be included and paid for by this section.  
3. Furnish and install combination meter/current transformer cabinet.

- B. Job Conditions:  
1. Coordinate with serving agency on all items, especially service entrance fittings, meter sockets, and C/T boxes where required.

PART 2 PRODUCT

2.1 Material:

- A. Install materials of types and sizes as shown on the drawings.

PART 3 EXECUTION

3.1 Installation:

- A. Install electric service equipment at locations indicated on the drawings and in accordance with manufacturer's written instructions.

SECTION 16450 GROUNDING

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Provide grounding for entire electrical installation as shown below and described in Contract Documents.  
a. Electrical service, its equipment and enclosures.  
b. Neutral or identified conductor of interior wiring system.  
c. Main panelboard, power and lighting panelboards.  
d. Conduits and other conductor enclosures.  
e. Non-current-carrying metal parts of fixed equipment such as motors, starter, and controller cabinets, instrument cases, and lighting fixtures.

PART 2 PRODUCTS

2.1 Material:

- A. Size materials as shown on Drawings and in accordance with applicable codes.  
B. Ground wires No. 6 and smaller shall have green insulation. Ground wires No. 4 and larger shall be bare or shall have green tape at conductor connections.  
C. Ground rods shall be triangular ground rod system with 3- 5/8" x 8' copperweld.  
D. Make grounding conductor connections to ground rods and water pipes using approved bolted clamps of bronze or brass designed for such use.

PART 3 EXECUTION

3.1 Installation:

- A. Grounding connection to main water supply shall be accessible for inspection and made within 6 inches of point of entrance to building or ahead of dielectric, if used, on meter side.  
B. Connect No. 4 copper wire to 20 foot of No. 2 rebar in footing (UFER Ground) and bond to service ground.  
C. Install additional ground rods as required by applicable codes and as indicated on Drawings.  
D. Ground identified grounded (neutral) conductor of electrical system on supply side of main service disconnect.  
E. Pull ground conductors in non-metallic raceways and in flexible steel conduit exceeding 8 feet long. Use same size ground as phase conductors up through #10 AWG. Use NEC Table 250-122 for all others unless noted otherwise on Drawings.

SECTION 16470 PANELBOARDS

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Furnish and install panelboards as described in Contract Documents.

PART 2 PRODUCTS

2.1 Material:

- A. Sub-Panelboard -  
1. Circuit breakers of type and size shown on Drawings. Multi-pole breakers shall be common trip.  
2. Minimum interrupting capacity of 10,000 amperes or as shown otherwise.  
3. Bussing arranged as required.  
4. Bolt-on type circuit breakers.  
5. Ground bus bonded to cabinet.  
6. Copper bussing.  
7. Quality Standard - Square D "NQOD".  
8. Hinged door cover.

B. Panelboard Cabinets -

1. Mono-flat (no screws) for flush or surface mounting as indicated with locking doors with card index holders and three keys.  
2. Key locks alike.

C. Approved Manufacturers -

1. Cutler Hammer  
2. General Electric  
3. Siemens  
4. Square D

PART 3 EXECUTION

3.1 Installation:

- A. Identify panelboards with black laminated plastic name plates with white 1/8 inch engraved letters. Attach with screws.  
B. Provide typewritten circuit schedules in panelboard to identify panelboard and each branch breaker.  
C. All panelboards shall have hinged door covers.  
D. At completion of project contractor shall clean all panels which includes vacuuming inside of panel and wiping down all panels.

SECTION 16510 INTERIOR BUILDING LIGHTING

PART 1 GENERAL

1.1 Description:

- A. Includes But Not Limited To -  
1. Furnish and install lighting system as described in Contract Documents complete with lamps.  
B. Related Work Specified Elsewhere -  
1. See Section 16050 for general requirements.

1.2 Job Conditions:

- A. Coordination -  
1. Coordinate with ceiling layout to obtain symmetrical arrangement of fixtures in acoustical tile ceiling.

PART 2 PRODUCTS

2.1 Material:

- A. Lighting Fixtures -  
1. See Fixture Schedule on Drawings.  
2. All alternate light fixture packages shall be submitted a minimum of 10 days prior to bid for approval.

