



Tx. Registration #5102
JPS
PLAN
LICENSING
INTERNATIONAL
91739

**JPS ARLINGTON SURGERY
OR HVAC REPLACEMENT PROJECT
4400 NEW YORK AVE.
ARLINGTON, TX 76018**

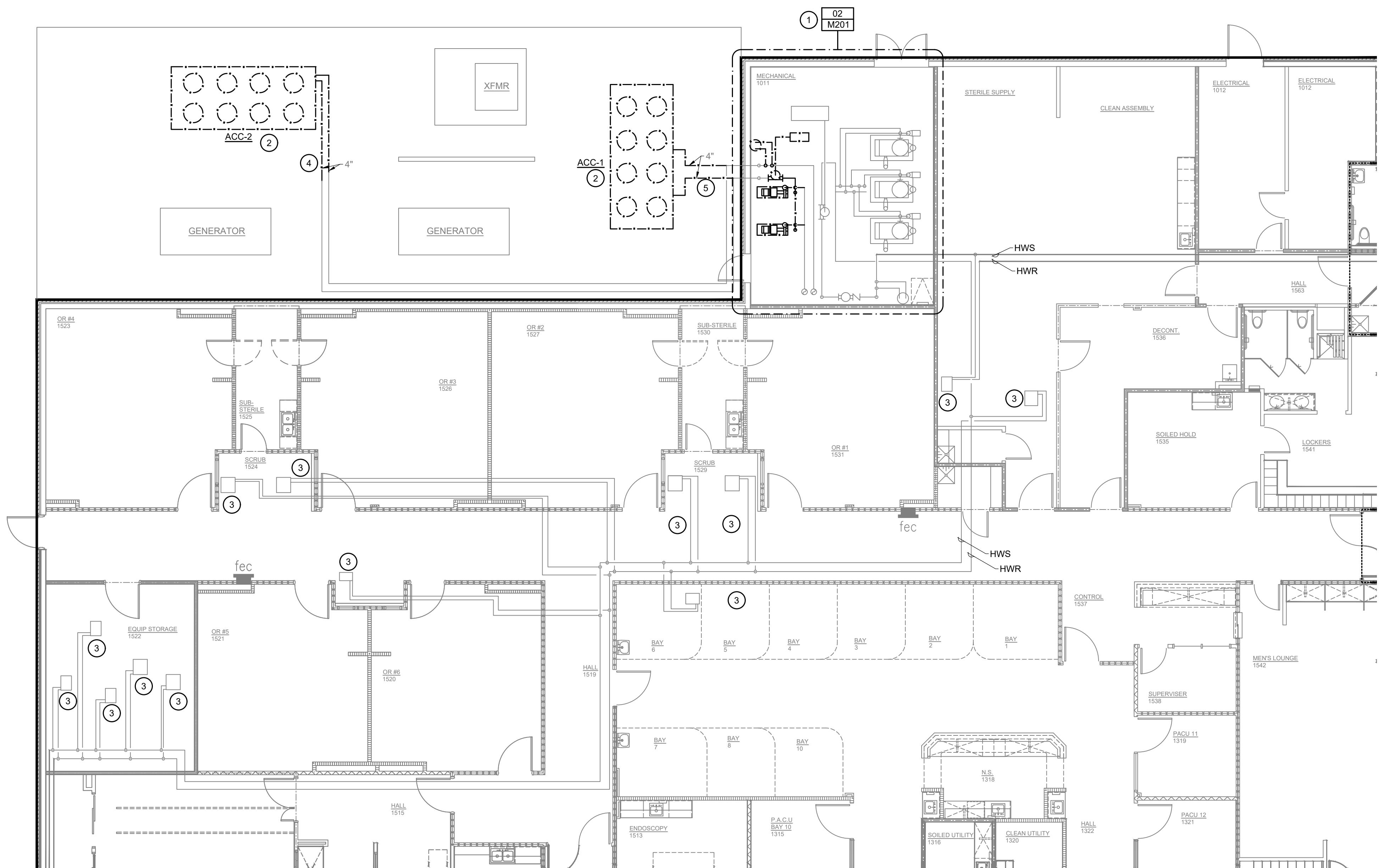
PROJECT #: 05194.09
SHEET TITLE:
MECHANICAL
COVER
SHEET #:
M-001

MECHANICAL ABBREVIATIONS, SYMBOLS AND NOTES (THIS IS A STANDARD LEGEND, NOT ALL SYMBOLS MAY BE APPLICABLE TO PROJECT)						
ABBREVIATIONS		LEGEND		GENERAL NOTES		
A	COMPRESSED AIR	LT.	LIGHT	—PCHS— PRIMARY CHILLED WATER SUPPLY —PCHR— PRIMARY CHILLED WATER RETURN —CHS— CHILLED WATER SUPPLY —CHR— CHILLED WATER RETURN —PHWS— PRIMARY HEATING WATER SUPPLY —PHWR— PRIMARY HEATING WATER RETURN —HWS— HEATING WATER SUPPLY —HWR— HEATING WATER RETURN —CWS— CONDENSER WATER —CWR— CONDENSER WATER —RS— REFRIGERANT SUCTION —RL— REFRIGERANT LIQUID —AD— AUXILIARY DRAIN LINE —CD— CONDENSATE DRAIN LINE —P— PRESSURE —PRV— PRESSURE REDUCING VALVE —P.S.— PRESSURE SWITCH —PSI— POUNDS PER SQUARE INCH —PTRV— PRESSURE-TEMPERATURE RELIEF VALVE —PRV— PRESSURE RELIEF VALVE —PVC— POLYVINYL CHLORIDE —PC— PULL CHAIN —PWR— POWER —R— RELAY —RA— RETURN AIR —RD— ROOF DRAIN —REC— RECESSED —RED— REDUCER —RPBF— REDUCED PRESSURE BACKFLOW PREVENTER —BFP— BACKFLOW PREVENTER —RTU— ROOFTOP UNIT —SS— SANITARY SEWER —SA— SUPPLY AIR —SAN— SANITARY —SD— SMOKE DAMPER —SE— SERVICE ENTRANCE —SF— SUPPLY FAN, SQUARE FEET —SENS— SENSIBLE —SH— SUPPLY HOOD —SPEC— SPECIFICATION —SPRK— SPRINKLER —SP— STATIC PRESSURE —S.S.— START STOP STATION —ST— STACK —ST, STL— STAINLESS STEEL —S.V.— SOLENOID VALVE —TEMP— TEMPERATURE —TSTAT— THERMOSTAT —TSP— TOTAL STATIC PRESSURE —TYP— TYPICAL —UH— UNIT HEATER —U.F.— UNDERFLOOR —U.G.— UNDERGROUND —UN— UNION —V— VENT, VOLT —VAV— VARIABLE AIR VOLUME TERMINAL UNIT —VEL— VELOCITY —VOL— VOLUME —V.P.— VAPORPROOF —VTR— VENT THRU ROOF —W— WATT OR WIRE —W/— WITH —WB— WET BULB —WCO— WALL CLEAN OUT —WG— WATER GAUGE —WSHP— WATER SOURCE HEAT PUMP —WP— WEATHERPROOF	—X— ANCHOR POINT ——— GUIDE OR RACK POINT —■— BELLOW TYPE EXPANSION JOINT —■■■— FLEX CONNECTOR —C.R.— CONCENTRIC REDUCER —E.R.— ECCENTRIC REDUCER ——— SYSTEM FILL CONNECTION —+— GAUGE COCK —#— UNION ——— CAP —●— NEW TO EXISTING CONNECTION —□— POINT OF DISCONNECTION —○— CO ₂ SENSOR —H— HUMIDITY SENSOR —T— THERMOSTAT —TS— TEMPERATURE SENSOR —S— PLUMED RATED SMOKE DETECTOR —P— PRESSURE SENSOR —R— RISE IN DUCT —D— DROP IN DUCT ——— SUPPLY DUCT IN VERTICAL ——— RETURN OR EXHAUST IN VERTICAL ——— MANUAL DAMPER —M— MOTORIZED DAMPER —FD— FIRE DAMPER —FSD— FIRE/SMOKE DAMPER —SD— SMOKE DAMPER —SD— DUCT MOUNTED SMOKE DAMPER ——— TURNING VANES —→— SUPPLY AIR FLOW ARROW —→— RETURN/EXHAUST AIR FLOW ARROW ——— SUPPLY DIFFUSER, SIZE AS DESIGNATED ON PLAN ——— RETURN OR EXHAUST GRILLE, SIZE AND TYPE DESIGNATED ON PLAN ——— SIDEWALL SUPPLY GRILLE ——— SIDEWALL RETURN/EXHAUST GRILLE ——— FLEXIBLE DUCTWORK, SIZE AS DESIGNATED ON PLAN	GENERAL CONDITIONS: 1. THE GENERAL CONTRACTOR SHALL ACCUMULATE ALL RELATED INFORMATION FROM THEIR SUB-CONTRACTORS AND SUPPLIERS THAT WILL ALLOW THE GENERAL CONTRACTOR TO INCORPORATE ALL ELEMENTS AND SYSTEMS INTO THE DRAWINGS. THIS WILL INCLUDE AN AUTO-CAD DRAWING SECTION THROUGH AREAS OF DENSE MECHANICAL, ELECTRICAL, CABLE TRAYS, PLUMBING, SECURITY, PA SYSTEM AND FIRE PROTECTION SYSTEMS PRIOR TO THE FABRICATION OR INSTALLATION OF ANY WORK. THIS WILL ALLOW PROPER ACCESS TO ALL ELEMENTS FOR PROPER OPERATION AND MAINTENANCE SERVICE SPACE. 2. ALL WORK BY CONTRACTOR SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL BUILDING CODES INCLUDING THE CURRENT INTERNATIONAL ENERGY CONSERVATION CODE. 3. MATERIALS AND EQUIPMENT FURNISHED UNDER THE CONTRACT SHALL BE NEW AND SHALL BEAR THE U.L. LABEL WHERE APPLICABLE. UNLESS NOTED OTHERWISE, ALL WORK SHALL BE GUARANTEED AGAINST DEFECTIVE MATERIALS AND WORKMANSHIP FOR A PERIOD OF NOT LESS THAN ONE YEAR AFTER COMPLETION AND ACCEPTANCE BY THE OWNER. 4. CONTRACTOR SHALL INSTALL SYSTEMS WITHOUT INTERFERENCE AND IN STRICT COORDINATION WITH OTHER TRADES. 5. MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE CONTRACT DOCUMENTS AND APPLICABLE CODES AND STANDARDS. IN THE EVENT OF A CONFLICT, THE APPLICABLE CODES AND STANDARDS AND THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER'S REPRESENTATIVE IN WRITING OF SUCH CONFLICT. SHOULD THE CONTRACTOR PERFORM ANY WORK THAT IS NOT IN ACCORDANCE WITH THE REQUIREMENTS OF APPLICABLE CODES AND STANDARDS HE SHALL BEAR ALL COSTS ARISING IN CORRECTING SUCH DEFECTS. 6. PROVIDE ACCESS, INCLUDING NECESSARY ACCESS DOORS, FOR EQUIPMENT REQUIRING ADJUSTMENT OR MAINTENANCE. LOCATE ALL EQUIPMENT SUCH THAT OPERATION OR MAINTENANCE IS NOT RESTRICTED. 7. DO NOT RUN PIPING OR DUCTWORK, OR LOCATE EQUIPMENT, WITH RESPECT TO SWITCHBOARDS, PANELBOARDS, POWER PANELS, MOTOR CONTROL CENTERS OR DRY TYPE TRANSFORMERS WITH APPLICABLE CODE CLEARANCES OR MANUFACTURER'S RECOMMENDED SERVICE CLEARANCES, WHICHEVER IS GREATER. 8. VERIFY ALL SENSOR AND THERMOSTAT LOCATIONS WITH ARCHITECT PRIOR TO ROUGHING IN. MOUNTING HEIGHTS SHALL COMPLY WITH ACCESSIBILITY STANDARDS. 9. DUCT SIZES SHOWN ON PLANS ARE CLEAR AIRSTREAM DIMENSIONS. 10. ALL EXPOSED SUPPLY AND OUTSIDE AIR DUCT SHALL BE INTERNALLY LINED WITH 1" DUCT LINER. 11. DIFFUSIONABLE GRILLE/FACE OR PROVIDE DAMPER ADJUSTABLE THROUGH DIFFUSER/GRILLE FACE OR PROVIDE PROVISIONS FOR ADJUSTING DAMPERS IN AREAS WITH HARD CEILING. 12. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF GRILLES AND DIFFUSERS. 13. SMOKE DETECTORS FOR HVAC EQUIPMENT AND SMOKE DAMPERS SHALL BE PROVIDED BY THE CONTRACTOR. MECHANICAL CONTRACTOR SHALL INSTALL FURNISHED DETECTORS IN EQUIPMENT AND/OR DUCTWORK. 14. ALL EXPOSED SUPPLY AND OUTSIDE AIR DUCT SHALL BE INTERNALLY LINED WITH 1" DUCT LINER. DEMOLITION NOTES: 1. THE SCOPE OF DEMOLITION WORK INCLUDES DEMOLITION AND REMOVAL OF ALL EXISTING HVAC EQUIPMENT SHOWN TO BE REMOVED ON THE DEMOLITION DRAWINGS. 2. LOCATION OF EXISTING EQUIPMENT & PIPING SHOWN ON THESE DRAWINGS IS APPROXIMATE. CONTRACTOR IS RESPONSIBLE FOR THE FIELD STUDY OF THE PROPOSED WORK, THE VERIFICATION OF FIELD CONDITIONS, AND THE PERFORMANCE OF COMPLETE DEMOLITION WORK RELATED THERETO. 3. ALL ITEMS CALLED OUT FOR "SALVAGE" SHALL BE CLEANED AND USED ON THIS PROJECT OR CLEANED AND DELIVERED TO THE OWNER IN AN ORDERLY MANNER. 4. ALL DEMOLITION MATERIALS NOT SALVAGED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF SITE. ALL METALS SHALL BE DISPOSED IN A METAL DUMPSTER. CONTRACTOR SHALL SUPPLY METAL DUMPSTER AND LOCATION SHALL BE COORDINATED WITH THE OWNER. 5. CONTRACTOR SHALL SUBMIT A DEMOLITION PHASING PLAN TO THE OWNER FOR REVIEW AND COMMENT PRIOR TO IMPLEMENTING DEMOLITION ACTIVITIES. 6. EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE. CONTRACTOR SHALL LOCATE ALL UTILITIES AFFECTED BY CONSTRUCTION ACTIVITIES AND SHALL PROTECT THEM FROM DAMAGE OR ADJUST AS NECESSARY TO ACTUAL CONDITIONS. 7. CONTRACTOR SHALL COORDINATE ALL SYSTEM SHUTDOWNS AND TESTING WITH THE OWNER. 8. THE CONTRACTOR SHALL RECLAIM REFRIGERANTS FROM AIR CONDITIONING UNITS BEING REMOVED IN ACCORDANCE WITH THE FEDERAL CLEAN AIR ACT, ARI STANDARD 740 AND APPLICABLE STATE OR LOCAL REGULATIONS. ATMOSPHERIC RELEASES OF REFRIGERANTS ARE PROHIBITED. CONTRACTOR SHALL TURN OVER THE RECLAIMED REFRIGERANTS TO THE OWNER. 9. NO EQUIPMENT SHALL BE REMOVED/DEMOLISHED BEFORE REPLACEMENT EQUIPMENT ARRIVES ON SITE AND VERIFIED FROM OWNER THAT EQUIPMENT CAN BE REMOVED/DEMOLISHED.
				DIFFUSER CALLOUT KEY DIFFUSER TYPE (REFER TO DIFFUSER SCHEDULE) X X"Ø XXX NECK SIZE (REFER TO PLANS) AIR QUANTITY IN CUBIC FEET PER MINUTE (REFER TO PLANS)		

