

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

INFRASTRUCTURE PLANNING AND FACILITIES  
PLANNING, DESIGN AND CONSTRUCTION

November 15, 2023

TITLE OF PROJECT: Bessey Hall - Chiller Replacement

PROJECT ISSUE DATE: October 31, 2023

PROJECT NUMBER: CP23031

ADDENDUM NO: 02

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: Revised drawings sheets S1.01, M1.01, M2.01, M2.02, M2.03, M2.04, M2.05, M5.01, M5.02 and M6.03.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>
01	Updated Drawing S1.01 a. Updated steel information and notes
02	Updated Drawing M1.01 a. Updated general notes b. Updated keyed notes
03	Updated Drawing M2.01 a. Updated general notes b. Updated keyed notes c. Updated water softener piping d. Updated refrigerant monitoring sensors
04	Updated Drawing M2.02 a. Updated keyed notes
05	Updated Drawing M2.03 a. Updated keyed notes b. Updated ice tank layout and piping
06	Updated Drawing M2.04 a. Updated keyed notes

- 07 Updated Drawing M2.05
  - a. Updated ice tank layout
  
- 08 Updated Drawing M5.01
  - a. Updated Chiller Schedule
  - b. Added refrigerant monitoring schedule
  
- 09 Updated Drawing M5.02
  - a. Updated ice tank schedule
  
- 10 Updated Drawing M6.03
  - a. Updated ice tank detail

Model Name: C:\Users\cwendling\Documents\2022-2504 MECH-Bessey Hall Central+22\_cwending\6\6\6.rvt  
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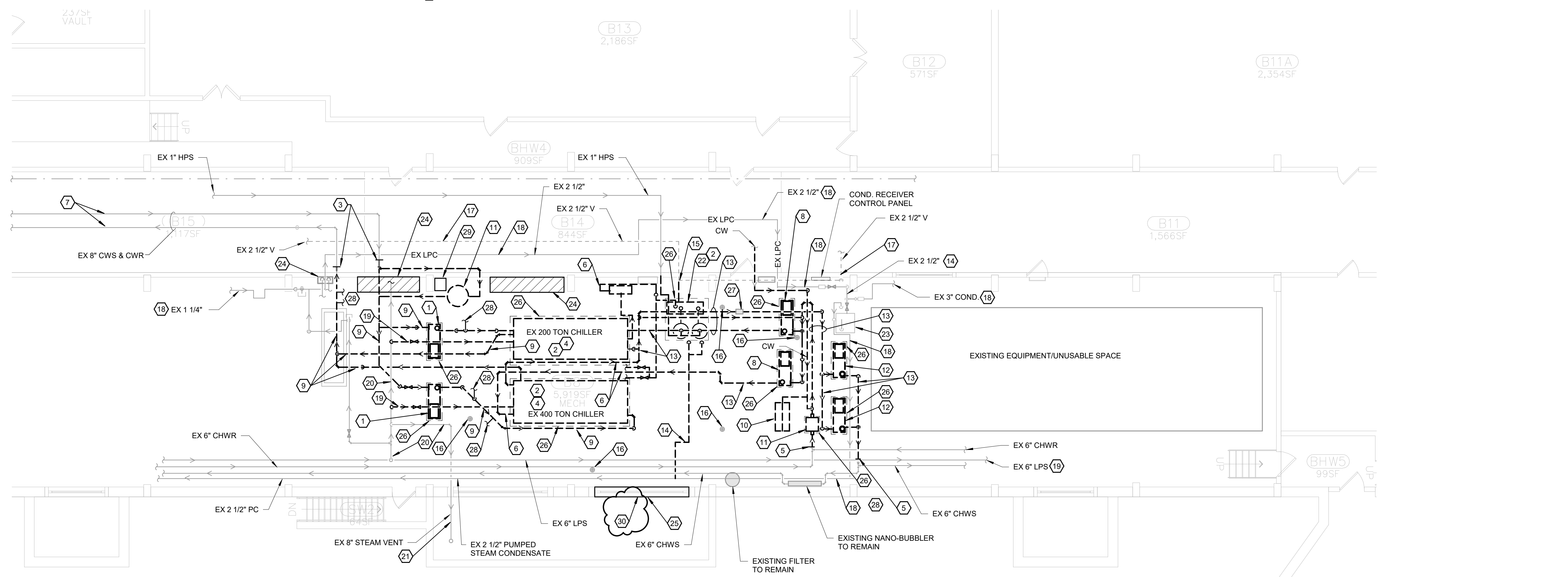
**KEYED NOTES**

- 1 REMOVE BASE MOUNTED CONDENSER WATER PUMP. REMOVE ALL CONNECTED PIPING, VALVES, DEVICES, ETC. ASSOCIATED WITH PUMP. EXISTING CONCRETE PAD SHALL BE REMOVED. REFER TO MECHANICAL REVISION PLAN.
- 2 WHEN DEMOLISHING EXISTING EQUIPMENT COORDINATE CLOSELY WITH MSU REGARDING SALVAGING COMPONENTS OF EXISTING EQUIPMENT.
- 3 REMOVE CONDENSER WATER PIPING UP TO THIS POINT. FIELD VERIFY EXACT LOCATION. REMOVE UP TO A FITTING THAT ALLOWS NEW PIPING TO BE RECONNECTED AT THIS LOCATION. CLOSELY COORDINATE REMOVAL POINT WITH MECHANICAL REVISION PLAN AND MECHANICAL CONTRACTOR.
- 4 REMOVE STEAM ABSORPTION CHILLER. REMOVAL SHALL INCLUDE PIPING, INSULATION, FITTINGS, VALVES, SUPPORTS, DEVICES, ETC. ACCESS OPENING AT WEST WALL OR WALKING PATHS INTO SPACE ARE ONLY ACCESS PATHS FOR REMOVING EQUIPMENT. DISASSEMBLE OR CUT CHILLER INTO SECTIONS SMALL ENOUGH TO ALLOW FOR REMOVAL. REMOVE CONCRETE PAD.
- 5 REMOVE CHILLED WATER PIPING BACK TO CHILLED WATER MAIN IN MECHANICAL ROOM AS SHOWN. REMOVAL SHALL INCLUDE ALL PIPING, INSULATION, FITTINGS, VALVES, SUPPORTS, ETC. CLOSELY COORDINATE REMOVAL POINT WITH MECHANICAL REVISION PLAN AND MECHANICAL CONTRACTOR.
- 6 EXISTING STEAM CONDENSATE PIPING SHALL BE REMOVED BACK TO MAIN AND CAPPED IN MECHANICAL ROOM.
- 7 EXISTING CONDENSER WATER PIPING ROUTED FROM MECHANICAL ROOM UP THRU ROOF TO EXISTING COOLING TOWERS TO REMAIN. CLOSELY COORDINATE WITH ROOF DEMOLITION PLAN AND MECHANICAL CONTRACTOR.
- 8 REMOVE BASE MOUNTED (PRIMARY LOOP) CHILLED WATER PUMP. REMOVE ALL PIPING, VALVES, CONTROLS, ELECTRICAL, ETC. ASSOCIATED WITH PUMP. REMOVE PIPING BACK TO CHILLED WATER MAINS IN MECHANICAL ROOM AS SHOWN. EXISTING CONCRETE PAD TO BE REMOVED. REFER TO MECHANICAL REVISION PLAN.
- 9 REMOVE CONDENSER WATER PIPING. REMOVAL SHALL INCLUDE ALL ASSOCIATED PIPING, VALVES, INSULATION, ETC. FIELD VERIFY EXACT LOCATION OF PIPING BEFORE REMOVING.
- 10 REMOVE EXISTING EXPANSION TANK, ASSOCIATED PIPING, VALVES, SUPPORTS, ETC.
- 11 REMOVE EXISTING AIR/SEDIMENT SEPARATOR, ASSOCIATED PIPING, VALVES, ETC. EXISTING CONCRETE PAD TO BE REMOVED.
- 12 REMOVE BASE MOUNTED (SECONDARY LOOP) CHILLED WATER PUMP. REMOVE ALL CONNECTED PIPING, VALVES, DEVICES, ETC. ASSOCIATED WITH PUMP. REMOVE PIPING BACK TO LOCATION SHOWN. EXISTING CONCRETE PAD TO BE REMOVED. REFER TO MECHANICAL REVISION PLAN.
- 13 REMOVE EXISTING CHILLED WATER PIPING. REMOVAL SHALL INCLUDE ALL PIPING, INSULATION, FITTINGS, VALVES, SUPPORTS, ETC.
- 14 REMOVE STEAM CONDENSATE PIPING. REMOVAL SHALL INCLUDE ALL ASSOCIATED VALVES, FITTINGS, INSULATION, ETC. CAP AT PREVIOUS CONNECTION TO PUMPED STEAM CONDENSATE PIPING.
- 15 REMOVE EXISTING STEAM VENT PIPE BACK TO TEE AND CAP AT TEE.
- 16 EXISTING FLOOR DRAIN TO REMAIN (TYP).

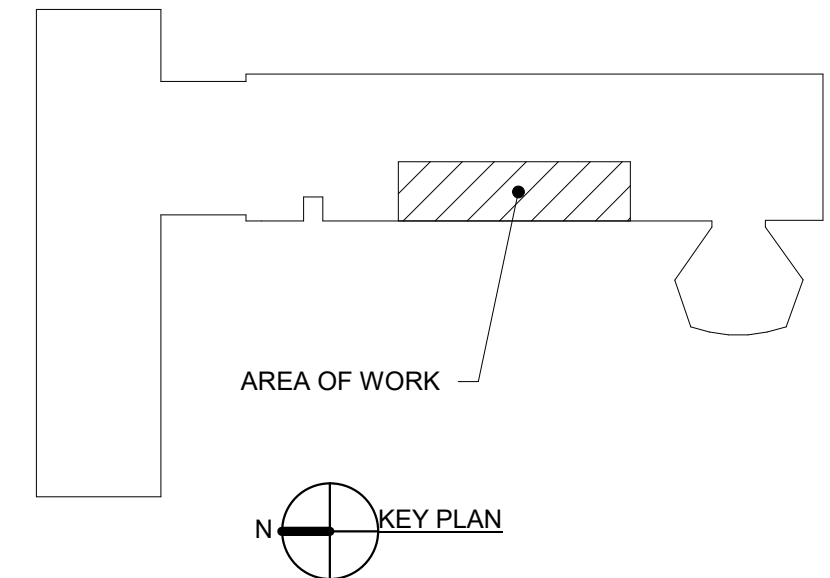
- 17 EXISTING STEAM VENT PIPING SERVING REMAINING CONDENSATE RECEIVERS SHALL REMAIN.
- 18 EXISTING STEAM CONDENSATE PIPING SHALL REMAIN (TYP).
- 19 REMOVE EXISTING STEAM PIPING FROM CHILLERS BACK TO EXISTING STEAM MAIN IN MECHANICAL ROOM AND CAP.
- 20 EXISTING STEAM PIPING SHALL REMAIN.
- 21 EXISTING STEAM VENT PIPING SHALL REMAIN.
- 22 EXISTING STEAM CONDENSATE RECEIVER UNIT AND PUMPS SHALL BE REMOVED. REMOVAL SHALL INCLUDE ALL ASSOCIATED PIPING, VALVES, FITTINGS, ELECTRICAL, ETC. IT SHALL FIRST BE VERIFIED ALL STEAM CONDENSATE PIPING CONNECTED TO THIS UNIT IS ONLY FROM THE ABSORPTION CHILLERS BEING REMOVED.
- 23 EXISTING STEAM CONDENSATE RECEIVER UNIT SHALL REMAIN.
- 24 EXISTING CHEMICAL TREATMENT EQUIPMENT TO REMAIN. IDENTIFY ALL ASSOCIATED PIPING AND COMPONENTS AND MAKE SURE TO PROTECT AND NOT DEMOLISH.
- 25 REMOVE EXISTING WALL PANEL TO ALLOW EXISTING CHILLER TO BE REMOVED. NEW CHILLER SHALL ENTER BUILDING THROUGH THE SAME OPENING. EXISTING PANEL TO BE PUT BACK IN PLACE UPON COMPLETION OF WORK. REFER TO THE INSTALLATION PROCEDURE DRAWING FOR MORE DETAILS.
- 26 REMOVE EXISTING CONCRETE PAD AFTER REMOVING MECHANICAL EQUIPMENT. IF LOCATION OF DEMOLISHED CONCRETE PAD IS NOT BEING USED FOR A NEW CONCRETE PAD THEN PATCH AND REFINISH SLABS PER MSU STANDARDS.
- 27 EXISTING BTU METER AND ASSOCIATED DEVICES AND VALVES TO BE REMOVED DURING DEMO AND TURNED OVER TO MSU. CONTACT MSU PRIOR TO REMOVAL TO RECEIVE DIRECTION OR TO ALLOW MSU STAFF TO BE PRESENT.
- 28 EXISTING CHEMICAL TREATMENT CONNECTION TO BE DISCONNECTED FROM EXISTING PIPING CAPPED AND THEN CONNECTED TO NEW PIPING. COORDINATE EXACT LOCATION AND CONNECTION TO NEW PIPING.
- 29 EXISTING CABINET TO REMAIN.
- 30 EXISTING 42" HIGH CONCRETE WALL BELOW PANEL TO BE REMOVED. INTENT IS TO BE COMPLETELY REMOVED SO THAT THERE IS NO OBSTRUCTION BETWEEN THE AREAWAY AND THE BASEMENT MECHANICAL ROOM FLOOR. AFTER INSTALLATION OF NEW CHILLERS REMOVED WALL IS TO BE REPLACED WITH LIKE CONSTRUCTION AND DOWELED TO EXISTING STRUCTURE.

**GENERAL NOTES**

1. WHERE PIPING OR DUCTWORK IS TO BE REMOVED AND CAPPED AT EXISTING MAINS/BRANCHES, THE CAP SHALL BE AIR/WATER TIGHT AND MATERIAL SHALL MATCH EXISTING, NO DISSIMILAR METAL SHALL BE USED.
2. FIELD VERIFY ALL MATERIALS AND EQUIPMENT SHOWN TO BE REMOVED.
3. COORDINATE ALL DEMOLITION WORK WITH CONTRACTORS PERFORMING NEW WORK, ESPECIALLY IN REGARDS TO NEW CONNECTIONS.
4. ALL CONTROLS REMOVED SHALL INCLUDE THE WIRING OR TUBING ALL THE WAY BACK TO THE SOURCE OR ACTIVE MAIN, UNLESS OTHERWISE NOTED, ANY REMOVED PNEUMATIC TUBING SHALL INCLUDE CAPPING TUBING AIR-TIGHT.
5. CONTRACTOR SHALL CLOSELY COORDINATE WITH CONTROLS CONTRACTOR AND MSU PRIOR TO REMOVING CONTROLS, CONTROL PANELS, SENSORS, THERMOSTATS, ETC. TO VERIFY THEY ARE PART OF THE SYSTEM THAT IS BEING REMOVED AND NOT ASSOCIATED WITH SYSTEMS THAT ARE REMAINING.
6. THE INTENT OF THE DRAWING IS TO REMOVE ALL MATERIALS AND EQUIPMENT SHOWN WITH A DASHED AND DARKER LINE TYPE.
7. CONTRACTOR SHALL REFER TO MSU'S STANDARDS FOR DEMOLISHING EXISTING EQUIPMENT CURBS, WHERE CURBS ARE TO BE DEMOLISHED AND NO NEW CURB IS TO BE INSTALLED REFER TO MSU'S STANDARDS FOR PATCHING CONCRETE SLAB.
8. COORDINATE THE TEMPORARY ADJUSTMENT OF THE EXISTING CABLE TRAY LOCATED ON THE WEST WALL OF THE MECHANICAL SPACE WITH ELECTRICAL TRADES AND MSU.
9. PRIOR TO DEMOLITION, CONTRACTOR SHALL WALK THE MECHANICAL ROOM WITH MSU MAINTENANCE STAFF TO IDENTIFY ANY EQUIPMENT, DEVICES, ETC. THAT THEY WOULD LIKE TO SALVAGE.
10. CONTRACTOR SHALL IDENTIFY BRINE SOLUTION FOR EXISTING CHILLERS. CONTRACTOR SHALL BE RESPONSIBLE FOR PUMPING OUT SOLUTION INTO 55 GALLON BARRELS AND HIRING THE SERVICES OF A CONTRACTOR TO REMOVE CONTAINERS FROM THE SITE AND PROPERLY DISPOSE OF. COORDINATE WITH MSU MAINTENANCE SERVICES WHEN REMOVING SOLUTION. SOLUTION IS ASSUMED TO BE LITHIUM BROMIDE WITH A MOLYBDATE INHIBITOR (NON-HAZARDOUS). SOLUTION VOLUME TOTAL (FOR BOTH CHILLERS) IS ASSUMED TO BE 800 GALLONS.



