AIR COOLED CHILLER SCHEDULE

MARK	LOCATION	AREA SERVED	MANUFACTURER	MODEL NUMBER	EVAPORATOR					REFRIGERANT	MOTOR			REMARKS
					TEMP °F ENT/LVG	DESIGN FLOW GPM	DESIGN DP (FT)	FOULING FACTOR	MIN FLOW GPM		MCA	MOCP	VOLT/PH/HZ	
CH-1	SEE DRAWING	–	YORK	YVAA0195A0V46BAVNXO	54/44	382.9	10.1	0.0001	200	R134a	316	400	460/3/60	1,2,3,4

NOTES:
1. SEE SPECIFICATION ON SHEET MP002 FOR ADDITIONAL INFORMATION.
2. INCLUDE AN INTEGRAL AND FACTORY WIRED FLOW SWITCH.
3. BACNET INTERFACE MODULE FOR CONNECTION TO EXISTING BACNET BUS IN BUILDING 112 VIA OWNER PROVIDED FIBER OPTIC CABLE WITH S.I. TECH MODEL 2110 FIBER DRIVERS.
4. ONE (1) YEAR PLANNED SERVICE AGREEMENT
5. UNIT WARRANTY: 5 YEARS PARTS, LABOR AND REFRIGERANT WARRANTY
6. ALTERNATES SHALL BE PRE-APPROVED.

WATER CIRCULATING PUMP SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL NO.	INLET INCH	DISCH INCH	PUMP TYPE	FLOW GPM	HEAD FT	MOTOR HP	RPM	V/PH/HZ	REMARKS
CHWP-1	CHILLED WATER	B&G	E-1510 2.5BB	3	2.5	BASE MOUNTED	196	80	7.5	1800	460/3/60	1,2,3,4,5
CHWP-2	CHILLED WATER	B&G	E-1510 2.5BB	3	2.5	BASE MOUNTED	196	80	7.5	1800	460/3/60	1,2,3,4,5

NOTES
1. VARIBLE PRIMARY PUMPS RUNNING IN PARALLEL.
2. VFD PROVIDED AND INSTALLED BY GREENVILLE TECHNICAL COLLEGE.
3. ALL MOTORS TO BE TEFC, PREMIUM EFFICIENCY.
4. PUMP MOTOR HP SHALL BE SELECTED FOR NOT-OVERLOADING OPERATION.
5. SEE ACCESSORIES FOR ADDITIONAL ITEMS

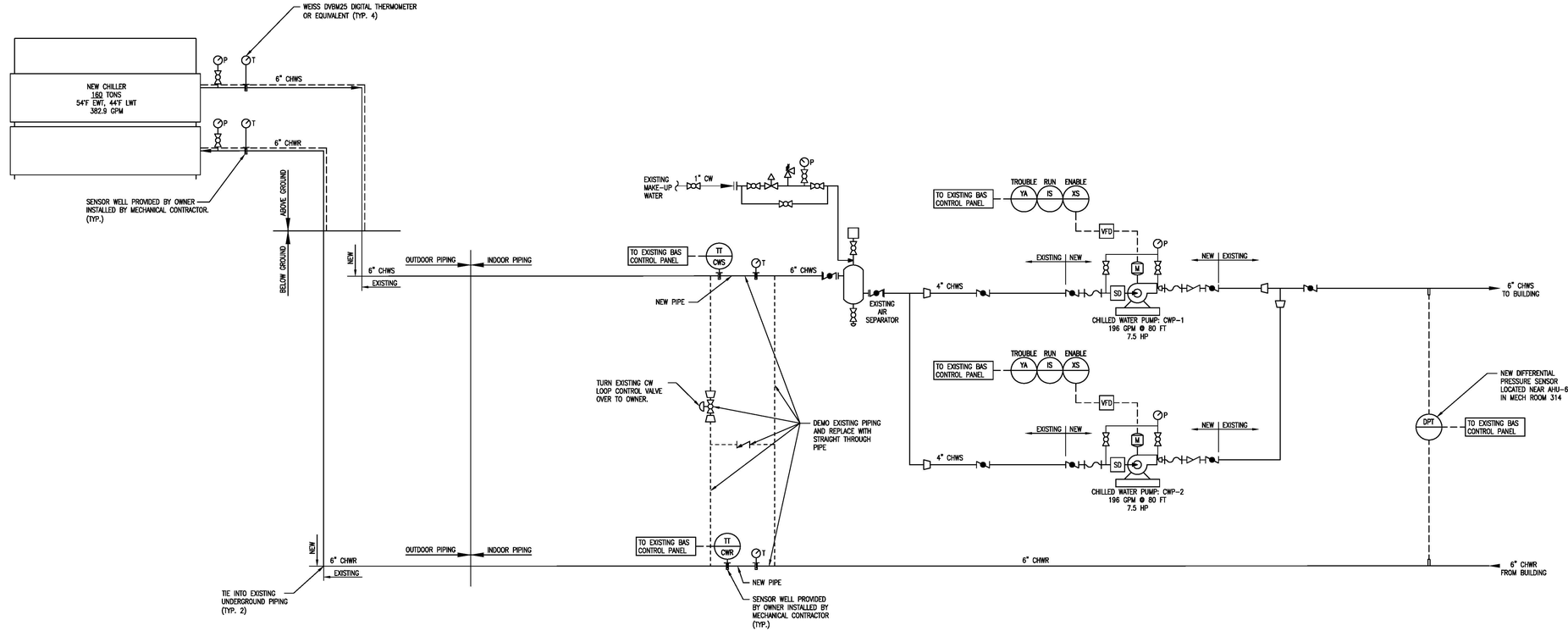
ACCESSORIES
1. B&G SUCTION DIFFUSER PLUS
2. TRIPLE DUTY VALVE
3. FLEX CONNECTORS
4. GAUGE KITS

