

CAMPUS PLANNING, DESIGN & CONSTRUCTION

Sixth Avenue and Grant Street • P.O. Box 172760 • Bozeman, Montana 59717-2760 Phone: (406) 994-5413 • Fax: (406) 994-5665

ADDENDUM NO. 1 - OUTLINE AND SUMMARY INFORMATION

Project Name:Leon Johnson Redundant Heat Pump ModuleLocation:Montana State University - Bozeman

<u>PPA No.: 19-0042</u> Date: November 3, 2021

Owner: <u>State of Montana, MSU - Bozeman</u> <u>Plew Building 6th and Grant, PO Box 172760</u> Bozeman, Montana 59717-2760

To: All Plan Holders of Record

The Plans and Specification prepared by <u>Cushing Terrell (fka CTA Architects and Engineers)</u> dated <u>October 15, 2021</u> shall be clarified and added as follow. The bidder proposes to perform all the following clarifications or changes. It is understood that the Base Bid shall include any modification of Work or Additional Work that may be required by reason of the following change or clarifications.

The Bidders are to acknowledge the receipt of this Addendum by inserting its number and date into their Bid Forms. Failure to acknowledge may subject the Bidder to disqualification and rejection of the bid. This Addendum forms part of the Contract Documents as if bound therein and modifies them as follows:

1. AMENDMENTS TO THE PROJECT MANUAL

a. SECTION 230523 - GENERAL-DUTY VALVES FOR HVAC PIPING

- i. Part 2, add the following: "2.6 Control Valves shall be fully proportioning and provide near linear control. The valves shall be quiet in operation and fail-safe closed position. Valves shall operate in sequence with another valve when required by the sequence of operations. Control valves as scheduled on the drawings shall be sized by the control manufacturer. Control valves shall be suitable for the system flow conditions and close against the differential pressures involved. Body pressure rating and connection type (sweat, screwed, or flanged) shall conform to the pipe schedule elsewhere in this Specification. Ball valves shall be acceptable for bypass applications up to 4 inch, butterfly valves shall be acceptable for bypass applications greater than 2 inches. Electronic valve actuators shall be manufactured by the valve manufacturer. Each actuator shall have current limiting circuitry incorporated in its design to prevent damage to the actuator. Modulating actuators shall be provided as required by the sequence of operations. Actuators shall provide the minimum torque required for proper valve close-off against the system pressure for the required application. The valve actuator shall be sized based on valve manufacturer's recommendations for flow and pressure differential as scheduled on the drawings. Actuators on valves shall have mechanical spring. The spring return feature shall permit normally open or normally closed positions of the valves, as required. All direct shaft mount rotational actuators shall have external adjustable stops to limit the travel in either direction. Modulating actuators shall accept 24 VAC or VDC and 120 VAC power supply and be UL listed. The control signal shall be 2-10 VDC or 4-20 mA."
- ii. Part 3, Paragraph 3.2, add the following: "G. Control valves for pump bypass sequence of operation, provide as shown, coordinate with Controls Contractor."

b. INVITATION TO BID

i. Change overall completion date from March 15, 2022 to February 15, 2023. Note intermediate completion date of March 1, 2022 for majority of work per Project Phasing Notes on Sheet G001.

2. AMENDMENTS TO THE DRAWINGS (attached)

- a. G001, Revision No. 1 Addendum 1 dated Nov. 3, 2021.
- b. M001, Revision No. 1 Addendum 1 dated Nov. 3, 2021.
- c. M100, Revision No. 1 Addendum 1 dated Nov. 3, 2021.
- d. M101, Revision No. 1 Addendum 1 dated Nov. 3, 2021.
- e. M200, Revision No. 1 Addendum 1 dated Nov. 3, 2021.
- 3. PRE-BID MEETING INFORMATION (attached)
 - a. Pre-bid Meeting Agenda
- 4. PRE-BID MEETING ATTENDENT LIST (attached)
 - a. Pre-bid meeting attendance list



