



**OREM**

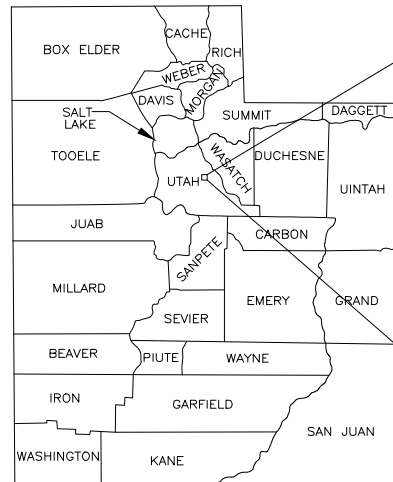
**ECONOMIC  
DEVELOPMENT**

# CITY OF OREM

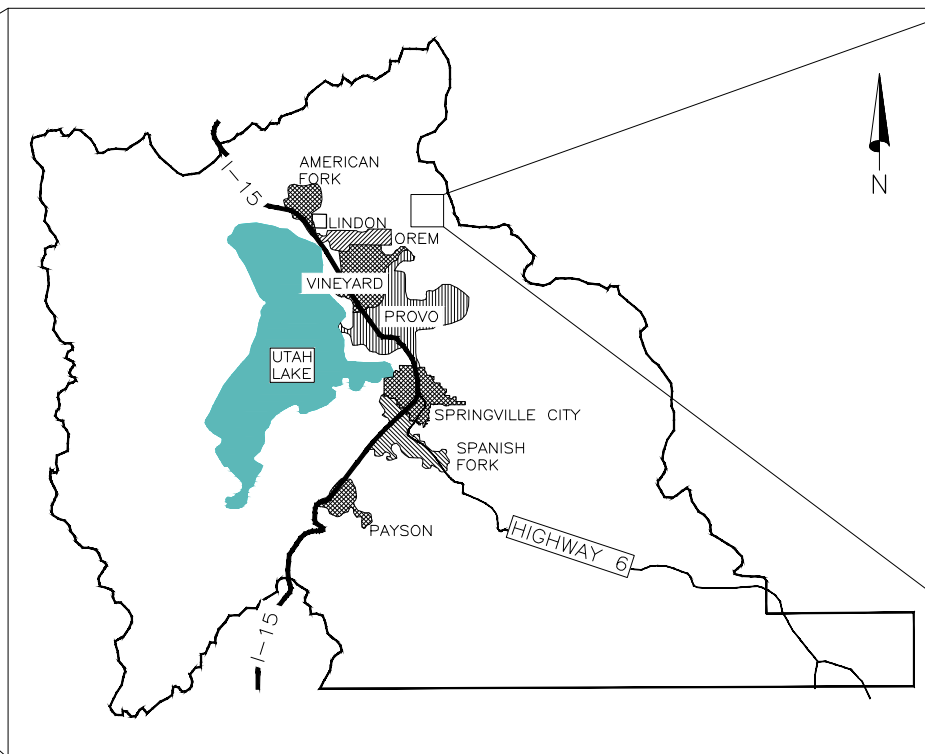
## WELL HOUSE #10

NOVEMBER 2024

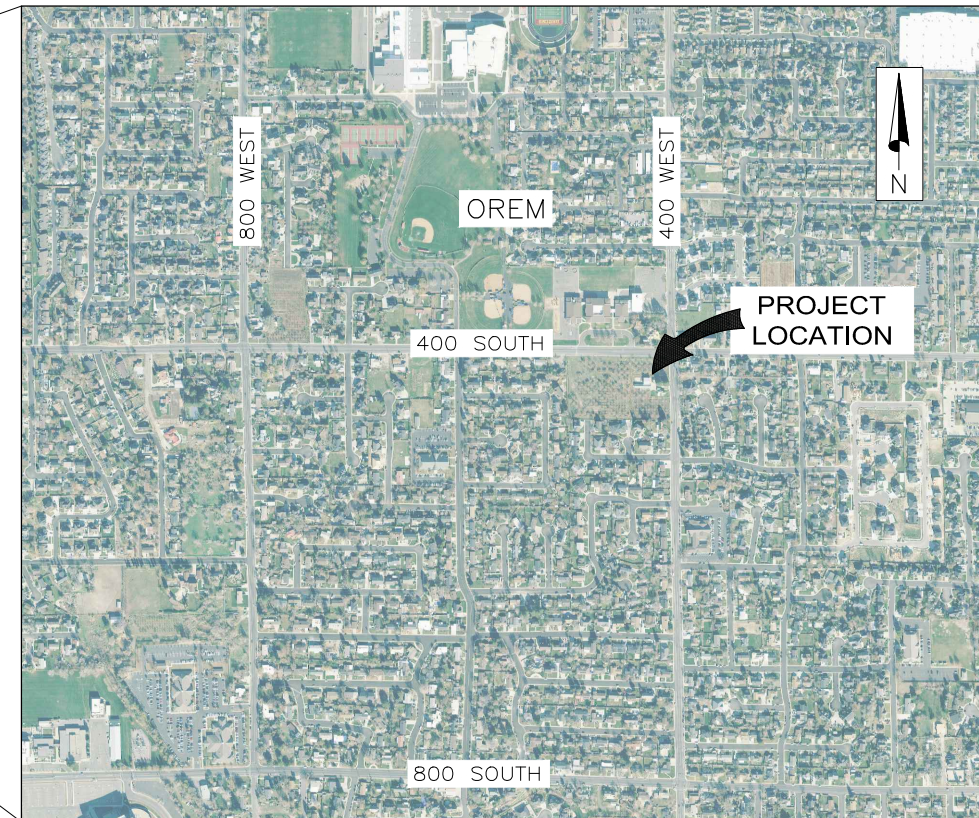
RELEASED FOR BIDDING



STATE OF UTAH



VICINITY MAP



PROJECT LOCATION

### HANSEN, ALLEN & LUCE DESIGN TEAM

MARV E. ALLEN, P.E. – PRINCIPAL IN CHARGE  
BENJAMIN D. MINER, P.E. – PROJECT MANAGER/TECH ADVISOR  
JACOB K. NIELSEN, P.E. – PROJECT ENGINEER

ROBERT CONDER, S.E. – STRUCTURAL  
(CONDER ENGINEERING)

KEITH B. HEGERHORST, P.E. – ELECTRICAL  
(HEGERHORST POWER ENGINEERING, INC.)

TAYLOR GROBERG, P.E. – HVAC  
(BLUEFIELD ENGINEERING)

JAY McQUIVEY, P.E. – GEOTECHNICAL ENGINEER  
(AGEC)

### OREM CITY

LANE GRAY – CAPITAL PROJECTS MANAGER  
QUINN FENTON – WATER DIVISION MANAGER  
JEREMY SLATER – WATER SUPPLY FIELD SUPERVISOR

CITY OF OREM ECONOMIC DEVELOPMENT  
56 N STATE STREET  
OREM, UT 84057



859 W. SOUTH JORDAN PKWY.  
STE. 200  
SOUTH JORDAN, UTAH 84095  
(801) 566-5599



*Jacob K. Nielsen*

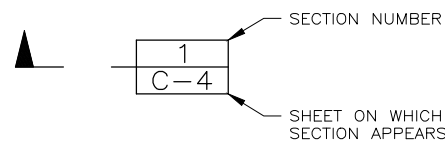
SECTION, DETAIL & ELEVATION IDENTIFICATION

NOTES:

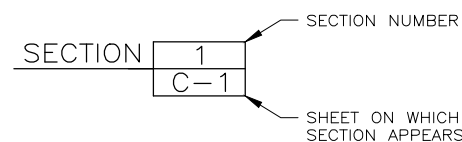
- IF SECTION CUT AND SECTION OR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON SAME SHEET, SHEET NUMBER IS REPLACED BY A LINE.
- DETAIL LETTERS "I" AND "O" NOT USED.

SECTION IDENTIFICATION

SECTION CUT ON SHEET C-1:

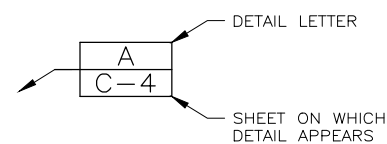


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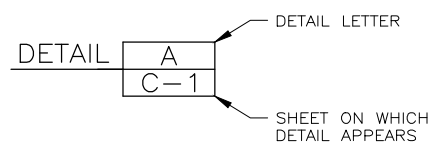


DETAIL IDENTIFICATION

DETAIL CALL-OUT ON SHEET C-1:

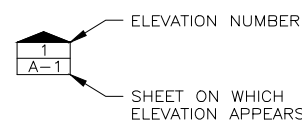


ON SHEET C-4, THIS DETAIL IS IDENTIFIED AS:

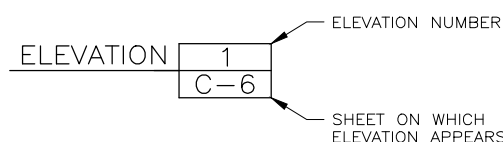


ELEVATION IDENTIFICATION

ELEVATION CALL-OUT ON SHEET C-6:



ON SHEET A-1, THIS ELEVATION IS IDENTIFIED AS:



LEGEND

EXISTING

4-G	EXISTING GAS LINE W/ SIZE
GS	EXISTING GAS SERVICE
10-W	EXISTING WATER LINE W/ SIZE
WS	EXISTING WATER SERVICE
15-SS	EXISTING SANITARY SEWER W/ SIZE
SL	EXISTING SANITARY SEWER LATERAL
24-SD	EXISTING STORM DRAIN W/ SIZE
12-IRR	EXISTING IRRIGATION W/ SIZE
FO-UG	EXISTING FIBER OPTIC LINE
T-UG	EXISTING UNDERGROUND TELEPHONE
C-TV-UG	EXISTING CABLE TV
P-UG	EXISTING UNDERGROUND POWER LINE
P-OH	EXISTING OVERHEAD POWER LINE
X	EXISTING FENCE LINE
TBC	EXISTING TOP BACK OF CURB
LOG	EXISTING LIP OF GUTTER
	EXISTING RAILROAD TRACKS
---	EXISTING PROPERTY LINE
---	EXISTING RIGHT-OF-WAY
///	EXISTING ASPHALT
- - - - -	EXISTING MAJOR CONTOUR
- - - - -	EXISTING MINOR CONTOUR

	EXISTING FIRE HYDRANT		EXISTING SANITARY SEWER MANHOLE
	EXISTING POWER POLE		EXISTING STORM DRAIN MANHOLE
	EXISTING POWER / LIGHT POLE COMBO		EXISTING WATER MANHOLE
	EXISTING LIGHT POLE		EXISTING GAS MANHOLE
	EXISTING GUY WIRE		EXISTING POWER MANHOLE
	EXISTING POWER BOX		EXISTING TELEPHONE MANHOLE
	EXISTING TELEPHONE BOX		EXISTING FIBER OPTICS MANHOLE
	EXISTING FIBER OPTIC BOX		EXISTING IRRIGATION MANHOLE
	EXISTING CABLE BOX		EXISTING WATER METER
	EXISTING SIGNAL POLE		EXISTING SEWER CLEANOUT
	EXISTING SIGNAL / LIGHT POLE COMBO		EXISTING VALVES
	EXISTING SIGNAL BOX		EXISTING REDUCERS
	EXISTING TRAFFIC LOOP		EXISTING SD CATCH BASIN
	EXISTING TRAFFIC BOX		EXISTING SD CATCH BASIN / JUNCTION BOX
	EXISTING IRRIGATION BOX		EXISTING SD JUNCTION BOX
	EXISTING SIGN		EXISTING SD CLEANOUT BOX
	EXISTING TREE		EXISTING SD COMBO CATCH BASIN / CLEANOUT BOX

CONTROL SYMBOLS

	EXISTING BENCH MARK		EXISTING SURVEY MONUMENT
	EXISTING HORIZONTAL CONTROL POINT		EXISTING SECTION MONUMENT
	EXISTING VERTICAL CONTROL POINT		GEOTECHNICAL BORING
	EXISTING HORIZONTAL & VERTICAL CONTROL POINT		

NOTE:  
SURVEY OF EXISTING RING & COVER IS FROM CENTER OF THE COVER.

NEW

	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	NEW UTILITY LINE
	PERMANENT EASEMENT
	CONSTRUCTION EASEMENT
	RIDGE LINE
	GRADE BREAK
	FLOW LINE
	RETAINING WALL

	NEW MANHOLE		NEW WATER VALVE
	NEW STORM DRAIN BOX		NEW GATE VALVE
	NEW INLET BOX		NEW BUTTERFLY VALVE
	NEW FIRE HYDRANT		NEW PLUG VALVE
			NEW CAP

HATCHING

	CONCRETE (PLAN)		GRATING
	CONCRETE (SECTION)		EARTH
	GROUT		AGGREGATE
	BRICK (PLAN)		GRAVEL
	CMU (PLAN)		RIPRAP
	CMU (SECTION)		SAND
	STEEL (SECTION)		ASPHALT

MISCELLANEOUS

	ROOM NUMBER		FITTING SCHEDULE
	DOOR NUMBER		KEY NOTES
	WINDOW NUMBER		COORDINATE POINT
	METER SCHEDULE		DIAMETER
	PUMP SCHEDULE		ANGLE
	VALVE SCHEDULE		CENTERLINE
	NEW FIRE EXTINGUISHER TYPE (1, 2, 3, OR 4)		
	CATHODIC TEST STATION		

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FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\G-2 INDEX - LEGEND & SYMBOLS.DWG  
FILE DATE: 11.6.2024 08:44:43 (BKC)



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
NONE



WELL HOUSE #10  
GENERAL  
DRAWING INDEX, LEGEND & SYMBOLS

SHEET  
G-2  
119.08.100

GENERAL NOTES

GENERAL NOTES

CONSTRUCTION NOTES

WATER PIPELINE NOTES

1. THE CONTRACTOR SHALL MEET ALL UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY AND U.S. EPA REQUIREMENTS, INCLUDING REQUIREMENTS FOR PUBLIC DRINKING WATER SYSTEMS.
2. TRAFFIC CONTROL SHALL BE PROVIDED DURING CONSTRUCTION. TRAFFIC CONTROL SHALL COMPLY WITH APPLICABLE STATE AND LOCAL REQUIREMENTS.
3. UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES, INCLUDING WATER LINES, IRRIGATION LINES, GAS LINES, TELECOMMUNICATIONS CABLES, ETC. AND ANY OTHER OBSTRUCTION DURING THE COURSE OF CONSTRUCTION AND INSTALLATION OF THE PIPELINES. CONTRACTOR SHALL CALL BLUE STAKES (811) BEFORE BEGINNING CONSTRUCTION. UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THEIR ORIGINAL CONDITION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN RIGHT OF INGRESS AND EGRESS SHOULD HE VENTURE ONTO PRIVATE PROPERTY WHICH IS NOT INCLUDED IN APPROVED RIGHTS-OF-WAY AND EASEMENTS.
5. UNLESS DETAILED, SPECIFIED OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS OR IN SPECIFIC DRAWINGS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT ALL EXISTING IMPROVEMENTS DURING CONSTRUCTION AND SHALL REPLACE OR RESTORE ANY IMPROVEMENTS DAMAGED AS A RESULT OF THE CONSTRUCTION ACTIVITY, AS DIRECTED BY THE ENGINEER.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
8. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
9. CONTRACTOR SHALL POT HOLE UTILITIES AT ALL CROSSINGS SUFFICIENTLY IN ADVANCE OF LAYING PIPE TO ALLOW FOR ADJUSTMENTS OF NEW PIPELINE GRADE TO AVOID CONFLICT.
10. CONTRACTOR SHALL REPLACE SURVEY MONUMENTS DAMAGED DURING CONSTRUCTION. SURVEY MONUMENTS TO BE REPLACED BY A LICENSED LAND SURVEYOR.
11. DIMENSIONS SHOWN ARE TO THE CENTER OF THE PIPELINE UNLESS OTHERWISE NOTED.
12. DISTANCES SHOWN ALONG PIPELINES ARE HORIZONTAL DISTANCES AND NOT ACTUAL PIPE LENGTHS. MORE PIPE MAY BE REQUIRED TO COMPLETE CONSTRUCTION THAN IS DIMENSIONED IN THE PLANS.
13. CONTRACTOR IS REQUIRED TO HAVE A SET OF APPROVED PLANS ON THE SITE AT ALL TIMES.
14. CONTRACTOR IS RESPONSIBLE FOR PROVIDING WATER NECESSARY FOR DUST ABATEMENT, COMPACTION, ETC.
15. ANY WORK DONE WITHIN A PUBLIC RIGHT-OF-WAY SHALL BE COORDINATED WITH THE APPROPRIATE TRANSPORTATION AGENCY AND SHALL MEET THE REQUIREMENTS OF THAT AGENCY AND THE REQUIREMENTS OF ANY RIGHT-OF-WAY OR SPECIAL USE PERMITS.
16. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONS NECESSARY TO INSURE THAT NO STORM WATER/SEDIMENT AND/OR CONSTRUCTION DEBRIS ARE RELEASED FROM THE SITE. ANY RELEASES SHALL BE CLEANED AND MITIGATED AT THE CONTRACTOR'S EXPENSE.
17. CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACCESS AND RELATED TRAFFIC CONTROL WITH THE OWNER. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO THE OWNER.
18. CONTRACTOR SHALL PROVIDE A STORM WATER POLLUTION PREVENTION PLAN. IF REQUIRED BY LOCAL OR STATE AUTHORITIES.
19. WHERE CALLED OUT, A P-TRAP CONSISTS OF A VERTICAL REVERSE BEND IN A SUBFLOOR DRAIN THAT RETAINS WATER TO BLOCK TOXIC GASES IN DRAIN FROM RISING INTO THE ROOM.

1. EXCAVATION, BEDDING AND BACKFILL FOR BURIED PIPELINES SHALL CONFORM TO APWA AND OREM CITY STANDARDS. THE MOST STRINGENT STANDARD SHALL CONTROL.
2. ASPHALT CUTTING AND PATCHING SHALL CONFORM TO OREM CITY STANDARDS.
3. CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS FROM PUBLIC WORKS DEPARTMENT PRIOR TO DOING ANY WORK IN THE CITY RIGHT-OF-WAY. TRAFFIC PLAN, BONDING & INSURANCE WILL BE REQUIRED.
4. ANY PROPOSED CHANGES TO THE APPROVED DESIGN SHALL BE REVIEWED AND APPROVED BY ENGINEER OF RECORD AND THE CITY ENGINEER.
5. NOTIFY PUBLIC WORKS 48 HOURS PRIOR TO REQUIRED INSPECTION OF CONSTRUCTION PHASE ON ANY ROADWAYS OR PUBLIC IMPROVEMENTS. SPECIAL INSPECTIONS LISTED IN THIS PLAN & SPECIFICATIONS, SHALL BE RECORDED AS REQUIRED. PROOF OF COMPLIANCE SHALL PRESENTED TO CITY ENGINEER AND ENGINEER OF RECORD.
6. PROCTOR TEST OF ROAD BASE AND STRUCTURAL FILL MATERIAL IS REQUIRED AND SHALL BE PROVIDED TO THE PUBLIC WORKS INSPECTOR.
7. DUST, MUD AND EROSION SHALL BE ADEQUATELY CONTROLLED BY WHATEVER LEGAL MEANS NECESSARY, AND THE ROADWAY SHALL BE KEPT FREE OF MUD AND DEBRIS, AT ALL TIMES.
8. CONTRACTOR SHALL REPLACE ANY EXISTING PAVEMENT, SIDEWALK OR CURB & GUTTER ALONG THE FRONTAGE OF THIS PROJECT, THAT IS DAMAGED OR REMOVED BY CONTRACTOR, AS DIRECTED BY THE OREM CITY INSPECTOR.

1. CONTACT OREM CITY 7 DAYS BEFORE ANY WATER SHUTDOWNS.
2. THE CONTRACTOR SHALL PROVIDE ADDITIONAL TEMPORARY BLOW OFF VALVES & FITTINGS AS NEEDED TO FLUSH & DISINFECT NEW WATERLINES. THE CONTRACTOR SHALL PROVIDE A DISINFECTION PLAN TO OREM CITY FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. TEMPORARY BLOW OFF & FITTINGS SHALL BE REMOVED PRIOR TO PUTTING THE NEW LINE INTO SERVICE.
3. MINIMUM COVER OVER TOP OF PIPE SHALL BE 4- FEET, UNLESS A DEPTH INDICATED WITH A SPECIFIC SLOPE IS SHOWN OTHERWISE.
4. THE MINIMUM SLOPE OF THE WATER LINE SHALL BE 0.3%, UNLESS INDICATED OTHERWISE, WITH NO LOCAL HIGH POINTS EXCEPT AS INDICATED ON THE DRAWINGS.
5. DEFLECTIONS IN PIPE JOINTS SHALL NOT EXCEED 5 DEGREES FOR DIP JOINTS AND 1 DEGREE FOR PVC PIPE JOINTS, OR MANUFACTURER'S PUBLISHED DEFLECTION, WHICHEVER IS LESS.
6. USE JOINT RESTRAINTS AT ALL BENDS, FITTINGS AND VALVES, ETC. THRUST BLOCKS ARE ALSO REQUIRED FOR ALL BURIED FITTINGS.
7. ALL DUCTILE OR CAST IRON PIPE AND ALL COMPRESSION COUPLINGS, MECHANICAL JOINTS, FLANGED JOINTS, VALVES, HYDRANTS AND FITTINGS INCLUDING TEES, WYES, ELBOWS, PLUGS, ETC. EXPOSED TO SOIL SHALL BE WRAPPED WITH 8 MIL THICK POLYETHYLENE FILM TUBE. ALL FITTINGS, VALVES AND EXPOSED NUTS & BOLTS SHALL BE LIBERALLY COATED WITH FM GREASE PRIOR TO WRAPPING. THE FILM SHALL BE HELD IN PLACE BY 2-INCH WIDE PLASTIC BACKED ADHESIVE TAPE EQUAL TO POLYKEN NO. 900 OR SCOTCHRAP NO. 50. THE TAPE SHALL BE INSTALLED TO TIGHTLY SECURE THE FILM TO THE PIPE. ENOUGH FILM SHALL BE USED TO OVERLAP ADJOINING SECTIONS OF FILM A MINIMUM OF ONE (1) FOOT.
8. VALVES SHALL BE WRAPPED BY BRINGING THE WRAP ON THE ADJACENT PIPE OVER THE BELLS OR FLANGES OF THE VALVE AND SEALING WITH THE ADHESIVE TAPE. THE VALVE BODIES ARE THEN WRAPPED WITH A FLAT SHEET OF THE FILM PASSED UNDER THE VALVE BOTTOM AND BROUGHT UP AROUND THE BODY TO THE STEM AND FASTENED IN PLACE WITH THE ADHESIVE TAPE.
9. ALL FITTINGS THAT REQUIRE CONCRETE BLOCKING SHOULD BE COMPLETELY WRAPPED PRIOR TO THE POURING OF THE CONCRETE THRUST BLOCK.
10. POLYETHYLENE WRAP SHALL BE PROTECTED FROM THE SUN AND WEATHERING PRIOR TO USE. CARE SHALL BE EXERCISED DURING BACK FILLING OF THE PROTECTED AREAS TO PREVENT PUNCTURING OF THE FILM.
11. BURIED PVC PRESSURE WATER PIPE SHALL BE AWWA C-900 DR-18 PC (235 PSI RATED). DUCTILE IRON PIPE INSIDE, BELOW, AND WITHIN 10- FEET OF BUILDINGS SHALL BE CLASS '53. OTHER DUCTILE IRON PIPING SHALL BE CLASS 51.
12. WATER LINE SHALL HAVE A 10 FOOT SEPARATION FROM SEWERS. WATER LINE SHALL BE A MINIMUM OF 18 INCHES ABOVE SANITARY SEWER LINE AT ANY CROSSING. OPEN ENDS OF PIPE TO BE SEALED AT THE END OF DAY'S CONSTRUCTION.
13. DISCONNECT ALL EXISTING WATER SERVICES FROM THE EXISTING WATER LINE AND RECONNECT TO THE NEW WATER LINE.
14. ALL DRINKING WATER SYSTEM COMPONENTS SHALL COMPLY WITH NSF INTERNATIONAL STANDARD 61 ANNEX G, STANDARD 372 OR STANDARD 60.

STORM DRAIN NOTES

1. CONTRACTOR SHALL FIELD VERIFY REQUIRED MANHOLE AND CATCH BASIN DEPTHS AND ELEVATIONS BEFORE CONSTRUCTION.
2. EXISTING STORM DRAIN SHALL REMAIN IN SERVICE DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE, OPERATE AND MAINTAIN ANY TEMPORARY PUMPS, PIPING OR RELATED EQUIPMENT REQUIRED TO BYPASS STORM DRAIN FLOWS AROUND AREAS OF CONSTRUCTION. A PLAN OF CONSTRUCTION OPERATIONS SHALL BE PREPARED BY CONTRACTOR, SUBMITTED TO ENGINEER, AND APPROVED BY ENGINEER PRIOR TO THE START OF CONSTRUCTION.
3. COORDINATES AND ELEVATIONS ARE GIVEN AT THE CENTER OF MANHOLES.

SURVEY CONTROL DATA

BASE POINT 1 (BP-1): UTAH COUNTY MONUMENT IN 400 S AND 400 W.

BASE POINT 2 (BP-2): CENTER OF OREM WELL #10 CASING.

NAD 83 STATE PLANE COORDINATES		DRAWING COORDINATES	
BP 1:	N: 7,274,392.29 US SURVEY FEET E: 1,583,097.72 US SURVEY FEET	N: 22,899.94 E: 108,475.73	
BP 2:	N: 7,274,281.64 US SURVEY FEET E: 1,583,097.87 US SURVEY FEET	N: 22,789.22 E: 108,366.33	

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\G-3 GENERAL NOTES.DWG  
FILE DATE: 11/27/2024 09:31:02 (BKG)



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
NONE

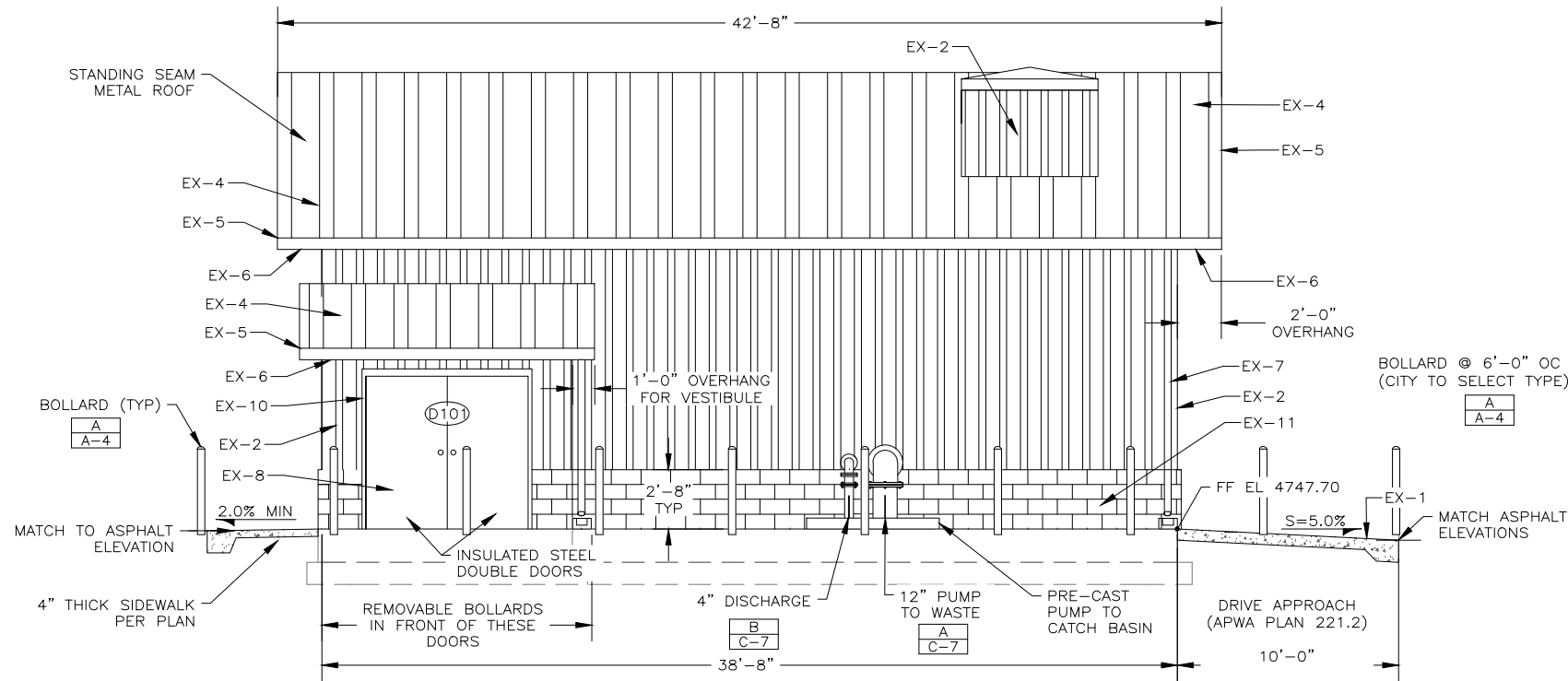


WELL HOUSE #10  
GENERAL  
GENERAL NOTES

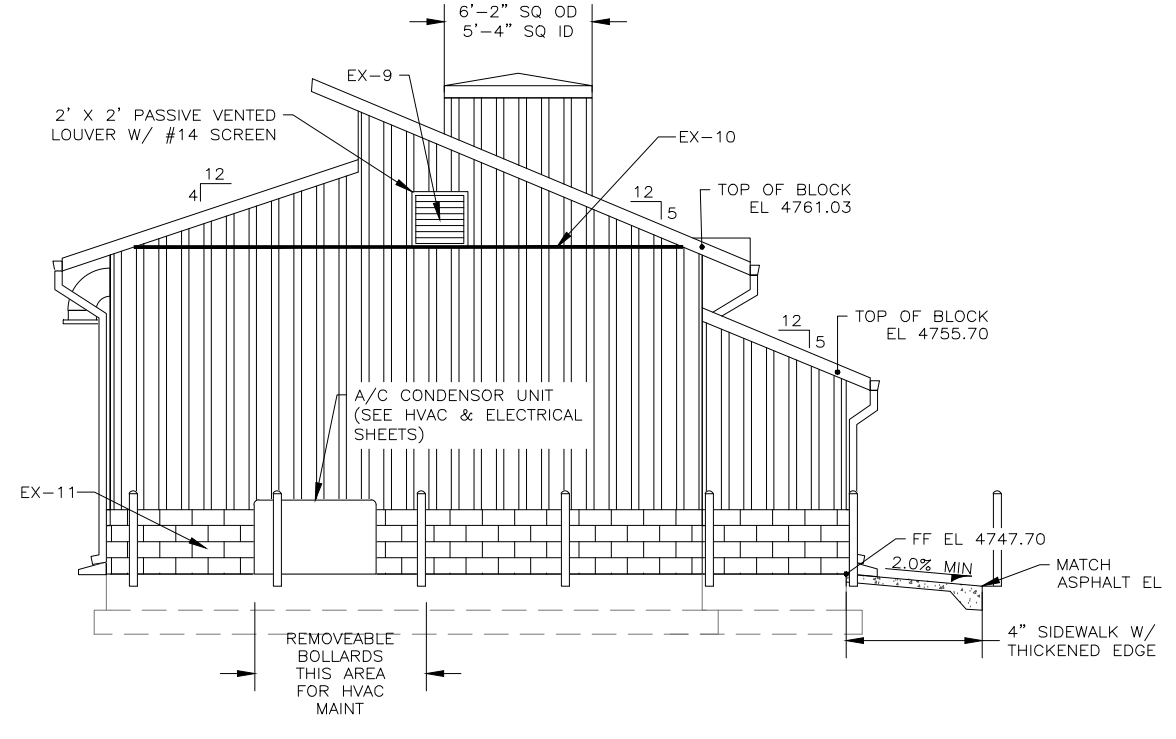
SHEET  
G-3  
119.08.100



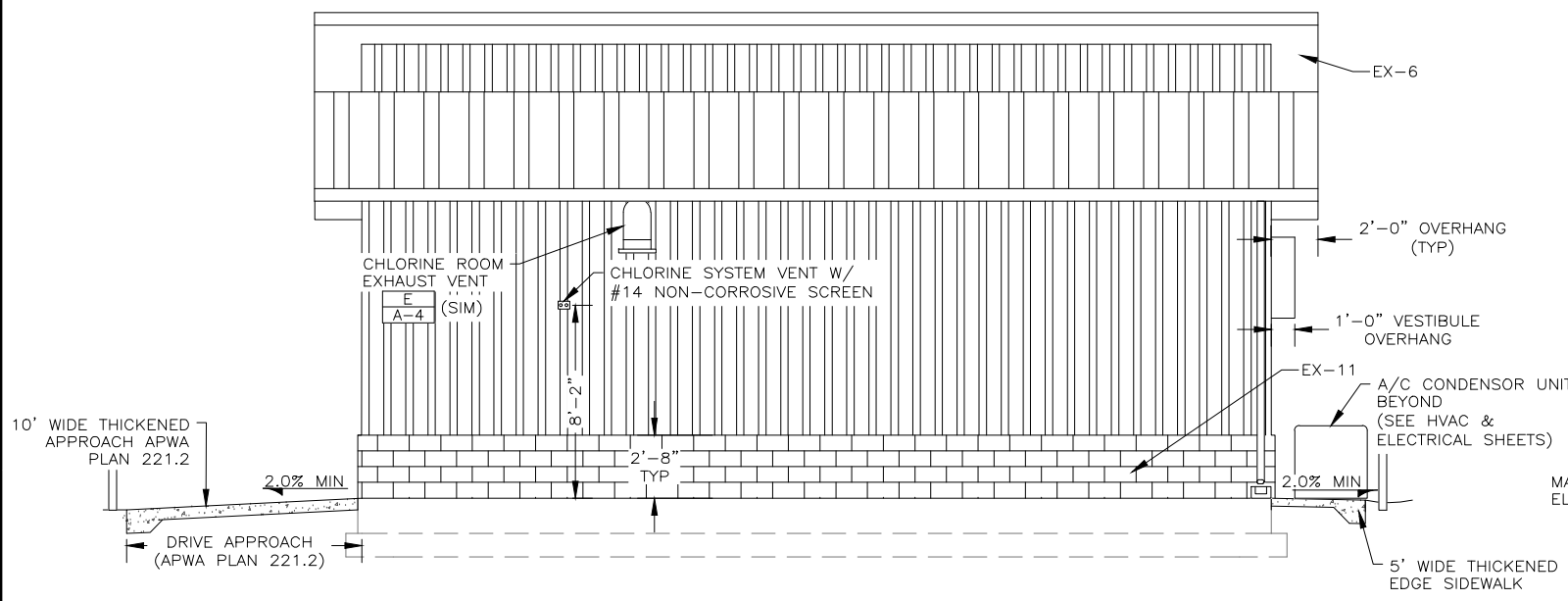
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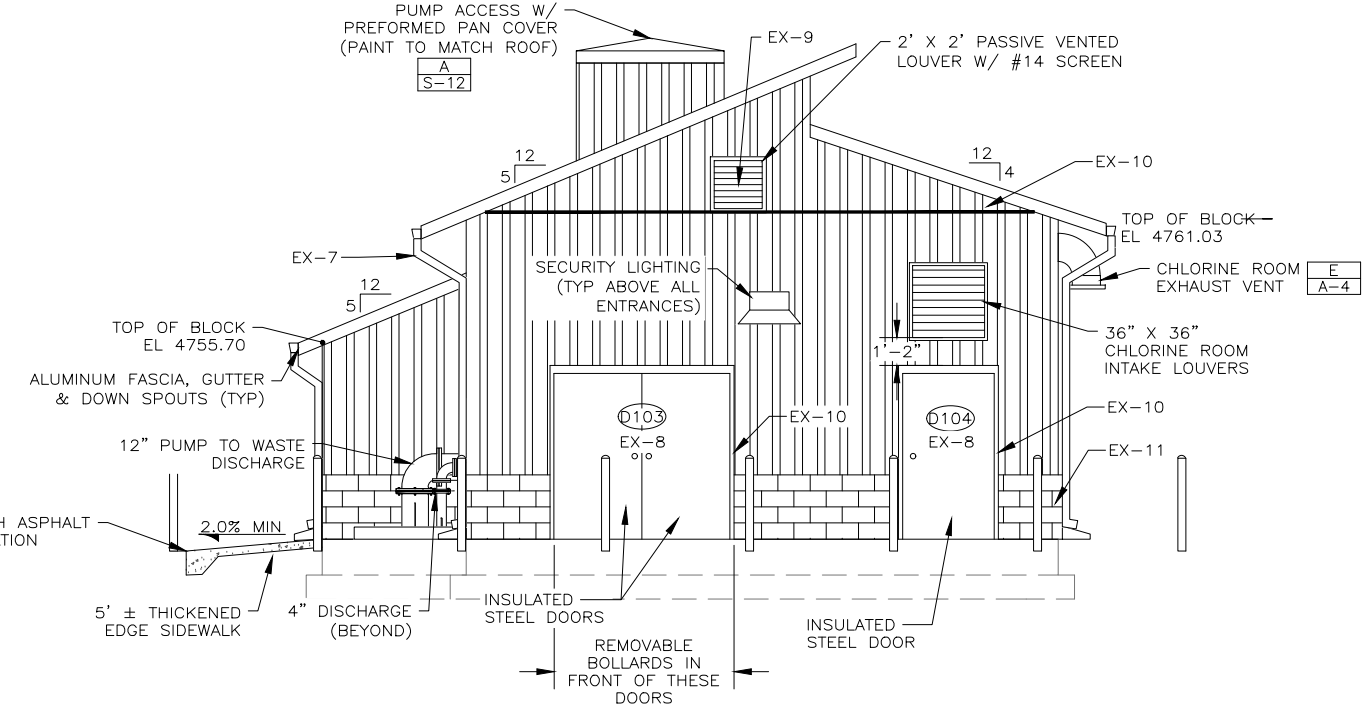
NORTH ELEVATION 1  
 C-2  
 SCALE IN FEET



EAST ELEVATION 2  
 C-2  
 SCALE IN FEET



SOUTH ELEVATION 3  
 C-2  
 SCALE IN FEET



WEST ELEVATION 4  
 C-2  
 SCALE IN FEET

GENERAL SHEET NOTE:  
 CLIENT TO CHOOSE EXTERIOR FINISH TYPE AND COLORS.



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
 AS  
 SHOWN



WELL HOUSE #10  
 ARCHITECTURAL  
 ELEVATIONS

SHEET  
 A-1  
 119.08.100

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\A-2 ARCHIT. SCHED.DWG  
 FILE DATE: 11.16.2024 09:38:50 (BKC)

7/04

### INTERIOR PAINTING SCHEDULE

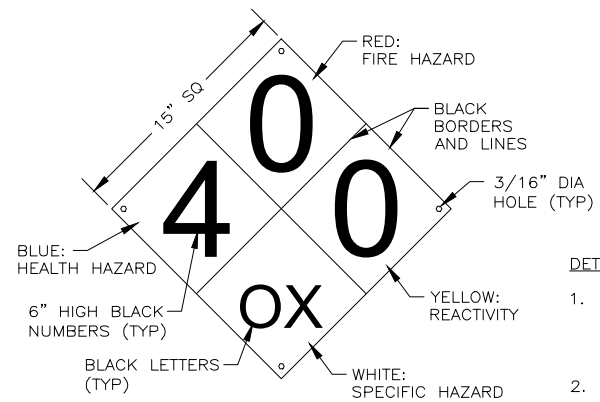
LOCATION	MATERIAL	COLOR	REMARKS
FLOOR (ALL)	CONCRETE	GALVANO GRAY (SW4027)	SYSTEM #9: CLEAN & PREPARE FLOOR, SIKAFLEX CONCRETE FLOOR EDGE, COAT FLOOR AND CONCRETE FOUNDATION WALL ADD NON-SLIP AGGREGATE TO FLOOR
WALLS (ALL)	MASONRY	WHITE	WATER RETARDANT (SYSTEM #13)
CEILING (ALL)	GYPSUM	WHITE (TNEMEC 00WH)	PAINT DECKING AND TRIM (SYSTEM #11)
PIPING	METAL	BLUE (TNEMEC 32GR)	SYSTEM #8: EXPOSED PIPE FITTINGS TO BE PAINTED (SEE NOTE 2)

### EXTERIOR COLOR SCHEDULE

MARK	MATERIAL	MANUFACTURER	FINISH	COLOR	REMARKS
EX-1	CONCRETE	CONTRACTOR	STONE RUB	NATURAL	
EX-2	CMU WALLS W/ CLADDING	SUNROC CMU CHAMCLAD CLADDING	SMOOTH FACE CMU CLADDING PATTERN TBD	CMU: NATURAL CLADDING: CINNAMON WALNUT	8"W X 8"H X 16"L CMU CLADDING PER MFG
EX-3	MORTAR	SPEC-MIX	SMOOTH	-	CONCAVE JOINTS
EX-4	METAL ROOF	ELEVATE	GALVALUME	-	2" STANDING SEAM
EX-5	FASCIA	ELEVATE	GALVALUME	-	
EX-6	SOFFIT	ELEVATE	GALVALUME	-	NON-VENTED
EX-7	GUTTER & DOWNSPOUT	ELEVATE	GALVALUME	-	4" DEEP 4" WIDE DOWNSPOUT 6" X 6" GUTTER
EX-8	DOORS	TBD	GAVANEALLED	-	SYSTEM #6 FACTORY PRIMED ONLY
EX-9	LOUVER	GREENHECK	SMOOTH	PER OWNER	FACTORY FINISH
EX-10	TRIM	PLYGEM	SMOOTH	SW3063 CHARCOAL	
EX-11	CMU WALLS	TBD	SPLIT FACE	PER OWNER	10"W X 8"H X 16"L CMU

### HAZARD TYPES AND LEVELS

NO.	BLUE: HEALTH HAZARD	RED: HAZARD	YELLOW: REACTIVITY
0	NORMAL MATERIAL	WILL NOT BURN	STABLE
1	SLIGHTLY HAZARDOUS	ABOVE 200° F	UNSTABLE IF HEATED
2	HAZARDOUS	ABOVE 100° F NOT EXCEEDING 200° F	VIOLENT CHEMICAL CHANGE
3	EXTREME DANGER	BELOW 100° F	SHOCK AND HEAT MAY DETONATE
4	DEADLY	BELOW 73° F	MAY DETONATE



SPECIFIC HAZARD:	
ACID:	ACID
ALKALI:	ALK
CORROSIVE:	COR
OXIDIZER:	OX
RADIOACTIVE:	
USE NO WATER:	W

#### DETAIL NOTES:

- DIAMOND HAZARD MATERIALS SIGN SHALL CORRECTLY IDENTIFY THE HAZARDOUS MATERIALS CONTAINED WITHIN THE CHEMICAL STORAGE ROOMS IN ACCORDANCE WITH NFPA 704.
- DIAMOND SIGN SHALL BE SURFACE MOUNTED ADJACENT TO OR ON ALL CHEMICAL ROOM ENTRY DOORS.
- SIGN MATERIAL: 0.118" THICK OUTER ALUMINUM WITH A SOLID THERMOPLASTIC DURA-ALUMALITE AS MANUFACTURED BY NORTHERN SAFETY AND INDUSTRIAL, OR APPROVED EQUAL.

### NFPA MATERIAL HAZARD IDENTIFICATION SIGN

#### GENERAL SHEET NOTES:

- OWNER TO SELECT ARCHITECTURAL COLORS. PROVIDE SAMPLE TO OWNER FOR FINAL COLOR SELECTION.
- DO NOT PAINT FACTORY COATED VALVES, FLOW METER, OR FITTINGS, UNLESS DELIVERED WITH PRIMER COATING ONLY.
- SEE TECHNICAL SPECIFICATION SECTION 09 90 00 FOR PAINTING AND FINISHES.



DESIGNED	JKN	3			
DRAFTED	BKC	2			
CHECKED	BDM	1			
DATE	NOVEMBER 2024	NO.	DATE	REVISIONS	BY

SCALE



WELL HOUSE #10  
 ARCHITECTURAL  
 SCHEDULES & DETAILS

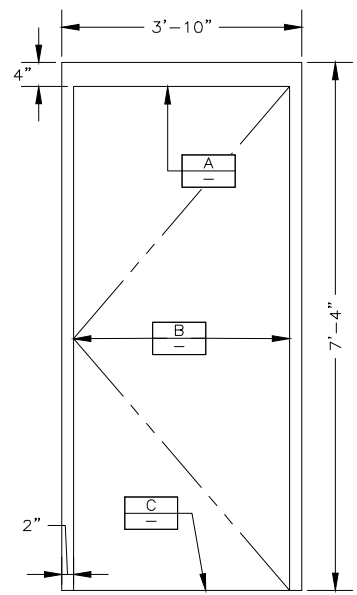
SHEET  
 A-2

119.08.100

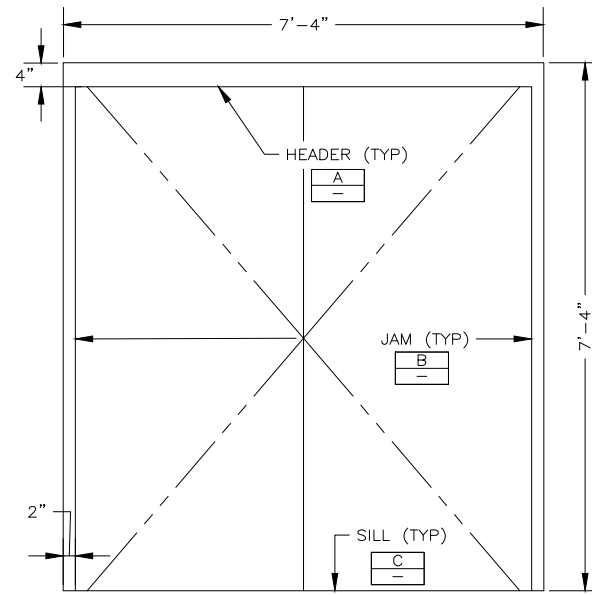
FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\A-3 DOORS SCHEDULE & DETAILS.DWG  
 FILE DATE: 11.12.2024 13:28:08 (BKC)

### DOOR & WINDOW SCHEDULE

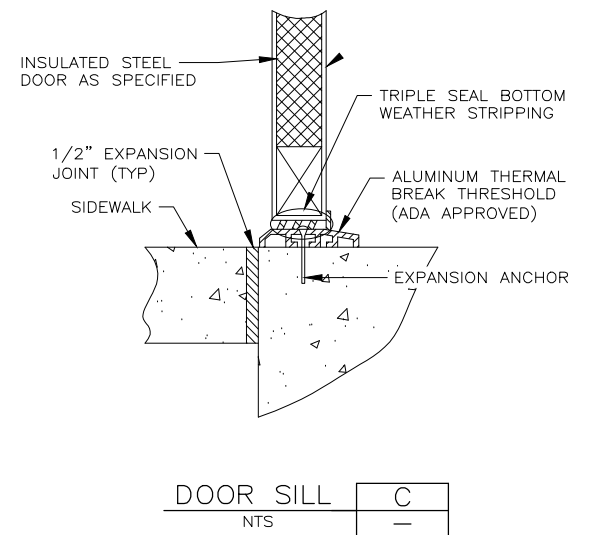
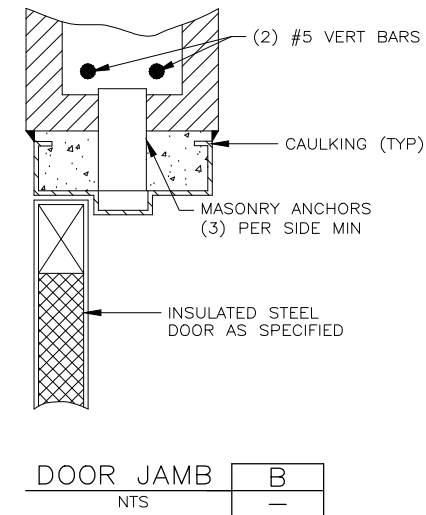
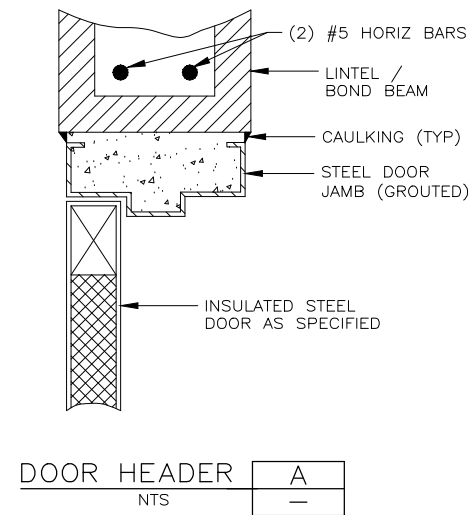
TAG NO.	DOOR						FRAME					DETAILS			HARDWARE	REMARKS
	WIDTH	HEIGHT	THICK	TYPE	MATERIAL	FINISH	WIDTH	HEIGHT	THICK	FRAME MAT.	FRAME FINISH	HEAD	JAMB	THRESHOLD		
D101	3'-6"	7'-0"	1 3/4"	B	HM	NOTES 4 & 5	7'-4"	7'-4"	7 3/4"	HM (GROUTED)	NOTES 4 & 5	A	B	C	200	EXTERIOR DOOR
D102	3'-6"	7'-0"	1 3/4"	B	HM	NOTES 4 & 5	7'-4"	7'-4"	7 3/4"	HM (GROUTED)	NOTES 4 & 5	A	B	C	200	INTERIOR DOOR
D103	3'-6"	7'-0"	1 3/4"	B	HM	NOTES 4 & 5	7'-4"	7'-4"	7 3/4"	HM (GROUTED)	NOTES 4 & 5	A	B	C	400	ACOUSTIC EXTERIOR DOOR
D104	3'-6"	7'-0"	1 3/4"	A	HM	NOTES 4 & 5	3'-10"	7'-4"	7 3/4"	HM (GROUTED)	NOTES 4 & 5	A	B	C	100	EXTERIOR DOOR
W-1	-	-	3/8"	W1	-	PER MFR	2'-0"	2'-0"	7 3/4"	HM (GROUTED)	NOTES 4 & 5	A (SIM)	B (SIM)	-	-	POLYCARBONATE GLAZING WINDOW FRAME PER MFG



TYPE **(A)** FLUSH DOOR



TYPE **(B)** DBL FLUSH DOOR



**GENERAL SHEET NOTES:**

1. SEE TECHNICAL SPECIFICATION SECTION 08 10 00 FOR HARDWARE & SECURITY REQUIREMENTS.
2. SEE TECHNICAL SPECIFICATION SECTION 08 21 00 FOR DOORS AND FRAMES.
3. SEE TECHNICAL SPECIFICATION SECTION 09 90 00 FOR PAINTING AND FINISHES.
4. OWNER TO SELECT ARCHITECTURAL COLORS. PROVIDE SAMPLE TO OWNER FOR FINAL COLOR SELECTION.
5. DO NOT PAINT FACTORY COATED VALVES, METERS, FITTINGS, DOORS & FRAMES UNLESS DELIVERED WITH PRIMER COATING ONLY.
6. ALL HOLLOW METAL DOORS AND FRAMES SHALL BE HOT-DIPPED GALVANIZED.



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
NONE



WELL HOUSE #10  
ARCHITECTURAL  
DOOR SCHEDULE & DETAILS

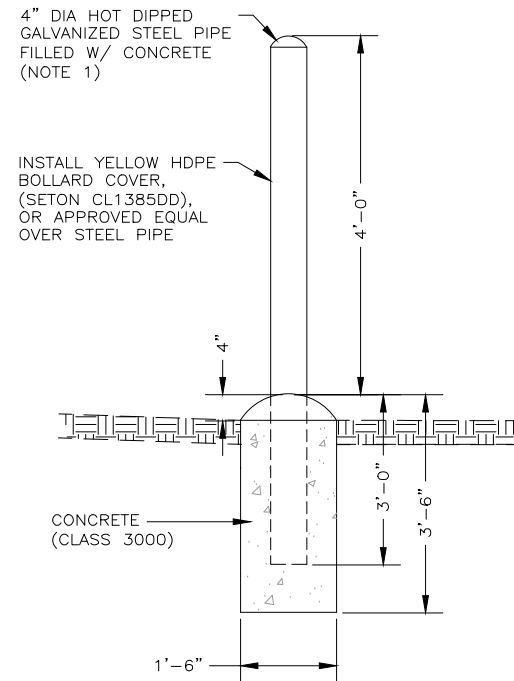
SHEET  
A-3

119.08.100

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\A-4 DETAILS.DWG  
 FILE DATE: 11.16.2024 09:40:32 (BKC)

**NOTE:**

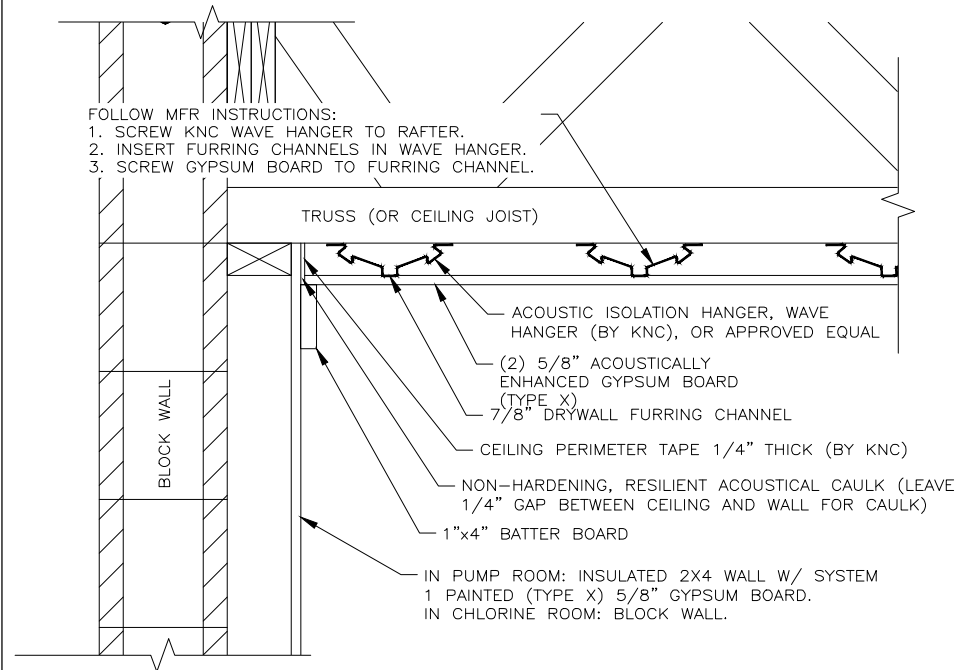
1. REMOVABLE BOLLARDS WHERE IDENTIFIED ON THE PLANS SHALL BE SETON STYLE NO. L8660H03, OR APPROVED EQUAL.



TYPICAL BOLLARD DETAIL  
 NTS

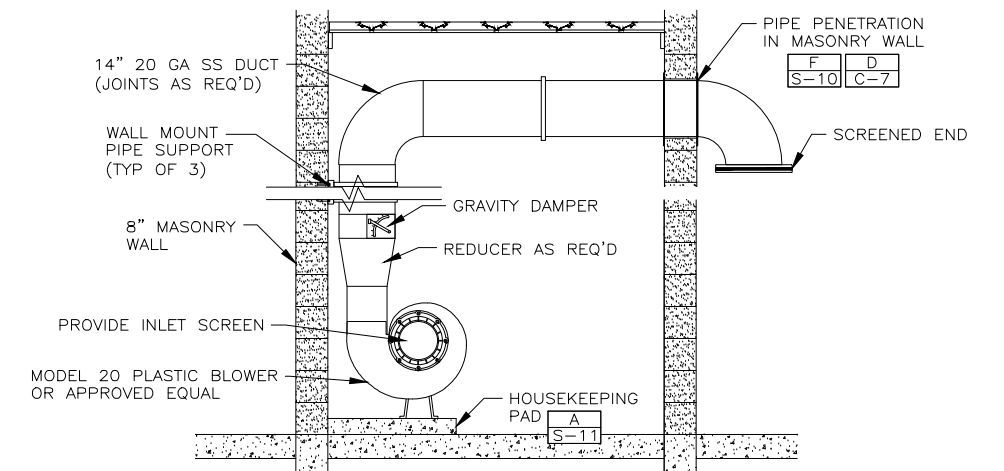
A	A
A-1	C-1

FOLLOW MFR INSTRUCTIONS:  
 1. SCREW KNC WAVE HANGER TO RAFTER.  
 2. INSERT FURRING CHANNELS IN WAVE HANGER.  
 3. SCREW GYPSUM BOARD TO FURRING CHANNEL.



TYPICAL ACOUSTIC CEILING  
 NTS

B
C-3



**DETAIL NOTE:**

EXHAUST AND INLET VENT SHALL BE MADE FROM STAINLESS STEEL DUCT. TAPE AND MASTIC REQUIRED ON ALL JOINTS AND PENETRATIONS EXCEPT DUCT TO FAN. DUCT TO FAN SHALL USE STAINLESS STEEL ADJUSTABLE BAND.

CHLORINE ROOM EXHAUST FAN  
 NTS

E	E	E
A-1	C-2	CF-2



DESIGNED JKN 3  
 DRAFTED BKC 2  
 CHECKED BDM 1  
 DATE NOVEMBER 2024 NO. DATE

NO.	DATE	REVISIONS	BY	APVD.

SCALE AS SHOWN



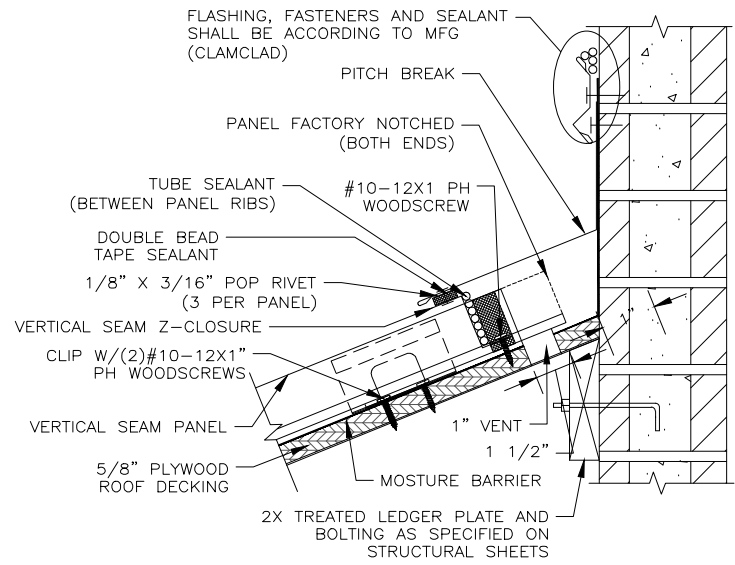
WELL HOUSE #10  
 ARCHITECTURAL  
 DETAILS

SHEET  
 A-4

119.08.100



FILE NAME: PROJECTS\119\_ OREM\08.100 - WELL #10 WELL HOUSE\CAD\A-5 ROOFING DETAILS.DWG  
 FILE DATE: 11.6.2024 09:41:31 (BKC)



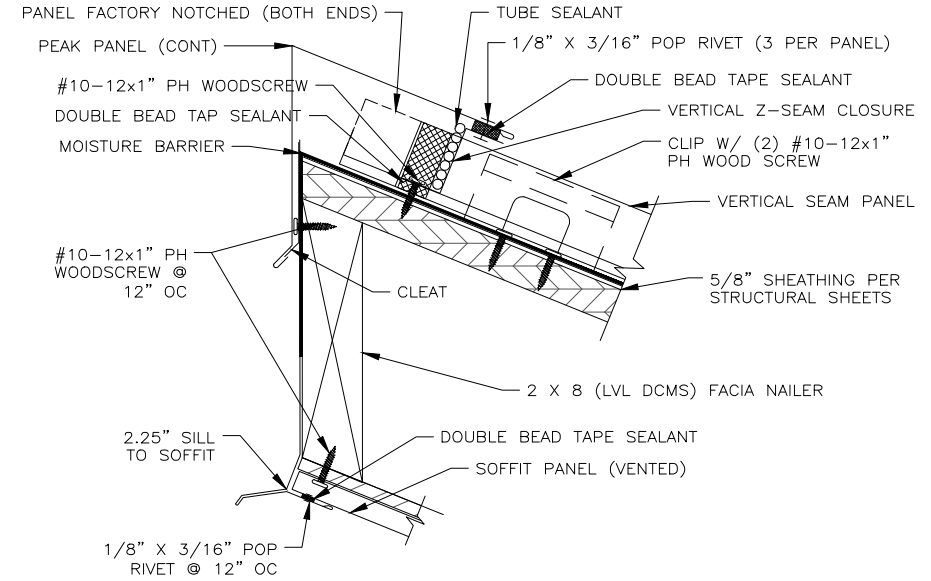
**DETAIL NOTES:**

1. INSTALLATION OF ROOFING AND ROOFING COMPONENTS SHALL BE ACCORDING TO MFG (CLAMCLAD) RECOMMENDATIONS.
2. THIS DETAIL APPLIES TO CMU AND WOOD TRUSS CONNECTIONS.

