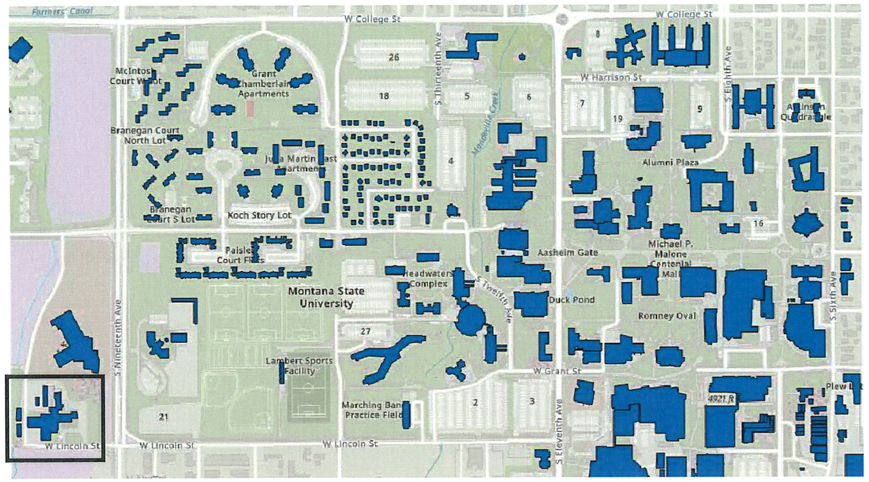
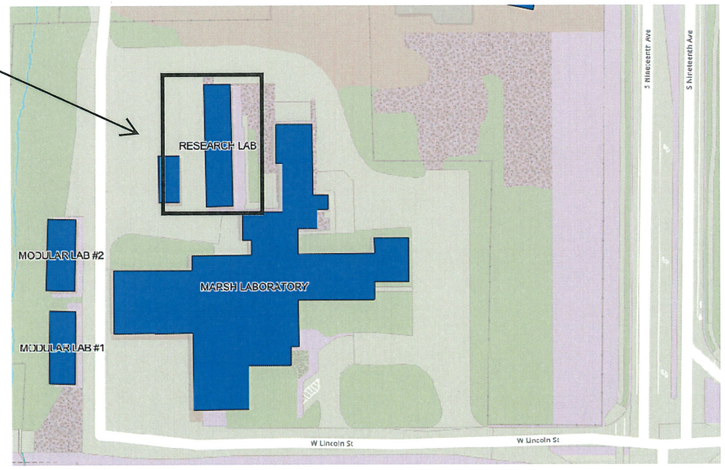
Jutila Research Lab Chiller Replacement

Montana State University - Bozeman, Montana

PPA #24-1200



JUTILA RESEARCH LAB



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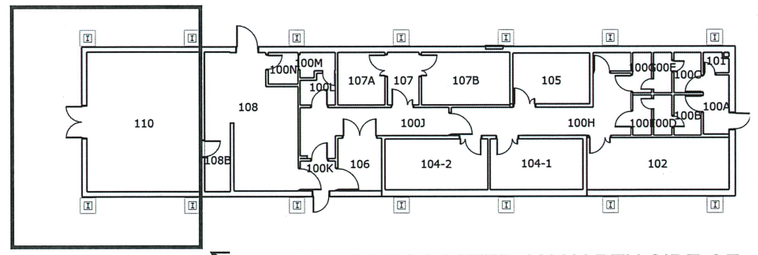
PROJECT MAP

NO SCALE

DRAWING INDEX



PROJECT LOCATED ON NORTH SIDE OF JUTILA RESEARCH LAB

N

OVERALL BUILDING PLAN

NO SCALE

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JUTILA RESEARCH LAB
CHILLER REPLACEMENT

MONTANA
LORAS J. O'TOOLE
No. 14498PE
LICENSED PROFESSIONAL ENGINEER

PPA # 24-1200
Drawing by RK/LOT

SHEET TITLE
COVER SHEET

SHEET
C1.0

DATE:
05-16-25

MECHANCIAL LEGEND

	MANUAL VALVE
	VENTURI FLOW MEASURING DEVICE
A	AUTOMATIC VALVE (3 WAY SHOWN)
	CHECK VALVE
	FLOW LIMITING VALVE
	AIR SEPERATOR
	STRAINER
	PIPE DOWN
	PUMP
	CONNECT TO EXISTING
	FLEXIBLE CONNECTION
	FLOW DIRECTION
	PT PLUG