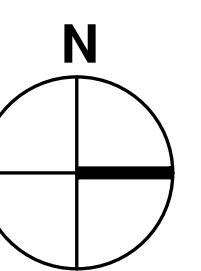
LEGEND		
	EXISTING	
	DEMO	
	NEW	

GENERAL MECHANICAL DEMOLITION NOTES	
1.	NO MECHANICAL EQUIPMENT SHALL BE REMOVED OR DEACTIVATED PRIOR TO THE REPLACEMENT EQUIPMENT ARRIVING ON SITE.
2.	VERIFY MECHANICAL EQUIPMENT, DUCTWORK, PIPING AND CONTROLS EXACT LOCATION PRIOR TO DEMOLITION.
3.	MECHANICAL EQUIPMENT DEMOLITION SHALL INCLUDE STRUCTURAL SUPPORT DEMOLITION AND PREPARATION FOR INSTALLATION OF NEW SUPPORT AND EQUIPMENT.

NOTES BY SYMBOL	
①	SEE ENLARGED PLAN FOR WORK IN THIS AREA.
②	REMOVE EXISTING CHILLER, CONTROLS, ASSOCIATED PIPING TO POINT INDICATED, AND ACCESSORIES FOR REPLACEMENT UNDER NEW WORK.
③	EXISTING TERMINAL UNIT TO REMAIN.
④	EXISTING CHS/R SHALL BE TEMPORARILY CAPPED AT THIS LOCATION FOR FUTURE CONNECTION.
⑤	EXISTING CHILLER PIPING SHALL BE REMOVED BACK TO MAIN AND CAPPED WATER TIGHT.



01 **MECHANICAL PIPING DEMO FLOOR PLAN**
SCALE: 1/8" = 1'-0"



GENERAL PHASING PLAN*:

- CLEAN AND FLUSH EXISTING PIPING SYSTEM PRIOR TO COMMENCEMENT OF WORK. INSPECT EXISTING PIPING CONDITION AND SUITABILITY FOR REUSE. REPORT TO OWNER FOR ANY ISSUES WITH EXISTING PIPING SYSTEM.
 - WHILE RUNNING ON ACC-2 AND THE EXISTING PUMPS, REPLACE ACC-2.
 - ONCE THE NEW CHILLER IS INSTALLED, RUN NEW CHILLER WITH EXISTING PUMPS AND REPLACE ACC-2. INSTALL NEW PUMP PACKAGE AND BUFFER TANK.
 - REMOVE EXISTING PUMPS, EXPANSION TANK, AIR SEPARATOR AND RECONFIGURE PIPING IN MECHANICAL ROOM AS REQUIRED TO ACCOMMODATE NEW CONFIGURATION. CLEAN AND FLUSH PIPING SYSTEM PRIOR TO SWITCHING OVER TO NEW PUMPING SKID.
 - SWITCH OVER TO NEW PUMPING SKID AT THE CHILLER YARD.
 - REPLACE AHU OF THE OWNERS CHOOSING WHILE THE OTHER AHU IS IN OPERATION.
 - REPLACE THE OTHER AHU ONCE THE PREVIOUSLY REPLACED AHU IS FULLY FUNCTIONAL AND BALANCED.
- * CONTRACTOR SHALL PROVIDE A DETAILED PHASING PLAN TO THE OWNER PRIOR TO COMMENCEMENT OF WORK FOR OWNERS APPROVAL. PHASING PLAN SHALL BE DEVELOPED TO MINIMIZE DOWNTIME OF THE OPERATING ROOMS AND ANY DOWNTIME SHALL BE SCHEDULED AND APPROVED BY OWNER.

SHEET TITLE:
MECHANICAL PIPING
DEMO FLOOR PLAN

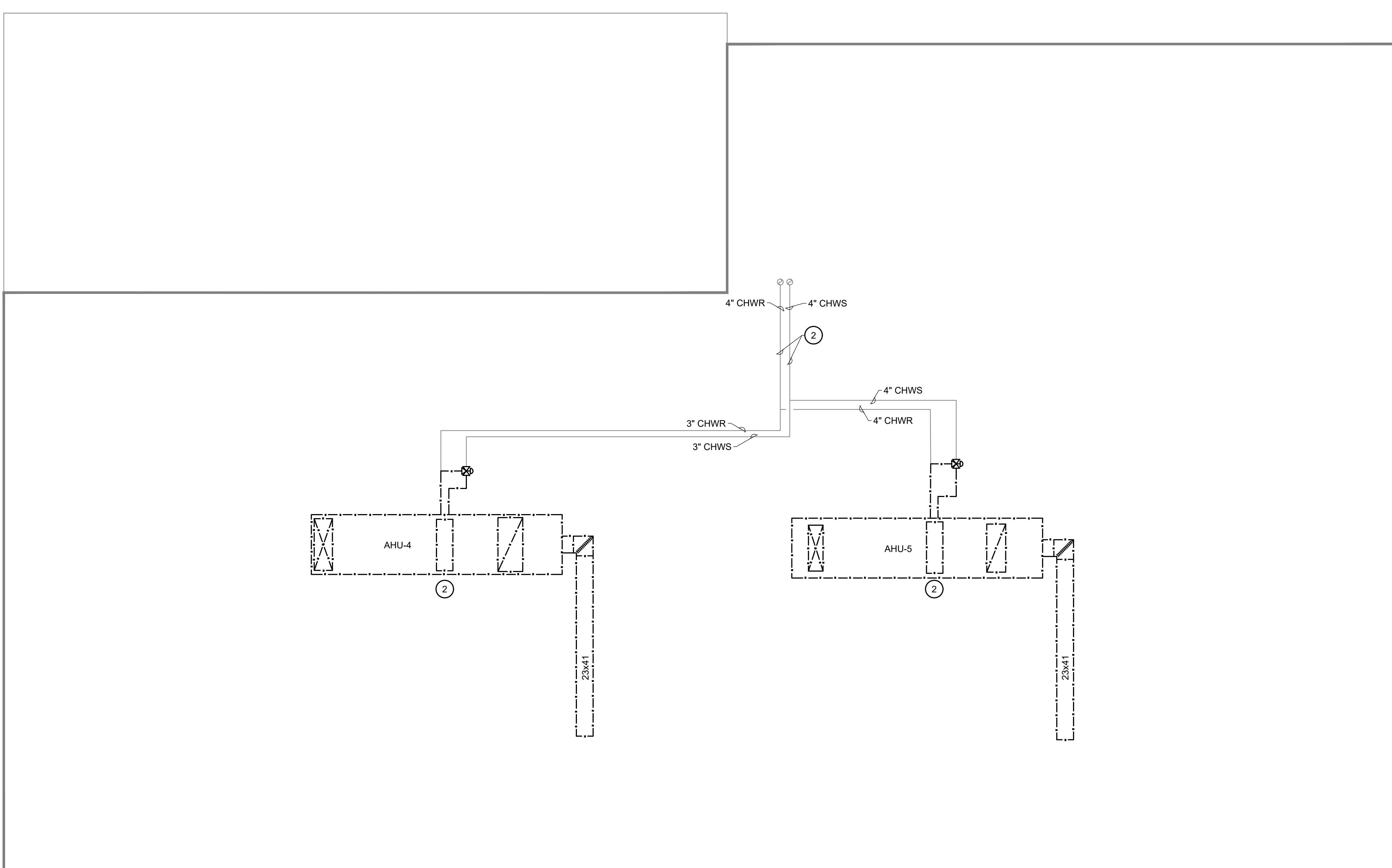
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LEGEND		
—	EXISTING	
---	DEMO	
—	NEW	

GENERAL MECHANICAL DEMOLITION NOTES	
1. NO MECHANICAL EQUIPMENT SHALL BE REMOVED OR DEACTIVATED PRIOR TO THE REPLACEMENT EQUIPMENT ARRIVING ON SITE. 2. VERIFY MECHANICAL EQUIPMENT, DUCTWORK, PIPING AND CONTROLS EXACT LOCATION PRIOR TO DEMOLITION. 3. MECHANICAL EQUIPMENT DEMOLITION SHALL INCLUDE STRUCTURAL SUPPORT DEMOLITION AND PREPARATION FOR INSTALLATION OF NEW SUPPORT AND EQUIPMENT.	