ENDWALL W/  
COUNTER DETAIL

A	S-6
---	-----

NTS



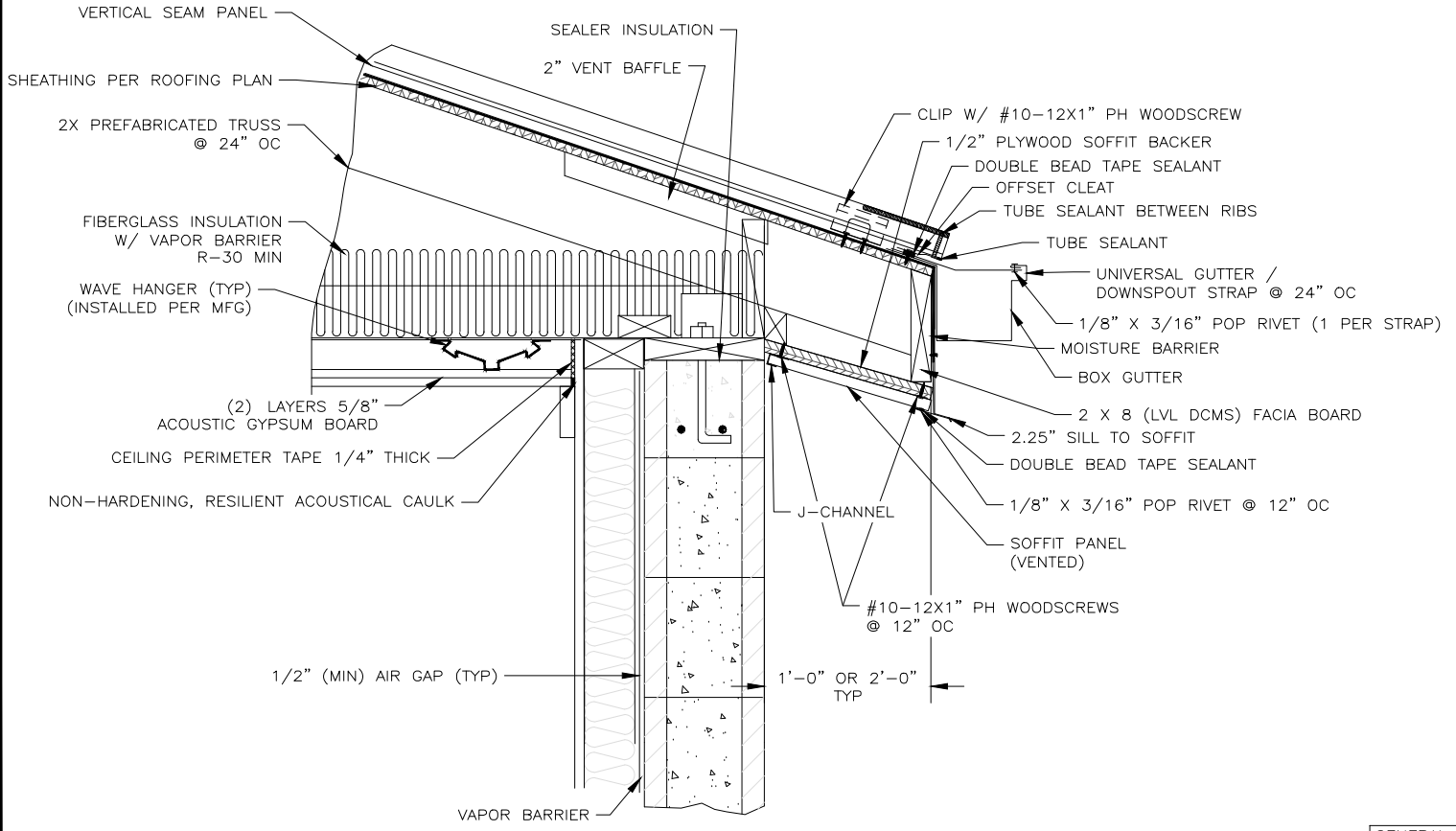
**DETAIL NOTE:**

INSTALLATION OF ROOFING AND ROOFING COMPONENTS SHALL BE ACCORDING TO MFG (CLAMCLAD) RECOMMENDATIONS.

HIGH EAVE

C	C
S-6	S-7

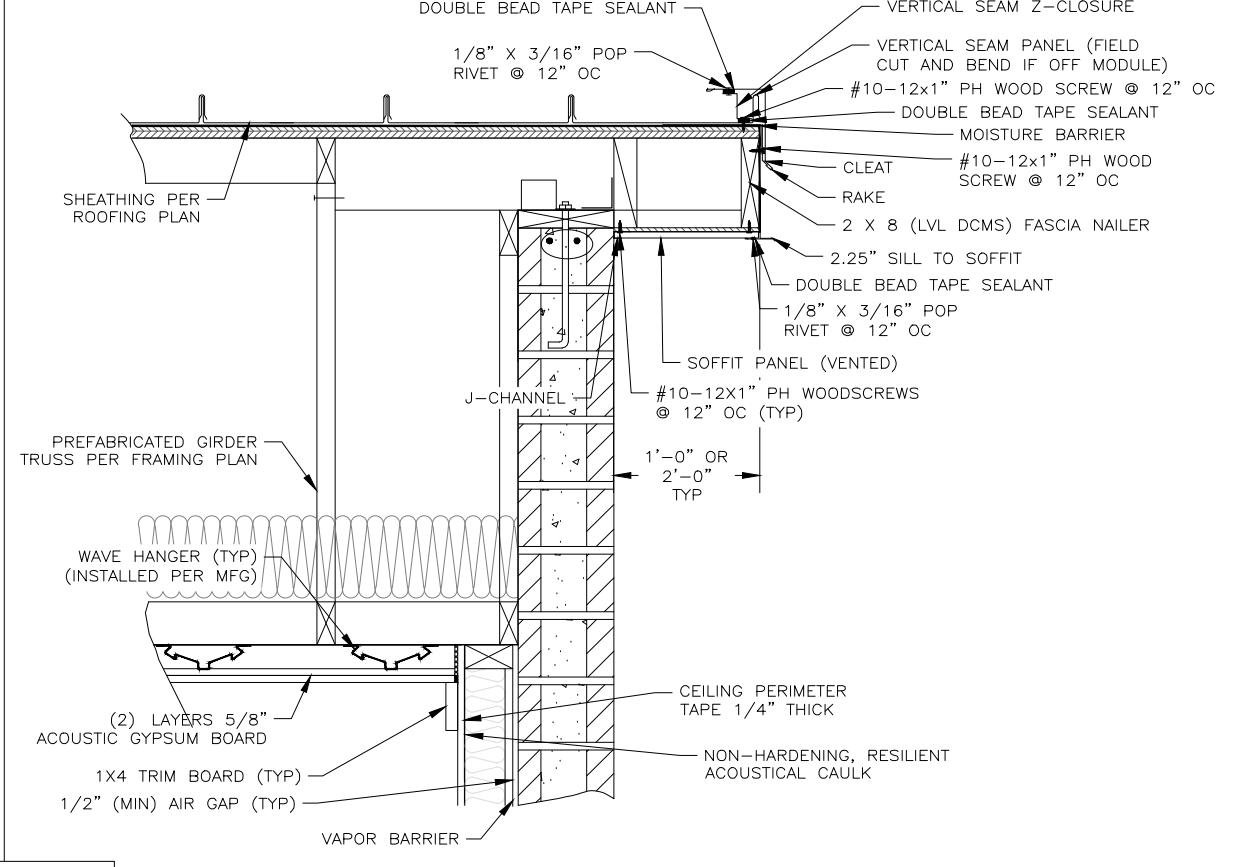
NTS



LOW EAVE DETAIL

B	B
S-6	S-8

NTS



GABLE DETAIL

D	D
S-6	S-8

NTS

**GENERAL SHEET NOTE:**  
 PAINT ALL HARDWARE TO MATCH SCHEDULE.



DESIGNED	JKN	3
DRAFTED	MAJ	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	

NO.	DATE	REVISIONS	BY	APVD.

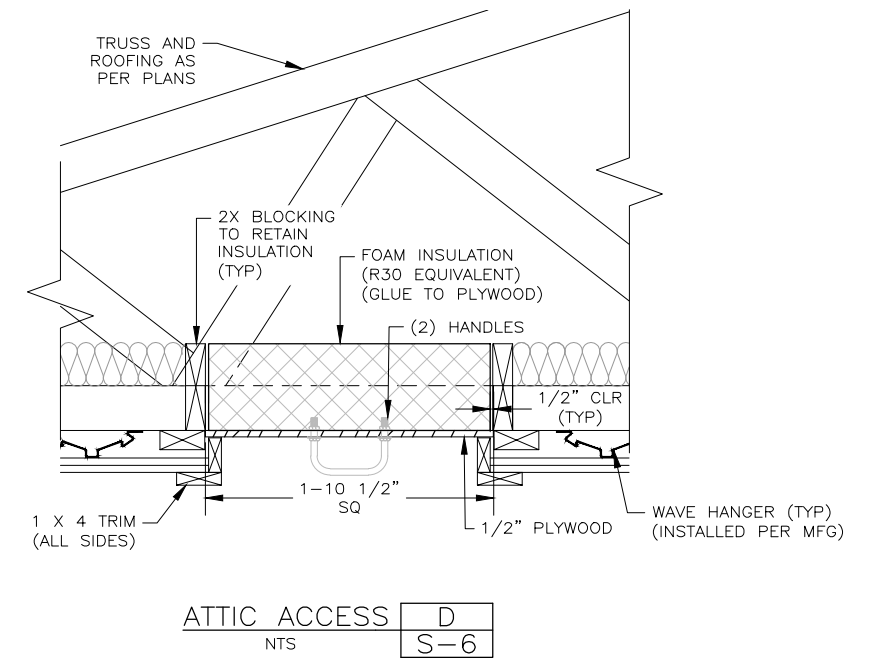
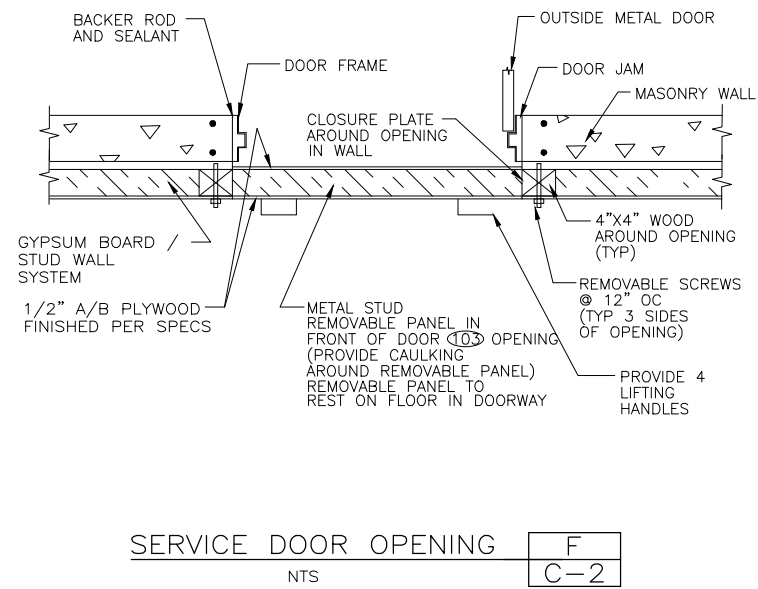
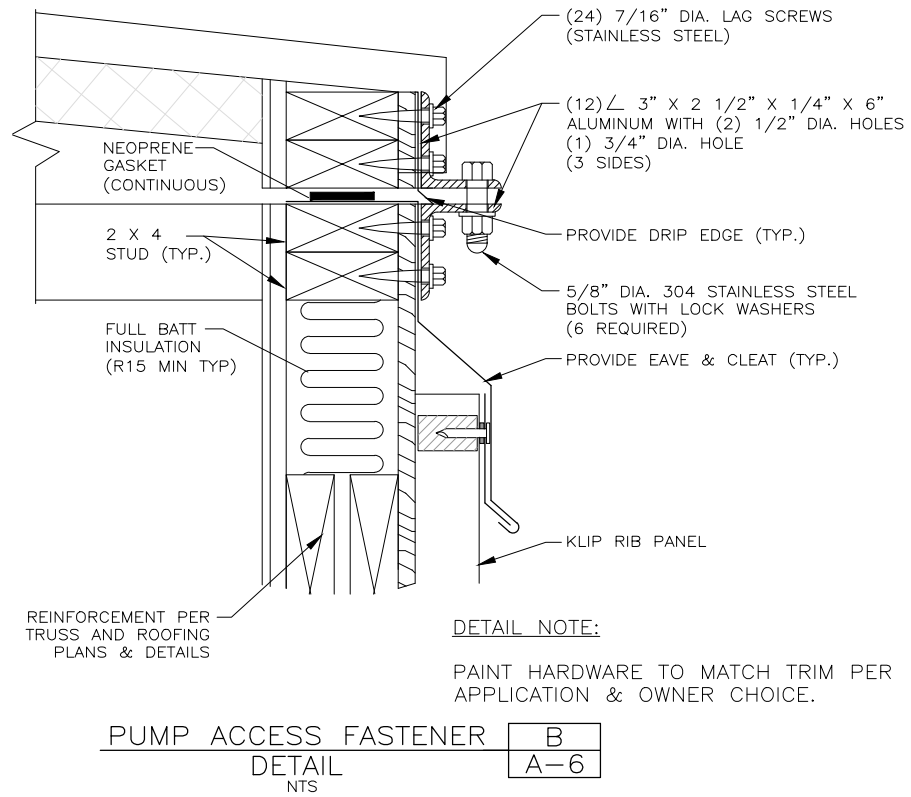
SCALE  
AS  
SHOWN



WELL HOUSE #10  
ARCHITECTURAL  
ROOFING DETAILS

SHEET  
A-5  
119.08.100

FILE NAME: PROJECTS\19\_ OREM\08.100 - WELL #10 WELL HOUSE\CAD\A-6 ACCESS DETAILS.DWG  
 FILE DATE: 11.6.2024 09:42:04 (BKC)



DESIGNED JKN 3  
 DRAFTED BKC 2  
 CHECKED BDM 1  
 DATE NOVEMBER 2024 NO. DATE

NO.	DATE	REVISIONS	BY	APVD.

SCALE AS SHOWN

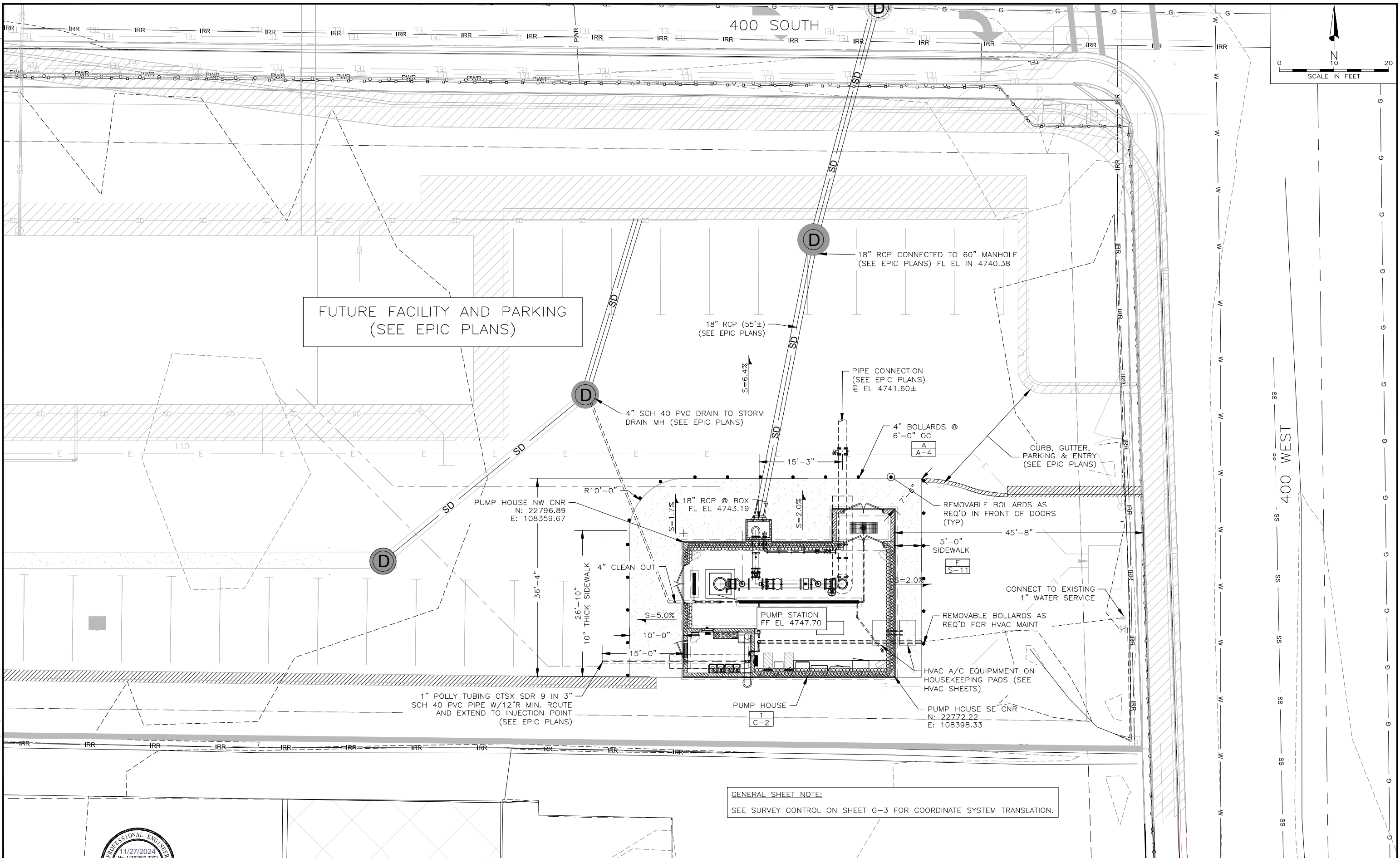


WELL HOUSE #10  
 STRUCTURAL  
 ACCESS SECTION & DETAILS

SHEET A-6

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\C-1 SITE PLAN.DWG  
 FILE DATE: 11/27/2024 12:34:43 (BKG)

7/04



FUTURE FACILITY AND PARKING  
(SEE EPIC PLANS)

GENERAL SHEET NOTE:  
SEE SURVEY CONTROL ON SHEET G-3 FOR COORDINATE SYSTEM TRANSLATION.



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
AS  
SHOWN

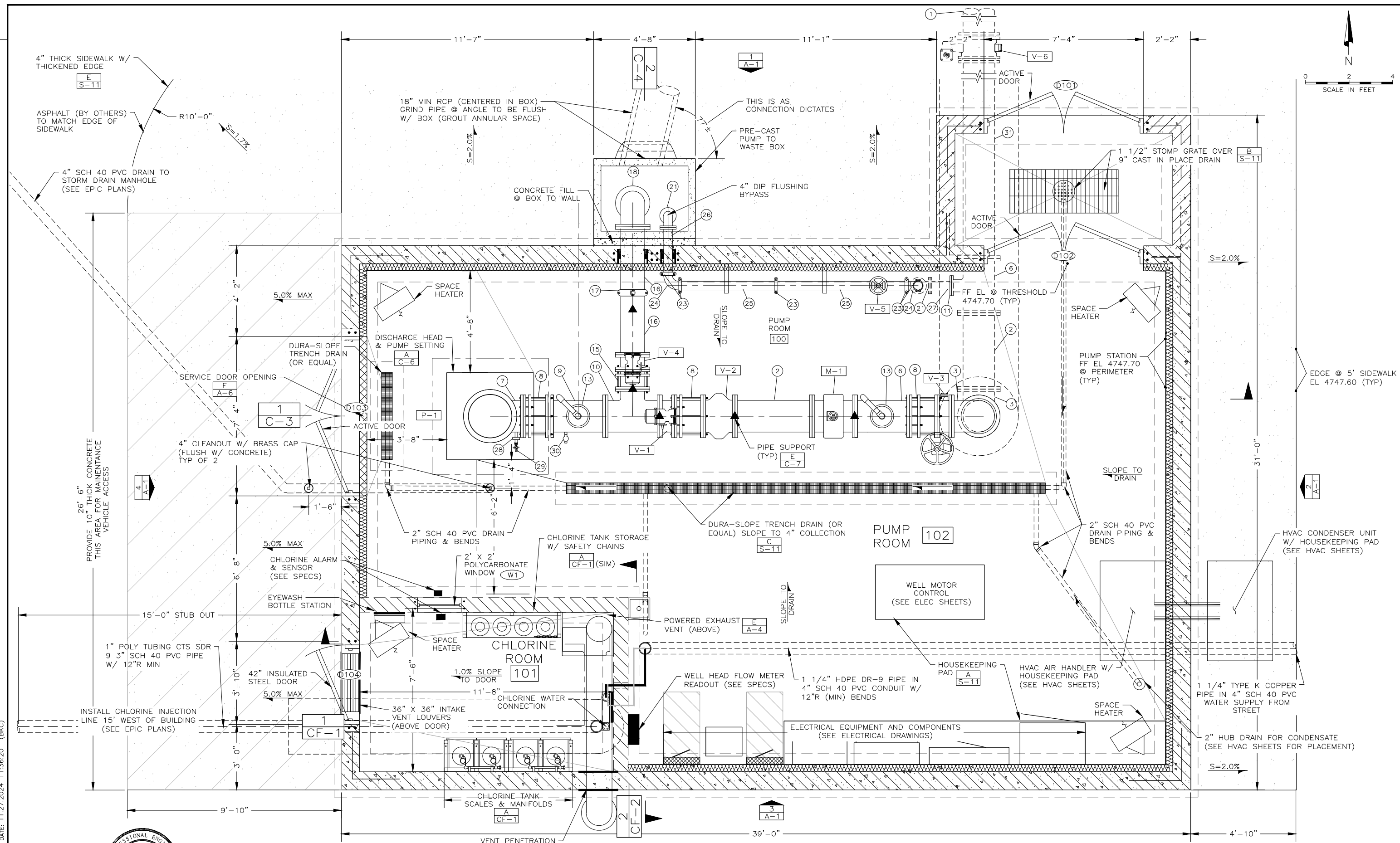


WELL HOUSE #10  
CIVIL  
SITE PLAN

SHEET  
C-1  
119.08.100

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\C-2 FLOOR PLAN.DWG  
 FILE DATE: 11-27-2024 11:36:20 (BKC)

7/04



GENERAL SHEET NOTE: VALVE & FITTING SCHEDULE FOUND ON SHEET C-5



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
AS SHOWN

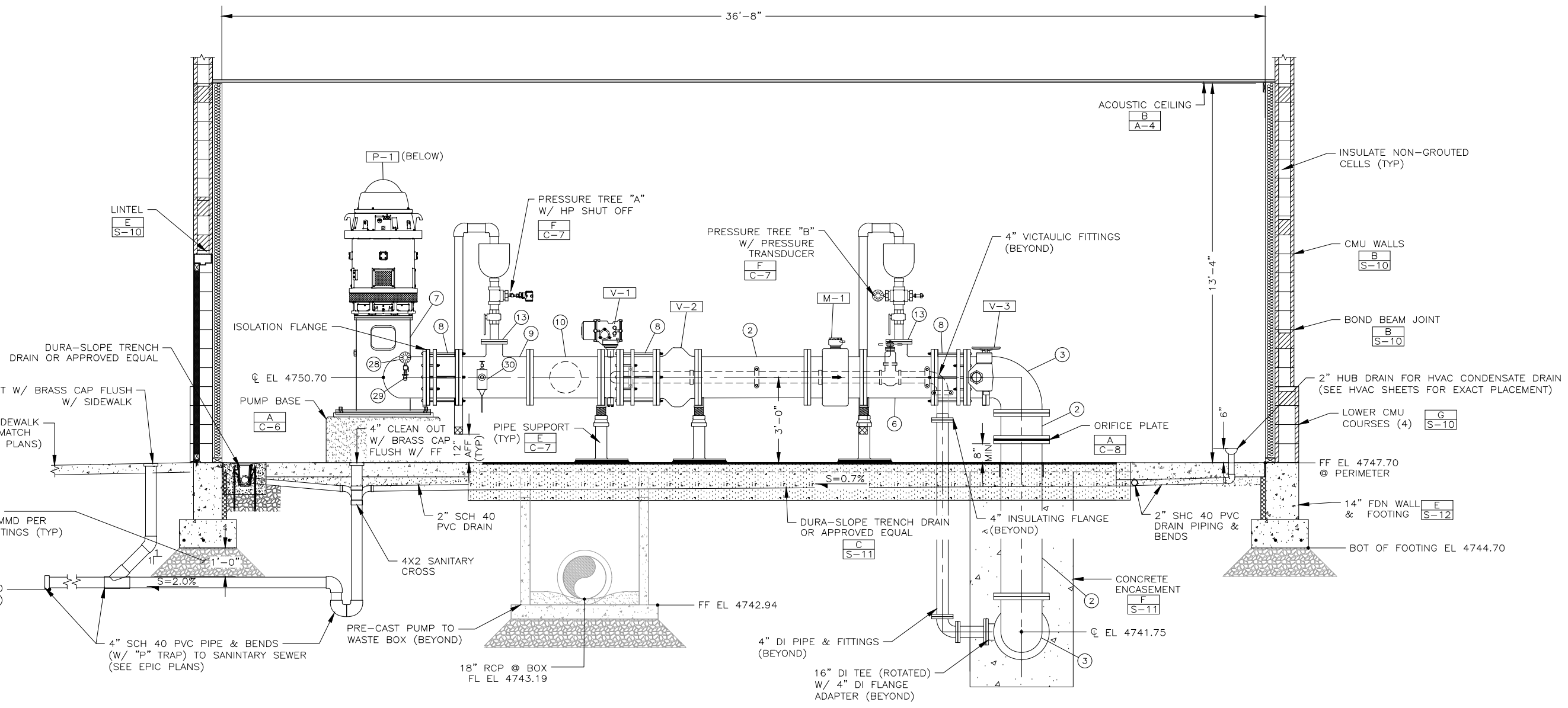


WELL HOUSE #10  
CIVIL  
FLOOR PLAN

SHEET  
C-2  
119.08.100

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\C-3 SECTIONS 1.DWG  
 FILE DATE: 11-29-2024 09:15:34 (BKC)

7/04



- GENERAL SHEET NOTES:
1. FITTING SCHEDULE FOUND ON SHEET C-5.
  2. A TORQUE WRENCH SHALL BE USED FOR ALL PIPE CONNECTIONS. (110 FT-LB) TORQUE SPECIFICATIONS SHALL BE VERIFIED BY CONTRACTOR WITH THE FLANGE KIT PROVIDER.



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

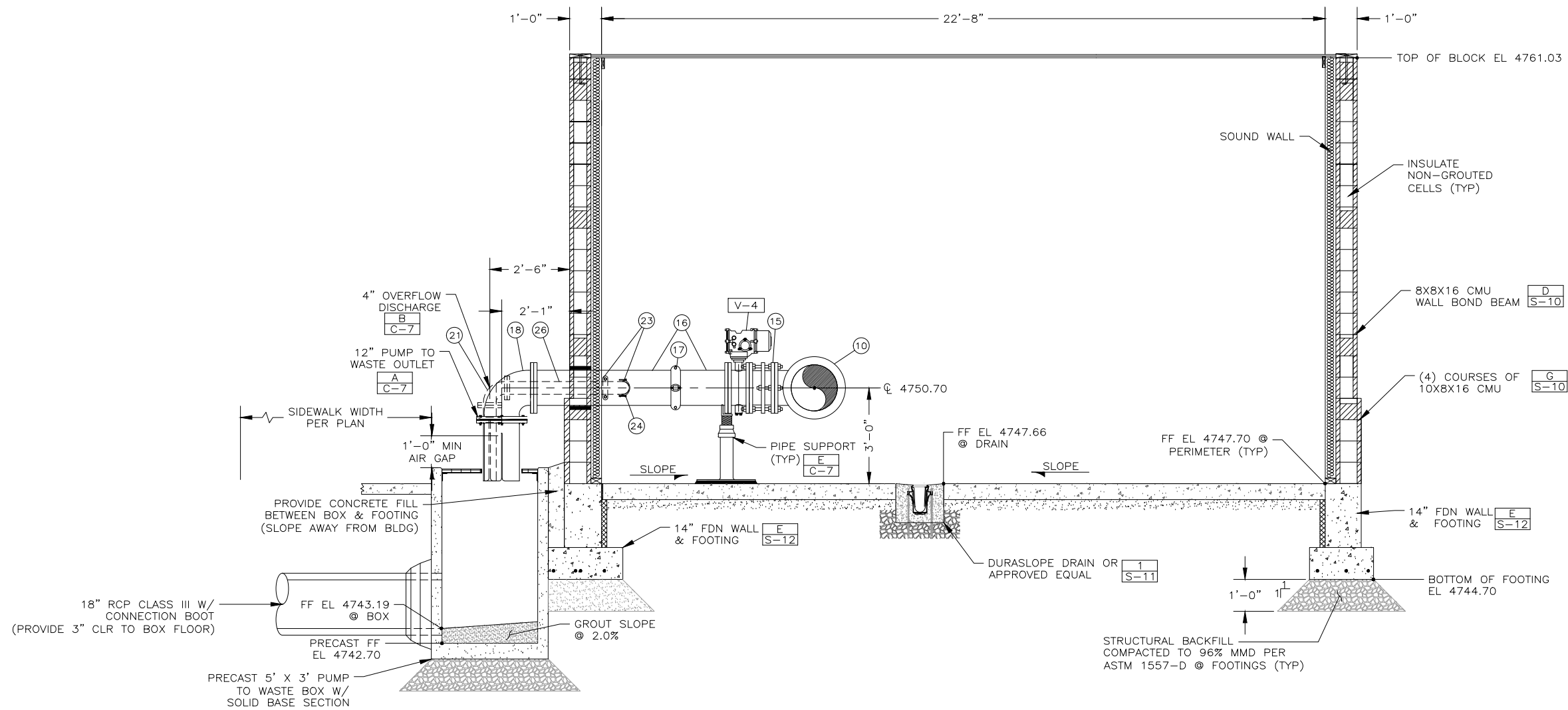
SCALE AS SHOWN



WELL HOUSE #10  
 CIVIL  
 SECTIONS I

SHEET C-3  
 119.08.100

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\C-4 SECTIONS I.DWG  
 FILE DATE: 11.11.2024 13:55:50 (BKC)



SECTION 2  
 0 2 4  
 SCALE IN FEET  
 C-2

DETAIL NOTE:  
 FITTING SCHEDULE FOUND ON SHEET C-5.



DESIGNED	JKN	3
DRAFTED	BKC	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
 AS  
 SHOWN



WELL HOUSE #10  
 CIVIL  
 SECTIONS II

SHEET  
 C-4  
 119.08.100

FITTING SCHEDULE			
NO.	DESCRIPTION	SIZE	JOINT
1	DIP, CLASS 53	16"	MJ X PE
2	DI, SPOOL, CLASS 53, LENGTH AS REQ'D	16"	FLG
3	DI, BEND, 90°	16"	FLG
4	DIP, CLASS 53	16"	FLG
5	NOT USED	-	-
6	DI, REDUCING TEE	16" X 6"	FLG
7	STEEL FABRICATED PUMP DISCHARGE HEAD, W/ 1/2" TAPPING BOSS	16"	FLG
8	DISMANTLING JOINT W/ SS TIE RODS (DJ 400)	16"	FLG
9	DI, REDUCING TEE, W/ 2" TAPPING BOSS	16" X 6"	FLG
10	DI, REDUCING TEE	16" X 12"	FLG
11	DI, THREADED REDUCING FLANGE	6" X 4"	FLG
12	DI, SPOOL, CLASS 53 (LENGTH AS REQ'D)	16"	FLG
13	DI, THREADED REDUCING FLANGE	6" X 3"	FLG
14	NOT USED	-	-
15	DISMANTLING JOINT W/ SS TIE RODS (DJ 400)	12"	FLG
16	DI, SPOOL, CLASS 53	12"	FLG X GE
17	VICTAULIC COUPLING, STYLE 31	12"	GE
18	DI, BEND, 90°	12"	FLG
19	NOT USED	-	-
20	DI, NIPPLE, CLASS 53	4"	THD X GE
21	DI, BEND, 90°	4"	FLG
22	DI, SPOOL, CLASS 53	4"	FLG X GE
23	VICTAULIC COUPLING, STYLE 31	4"	GE
24	DI, BEND, 90°	4"	GE
25	DI, NIPPLE, CLASS 53	4"	GE
26	DI, SPOOL, CLASS 53	4"	FLG X GE
27	DI, SPOOL, CLASS 53	4"	FLG X THD
28	PRESSURE GAUGE	1/2"	THD
29	SAMPLE TAP	1/2"	THD
30	ROSSUM SAND TESTER & PIPING (TAPPED)		THD
31	DI, NIPPLE, CLASS 53	16"	FLG X PE

METER SCHEDULE			
NO.	DESCRIPTION	SIZE	JOINT
M-1	MAG METER (UNRESTRICTED DISTANCE)	16"	FLG

PUMP SCHEDULE				
NO.	DESCRIPTION	OUTLET SIZE	INLET SIZE	MOTOR SIZE
P-1	VERTICAL MULTISTAGE CENTRIFUGAL (4,000 GPM)	16"	14"	450 HP

VALVE SCHEDULE			
NO.	DESCRIPTION	SIZE	JOINT
V-1	BUTTERFLY VALVE W/ ELEC ACTUATOR	16"	FLG
V-2	SILENT CHECK VALVE	16"	FLG
V-3	BUTTERFLY VALVE W/ HAND WHEEL	16"	FLG
V-4	BUTTERFLY VALVE W/ ELEC ACTUATOR	12"	FLG
V-5	GATE VALVE	4"	GE
V-6	BURIED BUTTERFLY VALVE W/ VALVE STEM & NUT	16"	MJ

DI = DUCTILE IRON  
 DIP = DUCTILE IRON PIPE  
 FLG = FLANGED  
 GE = GROOVED END  
 PE = PLAIN END  
 RJ = RESTRAINED JOINT

S = SOLDER  
 SR = STAINLESS STEEL REINFORCED  
 SW = SOLVENT WELD  
 THD = THREADED

FOR ADDITIONAL ABBREVIATIONS  
 SEE SHEET G-4.

**GENERAL SHEET NOTES:**

1. ALL PIPE JOINTS & FITTINGS TO HAVE RESTRAINED JOINTS.
2. PAINT PIPING - SEE SPECIFICATIONS.
3. PRESSURE GAUGES TO BE MINIMUM OF 0-50 PSI.
4. PUMP STATION TEST PRESSURE SHALL BE 150 PSI.
5. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS.



DESIGNED	JKN	3			
DRAFTED	BKC	2			
CHECKED	BDM	1			
DATE	NOVEMBER 2024	NO.	DATE	BY	APVD.

NO.	DATE	BY	APVD.

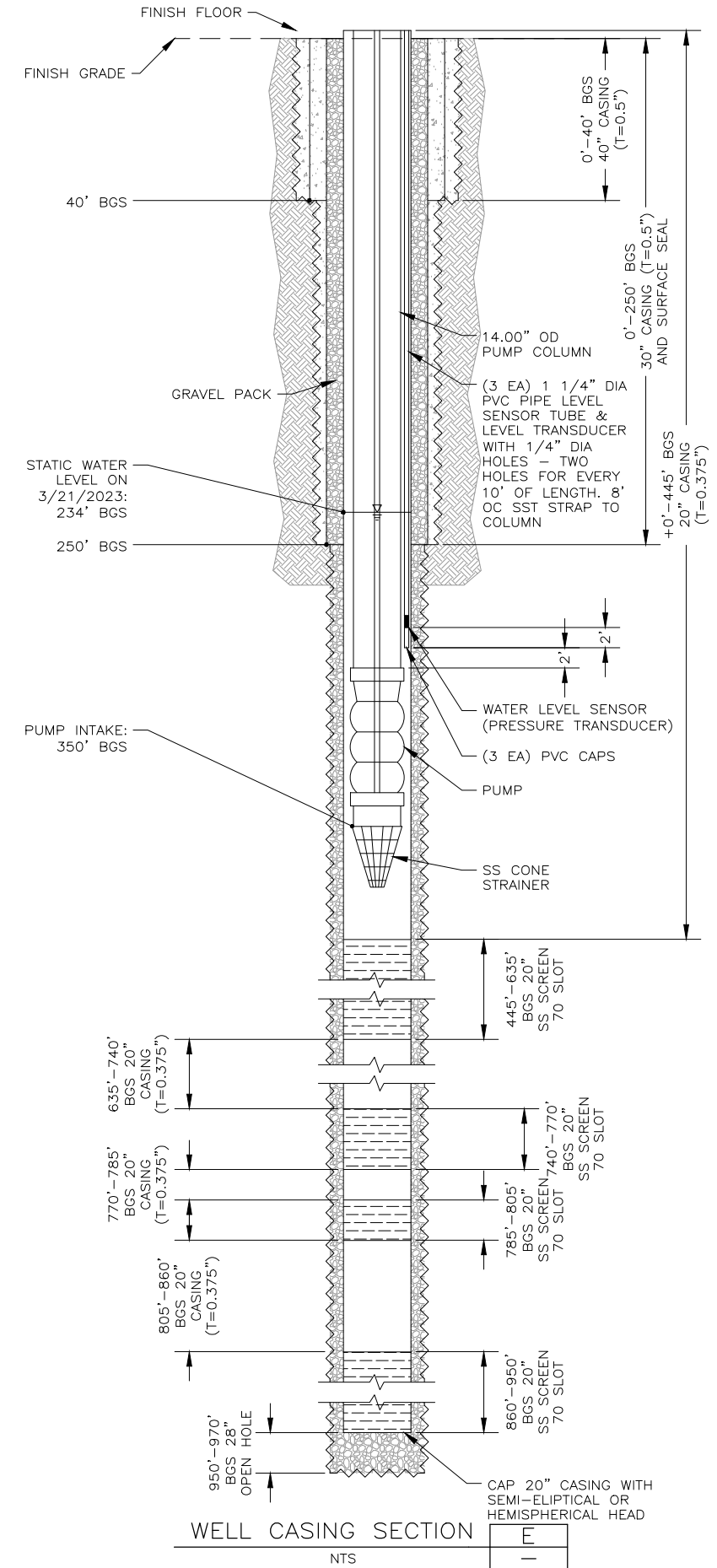
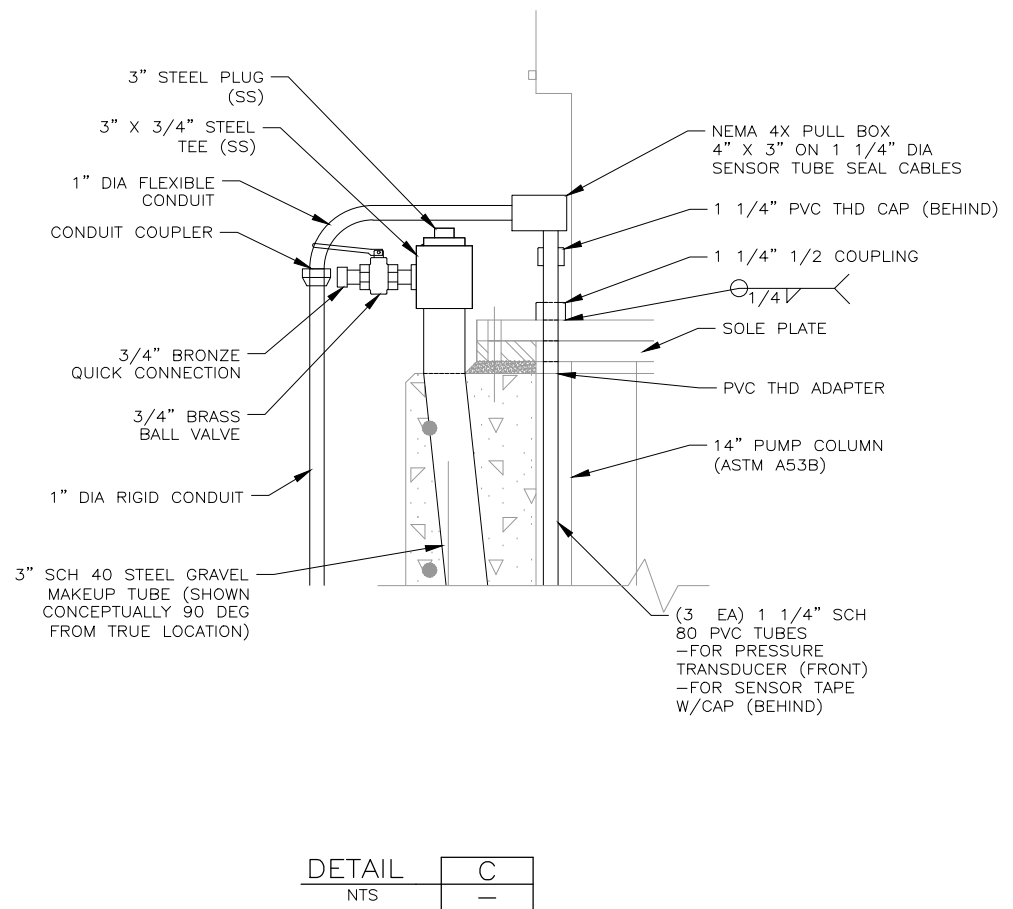
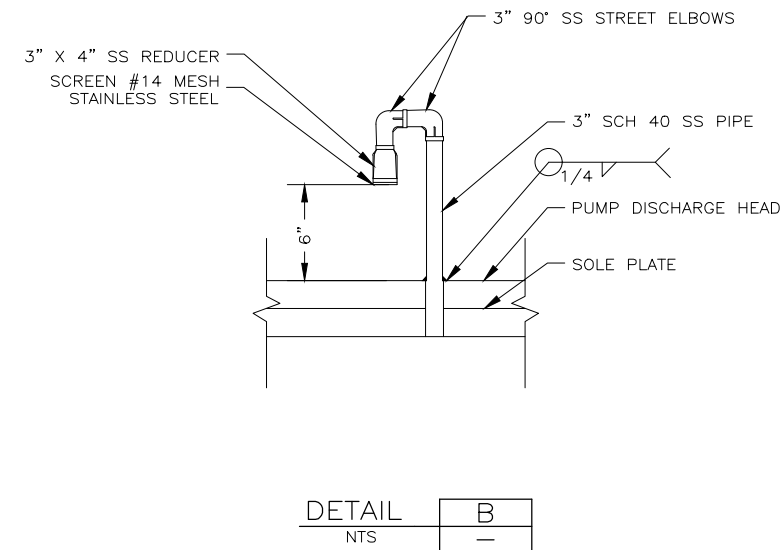
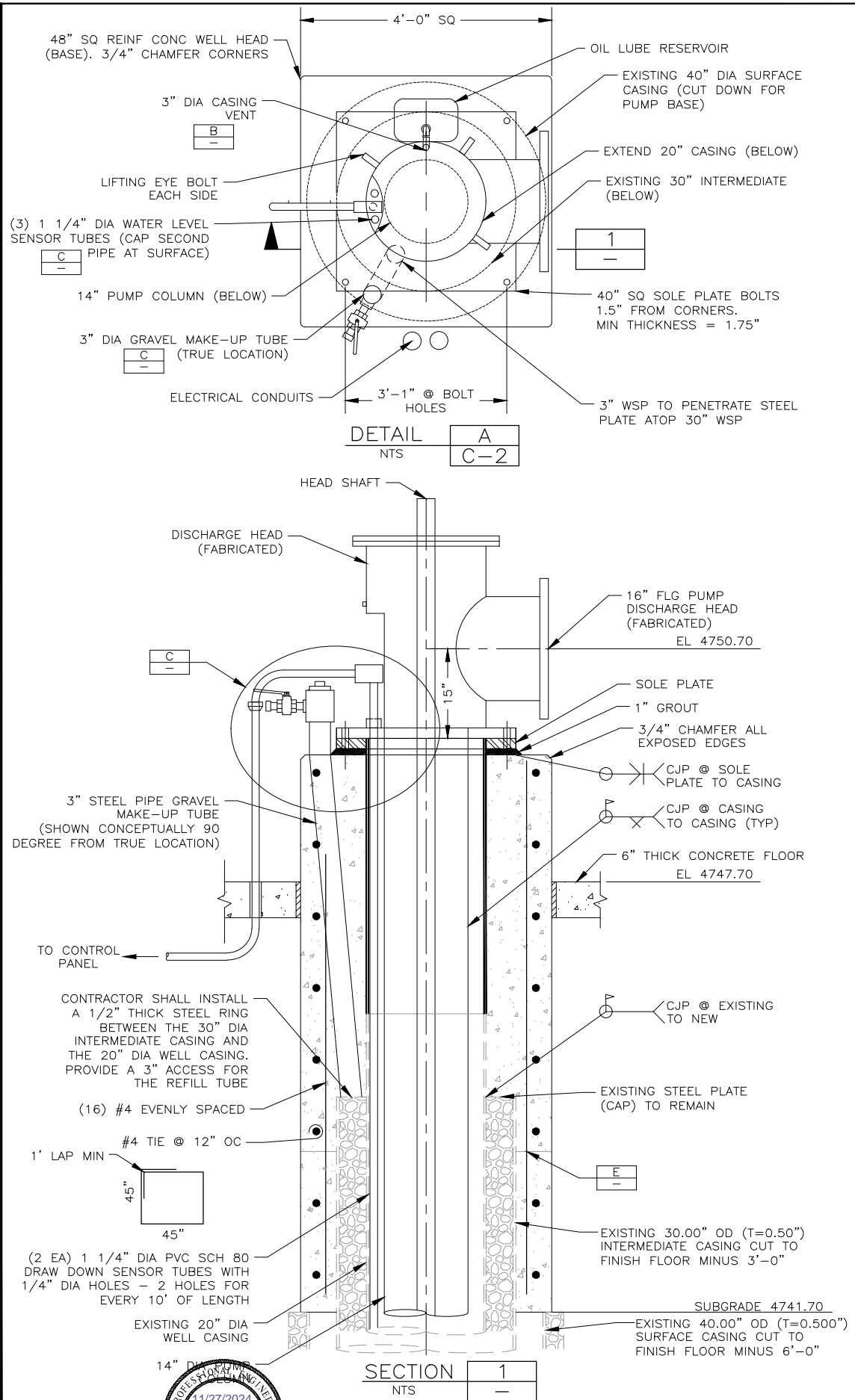
SCALE  
NONE



WELL HOUSE #10  
CIVIL  
FITTING, METER, PUMP & VALVE SCHEDULES

SHEET  
C-5

FILE NAME: PROJECTS\119 - OREM\108.100 - WELL #10 WELL HOUSE\CAD\C-6 PUMP BASE DETAILS.DWG  
 FILE DATE: 11.11.2024 14:04:20 (BKG)



**HANSEN ALLEN & LUCE**  
ENGINEERS

11/27/2024  
No. 1170290-2202  
JACOB K. NIELSEN  
PROJECT ENGINEER

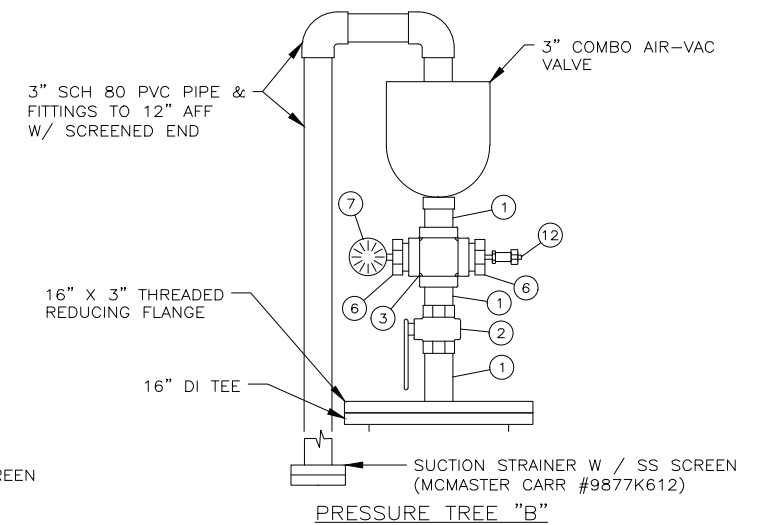
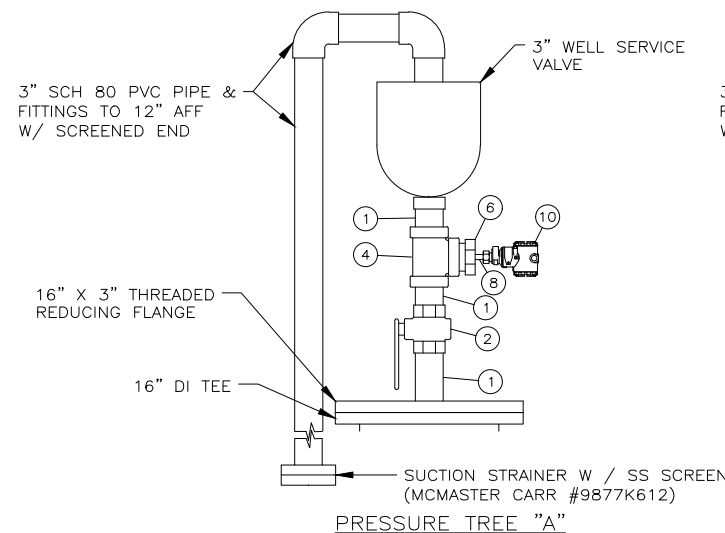
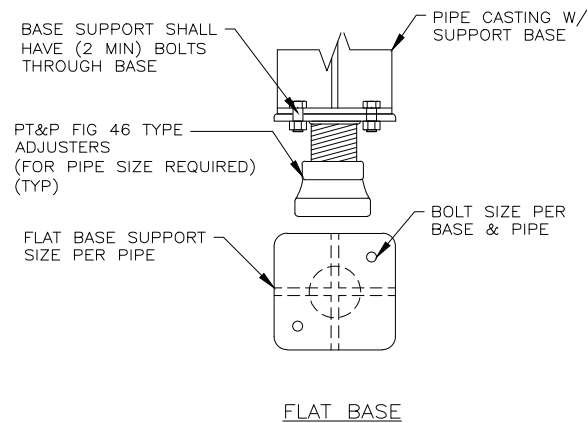
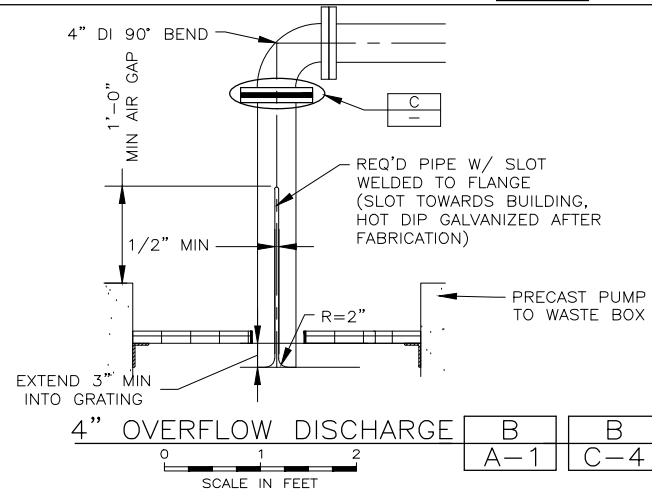
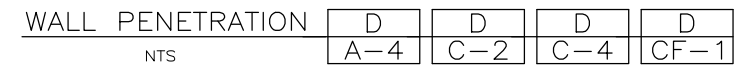
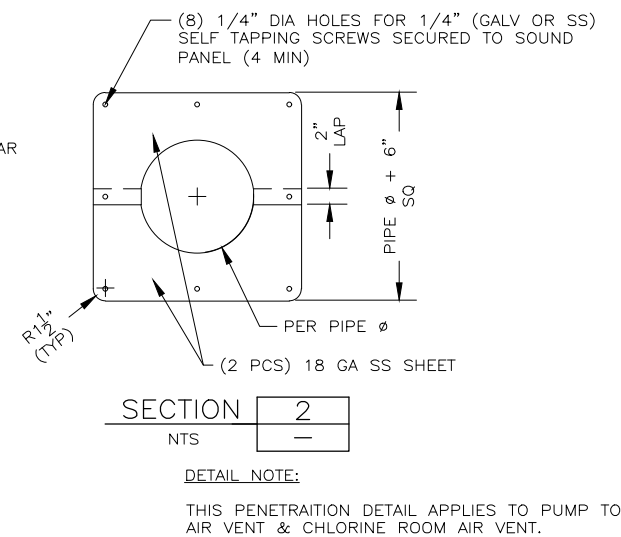
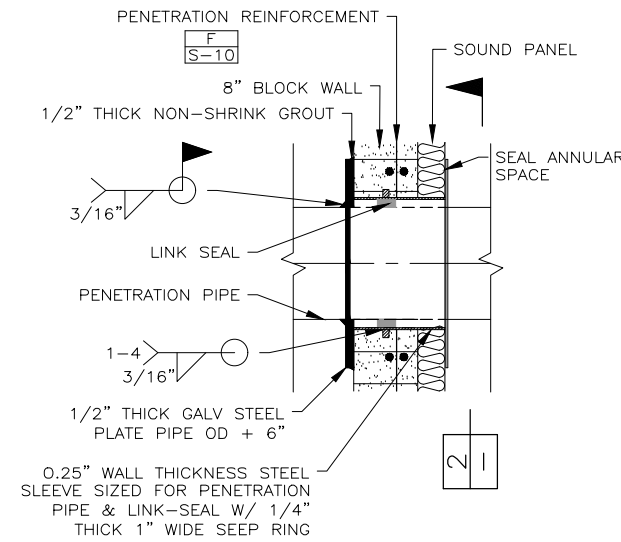
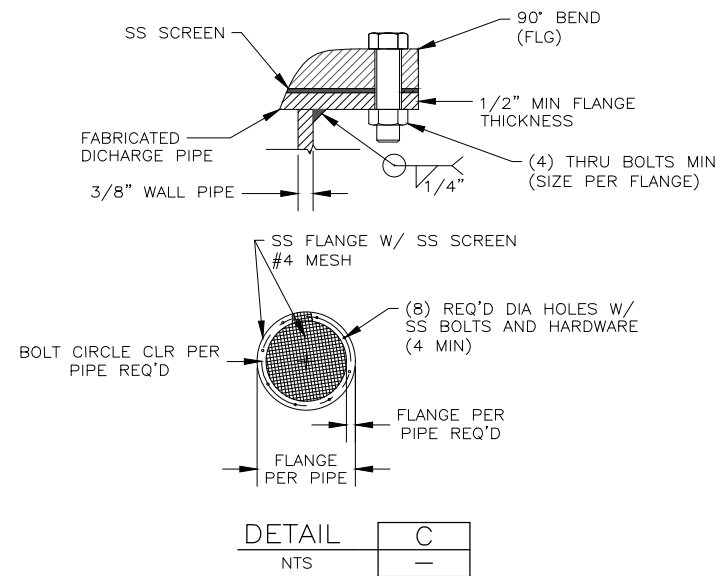
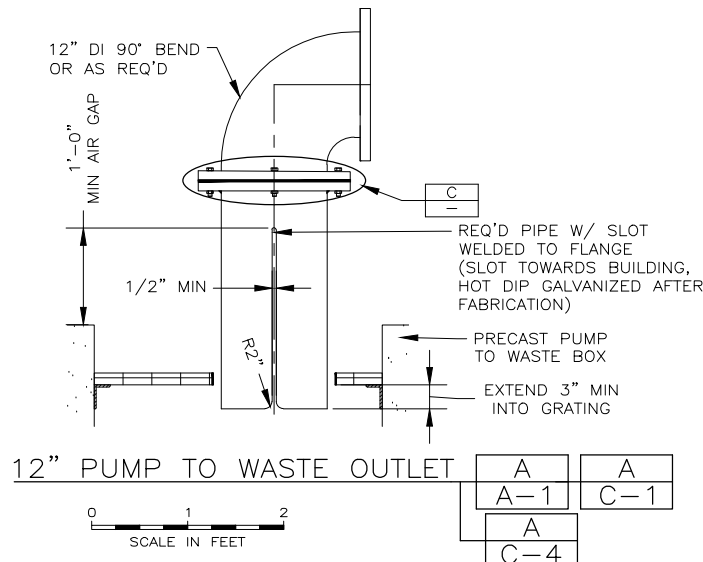
DESIGNED	JKN	3
DRAFTED	MAJ	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

SCALE	AS SHOWN
BY	APVD.





FILE NAME: PROJECTS\119 - OREM\08-100 - WELL #10 WELL HOUSE\CAD\C-7 MISC DETAILS.DWG  
FILE DATE: 11/16/2024 09:54:46 (BAC)



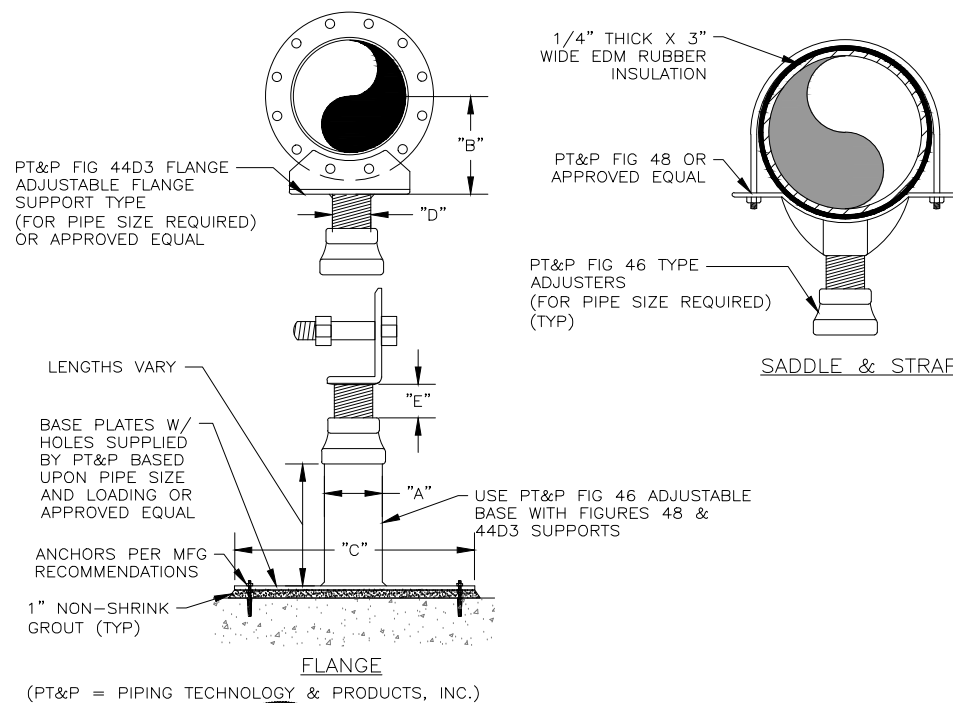
DIMENSIONS IN INCHES

PIPE SIZE	A	B	C (SQ)	D	E
4	3	4.25	9	2.50	3.75
12	3	9.93	9	2.50	4.75
16	4	12.37	11	3	4.50

"A" = SCHEDULE 40 PIPE DIAMETER. LENGTH CUT ON SITE.  
 "B" = BASE OF SADDLE TO CENTER OF PIPE  
 "C" = BASE PLATE (SQUARE) (DRILLED AND SLOTTED FROM PT&P)  
 "D" = THREADED PIPE ADJUSTER DIAMETER  
 "E" = TOTAL ALLOWABLE ADJUSTMENT

DETAIL NOTES:

- PIPE SADDLES, STRAPS AND ADJUSTERS SHALL BE "PT&P" OR APPROVED EQUAL.
- FABRICATED PIPE SUPPORTS MUST BE APPROVED BY ENGINEER.
- ADDITIONAL PIPE SUPPORTS FOR 4" PIPE ARE SHOWN ON SHEET S-11.