BOZEMAN, MT 59715

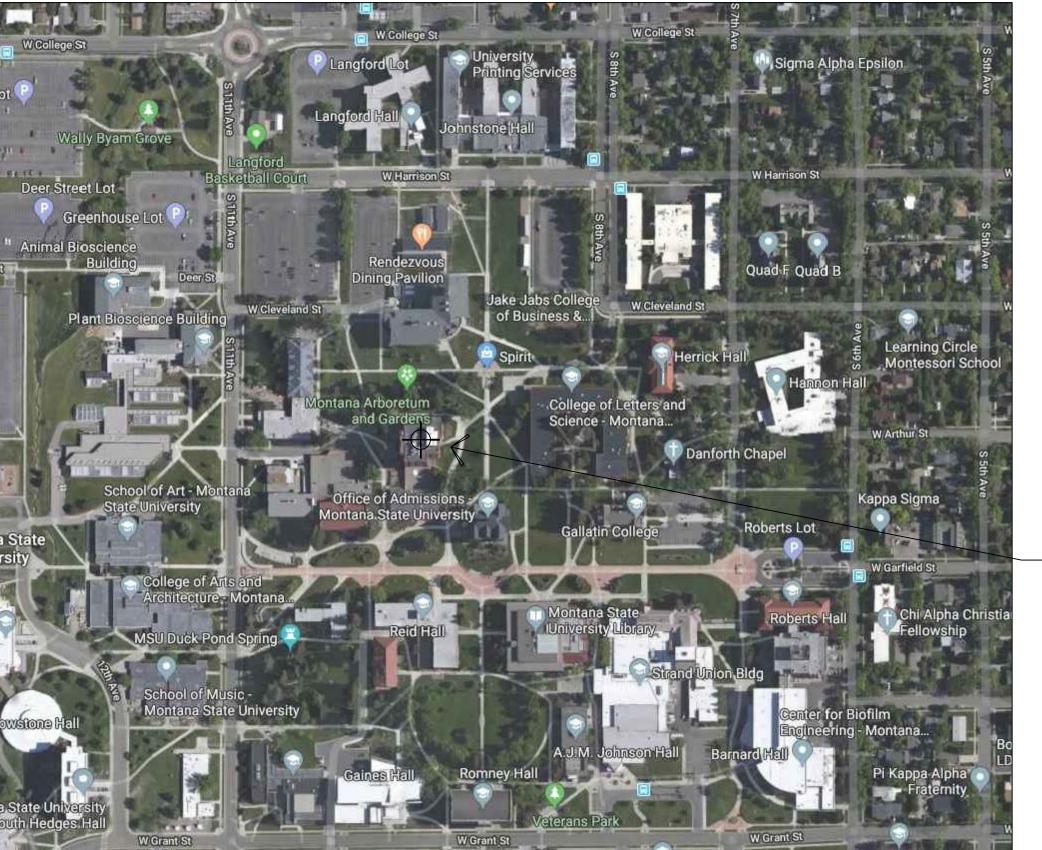


LEON JOHNSON HALL **REDUNDANT HEAT PUMP** MODULE INSTALLATION

OCTOBER 15, 2021

LEON JOHNSON HALL

VICINITY MAP: Locator



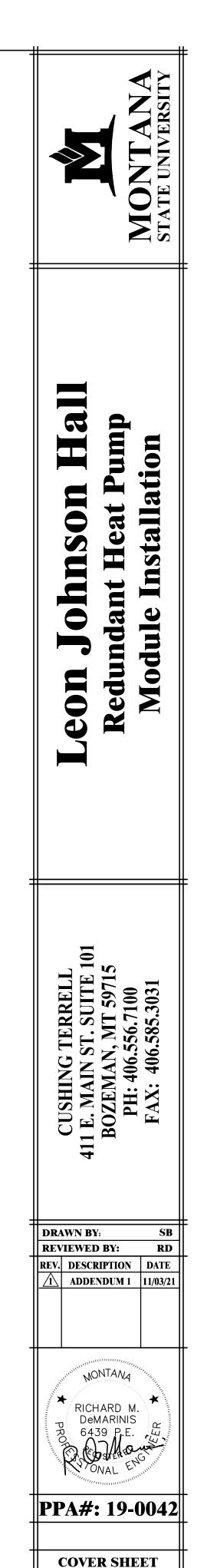
LEON JOHNSON HALL

OWNER Montana State University Bozeman, MT 59715

MECHANICAL

CUSHING TERRELL RICK DEMARINIS, P.E. JEFF FAIN, P.E. 316 Last Chance Gulch Helena, MT 59601 (406) 495-9400

ELECTRICAL CUSHING TERRELL 411 E. Main St. Bozeman, MT 59715 (406) 556-7100



G001

10-15-2021

1.1 HEAT PUMP INSTALLATION CONSTRAINTS AND OUTAGE EOUIREMENTS

A. HEATING HOT WATER AND COOLING CHILLED WATER MUST BE PROJECT TO RELOCATE THE EXISTING HEAT PUMP MODULES AND ADD THE NEW HEAT PUMP MODULE.

B. THE HWS AND HWR ISOLATION VALVES TO THE HEAT PUMP MODULES ARE TO BE CLOSED, THE HEAT FUNCTION OF THE HEAT PUMP MODULES ARE TO BE DISABLED. THE STEAM HEAT EXCHANGER HX-2(E) IS TO PROVIDE HEAT FOR THE BUILDINGS. REFER TO THE EXISTING HEAT PUMP PLANT CONTROL SEQUENCE, PARAGRAPHS E. AND F. ON DRAWING M001.

C. THE CWS AND CWR ISOLATION VALVES TO THE HEAT PUMP MODULES ARE TO BE CLOSED, THE COOLING FUNCTION FOR THE HEAT PUMP MODULES ARE TO BE DISABLED, THE HEAT PUMP BYPASS VALVE OPENED. AHU-1 AND AHU-4 ARE TO PROVIDE FREE COOLING FOR THE BUILDINGS. REFER TO THE EXISTING HEAT PUMP PLANT CONTROL SEQUENCE, PARAGRAPH G. ON DRAWING M001.

D. IN ORDER FOR THE FREE COOLING TO BE EFFECTIVE, THE OUTSIDE AIR TEMPERATURE NEEDS TO BE LESS THAN 50 deg. F (adj.) WHEN THE HEAT PUMPS MODULES ARE DISABLED. COORDINATE SHUTDOWN OF THE HEAT PUMP PLANT WITH MSU FACILITIES WHEN APPROPRIATE WEATHER IS

ANTICIPATED. 1.2 PROJECT PHASING

A. ALL WORK SHOWN ON THE PLANS WITH THE EXCEPTION OF INSTALLATION OF HEAT PUMP HP-6 (WHICH ARE BEING PRE-PURCHASED BY THE OWNER), SHALL BE COMPLETED BY THE CONTRACTOR BY MARCH 3 2022. PROVIDE TEMPORARY SPOOL PIECES FOR THE LATER INSTALLATION OF HP-6.) B. OWNER EXPECTS TO TAKE DELIVERY OF HP-6 AFTER MARCH 1, 2022.

C. CONTRACT SHALL RIG THE HEAT PUMP HP-6 INTO PLACE IN THE LEON JOHNSON BASEMENT MECHANICAL ROOM FROM THE OWNER'S STORAGE FACILITY. HP-6 IS APPROXIMATELY 34"x72"x67" DEEP, 2610 LBS. D. HP-6, ASSOCIATED HEAT PUMP MANUFACTURER'S MASTER CONTROLLER UPGRADES AND HP-6 POWER WIRING SHOWN ON DRAWING

E-100 SHALL BE INSTALLED DURING A CONSTRUCTION PERIOD OF NOVEMBER 15, 2022 AND FEBRUARY 15, 2023.

SHEET INDEX

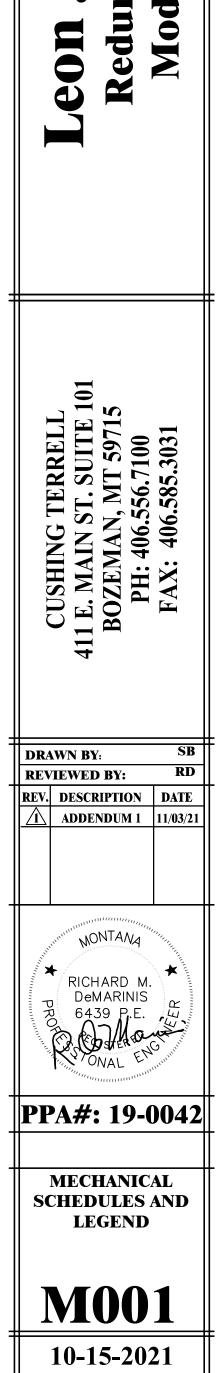
GENERAL G001 COVER SHEET MECHANICAL M001 MECHANICAL SCHEDULES AND LEGEND M010 MECHANICAL DEMOLITION PLAN M100 MECHANICAL PLAN M101 SEVENTH AND EIGHT FLOOR MECHANICAL PLANS M200 MECHANICAL FLOW DIAGRAMS ELECTRICAL E100 ELECTRICAL PLANS AND SCHEDULES

