General Notes - Mechanical

1. General Mechanical Work (Other Than Trade Trades - Electrical) Arising To Electrical, Engineering, And Specifications, Coordination Shall Occur Prior To Fabrication, Purchase, And Installation Of All Work.

2. Coordination Shall Ensure Systems Bidding Prior To Installation. Significant Notes Of Coordination Shall Be Documented Prior To Coordination With All Other Systems.

3. Unless Otherwise Specified, The General Contractor (GC) Shall Be Responsible For Finishing, Dressing, And Fitting Of Receiving Piping, Valves, And Controls, And For All Associated Work Required To Finalize The Systems Prior To Completion. The General Contractor Shall Be Responsible For All Work Not Otherwise Assigned.

4. The Contractor Shall Coordinate For The Safe Performance Of The Systems To The Above And Owner's Design Requirements For Protection Of Adjacent Pipes, Traps, And Environmental Conditions.

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# HEAT EXCHANGER SCHEDULE

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<td>85.0 - 120.0</td>
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<td>125.0 - 200.0</td>
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# HEAT EXCHANGER SCHEDULE - CONTINUED

# HYDRONIC WATER PIPING SIZING SCHEDULE

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# PIPING SYSTEMS INSULATION SCHEDULE

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</table>
1. REMOVE ABANDONED WATER COOLED CONDENSING UNIT & ASSOC. CWS/CWR PIPING.

2. DECOMMISSION AND DEMOLISH EXISTING CONDENSER WATER PUMPS.

EXISTING 1" CWS/R TO FCU-01.
EXISTING CWS MAKE-UP WATER.

DEMO PORTION OF CWR TO CONNECT AS-01 SEE DWG M7.0 FOR DETAILS.
PROVIDE ADDITIONAL VERTICAL OFFSETS AS NECESSARY TO INSTALL THE AIR SEPARATOR ABOVE HEAD HEIGHT.

DEMO PORTION OF CWS TO CONNECT HX-1 SEE DWG M7.0 FOR DETAILS.

1. SEE DWG. M0.2 FOR GENERAL NOTES.
2. DRAWINGS ARE BASED ON AS-BUILT DRAWINGS. NOT ALL EXISTING BUILDING ELEMENTS ARE SHOWN ON THE DRAWINGS. PRIOR TO START OF CONSTRUCTION, FIELD VERIFY EXISTING CONDITIONS AND ELEMENTS AND INCORPORATE INTO PLANS AS REQUIRED. NOTIFY ENGINEER OF DISCREPANCIES PRIOR TO COMMENCING WORK.
1. DECOMMISSION EXISTING FLUID COOLER AND DISCONNECT PIPING CONNECTIONS. DRAIN WATER/GLYCOL MIXTURE FROM THE SYSTEM AND DISPOSE OF THE MIXTURE AS REQUIRED BY THE UTILITY/AHJ.

2. DRAWINGS ARE BASED ON AS-BUILT DRAWINGS. NOT ALL EXISTING BUILDING ELEMENTS ARE SHOWN ON THE DRAWINGS. PRIOR TO START OF CONSTRUCTION, FIELD VERIFY EXISTING CONDITIONS AND ELEMENTS AND INCORPORATE INTO PLANS AS REQUIRED. NOTIFY ENGINEER OF DISCREPANCIES PRIOR TO COMMENCING WORK.

BID ALTERNATE #2: REMOVE THE DECOMMISSIONED FLUID COOLER IN THE PENTHOUSE, REMOVE THE FLUID COOLER LOUVER PLENUMS, AND SEAL AND INSULATE THE LOUVERED OPENINGS IN THE PENTHOUSE WALL.

BID ALTERNATE #2: REMOVE ALL EXISTING ABANDONED CONDENSER WATER PIPING, VALVES AND ASSOCIATED APPARATUS FROM THE PENTHOUSE. CAP PIPING AT THE RISERS.

MECHANICAL PIPING DEMOLITION PLAN - PENTHOUSE

2. REPLACE EXISTING DDC CONTROL CABINET WITH NEW. PROVIDE NEW LOCAL CONTROLLER TO CONTROL THE CONDENSER WATER/HEAT EXCHANGER SYSTEM. CONNECT LOCAL CONTROLLER TO BUILDING DDC SYSTEM. COORDINATE POWER CONNECTION WITH THE E.C.