PRESSURE TREE SCHEDULE

#	ITEM NAME	SIZE	JOINT	REMARKS
1	NIPPLE (BRASS)	3"	THD	
2	BALL VALVE (BRASS)	3"	THD	
3	CROSS (BRASS)	3"	THD	
4	TEE (BRASS)	3"	THD	
* 5	NOT USED	-	-	
6	BUSHING (BRASS)	3" X 1/2"	THD	
7	PRESSURE GAUGE (0-50 PSI)	1/2"	THD	4.5" DIA
8	NIPPLE (BRASS)	1/2"	THD	
9	NOT USED	-	-	
10	HIGH PRESSURE SHUT-OFF SWITCH	1/2"	THD	
11	NOT USED	-	-	
12	PRESSURE TRANSMITTER (0-150 PSI)	1/2"	THD	

\* REPLACE SAMPLE TAP WITH HOSE BIBB IF REQUIRED.



DESIGNED	JKN	3
DRAFTED	MAJ	2
CHECKED	BDM	1
DATE	NOVEMBER 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

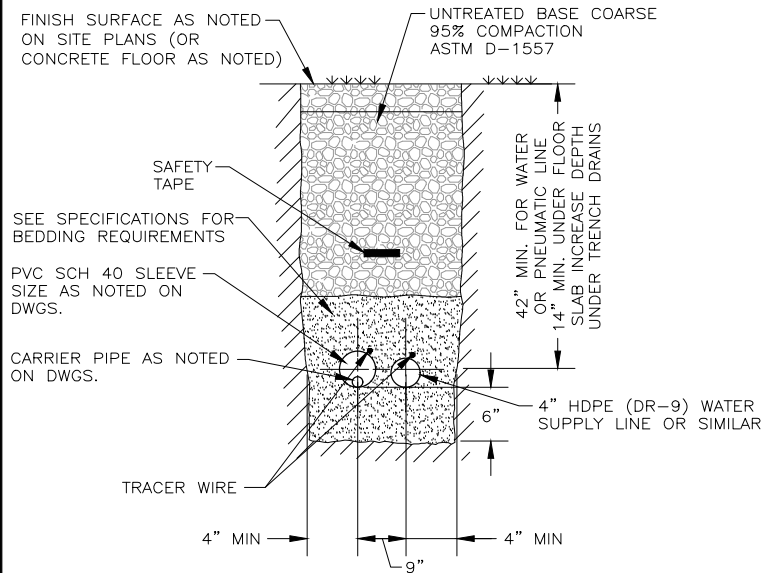
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WELL HOUSE #10  
CIVIL  
MISCELLANEOUS DETAILS I

SHEET  
C-7  
119.08.100

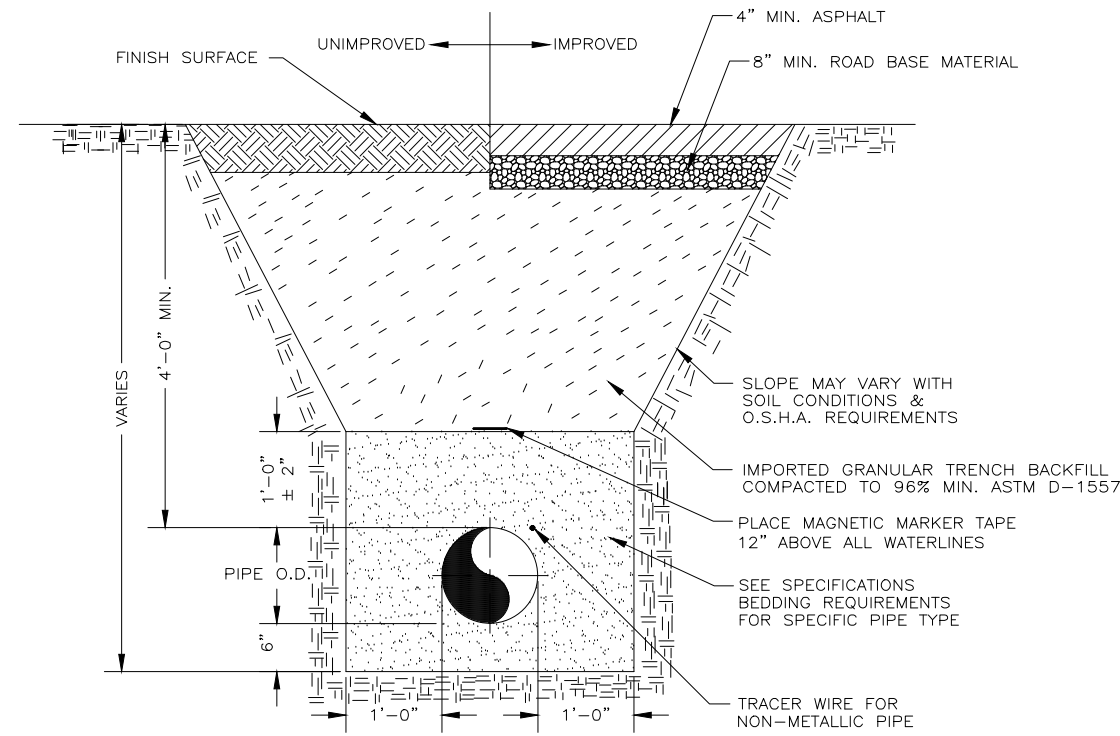
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 FILE DATE: 11/16/2024 09:33:41 (BAC)



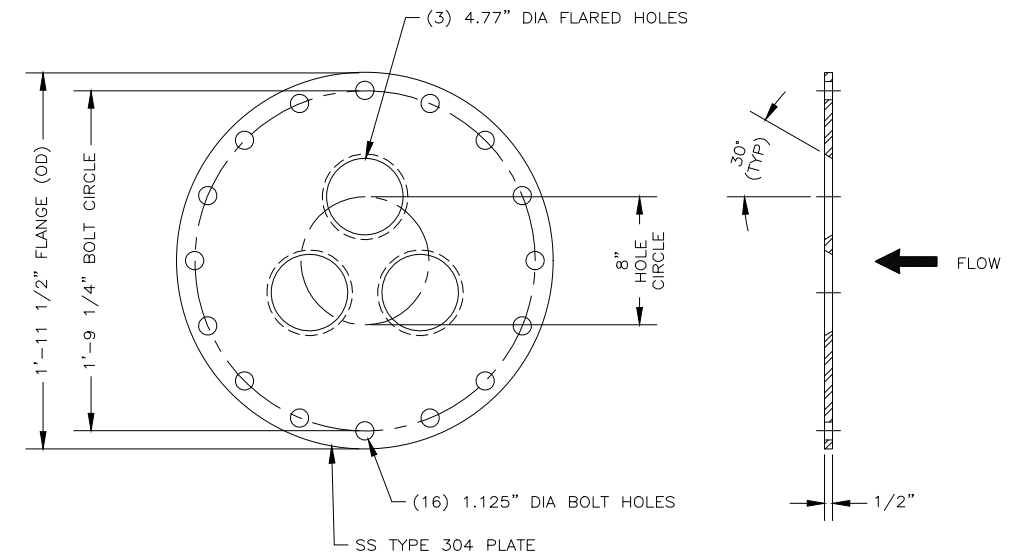
**DETAIL NOTES:**

1. DETAIL SIMILAR FOR PIPE INSTALLATION WITHOUT SLEEVES & DRAIN LINES FOR DEPTH OR SLOPE NOTED ON DRAWINGS.
2. USE LONG SWEEP BENDS IN ALL SLEEVED PIPE APPLICATIONS.

**SMALL DIAMETER TYPICAL PIPELINE TRENCH DETAIL**  
 NTS



**LARGE PIPELINE TYPICAL TRENCH DETAIL**  
 NTS



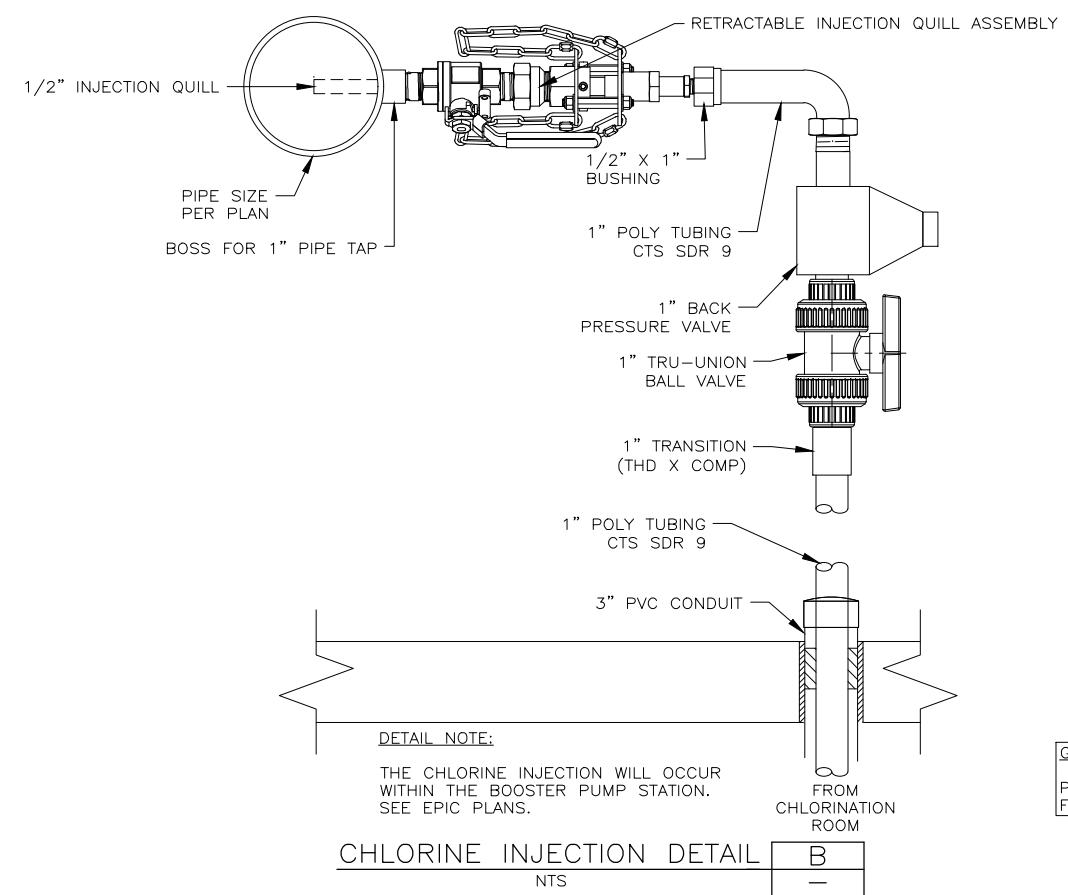
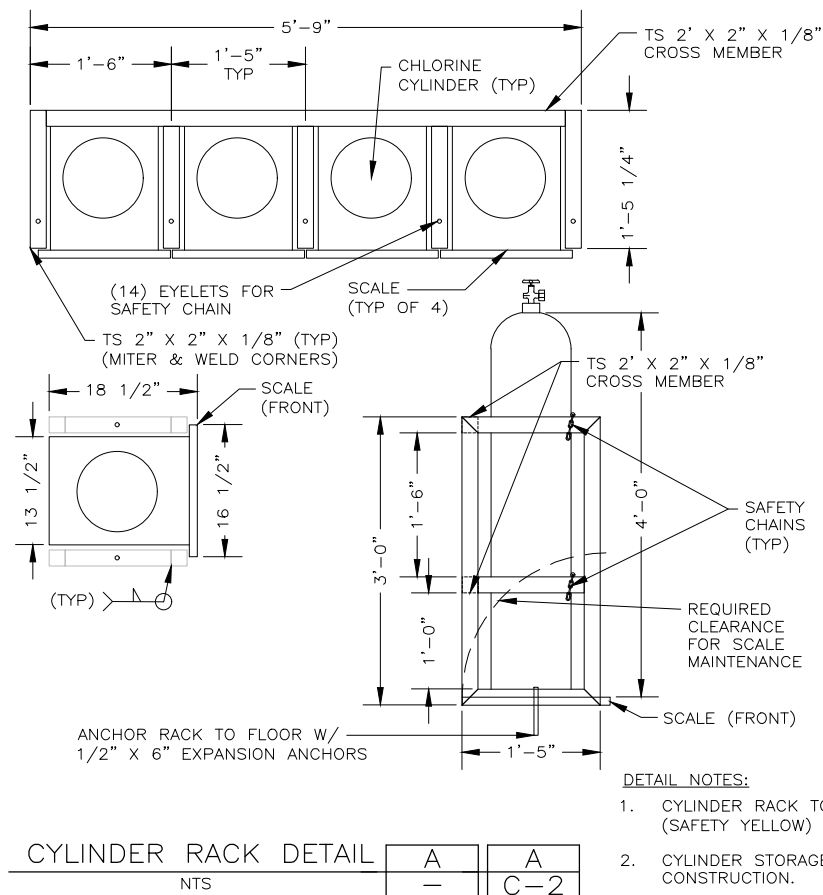
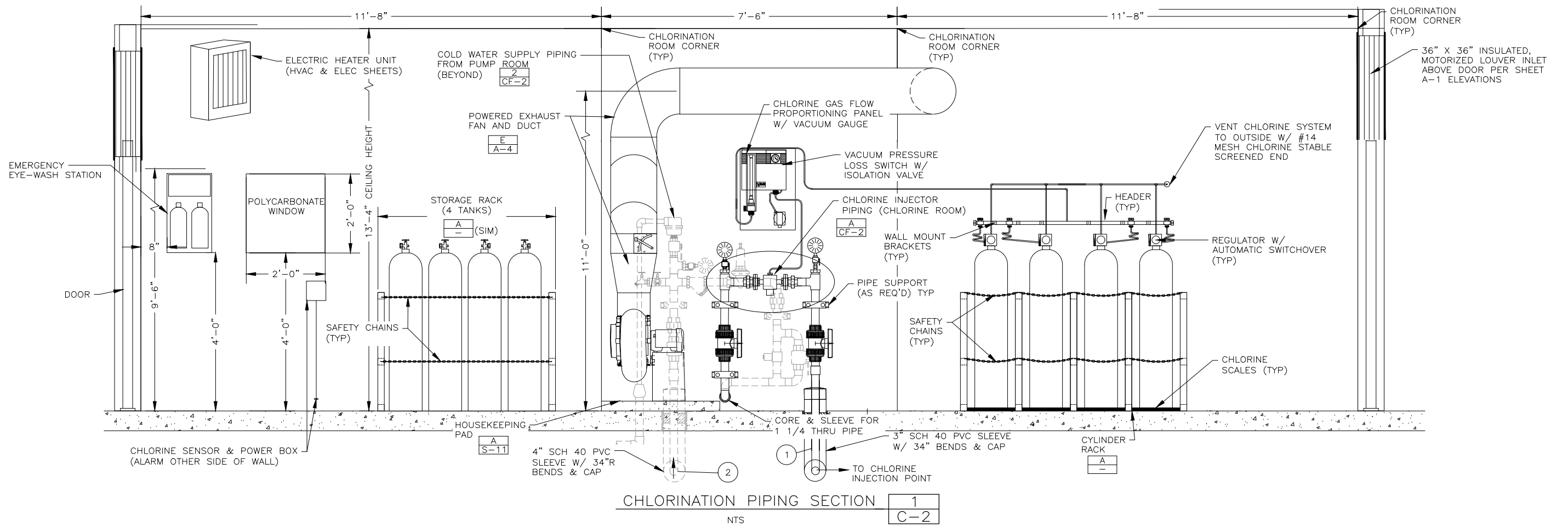
**DETAIL NOTES:**

1. BOLT PATTERN PER AWWA C110.
2. PROVIDE NSF 60/61 COATING PER AWWA C210 ON ALL WETTED AREAS.

**ORIFICE PLATE**  
 NTS

A
C-3

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\CF-1 CHLORINATION DETAILS.DWG  
 FILE DATE: 11/27/2024 11:49:20 (BKC)



- DETAIL NOTES:**
1. CYLINDER RACK TO BE POWDER COATED (SAFETY YELLOW) AFTER FABRICATION.
  2. CYLINDER STORAGE RACK SIMILAR CONSTRUCTION.

**DETAIL NOTE:**  
 THE CHLORINE INJECTION WILL OCCUR WITHIN THE BOOSTER PUMP STATION. SEE EPIC PLANS.

**GENERAL SHEET NOTE:**  
 PIPE & FITTING SCHEDULE IS FOUND ON SHEET CF-2



DESIGNED JKN 3  
 DRAFTED MAJ 2  
 CHECKED BDW 1  
 DATE NOVEMBER 2024 NO. DATE

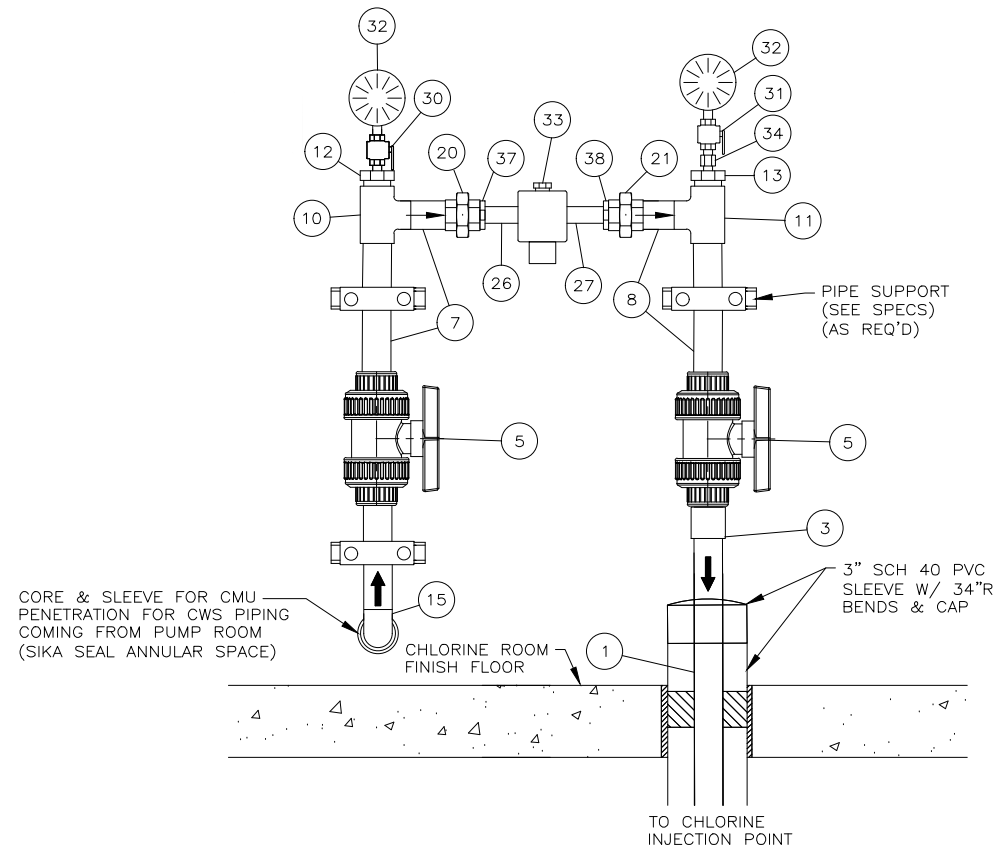
NO.	DATE	REVISIONS	BY	APVD.

SCALE NOT TO SCALE



WELL HOUSE #10  
 CIVIL  
 CHEMICAL FEED SECTION & DETAILS

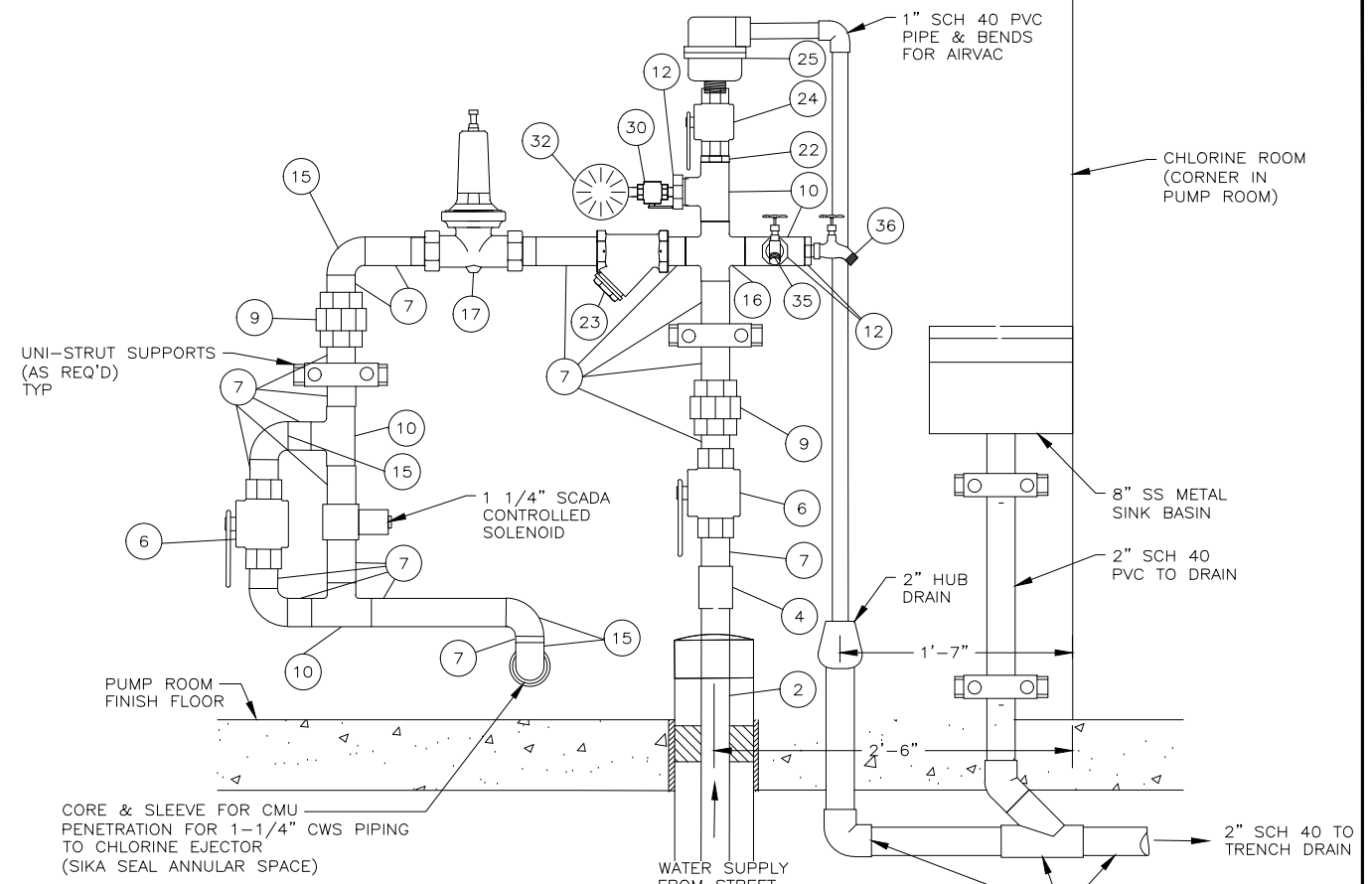
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 CF-1  
 119.08.100



CHLORINE ROOM INJECTOR PIPING 

A
CF-1

  
NTS



PUMP ROOM COLD WATER SUPPLY PIPING 

2	2
CF-1	C-2

  
NTS

FITTING SCHEDULE			
	DESCRIPTION	SIZE	JOINT
1.	POLY TUBING CTS SDR 9	1"	COMP
2.	PIPE, COPPER W/ FITTINGS (TYPE K)	1 1/4"	-
3.	TRANSITION FITTING (PVC)	1 1/4" X 1"	THD X COMP
4.	TRANSITION FITTING (COPPER)	1 1/4"	THD X SW
5.	BALL VALVE (TRU-UNION PVC)	1 1/4"	THD
6.	BALL VALVE (SS)	1 1/4"	THD
7.	PIPE, SCH 40 (SS)	1 1/4"	THD
8.	PIPE, & BENDS SHC 80 (PVC)	1 1/4"	THD
9.	UNION (SS)	1 1/4"	THD
10.	TEE (SS)	1 1/4"	THD
11.	TEE, SCH 80 (PVC)	1 1/4"	THD
12.	REDUCING HEX (SS)	1 1/4" X 1/2"	THD
13.	REDUCING HEX (PVC)	1 1/4" X 1/2"	THD

FITTING SCHEDULE CONT			
14.	REDUCING HEX (PVC)	1 1/4" X 3/4"	THD
15.	BEND, 90°, (SS)	1 1/4"	THD
16.	CROSS, (SS)	1 1/4"	THD
17.	PRESSURE SUSTAINING VALVE (SEE SPECS)	1 1/4"	THD
18.	COMPANION FLANGE (SS)	1 1/4"	THD X FLG
19.	COMPANION FLAGE (PVC)	1 1/4"	THD X FLG
20.	UNION (SS)	1 1/4"	THD
21.	UNION (PVC)	1 1/4"	THD
22.	REDUCING HEX (SS)	1 1/4" X 1"	THD
23.	"Y" STRAINER (SS)	1 1/4"	THD
24.	BALL VALVE (SS)	1"	THD
25.	AIR VAC (VALMATIC 15A)	1"	THD
26.	PIPE, (SS)	3/4"	THD
27.	PIPE SCH 80 (PVC)	3/4"	THD

FITTING SCHEDULE CONT			
28.	INJECTION QUILL W/ 1 1/4" BALL VALVE	3/4"	THD
29.	FLANGE (PVC) (MATCH INJECTOR)	1 1/4"	THD X FLG
30.	BALL VALVE (WATTS S-FBV-1, 316 SS)	1/2"	THD
31.	TRU-UNION PVC BALL VALVE (235 PSI)	1/2"	THD X SW
32.	PRESSURE GAUGE (0-100 PSI)	1/2"	THD
33.	EJECTOR (SEE SPECS W/ REDUCING FLG)	1/2"	FLG
34.	SNUBBER	1/2"	THD
35.	HOSE BIBB W/CAP (SS)	1/2"	THD
36.	HOSE BIBB W/COMPRESSION ADAPTER (SS)	1/2"	THD
37.	HEX REDUCING BUSHING (SS)	1-1/4" X 3/4"	THD
38.	HEX REDUCING BUSHING (PVC)	1-1/4" X 3/4"	THD

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\CF-2 CHLORINATION DETAILS.DWG  
FILE DATE: 11/27/2024 12:27:16 (BNC)



DESIGNED JKN 3  
DRAFTED MAJ 2  
CHECKED BDW 1  
DATE NOVEMBER 2024 NO. DATE

NO.	DATE	REVISIONS	BY	APVD.

SCALE NOT TO SCALE



WELL HOUSE #10  
CIVIL  
CHEMICAL FEED DETAILS & SCHEDULE

SHEET  
CF-2  
119.08.100

STRUCTURAL NOTES

GENERAL NOTES

- 1. ALL CONSTRUCTION SHALL BE ACCORDING TO THE 2021 EDITION OF THE INTERNATIONAL BUILDING CODE (IBC), AS AMENDED BY THE STATE OF UTAH.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND SAFETY IN AND AROUND THE JOB SITE AND/OR ADJACENT PROPERTIES.
3. THE CONTRACTOR AND/OR OWNER SHALL KEEP LOADS ON THE STRUCTURE WITHIN THE LIMITS OF THE DESIGN LOADS BOTH DURING AND AFTER CONSTRUCTION.

DESIGN CRITERIA

- 1. RISK CATEGORY: IV
2. IMPORTANCE FACTOR, I\_s : 1.20
3. IMPORTANCE FACTOR, I\_e : 1.50
4. WIND SPEED (3 SECOND GUST): 115 MPH; EXPOSURE: "B"
5. SEISMIC DESIGN CATEGORY: "D"
SITE CLASS: "D"
S\_s : 1.360g
F\_a : 1.0
S\_d1 : 0.91g
S\_d2 : 0.50g
F\_v : 1.80
S\_d3 : 0.60g
SPECIAL FORCE RESISTANT SYSTEM: SPECIAL REINFORCED MASONRY SHEAR WALLS
R : 5
Omega : 2.5
C\_p : 3.5
SEISMIC SNOW CONTRIBUTION 0 PSF
6. ROOF DESIGN:
ROOF DEAD LOAD: 20 PSF
SNOW EXPOSURE FACTOR: (C\_e) 1.0
SNOW THERMAL FACTOR: (C\_t) 1.0
SNOW SLOPE FACTOR: (C\_s) 1.0
GROUND SNOW LOAD (P\_g) 34 PSF
ROOF LIVE/SNOW LOAD (P\_s+P\_f) 28.6 PSF
ROOF LIVE/SNOW LOAD UNBALANCED 40.8 PSF (RISK CAT IV)
7. SOIL DESIGN:
SOILS REPORT PROVIDED BY AGEC: RPT #1210705
ALLOWABLE SOIL BEARING PRESSURE: 3500 PSF
COEFFICIENT OF FRICTION: (u) 0.45
AT-REST PRESSURE: 55/56 PCF
SEISMIC INCREASE: +/-26 PCF (81/91 PCF TOTAL)
ACTIVE PRESSURE: 40/50 PCF
SEISMIC INCREASE: +/-41 PCF (81/91 PCF TOTAL)
PASSIVE PRESSURE: 250/300 PCF
SEISMIC DECREASE: -41 PCF (209/259 PCF TOTAL)

STRUCTURAL NOTES

REINFORCED CONCRETE:

- 1. ALL CONCRETE CONSTRUCTION, INCLUDING BENDING OF BARS, SHALL COMPLY WITH ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318).
2. UNLESS CALLED OUT OTHERWISE ON THE PLANS, MINIMUM REINFORCEMENT OF CONCRETE WORK SHALL BE:
WALLS:
8" THICK OR LESS - USE #5 @ 16" E.W.
9" OR THICKER - USE #5 @ 12" E.W., E.F.
SLABS:
8" THICK OR LESS - USE #4 @ 16" E.W.
3. ALL WALL REINFORCEMENT AT CORNERS OR JUNCTIONS OF WALLS SHALL BE CONTINUOUS, LAPPED, OR TERMINATED IN A STANDARD 90 DEGREE HOOK. LAP SPLICES SHALL CONFORM WITH NOTE 6.
4. UNLESS SHOWN OTHERWISE ALL BARS SHALL BE DOWELED. DOWELS SHALL BE THE SAME SIZE AND SPACING AS THE REINFORCEMENT WHICH IS TO BE SPLICED TO THE DOWELS.
5. ALL REINFORCING BARS SHALL BE GRADE 60 AND SHALL CONFORM TO ASTM A-615, CURRENT REVISION. REINFORCING STEEL SHALL BE NEW AND FREE FROM RUST, OIL OR OTHER BOND INHIBITOR.
6. ALL CONTINUOUS REINFORCING BARS SHALL LAP AT LEAST 40 BAR DIAMETERS. SPLICES SHALL BE MADE AWAY FROM POINTS OF MAXIMUM STRESS. MINIMUM LAP SHALL BE 18 IN.

REINFORCED CONCRETE CONT:

- 7. CONCRETE COVER OVER REINFORCEMENT SHALL BE AS FOLLOWS:
A. SURFACE NOT EXPOSED DIRECTLY TO THE GROUND, WATER OR WEATHER AFTER FORM REMOVAL:
CONCRETE SLABS IN BUILDINGS - - - - - 3/4"
CONCRETE SLABS IN WATER BEARING SURFACES EXPOSED DIRECTLY TO THE GROUND, WATER OR WEATHER AFTER FORM REMOVAL:
FOR #5 BARS OR SMALLER - - - - - 1-1/2"
FOR #6 BARS OR LARGER - - - - - 2"
C. CONCRETE PLACED DIRECTLY AGAINST GROUND - - -3"
D. REINFORCEMENT SHALL BE PLACED WITHIN A TOLERANCE OF +/-1/4" OF POSITION SPECIFIED.
8. CONCRETE CURING SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SOME CONCRETE WORK REQUIRES WATER CURING, AS MEMBRANE CURING IS NOT ALLOWED. THE CONTRACTOR IS WARNED THAT WATER CURING IS DIFFICULT AT TIMES DUE TO WIND AND DRY CONDITIONS. THE CONTRACTOR SHALL STUDY REQUIREMENTS AND SHALL FURNISH ADEQUATE SYSTEMS TO PROVIDE WATER CURING WHERE REQUIRED. TOP OF WALLS SHALL BE KEPT VISIBLY MOIST AT ALL TIMES AND SHALL BE FLOODED NOT LESS THAN THREE TIMES DAILY.
A. FOR POURING CONCRETE DURING COLD WEATHER:
1. FOLLOW RECOMMENDATIONS CONTAINED IN PUBLICATION ACI 306R "GUIDE TO COLD-WEATHER CONCRETING," CURRENT REVISION.
2. PROTECT CONCRETE WORK FROM PHYSICAL DAMAGE OR REDUCED STRENGTH WHICH COULD BE CAUSED BY FROST, FREEZING ACTIONS OR LOW TEMPERATURES.
3. WHEN AIR TEMPERATURE HAS FALLEN TO OR IS EXPECTED TO FALL BELOW 40°F OR 4°C, UNIFORMLY HEAT WATER AND AGGREGATES BEFORE MIXING TO OBTAIN A CONCRETE MIXTURE TEMPERATURE OF NOT LESS THAN 50°F OR 10°C, AND NOT MORE THAN 80°F OR 27°C AT TIME OF PLACEMENT.
4. CONCRETE SHALL BE AIR ENTRAINED WITH AIR CONTENT OF 6% +/- 1% BY VOLUME.
5. DO NOT USE FROZEN MATERIALS OR MATERIALS CONTAINING ICE OR SNOW. DO NOT PLACE CONCRETE ON FROZEN SUBGRADE OR ON SUBGRADE CONTAINING FROZEN MATERIALS. DO NOT USE CALCIUM CHLORIDE, SALT OR OTHER MATERIALS CONTAINING ANTIFREEZE AGENTS OR CHEMICAL ACCELERATORS, UNLESS OTHERWISE APPROVED IN THE MIX DESIGN.
7. COVER AND HEAT CONCRETE FOR A MINIMUM OF 7 DAYS AS RECOMMENDED BY ACI 306R, CURRENT REVISION.
B. FOR POURING CONCRETE DURING HOT WEATHER:
1. FOLLOW RECOMMENDATIONS CONTAINED IN PUBLICATION ACI 305R "GUIDE TO HOT-WEATHER CONCRETING," CURRENT REVISION.
2. PROTECT CONCRETE FROM FLASH CURING BY PROVIDING A WATER/MOISTURE CURE FOR 3 DAYS. A 4500 PSI (WITH A 6-1/2 BAG MIX) IS RECOMMENDED FOR THESE CONDITIONS.
9. NO BACKFILL SHALL BE PLACED AGAINST WALLS UNTIL CONCRETE HAS REACHED 85 PERCENT OF THE SPECIFIED STRENGTH AND THE CONNECTING SLABS AND BEAMS HAVE BEEN CAST AND HAVE REACHED 85 PERCENT OF THE SPECIFIED STRENGTH.
10. CONCRETE TO HAVE A MIN. 28 DAY STRENGTH OF 4000 PSI FOR SLABS & 3500 PSI FOR FOOTINGS & FOUNDATION.

MASONRY WALL REINFORCING NOTES:

- 1. WALL REINFORCEMENT SHALL BE PLACED AND GROUTED AS DESCRIBED IN THE SPECIFICATIONS AND SHALL CONFORM TO IBC REQUIREMENTS.
2. ALL WALLS SHALL BE REINFORCED WITH A MINIMUM OF #5 VERTICAL REINFORCING GROUTED AT 32" O.C. AND (1) #5 @ 48" O.C. HORIZONTAL BOND BEAM. SEE WALL ELEVATION OR NOTE 5 FOR ADDITIONAL VERTICAL REINFORCEMENT ADJACENT TO WALL OPENINGS.
3. ALL VERTICAL REINFORCING SHALL EXTEND TO ROOF LEVEL AND SHALL BE DOWELED TO THE FOOTING WITH MATCHING DOWELS.
4. ALL DOWELS SHALL LAP WALL REINFORCING 48 DIA. AND EXTEND INTO FOUNDATION A MINIMUM OF 40 DIA. OR EXTEND 12 DIA. PLUS HAVE A STANDARD HOOK.
5. A #5 VERTICAL BAR SHALL BE PLACED AND GROUTED AT ALL WALL CORNERS AND WALL INTERSECTIONS AND TWO #5 VERTICAL BARS SHALL BE PLACED AT JAMBS OF WALL OPENINGS AND SUCH BARS SHALL EXTEND THE FULL HEIGHT OF WALL AND BE ANCHORED IN THE ROOF BOND BEAM AND FOOTING AS SPECIFIED IN PARAGRAPH ABOVE.
6. LINTELS FOR ALL OPENINGS SHALL BE AS SHOWN ON SHEET S-10 "TYPICAL CMU DETAILS", UNLESS OTHERWISE NOTED.
7. ALL HORIZONTAL AND VERTICAL JOINTS ON MASONRY UNITS SHALL BE CONCAVE ON BOTH FACES UNLESS SHOWN OR SPECIFIED OTHERWISE.
8. MASONRY CONTROL JOINTS IN WALLS SHALL BE INSTALLED AT 24'-0"± SPACING UNLESS SHOWN OTHERWISE.
9. EXTERIOR WALL CELLS NOT FILLED WITH GROUT SHALL BE FILLED WITH INSULATION.
10. ALL REINFORCING BARS SHALL BE GRADE 60, AND SHALL CONFORM WITH: "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", ASTM A-615. REINFORCING BARS SHALL BE NEW, FREE FROM RUST, OIL OR OTHER BOND INHIBITOR. WELDABLE REBAR TO BE ASTM A-706.
11. COLD WEATHER PLACEMENT OF MASONRY: IF THE LOW TEMPERATURE FOR ANY 24-HOUR PERIOD FOR THE FIRST SEVEN DAYS AFTER THE MASONRY IS PLACED OR GROUTED DROPS BELOW 40°F BUT REMAINS ABOVE 28°F, COVER MASONRY WITH INSULATED BLANKETS. IF THE TEMPERATURE DROPS BELOW 28°F FOR ANY PERIOD AS DESCRIBED ABOVE, APPLY HEAT AND INSULATED BLANKETS AND MAINTAIN A TEMPERATURE AT OR ABOVE 34°F FOR SEVEN DAYS.
12. PROVIDE (2) #5 @ TOP OF WALLS (TYP.)
13. ALL MASONRY TO HAVE SPECIAL INSPECTION PER TABLE 1704.5 OF IBC.
14. ALL TERMINAL BARS TO HAVE HOOK @ END.

WOOD FRAMING NOTES:

- 1. FRAMING LUMBER: DOUGLAS FIR LARCH (SURFACED DRY NOT TO EXCEED 19% MAXIMUM MOISTURE CONTENT), CONFORMING TO NATIONAL DESIGN SPECIFICATIONS (NDS) SUPPLEMENTS FOR WOOD DESIGN VALUES AND APPLICABLE STANDARDS IN THE FOLLOWING GRADES:
A. SILLS: REDWOOD, OR PRESSURE TREATED, FOUNDATION GRADE.
B. PLATES @ TOP OF MASONRY WALLS: DOUGLAS FIR-LARCH, NO. 1, FB=1000 PSI MIN.
C. STUDS: DOUGLAS FIR-LARCH, OR HEMLOCK-FIR, STUD GRADE.
D. BEAMS, JOISTS, LEDGERS, POSTS & HEADERS: DOUGLAS FIR-LARCH, NO. 2 MIN., 900 PSI MIN.
E. ALL OTHER HORIZONTAL FRAMING MEMBERS: DOUGLAS FIR-LARCH, CONSTRUCTION GRADE.
F. ALL OTHER VERTICAL FRAMING MEMBERS: DOUGLAS FIR-LARCH, STANDARD OR BETTER GRADE.
G. SHEATHING: STANDARD EXTERIOR GRADE WITH EXTERIOR GLUE. APA RATED.
H. GLUE-LAM BEAMS: DOUGLAS FIR-LARCH, 2400 PSI WITH AITC STAMP FOR QUALITY
2. PROVIDE SOLID BLOCKING AT LEAST 1-1/2" THICK AT ENDS AND AT EACH SUPPORT OF JOIST. PROVIDE APPROVED BRIDGING AT A MAXIMUM 8'-0" O.C. BETWEEN SUPPORTS.
3. NAILING SHALL CONFORM TO STANDARD NAILING SCHEDULE 2304.9.1 OF INTERNATIONAL BUILDING CODE UNLESS NOTED OTHERWISE ON PLANS OR SCHEDULES. ALL NAILS SHALL BE COMMON NAILS.
4. USE SIMPSON STRONG TIE (SST) HANGERS FOR ALL FLUSH CONNECTIONS. USE STRONGEST HANGER COMPATIBLE WITH MEMBER SIZE AND NAIL PER MANUFACTURER'S SPECIFICATION TO OBTAIN MAXIMUM LOAD CARRYING CAPACITY.
5. ALL METAL HANGERS AND CONNECTORS SHALL BE "SIMPSON" OR EQUAL.
6. SECURE SILL PLATE TO CONCRETE WITH 5/8" DIA. X 12" A.B. @ 32" O.C. UNLESS NOTED OTHERWISE ON PLAN.
7. DOUBLE TOP AND BOTTOM PLATES TO BE LAPPED 4'-0" AT SPLICE AND CONNECT WITH 16D COMMON NAILS @ 3" O.C., STAGGERED.
8. NOTCHING OR DRILLING THROUGH ANY LUMBER MEMBER WILL NOT BE ALLOWED WITHOUT SPECIFIC APPROVAL OF STRUCTURAL ENGINEER.
9. ROOF SHEATHING:
A. (5/8") A.P.A. RATED STRUCTURAL II, EXTERIOR, PANEL INDEX #32/16, UNLESS NOTED OTHERWISE.
B. NAIL WITH: 10D @ 6" O.C. - PANEL EDGES, UNLESS NOTED OTHERWISE
10D @ 12" O.C. - ALL ELSE, UNLESS NOTED OTHERWISE
C. INSTALL ROOF SHEATHING WITH "H" CLIPS.
10. KEEP ALL MATERIAL CLEARLY IDENTIFIED WITH ALL GRADE MARKS LEGIBLE. KEEP ALL DAMAGED MATERIAL CLEARLY IDENTIFIED AS DAMAGED AND SEPARATELY STORED TO PREVENT ITS INADVERTENT USE. IN THE EVENT OF DAMAGE, IMMEDIATELY MAKE ALL REPAIRS AND REPLACEMENTS NECESSARY TO THE APPROVAL OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE OWNER.
11. PROVIDE 3"x3"x1/4" SLOTTED PLATE WASHERS AT ALL BOLTS IN PLATES, AND 2" DIAMETER PLATE WASHERS AT ALL BOLTS IN LEDGERS, BEAMS, AND COLUMNS. UNLESS OTHERWISE SPECIFIED, USE A307 BOLTS.
12. PROVIDE SOLID BLOCKING UNDER ALL LOCATIONS WHERE CONCENTRATED LOADS ARE LOCATED, SUCH AS COLUMNS, POSTS, BEAMS, ETC. FULL SUPPORT MUST BE PROVIDED TO THE FOUNDATION.

WOOD TRUSSES NOTES:

- 1. DESIGN TRUSSES FOR FOLLOWING CRITERIA:
SEE "DESIGN CRITERIA" NOTES FOR REQUIRED LOADING
LIVE LOAD DEFLECTION = L/360 MAXIMUM
NOTE: ALL TRUSSES TO BE DESIGNED FOR DRIFT LOADS PER ASCE-7, RISK CAT IV.
2. PROVIDE BRIDGING AT TOP AND BOTTOM CHORDS AND STRUT BRACING, PER MANUFACTURER'S RECOMMENDATIONS.
3. NO STRESS INCREASE ALLOWED FOR TRUSS DESIGN.
4. DESIGN AND FABRICATION OF ALL TRUSSES SHALL COMPLY WITH REQUIREMENTS OF DESIGN SPECIFICATIONS FOR LIGHT METAL PLATE CONNECTED WOOD TRUSSES' BY THE TRUSS PLATE INSTITUTE.
5. TRUSS MANUFACTURER SHALL DESIGN AND FABRICATE TRUSSES TO SUPPORT LOADS SHOWN ON DRAWINGS. COORDINATE DESIGN WITH ALL MECHANICAL EQUIPMENT AND SUSPENDED LOADS. SUBMIT DESIGN CALCULATIONS BEARING STAMP OF A REGISTERED PROFESSIONAL ENGINEER LICENSED BY THE STATE OF UTAH.
6. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION INDICATING, FRAMING PLAN, BRIDGING AND BRACING, DIAGRAM OF THE TRUSSES WITH DIMENSIONS, SIZE AND GRADE OF MEMBERS, SIZE AND LOCATION OF METAL PLATES, BEARING DETAILS AND INSTRUCTION FOR INSTALLATION.
7. MOMENT COEFFICIENTS SHALL BE 1/8 FOR ONE AND TWO CONTINUOUS SPAN CONDITIONS AND 1/10 FOR THREE OR MORE CONTINUOUS SPAN CONDITIONS. LENGTH FACTOR FOR WEB DESIGN SHALL BE ONE. METAL PLATES AT COMPRESSION JOINTS SHALL BE DESIGNED FOR THE FULL LOAD WITHOUT CONSIDERING WOOD TO WOOD BEARING.
8. ALL METAL PLATE DIMENSIONS SHALL BE INCREASED BY 10% ABOVE THAT REQUIRED BY THE ANALYSIS. ALLOWABLE STRESS FOR METAL PLATE SHALL NOT BE INCREASED FOR THE LOAD DURATION. METAL PLATES SHALL BE PRESSED OR ROLLED INTO MEMBERS TO OBTAIN FULL PENETRATION WITHOUT CRUSHING THE WOOD SURFACE.
9. ALL METAL PLATES SHALL BE GALVANIZED STEEL AND SHALL BE ON BOTH SIDES OF EACH CONNECTION. SUBMIT A COPY OF THE I.C.B.O APPROVAL, INCLUDING ALLOWABLE STRESSES ESTABLISHED BY THIS COMMITTEE, FOR METAL PLATES USED.
10. ALL LUMBER SHALL BE DOUGLAS FIR OR YELLOW PINE #1 GRADE. MOISTURE CONTENT SHALL NOT EXCEED 19% NOR SHALL BE LESS THAN 7%. HANDLING, STORAGE AND INSTALLATION OF ALL TRUSSES SHALL BE DONE SUCH THAT THE SPECIFIED MINIMUM AND MAXIMUM MOISTURE CONTENT LIMITS ARE NOT EXCEEDED. GRADE STAMPS SHALL APPEAR ON ALL MEMBERS.

FILE NAME: PROJECTS\19\_08\_100\_08\_100 - WELL #10 WELL HOUSE\CAD\S-1 STRUCTURAL NOTES.DWG
FILE DATE: 11-12-2024 14:33:56 (BKC)



HANSEN ALLER & LUCE ENGINEERS
DESIGNED JKN RCC 3
DRAFTED MAJ 2
CHECKED BDM RCC 1
DATE NOVEMBER 2024 NO. DATE REVISIONS BY APVD.

Table with columns for Design, Draft, Check, Date, Revision, and Approval. Includes a 'SCALE' section with 'NONE'.



WELL HOUSE #10 STRUCTURAL STRUCTURAL NOTES SHEET S-1 119.08.100

STRUCTURAL NOTES CONT:

WOOD TRUSSES NOTES CONT:

11. PRIOR TO FABRICATION, CONTRACTOR SHALL SUBMIT IN WRITING PROOF OF COMPLIANCE OF IN PLANT INSPECTION BY AN I.C.B.O. APPROVED INDEPENDENT INSPECTION AGENCY. SUBMIT SHOP DRAWINGS FOR TRUSS LAYOUT & DESIGN.
12. A HURRICANE TIE IS TO BE INSTALLED AT EACH TRUSS TO DOUBLE TOP PLATE LOCATION.
13. TRUSS MANUFACTURER IS RESPONSIBLE FOR ALL TRUSS HANGERS.

SOIL NOTES:

1. SOILS REPORT WAS PREPARED FOR THE SITES BY AGECE.
2. ALL ORGANIC MATERIALS, RUBBISH, ETC. SHALL BE REMOVED FROM BENEATH LOCATIONS OF PROPOSED FOOTINGS, CONCRETE SLABS AND ASPHALT PAVING.
3. SLABS SHALL BE PLACED ON MINIMUM OF 4" OF GRANULAR BACKFILL COMPACTED TO 95% MAXIMUM RELATIVE DENSITY.
4. STRUCTURAL FILL SHALL CONFORM TO THE REQUIREMENTS OF 2.2.A OF SECTION 13 23 23 – EXCAVATING AND BACKFILL FOR STRUCTURES FOR STRUCTURAL FILL PLACED BENEATH PUMP HOUSE STRUCTURES; AND 2.1.B OF SECTION 31 22 00 – SITE GRADING FOR STRUCTURAL FILL PLACED BENEATH PAVEMENT AREAS, EXTERIOR CONCRETE FLATWORK, AND CURB AND GUTTER.
5. ALL FREE WATER SHALL BE REMOVED FROM THE FOUNDATION EXCAVATION PRIOR TO PLACING CONCRETE.
6. EXTERIOR FOOTINGS AND GRADE BEAMS SHALL BE LOCATED AT LEAST 30" BELOW FINISHED GRADE, AND MAINTAIN 6" BETWEEN FINISH GRADE AND WOOD FRAMING.

ANCHOR NOTES:

1. ALL ANCHORS TO BE INSTALLED PER THE MANUFACTURER'S REQUIREMENTS. FOR BOTH MECHANICAL AND EPOXY TYPE ANCHORS THESE REQUIREMENTS INCLUDE, BUT IS NOT LIMITED TO:
  - A. PROPER HOLE DIAMETER, DEPTH, EDGE DISTANCES, AND SPACING.
  - B. PROPER HOLE PREPARATION AND CLEANOUT
  - C. WEATHER REQUIREMENTS TO BE FOLLOWED, ESPECIALLY FOR COLD WEATHER APPLICATIONS.
  - D. ALL STRUCTURAL ANCHORS TO COMPLY WITH THE CRACKED CONCRETE REQUIREMENTS OF THE CURRENT EDITION OF THE ACI 318.
2. ANY EPOXY TYPE ANCHOR IS TO MEET THE CURRENT ANSI/NSF 61 REQUIREMENTS FOR DRINKING WATER SYSTEM COMPONENTS, WHERE APPLICABLE.

SEISMIC REQUIREMENTS:

1. CONTRACTOR SHALL DESIGN SEISMIC ATTACHMENTS, BRACES, AND ANCHORS TO THE STRUCTURE FOR ELEMENTS OF THE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL SYSTEMS, INCLUDED IN THE WORK, TO MEET CODE REQUIREMENTS. DESIGN REQUIREMENTS INCLUDE:
  - A. DESIGN IN ACCORDANCE WITH IBC, SECTION 1613 AND ASCE 7-16, CHAPTER 13.
  - B. ATTACHMENTS, BRACES, AND ANCHORS TO THE STRUCTURE FOR ARCHITECTURAL, MECHANICAL, AND ELECTRICAL SYSTEMS SHALL BE DESIGNED TO TRANSFER SEISMIC FORCES (SPECIFIED IN ASCE 7, SECTION 13.3) TO THE STRUCTURE.
  - C. DESIGN FORCES FOR ANCHORS IN CONCRETE OR MASONRY SHALL BE IN ACCORDANCE WITH ASCE 7, SECTION 13.4
  - D. SEISMIC ANCHORAGE AND BRACING SYSTEMS SHALL BE DESIGNED AND STAMPED BY A QUALIFIED PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF UTAH.
  - E. DESIGN SEISMIC ATTACHMENTS, BRACES, AND ANCHORAGES FOR THE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL SYSTEMS IN ACCORDANCE WITH THE PROVISIONS OF THE INTERNATIONAL BUILDING CODE AND THE SITE-SPECIFIC SEISMIC CRITERIA SHOWN ON THIS SHEET.
  - F. COMPONENT IMPORTANT FACTOR:
    1. IP EQUALS 1.0, UNLESS NOTED OTHERWISE.
    2. IP SHALL BE TAKEN AS 1.5 FOR COMPONENTS WHOSE FAILURE COULD IMPAIR CONTINUED OPERATION OF HAZARDOUS OR ESSENTIAL FACILITIES.
    3. IP SHALL BE TAKEN AS 1.5 FOR COMPONENTS THAT CONTAIN HAZARDOUS MATERIALS OR THAT ARE REQUIRED FOR LIFE SAFETY TO BE FUNCTIONAL AFTER A SEISMIC EVENT.
2. CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL SEISMIC ATTACHMENTS, BRACES, AND ANCHORS TO THE STRUCTURE FOR ELEMENTS OF THE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL SYSTEMS, INCLUDED IN THE WORK. CONTRACTOR SHALL ALSO SUBMIT SEISMIC DESIGN CALCULATIONS STAMPED BY A LICENSED ENGINEER.

FILE NAME: PROJECTS\19\_0\_OREM\08.100 - WELL #10 WELL HOUSE\CAD\S-2 STRUCTURAL NOTES CONT.DWG  
FILE DATE: 11-18-2024 07:52:22 (BKC)



PROFESSIONAL ENGINEER  
JACOB K. NIELSEN  
11/27/2024  
No. 11762890-2202

DESIGNED	JKN	RCC	3						
DRAFTED	MAJ		2						
CHECKED	BDM	RCC	1						
DATE	NOVEMBER 2024	NO.		DATE		REVISIONS		BY	APVD.

SCALE  
NONE



WELL HOUSE #10  
STRUCTURAL  
STRUCTURAL NOTES CONTINUED

SHEET  
S-2  
119.08.100

FILE NAME: PROJECTS\119\_09EM\08.100 - WELL #10 WELL HOUSE\CAD\3-SPECIAL INSPECTIONS.DWG  
 FILE DATE: 11.18.2024 07:52:57 (BKC)

SPECIAL INSPECTIONS AND TESTS OF SOILS				
SPECIAL INSPECTION REQUIRED Y/N	VERIFICATION AND INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCE OF CRITERIA
		CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED	IBC SECTION
Y	1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	---	X	1705.6
Y	2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	---	X	1705.6
Y	3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	---	X	1705.6
Y	4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	---	1705.6
Y	5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT THE SITE HAS BEEN PREPARED PROPERLY.	---	X	1705.6

SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION					
SPECIAL INSPECTION REQUIRED Y/N	TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCE STANDARD	IBC REFERENCE
Y	1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	---	X	ACI 318 CH. 20, 25.2, 25.3, 26.5.1-26.5.3	---
	2. REINFORCING BAR WELDING:				
N	a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A 706.	---	X	AWS D1.4 ACI 318: 26.5.4	---
N	b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16".	---	X		
N	c. INSPECT ALL OTHER WELDS.	X	---		
Y	3. INSPECT ANCHORS CAST IN CONCRETE.	---	X	ACI 318: 17.8.2	---
Y	4. VERIFY USE OF REQUIRED DESIGN MIX.	---	X	ACI 318 CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2
Y	5. PRIOR TO CONCRETE PLACEMENT, FABRICATION SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	---	ASTM C31 ASTM C172 ACI 318: 26.5, 26.12	---
Y	6. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	---	ACI 318: 26.5	---
Y	7. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	---	X	ACI 318: 26.5.3-26.5.5	---
Y	8. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	---	X	ACI 318: 26.11.1.2 (b)	---
	NOTE: ITEMS 11 AND 12 FROM IBC TABLE 1705.3 NOT REQUIRED.				

LEVELS 1, 2 AND 3 QUALITY ASSURANCE OF MASONRY (TMS 602-16 TABLE 3)				
MINIMUM VERIFICATION	REQUIRED FOR QUALITY ASSURANCE <sup>(a)</sup>			REFERENCE FOR CRITERIA
	LEVEL 1	LEVEL 2	LEVEL 3	TMS 602
PRIOR TO CONSTRUCTION, VERIFICATION OF COMPLIANCE OF SUBMITTALS.	R	R	R	ART. 1.5
PRIOR TO CONSTRUCTION, VERIFICATION OF $f_m$ and $f_{AAC}$ EXCEPT WHERE SPECIFICALLY EXEMPTED BY THE CODE.	NR	R	R	ART. 1.4 B
DURING CONSTRUCTION, VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) WHEN SELF-CONSOLIDATING GROUT IS DELIVERED TO THE PROJECT SITE.	NR	R	R	ART. 1.5 & 1.6.3
DURING CONSTRUCTION, VERIFICATION OF $f_m$ and $f_{AAC}$ FOR EVERY 5,000 SQ. FT. (465 SQ.M).	NR	NR	R	ART. 1.4 B
DURING CONSTRUCTION, VERIFICATION OF PROPORTIONS OF MATERIALS AS DELIVERED TO THE PROJECT SITE FOR PREMIXED OR PREBLENDED MORTAR, PRESTRESSING GROUT, AND GROUT OTHER THAN SELF-CONSOLIDATION GROUT.	NR	NR	R	ART. 1.4 B

(a) R = REQUIRED, NR = NOT REQUIRED

LEVELS 3 QUALITY ASSURANCE OF MASONRY (TMS 602-16 TABLE 3)					
SPECIAL INSPECTION REQUIRED Y/N	INSPECTION TASK	FREQUENCY (a)		REFERENCE OF CRITERIA	
		CONTINUOUS	PERIODIC	TMS 402	TMS 602
	1. AS MASONRY CONSTRUCTION BEGINS, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE.				
Y	a. PROPORTIONS OF SITE-PREPARED MORTAR.	---	X	---	ART. 2.1, 2.6 A & 2.6 C
Y	c. GRADE, TYPE AND SIZE OF REINFORCEMENT, CONNECTORS, ANCHOR BOLTS AND PRESTRESSING TENDONS AND ANCHORAGES.	---	X	---	ART. 3.4 & 3.6 A
Y	e. PROPERTIES OF THIN-BED MORTAR FOR AAC MASONRY.	X	---	---	2.1 C.1
Y	f. SAMPLE PANEL CONSTRUCTION.	X	---	---	ART. 1.6 D
	2. PRIOR TO GROUTING, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE.				
Y	a. GROUT SPACE.	X	---	---	ART. 3.2 D, 3.2 F
Y	c. PLACEMENT OF REINFORCEMENT, CONNECTORS AND ANCHOR BOLTS.	X	---	SEC. 6.1, 6.3.1, 6.3.6, 6.3.7	ART. 3.2 E & 3.4
	3. VERIFY COMPLIANCE OF THE FOLLOWING DURING CONSTRUCTION.				
Y	a. MATERIALS AND PROCEDURES WITH THE APPROVED SUBMITTALS.	---	X	---	ART. 1.5
Y	b. PLACEMENT OF MASONRY UNITS AND MORTAR JOINT CONSTRUCTION.	---	X	---	ART. 3.3 B
Y	c. SIZE AND LOCATION OF STRUCTURAL MEMBERS.	---	X	---	ART. 3.3 F
Y	d. TYPE, SIZE AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION.	---	X	SEC. 1.2.1(e), 6.2.1 & 6.3.1	---
Y	e. WELDING REINFORCEMENT.	X	---	SEC. 6.1.6.1.2	---
Y	f. PREPARATION, CONSTRUCTION AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMP BELOW 40F) OR HOT WEATHER (TEMP ABOVE 90F).	---	X	---	ART. 1.8 C & 1.8 D
Y	i. PLACEMENT OF AAC MASONRY UNITS AND CONSTRUCTION OF THIN-BED MORTAR JOINTS.	X	---	---	ART. 3.3 B.9 & 3.3 F.1.b
Y	4. OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS.	X	---	---	ART. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 b.2.c.3, 1.4 B.3, 1.4 B.4
	(a) FREQUENCY REFERS TO THE FREQUENCY OF SPECIAL INSPECTIONS, WHICH MAY BE CONTINUOUS DURING THE TASK LISTED OR PERIODIC DURING THE LISTED TASK, AS DEFINED IN THE TABLE.				
	(b) REQUIRED FOR THE FIRST 5000 SQUARE FEET OF AAC MASONRY.				
	(c) REQUIRED AFTER THE FIRST 5000 SQUARE FEET OF AAC MASONRY.				
	(d) REQUIRED AFTER THE FIRST 10% OF EACH DIFFERENT TYPE OF ANCHOR AND/OR INSTALLER.				
	(e) REQUIRED FOR THE REMAINING 90% OF EACH DIFFERENT TYPE OF ANCHOR AND/OR INSTALLER.				