PART 3 EXECUTION

3.1 Installation:

- A. Do not locate light fixtures in closet or storage areas within 18 inches of shelves. Do not locate fluorescent fixtures within six inches of shelves.  
B. Securely fasten fixtures in place in all areas. Fixtures located in secure areas shall be anchored at four corners.  
C. Where recessed lighting fixtures are to be installed, provide openings, plaster rings, etc., of exact dimensions for such fixtures to be inserted in openings. Terminate circuits for recessed fixtures in an extension outlet box near fixture and connect with 1/2 inch flexible conduit in accordance with Contract Documents.  
D. Where fluorescent units are shown installed end to end, provide suitable connectors or collars to connect adjoining units to appear as a continuous unit.  
E. Each fixture shall be wired with a 72 inch piece of flexible conduit connected to a blank covered junction box located in the accessible ceiling space within 36 inches of the fixture connection point.  
F. Do not install fixture lens enclosures or louvers in fixtures until general construction work is complete, including painting.  
G. All light fixtures and lamps shall be left clean at the time of substantial completion of the work. It is the responsibility of the electrical contractor for protection and final cleaning of fixtures. If fixtures are dirty at completion of the project, the Contractor shall clean them at no additional cost to the Owner.

3.2 Light Fixture Attachment:

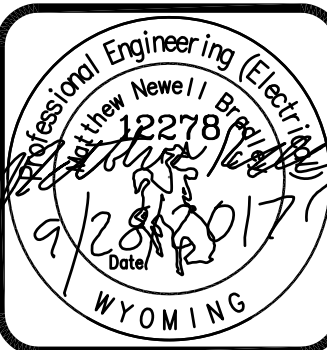
- A. Light fixtures in ceiling grid shall be mechanically attached to grid per NEC 410-16 (two per fixture unless independently supported).  
1. Surface-mounted fixtures shall be attached to grid.  
2. Pendant-hung fixtures shall be directly supported from structure with 8-gauge wire (or approved alternative).  
3. Rigid lay-in or can light fixtures:  
a. ≤10 lbs. - one wire to structure (may be slack).  
b. 11 to 56 lbs. - two wires from housing to structure (may be slack).  
c. ≥57 lbs. - supported directly to structure by approved method.

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**BRADLEY**  
Bradley Engineering/Chld.  
Electrical Consulting & Design

REV	DATE	DESCRIPTION
1		
2		
3		
4		

**TEMPORARY FIRE STATION JACKSON**  
**305 W. SNOW KING AVE.**  
**SPECIFICATIONS**



DRAWN BY  
J. BRADLEY  
CHECKED BY  
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JOB NO. DATE  
17-72 AUG 28

DRAWING NO.  
**E5.5**



SECTION 16721 AUTOMATIC FIRE ALARM AND DETECTION SYSTEMS

PART 1 GENERAL

1.1 Requirements Included:

- A. Scope of Work
- B. System Description and Function

1.2 Quality Assurance:

- A. Manufacturer: Firms engaged in the manufacture of fire protection equipment of the types and sizes required to complete the project.
- B. Installer: The Contractor for the system shall be duly licensed by the State of Wyoming and jurisdiction in which the project is being constructed. The Contractor must be engaged in the installation of fire alarm and detection systems and be fully familiar with all local conditions, codes, and requirements.
- C. Authorities Having Jurisdiction: Submit plans, calculations, and material data sheets to the County Fire Marshal office, the Owner, and the Engineer for review and acceptance.

1.3 Related Requirements:

- A. General and Supplementary Conditions
- B. Section 01 200 - Project meetings
- C. Section 01 300 - Submittals
- D. Section 01 700 - Project Closeout
- E. Division 16 000 – Electrical
- F. Standards:
- 2015 International Fire Codes (for Wyoming)
  - NFPA 72

