# Construction Drawings Montana State Hospital

Warm Springs, Montana Upgrade Wastewater System Project 2020

> A/E # 2011-11-01-03 October 2020





<u>Prepared by:</u> Anderson-Montgomery Consulting Engineers Helena, MT











# **Upgrade Wastewater System Project 2020** Montana State Hospital - Warm Springs, Montana A/E #2011-11-01-03





Install New Lift Station, Rotary Screen, Three Aerated Lagoon Treatment Reactors, Polishing Reactor, Ultraviolet Disinfection, New Outfall, New Rotary Screen Building and New Blower/UV Building, Non-Potable Water System, Fencing, Gravel Access Road, Parking Area, and Lagoon Access Road.

# **PROJECT DESIGN TEAM**

ANDERSON MONTGOMERY CONSULTING ENGINEERS DCI ENGINEERS KINGDOM BUILDERS ENGINEERING, INC.

# **PRIMARY CONTACTS**

Project Administrator - Architecture and Engineering Division, 1520 E. Sixth Avenue, P.O. Box 200103, Helena, MT 59620 Mark Hines, (406) 444-3331, mhines@mt.gov AMCE - Adam Eckhart, (406)449-3303, Adam@a-mce.com On Site - Raul Luciani, (406) 693-7110, Raul.Luciani@mt.gov



### Additive Alternate #1

- Non-potable water piping extension, including 3 frost free hydrants located on the lagoon dikes
- Non-potable water irrigation stub-out

### Additive Alternate #2

- Landscaping: including grass seeding around both buildings, trees along the secondary highway and a non-potable water irrigation system
- Asphalt access road and parking area to replace the base bid gravel access road and parking area
- Two stage air compressor located in the blower/UV building

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DRAWING IDENTIFICATION SYSTEM:

STRUCTURAL/ARCHITECTURAL

PIPING AND INSTRUMENTATION DIAGRAM

LETTER DISCIPLINE

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MECHANICAL ELECTRICAL

	Civil
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S-6	General Notes Continued					
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- Asphalt access road and parking area to replace the • base bid gravel access road and parking area
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Mechanical Drawings					
M-1	Screen Building Plumbing Schematic				
M-2	Screen Building Floor Drain Plan				
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E-9	Electrical Details			

ADMAL BUT
Revision         Date         By           Draft         7/21/20         AE           Draft         8/28/20         AE           Final         9/30/20         AE
Revision Final Plot Scale 1:2 Drawn By A.Eckhart, P.E. Approved By A.Eckhart, P.E. Checked By P.Montgomery, P.E. Checked By S.Anderson, P.E. Designed By A.Eckhart, P.E.
Engineer Anderson~ Montgomery constitution transferes 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
State Of Montana
Project Title Montana State Hospital Upgrade Wastewater System
Sheet Tide
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# **DETAIL DESIGNATION:**



 DETAIL OR SECTION DESIGNATION - ON DWG WHERE SECTION OR DETAIL IS TAKEN: DWG NO. WHERE SHOWN ON DWG WHERE SECTION OR DETAIL IS SHOWN: DWG NO. WHERE TAKEN

PIPE AND FITTING SYMBOLS						
DOUBLE LINE	SINGLE LINE	DESCRIPTION	DOUBLE LINE	SINGLE LINE	DESCRIPTION	
		EXISTING PIPE (SCREENED)			CONCENTRIC REDUCE	
		NEW PIPE			ECCENTRIC REDUCE	
	-•-•-	EXISTING PIPE TO BE ABANDONED			UNION	
<u>Elling</u>	<del></del>	EXISTING PIPE TO BE REMOVED	2		BLIND FLANGE	
23	*	WELDED JOINT		E	САР	
2		GROOVED END JOINT (FLEXIBLE)		, <u>+</u> ,	05000	
23		GROOVED END JOINT (RIGID)			CROSS	
2		GROOVED END FLANGE	8	<u>+_</u> +	TEE	
20		FLANGED JOINT				
		FLANGE COUPLING ADAPTER				
		MECHANICAL COUPLING	MECHANICAL COUPLING		ELBOW, 45	
	⊙+	ELBOW UP				
	C+	ELBOW DOWN			LATERAL (WTE)	
808		TEE UP				
8		TEE DOWN		+ <sup>±</sup>	ELBOW, 90°	

# VALVE SYMBOLS

DOUBLE LINE	SINGLE LINE	DESCRIPTION	DOUBLE LINE	SINGLE LINE	DESCRIPTION
8		GLOBE		<u>&gt;</u>	SAMPLE VALVE NO THREAD OUTLET
8		GATE		×	HOSE VALVE
8		BALL		× ①	NON FREEZE HOSE VALVE, X=NO IN SPECS
2	$\rightarrow$	PLUG			NON FREEZE HOSE VALVE, X=NO IN SPECS
8		BUTTERFLY		S	SAMPLE
2 × B		DIAPHRAGM			PRESSURE RELIEF
8		PINCH			SURGE CONTROL
8		SWING CHECK		Ŷ	AIR/VACUUM
ak B	$-K\vdash$	DOUBLE DISK CHECK	2 XB		REGULATED SIDE PRESSURE REDUCING
2 ¢ B		BALL CHECK			PRESSURE REDUCING VALVE
				X	FLOW CONTROL VALVE / NEEDLE VALVE

		CIVIL S	YMBOLS		
DOUBLE LINE	SINGLE LINE	DESCRIPTION	DOUBLE LINE	SINGLE LINE	Т
CONCRETE			CABLE TV -	TV	
GRAVEL			CURB		
PAVEMENT			DRAINAGE DITCH		
CURB AND SIDEWALK			ROAD		
PROPERTY LINE			BUILDING		
EASEMENT			DROP INLET	-	
RIGHT OF WAY			EASEMENT PIN	$\odot$	
GRAVEL ROAD			POWER POLE	•	
CONTOURS	4200	4200	POWER POLE WITH GUY WIRE	●→	
DRAINAGE			LIGHT POLE	<b>•</b> -*	
WATER	12"₩		SURVEY POINT		
WATER SERVICE LINE	<b>&gt;</b>		CONTROL POINT	CP	
WATER SERVICE	450		TELEPHONE PED	<b>D</b> PED	
SANITARY SEWER	©   	─────────SS───── MH	TELEPHONE BOX		
STORM DRAIN	===============	<b>•</b>	ELECTRICAL BOX		
FENCE LINE (BARB WIRE)			CURB BOX, SIGN	0	
FENCE LINE (CHAIN LINK)			DRILL HOLE OR TEST PIT	<ul> <li>DH1 TP1</li> </ul>	
SIGN	<del>-o-</del> <del>-o-o</del> -	<del></del>	CATTLE GUARD		
OVERHEAD POWER	<u>с</u> О ОНР WR		SECTION CORNER	*	
UNDERGROUND FIBER OPTIC	FO		QUARTER CORNER	++	
UNDERGROUND ELEPHONE, PEDESTAL	— PH		FROST FREE HYDRANT		
UNDERGROUND GAS	GAS		HOSE BIB		
UNDERGROUND POWER, TRANSFORMER	- E - PWR		FROST FREE HOSE BIB		
NATURAL GAS			• CONTACT THE E	NGINEER FOR SYN	M
HOT WATER			THIS IS A STAND SOME SYMBOLS	ARD LEGEND SHE MAY APPEAR ON	E
COLD WATER				LIZED ON THIS PR	U
NON-POTABLE WATER					
PLANT AIR			1		



MBOLS NOT LISTED. ET. THEREFORE, THIS SHEET AND OJECT.

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		Revision	Date	Ву		
		Draft	7/21/20	AE		
		Draft	8/28/20	AE		
		Final	9/30/20	AE		
		Revision	S			
	Final Plot Scale					
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		A.Eck	hart, P.I	Е.		
		Approved By A.Eck	hart. P.1	Е.		
		Checked By		DE		
		Checked By	omery,	P.E.		
		S.Ande	rson, P.	Е.		
		A.Eck	hart, P.1	Е.		
		Engineer				
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	1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304					
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	Project Title					
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**ABBREVIATIONS:** 

Ø       DIAMETER         @       AT         AA       ALL AROUND         AB       ANCHOR BOLT, AGGREGATE BASE         AC       ASBESTOS CEMENT OR ACRE         AFF       ABOVE FINISHED FLOOR         ADA       AMERICANS WITH DISABILITIES ACT         AH       AHEAD         AL       ALUMINUM         ANC       ANCHOR         ANSI       AMERICAN NATIONAL STANDARDS INSTITUTE         APPROX       APPROXIMATELY         ARVE       AVENUE         AWWA       AMERICAN WATER WORKS ASSOCIATION	FG FH FDC FM FPT FS FTG FT G GA GALV GPD GPM GPS	FINISH GRADE FIRE HYDRANT FLOOR, FLANGE OR FLOW LINE FACE OF CURB OR FACE OF CONCRETE FORCE MAIN FEMALE PIPE THREAD FINISHED SURFACE FOOTING FOOT OR FEET GAS GAUGE GALVANIZED GALLONS PER DAY GALLONS PER DAY GALLONS PER MINUTE CLOBAL POSITIONING SYSTEM	R RCB RCPA RDCR RFC RFC RPW RPC RPP RR RT RW RWL	RADIUS REINFORCED CONCRETE BOX REINFORCED CONCRETE PIPE REINFORCED CONCRETE PIPE ARCHED REDUCER ROTATED FOR CLARITY RIGHT-OF-WAY ROBERT PECCIA & ASSOCIATES RED PLASTIC CAP REINFORCED POLYPROPYLENE RAILROAD RIGHT RIGHT-OF-WAY OR RACEWAY RIGHT-OF-WAY RAIN WATER LEADER
BC       BUILDING CORNER         BF       BLIND FLANGE         BFF       BELOW FINISH FLOOR         BFV       BUTTERFLY VALVE         BGS       BELOW GROUND SURFACE         BK       BACK         BLDG       BUILDING         BLVD       BOULEVARD         BM       BENCH MARK         BOC       BACK OF CURB         BOD       BIOCHEMICAL OXYGEN DEMAND         BV       BALL VALVE         BVC       BEGIN VERTICAL CURVE         C       CHANNEL OR CENTER         CARV       COMBINATION AIR RELEASE VALVE         CATV       CABLE TELEVISION         CF       CUBIC FEET         CF       CUBIC FEET	GSP GV HD HDPE HDR HT HP HT HYD I&C ID IN IN IN IN IN IN IN IN IN IN IN	GALLONS PER SECOND GALVANIZED STEEL PIPE GATE VALVE HEAVY DUTY OR HOT-DIPPED HIGH DENSITY POLYETHYLENE PIPE HEADER HEIGHT HORSEPOWER HEIGHT HIGHWAY HYDRANT INSTRUMENTATION & CONTROL INTERNATIONAL BUILDING CODE INSIDE DIAMETER INCH INFLUENT INTERIOR OR INTERSECTION INVERT	S SBB S/C SCH SDR SDR SEB SECT SF SIM SECT SF SIM SSP ST SSMH SSP ST STA STD STL SCDEPD	SLOPE SLUDGE BUFFER BASINS SERVICE CONNECTION SCHEDULE STORM DRAIN STORM DRAIN INLET STANDARD DIMENSION RATIO SMALL END BELL SECTION SQUARE FOOT/FEET SIMILAR SQUARE FOOT/FEET SANITARY SEWER OR STAINLESS STEEL SANITARY SEWER MANHOLE SPIRAL STEEL PIPE STREET STATION STANDARD STEEL OR STEEL PIPE
CI       CAST IRON OR CURB INLET         CIP       CAST IRON PIPE OR CAST-IN-PLACE         CIPP       CURED-IN-PLACE PIPE         CL       CENTERLINE         CLR       CLEAR         CMP       CORRUGATED METAL PIPE         CMU       CONCRETE MASONRY UNIT         CO       CLEANOUT         CONC       CONCRETE         COS       CERTIFICATE OF SURVEY         CPE       CORRUGATED POLYETHYLENE PIPE         CPLG       COUPLING         CPVC       CHLORINATED POLYVINYL CHLORIDE         CSP       CORRUGATED STEL PIPE	JT K KW LB(S) LD LEB LF LT	JOINT KILOMETER KILOWATT ANGLE, LONG POUND(S) LOCAL DISCONNECT LARGE END BELL LINEAL FOOT OR LINEAR FEET LEFT MAXIMUM	T TBC TBLAY TBM TDW TEMP THD TOA TOC TOC TOG TOS TOW	SQUARE YARDS TELEPHONE TOP BACK OF CURB TOP BACK OF LAYDOWN CURB TEMPORARY BENCH MARK TREATED DISINFECTED WATER TEMPERATURE OR TEMPORARY THREAD TOP OF ASPHALT TOP OF CONCRETE TOP OF GRATE TOP OF GRATE TOP OF SIDEWALK TOP OF WALL
CV CHECK VALVE CY CUBIC YARDS C1D1 CLASS 1 DIVISION 1 DEC DECANT DEMO DEMOLISH DEPT DEPARTMENT DH DRILL HOLE (SOIL BORING) DI DUCTILE IRON OR DRAIN INLET DIA DIAMETER DIMJ DUCTILE IRON MECHANICAL JOINT DIP DUCTILE IRON PIPE	MC MCC MDT MECH MFR MH MJ MPT MPWSS MTL MWS	MECHANICAL COUPLING MOTOR CONTROL CENTER MONTANA DEPT. OF TRANSPORTATION MECHANICAL MANUFACTURER MANHOLE MINIMUM OR MINUTE MECHANICAL JOINT MALE PIPE THREAD MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS MATERIAL MAXIMUM WATER SURFACE	IP TS TV TW TWAS TYP UBC UG UGP UPC	IEST PII TECHNICAL SPECIFICATIONS CABLE TELEVISION TREATED WATER THICKENED WASTE ACTIVATED SLUDGE TYPICAL UNIFORM BUILDING CODE UNDERGROUND UNDERGROUND POWER UNIFORM PLUMBING CODE
DL DRAIN LINE DR DRAIN OR DIMENSION RATIO DWAS DIGESTED WASTE ACTIVATED SLUDGE DWG DRAWING EA EACH EFF EFFLUENT	N NEC N.I.C. NO. NPT NPW NTS	NORTH NATIONAL ELECTRICAL CODE NOT IN CONTRACT NUMBER NATIONAL PIPE THREAD NON-POTABLE WATER NOT TO SCALE	V VERT VFA VLV VPC VPT VTR	VENT, VOLTOR VALVE VERTICAL VOLATILE FATTY ACID VALVE VERTICAL POINT OF CURVATURE VERTICAL POINT OF TANGENCY VENT THROUGH ROOF
LLEV LLEVA IION EOC EDGE OF CONCRETE EOP EDGE OF PAVEMENT EOS EDGE OF SIDEWALK EPDM ETHYLENE PROPYLENE DIENE M-CLASS RUBBER EVC END VERTICAL CURVE EW EACH WAY EXT EXTERIOR EXIST EXISTING	OAL OC OD OF OHP PC PE PH PI	OVERALL LENGTH ON CENTER OUTSIDE DIAMETER OUTSIDE FACE OR OVERFLOW OVERHEAD POWER POINT OF CURVATURE PLAIN END PHONE POINT OF INTERSECTION	- W W/ WAS WLC WS WSO WSP WV WW WWF	WATER OR WEST WITH WITHOUT WASTE ACTIVATED SLUDGE WATER LEVEL CONTROL WATER SURFACE OR WATER STOP WATER SERVICE OUTLET WELDED STEEL PIPE WATER VALVE WASTEWATER WELDED WIRE FABRIC
FABFABRICATIONFCFLEXIBLE COUPLINGFCAFLANGED COUPLING ADAPTERFDNFOUNDATIONFETSFLARED END TERMINAL SECTIONFFFINISHED FLOOR	PL PLCS PROP PSI PSIG PT PVC PVI PWR	PROPERTY LINE OR PLATE PLACES PROPERTY OR PROPOSED POUNDS PER SQUARE INCH POUNDS PER SQUARE INCH, GAUGE POINT OF TANGENCY POLYVINYL CHLORIDE PLASTIC POINT OF VERTICAL INTERSECTION POWER	X XING YD YPC	USED AS A VARIABLE CROSSING YARD YELLOW PLASTIC CAP

NOTES:

• CONTACT THE ENGINEER FOR ABBREVIATIONS NOT LISTED.

• THIS IS A STANDARD ABBREVIATIONS SHEET. THEREFORE, SOME ABBREVIATIONS MAY APPEAR ON THIS SHEET AND MAY NOT BE UTILIZED ON THIS PROJECT.

Revision Date Bv 
 Draft
 7/21/20
 AE

 Draft
 8/28/20
 AE

 Final
 9/30/20
 AE
 Revision Final Plot Scale Plot Scale <u>1:2</u> Drawn By A.Eckhart, P.E. Approved By A.Eckhart, P.E. Checked By P.Montgomery, P.E. Checked By S.Anderson, P.E. Designed By A.Eckhart, P.E. Engineer nderson~ Montgomer ONSULTING ENGINEE 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304 Owner State Of Montana Project Title Montana State Hospital Upgrade Wastewater System Sheet Title Abbreviations Sheet **G-4** 

### DESIGN INFLUENT WASTEWATER CHARACTERISTICS

Design Year	2040	
Current Average Daily Flow	187,200	GPD
Design Average Daily Flow	237,600	GPD
Design Peak Hour Flow	576,000	GPD

### REGULATORY EFFLUENT STANDARDS

BOD <sub>5</sub>	45	mg/L
Total Suspended Solids	30	mg/L
E. Coli - Summer	126	org/100 mL
E. Coli - Winter	630	org/100 mL
Oil & Grease	10	mg/L
* 85% Pomoval of BOD		

### 85% Removal of BOD<sub>5</sub> 65% Removal of TSS

MASS LOAD LIMITS (lbs/day)				
	AML	AWL		
BOD <sub>5</sub>	89.2	128.8		
Total Suspended Solids	59.4	89.2		

AMMONIA LIMITS (mg/L)					
MAR-JUN JUL-OCT NOV-FEB					
MDL	29.9	2.8	26.3		
AML	14.9	1.4	13.1		

### SUMMARY OF PROJECT IMPROVEMENTS

(Not all-inclusive)

### Screening Building

- Precast Concrete Building
- Mechanical Rotary Screen
- Auxiliary Screen
- Composite Sampler
- Controls
- Remote Monitoring System

### Main Wastewater Lift Station

- Two New Submersible Pumps
- Check Valves
- Electromagnetic Flow Meter
- Control System

### Blower/UV Building

- Precast Concrete Building
- Electromagnetic Flow Meter
- Stainless Steel UV Disinfection Channel
- Wall Mounted Spare UV Light Module
- Mechanical Wiping System
- Bypass Piping
- UV Controls
- Composite Sampler
- Non-Potable Water Basin After UV Channel
- Two Non-Potable Water Pumps with VFDs and Controls
- Check valves, Isolation Valves, and Flow Meters
- Non-Potable Water Piping Distribution System
- Two Hybrid Blowers
- Blower Controls
- Bathroom with Lavatory
- Remote Monitoring System

- Polishing Reactor

Site Landscaping

### **Plant Security Fencing**

Potable Water Extension to the New Buildings

Building

### Additive Alternate #1

### Additive Alternate #2

- building

### Lagoon Treatment System

• 0.59 MG Membrane Lined Complete Mix Lagoon • 1.17 MG Membrane Lined Partially Mixed Lagoon • 1.23 MG Membrane Lined Partially Mixed Lagoon • Fine Bubble Aeration System

• Insulated Floating Cover for All Three Lagoon Cells Control Structures

**Gravel Access Road and Parking Area** 

Sanitary Sewer Extension to the New Screening

### New Sanitary Sewer Outfall

• Non-potable water piping extension, including 3 frost free hydrants located on the lagoon dikes Non-potable water irrigation stub-out

• Landscaping: including grass seeding around both buildings, trees along the secondary highway and a non-potable water irrigation system

• Asphalt access road and parking area to replace the base bid gravel access road and parking area • Two stage air compressor located in the blower/UV

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Draft	7/21/20	AE
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Final	9/30/20	AE
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A.Eck Approved By	hart, P.I	Ξ.
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P.Montg	omery, l	P.E.
S.Ande Designed By	erson, P.	E.
A.Eck	hart, P.I	5.
Engineer		
1064 I Helena Phone (4 Fax (4)	N. Warren , Mt 5960 06) 449-3 06) 449-3	NEERS 1 303 304
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4835	NONTAN
NEW MH #211         4830           RIM ELEV. 4817.00         4825           ELESCOPING VALVE #1 INV. IN S ELEV. 4806.00         4825           DRAIN INV. IN S ELEV. 4806.00         4825	
INV. OUT E ELEV. 4806.00           TELESCOPING VALVE #1 HW ELEV. 4814.75           TELESCOPING VALVE #1 LW ELEV. 4812.00           4815	Revision         Date         By           Draft         7/21/20         AE           Draft         8/28/20         AE
4810	Final 9/30/20 AE
CELL#2 TO CELL#3 OVERFLOW. 4800 INV. ELEV. 4815.00	Revision Final Plot Scale 1:2
4795	A.Eckhart, P.E. Approved By A.Eckhart, P.E. Checked By
4/90	P.Montgomery, P.E. Checked By S.Anderson, P.E. Designed By
	A.Eckhart, P.E.
4835	Engineer
4830	Anderson~ Montgomery
X. MH #1 4802.66	1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
.4802.61         NEW MH #218         4815           .4802.61         RIM ELEV. 4800.56         4815           .4802.61         INV. IN NW ELEV. 4800.56         4810	Owner
4805 	State Of Montana
4785	Project Title
	Montana State Hospital Upgrade Wastewater System
	Sheet Title
	Hydraulic Profile
	Sheet
	G-7





# Abbreviations & Letter Symbols

CP	CONTROL PANEL
HIM	HUMAN INTERFACE MODULE
HOA	HAND-OFF-AUTO
мн	MANHOLE
S	SOLENOID
VFD	VARIABLE FREQUENCY DRIVE
DIP	DUCTILE IRON PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
CPVC	CHLORINATED POLYVINYL CHLORIDE PIPE

# **Flow Stream Identification**

- WW WASTE WATER
- NPW NON-POTABLE WATER
- AIR COMPRESSED AIR
- TW TREATED WATER
- TDW TREATED DISINFECTED WATER











Revision Date Draft 7/2.1/ Draft 8/28/20 AE Final 9/30/20 AE Final Plot Scal 1:2 A.Eckhart, P.E. A.Eckhart, P.E. P.Montgomery, P.E. Checked By S.Anderson, P.E. A.Eckhart, P.E. 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304 State Of Montana Project Title Montana State Hospital Upgrade 217 Wastewater System CLARK FORK Sheet Title RIVER UV Disinfection & Non-Potable TO INTERIOR Water PLUMBING PID 2 PID-4 TO IRRIGATION SYSTEM  $\overline{}$ VALVE BOXES

## **GENERAL NOTES:**

- 1. CONTRACTOR TO OBTAIN ALL REQUIRED PERMITS FOR CONSTRUCTION, DEWATERING AND STORMWATER DISCHARGES.
- AS CONSTRUCTED ELEVATIONS SHALL BE WITHIN 0.08' OF ELEVATION SPECIFIED ON THE PLAN DRAWINGS.
   CONTRACTOR SHALL PROTECT AND PRESERVE ALL EXISTING SITE FEATURES (INCLUDING VEGETATION, SURFACES, STRUCTURES, SURVEY MONUMENTATION, ETC.) TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. ANY DAMAGE TO EXISTING SITE FEATURES SHALL BE REPAIRED TO ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING SEWER MAIN SIZE, MATERIAL TYPE, MANHOLE SIZE, MATERIALS AND CONDITION PRIOR TO INITIATION OF SEWER SYSTEM REHABILITATION ACTIVITIES.
- 5. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER DUST CONTROL DURING CONSTRUCTION.
- 6. CONTRACTOR MUST COMPLY WITH MONTANA STATE HOSPITAL REQUIREMENTS FOR CONSTRUCTION CONTRACTORS. SEE SPECIAL PROVISIONS.
- 7. DURING WORK ACTIVITIES, CONTRACTOR MUST STAY AT LEAST 50' FROM THE NEAREST RAILROAD TRACK.