**SPECIAL INSPECTION NOTES:**

- THE SPECIAL INSPECTOR IS RESPONSIBLE FOR ENSURING THE PUBLICATIONS USED FOR INSPECTION CRITERIA ARE THE MOST CURRENT AND UP TO DATE.
- FAILURE OF INSPECTABLE AREAS ARE TO BE NOTED AND SUBMITTED TO OWNER, ENGINEER OF RECORD, AND CONTRACTOR IF CORRECTIONS REQUIRE A FOLLOW UP INSPECTION AND CANNOT BE MADE COMPLETED "ON THE SPOT".
- DOCUMENTATION FOR INSPECTIONS MUST BE COMPLETED AND SUBMITTED IN ACCORDANCE WITH CONTRACT REQUIREMENTS, INTERNATIONAL BUILDING CODE (LATEST EDITION), AND MANUAL FOR SPECIAL INSPECTIONS" (LATEST EDITION), OR AS AGREED UPON WITH OWNER, ENGINEER OF RECORD, AND CONTRACTOR.
- SPECIAL INSPECTION DOES NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR ANY REQUIRED INSPECTIONS BY THE BUILDING OFFICIAL. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING INSPECTIONS WITH THE BUILDING DEPARTMENT AND COORDINATING SPECIAL INSPECTIONS WITH OWNER.
- SPECIFIED CONCRETE AND MASONRY TESTING DURING CONSTRUCTION WILL BE CONTRACTOR FURNISHED. SPECIFIED LAB TEST, MIXES, AND SIMILAR TESTING TO VERIFY MATERIAL QUALITY AND CONFORMANCE TO THE SPECIFICATIONS, REQUIRING SUBMITTAL FOR REVIEW AND ACCEPTANCE, SHALL BE THE RESPONSIBILITY OF CONTRACTOR.
- STRUCTURAL OBSERVATIONS (PROVIDED BY ENGINEER) IS REQUIRED IN ACCORDANCE WITH IBC SECTION 110 AND CHAPTER 17 AS INDICATED IN THE STATEMENT OF SPECIAL INSPECTION. CONTRACTOR SHALL PROVIDE 48 HOURS NOTICE TO ENGINEER PRIOR TO PLACING CONCRETE OR COVERING UP ANY WORK.
- OWNER WILL PROVIDE SPECIAL INSPECTIONS. CONTRACTOR SHALL PROVIDE AT LEAST 48 HOURS NOTICE TO OWNER WHEN REQUESTING SPECIAL INSPECTIONS.

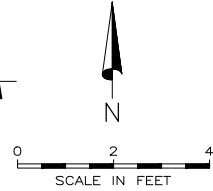
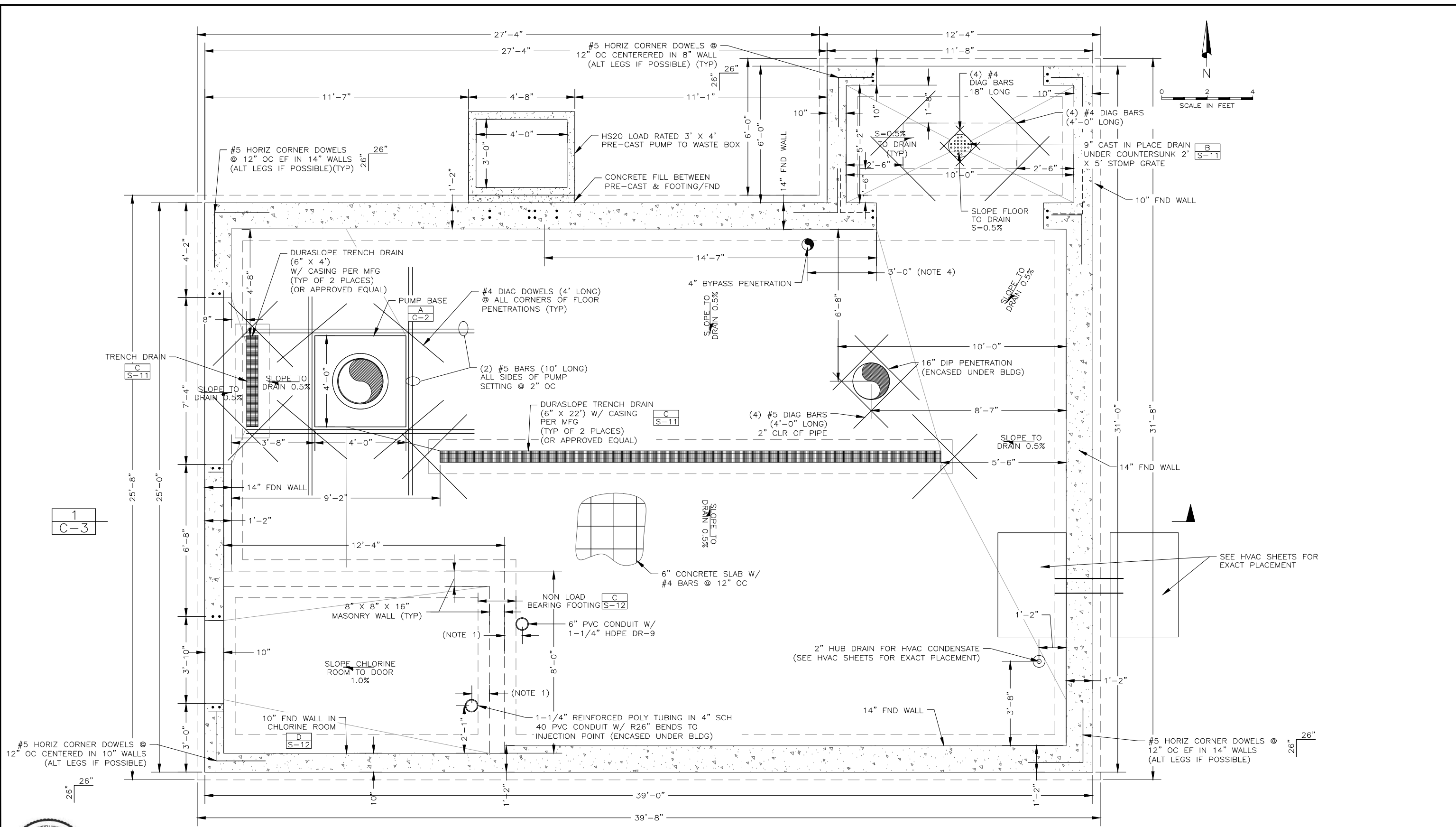
DESIGNED	JKN	RCC	3		
DRAFTED			2		
CHECKED	BDM	RCC	1		
DATE	NOVEMBER 2024	NO.		DATE	

SCALE: NONE

WELL HOUSE #10  
 STRUCTURAL  
 SPECIAL INSPECTIONS SCHEDULE

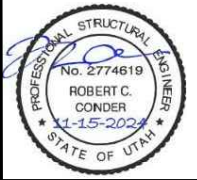
SHEET S-3  
 119.08.100

FILE NAME: PROJECTS\119 - OREM\08100 - WELL #10 WELL HOUSE\CAD\S-4 FOOTING & FOUNDATION PLAN.DWG  
 FILE DATE: 11-15-2024 07:53:30 (BKC)



FOUNDATION PLAN 1  
C-1

- GENERAL SHEET NOTES:
1. CONDUIT AND OR PVC PENETRATIONS ON INTERIOR WALL SHALL NOT INTERFERE WITH INTERIOR WALL FOOTING. DO NOT CUT STEEL REINFORCEMENT IN FOOTING.
  2. ALL PVC CONDUIT SHALL HAVE SEALED CAPS.
  3. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING OR FABRICATION.
  4. PENETRATION DICTATED BY CONNECTING TO 16" WL. POSITION MAY VARY.



DESIGNED	JKN	RCC	3
DRAFTED	BKC		2
CHECKED	BDM	RCC	1
DATE	NOVEMBER 2024	NO.	

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
AS SHOWN



WELL HOUSE #10  
STRUCTURAL  
FOOTING & FOUNDATION PLAN

SHEET  
S-4  
119.08.100



FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\S-5 STRUCTURAL FLOOR PLAN.DWG  
 FILE DATE: 11-15-2024 07:54:15 (BKC)



DESIGNED JKN RCC 3  
 DRAFTED BKC 2  
 CHECKED BDM RCC 1  
 DATE NOVEMBER 2024 NO. DATE

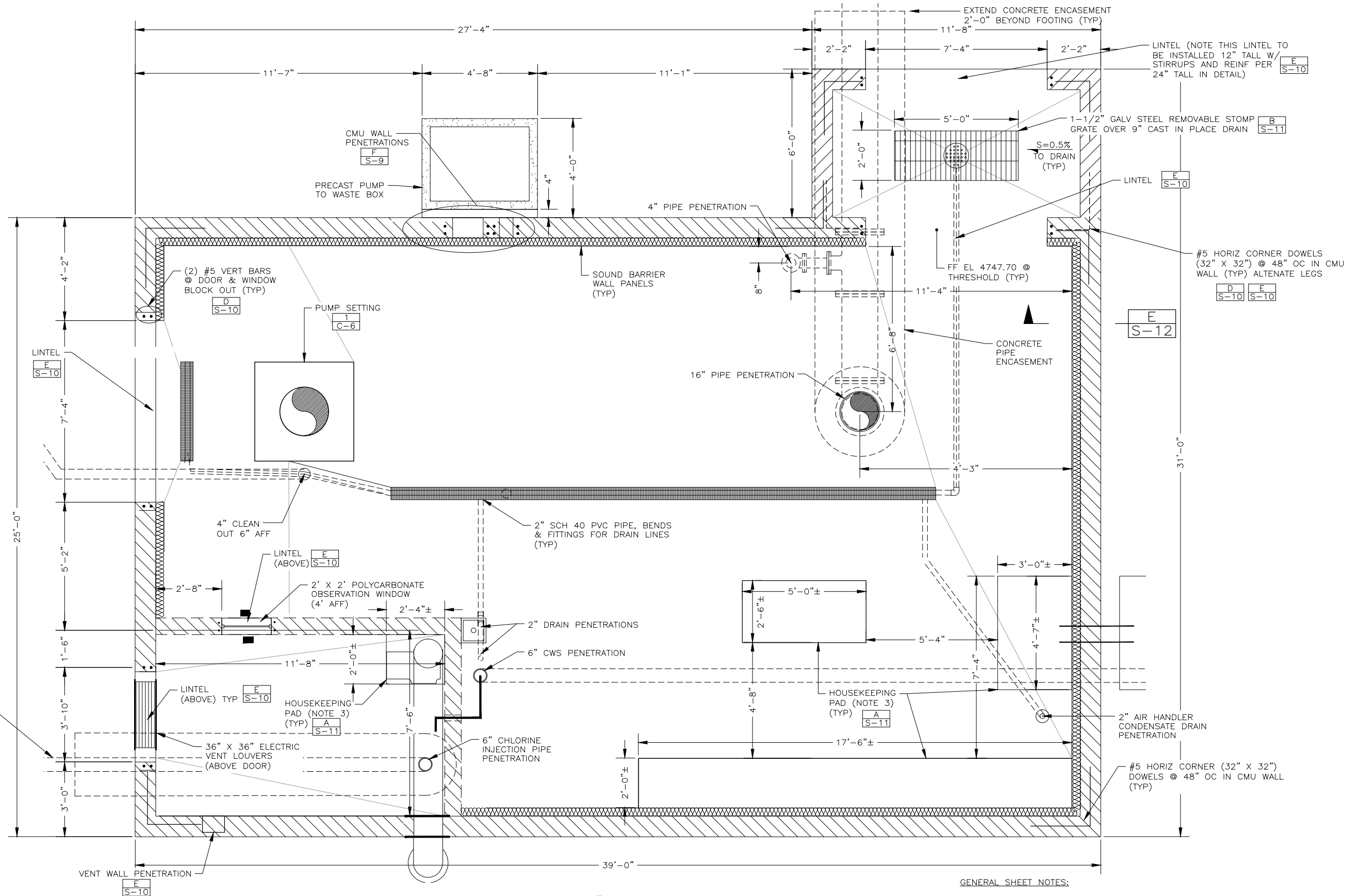
NO.	DATE	REVISIONS	BY	APVD.

SCALE AS SHOWN



WELL HOUSE #10  
 STRUCTURAL  
 WALL PLAN

SHEET S-5  
 119.08.100



GENERAL SHEET NOTES:

1. CONDUIT AND OR PVC PENETRATIONS ON INTERIOR WALL SHALL NOT INTERFERE WITH INTERIOR WALL FOOTING. DO NOT CUT STEEL REINFORCEMENT IN FOOTING.
2. ALL PVC CONDUIT SHALL HAVE SEALED CAPS.
3. VERIFY HOUSEKEEPING PAD DIMENSIONS AND REQUIREMENTS WITH SUBMITTED EQUIPMENT.

FILE NAME: PROJECTS\19\_ OREM\08.100 - WELL #10 WELL HOUSE\CAD\S-6 ROOFING PLAN.DWG  
 FILE DATE: 11.6.2024 11:14:23 (BNC)



DESIGNED	JKN	RCC	3
DRAFTED	MAJ		2
CHECKED	BDM	RCC	1
DATE	NOVEMBER 2024	NO.	DATE

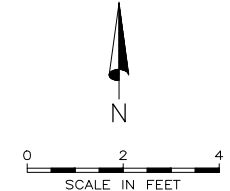
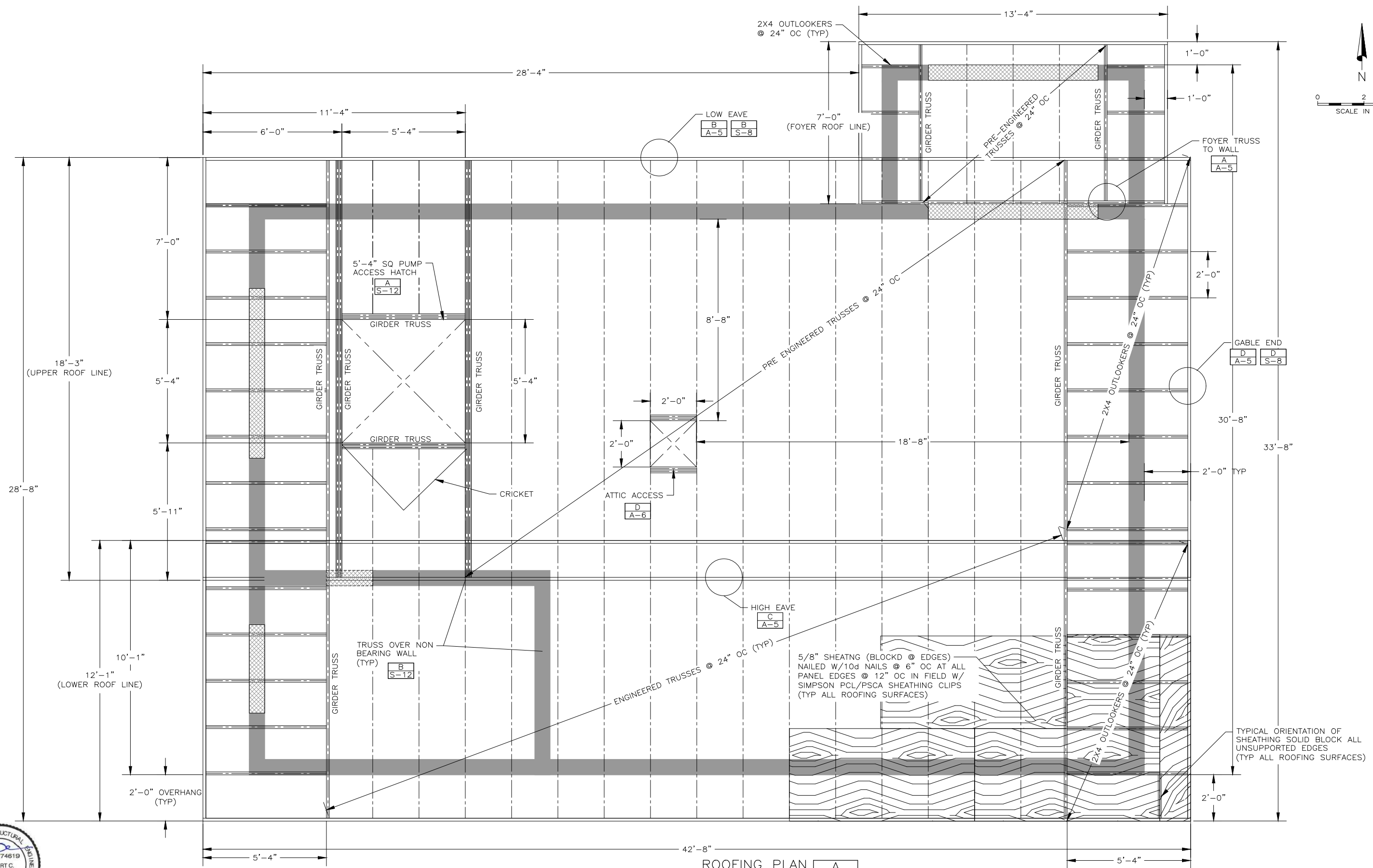
NO.	DATE	REVISIONS	BY	APVD.

SCALE  
AS SHOWN



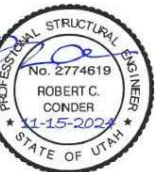
WELL HOUSE #10  
STRUCTURAL  
ROOFING PLAN

SHEET  
S-6  
119.08.100



ROOFING PLAN A  
A-1

FILE NAME: PROJECTS\119 - OREM\08.100 - WELL #10 WELL HOUSE\CAD\S-7 SECTION.DWG  
 FILE DATE: 11-15-2024 07:55:43 (BKC)



DESIGNED JKN RCC 3  
 DRAFTED BKC, MAJ 2  
 CHECKED BDM RCC 1  
 DATE NOVEMBER 2024 NO. DATE

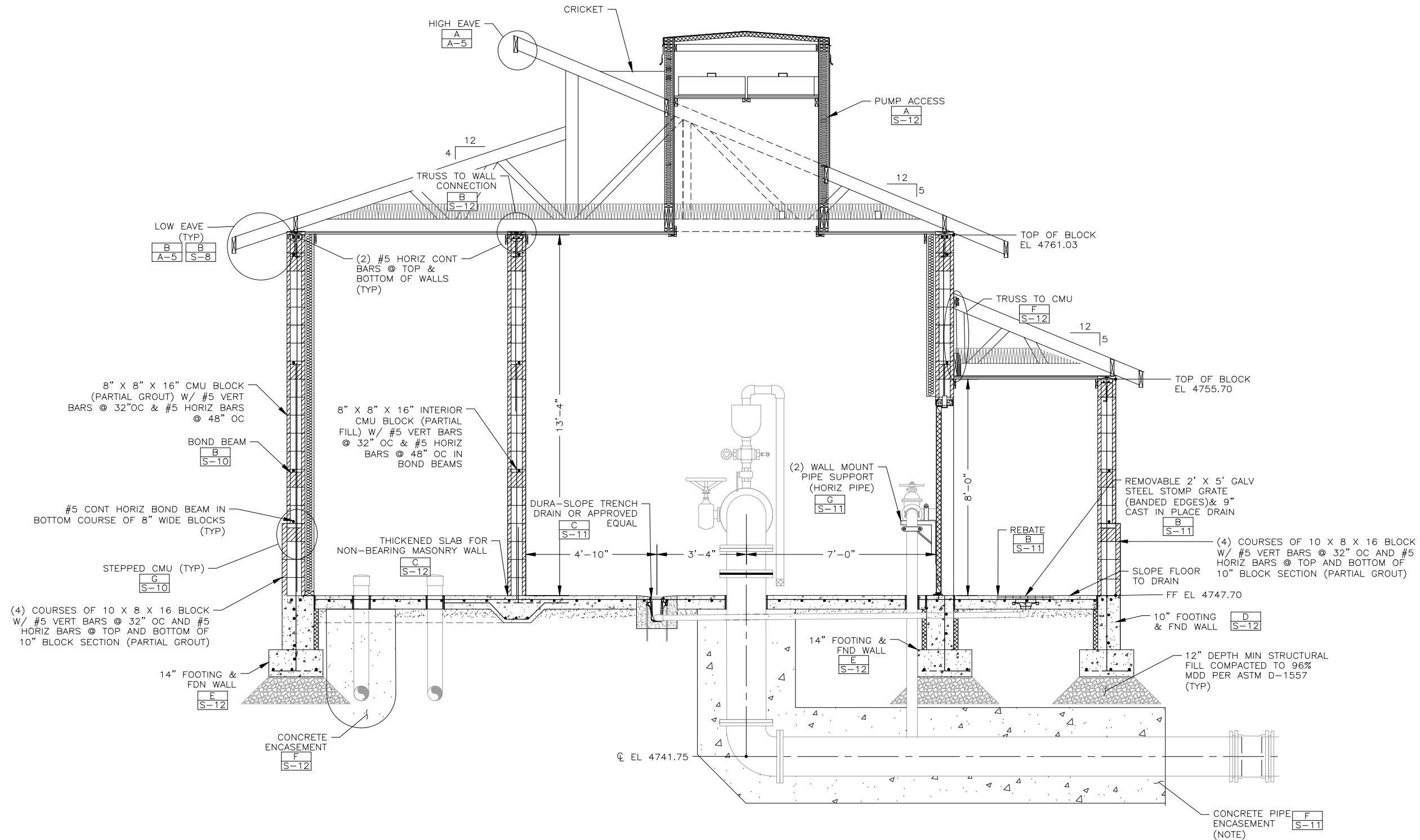
NO.	DATE	REVISIONS	BY	APVD.

SCALE AS SHOWN



WELL HOUSE #10  
 STRUCTURAL  
 SECTION

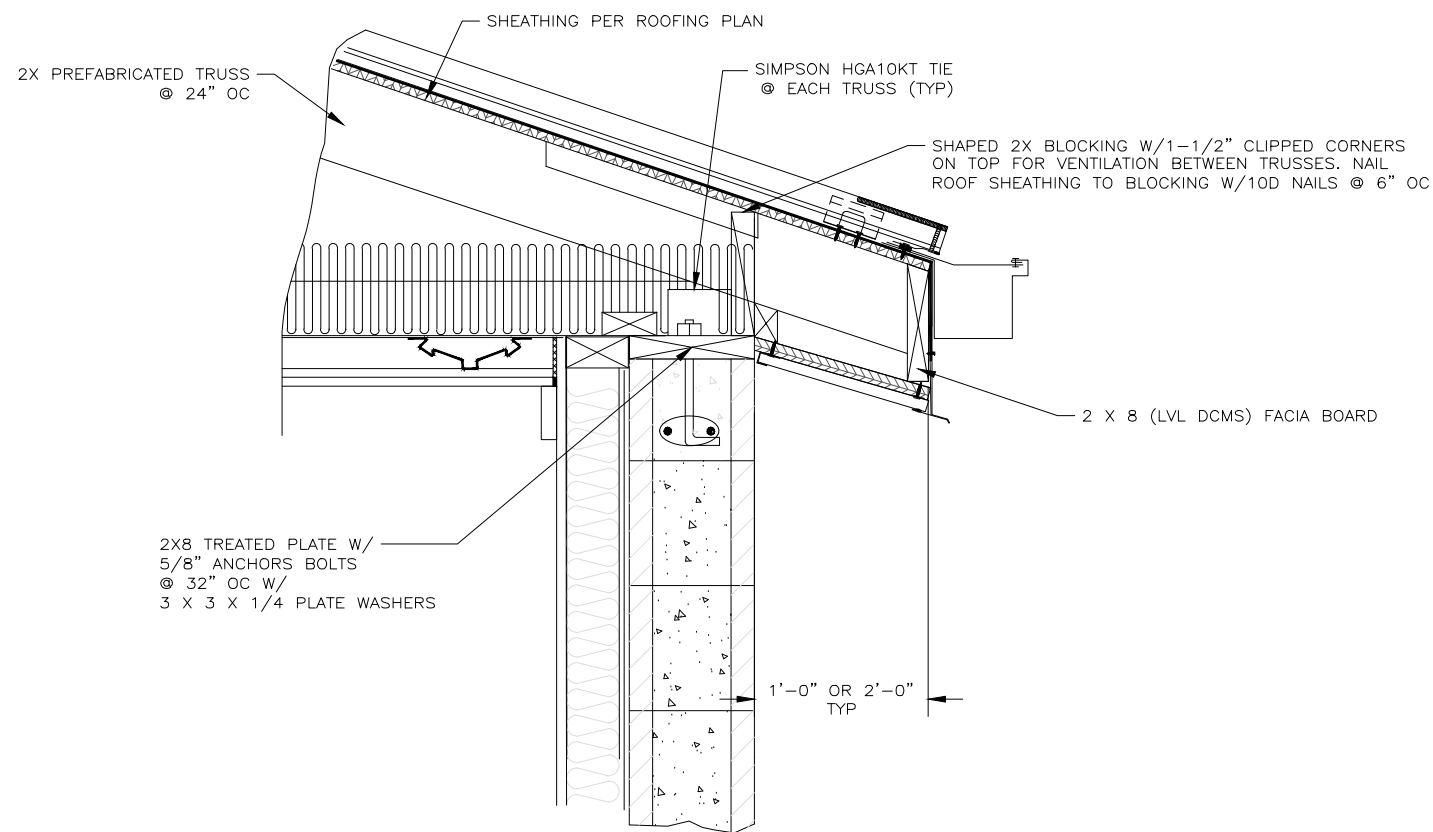
SHEET S-7  
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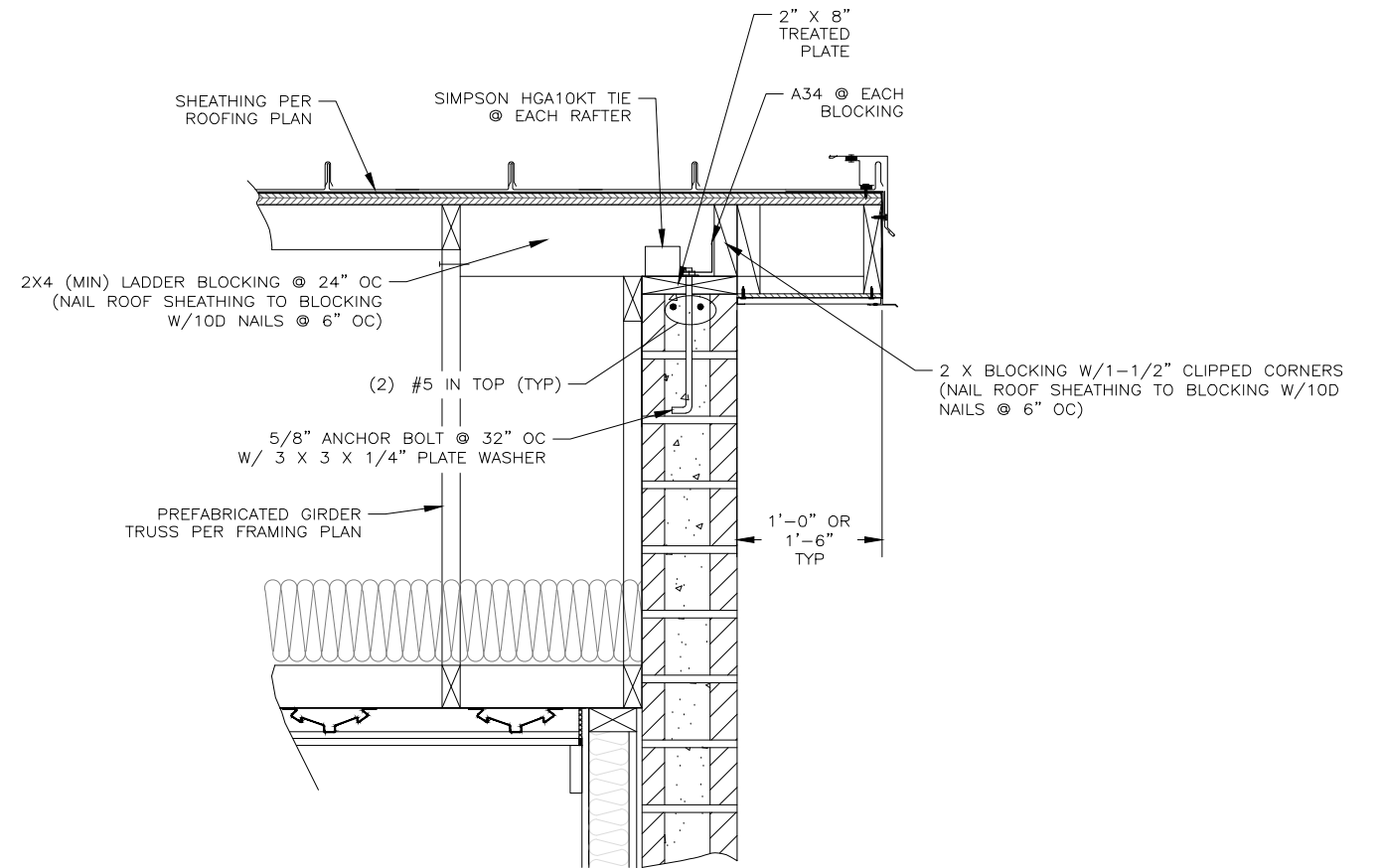
SECTION 2  
 C-2  
 SCALE IN FEET

GENERAL SHEET NOTE:  
 CONCRETE ENCASMENT SHALL EXTEND HORIZONTALLY BEYOND THE BUILDING FOOTPRINT TO A POINT THAT IS DETERMINED BY A 1:1 SLOPE FROM THE BOTTOM OF THE FOOTING.

FILE NAME: PROJECTS\19\_ OREM\08.100 - WELL #10 WELL HOUSE\CAD\S-B ROOFING DETAILS .DWG  
 FILE DATE: 11.18.2024 07:56:20 (BKC)



LOW EAVE DETAIL B B  
 NTS A-5 S-6



GABLE DETAIL D D  
 NTS A-5 S-6

GENERAL SHEET NOTE:  
 SAW CUT TOP COURSE AFTER BRICK INSTALLATION.



DESIGNED	JKN	RCC	3
DRAFTED	BKC		2
CHECKED	BDM	RCC	1
DATE	NOVEMBER 2024	NO.	DATE

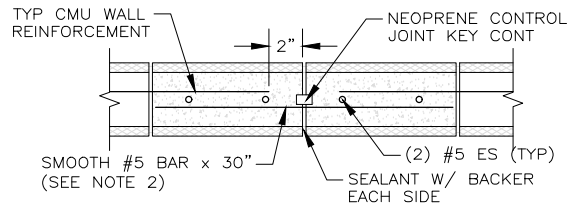
NO.	DATE	REVISIONS	BY	APVD.

SCALE  
 AS  
 SHOWN



WELL HOUSE #10  
 STRUCTURAL  
 ROOFING DETAILS

SHEET  
 S-8  
 119.08.100

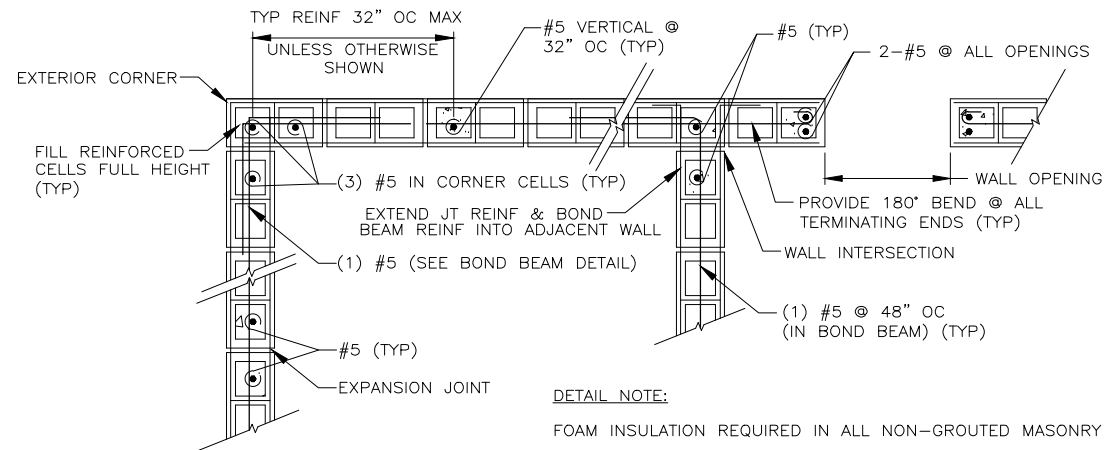


**DETAIL NOTES:**

1. EXACT LOCATIONS OF JOINTS TO BE DETERMINED BY THE CONTRACTOR & APPROVED BY THE ENGINEER. SPACING OF JOINTS TO NOT EXCEED 24' MAX.
2. SMOOTH BARS ACROSS JOINT SHALL MATCH HORIZONTAL BAR SPACING. PREVENT BOND BETWEEN BAR AND GROUT ON ONE SIDE OF JOINT WITH GREASE FILLED PVC SLEEVE, CAP AND SIZE SLEEVES TO ALLOW ONE INCH OF MOVEMENT BEYOND END OF PANELS.
3. ROOF LEVEL CHORD REINF. SHALL BE CONTINUOUS THROUGH CONTROL JOINT.
4. CONTROL JOINTS SHALL NOT INTERSECT LINTELS.

CMU EXPANSION JOINT 

A
NTS

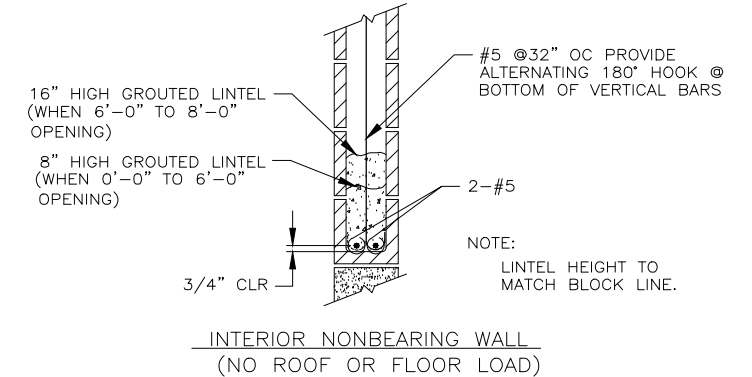


**DETAIL NOTE:**

FOAM INSULATION REQUIRED IN ALL NON-GROUTED MASONRY CELLS.

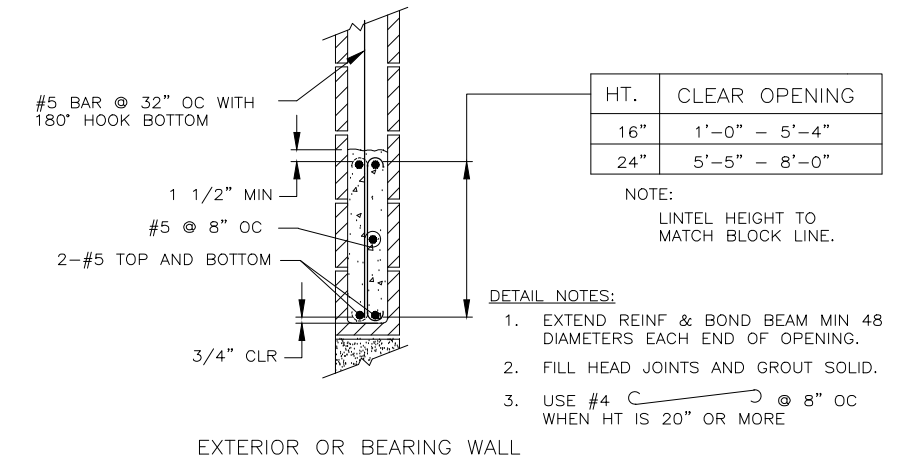
TYPICAL MASONRY WALL REINFORCING 

B
NTS



NOTE:  
LINTEL HEIGHT TO MATCH BLOCK LINE.

INTERIOR NONBEARING WALL (NO ROOF OR FLOOR LOAD)



NOTE:  
LINTEL HEIGHT TO MATCH BLOCK LINE.

**DETAIL NOTES:**

1. EXTEND REINF & BOND BEAM MIN 48 DIAMETERS EACH END OF OPENING.
2. FILL HEAD JOINTS AND GROUT SOLID.
3. USE #4 @ 8" OC WHEN HT IS 20" OR MORE

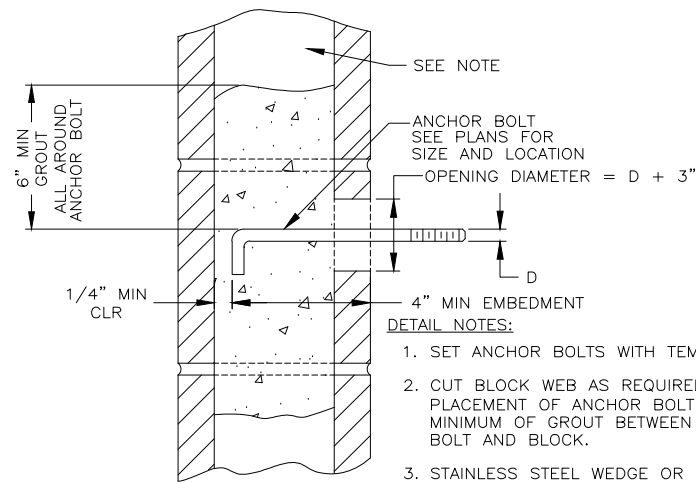
EXTERIOR OR BEARING WALL

**DETAIL NOTE:**

FOAM INSULATION REQUIRED IN ALL NON-GROUTED MASONRY CELLS.

MASONRY LINTEL DETAILS @ WALL OPENINGS 

E
NTS

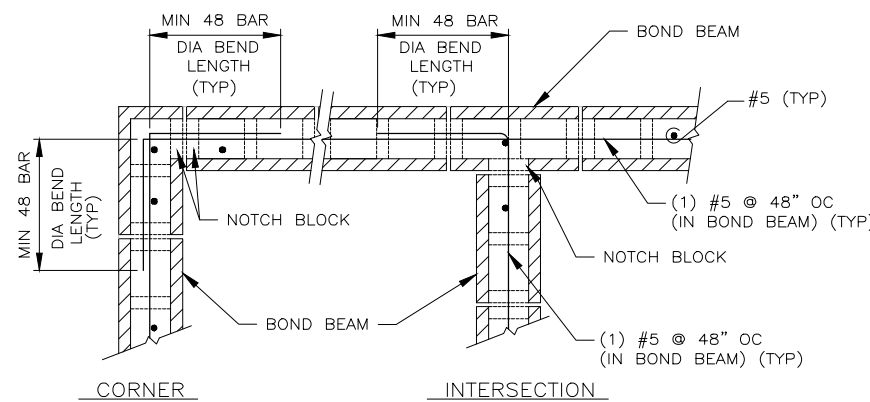


**DETAIL NOTES:**

1. SET ANCHOR BOLTS WITH TEMPLATE.
2. CUT BLOCK WEB AS REQUIRED TO ALLOW PLACEMENT OF ANCHOR BOLT AND 1/2" MINIMUM OF GROUT BETWEEN ANCHOR BOLT AND BLOCK.
3. STAINLESS STEEL WEDGE OR SCREW ANCHORS MAY BE USED IN LIEU OF ANCHOR BOLTS. CONTACT ENGINEER W/ ALT. IF DESIRED.

ANCHOR BOLTS IN MASONRY 

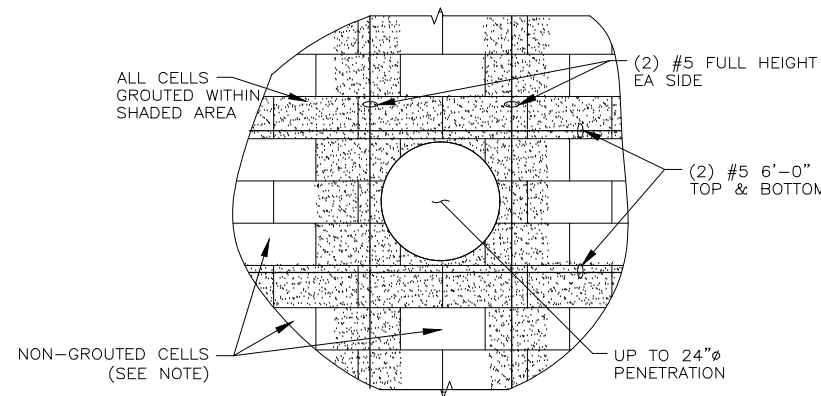
C
NTS



SEE MASONRY NOTES (SEE SHEET S-1)

MASONRY WALL REINFORCING AT TYPICAL BOND BEAM 

D
NTS

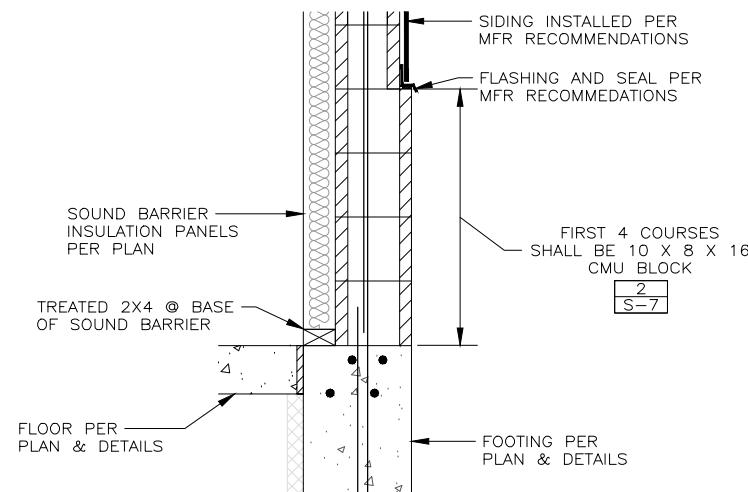


PIPE PENETRATION THROUGH MASONRY WALLS 

F	F
A-4	C-2

**DETAIL NOTE:**

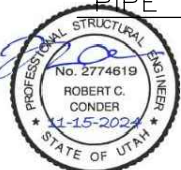
FLASHING FOR CMU PIPE PENETRATION IS FOUND AT D/C-7.



BOTTOM CMU COURSES 

G	G
C-3	C-4

FILE NAME: PROJECTS\19\_09\08\100 - WELL #10 WELL HOUSE\CAD\S-10 TYP MASONRY DETAILS.DWG  
FILE DATE: 11-18-2024 07:59:00 (BKC)



DESIGNED	JKN	RCC	3
DRAFTED	MAJ		2
CHECKED	BDM	RCC	1
DATE	NOVEMBER 2024	NO.	DATE

REVISIONS

BY APVD.

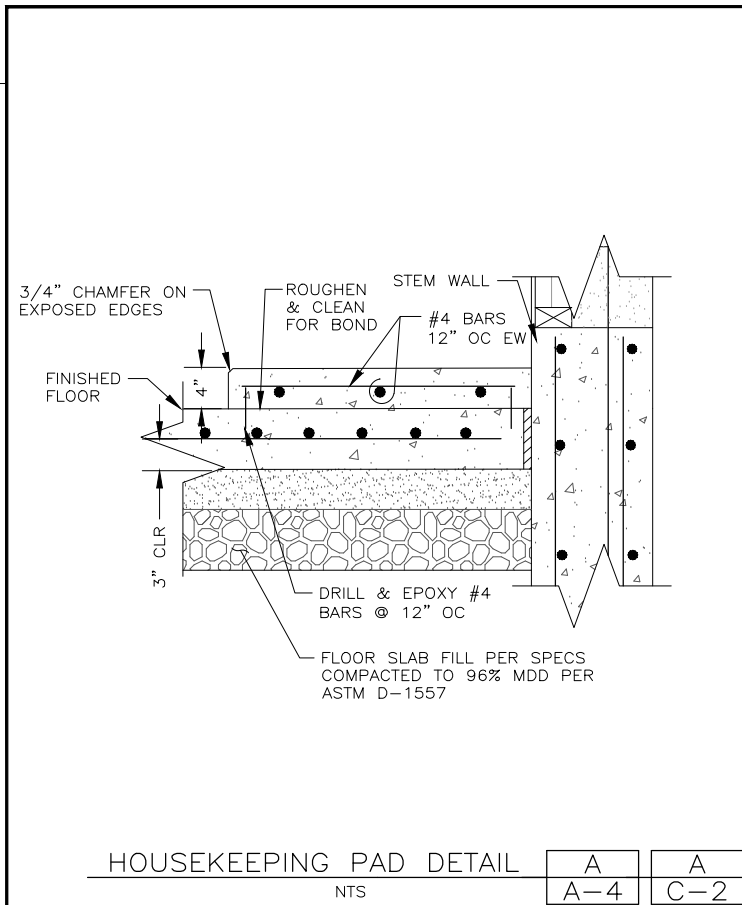
SCALE  
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WELL HOUSE #10  
STRUCTURAL  
TYPICAL MASONRY DETAILS

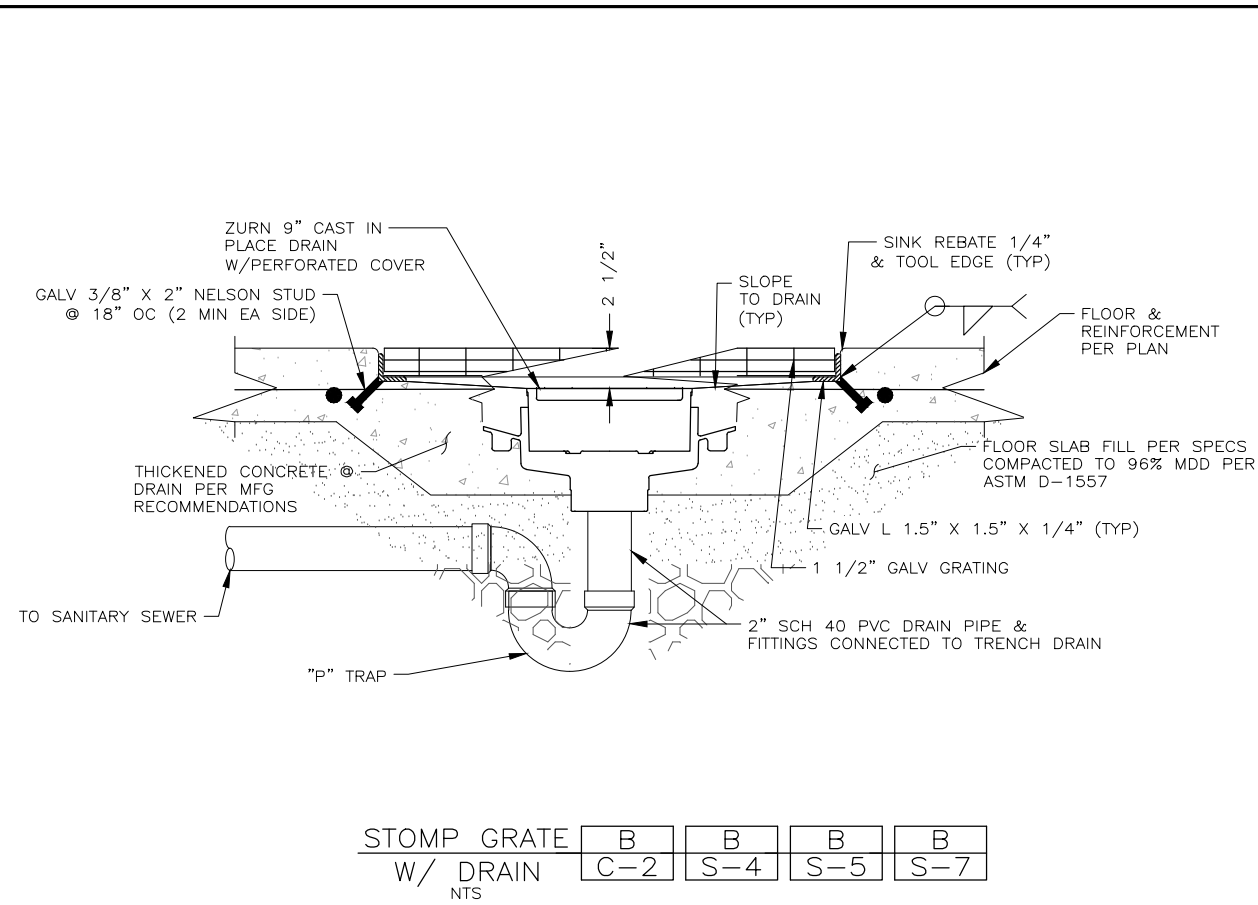
SHEET  
S-10  
119.08.100

FILE NAME: PROJECTS\19\_0RE\M\08.100 - WELL #10 WELL HOUSE\CAD\S-11\_MISC DETAILS I.DWG  
 FILE DATE: 11.23.2024 08:56:43 (BKC)



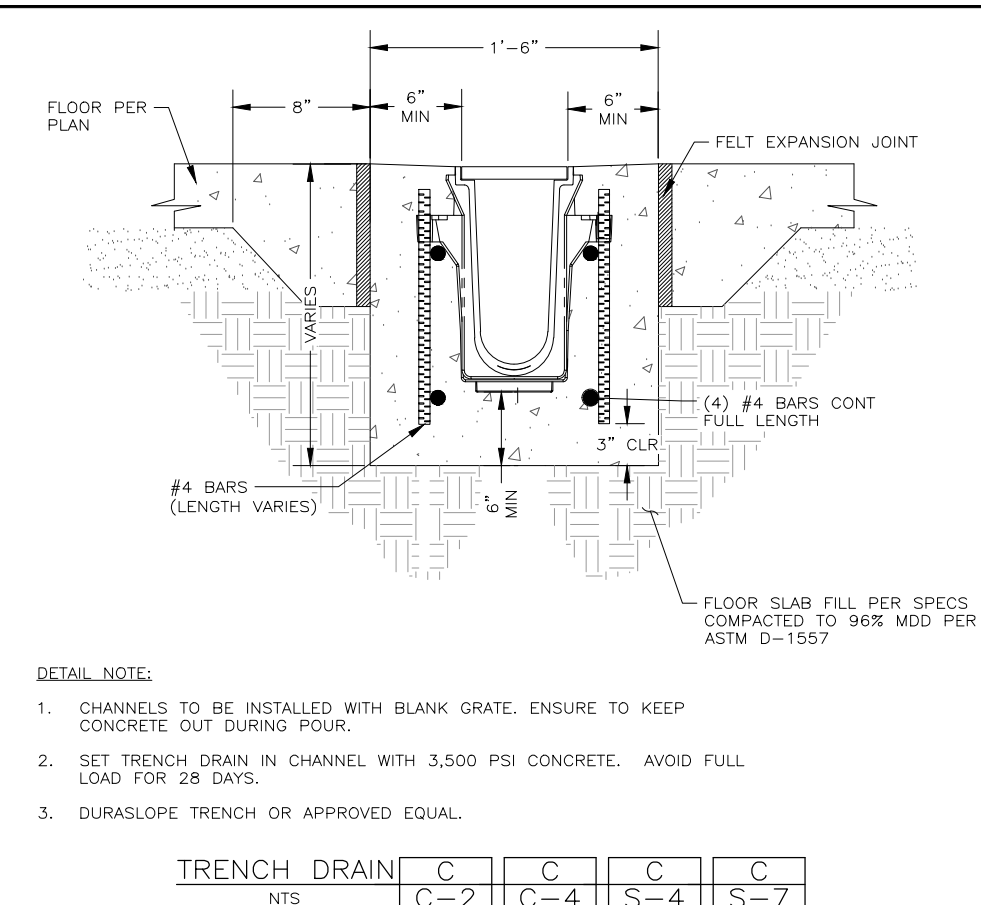
HOUSEKEEPING PAD DETAIL  
 NTS

A	A
A-4	C-2



STOMP GRATE W/ DRAIN  
 NTS

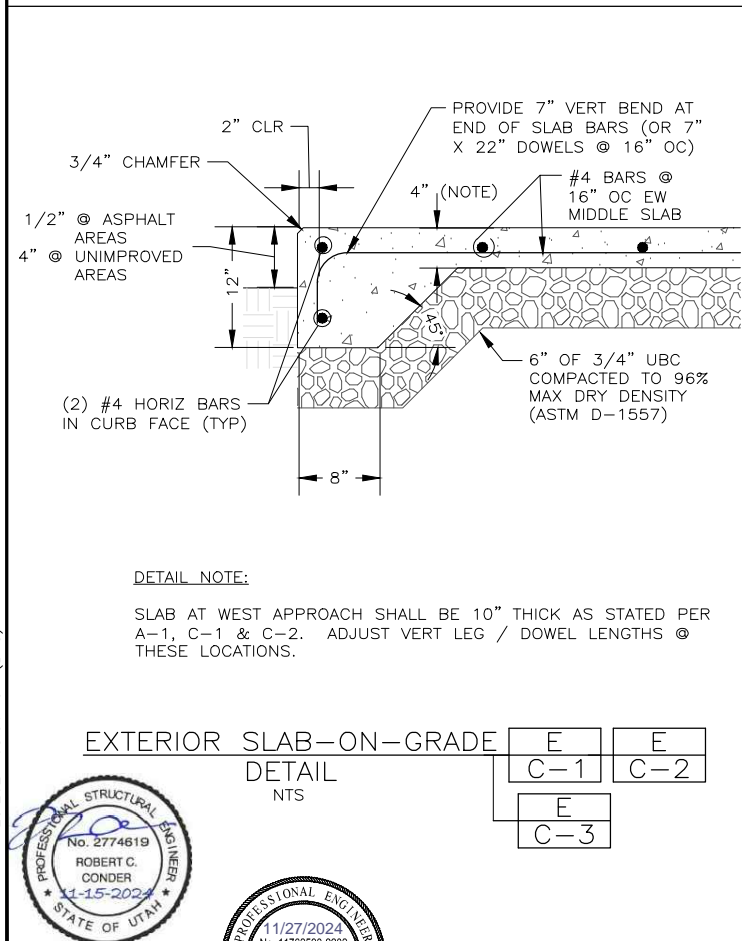
B	B	B	B
C-2	S-4	S-5	S-7



DETAIL NOTE:  
 1. CHANNELS TO BE INSTALLED WITH BLANK GRATE. ENSURE TO KEEP CONCRETE OUT DURING POUR.  
 2. SET TRENCH DRAIN IN CHANNEL WITH 3,500 PSI CONCRETE. AVOID FULL LOAD FOR 28 DAYS.  
 3. DURASLOPE TRENCH OR APPROVED EQUAL.

TRENCH DRAIN  
 NTS

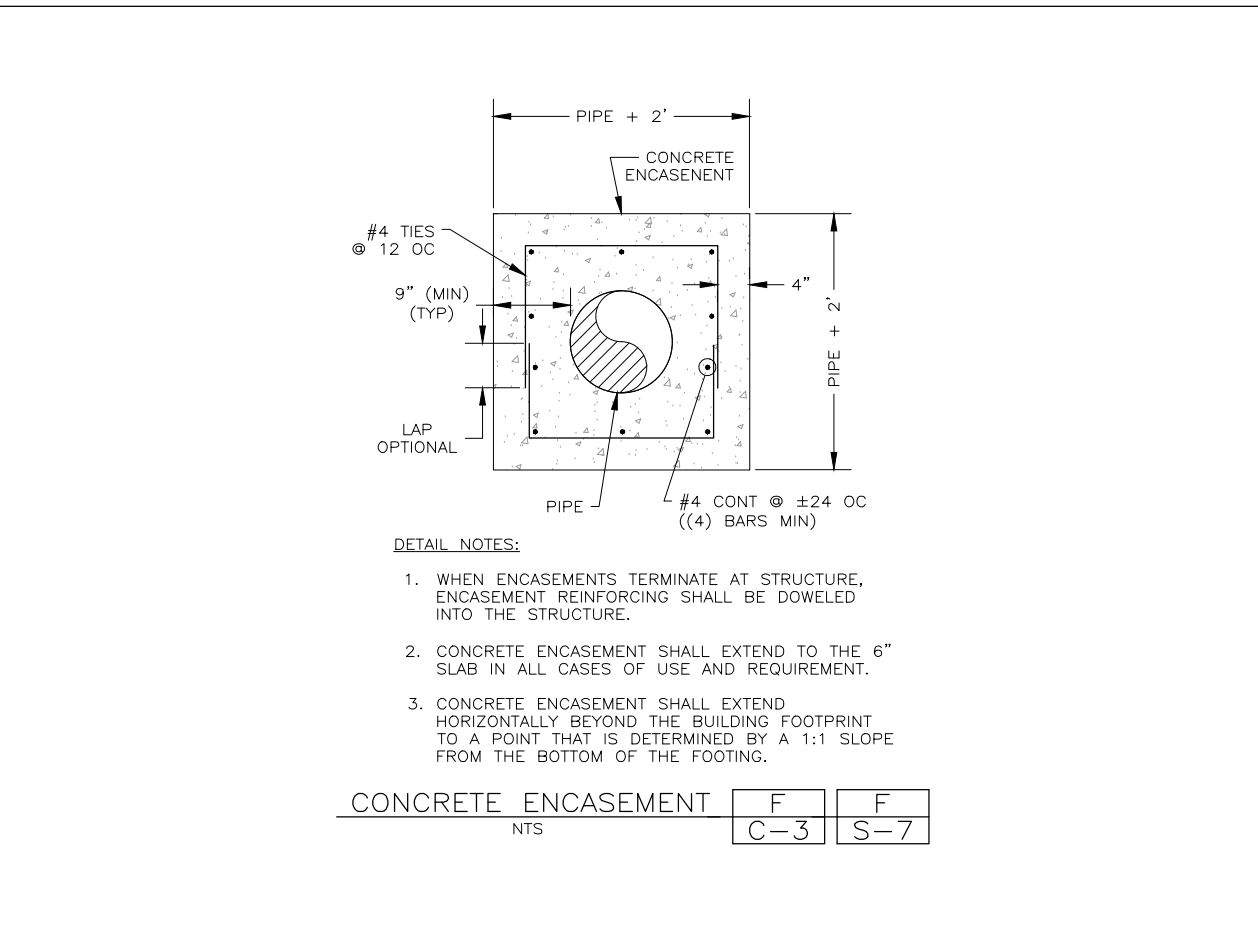
C	C	C	C
C-2	C-4	S-4	S-7



DETAIL NOTE:  
 SLAB AT WEST APPROACH SHALL BE 10" THICK AS STATED PER A-1, C-1 & C-2. ADJUST VERT LEG / DOWEL LENGTHS @ THESE LOCATIONS.