1.4 Scope of Work:

- A. The following is a summary of the work to be accomplished under this section:
- Install and make operational a new, addressable fire alarm system throughout the building, including spot smoke detectors, duct smoke detectors, manual fire alarm stations, audible/visual alarming devices, and wiring. Connect system to shut down HVAC system fans.
  - Furnish and connect to central monitoring service. Contract to include one (1) year monitor service.
- B. Install new wire and conduit as necessary to make a complete and functional system. This includes installation of wire and conduit in the specified building. The minimum wire size shall be:
- Initiation circuits - twisted pair #18 AWG
  - Audible/visual alarming circuits - #14 AWG. Circuits over 500 ft. shall be #12 AWG.
  - Power circuits - #12 AWG copper
- C. Final tests and inspection shall be held in the presence of the Engineer, Fire Marshal and the Owner and to their satisfaction. The fire alarm equipment supplier shall conduct the tests. The Contractor shall supply the personnel and equipment necessary to conduct this testing at no additional cost to the Owner. The whole system shall be tested and made operational prior to the final acceptance test.
- D. As a minimum, the Acceptance Test Procedure (ATP), shall provide a detailed method of testing the following to demonstrate that the system functions as intended by the design:
- Conductor Testing. Prior to connection of the equipment, all conductors should be tested in the following manner.
    - Stray voltage. Verify absence of unwanted voltages between circuit conductors and ground that would constitute a hazard or prevent proper system operation.
    - Ground Faults. All conductors, other than those intentionally and permanently grounded, should be tested for isolation from ground using an insulation testing device such as a "Megger".
    - Short Circuits. All conductors, other than those intentionally connected together, should be tested for conductor-to-conductor isolation using an insulation testing device.
    - Loop Resistance. With each circuit pair short-circuited at the far end of the circuit, measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit shown on the record drawings.
  - System Testing.
    - Verify that the FACP is in the normal operating condition as detailed in the manufacturer's manual.
    - Test each initiating and indication circuit to confirm that the integrity of installation conductors is being properly monitored by a suitable response at the FACP. One connection each should be opened at all of the initiating devices and indicating devices.
    - Test each initiating device and indicating device for alarm operation and proper response at the FACP in accordance with the following:
      - Manual Fire Alarm Stations - operate per manufacturer's instructions.
      - Smoke detectors - put into alarm using a simulated smoke aerosol.
      - Audible/Visual alarming devices - put into alarm condition.
        - The contractor shall furnish a decibel meter to verify sound level of audible devices.
    - Test all primary power supplies in accordance with the following:
      - Disconnect all standby power.
      - Test under maximum load for a minimum of five (5) minutes.
    - Test all standby power supplies in accordance with the following:
      - Disconnect all primary power.
      - Allow FACP to set in the supervisory condition for a minimum of twenty-four (24) hours (trouble signal silenced).
      - Test under maximum load for a minimum of five (5) minutes.
    - Re-connect all power supplies and devices and return the panel to normal condition, then record all information.
  - Provide one (1) year of testing and maintenance conducted by the qualified, factory trained fire alarm equipment supplier. The testing shall consist of the following, as a minimum:
    - Semi-annual testing of all control panels, audible/visual alarming devices, and alarm connections to the off-premises monitoring system.
    - Annual testing of each automatic fire detector and fire sprinkler system waterflow signal. Biannual sensitivity testing of all smoke detectors.
    - Semi-annual testing of each supervisory signal device (control valve tamper switches).
  - Tests and written reports which certify that all initiating devices have been tested and are operational shall be submitted to the Owner and the Engineer.
- E. The Contractor shall supply personnel and equipment to train the Owner's employees in the operation, testing and maintenance of the system. The training shall not exceed four (4) hours unless specified otherwise.

1.5 Exceptions to The Specifications:

- A. Any equipment proposed as equal to that specified shall conform to the standards indicated and the manufacturer shall supply proof of having produced similar equipment that has been in satisfactory service for the past five (5) years.
- B. The contractor must obtain the Engineer's approval, in writing, ten (10) working days prior to bidding equipment other than that specified. The manufacturer's name, model numbers, working samples of all proposed devices, UL test reports, three copies of working drawings, and engineering data shall be submitted to the Engineer for his approval.

PART 2 PRODUCTS

2.1 General:

- A. The equipment shall be manufactured by a firm having an established reputation and experience, who shall have produced similar equipment for a period of at least five (5) years. The equipment supplier shall be able to refer to similar installations providing satisfactory service within the State of Wyoming.
- B. The equipment vendor shall be the authorized factory representative for the location that the fire alarm system is to be installed. All vendors will be verified with the facility location.
- C. All materials, equipment, accessories, devices, other facilities, and connections covered by these specifications or as noted on the drawings and the Contractor's reviewed working drawings shall be new, best suited for its intended use and shall conform to the applicable standards for their use
- D. Part numbers and functions described herein are used to describe the levels of quality, features, and performance required by this specification. It is not the intent of these specifications and plans to eliminate approved competitive equipment.
- E. All fire alarm panels and Supplementary Notification Appliance Panels shall be synchronized.