## NOTES FOR WATER AND SEWER MAINS:

- 1. THE OWNER AND RESIDENTS SHALL BE NOTIFIED PRIOR TO CHANGE OR DISRUPTION OF WATER OR SEWER SYSTEM OPERATION.
- 2. WATER MAIN PIPING SHALL BE C900 WATER PIPE. THERMAL PIPING SHALL BE DR 11 HDPE PIPE.
- 3. SEWER MAIN PIPING SHALL BE DUCTILE IRON OR SDR-35 PVC SEWER PIPE.
- 4. ALL WATERMAIN AND FORCEMAIN FITTINGS, INCLUDING WYES, REDUCERS AND ELBOWS EQUAL TO OR GREATER THAN 22-1/2° SHALL BE RESTRAINED MECHANICAL JOINT. ALL MECHANICAL JOINT RESTRAINTS SHALL BE "MEGALUG", UNIFLANGE OR EQUAL. JOINT RESTRAINT SHALL BE IN ADDITION TO MEETING THRUST BLOCK REQUIREMENTS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND MPW STANDARD DRAWINGS 02660-1, AND 02660-3.
- 5. TRENCHES FOR THE INSTALLATION OF WATER MAINS AND SEWER MAINS SHALL BE PROPERLY BACKFILLED AS QUICKLY AS POSSIBLE, BUT NO MORE THAT 48-HOURS AFTER INITIAL DIGGING.
- 6. WHEN WORKING NEAR AND/OR EXPOSING EXISTING UTILITIES AND SERVICE LINES, WORKERS SHALL UTILIZE HAND-DIGGING IN ORDER TO AVOID DAMAGE TO THOSE UTILITIES. IF DAMAGE OCCURS, THE COST OF REPAIR AND PENALTIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- 7. DISINFECTION OF WATER MAINS SHALL BE IN ACCORDANCE WITH APPENDIX B OF MPWSS.
- 8. EXISTING WATER PIPE IS "TRANSITE" PIPE WHICH CONTAINS ASBESTOS CEMENT. CONTRACTOR SHALL OBSERVE ALL FEDERAL AND STATE REGULATIONS WHEN CUTTING, HANDLING AND DISPOSING THIS PRODUCT.

# UTILITY NOTES:

- 1. THE ENGINEER HAS OBTAINED UNDERGROUND UTILITY INFORMATION FROM OWNERS OF THE UNDERGROUND FACILITIES AND INCLUDED THAT INFORMATION AS PART OF THESE PLANS. THIS UTILITY LOCATION INFORMATION IS APPROXIMATE AND MAY BE INCOMPLETE.
- 2. BEFORE BEGINNING AN EXCAVATION, THE CONTRACTOR SHALL NOTIFY, THROUGH ONE-CALL NOTIFICATION CENTER, ALL OWNERS OF UNDERGROUND FACILITIES IN THE AREA OF THE PROPOSED EXCAVATION. THE PHONE NUMBER IS: 1-800-424-5555 OR 811. WEBSITE: WWW.CALLBEFOREYOUDIG.ORG
- 3. AFTER AN OWNER OF AN UNDERGROUND FACILITY HAS LOCATED AND MARKED THE UNDERGROUND FACILITIES, THE CONTRACTOR SHALL DETERMINE IF WEATHER, TIME, OR OTHER FACTORS MAY HAVE AFFECTED LOCATION MARKS, WARRANTING RELOCATION OF THE FACILITIES.
- 4. IF EXCAVATION HAS NOT OCCURRED WITHIN 30 DAYS OF THE LOCATE AND MARK, THE CONTRACTOR SHALL REQUEST THAT THE FACILITY BE RELOCATED AND REMARKED BEFORE EXCAVATING UNLESS OTHER ARRANGEMENTS HAVE BEEN MADE WITH THE UNDERGROUND FACILITY OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH RELOCATING AND REMARKING A FACILITY THAT IS NOT EXCAVATED WITHIN 30 DAYS OF THE LOCATE AND MARK.
- 5. THE CONTRACTOR MAY NOT BEGIN EXCAVATING BEFORE THE LOCATING AND MARKING IS COMPLETE OR BEFORE THE CONTRACTOR IS NOTIFIED THAT LOCATING AND MARKING IS UNNECESSARY.
- 6. THE CONTRACTOR SHALL LOCATE AND MARK THE AREA TO BE EXCAVATED IF REQUESTED BY THE UNDERGROUND FACILITY OWNER OR THEIR REPRESENTATIVE. IF THE CONTRACTOR DISCOVERS AN UNDERGROUND FACILITY THAT HAS NOT BEEN LOCATED AND MARKED, THE CONTRACTOR SHALL STOP EXCAVATING IN THE VICINITY OF THE FACILITY AND NOTIFY THE FACILITY OWNER OR THE ONE-CALL NOTIFICATION CENTER. IF THIS OCCURS THE CONTRACTOR SHALL PROCEED WITH OTHER ELEMENTS OF THE PROJECT, AT NO COST TO THE PROJECT OWNER, UNTIL THE UNDERGROUND FACILITY OWNER HAS NOTIFIED THE CONTRACTOR THAT EXCAVATION CAN PROCEED.

# SPECIAL MONTANA STATE HOSPITAL CAMPUS RULES:

1. SEE THE SPECIAL PROVISIONS IN THE CONTRACT DOCUMENTS FOR THE SPECIAL MONTANA STATE HOSPITAL CAMPUS RULES.

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RevisionDateByDraft7/21/20AEDraft8/28/20AEFinal9/30/20AE				
Revision Final Plot Scale				
1:2 Drawn By A.Eckhart, P.E. Approved By A.Eckhart, P.E. Checked By S.Anderson, P.E. Designed By A.Eckhart, P.E.				
Engineer				
Anderson~Montgomery CONSULTING ENGINEERS 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304				
State Of Montana				
Project Title Montana State Hospital Upgrade Wastewater System				
Sheet Title Civil Notes				
GC-1				

	LOCATION BLOCK						
	1/4	SECTION	TOWNSHIP	RANGE			
	x	13	5N	10W			
	X X	18	5N	9W			
	PRINCIPAL MERIDIAN MONTANA						
	DEER LODGE COUNTY, MONTANA						
·							

SURVEY	CONTROL	POINT	TABLE
	CONTROL		IADLL

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
2	722108.517	1137859.479	4814.014	FOUND ELI RPC
60	725678.589	1137559.584	4795.045	SET MAG NAIL
61	724093.994	1137329.146	4802.818	SET MAG NAIL
63	722651.294	1137151.223	4810.763	SET MAG NAIL
64	721867.567	1136919.967	4813.496	SET MAG NAIL
65	722756.018	1136523.837	4810.5	SET NAIL
66	721360.121	1136175.661	4821.632	SET MAG NAIL
67	721476.442	1136739.984	4817.335	SET ELI RPC
606	722139.157	1136186.695	4816.65	FOUND REBAR
1000	722669.469	1137673.399	4807.279	CL MANHOLE

\* MONTANA STATE PLAN COORDINATES (MTSP) NAD83 \* VERTICAL DATUM IS NAVD88 \* WARM SRPINGS DATUM. \* WARM SPRINGS DATUM COORDINATES WERE OBTAINED BY SCALING MTSP COORDINATES TO GROUND BY A COMBINED SCALE FACTOR OF 1.0007 AND ROTATING AND TRANSLATING TO FOUND POINTS #606 AND #1000

POINT

2

60

61

63

64

65

66

67

606

1000

NORTHING

9475.303

13032.7729

11439.0246

9989.2841

9196.2728

10068.5461

8658.6968

8797.8946

9438.0849

10028.6382

SU	IRVEY CONTRO	DL POINT TABL	E
IG	EASTING	ELEVATION	DESCRIPTION
3	12185.7758	4815.1188	FOUND ELI RPC
29	11741.1021	4796.1365	SET MAG NAIL
16	11574.9694	4803.915	SET MAG NAIL
1	11455.5894	4811.8655	SET MAG NAIL
8	11256.1616	4814.6004	SET ELI RPC
61	10824.0323	4811.6023	SET NAIL
8	10532.5217	4822.7421	SET MAG NAIL
6	11092.0572	4818.4421	SET ELI RPC
9	10511.9538	4817.7567	FOUND REBAR
32	11976.9642	4808.3791	CL MANHOLE

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Engineer		
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### NOTES:

MAINTAIN 10' HORIZONTAL SEPARATION BETWEEN NEW SANITARY SEWER AND NEW HDPE POTABLE WATER MAIN.

- WATERMAIN SHALL HAVE A MINIMUM OF 18" VERTICAL SEPARATION FROM SANITARY SEWER AT CROSSING. THE DISTANCE FROM THE CROSSING TO JOINTS IN THE
- SANITARY SEWER AND WATERMAIN SHALL BE MAXIMIZED. 3. DO NOT EXCEED THE BEND RADIUS OF 15' FOR NEW HDPE POTABLE WATER MAIN.
- MAINTAIN MINIMUM 6' BURY DEPTH WHERE POSSIBLE. IF 6' BURY DEPTH CANNOT BE MAINTAINED INSTALL 4" RIGID INSULATION AS PER DETAIL

GC-19



ADDITIVE ALTERNATE 1: (NOT ALL ITEMS SHOWN ON THIS SHEET) NON-POTABLE WATER PIPING TO FROST FREE HYDRANTS ON LAGOON DIKES - SEE SHEETS C-35 AND C-36. NON-POTABLE WATER IRRIGATION STUB-OUT - SEE SHEETS GC-10, C-29, AND C-33.

ADDITIVE ALTERNATE 2: (NOT ALL ITEMS SHOWN ON THIS SHEET) LANDSCAPING AND IRRIGATION SYSTEM - SEE SHEETS GC-10 AND GC-32. ASPHALT ACCESS ROAD - SEE SHEETS GC-8 & GC-34.

• 7.5 HP AIR COMPRESSOR - SEE SHEET C-29.



























### NOTES:

7

- 1. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES
- 2. POUR THRUST BLOCKING AGAINST 3/4" MINUS GRAVEL OR STRUCTURAL FILL. 3/4" MINUS GRAVEL OR STRUCTURAL FILL SHALL BE AGAINST UNDISTURBED EARTH.
- 3. REQUIRED VOLUMES AND BEARING AREAS SHALL BE AS SHOWN IN THE TABLE AND ADJUSTED, IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS OF 2,000 LBS/SQFT.
- THRUST BLOCK VOLUMES FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS ARE BASED ON TEST PRESSURE OF 150 PSIG AND 4 THE WEIGHT OF CONCRETE = 4,050 LBS PER CUBIC YARD. TO COMPUTE VOLUMES FOR DIFFERENT TEST PRESSURES USE THE FOLLOWING EQUATION:
  - ACTUAL VOLUME = (TEST PRESSURE/150) X (TABLE VOLUME).
- BEARING AREAS FOR HORIZONTAL BEND THRUST BLOCKS ARE BASED ON TEST PRESSURE OF 150 PSIG AND AN ALLOWABLE SOIL BEARING 5 STRESS OF 2,000 LBS/SQFT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES US THE FOLLOWING EQUATION:  $B_1 = B(13.33)(P_1 / 2000)$  WHERE:
  - $P_1 = ACTUAL TEST PRESSURE, PSIG$
  - **B** = COMPUTED BEARING AREA

  - **B = BEARING AREA FROM TABLE**
- VERTICAL BENDS HAVING DOWNWARD RESULTANT THRUSTS AND HORIZONTAL BENDS, HAVE THE SAME THRUST BLOCK REQUIREMENTS. BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SHOWN ELSEWHERE IN THESE PLANS TAKE PRECEDENCE OVER THIS
- STANDARD DETAIL THRUST BLOCK BEARING AREA SHALL NOT BE LESS THAN 1.0 SQFT. 8.
- TEST PRESSURES ARE INDICATED IN THE SPECIFICATIONS AND THE ALLOWABLE SOIL BEARING STRESS IS 2,000 LBS/SQFT. 9
- 10. THE USE OF RESTRAINED JOINT SYSTEMS WILL BE ACCEPTED AS AN ALTERNATIVE TO CONVENTIONAL CONCRETE THRUST BLOCKING.
- 11. CONTRACTOR SHALL PROVIDE THRUST BLOCKING FOR ALL BURIED FITTINGS AND VALVES.
- 12. ALL THRUST BLOCKING CONCRETE SHALL BE ENCASED IN 3/4" MINUS GRAVEL OR STRUCTURAL FILL TO PROTECT THE CONCRETE FROM THE CORROSIVE SOILS.

VOLUME OF	THRUST BL (VERTICAL	OCK IN CUE BENDS)	BIC YARDS
FITTING SIZE	E	BEND ANGLI	E
(INCHES)	45°	22-1/2°	11-1/4°
4	0.8	0.3	0.1
6	2.0	0.8	0.3
8	3.0	1.1	0.4
10	4.5	1.7	0.7
12	5.4	2.4	1.0
14	8.6	3.2	1.3
16	11.1	4.2	1.7
18	14.1	5.3	2.2
20	17.3	6.6	2.7
24	24.2	9.2	3.8

	BEARING ARE	EA OF THRUS	T BLOCKS I	N SQFT. (HO	ORIZONTAL	BENDS)	
FITTING SIZE	TEE, WYE, PLUG, OR	90° BEND, PLUGGED	TEE, PLUC	GGED RUN	BEND ANGLE		
(INCHES)	CAP	CROSS	A <sub>1</sub>	A <sub>2</sub>	45°	22-1/2°	11-1/4°
4	1.3	1.8	1.3	1.8	1.0	1.0	
6	3.0	4.2	3.0	4.2	2.3	1.2	1.0
8	5.3	7.6	5.3	7.6	4.1	2.1	1.0
10	8.3	11.8	8.3	11.8	6.4	3.3	1.6
12	12.0	17.0	12.0	17.0	9.2	4.7	2.4
14	16.3	23.1	16.3	23.1	12.5	6.4	3.2
16	21.4	30.2	21.4	30.2	16.3	8.3	4.2
18	27.0	32.0	27.0	32.0	20.7	10.5	5.3
20	33.4	47.2	33.4	47.2	25.5	13.0	6.5
24	40.3	55.0	40.3	55.0	35.7	18.0	9.0
NATE							

EACH AREA (A/2) IS HAVE OF TABULATED TOTAL AREA

\*\* RESTRAINED PLUG

VERTI	CAL BEND R	EBAR
FITTING SIZE	ROD SIZE	EMBEDMENT
12" AND LESS	#6	30"
14" - 16"	#8	36"
18" - 20"	#10	36"
24"	#11	42"

NOTE **EPOXY COATED REBAR OVER FITTING** AND EMBEDDED IN CONCRETE (SEE TABLE FOR SIZES)



	VAL\	/E THRI	JST BLO		ENSION	S	
VALVE SIZE	REBAR	100 PSI			150 PSI		
	SIZE	А	В	С	Α	В	С
4"	#6	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
6"	#6	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
8"	#6	2.0'	2.0'	2.0'	2.0'	2.0'	2.0'
10"	#6	2.0'	2.0'	2.0'	2.5'	2.5'	2.0'
12"	#6	2.3'	2.0'	2.0'	3.0'	3.0'	2.7'
14"	#8	2.3'	2.0'	2.3'	3.4'	3.0'	3.0'
16"	#9	3.0'	3.0'	2.9'	4.3'	3.0'	3.0'
18"	#10	3.7'	3.0'	3.0'	5.4'	3.0'	3.0'
20"	#10	3.9'	3.3'	3.3'	5.7'	3.3'	3.3'
24"	#11	4.3'	4.0'	4.0'	6.4'	4.0'	4.0'

DIMENSION 'A' IS WIDTH OF THRUST BLOCK (PERPENDICULAR TO PAGE)



NO SCALE




























		CHAIN LINK FENCE MINIMUM REQUIREMENTS			
FENCE HEIGHT (FEET)	TERMINAL POST DIM. (IN INCHES) (O.D. x WALL THICKNESS)	LINE POST DIM. (IN INCHES) (O.D. x WALL THICKNESS)	TERMINAL POST CONCRETE FOUNDATION SIZE (IN INCHES) (DIA. x DEPTH)	LINE POST CONCRETE FOUNDATION SIZE (IN INCHES) (DIA. x DEPTH)	NO. OF CROSS BRACES REQ'D FOR ALL PANELS. BRACES TO BE EQUALLY SPACED, VERTICALLY
UP TO 4	2-3/8 x 0.042	1-5/8 x 0.047	10 x 24	8 x 24	NA
OVER 4 TO 5	2-3/8 x 0.042	1-7/8 x 0.055	10 x 24	8 x 24	NA
OVER 5 TO 6	2-3/8 x 0.042	1-7/8 x 0.065	10 x 24	8 x 24	NA
OVER 6 TO 8	2-3/8 x 0.110	2-3/8 x 0.095	10 x 36	10 x 36	NA
OVER 8 TO 10	2-7/8 x 0.160	2-3/8 x 0.130	12 x 40	10 x 40	1
OVER 10 TO 12	2-7/8 x 0.160	2-Z7/8 x 0.120	12 x 42	12 x 42	1
OVER 12 TO 16	4 x 0.230	4 x 0.230	18 x 60	18 x 60	2



Chain Link Fence Details



DOUBLE PANEL

**PULL POST & CORNER** POST BRACING

• SEE TECHNICAL SPECIFICATIONS FOR MATERIALS.

- CONTRACTOR SHALL ATTACH FABRIC TO POSTS USING WIRE TIES.
- CONCRETE GATE POST ENCASEMENTS SHALL MEET MANUFACTURER'S REQUIREMENTS.
- INSTALL COPPER CLAD GROUNDING RODS EVERY 500'-0".
- GAPS NO GREATER THAN 2" WILL BE PERMITTED IN ALL LOCATIONS.
- A LATCH ASSEMBLY LOCKING DEVICE IS REQUIRED FOR ALL GATE INSTALLATIONS.



NO SCALE

## NOTES:

10:0" (TYP.)

NOTES:

GC-17

CORNER

BRACE

POST

- INSTALL LOCKABLE SLIDING GATE LATCH PER MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR SHALL ATTACH A 6" (MIN) DIAMETER WHEEL ASSEMBLY TO THE END OF EACH GATE. THE CONTRACTOR SHALL GET APPROVAL FOR THE PROPOSED ASSEMBLY PRIOR TO FABRICATION.
- GATE SHALL BE CENTERED OVER THE ACCESS ROAD.

12" DIA. CONCRETE FOOTING ON END PANELS (TYP. EACH SIDE OF GATE) TOP RAIL

-LINE POST

TENSION CABLE AT BOTTOM

• A SINGLE PANEL SHALL BE PLACED AT EVERY END OF CHAIN LINK FENCE. • TENSION BANDS ON TERMINAL POSTS TO BE INSTALLED AT 12" SPACING ON CENTER. ALL CONCRETE SHALL BE MADE USING 3/4" AGGREGATE AND 602 POUNDS OF CEMENT PER CUBIC YARD OF CONCRETE AND SHALL HAVE A SLUMP OF 5" WITH COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CONCRETE SHALL BE ENCASED IN A MINIMUM OF 4" OF STRUCTURAL FILL TO ISOLATE THE CONCRETE FROM THE

 DOUBLE PANELS SHALL BE INSTALLED NO MORE THAN 300'-0" APART ON TANGENT AND USED FOR PULLING. SUCH PANELS SHALL BE PLACED AT EACH CORNER SHAPER THAN 5 DEGREES AND BE EVENLY SPACED BETWEEN 20'-0" OF CENTRAL ANGLE (10'-0" DEFLECTION) APART, BUT NO MORE THAN 250'-0" APART ON ANY

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2 YD. TRASH RECEPTACLE (OWNER PROVIDED)

8" DI PIPE - EXTEND 3' BEYOND EXTERIOR WALL AND CAP FOR FUTURE BIOFILTER. INSTALL REMOVABLE PLUG IN PIPE TO PREVENT GAS FROM ENTERING THE PIPE.