EXTERIOR SLAB-ON-GRADE  
 DETAIL  
 NTS

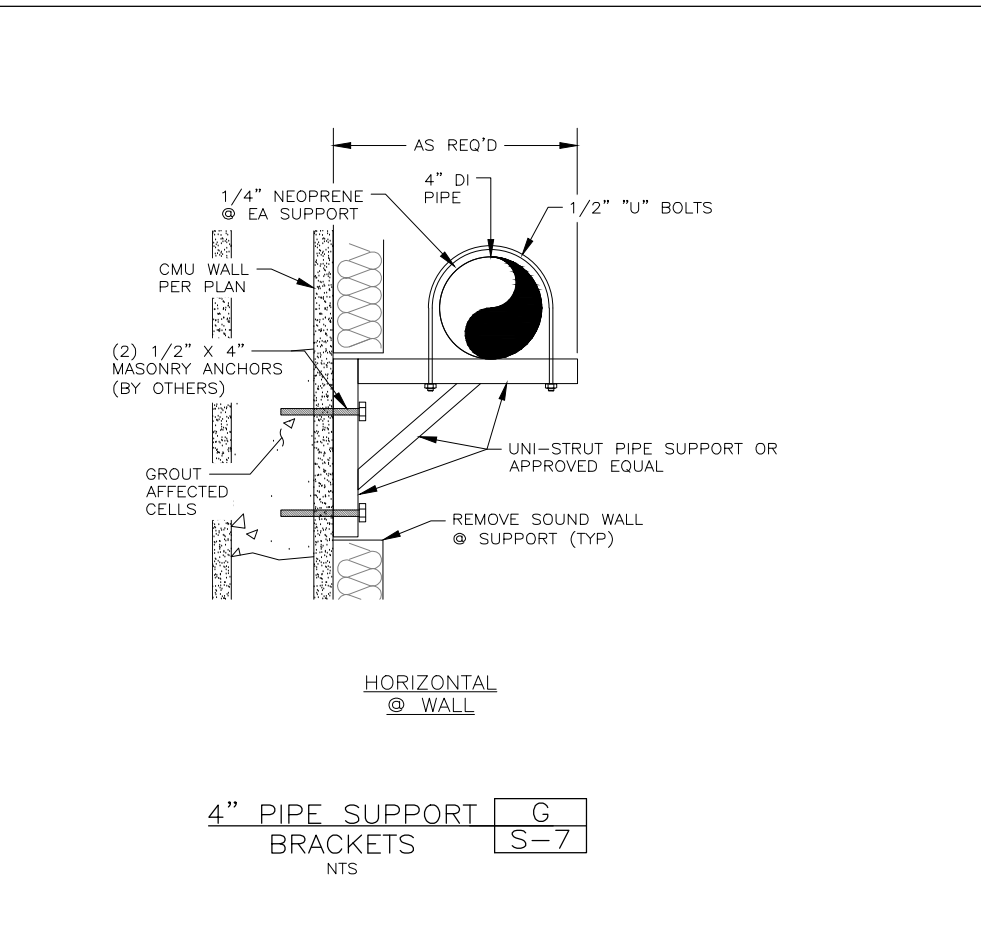
E	E
C-1	C-2
E	
C-3	



DETAIL NOTES:  
 1. WHEN ENCASEMENTS TERMINATE AT STRUCTURE, ENCASEMENT REINFORCING SHALL BE DOWELED INTO THE STRUCTURE.  
 2. CONCRETE ENCASEMENT SHALL EXTEND TO THE 6" SLAB IN ALL CASES OF USE AND REQUIREMENT.  
 3. CONCRETE ENCASEMENT SHALL EXTEND HORIZONTALLY BEYOND THE BUILDING FOOTPRINT TO A POINT THAT IS DETERMINED BY A 1:1 SLOPE FROM THE BOTTOM OF THE FOOTING.

CONCRETE ENCASEMENT  
 NTS

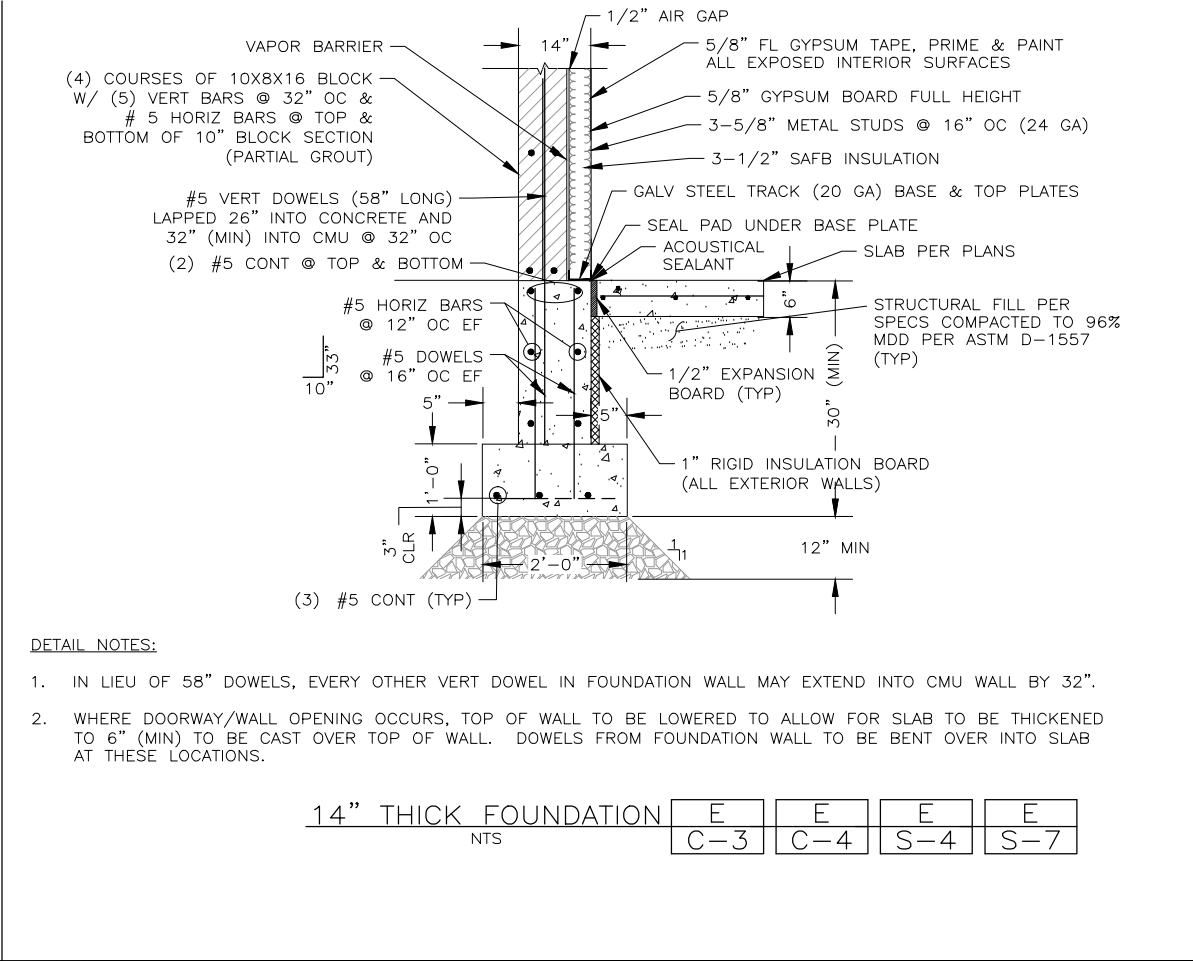
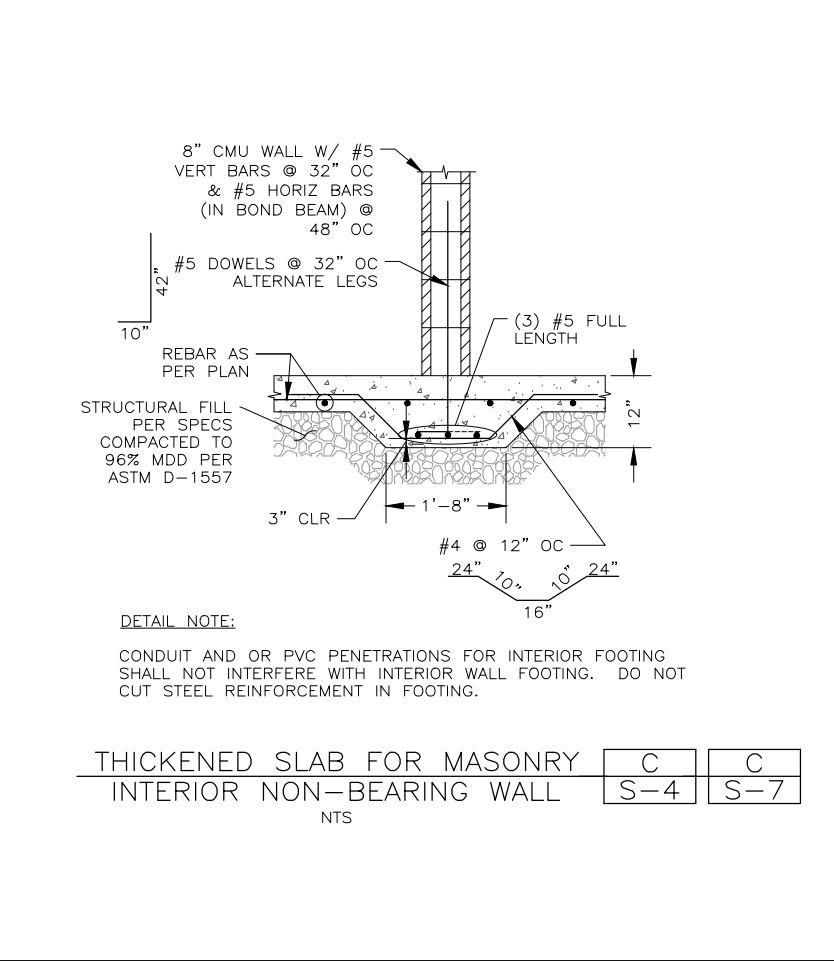
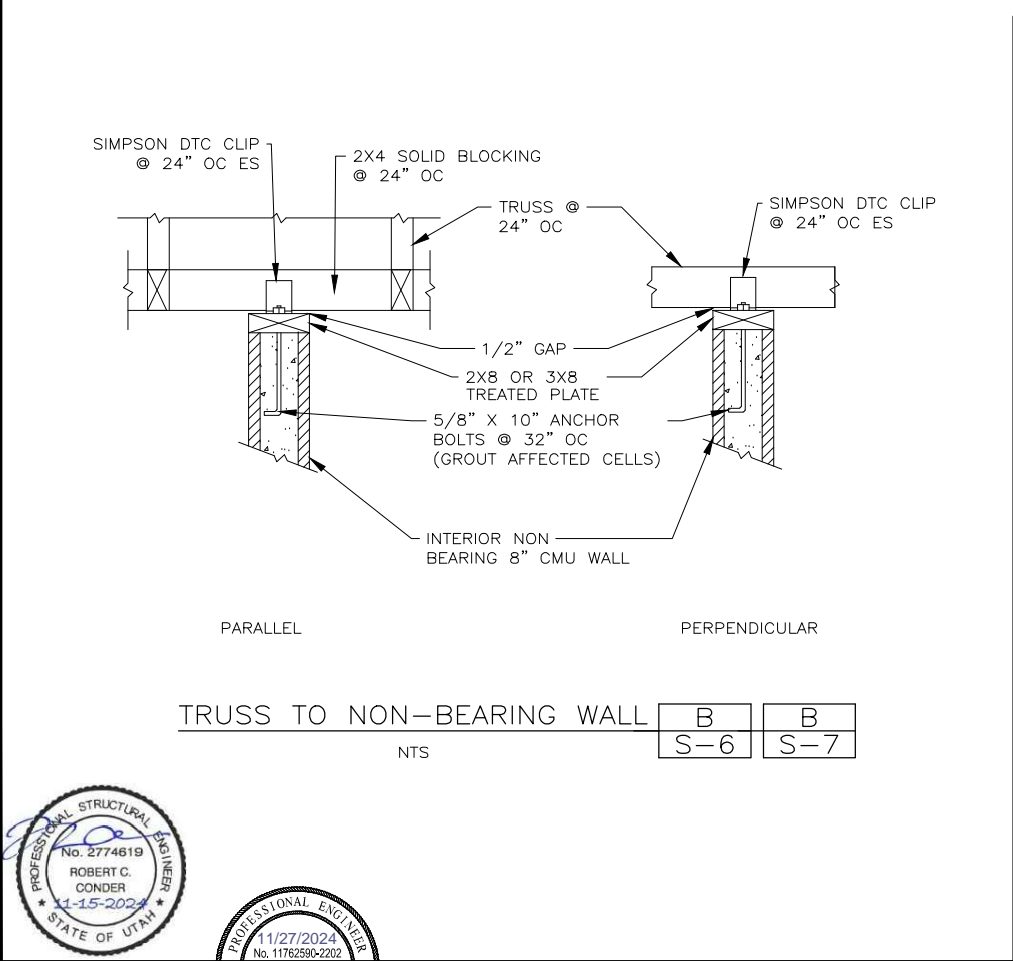
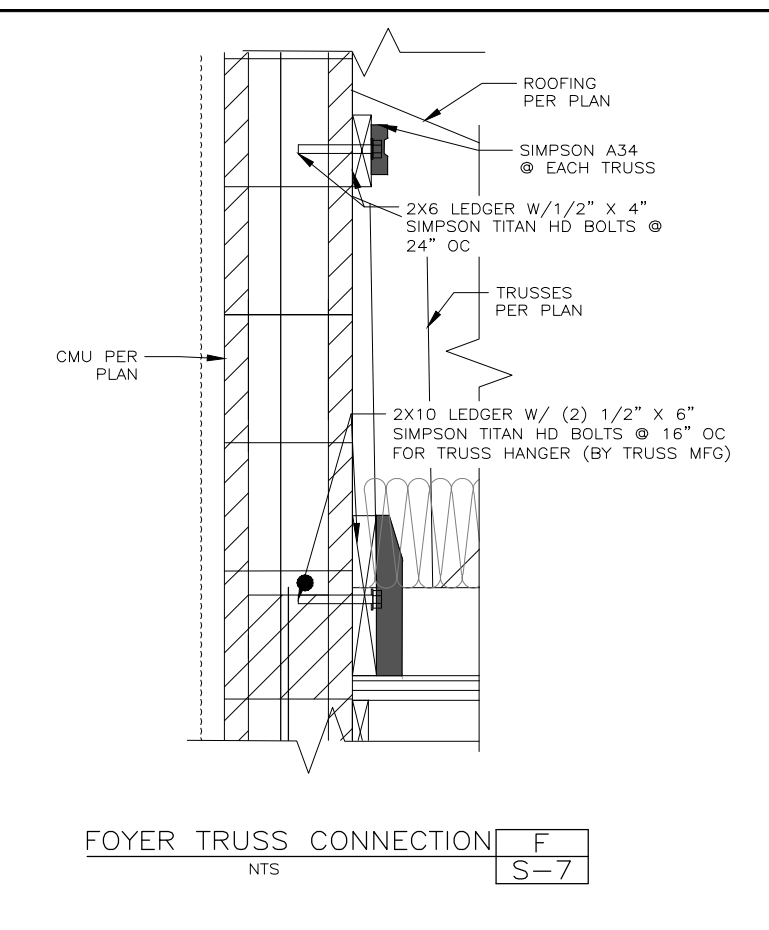
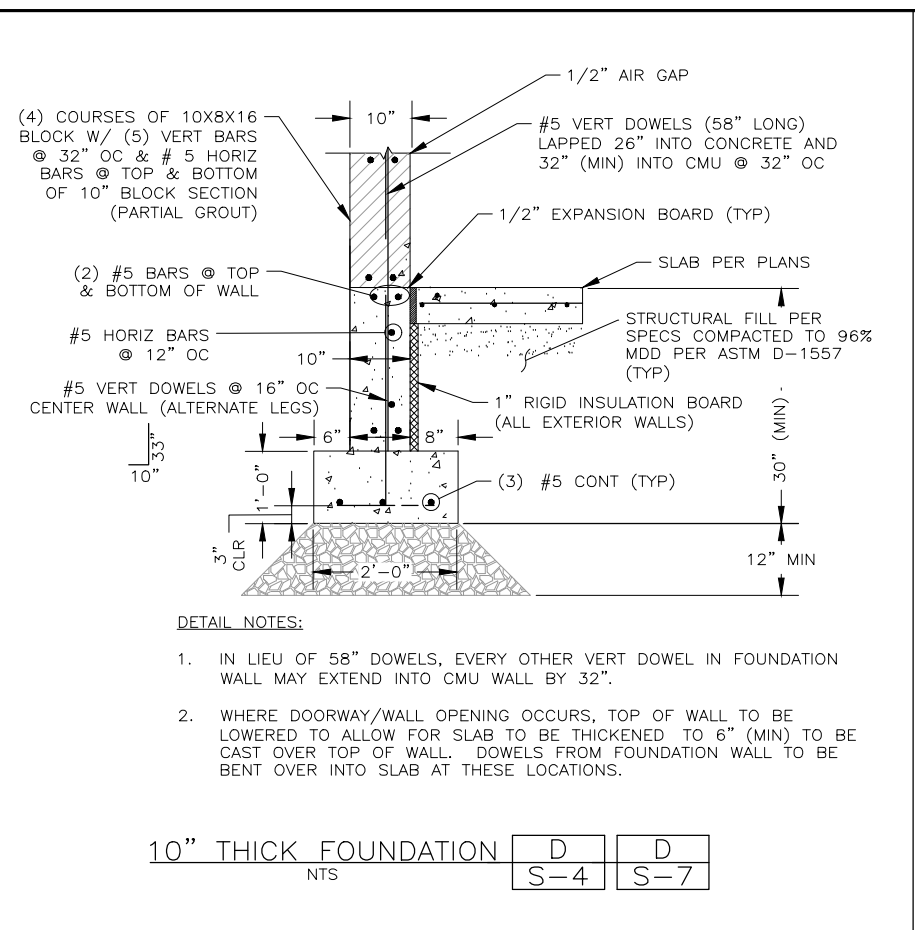
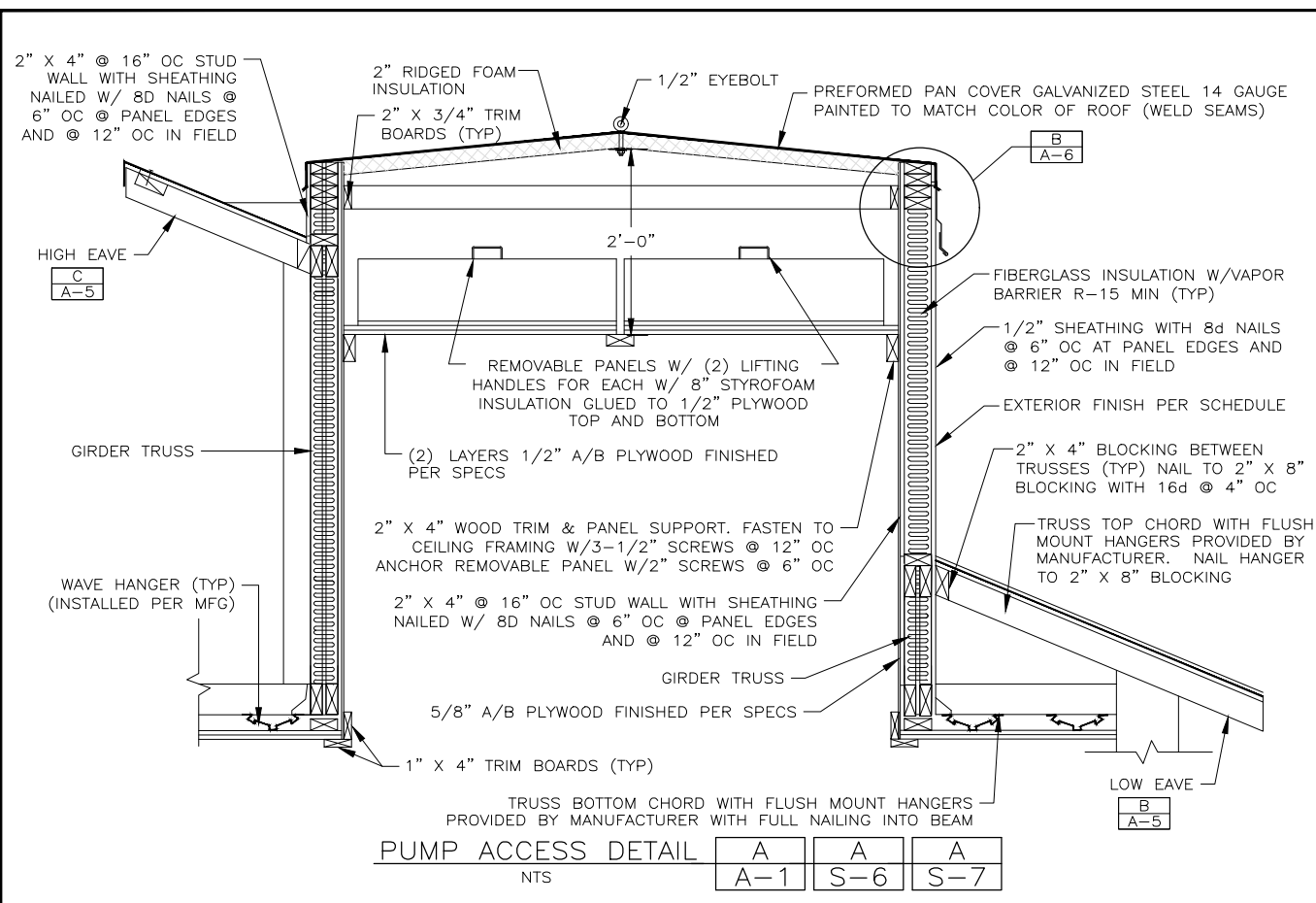
F	F
C-3	S-7



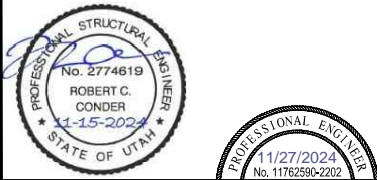
HORIZONTAL @ WALL

4" PIPE SUPPORT BRACKETS  
 NTS

G
S-7



FILE NAME: PROJECTS\19\_09\WELL HOUSE\CAD\S-12 MISC DETAILS II.DWG  
 FILE DATE: 11-18-2024 08:00:17 (BKC)



DESIGNED	JKN	RCC	3
DRAFTED	MAJ		2
CHECKED	BDM	RCC	1
DATE	NOVEMBER 2024	NO.	DATE

NO.	DATE	REVISIONS	BY	APVD.

SCALE



WELL HOUSE #10  
 STRUCTURAL  
 MISCELLANEOUS STRUCTURAL DETAILS II

POWER ONE-LINE SYMBOLS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	ANTENNA		UTILITY METERING SOCKET WITH CIRCUIT BREAKER
	EQUIPMENT GROUND CONNECTION		EXISTING UTILITY METERING SOCKET
	TRANSFER SWITCH ATS: AUTOMATIC TRANSFER SWITCH MTS: MANUAL TRANSFER SWITCH		UTILITY METERING SOCKET
	VARIABLE FREQUENCY DRIVE MOTOR CONTROLLER		FUTURE UTILITY METERING SOCKET
	FUSED DISCONNECT SWITCH		UTILITY METERING CURRENT TRANSFORMER
	NON-FUSED DISCONNECT SWITCH		MOTOR STARTER
	COMBINATION STARTER		SURGE PROTECTOR
	MAGNETIC CONTROLLER		TRANSFORMER
	MOTOR (HP SHOWN)		FUSED SWITCH
	GENERATOR		FUSE IN HOLDER
	CONDUCTOR WITH CALLOUT REFERENCE (SEE CONDUIT/CONDUCTOR SCHEDULE)		EXISTING POWER DISTRIBUTION PANEL
	POWER FACTOR CAPACITOR		POWER DISTRIBUTION PANEL
	CIRCUIT BREAKER		FUTURE POWER DISTRIBUTION PANEL
	POWER FEED		
	CONNECTION POINT		
	LUG		
	DELTA WYE		

GENERAL DRAWING SYMBOLS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	REFERENCE NOTE		DEMOLITION NOTE
	REVISION NOTE		IDENTIFICATION NOTE
	PHOTO REFERENCE		EQUIPMENT REFERENCE
	WIRE SIZE REFERENCE		PHOTO REFERENCE
	SECTION/ELEVATION REFERENCE		EQUIPMENT ID TAG

WIRING DEVICES		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	20 AMP RATED RECEPTACLE SINGLE STROKE = SINGLE DOUBLE STROKE = DUPLEX		EXISTING RECEPTACLE
	220V RECEPTACLE		GFCI RECEPTACLE
	ELECTRICAL CONNECTION		JUNCTION BOX
	PHOTOELECTRIC CONTROL UNIT		THERMOSTAT LOCATION
	CARD READER (ENTRY KEY PAD)		

CONTROL ONE-LINE SYMBOLS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	ENCLOSURE OR CONTROL PANEL		HOME RUN TO POWER PANEL "A" CIRCUIT "XX"
	LIGHT A: AMBER LENS G: GREEN LENS R: RED LENS W: WHITE LENS		COMBINATION MOTOR STARTER F: FUSED BLANK: CIRCUIT BREAKER
	EQUIPMENT IDENTIFICATION TAG		ELECTRICAL CONNECTION POINT
	SINGLE RECEPTACLE		

PLAN SYMBOLS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	CIRCUIT DISTRIBUTION PANELBOARD SURFACE MOUNTED		CIRCUIT DISTRIBUTION PANELBOARD RECESSED
	POWER DISTRIBUTION PANELBOARD SURFACE OR FLOOR MOUNTED DOORS DESIGNATE FRONT OF PANEL MDP DESIGNATES MAIN DISTRIBUTION PANEL		CONTROL PANEL ENCLOSURE
	LIGHTING CONTROL PANEL		DISCONNECT
	COMBO STARTER/DISCONNECT		

LIGHT SWITCHES		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	SINGLE POLE SWITCH		GANGED SWITCHES IN COMMON BOX WITH COMMON COVER PLATE
	SWITCH SUPERScript MODIFIER, LOWER CASE LETTER INDICATES CIRCUIT CONTROLLER -- a,b,c ETC. MAY BE COMBINED WITH CIRCUIT NUMBER. EXAMPLE: 1a, 3b		SWITCH SUBSCRIPT MODIFIER, UPPER CASE LETTER OR NUMBER: 2 = DOUBLE POLE 3 = THREE WAY 4 = FOUR WAY K = KEY OPERATED M = HORSEPOWER RATED MANUAL STARTER MC = MOMENTARY CONTACT, THREE POSITION MS = MANUAL (STARTER) OR SWITCH D = DIMMER S = SURFACE F = FLUSH WP = WEATHER PROOF

LIGHTING SYMBOLS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	DESIGNATES FIXTURE NUMBER -- REFER TO FIXTURE SCHEDULE		PHOTOCELL
	LED FIXTURES		SURFACE OR RECESSED 1X4 FIXTURE
	EXTERIOR LIGHTS		WALL PAK FIXTURE

CONDUIT AND RACEWAYS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	RACEWAY OR WIRING SYSTEM IN OR UNDER FLOOR OR CONCEALED IN WALL OR BEHIND STRUCTURE OR EQUIPMENT OR CONDUIT ROUTED BELOW GRADE IN CONCRETE ENCASEMENT		FLEX CONDUIT
	RACEWAY OR WIRING SYSTEM ABOVE FLOOR LEVEL BELOW CEILING, EXPOSED		HOMERUN: DESIGNATIONS INDICATE A ONE-LINE DIAGRAM OR PANELBOARD SCHEDULE REFERENCE
	JUNCTION BOX		RACEWAY OR WIRING SYSTEM TURNED TOWARD THE VIEWER (UP ON PLAN DRAWINGS)
	RACEWAY OR WIRING SYSTEM TURNED AWAY FROM THE VIEWER (DOWN ON PLAN DRAWINGS)		RACEWAY OR WIRING SYSTEM CHANGE IN ELEVATION OR DISTANCE FROM VIEWER
	CONDUIT STUB AND CAP		

MOTOR AND EQUIPMENT		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	MOTOR (HP SHOWN)		FRACTIONAL HORSEPOWER MOTOR
	WEATHERPROOF THERMAL DISCONNECT SWITCH		MOTOR STARTER, INDIVIDUAL, NOT LOCATED IN A MOTOR CONTROL CENTER (MCC) OR SIMILAR GROUP ASSEMBLY
	COMBINATION MOTOR STARTER ASSEMBLY, NOT LOCATED IN AN MCC OR SIMILAR ASSEMBLY		MAGNETIC CONTACTOR ASSEMBLY, NOT LOCATED IN AN MCC OR SIMILAR ASSEMBLY
	DISCONNECT, NON-FUSED, 3 POLE, 100A RATED		FUSED DISCONNECT SWITCH
	FIELD CONNECTION OR ELECTRICAL TERMINATION AT A FIELD DEVICE		EQUIPMENT DESIGNATION

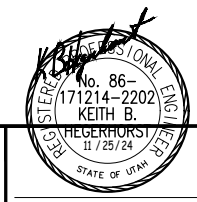
GROUNDING SYMBOLS		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	GROUND ROD (3/4" x 10' COPPER COATED STEEL)		GROUND ROD (3/4" x 10' COPPER COATED STEEL) IN WELL
	BOLTED GROUND CONNECTION (ABOVE GRADE)		WELDED GROUND CONNECTION (BELOW GRADE)
	GROUND CONDUCTOR		

HVAC EQUIPMENT		THIS IS A STANDARD LEGEND NOT ALL SYMBOLS MAY BE USED ON THIS PROJECT	
	UNIT HEATER, WALL MOUNTED		UNIT HEATER, CEILING MOUNTED
	CONDENSING UNIT, PAD MOUNTED, SIDE DISCHARGE		CONDENSING UNIT, PAD MOUNTED, UP FLOW
	ROOFTOP MOUNTED EQUIPMENT		

- GENERAL NOTES:**
- VERIFY ALL EQUIPMENT DIMENSIONS AND LOCATIONS BEFORE BEGINNING ROUGH-IN. CONSULT ALL APPLICABLE CONTRACT DRAWINGS AND SHOP DRAWINGS TO ENSURE NEC CODE CLEARANCE REQUIRED AROUND ALL ELECTRICAL EQUIPMENT.
  - CONTRACTOR SHALL VERIFY ALL ELECTRICAL LOADS (VOLTAGE, PHASE, CONNECTION REQUIREMENTS, ETC.) OF EQUIPMENT FURNISHED BEFORE BEGINNING ROUGH-IN.
  - SEE APPLICABLE SHOP DRAWINGS FOR ROUGH-IN LOCATION OF ALL EQUIPMENT, WIRING DEVICES, ETC.
  - THE ELECTRICAL CONTRACTOR SHALL NOTIFY AND COOPERATE WITH THE MECHANICAL CONTRACTOR SUCH THAT NO PIPING, OR EQUIPMENT FOREIGN TO THE OPERATION OF THE ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE INSTALLED IN, ENTER OR PASS THROUGH ELECTRICAL ROOMS OR SPACES; OR ABOVE OR BELOW ELECTRICAL EQUIPMENT IN THE OTHER AREAS.
  - ALL PENETRATIONS OF FLOORS, WALLS AND CEILINGS SHALL BE SEALED WITH APPROVED MATERIAL.
  - FOR PACKAGE EQUIPMENT PROVIDED ON THE PROJECT, SOME CONDUITS AND WIRES ARE SHOWN ON THE DRAWINGS, BUT IT IS EXPECTED THAT SOME ADDITIONAL CONDUITS AND WIRES MAY BE REQUIRED BY EQUIPMENT MANUFACTURERS TO COMPLETE INSTALLATION. IT IS INCUMBENT UPON THE GENERAL CONTRACTOR TO COORDINATE THIS REQUIREMENT WITH HIS SUBCONTRACTORS TO MAKE SURE THAT EQUIPMENT SUPPLIER PROVIDED ALL NECESSARY ELECTRICAL INFORMATION TO ELECTRICAL SUBCONTRACTOR FOR INCLUSION WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.
  - IF OTHER THAN FIRST NAMED EQUIPMENT IS USED, IT SHALL BE CAREFULLY CHECKED FOR ELECTRICAL REQUIREMENTS AND CONTROL REQUIREMENTS OF ALTERNATE EQUIPMENT. SHOULD CHANGES OR ADDITIONS OCCUR IN ELECTRICAL WORK, OR THE WORK OF OTHER CONTRACTORS BE REVISED BY THE ALTERNATE EQUIPMENT, THE COST OF ALL CHANGES SHALL BE BORNE BY THE ELECTRICAL CONTRACTOR.

Sheet Number	Sheet Title
E1.1	LEGEND
E1.2	TABLES
E2.1	SCHEDULES
E3.1	POWER ONE-LINE DIAGRAM
E3.2	INST. AND CONTROL ONE-LINE DIAGRAM
E3.3	TYPICAL RVSS CONTROL DIAGRAM
E3.4	CP-1 TYP CONTROL DIAGRAM, SHT. 1
E3.5	CP-1 TYP CONTROL DIAGRAM, SHT. 2
E3.6	CP-2 CONTROL DIAGRAM
E4.1	POWER PLAN
E4.2	INSTRUMENTATION AND CONTROL PLAN
E4.3	LIGHTING PLAN
.5.1	CP-1 MAIN CP ARRANGEMENT
E5.2	CP-2 SMALL MOTOR CONTROL PANEL
E6.1	DETAILS, SHT. 1
E6.2	DETAILS, SHT. 2
E6.3	DETAILS, SHT. 3

FILE NAME:  
FILE DATE:





**CONDUIT/CONDUCTOR SCHEDULE  
THHN, THWN, THWN-2**

AMP RATING	DRAWING ID TAG.	CONDUCTOR QTY.*	CONDUCTOR SIZE	MIN. CONDUIT SIZE	CONDUIT EXCEPTIONS
20** 20+	212	2	#12	3/4"	
	312	3		3/4"	
	412	4		3/4"	
30** 30+	20	2	#10	3/4"	
	30	3		3/4"	
	40	4		3/4"	
40** 50+	28	2	#8	3/4"	
	38	3		3/4"	
	48	4		3/4"	
55** 65+	26	2	#6	3/4"	
	36	3		3/4"	
	46	4		3/4"	1"(C9)
70** 85+	24	2	#4	3/4"	1"(C2,C9)
	34	3		1"	3/4"(C4),1-1/4"(C9)
	44	4		1"	1-1/4"(C9)
95** 115+	22	2	#2	1"	
	32	3		1"	1-1/4"(C9)
	42	4		1-1/4"	
110** 130+	21	2	#1	1-1/4"	1"(C3,C4)
	31	3		1-1/4"	1"(C3)
	41	4		1-1/4"	1-1/2"(C2,C9,C10)
150	210	2	1/0	1-1/4"	
	310	3		1-1/4"	1-1/2"(C3,C9)
	410	4		1-1/2"	2"(C9)
175	220	2	2/0	1-1/4"	1-1/2"(C3,C4,C9)
	320	3		1-1/2"	
	420	4		2"	
200	230	2	3/0	1-1/2"	1-1/4"(C4)
	330	3		1-1/2"	2"(C3,C9)
	430	4		2"	
230	240	2	4/0	1-1/2"	2"(C3)
	340	3		2"	
	440	4		2"	2-1/2"(C9)
255	225	2	250 KCMIL	2"	1-1/2"(C4)
	325	3		2"	2-1/2"(C1,C8)
	425	4		2-1/2"	2"(C4)
310	235	2	350 KCMIL	2"	2-1/2"(C9)
	335	3		2-1/2"	2"(C4)
	435	4		3"	2-1/2"(C1,C4)
380	250	2	500 KCMIL	2-1/2"	2"(C4)
	350	3		3"	2-1/2"(C1,C4)
	450	4		3"	3-1/2"(C9)
475	275	2	750 KCMIL	3"	
	375	3		3-1/2"	3"(C1,C7,C8)
	475	4		4"	3-1/2"(C1,C4,C8)

\* CONDUCTOR QUANTITY DOES NOT INCLUDE GROUNDING CONDUCTORS. SEE EQUIPMENT GROUNDING CONDUCTORS FOR WIRE SIZES.

WHERE: C1 = ELECTRICAL METALLIC TUBING      "\*\*\*" = 60°C RATING  
 C2 = ELECTRICAL NON-METALLIC TUBING    "+" = 75°C RATING  
 C3 = FLEXIBLE STEEL CONDUIT  
 C4 = INTERMEDIATE METALLIC CONDUIT  
 C7 = LIQUIDTIGHT FLEXIBLE METAL CONDUIT  
 C8 = RIGID METALLIC CONDUIT  
 C9 = PVC SCHEDULE 80 CONDUIT  
 C10 = PVC SCHEDULE 40 CONDUIT  
 "\*\*\*" = RATED AMPACITY AT 60°C  
 "+" = RATED AMPACITY AT 75°C  
 USE 60°C CONDUCTOR RATING WHEN TERMINATION RATINGS ARE NOT PUBLISHED

**GROUNDING ELECTRODE  
CONDUCTOR SERVICE  
ENTRANCE OR SEPARATELY  
DERIVED SYSTEM**

COPPER CONDUCTOR	WIRE SIZE
#2 OR SMALLER	#8
1 OR 1/0	#6
2/0 OR 3/0	#4
>3/0 THRU 350 KCMIL	#2
>350 KCMIL THRU 600 KCMIL	1/0

**WELL TAG LIST  
HVAC EQUIPMENT**

TAG	DESCRIPTION	LOCATION	POWER SOURCE	SUPPLIED BY	INSTALLED BY
CU-1	CONDENSING UNIT	BUILDING EXTERIOR	H-8,10,12	CONTRACTOR	CONTRACTOR
AH-1	AIR HANDLER	PUMP ROOM	H-14,16,18	CONTRACTOR	CONTRACTOR
EUH-1	ELECTRIC UNIT HEATER	PUMP ROOM	H-1,3,5	CONTRACTOR	CONTRACTOR
EUH-2	ELECTRIC UNIT HEATER	PUMP ROOM	H-7,9,11	CONTRACTOR	CONTRACTOR
EUH-3	ELECTRIC UNIT HEATER	CHLORINE ROOM	H-13,15,17	CONTRACTOR	CONTRACTOR
EUH-4	ELECTRIC UNIT HEATER	PUMP ROOM	H-19,21,23	CONTRACTOR	CONTRACTOR
ML-1	MOTORIZED LOUVER	CHLORINE ROOM	CP-2	CONTRACTOR	CONTRACTOR
EF-1	EXHAUST FAN	CHLORINE ROOM	CP-2	CONTRACTOR	CONTRACTOR

**SWITCHES**

TAG	DESCRIPTION	LOCATION	POWER SOURCE	SUPPLIED BY	INSTALLED BY
ZS-1A	DOOR POSITION SWITCH	W. ROOM VESTIBULE	CP-1	CONTRACTOR	CONTRACTOR
ZS-1B	DOOR POSITION SWITCH	W. ROOM VESTIBULE	CP-1	CONTRACTOR	CONTRACTOR
ZS-2A	DOOR POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-2B	DOOR POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-3	DOOR POSITION SWITCH	CHLORINE ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-4	HATCH POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-5A	SYSTEM VALVE (VA-1) POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-5B	SYSTEM VALVE (VA-1) POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-6A	WASTE VALVE (VA-4) POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
ZS-6B	WASTE VALVE (VA-4) POSITION SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
PSH-1	WELL HIGH DISCHARGE PRESSURE	PUMP ROOM	RVSS-1	CONTRACTOR	CONTRACTOR
LSH-1	FLOOR HIGH WATER LEVEL SWITCH	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR

**VALVES**

TAG	DESCRIPTION	LOCATION	POWER SOURCE	SUPPLIED BY	INSTALLED BY
VA-4	WASTE VALVE ACTUATOR	PUMP ROOM	H-26,28,30	CONTRACTOR	CONTRACTOR
VA-1	SYSTEM VALVE ACTUATOR	PUMP ROOM	H-20,22,24	CONTRACTOR	CONTRACTOR
SV-1	OIL-LUBE SOLENOID VALVE	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
SV-2	CHLORINATION SOLENOID VALVE	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR

**PUMP AND EQUIPMENT**

TAG	DESCRIPTION	LOCATION	POWER SOURCE	SUPPLIED BY	INSTALLED BY
CP-1	MAIN CONTROL PANEL	PUMP ROOM	L-2	OWNER	CONTRACTOR
CP-2	SMALL MOTOR CONTROL PANEL	PUMP ROOM	L-13	CONTRACTOR	CONTRACTOR
MDP	MAIN DISTRIBUTION PANELBOARD	PUMP ROOM	MSD	CONTRACTOR	CONTRACTOR
MSD	MAIN SERVICE DISCONNECT	BUILDING EXTERIOR	SITE POWER	CONTRACTOR	CONTRACTOR
PNL-H	POWER PANELBOARD	PUMP ROOM	MDP-1	CONTRACTOR	CONTRACTOR
P-1	WELL PUMP MOTOR	PUMP ROOM	RVSS-1	CONTRACTOR	CONTRACTOR
PNL-L	POWER PANELBOARD	PUMP ROOM	XFMR-L	CONTRACTOR	CONTRACTOR
RVSS-1	WELL MOTOR CONTROLLER	PUMP ROOM	MDP-2	CONTRACTOR	CONTRACTOR
XFMR-L	TRANSFORMER L	PUMP ROOM	H-2,4	CONTRACTOR	CONTRACTOR
AL-1	ALARM LIGHT	BUILDING EXTERIOR	CP-1	CONTRACTOR	CONTRACTOR

**INSTRUMENTATION**

TAG	DESCRIPTION	LOCATION	POWER SOURCE	SUPPLIED BY	INSTALLED BY
FE-1	WELL FLOW ELEMENT	PUMP ROOM	FIT-1	CONTRACTOR	CONTRACTOR
FIT-1	WELL FLOW INDICATOR/TRANSMITTER	PUMP ROOM	L-4	CONTRACTOR	CONTRACTOR
LT-1	WELL LEVEL TRANSDUCER	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
TT-1	TEMPERATURE INDICATOR/TRANSMITTER	PUMP ROOM	CP-1	CONTRACTOR	CONTRACTOR
TT-2	TEMPERATURE INDICATOR/TRANSMITTER	CHLORINE ROOM	CP-1	CONTRACTOR	CONTRACTOR
WIT-1A/1B	DUAL CHLORINE WEIGHT SCALE	CHLORINE ROOM	L-10	CONTRACTOR	CONTRACTOR
WE-1A	CHLORINE SCALE 1A WEIGHT ELEMENT	CHLORINE ROOM	WIT-1	CONTRACTOR	CONTRACTOR
WE-1B	CHLORINE SCALE 1B WEIGHT ELEMENT	CHLORINE ROOM	WIT-1	CONTRACTOR	CONTRACTOR
WIT-2A/2B	DUAL CHLORINE WEIGHT SCALE	CHLORINE ROOM	L-14	CONTRACTOR	CONTRACTOR
WE-2A	CHLORINE SCALE 2A WEIGHT ELEMENT	CHLORINE ROOM	WIT-2	CONTRACTOR	CONTRACTOR
WE-2B	CHLORINE SCALE 2B WEIGHT ELEMENT	CHLORINE ROOM	WIT-2	CONTRACTOR	CONTRACTOR
ASH-1	CHLORINE GAS DETECTOR	PUMP ROOM	L-6	CONTRACTOR	CONTRACTOR
AE-1	CHLORINE GAS PROBE	PUMP ROOM	ASH-1	CONTRACTOR	CONTRACTOR
PT-1	SYSTEM PRESSURE TRANSMITTER	PUMPL ROOM	CP-1	CONTRACTOR	CONTRACTOR

**EQUIPMENT GROUNDING  
CONDUCTORS**

FUSE OR CB SIZE	SIZE (COPPER)
15	14
20	12
30	10
40	10
60	10
100	8
200	6
300	4
400	3
500	2
600	1
800	1/0
1000	2/0
1200	3/0
1600	4/0
2000	250
2500	350

**FIXTURE SCHEDULE**

TYPE	DESCRIPTION	MANUFACTURER		FIX VA	LAMP	LUMENS	KELVIN	MOUNTING	NOTES:
		NAME	CATALOG NO.						
F1	4' LED ENCLOSED INDUSTRIAL, FIBERGLASS HOUSING, DAMP LOCATION, MVOLT	METALUX	4VT2-LD5-11-DR-W-UNV-L840-CD-1-U	82.4	LED	11000	4000	SURFACE	
F2	4' LED ENCLOSED INDUSTRIAL, FIBERGLASS HOUSING, DAMP LOCATION, MVOLT	METALUX	4VT2-LD5-6-DR-W-UNV-L840-CD-1-U	52	LED	6000	4000	SURFACE	
F3	LED WALL MOUNTED FULL CUTOFF MINI AREA WALL PACK FOR WET LOCATIONS	LUMARK	XTOR2B-W-PC1	18	LED	1472	4000	WALL	1)

NOTES: 1) BUILT-IN PHOTOCCELL

H.P.E. INC. ELECTRICAL ENGINEERS  
 POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
 HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
 AMERICAN FORK, UT 84003 FAX (801) 642-2154  
 HPE PROJECT:21.122 ©2024  
 FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

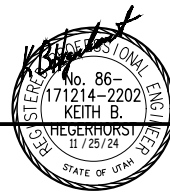
**GENERAL NOTES:**

1. NOT USED.

**SHEET KEYNOTES:**

1. NOT USED.

7/04  
 FILE NAME:  
 FILE DATE:



DESIGNED KBH	3
DRAFTED KBH	2
CHECKED KBH	1
DATE JANUARY 2024	NO.

REVISIONS

SCALE  
 NONE



WELL HOUSE #10  
 ELECTRICAL  
 TABLES

SHEET  
 E1.2  
 119.08.100

**MDP-1, MAIN DISTRIBUTION PANELBOARD**

LOCATION: PUMP ROOM	MFGR: SQUARE D	1200 AMPS	VOLTS: 480Y/277
DIMENSIONS: 24" W x 48" D x 36" H	TYPE: I-LINE	X M.L.O.	PHASE: 3
MOUNTING: SURFACE	NEMA: 1	22,000 A.I.C.	WIRES: 4
FED FROM: BOTTOM	X SURGE PROTECTION FED FROM:		

BRKR	A	P	DESCRIPTION	WIRE SIZE	CONT.		N-CONT.		A		B		C		N-CONT.	CONT.	CIRCUIT ID	DESCRIPTION	BRKR	A	P	
					WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	NO	WATTS	WATTS								
125	3		PANELBOARD H	42			1		982	13,996	651	12,196		0								
1000	3		P-1 WELL PUMP AVAILABLE SPACE	2-335	404,405		0	2	134,802		134,802		0	134,802								
TOTAL WATTS:					404,405		0		135,783	13,996	135,453	12,196		134,802								
CONTINUOUS LOAD:					404,405																	
CONTINUOUS LOAD * 125%:					505,506																	
NON-CONTINUOUS LOAD:					0																	
DESIGN WATTS:					505,506																	
MIN. RATING (AMPS):					609																	

**PANELBOARD H**

LOCATION: PUMP ROOM	MFGR: SQUARE D	125 AMPS	VOLTS: 480Y/277
DIMENSIONS: 20"W x 5.75"D x 32"H	TYPE: NF	X M.L.O.	PHASE: 3
MOUNTING: SURFACE	NEMA: 1	22,000 A.I.C.	WIRES: 4
FED FROM: BOTTOM	X SPD FED FROM:		

BRKR	A	P	DESCRIPTION	CIRCUIT ID	CONT.		N-CONT.		A		B		C		N-CONT.	CONT.	CIRCUIT ID	DESCRIPTION	BRKR	A	P
					WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	NO	WATTS	WATTS							
20	3		EUH-1 UNIT HEATER	312			1		982	3,080					2	1,980	982	28	TRANSFORMER L	40	2
20	3		EUH-2 UNIT HEATER	312			7		0	7,200				8	6,200	38		CU-1 CONDENSING UNIT	35	3	
														10	6,200						
														12	6,200						
20	3		EUH-3 UNIT HEATER	312			13		0	2,107				14	1,107	312		AH-1 AIR HANDLER	20	3	
														16	1,107						
														18	1,107						
20	3		EUH-4 UNIT HEATER	312			19		0	1,304				20	304	312		VA-1 VALVE ACTUATOR	20	3	
														22	304						
														24	304						
														26	304	312		VA-4 VALVE ACTUATOR	20	3	
														28	304						
														30	304						
														32				AVAILABLE SPACE			
														34				AVAILABLE SPACE			
														36		0	0	AVAILABLE SPACE			
														38				AVAILABLE SPACE			
														40				AVAILABLE SPACE			
														42				AVAILABLE SPACE			
TOTAL WATTS:					0				12,300	982	13,996	651	12,196	0	12,016	25,909	1,633				
CONTINUOUS LOAD:					1,633																
CONTINUOUS LOAD * 125%:					2,041																
NON-CONTINUOUS LOAD:					38,209																
DESIGN WATTS:					40,250																
MIN. RATING (AMPS):					48																

H.P.E. INC. ELECTRICAL ENGINEERS  
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HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
HPE PROJECT: 21.122 ©2024  
FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

**GENERAL NOTES:**

1. NOT USED.

**SHEET KEYNOTES:**

1. NOT USED.

**TRANSFORMER L**

LOCATION: PUMP ROOM	8.8 PRIMARY AMPS	PRIMARY VOLTS: 480
DIMENSIONS: 3.75"W x 9.75"D x 14.75"H	17.5 SECONDARY AMPS	SECONDARY VOLTS: 240/120
MOUNTING: WALL	KVA: 10	
FED FROM: SIDE	FED FROM: PNL MDP	

POWER PANEL L	CONT.		N-CONT.		A		B	
	WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	
	1,633	2,160	982	1,980	651	180		
TOTAL WATTS:								
CONTINUOUS LOAD:								
CONTINUOUS LOAD * 125%:								
NON-CONTINUOUS LOAD:								
DESIGN WATTS:								

**PANELBOARD L**

LOCATION: PUMP ROOM	MFGR: SQUARE D	100 AMPS	VOLTS: 240/120
DIMENSIONS: 20"W x 5.75"D x 38"H	TYPE: NQ	M.C.B.	PHASE: 1
MOUNTING: SURFACE	NEMA: 1	10,000 A.I.C.	WIRES: 3
FED FROM: BOTTOM	X SPD FED FROM: XFMR-L		

BRKR	A	P	DESCRIPTION	CIRCUIT ID	CONT.		N-CONT.		A		B		C		N-CONT.	CONT.	CIRCUIT ID	DESCRIPTION	BRKR	A	P
					WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	NO	WATTS	WATTS							
20	1		RECPT, WELL ROOM & VESTIBULE	212			1		500	1,260				2		500	212	CP-1 MAIN CONTROL PANEL	20	1	
20	1		RECPT, CHLORINE ROOM	212			3				50	180		4		50	212	FIT-1 FLOW METER	20	1	
20	1		RECPT, EXTERIOR	212			5		120	720				6		120	212	ASH-1 CHLORINE LEAK DETECTOR	20	1	
20	1		LTS, WELL & CHL. ROOM	212	601		7				601	0		8				SPARE	20	1	
20	1		LTS, EXTERIOR	212	56		9		156	0		0		10		100	212	WIT-1 CHLORNE SCALES	20	1	
20	1		SPARE				11				0	0		12				SPARE	20	1	
20	1		CP-2 SMALL MOTOR CONTROL PNL	212	106	0	13		206	0		0		14		100	212	WIT-2 CHLORNE SCALES	20	1	
20	1		SPARE				15				0	0		16				SPARE	20	1	
			AVAILABLE SPACE				17		0	0		0		18				AVAILABLE SPACE			
			AVAILABLE SPACE				19				0	0		20				AVAILABLE SPACE			
			AVAILABLE SPACE				21		0	0		0		22				AVAILABLE SPACE			
			AVAILABLE SPACE				23				0	0		24				AVAILABLE SPACE			
			AVAILABLE SPACE				25		0	0		0		26				AVAILABLE SPACE			
			AVAILABLE SPACE				27				0	0		28				AVAILABLE SPACE			
			AVAILABLE SPACE				29		0	0		0		30				AVAILABLE SPACE			
TOTAL WATTS:					763	2,160			982	1,980	651	180			0	870					
CONTINUOUS LOAD:					1,633																
CONTINUOUS LOAD * 125%:					2,041																
NON-CONTINUOUS LOAD:					2,160																
DESIGN WATTS:					4,201																
MIN. RATING (AMPS):					18																

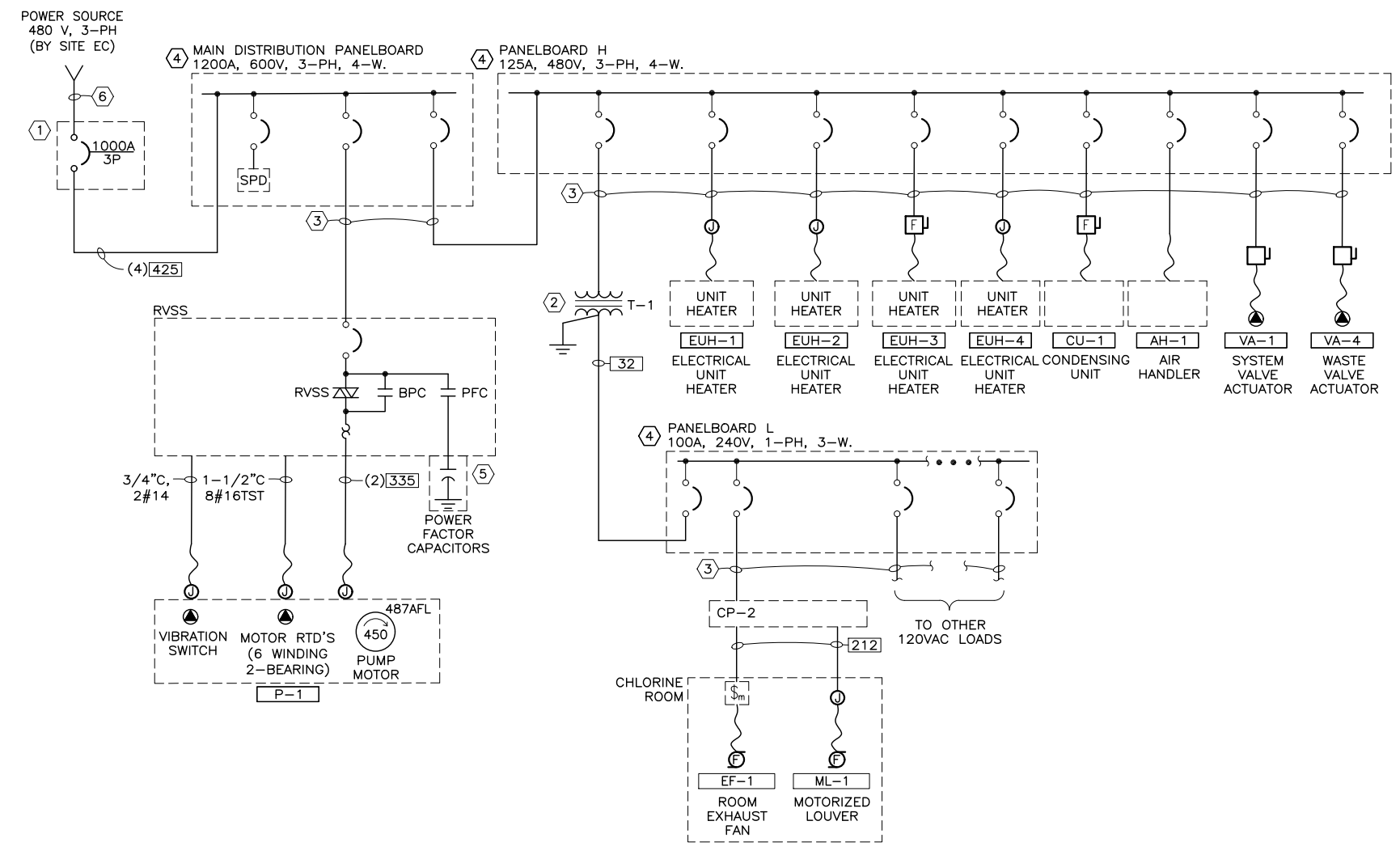
**CP-2, SMALL MOTOR CONTROL PANEL**

LOCATION: PUMP ROOM	MFGR: CUSTOM	AMPS	VOLTS: 120
DIMENSIONS: BY CONTRACTOR	TYPE:	M.C.B.	PHASE: 1
MOUNTING: SURFACE	NEMA: 1		WIRES: 3
FED FROM: TOP	FED FROM:		

BRKR	A	P	DESCRIPTION	CIRCUIT ID	CONT.		N-CONT.		A		B	
					WATTS	WATTS	NO	CONT.	N-CONT.	CONT.	N-CONT.	
10	1		CONTROL POWER	-			5		5	0		
15	1		EF-1 EXHAUST FAN	212	106		2		106	0		
TOTAL WATTS:												
CONTINUOUS LOAD:												
CONTINUOUS LOAD * 125%:												
NON-CONTINUOUS LOAD:												
DESIGN WATTS:												
MIN. RATING (AMPS):												

**HVAC MECHANICAL EQUIPMENT SCHEDULE**

TAG	DESCRIPTION	LOCATION	EQUIPMENT RATING										DISCONNECT				STARTER TYPE	NEMA SIZE	NOTES					
			VOLTS	PH	HP	WATTS	FLA	MCA	AMPS	VOLTS	POLES	NEMA	FUSE	CONNECTION	TYPE	SIZE								
EUH-1	UNIT HEATER	WELL ROOM	480	3		3,300	4.0																	
EUH-2	UNIT HEATER	WELL ROOM	480	3		3,000	3.6																	
EUH-3	UNIT HEATER	WELL ROOM	480	3		3,000	3.6																	
EUH-4	UNIT HEATER	WELL ROOM	480	3		3,000	3.6																	
EF-1	EXHAUST FAN	CHLORINE ROOM	120	1	0.25	696	5.8					5-20R											1)	
CU-1	CONDENSING UNIT	OUTSIDE	480	3		13,951	16.8	21	30	600	3	3R	30											
AH-1	AIR HANDLER	WELL ROOM	480	3		3,322	4.0	5	30	600	3	1												
ML-1	LOUVER ACTUATOR	CHLORINE ROOM	1																					



POWER ONE-LINE DIAGRAM

- GENERAL NOTES:**
1. REFER TO CONDUIT/CONDUCTOR TABLE FOR WIRE AND CONDUIT REQUIREMENTS.
  2. REFER TO ELECTRICAL PLANS FOR ELECTRICAL EQUIPMENTS LOCATIONS.
  3. REFER TO THE ELECTRICAL UTILITY INSTALLATION TABLE FOR CONTRACTOR AND UTILITY RESPONSIBILITIES.