PIPE LEGEND

CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY

EQUIPMENT LEGEND

AAC	AIR COOLED CHILLER
AHU	AIR HANDLING UNIT
B	BOILER
BT	BUFFER TANK
CWP	CHILLED WATER PUMP
HRC	HEAT RECOVERY COIL

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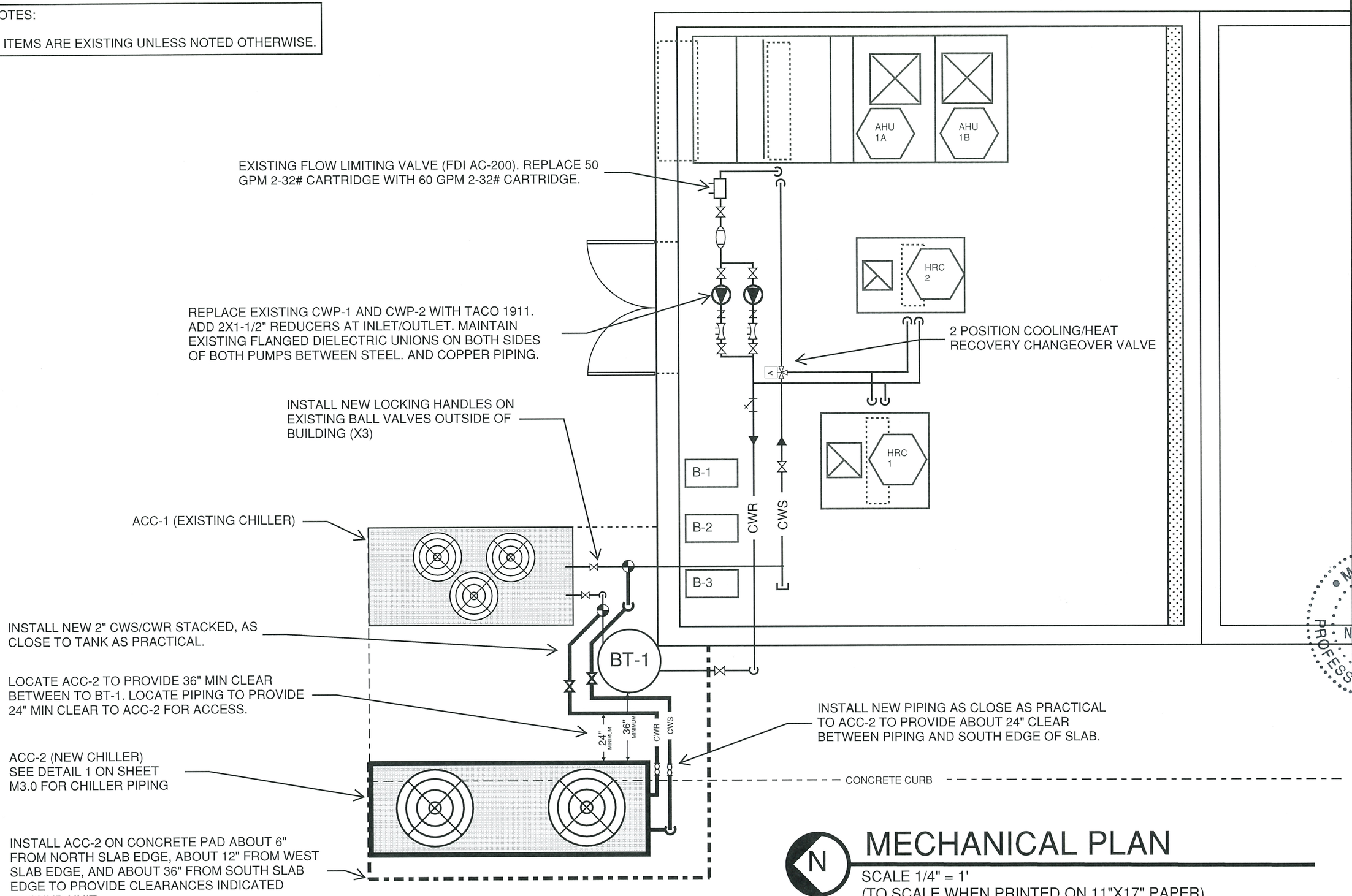
SHEET TITLE
MECHANICAL SYMBOLS AND LEGENDS

SHEET
M1.0

DATE:
05-16-25

NOTES:

1. ITEMS ARE EXISTING UNLESS NOTED OTHERWISE.



MECHANICAL PLAN

N

SCALE 1/4" = 1'
(TO SCALE WHEN PRINTED ON 11"X17" PAPER)

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LICENSED PROFESSIONAL ENGINEER