2.2 Fire Alarm Control Panel:

- A. The Fire Alarm Control Panel (FACP) shall be designed to meet the requirements of NFPA 72 for Class B, Style "B" initiation device circuits; Class B, Style "4F" signaling line circuits; and Class B, Style "Y" notification appliance circuits. The panels shall be UL 864 listed.
- B. The FACP shall provide power, zone annunciation, supervision, communications with initiation devices, releasing system activation, auxiliary relay operation, and alarm output signals.
- C. The FACP will include a battery charger and back-up batteries to automatically operate the panel in the supervisory mode for twenty-four (24) hours and, at the completion of the twenty-four (24) hours, five (5) minutes in the alarm mode. Loss of commercial power shall be annunciated as an audible trouble signal on the FACP.
- D. Fire alarm panel shall be furnished with DACT dialer for remote annunciation of fire alarms.
- E. The following FACP has been approved by the Engineer for use on this project:
- FCI E3
  - Edwards E85005-0135
- F. Auxiliary Power Supplies (APU) (NAC)
- Notifier FCPS-24(E)
  - FCI-FF8
  - Edwards E85005-0127

2.3 Alarm Initiating Devices:

- A. All new fire detectors shall be capable of being replaced without disconnecting any wires or wire connectors from the base or the detector. Each detector shall be installed on a separate base. They shall be UL 268 listed.
- Smoke detectors shall be:
    - Notifier NP-100
    - FCI ASD-PL2F
    - Edwards E85005-0651
  - Thermal detectors shall be:
    - Notifier NTH-100
    - FCI ATD-RLF
    - Edwards E85005-0647
  - Install smoke/heat/co detector with auxiliary relay in front of elevator doorways:
    - FCI MCS-COF
    - Edwards E85005-0621
  - Install smoke detector with auxiliary relay in front of elevator doorways:
    - Notifier NP-100 with relay base
    - FCI smoke detector with control mod AOM-2RF
    - Edwards E85005-0644
- B. All manual fire alarm stations (MFAS's) shall be designed for surface mounting. Stations shall be of the internal switch type and must be opened to re-set. They shall be UL 38 listed.
- Notifier NOT-BG12LX
  - FCI MS-2 and AWM-2 module
  - Edwards E85005-0279
- C. Duct Smoke Detectors: Addressable, ionization type with full length sampling tube and auxiliary relay to shut down fan starter (and remote key test switch).
- Notifier ND-100
  - FCI ADP-F
  - Edwards E85005-0584

2.4 Alarm Actuated Devices:

- A. All fire alarm signal devices shall be surface mounted (84" A.F.F. or as shown) audible/visual horns. All interior devices shall be UL 1971 listed. All exterior devices shall be UL 50 listed. All fire alarm horn/strobe signal devices shall have field selectable reversible features as follows. All horns/strobes shall have 75 candela strobe minimum.
- Continuous or audible emergency evacuation signal per ANSI 53.41 (temporal pattern).
  - High or low dBA sound output 100 or 90 dBA.
  - High or low tone operation, electro mechanical or 3000 Hz interrupted.
  - Set all horns in small spaces (rest rooms, interior office corridors), on low dBA setting.
  - All ceiling mounted audible/visual alarm devices shall be UL listed for the location they are installed such as wall mount and/or ceiling mount.
  - Furnish horn strobe protective covers where shown.
- B. The following horn/strobes are approved:
- Interior horn/strobe - red
    - 75 cd System Sensor SRK
    - FCI P1224-MC-R
    - Edwards E85005-0635
  - Exterior horn only - red
    - System Sensor HR
    - FCI H-12/24-K
    - Simplex 4901-9920
    - Edwards E85005-0628
  - Strobe only 75 cd - red
    - System Sensor SCR
    - FCI S1224-MCW
    - Simplex 4906 series
    - Edwards E85005-0557
- C. Provide remote supervising station service for a period of one (1) year from substantial completion of contract in accordance with NFPA-72.