NOTES BY SYMBOL	
<ul style="list-style-type: none"> ① REMOVE ALL CHILLED WATER PIPING TO POINT INDICATED INCLUDING ALL SUPPORTS, VALVES, ACCESSORIES, AND CONTROLS. ② REMOVE EXISTING AHU AND PREPARE CURB, ELECTRICAL, AND DUCTWORK FOR CONNECTION UNDER NEW WORK. ③ EXISTING PIPING PENETRATION THRU ROOF TO REMAIN. 	



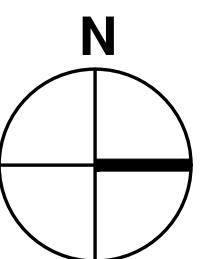
02 MECHANICAL DEMO ROOF PLAN

SCALE: 1/8" = 1'-0"

GENERAL PHASING PLAN*:

- CLEAN AND FLUSH EXISTING PIPING SYSTEM PRIOR TO COMMENCEMENT OF WORK. INSPECT EXISTING PIPING CONDITION AND SUITABILITY FOR REUSE. REPORT TO OWNER FOR ANY ISSUES WITH EXISTING PIPING SYSTEM.
- WHILE RUNNING ON ACC-2 AND THE EXISTING PUMPS, REPLACE ACC-1.
- ONCE THE NEW CHILLER IS INSTALLED, RUN NEW CHILLER WITH EXISTING PUMPS AND REPLACE ACC-2. INSTALL NEW PUMP PACKAGE AND BUFFER TANK.
- REMOVE EXISTING PUMPS, EXPANSION TANK, AIR SEPARATOR AND RECONFIGURE PIPING IN MECHANICAL ROOM AS REQUIRED TO ACCOMMODATE NEW CONFIGURATION. CLEAN AND FLUSH PIPING SYSTEM PRIOR TO SWITCHING OVER TO NEW PUMPING SKID.
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SHEET TITLE:
MECHANICAL DEMO
ROOF PLAN

SHEET #:

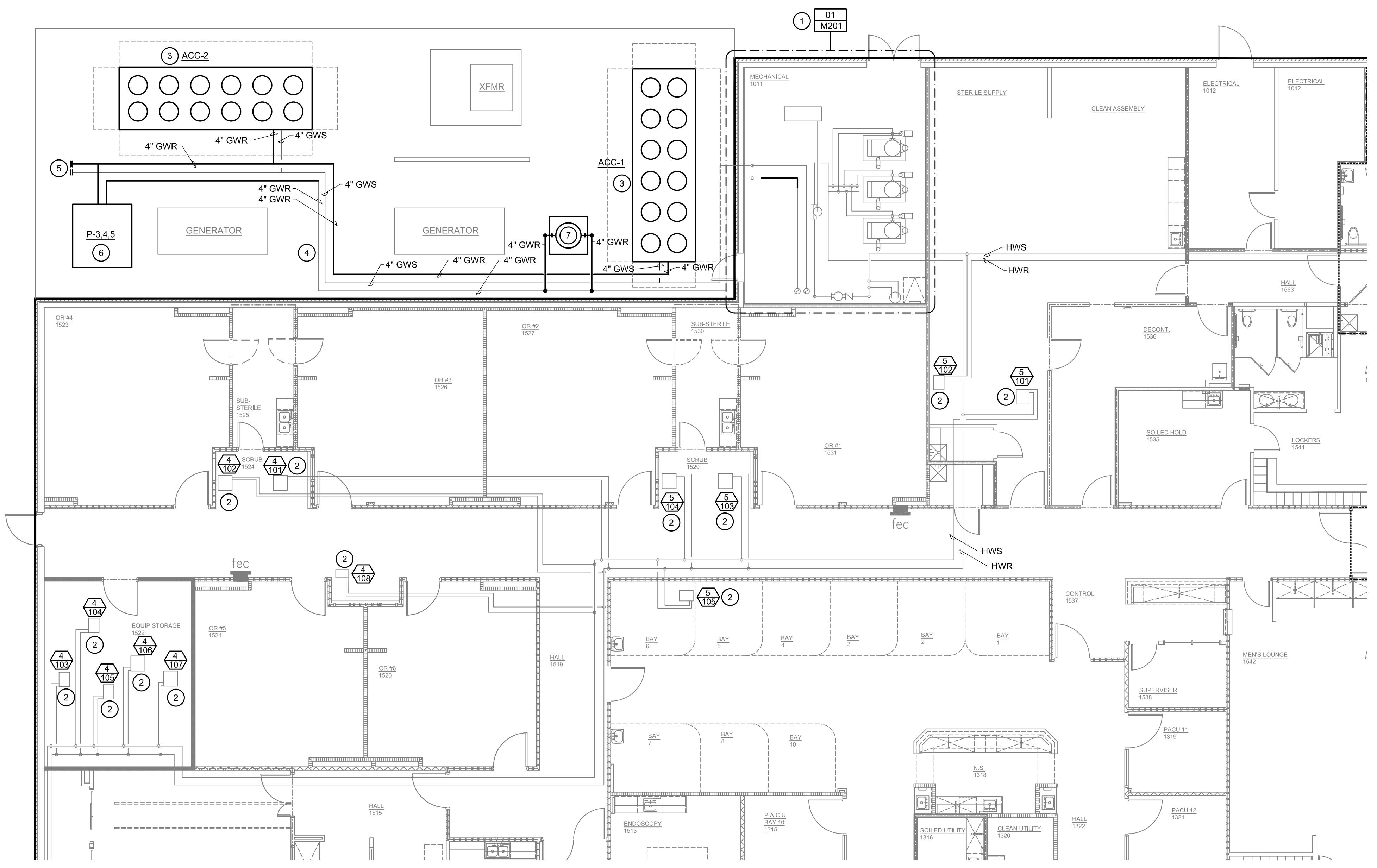
M-021

VAV FLOW SCHEDULE	
DESIGNATION	FLOW (GPM)
4-101	4.5
4-102	4.6
4-103	2.5
4-104	2.9
4-105	2.9
4-106	3.8
4-107	3.8
4-108	0.7
5-101	3.8
5-102	3.1
5-103	4.5
5-104	4.5
5-105	2.8

LEGEND	
—	EXISTING
—	DEMO
—	NEW

GENERAL MECHANICAL NOTES	
1.	FINAL LOCATIONS OF ALL AIR DEVICES SHALL BE COORDINATED WITH ARCHITECTURAL CEILING FINISHES.
2.	ALL DUCT SIZE NOTES REFER TO CLEAR INSIDE DIMENSION OF DUCT.
3.	PROVIDE VOLUME DAMPERS FOR ALL SUPPLY, RETURN, AND EXHAUST BRANCH DUCTS TO BALANCE SYSTEM.

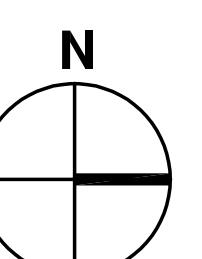
NOTES BY SYMBOL	
①	SEE ENLARGED PLAN FOR WORK IN THIS AREA.
②	BALANCE HEATING WATER FLOW TO GPM SPECIFIED IN VAV FLOW SCHEDULE.
③	NEW GLYCOL CHILLER. ADJUST CONCRETE PAD AS NECESSARY. EXTEND NEW PIPING TO CONNECT TO CHILLER PER MANUFACTURERS RECOMMENDATIONS.
④	PIPING SYSTEM SHALL BE CLEANED AND FLUSHED PRIOR TO OPERATION OF NEW CHILLER.
⑤	PROVIDE 4" TEMPORARY CHILLER CONNECTIONS WITH ISOLATION VALVES AND BLIND FLANGE.
⑥	PREFABRICATED, SKID MOUNTED, INSULATED PUMP HOUSE WITH AIR SEPARATOR, EXPANSION TANK, CHEMICAL FEEDER, PUMPS, AND GLYCOL STATION BY TEXAS AIR SYSTEMS OR APPROVED EQUAL. PUMP HOUSE SHALL BE FULLY PIPED WITH SUPPLY AND RETURN FLANGED CONNECTIONS AT THE EXTERIOR ON THE SAME SIDE.
⑦	250 GALLON BUFFER TANK ON 4" HOUSEKEEPING PAD. PROVIDE A NORMALLY CLOSED MANUAL BYPASS VALVE AT THE CHILLED WATER MAIN BETWEEN THE CONNECTIONS FOR THE BUFFER TANK. PROVIDE ISOLATION VALVES AT CONNECTIONS TO MAIN ON BOTH SIDES OF THE TANK.



MECHANICAL PIPING FLOOR PLAN

01

SCALE: 1/8" = 1'-0"



GENERAL PHASING PLAN*:

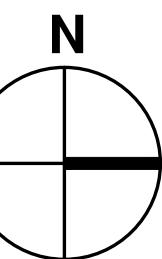
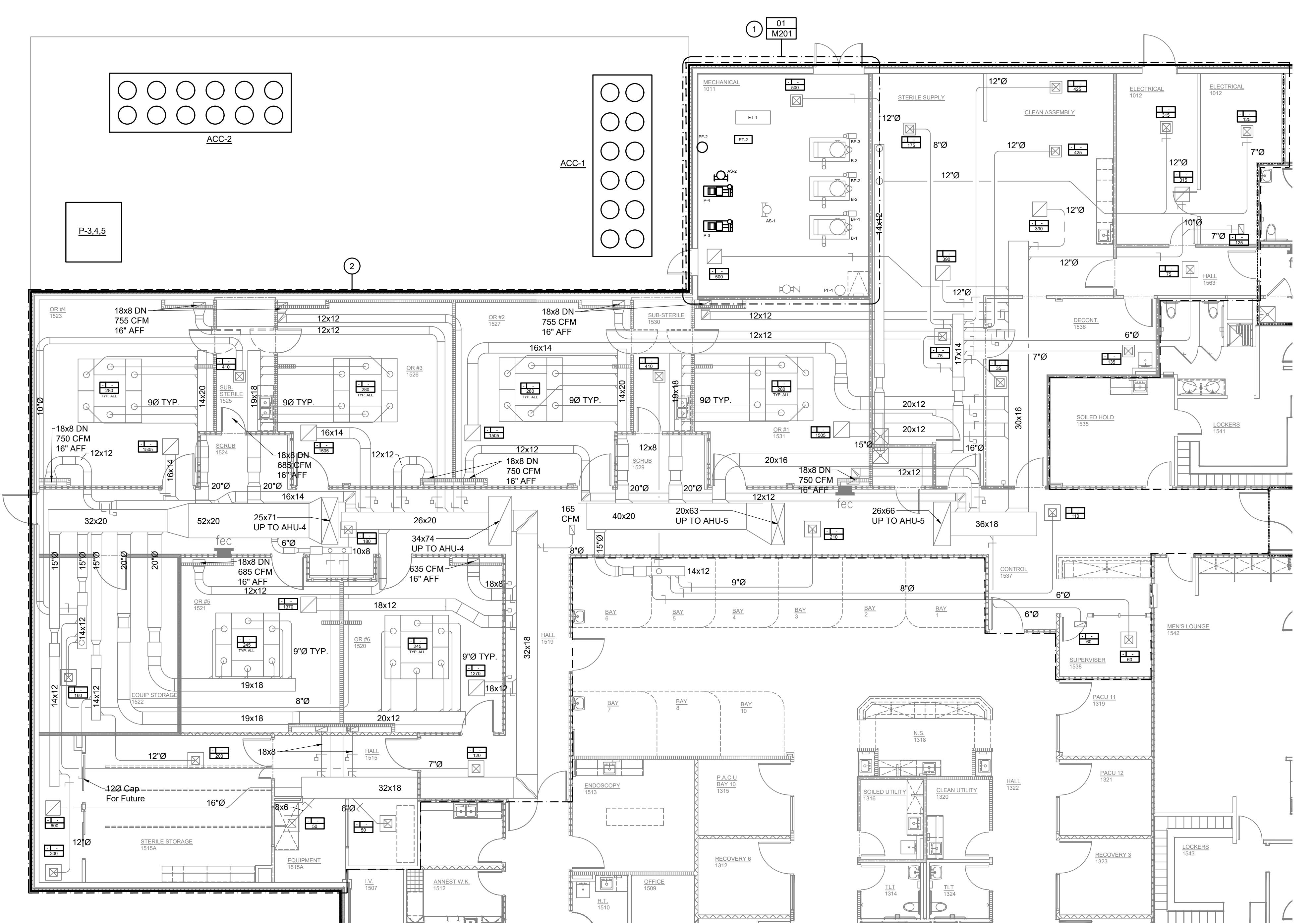
- CLEAN AND FLUSH EXISTING PIPING SYSTEM PRIOR TO COMMENCEMENT OF WORK. INSPECT EXISTING PIPING CONDITION AND SUITABILITY FOR REUSE. REPORT TO OWNER FOR ANY ISSUES WITH EXISTING PIPING SYSTEM.
- WHILE RUNNING ON ACC-2 AND THE EXISTING PUMPS, REPLACE ACC-1.
- ONCE THE NEW CHILLER IS INSTALLED, RUN NEW CHILLER WITH EXISTING PUMPS AND REPLACE ACC-2. INSTALL NEW PUMP PACKAGE AND BUFFER TANK.
- REMOVE EXISTING PUMPS, EXPANSION TANK, AIR SEPARATOR AND RECONFIGURE PIPING IN MECHANICAL ROOM AS REQUIRED TO ACCOMMODATE NEW CONFIGURATION. CLEAN AND FLUSH PIPING SYSTEM PRIOR TO SWITCHING OVER TO NEW PUMPING SKID.
- SWITCH OVER TO NEW PUMPING SKID AT THE CHILLER YARD.
- REPLACE AHU OF THE OWNERS CHOOSING WHILE THE OTHER AHU IS IN OPERATION.
- REPLACE THE OTHER AHU ONCE THE PREVIOUSLY REPLACED AHU IS FULLY FUNCTIONAL AND BALANCED.

* CONTRACTOR SHALL PROVIDE A DETAILED PHASING PLAN TO THE OWNER PRIOR TO COMMENCEMENT OF WORK FOR OWNERS APPROVAL. PHASING PLAN SHALL BE DEVELOPED TO MINIMIZE DOWNTIME OF THE OPERATING ROOMS AND ANY DOWNTIME SHALL BE SCHEDULED AND APPROVED BY OWNER.

LEGEND		
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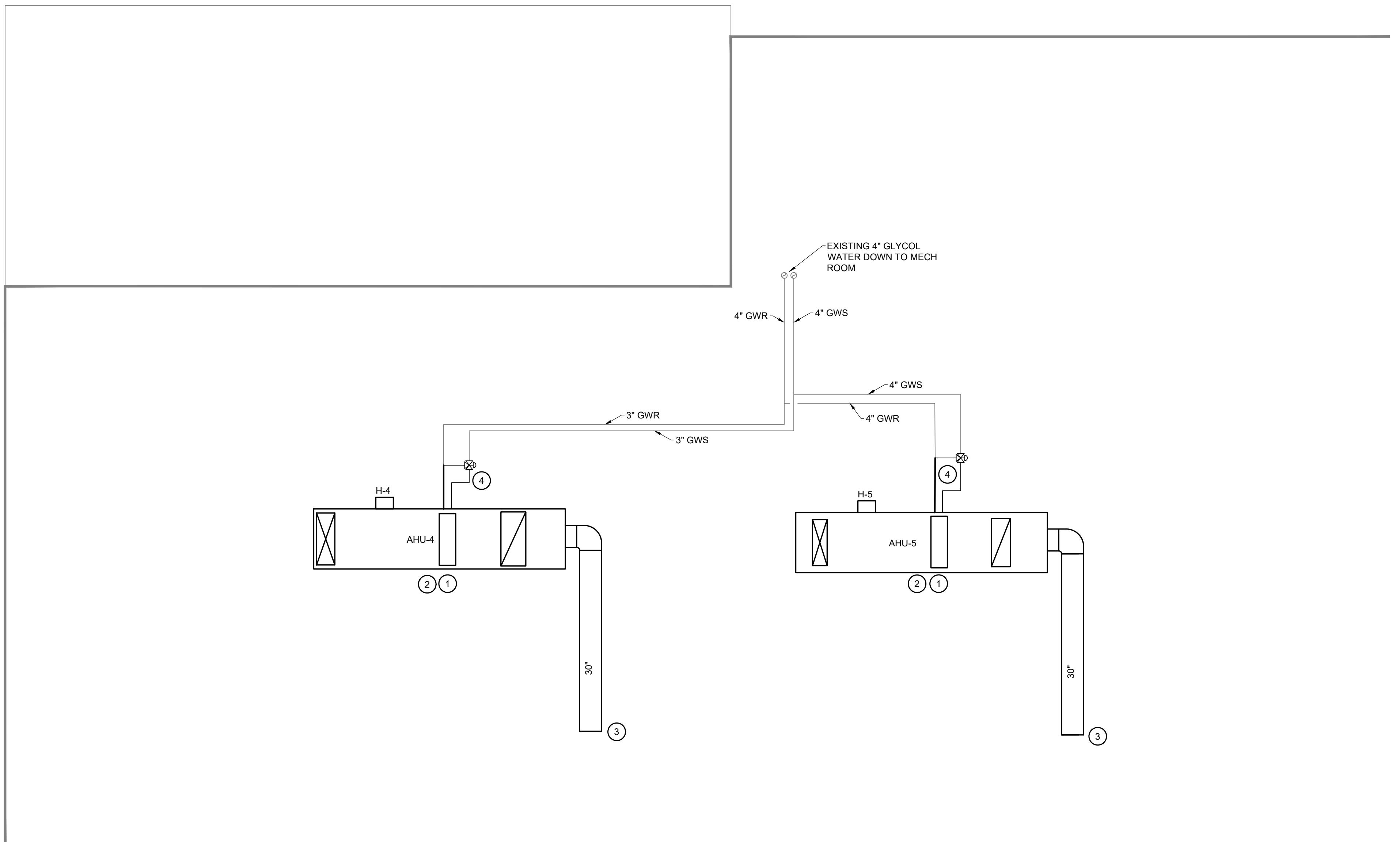
GENERAL MECHANICAL NOTES	
1. FINAL LOCATIONS OF ALL AIR DEVICES SHALL BE COORDINATED WITH ARCHITECTURAL CEILING FINISHES.	
2. ALL DUCT SIZE NOTES REFER TO CLEAR INSIDE DIMENSION OF DUCT.	
3. PROVIDE VOLUME DAMPERS FOR ALL SUPPLY, RETURN, AND EXHAUST BRANCH DUCTS TO BALANCE SYSTEM.	
4. CONTRACTOR TO REBALANCE ALL EXISTING DIFFUSERS, REGISTERS, AND GRILLES SERVED NY AHU 4 AND 5.	

NOTES BY SYMBOL	
(1)	SEE ENLARGED PLAN FOR WORK IN THIS AREA.
(2)	REBALANCE SUPPLY AND RETURN TO CFM SPECIFIED IN IN DASHED OUTLINED AREA.



LEGEND		GENERAL MECHANICAL NOTES
—	EXISTING	1. FINAL LOCATIONS OF ALL AIR DEVICES SHALL BE COORDINATED WITH ARCHITECTURAL CEILING FINISHES.
-----	DEMO	2. ALL DUCT SIZE NOTES REFER TO CLEAR INSIDE DIMENSION OF DUCT.
—	NEW	3. PROVIDE VOLUME DAMPERS FOR ALL SUPPLY, RETURN, AND EXHAUST BRANCH DUCTS TO BALANCE SYSTEM.

NOTES BY SYMBOL

- 1 INSTALL NEW AHU. ADJUST EXISTING ROOF CURB AS REQUIRED. REBALANCE AIR AND WATER FLOW TO NEW AHU.
- 2 ADJUST/EXTEND EXISTING CONDENSATE DRAIN AS NECESSARY.
- 3 PROVIDE WITH 45 DEGREE UNDERCUT, FULL PERIMETER ANGLE, AND WIRE MESH COVER.
- 4 CONNECT NEW CHS/R TO EXISTING AND CONNECT TO UNIT PER MANUFACTURERS RECOMMENDATIONS. PROVIDE NEW 3-WAY CONTROL VALVE.


66 **MECHANICAL ROOF PLAN - ALT-1**

SCALE: 1/8" = 1' 0"

SCALE: 1/8" = 1'-0"

GENERAL PHASING PLAN*:

1. CLEAN AND FLUSH EXISTING PIPING SYSTEM PRIOR TO COMMENCEMENT OF WORK. INSPECT EXISTING PIPING CONDITION AND SUITABILITY FOR REUSE. REPORT TO OWNER FOR ANY ISSUES WITH EXISTING PIPING SYSTEM.
 2. WHILE RUNNING ON ACC-2 AND THE EXISTING PUMPS, REPLACE ACC-1.
 3. ONCE THE NEW CHILLER IS INSTALLED, RUN NEW CHILLER WITH EXISTING PUMPS AND REPLACE ACC-2. INSTALL NEW PUMP PACKAGE AND BUFFER TANK.
 4. REMOVE EXISTING PUMPS, EXPANSION TANK, AIR SEPARATOR AND RECONFIGURE PIPING IN MECHANICAL ROOM AS REQUIRED TO ACCOMMODATE NEW CONFIGURATION. CLEAN AND FLUSH PIPING SYSTEM PRIOR TO SWITCHING OVER TO NEW PUMPING SKID.
 5. SWITCH OVER TO NEW PUMPING SKID AT THE CHILLER YARD.
 6. REPLACE AHU OF THE OWNERS CHOOSING WHILE THE OTHER AHU IS IN OPERATION.
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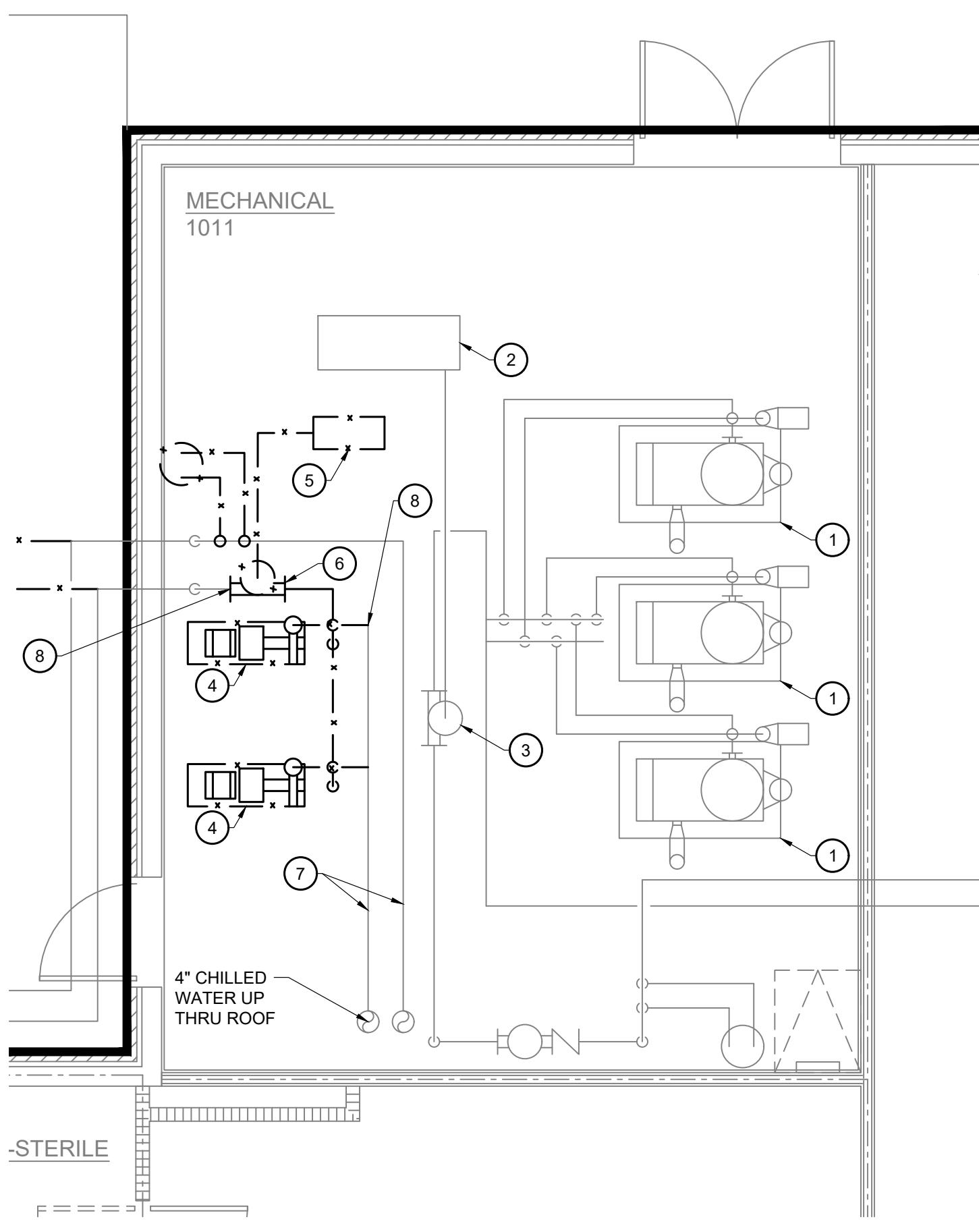
M-121

LEGEND	
—	EXISTING
- - -	DEMO
—	NEW

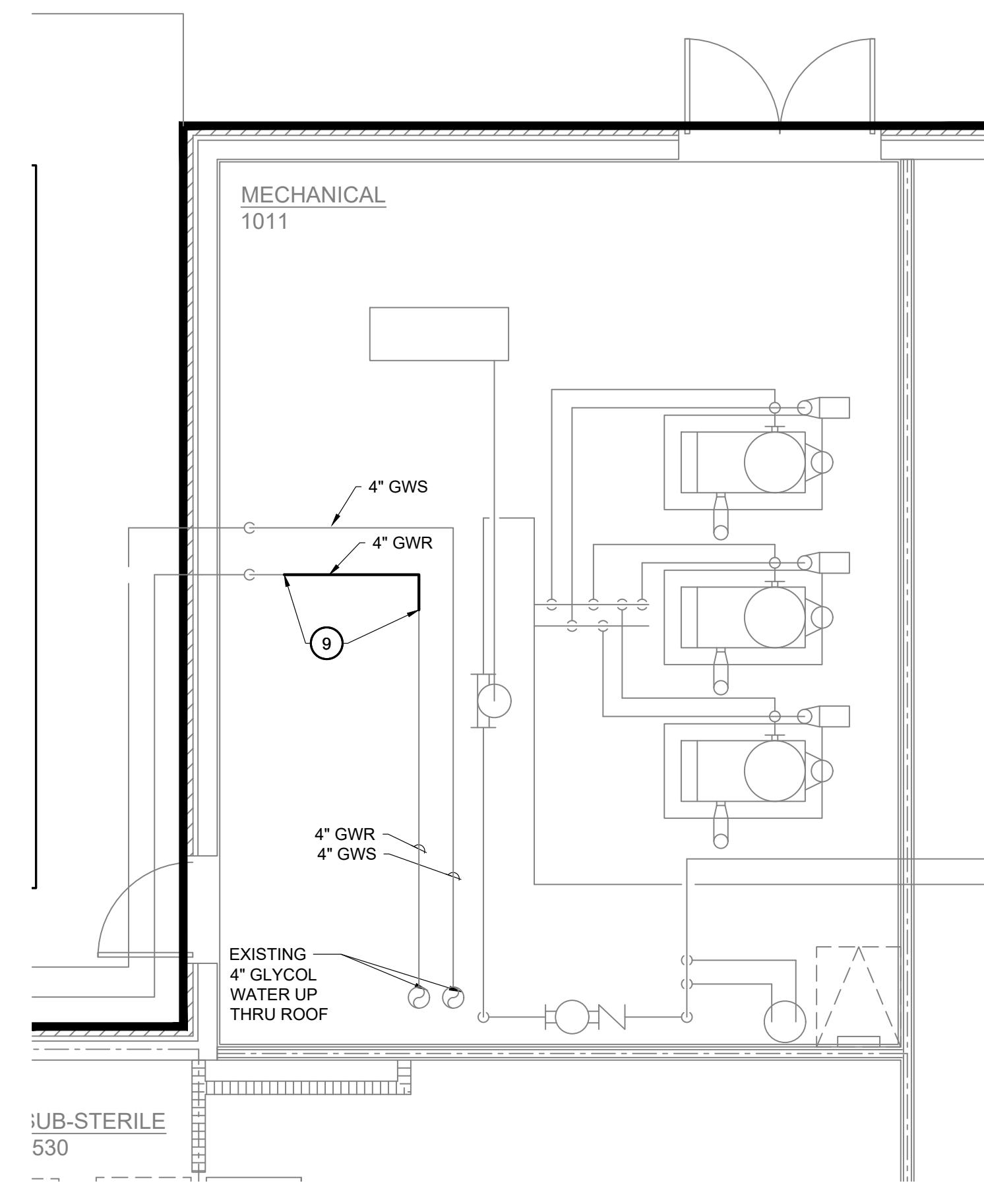
GENERAL MECHANICAL DEMOLITION NOTES
<ol style="list-style-type: none"> 1. NO MECHANICAL EQUIPMENT SHALL BE REMOVED OR DEACTIVATED PRIOR TO THE REPLACEMENT EQUIPMENT ARRIVING ON SITE. 2. VERIFY MECHANICAL EQUIPMENT, DUCTWORK, PIPING AND CONTROLS EXACT LOCATION PRIOR TO DEMOLITION. 3. MECHANICAL EQUIPMENT DEMOLITION SHALL INCLUDE STRUCTURAL SUPPORT DEMOLITION AND PREPARATION FOR INSTALLATION OF NEW SUPPORT AND EQUIPMENT.

GENERAL MECHANICAL NOTES
<ol style="list-style-type: none"> 1. FINAL LOCATIONS OF ALL AIR DEVICES SHALL BE COORDINATED WITH ARCHITECTURAL CEILING FINISHES. 2. ALL DUCT SIZE NOTES REFER TO CLEAR INSIDE DIMENSION OF DUCT. 3. PROVIDE VOLUME DAMPERS FOR ALL SUPPLY, RETURN, AND EXHAUST BRANCH DUCTS TO BALANCE SYSTEM.

NOTES BY SYMBOL
<ol style="list-style-type: none"> 1 EXISTING HEATING WATER BOILER TO REMAIN. 2 EXISTING HEATING WATER EXPANSION TANK TO REMAIN. 3 EXISTING HEATING WATER AIR SEPARATOR TO REMAIN. 4 REMOVE EXISTING CHILLED WATER PUMP AND ASSOCIATED PIPING/ APPURTEANCES FOR REPLACEMENT UNDER NEW WORK. 5 REMOVE EXISTING CHILLED WATER EXPANSION TANK AND ASSOCIATED PIPING AND APPURTEANCES . 6 REMOVE EXISTING CHILLED WATER AIR SEPARATOR AND ASSOCIATED PIPING AND APPURTEANCES. 7 EXISTING CHILLED WATER PIPING, CONTROLS, VALVES, AND ACCESSORIES SHALL REMAIN EXCEPT WHERE NOTED TO BE REMOVED. 8 REMOVE PORTION OF CHILLED WATER RETURN AND TEMPORARILY CAP FOR RECONNECTION. REFER TO 01/M-201 FOR NEW PIPING CONNECTIONS. 9 REROUTE EXISTING CHR AS INDICTED.