**BASEMENT PLAN - MECHANICAL DEMOLITION**  
 1/8" = 1'-0"



MACMILLAN ASSOCIATES CONSULTING ENGINEERS  
 714 EAST MIDLAND STREET  
 BAY CITY, MICHIGAN 48706  
 2022-2504  
 CW  
 DF  
 GS

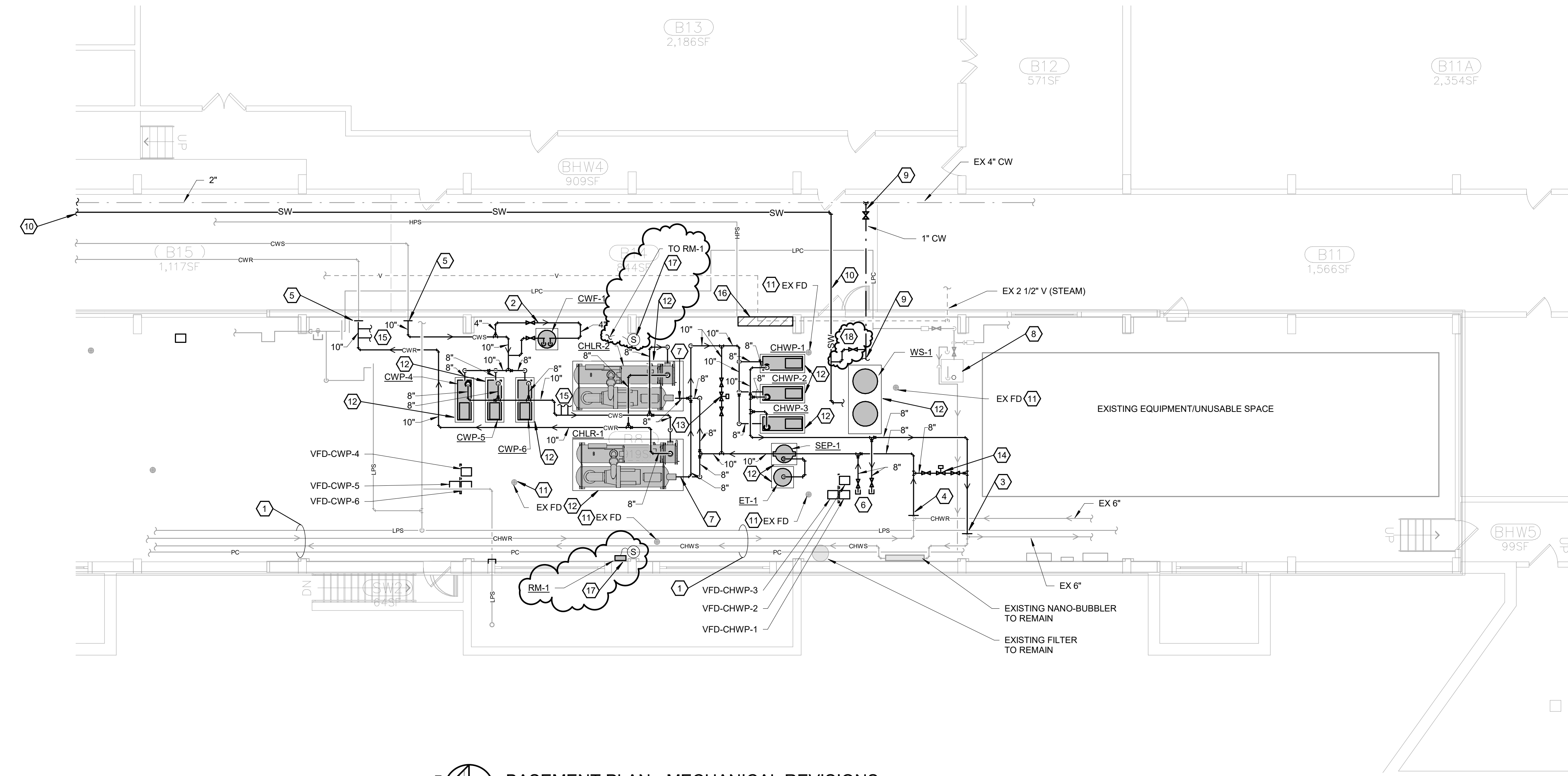
**MICHIGAN STATE UNIVERSITY**  
 Infrastructure Planning and Facilities

**BESSEY HALL**  
 CHILLER REPLACEMENT

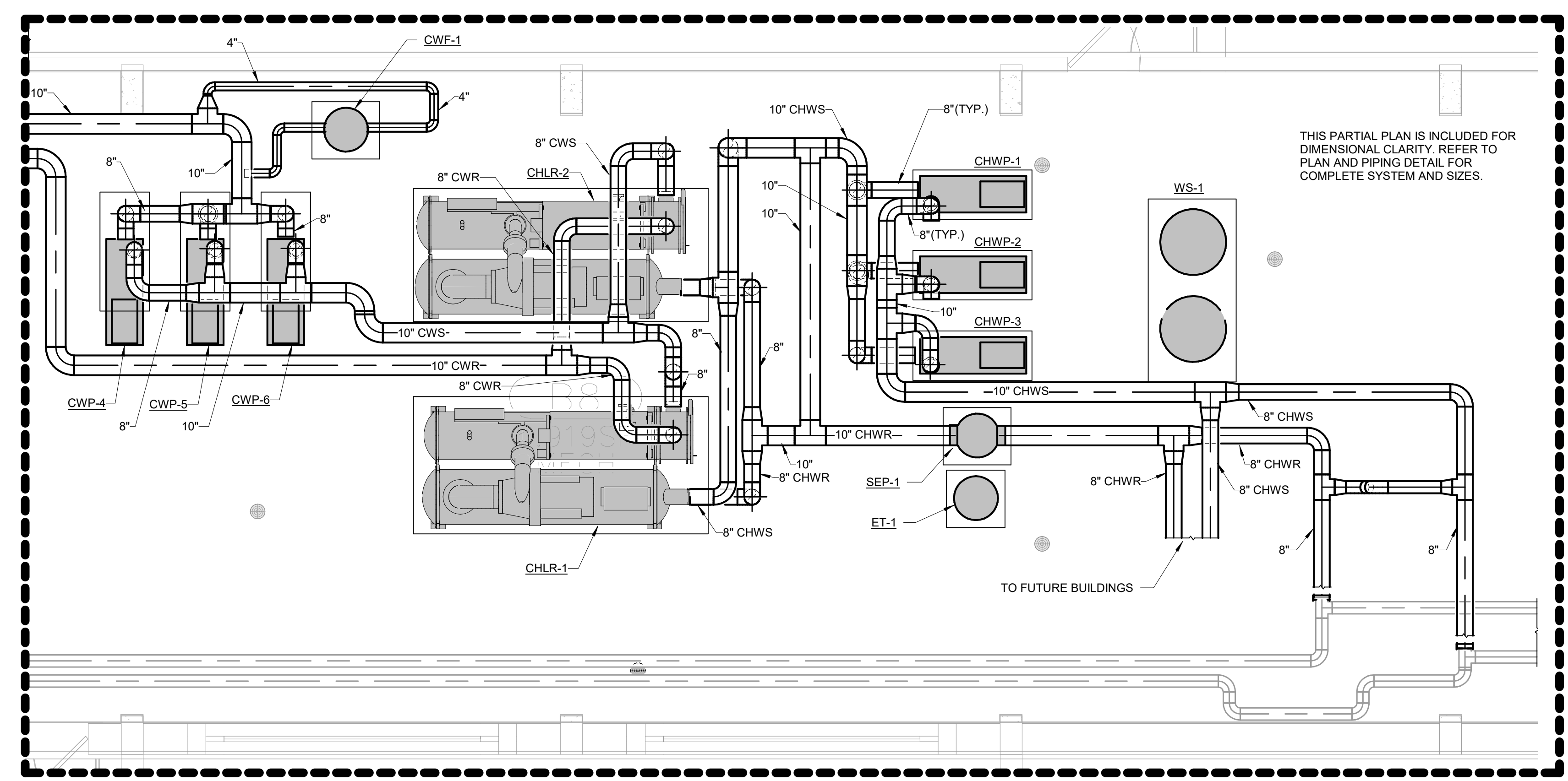
CAPITAL PROJ. NO.	MORGAN
CP23031	CHARLAND
LEAD ARCH.	WINKLER
MECH.	BEACH
ELEC.	GARDNER
CIVIL	L.A.
INT DES	WILBER
REP.	MORGAN
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	
ISSUED FOR BIDS	10/23/2023
ADDENDUM NO. 2	11/14/2023

**BASEMENT PLAN - MECHANICAL DEMOLITION**  
**M1.01**  
 2 OF 27

CAPITAL PROJ. NO.	MORGAN
CP23031	CHARLAND
LEAD ARCH.	WINKLER
MECH. ELEC.	BEACH
CIVIL	GARDNER
L.A.	WILBER
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APPR	10/23/2023
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ISSUED FOR BIDS	10/23/2023
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**BASEMENT PLAN - MECHANICAL REVISIONS**  
 1/8" = 1'-0"



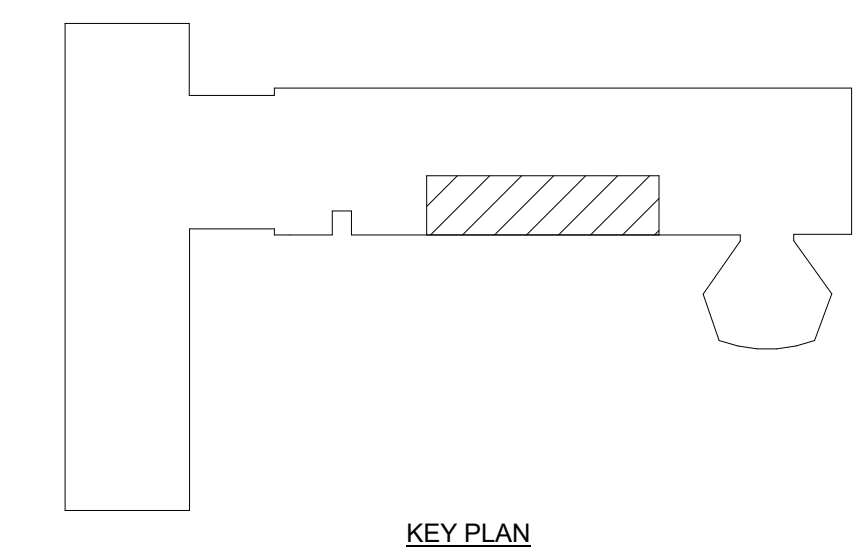
**ENLARGED BASEMENT PLAN - MECHANICAL REVISIONS**  
 1/4" = 1'-0"

**KEYED NOTES**

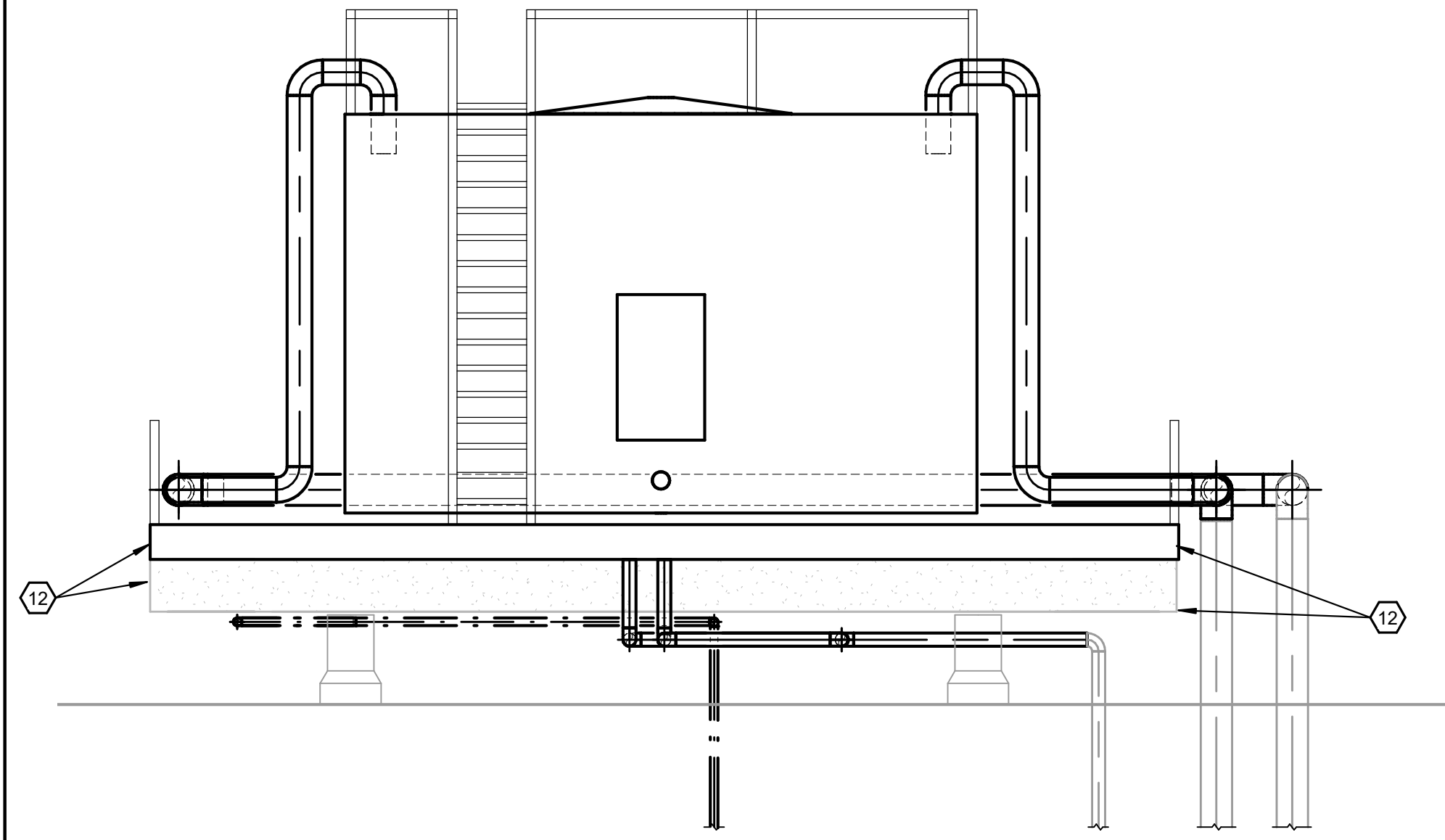
- 1 EXISTING PIPING SHALL REMAIN (TYP).
- 2 ROUTE NEW CONDENSER WATER PIPING THROUGH NEW SIDESTREAM FILTRATION UNIT.
- 3 CONNECT NEW CHILLED WATER SUPPLY PIPING TO EXISTING CHILLED WATER SUPPLY PIPING COORDINATE EXACT SIZE AND LOCATION OF CONNECTION.
- 4 CONNECT NEW CHILLED WATER RETURN PIPING TO EXISTING CHILLED WATER RETURN PIPING COORDINATE EXACT SIZE AND LOCATION OF CONNECTION.
- 5 ROUTE NEW 10" CONDENSER WATER SUPPLY AND RETURN PIPING TO EXISTING 10" CONDENSER WATER SUPPLY AND RETURN PIPING. FIELD VERIFY EXACT LOCATION AND SIZE.
- 6 NEW 8" CHILLED WATER SUPPLY AND RETURN PIPING FOR FUTURE USE. FURNISH AND INSTALL ISOLATION VALVES AND CAP PIPING ENDS.
- 7 CHILLED WATER SUPPLY PIPING TO BE ROUTED VERTICALLY ABOVE CHILLED WATER RETURN PIPING WHEN CONNECTING TO CHILLER. REFER TO NEW ENLARGED CHILLER PLANS FOR MORE DETAIL.
- 8 EXISTING CONDENSATE RECEIVER UNIT SHALL REMAIN. ALL EXISTING PIPING AND WALL-MOUNTED PANEL SHALL REMAIN.
- 9 CONNECT NEW DOMESTIC COLD WATER PIPING TO EXISTING PIPING AND ROUTE TO NEW WATER SOFTENER SYSTEM. FIELD VERIFY EXISTING PIPING LOCATION AND SIZE.
- 10 ROUTE NEW SOFTENED WATER PIPING TO CONNECT TO COOLING TOWER MAKE-UP WATER PIPING. MAKE CONNECTION UPSTREAM OF EXISTING METER AND BACKFLOW PREVENTER. FIELD VERIFY LOCATION OF EXISTING PIPING.
- 11 NEW EQUIPMENT AND ASSOCIATED CONCRETE PAD SHALL BE LOCATED TO AVOID COVERING OR BLOCKING DRAINAGE TO AN EXISTING FLOOR DRAIN. FIELD VERIFY EXACT LOCATIONS OF EXISTING FLOOR DRAINS.
- 12 FURNISH AND INSTALL NEW 3.5" CONCRETE PAD. COORDINATE DIMENSIONS WITH EQUIPMENT SIZE.
- 13 AUTOMATIC CONTROL VALVE ON FULL SIZE BYPASS. MANUAL VALVES TO BE LOCATED ON EITHER SIDE OF AUTOMATIC VALVE. REFER TO PIPING DETAIL AND CONTROLS DIAGRAM.
- 14 AUTOMATIC CONTROL VALVE ON 8" CHILLED WATER PIPING BYPASS. BYPASS TO BE SIZED TO MEET MINIMUM FLOW OF BOTH CHILLERS. MANUAL VALVES TO BE LOCATED ON EITHER SIDE OF AUTOMATIC VALVE. REFER TO PIPING DETAIL AND CONTROLS DIAGRAM.
- 15 NEW CHEMICAL TREATMENT CONNECTION. CONNECT NEW PIPING TO EXISTING CHEMICAL TREATMENT PIPING. COORDINATE WITH THE MECHANICAL DEMOLITION PLAN. COORDINATE EXACT LOCATION AND CONNECTION TO NEW PIPING.
- 16 NEW ELECTRICAL GEAR ON WALL. COORDINATE ALL CLEARANCE REQUIREMENTS WITH ELECTRICAL TRADES PRIOR TO INSTALLING PIPING AND EQUIPMENT IN THIS AREA.
- 17 FURNISH AND INSTALL A NEW REFRIGERANT MONITORING DEVICE. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS IN REGARDS TO SPACING, HEIGHT AND DISTANCE FROM REFRIGERANT SOURCE (CHILLERS). CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR SHALL CLOSELY COORDINATE INSTALLATION.
- 18 BLEEDER PIPING WITH BALL VALVE FROM UNSOFTENED WATER TO BE ROUTED TO SOFTENED WATER PIPING. REFER TO MSU STANDARDS AND DETAILS FOR MORE INFORMATION.