SYMBOL LEGEND

- TEMPERATURE GAUGE (WEISS DVBM25 DIGITAL THERMOMETER OR EQUIVALENT)
- PRESSURE GAUGE
- MANUALLY OPERATED BALL VALVE
- 2-POSITION ACTUATED BALL VALVE
- MANUALLY OPERATED BUTTERFLY VALVE
- 2-POSITION ACTUATED BUTTERFLY VALVE
- 2-WAY ACTUATED CONTROL VALVE
- 3-WAY ACTUATED CONTROL VALVE
- TRIPLE DUTY VALVE
- PRESSURE REGULATOR VALVE
- CHECK VALVE
- STRAINER
- FLOW METER
- FLEXIBLE CONNECTOR
- THERMOWELL
- CTWS COOLING TOWER WATER – SUPPLY
- CTWR COOLING TOWER WATER – RETURN
- CHWS CHILLED WATER – SUPPLY
- CHWR CHILLED WATER – RETURN
- MW MAKE UP WATER
- XX CONTROL INSTRUMENT OR FUNCTION
- XX CONTROL FUNCTION PROVIDED BY THE BMS
- M ELECTRIC MOTOR
- SD PUMP SUCTION DIFFUSER (WITH STRAINER)
- VFD VARIABLE FREQUENCY DRIVE
- EXISTING PIPING
- NEW PIPING
- HEAT TRACED PIPING

CONTROL LEGEND

HS: HAND SWITCH
HOA: HAND-OFF-AUTO
FCV: FLOW CONTROL VALVE
PV: TWO-POSITION ISOLATION VALVE
TT: TEMPERATURE TRANSMITTER
FT: FLOW TRANSMITTER
LT: LEVEL TRANSMITTER
SC: SPEED CONTROL
PDT: PRESSURE DIFFERENTIAL TRANSMITTER
IS: CURRENT SWITCH (RUN INDICATION)
YA: STATUS INDICATION FROM EQUIPMENT TO BMS
XS: ENABLE SIGNAL FROM BMS TO EQUIPMENT
LV: LEVEL CONTROL VALVE



CHILLED WATER FLOW DIAGRAM

SCALE: NONE

PROJECT NOTES

1. THE PROJECT IS ADDING A DEDICATED CHILLER TO BUILDING 112.
2. THE MAIN EQUIPMENT INCLUDES A NEW CHILLER AND PUMPS.
3. ALL WORK SHALL COMPLY WITH THE 2018 INTERNATIONAL MECHANICAL, PLUMBING (WITH INSERTIONS) AND BUILDING CODE, 2020 EDITION OF OSE PROJECT MANUAL, AND ALL LOCAL CODES.
4. THE ENTIRE BUILDING CHILLED WATER SYSTEM SHALL BE TESTED, ADJUSTED AND BALANCED BY AN INDEPENDENT CONTRACTOR PER INDUSTRY STANDARDS. BALANCE REPORTS SHALL BE SUBMITTED TO ENGINEER AND OWNER FOR REVIEW. THE WORK SHALL BE COMPLETED AFTER ALL INSTALLATION IS COMPLETE INCLUDING OWNER SCOPE. THERE ARE 5 AIR HANDLERS SPREAD THROUGHOUT THE BUILDING ON THE CHILED WATER SYSTEM. ADDITIONAL INFORMATION REQUIRED TO BALANCE THE AIR HANDLING SYSTEM WILL BE PROVIDED TO SUCCESSFUL CONTRACTOR. TEST AND BALANCE SHALL WORK WITH THE OWNER AND CONTROLS CONTRACTOR TO BALANCE FLOWS AND SET CRITERIA FOR MINIMUM PUMP SPEED AND SYSTEM DIFFERENTIAL PRESSURE AS DESCRIBED BELOW.