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Helen	na, Mt 59601
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Anderson-Montgomery consulting Engineery 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
State Of Montana
Project Title Montana State Hospital Upgrade Wastewater System
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	Checked By P.Montgomery, P.E. Checked By S.Anderson, P.E. Designed By A.Eckhart, P.E.
	Engineer Anderson ~ Montgomery consulting engineers 1064 N. Warren Helena, Nt. 59601
	Phone (406) 449-3303 Fax (406) 449-3304
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GOON DIKES - SEE SHEETS C-35 AND C-36.	ADAM ADAM
N-POTABLE WATER IRRIGATION STUB-OUT - SEE SHEETS	COSU2PE AS
-10, C-29, AND C-33.	A LONGE CON
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TIVE ALTERNATE 2: (NOT ALL ITEMS SHOWN ON THIS SHEET)	Revision Date By
NDSCAPING AND IRRIGATION SYSTEM - SEE SHEETS GC-10	Draft 7/21/20 AE
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	1:2 Drawn By
	A.Eckhart, P.E.
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	Checked By
	Checked By
	S.Anderson, P.E.
	A.Eckhart, P.E.
	Engineer
	Anderson~ Montgomery
BLE WATER EXTENSION SHOWN ON THIS SHEET	CONSULTING ENGINEERS
NSTALLED IF ALTERNATE #1 IS AWARDED. THE	1064 N. Warren
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ADDITIVE ALTERNATE 1: (NOT ALL ITEMS SHOWN ON THIS SHEET) NON-POTABLE WATER PIPING TO FROST FREE HYDRANTS ON LAGOON DIKES - SEE SHEETS C-35 AND C-36 NON-POTABLE WATER IRRIGATION STUB-OUT - SEE SHEETS GC-10, C-29, AND C-33. ADDITIVE ALTERNATE 2: (NOT ALL ITEMS SHOWN ON THIS SHEET) LANDSCAPING AND IRRIGATION SYSTEM - SEE SHEETS GC-10 Revision Date Draft 7/21/20 AE AND GC-32 Draft 8/28/20 AE ASPHALT ACCESS ROAD - SEE SHEETS GC-8 & GC-34. • 7.5 HP AIR COMPRESSOR - SEE SHEET C-29. Final 9/30/20 AE Revisio Final Plot Scale 1:2 Drawn By A.Eckhart, P.E. pproved By A.Eckhart, P.E. Thecked By P.Montgomery, P.E. Checked By S.Anderson, P.E. A.Eckhart, P.E. Enginee AAA 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304 State Of Montana Project Title Montana State Hospital Upgrade Wastewater System Sheet Title Non-Potable Water Piping Plan & Profile

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~SCREENING	Anderson~ Montgomery
BUILDING	consulting engineers 1064 N. Warren
	Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
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	Wastewater
	System
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	Blower/UV Building
	Sewer
	Service Plan
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	C-37



12" PVC PIPE       WATER         Vertex       State Of Montana         State Of Montana       State Hospital         Upgrade       Water         Vertex       State Of Montana         State Of Montana       State Hospital         Upgrade       Water         System       State Of Montana         State Of Montana       State Hospital         Upgrade       State Hospital         Upgrade       Water         System       State Hospital         Upgrade       State		C-38
12° PVC PIPE         VATER         SURFACE		Lagoon Leakage Test Device
Image: State Of Montana	-12" PVC PIPE -WATER SURFACE	Project Title Montana State Hospital Upgrade Wastewater System
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Revision       Date       By         Draft       7/21/20       AE         Draft       8/28/20       AE         Final       9/30/20       AE         Plot Scale       1:2         Drawn By       A.Eckhart, P.E.         Approved By       A.Eckhart, P.E.         Checked By       S.Anderson, P.E.         Designed By       A.Eckhart, P.E.         Designed By       A.Eckhart, P.E.         Designed By       A.Eckhart, P.E.         Designed By       A.Eckhart, P.E.		AndersonMontgomery consulting engineers 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
Revision     Date     By       Draft     7/21/20     AE       Final     9/30/20     AE		Revision         Final         Plot Scale         1:2         Drawn By         A.Eckhart, P.E.         Approved By         A.Eckhart, P.E.         Checked By         S.Anderson, P.E.         Designed By         A.Eckhart, P.E.
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ADDITIVE ALTERNATE 1: (NOT ALL ITEMS SHOWN ON THIS SHEET)

NON-POTABLE WATER PIPING TO FROST FREE HYDRANTS ON LAGOON DIKES - SEE SHEETS C-35 AND C-36.
NON-POTABLE WATER IRRIGATION STUB-OUT - SEE SHEETS GC-10, C-29, AND C-33.

ADDITIVE ALTERNATE 2: (NOT ALL ITEMS SHOWN ON THIS SHEET) • LANDSCAPING AND IRRIGATION SYSTEM - SEE SHEETS GC-10 AND GC-32.

ASPHALT ACCESS ROAD - SEE SHEETS GC-8 & GC-34.
 7.5 HP AIR COMPRESSOR - SEE SHEET C-29.

LIFT STATION (72" DIA.) RIM - 4810.20 INV. IN S 10" DI - 4800.89 INV. IN NE 4" PVC - 4800.89 INV. IN N 2" PVC - 4801.25 INV. IN S 3" DI - 4800.89 INV. OUT N 4" DI - 4803.80 INV. OUT N 4" DI - 4803.80

> -SCREENING BUILDING

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Engineer Anderson~ Montgomery
1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
State Of Montana
Project Title Montana State Hospital Upgrade Wastewater System
Sheet Title Polishing Reactor Drain Piping Plan & Profile
Sheet C-39

# DRAWING LEGEND

MARK	DESCRIPTION	MARK	DESCRIPTION			
F2.0	FOOTING SYMBOL (REFER TO SPREAD FOOTING SCHEDULE)	I	INDICATES WIDE FLANGE COLUMN			
	PILE CAP SYMBOL (REFER TO PILE CAP SCHEDULE)		INDICATES HOLLOW STRUCTURAL SECTION (HSS) COLUMN OR TUBE STEEL (TS) COLUMN			
1	TILT-UP/PRECAST CONCRETE WALL CONNECTION SYMBOL (REFER TO CONNECTION DETAIL)	0	INDICATES HOLLOW STRUCTURAL SECTION (HSS) COLUMN OR STEEL PIPE COLUMN			
2W4	SHEAR WALL SYMBOL (REFER TO SHEAR WALL SCHEDULE)	⊠	INDICATES WOOD POST			
	REVISION TRIANGLE	•	INDICATES BUNDLED STUDS			
1	TILT-UP/PRECAST CONCRETE WALL PANEL NUMBER (REFER TO TILT-UP/ PRECAST CONCRETE WALL ELEVATIONS)		INDICATES CONCRETE COLUMN			
	CMU WALL REINFORCING SYMBOL (REFER TO CMU WALL REINFORCING SCHEDULE)		INDICATES PRECAST CONCRETE COLUMN			
8"	CONTINUITY PLATE LENGTH (REFER TO TYPICAL DETAIL)	►	INDICATES MOMENT FRAME CONNECTION			
	INDICATES DOUBLE SHEAR CONNECTION (REFER TO THE DOUBLE SHEAR PLATE CONNECTIONS DETAIL)	▶	INDICATES CANTILEVER CONNECTION			
	ROOF/FLOOR DIAPHRAGM NAILING SYMBOL (REFER TO DIAPHRAGM NAILING SCHEDULE)	÷•••••	INDICATES WOOD OR STEEL STUD BEARING WALL LINE PER KEY ON SHEET			
C1 XX"xXX"	STEEL/CONCRETE COLUMN SYMBOL (REFER TO STEEL COLUMN SCHEDULE)		INDICATES WOOD OR STEEL STUD SHEAR WALL LINE AND HOLD-DOWNS PER KEY ON SHEET			
T/FTG = X'-X"	ELEVATION SYMBOL (T/ REFERS TO COMPONENT THAT THE ELEVATION REFERENCES)	\$	INDICATES MASONRY/CMU WALL			
3	STUD BUBBLE (INDICATES NUMBER OF STUDS REQUIRED IF EXCEEDS NUMBER SPECIFIED IN PLAN NOTE)	<u> </u>	INDICATES CONCRETE/TILT-UP CONCRETE WALL			
	INDICATES STEP IN FOOTING (REFER TO TYPICAL STEP IN FOOTING DETAIL)	\$\$	INDICATES BEARING WALL BELOW			
X SX.X	DETAILS OR SECTION CUT (DETAIL NUMBER/SHEET NUMBER)	<u></u>	INDICATES EXISTING WALL			
00 S0.0	DETAILS OR SECTION CUT IN PLAN VIEW (DETAIL NUMBER/SHEET NUMBER)	<b>┝</b> ─────́,	POST-TENSION DEAD END (PLAN)			
XX/SXX.XX	INDICATES LOCATION OF CONCRETE WALLS, SHEAR WALLS OR BRACED FRAME ELEVATIONS	<b>← + →</b>	POST-TENSION STRESSING END (PLAN)			
	INDICATES DIRECTION OF DECK SPAN					

ABBREVIATIONS						
	Angle	EXT	Exterior	PJP	Partial Joint Penetration	
AB	Anchor Bolt	FB	Factory-Built	PREFAB	Prefabricated	CALL AND
ADDL	Additional	FD	Floor Drain	PSF	Pounds per Square Foot	ONAL ENTIT
ADH	Adhesive	FDN	Foundation	PSI	Pounds Per Square Inch	Parisian Data Dry
ALT	Alternate	FIN	Finish	PSL	Parallel Strand Lumber	Draft 7/31
ARCH	Architectural	FLR	Floor	P-T	Post-Tensioned	Draft 8/13
B or BOT	Bottom	FRP	Fiberglass Reinforced Plastic	PT	Pressure Treated	Draft 8/25
B/	Bottom Of	FRT	Fire Retardant Treated	R	Radius	Final 9/30
BLDG	Building	FTG	Footing	RD	Roof Drain	Description
BLKG	Blocking	F/	Face of	REF	Refer/Reference	Final
BMU	Brick Masonry Unit	GA	Gage	REINF	Reinforcing	Plot Scale
BP	Baseplate	GALV	Galvanized	REQD	Required	Drawn By
BRBF	Buckling Restrained	GEOTECH	Geotechnical	RET	Retaining	PDD Approved By
	Braced Frame	GL	Glue Laminated Timber	SB	Site-Built	MJS Charled Dec
BRG	Bearing	GWB	Gypsum Wall Board	SCBF	Special Concentric	TPV
BTWN	Between	HDR	Header		Braced Frame	Designed By
С	Camber	HF	Hem-Fir	SCHED	Schedule	
СВ	Castellated Beam	HGR	Hanger	SER	Structural Engineer of	
C'BORE	Counterbore	HD	Hold-down		Record	
CL or 🖞	Centerline	HORIZ	Horizontal	SFRS	Seismic Force-	
CLT	Cross-Laminated Timber	HP	High Point		Resisting System	Engineer
CIP	Cast in Place	HSS = TS	(Hollow Structural Section)	SHTHG	Sheathing	о И
CJ	Construction or	IBC	International Building Code	SIM	Similar	ш <u>–</u>
	Control Joint	ID	Inside Diameter	SLBB	Short Leg Back-to-Back	
CJP	Complete Joint	IE	Invert Elevation	SMF	Special Moment Frame	
<u></u>	Penetration	IF	Inside Face	SOG	Slab on Grade	
CLR	Clear	INT	Interior	SP	Southern Pine	
CLG	Ceiling	k	Kips	SPEC	Specification	soul v
CMU	Concrete Masonry Unit	KSF	Kips Per Square Foot	SQ	Square	Misim
COL	Column		Lineal Foot	SR	Studrail	Owner
CONC	Concrete	LL	Live Load	SF	Square Foot	
CONN	Connection	LLBB	Long Leg Back-to-Back	SSI	Stainless Steel	
	Construction	LLH	Long Leg Horizontal	STAGG	Stagger/Staggered	State Of
	Continuous	LLV	Long Leg Vertical	SID	Standard	Montana
	Countersink	LP	Low Point	STIFF	Stiffener	Iviolitalia
	Centered	LONGII		SIL	Steel	
	Diameter	LSL	Laminated Strand Lumber	SIRUCI		
	Drop Beam		Laminated Veneer Lumber	SVVVJ	Solid Web Wood Joist	
	Detormed Bar Anchor	IVIAS	Maximuma	STIVI	Symmetrical	Project Title
	Double		Machanical		Top Top Of	
	Demoisri		Mezzonine	1/ T.9.D	Top OI	
	Development Develop Fir		Mapufacturar		Top & Bottom	Stata Hagnital
	Diagonal		Minimum			State Hospital
	Diagonal	MISC	Miscellaneous		Tie Down System	Upgrade
וסוס חו	Dead Load	NIC	Not In Contract	TNG	Tongue & Groove	wastewater
	Dead Load		Nail-Laminated Timber		Thickened	System
	Ditto	NTS	Not To Scale	THRD	Threaded	
DD DP	Denth/Deen		On Center	THRU	Through	
	Drawing	OCBE	Ordinary Concentric Braced	TRANSV	Transverse	Sheet Title
(F)	Existing	OODI	Frame	TYP	Typical	
ΓΔ	Each	OD	Outside Diameter		Linless Noted Otherwise	
FF	Each Face	OF	Outside Face	URM	Unreinforced Masonry	Legend/Abbr.
El	Elevation	OPNG			Unit	
ELEC.	Electrical	OPP	Opposite	VFRT	Vertical	
FLEV	Elevator	OWS.I	Open Web Steel Joist	W	Wide	
	Embedment	0\W\W/1	Open Web Wood Joist	W/	With	
FO	Equal	PI	Plate	, W/O	Without	Sheet
FOUIP	Fauipment	PAF	Powder Actuated Fastener	WHS	Welded Headed Stud	
EW	Each Wav	PC	Precast	WP	Working Point	∣∣ S-1
EXP	Expansion	PERP	Perpendicular	WWF	Welded Wire Fabric	
	Expansion loint		Plywood	+	Plus or Minus	

# **STRUCTURAL - GENERAL NOTES**

# **GENERAL REQUIREMENTS**

<u>GOVERNING CODE</u>: The design and construction of this project is governed by the "International Building Code (IBC)", 2018 Edition, hereafter referred to as the IBC, as adopted and modified by the County of Deer Lodge, MT understood to be the Authority Having Jurisdiction (AHJ).

**<u>REFERENCE STANDARDS</u>: Refer to Chapter 35 of 2018 IBC**. Where other Standards are noted in the drawings, use the latest edition of the standard unless a specific date is indicated. Reference to a specific section in a code does not relieve the contractor from compliance with the entire standard.

**DEFINITIONS**: The following definitions cover the meanings of certain terms used in these notes:

"Architect/Engineer" - The Architect of Record and the Structural Engineer of Record.

- "Structural Engineer of Record" (SER) The structural engineer who is licensed to stamp & sign the structural documents for the project. The SER is responsible for the design of the Primary Structural System.
- "Submit for review" Submit to the Architect/SER for review prior to fabrication or construction.
- "Per Plan" Indicates references to the structural plans, elevations and structural general notes.
- "Seismic Force Resisting System (SFRS)" A recognized structural system of components (beams, braces, drags, struts, collectors, diaphragms, columns, walls, etc) of the primary structure that are specially designed and proportioned to resist earthquake-induced ground motions and maintain stability of the structure. Fabrication and installation of components designated as part of the SFRS require the general contractor, subcontractor, or supplier who is responsible for any portion of SFRS fabrication or installation to comply with special requirements (including, but not limited to, material control, compliance certifications, personnel qualifications, documentation, reporting requirements, etc) and to provide the required Quality Control including the required coordination of Special Inspections (Quality Assurance – QA). Special provisions apply to any member designated as part of the SFRS. Refer to plans, elevations, details, Design Criteria and Symbols and Legends for applicable members and connections.
- "Specialty Structural Engineer" (SSE) A professional engineer (PE or SE), licensed in the State
  where the project is located, (typically not the SER), who performs specialty structural engineering
  services for selected specialty-engineered elements identified in the Contract Documents, and who
  has experience and training in the Specialty. Documents stamped and signed by the SSE shall be
  completed by or under the direct supervision of the SSE.
- "Bidder-designed" Components of the structure that require the general contractor, subcontractor, or supplier who is responsible for the design, fabrication and installation of specialty-engineered elements identified in the Contract Documents to retain the services of an SSE. Submittals of "Bidder-designed" elements shall be stamped and signed by the SSE.

**<u>SPECIFICATIONS</u>**: Refer to the project specifications issued as part of the contract documents for information supplemental to these drawings.

**<u>OTHER DRAWINGS</u>**: Refer to the architectural, mechanical, electrical, civil and plumbing drawings for additional information including but not limited to: dimensions, elevations, slopes, door and window openings, non-bearing walls, stairs, finishes, drains, waterproofing, railings, curtain walls, elevators, curbs, depressions, mechanical unit locations, and other nonstructural items.

**STRUCTURAL DETAILS:** The structural drawings are intended to show the general character and extent of the project and are not intended to show all details of the work. Use entire detail sheets and specific details referenced in the plans as "typical" wherever they apply. Similarly, use details on entire sheets with "typical" in the name wherever they apply.

**<u>STRUCTURAL RESPONSIBILITIES</u>**: The structural engineer (SER) is responsible for the strength and stability of the primary structure in its completed form.

**<u>COORDINATION</u>**: The Contractor is responsible for coordinating details and accuracy of the work; for confirming and correlating all quantities and dimensions; for selecting fabrication processes; for techniques of assembly; and for performing work in a safe and secure manner.

**PRE-CONSTRUCTION MEETINGS:** The Contractor is responsible for coordinating pre-construction meetings prior to commencing work. Pre-con meetings, scheduled approximately two weeks prior to the start of the relevant work, are required for the following phases of construction: **Post-tensioned slabs**, **Structural Steel, Cold-Formed Steel, Shotcrete, Concrete, Masonry, Pile Installation, Demolition, Heavy Timber, Cross-Laminated Timber, Wood Framing**. Attendees for pre-construction meeting are to include contractor, relevant subcontractors, fabricators, inspectors, architect/SER, and representative of the Authority Having Jurisdiction where required. Meeting agendas are to include review of the work scope, project schedule relevant to the work, contact information of responsible parties, inspection points, review of materials and any special cases or issues, procedures for clarifications if required, testing and acceptance, etc.

**MEANS, METHODS and SAFETY REQUIREMENTS**: The contractor is responsible for the means and methods of construction and all job-related safety standards such as OSHA and DOSH (Department of Occupational Safety and Health). Contractor is responsible to adhere to OSHA regulations regarding steel erection items specifically addressed in the latest OSHA regulations. Bolting and field welding at all member connections is to be completed prior to the release of the member from the hoisting mechanism unless reviewed and approved by the General Contractor's temporary bracing and shoring design engineer. The construction documents represent the completed structure. The contractor is responsible for means and methods of construction related to the intermediate structural conditions (i.e. movement of the structure due to moisture and thermal effects; construction sequence; temporary bracing, etc).

**BRACING/SHORING DESIGN ENGINEER**: The contractor shall at his discretion employ an SSE, a registered professional engineer for the design of any temporary bracing and shoring.

**TEMPORARY SHORING, BRACING:** The contractor is responsible for the strength and stability of the structure during construction and shall provide temporary shoring, bracing and other elements required to maintain stability until the structure is complete. It is the contractor's responsibility to be familiar with the work required in the construction documents and the requirements for executing it properly.

**<u>CONSTRUCTION LOADS</u>**: Loads on the structure during construction shall not exceed the design loads as noted in DESIGN CRITERIA & LOADS below or the capacity of partially completed construction as determined by the Contractor's SSE for Bracing/Shoring.

**CHANGES IN LOADING:** The contractor has the responsibility to notify the SER of any architectural, mechanical, electrical, or plumbing load imposed onto the structure that differs from, or that is not documented on the original Contract Documents (architectural / structural / mechanical / electrical or plumbing drawings). Provide documentation of location, load, size and anchorage of all undocumented loads in excess of **400** pounds. Provide marked-up structural plan indicating locations of any new equipment or loads. Submit plans to the Architect/Engineer for review prior to installation.

**NOTE PRIORITIES**: Plan and detail notes and specific loading data provided on individual plans and detail drawings supplements information in the Structural General Notes.

**DISCREPANCIES**: In case of discrepancies between the General Notes, Specifications, Plans/Details or Reference Standards, the Architect/Engineer shall determine which shall govern. Discrepancies shall be brought to the attention of the Architect/Engineer before proceeding with the work. Should any discrepancy be found in the Contract Documents, the Contractor will be deemed to have included in the price the most expensive way of completing the work, unless prior to the submission of the price, the Contractor asks for a decision from the Architect as to which shall govern. Accordingly, any conflict in or between the Contract Documents shall not be a basis for adjustment in the Contract Price.

**<u>SITE VERIFICATION</u>**: The contractor shall verify all dimensions and conditions at the site. Conflicts between the drawings and actual site conditions shall be brought to the attention of the Architect/Engineer before proceeding with the work.

**ADJACENT UTILITIES**: The contractor shall determine the location of all adjacent underground utilities prior to earthwork, foundations, shoring, and excavation. Any utility information shown on the drawings and details is approximate and not necessarily complete.



ALTERNATES: Alternate products of similar strength, nature and form for specified items may be submitted with adequate technical documentation (proper test report, etc.) to the Architect/Engineer for review. Alternate materials that are submitted without adequate technical documentation or that significantly deviate from the design intent of materials specified may be returned without review. Alternates that require substantial effort to review will not be reviewed unless authorized by the Owner.

# DESIGN CRITERIA AND LOADS

OCCUPANCY: Risk Category of Building per 2018 IBC Table 1604.5 =
------------------------------------------------------------------

WIND DESIGN:	MAIN WIND FORCE RESISTING SYSTEM		
	Ultimate Design Wind Speed, $V_{ULT}$ (MPH)		113
	Exposure Category	В	
	Internal Pressure Coefficient	+/- 0.18	
	Topographic Factor	Kzt =	1.0
	Wind Analysis procedure used:		Directional

#### WIND DESIGN: **COMPONENTS & CLADDING PRESSURES FOR DESIGN (PSF,** ULTIMATE)



SC	M	ET	RI	С	٧I	ΕW
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PLAN VIEW

- 1) Components and Cladding Wind Pressures are based on ASCE 7-16 Chapter 30 Part 3: Buildings with h > 60 ft.
- 2) Components and Cladding zone locations are based on ASCE 7-16 Table 30.5-1 for Flat Roofs  $\Theta$  < 10 deg.
- 3) For parapets around the perimeter of the roof equal to or higher than 3 ft, Zone 3 shall be treated as Zone 2.
- 4) All Parapet Components and Cladding Wind Pressures shall be determined through ASCE 7-16 Figure 30.6-2.

