

MICHIGAN STATE
U N I V E R S I T Y

INFRASTRUCTURE PLANNING AND FACILITIES
PLANNING, DESIGN AND CONSTRUCTION

November 22, 2023

TITLE OF PROJECT: Bessey Hall – Chiller Replacement

PROJECT ISSUE DATE: October 31, 2023

PROJECT NUMBER: CP23031

ADDENDUM NO: 03

GENERAL

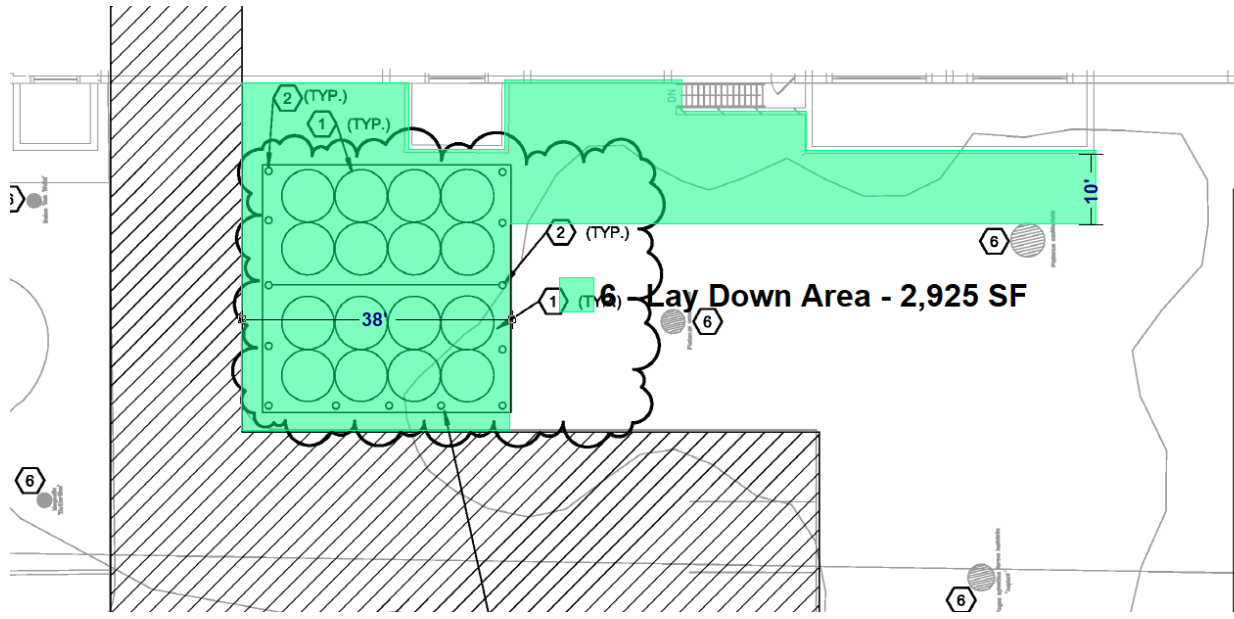
This Addendum is issued prior to receipt of Proposals to amend the Contract Documents identified as Bessey Hall – Chiller Replacement

Except as otherwise specifically mentioned, the general character of the work required by this Addendum shall be the same as originally specified, and all incidentals required in connection with the work hereinafter described shall be included even though not specifically mentioned. When an item is mentioned with additional specifications given, reference shall be made to the original specifications.

Drawing(s) accompanying this Addendum include: M5.01 and M6.01

TRADES – N/A

<u>ITEM NO.</u>	<u>DESCRIPTION</u>
1	Refer to specification sections 230700-HVAC Insulation and 232113-Hydronic Piping for buried chilled water piping material, insulation and jacketing requirements.
2	Refer to E2.03 for disconnection of existing lightning protection and reconnection at new cooling tower.
3	Refer to M5.01 for revised cooling tower schedule notes in reference to VFD/control panel location/enclosure and clarification regarding hours by cooling tower manufacturer.
4	Refer to M6.01 for Energy and Flow Meter locations and acceptable model numbers.
5	Assume 600 gallons of lithium bromide solution need to be disposed of. Include a \$10,000 dollar allowance for trucking and landfill disposal costs.
6	MSU Landscape services will handle all tree protection, construction site fencing, install asphalt millings/stone, and final site restoration. Below is a sketch on the extent of laydown area. They will handle tree trimming above the areaway and adjacent to the building along with cleaning out the areaway of debris. See sketch below.