**GENERAL NOTES**

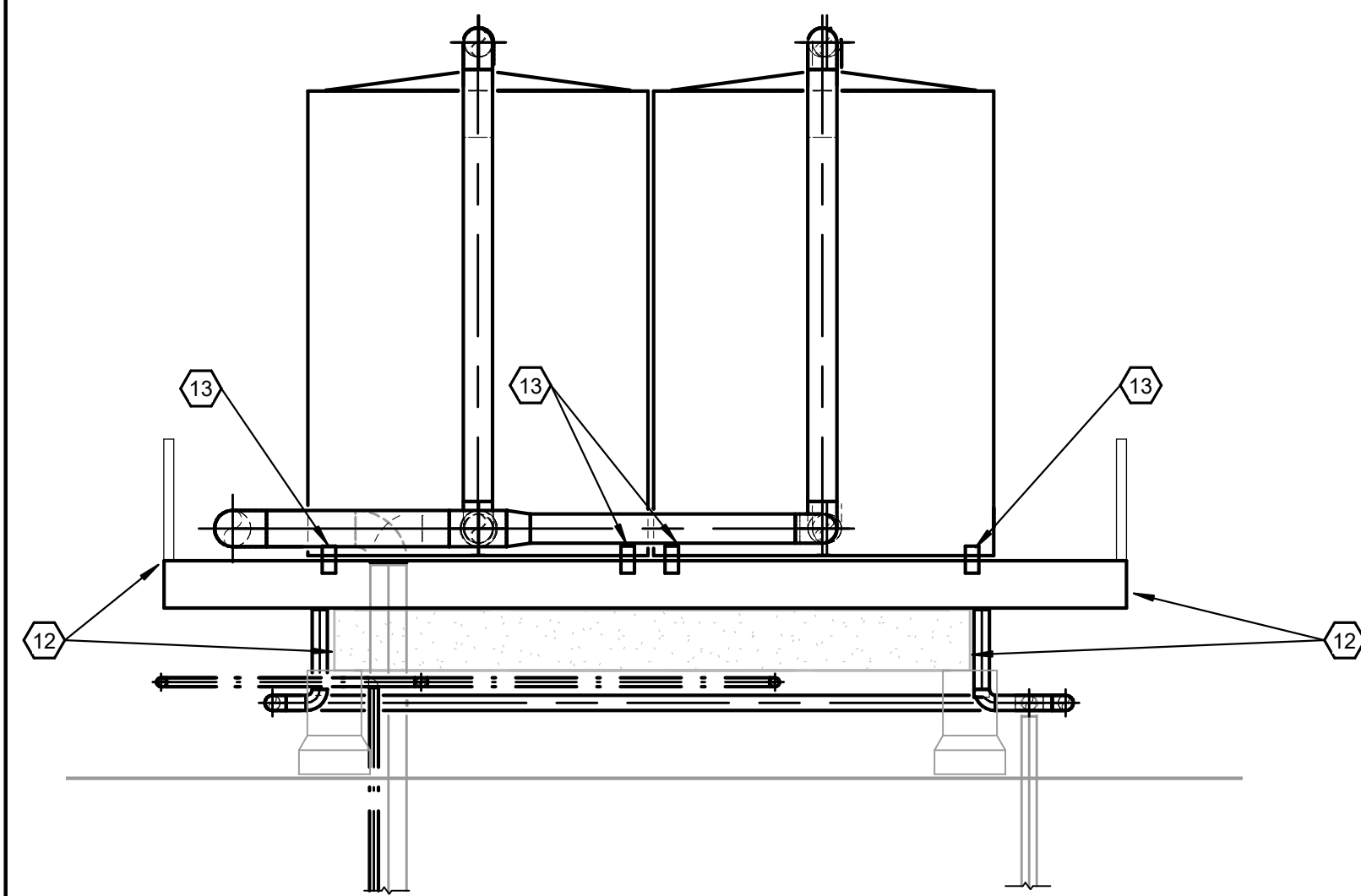
1. ALL PIPING SHALL BE INSTALLED PER STATE/LOCAL CODES.
2. COORDINATE ROUTING OF PIPING WITH ALL OTHER TRADES. DETERMINE LOCATION OF ALL PIPING, DUCTWORK, CONDUIT, CABLE TRAY, ETC. PRIOR TO INSTALLING PIPING IN FINAL LOCATION.
3. NO PIPING SHALL BE LOCATED DIRECTLY ABOVE ELECTRICAL PANELS OR DEVICES. NO PIPING SHALL BE ALLOWED WITHIN 3'-0" OF PANELS, UNLESS PIPING IS HIGHER THAN 7'-0" ABOVE FLOOR. VERIFY ALL PIPE ROUTING WITH ELECTRICAL TRADES.
4. REFER TO PIPING DETAILS AND PROVIDE ALL VALVES, DEVICES, FITTINGS, PIPING, ETC.
5. THE NEW CHILLED WATER SYSTEM SHALL BE FLUSHED 3 TIMES. THE EXISTING PIPING AND COILS SHALL ALSO BE FLUSHED 3 TIMES, SEPARATE FROM THE NEW PIPING (AND PRIOR TO BEING CONNECTED TO THE NEW PIPING). AFTER THE FINAL FLUSH, THE SYSTEM IS TO BE FILLED, CHECKED THEN TREATED.



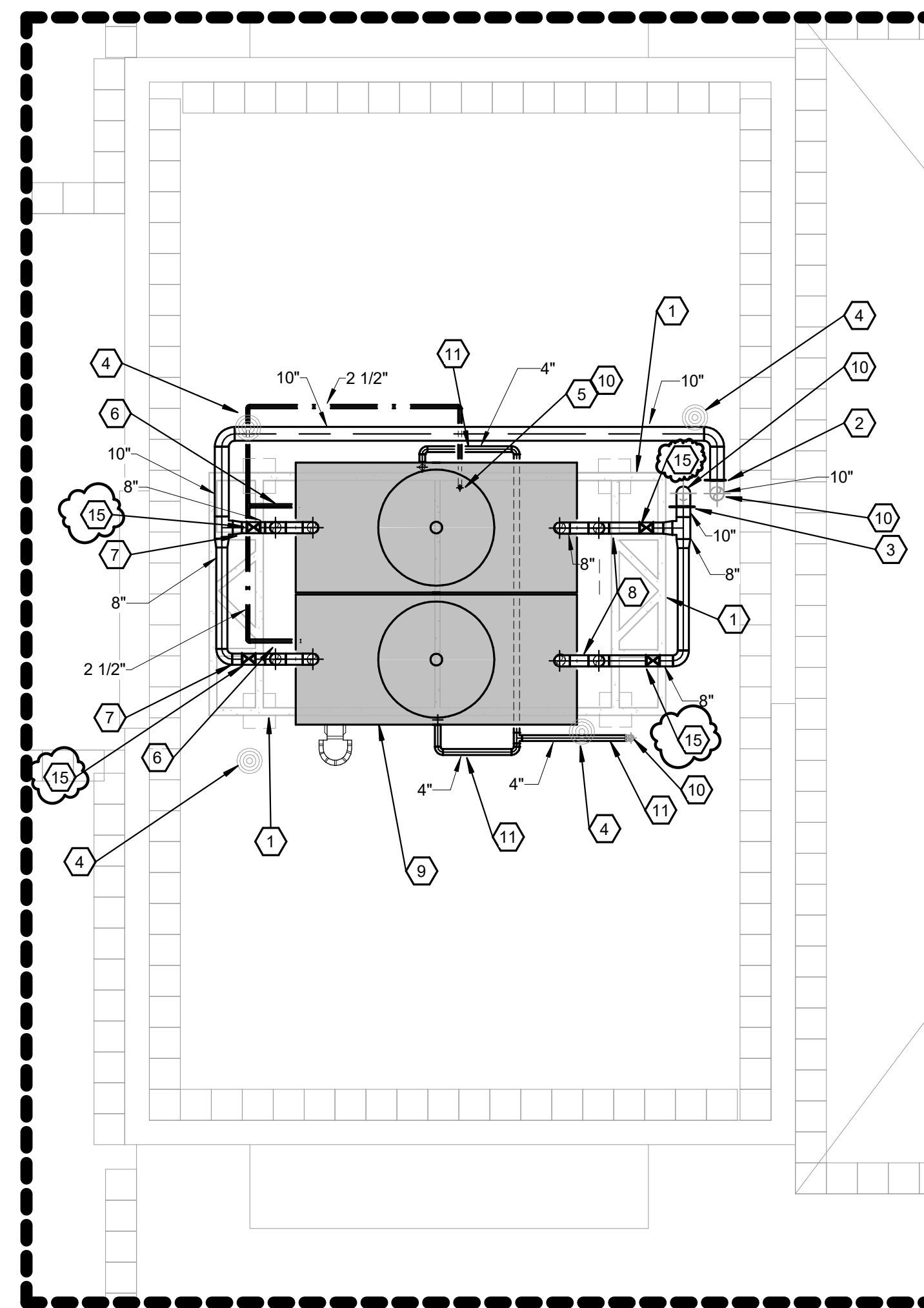
KEY PLAN



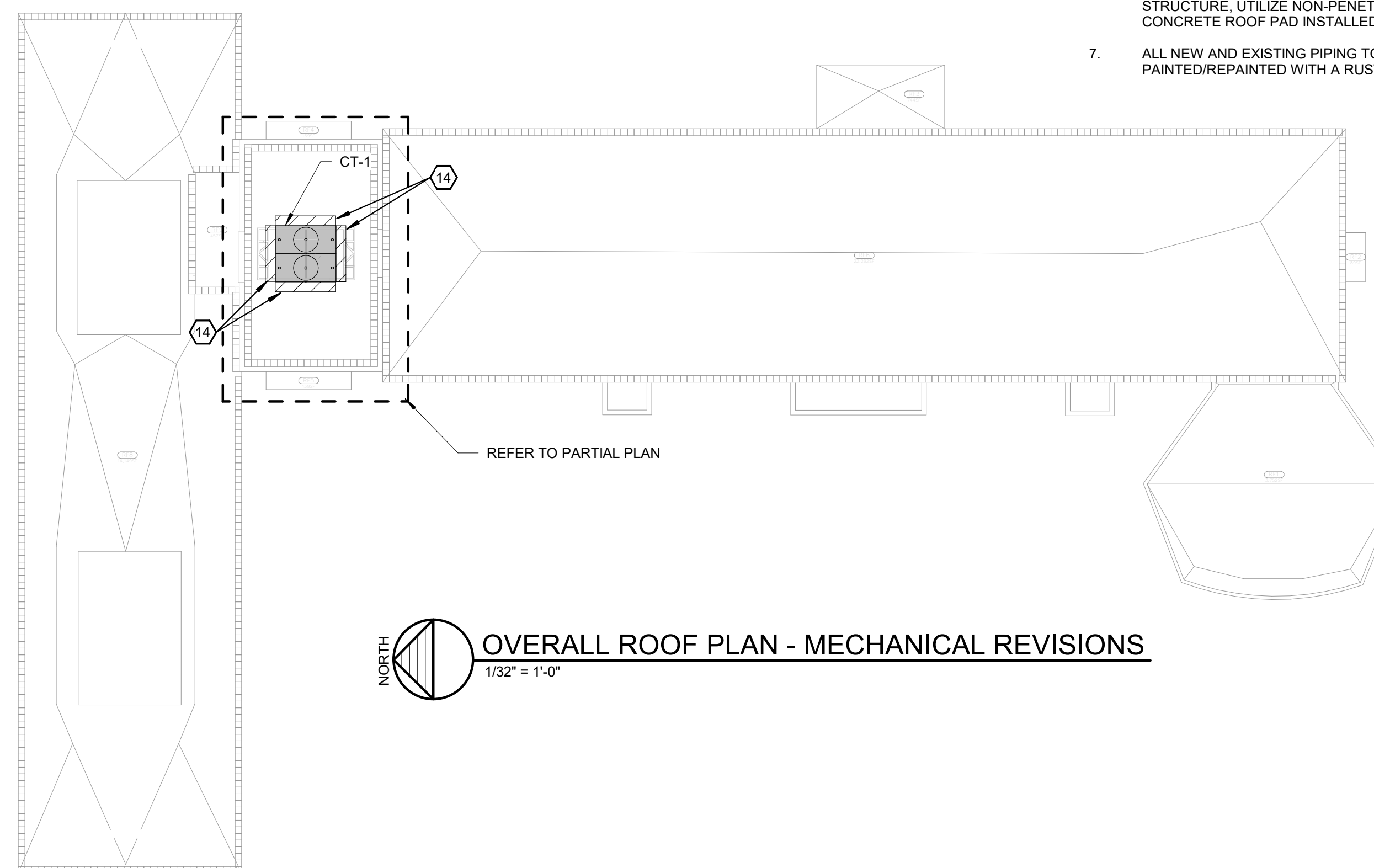
**ELEVATION VIEW 1 - COOLING TOWER (LOOKING EAST)**  
1/4" = 1'-0"