Seismic Design Category:	SDC =	С
Basic Structural System		Bearing Wall
Seismic Force Resisting System		Intermediate Pre- cast Concrete Shear Walls
Response Modification Factor:	R =	4 (Intermediate Precast Shear Walls)
System Over Strength Factor	Omega =	2.5
Deflection Amplification Factor	Cd =	4
Site Classification per IBC 1613.3.2 & ASCE 7-16, C Site Class =	Ch. 20	D
Seismic Importance Factor per ASCE 7-16 Table 1.5	5-2 <b>le =</b>	1.00
Spectral Response Acceleration (Short Period)	S <sub>s</sub> =	0.390 g
Spectral Response Acceleration (1-Second Period)	S <sub>1</sub> =	0.127 g
Spectral Design Response Coefficient (Short Period	) <b>S</b> <sub>DS</sub> =	0.387 g
Spectral Design Response Coefficient (1-Second Pe	eriod) <b>S<sub>DI</sub> =</b>	0.194 g
Seismic response coefficient(s)	Cs =	0.114
Redundancy Factor (North/South Direction)	N/S rho=	1.0
Redundancy Factor (East / West Direction)	E/W rho=	1.0
Design Base Shear (North/South Direction)	(KIPS)	16.7 (Screening Building) 18 (Blower Build- ing)
Design Base Shear (East / West Direction)	(KIPS)	16.7 (Screening Building) 18 (Blower Build- ing)
Base shear governed by:		Seismic
Seismic Analysis procedure used:		Equivalent Lateral Force (ELF)

SEISMIC

DESIGN:



<b>SNOW LOAD</b> : <sup>(1)</sup>	Flat Roof Snow Load, (PSF)	р <sub>f</sub> =	<b>30</b> <sup>(2)</sup>
	Snow Drift Loading required by Authority Having Jurisdiction?		Yes
	Snow Load Importance Factor	I <sub>s</sub> =	<b>0.8</b> <sup>(3)</sup>
	Ground Snow Load, (PSF)	p <sub>g</sub> =	32
	Snow Exposure Factor	C $_{\rm e}$ =	1.0
	Thermal Factor	<b>C</b> <sub>t</sub> =	1.0
	Snow Drift Loading – Against High Wall (Screening Building) Snow Drifting Loading – Unbalanced (Blower Building)		70 psf 51 psf (within 7' of ridge)

1) Snow Load is un-reducible and includes 5 psf rain-on-snow surcharge where ground snow load is greater than zero and 20 psf or less per ASCE 7-16 Section 7.10.

Snow Load based on Montana Ground Snow Load Finder. 2)

3) Snow Load Importance Factor per ASCE 7-16 Table 1.5-2.

DESIGN LIVE LOADS	AREA	LIVE LOADS (PSF) UNO	REMARKS & FOOT- NOTES (6)
	Handrails & Pedestrian Guardrails	50 PLF or 200 LB	(1)
	Stairs & Exits	100 PSF or 300 LB	Stair treads per note (2)
	Vehicle Barrier	6000 lbs	Applied horizontally at both 18" and 27" above the level (3)
	Platforms	125	1000 lb conc. load
	Mechanical Rooms	150	

(1) Top rail shall be designed to resist 50 PLF line load or 200 lb point load applied in any direction at any point. Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 LB on an area not to exceed 1 ft square. These three loads are to be considered separately with worst case used for design.

(2) Place 300 lb concentrated load over 2"x2" area at any point to produce maximum stress. Area load and concentrated load are to be considered separately with worst case used for design.

(3)Need not apply concurrently with other handrail and guardrail loads; applied over not more than 1 square foot.

DESIGN DEAD LOADS	BIDDER DESIGN	<u>DEAD LOADS</u> (PSF) UNO	REMARKS & FOOTNOTES
	Roof	<u>5 PSF</u>	Additional

# SUBMITTALS

**SUBMIT FOR REVIEW:** SUBMITTALS of shop drawings, product data are required for items noted in the individual materials sections and for bidder designed elements.

SUBMITTAL REVIEW PERIOD: Submittals shall be made in time to provide a minimum of TWO WEEKS or 10 WORKING DAYS for review by the Architect/Engineer prior to the onset of fabrication.

GENERAL CONTRACTOR'S PRIOR REVIEW: Prior to submission to the Architect/Engineer, the Contractor shall review the submittal for completeness. Dimensions and quantities are not reviewed by the SER, and therefore, must be verified by the General Contractor. Contractor shall provide any necessary dimensional details requested by the Detailer and provide the Contractor's review stamp and signature before forwarding to the Architect/Engineer.

SHOP DRAWING REVIEW: Once the contractor has completed his review, the SER will review the submittal for general conformance with the design concept and the contract documents of the building and will stamp the submittal accordingly. Markings or comments shall not be construed as relieving the contractor from compliance with the project plans and specifications, nor departures there from. The SER will return submittals in the form they are submitted in (either hard copy or electronic). For hard copy submittals, the contractor is responsible for submitting the required number of copies to the SER for review.

SHOP DRAWING DEVIATIONS: When shop drawings (component design drawings) differ from or add to the requirements of the structural drawings they shall be designed and stamped by the responsible SSE.

# **DEFERRED SUBMITTALS**

# **BIDDER-DESIGNED ELEMENTS**

Submit "Bidder-Designed" deferred submittals to the Architect and SER for review. The deferred submittals shall also be submitted to the city for approval, if required by the city.

Design of prefabricated, "bidder designed", manufactured, pre-engineered, or other fabricated products shall comply with the following requirements:

- 1) Design considers tributary dead, live, wind and earthquake loads in combinations required by IBC.
- Design within the Deflection Limits noted herein and as specified or referenced in the IBC.
- 3) Design shall conform to the specifications and reference standards of the governing code.
- Submittal shall include:
  - a. Calculations prepared, stamped and signed by the SSE demonstrating code conformance
  - b. Engineered component design drawings are prepared, stamped and signed by the SSE.
  - c. Product data, technical information and manufacturer's written requirements and Agency approvals as applicable.
  - d. SSE may submit to the Architect/Engineer, a request to utilize relevant alternate design criteria of similar nature and generally equivalency which is recognized by the Code and acceptable to the Authority Having Jurisdiction. Submit adequate documentation of design.

DEFLECTION	VERTICAL	LIMIT
LIMITS FOR SSE / BIDDER	Roof Members, Dead + Live or Snow or Wind, Total Load (TL) Deflection	L / 240, where (L is span length,inches)
DESIGNED	Roof, Live or Snow or Wind Load (RLL)	L / 360
ELEMENTS:	Floor Members, Total Load (TL) uno	L / 240
	Floor Live Load (LL) uno	L / 360
	HORIZONTAL	LIMIT and FOOTNOTE
	Members Supporting Brittle Finishes	L/240 (1)
	Members Supporting Flexible Finishes	L/180 (1)

(1) Wind Load is reducible to 0.42 times the Component and Cladding Loads per Table 1604.3 footnote f.

GENERAL CONTRACTOR'S PRIOR REVIEW: Once the contractor has completed his review of the SSE component drawings, the SER will review the submittal for general conformance with the design of the building and will stamp the submittal accordingly. Review of the Specialty Structural Engineer's (SSE) shop drawings (component design drawings) is for compliance with design criteria and compatibility with the design of the primary structure and does not relieve the SSE of responsibility for that design. All necessary bracing, ties, anchorage, proprietary products shall be furnished and installed per manufacturer's instructions or the SSE's design drawings and calculations. These elements include but are not limited to:

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- Exterior Cladding Systems: Curtain Wall Systems, Pre-engineered Panels
- **Temporary Shoring Systems** .
- Precast Structural Elements

# INSPECTIONS. QUALITY ASSURANCE VERIFICATIONS AND TEST REQUIREMENTS

INSPECTIONS: Foundations, footings, under slab systems and framing are subject to inspection by the Building Official in accordance with IBC 110.3. Contractor shall coordinate all required inspections with the Building Official.

SPECIAL INSPECTIONS, VERIFICATIONS and TESTS: Special Inspections, Verifications and Testing shall be done in accordance with IBC Chapter 17, the STATEMENT AND SCHEDULES OF SPECIAL IN-SPECTIONS listed in these drawings.

### STRUCTURAL OBSERVATION: per IBC Section 1704.6

Structural Observation is the visual observation of the structural system by a registered design professional for general conformance to the approved construction documents. It is not always required on a project, does not include or waive the responsibility for the special inspections and tests required by a Special Inspector per IBC Chapter 17, is not continuous, and does not certify conformance with the approved construction documents.

Structural Observation for this project is required per IBC Section 1704.6. Contractor shall notify the SER in a timely manner to allow required Structural Observations to occur. Reports will be distributed to the Architect, the Contractor, Special Inspector and the Authority Having Jurisdiction.

The frequency and extent of observations is at the discretion of the structural observer. Only significant stages of construction identified by the Structural Observer require observation. For repetitive or similar structural elements identified as significant, only the first element of a stage requires observation unless noted otherwise. The following significant stages of construction require observation: prior to foundation concrete placement, prior to shear wall concrete placement, shear wall construction, during the first elevated floor framing, during roof framing, and after roof diaphragm is complete prior to roofing.

CONTRACTOR RESPONSIBILITY: Prior to issuance of the building permit, the Contractor is required to provide the Authority Having Jurisdiction a signed, written acknowledgement of the Contractor's responsibilities associated with the above Statement of Special Inspections addressing the requirements listed in IBC Section 1704.4. Contractor is referred to IBC Sections 1705.12.5 and 1705.12.6 for architectural and MEP building systems that may be subject to additional inspections (based on the building's designated Seismic Design Category listed in the CRITERIA), including anchorage of HVAC ductwork containing hazardous materials, piping systems and mechanical units containing flammable, combustible or highly toxic materials, electrical equipment used for emergency or standby power, exterior wall panels and suspended ceiling systems.

# SOILS AND FOUNDATIONS

REFERENCE STANDARDS: Conform to IBC Chapter 18 "Soils and Foundations."

GEOTECHNICAL REPORT: Recommendations contained inMontana State Hospital Treatment Plant Geotechnical Report by Pioneer Technical Services, Inc. dated September 2019 were used for design.

CONTRACTOR'S RESPONSIBILITIES: Contractor shall be responsible to review the Geotechnical Report and shall follow the recommendations specified therein including, but not limited to, subgrade preparations, pile installation procedures, ground water management and steep slope Best Management Practices."

GEOTECHNICAL SUBGRADE INSPECTION: The Geotechnical Engineer shall inspect all sub-grades and prepared soil bearing surfaces, prior to placement of foundation reinforcing steel and concrete. Geotechnical Engineers shall provide a letter to the owner stating that soils are adequate to support the "Allowable Foundation Bearing Pressure(s)" shown below. Assumed values shall be field verified by the Building Official or the Geotechnical Engineer prior to placing concrete.

### **DESIGN SOIL VALUES:**

Safety Factor per Soils Report	1.5
Allowable Foundation Bearing Pressure	3000
Passive Lateral Pressure	222 F
Active Lateral Pressure (unrestrained)	37 PS
At-Rest Lateral Pressure (restrained)	53 PS
Seismic Lateral Pressure	51 PS
Coefficient of Sliding Friction	0.4

FOUNDATIONS and FOOTINGS: Foundations shall bear either on competent native soil or compacted structural fill as per the geotechnical report. Exterior perimeter footings shall bear not less than 36 inches below finish grade, unless otherwise specified by the geotechnical engineer and/or the building official.

FOOTING DEPTH: Tops of footings shall be as shown on plans with vertical changes as indicated with steps in the footings; locations of steps shown as approximate and shall be coordinated with the civil grading plans.

SLABS-ON-GRADE: All slabs-on-grade shall bear on compacted structural fill or competent native soil per the geotechnical report. All moisture sensitive slabs-on-grade or those subject to receive moisture sensitive coatings/ covering shall be provided with an appropriate capillary break and vapor barrier/retardant over the subgrade prepared and installed as noted in the geotechnical report, barrier manufacturer's written recommendations and coordinated with the finishes specified by the Architect.

# **CAST-IN-PLACE CONCRETE**

**REFERENCE STANDARDS: Conform to:** 

- (1) ACI 301-16 "Specifications for Structural Concrete"
- (2) IBC Chapter 19 "Concrete"
- (3) ACI 318-14 "Building Code Requirements for Structural Concrete" (4) ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

FIELD REFERENCE: The contractor shall keep a copy of ACI Field Reference manual, SP-15, "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References.'

CONCRETE MIXTURES: Conform to ACI 301 Section 4 "Concrete Mixtures" and IBC Section 1904.1.

MATERIALS: Conform to ACI 301 Section 4.2.1 "Materials" for requirements for cementitious materials, aggregates, mixing water and admixtures.

SUBMITTALS: Provide all submittals required by ACI 301 Section 4.1.2. Submit mix designs for each mix in the table below. Substantiating strength results from past tests shall not be older than 24 months per ACI 318 Section 26.4.3.1 (b).

PSF PSF/FT SF/FT SF/FT SF/FT



# TABLE OF MIX DESIGN REQUIREMENTS

Member Type/Location	Strength f'c (psi)	Test Age (days)	Nominal Maximum Aggregate	Exposure Class	Max W/C Ratio	Air Con- tent	Notes (1 to 9 Typical UNO)
Interior Spread Footings/ Slabs on Grade	4500	28	1"	-	0.45	-	10
Exterior Slabs on Grade	4500	28	1"	F2	0.45	5%	
Slabs on Metal Deck	4500	28	1"	-	-	-	-
Interior Precast Concrete Shear Walls	5000	-	-				
Exterior Precast Concrete Shear Walls	5000	-	-	F2	0.45	5%	-
Foundation Walls/Strip Footings	4500	28	1"	F2	0.45	6%	-

Table of Mix Design Requirements Notes:

- (1) W/C Ratio: Water-cementitious material ratios shall be based on the total weight of cementitious materials. Maximum ratios are controlled by strength noted in the Table of Mix Design Requirements and durability requirements given in ACI 318 Section 19.3.
- (2) Cementitious Materials:
  - The use of fly ash, other pozzolans, silica fume, or slag shall conform to ACI 318 Sections 19.3.2 and a. 26.4.2.2. Maximum amount of fly ash shall be 25% of total cementitious content unless reviewed and approved otherwise by SER.
  - b. For concrete used in elevated floors, minimum cementitious-materials content shall conform to ACI 301 Table 4.1.2.9. Acceptance of lower cement content is contingent on providing supporting data to the SER for review and acceptance.
  - Cementitious materials shall conform to the relevant ASTM standards listed in ACI 318 Section C. 26.4.1.1.1(a).
- (3) Air Content: Conform to ACI 318 Section 19.3.3.1. Minimum standards for exposure class are noted in the table. If freezing and thawing class is not noted, air content given is that required by the SER. Tolerance is  $\pm 1-\frac{1}{2}$ %. Air content shall be measured at point of placement.
- (4) Aggregates shall conform to ASTM C33.
- (5) Slump: Conform to ACI 301 Section 4.2.2.2. Slump shall be determined at point of placement.
- (6) Chloride Content: Conform to ACI 318 Table 19.3.2.1.
- (7) Non- chloride accelerator: Non-chloride accelerating admixture may be used in concrete placed at ambient temperatures below 50°F at the contractor's option.
- (8) ACI 318, Section 19.3.1.1 exposure classes shall be assumed to be F2 unless different exposure classes are listed in the Table of Mix Design Requirements that modify these base requirements.

FORMWORK & RESHORING: Conform to ACI 301 Section 2 "Formwork and Form Accessories." Removal of Forms shall conform to Section 2.3.2 except strength indicated in Section 2.3.2.5 shall be 0.75 f' c.

MEASURING, MIXING, AND DELIVERY: Conform to ACI 301 Section 4.3.

HANDLING, PLACING, CONSTRUCTING AND CURING: Conform to ACI 301 Section 5. In addition, hot weather concreting shall conform to ACI 305R-10 and cold weather concreting shall conform to ACI 306R-10.

CONSTRUCTION JOINTS: Conform to ACI 301 Sections. 2.2.2.5 and 5.3.2.6. Construction joints shall be located and detailed as on the construction drawings. Submit alternate locations per ACI 301 Section 5.1.2.4 (a) for review and approval by the SER two weeks minimum prior to forming. Use of an acceptable adhesive, surface retardant, portland cement grout or roughening the surface is not required unless specifically noted on the drawings.

EMBEDDED ITEMS: Position and secure in place expansion joint material, anchors and other structural and non-structural embedded items before placing concrete. Contractor shall refer to mechanical, electrical, plumbing and architectural drawings and coordinate other embedded items.

GROUT: Use 7000 psi non-shrink grout under column base plates and under tilt-up panels.

GROUTED REBAR: See Post-Installed Anchors to Concrete.

POST-INSTALLED ANCHORS to CONCRETE: Anchor location, type, diameter and embedment shall be as indicated on drawings. Reference the POST INSTALLED ANCHORS section for applicable Post-Installed Anchor Adhesives. Anchors shall be installed and inspected in strict accordance with the applicable ICC-Evaluation Service Report (ESR). Special inspection shall be per the TESTS and INSPECTIONS section.

SHRINKAGE: Conventional and post-tensioned concrete slabs will continue to shrink after initial placement and stressing of concrete. Contractor and subcontractor shall coordinate jointing and interior material finishes to provide adequate tolerance for expected structural frame shrinkage and shall include, but not be limited to: curtain wall, dryvit, storefront, skylight, floor finish, and ceiling suppliers. Contact Engineer for expected range of shrinkage.

## STRENGTH TESTING AND ACCEPTANCE:

Testing: Obtain samples and conduct tests in accordance with ACI 301 Section 1.6.3.2. Additional samples may be required to obtain concrete strengths at alternate intervals than shown below.

- Cure 4 cylinders for 28-day test age [Cure 6 cylinders for 28-day test age post-tensioned concrete. Test 2 cylinders at 2 or 3 days for post-tensioned concrete only, ] test 1 cylinder at 7 days, test 2 cylinders at 28 days, and hold 1 cylinder in reserve for use as the Engineer directs. After 56 days, unless notified by the Engineer to the contrary, the reserve cylinder may be discarded without being tested for specimens meeting 28-day strength requirements.
- The number of cylinders indicated above reference 6 by 12 in cylinders. If 4 by 8 in cylinders are to be used, additional cylinders must be cured for testing of 3 cylinders at test age per the table of mix design requirements.

Acceptance. Strength is satisfactory when:

- (1) The averages of all sets of 3 consecutive tests equal or exceed the specified strength.
- (2) No individual test falls below the specified strength by more than 500 psi.

A "test" for acceptance is the average strength of two 6 by 12 in. cylinders or three 4 by 8 in. cylinders tested at the specified test age.

CONCRETE PLACEMENT TOLERANCE: Conform to ACI 117-10 for concrete placement tolerance.



CONCRETE COVER: Conform to the following cover requirements unless noted otherwise in the drawings.

Concrete cast against earth	3"
Concrete exposed to earth or weather	2"
Ties in columns and beams	1-1/2"
Bars in slabs	3⁄4"
Bars in walls	<sup>3</sup> /4"
Exterior bars in Tilt-up Panels	1"

SPLICES: Conform to ACI 301, Section 3.3.2.7, "Splices". Refer to "Typical Lap Splice and Development Length Schedule" for typical reinforcement splices. Splices indicated on individual sheets shall control over the schedule. Mechanical connections may be used when approved by the SER. FIELD BENDING: Conform to ACI 301 Section 3.3.2.8. "Field Bending or Straightening." Bar sizes #3 through #5 may be field bent cold the first time. Subsequent bends and other bar sizes require preheating. Do not twist bars. Bars shall not be bent past 45 degrees.

WATERSTOPS: Provide waterstops where indicated on drawings. Waterstops shall be Sika Greenstreak PVC, profile 703 or approved equal. Install waterstops in strict accordance with manufacturer's written instructions.

# **CONCRETE REINFORCEMENT**

**REFERENCE STANDARDS: Conform to:** 

- (1) ACI 301-16 "Standard Specifications for Structural Concrete", Section 3 "Reinforcement and Reinforcement Supports."
- (2) ACI SP-66(04) "ACI Detailing Manual"
- (3) CRSI MSP-09, 28<sup>th</sup> Edition, "Manual of Standard Practice."
- (4) ANSI/AWS D1.4: 2005, "Structural Welding Code Reinforcing Steel."

(5) IBC Chapter 19-Concrete.

- (6) ACI 318-14 "Building Code Requirements for Structural Concrete."
- (7) ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

SUBMITTALS: Conform to ACI 301 Section 3.1.2 "Submittals." Submit placing drawings showing fabrication dimensions and placement locations of reinforcement and reinforcement supports.

LIFTING REQUIREMENTS for Tilt-Up Panels or Precast Plank: The contractor is responsible for temporarily bracing the panels against wind or other forces that may occur during construction and until connections to the permanent structural system are completed.

# MATERIALS:

Reinforcing Bars	ASTM A615, Grade 60, deformed bars.
Ũ	ASTM A706, Grade 60, deformed bars.
Smooth Welded Wire Fabric	ASTM A1064
Deformed Welded Wire Fabric	ASTM A1064
Bar Supports	CRSI MSP-09, Chapter 3 "Bar Supports."
Tie Wire	16 gage or heavier, black annealed.
Stud Rails	ASTM A1044
Headed Deformed Bars	ASTM A970

FABRICATION: Conform to ACI 301, Section 3.2.2. "Fabrication", and ACI SP-66 "ACI Detailing Manual."

WELDING: Bars shall not be welded unless authorized. When authorized, conform to ACI 301, Section 3.2.2.2. "Welding", AWS D1.4, and provide ASTM A706, grade 60 reinforcement.

PLACING: Conform to ACI 301, Section 3.3.2 "Placing." Placing tolerances shall conform to ACI 117.

# POST-INSTALLED ANCHORS (INTO CONCRETE AND MASONRY)

**REFERENCE STANDARDS:** Conform to:

- 1) IBC Chapter 19 "Concrete"
- 2) ACI 318-14 "Building Code Requirements for Structural Concrete"
- 3) IBC Chapter 21 "Masonry"
- 4) TMS402-16 "Building Code Requirements for Masonry Structures"

POST-INSTALLED ANCHORS: Install only where specifically shown in the details or allowed by SER. All post-Installed anchors types and locations shall be approved by the SER and shall have a current ICC-Evaluation Service Report that provides relevant design values necessary to validate the available strength exceeds the required strength. Submit current manufacturer's data and ICC ESR report to SER for approval regardless of whether or not it is a pre-approved anchor. Anchors shall be installed in strict accordance to ICC-ESR and the manufacturer's printed installation instructions (MPII) in conjunction with edge distance, spacing and embedment depth as indicated on the drawings. The contractor shall arrange for a manufacturer's field representative to provide installation training for all products to be used, prior to the commencement of work. Only trained installer shall perform post installed anchor installation. A record of training shall be kept on site and be made available to the SER as requested. Adhesive anchors installed in horizontally or upwardly inclined orientation shall be performed by a certified adhesive anchor installer (AAI) as certified through ACI/CRSI or approved equivalent. Proof of current certification shall be submitted to the engineer for approval prior to commencement of installation. No reinforcing bars shall be damaged during installation of post-installed anchors. Special inspection shall be per the TESTS and INSPECTIONS section. Anchor type, diameter and embedment shall be as indicated on drawings.