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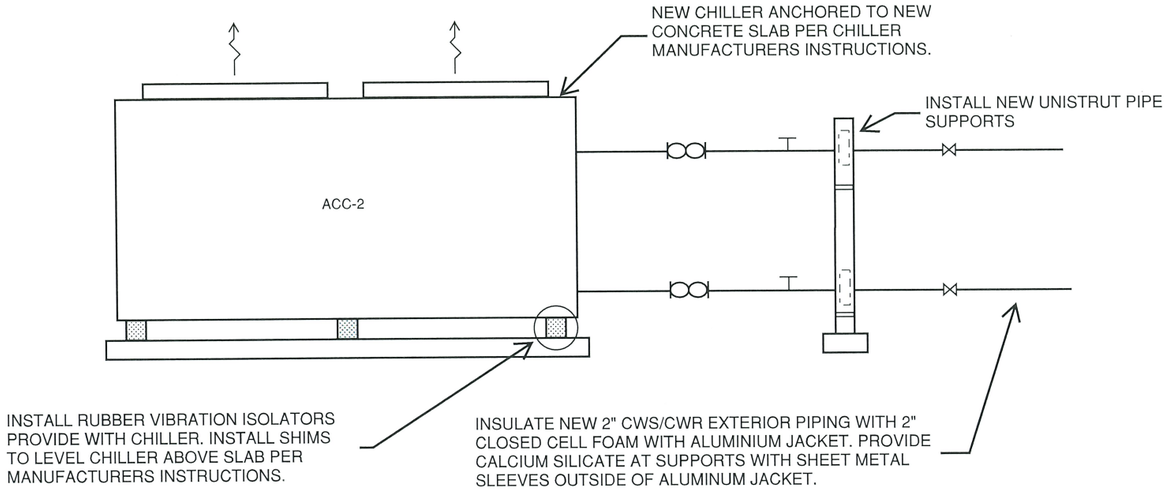
SHEET TITLE
MECHANICAL PLAN

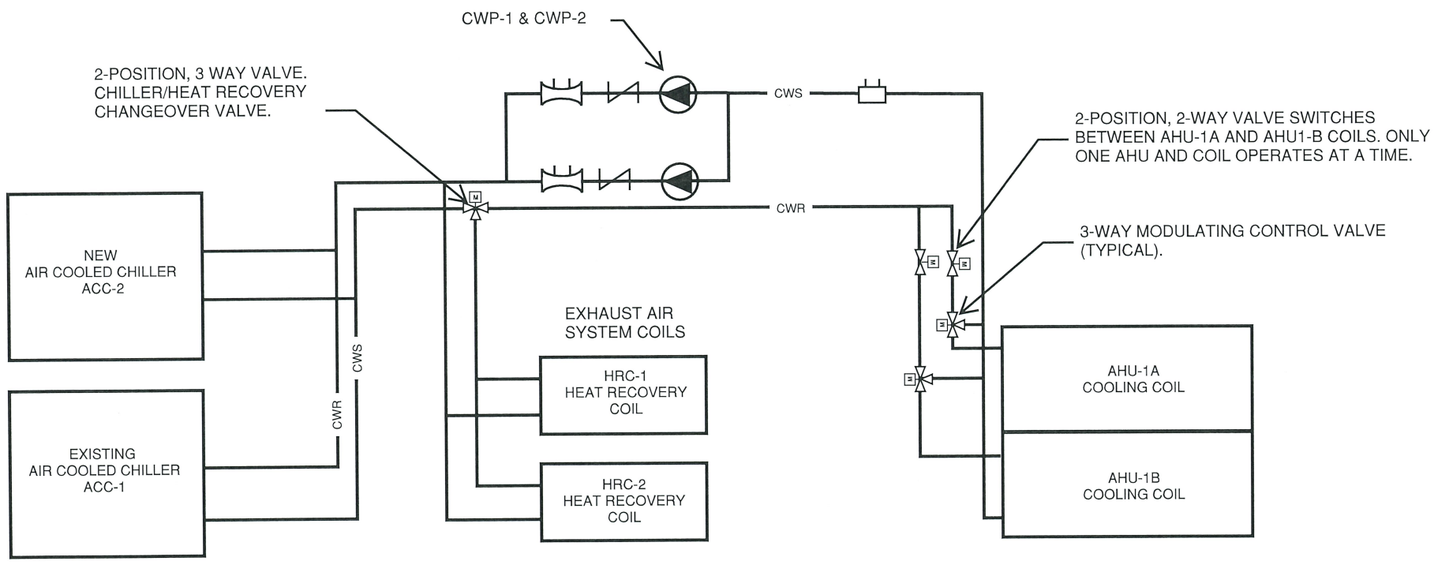
SHEET
M2.0

DATE:
05-16-25



1 NEW CHILLER PIPING DETAIL

NO SCALE



2 CHILLED WATER AND HEAT RECOVERY SYSTEM DIAGRAM

NO SCALE

NOTE: CHILLED WATER / HEAT RECOVERY SYSTEM IS USED TO PROVIDE COOLING IN SUMMER, AND TO MOVE HEAT FROM EXHAUST AIR SYSTEM COILS HRC-1 / 2 TO AHU-1A / 2A "COOLING" COILS IN WINTER.