- SHEET KEYNOTES:**
1. MAIN SERVICE DISCONNECT: 480VAC, 1000A, 3-POLE CIRCUIT BREAKER IN NEMA 3R ENCLOSURE. LABEL AS "MAIN SERVICE DISCONNECT" AND AS REQUIRED BY NEC 110.24.
  2. TRANSFORMER T-1: 10 KVA, 480VAC PRIMARY, 240/120V SECONDARY.
  3. REFER TO PANELBOARD SCHEDULE FOR WIRE IDENTIFICATION.
  4. REFER TO PANELBOARD SCHEDULES FOR CIRCUIT ID, THEN THE WIRE/CONDUIT REQUIREMENTS ARE IN THE CONDUIT/CONDUCTOR TABLE ON E1.2.
  5. CONTRACTOR MAY LOCATE POWER FACTOR CORRECTION CAPACITORS ON TOP OF THE MOTOR CONTROLLER.
  6. REFER TO TANK/BOOSTER/WELL SITE PLAN FOR WIRE AND CONDUIT REQUIREMENTS.

FILE NAME:  
FILE DATE:



PROJECT ENGINEER

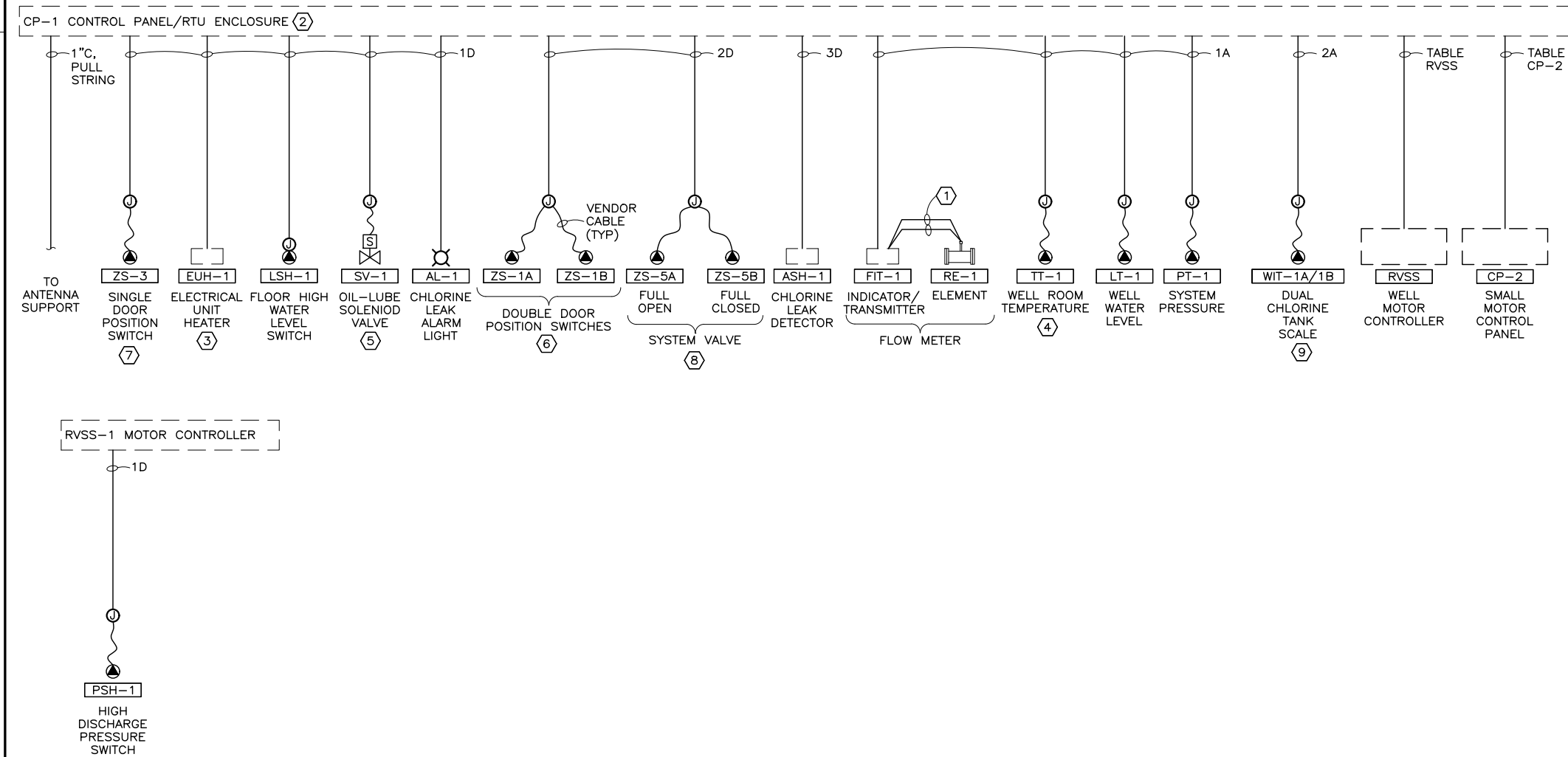
DESIGNED	KBH	3					
DRAFTED	KBH	2					
CHECKED	KBH	1					
DATE	JANUARY 2024	NO.	DATE	REVISIONS	BY	APVD.	

SCALE  
NONE



WELL HOUSE #10  
ELECTRICAL  
POWER ONE-LINE DIAGRAM

SHEET  
E3.1  
119.08.100



**INSTRUMENTATION AND CONTROL  
 ONE-LINE DIAGRAM**

**GENERAL NOTES:**

1. INSTRUMENTS AND CONTROL DEVICES SHOWN ON E2.2. HVAC EQUIPMENT SHOWN ON E2.4.
2. FOR WIRE AND CONDUIT REQUIREMENTS, REFER TO THE TABLES ON THIS SHEET.

**SHEET KEYNOTES:**

1. CABLE SUPPLIED WITH FLOW METER. VERIFY CONDUIT SIZE WITH SUPPLIER PRIOR TO ROUGH-IN. DO NOT COMBINE SIGNAL AND DATA CABLE IN THE SAME CONDUIT.
2. CP-1 PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR. CP-1 TERMINATIONS BY CONTRACTOR AS REQUIRED BY OWNER. CP-1 PLC I/O LIST PROVIDED ON E5.1 AND PLC PROGRAMMED BY OWNER.
3. SHOWN FOR ELECTRICAL UNIT HEATER EUH-1. DUPLICATE FOR ELECTRICAL UNIT HEATER EUH-2, EUH-3 AND EUH-4.
4. SHOWN FOR WELL ROOM TEMPERATURE TRANSMITTER TT-1. DUPLICATE FOR CHLORINE ROOM TEMPERATURE TRANSMITTER TT-2.
5. SHOWN FOR PRE-LUBE SOLENOID VALVE SV-1. DUPLICATE FOR CHLORINE SYSTEM SOLENOID VALVE SV-2.
6. SHOWN FOR DOUBLE DOOR POSITION SWITCHES ZS-1A/1B. DUPLICATE FOR DOUBLE DOOR POSITION SWITCHES ZS-2A/2B.
7. SHOWN FOR SINGLE DOOR SWITCH ZS-3. DUPLICATE FOR ROOF HATCH POSITION SWITCH ZS-4.
8. SHOWN FOR SYSTEM VALVE VA-1 POSITION SWITCHES ZS-5A/5B. DUPLICATE FOR WASTE VALVE VA-4 POSITION SWITCHES ZS-6A/6B.
9. SHOWN FOR WEIGHT SCALE 1A/1B. DUPLICATE FOR WEIGHT SCALE 2A/2B.

**I&C WIRE/CONDUIT TABLE**

IDENT.	CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1A	3/4"	1	#18TSP	1 ANALOG SIGNAL
2A	3/4"	2	#18TSP	2 ANALOG SIGNALS
3A	3/4"	3	#18TSP	3 ANALOG SIGNALS
IDENT.	CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1D	3/4"	2	#14	1 SIGNAL
2D	3/4"	3	#14	1 COMMON, 2 DISCRETE SIG.
3D	3/4"	4	#14	VARIES
4D	3/4"	5	#14	VARIES

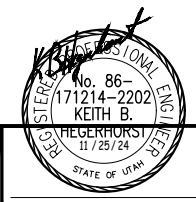
**TABLE RVSS (CP-1 TO RVSS)**

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1"	1	#14	COMMON INPUT
	1	#14	COMMON OUTPUT
	1	#14	MOTOR HIGH TEMP ALARM
	1	#14	MOTOR HIGH VIBRATION
	1	#14	WELL BACKSPIN TIME DELAY
	1	#14	WELL COMMAND RUN
	1	#14	WELL HIGH PRESS. SHUTDOWN
	1	#14	WELL LOW LEVEL SHUTDOWN
	1	#14	WELL PUMP RUNNING
	1	#14	WELL RVSS FAULT
	1	#14	WELL RVSS IN AUTO
	1	#14	WELL RVSS IN HAND
	4	#14	SPARE
	3/4"	1	CAT 6U
3/4"	1	PS	SPARE W/PULL STRING

**TABLE CP2 (CP-1 TO CP-2)**

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
3/4"	1	#14	COMMON INPUT
	1	#14	COMMON OUTPUT
	1	#14	EF-1 COMMAND RUN
	1	#14	EF-1 HOA IN AUTO
	1	#14	EF-1 HOA IN HAND
	1	#14	EF-1 RUNNING
	4	#14	SPARE

FILE NAME:  
 FILE DATE:



DESIGNED KBH 3  
 DRAFTED KBH 2  
 CHECKED KBH 1  
 PROJECT ENGINEER DATE JANUARY 2024 NO. DATE

NO.	DATE	REVISIONS	BY	APVD.

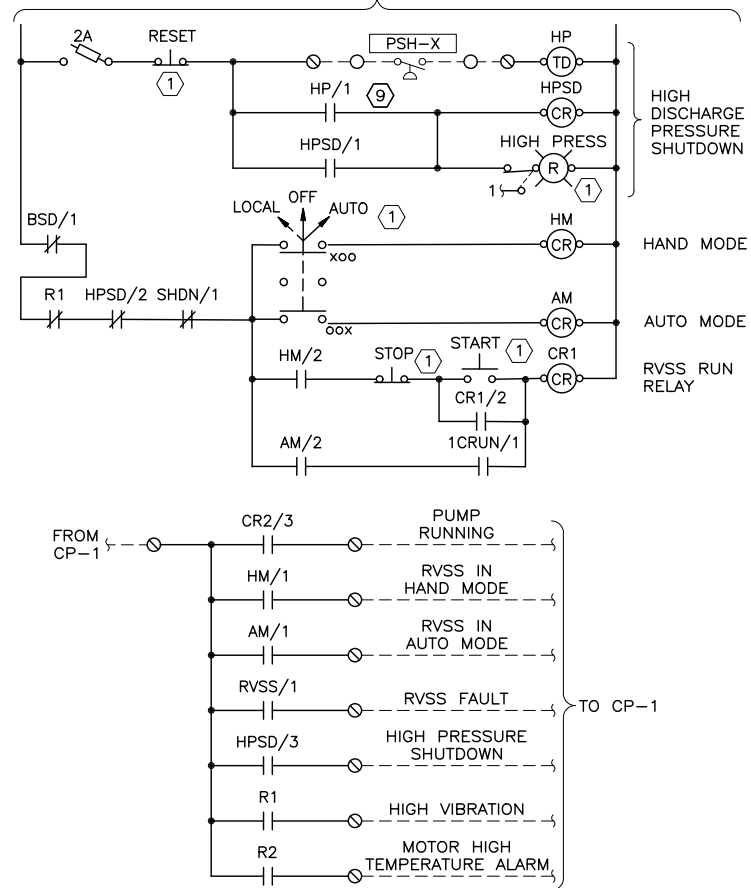
SCALE  
 NONE



WELL HOUSE #10  
 ELECTRICAL  
 INST. AND CONTROL ONE-LINE DIAGRAM

SHEET  
**E3.2**  
 119.08.100

CONTINUED FROM LOWER LEFT COLUMN



TYPICAL RVSS WIRING DIAGRAM

TERMINAL LEGEND:

- CP-1 MAIN CONTROL PANEL.
- ▣ CP-2 SMALL MOTOR CONTROL PANEL
- RVSS MOTOR CONTROLLER
- FIELD TERMINAL

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 708 EAST 90 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
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 FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

GENERAL NOTES:

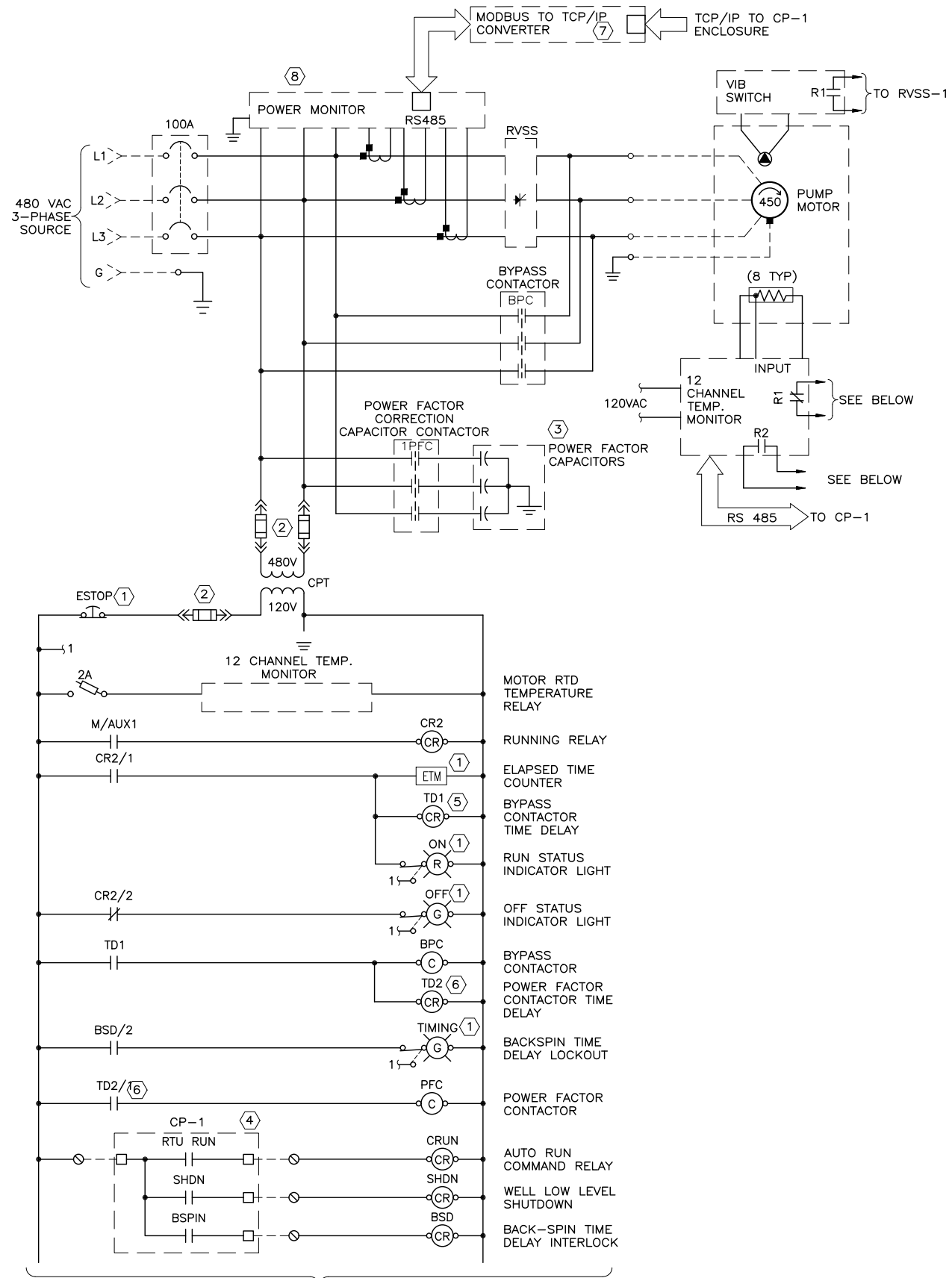
1. THIS IS A TYPICAL WIRING DIAGRAM. CONTRACTOR SHALL MODIFY AS REQUIRED FOR THE RVSS AND OTHER COMPONENTS PROVIDED.
2. CONTRACTOR SHALL PROVIDE TERMINAL, WIRE AND OVERCURRENT DEVICE NUMBERS AS REQUIRED.
3. THE RVSS SHALL STOP ON WELL LOW LEVEL.

SHEET KEYNOTES:

1. DEVICE SHALL BE LOCATED ON ENCLOSURE DOOR AVAILABLE TO THE OPERATOR.
2. FUSES SIZED BY EQUIPMENT MANUFACTURER.
3. POWER FACTOR CAPACITORS MAY BE INSTALLED ON THE TOP OF THE RVSS MOTOR CONTROLLER ENCLOSURE.
4. DEVICE LOCATED IN CP-1. COORDINATE WITH THE PANEL MANUFACTURER FOR RELAY INFORMATION.
5. TIME DELAY MAY BE PROVIDED WITH THE RVSS MOTOR CONTROLLER. MODIFY AS REQUIRED.
6. POWER FACTOR CAPACITORS SHALL BE ENERGIZED AFTER THE PUMP IS RUNNING ON THE BYPASS CONTACTOR. TYPICAL TIME DELAY 5 SECONDS.
7. PROVIDE AN RS485 TO ETHERNET CONVERTER AND POWER SUPPLY AS REQUIRED.
8. POWER MONITOR SHOWN WITHOUT FUSING. CONTRACTOR SHALL PROVIDE FUSING AS REQUIRED BY MANUFACTURER.
9. CONTACTS TO CLOSE AFTER 3 SECOND DELAY.

TABLE RVSS (CP-1 TO RVSS)

CONDUIT SIZE	CONDUCTOR QTY	CONDUCTOR SIZE	SIGNAL DESCRIPTION
1"	1	#14	COMMON INPUT
	1	#14	COMMON OUTPUT
	1	#14	MOTOR HIGH TEMP ALARM
	1	#14	MOTOR HIGH VIBRATION
	1	#14	WELL BACKSPIN TIME DELAY
	1	#14	WELL COMMAND RUN
	1	#14	WELL HIGH PRESS. SHUTDOWN
	1	#14	WELL LOW LEVEL SHUTDOWN
	1	#14	WELL PUMP RUNNING
	1	#14	WELL RVSS FAULT
	1	#14	WELL RVSS IN AUTO
	1	#14	WELL RVSS IN HAND
3/4"	1	CAT 6U	POWER MONITOR
3/4"	1	PS	SPARE W/PULL STRING



CONTINUED TOP RIGHT COLUMN



FILE NAME:  
FILE DATE:



DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO. DATE

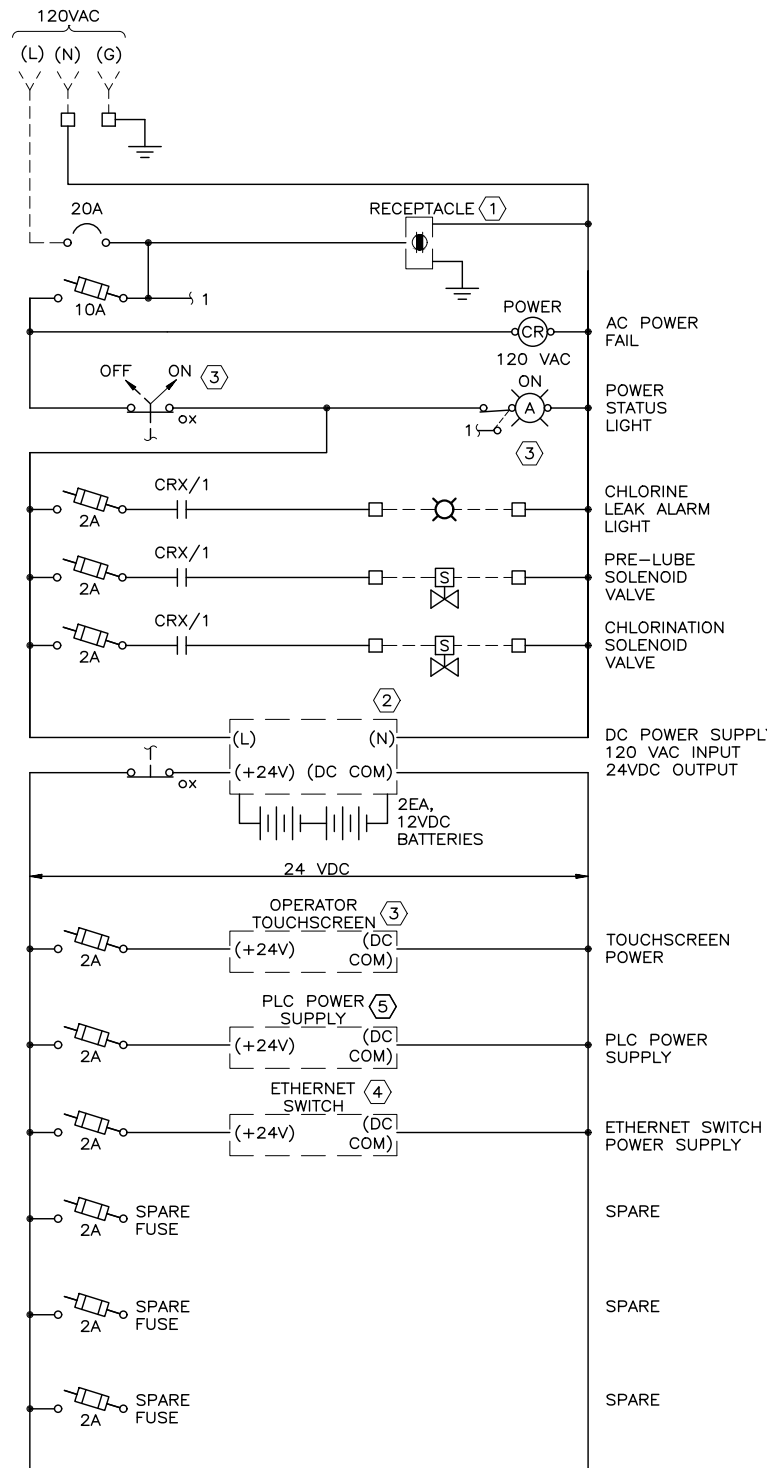
REVISIONS		BY	APVD.

SCALE  
NONE

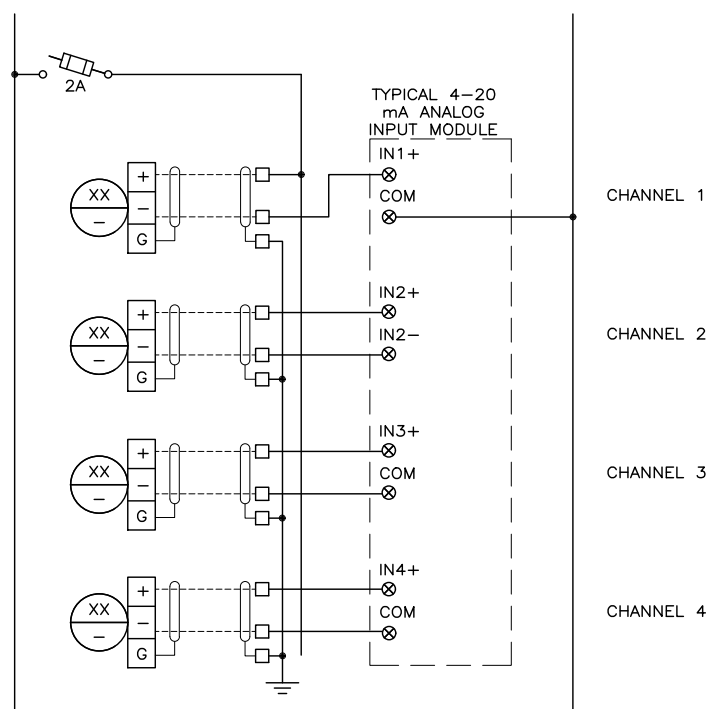


WELL HOUSE #10  
ELECTRICAL  
TYPICAL RVSS CONTROL DIAGRAM

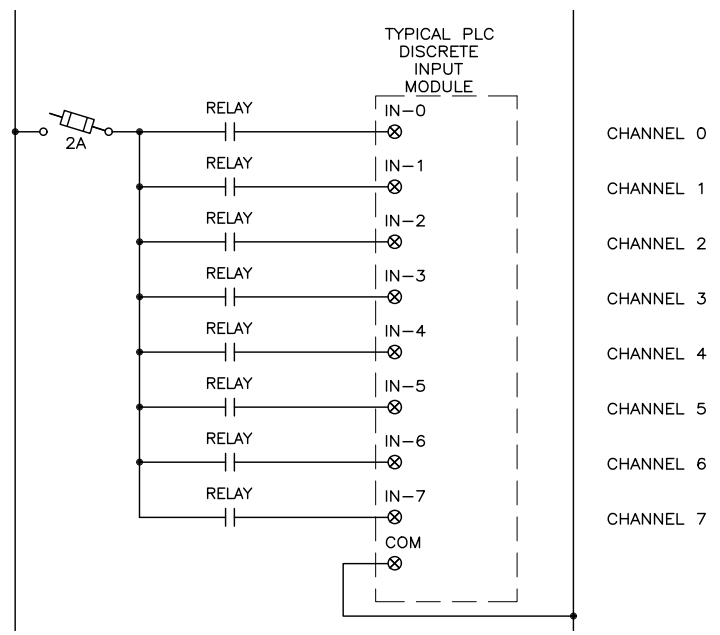
SHEET  
E3.3  
119.08.100



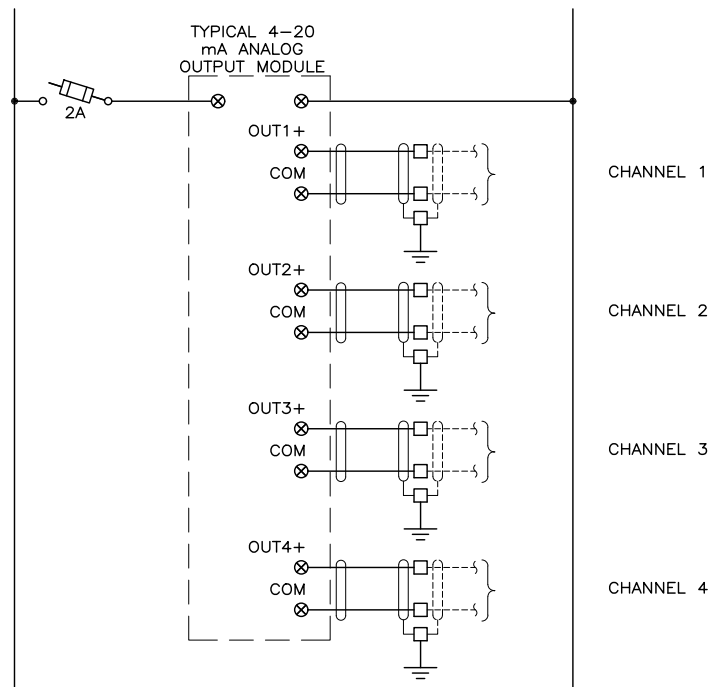
TYPICAL POWER LOGIC WIRING



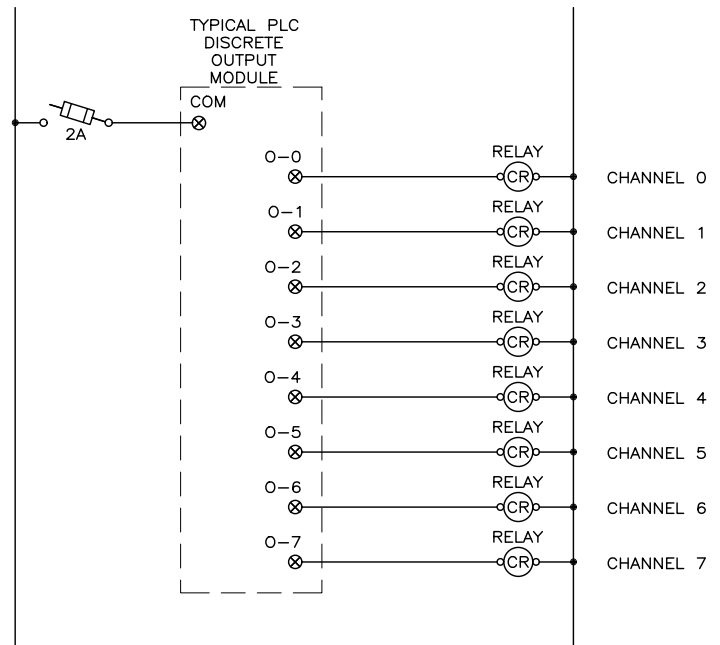
TYPICAL ANALOG INPUT MODULE WIRING



TYPICAL DISCRETE INPUT MODULE WIRING



TYPICAL ANALOG OUTPUT MODULE WIRING



TYPICAL DISCRETE OUTPUT MODULE WIRING

GENERAL NOTES:

1. THIS DIAGRAM IS TYPICAL AND INDICATES THE BASIC CONTROL PANEL CONTROL DIAGRAM. THE CONTRACTOR SHALL MODIFY AS REQUIRED FOR THE DEVICES AND PLC MODULES USED. FOUR OR EIGHT CHANNEL MODULES HAVE BEEN SHOWN. PROVIDED MULTI-CHANNEL I/O MODULES AS REQUIRED.
2. OWNER SHALL PREPARE A CONTROL DIAGRAM, INCLUDING WIRE, FUSE AND TERMINAL NUMBERS AS REQUIRED. THE PLC I/O SHOWN IS GENERIC.

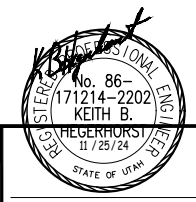
SHEET KEYNOTES:

1. PROVIDE A DUPLEX GFCI RECEPTACLE IN THE ENCLOSURE.
2. PROVIDE A 120VAC:24VDC POWER SUPPLY/BATTERY CHARGER COMPLETE WITH BATTERY CAPACITY TO PROVIDE 2 HOURS OF PANEL OPERATION UPON THE LOSS OF UTILITY POWER OR PROVIDE 120VAC UNINTERRUPTIBLE POWER SUPPLY.
3. DEVICE SHALL BE INSTALLED IN THE ENCLOSURE DOOR AND AVAILABLE TO THE OPERATOR.
4. OWNER TO PROVIDE A MULT-PORT ETHERNET SWITCH AS REQUIRED. PROVIDE A MINIMUM OF 2 SPARE PORTS.

TERMINAL LEGEND:

- CP-1 MAIN CONTROL PANEL.
- ▣ CP-2 SMALL MOTOR CONTROL PANEL
- ⊗ RVSS MOTOR CONTROLLER
- FIELD TERMINAL

FILE NAME:  
FILE DATE:



DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
NONE

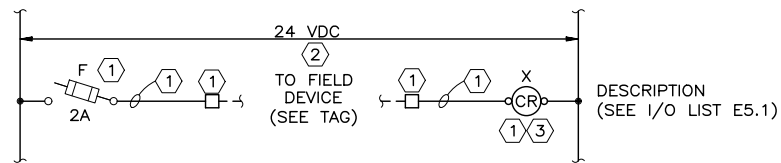


WELL HOUSE #10  
ELECTRICAL  
CP-1 TYP CONTROL DIAGRAM, SHT. 1

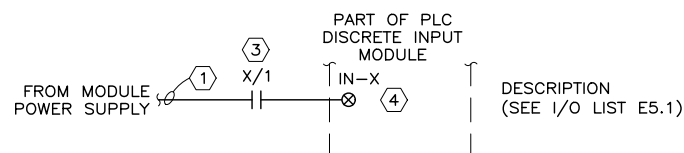
SHEET  
E3.4  
119.08.100

**NOTES:**

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.
2. CONTRACTOR MAY COMBINE CONDUCTORS IN COMMON CONDUIT TO DEVICES IN SAME PROXIMITY.
3. PROVIDE AN INTERPOSING RELAY AND WIRE RELAY CONTACT TO PLC INPUT AS INDICATED.
4. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.



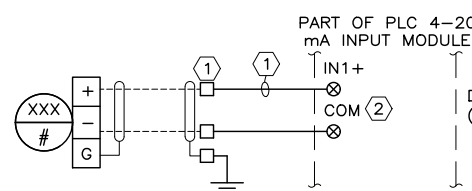
**INTERPOSE RELAY LOGIC**



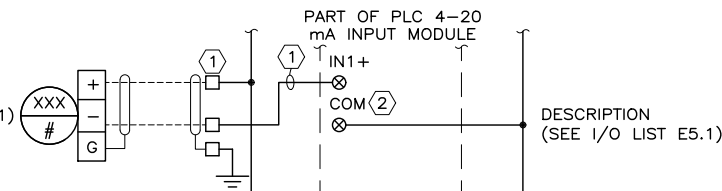
**PLC DISCRETE INPUT LOGIC**

**NOTES:**

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.
2. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.



**PLC ANALOG INPUT TYPE 1**



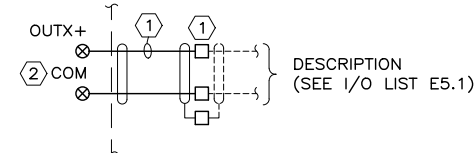
**PLC ANALOG INPUT TYPE 2**

**TYPICAL INPUT AND OUTPUT SIGNAL WIRING**

**NOTES:**

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.
2. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.

PART OF PLC 4-20 mA OUTPUT MODULE

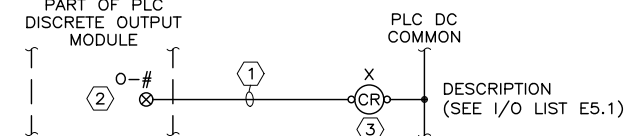


**PLC ANALOG OUTPUT**

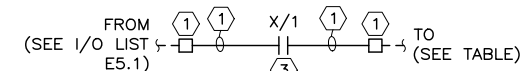
**NOTES:**

1. CONTRACTOR SHALL ASSIGN FUSE, RELAY, TERMINAL AND WIRE NUMBERS AS REQUIRED.
2. CONTRACTOR SHALL ASSIGN PLC MODULE AND CHANNEL.
3. PROVIDE AN INTERPOSING RELAY AND WIRE RELAY CONTACT TO PLC INPUT AS INDICATED.

PART OF PLC DISCRETE OUTPUT MODULE



**PLC DISCRETE OUTPUT LOGIC**



**INTERPOSE RELAY LOGIC**

**GENERAL NOTES:**

1. REFER TO E-2.4 FOR GENERAL NOTES.

**SHEET KEYNOTES:**

1. KEYNOTES ARE SHOWN IN EACH DIAGRAM.

FILE NAME:  
FILE DATE:



PROJECT ENGINEER

DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO.

DATE

REVISIONS

BY: APVD.

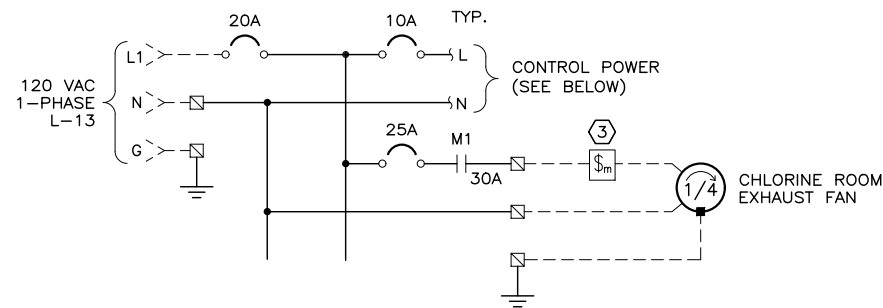
SCALE  
NONE



WELL HOUSE #10  
ELECTRICAL  
CP-1 TYP CONTROL DIAGRAM, SHT. 2

SHEET  
E3.5

119.08.100



**TERMINAL LEGEND:**

- CP-1 MAIN CONTROL PANEL.
- ▣ CP-2 SMALL MOTOR CONTROL PANEL
- ⊙ RVSS MOTOR CONTROLLER
- FIELD TERMINAL

**TABLE CP2 (CP-1 TO CP-2)**

CONDUIT SIZE	CONDUCTOR		SIGNAL DESCRIPTION
	QTY	SIZE	
3/4"	1	#14	COMMON INPUT
	1	#14	COMMON OUTPUT
	1	#14	EF-1 COMMAND RUN
	1	#14	EF-1 HOA IN AUTO
	1	#14	EF-1 HOA IN HAND
	4	#14	EF-1 RUNNING
			SPARE

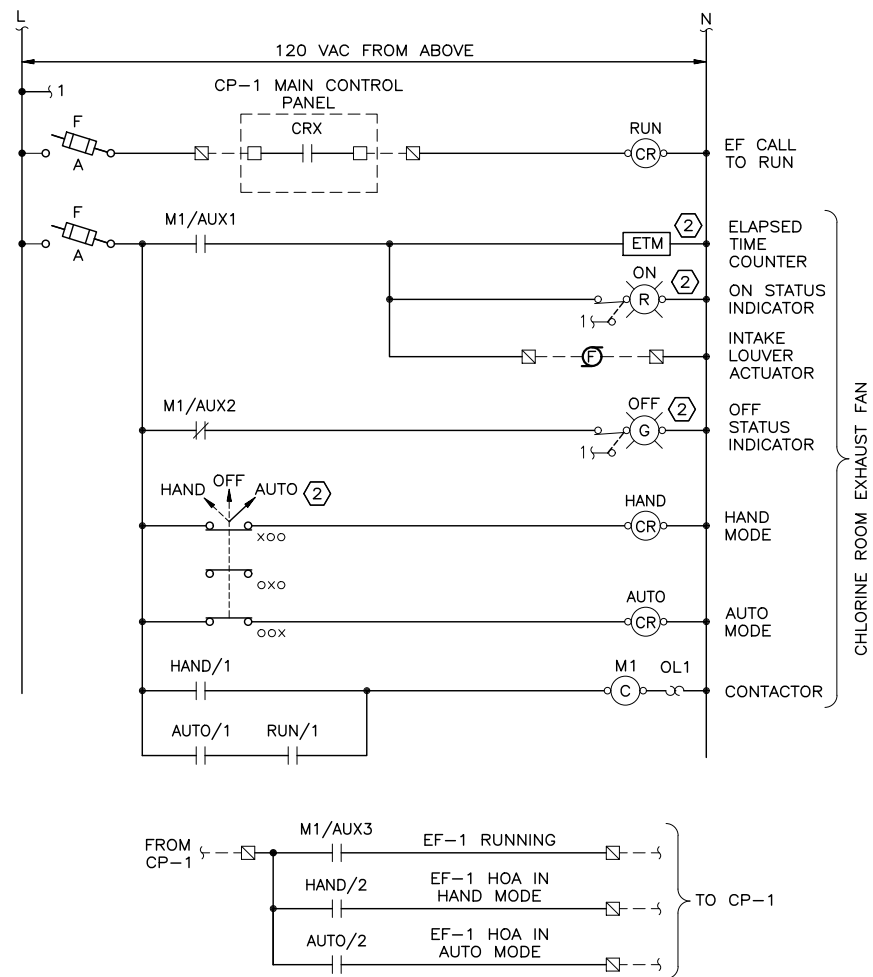
H.P.E. INC. ELECTRICAL ENGINEERS  
 POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
 HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
 708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
 HPE PROJECT: 21.122 ©2022  
 FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

**GENERAL NOTES:**

- REFER TO E5.2 FOR TYPICAL ENCLOSURE ARRANGEMENT.
- CONTRACTOR SHALL PROVIDE FUSE, TERMINAL AND WIRE NUMBERS AS REQUIRED.
- DIAGRAM IS CONCEPTUAL AND SHALL BE MODIFIED FOR THE PROVIDED DEVICES.

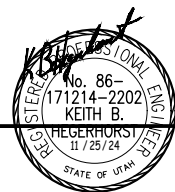
**SHEET KEYNOTES:**

- FUSE RATINGS DETERMINED BY CONTRACTOR.
- DEVICE SHALL BE INSTALLED IN ENCLOSURE DOOR AND AVAILABLE TO THE OPERATOR.
- PROVIDE A 1-POLE MANUAL STARTER AS THE MOTOR DISCONNECT. FIELD LOCATE NEAR MOTOR, AND LABEL AS "EXHAUST FAN DISCONNECT".



**CP-2 WIRING DIAGRAM**

FILE NAME:  
FILE DATE:



PROJECT ENGINEER

DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO. DATE

REVISIONS		BY	APVD.

SCALE  
NONE



WELL HOUSE #10  
ELECTRICAL  
CP-2 CONTROL DIAGRAM

SHEET  
E3.6  
119.08.100



POWER PLAN ITEMS (E4.1)

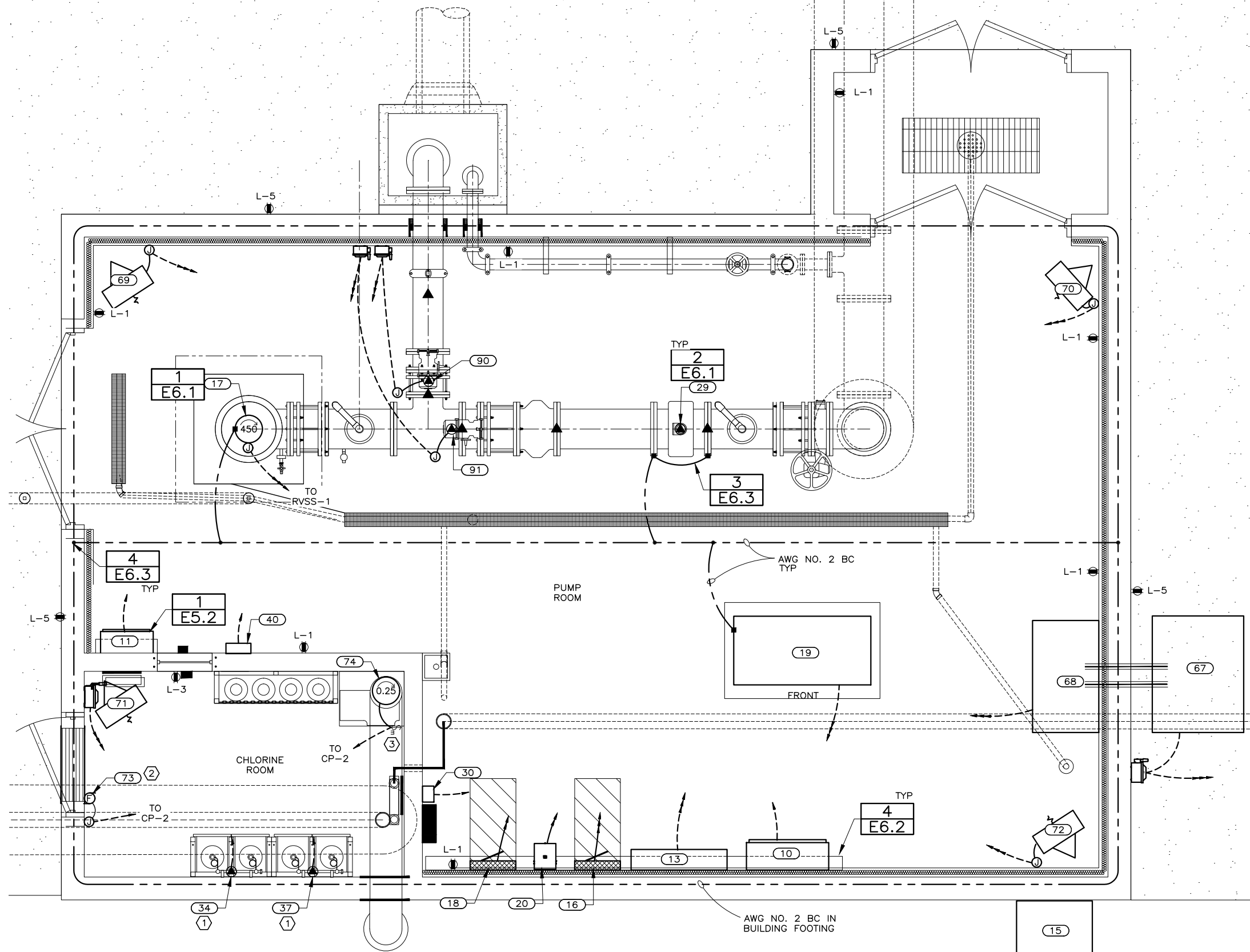
DRAWING ID	TAG	DESCRIPTION	POWER SOURCE	LOCATION
10	CP-1	MAIN CONTROL PANEL	L-2	PUMP ROOM
11	CP-2	SMALL MOTOR CONTROL PANEL	L-13	PUMP ROOM
13	MDP	MAIN DISTRIBUTION PANELBOARD	MSD	PUMP ROOM
15	MSD	MAIN SERVICE DISCONNECT	SITE POWER	BUILDING EXTERIOR
16	PNL-H	POWER PANELBOARD	MDP-1	PUMP ROOM
17	P-1	WELL PUMP MOTOR	RVSS-1	PUMP ROOM
18	PNL-L	POWER PANELBOARD	XFMR-L	PUMP ROOM
19	RVSS-1	WELL MOTOR CONTROLLER	MDP-2	PUMP ROOM
20	XFMR-L	TRANSFORMER L	H-2,4	PUMP ROOM
29	FE-1	WELL FLOW ELEMENT	FIT-1	PUMP ROOM
30	FIT-1	WELL FLOW INDICATOR/TRANSMITTER	L-4	PUMP ROOM
34	WIT-1A/1B	DUAL CHLORINE WEIGHT SCALE	L-10	CHLORINE ROOM
37	WIT-2A/2B	DUAL CHLORINE WEIGHT SCALE	L-14	CHLORINE ROOM
40	ASH-1	CHLORINE GAS DETECTOR	L-6	PUMP ROOM
67	CU-1	CONDENSING UNIT	H-8,10,12	BUILDING EXTERIOR
68	AH-1	AIR HANDLER	H-14,16,18	PUMP ROOM
69	EUH-1	ELECTRIC UNIT HEATER	H-1,3,5	PUMP ROOM
70	EUH-2	ELECTRIC UNIT HEATER	H-7,9,11	PUMP ROOM
71	EUH-3	ELECTRIC UNIT HEATER	H-13,15,17	CHLORINE ROOM
72	EUH-4	ELECTRIC UNIT HEATER	H-19,21,23	PUMP ROOM
73	ML-1	MOTORIZED LOUVER	CP-2	CHLORINE ROOM
74	EF-1	EXHAUST FAN	CP-2	CHLORINE ROOM
90	VA-4	WASTE VALVE ACTUATOR	H-26,28,30	PUMP ROOM
91	VA-1	SYSTEM VALVE ACTUATOR	H-20,22,24	PUMP ROOM

GENERAL NOTES:

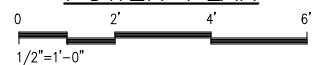
- POWER SOURCE OR "HOME RUN" IS LISTED IN THE ITEM TABLE ON THIS SHEET. REFER TO POWER ONE-LINE DIAGRAM FOR CIRCUIT ID, THEN THE WIRE AND CONDUIT REQUIREMENTS ARE IN THE CONDUIT/CONDUCTOR TABLE ON E1.2
- INSTALL ALL INTERIOR RECEPTACLES AT +36-IN ABOVE FINISHED FLOOR. INSTALL ALL EXTERIOR RECEPTACLES AT +18-IN AND PROVIDE IN-SERVICE W/P COVER PLATE.

SHEET KEYNOTES:

- INSTALL OUTLET FOR CHLORINE WEIGHT SCALES 6-IN ABOVE TOP OF INDICATOR/TRANSMITTERS.
- VERIFY LOCATION OF LOUVER ACTUATOR PRIOR TO CONDUIT ROUGH-IN.
- FIELD LOCATE MANUAL STARTER. LABEL AS CHLORINE EF MOTOR DISCONNECT.



POWER PLAN



DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO.

REVISIONS

SCALE  
AS SHOWN



WELL HOUSE #10  
ELECTRICAL  
POWER PLAN

SHEET  
E4.1  
119.08.100

INSTR. & CONTROL PLAN ITEMS (E4.2)

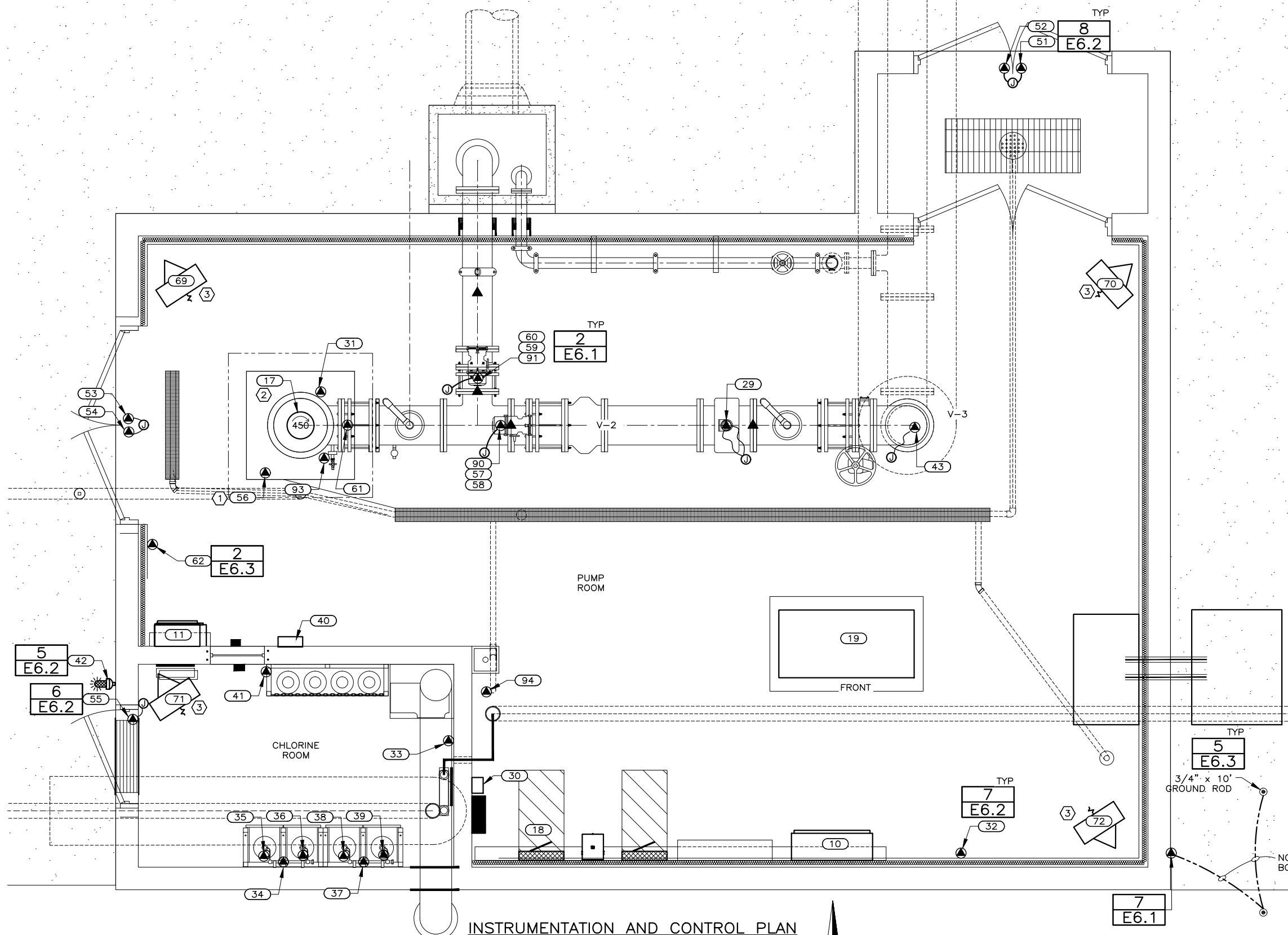
DRAWING ID	TAG	DESCRIPTION	POWER SOURCE	LOCATION
10	CP-1	MAIN CONTROL PANEL	L-2	PUMP ROOM
11	CP-2	SMALL MOTOR CONTROL PANEL	L-13	PUMP ROOM
17	P-1	WELL PUMP MOTOR	RVSS-1	PUMP ROOM
18	PNL-L	POWER PANELBOARD	XFMR-L	PUMP ROOM
19	RVSS-1	WELL MOTOR CONTROLLER	MDP-2	PUMP ROOM
29	FE-1	WELL FLOW ELEMENT	FIT-1	PUMP ROOM
30	FIT-1	WELL FLOW INDICATOR/TRANSMITTER	L-4	PUMP ROOM
31	LT-1	WELL LEVEL TRANSDUCER	CP-1	PUMP ROOM
32	TT-1	TEMPERATURE INDICATOR/TRANSMITTER	CP-1	PUMP ROOM
33	TT-2	TEMPERATURE INDICATOR/TRANSMITTER	CP-1	CHLORINE ROOM
34	WIT-1A/1B	DUAL CHLORINE WEIGHT SCALE	L-10	CHLORINE ROOM
35	WE-1A	CHLORINE SCALE 1A WEIGHT ELEMENT	WIT-1	CHLORINE ROOM
36	WE-1B	CHLORINE SCALE 1B WEIGHT ELEMENT	WIT-1	CHLORINE ROOM
37	WIT-2A/2B	DUAL CHLORINE WEIGHT SCALE	L-14	CHLORINE ROOM
38	WE-2A	CHLORINE SCALE 2A WEIGHT ELEMENT	WIT-2	CHLORINE ROOM
39	WE-2B	CHLORINE SCALE 2B WEIGHT ELEMENT	WIT-2	CHLORINE ROOM
40	ASH-1	CHLORINE GAS DETECTOR	L-6	PUMP ROOM
41	AE-1	CHLORINE GAS PROBE	ASH-1	PUMP ROOM
42	AL-1	ALARM LIGHT	CP-1	BUILDING EXTERIOR
43	PT-1	SYSTEM PRESSURE TRANSMITTER	CP-1	PUMP ROOM
51	ZS-1A	DOOR POSITION SWITCH	CP-1	W. ROOM VESTIBULE
52	ZS-1B	DOOR POSITION SWITCH	CP-1	W. ROOM VESTIBULE
53	ZS-2A	DOOR POSITION SWITCH	CP-1	PUMP ROOM
54	ZS-2B	DOOR POSITION SWITCH	CP-1	PUMP ROOM
55	ZS-3	DOOR POSITION SWITCH	CP-1	CHLORINE ROOM
56	ZS-4	HATCH POSITION SWITCH	CP-1	PUMP ROOM
57	ZS-5A	SYSTEM VALVE (VA-1) POSITION SWITCH	CP-1	PUMP ROOM
58	ZS-5B	SYSTEM VALVE (VA-1) POSITION SWITCH	CP-1	PUMP ROOM
59	ZS-6A	WASTE VALVE (VA-4) POSITION SWITCH	CP-1	PUMP ROOM
60	ZS-6B	WASTE VALVE (VA-4) POSITION SWITCH	CP-1	PUMP ROOM
61	PSH-1	WELL HIGH DISCHARGE PRESSURE	CP-1	PUMP ROOM
62	LSH-1	FLOOR HIGH WATER LEVEL SWITCH	CP-1	PUMP ROOM
69	EUH-1	ELECTRIC UNIT HEATER	H-1,3,5	PUMP ROOM
70	EUH-2	ELECTRIC UNIT HEATER	H-7,9,11	PUMP ROOM
71	EUH-3	ELECTRIC UNIT HEATER	H-13,15,17	CHLORINE ROOM
72	EUH-4	ELECTRIC UNIT HEATER	H-19,21,23	PUMP ROOM
90	VA-4	WASTE VALVE ACTUATOR	H-26,28,30	PUMP ROOM
91	VA-1	SYSTEM VALVE ACTUATOR	H-20,22,24	PUMP ROOM
93	SV-1	OIL-LUBE SOLENOID VALVE	CP-1	PUMP ROOM
94	SV-2	CHLORINATION SOLENOID VALVE	CP-1	PUMP ROOM

GENERAL NOTES:

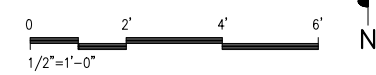
- REFER TO THE INSTRUMENTATION AND CONTROL ONE-LINE DIAGRAM FOR WIRE AND CONDUIT REQUIREMENTS.
- DEVICES LOCATED AT WELL ARE DIAGRAMMATIC. PRIOR TO CONDUIT ROUGH-IN REFER TO CIVIL DRAWINGS FOR DEVICE LOCATIONS.

SHEET KEYNOTES:

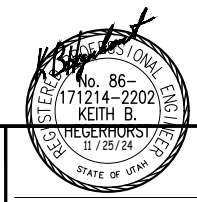
- LOCATE DEVICE AT ROOF HATCH.
- LOCATIONS FOR MOTOR RTD J-BOX AND THE VIBRATION SWITCH ARE NOT SHOWN ON THIS PLAN. COORDINATE WITH MOTOR SUPPLIER FOR LOCATIONS PRIOR TO CONDUIT ROUGH-IN.
- UNIT HEATERS CONTROLLED BY PLC IN CP-1 AND THE ROOM TEMPERATURE TRANSMITTER.



INSTRUMENTATION AND CONTROL PLAN



FILE NAME:  
 FILE DATE:



DESIGNED	KBH	3	
DRAFTED	KBH	2	
CHECKED	KBH	1	
DATE	JANUARY 2024	NO.	DATE

REVISIONS

BY APVD.

SCALE  
 AS SHOWN



WELL HOUSE #10  
 ELECTRICAL  
 INSTRUMENTATION AND CONTROL PLAN

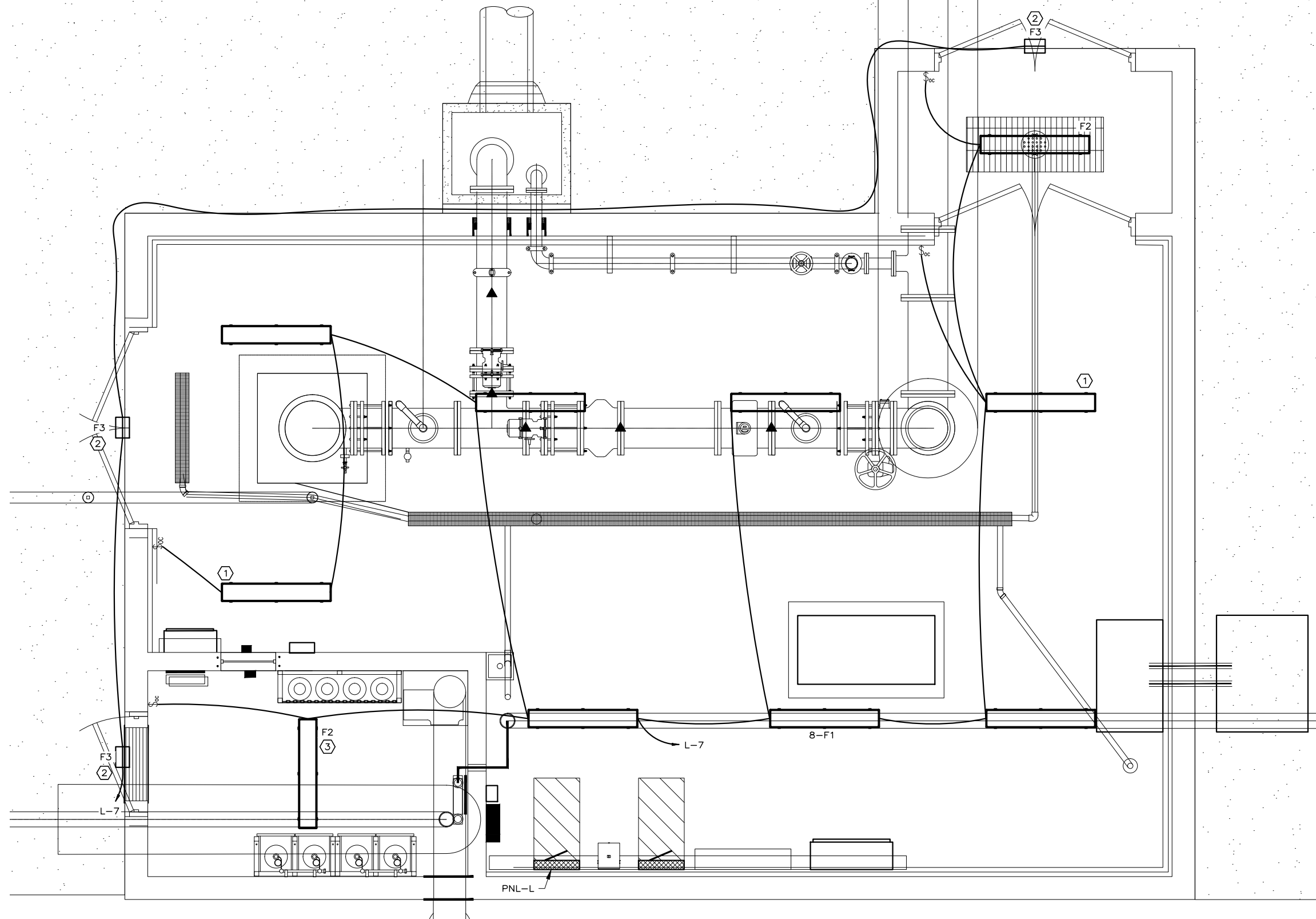
SHEET  
 E4.2  
 119.08.100

**GENERAL NOTES:**

1. REFER TO POWER ONE-LINE DIAGRAM FOR CIRCUIT ID, THEN THE WIRE AND CONDUIT REQUIREMENTS ARE IN THE CONDUIT/CONDUCTOR TABLE ON E1.2
2. REFER TO THE ELECTRICAL UTILITY INSTALLATION TABLE FOR CONTRACTOR AND UTILITY RESPONSIBILITIES.
3. FIXTURE SCHEDULE ON E1.2.