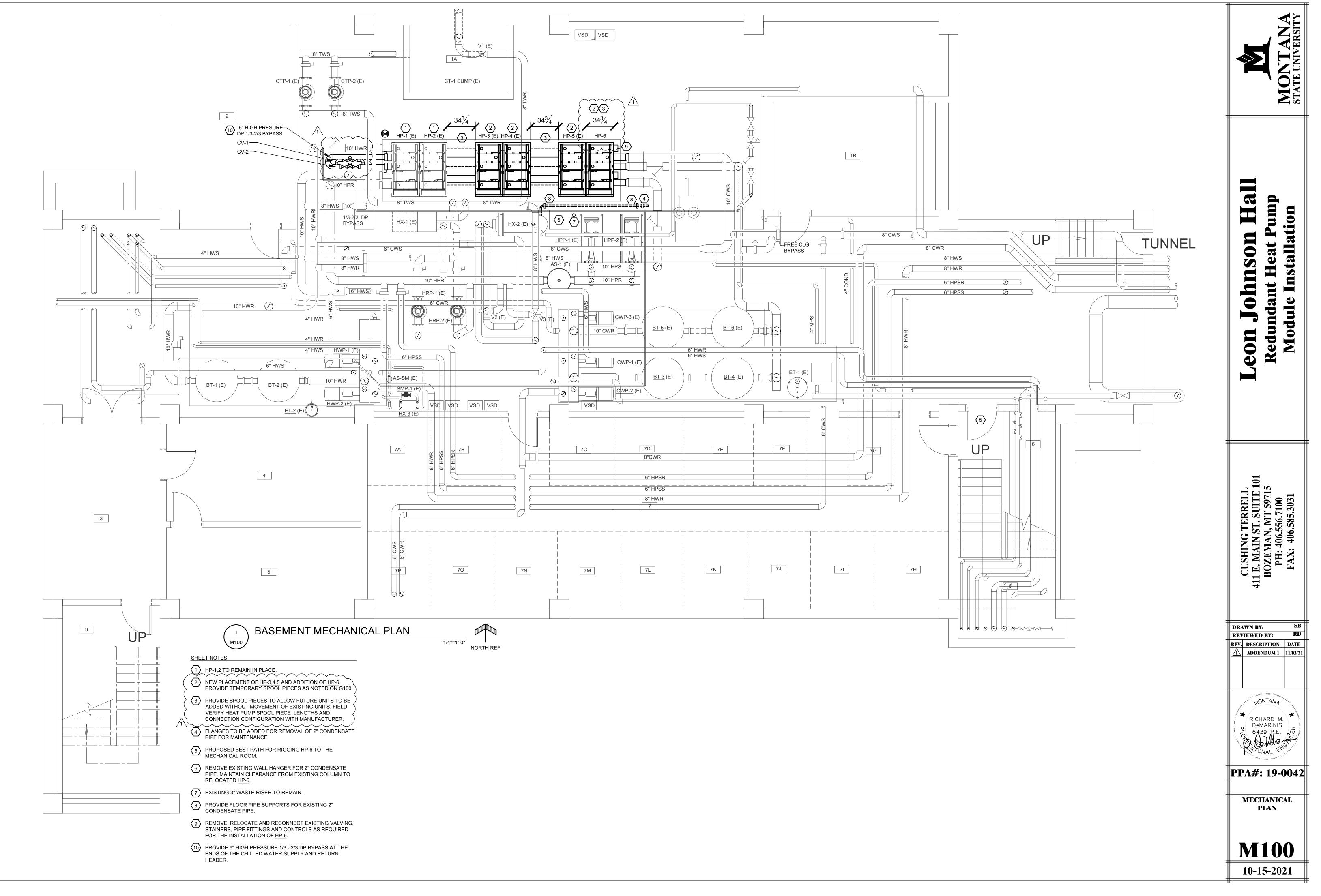
													Γ PUMF																
PLAN	LOCATION							CC	OLING									HE	ATING						ELE				
CODE	ROOM #	MFGR	MODEL	EVAPO GPM	RATOR	CONDE GPM						(MBH)	EER	EVA GPI							(M	OT BH)	EER)WER Ph/Hz)	MCA	MCOP	REM	/IARK
HP-1 (E)	1	CLIMACOOL	UCH085AF ASAHB0S	210	14.8	255	13.3	85	95	55	45	975.8	15.8	110		190	7.8	,		, , ,	. ,	359	3.92	46	60/3/60	162	225		1, 4
HP-2 (E)	1	CLIMACOOL	UCH085AF ASAHB0S	210	14.8	255	13.3	85	95	55	45	975.8	15.8	110	0 3.8	190	7.8	82.	0 62.0	105 1	20 13	359	3.92	46	80/3/60	162	225		1, 4
HP-3 (E)	1	CLIMACOOL	UCH085AF ASAHB0S	210	14.8	255	13.3	85	95	55	45	975.8	15.8	110	0 3.8	190	7.8				-	359	3.92		80/3/60	162	225		2, 4
HP-4 (E) HP-5 (E)	1	CLIMACOOL	UCH085AF ASAHB0S UCH085AF ASAHB0S	210	14.8	255 255	13.3	85	95 95	55 55	45	975.8 975.8	15.8	110		190	7.8					359 359	3.92 3.92		30/3/60	162	225		2, 4 2. 4
HP-6	1	CLIMACOOL	UCH085AF ASAHB0S	210 210	14.8 14.8	255	13.3 13.3	85 85	95	55	45	975.8	15.8 15.8	110		190 190	7.8 7.8					359	3.92		80/3/60 80/3/60	162 162	225 225		2, 4 3, 4
NEW HEAT P	BE RELOCATE	CHASED BY TH	TOTAL E OWNER, RIG FROM OWN LOAD AND SOURCE SIDES		GE FACILIT	1530 Y INTO P	LACE AS	SHOW	/N ON DR	AWING N	//100. NE	5854.8	MP TO BE INT	660 TEGRA	I	1140	S, PRO	VIDE 60 M	ESH BASKI	TS FOR EXIST		IS4	N ALL (3	3) INLET.					
EXISTING HEAT WORK PERFOR	F PUMP PLANT CORNED BY MTI CO	ONTROL SEQUEN	CE (NEW WORK IS SHOWN BO		G. COOL	ING WATE	R:					~~~~~	\sim							PLIM	P SC			:					
HEAT PUMP PUMPS ARE 10 PALTERNATIC UTE DELAY THE	SOURCE WATER 00% REDUNDAN DN LAG PUMP RA E LEAD PUMP RA	R PUMPS {HPP-1, : T AND ALTERNATI MPS UP TO LEAD MPS DOWN AND	E ON A WEEKLY BASIS. DURING PUMP SPEED AND AFTER A 1 SHUTS OFF. THE PUMPS ARE	G A	50°F (ADJ.), (BASED ON R OUTPUT OF	RE IS ABO COOLING \ ETURN W 20% UP TO	OVE 43°F WATER T ATER TEI O A DIFFE	(ADJ.). W EMPERA /IPERAT RENTIA	/HEN OUTS TURE IS R JRE. DIFFI _ OF 0°F W	SIDE AIR T ESET BY (ERENTIAL 'ITH A PID	EMPERAT CLIMA COO WILL BE 1 OUTPUT (URE IS BELC OL PID OUTP 11°F WITH A P OF 62% (ADJ.	UT { PID }). } PLA		LOCATION	SERVIC	=	MFGR	MODEL N		GPM	HEAD (FT)				POWER (V/PH/HZ)			NO
ERMINED BY TI NTRACTOR FUR RATES CONTIN	HE TEST AND BARNISHED THE VFI NUOUSLY TO MA	LANCE CONTRAC D'S FOR EACH PU INTAIN THE SYST	EM DIFFERENTIAL PRESSURE CTOR. THE CONTROL IMP MOTOR. THE LEAD PUMP EM DIFFERENTIAL SETPOINT. I AND AN ALARM REQUIRING	F	WHEN RETU RETURN WA SUPPLY WA	RN WATER TER TEMP TER TEMP	r tempe Peratur P eratur	RATURE E GOES E SENSC	GOES BEL ABOVE 55° DR TO THE	OW 49 °F °F (ADJ.). I LOCATIO	, AND RE-E RELOCATE N SHOWN	OOL IS DISAE ENABLED WH E CLIMA COO I, PROVIDE A TING LOCATI			LJ BSMT	CLG. TOV	VER	TACO	KS 5095	BASE MTI		20	1,750		HP 20	460/3/60	DIA. 11.625	EFF. 85%	NO
NOWLEDGEME	ENT IS INITIATED	AT THE OPERATO	OR WORKSTATION. CURRENT		WHEN CLIM/ PRE-CHILLE COOLING CO	A COOL IS D WATER V ONTROL V/	DISABLE VALVE A1 ALVE SHA	D, CHILL AHU- 2 ALL OPE	ED WATEF ARE OPEN N. THESE \	R VALVES I TO PROV /ALVES W	at ahu-1 /ide free 'ill close	AND AHU-4, A COOLING. FI UPON CLIM - 2/3 (CV-1 A	AND { REE } CTP-	. ,	MECH LJ BSMT MECH	CLG. TOV		TACO	KS 5095		,	20	1,750			460/3/60	11.625	85%	NO
PUMPS ARE 10	00% REDUNDAN ON LAG PUMP RA	MPS UP TO LEAD	E ON A WEEKLY BASIS. DURING PUMP SPEED AND AFTER A 1	G	CV-2) CHILLI CLIMA COOL WATER BYP	ED WATER DIFFERE ASS SHAL	BYPASS NTIAL AT	VALVE 10 PSID ATED T	S SHALL M (ADJ.). LC O MAINTAI	IODULATE W PRESS N MINIMU	ED TO MAI SURE (CV-3 M CLIMA (NTAIN MAXIN 3) CHILLED COOL	HPP-	()	LJ BSMT MECH LJ BSMT	HP SOUR WATER HP SOUR		TACO	FI 8013	BASE MTI	, -		1,150			460/3/60	12.25	84%	NO
ITROLLED IN A ERMINED BY TI	MANNER TO MA HE TEST AND BA RNISHED THE VFI	INTAIN THE SYST LANCE CONTRAC D'S FOR EACH PU	SHUT OFF. THE PUMPS ARE EM DIFFERENTIAL PRESSURE CTOR. THE CONTROL MP MOTOR. THE LEAD PUMP	È	DIFFERENCI SINGLE CON WHEN THE S	AL PRESS ITROLLER SOURCE W	URE SEN TO AVO ATER GO	SORS A D NETW DES ABO	ND CHILLE ORK LAG VE 106°F A	E d Water Time . Thi	r <i>Pump VF</i> E climaco	PASS VALVE FD'S TO BE TO OOL IS DISAB (HEN THE			MECH LJ BSMT	WATER HP CHILL		TACO TACO	FI 8013 FI 6013	BASE MTI			1,150 1,750		40	460/3/60	12.25 11.375	84% 83%	NO ⁻