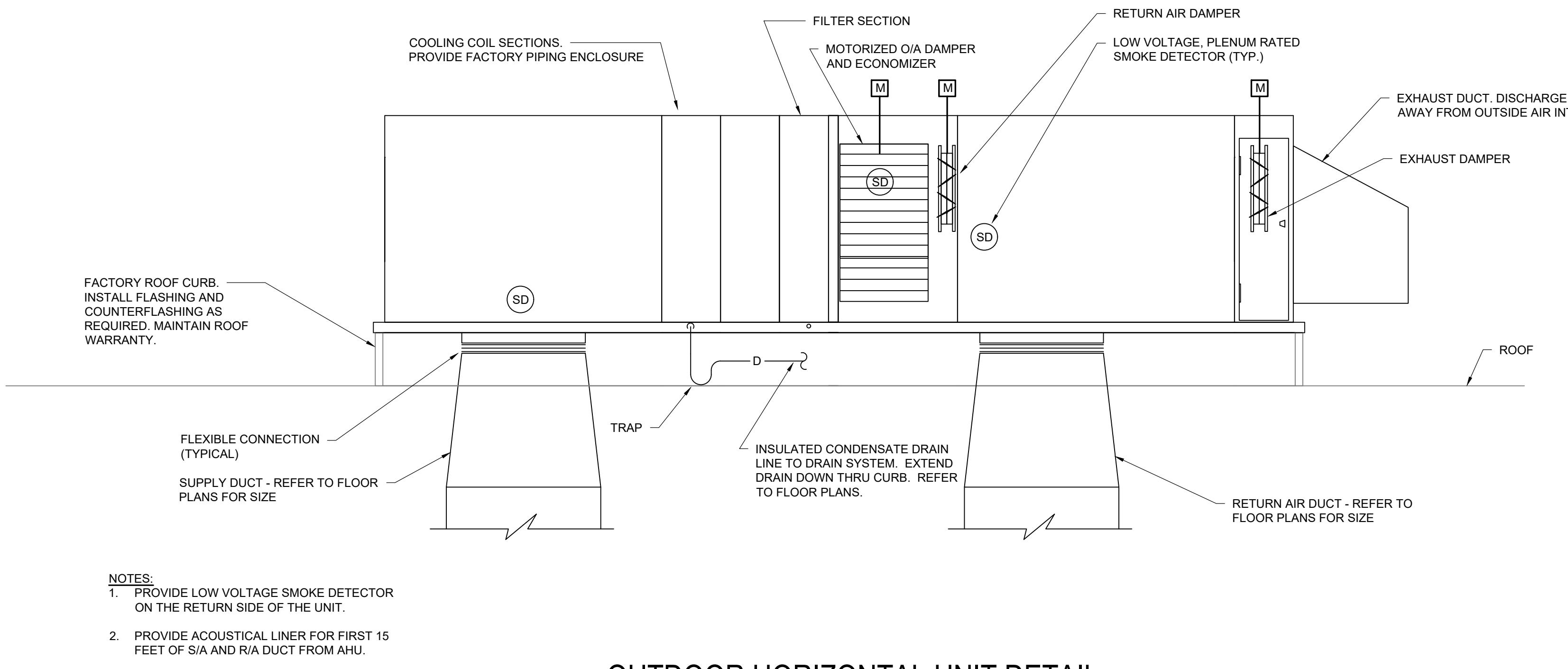


02 ENLARGED MECHANICAL DEMO MECHANICAL ROOM PLAN

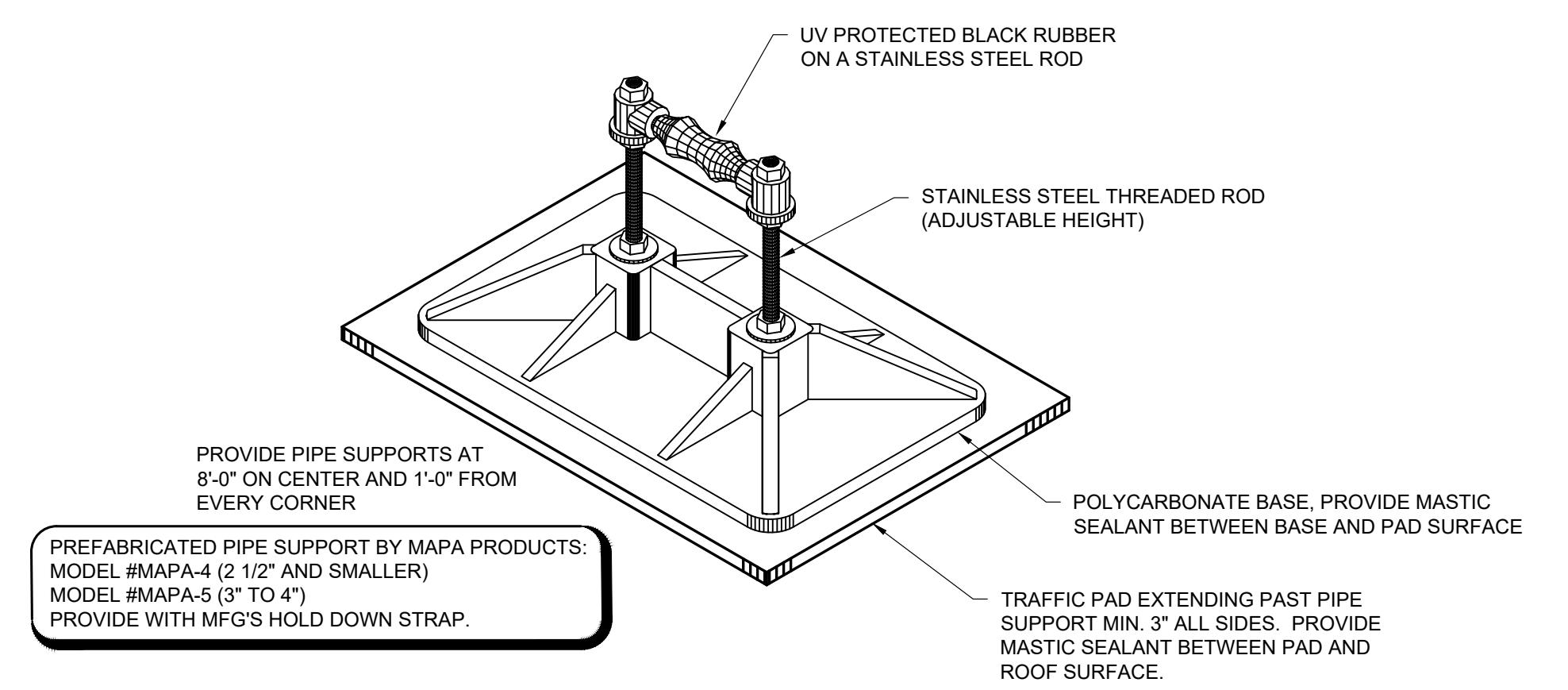


01 ENLARGED MECHANICAL MECHANICAL ROOM PLAN

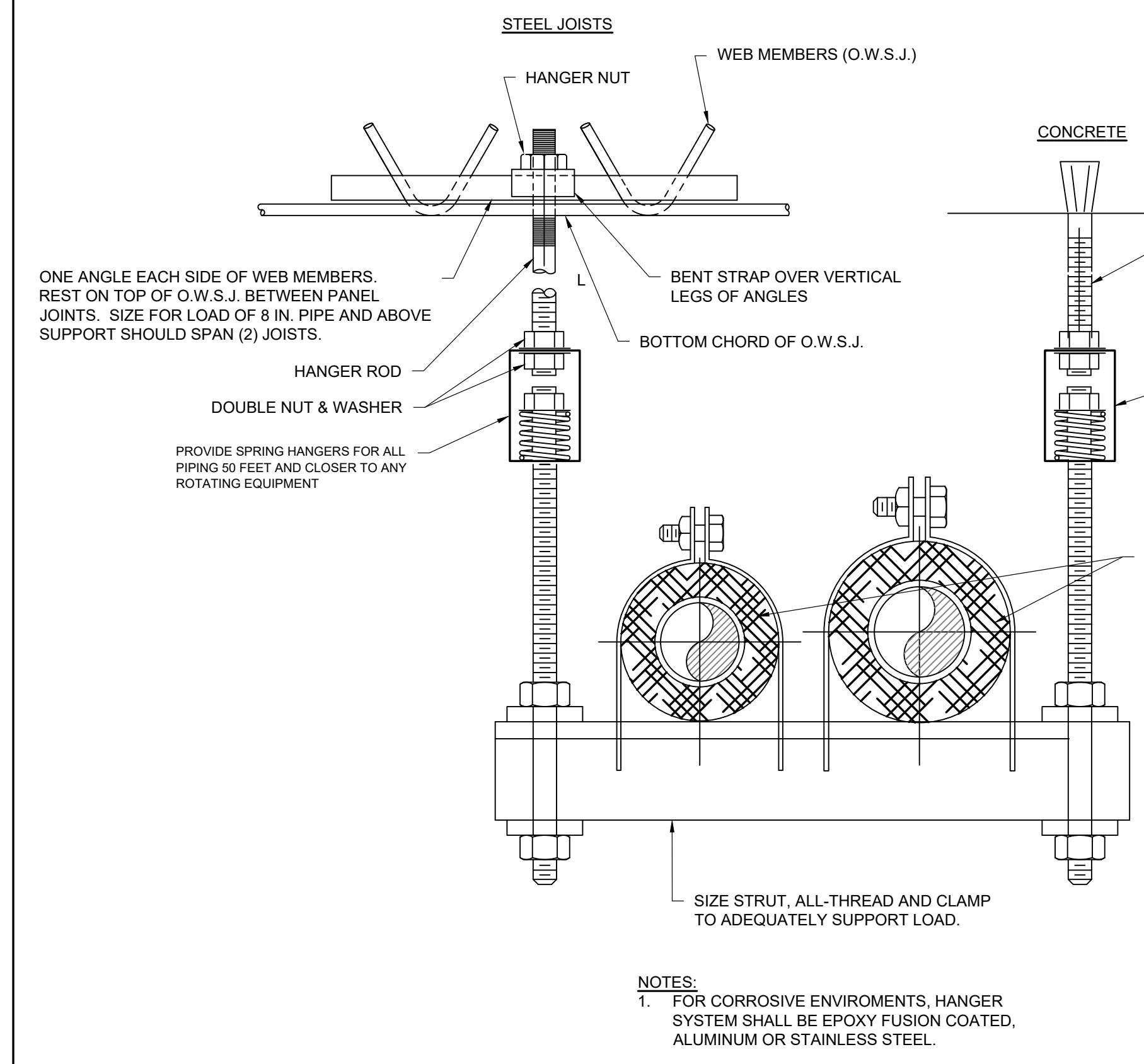




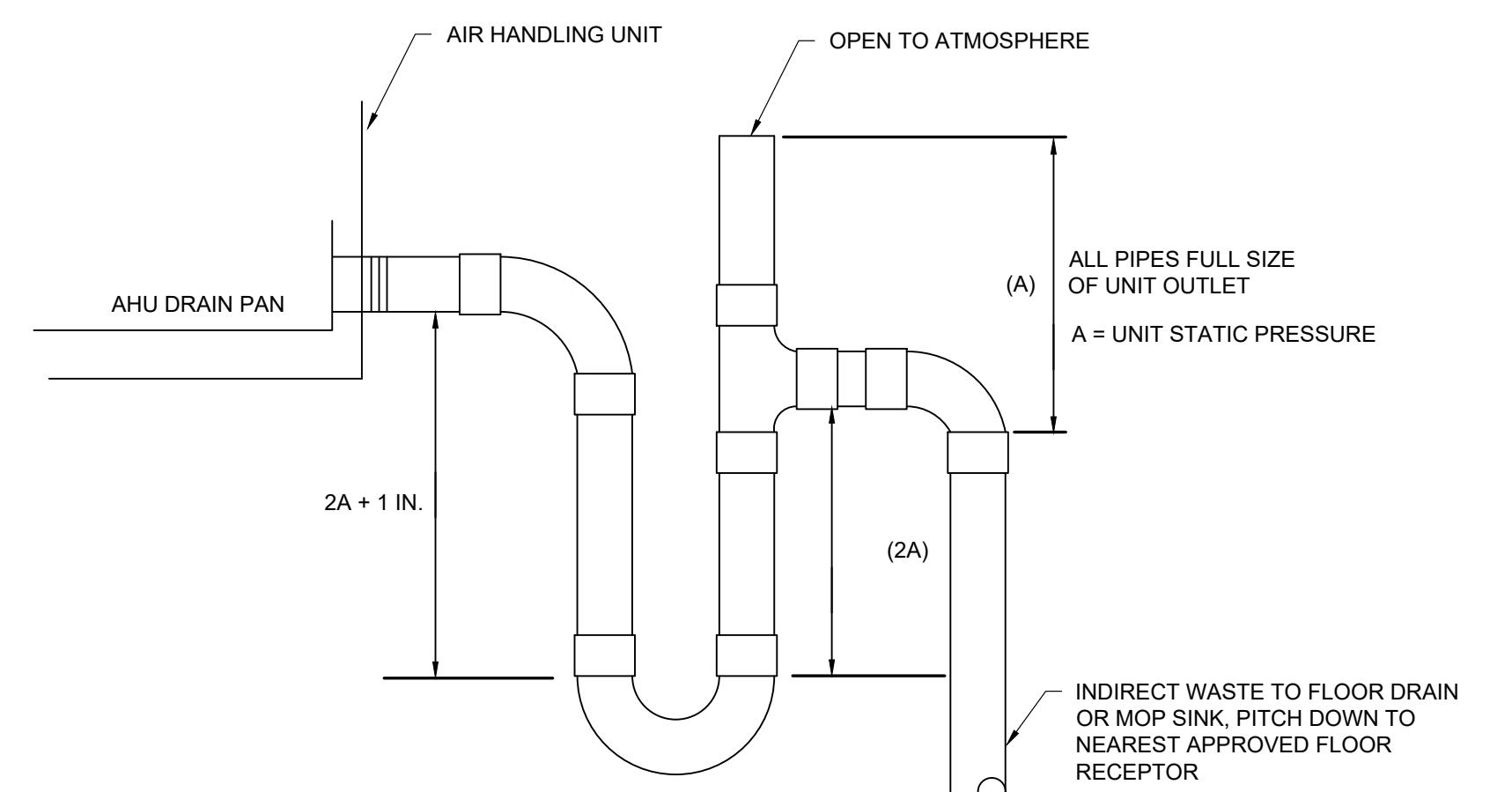