PART 3 EXECUTION

3.1 Installation:

- A. All fire alarm junction boxes must be clearly marked (painted red) for easy identification.
- B. All wiring shall be installed in accordance with Section 16, the National Electrical Code (NFPA 70) Article 760, and the following:
- All conduit, mounting boxes, junction boxes and panels, detectors, alarm devices, etc. shall be securely mounted and fastened with appropriate fittings to insure positive grounding throughout the entire system.
  - All wires shall be installed in steel raceway (rigid, imc, EMT). Outside and underground conduit may be PVC with wiring designed for underground

- applications that may always be wet. Wire fill in conduit shall not exceed forty percent (40%) of the interior cross sectional area of the conduit. The number and size of the wire conductors shall be as recommended by the fire alarm equipment manufacturer and as stipulated in these specifications. The minimum raceway size shall be one-half (1/2) inch.
- All new raceway shall be concealed from finished areas. Wiremold shall be run where raceway must be exposed. Raceway may be exposed in unfinished areas. The Contractor may use existing conduit at his own risk.
  - No wiring other than that directly associated with the fire alarm and detection systems shall be permitted inside the fire alarm conduits.
  - Wiring splices are to be avoided to the maximum extent possible. If needed, they must be made only in junction boxes and shall be crimp connected. Transposing or changing wire color coding of the wires shall not be permitted. Wire nut type connectors are not acceptable.
  - All conductors in conduit containing more than one wire shall be labeled on each end with "E-Z Markers" or equivalent. Conductors in the cabinets shall be carefully formed and harnessed so that each drops off directly opposite to its terminal. Cabinet terminals shall be numbered and coded. All controls, function switches, etc., shall be clearly labeled on all equipment panels.
  - All wiring shall be checked and tested to insure that there are no grounds, opens or shorts. The minimum allowable resistance between any two conductors or between conductors and ground is ten (10) megohms as checked by a megger after all conduit, conductors, detector bases, etc., have been installed, but before the detection devices are plugged into the bases or the end-of-line devices have been installed.
  - Paint all exposed conduit to match existing building color scheme. All junction boxes are to be marked "Fire Alarm" or painted red. All conduit shall be marked every 50 feet with labels or stamped, red with white, letters one-half (1/2) inch high, reading "FIRE ALARM".
  - All fire detection and fire alarm devices shall be marked with nominal one-half (1/2) inch high letters with zone and device number. For example: 1-20 indicates zone 1, device number 20. AV12-1 indicates audiovisual device alarm zone 12, device 1.

3.2 Contractor Submittals:

- A. Installation
- Submit for review and approval to the County Fire Marshal office and the Engineer. A copy of the transmittal letter from the fire alarm vendor to the local authority shall be forwarded to the Engineer.
  - Within thirty (30) days after the contract award and prior to the purchase of any equipment, the fire alarm system contractor shall submit for approval, by the Engineer, office eight (8) copies of the following. All submittals to be in accordance with the 2015 addition of the International Fire Codes for Wyoming and NFPA 72-1-6.1.1.
    - A list of materials that are to be used on the project, including manufacturer, model number, and technical information on all equipment, devices, and materials.
    - A floor plan showing the location of all alarm initiating and alarm signaling devices. Floor plans to be 24" x 36" done in a professional manner.
    - Circuit diagrams showing interconnection of all modules, detectors, horns, panels, and wiring counts. Diagrams are to be 24" x 36" done in a professional manner.
    - Technical manuals for all of the equipment that is to be used on the project.
    - Voltage drop calculations.
    - Include vendor data on wire types and sizes.
    - Battery calculations.
    - Authorized copies of all software and database programs.
- B. Test and Reports
- The contractor shall perform all of the electrical and mechanical tests required by the equipment manufacturer. All test reports shall be submitted as part of the ATP required by these specifications.
- C. Final
- Before final acceptance of the work, the fire alarm system contractor shall deliver three (3) copies of the operating and maintenance manual to the Engineer. Each manual shall contain, as a minimum, the following:
    - Record circuit drawings, reproducible, 24" x 36", and one copy of AutoCAD 2008 compatible electronic media.
    - Technical manuals containing information on the testing and maintenance of all equipment.
    - Recommended testing and maintenance schedule for all equipment, including a recommended spare parts list.
    - The name, address, and telephone number of the person and/or firm to be contacted in the event of equipment failure.
    - The one-year guarantee, including effective date and the equipment that is covered.
    - Written Contract for one (1) year of testing and maintenance.
- D. Written Contract for one (1) year monitoring with renewal options.