3. PROVIDE NEW MAKE-UP WATER PRV, COORDINATE PRESSURE RANGE & SETTING WITH THE OWNER PRIOR TO ORDERING.

4. WHILE THE CONDENSER WATER LOOP MODIFICATIONS ARE UNDERWAY, THE CONTRACTOR SHALL PROVIDE BYPASS PIPING AND ISOLATION VALVES AS NECESSARY TO ENABLE TEMPORARY COOLING WATER SUPPLY TO THE FAN-COIL UNIT AND THE WATER COOLED CONDENSING UNIT CURRENTLY BEING SERVED BY THE EXISTING CONDENSER LOOP.
DETAIL - IN-LINE PUMP INSTALLATION

DETAIL - PLATE & FRAME HEAT EXCHANGER

DETAIL - AIR SEPARATOR

NOTE:
1. REFER TO FLOOR PLANS FOR PIPING SIZES. PROVIDE PIPING TRANSITIONS AS NECESSARY.
2. HANG AIR SEPARATOR FROM STRUCTURE ABOVE.

PROVIDE UNISTRUT SUPPORT PACK SECURELY RELATE TO THE HOUSEKEEPING PAD FOR MOUNTING HEAT EXCHANGERS, PUMPS AND ASSOCIATED SPECIALTIES.
PROVIDE PROPER HEAT EXCHANGER MOUNTING駐
PROVIDE UNISTRUT SUPPORT FOR MOUNTING HEAT EXCHANGERS.
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HIGH-CAPACITY AUTOMATIC AIR UNIT W/ 3" COPPER TUBING PIPED TO FUNNEL FLOOR DRAIN, MANUAL AIR UNIT VALUE.
BLOODDRAIN FOR AIR SEPARATOR W/ 3" BALL VALVE W/ CAP BALL HOSE THREAD FITTING ON OUTLET.

PROVIDE VERTICAL OFFSETS IN THE CONNECTING PIPING AS NECESSARY TO SUIT THE BOTTOM OF THE AIR SEPARATOR BEING MIN. 7' AFF.
PROVIDE UNISTRUT SUPPORT RACK SECURELY BOLTED TO THE HOUSEKEEPING PAD FOR MOUNTING THE PUMPS AND ASSOCIATED SPECIALTIES.

PROVIDE UNISTRUT SUPPORT PACK SECURELY RELATE TO THE HOUSEKEEPING PAD FOR MOUNTING HEAT EXCHANGERS, PUMPS AND ASSOCIATED SPECIALTIES.
CONTROL EQUIPMENT LEGEND

DESCRIPTION

SCHEDULE

DIFFERENTIAL PRESSURE SENSOR (WATER)

PUMP WITH ECM MOTOR

PROVIDE COMMUNICATION DEVICES VIA BACNET WHERE INTERFACE TO EMS SOLUTION IS ALLOWED.

NOTE: ALL OF THE ABOVE SHALL BE PROVIDED AS BACNET OBJECTS.

NOTE: ALL POINTS SHALL BE TRENDED UNLESS OTHERWISE NOTED.

NOTE: ALL POINTS SHALL BE DISPLAYED ON GRAPHIC USER INTERFACE UNLESS OTHERWISE NOTED.

NOTE: ALL POINTS ARE HARDWIRED UNLESS NOTED OTHERWISE.

VARIOUS THERMAL SCHEMATIC AND VALUE OF ALL SENSORS, LOCATION AND POSITION OF ALL VALUES, LOCATION AND VALUE OF ALL ALARMS SHALL BE EVENT ENROLLMENT TYPE OR ENHANCED IF APPLICABLE.

TREND MONITORING:

1. ANALOG INPUTS SHALL BE TRENDED BASED ON CHANGE OF VALUE.
2. ANALOG OUTPUTS AND USER-DEFINED MINIMUM, ARE AN ACCEPTABLE ALTERNATIVE.
3. SAMPLE IS TAKEN EVERY TIME THE VALUE CHANGES BY MORE THAN A
4. ONE SAMPLE EVERY 5 SECONDS. (CHANGE OF VALUE TRENDING (COV), WHERE A
5. LOG OF THIS OBJECT. THE TRENDING INTERVAL SHALL BE NO LESS THAN
6. THE CONTROL SYSTEM SHALL BE CONFIGURED TO COLLECT AND DISPLAY A TREND
7. OF THE OBJECT. THE TRENDS INTERSECT SHALL BE NO LESS THAN
8. THE MAPS EVERY 10 SECONDS. CHANGE OF VALUE TRENDING (COV), WHERE A
9. SAMPLE OF THIS TIME THE VALUE CHANGED BY MORE THAN A
10. USER-DEFINED INTERVAL IS ACCEPTABLE AS DEFINED.

ACTIVE WHEN A HVAC UNIT IS CALLING FOR HEATING, COOLING OR AIR FLOW.

WHEN CX FINAL SETPOINT IS DIFFERENT THAN THE INITIAL SPECIFIED SETPOINT, THE SETPOINT SHALL INDICATE AS
12. WHERE CX FINAL SETPOINT IS DIFFERENT THAN THE INITIAL SPECIFIED SETPOINT, THE SETPOINT SHALL INDICATE AS
13. USER-DEFINED MINIMUM, IS AN ACCEPTABLE ALTERNATIVE).
14. SAMPLING INTERVAL IS ACCEPTABLE AS DEFINED.