**SHEET KEYNOTES:**

1. PROVIDE A 90-MINUTE BATTERY IN THIS FIXTURE.
2. INSTALL FIXTURE 6-IN ABOVE TOP OF DOOR.
3. CHLORINE ROOM LIGHT SHALL BE CONTROLLED WITH PUMP ROOM LIGHTS.



**LIGHTING PLAN**



FILE NAME:  
FILE DATE:



PROJECT ENGINEER

DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO.

DATE		NO.
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REVISIONS

BY	APVD.
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SCALE  
AS SHOWN



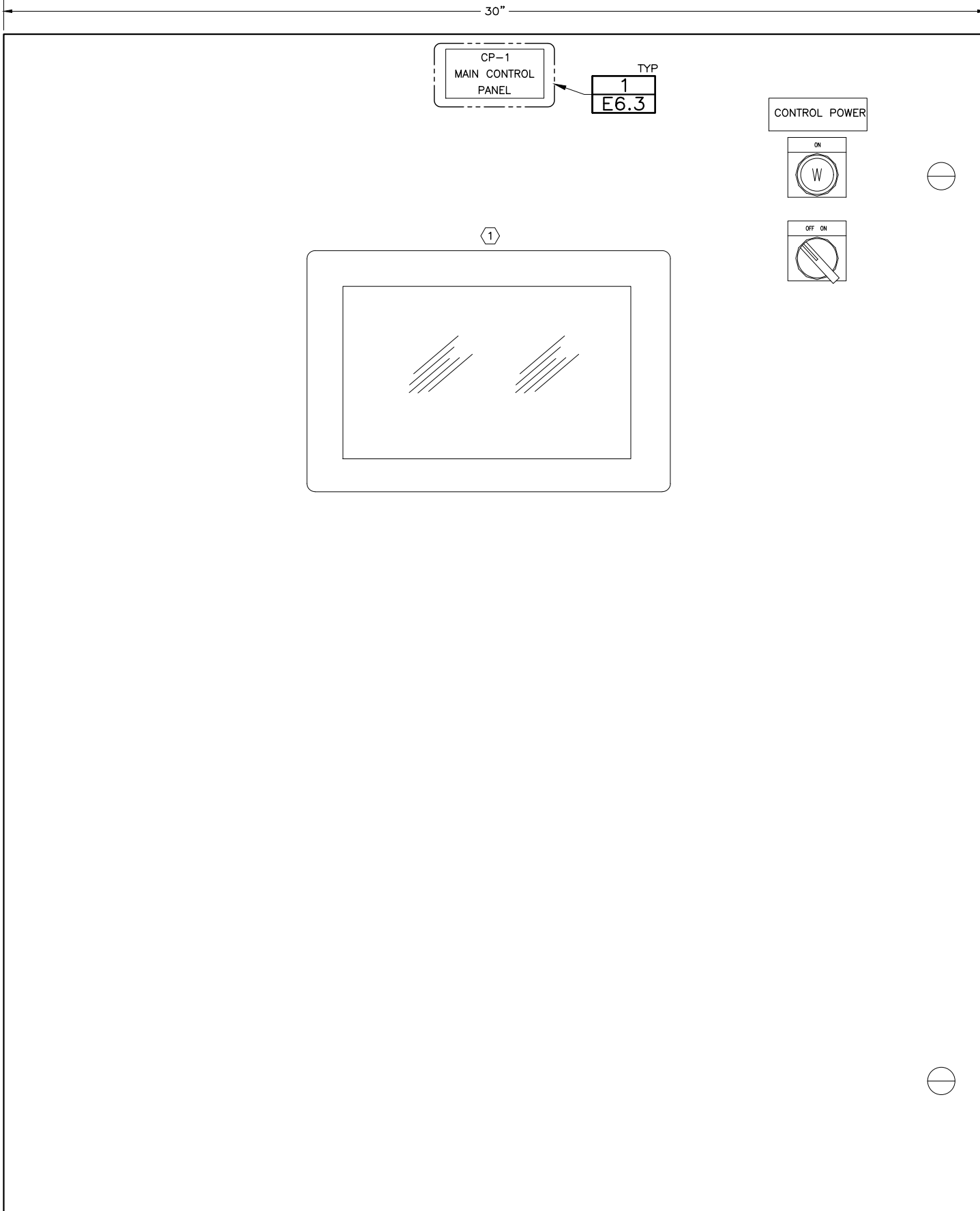
WELL HOUSE #10  
ELECTRICAL  
LIGHTING PLAN

SHEET  
E4.3  
119.08.100

OREM WELL 10 INPUT/OUTPUT LIST

TYPE	DESCRIPTION	FROM DEVICE	TO DEVICE
AI	CHLORINE ROOM TEMPERATURE	TT-2	CP-1
AI	CHLORINE TANK #1A WEIGHT	WIT-1	CP-1
AI	CHLORINE TANK #1B WEIGHT	WIT-1	CP-1
AI	CHLORINE TANK #2A WEIGHT	WIT-1	CP-1
AI	CHLORINE TANK #2B WEIGHT	WIT-1	CP-1
AI	PUMP ROOM TEMPERATURE	TT-1	CP-1
AI	SYSTEM FLOW	FIT-1	CP-1
AI	SYSTEM PRESSURE	PT-1	CP-1
AI	WELL LEVEL	LT-1	CP-1
DI	CHLORINE LEAK	ASH-1	CP-1
DI	CHLORINE RM. EF-1 HOA IN AUTO	CP-2	CP-1
DI	CHLORINE RM. EF-1 HOA IN HAND	CP-2	CP-1
DI	CHLORINE RM. EF-1 RUNNING	CP-2	CP-1
DI	CHLORINE ROOM DOOR NOT CLOSED	ZS-3	CP-1
DI	PUMP ROOM DOOR 1A NOT CLOSED	ZS-1A	CP-1
DI	PUMP ROOM DOOR 1B NOT CLOSED	ZS-1B	CP-1
DI	PUMP ROOM DOOR 2A NOT CLOSED	ZS-2A	CP-1
DI	PUMP ROOM DOOR 2B NOT CLOSED	ZS-2B	CP-1
DI	PUMP ROOM FLOOR HIGH WATER	LSH-1	CP-1
DI	PUMP ROOM ROOF HATCH NOT CLOSED	ZS-4	CP-1
DI	RVSS FAULT	RVSS-1	CP-1
DI	RVSS HOA IN AUTO	RVSS-1	CP-1
DI	RVSS HOA IN HAND	RVSS-1	CP-1
DI	RVSS RUNNING	RVSS-1	CP-1
DI	SYSTEM VALVE FULL CLOSED	ZS-5B	CP-1
DI	SYSTEM VALVE FULL OPEN	ZS-5A	CP-1
DI	WASTE VALVE FULL CLOSED	ZS-6B	CP-1
DI	WASTE VALVE FULL OPEN	ZS-6A	CP-1
DI	WELL MOTOR HIGH TEMPERATURE ALARM	RVSS-1	CP-1
DI	WELL MOTOR HIGH VIBRATION	RVSS-1	CP-1
DI	WELL HIGH DISCHARGE PRESSURE SHDN	RVSS-1	CP-1
DI	WELL HIGH DISCHARGE PRESSURE SHUTDOWN	RVSS-1	CP-1
DI	WELL ROOM HIGH FLOOR WATER LEVEL	LSH-1	CP-1
DO	CHLORINE EF-1 COMMAND RUN	CP-1	CP-2
DO	CHLORINATION SOLENOID VALVE CMD OPEN	CP-1	SV-2
DO	CHLORINE LEAK ALARM LIGHT CMD ON	CP-1	AL-1
DO	LEAK DETECTOR REMOTE RESET	CP-1	ASH-1
DO	UNIT HEATER COMMAND ON	CP-1	EUH-1
DO	UNIT HEATER COMMAND ON	CP-1	EUH-2
DO	UNIT HEATER COMMAND ON	CP-1	EUH-3
DO	UNIT HEATER COMMAND ON	CP-1	EUH-4
DO	WELL BACKSPIN TIME DELAY	CP-1	RVSS-1
DO	WELL COMMAND RUN	CP-1	RVSS-1
DO	WELL LOW LEVEL SHUTDOWN	CP-1	RVSS-1
DO	WELL PRELUBE SOLENOID CMD OPEN	CP-1	SV-1
ETHERNET	RVSS POWER QUALITY METER	CP-1	RVSS-1

36"



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 POWER SYSTEMS, CONTROL & INSTRUMENTATION SYSTEMS  
 HEGERHORST POWER ENGINEERING INCORPORATED (801) 642-2051  
 708 EAST 50 SOUTH AMERICAN FORK, UT 84003 FAX (801) 642-2154  
 HPE PROJECT:21.122 ©2023  
 FOR INFORMATION ABOUT THIS JOB, PLEASE CONTACT: KEITH HEGERHORST

- GENERAL NOTES:**
- REFER TO E3.4 AND E3.5 FOR TYPICAL CP-1 CONTROL DIAGRAMS.
  - ENCLOSURE DIMENSIONS SHOWN ARE ANTICIPATED. ENCLOSURE DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE REQUIRED DEVICES.
  - CP-1 ENCLOSURE, INTERNAL COMPONENTS, ASSEMBLY AND WIRING PROVIDED BY CONTRACTOR. OWNER WILL PROVIDE PLC AND OPERATOR DISPLAY PROGRAMMING DURING CONSTRUCTION.
  - CONTRACTOR SHALL DETERMINE TERMINAL, OVERCURRENT, AND WIRE NUMBERS AS REQUIRED.

- SHEET KEYNOTES:**
- PROVIDE A 10-IN COLOR TOUCH SCREEN FOR THE OPERATOR INTERFACE.

CP-1 EXTERIOR ARRANGEMENT 1  
 6" = 1'-0" E4.1

FILE NAME:  
 FILE DATE:



PROJECT ENGINEER

DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE  
 AS SHOWN



WELL HOUSE #10  
 ELECTRICAL  
 CP-1 MAIN CP ARRANGEMENT

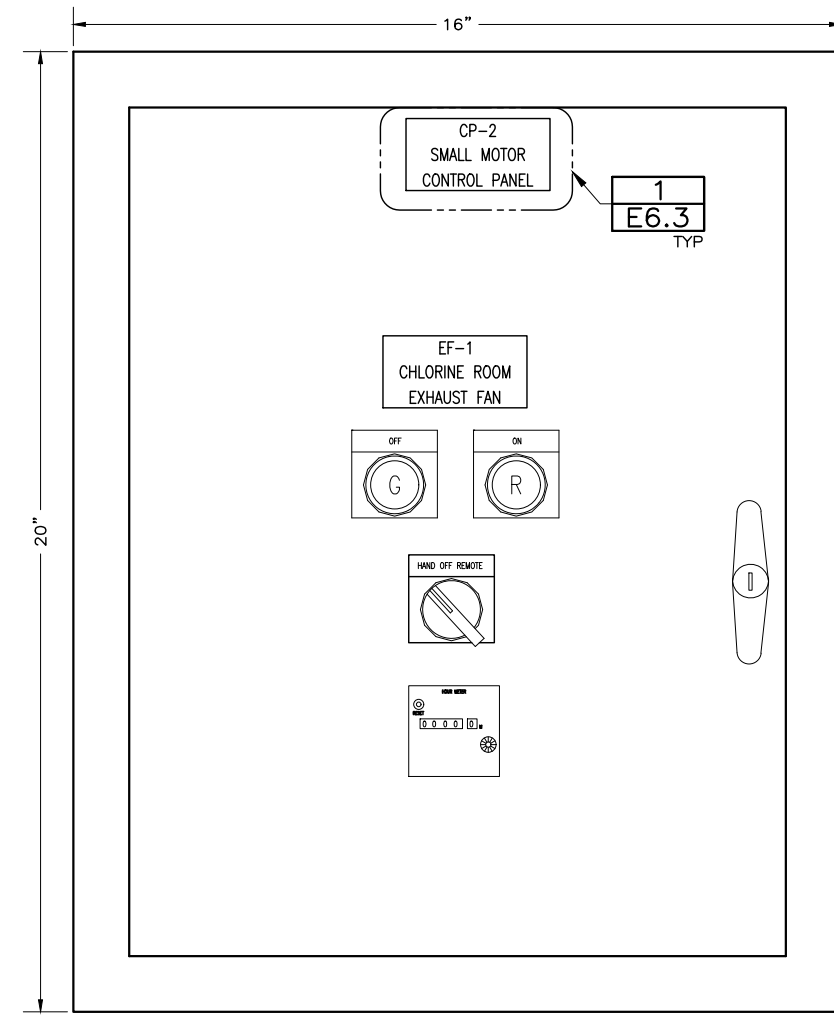
SHEET  
 E5.1  
 119.08.100

**GENERAL NOTES:**

1. TYPICAL CONTROL DIAGRAM SHOWN ON E2.4.
2. ENCLOSURE DIMENSIONS ARE AS ANTICIPATED. DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE SELECTED COMPONENTS.

**SHEET KEYNOTES:**

1. NOT USED.



CP-2 EXTERIOR ARRANGEMENT 1  
 6" = 1'-0" E4.1

FILE NAME:  
 FILE DATE:



DESIGNED	KBH	3			
DRAFTED	KBH	2			
CHECKED	KBH	1			
DATE	JANUARY 2024	NO.	DATE		

REVISIONS		BY	APVD.

SCALE  
 AS SHOWN



WELL HOUSE #10  
 ELECTRICAL  
 CP-2 SMALL MOTOR CONTROL PANEL

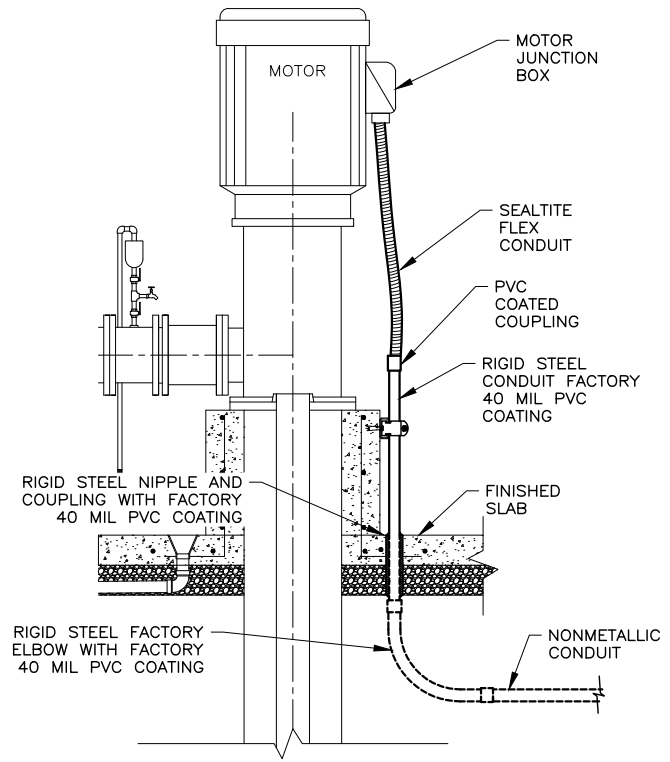
SHEET  
**E5.2**  
 119.08.100

**GENERAL NOTES:**

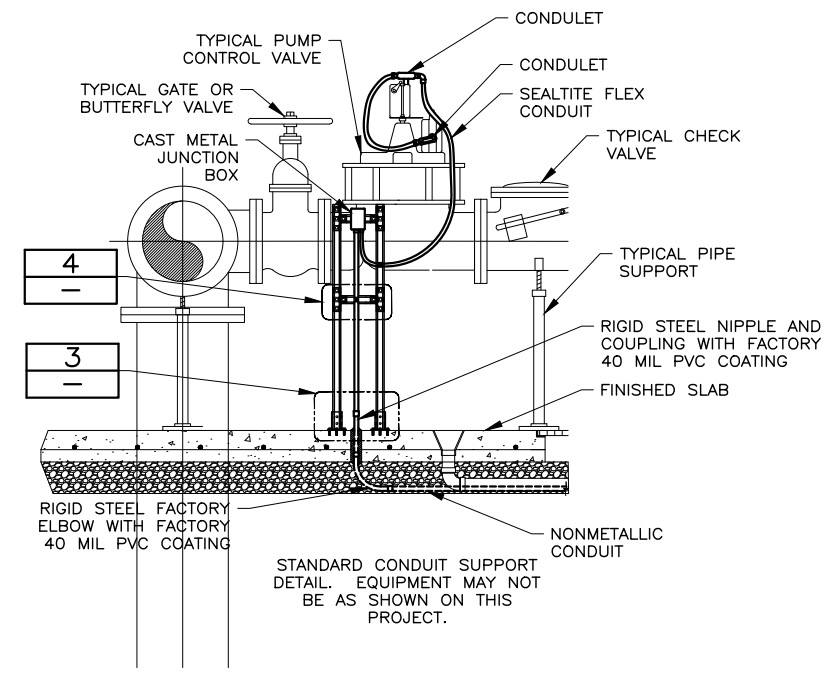
1. NOT USED.

**SHEET KEYNOTES:**

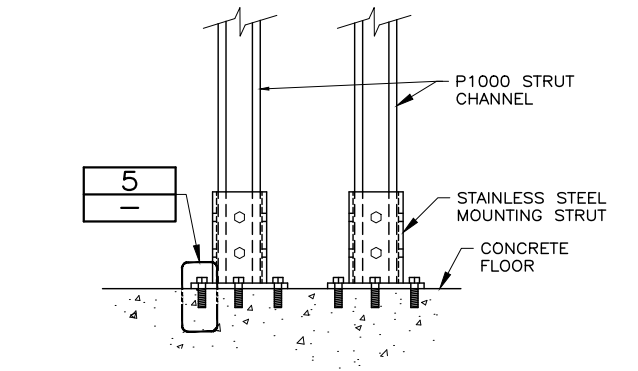
1. NOT USED.



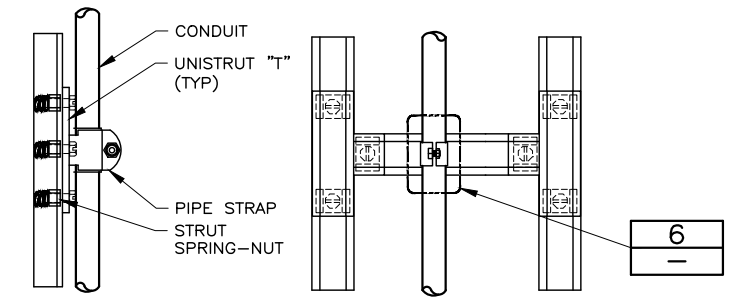
**TYPICAL MOTOR CONDUIT INSTALLATION** 1  
 3/8" = 1'-0" E4.1



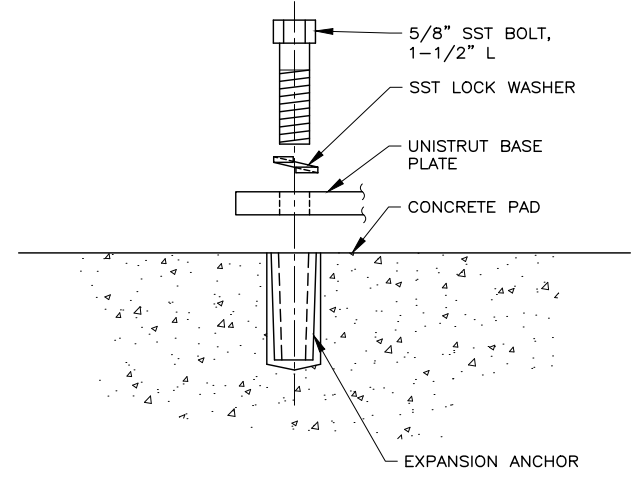
**TYPICAL CONDUIT SUPPORT INSTALLATION** 2  
 3/4" = 1'-0" E4.2



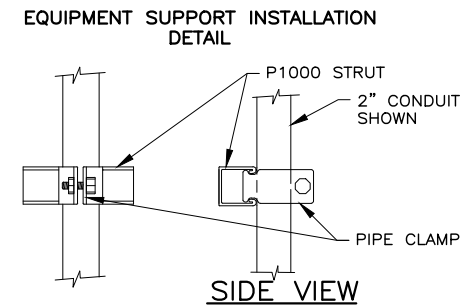
**CONDUIT SUPPORT INSTALLATION** 3  
 3" = 1'-0" -



**CONDUIT SUPPORT DETAIL** 4  
 3" = 1'-0" -



**SUPPORT ANCHOR** 5  
 6" = 1'-0" -

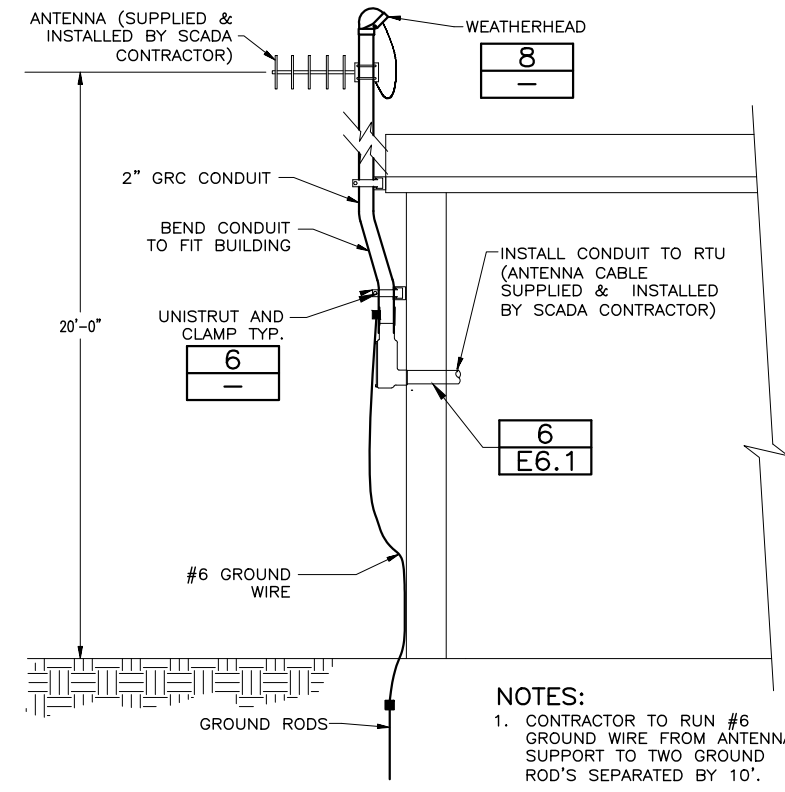


**CONDUIT PIPE CLAMPS\***

SIZE	EMT	RGS	EMT/RGS
1/2"	P1426	P1111	-
3/4"	P1427	P1112	P1212
1"	P1428	P1113	P1213
1-1/4"	P1429	P1114	P1214
1-1/2"	P1430	P1115	P1215
2"	P1431	P1117	P1217
2-1/2"	P1118	P1118	-
3"	P1119	P1119	-
3-1/2"	P1120	P1120	-
4"	P1121	P1121	-

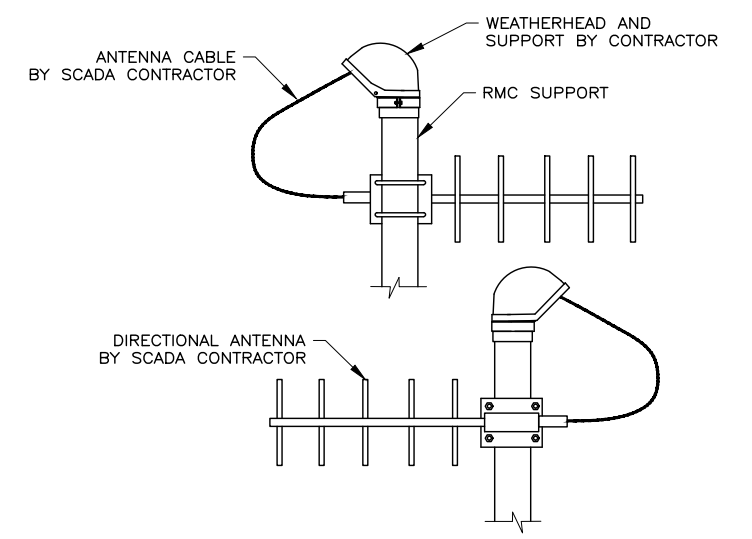
\* = SUPPLIED WITH SLOTTED HEAD SCREW AND NUT

**CONDUIT CLAMP** 6  
 3" = 1'-0" -



**SCADA ANTENNA SUPPORT** 7  
 1' = 1'-0" E4.2

**NOTES:**  
 1. CONTRACTOR TO RUN #6 GROUND WIRE FROM ANTENNA SUPPORT TO TWO GROUND ROD'S SEPARATED BY 10'.



**ANTENNA WEATHERHEAD INSTALLATION** 8  
 3" = 1'-0" -

FILE NAME: FILE DATE:



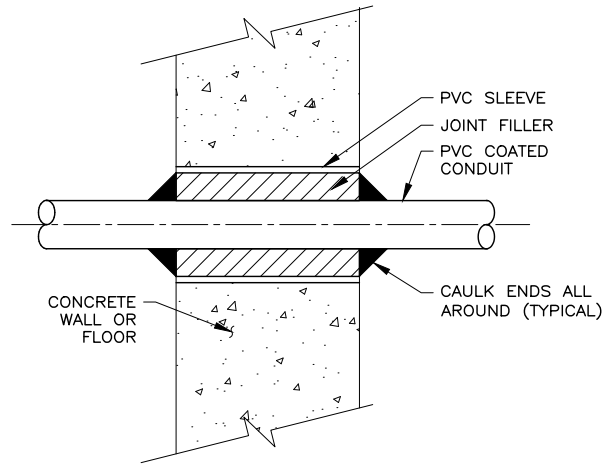
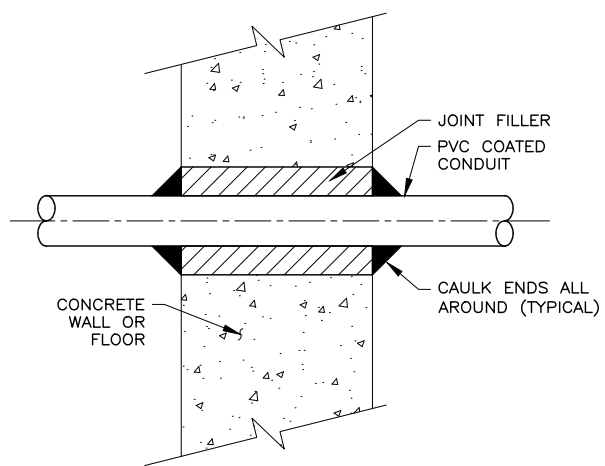
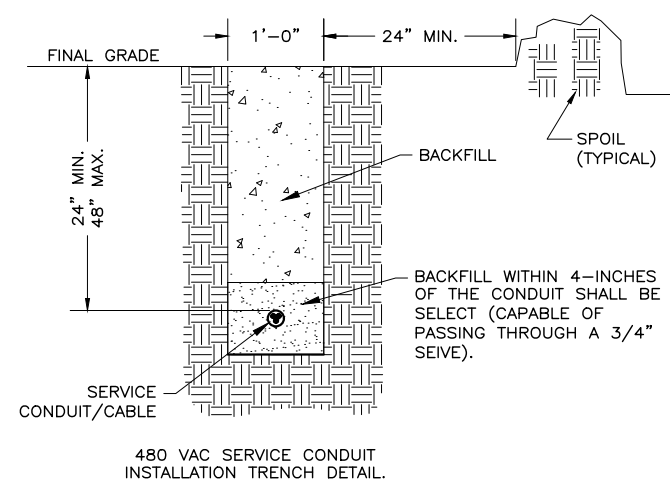
DESIGNED	KBH	3							
DRAFTED	KBH	2							
CHECKED	KBH	1							
PROJECT ENGINEER	DATE	JANUARY 2024	NO.		DATE		REVISIONS	BY	APVD.

SCALE  
AS SHOWN



WELL HOUSE #10  
ELECTRICAL  
DETAILS, SHT. 1

SHEET  
**E6.1**  
119.08.100



**GENERAL NOTES:**

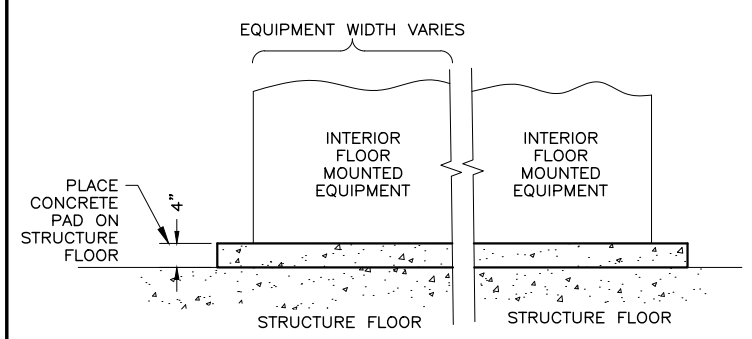
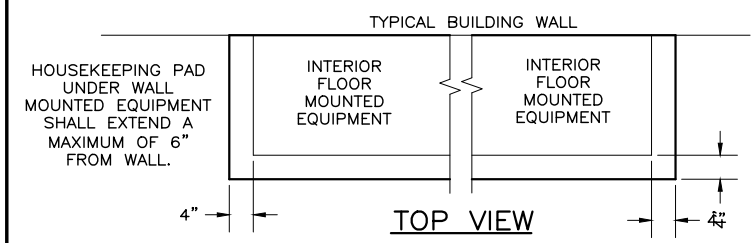
1. NOT USED.

**SHEET KEYNOTES:**

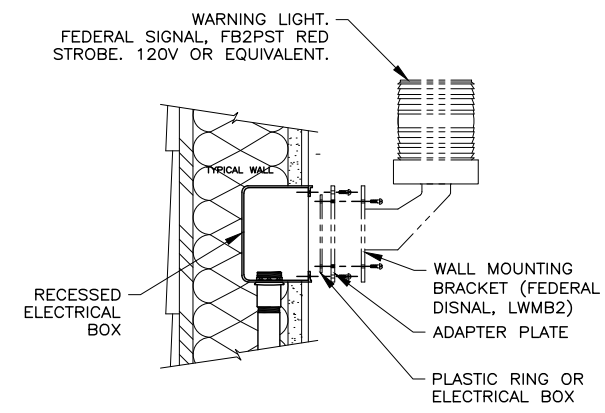
1. NOT USED.

**SERVICE TRENCH (ONLY) SECTION DETAIL**

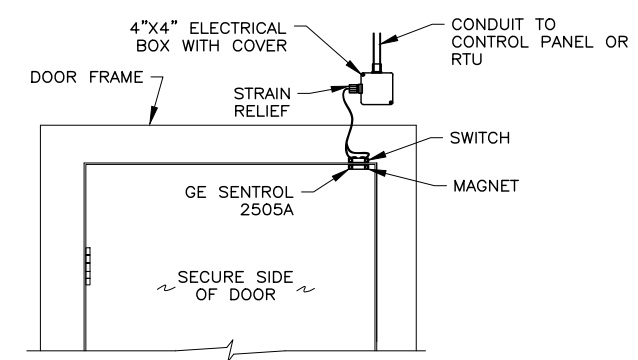
SERVICE CONDUIT TRENCH	1
1" = 1'-0"	—



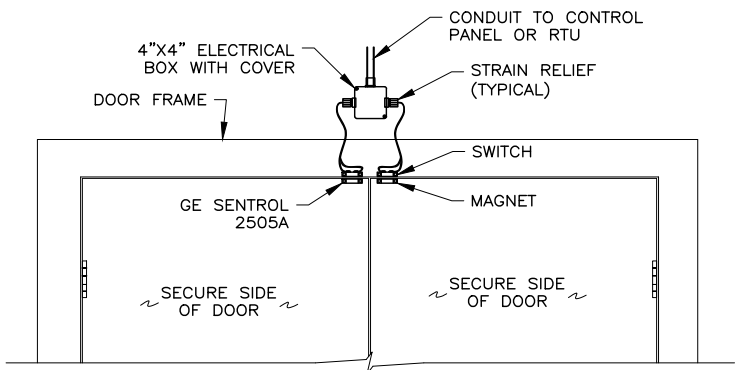
INTERIOR EQUIPMENT HOUSEKEEPING PAD	4
3/4" = 1'-0"	E4.1



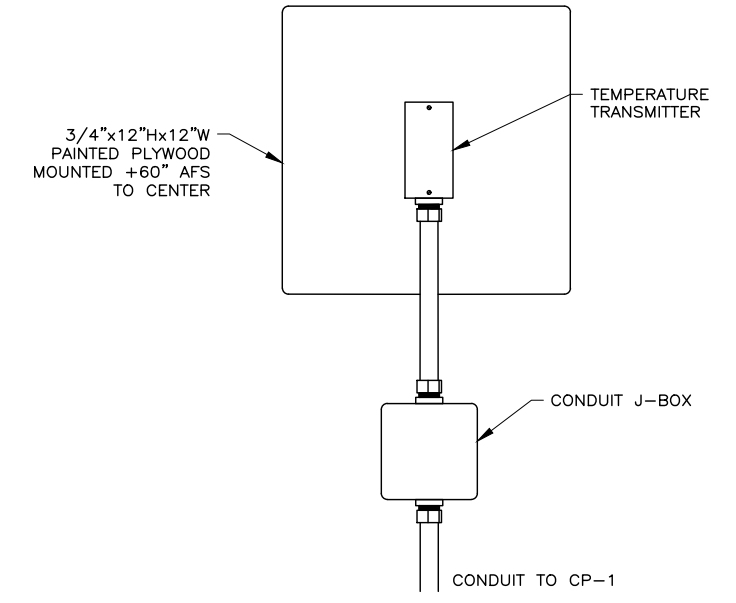
ALARM LIGHT INSTALLATION	5
3" = 1'-0"	E4.2



SINGLE DOOR POSITION SWITCH	6
1" = 1'-0"	E4.2



DOUBLE DOOR POSITION SWITCH	8
1" = 1'-0"	E4.2



TEMPERATURE TRANSMITTER	7
3" = 1'-0"	E4.2

FILE NAME:  
FILE DATE:



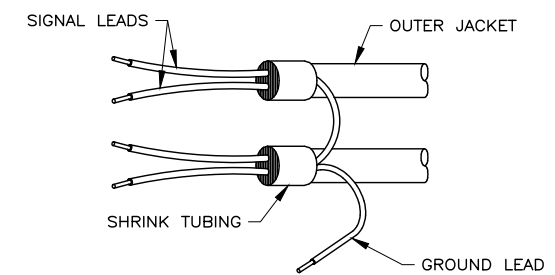
DESIGNED	KBH	3
DRAFTED	KBH	2
CHECKED	KBH	1
DATE	JANUARY 2024	NO.
DATE		

REVISIONS		BY	APVD.

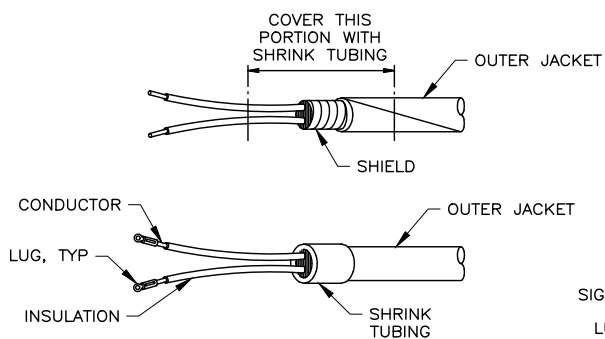
SCALE  
AS SHOWN



WELL HOUSE #10  
ELECTRICAL  
DETAILS, SHT. 2

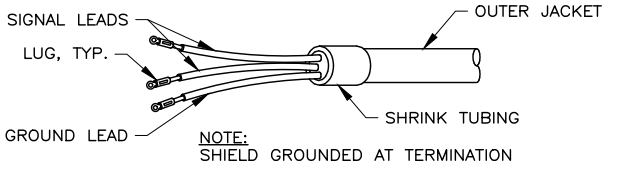
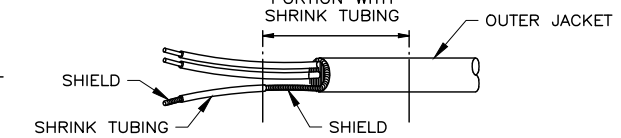
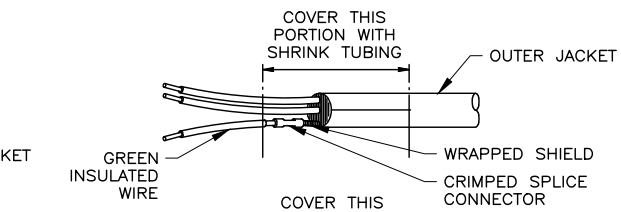


**UNACCEPTABLE METHOD OF GROUNDING CONTROL CABLE SHIELD** NTS

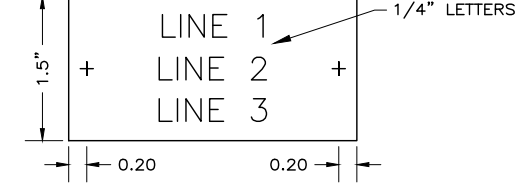
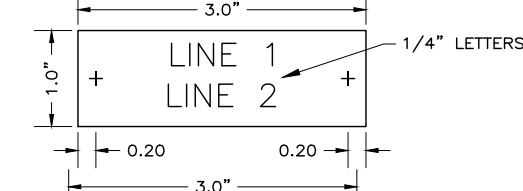
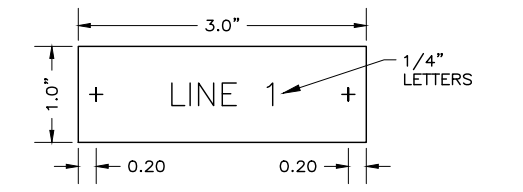


**TERMINATION OF SHIELDED CONTROL CABLE** NTS  
 NOTE: SHIELD NOT GROUNDED AT TERMINATION.

**SIGNAL WIRE TERMINATIONS**



**TERMINATION OF SHIELDED CONTROL CABLE** NTS  
 NOTE: SHIELD GROUNDED AT TERMINATION



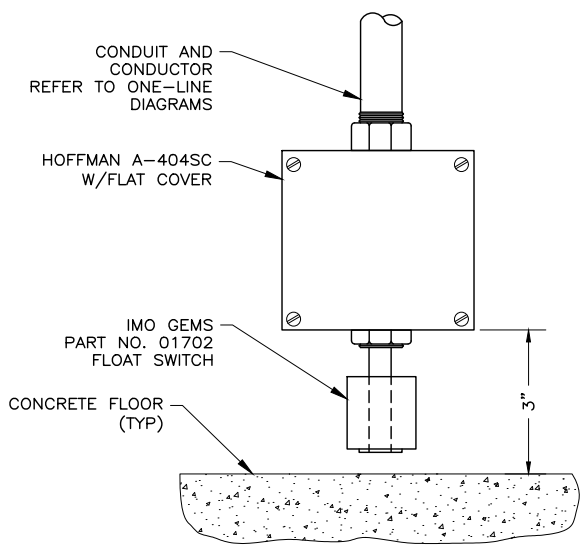
**NAMEPLATE DETAIL** 1 1  
 1' = 1'-0" E5.1 E5.2

**GENERAL NOTES:**

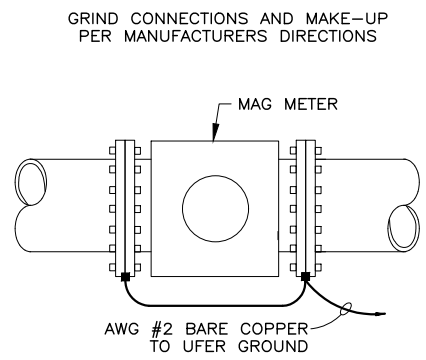
1. NOT USED.

**SHEET KEYNOTES:**

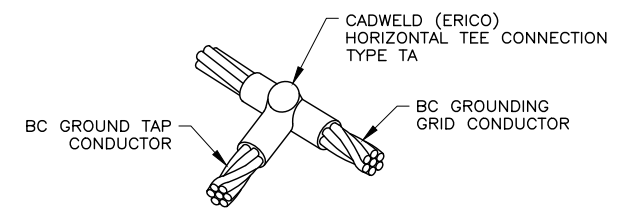
1. NOT USED.



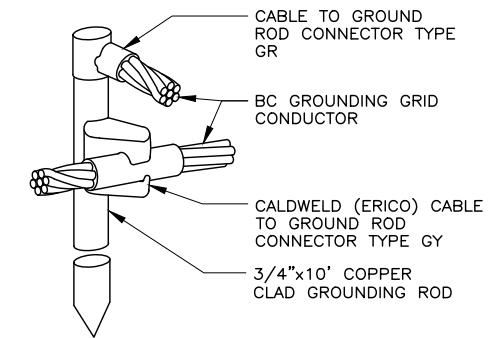
**FLOOR FLOOD SWITCH** 2  
 6" = 1'-0" E4.2



**MAG METER GROUNDING** 3  
 1 1/2" = 1'-0" E4.1

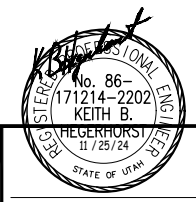


**WELDED GROUND TEE CONNECTION** 4  
 6" = 1'-0" E4.1



**GROUND ROD CONNECTION** 5  
 6" = 1'-0" E4.2

FILE NAME:  
 FILE DATE:



DESIGNED KBH	3										
DRAFTED KBH	2										
CHECKED KBH	1										
PROJECT ENGINEER	DATE	JANUARY 2024	NO.		DATE				BY	APVD.	

SCALE  
 AS SHOWN



WELL HOUSE #10  
 ELECTRICAL  
 DETAILS, SHT. 3

SHEET  
**E6.3**  
 119.08.100



# LEGEND OF HVAC/PLUMBING SYMBOLS AND ABBREVIATIONS

	SUPPLY AIR DUCT - RISE
	SUPPLY AIR DUCT - DROP
	RETURN AIR DUCT - RISE
	RETURN AIR DUCT - DROP
	ROUND DUCT - RISE
	ROUND DUCT - DROP
	UNDER FLOOR DUCT
	TURNING VANES
	FRESH AIR LOUVER
	RELIEF AIR OR EXHAUST AIR LOUVER
	CEILING SUPPLY DIFFUSER
	CEILING RETURN REGISTER
	CEILING EXHAUST REGISTER (BALANCE TO MATCH SUPPLY IF RETURN CFM IS NOT SHOWN)
	SIDEWALL SUPPLY REGISTER
	SIDEWALL EXHAUST OR RETURN REGISTER
	CEILING SUPPLY DIFFUSER WITH FLEXIBLE DUCT
	CEILING RETURN AIR GRILLE W/ SOUND BOOT
	LINEAR DIFFUSER WITH PLENUM AND FLEXIBLE DUCT CONNECTION. NO. OF SLOTS ON TOP, ACTIVE LENGTH AND CFM ON BOTTOM
	FLEXIBLE DUCT CONNECTION
	FLEXIBLE DUCT
	RECTANGULAR DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.
	ROUND DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.
	INCLINED RISE
	INCLINED DROP
	R/W=1. ROUND DUCT SIMILAR TO RECTANGULAR
	RECTANGULAR TO RECTANGULAR OR ROUND TO ROUND DUCT TRANSFORMATION MAXIMUM 15° INCLUDED ANGLE EXCEPT WHERE SHOWN OTHERWISE.
	TAP FITTING FOR RECTANGULAR & ROUND DUCT
	MANUAL VOLUME DAMPER
	FIRE DAMPER IN DUCT. W/ ACCESS PANEL REQD.
	COMBINATION FIRE/SMOKE DAMPER W/ ACCESS PANEL
	SMOKE DAMPER W/ ACCESS PANEL
	ATC DAMPER/MOTORIZED DAMPER
	BALANCE DAMPER
	ACCESS PANEL
	CONNECTION TO EXISTING
	DEMOLITION

TOP FIGURES INDICATE NECK SIZE. BOTTOM FIGURE INDICATES CFM.

	4-WAY BLOW PATTERN
	3-WAY BLOW PATTERN
	2-WAY BLOW PATTERN
	1-WAY BLOW PATTERN
	THERMOSTAT
	EMCS SENSOR
	SENSOR
	REVISION
	SECTION CUT
	DETAIL TAG - TOP FIGURE IS DETAIL NO.
	EQUIPMENT IDENTIFICATION
	KEYED NOTE IDENTIFICATION
	ANCHOR
	NRS GATE VALVE WITH SUPERVISION
	FLOW SWITCH
	HOSE VALVE
	ROOF DRAIN
	ROOF DRAIN OVERFLOW
	WALL CLEAN-OUT
	FLOOR CLEAN-OUT OR CLEAN-OUT TO GRADE
	VENT THRU ROOF
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOMESTIC RECIRCULATING HOT WATER
	SEWER (BELOW GRADE)
	SEWER (ABOVE GRADE)
	VENT (SEWER)
	PLUMBING FIXTURE CALLOUT
	LOW PRESSURE CONDENSATE
	MEDIUM PRESSURE CONDENSATE
	HIGH PRESSURE CONDENSATE
	LOW PRESSURE STEAM
	MEDIUM PRESSURE STEAM
	HIGH PRESSURE STEAM
	VACUUM
	PUMPED CONDENSATE
	MAKE UP WATER
	NATURAL GAS
	EXISTING PIPING

	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	HEATING HOT WATER SUPPLY
	HEATING HOT WATER RETURN
	GLYCOL HEAT RECOVERY PIPING
	GLYCOL PIPING SOLUTION
	LIQUEFIED PETROLEUM GAS
	EXISTING PIPING TO BE REMOVED
	REFRIGERANT LIQUID
	REFRIGERANT SUCTION
	HOT GAS
	SOLENOID VALVE
	EXPANSION JOINT
	ALIGNMENT GUIDE
	DEMOLITION
	PRESSURE GAUGE WITH SHUT-OFF COCK
	PRESSURE GAUGE WITH PIGTAIL
	FLANGE
	UNION
	FLOW METER ORIFICE
	AIR VENT-MANUAL
	AIR VENT-AUTO
	FLOW SWITCH
	PRESSURE SWITCH
	REDUCED PRESSURE BACKFLOW PREVENTOR W/ DRAIN PAN
	PRESSURE REDUCING, SELF CONTAINED VALVE
	PRESSURE REDUCING, EXTERNAL PRESSURE VALVE
	BALL VALVE (PIPE SIZES 2" AND SMALLER)
	BUTTERFLY VALVE (PIPE SIZES 2-1/2" AND LARGER)
	CHECK VALVE
	MOTOR OPERATED BUTTERFLY VALVE
	GAS COCK
	RELIEF VALVE
	GATE VALVE
	ATC VALVE - 2 WAY
	ATC VALVE - 3 WAY
	GLOBE VALVE
	FLOW CONTROL VALVE
	CALIBRATED BALANCING VALVE

	SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE
	PUMP
	FLEXIBLE CONNECTION
	FLOW METER
	90° ELBOW
	45° ELBOW
	REDUCER
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	LATERAL STRAINER WITH BLOW-OFF VALVE. PROVIDE HOSE WHERE DISCHARGE IS NOT PIPED TO DRAIN
	THERMOMETER 0-100°F
	STEAM TRAP, F&T=FLOAT & THERMOSTATIC B=BUCKET, T=THERMOSTATIC
	DUCT SMOKE DETECTOR
	ARROW INDICATES DIRECTION OF FLOW IN PIPE
	LEADER INDICATES DOWNWARD SLOPE
	PIPE INTO PLANE
	PIPE OUT OF PLANE
	PIPE BRANCH - IN TO PLANE
	PIPE BRANCH - OUT OF PLANE
	PIPE BRANCH - IN PLANE
	EMERGENCY SHUT-DOWN

- MECHANICAL GENERAL NOTES**
- DUCT DIMENSIONS SHOWN REPRESENT INSIDE DUCT DIMENSIONS.
  - ALL EXTERIOR DUCTWORK TO BE CONCENTRIC WITH A MINIMUM OF R-8 INSULATION BETWEEN THE INNER AND OUTER DUCT.
  - ALL INTERIOR RECTANGULAR DUCTWORK TO BE LINED WITH 1/2" LINER WHERE CODE REQUIRED. DUCT DIMENSIONS ARE TO ACCOUNT FOR INSULATION.
  - GAS PIPING IS BY THE PLUMBING CONTRACTOR.
  - THE SHEET METAL DUCT WORK SHALL BE GALVANIZED STEEL, PER SMACNA STANDARDS, AND BE FABRICATED & INSTALLED IN ACCORDANCE WITH THE LATEST SMACNA DUCT STANDARD EDITION.
  - COORDINATE THE HVAC SYSTEM, DUCT WORK, AND DIFFUSERS/GRILLES WITH THE OTHER TRADES AND THE REFLECTED CEILING PLAN.
  - THE MECHANICAL CONTRACTOR SHALL PERFORM THE NECESSARY TESTING, ADJUSTING, AND BALANCING OF THE HVAC EQUIPMENT AND SYSTEM.
  - PRIOR TO FINAL INSPECTION OR ACCEPTANCE, FULLY INSTRUCT THE OWNERS DESIGNATED OPERATION & MAINTENANCE PERSONNEL IN OPERATION, ADJUSTING, AND MAINTAINING THE PRODUCTS, EQUIPMENT, OR SYSTEMS.
  - THE INSTALLATION OF THE HVAC SYSTEM SHALL COMPLY WITH THE LATEST SMACNA, ACCA, UBC, IMC, AND IPS CODES BEING ENFORCED BY THE LOCAL STATE OR CITY WHERE IN THE STRUCTURE IS BEING BUILT.
  - INSTALL ALL EQUIPMENT WITH PROPER CLEARANCE.
  - SMOKE DAMPERS SHALL BE LISTED UL555S AND BE CONTROLLED BY AUTOMATIC SMOKE DETECTION.
  - PENETRATION OF A SMOKE BARRIER SHALL BE PROVIDED WITH AN APPROVED FIRE/SMOKE STOP SYSTEM OF A MINIMUM OF 1 HOUR FIRE RATED MATERIALS WHICH HAVE BEEN TESTED BY THE AMERICAN SOCIETY OF TESTING MATERIALS (ASTM) E 814.
  - ENVIRONMENTAL AIR DUCTS THAT PENETRATE A FIRE RATED ASSEMBLY SHALL BE PROVIDED WITH FIRE DAMPERS WHICH ARE LABELED UL 555 AND LABELED A FIRE RATING WHICH IS 3/4 OF THE HOUR OF THE FIRE RATED ASSEMBLY PENETRATED.
  - THE CONTRACTOR SHALL SUBMIT PLANS AND CALCULATIONS FOR SEISMIC BRACING WHERE REQUIRED BY CODE.

- PLUMBING GENERAL NOTES**
- PIPING FOR THIS PROJECT IS TO BE PLENUM RATED UNLESS EXPLICITLY STATED OTHERWISE.
  - INSTALL EXPANSION CONTRACTION CONTROL DEVICE EVERY 65 FEET IN STRAIGHT PIPING LENGTH. COORDINATE WITH MANUFACTURER.
  - SLEEVE PIPING THRU WALLS AND FOUNDATIONS.
  - COORDINATE EXACT ROUTING WITH ALL OTHER TRADES. (PLUMBING DRAWINGS ARE SCHEMATIC IN NATURE.)
  - ARRANGE PIPING IN PLUMBING CHASES TO ALLOW MAINTENANCE ACCESS.
  - NO PIPING TO BE RUN OVER ELECTRICAL PANELS, VFD'S, OR MCC'S AND A 4" DEEP ZONE IN FRONT OF PANELS, VFD'S, AND MCC'S IS TO BE PROTECTED.
  - FIGURE MOUNTING HEIGHTS, DIMENSIONS, AND OTHER REQUIREMENTS ARE TO BE COORDINATED WITH ARCHITECTURAL AND ADA REQUIREMENTS.
  - LOCATE VENTS A MINIMUM 10' AWAY FROM AIR INTAKES.
  - DOMESTIC WATER LINES ARE TO BE INSTALLED BELOW DUCTWORK.
  - A 24" X 24" ACCESS DOOR IS TO BE INSTALLED BELOW ALL ISOLATION VALVES & CIRCUIT SETTERS WHERE MOUNTED ABOVE HARD CEILING.
  - EXISTING CONDITIONS ARE TO BE VERIFIED PRIOR TO COMMENCING WORK.
  - PLUMBING INSTALLATION AS PER IMC 2021, IFGC 2021, IPC 2021, AND IECC 2021 AS WELL AS ALL LOCAL CODES.
  - ALL FIXTURES ARE TO BE PROPERLY VENTED TO THE ATMOSPHERE.
  - COORDINATE INDIVIDUAL LINE SIZES TO FIXTURES
  - PENETRATION OF A SMOKE BARRIER SHALL BE PROVIDED WITH AN APPROVED FIRE/SMOKE STOP SYSTEM OF A MINIMUM OF 1 HOUR FIRE RATED MATERIALS WHICH HAVE BEEN TESTED BY THE AMERICAN SOCIETY OF TESTING MATERIALS (ASTM) E 814.

SHEET INDEX	
SHEET NUMBER	SHEET NAME
H-1	MECHANICAL LEGENDS, GENERAL NOTES, & INDEX
H-2	LEVEL 1 MECHANICAL PLAN
H-3	MECHANICAL LOAD CALCS
H-4	MECHANICAL COMCHECK
H-6	MECHANICAL & PLUMBING SPECIFICATIONS
H-7	MECHANICAL & PLUMBING SPECIFICATIONS
H-8	MECHANICAL & PLUMBING SPECIFICATIONS



DESIGNED	3				
DRAFTED	2				
CHECKED	1				
DATE	NO.	DATE	REVISIONS	BY	APVD.



OREM WELLHOUSE 10  
MECHANICAL LEGENDS, GENERAL NOTES,  
& INDEX

### LOUVER SCHEDULE

TAG	MANUFACTURER	MODEL	TYPE	AIRFLOW (CFM)	STATIC PRESSURE (IN-WC)	HEIGHT (IN)	WIDTH (IN)	DEPTH (IN)	NOTES
L-1	UNITED ENERTECH	FD-D-6	EXHAUST	1200	0.1	36	36	6	1,2

1. INSTALL LOUVER UP HIGH ON THE WALL.
2. PROVIDE WITH DAMPER AND A BELIMO 24V ACCUATOR TIED TO EXHAUST FAN OPERATION.

### AIR HANDLER SCHEDULE

TAG	MANUFACTURER	MODEL	ASSOCIATED EQUIPMENT	AIRFLOW	TOTAL CAPACITY	EXTERNAL STATIC PRESSURE	MOTOR SIZE	MCA	MOCP	VOLT / PHASE	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	WEIGHT (LBS)	NOTES
AH-1	CARRIER	40RFA	CU-1	5000	137,800	0.5	2.5 HP	5	15	480 / 3	49	28	56	425	1,2,3,4,5,6,7

1. PROVIDE UNIT WITH SINGLE POINT ELECTRICAL CONNECTION.
2. PROVIDE CURB.
3. PROVIDE WITH 2 REFRIGERANT CIRCUITS.
4. PROVIDE WITH DISCONNECT.
5. PROVIDE WITH EXPANSION VALVE.
6. VERTICAL FLOOR MOUNT UNIT.
7. PROVIDE WITH 2-SPEED VFD.

### AIR COOLED CONDENSING UNIT SCHEDULE

TAG	ASSOCIATED EQUIPMENT	MANUFACTURER	MODEL	MIN SENS HEAT REJ CAPACITY (MBH)	REFRIGERANT	MCA / MOCP (A)	VOLT / PH	W / L / H (IN)	WEIGHT (LBS)	NOTES
CU-1	AH-1	CARRIER	38 AUD	150	R-410A	21 / 30	460 / 3	40 / 52 / 51	600	1,2,3

1. PROVIDE WITH (2) DUAL REFRIGERANT CIRCUITS.
2. PROVIDE WITH RAWAL DEVICE FOR CONTINUOUS CAPACITY MODULATION.
3. PROVIDE WITH LOW AMBIENT HEAD PRESSURE CONTROL AND HAIL GUARDS.