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DUBUQUE, IA 52002  
ID: 83402  
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E-MAIL: brad@bradleyengineering.com

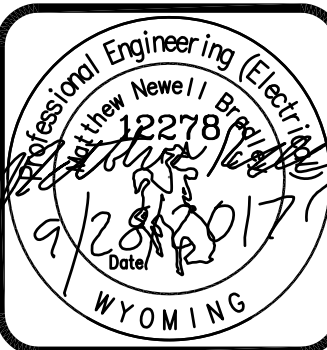
**BRADLEY**  
Bradley Engineering/Chd.  
Electrical Consulting & Design

REV	DESCRIPTION	DATE

TEMPORARY FIRE STATION JACKSON

305 W. SNOW KING AVE.

SPECIFICATIONS



DRAWN BY: J. BRADLEY  
CHECKED BY: M.N. BRADLEY  
DESIGNED BY: J. BRADLEY  
JOB NO.: 17-72  
DATE: AUG 28

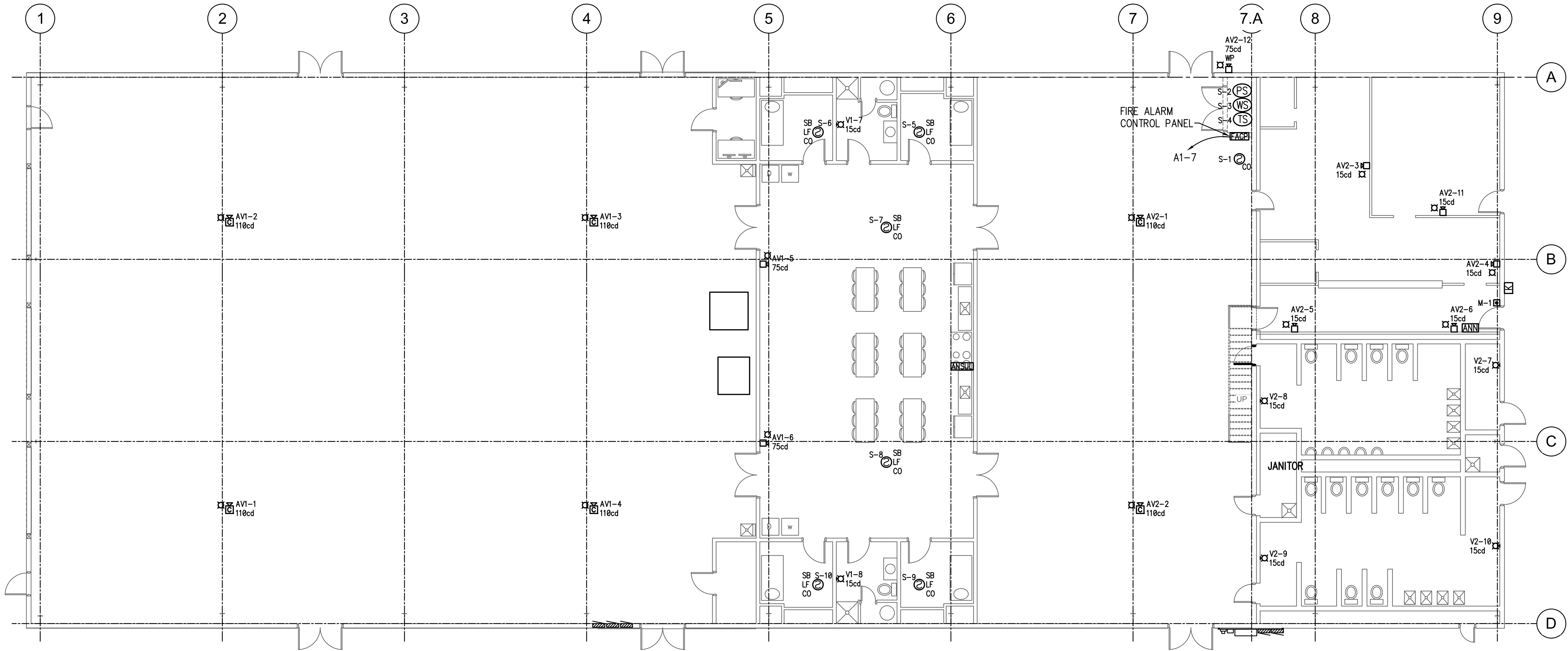
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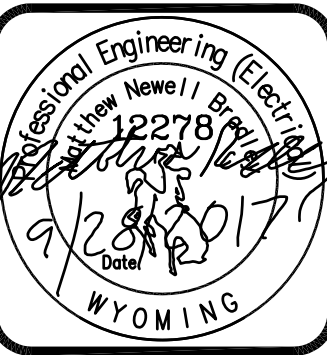
 FIRE ALARM PLAN  
SCALE: 1/8"=1'-0"