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WATER-COOLED MAGNETIC BEARING CENTRIFUGAL CHILLER SCHEDULE																					
TAG	MANUFACTURER	MODEL	TYPE	COOLING CAPACITY (TONS)	REFRIGERANT TYPE	FULL LOAD KW/TON	IPLV	NPLV	OPERATING WEIGHT (LB)	ELECTRICAL				DESIGN FLOWRATE (GPM)	MIN. FLOW RATE (GPM)	TOTAL PRESSURE DROP (FT. H2O)	EWT	LWT	FOULING FACTOR	FLUID	
										VOLTS	PHASE	MCA	MOP								
CH-1.2	YORK (BASIS OF DESIGN)	YMC2-S1407AB	WATER COOLED	400	R-134a	0.5537	0.3341	0.3341	16,600	480	3	364	700	EVAPORATOR	956.9	522	14.0	54	44	0.0001	WATER
														CONDENSER	1205	710	12.6	85	94.3	0.00025	WATER
EQUALS																					
CH-1.2	TRANE (EQUAL)	HDWA	WATER COOLED	400	R-134a	0.5432	0.3203	0.3203	15,506	480	3	357	600	EVAPORATOR	955.5	233	29.9	54	44	0.0001	WATER
														CONDENSER	1200	510	18.5	85	94.3	0.00025	WATER
CH-1.2	DAIKIN (EQUAL)	WME092DSCSNA	WATER COOLED	400	R-134a	0.5641	0.3477	0.3477	-	480	3	364	700	EVAPORATOR	957.2	230	31.3	54	44	0.0001	WATER
														CONDENSER	1124	-	10.6	85	95	0.00025	WATER
ALTERNATE #1																					
CH-1.2	TRANE (BASIS OF DESIGN)	HDWA	WATER COOLED	310	R-134a	0.8572	0.5562	0.5562	16,645	480	3	439	700	EVAPORATOR	1100	249	51	30.4	80	0.000100	GLYCOL
														CONDENSER	1100	591	12.7	23	88.5	0.000250	WATER
CH-1.2	YORK (EQUAL)	YMC2-S0844ABS	WATER COOLED	240	R-134a	0.8710	0.7316	0.7316	18,521	480	3	346	600	EVAPORATOR	1025	520	23.5	28	22	0.000100	GLYCOL
														CONDENSER	780	712	7.81	80	89.3	0.000250	WATER

- NOTES:
- CHILLER SHALL BE PROVIDED WITH SINGLE POINT ELECTRICAL CONNECTION AT VFD. VFD SHALL BE FACTORY MOUNTED AND WIRED AND SHALL INCLUDE DISCONNECT SWITCH.
 - VARIABLE SPEED DRIVE STARTER.
 - 75 dBA MAXIMUM SOUND PRESSURE LEVEL AT ALL LOADS.
 - THE CHILLER SHALL BE CONTROLLED BY A STAND-ALONE MICROPROCESSOR BASED CONTROL CENTER. THE CHILLER CONTROL CENTER SHALL PROVIDE CONTROL OF CHILLER OPERATION AND MONITORING OF CHILLER SENSORS, ACTUATORS, RELAYS AND SWITCHES.
 - CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR ANY GATEWAY REQUIRED TO ALLOW BUILDING MANAGEMENT SYSTEM TO COMMUNICATE AND VIEW CHILLER CONTROL INFORMATION.
 - MANUFACTURER SHALL INCLUDE (4) 1 INCH THICK NEOPRENE VIBRATION ISOLATION MOUNTING PADS, FOR FIELD MOUNTING.
 - COMPRESSOR MOTOR SHALL BE A HERMETIC, OIL-FREE, PERMANENT MAGNETIC TYPE WITH ACTIVE MAGNETIC BEARINGS AND DIRECTLY COUPLED WITH COMPRESSOR.
 - EVAPORATOR AND CONDENSER WATER BOXES SHALL BE REMOVABLE TO PERMIT TUBE CLEANING AND REPLACEMENT. WATER BOX SHALL BE PROVIDED WITH HINGES ON EACH END.
 - DRIVELINE COMPONENTS SHALL BE INDIVIDUALLY FIELD SERVICEABLE BY THE ORIGINAL EQUIPMENT MANUFACTURER. IF NOT, THE MANUFACTURER SHALL PROVIDE ONE REPLACEMENT DRIVELINE PER CHILLER.
 - CHILLERS ARE TO BE SHIPPED BROKEN DOWN INTO THREE MAJOR PIECES: EVAPORATOR SHELL, CONDENSER SHELL AND DRIVELINE TO FACILITATE RIGGING INTO THE MECHANICAL ROOM.
 - THE MANUFACTURER IS RESPONSIBLE FOR PROVIDING FACTORY CERTIFIED TECHNICIANS TO SUPERVISE THE RIGGING OF THE CHILLER COMPONENTS INTO PLACE AND MAKE ALL FINAL CONNECTIONS MECHANICALLY, ELECTRICALLY AND CONTROL WISE.
 - THE SERVICES OF A FACTORY TRAINED, FIELD SERVICE REPRESENTATIVE WILL BE PROVIDED TO SUPERVISE THE FINAL LEAK TESTING, CHARGING AND THE INITIAL STARTUP AND CONDUCT CONCURRENT OPERATOR INSTRUCTION.
 - 18 MONTH (STARTING ON DAY OF SHIPMENT) FACTORY WARRANTY COVERING ALL PARTS, LABOR AND REFRIGERANT. WARRANTY FOR COMPRESSOR/MOTOR DRIVELINE SHALL BE AN ADDITIONAL 48 MONTHS (66 MONTHS TOTAL).
 - REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