E LEAD PUMP FA	AILS, THE LAG PU ENT IS INITIATED	JMP IS ENABLED	EM DIFFERENTIAL SETPOINT. I AND AN ALARM REQUIRING DR WORKSTATION. CURRENT INDICATION AT THE OPERATO	Ĺ	THE MICROP	PROCESSO		ROL PAN	IEL SHALL	LIMIT TO	FIVE (5) T	THE NUMBER	OF CWP-	. ,	MECH LJ BSMT MECH	WATER HP CHILL WATER	ED	TACO	FI 6013	BASE MTI	,		1,750			460/3/60	11.375	83%	NO
		ATER PUMP {CWP	-3}: 45°F (ADJ.) THE PONY PUMP	C	USER INTER	FACE AT		T PUMP.	\sim			TED AT THE		-3(E)	LJ BSMT MECH	HP CHILL WATER		TACO	FI 3013	BASE MTI	0. 600	105	1,750) 58.5	30	460/3/60	11.375	83%	NO
ES OVER AS TH FER DIFFERENT N JOHNSON. W	HE LEAD PUMP. ⁻ TIAL PRESSURE VHEN THIS PUMP	THIS PUMP MODU SETPOINT AS ME IS RUNNING ABC	LATES TO MAINTAIN THE CHIL ASURED ON THE 8TH FLOOR A OVE 56 HERTZ FOR LONGER TH SUME OPERATION AND THE PO	LED .T IAN	THE SOURC UTILIZING A	e water i Combina ⁻ Ration. T	LOOP IS I TION OF ⁻ THE SOUF	AINTAI	NED BETW OUND SOU ER IS COM	RCE LOOF	O AND THE	TEMPERATUR	, , , , , , , , , , , , , , , , , , ,	. ,	LJ BSMT MECH LJ BSMT	HP HEAT WATER HP HEAT		TACO TACO	FI 5011 FI 5011	BASE MTI			1,150 1,150			460/3/60	13.375 13.375	85% 85%	NO ⁻
IP WILL BE DISA TUS INDICATIO	ABLED. CURREN	T SENSORS FOR ATOR WORKSTAT	PROOF OF FLOW AND PUMP	1^{1}		INJECTIO		(HIP-1, 2	~~~~			~~~~~		. ,	MECH	WATER				- REMOVE	,		1,100				10.070		
PUMPS ARE 10 PALTERNATIC UTE DELAY THE	00% REDUNDAN ⁻ ON LAG PUMP RA E LEAD PUMP RA	T AND ALTERNATI MPS UP TO LEAD MPS DOWN AND	E ON A WEEKLY BASIS. DURING PUMP SPEED AND AFTER A 1 SHUTS OFF. THE PUMPS ARE EM DIFFERENTIAL PRESSURE		THE SOURC	E WATER I	IS CONTR	OLLED I G THE H	EAT PUMP	. WHEN TH	HE LOOP T			2(E)						- REMOVE	D								\vdash
ERMINED BY TI ERENTIAL PRE I'S FOR EACH P	HE TEST AND BA ESURE SENSOR. PUMP MOTOR. TH	LANCE CONTRACT THE CONTROL CO IE LEAD PUMP OF	TOR OF THE HEAT PUMP ONTRACTOR FURNISHED THE PERATES CONTINUOUSLY TO		ENABLES HF SOURCE TEI TEMPERATU	RP 1 OR 2 / MPERATUR IRE, MODU	AND ENA RE DROP JLATE IN	BLES CT S 6°F BE SEQUEN	P 1 OR 2, A LOW SETF CE THE C	AND DISAE POINT. UP DOLING T	BLES PUMI ON A FUR ⁻ OWER VAL	PS WHEN THER RISE IN LVE V1 AND		. ,	LJ BSMT MECH LJ BSMT	CLG. TOV HX-1 CLG. TOV		TACO TACO	KS 801 ⁷ KS 801 ⁷	INLINE	1,275	30 30	1,150 1,150			460/3/60	9.375 9.375	82% 82%	NO ⁻
IP IS ENABLED	AND AN ALARM	REQUIRING ACKN	THE LEAD PUMP FAILS, THE LA IOWLEDGEMENT IS INITIATED A S FOR PROOF OF FLOW AND KSTATION.	AT	COOLING TO CONTROLLE MANUAL PO	WER FAN D TO FULL NT ON GR	IS DISAB BYPASS APHICS \	LED ANI AND CO VILL DIS) THE COC OOLING TC ABLE TOW	ULING TOV WER DRA ER, LOCK	VER VALVI IN VALVE COOLING	V2 IS OPENE TOWER VAL	D. A VE GSP-	. ,	MECH JABS HALL	HX-1 GRD. SOI WELLS	JRCE				.,		250					0270	NO ⁻
HEAT PUMPS	THE CONTROL P	VÍTH A LON COMP ANEL PROVIDES /	ATIBLE MICROPROCESSOR		THROUGH W K. SUMF	/INTER.	/E					EMAIN DRAIN	GSP-	-2(E)	JABS HALL	GRD. SOU WELLS							250						NO
TER SETPOINT ROPROCESSO	CONTROL. INTE	GATE HEAT PUMP EL SIMILAR TO TH	E CHILLED AND HEATING HOT P HP-6 INTO THE IE EXISTING HEAT PUMPS. THE MP, STAGING, CYCLING AND		ADJUSTABL	•••=••	IT, COOR	DINATEI	WITH OV			P LEVEL AT A	N SWP-	. ,	JABS HALL JABS	GRD. SO HX GRD. SO							250 250						NO NO
IPERATURES. T DISABLING TH	THE CONTROL CONTROL CONTROL CONTROL	ONTRACTOR WAS	ED AND HOT WATER LOOP S RESPONSIBLE FOR ENABLING NTRACTOR IS RESPONSIBLE F S BACK ALL POINTS TO THE FR	G FOR	PUMP OPER PUMP FAILS	ATION IS E THE LAG	ENABLED PUMP IS	THROU(ENABLE	gh loop c d and an	ONTROL	SEQUENC EQUIRING	i Time Hours E. If the Lea N. Current	S.	. ,	HALL LJ BSMT MECH	HX SNOW MI HX-3	ELT	TACO	KS 1507	INLINE	63	45	1,750) 1.44	1.5	460/3/60	6.625	57.9%	NO