ADDRESS:  
305 W. SNOW ST.  
JACKSON, WY 83202  
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**BRADLEY**  
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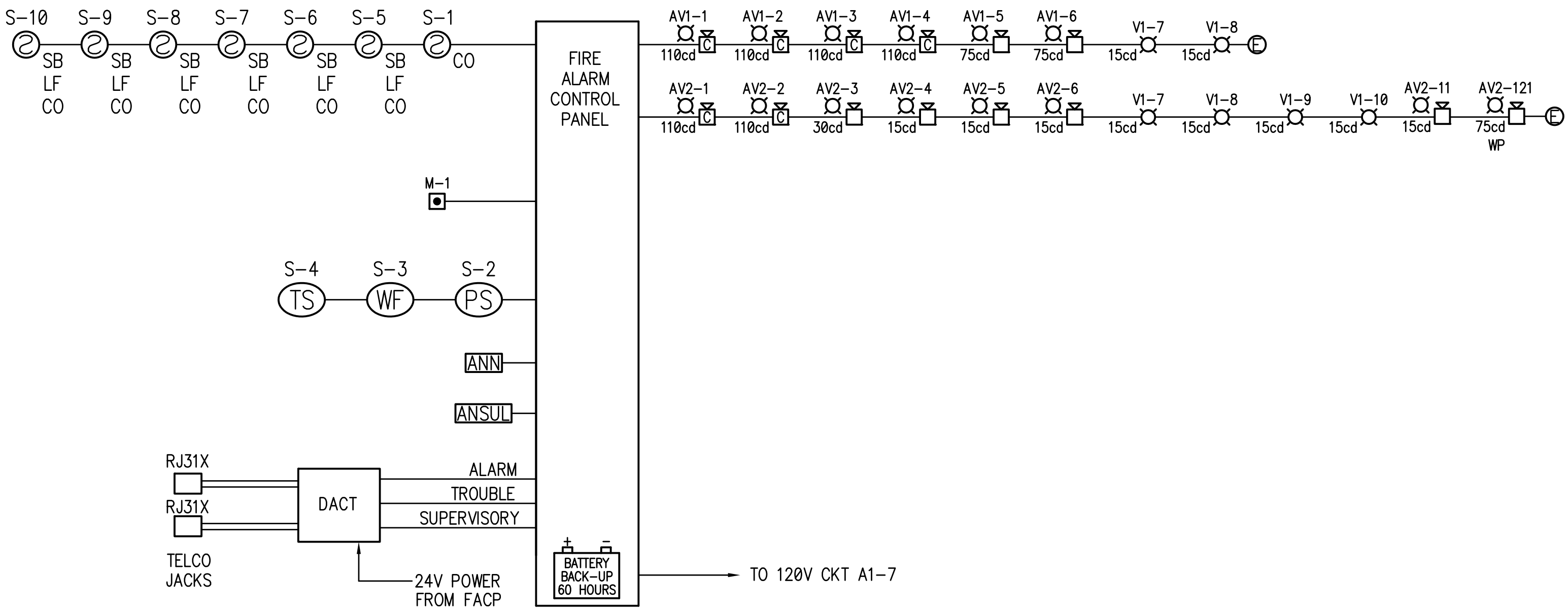
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**TEMPORARY FIRE STATION JACKSON**  
**305 W. SNOW KING AVE.**  
**FIRE ALARM INSTALLATION PLAN**



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FIRE ALARM RISER  
SCALE: NTS

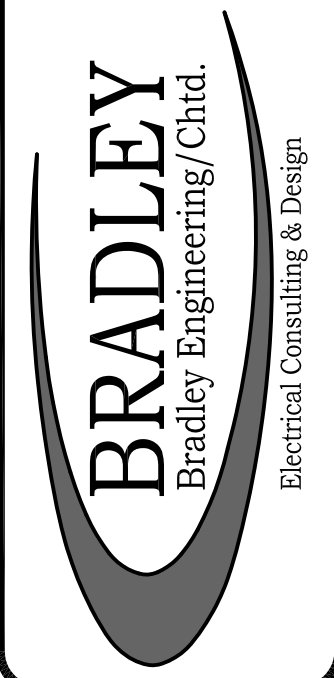
NOTES FIRE ALARM RISER:

1. THE FIRE ALARM VENDOR SHALL SUBMIT PLANS TO THE LOCAL AUTHORITY HAVING JURISDICTION FOR REVIEW IN ACCORDANCE WITH NFPA-72 PARAGRAPH 4.5 DOCUMENTATION.
2. THE FIRE ALARM SYSTEMS TO BE INSTALLED BY THE FIRE ALARM VENDOR SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION NFPA-72 AND SHALL MEET ALL REQUIREMENTS OF THAT STANDARD.
3. COORDINATE ALL FIRE ALARM LOCATIONS WITH OTHER ELECTRICAL DEVICES. i.e. RECEPTACLES, SWITCHES AND LIGHTING etc.
4. BREAKER LOCKS SHALL BE INSTALLED ON ALL CIRCUIT BREAKERS PROVIDING POWER TO THE FIRE ALARM CONTROL PANEL AND AUXILIARY POWER SUPPLIES IN ACCORDANCE WITH NFPA 72, 4.4.1.4.2.1
5. CIRCUIT BREAKER SERVING FIRE ALARM CONTROL PANEL AND AUXILIARY POWER SUPPLIES SHALL HAVE A RED MARKING AND BE LABELED "FIRE ALARM CIRCUIT" IN ACCORDANCE WITH NFPA 72, 4.4.1.4.2.2
6. LABEL INSIDE OF FIRE ALARM CONTROL PANEL AND AUXILIARY POWER SUPPLIES THE LOCATION OF THE CIRCUIT DISCONNECTING MEANS IN ACCORDANCE WITH NFPA 72, 4.4.1.4.2.3

FIRE ALARM SYMBOLS LEGEND	
	SMOKE DETECTOR
	SMOKE DETECTOR WITH LOW FREQUENCY SOUNDER BASE
	COMBINATION SMOKE AND CARBON MONOXIDE DETECTOR
	HEAT DETECTOR
	CARBON MONOXIDE DETECTOR
	MANUAL FIRE ALARM STATION +42"
	MINIMUM CANDELA RATING OF APPLIANCE OCCUPANT NOTIFICATION HORN/ADA STROBE MOUNT AT +84"
	CEILING MOUNTED OCCUPANT NOTIFICATION HORN/ADA STROBE
	OCCUPANT NOTIFICATION HORN MOUNT AT +84"
	OCCUPANT NOTIFICATION HORN MOUNT AT +84", LOW FREQUENCY
	MINIMUM CANDELA RATING OF APPLIANCE OCCUPANT NOTIFICATION ADA STROBE MOUNT AT +84"
	WP WATER-PROOF DEVICE
	WATER FLOW BELL
	DUCT SMOKE DETECTOR
	DOOR HOLDER
	KNOX BOX
	FIRE/SMOKE DAMPER
	MM MONITOR MODULE
	CM CONTROL MODULE
	FACP FIRE ALARM CONTROL PANEL
	ANSUL HOOD FIRE SUPPRESSION SYSTEM
	ANN REMOTE ANNUNCIATOR PANEL
	APU AUXILIARY POWER UNIT
	E END OF LINE DEVICE
	TS FIRE SPRINKLER VALVE SUPERVISORY TAMPER SWITCH
	WS FIRE SPRINKLER WATERFLOW ALARM SWITCH
	PS WATER PRESSURE SWITCH
	SOV SOLENOID VALVE

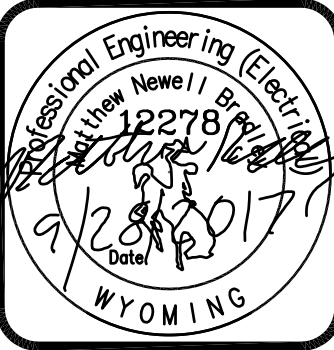
NOTE: ALL SYMBOLS MAY NOT BE USED

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REV	DESCRIPTION	DATE

TEMPORARY FIRE STATION JACKSON  
305 W. SNOW KING AVE.  
FIRE ALARM RISER AND LEGEND



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