CROSS-FLOW COOLING TOWER SCHEDULE																							
MARK	LOCATION	NOMINAL TONS	NUMBER OF CELLS	FANS				PERFORMANCE						PIPING CONNECTIONS				ELECTRICAL			MANUFACTURER MODEL NUMBER	WEIGHT OPERATING (LBS)	
				QTY	HP (EACH)	BHP (EACH)	TOTAL FLOW (GPM)	EACH CELL FLOW (GPM)	WATER INLET TEMP	WATER INLET TEMP	WPD (PSI)	AMBIENT AIR TEMP (WB)	BASIN VOLUME (GAL)	INLET/OUTLET	OVERFLOW	MAKEUP WATER	BASIN DRAIN	VOLTAGE	PHASE	HZ			
CT-1	ROOF	800	2	2	40	35.5	1,900	1,210	95°F	85°F	2	78°F	229	10"	4"	2"	1-1/2"	480	3	60	MARLEY NC8403TLN2	33,970	20'-4" X 18'-2" X 15'-1"H

NOTES:

- GALVANIZED STEEL CASING AND STRUCTURE.
- STAINLESS STEEL COLLECTION BASIN AND DISTRIBUTION BASIN.
- 15 MIL PVC FILM FILL WITH INTEGRAL LOUVERS AND DRIFT ELIMINATORS.
- PROVIDE WITH WATER-LEVEL CONTROL USING A STANDARD FLOAT.
- HDG STEEL FAN GUARD.
- ACCESS DOOR ON EACH SIDEWALL. STAINLESS STEEL PLENUM WALKWAY INSIDE EACH CELL. EXTERNAL LUBE LINE WITH DIPSTICK. LADDER WITH CAGE.
- FAN MOTOR SHALL BE CONTROLLED USING A VFD. FURNISH WITH RTD TEMPERATURE SENSOR FOR VFD OPERATION.
- PROVIDE INSTALLATION SUPPORT AND START-UP SUPPORT BY FACTORY-TRAINED AND AUTHORIZED PERSONNEL.
- PROVIDE 5-YEAR WARRANTY FOR FANS, FAN SHAFTS, FAN MOTOR, BEARINGS, SHEAVES, GEARBOXES, DRIVESHAFTS, COUPLINGS AND MECHANICAL EQUIPMENT SUPPORT.
- FURNISH WITH MANUFACTURER CONTROL PANEL. NEMA-3R VFD AND CONTROL PANEL SHALL BE LOCATED OUTDOORS. VFD WITH DISCONNECT SHALL BE FIELD-INSTALLED BY ELECTRICAL TRADES FOR EACH CELL. MANUFACTURER SHALL INCLUDE FACTORY REPRESENTATIVE VFD STARTUP EXPENSES.
- MANUFACTURER SHALL INCLUDE FIELD INSTALLATION BY FACTORY REPRESENTATIVE, AS WELL AS ALL START-UP EXPENSES.
- BAC, EVAPCO, TOWERTECH SHALL BE CONSIDERED EQUALS. REVISIONS TO EXISTING STEEL STRUCTURE, IN ADDITION TO BASE BID SCOPE, ASSOCIATED WITH A SPECIFIC MANUFACTURER SHALL BE INCLUDED IN BID COST.