**ELEVATION VIEW 2- COOLING TOWER (LOOKING NORTH)**  
1/4" = 1'-0"



**PARTIAL ROOF PLAN - MECHANICAL REVISIONS**  
1/8" = 1'-0"



**OVERALL ROOF PLAN - MECHANICAL REVISIONS**  
1/32" = 1'-0"

**KEYED NOTES**

- 1 EXISTING COOLING TOWER SUPPORT STEEL TO REMAIN. REFER TO DETAILS ON THIS SHEET.
- 2 NEW CONDENSER WATER RETURN PIPING. CONNECT NEW CONDENSER WATER RETURN PIPING TO EXISTING CONDENSER WATER RETURN PIPING AT ROOF. CLOSELY COORDINATE CONNECTION POINT WITH DEMOLITION PLANS. FIELD VERIFY EXACT CONNECTION LOCATION AT ROOF.
- 3 NEW CONDENSER WATER SUPPLY PIPING. CONNECT NEW CONDENSER WATER SUPPLY PIPING TO EXISTING CONDENSER WATER SUPPLY PIPING AT ROOF. CLOSELY COORDINATE CONNECTION POINT WITH DEMOLITION PLANS. FIELD VERIFY EXACT CONNECTION LOCATION AT ROOF.
- 4 EXISTING ROOF SUMP TO REMAIN.
- 5 CONNECT NEW 2 1/2" CW MAKE-UP PIPING TO EXISTING 2 1/2" CW MAKE-UP PIPING AT ROOF. FIELD VERIFY EXACT CONNECTION LOCATION AT ROOF.
- 6 ROUTE NEW 2 1/2" CW PIPING TO NEW COOLING TOWERS ON ROOF. TRANSITION CW PIPING AT COOLING TOWERS AS NECESSARY FOR CONNECTION. FIELD VERIFY EXACT CONNECTION LOCATION.
- 7 CONNECT NEW CONDENSER WATER RETURN PIPING TO NEW COOLING TOWER. TRANSITION PIPE SIZE AT COOLING TOWER AS NECESSARY FOR NEW CONNECTION. FIELD VERIFY EXACT CONNECTION LOCATION.
- 8 CONNECT NEW CONDENSER WATER SUPPLY PIPING TO NEW COOLING TOWER. TRANSITION PIPE SIZE AT COOLING TOWER AS NECESSARY FOR NEW CONNECTION. FIELD VERIFY EXACT CONNECTION LOCATION.
- 9 NEW COOLING TOWER SHALL BE INSTALLED ON EXISTING FRAMEWORK. INSTALL NEW COOLING TOWER ON EXISTING FRAME AS NECESSARY FOR SUPPORT OF NEW COOLING TOWER. FIELD VERIFY EXACT LOCATION OF FRAME AND NEW COOLING TOWER. REFER TO DETAILS ON THIS SHEET.
- 10 EXISTING PIPE PENETRATION CURB SHALL BE REMOVED, REPAIRED RE-INSTALLED AND RE-SEALED.
- 11 ROUTE NEW BASIN DRAIN PIPING BELOW TOWER AND CONNECT TO EXISTING DRAIN PIPING JUST ABOVE ROOF.
- 12 NEW STEEL TO BE INSTALLED ON EXISTING STEEL STRUCTURE TO SUPPORT NEW COOLING TOWER. CONTRACTORS AND COOLING TOWER MANUFACTURER SHALL FIELD VERIFY ALL DIMENSIONS OF EXISTING STEEL AND FURNISH AND INSTALL THE ADDITIONAL STEEL REQUIRED TO MAKE THE MANUFACTURER-REQUIRED CONNECTIONS WORK. REFER TO STRUCTURAL DRAWINGS FOR MORE DETAIL.
- 13 FURNISH AND INSTALL NEW ANCHOR BOLTS TO CONNECT NEW COOLING TOWER TO NEW SUPPORT STEEL. MECHANICAL CONTRACTOR SHALL COORDINATE EXACT BOLT REQUIREMENTS WITH COOLING TOWER MANUFACTURER. REFER TO STRUCTURAL DRAWINGS FOR MORE DETAIL.
- 14 FURNISH AND INSTALL NEW SECTIONS OF GRATING TO EXTEND AREA OF EXISTING ACCESS PLATFORM FLOOR. FIELD VERIFY DIMENSION OF NEW SECTIONS REQUIRED. REFER TO STRUCTURAL DRAWINGS FOR MORE DETAIL.
- 15 MANUAL VALVES ON CONDENSER WATER SUPPLY AND RETURN BRANCH PIPING. INTENT IS FOR MSU TO HAVE THE OPTION TO RUN EACH COOLING TOWER CELL INDEPENDENTLY.

**GENERAL NOTES**

1. ALL PIPING SHALL BE INSTALLED PER STATE/LOCAL CODES.
2. COORDINATE ROUTING/LOCATION OF PIPING WITH ALL OTHER TRADES. DETERMINE LOCATION OF ALL PIPING, DUCTWORK, CONDUIT, CABLE TRAY, ETC. PRIOR TO INSTALLING PIPING IN FINAL LOCATION.
3. NO PIPING SHALL BE LOCATED DIRECTLY ABOVE ELECTRICAL PANELS OR DEVICES. NO PIPING SHALL BE ALLOWED WITHIN 3'-0" OF PANELS, UNLESS PIPING IS HIGHER THAN 7'-0" ABOVE FLOOR. VERIFY ALL PIPE ROUTING WITH ELECTRICAL TRADES.
4. WHEN DEMOLISHING EXISTING EQUIPMENT AND INSTALLING NEW EQUIPMENT ON ROOF REFER TO MSU'S STANDARDS FOR ROOF PROTECTION (1" INSULATION UNDER 1/2" PLYWOOD).
5. REVISIONS TO EXISTING STEEL STRUCTURE SHOWN ARE ASSOCIATED WITH THE BASIS OF DESIGN COOLING TOWER. MECHANICAL CONTRACTOR SHALL INCLUDE COSTS ASSOCIATED WITH ANY ADDITIONAL STEEL REVISIONS OR ADDITIONS NECESSARY TO MAKE ANOTHER COOLING TOWER MANUFACTURER WORK.
6. SUPPORT NEW PIPING FROM EXISTING STEEL STRUCTURE WHERE NEW PIPING IS UNDER OR ALONGSIDE THE STEEL STRUCTURE. WHERE PIPING IS LOCATED OUTSIDE THE BOUNDARY OF THE EXISTING STEEL STRUCTURE, UTILIZE NON-PENETRATING PIPE SUPPORTS, WITH A CONCRETE ROOF PAD INSTALLED UNDERNEATH SUPPORT.
7. ALL NEW AND EXISTING PIPING TO REMAIN SHALL BE PRIMED AND PAINTED/REPAINTED WITH A RUST INHIBITOR PAINT.

CAPITAL PROJ. NO.  
CP23031

LEAD ARCH.	MORGAN CHARLAND
MECH.	WINKLER
ELEC.	BEACH
CIVIL	GARDNER
L.A.	WILBER
INT DES REP.	MORGAN
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	

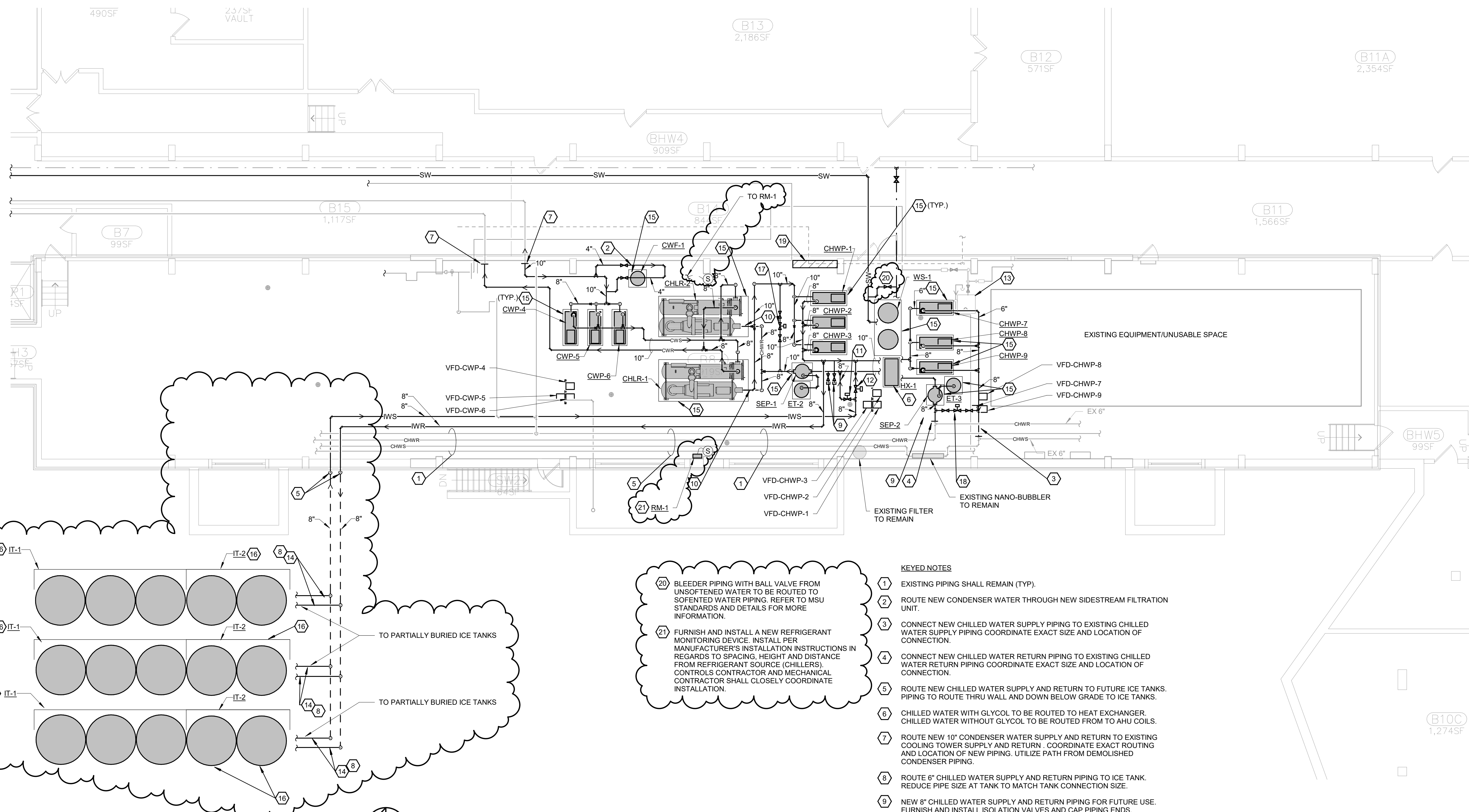
ISSUED FOR BIDS 10/23/2023  
ADDENDUM NO. 2 11/14/2023

ROOF PLAN - MECHANICAL REVISIONS

**M2.02**



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**BASEMENT PLAN - MECHANICAL REVISIONS - ALTERNATE #1**  
 1/8" = 1'-0"

20 BLEEDER PIPING WITH BALL VALVE FROM UNSOFTENED WATER TO BE ROUTED TO SOFTENED WATER PIPING. REFER TO MSU STANDARDS AND DETAILS FOR MORE INFORMATION.

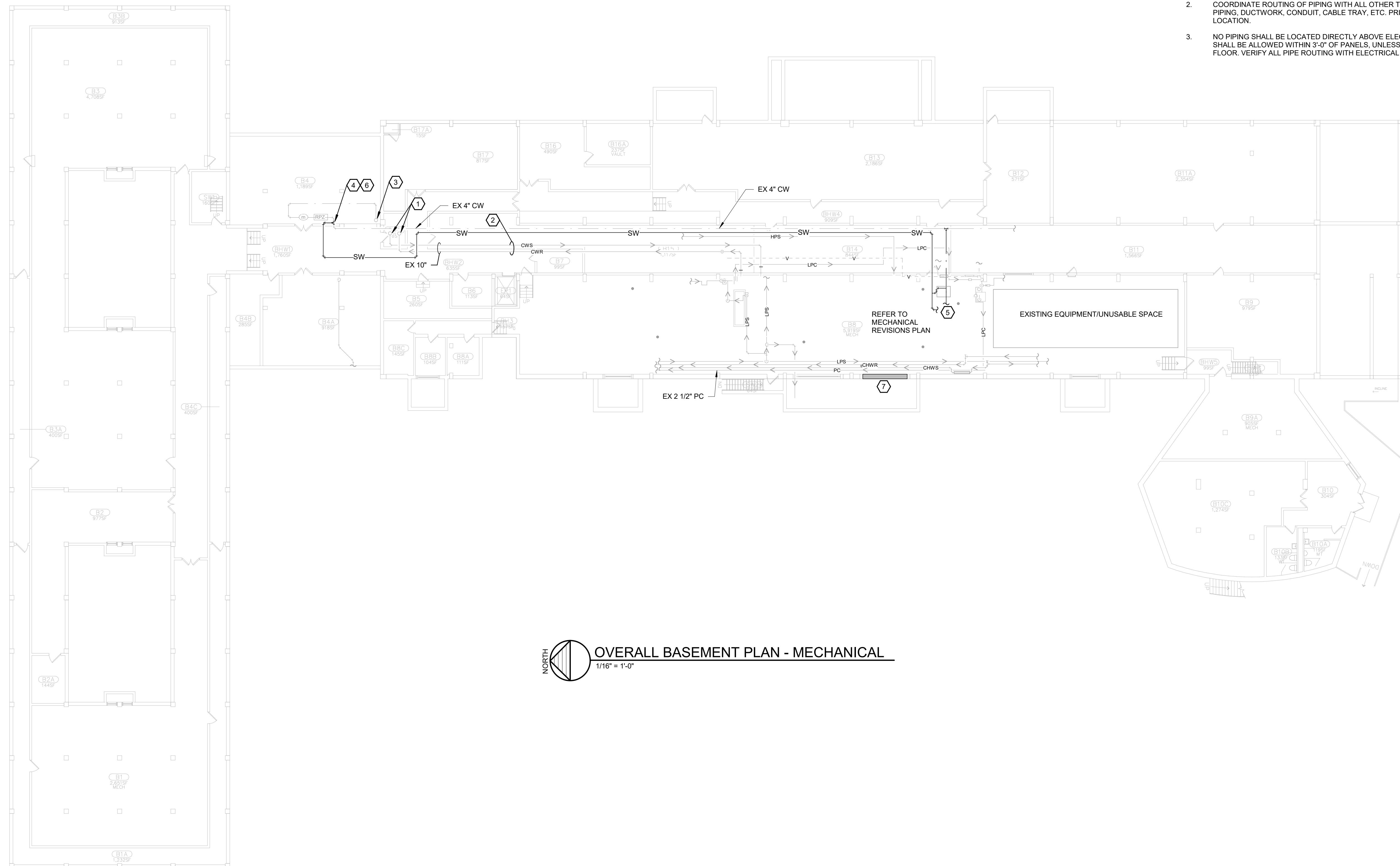
21 FURNISH AND INSTALL A NEW REFRIGERANT MONITORING DEVICE. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS IN REGARDS TO SPACING, HEIGHT AND DISTANCE FROM REFRIGERANT SOURCE (CHILLERS). CONTROLS CONTRACTOR AND MECHANICAL CONTRACTOR SHALL CLOSELY COORDINATE INSTALLATION.