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MONTANA
LORAS J. O'TOOLE
No. 14498PE
PROFESSIONAL ENGINEER
LICENSED

PPA # 24-1200
Drawing by RK/LOT

SHEET TITLE
DIAGRAMS AND DETAILS

SHEET
M3.0

DATE:
05-16-25

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	POWER PANEL
	DISCONNECT SWITCH
	CONDUIT RUN – NUMBER OF ARROWHEADS INDICATES THE NUMBER OF CIRCUITS REQUIRED.
	DUPLEX CONVENIENCE RECEPTACLE
	SPECIAL EQUIPMENT CONNECTION OR OUTLET AS NOTED
(J) J	JUNCTION BOX OR J–BOX
(P)	PUMP MOTOR
VFD	VARIABLE FREQUENCY DRIVE
	CONTACTOR
$	TOGGLE SWITCH

GUIDE TO LINE WEIGHTS FOR ELECTRICAL ITEMS

————	ITEMS SHOWN LIGHT ARE EXISTING AND TO REMAIN
————	ITEMS SHOWN BOLD AND SOLID ARE NEW
– – – – – – –	ITEMS SHOWN BOLD AND DASHED ARE TO BE REMOVED (DEMOLITION PLANS)

MECHANICAL EQUIPMENT CONNECTION SCHEDULE

UNIT	VOLTAGE	ø	HP/ LOAD	STARTER & CONTROLS							SAFETY DISCONNECT SWITCH			
				TYPE	MCP/ FUSED	NEMA ENCLOS.	NEMA SIZE	POLES	SWITCH	PILOT	SIZE	NEMA ENCLOS.	FUSED	NOTE
ACC–2	208	3	138 MCA	INTEGRAL										(1)
CWP–1, 2	208	3	3 HP	EXISTING MCC										(2)

NOTES:

(1) UNIT PROVIDED WITH INTEGRAL CIRCUIT BREAKER DISCONNECT.

(2) CONNECT TO EXISTING MOTOR CONTROL CENTER, 'MCC'.

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MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

JUTILA RESEARCH LAB
CHILLER REPLACEMENT

TD&H Engineering
tdhengineering.com

DRAWN BY:
REVIEWED BY:

REV.	DESCRIPTION	DATE

MONTANA
BRADY M. KAUFFMAN
No. 14587 PE
LICENSED PROFESSIONAL ENGINEER

PPA#24-1200
TDH#G25-003

SHEET TITLE
ELECTRICAL SCHEDULES

SHEET
E0.1

DATE
05-16-25

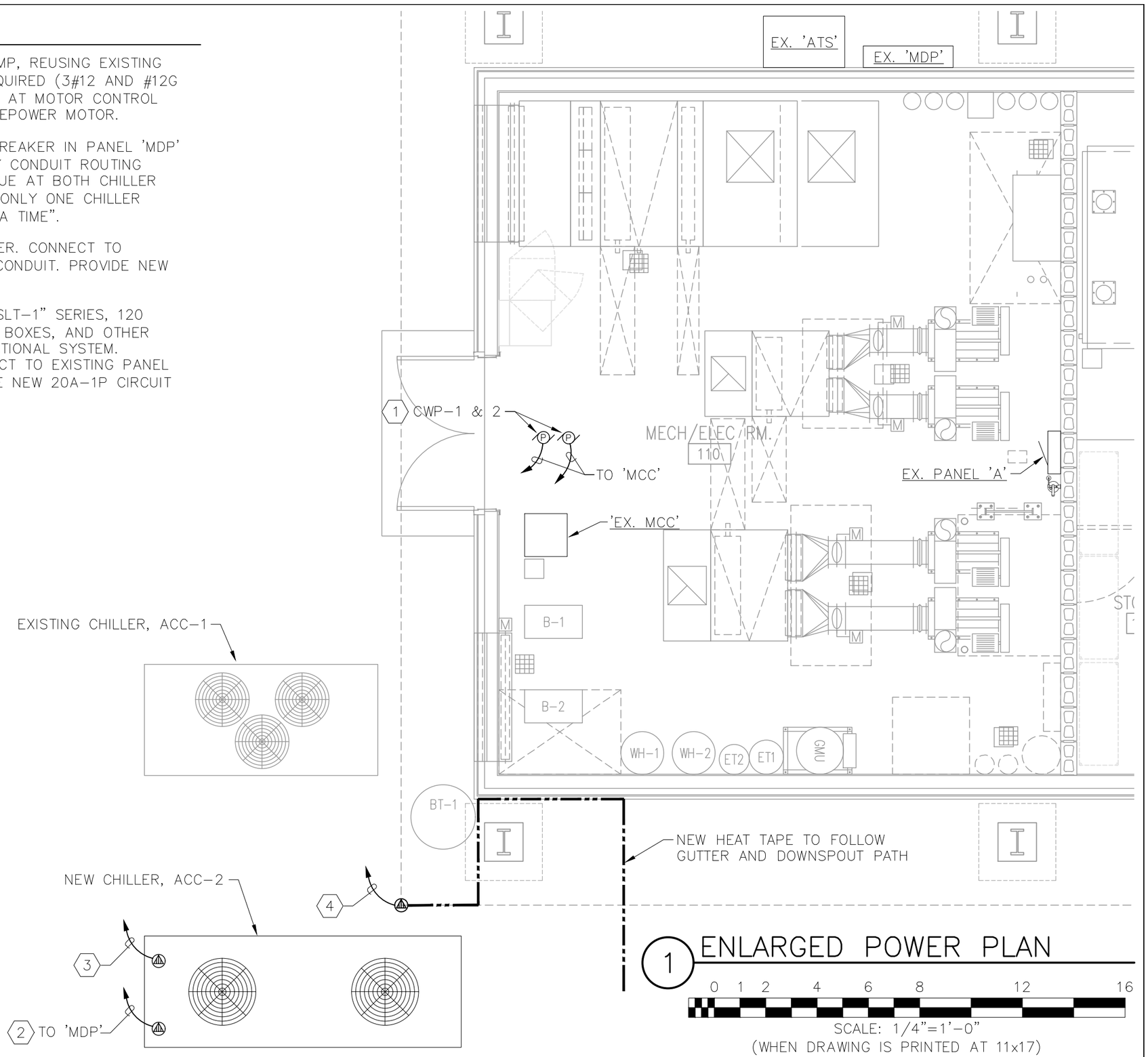
SPECIFIC SHEET NOTES:

1. PROVIDE CONNECTION TO NEW CHILLED WATER PUMP, REUSING EXISTING CIRCUITING, EXTENDING CONDUIT AND WIRE AS REQUIRED (3#12 AND #12G IN 3/4"C). CHANGE THERMAL OVERLOAD SETTINGS AT MOTOR CONTROL CENTER STARTER TO ACCOMMODATE HIGHER HORSEPOWER MOTOR.

2. CONNECT TO EXISTING SPARE 200A–3P CIRCUIT BREAKER IN PANEL 'MDP' VIA 3#3/0 AND #4GROUND IN 2" CONDUIT. VERIFY CONDUIT ROUTING WITH MSU PRIOR TO INSTALLATION. PROVIDE PLAQUE AT BOTH CHILLER CIRCUIT BREAKERS IN PANEL 'MDP' THAT READS "ONLY ONE CHILLER CIRCUIT BREAKER SHALL BE IN 'ON' POSITION AT A TIME".

3. PROVIDE 120 VOLT CONNECTION TO CHILLER HEATER. CONNECT TO EXISTING PANEL 'A' VIA 2#12 AND #12G IN 1/2" CONDUIT. PROVIDE NEW 20A–1P CIRCUIT BREAKER.

4. PROVIDE SELF REGULATING HEAT TAPE, NELSON "SLT–1" SERIES, 120 VOLT, 12 WATTS/FOOT, AND ALL CLIPS, JUNCTION BOXES, AND OTHER REQUIRED MATERIALS FOR A COMPLETE AND FUNCTIONAL SYSTEM. INSTALL IN NEW GUTTER AND DOWNSPOUT. CONNECT TO EXISTING PANEL 'A' VIA 2#12 AND #12G IN 1/2" CONDUIT. PROVIDE NEW 20A–1P CIRCUIT BREAKER WITH 30mA GFCI TRIP.



1 ENLARGED POWER PLAN

0 1 2 4 6 8 12 16

SCALE: 1/4"=1'–0"
(WHEN DRAWING IS PRINTED AT 11x17)

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MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

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TD&H Engineering
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MONTANA
BRAD M. KAUFFMAN
No. 14587 PE
LICENSED PROFESSIONAL ENGINEER

PPA#24-1200

TDH#G25-003

SHEET TITLE
ELECTRICAL PLAN

SHEET
E1.0

DATE
05-16-25

CONCRETE

1. CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301, "STANDARD SPECIFICATIONS FOR STRUCTURAL CONCRETE" AND ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE." ALL REINFORCING SHALL CONFORM TO THE CRSI SPECIFICATIONS & HANDBOOK. CONCRETE PLACEMENT SHALL MEET ALL COLD WEATHER AND HOT WEATHER REQUIREMENTS OUTLINED IN ACI 306 & 305 RESPECTIVELY.