NUNCIATED AT RENT MONTAN HEATING WA TING WATER T IPERATURE TO ONTROLLED U FOLLOWS: CLIM ON ENABLING O ITTEN TO THE C IPERATURE BY L BE BASED ON	THE OPERATOR NA STATE UNIVE EMPERATURE A 145°F AT -5°F O TILIZING STEAM MA COOL SETPOI OF THE HEATING CLIMA COOL TO I Y A VALUE SET B N THE PID OUTPL	WORKSTATION IN RSITY ALARM PRO RE RESET FROM UTDOOR AIR TEM INJECTION AS WE NT WAS SET BY T SYSTEM, THE HEA BE HIGHER THAN Y THE FOLLOWING JT FROM THE CLII	NS AT THE PANEL ARE N CONFORMANCE WITH THE DTOCOL STANDARD. 90°F AT 40°F OUTDOOR AIR PERATURE (ADJ.). THE SETPO ELL AS CLIMA GOOL OPERATIO THE CONTROLS CONTRACTOR ATING WATER SETPOINT IS THE HOT WATER RETURN 3 RESET SCHEDULE. THE RESI MA COOL, FROM A 11°F	INT N ET	WORKSTATI M. COOL THE PUMPS PUMP OPER PUMP FAILS ACKNOWLEI SENSORS FO	ON. ING TOWE ARE 100% ATION IS E THE LAG DGEMENT DR PROOF ON. LEVEL EVEL FALL	ER PUMPS REDUNE ENABLED PUMP IS IS INITIA OF FLOV SWITCH S BELOV	6 (CTP-1 DANT AN THROUG ENABLE FED AT 1 V AND P IN THE	2): D ALTERN GH LOOP C D AND AN THE OPER/ UMP STAT SUMP TO L	ATE BASE CONTROL ALARM RE ATOR WOP US INDICA	D ON RUN SEQUENC EQUIRING RKSTATIO ATION AT 1	I TIME HOURS E. IF THE LEA N. CURRENT THE OPERATION	S. AD OR	1) E) 2) E) 3) E) 3) E) 4) E) 0 5) E)	XISTING PUM XISTING PUM PERATING CO XISTING PUM PERATING CO	P WITH VAR P WITH VAR ONDITION. P WITH VAR ONDITION. TANT SPEEL	ABLE SI ABLE SI ABLE SI) PUMP	PEED DRI' PEED DRI' PEED DRI'	VE TO REM VE TO REM VE TO REM	ANCE FOR 127 AIN, SYSTEM (AIN, SYSTEM (AIN, SYSTEM (CONTAINS 35	ONTAINS ONTAINS ONTAINS	35% PRC 35% PRC)PYLEN)PYLEN	IE GLYCC)L/ 65% W/)L/ 65% W/	ATER, TEST ATER, TEST	AND RECO	RD EXIST	ΓING
J.). THE INTENT TING FUNCTION IPERATURE GC	TION OF THIS RES	SET IS TO LIMIT C COOL IS DISABLE AND RE-ENABLED	PERATURE RISE AT 62% OUTPU OMPRESSOR CYCLING. ED IF HEATING RETURN WATER WHEN THE RETURN WATER	२	RELAY FROM	JT RELAY // THE EXIS IEN THE H	FROM TH STING CC EAT OUT	E EXIST NTROLL PUT COI	ING CONTI ER AS AN NTACTS AF	Roller: U INPUT TO RE CLOSE	JSE THE H THE BUIL D, VERIFY	OUTDOOR A	IR					С	ONTF	Rol Val	VE S	CHE	DUI	LE (35%	% GYLCOL)			
L BE DISABLED ENABLED WHEN EN SOURCE WA JRCE WATER TI) WHEN SOURCE N SOURCE WATE ATER TEMPERAT EMPERATURE G	WATER TEMPERA ER TEMPERATURE FURE GOES ABOV OES BELOW 82°F	G FUNCTION OF THE CLIMA CC ATURE GOES BELOW 45°F, ANI E GOES ABOVE 49°F (ADJ) OR E 87°F, AND RE-ENABLED WHE (ADJ). HEATING FUNCTION OF DE AIR TEMPERATURE IS BELO	N W	EXCHANGEF OPENS CLOS SMP-1. SUPF AND 95°F WI	R AND ENE SE THE 2-V PLY TEMP HEN THE C OR PROOF	RGIZE SI WAY VAL RESET IS DUTDOOF	/IP-1. WH /E AT TH 125°F V R AIR TEI	IEN THE H IE SNOWM /HEN OUTI /IPERATUF	EAT RELA IELT HEAT DOOR AIR RE IS 10°F	Y FROM T EXCHANG TEMPERA (ADJ.). CU	W MELT HEA HE CONTROL GER AND STO ATURE IS -10° JRRENT THE OPERATO	LER DP PLA F COI		LOCATION	SERVIC		VALVI	E TYPE	VALVE BODY	CV	GF	PM LO	PSI)	REMARKS				
STEAM INJE 3-WAY DIVER	TING VALVES A		LY OPEN TO THE HEATING P. THE 2 ½" 2-WAY VALVE			IUM RUNT		: This is		MUM RUN	TIME OF T	HE HEAT	cv cv	12	LJ BSMT MECH LJ BSMT	HIGH PRES 1/3 BYPAS HIGH PRES	S SURE	MODUL		2 1/2"	51 150	16	20	10 10 N	SUITA	CLOSED S	PTO 50 PSI. PRING RET	URN	
DULATES TO M ROSS THE HEA LY OPEN AND AY VALVE MOI 9, WITH BOTH V	AINTAIN A PRES DERS OF THE C CAN NO LONGE DULATES OPEN VALVES CONTIN	SSURE DIFFEREN CLIMA COOL HEA R MAINTAIN PRE . THIS VALVE MO UING TO MODUL	P. THE 2 ½ 2-WAY VALVE NTIAL OF 4.5 PSID AS MEASUF T PUMP. WHEN THIS VALVE IS SSURE DIFFERENTIAL, THE & DULATES IN INCREMENTS OF ATE DOWN TO MAINTAIN S. THE 8" VALVE IS FULLY	RED S 3"	END OF SEC							Ĺ		/-3	WECH	2/3-BXPAS LOW PRES BYPASS	SSURE	MODUL	ATING	1 1/2"	27.5	6	 i1	5 N	IORMALLY SUITA	BLE FOR UF CLOSED SI BLE FOR UF	PRING RET PTO 50 PSI.	URN	
ENED WHEN THE STEAM HEAT PPLY WATER T FERENTIAL PR	HE HEATING FUI EXCHANGER M EMPERATURE A ESSURE TRANS SED TO PROVE	NCTION OF THE (ODULATES 1/3 A NT SETPOINT PEF DUCER INSTALL FLOW, AND PREN	CLIMA COOL UNIT IS DISABLE ND 2/3 VALVES TO MAINTAIN R RESET SCHEDULE. A ED ACROSS THE STEAM HEA VENT STEAM VALVES FROM																										