GRAPHIC SHOWS THE TOTALIZED HOURS OF RUN TIME FOR EACH BINARY OUTPUT POINT.

ELECTRICAL ROOM IS SELECTED, THE GRAPHIC FOR THAT ROOM, SHOWING ALL EQUIPMENT IN THE ROOM, SHALL COME UP ON
17. PROVIDE "BUTTONS" ON THE SCREENS TO ALLOW FOR
18. PROVIDE COMMUNICATION DEVICES VIA BACNET WHERE INTERFACE TO EMS SOLUTION IS ALLOWED.

PROVIDE POSITION FEEDBACK.

PROVIDE A GRAPHIC SCREEN THAT SHOWS THE TOTALIZED HOURS OF RUN TIME FOR EACH BINARY OUTPUT POINT.

PROVIDE COMMUNICATION DEVICES VIA BACNET WHERE INTERFACE TO EMS SOLUTION IS ALLOWED.

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CONDENSER WATER SYSTEM WITH BRAZED PLATE HX

**SCALE:** NONE

**CONDENSER WATER SYSTEM VARIABLE SPEED PUMPS SEQUENCE OF OPERATION**

**CONDENSER WATER PUMP DIFFERENTIAL PRESSURE LIMIT:**

- THE CONTROLLER SHALL MEASURE CONDENSER WATER DIFFERENTIAL PRESSURE ACROSS CONDENSER WATER SUPPLY/RETURN HEADERS.
- THE PUMP SPEED SHALL BE LIMITED BY THE DIFFERENTIAL PRESSURE REQUIRED FOR MAXIMUM FLOW SETPOINT (ADJ. SET BY BALANCER).

**STAGING ON LEAD PUMP CWP-1**

- LEAD PUMP CWP-1 SHALL BE ALWAYS ON.
- MODULATE PUMP CWP-1 SPEED UP TO 100% (ADJ.) AS REQUIRED TO SATISFY CONDENSER WATER DIFFERENTIAL PRESSURE SETPOINT OF 12 PSI (ADJ. SET BY BALANCER).

**LAG PUMP CWP-2**

- IF LEAD PUMP FAILS, LAG PUMP SHALL BE ENERGIZED AND OPERATE AS LEAD PUMP.

**THE DESIGNATED LEAD AND LAG PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):**

- DAILY, WEEKLY OR MONTHLY

**PUMPS**

- PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- PUMP IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- PUMP VFD FAULT.

**CONTROL VALVE SEQUENCE OF OPERATION**

- **CAMPUS CHILLED WATER WATER CONTROL VALVE**
  - HVAC-CCWR SHALL MODULATE SO AS TO MAINTAIN THE (ADJ.) CONDENSER WATER DISCHARGE TEMPERATURE.
  - HVAC-CCWR SHALL DOWNSTAGE TO THE MINIMUM ADJUSTED TEMPERATURE.
  - HVAC-CCWR SHALL USE A GRAPHICAL INTERFACE ON THE EXISTING MARIAN SCIENCE DECS SYSTEM FOR HCI AT INDICATING.

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**CONDENSER WATER SYSTEM WITH BRAZED PLATE HX**

**SCALE:** NONE

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1. Items are shown schematically. Coordinate following:
   - For complete and operational systems existing condition when directed by owner.
   - Prior to the commencement of work on the demolition existing systems as indicated on the drawing.
   - Prior to fabrication, purchase, and installation of new systems, components, and materials. The statement of responsibility shall include the system or component. The contractor's work shall be performed in accordance with the quality assurance plan.
   - Components that are permanently attached to steel joists or other structural members shall be designed to resist the effects of seismic, wind, and fire, and shall be listed or labeled by the manufacturer as suitable for use in a building or structure. The contractor shall be responsible for the coordination of the work with the general contractor and the architect, and shall be responsible for ensuring that the work is coordinated with the work of other trades.

   The communication pathways and equipment shall be designed to be compatible with the existing telecommunications systems and shall be installed in accordance with the manufacturer's instructions.

   The contractor shall be responsible for obtaining permits required for the work, and shall ensure that the work is coordinated with the work of other trades.

   - The statement of responsibility shall include the following:
     - Acknowledgment of owner's responsibility for the coordination of the work with the general contractor and the architect.
     - Acknowledgment of the contractor's responsibility for the coordination of the work with the architect and the owner.
     - Acknowledgment of the owner's responsibility for the coordination of the work with the contractor.
     - Acknowledgment of the architect's responsibility for the coordination of the work with the owner and the contractor.
     - Acknowledgment of the contractor's responsibility for the coordination of the work with the architect and the owner.