- 1. ADHESIVE ANCHORS: The following Adhesive-type anchoring systems have been used in the design and shall be used for anchorage to CONCRETE, as applicable and in accordance with corresponding current ICC ESR report. Reference the corresponding ICC ESR report for required minimum age of concrete, concrete temperature range, moisture condition, light weight concrete, and hole drilling and preparation requirements. Drilled-in anchor embedment lengths shall be as shown on drawings, or not less than 7 times the anchor nominal diameter (7D). Adhesive anchors are to be installed in concrete aged a minimum of 21 days, unless otherwise specified in the ICC ESR report.
  - a. [HILTI "HIT-HY 200" ICC ESR-3187 for anchorage to CONCRETE with embedment depth less than or equal to 20 bar diameters]
  - b. [SIMPSON "SET-XP" ICC ESR 2508 for anchorage to CONCRETE], [IAPMO 265 for anchorage to MASONRY
- 2. [SCREW ANCHORS: The following Screw type anchor is pre-approved for anchorage to CONCRETE or MASONRY in accordance with corresponding current ICC ESR report:



# STRUCTURAL STEEL

# **REFERENCE STANDARDS:** Conform to:

- 1) IBC Chapter 22 "Steel"
- ANSI/AISC 303-16 "Code of Standard Practice for Steel Buildings & Bridges" 2)
- AISC "Manual of Steel Construction", Fifteenth Edition (2016) 3)
- ANSI/AISC 360-16 "Specification for Structural Steel Buildings" 4)
- AWS D1.1:2015 "Structural Welding Code Steel" 5)
- 6) 2014 RCSC "Specification for Structural Joints using High-Strength Bolts"

SUBMITTALS: Submit the following documents to the SER for review:

- (1) SHOP DRAWINGS complying with AISC 360 Sections M1and N3 and AISC 303 Section 4.
- (2) ERECTION DRAWINGS complying AISC 360 Sections M1and N3 and AISC 303 Section 4.

Make copies of the following documents "Available upon Request" to the SER or Owner's Inspection Agency in electronic or printed form prior to fabrication per AISC 360 Section N3.2 requirements:

- (1) Fabricator's written Quality Control Manual that includes, as a minimum:
  - a. Material Control Procedures
  - b. Inspection Procedures
  - c. Non-conformance Procedures
- (2) Steel & Anchor Rod suppliers' Material Test Reports (MTR's) indicating the compliance with specifications.
- (3) Fastener manufacturer's Certification documenting conformance with the specification.
- (4) <u>Filler metal manufacturer's product data</u> for SMAW, FCAW and GMAW indicating:
  - a. Product specification compliance
  - Recommended welding parameters b.
  - Recommended storage and exposure requirements including baking C.
  - d. Limitations of use
- (5) Welded Headed (Shear) Stud Anchors Manufacturer's certification indicating the meet specifications
- Weld Procedure Specifications (WPS's) for shop and field welding. (6)
- Manufacturer's Certificates of Conformance for electrodes, fluxes and gases (welding consumables).
- (8) Procedure Qualification Records (PQR's) for WPS's that are not pregualified in accordance with AWS.
- (9) Welding personnel Performance Qualification Records (WPQR) and continuity records conforming to AWS standards.

#### MATERIALS:

Structural steel materials shall conform to materials and requirements listed in AISC 360 section A3 including, but not limited to:

## STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS:

- 1) ASTM F3125 Gr. A325-N bolts- "threads NOT excluded in the shear plane".
- 2) High-strength bolted joints have been designed as "BEARING" connections.
- 3) Provide ASTM Bolt Grade and Type as specified in the Materials section above.

- 4) Provide Washers over outer ply of slotted holes and oversize holes per RCSC Table 6.1.
- Provide Nut and Washer grades, types and finishes conforming to RCSC specification Table 2.1. 5)
- Provide *fastener assemblies* from a single supplier. 6)
- Joint Types shall be ST "Snug Tight", for typical beam end "shear" connections, unless noted other-7) wise
- Install bolts in joints in accordance with the RCSC Specification Section 8 and Table 4.1. 8)
- 9) Inspection is per RCSC Section 9.

### ANCHORAGE to CONCRETE:

- 1) SHEAR STUDS on STEEL BEAMS for COMPOSITE CONSTRUCTION: Headed Shear Studs welded to tops of Wide Flance Beams, shall be 3/4" diameter WHS with nominal stud lengths as indicated. Unless noted otherwise, provide minimum shear stud height equal to the (metal deck depth + 1  $\frac{1}{2}$ ) and a maximum shear stud height that allows for  $\frac{1}{2}$  of concrete cover over the stud.
- EMBEDDED STEEL PLATES for Anchorage to Concrete: Plates (PL) embedded in concrete with 2) studs (WHS) or dowel bar anchors (DBA) shall be of the sizes and lengths as indicated on the plans with minimum 1/2" dia. WHS x 6" long but provide not less than  $\frac{3}{4}$ " interior cover or 1  $\frac{1}{2}$ " exterior cover to the opposite face of concrete, unless noted otherwise.
- 3) COLUMN ANCHOR RODS and BASE PLATES: All columns (vertical member assemblies weighing over 300 pounds) shall be provided with a minimum of four 3/4" diameter anchor rods. Column base plates shall be at least 3/4" thick, unless noted otherwise. Cast-in-place anchor rods shall be provided unless otherwise approved by the Engineer. Unless noted otherwise, embedment of castin-place anchor rods shall be 12 times the anchor diameter (12D).

# FABRICATION:

- 1) Conform to AISC 360 Section M2 "Fabrication" and AISC 303 Section 6 "Shop Fabrication".
- 2) Quality Control (QC) shall conform to:
  - a. AISC 360 Chapter N "Quality Control and Quality Assurance" and
  - b. AISC 303 Section 8 "Quality Control".
  - c. Fabricator and Erector shall establish and maintain written Quality Control (QC) procedures per AISC 360 section N3.
  - Fabricator shall perform self-inspections per AISC 360 section N5 to ensure that their work is performed in accordance with Code of Standard Practice, the AISC Specification, Contract Documents and the Applicable Building Code.
  - QC inspections may be coordinated with Quality Assurance inspections per Section N5.3 e. where fabricators QA procedures provide the necessary basis for material control, inspection, and control of the workmanship expected by the Special Inspector.

# WELDING:

- 1) Welding shall conform to AWS D1.1 with Pregualified Welding Processes except as modified by AISC 360 section J2. Welders shall be qualified in accordance with AWS D1.1 requirements.
- 2) Use 70ksi strength, low-hydrogen type electrodes (E7018) or E71T as appropriate for the process selected.
- Welding of high strength anchor rods is prohibited unless approved by Engineer. 3)
- Welding of headed stud anchors shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding". 4)

## **ERECTION:**

2)

- Conform to AISC 360 Section M4 "Erection" and AISC 303 Section 7 "Erection".
  - Conform to AISC 360 Chapter N "Quality Control and Quality Assurance" and AISC 303 Section 8. a. The Erector shall maintain detailed erection quality control procedures that ensure that the work is performed in accordance with these requirements and the Contract Documents.
- 3) Steel work shall be carried up true and plumb within the limits defined in AISC 303 Section 7.13.
- High strength bolting shall comply with the RCSC requirements including RCSC Section 7.2
- "Required Testing", as applicable and AISC 360 Chapter J, Section M2.5 and Section N5.6.
- Welding of HEADED STUD ANCHORS shall be in accordance with AWS D1.1 Chapter 7 "Stud 5) Welding.
- Provide Headed (Shear) Stud Anchors welded through the metal deck to tops of beams denoted in 6) plans.
- The contractor shall provide temporary bracing and safety protection required by AISC 360 Section 7) M4.2 and AISC 303 Section 7.10 and 7.11.

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### PROTECTIVE COATING REQUIREMENTS:

- 1) SHOP PAINTING: Conform to AISC 360 Section M3 and AISC 303 Section 6.5 unless otherwise specified by the project specifications.
- 2) INTERIOR STEEL:
  - a. Unless noted otherwise, do not paint any of the steel surfaces meeting the following conditions:
    - Concealed by the interior building finishes,
    - Fireproofed,
    - Embedded in concrete,
    - Specially prepared as a "faving surface" for Type-SC "slip-critical" connections including bolted connections that form a part of the Seismic Force Resisting System governed by AISC 341 unless the coating conforms to requirements of the RCSC Bolt Specification and is approved by the Engineer.
    - Welded; if area requires painting, do not paint until after weld inspections and nondestructive testing requirement, if any, are satisfied.
  - b. Interior steel, exposed to view, shall be painted with one coat of shop primer unless otherwise indicated in the project specifications. Field touch-ups to match the finish coat or as otherwise indicated in the project specifications.
- 3) EXTERIOR STEEL: Exposed exterior steel shall be protected by either:
  - Paint with an exterior multi-coat system as per the project specifications. Field touch-up painting a. shall be per the project specifications.

# PRESTRESSED/PRECAST CONCRETE

Structural prestressed/precast supplier shall be a PCI certified plant. Copy of certification shall be 1. provided.

- 2. Structural prestressed (precast) concrete shall be made with stone aggregate and shall develop 5000 psi compressive strength (higher strengths may be required).
- All fabrication and erection tolerances, cleaning and general product quality including materials and mix-3. es shall be in accordance with the latest editons of ACI 318, PCI MNL-120 and PCI MNL-116.
- Pretensioned steel shall not be released until the concrete has reached 3500 psi (minimum). 4.
- Details of all precast members and connections shall be submitted to the engineer for review and mem-5. bers shall not be fabricated prior to review. Alternate designs or details may be substituted but used only after engineer's written review. Along with shop drawings, design calculations of all precast members and connections bearing the stamp of a registered professional engineer shall be submitted. Individual piece drawings are not required unless specifically requested.
- 6. Precast concrete shall be handled and erected in a manner that will not impair the strength of the members and adequate temporary bracing shall be provided until all related field connections have been fully completed. Provide lifting devices that will support twice the weight of the precast members and are not to be left exposed. All connections requiring dry packing to be completed prior to applying any superimposed load including anchor bolt pockets and column base plates. Grout for all joints and embedments shall be non-shrink, non-metallic grout with a minimum 28 day compressive strength of 5000 psi.
- 7. The welding of connections for all precast elements shall be in accordance with AWS D1.1 or AWS D1.4. All welders shall have evidence of passing the AWS standard gualifications test. Steel leveling plates shall be provided at 1'-6" minimum from each end of all wall panels unless otherwise shown on plans. Leveling plates stacked in excess of 1" must be welded together and approved by the engineer. Plates in adjacent slabs shall be welded together to eliminate differential camber. Precast concrete connections shall be of readily weldable steel. Alternate connections may be substituted only after review by the engineer.
- Precaster shall design precast walls at all exterior stairs to transfer earth, wind or seismic loads. Walls 8. may be designed to span horizontally at these locations. Precaster shall provide a minimum of two wall/ wall connections at each vertical wall joint, unless approved otherwise.

Do not weld floor or roof slabs connections unless slabs have been cast at least two weeks prior to 9. erection.

10. Wire strand used in pre-stressing shall have 270 ksi ultimate strength and conform to "Specifications for Uncoated Seven-Wire Low Relaxation Strand for Prestressed Concrete", ASTM 1416 or ASTM A421. Stress relieved strand may be substituted as an option only after structural engineer review.

# NOTE:

Items discussed on sheets S-2 through S-9 shall conform to the specifications on the drawings or the Technical Specifications in the Contract Documents. The more stringent specification shall aovern.

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STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND LEGEND PER S-1 THROUGH S-9.

CONTRACTOR SHALL LOCATE AND VERIFY THE FOLLOWING WITH OTHERS PRIOR TO POURING CONCRETE: ALL DOOR OPENINGS IN FOUNDATION WALLS; DRAINS AND SLOPES; BLOCKOUTS FOR PLUMBING, SPRINKLERS AND HVAC. ALL DUCTS, CHASES AND PIPES PER MECHANICAL, PLUMBING, ELECTRICAL AND

TOP OF SLAB (T/SLAB) ELEVATION ASSUMED 4810'-2 3/8". FOR ACTUAL T/SLAB ELEVATION REFER TO CIVIL DRAWINGS. PROVIDE 6 MIL VAPOR BARRIER BELOW SLAB AT INTERIOR SPACES. PROVIDE FREE-DRAINING GRANULAR FILL PER GEOTECH REPORT.

TYPICAL TOP OF INTERIOR (T/INTERIOR) FOOTING ELEVATION = 4803'-8 3/8", UNO. TYPICAL TOP OF EXTERIOR (T/EXTERIOR)

ALL FOOTINGS AND SLABS TO BEAR ON COMPETENT NATIVE SOIL AND/OR STRUCTURAL FILL. SUBGRADE PREPARATION, STRUCTURAL FILL, FOOTING DRAINS, AND OTHER REQUIREMENTS PER GEOTECH REPORT AS NOTED IN THE

CONC WALL REINFORCING AT INTERSECTIONS/CORNERS PER





STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND LEGEND PER S-1 THROUGH S-9.

VERIFY ALL DIMENSIONS AND ELEVATIONS.

CONTRACTOR SHALL LOCATE AND VERIFY THE FOLLOWING WITH OTHERS PRIOR TO POURING CONCRETE: ALL DOOR OPENINGS IN FOUNDATION WALLS; DRAINS AND SLOPES; BLOCKOUTS FOR PLUMBING, SPRINKLERS AND HVAC. ALL DUCTS, CHASES AND PIPES PER MECHANICAL, PLUMBING, ELECTRICAL AND

TOP OF SLAB (T/SLAB) ELEVATION ASSUMED 4810'-2 3/8". FOR ACTUAL T/SLAB ELEVATION REFER TO CIVIL DRAWINGS. PROVIDE 6 MIL VAPOR BARRIER BELOW SLAB AT INTERIOR SPACES. PROVIDE FREE-DRAINING GRANULAR FILL PER GEOTECH REPORT.

TYPICAL TOP OF INTERIOR (T/INTERIOR) FOOTING ELEVATION = 4803'-8 3/8", UNO. TYPICAL TOP OF EXTERIOR (T/EXTERIOR) FOOTING ELEVATIONS = 4803'8 3/8", UNO.

ALL FOOTINGS AND SLABS TO BEAR ON COMPETENT NATIVE SOIL AND/OR STRUCTURAL FILL. SUBGRADE PREPARATION, STRUCTURAL FILL, FOOTING DRAINS, AND OTHER REQUIREMENTS PER GEOTECH REPORT AS NOTED IN THE

CONC WALL REINFORCING AT INTERSECTIONS/CORNERS PER





STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND LEGEND PER S-1 THROUGH S-9.

VERIFY ALL DIMENSIONS AND ELEVATIONS.

CONTRACTOR SHALL LOCATE AND VERIFY THE FOLLOWING WITH OTHERS PRIOR TO POURING CONCRETE: ALL DOOR OPENINGS IN FOUNDATION WALLS; DRAINS AND SLOPES; BLOCKOUTS FOR PLUMBING, SPRINKLERS AND HVAC. ALL DUCTS, CHASES AND PIPES PER MECHANICAL, PLUMBING, ELECTRICAL AND

TOP OF SLAB (T/SLAB) ELEVATION ASSUMED 4810'-2 3/8". FOR ACTUAL T/SLAB ELEVATION REFER TO CIVIL DRAWINGS. PROVIDE 6 MIL VAPOR BARRIER BELOW SLAB AT INTERIOR SPACES. PROVIDE FREE-DRAINING GRANULAR FILL PER GEOTECH REPORT.

TYPICAL TOP OF INTERIOR (T/INTERIOR) FOOTING ELEVATION = 4803'-8 3/8", UNO. TYPICAL TOP OF EXTERIOR (T/EXTERIOR) FOOTING ELEVATIONS = 4803'8 3/8", UNO.

ALL FOOTINGS AND SLABS TO BEAR ON COMPETENT NATIVE SOIL AND/OR STRUCTURAL FILL. SUBGRADE PREPARATION, STRUCTURAL FILL, FOOTING DRAINS, AND OTHER REQUIREMENTS PER GEOTECH REPORT AS NOTED IN THE

CONC WALL REINFORCING AT INTERSECTIONS/CORNERS PER





# PC ROOF PLAN NOTES:

1. STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND LEGEND PER S-1 - S-9.

VERIFY ALL DIMENSIONS AND ELEVATIONS WITH THE ARCHITECTURAL DRAWINGS.

PC ROOF PANEL THICKNESS ARE AS SHOWN ON

ROOF VENTS/OPENINGS/PENETRATIONS TO BE LOCATED PER THE LATEST CIVIL/MECHANIC DRAWINGS. ADDITIONALLY THEY SHALL NOT BE LOCATED WHER DRILLING OF THE STRAND WOULD BE REQUIRED WITHOUT WRITTEN CONSENT FROM

REINFORCING SHALL BE SUPPORTED TO MAINTAIN PROPER POSITION IN THE WALL PANELS.

PROVIDE 3/4" CLEAR COVER FOR ALL TOP AND BOTTOM REINFORCING, UNO.

CONTRACTOR TO COORDINATE EMBED PLATES REQUIRED FOR STAIRS, GUARDRAILS, INTERIOR AND EXTERIOR WALLS, WINDOW WASHING

ROOF PANEL TO PANEL CONNECTIONS TO ENSURE DIAPHRAGM CONTINUITY PER PRECAST ENGINEER.





# ONTA PC ROOF PLAN NOTES: Revision Date By Draft 7/31 Draft 8/13 STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, Draft 8/25 ABBREVIATIONS AND LEGEND PER S-1 - S-9. Final 9/30 VERIFY ALL DIMENSIONS AND ELEVATIONS WITH Revision Final THE ARCHITECTURAL DRAWINGS. Plot Scale Drawn By PDD PC ROOF PANEL THICKNESS ARE AS SHOWN ON Approved By MJŚ Checked By TPV Designed By ROOF VENTS/OPENINGS/PENETRATIONS TO BE TĆG LOCATED PER THE LATEST CIVIL/MECHANIC DRAWINGS. ADDITIONALLY THEY SHALL NOT BE LOCATED WHER DRILLING OF THE STRAND WOULD BE REQUIRED WITHOUT WRITTEN CONSENT FROM THE STRUCTURAL EOR. Engineer REINFORCING SHALL BE SUPPORTED TO MAINTAIN PROPER POSITION IN THE WALL PANELS. PROVIDE 3/4" CLEAR COVER FOR ALL TOP AND BOTTOM REINFORCING, UNO. West soula, 7. CONTRACTOR TO COORDINATE EMBED PLATES REQUIRED FOR STAIRS, GUARDRAILS, INTERIOR Owner AND EXTERIOR WALLS, WINDOW WASHING State Of ROOF PANEL TO PANEL CONNECTIONS TO ENSURE Montana DIAPHRAGM CONTINUITY PER PRECAST ENGINEER. Project Title Montana State Hospital Upgrade Wastewater System Sheet Title **Roof Plan** Sheet S-14



1. STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND

ALL STEEL FRAMING AND BAR GRATING TO BE GALVANIZED, EPOXY

GRATING OPENING LOCATIONS FOR HDPE AERATION LATERAL AND BALL VALVE TO BE VERIFIED WITH MECHANICAL/WW ENGINEER.

BAR GRATING TO MEET REQUIREMENTS FOR PLATFORM LIVE LOADS (SEE GENERAL NOTES). BAR GRATE SHALL MEET OR EXCEED 'MCNICHOLS' GW-225 (1 3/16" SPACING) WITH SERRATED SURFACE OR

MONTANA MIL			
H-258-6			
14046PE			
Revision Date By			
Draft	7/31	By	
Draft Draft	8/13 8/25		
Final	9/30		
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S-15			
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PRECAST ELEVATION NOTES	MONTAN4
OTE: WIND ± 0K EQ ± 0K (ULTIMATE)	14046PE
DENOTES MINIMUM SHEAR LOADS TO BE USED IN PRECAST PANEL DESIGN. LOADS SHOWN ARE TO BE DISTRIBUTED ALONG PANEL ELEVATION.	RevisionDateByDraft7/31Draft8/13Draft8/25Final9/30
OTES: COORDINATE ALL EMBEDS, WALL OPENINGS AND PENETRATIONS WITH ARCH AND MECH DRAWINGS. DIMENSIONS SHALL BE INCLUDED ON SHOP DRAWINGS. ALL DISCIPLINES SHALL REVIEW SHOP DRAWINGS TO COORDINATE AND FINALIZE OPENINGS AND PENETRATIONS. THE GENERAL CONTRACTOR SHALL INITIATE AND COORDINATE THE REVIEW TO ENSURE ALL DISCIPLINES RESPOND.	Revision Final Plot Scale As Noted Drawn By PDD Approved By MJS Checked By TPV Designed By TCG
<u>ALL</u> - <u>110'-0"</u> 820' - <u>23/8"</u> - ∲-	Missoula, Montana 59801
	State Of Montana
	Project Title
LAB 100'-0" 810' - 2 3/8"	Montana State Hospital Upgrade Wastewater System
<u></u>	Sheet Title
	Sheet Thie
	Ext. Elevation
	Sheet
	S-22










**EXTERIOR ELEVATION - POLISHING BUILDING, GRID 1**"

SCALE: 1/4" = 1'-0"

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**POLISHING BUILDING SECTION** SCALE: 1/4" = 1'-0" 1

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BAR	MISCE	ELLANEOUS BARS	TC (see	P BARS e note #3)	HOOKED BARS
SIZE	Ld	Splice	Ld	Splice	Ldh
f'c = 4000	f'c = 4000psi				
#3	15	19	19	25	8
#4	19	25	25	33	10
#5	24	31	31	41	12
#6	29	37	37	49	15











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	BOLTED SINGLE SHEAR PLATE CONNECTION - SCHEDULE "A"										
3/4"Ø -	A325-N	SING	GLE ROW		BEAM F	y=50KSI - CONNE	CTION PLATE F	y=36KSI			
BEAM SIZE	"N" BOLTS REQUIRED (1)	"N" BOLTS REQUIRED (1) MIN SHE PLATE OF STEN THICKNE	MIN SHEAR PLATE OR WT	MIN HSS COLUMN	WELD	MAX SINGLE	MAX DOUBLE	CONNECT	ION CAPACI (KIPS)	TY - ASD (3)	
			STEM WALL THICKNESS(10)	SIZE +(7)		COPE DEPTH		COPED			
			THICKNESS		() /	(0)	(0)		SINGLE	DOUBLE	
C8,C9,C10	2	1/4"	1/4"	3/16"	1 1/4"	NR (11)	13.2	7.6	NR (11)		
W8	2	1/4"	1/4"	3/16"	1 1/4"	NR (11)	13.2	7.6	NR (11)		
W10	2	1/4"	1/4"	3/16"	2 1/2"	1 1/4"	13.2	11.0	11.0		

# **BOLTED SINGLE ROW SHEAR PLATE CONNECTION NOTES:**

1. PROVIDE EITHER STANDARD OR HORIZONTAL SHORT SLOTTED HOLES AS PERMITTED BY AISC J3.2 IN THE BEAM WEB AND/OR THE SHEAR PLATE.