PUMP SCHEDULE										
MARK	SYSTEM	MANUFACTURER	MODEL	TYPE	DESIGN GPM	DESIGN HEAD	ELECTRICAL			NOTES
							VOLTS	PHASE	HP	
CHWP-1,2,3	CHW (PRIMARY LOOP)	BELL & GOSSETT	e-1510-6G	BASE-MOUNTED	1200	55	480	3	25	1,2,3,4
CWP-4,5,6	CONDENSER WATER	BELL & GOSSETT	e-1510-5EB	BASE-MOUNTED	950	99	480	3	40	1,2,3,4

NOTES:

- PUMP MANUFACTURER SHALL FURNISH SYSTEM CHECK, TEST AND START-UP, ALONG WITH OWNER'S TRAINING.
- ALL PUMPS, VALVES, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED INSTALLTION INSTRUCTIONS.
- FURNISH CONCENTRIC PIPE REDUCER AT PUMP SUCTION AND DISCHARGE TO REDUCE FROM LISTED PIPE SIZE ON DRAWINGS TO PUMP CONNECTION SIZE.
- PUMP SHALL BE WIRED TO AND OPERATED BY A REMOTE VFD. WIRING BY ELECTRICAL TRADES.
- GRUNDFOS AND ARMSTRONG SHALL BE BID AS A VOLUNTARY ALTERNATE.

PUMP SCHEDULE ALTERNATE #1										
MARK	SYSTEM	MANUFACTURER	MODEL	TYPE	DESIGN GPM	DESIGN HEAD	ELECTRICAL			NOTES
							VOLTS	PHASE	HP	
CHWP-1,2,3	CHW (PRIMARY LOOP)	BELL & GOSSETT	e-1510-5BD	BASE-MOUNTED	1200	65	480	3	25	1,2,3,4
CHWP-7,8,9	AHU LOOP	BELL & GOSSETT	e-1510-3BD	BASE-MOUNTED	600	58	480	3	15	1,2,3,4

NOTES:

- PUMP MANUFACTURER SHALL FURNISH SYSTEM CHECK, TEST AND START-UP, ALONG WITH OWNER'S TRAINING.
- ALL PUMPS, VALVES, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED INSTALLTION INSTRUCTIONS.
- FURNISH CONCENTRIC PIPE REDUCER AT PUMP SUCTION AND DISCHARGE TO REDUCE FROM LISTED PIPE SIZE ON DRAWINGS TO PUMP CONNECTION SIZE.
- PUMP SHALL BE WIRED TO AND OPERATED BY A REMOTE VFD. WIRING BY ELECTRICAL TRADES.
- CONDENSER WATER PUMPS ARE THE SAME AS BASE BID.
- GRUNDFOS AND ARMSTRONG SHALL BE BID AS A VOLUNTARY ALTERNATE.

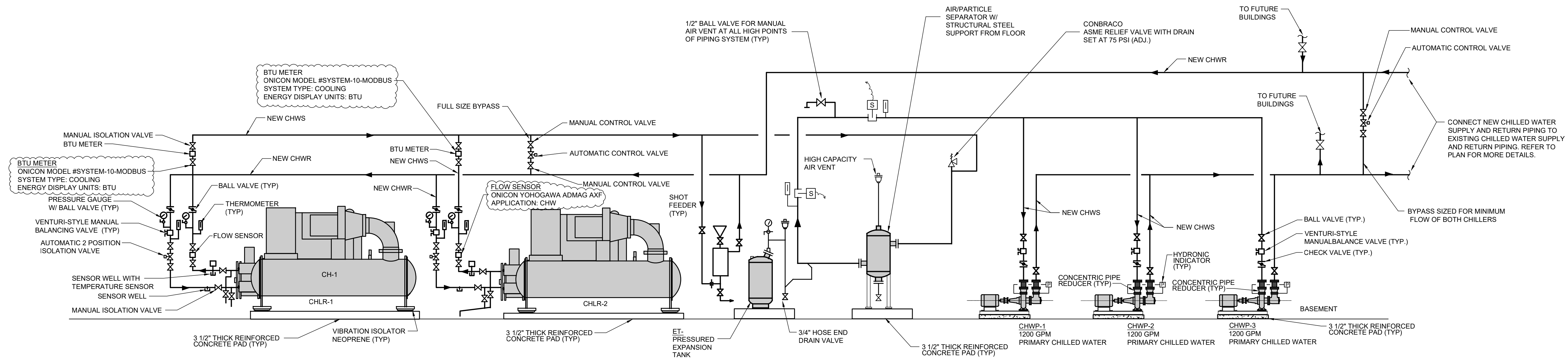
REFRIGERANT MONITORING SCHEDULE			
TAG	MANUFACTURER	MODEL	MODEL
RM-1	ARMSTRONG MONITORING	REFRIGERANT MONITOR AMC-1AREF	ASA 61 GRAY ENAMELED 16 GAUGE STEEL ENCLOSURE, UP TO 2 x 4-20 mA SENSOR/TRANSMITTER INPUTS, 120V/60HZ/1PH. 32-104 DEGREES F OPERATING TEMP, RECOMMENDED MOUNTING HEIGHT 4-5 FT.
RM-1 (SENSOR)	ARMSTRONG MONITORING	SENSOR/TRANSMITTER AMC-SIR	DUAL BEAM NON-DISPERSIVE INFRARED SENSOR, POLYCARBONATE/ABS BLEND ENCLOSURE, 4-104 DEGREE F OPERATING TEMPERATURE, T90 IN 60 SECONDS RESPONSE TIME.