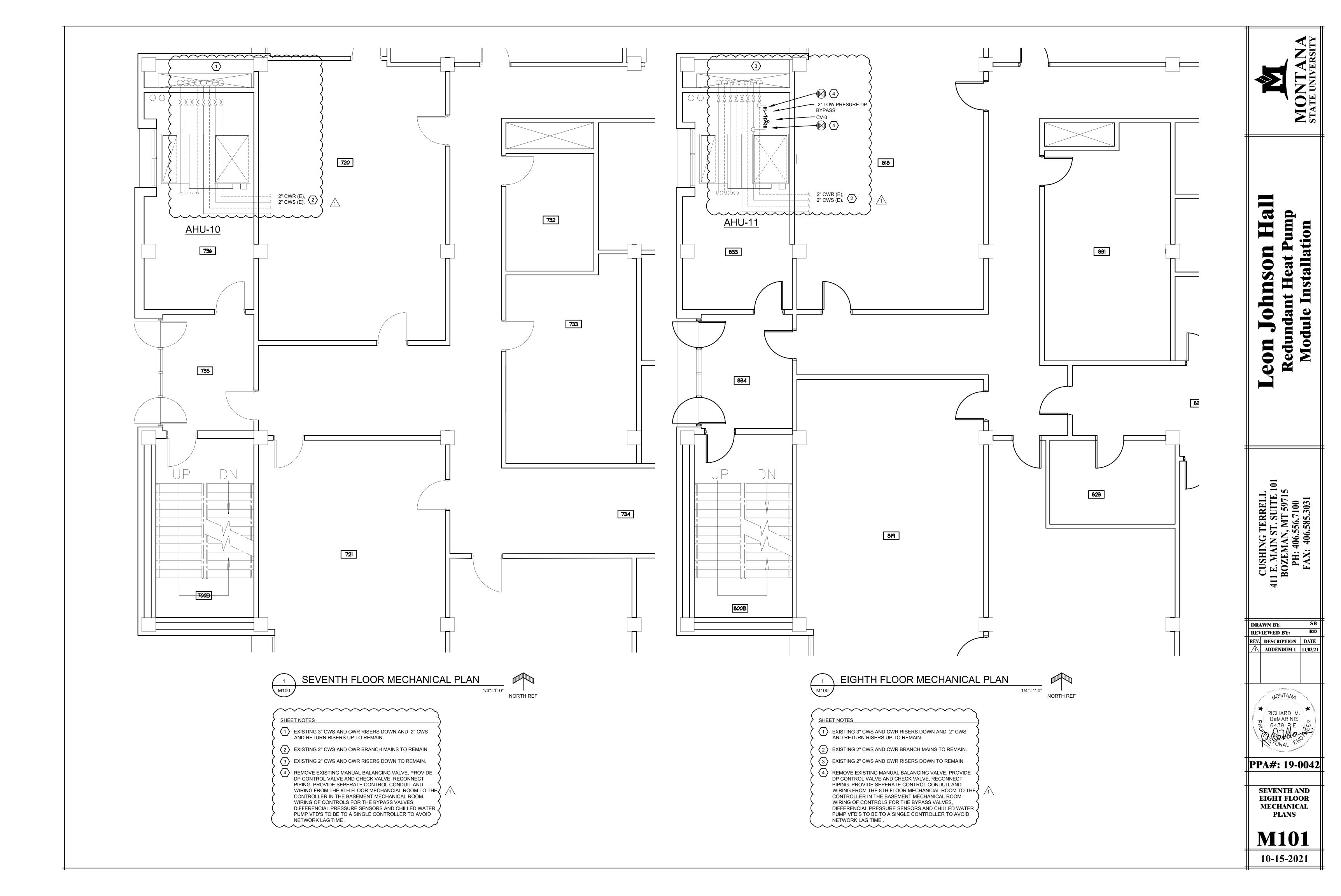
	ΜΕΛΗΔΝ	ICAL LEGEN		NA SITY
SYMBOL	DESCRIPTION		DESCRIPTION	
D	DRAIN		ELECTRIC THERMOSTAT	
	HEATING WATER SUPPLY	Ð	ELECTRIC THERMOSTAT W/GUARD	
HWR	HEATING WATER RETURN		PNEUMATIC THERMOSTAT OR DDC	
CWS	CHILLED WATER SUPPLY		TEMPERATURE SENSOR (JOB SPECIFIC) PNEUMATIC RECESSED	
CWR	CHILLED WATER RETURN		ASPERATING THERMOSTAT	
	REFRIGERANT SUCTION LINE		PNEUMATIC STAT W/GUARD	
	REFRIGERANT LIQUID LINE	ţţ	ACOUSTICALLY LINED SHEET	
HG	REFRIGERANT HOT GAS LINE	┝╼╼╼╼╼╼╼┥ ┕──── <u></u>	METAL DUCT	
FOS	FUEL OIL SUPPLY		MANUAL BALANCING DAMPER	
FOR	FUEL OIL RETURN		FLEX CONNECTOR	
FOV	FUEL OIL VENT			
DFS	DRY FLUID SUPPLY		ACCESS DOORS	
DFR	DRY FLUID RETURN	FD FD	FIRE DAMPER	
LPS	LOW PRESSURE STEAM SUPPLY			
COND	STEAM CONDENSATE RETURN	FSD	FIRE/SMOKE DAMPER	
——×——	GATE VALVE			
iói	BALL VALVE		MOTORIZED DAMPER	
Ó	BUTTERFLY VALVE	[TURNING VANE ELL	
	GLOBE VALVE	Ţ,	TORNING VANE ELL	
¢	TRIPLE DUTY VALVE	Ţ ∕ Ţ∳──	45° LOW-LOSS TAKE-OFF FITTING W/ DAMPER & FLEX DUCT	
t	SWING CHECK VALVE	┵み┶ ╾╱╼		He
	STRAINER	L, pr	45° LOW-LOSS TAKE-OFF FITTING W/ DAMPER & RIGID ROUND DUCT	
	FLEX CONNECTOR	Ľ Ľ		
\longrightarrow	HOSE END DRAIN VALVE		90° TEE TAKE-OFF FITTING	
	PRESSURE REDUCING VA.	<u>Ľ</u>	CONICAL 90° TEE TAKE-OFF FITTING	
——-这	SAFETY RELIEF VALVE			
	UNION		45° TEE TAKE-OFF FIITTING	
&	MOTORIZED T.C. VA/2-WAY			
<u> </u>	MOTORIZED T.C. VA/3-WAY		45°-90° TEE TAKE-OFF FITTING	
	ECCENTRIC PLUG BALANCING VALVE		SUPPLY AIR DUCT (SINGLE LINE)	
₽	VALVE IN RISER		RETURN AIR DUCT (SINGLE LINE)	
O	TEE UP	——————————————————————————————————————	EXHAUST AIR DUCT (SINGLE LINE)	
	TEE DOWN	→ ⊠ →		
o	ELBOW UP	SD-1 (PLAN CODE)	DIFFUSER, REGISTER, OR GRILLE THROW PATTERN SHOWN ON DWGS.	
ə	ELBOW DOWN	8x8 (NECK SIZE) 200 (CFM)		
	PIPE SIZE CHANGE		CONNECT NEW WORK TO EXISTING	
<u>ф</u>	MANUAL FLOW BALANCING VALVE (CIRCUIT SETTER)	<u>₽</u>	PRESSURE GAUGE W/ SNUBBER	++
——齿———	AUTOMATIC FLOW BALANCING VALVE	NO	NORMALLY OPEN	
	PIPE GUIDE	NC	NORMALLY CLOSED	
——————————————————————————————————————	PIPE ANCHOR	C	COMMON	01
<u> </u>	PRESSURE/TEMP. TEST PLUG	(E)	EXISTING	1 5
Ţ	DIAL THERMOMETER	(-)		31 31 31
		BREVIATION	IS	RREI SUIT SUIT 5.7100 5.7100 85.303
AFF ABOVE ACFM ACTUAL	FINISHED FLOOR L CFM	LWT	LEAVING AIR TEMPERATURE LEAVING WATER TEMPERATURE	VG TE N ST. AN, M 06.556 406.58
HU AIR HAN NSI AMERIC	NDLING UNIT CAN NATIONAL STANDARDS INSTITUTE E (AMP,AMPS)	LF MAX M.C.	LINEAR FEET MAXIMUM MECHANICAL CONTRACTOR	HING AAIN EMAN H: 406 X: 40