MATERIALS

CONCRETE	ALL (U.N.O.)	PORTLAND CEMENT ASTM C150 TYPE II W/C RATIO = 0.45 MAXIMUM 28 DAY f'c = 4000 PSI SLUMP RANGE 3–5 INCHES AIR CONTENT = 4.5 – 7.5% ¾" MAXIMUM NORMAL WEIGHT AGGREGATE
REINFORCING BARS		ASTM A615, GRADE 60 (NON–WELDABLE) ASTM A706, GRADE 60 (WELDABLE) ASTM A–185 (WELDED WIRE FABRIC)

DEMOLITION

1. REFER TO DEMOLITION DRAWINGS FOR THE EXTENT AND REQUIREMENTS OF DEMOLITION WORK. COORDINATE LOCATION AND EXTENT OF DEMOLITION WORK WITH THE STRUCTURAL DRAWINGS TO ACHIEVE THE FINAL BUILT CONDITION DESCRIBED THEREIN. NOTIFY ARCHITECT AND ENGINEER OF ANY DISCREPANCIES BETWEEN THE STRUCTURAL, ARCHITECTURAL, AND DEMOLITION DRAWINGS PRIOR TO COMMENCING DEMOLITION.

2. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SEQUENCES OF DEMOLITION, FOR PROVIDING ALL TEMPORARY SHORING AND BRACING AS NEEDED TO SAFELY RESIST ALL LOADS WHICH THE EXISTING STRUCTURE MAY EXPERIENCE DURING DEMOLITION.

3. WHERE TEMPORARY SHORING OR BRACING IS REQUIRED, RETAIN THE SERVICES OF A STRUCTURAL ENGINEER REGISTERED IN THE PROJECT JURISDICTION TO DESIGN AND DETAIL THE BRACING OF THAT EQUIPMENT FOR THE GRAVITY AND LATERAL FORCES PRESCRIBED BY THE REFERENCE CODE. SUBMIT THE STAMPED AND SIGNED DESIGN DOCUMENTS TO THE PROJECT JURISDICTION AS A DEFERRED SUBMITTAL FOR APPROVAL PRIOR TO PERFORMING THE WORK.

4. REPAIR OR REPLACE ANY STRUCTURAL ELEMENTS DAMAGED DURING DEMOLITION TO MATCH THE STRENGTH, QUALITY, AND APPEARANCE OF THE EXISTING CONDITION. RETAIN THE SERVICES OF A STRUCTURAL ENGINEER REGISTERED IN THE PROJECT JURISDICTION TO DESIGN THE REPAIR OR REPLACEMENT OF A DAMAGED ELEMENT WHEREVER THE STRENGTH AND QUALITY OF THE EXISTING ELEMENT IS NOT EVIDENT. SUBMIT THE STAMPED AND SIGNED DESIGN DOCUMENTS TO THE PROJECT JURISDICTION AS A DEFERRED SUBMITTAL FOR APPROVAL PRIOR TO PERFORMING THE WORK.

5. SAWCUT EXISTING CONCRETE AND MASONRY WALLS AT LEAST 1" DEEP ON BOTH FACES OF WALL, ALL AROUND NEW OPENINGS PRIOR TO REMOVAL OF MATERIAL. DO NOT OVER CUT AT CORNERS.

6. REMOVE ALL DEMOLITION MATERIALS FROM THE SITE UNO AND DISPOSE OF IT IN A LEGAL MANNER.

SHOP DRAWINGS

1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER AND MUST RECEIVE APPROVAL PRIOR TO FABRICATION. SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING MATERIALS:
   1.1. CONCRETE MIX DESIGN
   1.2. REBAR TYPE & LOCATION

BAR SIZE			CONCRETE	
IN–LB	SOFT METRIC	AREA (IN*2)	HORIZ & VERT	TOP
#3	#10	0.11	1'–7"	2'–1"
#4	#13	0.20	2'–1"	2'–9"
#5	#16	0.31	2'–7"	3'–5"
#6	#19	0.44	3'–1"	4'–1"
#7	#22	0.60	4'–6"	5'–11"
#8	#25	0.79	5'–2"	6'–9"
#9	#29	1.00	5'–10"	7'–7"
#10	#32	1.27	6'–7"	8'–6"
#11	#36	1.56	7'–3"	9'–6"

NOTES:
1. FOR REINFORCING WITH EPOXY COATING, MULTIPLY LAP LENGTH SHOWN BY 1.5.
2. CONCRETE LAP LENGTHS ARE CLASS "B" BASED ON F'C=4,000 PSI WITH COVER REQUIREMENTS INDICATED AND BAR SPACING AT LEAST TWO BAR DIAMETERS.
3. TOP BAR LAPS ARE HORIZONTAL LAPS WHERE MORE THAN 12" OF FRESH CONCRETE IS PLACED BELOW THE BARS.
4. TOP BAR LENGTHS MAY BE USED AT ALL LOCATIONS IN CONCRETE AT THE CONTRACTOR'S DISCRETION.