2. WHERE SHORT-SLOTTED HOLES ARE USED, PROVIDE HARDENED WASHERS PER AISC J3.2.

3. CAPACITIES BASED ON AISC 13TH EDITION WITH ASTM A325-N BOLTS.

4. HORIZONTAL DISTANCE FROM SUPPORT FACE TO CENTERLINE OF BOLT GROUP SHALL BE AS SHOWN IN THE DETAILS, BUT SHALL NOT EXCEED 3 1/2" IN THE AS-BUILT CONDITION. SUPPORT FACE FOR TEE IS THE INSIDE FACE OF FLANGE.

5. VERTICAL EDGE DISTANCE FROM BOLT CENTERLINE TO EDGE OF STEEL SHALL BE 1 1/2" TYPICALLY, EXCEPT THAT 1 1/4" IS PERMITTED PER AISC TABLE J3.4 FOR 3/4" DIAMETER BOLTS WITHOUT ANY REDUCTION IN THE TABULATED CAPACITIES

6. GAP BETWEEN BEAM END AND SUPPORT FACE SHALL BE 1/2" EXCEPT FOR "WT" CONNECTORS USED WITH HSS COLUMNS. WHERE "WT" ARE USED AS SHEAR TAB ELEMENTS. THE GAP BETWEEN FACE OF COLUMN AND END OF BEAM SHALL NOT EXCEED THE LESSER OF 1 1/2" OR THE "k" DISTANCE OF THE "WT" PLUS 1/4".

7. WELD SIZES SHALL BE THE LARGER OF THE SIZE (t), TABULATED IN SCHEDULE "A" OR MINIMUM SHOWN IN TABLE 1.

8. FIELD FILLET WELDS SHALL BE SIZED TO BE AT LEAST 1/8" LARGER THAN THE WELD SIZE SHOWN IN SCHEDULE "A", UNLESS PROPER FIT-UP IS VERIFIED BY A SPECIAL INSPECTOR PRIOR TO WELDING.

9. COPE DEPTHS (SINGLE AND DOUBLE) SHALL NOT EXCEED THE LESSER OF THOSE SHOWN IN SCHEDULE "A", NOR AS ALLOWED BY BOLT HOLE SPACING AND MINIMUM EDGE DISTANCE REQUIREMENTS. SINGLE COPE LENGTH SHALL NOT EXCEED 6 1/2". DOUBLE COPE LENGTHS SHALL NOT EXCEED THAT REQUIRED TO ACCOMMODATE GIRDER FLANGE + 1/2" MAX GAP BETWEEN FLANGES.

10. UNCOPED CAPACITIES OF WT CONNECTIONS ARE VALID WITH MINIMUM NOMINAL HSS COLUMN WALL TABULATED THICKNESS. THE EFFECTIVE THROAT OF FLARE BEVEL GROOVE WELDS IS BASED ON OUTSIDE RADIUS OF HSS, AND IS TAKEN AS 5/8 TIMES THE HSS WALL THICKNESS BASED ON AWS D1.1, TABLE 2.1. WHEN 3/4" A325-N BOLTS ARE USED, A 3/16" HSS COLUMN WALL THICKNESS IS PERMITTED WITH A 20% REDUCTION OF THE WT CONNECTION CAPACITY.

11. NR = NOT RECOMMENDED, DOUBLE COPES FOR THESE BEAMS ARE RESTRICTED BY CONNECTION GEOMETRY AND/OR LARGE REDUCTIONS IN SHEAR CAPACITY. DOUBLE COPES ARE POSSIBLE, BUT CAPACITIES MUST BE CALCULATED FOR SPECIFIC BEAM AND GIRDER GEOMETRIES AND MUST BE DETAILED SEPARATELY.

# SINGLE SHEAR PLATE (SINGLE ROW) CONNECTIONS

SCALE: 1" = 1'-0"



## TYPICAL SHEAR PLATE CONNECTION

T/STL

PER PLAN

"N" BOLTS @ 3"OC PER SCHED "A"

8

1 1/2" TYP\_ (NOTE 5)

TABLE 1					
MINIMUM WELD S					
PLATE OR FLANGE	MI				
THICKNESS (T) *	FIL				
T < 1/2"					











	Revision         Bat         By           Draft         7/21/20         AE           Final         9/30/20         AE           Plot Scale         1:2
	Drawn By A.Eckhart, P.E. Approved B A.Eckhart, P.E. Checked By P.Montgomery, P.E. Checked By S.Anderson, P.E. Designed By A.Eckhart, P.E.
BING VENT	Anderson Montgomery consulting tradities 1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
GUTTER, FULL LENGTH GREENHECK DIRECT DRIVE UPBLAST CENTRIFUGAL WALL EXHAUST FAN. MODEL CUE-070-D OR APPROVED EQUAL.	<sup>Owner</sup> State Of Montana
UT (TYP.) DPE (TYP.)	Project Title Montana State Hospital Upgrade Wastewater System
	Sheet Title Screening Building East Architectural Elevation
	S-42



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	Revision Date By
	Draft 8/28/20 AE
	Final 9/30/20 AE
	Revision Final
	Plot Scale 1:2
	Drawn By A.Eckhart, P.E.
	Approved By A.Eckhart, P.E.
	Checked By P.Montgomery, P.E.
	Checked By S.Anderson, P.E.
	Designed By A.Eckhart, P.E.
	Engineer
IG VENT	
	Anderson~ Montgomer
	CONSULTING ENGINEER
	1064 N. Warren Helena, Mt 59601
NGTH	Phone (406) 449-3303 Fax (406) 449-3304
	Owner
EENHECK DIRECT DRIVE BLAST CENTRIFLIGAL WALL	
HAUST FAN. MODEL CUE-099-B	
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WINDOW BLOCKS	
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PPVC PLUMBING VENT GUTTER, FULL GUTTER, FULLGUTTER, FULL		S-45
PVC PLUMBING VENT  PVC PLUMBING VENT  GUTTER, FULL  CUTTER, FULL  CUTTER		Blower/UV Building South Architectural Elevation
PVC PLUMBING VENT         GUTTER, FULL LENGTH         OWNSPOUT (TYP.)         Project Tale	MIN. SLOPE (TYP.)	Montana State Hospital Upgrade Wastewater System
PVC PLUMBING VENT         -GUTTER, FULL         Final PULL         State Of Montana	OWNSPOUT (TYP.)	Project Title
PVC PLUMBING VENT		State Of Montana
PVC PLUMBING VENT         PVC PLUMBING VENT	GUTTER, FULL LENGTH	1064 N. Warren Helena, Mt 59601 Phone (406) 449-3303 Fax (406) 449-3304
Revision       Date       By         Draft       7/21/20       AE         Draft       8/28/20       AE         Final       9/30/20       AE         I       1       Image: Constraint of the second s	PVC PLUMBING VENT	Engineer Anderson Montgomery consulting engineers
NONTANA S		Revision       Date       By         Draft       7/21/20       AE         Draft       7/21/20       AE         Draft       8/28/20       AE         Final       9/30/20       AE         Final       9/30/20       AE         12       Drawn By       A.Eckhart, P.E.         Approved By       A.Eckhart, P.E.         Checked By       P.Montgomery, P.E.         Checked By       S.Anderson, P.E.         Designed By       A.Eckhart, P.E.         Designed By       A.Eckhart, P.E.







- RPZ SHALL BE WATTS SERIES 009 OR APPROVED EQUAL. CONTRACTOR TO PROVIDE AND INSTALL DRAINAGE PIPING FROM INTERNAL RELIEF VALVE TO RPZ FLOOR DRAIN LOCATED DIRECTLY BELOW THE RPZ. AIR GAP REQUIRED ON DRAIN PIPING PER MANUFACTURER'S REQUIREMENTS. RPZ TO BE INSTALLED A MINIMUM OF 12" ABOVE FINISHED FLOOR.
- ALL WATER PIPING TO BE INSTALLED 3'-0" ABOVE FINISHED FLOOR AND ATTACHED TO THE WALL WITH UNI-STRUT 4' O.C. UNLESS NOTED OTHERWISE.
- INSTANTANEOUS HOT WATER HEATER TO BE RHEEM MODEL RTEX-08 OR APPROVED EQUAL.
- SINK ASSEMBLY TO BE PLASTIC UTILITY SINK WITH LEGS AND A FAUCET. SINK TO BE MUSTEE 14CP UTILATUB COMBO OR APPROVED EQUAL.
- ALL CPVC WATER PIPING SHALL BE SCHEDULE 80 CPVC UNLESS SPECIFIED OTHERWISE.
- INSTALL "NON-POTABLE WATER" SIGNS OVER HOSE BIBS.
- INSTALL "NON-POTABLE WATER" SIGN OVER NON-POTABLE WATER 1-1/4" BALL VALVE.
- CONTRACTOR TO PROVIDE NECESSARY FITTINGS AND PIPE SIZES TO PIPE TO ALL PLUMBING FIXTURES PER MANUFACTURER'S REQUIREMENTS AND IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE.
- HOT WATER HOSE BIB SHALL BE ANTI-SIPHON.
- INSTALL A TEE AT THE HIGH POINT IN THE WATER LINE FEEDING THE ROTARY SCREEN. INSTALL AIR RELEASE VALVE ON TEE AS PER MANUFACTURER'S RECOMMENDATIONS.
- PLUMB AIR RELEASE VALVE DISCHARGE TO THE FLOOR ALONG THE WALL. INSTALL A 90° BEND POINTED TOWARDS THE NEAREST FLOOR DRAIN AT THE BASE OF THE WALL.





#### NOTES:

- 1. ALL DRAINAGE PIPE AND FITTINGS SHALL BE PVC SCH. 40 AND SLOPE AT A MINIMUM 1/4" PER FOOT UNLESS OTHERWISE NOTED.
- 2. SECURE ALL VERTICAL PIPING AND VENTS TO CONCRETE WALLS.
- 3. ALL PLUMBING SHALL BE INSTALLED PER UNIFORM PLUMBING CODE.
- 4. THERE SHALL BE A FLOOR DRAIN LOCATED DIRECTLY BELOW THE RPZ. THERE SHALL BE AN AIR GAP BETWEEN THE FLOOR DRAIN AND RPZ AS PER MANUFACTURER'S RECOMMENDATIONS.

SPOT ELEVATION		ION	4" VENT THROUGH ROOF
POINT	DESCRIPTION	FLOOR ELEVATION	
#1	FLOOR DRAIN WITH TRAP	4809.87'	
#2	FLOOR DRAIN WITH TRAP	4809.87'	
#3	FLOOR DRAIN WITH TRAP	4809.97'	
#3 #4	FLOOR DRAIN WITH TRAP RPZ FLOOR DRAIN WITH TRAP	4809.97' 4810.15'	FLOOR DRAIN SINK SEE DETAIL & HROUGH ROOF HROUGH ROOF HI HROUGH ROOF HI HROUGH ROOF HI HROUGH ROOF HI HROUGH ROOF HI HROUGH ROOF HI HROUGH ROOF HI HROUGH ROOF HI HROUGH HI HROUGH HI HI HI HI HI HI HI HI HI HI HI HI HI H
			FLOOR DRAIN (TYP.) SEE DETAIL 1 4" VENT THROUGH ROOF M-5
			Screening Building Floor Drain Plan SCALE 2 1 0 2 4





#### NOTES:

- SECURE ALL VERTICAL PIPING AND VENTS TO CONCRETE WALLS.
- .
- . DRAIN AND RPZ AS PER MANUFACTURER'S RECOMMENDATIONS.