   The contractor shall be responsible for the coordination of the work with the general contractor and the architect, and shall be responsible for ensuring that the work is coordinated with the work of other trades.
PUMP TO BE REMOVED. REMOVED ASSOCIATED WIRE AND FUSED DISCONNECT, EXPOSED CONDUIT. HOME RUN TO REMAIN FOR CONNECTION OF NEW EQUIPMENT, SEE SHEET E4.1 FOR ADDITIONAL INFORMATION.

1. ELECTRICAL ITEMS SHOWN ARE DIAGRAMMATIC BASED ON AVAILABLE RECORD DRAWINGS AND SITE WALKS DURING THE DESIGN PERIOD. NOT ALL SYSTEM COMPONENTS ARE SHOWN. CONTRACTOR SHALL FIELD VERIFY DEVICE LOCATIONS AND QUANTITIES PRIOR TO COMMENCING WORK. REROUTE EXISTING-TO-REMAIN DEVICE CONDUIT AND WIRING AS REQUIRED.

2. REMOVE UNUSED SURFACE RACEWAY, BOXES AND WIRING. COORDINATE PATCHING AND PAINTING WITH DIVISION 09 CONTRACTOR. REMOVE UNUSED BOXES. PROVIDE MUD RINGS AND BLANK COVERS FOR UNUSED RECESSED BOXES TO REMAIN. REFER TO SPECIFICATION SECTION 2627 FOR ADDITIONAL INFORMATION.

3. PATCHING AND PAINTING TO MATCH EXISTING CONDITIONS AND SHALL BE PROVIDED BY DIVISION 09 CONTRACTOR.

4. ABANDON BELOW GRADE AND INACCESSIBLE RACEWAY IN PLACE AND RECORD LOCATIONS ON RECORD DRAWINGS.
1. DEMOLISH EXISTING FLUID COOLER CONNECTIONS, CONDUIT, WIRE, DISCONNECTS, ETC. BACK TO SERVICE POINT. RE-LABEL SERVICE POINT AS "SPARE".

2. ELECTRICAL ITEMS SHOWN ARE DIAGRAMMATIC BASED ON AVAILABLE RECORD DRAWINGS AND SITE WALKS DURING THE DESIGN PERIOD. NOT ALL SYSTEM COMPONENTS ARE SHOWN. CONTRACTOR SHALL FIELD VERIFY DEVICE LOCATIONS AND QUANTITIES PRIOR TO COMMENCING WORK. REROUTE EXISTING-TO-REMAIN DEVICE CONDUIT AND WIRING AS REQUIRED TO SUPPORT REMODEL ACTIVITIES.

3. REMOVE UNUSED SURFACE RACEWAY, BOXES AND WIRING. COORDINATE PATCHING AND PAINTING WITH DIVISION 09 CONTRACTOR. REMOVE UNUSED BOXES. PROVIDE MUD RINGS AND BLANK COVERS FOR UNUSED RECESSED BOXES TO REMAIN. REFER TO SPECIFICATION SECTION 2627 FOR ADDITIONAL INFORMATION.

4. PATCHING AND PAINTING TO MATCH EXISTING CONDITIONS SHALL BE PROVIDED BY DIVISION 09 CONTRACTOR.

5. ABANDON BELOW GRADE AND INACCESSIBLE RACEWAY IN PLACE AND RECORD LOCATIONS ON RECORD DRAWINGS.

FLAG NOTE:

DEMOLISH EXISTING FLUID COOLER CONNECTIONS, CONDUIT, WIRE, DISCONNECTS, ETC. BACK TO SERVICE POINT. RE-LABEL SERVICE POINT AS "SPARE".
1. Refer to mechanical equipment schedule sheet E9.1 for additional equipment characteristics, requirements and circuit information.

2. Final location of equipment disconnects/controls shall be coordinated with other trades prior to rough-in. Maintain code-required working clearances. Provide/construct unistrut assembly for mounting of disconnects/controls which cannot be located on building structure. See one-line diagram and equipment schedule, sheet E9.1, for additional information. Provide unistrut support as needed for new equipment disconnect switch.

Sheet Notes:

Flag Note:

CWP-01

CWP-02

(E)

MCC #1

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**NOTES:**
1. CONNECT TO INJ supplied with unit.
2. PROVIDE FUSED DISCONNECT.
3. MINIMUM SCCR RATING CALCULATED BASED ON AVAILABLE FAULT CURR FROM RECORD DRAWINGS.

**LOAD REDUCTION CALCULATION**

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**GENERAL NOTES:**
1. EXISTING LOADS BASED OFF AS-BUILT DRAWINGS.
2. CWP-01 & 02 ARE NON-COINCIDENT LOADS.