- KEYED NOTES**
- 1 EXISTING PIPING SHALL REMAIN (TYP).
  - 2 ROUTE NEW CONDENSER WATER THROUGH NEW SIDESTREAM FILTRATION UNIT.
  - 3 CONNECT NEW CHILLED WATER SUPPLY PIPING TO EXISTING CHILLED WATER SUPPLY PIPING COORDINATE EXACT SIZE AND LOCATION OF CONNECTION.
  - 4 CONNECT NEW CHILLED WATER RETURN PIPING TO EXISTING CHILLED WATER RETURN PIPING COORDINATE EXACT SIZE AND LOCATION OF CONNECTION.
  - 5 ROUTE NEW CHILLED WATER SUPPLY AND RETURN TO FUTURE ICE TANKS. PIPING TO ROUTE THRU WALL AND DOWN BELOW GRADE TO ICE TANKS.
  - 6 CHILLED WATER WITH GLYCOL TO BE ROUTED TO HEAT EXCHANGER. CHILLED WATER WITHOUT GLYCOL TO BE ROUTED FROM TO AHU COILS.
  - 7 ROUTE NEW 10" CONDENSER WATER SUPPLY AND RETURN TO EXISTING COOLING TOWER SUPPLY AND RETURN. COORDINATE EXACT ROUTING AND LOCATION OF NEW PIPING. UTILIZE PATH FROM DEMOLISHED CONDENSER PIPING.
  - 8 ROUTE 6" CHILLED WATER SUPPLY AND RETURN PIPING TO ICE TANK. REDUCE PIPE SIZE AT TANK TO MATCH TANK CONNECTION SIZE.
  - 9 NEW 8" CHILLED WATER SUPPLY AND RETURN PIPING FOR FUTURE USE. FURNISH AND INSTALL ISOLATION VALVES AND CAP PIPING ENDS.
  - 10 CHILLED WATER SUPPLY PIPING TO BE ROUTED VERTICALLY ABOVE CHILLED WATER RETURN PIPING WHEN CONNECTING TO CHILLER. REFER TO NEW ENLARGED CHILLER PLANS ON SHEET M3.01 FOR MORE DETAIL.
  - 11 CONTROL VALVE TO BE OPEN DURING ICE MAKING MODE.
  - 12 CONTROL VALVE TO BE CLOSED DURING ICE MAKING MODE.
  - 13 EXISTING CONDENSATE RECEIVER UNIT SHALL REMAIN. ALL EXISTING PIPING AND WALL-MOUNTED PANEL SHALL REMAIN.
  - 14 ICE TANK CHILLED WATER PIPING TO BE ROUTED BELOW GRADE. PIPING WILL THEN ROUTE ABOVE GRADE TO CONNECT TO THE ICE TANKS. ICE TANK TO BE MOUNTED PARTIALLY BELOW GRADE ON CONCRETE PAD. REFER TO ICE TANK DETAIL.
  - 15 FURNISH AND INSTALL NEW 3.5" CONCRETE PAD. COORDINATE DIMENSIONS WITH EQUIPMENT SIZE.
  - 16 ICE TANKS TO BE BURIED PARTIALLY BELOW GRADE. COORDINATE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR THE MAXIMUM DEPTH THAT THEY CAN BE BURIED. REFER TO THE ICE TANK DETAIL AND SITE PLAN FOR MORE INFORMATION.
  - 17 AUTOMATIC CONTROL VALVE ON FULL SIZE 10" BYPASS. MANUAL VALVES TO BE LOCATED ON EITHER SIDE OF AUTOMATIC VALVE. REFER TO PIPING DETAIL AND CONTROLS DIAGRAM.
  - 18 AUTOMATIC CONTROL VALVE ON 8" CHILLED WATER PIPING BYPASS. BYPASS TO BE SIZED TO MEET MINIMUM FLOW OF BOTH CHILLERS. MANUAL VALVES TO BE LOCATED ON EITHER SIDE OF AUTOMATIC VALVE. REFER TO PIPING DETAIL AND CONTROLS DIAGRAM.
  - 19 NEW ELECTRICAL GEAR ON WALL. COORDINATE ALL CLEARANCE REQUIREMENTS WITH ELECTRICAL TRADES PRIOR TO INSTALLING PIPING AND EQUIPMENT IN THIS AREA.

- GENERAL NOTES**
1. ALL PIPING SHALL BE INSTALLED PER STATE/LOCL CODES.
  2. COORDINATE ROUTING OF PIPING WITH ALL OTHER TRADES. DETERMINE LOCATION OF ALL PIPING, DUCTWORK, CONDUIT, CABLE TRAY, ETC. PRIOR TO INSTALLING PIPING IN FINAL LOCATION.
  3. NO PIPING SHALL BE LOCATED DIRECTLY ABOVE ELECTRICAL PANELS OR DEVICES. NO PIPING SHALL BE ALLOWED WITHIN 3'-0" OF PANELS. UNLESS PIPING IS HIGHER THAN 7'-0" ABOVE FLOOR. VERIFY ALL PIPE ROUTING WITH ELECTRICAL TRADES.
  4. THE INTENT OF THIS DRAWING IS TO INTRODUCE SCOPE ASSOCIATED WITH ALTERNATE AND ICE STORAGE SYSTEM. ALL SCOPE ASSOCIATED WITH NEW WORK ON NON-ALTERNATE MECHANICAL REVISIONS PLAN SHALL BE INCLUDED, WHETHER IT IS FULLY DETAILED ON BOTH PLANS OR NOT. ALTERNATE SHALL INCLUDE ALL SCOPE NECESSARY TO ACCOMPLISH ICE STORAGE SYSTEM AS SHOWN, IN ADDITION TO BASE-BID SCOPE.

**BESSEY HALL**  
 CHILLER REPLACEMENT

CAPITAL PROJ. NO. CP23031	
LEAD ARCH.	MORGAN CHARLAND
MECH.	WINKLER
ELEC.	BEACH
CIVIL	GARDNER
L.A.	WILBER
INT DES REP.	MORGAN
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	
ISSUED FOR BIDS 10/23/2023 ADDENDUM NO. 2 11/14/2023	



NORTH  
 OVERALL BASEMENT PLAN - MECHANICAL  
 1/16" = 1'-0"

**KEYED NOTES**

- 1 EXISTING 10" CONDENSER WATER SUPPLY AND 10" CONDENSER WATER RETURN PIPING ROUTED UP TO COOLING TOWER ON ROOF TO REMAIN. FIELD VERIFY EXACT LOCATIONS OF EXISTING PIPING AT ROOF FOR NEW CONNECTIONS.
- 2 EXISTING 10" CONDENSER WATER SUPPLY AND 10" RETURN PIPING ROUTED THRU CORRIDOR IN BASEMENT TO REMAIN. FIELD VERIFY EXACT LOCATIONS OF EXISTING PIPING FOR NEW CONNECTIONS.
- 3 EXISTING 2 1/2" CW MAKE-UP WATER UP TO COOLING TOWER ON ROOF TO REMAIN. FIELD VERIFY EXACT LOCATION OF EXISTING PIPING AT ROOF FOR NEW CONNECTIONS.
- 4 CONNECT NEW SOFTENED WATER PIPING TO EXISTING DOMESTIC WATER PIPING SERVING COOLING TOWERS. CONNECT TO EXISTING LINE UPSTREAM OF EXISTING BACKFLOW PREVENTER AND METER. FIELD VERIFY EXACT LOCATION AND SIZES.
- 5 REFER TO MECHANICAL REVISIONS PLAN FOR CONTINUATION OF COLD WATER AND SOFTENED WATER.
- 6 BEFORE CONNECTION OF SOFTENED WATER TO EXISTING COOLING TOWER MAKE-UP WATER PIPING, FURNISH AND INSTALL DOUBLE-CHECK ASSEMBLY BACKFLOW PREVENTER WITH ISOLATION BALL VALVES ON EITHER SIDE.
- 7 EXISTING WALL PANEL SHALL BE RE-INSTALLED AFTER CHILLER IS ROUTED INTO MECHANICAL ROOM. PANEL CONSISTS OF AN INNER METAL PANEL AND AN OUTER LOUVER STRUCTURE. WHEN REMOVED FROM OPENING PRIOR TO THE PROJECT, THESE COMPONENTS AND MATERIALS SHALL BE STORED SOMEWHERE TO PREVENT DAMAGE OR CORROSION AND THE OPENING SHALL BE CLOSED OFF AT ALL TIMES TO PREVENT WEATHER, WATER OR COLD CONDITIONS FROM IMPACTING THE SYSTEMS IN THE MECHANICAL ROOM. COORDINATE WITH MSU. EXISTING 42" WALL BELOW PANEL TO BE REPLACED WITH A NEW 42" CONCRETE WALL OF LIKE CONSTRUCTION. REFER TO MECHANICAL DEMOLITION PLAN FOR MORE DETAIL.

**GENERAL NOTES**

1. ALL PIPING SHALL BE INSTALLED PER STATE/LOCAL CODES.
2. COORDINATE ROUTING OF PIPING WITH ALL OTHER TRADES. DETERMINE LOCATION OF ALL PIPING, DUCTWORK, CONDUIT, CABLE TRAY, ETC. PRIOR TO INSTALLING PIPING IN FINAL LOCATION.
3. NO PIPING SHALL BE LOCATED DIRECTLY ABOVE ELECTRICAL PANELS OR DEVICES. NO PIPING SHALL BE ALLOWED WITHIN 3'-0" OF PANELS, UNLESS PIPING IS HIGHER THAN 7'-0" ABOVE FLOOR. VERIFY ALL PIPE ROUTING WITH ELECTRICAL TRADES.

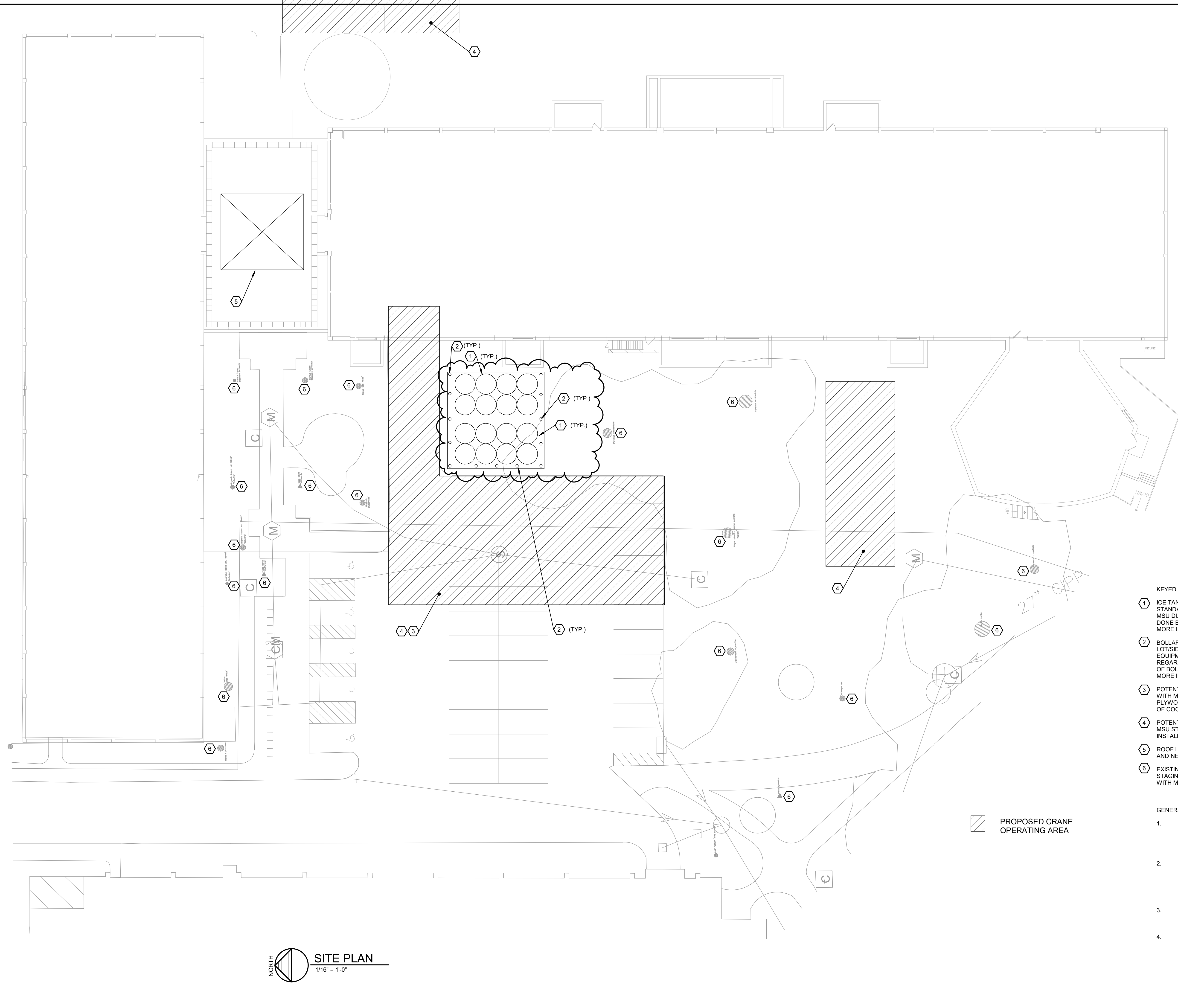
BESSEY HALL  
 CHILLER REPLACEMENT

CAPITAL PROJ. NO. CP23031	
LEAD ARCH.	MORGAN CHARLAND
MECH.	WINKLER
ELEC.	BEACH
CIVIL	GARDNER
L.A.	WILBER
INT DES	
REP.	MORGAN
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	
ISSUED FOR BIDS	10/23/2023
ADDENDUM NO. 2	11/14/2023

OVERALL BASEMENT PLAN - MECHANICAL

M2.04

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NORTH  
 SITE PLAN  
 1/16" = 1'-0"

PROPOSED CRANE OPERATING AREA

**KEYED NOTES**

- 1 ICE TANKS TO BE PARTIALLY BURIED DURING INSTALLATION. REFER TO MSU STANDARDS FOR TREE PROTECTION AND CLOSELY COORDINATE WITH MSU DURING INSTALLATION AROUND TREES. TREE PROTECTION TO BE DONE BY MSU. REFER TO THE ALTERNATE PLAN AND ICE TANK DETAIL FOR MORE INFORMATION.
- 2 BOLLARDS TO BE LOCATED BETWEEN ICE TANKS AND PARKING LOT/SIDEWALK AREAS. ADDITIONAL BOLLARDS TO BE PLACED WHEREVER EQUIPMENT MAY COLLIDE WITH ICE TANKS. COORDINATE WITH MSU REGARDING QUANTITY AND LOCATIONS OF BOLLARDS. MINIMUM QUANTITY OF BOLLARDS IS SHOWN. REFER TO STANDARD BOLLARD DETAIL FOR MORE INFORMATION.
- 3 POTENTIAL CRANE / LIFT AREA FOR NEW COOLING TOWER. COORDINATE WITH MSU STANDARDS FOR ROOF PROTECTION (1" INSULATION UNDER 1/2" PLYWOOD), AND TREE PROTECTION DURING THE SETUP AND INSTALLATION OF COOLING TOWER.
- 4 POTENTIAL CRANE / LIFT AREA FOR NEW CHILLERS. COORDINATE WITH MSU STANDARDS FOR TREE PROTECTION DURING THE SETUP AND INSTALLATION OF CHILLERS.
- 5 ROOF LOCATION WHERE EXISTING COOLING TOWER SHALL BE REMOVED AND NEW TOWER SHALL BE INSTALLED.
- 6 EXISTING TREE SHALL BE PROTECTED DURING SITE WORK, CRANE LIFTS, STAGING OF EQUIPMENT, ETC. FIELD VERIFY ALL TREES AND COORDINATE WITH MSU.

**GENERAL NOTES**

- 1. CRANE LIFT LOCATIONS SHOWN ARE SUGGESTED LOCATIONS FOR BIDDING PURPOSES. CONTRACTOR SHALL HIRE THE SERVICES OF A LIFTING CONTRACTOR AND FIELD VERIFY A WORKING LOCATION. CONTRACTOR SHALL THEN SUBMIT PLAN FOR LIFT(S) TO MSU FOR FINAL APPROVAL.
- 2. SCHEDULE OF CRANE LIFT SHALL BE COORDINATED WITH MSU IN ADVANCE AND PROPER NOTICE SHALL BE MADE TO ALLOW FOR CLOSING OFF OF ROADS, SIDEWALKS, PARKING. PROPER NOTICE IS ALSO REQUIRED FOR HAVING OCCUPANTS REMOVED FROM BUILDING DURING LIFT. COORDINATE ALL REQUIREMENTS WITH MSU.
- 3. ALL SITE CONSTRUCTION AND CRANE LIFTS SHALL PROTECT TREES, LANDSCAPING, PARKING LOTS, SIDEWALKS, ETC. AS REQUIRED BY MSU STANDARDS. COORDINATE ALL PROTECTION WITH MSU.
- 4. ALL DAMAGE DONE TO GRASS, PARKING LOTS OR SIDEWALKS SHALL BE REPAIRED/REPLACED BY CONTRACTOR TO MSU STANDARDS.

BESSEY HALL  
 CHILLER REPLACEMENT

CAPITAL PROJ. NO.  
 CP23031

LEAD ARCH.	MORGAN CHARLAND
MECH.	WINKLER
ELEC.	BEACH
CIVIL	GARDNER
L.A.	WILBER
INT DES	
REP.	MORGAN
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	

ISSUED FOR BIDS 10/23/2023  
 ADDENDUM NO. 2 11/14/2023

SITE PLAN

M2.05



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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
<b>EQUALS</b>																					
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
<b>ALTERNATE #1</b>																					
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			
				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	OPERATING (LBS)	
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"

- 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 MARLEY CONTROL PANEL. VFD WITH DISCONNECT SHALL BE FIELD-INSTALLED BY ELECTRICAL TRADES FOR EACH CELL. MARLEY SHALL INCLUDE FACTORY REPRESENTATIVE VFD STARTUP EXPENSES.
  - MANUFACTURER SHALL INCLUDE FIELD INSTALLATION BY FACTORY REPRESENTATIVE, AS WELL AS ALL START-UP EXPENSES. (MINIMUM OF 50 HOURS OF TIME FROM MANUFACTURER REPRESENTATIVE ON-SITE)
  - PROVIDE MARLEY SP BASIN SWEEPER SYSTEM OR EQUAL.
  - 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.