ELECTRICAL SYMBOLS LEGEND		LEGEND	GENERAL ELECTRICAL NOTES	RACEWAYS: RACEWAYS SHALL BE CONCEALED AND APPROVED FOR USE AND LOCATION	ABBREVIATI	ONS LEGEND		
	LIGHTING			CONTRACTOR SHALL INCREASE CONDUIT AND CONDUCTOR SIZE TO ALLOW FOR A 3% MAXIMUM VOLTAGE	DRY LOCATIONS - GRC, IMC, ENT. UNDERGROUND - GRC, PVC	A – AMPERE A/C – AIR CONDITIONING A/C – AIR COMPRESCOP	N – NEUTRAL N/A – NOT APPLICABLE	DANIEL LEE
$\vdash \bigcirc \dashv$	LINEAR STRIP	-+	HOMERUN TO PANEL A, CKT 1. ARROWHEADS INDICATE # OF CIRCUITS. HASH MARKS INDICATE # OF CONDUCTORS.	DROP WHERE NECESSARY. SHOULD THE CONTRACTOR EXCEED THE SPECIFIC ROUTING INDICATED ON THE PLANS, THEN THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING PRIOR TO ANY DEVIATION EPOND THE PLANS.	FLEXIBLE CONDUIT - GALVANIZED, LIQUID TIGHT STEEL.	ACP – AIR COMPRESSOR AFF – ABOVE FINISHED FLOOR AHU – AIR HANDLING UNIT	NEC – NATIONAL ELECTRIC CODE NO – NORMALLY OPEN	PND2+15453PE
0	SURFACE-MOUNT LIGHT	!+=	= NEUTRAL; I = HOT; T = ISOLATED GND: ⊨ RETURN	ALL WORK SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE THAT HAS	DRY LOCATIONS - STEEL WITH COVERS. WET LOCATIONS - CAST ALUMINUM.	ARCH – ARCHITECTURAL AMP – AMPLIFIER ATS – AUTOMATIC TRANSFER SWITCH		DNAL EN 1110
Ø	RECESSED LIGHT	o	CONDUIT TURNED UP	ALL CONDUCTORS SHALL BE TYPE THHN, UNLESS NOTED OTHERWISE.		AUX – AUXILIARY BLDG – BUILDING	P – POLE PH – PHASE	Revision Date By
9	RECESSED EMERGENCY LIGHT		CONDUIT TURNED DOWN	RECEPTACLES SHALL BE NEMA 5-20R.	GRC - THREADED IMC - THREADED	BLR – BOILER C – CONDUIT	PNL – PANEL PP – POWER PACK PVC – POLY VINYL CHLORIDE	Draft 9/18/20 DT
$\oslash$	RECESSED CAN LIGHT		UNDERGROUND CONDUIT	PRIOR TO BID, ROUGH-IN, AND INSTALLATION, THE CONTRACTOR SHALL FIELD VERIFY THE LOCATION AND REQUIREMENTS OF ALL ELECTRICAL ITEMS.	EMT - COMPRESSION OR SET SCREW, BOTH OF STEEL PVC - CEMENT JOINT TYPE INDENTED TYPE CONNECTORS DROHIBITED	CB – CIRCUIT BREAKER CCTV – CLOSED CIRCUIT TELEVISION CKT – CIRCUIT	PWR - POWER	Final 9/30/20 DT
۵	RECESSED EMERGENCY CAN LIGHT		CONDUIT HIDDEN IN WALLS/CEILING	CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS AND PERFORM ALL OPERATIONS NECESSARY FOR THE INSTALLATION OF COMPLETE AND OPERATING ELECTRICAL SYSTEMS SUBJECT TO THE CONDITIONS OF	WRING DEVICES AND PLATES:	CP – CONTROL PANEL CT – CURRENT TRANSFORMER CU – CORPER	RH – RANGE HOOD RCPT – RECEPTACLE RM – ROOM	
	PENDANT LIGHT		PANEL BOARD		DUPLEX OUTLETS - INDUSTRIAL GRADE, 20 AMP, 5-20R (HUBBELL #HBL5362 OR LEVITON #5362) GFCI OUTLETS - COMMERCIAL GRADE, 20 AMP, 5-20R (HUBBELL #HBLGF3542 OR LEVITON #7899) AC SWITCHES GENERAL - INDUSTRIAL GRADE, 20 AMP (HUBBELL #HBLGF3542 OR LEVITON #7899)	DB – DIRECT BURIED	SA – SURGE ARRESTOR	Revision
-0	WALL MOUNTED SCONCE	$\cap$	CIRCUIT BREAKER	PROVIDE SATISFACTORY OPERATION OF ALL EQUIPMENT AND CONTROLS TO THE ENGINEER OPON REQUEST.	EXPLOSION PROOF OUTLETS: 20 AMP, 125VAC (APPLETON #EFSC175-2023) EXPLOSION PROOF SWITCHES: 20 AMP, 125VAC (APPLETON #EDSC175-F1/F3W)	DP – DIMMABLE LIGHT PACK DPDT – DOUBLE POLE DOUBLE THROW	SPST – SINGLE POLE SINGLE THROW SV – SOLENOID VALVE	Plot Scale 1:2
Ø	BOLLARD LIGHT		UTILITY METER	CONTRACTOR IS REQUIRED TO VISIT THE PREMISES BEFORE SUBMITTING BID, AS NO EXTRAS WILL BE ALLOWED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.	DEVICE COLOR - STAINLESS STEEL PLATES - STAINLESS STEEL	DPIS – DOOR POSITION INDICATOR SWITCH DVR – DIGITAL VIDEO RECORDER	TBD – TO BE DETERMINED TC – TIME CLOCK	Drawn By D.Tintzman, P.E.
- <b>→</b> -□	POLE-MOUNTED LIGHT, SINGLE HEAD	J	UTILITY POLE	ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND BECAUSE OF THE SMALL SCALE, IT IS NOT POSSIBLE TO INDICATE EVERY REQUIRED OFFSET, FITTING, ETC. VERIFY ALL SPACE REQUIREMENTS, COORDINATING	WIRE: COPPER ONLY WITH THHN/THWN TYPE INSTALLATION. NO ALUMINUM CONDUCTORS ALLOWED. UL LISTED LUGS AND CONNECTORS. ALL COLOR-CODING SHALL BE NEC APPROVED. ALL WIRE SIZES BASED ON	DW – DISHWASHER DWG – DRAWING	TEL – TELEPHONE TEMP – TEMPERATURE TTB – TELEPHONE TERMINAL BOARD	Approved By D.Tintzman, P.E.
$\phi = \phi$	POLE-MOUNTED LIGHT, DOUBLE HEAD	0	ELECTRICAL JUNCTION BOX	WITH OTHER TRADES, AND INSTALL THE SYSTEMS IN THE SPACE PROVIDED WITHOUT EXTRA CHARGES TO THE OWNER.	75 DEGREE C TERMINALS.	EA – EACH EG – EARTH GROUND EL – ELECTRIC LATCH	TVSS – TRANSIENT VOLTAGE SURGE SUPP. TYP – TYPICAL	Checked By D.Tintzman, P.E.
	WALLPACK		GENERATOR	CONTRACTOR SHALL PERFORM WORK IN ACCORDANCE WITH GOOD COMMERCIAL PRACTICE. THE GOOD APPEARANCE OF THE FINISHED WORK SHALL BE OF EQUAL IMPORTANCE WITH ITS ELECTRICAL EFFICIENCY	PROVIDE COPPER EQUIPMENT GROUNDING CONDUCTOR IN ALL RACEWAYS.	EMT - ELECTRICAL METALLIC TUBING EQP - EQUIPMENT EX - EXISTING	UG – UNDERGROUND UOI – UNLESS OTHERWISE INDICATED	Designed By D.Tintzman, P.E.
	EXIT LIGHT W/ DIRECTIONAL ARROW	7.	AUTOMATIC TRANSFER SWITCH	THE ENGINEER MAY REJECT WORK IF WORKMANSHIP AND APPEARANCE ARE NOT SATISFACTORY. INSTALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATIONS UNLESS	SUPPORTS AND HANGERS: SUPPORTS AND HANGERS MUST BE UL LISTED AND APPROVED BY LOCAL INSPECTORS.	F – FAN FACP – FIRE ALARM CONTROL PANEL	V – VOLT VA – VOLT AMPERES	
4	WALL-MOUNT EMERGENCY FLOODLIGHT		TRANSFORMER	SPECIFICALLY INDICATED OTHERWISE, OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.	ANCHORS: HOLLOW MASONRY - TOGGLE BOLT	FARA – FIRE ALARM REMOTE ANNUNCIATOR FBO – FURNISHED BY OTHERS FIR – FLOOR	W – WATTS W/ – WITH WD – WATER DETECTOR	
F	EXHAUST FAN		GROUND ROD	DIVISION OF WORK. COMPLY WITH STATE AND LOCAL CODE REQUIREMENTS AND ORDINANCES. COMPLY WITH REQUIREMENTS OF THE UTILITY COMPANIES. IN THE CASE OF DIFFERENCES BETWEEN THESE	SOLID MASONRY - EXPANSION BOLT METAL - MACHINE SCREWS, BOLTS, WELDING WOOD, WOOD SCREWS	GFI – GROUND FAULT CIRCUIT INTERUPT	WG – WIRE GUARD WH – WATER HEATER WI – WET LOCATION	Engineer
ß	EXHAUST FAN WITH LIGHT FIXTURE		LOW VOLTAGE	REQUIREMENTS AND ORDINANCES, THE MOST STRINGENT SHALL GOVERN. CALL FOR INSPECTIONS REQUIRED BY LOCAL BUILDING INSPECTION AUTHORITY.	WOOD - WOOD SCREWS NAME PLATES: PROVIDE ON ALL PANELS, DISCONNECTS: 3/16" HIGH LETTERS ENGRAVED WITH	GRS – GALVANIZED RIGID STEEL	WP - WEATHER PROOF WS - WATER SOFTENER	Engineer
	PHOTOCELL	⊥	GROUND	PLANS AND SPECIFICATIONS GO HAND IN HAND. WHAT IS REQUIRED IN ONE IS REQUIRED IN BOTH. WHERE CONFLICTS BETWEEN SPECIFICATIONS AND PLANS EXIST, THE MOST STRINGENT REQUIREMENTS SHALL	CONTRASTING COLOR FILL. DEVICE PLATE ENGRAVING SHALL BE 1/8" HIGH LETTERS WITH CONTRASTING COLOR FILL. COLORS TO CONFORM TO OWNER'S STANDARDS.	HOA - HAND-OFF-AUTO HP - HORSE POWER	W/U - WITHUUT WTR - WATER	<b>Ke</b> ×
	RECEPTACIES	- 	TIME CLOCK	APPLY. CONTRACTOR SHALL, AT COMPLETION OF WORK. DELIVER COMPLETED PROJECT RECORD DOCUMENTS	DISCONNECTS: 600 VAC HEAVY DUTY, FUSIBLE, SINGLE THROW. MANUFACTURER CUTLER-HAMMER DH SERIES OR EQUIVALENT. NEMA 12 ENCLOSURE INDOORS OR NEMA 3R ENCLOSURE OUTDOORS. COMPLETE	HPS - HIGH PRESSURE SODIUM HRV - HEAT RECOVERY VENTILATOR HU - HEAT UNIT	XUCK – PRESSURE TRANSDUCER XFMR – TRANSFORMER	E H G I N B E R I N G
<b>A</b>				MARKED WITH FIELD CHANGES TO ENGINEER.	WITH TYPEWRITTEN DIRECTORY, CIRCUIT BREAKERS (MULTIPLE POLE INTERNAL TRIP), DEAD FRONT, LOCKING DOORS, UL LISTING, ETC. PROVIDE NEW PANEL TYPE WRITTEN DIRECTORIES IN PANELS WHERE	HVAC - HEATING, VENTILATION, AIR CONDITION KW - KILOWATTS	<ul> <li>Y – WYE CONNECTED</li> <li>Δ – DELTA CONNECTED</li> </ul>	P.O. Box 8694 Kalispell MT 59904
				CONTRACTOR SHALL PROVIDE A WRITTEN WARRANTY TO THE OWNER COVERING THE ENTIRE ELECTRICAL WORK TO BE FREE FROM DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP FOR A PERIOD OF (ONE) YEAP AFTER DATE OF ACCEPTANCE	BRANCH CIRCUITS ARE CHANGED. WHERE JOB CONDITIONS REQUIRE REASONABLE CHANGES IN INDICATED LOCATIONS AND ARRANGEMENT.	KVA – KILOVOLT AMPERES MAX – MAXIMUM	Ø – PHASE	Phone (406) 212-1624 KBengineers@centurytel.net
_ <del>_</del>		-N-		CONTRACTOR SHALL CLEAN EXPOSED SURFACES OF LIGHT FIXTURES, SWITCHGEAR AND OTHER EXPOSED	MAKE SUCH CHANGES WITHOUT EXTRA COST TO OWNER. THE DRAWINGS ARE NOT INTENDED TO BE SCALED FOR ROUGHING IN MEASUREMENTS AND NOT TO SERVE AS SHOP DRAWINGS.	MCB – MAIN CIRCUIT BREAKER MDP – MAIN DISTRIBUTION PANEL MEG – MANUEACTURER		
		37		ITEMS OF GREASE, DIRT OR OTHER FOREIGN MATERIAL. REMOVE RUBBISH AND DEBRIS RESULTING FROM THE OPERATIONS AND LEAVE EQUIPMENT SPACES CLEAN AND READY FOR USE.	PANELBOARDS: PANELS SHALL BE OF TYPE AND SIZE AS INDICATED ON THE DRAWINGS. PANEL ENCLOSURES SHALL BE RATED FOR THE SURROUNDING ENVIRONMENT. NEWA 12 FOR INDOOR. NEWA 3R	MH – METAL HALIDE MIN – MINIMUM		Owner
			PUMPS/MUTURS	CONTRACTOR SHALL MAINTAIN ALL CEILING, FLOOR AND WALL FIRE AND SMOKE PROTECTION RATINGS. SEAL ALL CONDUIT AND ENCLOSURE PENETRATIONS TO COMPLY WITH UL ASSEMBLY AND BUILDING CODE	FOR OUTDOOR, AND NEMA 4X FOR CORROSING ENVIRONMENTS. PANELS SHALL BE FULLY RATED TO INTERRUPT SYMMETRICAL SHORT-CIRCUIT CURRENT AVAILABLE AT TERMINALS. TRIM CLAMPS AND HINGES	MON - MONTOK		J
₩ ××	SPECIALTY RECEPTACLE, SEE NOTES		PUMP	REQUIREMENTS. ALL SEALANTS AND CONSTRUCTIONS SHALL BE APPROVED BY ENGINEER PRIOR TO APPLICATION. ALL OPENINGS SHALL BE SEALED DAILY.	SHALL BE CONCEALED. LOAD CENTERS ARE NOT ACCEPTABLE.			
	SWITCHES	M	MOTOR	CONTRACT DRAWINGS FOR ELECTRICAL WORK ARE IN PART DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, CONDUITS, AND APPROXIMATE	EQUIPMENT WITH OWNER.		MOUNTING HEIGHTS	State Of
\$	SINGLE POLE SWITCH		VARIABLE SPEED PUMP	SIZES AND LOCATIONS OF EQUIPMENT AND OUTLETS. ELECTRICAL TRADES SHALL FOLLOW THESE DRAWINGS IN LAYING OUT THEIR WORK, CONSULT GENERAL CONSTRUCTION DRAWINGS TO FAMILIARIZE	SUBSTITUTIONS: ALL SUBSTITUTIONS TO BE APPROVED BY OWNER, ARCHITECT, AND ENGINEER. ALL LIGHTING SUBSTITUTIONS MUST BE SUBMITTED IN WRITING TO THE ENGINEER FOR CONSIDERATION.	WALL SWITC	CH 48"	Montana
\$			PUMP CONTROL PANEL	THEMSELVES WITH ALL CONDITIONS AFFECTING THEIR WORK, AND SHALL VERIFT SPACES IN WHICH THEIR WORK WILL BE INSTALLED. COORDINATE WORK WITH OTHER TRADES AS JOB CONDITIONS REASONABLY REQUIRE.	LIGHT FIXTURES: PROVIDE NEW LIGHT FIXTURES AS SCHEDULED COMPLETE WITH TRIM, LAMPS, FUSES, GASKETS, BALLASTS, ETC. AS SCHEDULED.	CONVENIEN TELEPHONE	CE OUTLET 16" OUTLET 16"	
\$	THREE CIRCUIT SWITCH		EQUIPMENT DISCONNECT	NO MORE THAN ONE OF EACH PHASE CONDUCTOR, ONE NEUTRAL, TWO TRAVELERS, TWO SWITCH LEGS,	MECHANICAL EQUIPMENT: SEE PLANS FOR CONNECTION OF MECHANICAL EQUIPMENT. PROVIDE	FIRE ALARM FIRE ALARM	PULL STATION 42" HORN STROBE 12" BELOW CEILING (AS LONG AS 80"-96" AFE)	
¥2	DOUBLE POLE SWITCH		MAGNETIC MOTOR STARTER	AND GROUNDING CONDUCTORS SHALL BE INSTALLED IN A SINGLE RACEWAT UNLESS PRIOR APPROVAL IS OBTAINED FROM THE ENGINEER. CONDUIT FILL SHALL NOT EXCEED 40%.	THESE ARE BASIC REQUIREMENTS. SEE DIVISION 26 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.	FIRE ALARM EXIT SIGN	HORN 90" AFF, 6" BELOW CEILING CENTER, 12" ABOVE DOOR	Project Title
\$ <sup>3</sup>	THREE-WAY SWITCH		MAGNETIC MOTOR STARTER WITH DISCONNECT	ALL RACEWAYS SHALL BE SURFACE-MOUNTED, EXPOSED ON EXISTING WALLS AND GYP BOARD CEILINGS. ALL EXPOSED RACEWAYS SHALL BE ROUTED PLUMB AND SQUARE TO BUILDING SURFACES.	NOTE: THIS IS A STANDARD ELECTRICAL LEGEND SHEET. THEREFORE, MANY OF THE SYMBOLS AND	INTERCOM S MOTOR CON	PEAKER 88" ITROL SWITCHES 42"	
₹	FOUR-WAY SWITCH	20/3 DEF	20A, 3 POLE, DUEL ELEMENT FUSE WITH DISCONNECT		ABBREVIATIONS ON THIS SHEET MAY NOT BE USED ON THIS PROJECT	PANELBOAR MOUNTING	DS, ENCLOSURES 72" TO TOP HEIGHTS ARE FROM FINISHED FLOOR TO BOTTOM OF	Montana
\$ <sup>ĸ</sup>	KEY OPERATED SWITCH		FUSE	LIGHTING NOTES: COORDINATING THE PROPER TYPES OF TRIMS TO FIT THE RECESSED FIXTURES IN THE CEILING TYPE		BOX UNLESS	NOTED OTHERWISE.	State Hospital
₹ _	SWITCH WITH TIMER		FUSE WITH DISCONNECT	INDICATED BY THE ENGINEER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.			SHEET INDEX	Upgrade
ж,	MOTION CONTROLLED SWITCH	1	THERMOSTAT	ENGINEER.		E-4		wastewater System
\$ \$	DIMMER SWITCH		PHONE/DATA	ALL LAMPS NOT SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE SHALL OF THE LED TYPE.		E-2 F-3	SCREEN BUILDING ELECTRICAL PLAN	
<sup>рн</sup>			TELEPHONE PORT	CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING MOUNTING BRACKETS TO FIT CEILING CONDITIONS.		E-5 E-4 E-5	ELECTRICAL SITE PLAN	
₽ <sub>DLS</sub>	DIGITAL LIGHTING SWITCH		DATA PORT	FIXTURES IN CONTACT WITH INSULATION SHALL HAVE A U.L. LISTED THERMAL BARRIER.		E-5 E-6 F-7		Sheet Title
	SECURITY/INTERCOM	Δ	DATA/PHONE PORT			E-8 F-9		
-11	RECESSED DOOR CONTACT	Δ	DATA/PHONE PORT, FLOOR MOUNTED					Electrical
К	KEYPAD	DJ	DATA/PHONE JUNCTION BOX	ALTERNATE #1:		L	1	Legends
	EMERGENCY PANEL		TELEPHONE TERMINAL BOARD	NON-POTABLE WATER 2" ELECTROMAG	NETIC FLOW METER			
3	SPEAKER		FIRE ALARM SYSTEM					
PB	PUSHBUTTON STATION	3	SMOKE DETECTOR	ALTERNATE #2:				
PB	PUSHBUTTON STATION W/ SPEAKER	H	HEAT DETECTOR	AIR COMPRESSOR				Sheet
VC	VOLUME CONTROL	DH	MAGNETIC DOOR HOLD					
WD	WATER LEVEL DETECTOR							



- FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT, AND THE DATE THE FAULT CURRENT CALCULATION WAS PERFORMED IN
- 1. PROVIDE A UFER GROUND IN THE BUILDING FOOTING. COORDINATE WITH CONCRETE/FOUNDATION CONTRACTOR. REFER TO
- GROUNDING DETAIL 1/E-5. 2. LOCATE THE SCREEN DRIVE EMERGENCY STOP BUTTON AS DIRECTED BY THE MFG. REFER TO THE CONTROL PANEL WIRING DIAGRAM FOR TERMINATING INSIDE THE CONTROL PANEL. 3. ROTARY SCREEN CONTROL PANEL (RSCP). REFER TO THE CONTROL PANEL WIRING DIAGRAM FOR ALL NECESSARY FIELD WIRING, INCLUDING THE SCREEN DRIVE MOTOR, INSPECTION DOOR INTERLOCK SWITCH, FIELD MOUNTED E-STOP BUTTON, SCREEN MOTOR T-STAT, AND THE PRESS ZONE FLUISH SOLENDID ALV.E. ENSURE THAT THE CONTROL PANEL IS ADOQUATELY CROUNDED. 4. PROVIDE FIELD WIRING TO THE INSPECTION DOOR INTERLOCK SWITCH, SCREEN MOTOR T-STAT, AND THE PRESS ZONE FLUISH NOTROR 1. ROVIDE FIELD WIRING TO THE INSPECTION DOOR INTERLOCK SWITCH, SCREEN MOTOR T-STAT, AND THE PRESS ZONE FLUISH SOLENDID VIENCE MOTOR, INSTAL VIENTIMETRUCTORIES.
- "LIGHTS & VENTILATION". 13. LOCATE THE VISUAL/AUDIBLE ALARM PER ENGINEER'S DIRECTION. THE AUDIBLE ALARM SHALL BE SWITCHED SEPARATELY FROM THE VISUAL ALARM TO ALLOW THE SYSTEM OPERATOR TO BE ABLE TO TURN EITHER ALARM ON/OFF OR TO DISABLE EITHER ALARM. COORDINATE ALARM DEVICE VOLTAGES WITH CONTROL PANEL OUTPUTS. 14. XFMR TZ SHALL BE WALL MOUNTED ABOVE THE POWER PANELS. PROVIDE BRACKET SUPPORTS AS REQD. 15. PACKAGED DUPLEX LIFT STATION PUMP CONTROL PANEL FURNISHED BY THE PUMP CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE A SINGLE POINT POWER CONNECTION TO THE PUMP CONTROL PANEL AND INSTALL ALL CABLES FURNISHED BY THE PUMP CONTRACTOR, INCLUDING POWER CABLES TO THE SUBMERSIBLE PUMPS AND SIGNAL CABLES TO THE PRESSURE TRANSDUCER AND FLOAT
- SWITCHES. 16. JUNCTION BOXES IN THE WET WELL SHALL BE RATED FOR A HAZARDOUS ENVIRONMENT (CLASS 1, DIV 2) AND MADE INTRINSICALLY SAFE SEAL ALL CONDUITS, HOLES, AND PENETRATIONS IN THE WET WELL TO MAKE THEM INTRINSICALLY SAFE. 17. PROVIDE POWER AND DATA CONNECTIONS FROM THE FLOW METER CONVERTER BOX TO THE FLOW METER IN THE LIFT STATION METER VILLE
- VAULT. 18. REMOTE EMERGENCY STOP BUTTON FOR THE GENERATOR (EATON 10250T5862-S103, OR EQUAL). PROVIDE A PROTECTIVE COVER FOR THE E-STOP BUTTON TO ENSURE THAT IT CANNOT BE ACCIDENTALLY ACTIVATED. LOCATE NEXT TO THE ATS INSIDE EACH BULLDING.

### CAUTION

THE SCREEN ROOM IS A CLASS I, DIVISION I HAZARDOUS ENVIRONMENT. ALL LIGHTS, DEVICES, BOXES, FITTINGS, JOINTS AND WIRING METHODS WITHIN THE SCREEN ROOM, AS WELL AS WITHIN 5 FEET OF ANY OPENING, MUST BE RATED AND APPROVED FOR CLASS I, DIVISION I. COMPLY WITH ALL REQUIREMENTS OF ARTICLE 501 OF THE NATIONAL ELECTRICAL CODE.

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#### **ALTERNATE #1:**

NON-POTABLE WATER 2" ELECTROMAGNETIC FLOW METER

#### ALTERNATE #2:

AIR COMPRESSOR



## GENERAL NOTES

1. ALL CONDUCTORS TO BE THHN/THWN, UNLESS NOTED OTHERWISE. 2. COORDINATE ELECTRICAL SUB-METER TYPE AND SOCKET TYPE WITH THE OWNER.

 CONDUCT STUB OUTS ON THIS DRAWING ARE SCHEMATIC AND SHOWN FOR IDENTIFICATION OF EXTERIOR CONDUIT RUNS. SEE CIVIL SITE PLAN FOR CONSTRUCTION REQUIREMENTS OUTSIDE OF THE BUILDING. 4. ALL CONDUIT RUN INSIDE OF THE BUILDING SHALL BE EXPOSED, SURFACE MOUNTED TO FINISHED WALLS

ALL CONDUIT RUN INSIDE OF THE BUILDING SHALL BE EXPOSED, SURFACE MOUNTED TO FINISHED WALL AND CEILINGS.
 LIGHTING LAYOUT AND PLACEMENT IS SCHEMATIC ONLY. COORDINATE EXACT LOCATION OF LIGHT FIXTURES WITH ARCHITECTURAL REFLECTED CEILING PLAN TO AVOID INTERFERENCE WITH MECHANICAL, PLUBBING, AND STRUCTURAL SYSTEMS.
 REFER TO SHEET E-8 FOR THE LIGHTING FIXTURE SCHEDULE.
 LIGHTING CUITAL SYSTEMS.
 REFER TO SHEET E-10.9 AND TO 10.10. THE MAXIMUM AVAILABLE FAULT CURRENT AT EACH ELECTRICAL SERVICE EQUIPMENT, TO INCLUDE IF PRESENT TRANSFORMERS, GENERATORS, AND ATS/MTS, SHALL BE CALCULATED AND PROVIDED TO THE ELECTRICAL INSPECTOR AT THE TIME SAM SHALL AND PROVIDED TO THE ELECTRICAL INSPECTOR AT THE TIME THE SIM SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT, AND THE DATE THE FAULT CURRENT CALCULATED AND REPROVED IN ACLORDANCE TO NECT AND ATS/MTS, SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT, AND THE DATE THE FAULT CURRENT CALCULATION WAS PERFORMED IN ACCORDANCE TO NECT 10.21(B).



1. PROVIDE A UFER GROUND IN THE BUILDING FOOTING. COORDINATE WITH CONCRETE/FOUNDATION CONTRACTOR. REFER TO GROUNDING DETAIL 1/E-5. 2. MOUNT A DEDICATED 120V, 20A, RECEPTACLE NEXT TO THE AUTO SAMPLER. FIELD VERIFY EXACT

LOCATION. 3. XFMR T2' SHALL BE WALL MOUNTED ABOVE THE POWER PANELS. PROVIDE BRACKET SUPPORTS AS

REQ'D. 4. PROVIDE A 480V, 3Ø ELECTRICAL CONNECTION TO THE MAGNETIC STARTER FURNISHED WITH THE AIR COMPRESSOR. COMPLETE ALL WIRING FOR THE COMPRESSOR AND ASSOCIATED DRYER. 5. PROVIDE AN EXTERIOR GFI RECEPTACLE WITH A METALLIC, LOCKABLE, WEATHERPROOF ENCLOSURE (LEVITON M5979GY).

(LEVITON M5979CY). 6. NON-POTABLE WATER PUMP. PROVIDE A SINGLE POINT ELECTRICAL CONNECTION TO THE INTEGRATED CONTROLLER IN THE MOTOR TERMINAL BOX ABOVE THE PUMP. PROVIDE LFMC RACEWAY BETWEEN THE WALL/CEILING AND THE CONTROLLER. (TYP 2) 7. LIGHTS MAY BE SUSPENDED FROM OR SUBFACE MOUNTED TO THE CENTER BEAM (TYP 4). 8. PROVIDE A 200A, 480V, 30, ELECTRICAL SUB-METER FOR THE BUILDING (POWER-LOGIC PM5500 SERIES,

OR EQUAL). THE METER SHALL BE OWNED BY THE OWNER AND NOT BY THE UTILITY COMPANY. SUBMIT THE METER INFORMATION TO THE OWNER FOR SIGNATURE APPROVAL PRIOR TO ORDERING.

SUBMIT THE METER INFORMATION TO THE OWNER FOR SIGNATURE APPROVAL PRIOR TO ORDENIG. REFER TO MG INSTALLION INSTRUCTIONS. 9. DEDICATED RECPT FOR THE UV WIPING SYSTEM AIR COMPRESSOR. FIELD COORDINATE EXACT ELECTRICAL CONNECTIONS IF A HARDWIRE CONNECTION IS REQUIRED. 10. FLEXIBLE CONDUIT AND INTERCONNECT WIRES BETWEEN THE UV CONTROL POWER PANEL (CPP AND THE UV CHAMBER (INCLUDING UV SENSOR, TEMPERATURE SWITCH, END CAP SWITCH, AND LAMP CABLES) SHALL BE SUPPLIED BY THE UV MFG AND INSTALLED BY CONTRACTOR. REFER TO THE MFG'S INSTALLATION INSTRUCTIONS AND THE UV DISINFECTION FOURMENT SPEC SECTION 46 6656

INSTALLATION INSTALLA STRUCTIONS AND THE OF USINGET TO REQUIRED THE SECTION AND THE AND THE OF USINGET TO REQUIRED THE RESTROOM (70 CFM MIN.). 12. PROVIDE 120V CONNECTION TO FLOW METER REMOTE CONVERTER BOX (TYP 3). INSTALL LOW VOLTAGE CONDUCTORS BETWEEN THE FLOW METER CONVERTER BOX AND THE CONTROL PANELS AS REQUIRED TO PRODUCE A 4-20mA FLOW RATE TO THE UV CONTROL POWER PANEL AND TO THE AUTO

SAMPLER. 13.INSTALL THE FACTORY PROVIDED McCROMETER CABLE FROM THE FLOW METER TO THE REMOTE CONVERTER BOX IN 1/2" CONDUIT. (TYP 3) 14. DEDICATED CIRCUIT FOR THE AIR FLOW METER IN THE AERATION MANHOLE. REFER TO THE SITE PLAN

 DEDICATED CIRCUIT FOR THE AIR FLOW METER IN THE AERATION MANHOLE. REFER TO THE SITE PLAN DRAWINGS GG-3 AND C-20 FOR THE MANHOLE LOCATION, APPROXIMATELY 100' NORTHWEST OF THE UV BUILDING.
 LIOCATE THE VISUAL/AUDIBLE ALARM PER ENGINEERS DIRECTION. THE AUDIBLE ALARM SHALL BE SWITCHED SEPARATELY FROM THE VISUAL ALARM TO ALLOW THE SYSTEM OPERATOR TO BE ABLE TO TURN EITHER ALARM ON/OFF OR TO DISABLE EITHER ALARM. COORDINATE ALARM DEVICE VOLTAGES NUTLICED ADVICE DIRECTORY WITH CONTROL PANEL OUTPUTS.