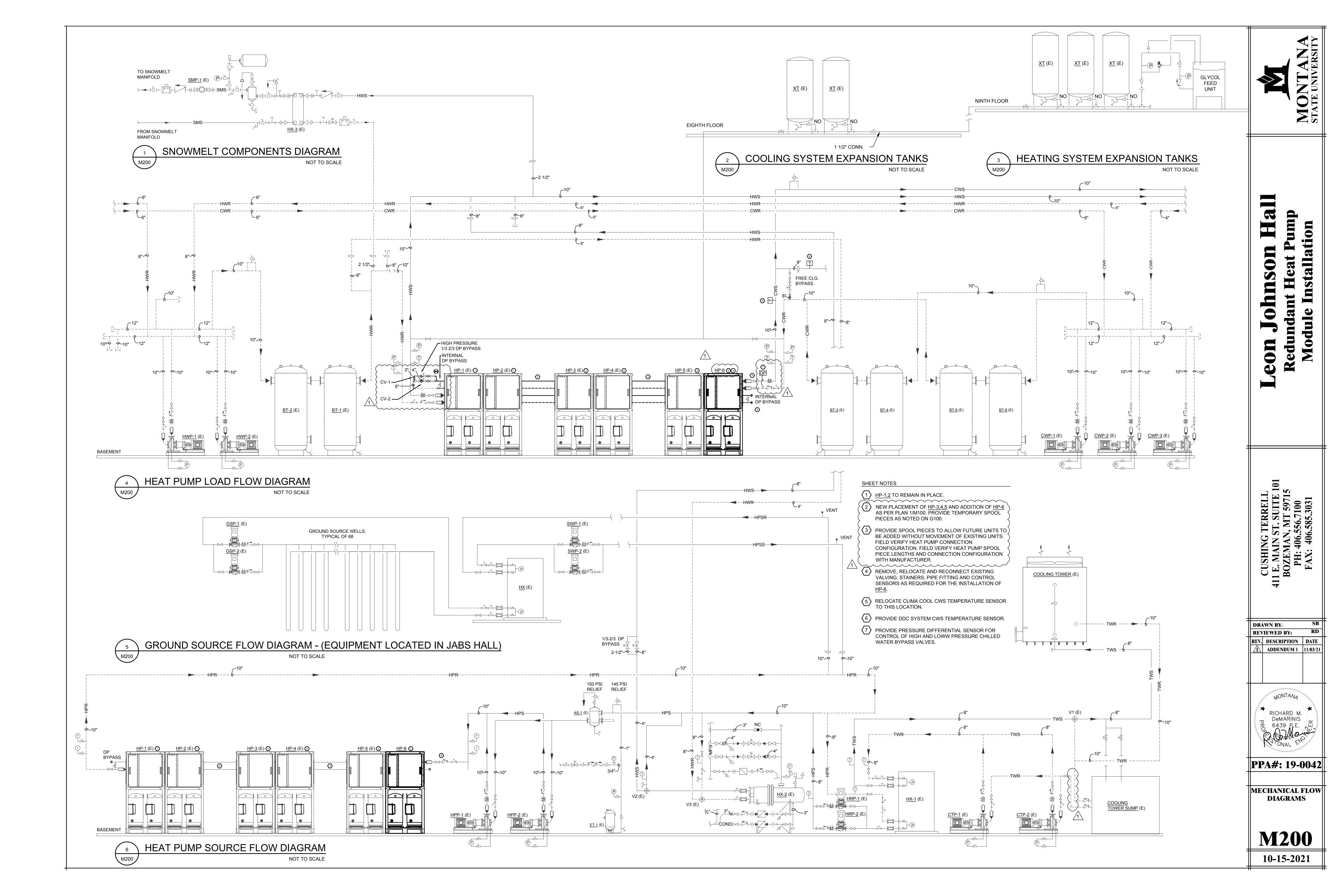
AMP APD APPROX BHP BTU MBH CU FT CU IN CFM SCFM DB DIA, Ø ID OD DBT EAT E.C. EDR EXP EWT F FPM FPS FT HZ GA GAL G.C. GPH GPD HD HGT HP RH KW KWH