MACMILLAN ASSOCIATES CONSULTING ENGINEERS  
 714 EAST MIDLAND STREET  
 BAY CITY, MICHIGAN 48706  
 2022-2504

CW  
 DF  
 GS

MICHIGAN STATE UNIVERSITY  
 Infrastructure Planning and Facilities

BESSEY HALL  
 CHILLER REPLACEMENT

CAPITAL PROJ. NO.  
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MECHANICAL SCHEDULES

M5.01

HEAT EXCHANGER SCHEDULE - ALTERNATE #1																			
TAG	MANUFACTURER	MODEL	TYPE	FLOW RATE (GPM)		FLUID TEMPERATURES (DEGREES F)				HEAT LOAD (BTUH)	U-VALUE	PRESSURE DROP (PSI)		FLUID		PIPING CONNECTIONS		DIMENSIONS (W" x L" x H")	WEIGHT (FLOODED) (LBS)
				COLD SIDE	HOT SIDE	COLD SIDE IN	COLD SIDE OUT	HOT SIDE IN	HOT SIDE OUT			COLD SIDE	HOT SIDE	COLD SIDE	HOT SIDE				
HX-1	BELL AND GOSSETT	AP130	PLATE & FRAME	1200	1,200	42F	52.7F	55	45	6,025,300	276.32	3.0	1.9	30% GLYCOL	WATER	8"	8"	33" x 158" x 107"	17,500

NOTES:  
1. AHRI STANDARD 400.  
2. HEAT EXCHANGER PLATES: THICKNESS=0.5 MM, QUANTITY OF PLATES=586, PLATE MATERIAL=304 STAINLESS STEEL.  
3. SINGLE PASS DESIGN WITH ALL CONNECTIONS LOCATED ON THE FRAME PLATE (FIXED HEAD).  
4. ALUMINUM SPLASH SHIELD COVERING THE SIDES AND TOP OF PLATE PACK.  
5. FRAME PLATES SHALL HAVE INTEGRAL LIFTING EYES IN THE UPPER CORNERS. BOLTED OR WELDED ON LIFTING LUGS ARE NOT ALLOWED.  
6. AIC, ALFA LAVAL, ARMSTRONG SHALL BE CONSIDERED EQUAL IF ALL REQUIREMENTS ARE MATCHED OR EXCEEDED.

AIR & SEDIMENT SEPARATOR SCHEDULE					
MARK	MANUFACTURER	MODEL	TYPE	CONNECTION SIZE	REMARKS
SEP-1	BELL & GOSSETT	CRSN-10F	ASME AIR SEPARATOR	10"	PROVIDE AUTOMATIC AIR VENT, AND DRAIN VALVE, INSULATE PER SPECIFICATION
ALTERNATE #1					
SEP-2	BELL & GOSSETT	CRSN-8F	ASME AIR SEPARATOR	8"	PROVIDE AUTOMATIC AIR VENT, AND DRAIN VALVE, INSULATE PER SPECIFICATION

EXPANSION TANK SCHEDULE						
MARK	MANUFACTURER	MODEL	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	TYPE	NOTES
ET-1	BELL & GOSSETT (OR EQUAL)	B-165	44	44	ASME FLOOR MOUNTED BLADDER TANK	FILL PRESSURE OF TANK SHALL MATCH SYSTEM PRESSURE. PROVIDE TRIM INCLUDING TANK PURGE VALVE, TANK DRAIN AND AIR CONNECTION.
ALTERNATE #1						
ET-1	BELL & GOSSETT (OR EQUAL)	B-300	80	80	ASME FLOOR MOUNTED BLADDER TANK	FILL PRESSURE OF TANK SHALL MATCH SYSTEM PRESSURE. PROVIDE TRIM INCLUDING TANK PURGE VALVE, TANK DRAIN AND AIR CONNECTION.
ET-2	BELL & GOSSETT (OR EQUAL)	B-165	44	44	ASME FLOOR MOUNTED BLADDER TANK	FILL PRESSURE OF TANK SHALL MATCH SYSTEM PRESSURE. PROVIDE TRIM INCLUDING TANK PURGE VALVE, TANK DRAIN AND AIR CONNECTION.

ICE STORAGE TANK SCHEDULE - ALTERNATE #1									
TAG	MANUFACTURER	MODEL	CAPACITY (TON HOURS)	MAX OPERATING PRESSURE (psi)	PIPING CONNECTIONS	VOLUME (gal)	WEIGHT (lbs)	OVERALL DIMENSIONS (W"xL"xH")	INDIVIDUAL TANK DIMENSIONS (DIA"xH")
IT-1	CALMAC	1500CSF	486	90	4"	4,965	34,000	89"x273"x102"	89"x102"
IT-2	CALMAC	1190C4F	162	90	4"	1,655	16,900	89"x102"	89"x102"

NOTES:  
1. PRE-ENGINEERED SYSTEM SHALL CONSIST OF (3) TANKS, INTEGRAL PIPING, REQUIRING ONLY A SINGLE INLET AND OUTLET PIPE CONNECTION.  
2. STANDARD 5 YEAR HEAT EXCHANGER WARRANTY AND 10 YEAR TANK PARTS WARRANTY.  
3. ALLOW 36" OVERHEAD CLEARANCE.  
4. SEAMLESS ONE PIECE TANK WITH WELDED COUNTER-FLOW POLYETHYLENE HEAT EXCHANGER.  
5. ICE TANKS IN SERIES TO BE PIPED IN REVERSE RETURN ORIENTATION.  
6. SELECTION BASED ON CALMAC. EVAPCO ICE STORAGE SHALL BE CONSIDERED EQUAL IF TANK SYSTEMS UTILIZE THE SAME (OR SMALLER) FOOTPRINT ON SITE.

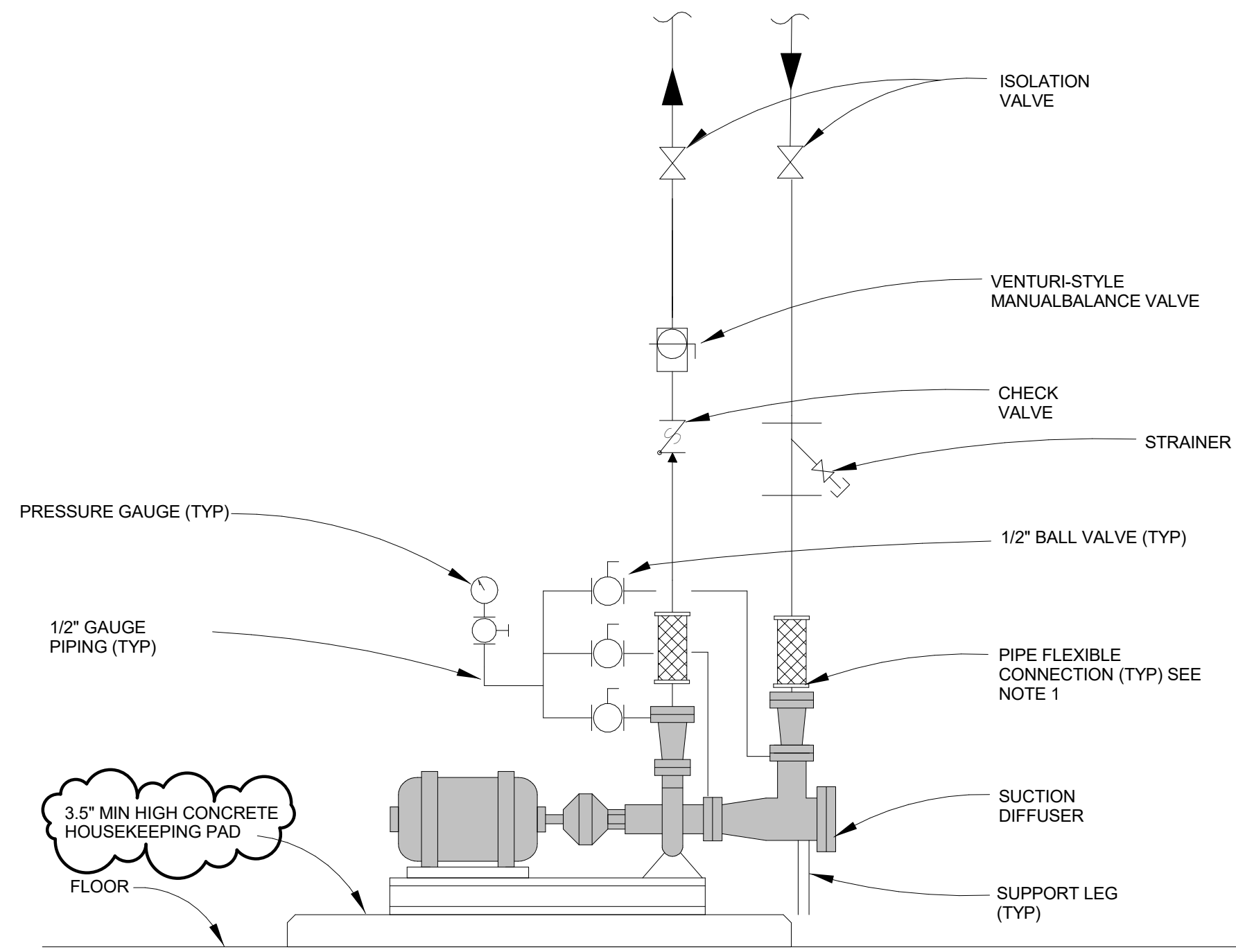
WATER SOFTENER SCHEDULE									
TAG	SYSTEM MANUFACTURER	SYSTEM TYPE	RESIN TYPE	VOLUME (FT3)	LOW FLOW RATE PER TANK (GPM)	SERVICE FLOW RATE PER TANK (GPM)	MAXIMUM FLOW RATE PER TANK (GPM)	NUMBER OF TANKS	TANK SIZE (DIA" x H") EACH
WS-1	CHARGER	TWIN ALTERNATING	C-800	4.0	4	20	35	2	16"x65"

NOTES:  
1. WATER SOFTENER SYSTEM SHALL BE FURNISHED BY CHARGER WATER TREATMENT PRODUCTS, NO EXCEPTIONS.  
2. SYSTEM SHALL UTILIZE ALDEX C-800 WATER SOFTENING RESIN.  
3. SYSTEM SHALL UTILIZE CLACK MINERAL TANKS.  
4. ENTIRE SOFTENER SYSTEM SHALL BE DESIGNED AND PROVIDED BY CHARGER. MECHANICAL CONTRACTOR SHALL INSTALL.

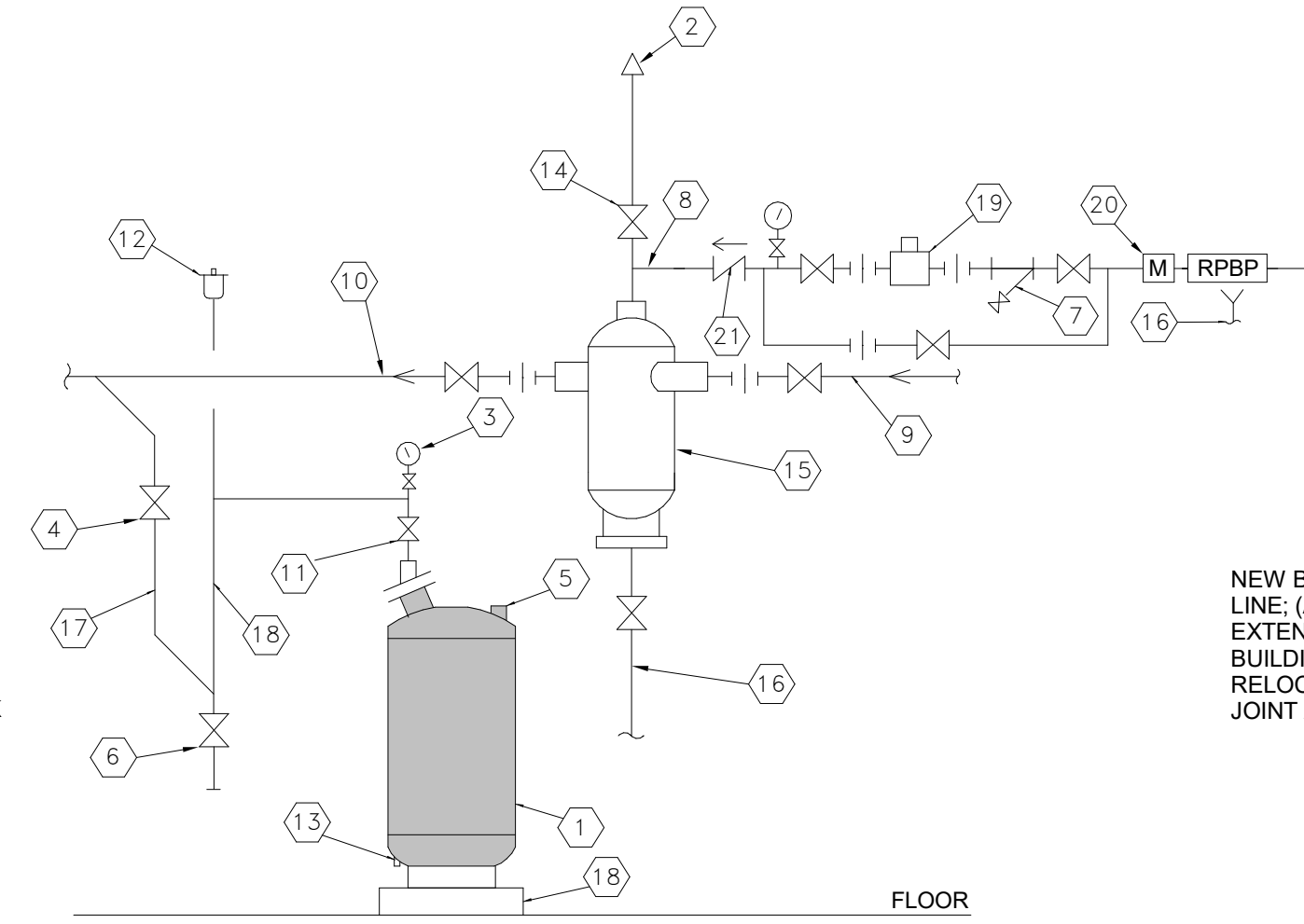
CONDENSER WATER FILTRATION UNIT							
TAG	MANUFACTURER	MODEL	FLOW RATE (GPM)	PIPING CONNECTIONS	PUMP (HP)	PUMP ELECTRICAL	DIMENSIONS (W"xL"xH")
CWF-1	PUROFLUX	PF-2036	140	2-1/2"	5	480V - 3PH, 8 AMPS	48" x 66" x 48"H

NOTES:  
1. FILTER MEDIA: SPHERICAL-BASED CRYSTALLINE SILICA, WITH GRAVEL SUPPORT MEDIA BELOW.  
2. PROVIDE WITH AUTOMATIC CONTROLS, INCLUDING PRE-WIRED PANEL WITH DISCONNECT AND OVERLOAD/SHORT CIRCUIT PROTECTION.  
3. ELECTRICAL TRADES SHALL PROVIDE POWER CONNECTION AT CONTROL PANEL.  
4. FULLY-ASSEMBLED SKID WITH 304 STAINLESS STEEL FILTER VESSEL (RATED TO 75 PSI) AND VALVES, INTERCONNECTED PIPING AND PUMP.  
5. GWS, LAKOS OR PEP SAND/MEDIA FILTERS SHALL BE CONSIDERED EQUAL IF ALL REQUIREMENTS ARE MATCHED OR EXCEEDED.