08 OUTDOOR HORIZONTAL UNIT DETAIL



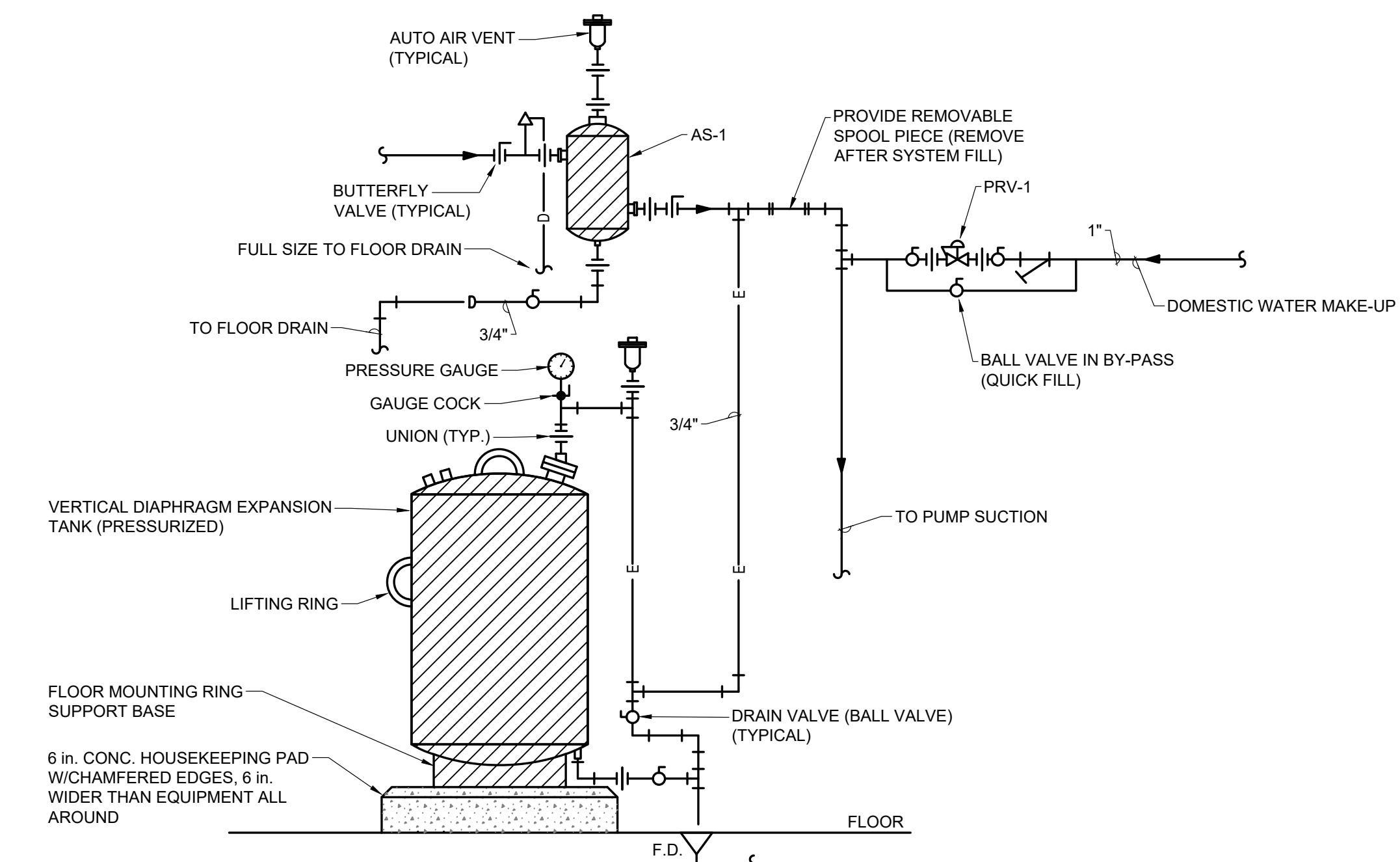
07 ROOF PIPE SUPPORT DETAIL



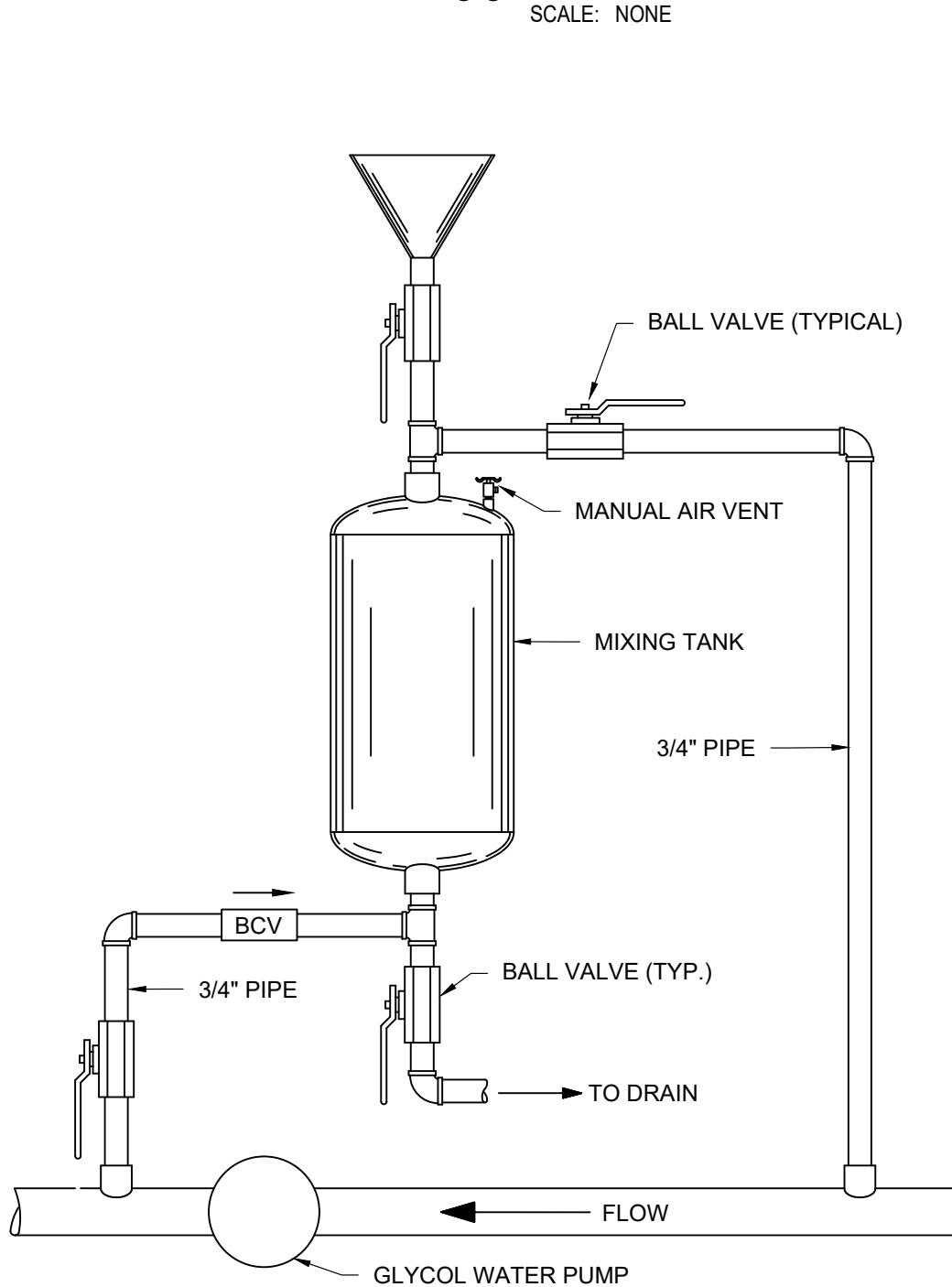
06 STRUT TYPE INSULATED PIPE SUPPORT DETAIL



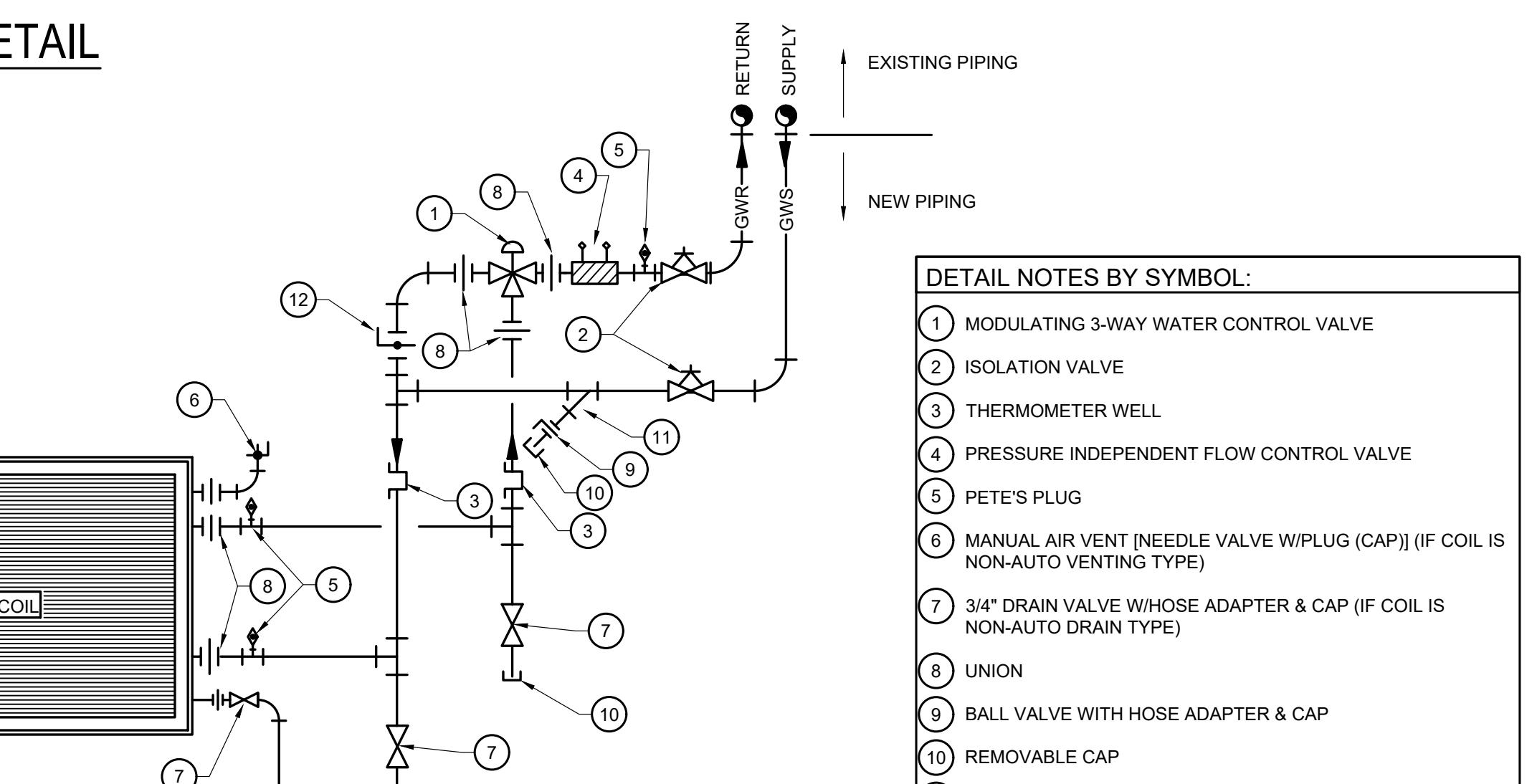
05 CONDENSATE DRAIN DETAIL