1 TYP. REINFORCING SPLICE LENGTHS

NTS

TDH 1904
TDH 11806

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MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

JUTTILA RESEARCH LAB
CHILLER REPLACEMENT

TD&H Engineering
tdhengineering.com

DRAWN BY:		RLT
REVIEWED BY:		SWM
REV.	DESCRIPTION	DATE

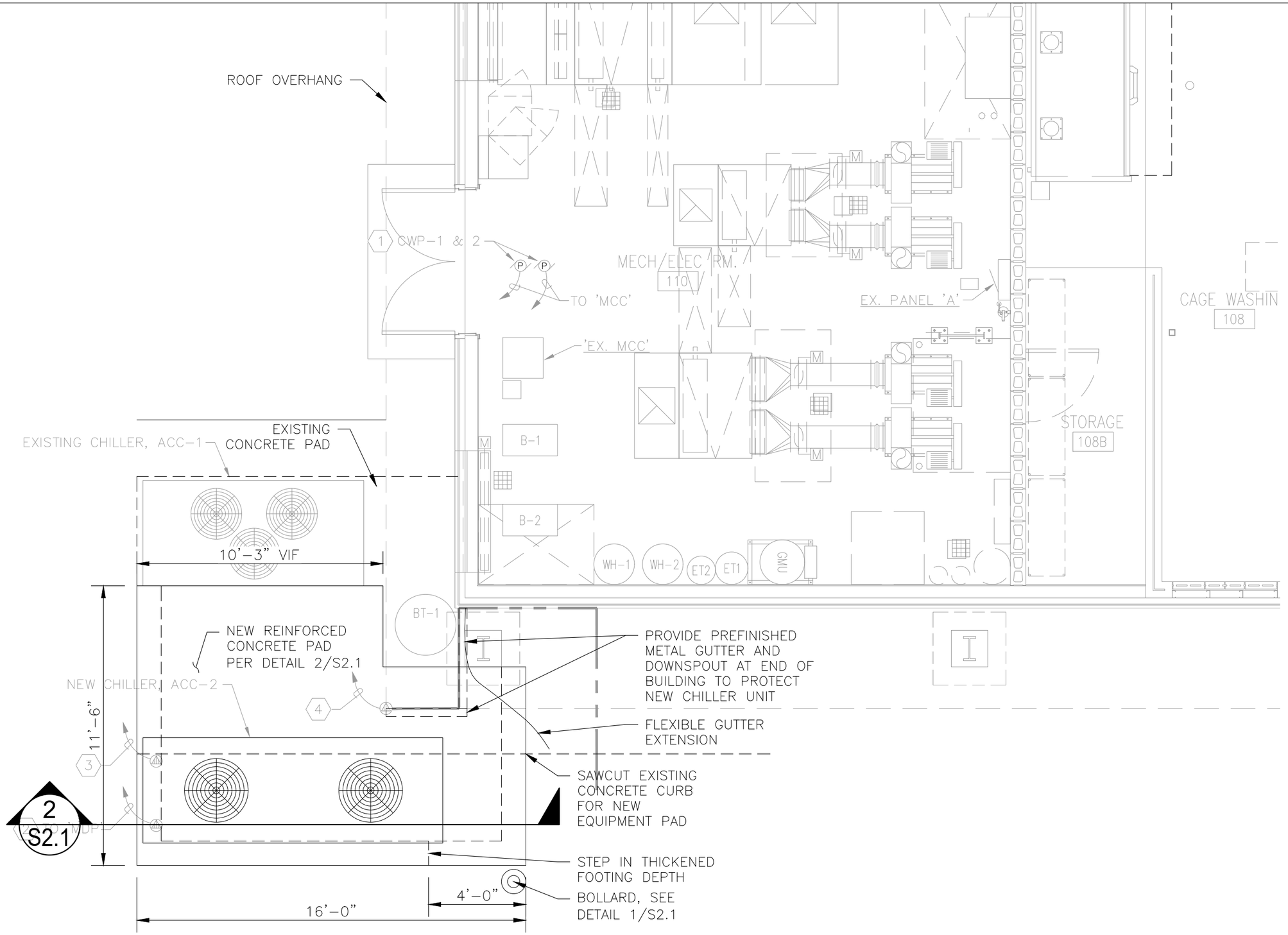
MONTANA
SCOTT W. MAHURIN
No. 38400 PE
PROFESSIONAL ENGINEER

PPA#24-1200
TDH#G25-003

SHEET TITLE
GENERAL NOTES & TYPICAL DETAILS

SHEET
S1.0

DATE
05-16-25



1 FOUNDATION PLAN

0 2' 4'

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MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