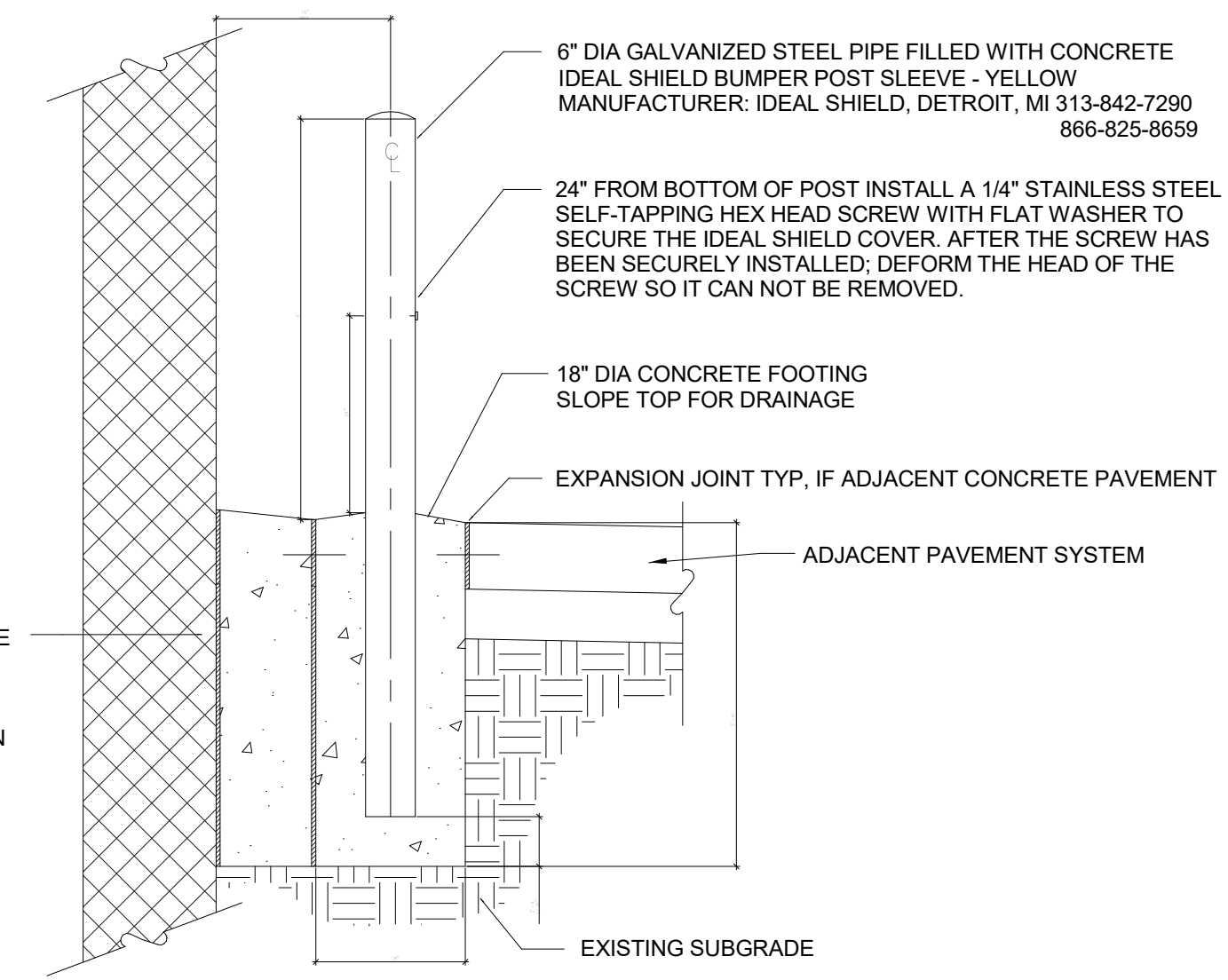
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Plotted By: Author  
Plotted Date: 11/15/2023 1:38:11 PM



- 1 A.S.M.E. EXPANSION TANK
- 2 AIR VENT (HIGH CAPACITY)
- 3 PRESSURE GAUGE
- 4 LOCK-SHIELD VALVE
- 5 PRE-CHARGING CONNECTION
- 6 DRAIN VALVE
- 7 STRAINER
- 8 DOMESTIC COLD WATER MAKE-UP PIPING
- 9 WATER PIPING FROM HEAT EXCHANGER
- 10 WATER PIPING TO PUMP SUCTION
- 11 TANK PURGE VALVE
- 12 AIR VENT
- 13 DRAIN
- 14 NORMALLY OPEN GATE VALVE IN VERTICAL PIPE (REMOVE HANDLE)
- 15 AIR/PARTICLE SEPARATOR - FURNISH SUPPORTS AND CONCRETE PAD AS REQUIRED
- 16 DRAIN PIPING EXTEND TO FLOOR DRAIN
- 17 PROVIDE A MINIMUM 12" DROP ANTI-THERMOSYPHON LOOP TO PREVENT GRAVITY HEATING OF EXPANSION TANK
- 18 3.5" MIN HIGH CONCRETE HOUSEKEEPING PAD
- 19 PRESSURE REDUCING VALVE SET 4 P.S.I.G. HIGHER THAN PRESSURE AT SYSTEM HIGH POINT
- 20 WATER METER SIMILAR TO ISTEK 1710 WITH MINIMUM FLOW RATE CAPACITY OF 0.22 GPM.
- 21 CHECK VALVE



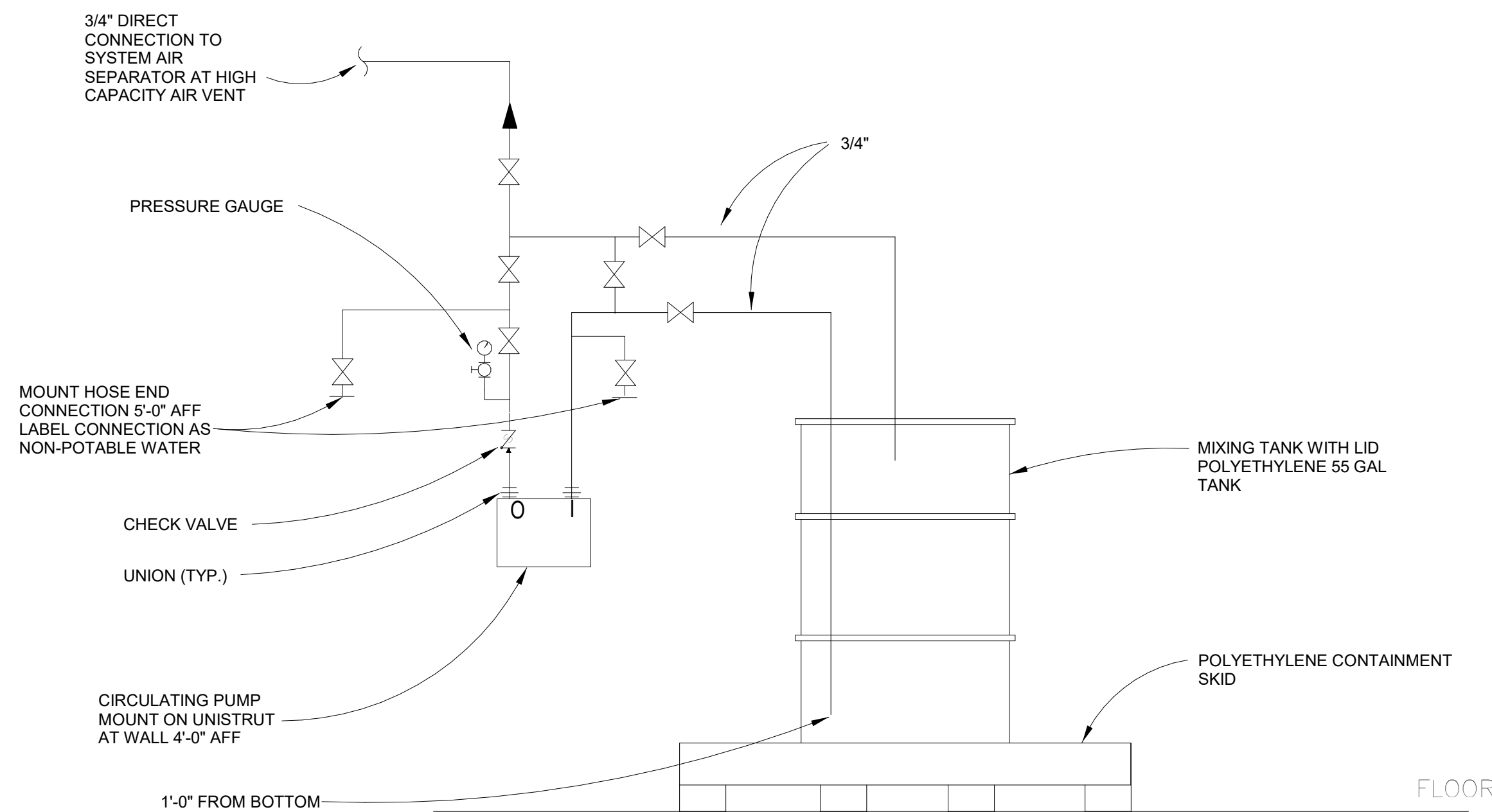
**AIR ELIMINATION AND MAKE-UP WATER PIPING DETAIL**  
NO SCALE



**GUARD POST BOLLARD**  
NO SCALE

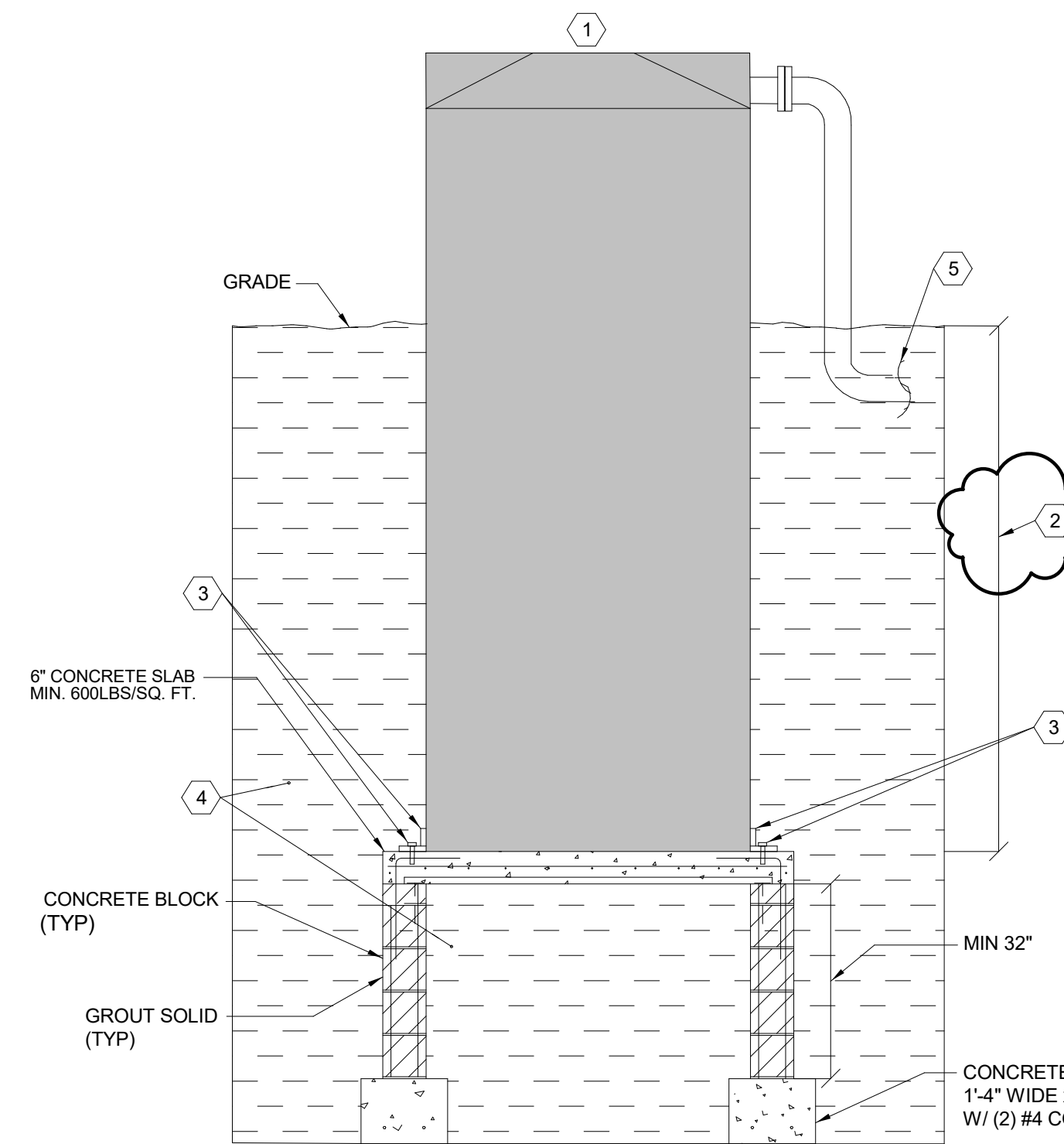
**BASE MOUNTED END SUCTION PUMP PIPING DIAGRAM**

- NO SCALE
- NOTES:
1. FLEXIBLE COUPLINGS FOR GROOVED SYSTEM MAY BE USED IN LIEU OF FLEXIBLE CONNECTIONS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
  2. REFER TO MSU STANDARDS OF CONSTRUCTION FOR GROUTING SPECIFICS
  3. BUTTERFLY VALVE NOT ACCEPTABLE FOR BALANCING
  4. TRIPLE DUTY VALVES NOT ACCEPTABLE
  5. REFER TO MSU STANDARDS OF CONSTRUCTION FOR INSULATION REQUIREMENTS.
  6. EXTEND EXISTING HOUSEKEEPING PAD AT LEAST 3" WIDER THAN BASE AND SUPPORT LEG AREA, IF NEEDED BASED ON NEW PUMP DIMENSIONS.
  7. UTILIZE HARD PIPE FOR DIFFERENTIAL PRESSURE GAUGE ASSEMBLY, IN LIEU OF HARD PIPING ASSEMBLY, CONTRACTOR HAS THE OPTION OF SUPPLYING/INSTALLING THREE GAUGES WITH VALVES. THE USE OF RUBBER HOSE IS NOT PERMITTED.



**GLYCOL SOLUTION FEED SYSTEM**

- NO SCALE
- NOTES:
1. GLYCOL FILL PUMP SHALL BE GRAINGER ITEM NO 30EK54, 115V, 1/2 HP WITH MANUAL SWITCH MOUNTED ON WALL NEXT TO PUMP.
  2. ALL PIPING SHALL BE COPPER.
  3. SOLUTION TO BE FILLED WITH PRE-MIXED GLYCOL SOLUTION.



**ICE TANK INSTALLATION DETAIL**  
NO SCALE

- 1 TOP ACCESS AVAILABLE. KEEP ABOVE TOP OF TANK CLEAR.
- 2 ICE TANK TO BE PARTIALLY BURIED AN APPROXIMATE DEPTH OF 42". COORDINATE WITH MSU FOR EXACT DEPTH OF BURIAL AND INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 3 ICE TANK GUIDES TO BE FASTENED TO CONCRETE PAD WITH STAINLESS STEEL FASTENERS.
- 4 BACKFILL TO BE DONE WITH SAND PER MANUFACTURER'S INSTRUCTIONS.
- 5 ICE/WATER SUPPLY AND RETURN PIPING. REFER TO PLANS.

- NOTES:
1. PAD SIZES (FINAL DIMENSIONS SHALL BE BASED ON SHOP DRAWINGS)
  2. ICE TANKS GUIDES ARE BOLTED DOWN ANGLE IRON ROUNDED TO THE TANKS TO BE USED FOR SECURING TANK LOCATION ON SLAB.
  3. ICE TANKS TO BE PROVIDED IN SKIDS OF THREE. DETAIL SHOWS SIDE PROFILE OF ICE TANKS. COORDINATE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MORE DETAIL.