AIR HANDLING UNITLFAMERICAN NATIONAL STANDARDS INSTITUTEMAXAMPERE (AMP,AMPS)M.C.AIR PRESSURE DROPMINAIR PRESSURE DROPN OAPPROXIMATEN OBRAKE HORSEPOWER, BOILER HORSEPOWERN/ABRITISH THERMAL UNITNICBTU PER HOUR (THOUSAND)NTSCUBIC FEETNOCUBIC FEET PER MINUTEOACFM, STANDARD CONDITIONS%DECIBELPHDIAMETER, INSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDIAMETER, OUTSIDEPSIDENTERING AIR TEMPERATURERHEQUIVALENT DIRECT RADIATIONRAEXPANSIONRPMENTERING WATER TEMPERATURESHFAHRENHEITSPEFEET PER MINUTESPEFEET PER MINUTESPIFEET PER MINUTESPIFEET PER MINUTESPISTDSTD	. MECHANICAL CONTRACTOR MINIMUM NORMALLY OPEN NORMALLY CLOSED NOT APPLICABLE NOT IN CONTRACT
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ELECTRICAL CONTRACTORR/OEQUIVALENT DIRECT RADIATIONRAEXPANSIONRPMENTERING WATER TEMPERATURESHFAHRENHEITSPEFEET PER MINUTESP V	G PSI GAUGE
EQUIVALENT DIRECT RADIATIONRAEXPANSIONRPMENTERING WATER TEMPERATURESHFAHRENHEITSPEFEET PER MINUTESP V	RUN OUT
EXPANSIONNAENTERING WATER TEMPERATURESHFAHRENHEITSPEFEET PER MINUTESP V	RELATIVE HUMIDITY
ENTERING WATER TEMPERATURESHFAHRENHEITSPEFEET PER MINUTESP V	RETURN AIR
FAHRENHEITSPEFEET PER MINUTESP V	A REVOLUTIONS PER MINUTE
FEET PER MINUTE SP V	SENSIBLE HEAT
	C SPECIFICATION
FOOT OR FEET SP	
FREQUENCY SUC	
GAGE OR GAUGE SA	SUPPLY AIR
GALLONS	
	TEMPERATURE DIFFERENCE
VAC	
HORSEPOWER V	
HUMIDITY, RELATIVE VOL	
KILOWATT VFD	
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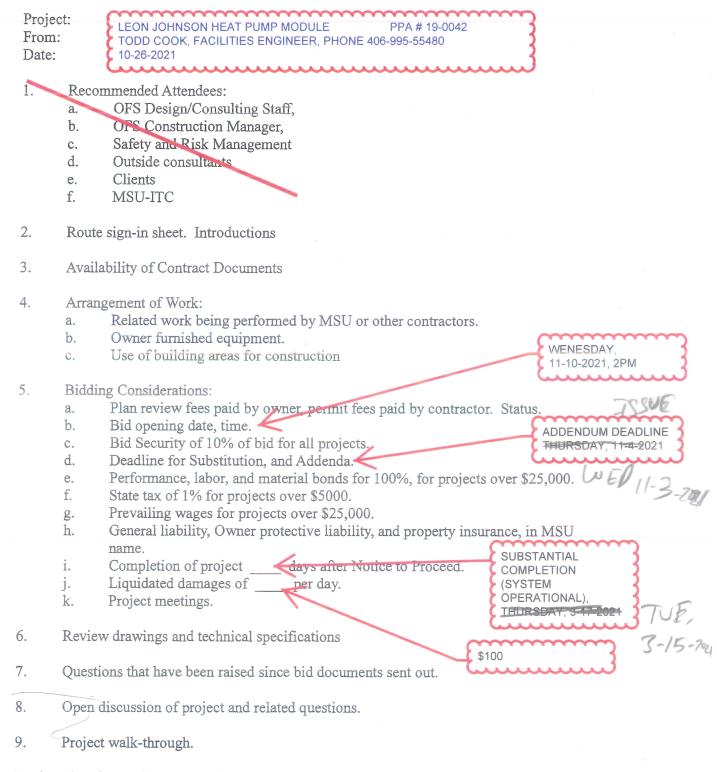








PRE-BID MEETING AGENDA



Encl: List of Attendees, Notes from Meeting

Page 1 of 1

<u>Leon Johnson H</u>	eat Pump Module (Pl	PA # 19-0042) - PRE BID MEETING	10-26-2021
Name		Email	Phone # .
TODD CUOK	MSU	TODD. COOK 1 @ MONTANA.	EDU 406-994-5480
NEil Jorge	-seg 11	Meil Jorganson 11	11 181
RICK DeMI	ARINIS ET	rick de marini e cushing.	lepre 11, 10m 406 431
Black Brech	W Vemcc	blake by Vencoinc. com	406-551-1226
Dan Bokm	a wpH	dbokma ewill plumb, com	406-922-5415
Lovas o'T	ioole MSU	lovase montana.edu	994-7092