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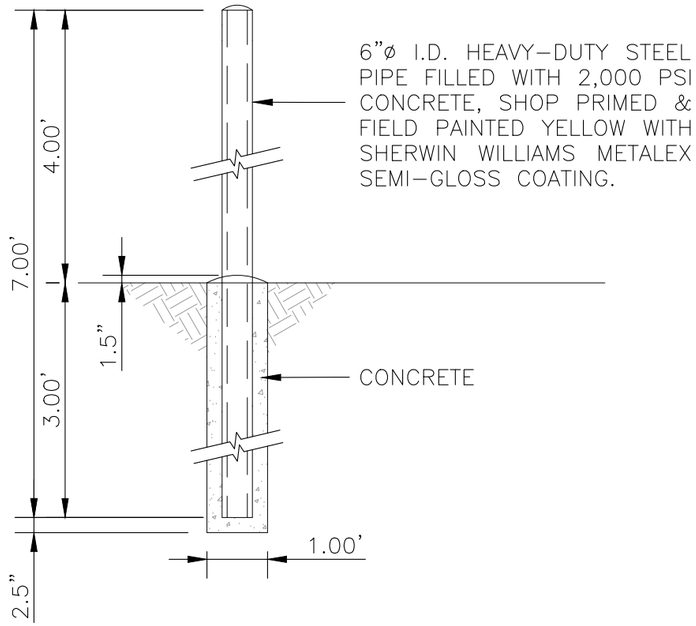
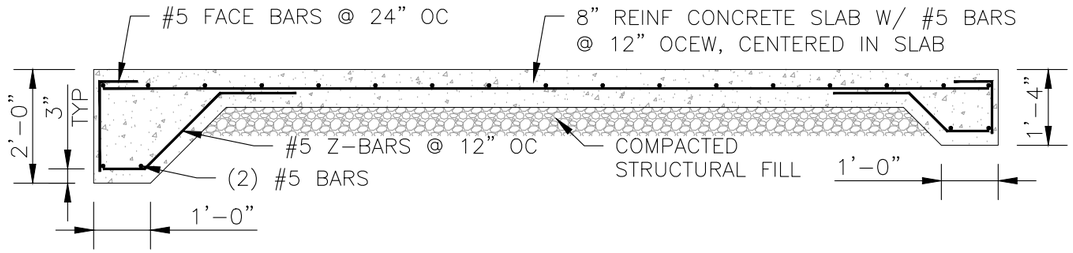


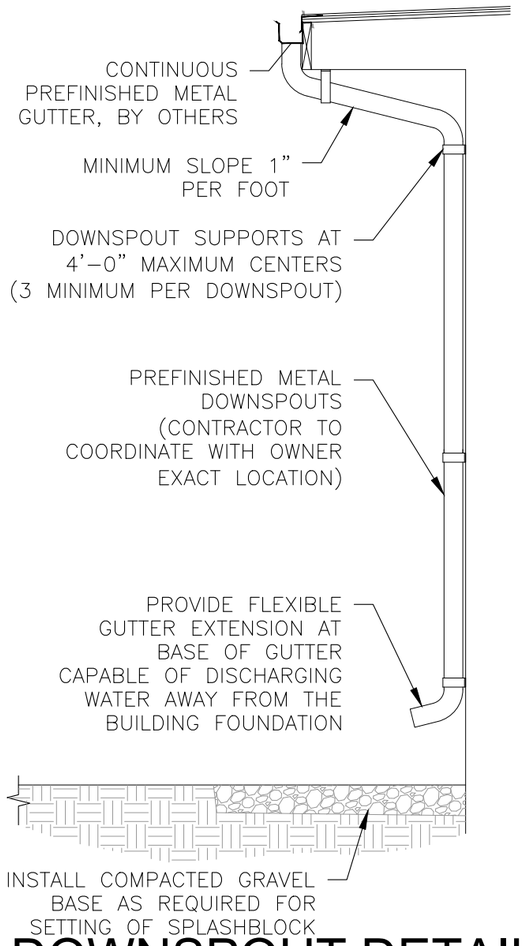
1 TYPICAL BOLLARD DETAIL

NTS



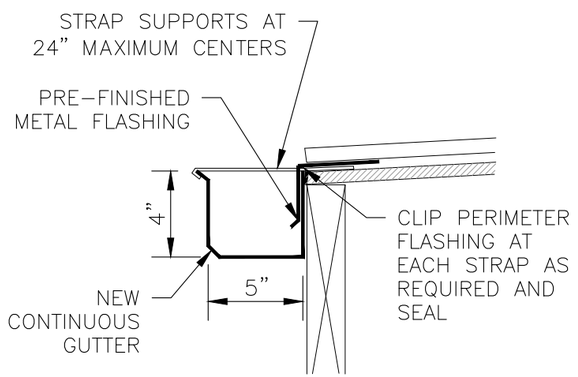
2 SLAB SECTION

0 2' 4'



3 DOWNSPOUT DETAIL

NTS



5 GUTTER DETAIL

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