### ELECTRIC FIRED UNIT HEATER SCHEDULE

TAG	Manufacturer	Model	Location	Type	Airflow CFM	Load MBH	Input KW	Volt / Ph	Length / Width / Height In	WEIGHT	Notes
EUH-2	QMARK	MUH03-41	SEE PLANS	ELCTRIC	350	10.2	3.0	480 / 3	16 / 14 / 7	30	1,2,3
EUH-1	QMARK	MUH03-41	SEE PLANS	ELCTRIC	350	10.2	3.0	480 / 3	16 / 14 / 7	30	1,2,3
EUH-4	QMARK	MUH03-41	SEE PLANS	ELCTRIC	350	10.2	3.0	480 / 3	16 / 14 / 7	30	1,2,3
EUH-3	QMARK	MUH03-41	SEE PLANS	ELCTRIC	350	10.2	3.0	480 / 3	16 / 14 / 7	30	1,2,3

1. PROVIDE WITH FACTORY WALL MOUNT BRACKET.
2. PROVIDE WITH FINGER PROOF FAN GUARD.
3. COORDINATE WITH ARCHITECTURAL.

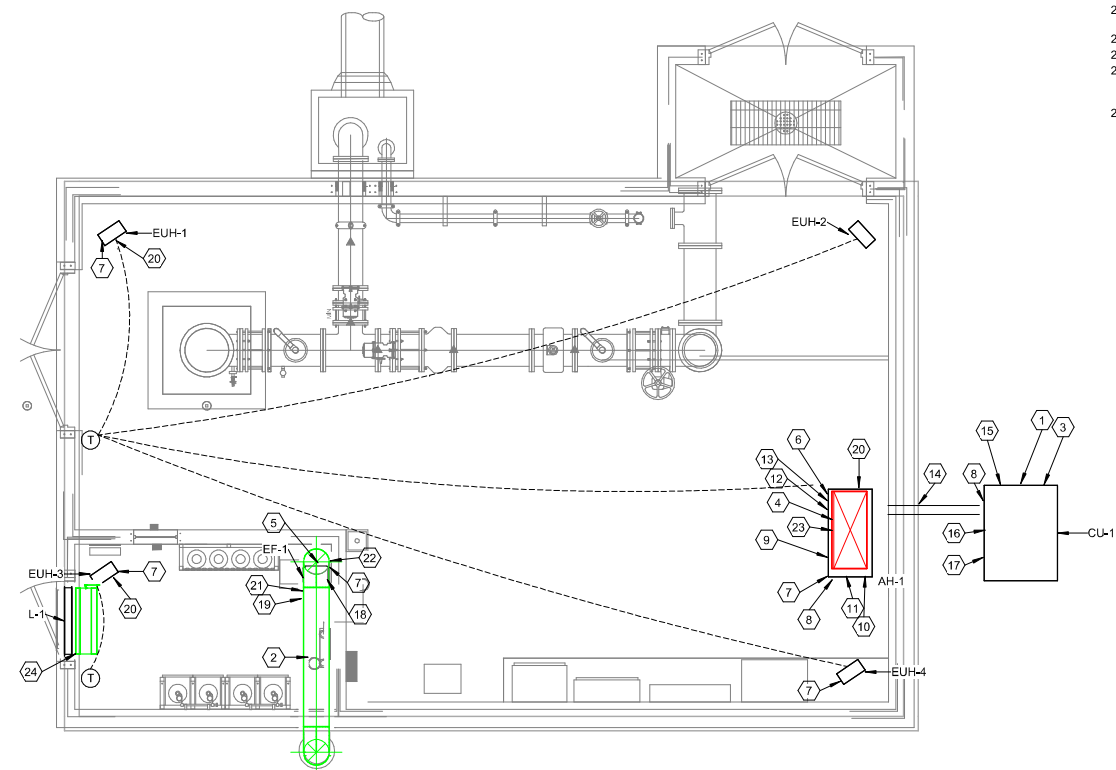
### EXHAUST FAN SCHEDULE

TAG	TYPE	MANUFACTURER AND MODEL	AIR TYPE	AIRFLOW (CFM)	RPM	STATIC PRESSURE (IN-WC)	HP	VOLT / PHASE	HEIGHT (IN)	WIDTH (IN)	DEPTH (IN)	WEIGHT (LBS)	NOTES
EF-1	EXHAUST	PLASTEC 30	CORROSIVE	1200	1120	0.5	0.75	120 / 1	10	10	17	23	1

1. PROVIDE WITH GRAVITY BACKDRAFT DAMPER AND SPEED CONTROLLER.

### KEYED NOTES

1. INSTALL MECHANICAL EQUIPMENT ON 4" HOUSEKEEPING PAD.
2. ALL EXHAUST FANS ARE TO HAVE MANUAL OVERRIDE. COORDINATE WITH ELECTRICAL.
3. INTERLOCK AIR HANDLING SYSTEM AND UNIT HEATERS TO CONTROL SYSTEM. CONTROL SYSTEM BY ELECTRICAL CONTRACTOR.
4. DRAIN CONDENSATE TO FLOOR DRAIN. EXHAUST FROM THE BOTTOM OF THE ROOM.
5. SEISMIC SUPPORT AIR HANDLER FROM WALL AND INSTALL ON VIBRATION ISOLATORS. INSTALL SEISMIC CABLES AT 45 DEGREE ANGLES FROM EACH CORNER.
6. PROVIDE WITH FACTORY WALL MOUNTING BRACKETS. TIE OPERATION TO CONTROL SYSTEM. COORDINATE WITH ELECTRICAL. TYPICAL.
7. 4" HOUSEKEEPING PAD.
8. INSTALLATION OF AIR HANDLER TO BE ACCORDING TO MANUFACTURERS INSTALLATION INSTRUCTIONS.
9. ACCESS DOORS TO AIR HANDLER FROM THIS SIDE. COORDINATE WITH ELECTRICAL AND ARCHITECTURAL.
11. PROVIDE GUARD FOR RETURN AIR INLET AND ANGLE STEEL SUPPORT.
12. LOW SIDE RETURN WITH RETURN AIR GRILLE.
13. PROVIDE ADDITIONAL SET OF FILTERS UPON COMPLETION.
14. 16 GA STAINLESS STEEL COVER TO PROTECT REFRIGERANT PIPING.
15. REFRIGERANT TO BE SIZED ACCORDING TO MANUFACTURER REQUIREMENTS.
16. INSTALL WITH PROPER MAINTENANCE ACCESS AS PER MANUFACTURER. INSTALL ON FACTORY SKID.
17. COORDINATE EXACT LOCATON WITH CIVIL. TYPICAL.
18. CORROSION RESISTANT PASTEC VENT SET FAN.
19. MOTORIZED DAMPER TIED TO FAN OPERATION.
20. COORDINATE CONTROLS WITH ELECTRICAL. TYPICAL.
21. CONSULT DETAIL FROM HAL.
22. 20 GA STAINLESS STEEL DUCT.
23. INSTALL WITH DISCHARGE PLENUM AND RETURN-AIR GRILLE AND SUBBASE. CONSULT EQUIPMENT SUBMITTAL.
24. PROVIDE WITH HAND OFF AUTO CONTROL WITH AUTO MODE TIED TO OWNER CONTROL SYSTEM. COORDINATE WITH ELECTRICAL.



① LEVEL 1 MECHANICAL PLAN  
1/4" = 1'-0"



DESIGNED	3														
DRAFTED	2														
CHECKED	1														
DATE	NO.	DATE	REVISIONS		BY	APVD.									

**Building or Zone Name:**  
OREM WELL 10

---

**Location or Address:**  
OREM, UT 84058

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**Design Conditions:**

Weather Data Used	Cooling	Heating
Indoor Dry Bulb Design Temperature	76 °F	70 °F
Indoor Design Relative Humidity	50 %	24 %

**Load Calculation Method:**  
(Indicate which of the following methods is used)

**CLTD/CLF** — Cooling Load Temperature Difference / Cooling Load Factor methods

**HB** — Heat Balance methods

**TET/DTA** — Total Equivalent Temperature Difference / Time Averaging methods

**TFM** — Transfer Function methods

**RTS** — Radiant Time Series methods

**OTHER** (please specify) \_\_\_\_\_

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The undersigned attests that the above information is correct and that the procedures used to perform the load calculations comply with ANSI/ASHRAE/ACCA Standard 183

Signed: **Gregory P Mockett** (Digital Signature: Gregory P Mockett, Bluefield Engineering/Quintus Inc., 2024-01-04 10:19:48-07:00)

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Submitted by: \_\_\_\_\_ Date: Jan 04, 2024

**wrightsoft® Right-Suite® Universal 2023 Short Form**  
**OREM WELL 10**  
 Bluefield Engineering

Job: 23.138  
 Date: Jan 04, 2024  
 By: \_\_\_\_\_

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**Project Information**

For: OREM WELLHOUSE 10  
 OREM, UT 84058

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Outside db (°F)	Htg	Cg	Inside db (°F)	Htg	Cg
5	100		70	76	
Outside RH (%)	-	15	Inside RH (%)	-	50
Outside wb (°F)	-	64	Inside wb (°F)	-	62
Daily range (°F)	-	30	Design TD (°F)	65	24
Moisture diff. (gr/lb)	-	-29			

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**Heating Equipment**

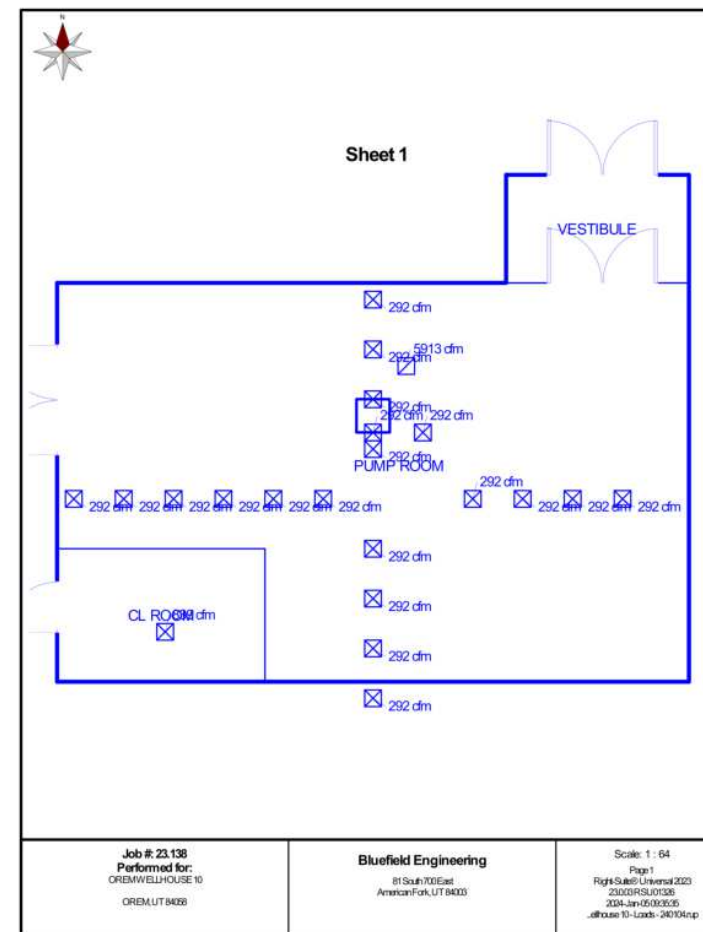
Make	Model	Make	Model
	Gas furnace		Type
	80 AFUE		COP / EER / SEER
Efficiency	80 AFUE	Sensible Cooling	0 MBtuh
Heating Output	0 MBtuh	Latent Cooling	0 MBtuh
Humidifier	2.0 gpd	Total Cooling	0 MBtuh
Leaving Air Temp	70.0 °F	Leaving Air Temp	55.0 °F
Actual Heating Fan	5913 cfm	Actual Cooling Fan	5913 cfm

**Cooling Equipment**

Equipment Location	System Type	Fan Motor Heat Type	Fan & Motor Combined Efficiency	Static Pressure Across Fan
OREM WELL 10	PEAKCV	PACKAGE	0 %	0 in H2O

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NAME	Area #'	Heat Loss	Sensible Gain	Latent Gain	Htg cfm	Cg cfm	Time
PUMP ROOM	812	20687	111948	-767	5074	5842	Jul 1700 LDT
CL ROOM	100	3597	1351	-175	839	71	Jul 1700 LDT
OREM WELL 10	912	24284	113299	-942	5913	5913	Jul 1700 LDT



DESIGNED	3					
DRAFTED	2					
CHECKED	1					
DATE	NO.	DATE				
			REVISIONS		BY	APVD:

### COMcheck Software Version COMcheckWeb Mechanical Compliance Certificate

**Project Information**  
 Energy Code: 2021 IECC  
 Project Title: Orem Wellhouse #10  
 Location: Orem, Utah  
 Climate Zone: 5b  
 Project Type: New Construction

Construction Site: Orem, Utah 84058  
 Owner/Agent: Bluefield/Contractor  
 Designer/Contractor: Bluefield Engineering  
 81 South 700 East  
 American Fork, Utah 84003

**Additional Efficiency Packages(s)**

Credits: 10.0 Required 0.0 Proposed

**Mechanical Systems List**

**Quantity System Type & Description**

1 Carrier 40RFA w/38AUC AC (Single Zone)  
 Heating: 1 each - Central Furnace, Gas, Capacity = 137 kBtu/h  
 Proposed Efficiency = 80.00% E1, Required Efficiency: 80.00% E1 or 80% AFUE  
 Cooling: 1 each - Split System, Capacity = 150 kBtu/h, Air-Cooled Condenser, Air Economizer  
 Proposed Efficiency = 22.00 EER, Required Efficiency = 19.80 EER  
 Proposed Part Load Efficiency = 14.00 EER, Required Part Load Efficiency = 14.00 EER  
 Fan System: BLOWER FAN - Compliance (Motor nameplate HP and fan efficiency method) | Passes

Fans:  
 FAN1 Supply, Single-Zone VAV, 5000 CFM, 2.5 motor nameplate hp, 0.00 fan energy index, fan exception: Fan array <= 5 total HP or <= 4.1 kW

1 QMARK MH03-41 (Unknown w/ Fan/Meat/Steam)  
 Heating: 1 each - Unit Heater, Electric, Capacity = 10 kBtu/h  
 No minimum efficiency requirement applies.  
 Fan System: Unit Heater Fan - Compliance (Motor nameplate HP and fan efficiency method) | Passes

Fans:  
 FAN2 Supply, Single-Zone VAV, 350 CFM, 0.1 motor nameplate hp, 0.00 fan energy index, fan exception: Single fan < 1 HP or < 0.89 kW

**Mechanical Compliance Statement**

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COMcheck Software Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Gregory P Mockett  
 Name Title Signature Date

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
 Data filename: Page 1 of 9

### COMcheck Software Version COMcheckWeb Inspection Checklist Energy Code: 2021 IECC

Requirements: 78.0% were addressed directly in the COMcheck software  
 Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [P92]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical and service water heating systems and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. Hot water system sized per manufacturer's sizing guide.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C406 [P93]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
C403.13.3 [F09]	Snow/ice melting system and freeze protection systems have sensors and controls configured to limit service to pavement temperature above 50F and outdoor temperature above 40F.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5, C404.5.1, C404.5.2 [F67]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME17]	Thermally ineffective panel surfaces of variable heating panels have insulation >= R-5.5.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.8.4 [ME142]	Motors for fans that are not less than 1/12 hp and less than 1 hp are electronically commutated motors or have a minimum motor efficiency of 70 percent. These motors have the means to adjust motor speed.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Motors in the airstream within fan coils and terminal units only provide heating to the space served.
C403.8.6 [ME143]	Each DX cooling system > 65 kBtu/h and chiller water/evaporative cooling system with fans > 1/8 hp are designed to vary the motor fan airflow as a function of load and comply with detailed requirements of this section.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.9 [ME144]	Large diameter fans where installed shall be tested and labeled in accordance with AMCA 230.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.3 [ME35]	HVAC equipment efficiency verified.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Mechanical Systems list for values.
C403.5.5 [ME113]	Fault detection and diagnostics installed with air-cooled unitary DX units or VRF units having economizers.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.2.2 [ME59]	Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.7.1 [ME59]	Demand control ventilation provided for spaces >500 ft <sup>2</sup> and >15 people/1000 ft <sup>2</sup> occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3.00 cfm.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Multiple-zone systems with design outdoor air of less than 750 cfm.
C403.7.2 [ME155]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.7.6 [ME141]	HVAC systems serving guestrooms in Group R-3 buildings with > 50 guestrooms. Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2).	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.7.4 [ME57]	Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2).	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Systems serving spaces that are not cooled and heated to 60°F.

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.7.5 [ME110]	Kitchen exhaust systems comply with replacement air flow rate, and supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.5.1 [ME62]	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.5.3 [ME124]	Air economizers automatically reduce outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will not reduce cooling energy usage. See Table C403.5.3.1 for applicable device types and climate zones.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.5.3 [ME125]	System capable of relieving excess outdoor air during an economizer operation to prevent over pressurizing the building. The relief air outlet located to avoid recirculation into the building.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.5.3 [ME126]	Return, exhaust, relief and outdoor air dampers used in economizers have motorized dampers that automatically shut when not in use and meet maximum leakage rates. Reference section C403.7.7 for details.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [ME63]	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 43F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 60F.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.
C403.3.3 [ME35]	Hot gas bypass limited to <=240 kBtu/h >50% >40 kBtu/h >20%.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.2 [ME53]	Air outlets and zone terminal devices have means for air balancing.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.11.3 [ME123]	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers that are located in a condensing unit, have fan-powered condensers that comply with Sections C403.11.3.1 and refrigeration compressor systems that comply with C403.11.3.2.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	<b>Exception:</b> Requirement does not apply.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Final Inspection	Complies?	Comments/Assumptions
C403.2.5 [F08]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.3.1 [F127]	HVAC systems and equipment capacity does not exceed calculated loads.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [F147]	Heating and cooling to each zone is controlled by a thermostat control. Minimum humidity control device per installed humidification/dehumidification system.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [F138]	Thermostatic controls have a 5°F deadband.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [F139]	Temperature controls have setback/overlap restrictions.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.2 [F139]	Each zone equipped with setback controls using automatic time clock or programmable control system.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.2 [F140]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool), 7-day clock, 2-hour occupant override, 10-hour backup.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.2 [F141]	Systems include optimum start controls.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.1.1 [F157]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturer's information, specifications, programming procedures and means of frustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.1 [F128]	Commissioning plan developed by registered design professional or approved agency.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.1 [F131]	HVAC equipment, systems and system-to-system relationships have been tested to ensure proper operation.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Final Inspection	Complies?	Comments/Assumptions
C403.2.5 [F08]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.3.1 [F127]	HVAC systems and equipment capacity does not exceed calculated loads.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [F147]	Heating and cooling to each zone is controlled by a thermostat control. Minimum humidity control device per installed humidification/dehumidification system.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [F138]	Thermostatic controls have a 5°F deadband.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.1 [F139]	Temperature controls have setback/overlap restrictions.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.2 [F139]	Each zone equipped with setback controls using automatic time clock or programmable control system.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.2 [F140]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool), 7-day clock, 2-hour occupant override, 10-hour backup.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C403.4.2 [F141]	Systems include optimum start controls.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.1.1 [F157]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturer's information, specifications, programming procedures and means of frustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.1 [F128]	Commissioning plan developed by registered design professional or approved agency.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.1 [F131]	HVAC equipment, systems and system-to-system relationships have been tested to ensure proper operation.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
 Report date: 10/15/24  
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Section # & Req ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.1 [F101]	HVAC and service water heating control systems have been tested to ensure proper operation, calibration and adjustment of controls.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.3 [F132]	Economizers have been tested to ensure proper operation.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.4 [F142]	Preliminary commissioning report completed and certified by registered design professional or approved agency.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.5 [F17]	Furnished HVAC as built drawings submitted within 90 days of system acceptance.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.5 [F143]	An air and/or hydronic system balancing report is provided for HVAC systems.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.5 [F130]	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Project Title: Orem Wellhouse #10  
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DIVISION 22/23 - PLUMBING/HVAC

SECTION 22 0500/23 0500  
COMMON WORK RESULTS FOR PLUMBING/HVAC

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GENERAL CONDITIONS

The General Conditions of the Contract, with the amendments, supplements, forms and requirements in Division 1, and herewith made a part of this Division.

All sections of Division 15 shall comply with the Mechanical General Requirements. The standards established in this section as to quality of materials and equipment, the type and quality of workmanship, mode of operations, safety rules, code requirements, etc., shall apply to all sections of this Division as though they were repeated in each Division.

SCOPE OF WORK

The project described herein is Red Bridge Well House, Payson, Utah. This work shall include all labor, materials, equipment, fixtures, and devices for the entire mechanical work and a complete operating, tested and commissioned installation.

Section 23 Index:

SECTION 23 0500 - COMMON WORK RESULTS FOR HVAC PIPING  
SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING & EQUIPMENT  
SECTION 23 3113 - METAL DUCTS  
SECTION 23 3300 - AIR DUCT ACCESSORIES  
SECTION 23 3423 - HVAC POWER VENTILATORS  
SECTION 23 6800 - MODULAR AIR HANDLING UNITS  
SECTION 23 0900 - TEMPERATURE CONTROLS  
SECTION 23 0593 - TESTING, ADJUSTING AND BALANCING AND MAINTENANCE MANUALS  
SECTION 23 0822 - LOUVERS  
SECTION 23 9900 - CONTROLS SEQUENCE

SYSTEM DESCRIPTION

CODES & ORDINANCES

All work shall be executed in accordance with all underwriters, public utilities, local and state rules and regulations applicable to the trade affected. Should any change in the plans and Specifications be required to comply with these regulations, the Contractor shall notify the Engineer before the time of submitting his bid. After entering into contract, the Contractor will be held to complete all work necessary to meet these requirements without extra expense to the Owner. Where work required by drawings or specifications is above the standard required, it shall be done as shown or specified.

Applicable codes are as follows:  
2018 International Mechanical Code  
2018 International Building Code  
2018 International Plumbing Code  
Utah State Boiler Code

SUBMITTALS AND SHOP DRAWINGS

Submittals:

As soon as possible after the contract is awarded, but in no case more than 5 calendar days thereafter, the Contractor shall submit to the Engineer four (4) copies of the descriptive literature covering products and materials to be used in the installation of mechanical systems for this project. The review of the submitted data will require a minimum of [7] days. If the Contractors schedule requires return of submitted literature in less than the allotted time, the Contractor shall accelerate his submittal delivery date. The Contractor shall resubmit all items requiring re-review within 7 days of returned submittals. Refer to each specification section for items requiring submittal review. Written approval of the Owner's Representative shall be obtained before installing any such equipment or materials for the project. The submittals shall be prepared in an orderly manner, contained in a 3-ring loose-leaf binder with index and identification tabs each item or group of items and for each specification section. All items shall be submitted at one time except automatic temperature control drawings and seismic restraint drawings which may be submitted separately within 60 days of the contract award date. Partial submittals will not be reviewed until the complete submittal is received.

Submitted literature shall bear the Contractor's stamp, indicating that he has checked all equipment being submitted; that each item will fit into the available space with the accesses shown on the drawings; and, further, that each item conforms to the capacity and quality standards given in the contract documents.

Coordination Drawings: Detail major elements, components, and systems of plumbing and HVAC equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:

- Planned piping and duct layout, including specialty locations and access areas.
- Clearances for installing and maintaining insulation.
- Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
- Equipment and accessory service connections and support details.
- Exterior wall and foundation penetrations.
- Fire-rated wall and floor penetrations.
- Sizes and location of required concrete pads and bases.
- Scheduling, sequencing, movement, and positioning of large equipment into building during construction.
- Floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

Submitted literature shall clearly indicate performance, quality, and utility requirements; shall show dimension and size of connection points; and shall include derating factors that were applied for each item of equipment to provide capacity at job site elevation. Temperature control submittals shall include piping and wiring diagrams, sequence of operation and equipment. Equipment must fit into the available space with allowance for operation, maintenance, etc. Factory piped and wired equipment shall include shop drawings for all internal wiring and piping furnished with the unit.

Submitted literature shall clearly show all required field install wiring, piping, and accessory installations required by the Contractor to provide a complete operating system.

Review by the Owner's Representative is for general conformance of the submitted equipment to the project specification. In no way does such review relieve this Contractor of his obligation to furnish equipment and materials that comply in detail to the specification nor does it relieve the Contractor of his obligation to determine actual field dimensions and conditions that may affect his work. Regardless of any items overlooked by the submittal review, the requirements of the contract drawings and specifications must be followed and are not waived or superseded in any way by the review.

The contractor is to review equipment by description, catalog number, and manufacturer's names. Standards of quality have been established by the Engineer for certain manufactured equipment items and specialties that are to be furnished by this Division. Alternate products and equipment may be proposed for use only if specifically named in the specifications or if given written prior approval in published addenda. Design equipment is the equipment listed on the drawings or if not listed on the drawings is the equipment first named in the specifications.

Alternate Equipment:  
The Contractor should protect himself with the supplier of alternate named equipment. Alternate named equipment will be reviewed only one time.

Should alternate equipment be submitted and be rejected, it shall not be resubmitted for review and it shall be the responsibility of this contractor. The contractor shall only submit on design equipment on future submittals. Incomplete submittal data will be rejected.

If the Engineer is required to do additional design work to incorporate changes caused by submitting equipment or products, different than the design equipment specified, as defined above, the contractor shall reimburse the engineer for additional time and expenses at the engineers current, recognized, hourly rates.

DRAWINGS AND MEASUREMENTS

Drawing:

The contract document drawings show the general design, arrangements, and extent of the system. In certain cases, the drawings may include details that show more nearly exact locations and arrangements; however, the locations, as shown diagrammatically, are to be regarded as general.

It shall be the work of this Section to make such slight alterations as may be necessary to make adjustable parts fit to fixed parts, leaving all complete and in proper shape when done. All dimensions given on the drawings shall be verified as related to this work and with the Engineer's office before work is started.

This Section shall carefully study building sections, space, clearances, etc., and then provide offsets in piping or ductwork as required to accommodate the building structure without additional cost to the Owner. In any case and at any time, a change in location required by obstacles or the installation of other trades not shown on the mechanical plans shall be made without charge.

The drawings shall not be scaled for roughing in measurements nor shall they be used as shop drawings. Where drawings are required for these purposes or where drawings must be made from field measurements, the Contractor shall take the necessary measurements and prepare the drawings. Shop drawings of the various subcontractors shall be coordinated to eliminate all interferences and to provide sufficient space for the installation of all equipment, piping, ductwork, etc.

The drawings and specifications have been prepared to supplement each other and they shall be interpreted as an integral unit with items shown on one and not the other being furnished and installed as though shown and called out on both.

Record Drawings:

Record drawings for all systems and sections of this Division shall be furnished as work of this Section. Blue-line white prints of floor plans shall be furnished by the Engineer's office. These prints shall be accurately and neatly marked in colored pencil, showing all changes from schematics. Installation and commissioning checklists that are provided on the drawings are to be initialed and dated upon completion.

These drawings shall be reviewed with the Engineer's at least once each month, shall be submitted at time of final inspection, and shall be checked for accuracy. Failure to keep record drawings up-to-date shall be cause for withholding monthly payments.

CONTRACTOR'S USE OF BUILDING EQUIPMENT

The Contractor may use equipment such as electric motors, fans, heat exchangers, filters, etc., with the written permission of the Owner. As each piece of equipment is used (such as electric motors and fans), maintenance procedures approved by the manufacturer are to be followed. A careful record is to be kept of the length of the time the equipment is used, maintenance procedures followed, and any difficulty encountered. The record is to be submitted to the Owner upon acceptance. All fan belts and filter media (such as bearings) shall be carefully inspected just prior to acceptance. Any excessive wear noted shall require replacement. Any damage by Contractor to be replaced by Contractor.

EXISTING CONDITIONS

The Contractor shall carefully examine all existing conditions that might affect the mechanical system and shall compare these conditions with all drawings and specifications for work included under this contract. He shall, at such time, ascertain and check all conditions that may affect his work. No allowance shall subsequently be made in his behalf for an extra expense incurred as a result of his failure or neglect to make such examination. This Contractor shall include in his bid proposal all necessary allowances to repair or replace any item that will remain or will be removed, and any item that will be damaged or destroyed by new construction.

The Contractor shall remove all abandoned piping, etc., required by new construction and cap or plug openings. No capping, etc., shall be exposed in occupied areas. All openings of items removed shall be sealed to match adjacent surfaces.

The Contractor shall verify the exact location of all existing services, utilities, piping, etc., and make connections to existing systems as required or as shown on the drawings. The exact location of each utility line, together with size and elevation, shall be established before any on-site lines are installed. Should elevation or size of existing main utility lines make connections to them impossible as shown on drawings, then notification of such shall immediately be given to the Owners Representative for a decision.

EQUIPMENT CAPACITIES

Capacities shown for equipment in the specifications and on the drawings are the minimum acceptable. No equipment shall be considered as an alternate without prior approval of the design Engineer.

All equipment shall give the specified capacity and performance at the job-site elevation of [4200] feet above sea level. Manufacturers' standard ratings shall be adjusted accordingly. All capacities and performances listed on drawings or in specifications are for job-site conditions.

SEISMIC REQUIREMENTS FOR EQUIPMENT

All equipment must be furnished structurally adequate to withstand seismic forces as outlined in the Uniform Building Code for seismic Zone 3. Equipment bases shall be designed for direct attachment of seismic snubbers and/or seismic anchors. Coordinate with structural.

COOPERATION WITH OTHER TRADES

The general contractor shall be responsible for job site coordination. The Contractor shall refer to other drawings and parts of this specification that cover work of other trades that is carried on in conjunction with the mechanical work such that all work can proceed without interference resulting from lack of coordination.

The Contractor shall properly size and locate all openings, chases, sleeves, equipment bases, and accesses. He shall provide accurate wiring diagrams to the Electrical Contractor for all equipment furnished under this Division.

The ceiling cavity must be carefully reviewed and coordinated with all trades. In the event of conflict, the installation of the mechanical equipment and piping shall be in the following order: plumbing, waste, and soil lines; supply, return, and exhaust ductwork; water piping; medical gases; fire protection piping; and pneumatic control piping.

The mechanical Contractor shall insure that the installation of all piping, ducts and equipment is in compliance with Articles 110-16 and 384-4 of the National Electrical Code relative to proper clearances in front of and over all electrical panels and equipment. No piping or ductwork will be allowed to run over an electrical panel.

RESPONSIBILITY OF CONTRACTOR

The Contractor is responsible for the installation of a satisfactory piece of work in accordance with the true intent of the drawings and specifications. He shall provide, as a part of his work and without expense, all incidental items required even though these items are not particularly specified or indicated. The installation shall be made so that its several component parts will function together as a workable system and shall be left with all equipment properly adjusted and in working order. (The Contractor shall familiarize the Owner's Representative with maintenance and lubrication instructions as prepared by the Contractor and shall explain and fully instruct him relative to operating, servicing, and maintenance of them.) Part of training package and P.M. program.

UNFIT OR DAMAGED WORK

Any part of this installation that fails, is unfit, or becomes damaged during construction, shall be replaced or otherwise made good. The cost of such remedy shall be the responsibility of this Division and general contractor.

WORKMANSHIP

Workmanship shall be the best quality of its kind for the respective industries, trades, crafts, and practices, and shall be acceptable in every respect to the Owner's representative. Nothing contained herein shall relieve the Contractor from making good and perfect work in all details in construction. All work shall be performed under the directories of any licensed journeyman. Contractor shall maintain a licensed journeyman on site at all times during construction.

SAFETY REGULATION:

The Contractor shall comply with all local and OSHA safety requirements in performance with this work. (See General Conditions). This Contractor shall be required to provide equipment, supervision, construction, procedures, and all other necessary items to assure safety to life and property.

ELECTRICAL SERVICES

Motors:  
All motors required under this Division shall be furnished and installed as work of this Division. All motor-starting equipment, unless otherwise specified in Division 15 shall be furnished as work of Division 16, Electrical. Motors shall be name plated with Class F insulation as manufactured by Lincoln Electric, US Motors, General Electric, Allis Chalmers, Century, or Reliance, designed for quiet continuous operations with maximum (Class B) 90oC resistance heating rise with 40oC ambient temperature at full load and rated speed and voltage individually specified with minimum 1.15 service factor. Motors shall be all of the same make except those incorporated in packaged units. All motors shall be provided with ball bearings and conduit connection boxes. Lifting eyes shall be provided on motors 1-1/2 horsepower and larger. Unless otherwise specified, motors 3/4 horsepower and larger shall be 3 phase, 60 cycle, and motors 1/2 horsepower and smaller shall be single phase, 60 cycle. Contractor is to coordinate with available power voltage and phase. Refer to fan and equipment schedules on drawings for voltage characteristics, horsepower, size, etc. All single-phase motors shall have thermal overload protection. If motor-starting equipment is included in packaged units, all three phases shall have overload protection. All motors shall have a power factor of 85 percent or better. All motors 20 horsepower and larger shall be manufacturers Premium Efficiency grade and shall meet the NEMA MG 1-12.54" efficiency ratings for energy efficient motors. All two speed motors, unless otherwise specified, shall be 1800/1200 rpm dual winding type. All 3 phase motors shall be designed and manufactured to be capable of speed control through a variable frequency drive controller.

Motors and other electrical control equipment installed in damp or moist areas or in areas of other special conditions shall be designed and approved for the installation. Motors and electrical equipment in explosive locations shall be approved for those locations. Motors located outside buildings shall be totally enclosed.

Electric Wiring:  
All equipment control wiring and all boiler control wiring, water heater control wiring, pump interlocks, automatic temperature control wiring including all necessary contacts, relays, and interlocks, whether low or line voltage, except power wiring, shall be furnished and installed as work of this Division. All equipment that requires an electrical connection shall be furnished so that it will operate properly and deliver full capacity on the electrical service available and also satisfy the requirements under "Motors," as specified above. The Mechanical Contractor must refer to the electrical control equipment and wiring shown on the diagrams. Any changes or additions required by specific equipment furnished shall be the complete responsibility of the Contractor furnishing the equipment. The Mechanical Contractor must coordinate with the Electrical Contractor to insure that all required components of control work are included and fully understood. No additional cost shall accrue to the Owner as a result of lack of such coordination.

WORK, MATERIALS, AND QUALITY OF EQUIPMENT

Unless otherwise specified, all materials shall be new and of the best quality of their respective kinds and all labor shall be done in a most thorough and workmanlike manner. Work shall be performed by a licensed electrician. Products or equipment of any of the manufacturers cited herein or any of the products approved by the Addenda may be used. However, where lists of products are cited herein, the one first listed in the design equipment used in drawings and schedules to establish size, quality, function, and capacity standards. If other than design equipment is used, it shall be carefully checked for access to equipment, electrical and control requirements, valving, and piping. Should changes or additions occur in piping, valving, electrical work, etc., or if the work of other Contractors would be revised by the alternate equipment, the cost of all changes shall be borne as work of this Division. Pipe of foreign manufacture will not be acceptable. The access to equipment shown on the drawings are the minimum acceptable space requirements. No equipment that reduces or restricts accessibility to this or any other equipment will be considered.

END OF SECTION 22 0500/23 0500



DIVISION 22/23 - PLUMBING/HVAC	
SECTION 22 0500/23 0500 COMMON WORK RESULTS FOR PLUMBING/HVAC PIPING	
PRODUCTS	
SUBMITTALS Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated. Shop Drawings: Signed and sealed by a qualified professional engineer for multiple piping supports and trapeze hangers. Include design calculations and indicate size and characteristics of components and fabrication details. Welding Certificates: Copies of certificates for welding procedures and operators.	
QUALITY ASSURANCE Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications." Engineering Responsibility: Design and preparation of Shop Drawings and calculations for multiple pipe supports, trapeze, equipment anchorage, and seismic restraint by a qualified professional engineer. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of hangers and supports that are similar to those indicated for this Project in material, design, and extent.	
SUPPORTING DEVICES Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for hangers in direct contact with copper tubing. Building Attachments: Powder-actuated-type, drive-pin attachments with pullout and shear capacities appropriate for supported loads and building materials; UL listing and FM approval for fire-protection systems. Mechanical-Anchor Fasteners: Insert-type attachments with pullout and shear capacities appropriate for supported loads and building materials; UL listing and FM approval for fire-protection systems.	
EXECUTION Install piping free of sags and bends. Install fittings for changes in direction and branch connections. Install sleeves for pipes passing through concrete walls, gypsum-board partitions, and concrete floor and roof slabs. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves. Fire-Barrier Penetrations: Seal pipe penetrations with through-penetration firestop systems specified in Division 7. Install unions adjacent to each valve and at final connection to each piece of equipment. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water and steam piping. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install powder-actuated drive-pin fasteners in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick. Install mechanical-anchorage fasteners in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick. Support fire-protection system piping independent of other piping. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems. 1. Field assemble and install according to manufacturer's written instructions. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts. Install mechanical-anchorage fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.	
PAINTING Touching Up: Where cleaning and touch up painting is not specified in Division 9, Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.	
END OF SECTION 22 0500/23 0500	

DIVISION 22/23 - PLUMBING/HVAC	
SECTION 22 0553/23 0553 IDENTIFICATION FOR MBING/HVAC PIPING & EQUIPMENT	
SUBMITTALS Product Data: For identification materials and devices. Samples: Of color, lettering style, and graphic representation required for each identification material and device.	
QUALITY ASSURANCE Comply with ASME A13.1, "Scheme for the Identification of Piping Systems" for lettering size, length of color field, colors, and viewing angles of identification devices.	
PRODUCTS Products specified are for applications referenced in other Division 15 Sections. If more than single type is specified for listed applications, selection is Installer's option. Equipment Nameplates: Metal permanently fastened to equipment with data engraved or stamped. Data: Manufacturer, product name, model number, serial number, capacity, operating Location: Accessible and visible. Stencils: Standard stencils, prepared with letter sizes conforming to recommendations of ASME A13.1. Minimum letter height is 1-1/4 inches for ducts, and 3/4 inch for access door signs and similar operational instructions. Stencil Paint: Exterior, oil-based, alkyd gloss black enamel, unless otherwise indicated. Paint may be in pressurized spray-can form. Identification Paint: Exterior, oil-based, alkyd enamel in colors according to ASME A13.1, unless otherwise indicated. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semi-rigid, snap-on type. Include color-coding according to ASME A13.1, unless otherwise indicated. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers, extending 360 degrees around pipe at each location. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers, at least 3 times letter height and of length required for label.	
Lettering: Manufacturer's standard preprinted captions as selected by Engineer. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length. Arrows: Either integrally with piping system service lettering, to accommodate both directions, or as separate unit, on each pipe marker to indicate direction of flow. Plastic Duct Markers: Manufacturer's standard laminated plastic, in the following color codes: Green: Cold-air supply. Yellow: Hot-air supply. Blue: Exhaust, outside, return, and mixed air. Hazardous Material Exhausts: Use colors and designs recommended by ASME A13.1. Terminology: Include direction of airflow; duct service such as supply, return, and exhaust; duct origin, duct destination, and design flow. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive, vinyl tape, at least 3 mils thick. Width: 1-1/2 inches on pipes with OD, including insulation, less than 6 inches; 2-1/2 inches for larger pipes. Color: Comply with ASME A13.1, unless otherwise indicated. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch sequenced numbers. Include 5/32-inch hole for fastener. Material: 0.032-inch-thick, polished brass. Size: 1-1/2-inches diameter, unless otherwise required. Indicate valve service and normal position on valve. Example Cold water, N.O. Valve Tag Fasteners: Brass, wire-link or beaded chain; or brass S-hooks. Valve Tag Fasteners: Brass, wire-link chain; beaded chain; or S-hooks. Access Panel Markers: 1/16-inch-thick, engraved plastic-laminate markers, with abbreviated terms and numbers corresponding to concealed valve. Provide 1/8-inch center hole for attachment. Plastic Equipment Markers: Manufacturer's standard laminated plastic, in the following color codes: Green: Cooling equipment and components. Yellow: Heating equipment and components. Brown: Energy reclamation equipment and components. Blue: Equipment and components that do not meet criteria above. Hazardous Equipment: Use colors and designs recommended by ASME A13.1. Terminology: Match schedules as closely as possible. Include the following: (a) Name and plan number. (b) Equipment service. (c) Design capacity. (d) Other design parameters such as pressure drop, entering and leaving conditions, and speed. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of mechanical systems and equipment. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.	
EXECUTION Install pipe markers on each system. Include arrows showing normal direction of flow. Marker Type: Stenciled markers with painted, color-coded bands complying with ASME A13.1. Marker Type: Plastic markers, with application systems. Install on pipe insulation segment where required for hot, non-insulated pipes.	

Fasten markers on pipes and insulated pipes by one of following methods: Snap-on application of pre-tensioned, semi-rigid plastic pipe marker. Adhesive lap joint in pipe marker overlap. Laminated or bonded application of pipe marker to pipe or insulation. Taped to pipe or insulation with color-coded plastic adhesive tape, not less than 3/4 inch wide, lapped a minimum of 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe. Taped to pipe or insulation with color-coded plastic adhesive tape, not less than 1-1/2 inches wide, lapped a minimum of 3 inches at both ends of pipe marker, and covering full circumference of pipe. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations according to the following: Near each valve and control device. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious. Near penetrations through walls, floors, ceilings, or nonaccessible enclosures. At access doors, manholes, and similar access points that permit view of concealed piping. Near major equipment items and other points of origination and termination. Spaced at a maximum of 50-foot intervals along each run. Reduce intervals to 25 feet in areas of congested piping and equipment. On piping above removable acoustical ceilings, except omit intermediately spaced markers.	
VALVE TAGS Install on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, plumbing fixture supply stops, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. Indicate service and normal position of all tagged valve and control devices. List tagged valves in valve schedule. Tag Material: Brass.	
3.3 EQUIPMENT SIGNS AND MARKERS Install engraved plastic-laminate signs or equipment markers on or near each major item of mechanical equipment. Include signs for the following general categories of equipment: Main control and operating valves, including safety devices and hazardous units such as gas outlets. Fire department hose valves and hose stations. Meters, gages, thermometers, and similar units. Fuel-burning units, including furnaces and heaters. Fans, blowers, primary balancing dampers, and mixing boxes. Packaged HVAC central-station and zone-type units. Tanks and pressure vessels. Strainers, filters, water-treatment systems, and similar equipment. Optional Sign Types: Stenciled signs may be provided instead of engraved plastic, at Installer's option, where lettering larger than 1-inch high is needed for proper identification because of distance from normal location of required identification. Lettering Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering. Terms on Signs: Distinguish between multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows showing service and direction of flow. Location: Locate signs near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.	
ADJUSTING AND CLEANING Relocate mechanical identification materials and devices that have become visually blocked by work of this or other Divisions. Clean faces of identification devices and glass frames of valve charts.	
END OF SECTION 22 0553/23 0553	
DIVISION 23 -HVAC	
SECTION 23 3113 METAL DUCTS	
GENERAL	
1. Duct system design, as indicated, has been used to select and size air-moving and -distribution equipment and other components of air system. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure. 2. Duct material: galvanized, sheet steel, lock-forming quality; ASTM A 653/A 653M, coating designation; mill-phosphatized finish for surfaces of ducts exposed to view. 3. Underground duct shall be PVC pipe or PVC coated galvanized steel encased in concrete.	

4. Duct liner: Comply with NFPA 90A or NFPA 90B and NAIMA's "Fibrous Glass Duct Liner Standard." ASTM C 1071 with coated surface exposed to airstream to prevent erosion of glass fibers. a. Thickness: 1". b. Thermal Conductivity (k-Value): .26 at 75 deg F mean temperature. c. Fire-Hazard Classification: Maximum flame-spread rating of 25 and smoke-developed rating of 50, when tested according to ASTM C 411. d. Liner Adhesive: Comply with NFPA 90A or NFPA 90B and ASTM C 916.	
5. Round duct: Diameter as applied to flat-oval ducts in this Article is the diameter of the size of round duct that has a circumference equal to perimeter of a given size of flat-oval duct. a. Round Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards—Metal and Flexible." b. Branch supply ducts are to be Unico system low temperature insulated round duct supply kits. c. Fittings are to be Unico system fittings.	
6. Rectangular duct: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA's "HVAC Duct Construction Standards—Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals. a. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification. b. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations.	
7. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following: a. Supply Ducts: 3" wg. b. Return Ducts: 2" wg, negative pressure. c. Exhaust Ducts: 2" wg, negative pressure.	
8. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19" and larger and .0359" thick or less, with more than 10∅ of unbraced panel area, unless ducts are lined.	
END OF SECTION 23 3113	
DIVISION 23 - HVAC	
SECTION 23 3300 AIR DUCT ACCESSORIES	
GENERAL	
1. Volume dampers: Factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class. 2. Pressure Classifications of or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft. 3. Fire Dampers: Labeled to UL 555. a. Fire Rating: One and one-half and three hours. b. Frame: SMACNA Type B with blades out of airstream; fabricated with roll-formed, thick galvanized steel; with mitered and interlocking corners. c. Provide access door through ductwork and other systems for damper access. d. Fusible Link: Replaceable, 165° rated as indicated. 4. Manufactured Turning Vanes: Fabricate of 1.5" wide, curved blades set 3/4" o.c.; support with bars perpendicular to blades set 2" o.c.; and set into side strips suitable for mounting in ducts. 5. Flexible Ducts, Insulated: Factory-fabricated, insulated, round duct, with an outer jacket enclosing 1.5" thick, glass-fiber insulation around a continuous inner liner.	
END OF SECTION 23 3300	
DIVISION 23 - HVAC	
SECTION 23 3423 HVAC POWER VENTILATORS	
GENERAL	
1. Fan description: Coordinate with Electrical Engineering Plans. Corrosion resistant as required. Centrifugal fans designed for installing in ceiling or wall, or for concealed in-line applications. 2. Housing: Galvanized steel lined with acoustical insulation. Plastic for corrosion resistant areas. 3. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service. 4. Grille: Stainless-steel, louvered grille with flange on intake and thumbscrew attachment to fan housing. 5. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in. 6. Variable-Speed Controller: Solid-state control to reduce speed from 100 percent to less than 50 percent. 7. Accessories: Manufacturer's standard roof jack or wall cap, and transition fittings. 8. Provide wall cap and room grille with each fan.	
END OF SECTION 23 3423	



DESIGNED	3		
DRAFTED	2		
CHECKED	1		
DATE	NO.	DATE	

REVISIONS		BY	APVD.



DIVISION 23 - HVAC	
SECTION 23 68 00 MODULAR AIR HANDLING UNITS	
PART 1 GENERAL	
1.01 WORK INCLUDED	A. Modular Air Handling Units.
1.02 REFERENCES	A. AMCA 300 - Reverberant Method for Sound Testing of Fans. B. AMCA 301 - Method for Publishing Sound Ratings for Air Moving Devices. C. ANSI/AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings. D. ANSI/UL 900 - Test Performance of Air Filter Units. E. ARI 260 - Standard for Sound Rating of Ducted Air Moving and Conditioning Equipment F. ARI 410 - Standard for Forced Circulation Air-Cooling and Air-Heating Coils. G. ARI 430 - Standard for Central Station Air Handling Units. H. ARI 1060 Air-To-Air Energy Recovery Ventilation Equipment I. ASHRAE 68 - Laboratory Method of Testing In-Duct Sound Power Measurement Procedure for Fans. J. ASTM 117 - Standard Practice for Operation Salt Spray Apparatus K. NEMA MG1 - Motors and Generators L. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems. M. SMACNA - HVAC Duct Construction Standards. N. UL 1995 - Heating and Cooling Equipment
1.03 QUALITY ASSURANCE	A. Air Coils: Certify capacities, pressure drops and selection procedures in accordance with current ARI 410 Standard. B. Certify air-handling units in accordance with ARI 430. C. ISO 9001 Certification.
1.04 SUBMITTALS	A. Submit unit performance including: capacity, nominal and operating performance. B. Submit Mechanical Specifications for unit and accessories describing construction, components and options. C. Submit shop drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lift points and recommendations. Indicate unit shipping split locations, and split dimensions, installation and operating weights including dimensions. D. Provide fan curves with specified operating point clearly plotted. E. Submit data on electrical requirements. Include safety and start-up instructions. F. Submit sound data certified to ARI 260.
1.05 REGULATORY REQUIREMENTS	A. Unit shall be manufactured to conform to UL 1995 Standard and shall be listed by either UL/CUL or ETL. Units shall be provided with listing agency label affixed to unit. In the event the unit is not UL/CUL or ETL approved, the contractor shall, at his/her expense provide for a field inspection by a UL/CUL or ETL representative to verify conformance. If necessary, contractor shall perform modifications to the unit to comply with UL/CUL or ETL as directed by the representative, at no additional expense to the owner. B. Certify air-handling units in accordance with ARI 430. If air-handling units are not certified in accordance with ARI 430, contractor shall be responsible for expenses associated with testing of units after installation to verify performance of fan(s). Any costs incurred to adjust fans to meet scheduled capacities shall be the sole responsibility of the contractor. C. Certify air-handling coils in accordance with ARI 410. If air-handling coils are not certified in accordance with ARI 410, contractor shall be responsible for expenses associated with testing of coils after installation to verify performance of coil(s). Any costs incurred to adjust coils to meet scheduled capacities shall be the sole responsibility of the contractor.
1.06 DELIVERY, STORAGE, AND HANDLING	A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units. B. Units shall ship fully assembled up to practical shipping and rigging limitations. Units not shipped fully assembled shall have tags and airflow arrows on each section to indicate location and orientation in direction of airflow. Shipping splits shall be clearly defined on submittal drawings. Cost associated with non conformance to shop drawings shall be the responsibility of the manufacturer. Each section shall have lifting lugs or shipping skid to allow for field rigging and final placement of section. C. Deliver units to jobsite with fan motor(s), sheave(s), and belt(s) completely assembled and mounted in units. D. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.
1.07 START-UP AND OPERATING REQUIREMENTS	A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters in place, bearings lubricated (if applicable), condensate properly trapped, piping connections verified and leak-tested, belts aligned and tensioned, all shipping braces removed, bearing set screws torqued, and fan has been test run under observation.
1.08 WARRANTY	A. The equipment manufacturer shall provide, at no additional cost, a standard parts warranty that covers a period of one year from unit start-up or 18 months from shipment, whichever occurs first. This warrants that all products are free from defects in material and workmanship and shall meet the capacities and ratings set forth in the equipment manufacturer's catalog and bulletins.

PART 2 PRODUCTS	
2.01 ACCEPTABLE MANUFACTURERS	A. Approved manufacturer shall be Trane, with pre-approved alternates considered. Manufacturers not pre-approved, must obtain pre-approval in writing from consulting engineer prior to bid day. Alternates must comply with all performance and features as called for in this specification. Job awarded on basis of specified equipment. Alternate will be evaluated and considered after job is awarded. B. Manufacturer must clearly define any exceptions made to Plans and Specifications. Any deviations in layout or arrangement shall be submitted to consulting engineer prior to bid date. Acceptance of deviation(s) from specifications shall be in the form of written approval from the consulting engineer. Mechanical Contractor is responsible for expenses that occur due to exceptions made. C. Approved Custom Manufacturers 1. Trane 2. Temtrol 3. System Aire 4. Haakon
2.02 GENERAL	A. Unit layout and configuration shall be as defined in project plans and schedule. B. Provide unit mounting legs to support all sections of unit and raise unit for proper trapping. Contractor will be responsible for providing a housekeeping pad when unit mounting device is not of sufficient height to properly trap unit. Unit mounting devices not constructed of galvanized steel shall be chemically cleaned and coated with both a rust-inhibiting primer and finished coat of rust-inhibiting enamel.
2.03 UNIT CASING	A. Unit shall be constructed of a complete structural frame with removable panels. Unit manufacturer shall ship separate segments so unit can be broken down for ease of installation in tight spaces. The entire air handler shall be constructed of galvanized steel. Casing finished to meet ASTM B 117 250-hour salt-spray test. The removal of side panels shall not affect the structural integrity of the unit. All removable panels shall be gasketed to minimize air leakage. All doors shall have gasketing around full perimeter to prevent air leakage. Contractor shall be responsible to provide connection flanges and all other framework that is needed to properly support the unit. B. Construct casing sections capable of operating from -4"wg to +6"wg . C. Access panels and/or access doors shall be available on both sides of the unit in all sections to allow easy access to drain pan, coil(s), motor, drive components and bearings for cleaning, inspection, and maintenance. If panels are not removable, then manufacturer shall provide access sections with doors between all internal components to ensure access and cleanability of the air handler. D. Access doors shall be double wall construction to prevent damage to insulation during routine maintenance. E. Access panels and doors shall be fully removable without the use of specialized tools to allow complete access of all interior surfaces. F. Door hardware shall be surface mounted to minimize penetrations in the door casing that could lead to air leakage paths. G. All joints between exterior panels and structural frames, as well as joints between module frames, shall be properly sealed and gasketed to provide an air seal. H. Insulation - High density - Insulation shall be encased in double-wall casing between exterior and interior solid panel such that no insulation can erode to the airstream. Foil facing on insulation is not an acceptable alternate to double wall construction. Insulation shall have a minimum R-Value of 8 and shall be UL listed. The installation shall comply with NFPA-90A and B requirements.
2.04 FANS	A. Provide fans of type and class as specified on the schedule. Fan shafts shall be solid, coated with a rust-inhibiting coating, and properly designed so that fan shaft does not pass through first critical speed as unit comes up to rated RPM. All fans shall be statically and dynamically tested by the manufacturer for vibration and alignment as an assembly at the operating RPM to meet design specifications. Fans controlled by variable frequency drives shall be statically and dynamically tested for vibration and alignment at speeds between 25% and 100% of design RPM. If fans are not factory-tested for vibration and alignment, the contractor shall be responsible for cost and labor associated with field balancing and certified vibration performance. Fan wheels shall be keyed to fan shafts to prevent slipping. B. Provide grease lubricated ball bearings selected for L-50 200,000-hour average life per ANSI/AFBMA 9. Greasable bearings shall have lubrication lines extended to the drive side of the unit. Lubrication lines shall be a clear, high-pressure, polymer to aid in visual inspection. Extend both grease lubrication lines to drive side of unit and rigidly attach to drive side bearing support with zerk fittings. If extended lubrication lines are not provided, manufacturer shall provide permanently lubricated bearing with engineering calculations for proof of bearing life. C. Fans shall be mounted on isolation bases. Internally-mounted motor shall be on the same isolation base. Fan and motor shall be internally isolated with spring isolators. Flexible canvas ducts shall be installed between fan and unit casing to ensure complete isolation. Flexible canvas ducts shall comply with NFPA 90A and UL 181 requirements. If fans and motors are not internally isolated, then the entire unit shall be externally isolated from the building, including supply and return duct work, piping, and electrical connections. External isolation shall be furnished by the contractor in order to avoid transmission of noise and vibration through the ductwork and building structure. D. Fan modules shall have a minimum of one access door located on the drive side of the unit to allow inspection and maintenance of the fan, motor, and drive components. Construct door(s) per Section 2.03 paragraphs D, E, and F. E. Belts shall be enclosed as required by OSHA standard 29 CFR 1910 to protect worker from accidental contact with the belts and sheaves.

F. MOTORS AND DRIVES	
1. All motors and drives shall be factory-installed and run tested. All motors shall be installed on a slide base to permit adjustment of belt tension. Slide base shall be designed to accept all motor sizes offered by the air-handler manufacturer for that fan size to allow a motor change in the future, should airflow requirements change.	2. Fan Motors shall be heavy duty, open drip-proof (ODP)high efficiency, operable at 460 volts, 60Hz, 3-phase
3. Motors shall be selected to operate continuously at 104 F (40 C) ambient without tripping of overloads. Motors shall have a +/- 10 percent voltage utilization range to protect against voltage variation. Motors shall be in compliance with EPACKT when applicable. Motors shall have Class F Insulation.	4. V-Belt Drive shall be constant pitch rated at 1.2 times the motor nameplate.
5. Manufacturer shall provide for each fan a nameplate with the following information to assist air balance contractor in start up and service personnel in maintenance: a. Fan and motor sheave part number b. Fan and motor bushing part number c. Number of belts and belt part numbers d. Fan design RPM and motor HP e. Belt tension and deflection f. Center distance between shafts	
6. Combination Starter / Disconnect - A combination starter / disconnect is provided for each fan motor. Each starter / disconnect is properly sized, factory mounted, and wired to the fan motor to facilitate temporary heating, cooling, ventilation, and/or timely completion of the project. Starter / disconnects include a circuit breaker disconnect with a through-the-door interlocking handle spring loaded and designed to rest only in the full "ON" or "OFF" state and is lockable in these states. A concealed defeater mechanism allows entry into the enclosure when the handle is in the "ON" position. Cover mounted controls include a Hand-Off-Auto switch and a reset button. Also included are fused control transformers, one N.O. auxiliary contact, and manual reset overloads. Starter/disconnects have full metal NEMA type 1 enclosure with a durable painted finish.	
2.05 COILS	A. Install coils such that headers and return bends are enclosed by unit casing to ensure that if condensate forms on the header or return bends, it is captured by the drainpan under the coil. B. Coils shall be manufactured with plate fins to minimize water carryover and maximize airside thermal efficiency. Fin tube holes shall have drawn and belled collars to maintain consistent fin spacing to ensure performance and air pressure drop across the coil as scheduled. Tubes shall be mechanically expanded and bonded to fin collars for maximum thermal conductivity. Use of soldering or tinning during the fin-to-tube bonding process is not acceptable due to the inherent thermal stress and possible loss of bonding at that joint. C. Construct coil casings of galvanized steel. End supports and tube sheets shall have belled tube holes to minimize wear of the tube wall during thermal expansion and contraction of the tube. D. All coils shall be completely cleaned prior to installation into the air handling unit. Complete fin bundle in direction of airflow shall be degreased and steam cleaned to remove any lubricants used in the manufacturing of the fins, or dirt that may have accumulated, in order to minimize the chance for water carryover. E. On stacked cooling coils, intermediate drain pans shall be installed between the coils. Intermediate drain pans shall have drop tubes to guide condensate to the main drain pan, thus preventing flooding of lower coils that would result in moisture carryover.
2.06 BASE-LEVEL DRAIN PANS	A. Insulation shall be encased between exterior and interior walls. Units with cooling coils shall have drain pans under complete cooling coil section that extend beyond the air-leaving side of the coil to ensure capture of all condensate in section. Cooling coil drain pans shall be sloped in 2 planes, pitched toward drain connections to ensure complete condensate drainage when unit is installed level and trapped per manufacturer's requirements. See section 2.05, paragraph E for specifications on intermediate drain pans between cooling coils. B. Units with heating coils shall have a drain pan under complete heating coil section sloped in 2 planes and pitched toward drain connections to ensure proper drainage during cleaning and to capture water in the event of a coil failure. C. All drain pan connections supplied by unit manufacturer including, piping, and piping connections extending from stainless steel drain pans shall be constructed of stainless steel. The contractor is responsible to ensure the unit is installed level, trapped in accordance with the manufacturer's requirements, and visually inspected to ensure proper drainage of condensate. D. Flat drain pans shall be acceptable in sections that may have incidental, but not continuous contact with moisture. Flat drainpans shall be accessible for cleaning.
2.07 FILTERS	A. Provide factory-fabricated filter section of the same construction and finish as unit casings. Filter section shall have filter guides and access door(s) extending the full height of the casing to facilitate filter removal. Construct doors in accordance with Section 2.03, paragraphs D, E, and F. Provide filter blockoffs as required to prevent air bypass around filters. B. Filter type, efficiency, and arrangement shall be provided as defined in project plans and schedule. Filters shall be removable from one side of filter section(s). C. Manufacturer shall provide one set of startup filters and an additional 1 set of operational filters. D. Provide aluminum screen prefilter.
END OF SECTION 23680	

DIVISION 23 - HVAC	
SECTION 23 0900 TEMPERATURE CONTROLS	
GENERAL	
1. A programmable temperature controller shall be located in each zone and shall control the air handler, exhaust fan and unit heaters according to documented sequence to maintain the space temperature setpoint. Coordinate with electrical.	
2. Exhaust fans shall also operate based on hand-off-auto wall switch.	
END OF SECTION 23 0900	
DIVISION 23 - HVAC	
SECTION 23 0593 TESTING, ADJUSTING, BALANCING AND MAINTENANCE MANUALS	
GENERAL	
1. All air and water systems to be tested and balanced by an independent testing and balancing firm approved by the engineer. All systems shall be adjusted to perform within 5% of the design document requirements. A complete report shall be provided at the completion of the work.	
2. Each system shall be commissioned to insure correct operation. A complete report shall be provided at the completion of the work.	
3. Complete maintenance and operations manuals shall be provided for all equipment in the building.	
END OF SECTION 23 0593	
DIVISION 23 - HVAC	
SECTION 23 0822 LOUVERS	
GENERAL	
1. EXAMINATION	1.1 Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. 1.2 Proceed with installation only after unsatisfactory conditions have been corrected.
2. PREPARATION	2.1 Clean Opening thoroughly prior to installation. 2.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
3. INSTALLATION	3.1 Install louvers at locations as indicated on the drawings and in accordance with manufacturer's instructions. 3.2 Install louvers plumb, level, in plane of wall, and in alignment with adjacent work. 3.3 Install joint sealants as specified in Section 079000.
4. CLEANING	4.1 Clean exposed surfaces of louvers with water and mild soap or detergent not harmful to finish taking care to remove fingerprints and soil. Thoroughly rinse surfaces and dry. Do not let soil accumulate during construction period. 4.2 Touch-up, repair, or replace louvers damaged during installation and construction so that no evidence remains of the corrective work.
END OF SECTION 23 0822	
DIVISION 23 - HVAC	
SECTION 23 9900 CONTROLS SEQUENCE	
1. PUMP ROOM:	
1.1. Heating: existing UH to be provided with integral stat at set to 55 deg. F.	
1.2. Cooling: AH-1 fan, pump control by RTU to maintain space temperature setpoint. Space temp sensor by others, wired to RTU.	
1.3. Heat:	
1.3.1. Heating existing unit heater Start<50 deg. F.	
1.3.2. existing unit heater Stop > 55 deg. F. Space temperature.	
1.4. Cool:	
1.5. Control panel will provide dry contact status of L.1. Closed upon open louver status.	
END OF SECTION 23 9900	