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#### ALTERNATE #1: • NON-POTABLE WATER 2" ELECTROMAGNETIC FLOW METER

## ALTERNATE #2:





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P.O. Box 8 Kalispell, MT Phone (406) 2 KBengineers@ce	3694 59! 12-1 ntur	904 624 ytel.net										
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	MAIN BREAKER: N/A				PANEL: HP1		011		TOT	AL CALCULATED LOAI	D 68.63 K	VA
	MOUNTING: SURFACE				277/480.3	P.4W						
	BRACING: 22 Kaic				225 AI	ЛР						
	CIRCUIT			LOAD			LOAD			CIRCUIT		
NO.	DESCRIPTION	OCP	TYPE	(VA)	(A) PH	(A)	(VA)	TYPE	OCP	DESCRIPTION		NO.
1	Unit Heater 15kW	25A-3P	N	5000	18.0 A	18.0	5000	Н	25A-3P	Unit Heater 15kW		2
3	"	"	N	5000	18.0 B	18.0	5000	Н	"	"		4
5	"	"	N	5000	18.0 C	18.0	5000	Н	"	"		6
7	Unit Heater 4kW	15A-3P	Н	1333	4.8 A	2.0	560	N	15A-3P	Headworks Screen Mo	tor (1HP)	8
9	"	"	Н	1333	4.8 B	2.0	560	N	"	"		10
11	"	"	Н	1333	4.8 C	2.0	560	N	"	"		12
13	Lift Station Pump Control Panel	30A-3P	N	4739	17.1 A	28.1	7796		70A-2P	Panel LP1 via XFMR T	2	14
15	"	"	N	4739	17.1 B	36.8	10192		"	"		16
17	"	"	N	4739	17.1 C				20A-1P			18
19	SPARE	15A-3P			A				20A-1P			20
21	SPARE	"			В				20A-1P			22
23	SPARE	"			С				20A-1P			24
25	SPARE	20A-1P			A				20A-1P			26
27	SPARE	20A-1P			В				20A-1P			28
29	SPARE	20A-1P			С				20A-1P			30
					A							
					В							
					С							
					A				600000000 <b>F</b>			
					B				•			
					С							
								LOAD:		CONNECTED	CALCULATE	D
NO	TES:							(C)ontir	uous:	2996 x 1.25 :	= 3745 V	A
								(R)ec (1	lst 10 kva)	2640 x 1.00 :	= 2640 V	A
								(R)ec (r	emainder)	: x 0.50 :	= <b>V</b>	A
								(N)on-c	ontinuous:	41249 x 1.00 :	= 41249 V	A
								(H)eatir	ıg:	20999 x 1.00 :	= 20999 V	A
								(A)ir co	nditioning:	x 1.00 :	= V	A
1								(L)arges	st motor:	x 1.25 :	= V	A
								TOTAL	ADDITION	IAL LOAD: VA	68633 V	A
											83 A	MPS
									NOTE: HEATIN	IG AND COOLING LOADS ARE NON-	SIMULTANEOUS	

				PANELBOARD	SCHEDU	ILE					
MAIN BREAKER: 125 AMP				PANEL: LP1				TOT	AL CALCULATED LOAD	0 18.74 K	VA
MOUNTING: SURFACE				120/240V,1	P,3W						
BRACING: 22 KAIC				225 AN	P						
CIRCUIT			LOAD			LOAD			CIRCUIT		
NO. DESCRIPTION	OCP	TYPE	(VA)	(A) PH	(A)	(VA)	TYPE	OCP	DESCRIPTION		NO
1 Recpt - Admin Room	20A-1P	R	360	3.0 A	7.5	900	R	20A-1P	Recpt - Screen Room		2
3 Lights, Exhaust Fan (1/2 HP)	20A-1P	С	1760	14.7 B	5.8	696	С	20A-1P	Exhaust Fan (1/4 HP)		4
5 Auto Sampler	20A-1P	С	180	1.5 A	33.3	4000	N	40A-2P	Water Heater		6
7 RTU/Autodialer/Flow Meter	20A-1P	С	360	3.0 B	33.3	4000	N		"		8
9 Recpt - Exterior	20A-1P	R	180	1.5 A	9.8	1176	N	20A-2P	Overhead Door		10
11 Generator Battery Charger	20A-1P	R	1200	10.0 B	9.8	1176	N	"	•		12
13 Generator Block Heater	20A-2P	н	1000	8.3 A				20A-1P	SPARE		14
15 "		н	1000	8.3 B				20A-1P	SPARE		16
17 SPARE	20A-1P			А				20A-1P	SPARE		18
19 SPARE	20A-1P			В				20A-1P	SPARE		20
21 SPARE	20A-1P			А				20A-1P	SPARE		22
23 SPARE	20A-1P			В				20A-1P	SPARE		24
25 SPARE	20A-1P			А				20A-1P	SPARE		26
27 MAIN	125A-2P			В				20A-1P	SPARE		28
29 "	"			A				20A-1P	SPARE		30
				В							
				A							
				В							
				A							
				B							
				A							
							LOAD:		CONNECTED	CALCULATED	5
							(C)ontin	nuous:	2996 x 1.25 =	3745 V	A
NOTES:							(B)ec (	1st 10 kva)	2640 x 1.00 =	2640 V	A
							(R)ec (	remainder)	: x 0.50 =	V/	A
							(N)on-c	ontinuous	10352 x 1 00 =	10352 V	A
							(H)eatir	na.	2000 x 1 00 =	2000 V	A
							(A)ir co	nditionina <sup>.</sup>	x 1 00 =	V	A
							(I)arge	st motor	x 1.25 =	v.	A
							TOTAL		17988	18737 V	Ā
								20/10.		78 41	MPS
									IG AND COOLING LOADS ARE NON-SI		
							I	NOTE. REATIN	IG AND COOLING LOADS ARE NON-SI	NI OLI AINLOUS	
	<u></u> =-			/ <b>-</b>	<b>—</b> —						
PANEL S	CHED	ULE	'LP1'	(SCRE	EN E	BLDG	i)				
				-		-	-				

PANEL SCHEDULE 'HP1' (SCREEN BLDG)

SCALE: N.T.S.

(1)



				P/	ANELBOARD	SCHED	ULE						
	MAIN BREAKER: N/A				PANEL: HP2				TOT	AL CALCULATE	D LOAD	203.37 KV	A
	MOUNTING: SURFACE				277/480,3F	,4W							
	BRACING: 22 Kaic				400 AM	P							
	CIRCUIT			LOAD			LOAD			CIR	CUIT		
NO.	DESCRIPTION	OCP	TYPE	(VA)	(A) PH	(A)	(VA)	TYPE	OCP	DESCRIPTION			NO
1	Blower #1	110A-3P	С	21339	77.0 A	55.2	15291		125A-3P	Panel HP3 via A	TS		2
3	"	"	С	21339	77.0 B	64.4	17855		"	"			4
5	"	"	С	21339	77.0 C	32.7	9059		"	"			6
7	Blower #2	110A-3P	С	21339	77.0 A								8
9	"	"	С	21339	77.0 B								10
11	"	"	С	21339	77.0 C								12
13					A								14
15					В								16
17					С								18
19					A								20
21					В								22
23					С								24
25					A								26
27					В								28
29					С								30
					A								
					В								
					С								
					A								
					В								
					С								
								LOAD:		CONNECTED	(	CALCULATED	
NO.	TES:							(C)ontir	iuous:	132514 >	(1.25 =	165643 VA	
								(R)ec (1	lst 10 kva)	2796 >	( 1.00 =	2796 VA	
								(R)ec (r	emainder):	)	( 0.50 =	VA	
J								(N)on-c	ontinuous:	34316 >	( 1.00 =	34316 VA	
								(H)eatir	ig:	612 >	( 1.00 =	612 VA	
								(A)ir co	nditioning:	)	( 1.00 =	VA	
								(L)arges	st motor:	)	( 1.25 =	VA	
I								TOTAL	ADDITION	AL LOAD:	/A	203367 VA	
I												245 AM	IPS
1											RENON-SIMI		

				P	ANELBOARD	SCHED	ULE						
1	MAIN BREAKER: N/A				PANEL: HP3			-	TOT	AL CALCULA	TED LOAD	45.68 K	VA
	MOUNTING: SURFACE				277/480,3F	9,4W							
	BRACING: 22 Kaic				125 AM	P							
	CIRCUIT			LOAD			LOAD			(	CIRCUIT		
₽.	DESCRIPTION	OCP	TYPE	(VA)	(A) PH	(A)	(VA)	TYPE	OCP	DESCRIPTIC	N		N
1	UV Power Dist. Center (PDC)	15A-3P	С	1450	5.2 A	14.0	3880	N	20A-3P	Air Compress	sor (10HP)		
3	"	"	С	1450	5.2 B	14.0	3880	N	<u>"</u>	<u>"</u>			
5	"	"	С	1450	5.2 C	14.0	3880	N	<u>"</u>	"			
7	SPARE	20A-1P			A	7.6	2106	N	15A-3P	Non-Potable	Water Pump	#1	
9	SPARE	20A-1P			В	7.6	2106	N	"	"			
11	SPARE	20A-1P			С	7.6	2106	N	"	"			
13	SPARE	20A-1P			A	7.6	2106	N	15A-3P	Non-Potable	Water Pump	#2	T
15	SPARE	20A-1P			В	7.6	2106	N	"	"			-
17	SPARE	20A-1P			С	7.6	2106	N	"	"			
19	SPARE	20A-1P			A				20A-1P				
21	SPARE	20A-1P			В				20A-1P				
23	SPARE	20A-1P			С				20A-1P				
25	SPARE	20A-1P			A	24.4	6772		70A-2P	Panel LP3 via	a XFMR T3		
27	SPARE	20A-1P			В	31.7	8796		"	"			1
29	SPARE	20A-1P			С				20A-1P	SPARE			
					A								
					В								2012 2012002
					С								
					A								
					В								-
					С								
								LOAD:		CONNECTER	) (	CALCULATE	ō.
IOI	ES:							(C)ontir	nuous:	593	30 x 1.25 =	7413 V	Ā
								(R)ec (1	lst10 kva)	: 333	36 x 1.00 =	3336 V	А
								(R)ec (r	emainder):		x 0.50 =	V	А
								(N)on-c	ontinuous:	3431	6 x 1.00 =	34316 V	А
								(H)eatir	ng:	61	2 x 1.00 =	612 V	А
								(A)ir co	nditioning:		x 1.00 =	V	А
								(L)arges	st motor:		x 1.25 =	V	А
								TOTAL	ADDITION	AL LOAD:	VA	45677 V	A
												55 A	MP
									NOTE: HEATIN	G AND COOLING LOA	DS ARE NON-SIMU	ILTANEOUS	
	PANEL SC	CHED	ULE	· 'HP3	° (UV B		)						
							,						_
	SCALE: N.I.S.												

PANEL SCHEDULE 'HP2' (UV BLDG) SCALE: N.T.S.

(1)

# ALTERNATE #1:

• NON-POTABLE WATER 2" ELECTROMAGNETIC FLOW METER

ALTERNATE #2: • AIR COMPRESSOR

				PANELBOARD	O SCHEDL	JLE				
MAIN BREAKER: 125 AMP				PANEL: LP3				TOT	TAL CALCULATED LOAD	15.96 KVA
MOUNTING: SURFACE				120/240V,1	P,3W					
BRACING: 22 KAIC				125 AN	IP					
CIRCUIT			LOAD			LOAD			CIRCUIT	
NO. DESCRIPTION	OCP	TYPE	(VA)	(A) PH	(A)	(VA)	TYPE	OCP	DESCRIPTION	N
1 Unit Heater	15A-1P	н	612	5.1 A	10.5	1260	R	20A-1P	Recpt - Utility	
3 Lights	20A-1P	С	1220	10.2 B	9.8	1176	N	20A-1P	Exhaust Fan	
5 Auto Sampler	20A-1P	С	180	1.5 A	33.3	4000	N	40A-2P	Water Heater	
7 Autodialer, Flow Meter	20A-1P	R	360	3.0 B	33.3	4000	N	"	"	
9 Recpt - Exterior	20A-1P	R	360	3.0 A	1.5	180	R	20A-1P	Recpt - Restroom	1
11 UV Air Compressor	20A-1P	R	1176	9.8 B	7.2	864	N	20A-1P	Overhead Door	1
13 Ceiling Fan (Future)	20A-1P			А	1.5	180	С	20A-1P	Air Flow Meter	1
15 SPARE	20A-1P			В				20A-1P	SPARE	1
17 SPARE	20A-1P			А				20A-1P	SPARE	1
19 SPARE	20A-1P			В				20A-1P	SPARE	2
21 SPARE	20A-1P			А				20A-1P	SPARE	2
23 SPARE	20A-1P			В				20A-1P	SPARE	2
25 SPARE	20A-1P			А				20A-1P	SPARE	2
27 MAIN	125A-2P			В				20A-1P	SPARE	2
29 "				А				20A-1P	SPARE	3
				В						
				А						
				В						
				А						
				В						
				А						
							LOAD:		CONNECTED	CALCULATED
							(C)ontir	nuous:	1580 x 1.25 =	1975 VA
NOTES:							(R)ec (	1st 10 kva)	): 3336 x 1.00 =	3336 VA
							(R)ec (r	remainder)	: x 0.50 =	VA
							(N)on-c	ontinuous:	: 10040 x 1.00 =	10040 VA
							(H)eatir	ng:	612 x 1.00 =	612 VA
							(A)ir co	nditioning:	x 1.00 =	VA
							(L)arge	st motor:	x 1.25 =	VA
							TOTAL	LOAD:	15568	15963 VA
										67 AMP
								NOTE: HEATIN	IG AND COOLING LOADS ARE NON-SIM	ULTANEOUS
						<b>`</b>				
		ULE	LLJ		_DG/	,				

PANEL SCHEDULE 'LP3' (UV BLDG) SCALE: N.T.S.

HUNNING AND	T A N TEL LEE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE STEMAKE	611, WER 24, 111
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Kalispe	ll, MT 59	904
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			L	IGHTIN	G FI	XTU	re sc	HEDULE	
TYPE	DESCRIPTION	LAMPS PER FIXTURE	WATTS PER LAMP	LAMP SIZE	VOLTS	MAX WATTS	MOUNTING	MFG & P/N	NOTES
F1	Vaportight Industrial Surface LED	1	107	11,000 Lumen LED 4000k	120	107	Surface	Lithonia VAP-12000LM-PCL-MD- MVOLT-GZ10-40K-80CRI	
F2	Wall Pack	1	50	6,600 Lumen LED 4000k	120	50	Wall	Lithonia WST LED P3 40K VW MVOLT PE DDBXD	Switch on photo-cell; Feed-thru wiring; Bronze in color
F3	Class I, Div I Hazardous Fixture	1	40	4,000 Lm/4ft LED 4000k	120	40	Surface	IRL: IR4-4-2-LED-UNV	Fixture must be explosion proof
F4	Vanity Light	1	30	4,000 Lumen LED 4000k	120	30	Wall	Williams: WMA-4-L40-840-AFDRV-UNV	

8							
			TR	ANSFOF	RMER SC	CHEDULE	-
TAG	KVA	PHASE	PRIMARY VOLTAGE	SECONDARY VOLTAGE	MOUNTING	GROUND CONDUCTOR	NOTES
T1	300	3 PH	12,470	480Y/277	VAULT	#1/0	
Т2	25	1 PH	480	120/240	FLOOR/WALL	#6	
Т3	25	1 PH	480	120/240	FLOOR/WALL	#6	

### ALTERNATE #1:

NON-POTABLE WATER 2" ELECTROMAGNETIC FLOW METER

## ALTERNATE #2:

• AIR COMPRESSOR

		CONDUIT & V	wire schedu	ILE	
TAG	CONDUIT SIZE	WIRE SIZE	FROM	то	AMPS
F00	[1] 4"	3#2 EPR AL	POWER POLE	XFMR T1	
F01	[1] 4"	3#4/0, 1#1/0 AL	XFMR T1	SCREEN BLDG SERV. DISC.	200A, 3Ø,4W
F02	2"	4#3/0, 1#6 GND	SCREEN BLDG SERV. DISC.	ATS	200A, 3Ø,4W+0
F03	1-1/2"	4#1, 1#6 GND	GENERATOR	ATS	125A, 3Ø,4W+0
F04	2"	4#3/0, 1#6 GND	ATS	PANEL HP1	200A, 3Ø,4W+0
F05	1"	2#4, 1#8 GND	PANEL HP1	XFMR T2	70A, 1Ø, 2W+G
F06	1-1/4"	3#1, 1#6 GND	XFMR T2	PANEL LP1	125A, 1Ø,3W+0
F07	[1] 4"	4#350 AL	XFMR T1	UV BLDG SERV. DISC.	400A, 3Ø,4W
F08	[2] 2"	[2] 4#3/0, 1#3 GND	UV BLDG SERV. DISC.	PANEL HP2	400A, 3Ø,4W+0
F09	1-1/2"	4#1, 1#6 GND	PANEL HP2	ATS	125A, 3Ø,4W+C
F10	1-1/2"	4#1, 1#6 GND	ATS	PANEL HP3	125A, 3Ø,4W+C
F11	1"	2#4, 1#8 GND	PANEL HP3	XFMR T3	70A, 1Ø, 2W+G
F12	1-1/4"	3#1, 1#6 GND	XFMR T3	PANEL LP3	125A, 1Ø,3W+0
P01	3/4"	4#12, 1#12 GND	PANEL HP1	UV PDC	20A, 3Ø, 4W+C
> P02	3/4"	3#12, 1#12 GND	PANEL HP1	AIR COMPRESSOR	20A, 3Ø, 3W+G
P03	3/4"	3#12, 1#12 GND	PANEL HP1	NON-POT. WATER PUMP	20A, 3Ø, 3W+O
P04	3/4"	2#8, 1#10 GND	PANEL LP1	WATER HEATER	40A, 1Ø, 2W+O
P05	3/4"	2#12, 1#12 GND	PANEL LP1	GENSET BATT. CHARGER	20A, 1Ø, 2W+G
		2#12, 1#12 GND	PANEL LP1	GENSET ENGINE HEATER	20A, 1Ø, 2W+G
P06	3/4"	3#12, 1#12 GND	PANEL HP1	SCREEN MOTOR	20A, 3Ø, 3W+G
P07	3/4"	3#10, 1#10 GND	PANEL HP1	15 KW UNIT HEATERS	25A, 3Ø, 3W+G
P08	3/4"	3#12, 1#12 GND	PANEL HP1	4 KW UNIT HEATER	20A, 3Ø, 3W+G
P09	3/4"	3#10, 1#10 GND	PANEL HP1	LIFT STATION CNTRL PNL	30A, 3Ø, 3W+G
P10	3" SCH 80	3#12, 1#12 GND	LIFT STATION CNTRL PNL	LIFT STATION PUMP #1	20A, 3Ø, 3W+G
		3#12, 1#12 GND	LIFT STATION CNTRL PNL	LIFT STATION PUMP #2	20A, 3Ø, 3W+G
P11	1-1/4"	3#1, 1#6 GND	PANEL HP2	BLOWERS	110A, 3Ø, 3W+
P12	1"	2#10, 1#10 GND	PANEL LP3	AIR FLOW METER	20A, 1Ø, 2W+G
C01	1/2"	4#14 Cu STRANDED	LIFT STATION CNTRL PNL	AUDIO/VISUAL ALARMS	
C02	3" SCH 80	4#14 Cu STRANDED	LIFT STATION CNTRL PNL	WET WELL FLOATS	
		4#18 Cu TSP	LIFT STATION CNTRL PNL	WET WELL XDUCER	
C03	3/4"	4#14 Cu STRANDED	ATS GENERATOR START	GENERATOR	
C04	3/4"	4#14 Cu STRANDED	GENERATOR E-STOP	GENERATOR	
C05	3/4"	4#18 Cu STRND/SHIELD	GENERATOR ALARM/RUN	AUTODIALER	
C07	1/2"	4#14 Cu STRANDED	UV CNTRL PNL	AUDIO/VISUAL ALARMS	

### NOTES:

ALTERNATE #2

 All other branch circuits are 2#12, 1#12 GND - 3/4"C.
 All conductors are sized per AWG and shall be 75°C copper wire with 60°C terminals up to 100 amps and 75°C wire and terminals thereafter.

3. Aluminum conductors are acceptable for all feeders 200 Amps or larger. Upsize wire and conduit sizes accordingly to

Additional to the required ampacity.
 Wire sizes and combinations are suggestions based upon available load information at the time of drawing release. The contractor shall verify all equipment name plates for actual load ratings.
 #10AWG and smaller conductors shall be solid wire. #8AWG and larger conductors shall be stranded.

6. The contractor shall derate conductor ampacity for elevated temperatures over ambient and for multiple conductors in raceways or conduit per NEC requirements.

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Engineer		
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Kalispel Phone (4	1, MT 599 06) 212-1	904 624
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### GENERAL NOTES

- ALL CONDUCTORS TO BE THHN, UNLESS NOTED OTHERWISE.
  REFER TO WRITTEN SPECIFICATIONS SECTION 13500 FOR COMPLE TELEMETRY SYSTEM REQUIREMENTS.
  THE REMOTE TELEMETRY UNIT AND RADIO ANTENNA SHALL BE FURNISHED AND INSTALLED BY THE TELEMETRY CONTRACTOR.

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	P.O. 1	Box 8694						
	Phone (4	l, MT 599 06) 212-1	624					
	KBengineers	@centur	ytel.net					
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VAULT NOTES: 1. CONTRACTOR SUPPLIED VAULT

2. SET VAULT PLUMB AND LEVEL ON UNDISTURBED EARTH 3. EXTEND CONDUIT THRU BOTTOM KNOCKOUT UNLESS SPECIFIED BY UTILITY ENGINEER.

4. CONDUIT ANGLED TOWARDS VAULT WALL, FLOOR; OTHER CONDUITS AND SWEEPS INTO VAULT WILL BE 5. HDPE EXTENDED INTO VAULTS WILL BE REJECTED.

6. COPPER PIG TAIL SHALL BE PLACED FIELD SIDE (FOR BONDING TO OTHER UTILITIES OF VAULT) 7. LID SHOULD BE INSTALLED WITH OPENING FACING THE

LID SHOULD BE INSTALLED WITH OPENING FACI ROAD UNLESS SPECIFIED OTHERWISE.
 INSTALL NEW <sup>1</sup>/<sub>4</sub> " MIN. NYLON PULL ROPE.
 CLEAN ANY DEBRIS FROM VAULT.
 VAULT LID SHOULD BE COVERED WITH COVER SUPPLIED BY PRECAST COMPANY.