NOTES:

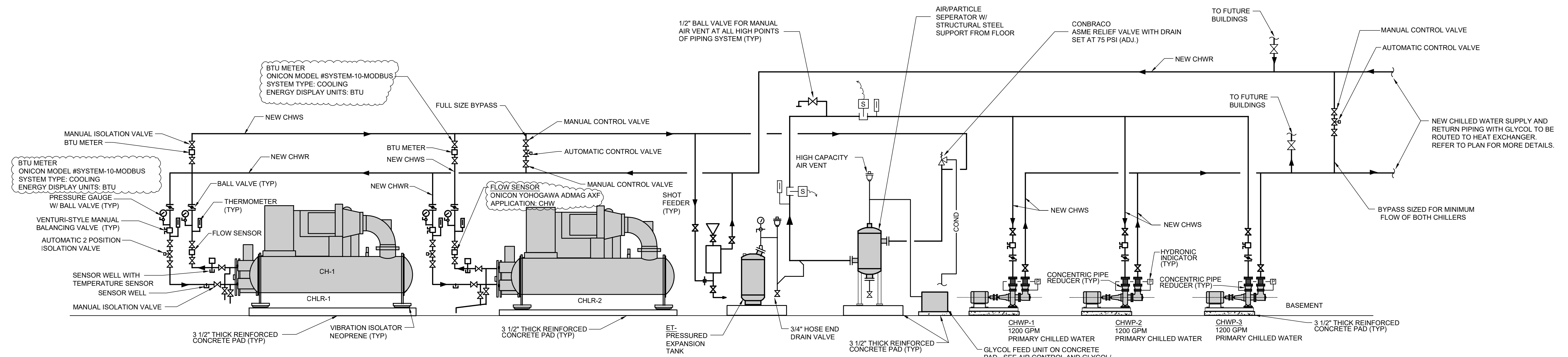
- SENSOR SHALL BE MOUNTED LOW ON WALL NEAR REFRIGERANT SOURCE. MONITOR SHALL BE MOUNTED ON WALL WITH 36" CLEARANCE IN FRONT.
- SENSOR SHALL BE WIRED TO MONITOR ON WALL BY CONTROLS CONTRACTOR OR INSTALLING MECHANICAL CONTRACTOR.
- 2-YEAR MONITOR WARRANTY. 1-YEAR SENSOR WARRANTY.
- MSA CHILLGARD 5000 SHALL BE CONSIDERED EQUAL.

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BESSEY HALL
 CHILLER REPLACEMENT



CHILLED WATER SYSTEM DIAGRAM
 NO SCALE



CHILLED WATER SYSTEM DIAGRAM ALTERNATE #1

CAPITAL PROJ. NO.	MORGAN
CP23031	CHARLAND
LEAD ARCH.	WINKLER
MECH.	BEACH
ELEC.	GARDNER
CIVIL	L.A.
INT DES	MORGAN
REP.	
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	
ISSUED FOR BIDS	10/23/2023
ADDENDUM NO. 3	11/22/2023

MECHANICAL
 DETAILS

M6.01

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