CONTROLS AND CW PUMP VFDs WILL BE FURNISHED AND INSTALLED BY OWNER

1. GREENVILLE TECHNICAL COLLEGE (OWNER) WILL SELF PERFORM ALL CONTROL WORK AND INTERLOCK WIRING NOT SPECIFICALLY NOTED TO BE PERFORMED BY THE CONTRACTOR. OWNER WILL PROVIDE ALL CONTROL DEVICES AND WILL BE RESPONSIBLE FOR ALL CONTROL AND INTERLOCK WIRING FOR CHILLED WATER (CW) SYSTEM INCLUDING FIBER OPTIC COMMUNICATIONS CABLE FROM BUILDING TO REQUIRED BACNET INTERFACE MODULE PROVIDED BY THE CHILLER MANUFACTURER. CHILLER COMMUNICATION WIRING WILL BE TERMINATED PER DIAGRAMS PROVIDED BY THE CHILLER MANUFACTURER. FIBER OPTIC CABLE WILL BE INTERFACED TO BACNET BUS USING S.I. TECH MODEL 2110 FIBER DRIVERS. CHILLER TO BE FURNISHED WITH FACTORY WIRED INTEGRAL FLOW SWITCH.
2. THE CHILLED WATER PUMP VFDs WILL BE FURNISHED, INSTALLED, AND WIRED (POWER AND CONTROLS) BY OWNER.
3. OWNER WILL REMOVE ANY EXISTING CONTROL DEVICES FROM ALL SECTIONS OF CW PIPE TO BE REMOVED IN MECHANICAL EQUIPMENT ROOM 013 PRIOR TO DEMOLITION.

CHILLED WATER SYSTEM SEQUENCE OF OPERATION

GENERAL:

1. ENABLE/DISABLE (START/STOP) CONTROL OF CHILLER AND CHILLED WATER PUMPS WILL BE PROVIDED THROUGH THE EXISTING JCI METASYS BUILDING AUTOMATION SYSTEM (BAS).
2. THE BAS WILL PROVIDE STATUS AND ALARM MONITORING FOR EACH CHILLED WATER SYSTEM COMPONENT INCLUDING CHILLER STATUS AND DIAGNOSTICS PROVIDED BY THE CCP THROUGH THE REQUIRED BACNET INTERFACE.
3. THE CHILLER MANUFACTURER CONTROL PANEL (CCP) WILL CONTROL THE CHILLER AND ITS INTEGRAL START/STOP/SAFETY AND CHILLED WATER TEMPERATURE CONTROL FUNCTIONS.

CW SYSTEM ENABLE/DISABLE:

1. THE CW SYSTEM WILL BE ENABLED WHEN ANY BUILDING AHU IS IN OPERATION AND THE OUTDOOR AIR TEMPERATURE (OAT) IS ABOVE 55°F (ADJ). CW SYSTEM ENABLE WILL INITIATE STARTUP OF CHILLER AND LEAD CHILLED WATER PUMP
2. ALL CHILLER SAFETY CONDITIONS MUST BE SATISFIED FOR CW SYSTEM STARTUP TO PROCEED. IF ANY SYSTEM CONDITIONS ARE NOT NORMAL OR CHILLER DIAGNOSTICS ARE INDICATED BY THE CCP, AN ALARM MESSAGE WILL BE GENERATED INDICATING THE SPECIFIC STARTUP PROBLEM. IF THERE ARE NO ALARM CONDITIONS BOTH THE CHILLER WILL BE ENABLED AND THE LEAD CW PUMP WILL BE ENABLED.

CHILLER CONTROL AND SEQUENCING:

1. CHILLER INTEGRAL FLOW SWITCH WILL BE INTERLOCKED WITH CHILLER CCP. CHILLER WILL START WHEN CW FLOW THROUGH THE CHILLER IS PROVEN. THE CCP WILL CONTROL ALL CHILLER FUNCTIONS TO MAINTAIN THE CHILLED WATER SUPPLY TEMPERATURE SET POINT AT 44 °F (ADJ) AS SEEN BY THE INTEGRAL SUPPLY TEMPERATURE SENSOR.