CAPITAL PROJ. NO. CP23031	MORGAN CHARLAND
LEAD ARCH.	WINKLER
MECH.	BEACH
ELEC.	GARDNER
CIVIL	L.A. WILBER
INT DES REP.	MORGAN
APPR	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	
ISSUED FOR BIDS	10/23/2023
ADDENDUM NO. 2	11/14/2023

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**GENERAL**

- VERIFY DIMENSIONS BEFORE COMMENCING WORK. REPORT DISCREPANCIES TO THE ENGINEER.
- VERIFY OPENINGS IN THE FRAMING PLANS WITH MECHANICAL AND ELECTRICAL DRAWINGS.
- ALL WORK SHALL CONFORM TO MICHIGAN BUILDING CODE 2015.
- DESIGN LOADS
  - DESIGNED IN ACCORDANCE WITH MICHIGAN BUILDING CODE 2015.
  - ROOF SNOW LOAD:
    - GROUND SNOW LOAD PG = 30 PSF
    - FLAT ROOF SNOW LOAD, PF = 28 PSF
    - SNOW EXPOSURE FACTOR, CE = 1.0
    - SNOW LOAD IMPORTANCE FACTOR, I = 1.1
    - THERMAL FACTOR, CT = 1.2
  - PLATFORM LIVE LOAD:
    - MEZZANINE LOADS 40 PSF
  - WIND LOADS:
    - BASIC WIND SPEED  $V_{ULT} = 120$  MPH
    - $V_{ASD} = 93$  MPH
    - WIND EXPOSURE C
    - INTERNAL PRESSURE COEFFICIENT, GC PI = 1.9
    - COOLING TOWER WIND LOADING: 62.2 PSF ULTIMATE
  - EARTHQUAKE DESIGN DATA:
    - BUILDING RISK CATEGORY III
    - SEISMIC IMPORTANCE FACTOR, I = 1.25
    - SPECTRAL RESPONSE COEFFICIENTS: SDS = .092, SD1 = .045
    - SITE CLASS D
    - BASIC SEISMIC - FORCE - RESISTING SYSTEM: MOMENT FRAME
    - SEISMIC DESIGN CATEGORY, B
    - SEISMIC BASE SHEAR V = 1,300 LBS ULTIMATE, EACH DIRECTION
- SPECIAL INSPECTIONS:
  - SPECIAL INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MICHIGAN BUILDING CODE 2015 SECTION 1700.
  - THE FOLLOWING TYPES OF WORK REQUIRE SPECIAL INSPECTIONS: (REFER TO THE BUILDING CODE AND SPECIFICATIONS FOR DETAILED INSPECTION REQUIREMENTS).
    - STEEL CONSTRUCTION.

**STRUCTURAL STEEL**

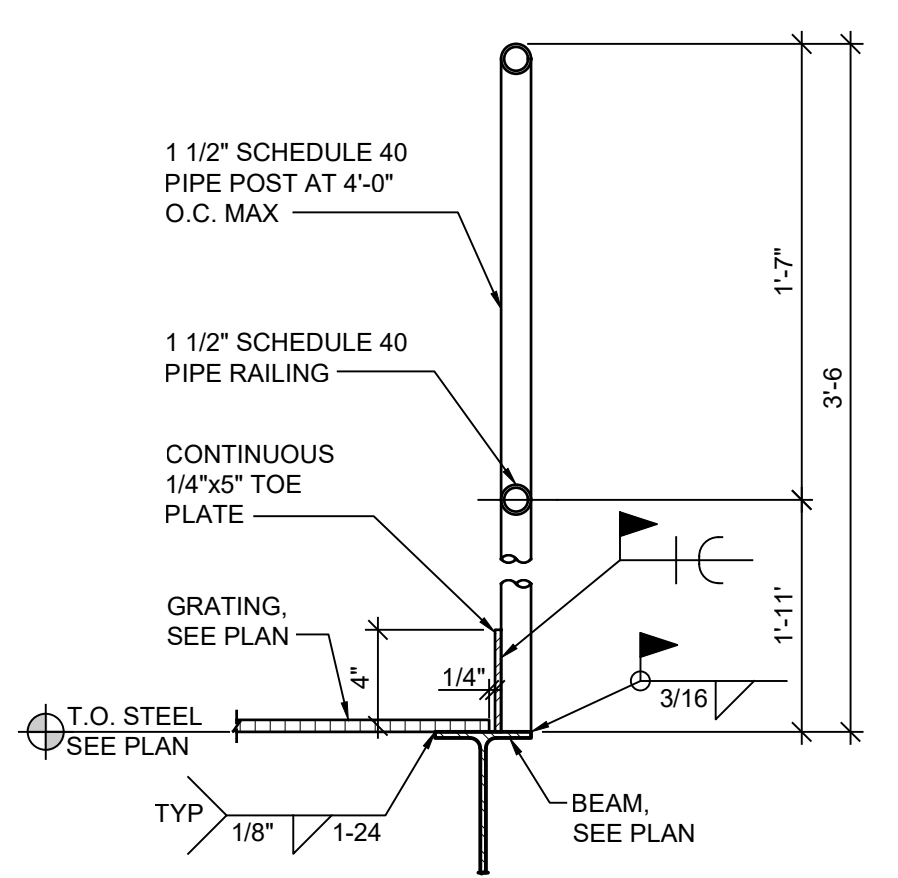
- STRUCTURAL STEEL: FABRICATED AND ERECTED PER THE AISC MANUAL OF STEEL CONSTRUCTION.
  - W-BEAMS: ASTM A-992 GR. 50.
  - HSS: ASTM A-500 GRADE B.
  - STEEL PIPE: ASTM A53, TYPE E, GRADE B.
  - ALL OTHER SHAPES: ASTM A-36.
- WELDS: TO BE 70 KSI LOW HYDROGEN FILLER METAL PLACED BY WELDERS CERTIFIED IN WELD AND POSITION BY AWS D1.1, STRUCTURAL WELDING CODE. ALL WELDS SHALL BE APPLIED TO SURFACES FREE OF GREASE, PAINT, DIRT, OR OTHER HARMFUL MATERIAL.
- BOLTED CONNECTIONS: 3/4" DIAMETER A-325 BOLTS WITH HEAVY HEX NUTS UNLESS NOTED. DESIGNED FOR BEARING CONNECTIONS, NOT TIGHTENED TO SNUG TIGHT CRITERIA UNLESS NOTED OTHERWISE. HOT-DIP GALVANIZED.
- ALL STRUCTURAL STEEL, STEEL GRATING, AND BOLTS TO BE HOT-DIP GALVANIZED. FIELD-WELDED CONNECTIONS TO BE TOUCHED UP WITH COLD GALVANIZING COMPOUND.
- BEAM CONNECTIONS SHALL BE DESIGNED TO SUPPORT ONE-HALF THE TOTAL UNIFORM LOAD CAPACITY PER AISC. WHEREVER POSSIBLE, EXTEND CONNECTIONS FULL DEPTH OF BEAM.
- SHEAR TAB CONNECTIONS TO STEEL BEAMS ARE NOT ACCEPTABLE UNLESS BEAMS OF EQUAL DEPTHS ARE FASTENED ON OPPOSITE SIDES OF THE STEEL BEAM.
- PROVIDE FITTED STIFFENER PLATES EACH SIDE FOR ALL CONDITIONS WHERE BEAMS BEAR ON COLUMNS, BEAMS BEAR ON BEAMS, BEAMS HANG FROM BEAMS, OR COLUMNS BEAR ON BEAMS. STIFFENER PLATES MINIMUM 1/4" THICK.
- GRATING: 1" DEEP WELDED STEEL TYPE WITH 1" X 3/16" BEARING BARS 1 3/16" O.C. AND CROSSBARS 4" O.C. GRATING WELDED TO EACH SUPPORT MEMBER USING A 1/8" FILLET 1" LONG AT 2" O.C. MAXIMUM. EXPOSED CUT EDGES OF GRATING SHALL HAVE BANDING BARS (EQUAL IN SIZES) WELDED TO THE BEARING BARS HOT-DIP GALVANIZED.
- RAILING MATERIAL: SCHEDULE 40 PIPE, 1 1/2" DIAMETER ASTM A 53, TYPE E, GRADE B.

MICHIGAN ASSOCIATES CONSULTING ENGINEERS  
 714 EAST MICHIGAN STREET, ANN ARBOR, MICHIGAN 48106  
 (734) 769-1300 FAX (734) 769-1301 WWW.MICHIGANASSOCIATES.COM  
 APPROVED BY: JAG CHECKED BY: ASK DRAWN BY: OKT PROJECT:

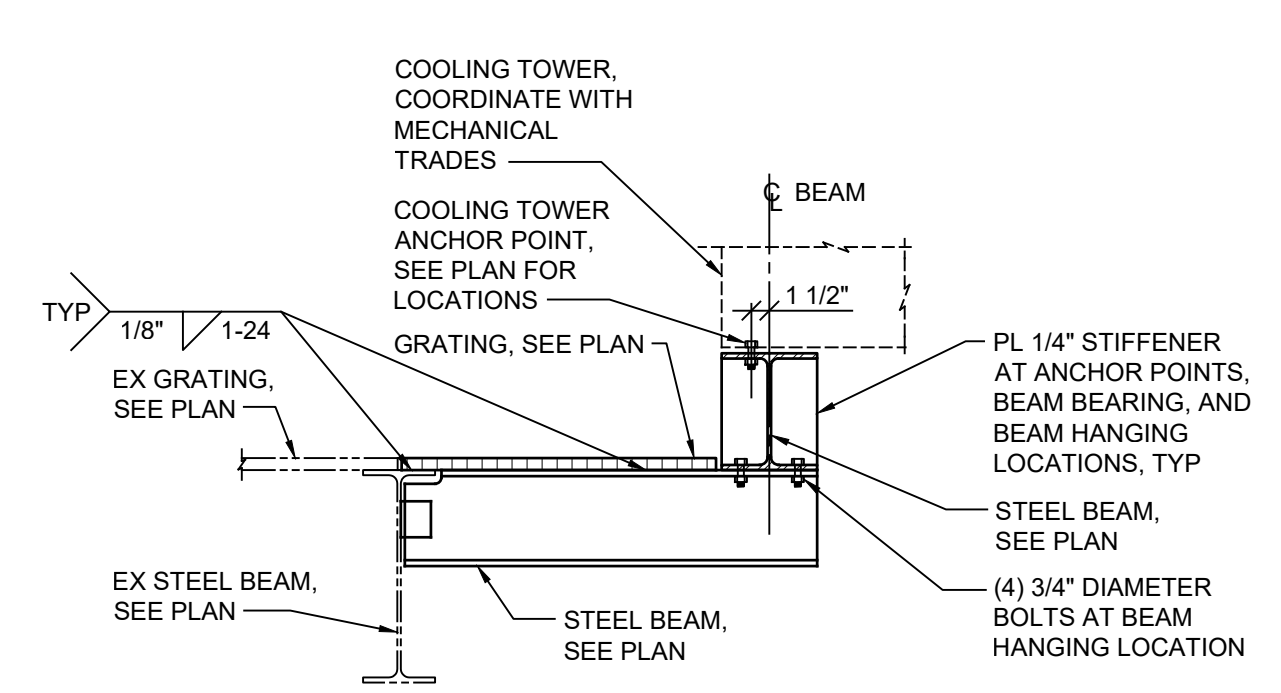
**MICHIGAN STATE UNIVERSITY**  
**Infrastructure Planning and Facilities**

**BESSEY HALL**  
**CHILLER REPLACEMENT**  
**PARTIAL CHILLER FRAMING PLAN, DETAILS AND NOTES**

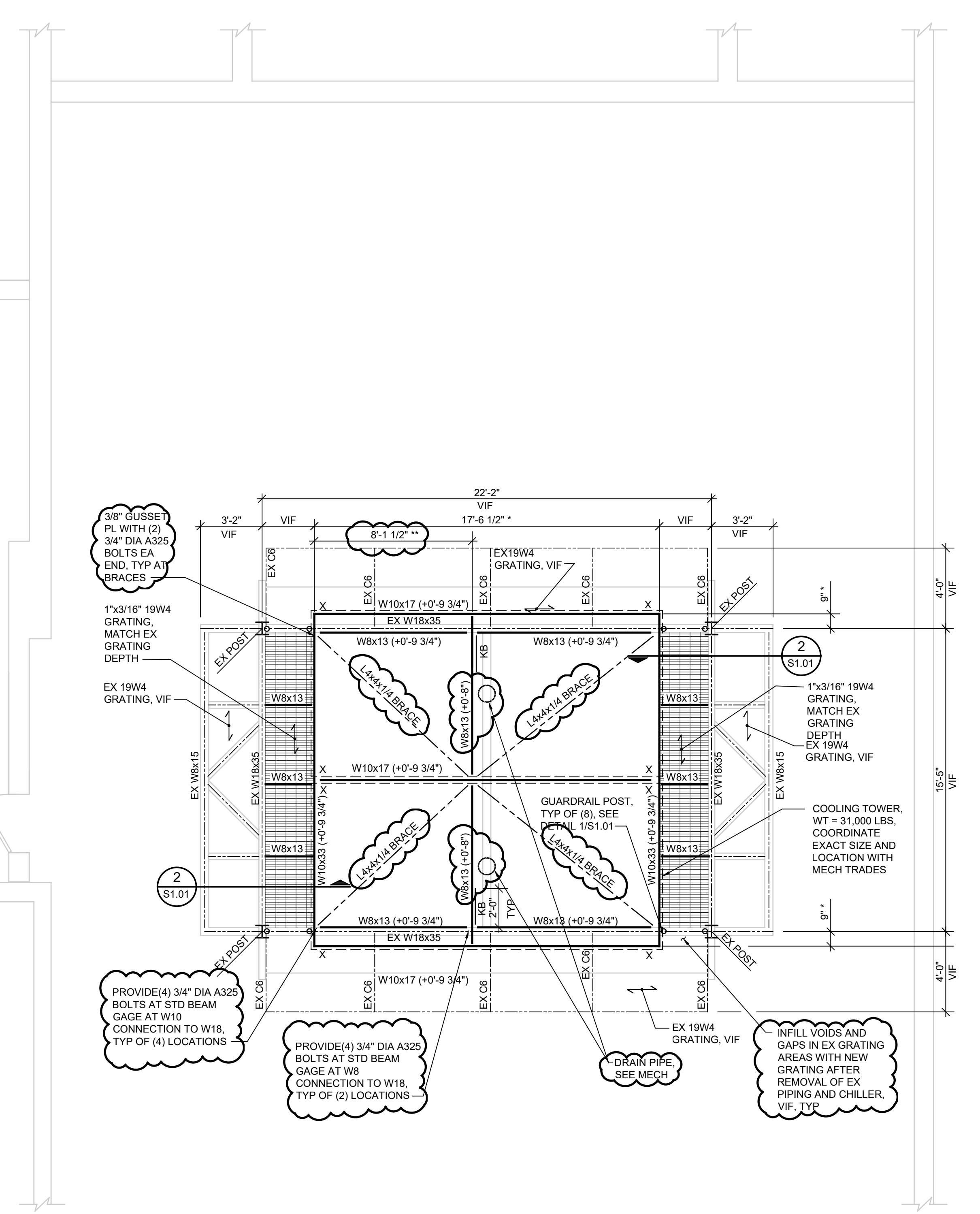
CAPITAL PROJ. NO. CP22037	
LEAD ARCH.	MORGAN CHARLAND
MECH.	WINKLER
ELEC.	BEACH
CIVIL	GARDNER
L.A.	WILBER
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APPR.	
DATE	10/23/2023
SCALE	AS NOTED
ISSUED	
ISSUED FOR BIDS 10/23/2023	
ADDENDUM NO. 2 11/14/2023	



**1**  
S1.01  
3/4"=1'-0" 2022-2504 S-Railing.dwg



**2**  
S1.01  
3/4"=1'-0" 2022-2504 S-Grating Edge.dwg



**PARTIAL CHILLER FRAMING PLAN**  
 1/4"=1'-0" T.O. STEEL = 38'-0" ABOVE ROOFING UNO, VIF (+/- 0'-0")

**LEGEND**

- KB - L3X3X1/4 KNEE BRACE, 3/8" GUSSET PLATE TO EX W18 BOTTOM FLANGE AND W8 BEAM, (1) 3/4 BOLT EACH END
- X - ANCHOR POINT LOCATION AS DETERMINED BY MECHANICAL UNIT SUPPLIER, PROVIDE 3/4" DIAMETER A307 BOLT WITH NUT AND WASHER PER MANUFACTURER'S RECOMMENDATIONS, COORDINATE EXACT LOCATION WITH MECHANICAL TRADES.
- \* - DIMENSION SHOWN FOR REFERENCE ONLY, COORDINATE FINAL UNIT DIMENSIONS AND LOCATION WITH MECHANICAL TRADES
- \*\* - DIMENSION SHOWN FOR REF. COORDINATE WITH DRAIN LOCATION TO AVOID INTERFERENCE WITH DRAIN PIPING.

**S1.01**  
27 OF 27

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