CW PUMP CONTROL AND SEQUENCING:

1. ON CW SYSTEM STARTUP, THE LEAD PUMP WILL RAMP UP TO A MINIMUM SPEED (ADJ) DETERMINED BY T&B CONTRACTOR TO PROVIDE THE CHILLER MANUFACTURER'S PUBLISHED MINIMUM CW FLOW.
2. LEAD CW PUMP SPEED WILL BE CONTROLLED TO MAINTAIN THE BUILDING CW SYSTEM DIFFERENTIAL PRESSURE SET POINT (ADJ) AS SEEN BY THE CW DIFFERENTIAL PRESSURE TRANSMITTER INSTALLED AT AC 6. THE CW SYSTEM DIFFERENTIAL PRESSURE SET POINT WILL BE DETERMINED BY T&B CONTRACTOR AS MINIMUM E.O.L. SYSTEM PRESSURE REQUIRED TO PROVIDE DESIGN CW FLOW TO BUILDING AHUs.
3. ON A DROP IN DIFFERENTIAL PRESSURE BELOW THE SET POINT, THE LEAD CHILLED WATER LOOP PUMP SPEED WILL BE INCREASED TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE SET POINT.
4. ON A CONTINUED DROP IN SYSTEM DIFFERENTIAL PRESSURE, WITH THE LEAD CW PUMP OPERATING AT 90%, THE CONTROL SYSTEM WILL ENABLE THE LAG CW PUMP. CW PUMPS WILL THEN BE OPERATED TOGETHER AT THE SAME SPEED TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE SET POINT.
5. WITH BOTH LEAD AND LAG CW PUMPS OPERATING, ON A RISE IN SYSTEM DIFFERENTIAL PRESSURE AND PUMP SPEEDS REDUCED TO 45%, THE LAG CW PUMP WILL BE DISABLED. THE LEAD CW PUMP SPEED WILL THEN BE INCREASED TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE SET POINT.
6. THE DESIGNATED LEAD CW PUMP WILL BE ROTATED BY THE BAS TO EQUALIZE PUMP RUN TIMES (ADJ). LEAD PUMP CAN BE MANUALLY SELECTED AND LAG PUMP DISABLED FOR MAINTENANCE.

ALARMS AND FAILURE MODES:

1. ALL CHILLER SAFETY CONDITIONS MUST BE SATISFIED FOR CW SYSTEM STARTUP TO OCCUR. IF ANY SYSTEM CONDITIONS ARE NOT NORMAL OR CHILLER DIAGNOSTICS ARE INDICATED BY THE CCP, AN ALARM MESSAGE WILL BE GENERATED INDICATING THE SPECIFIC STARTUP PROBLEM.
2. THE BAS WILL PROVIDE ENUNCIATION OF CHILLER DIAGNOSTIC ALARMS PROVIDED BY THE CCP THROUGH THE REQUIRED BACNET INTERFACE AND ADJUSTABLE ALARM LIMITS ON ALL CW SYSTEM SENSORS.
3. UPON A FAILURE OF THE LEAD CW PUMP TO OPERATE, AN ALARM MESSAGE WILL BE GENERATED, THE LEAD CW PUMP DISABLED AND THE LAG CW PUMP ENABLED.

CRAIG GAULDEN DAVIS
Architecture
Planning
Interiors
19 Washington Park
Greenville, SC 29601
Phone 864.242.0761
Fax 864.501.9945
E-mail cgd@cgdarch.com

CAVINESS LAMBERT ENGINEERING
www.cl-e.com
MECHANICAL/ELECTRICAL/PLUMBING
508 East North Street
Greenville, SC 29601

Greenville Technical College

GREENVILLE - BLDG. 112 AIR COOLED CHILLER ADDITION

Project No.: H59-N054-FW

DATE	MARK	DESCRIPTION
09/02/2020	A	ISSUED FOR REVIEW
10/02/2020	B	ISSUED FOR REVIEW
1/15/2021	C	CONSTRUCTION
2/26/2021	D	ADDENDUM NO. 1

ISSUE:	CONSTRUCTION
DATE:	1/15/2021
PROJECT NO:	120047.015
DRAWN BY:	CTL
CHECKED BY:	JAC

MECHANICAL PIPING SCHEDULES & NOTES

MP001