04 EXPANSION TANK PIPING CONNECTION DETAIL



03 CHEMICAL FEEDER DETAIL



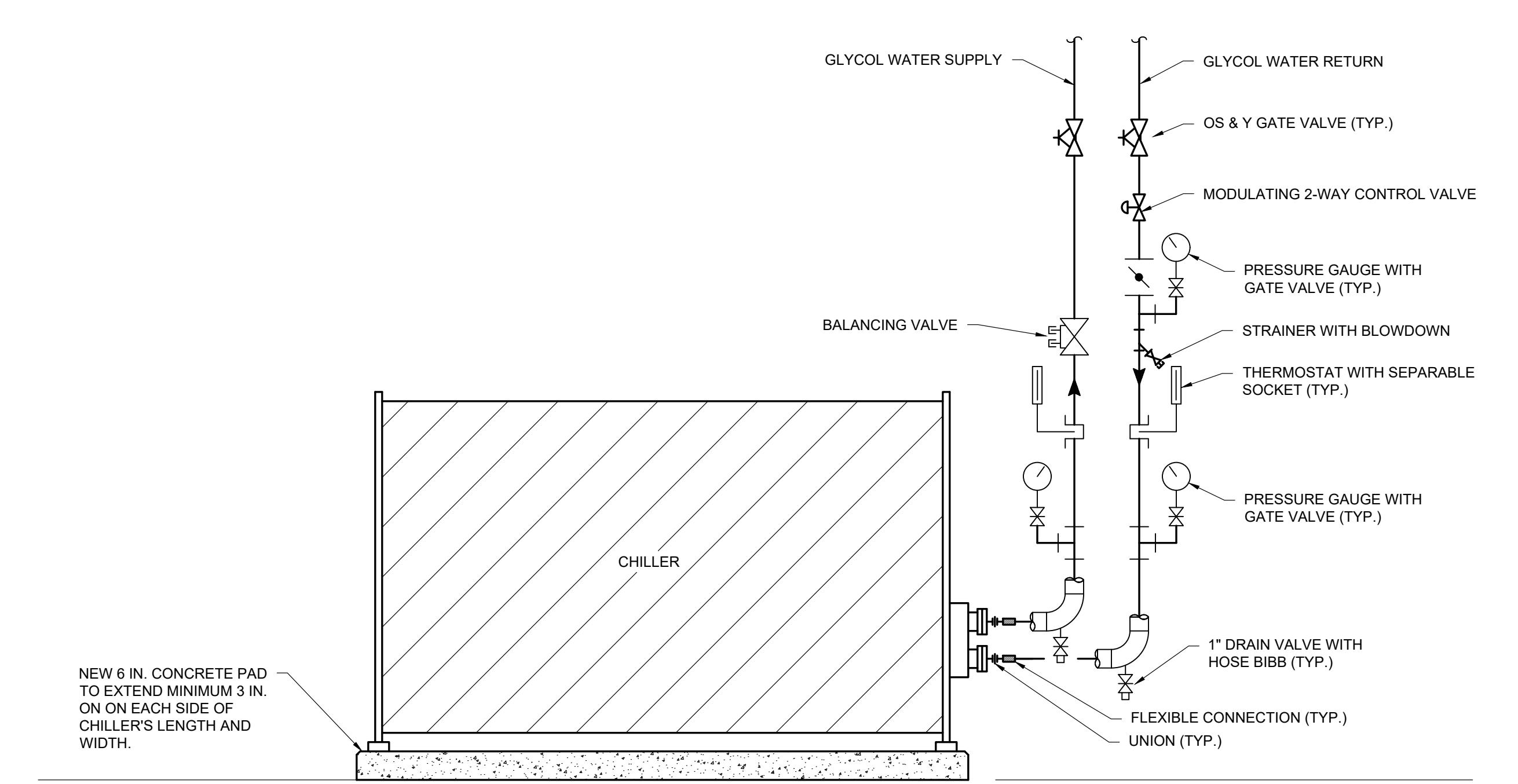
02 GLYCOL WATER COIL
WITH 3-WAY VALVE - AHU

DETAIL NOTES BY SYMBOL:

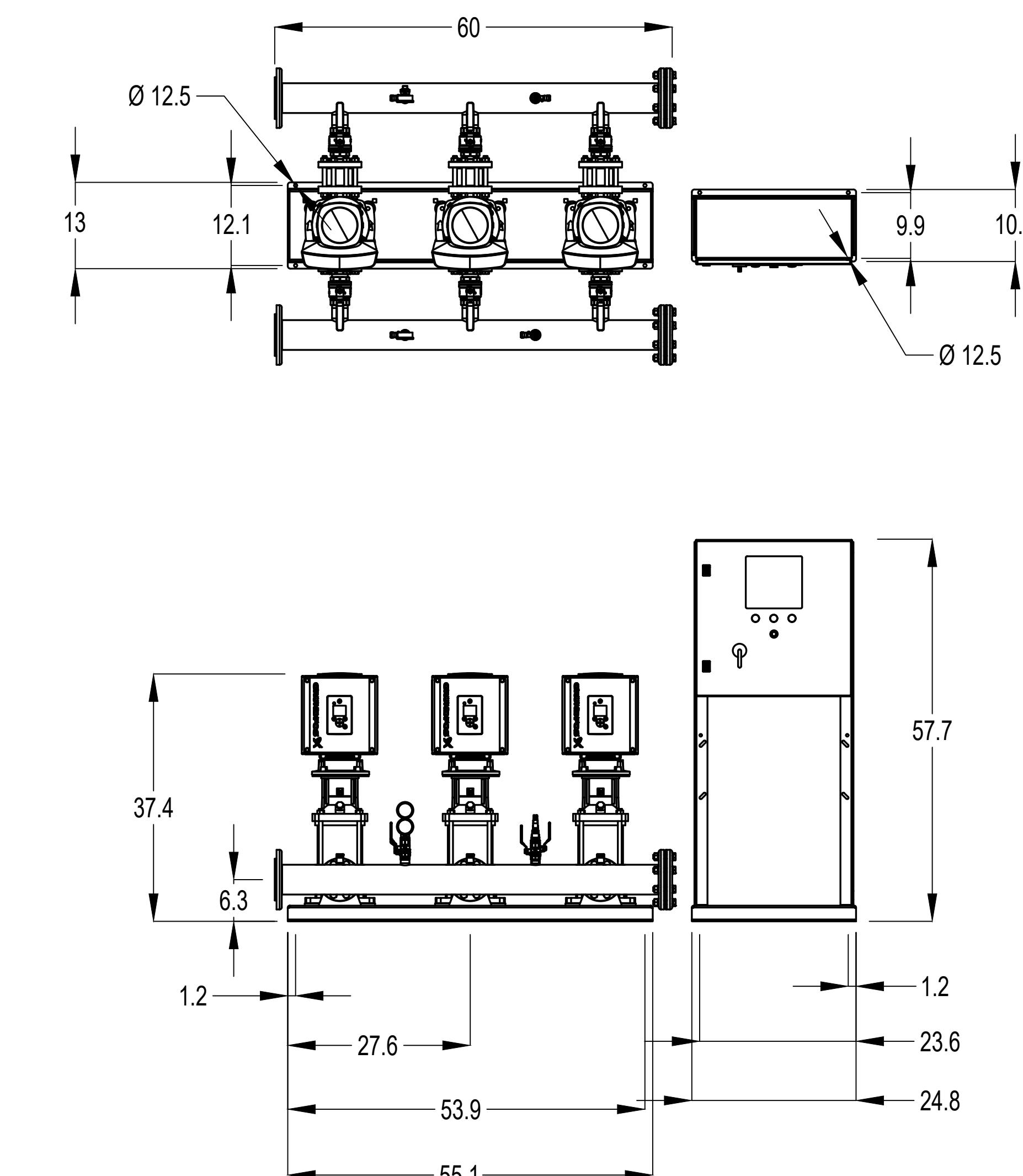
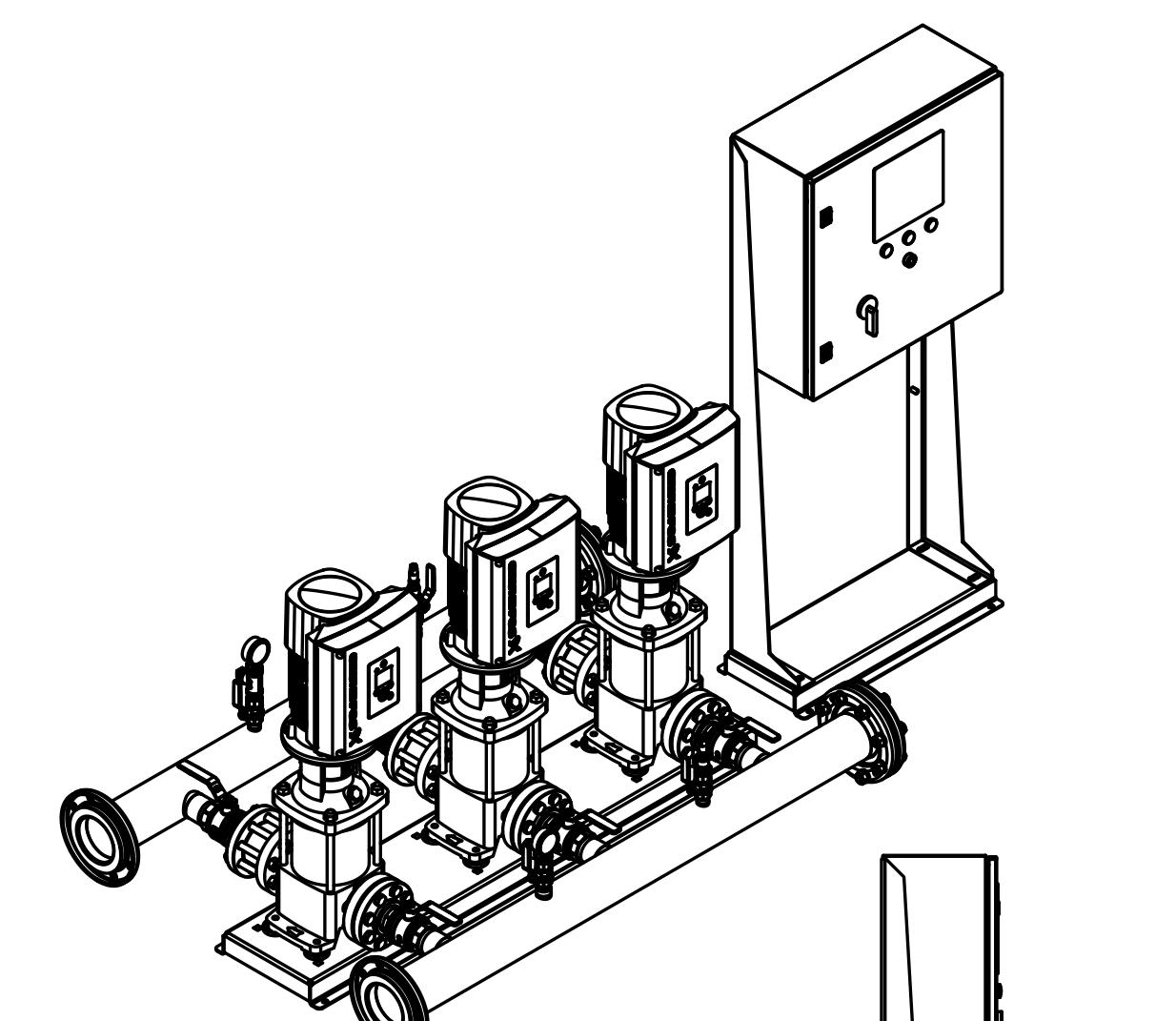
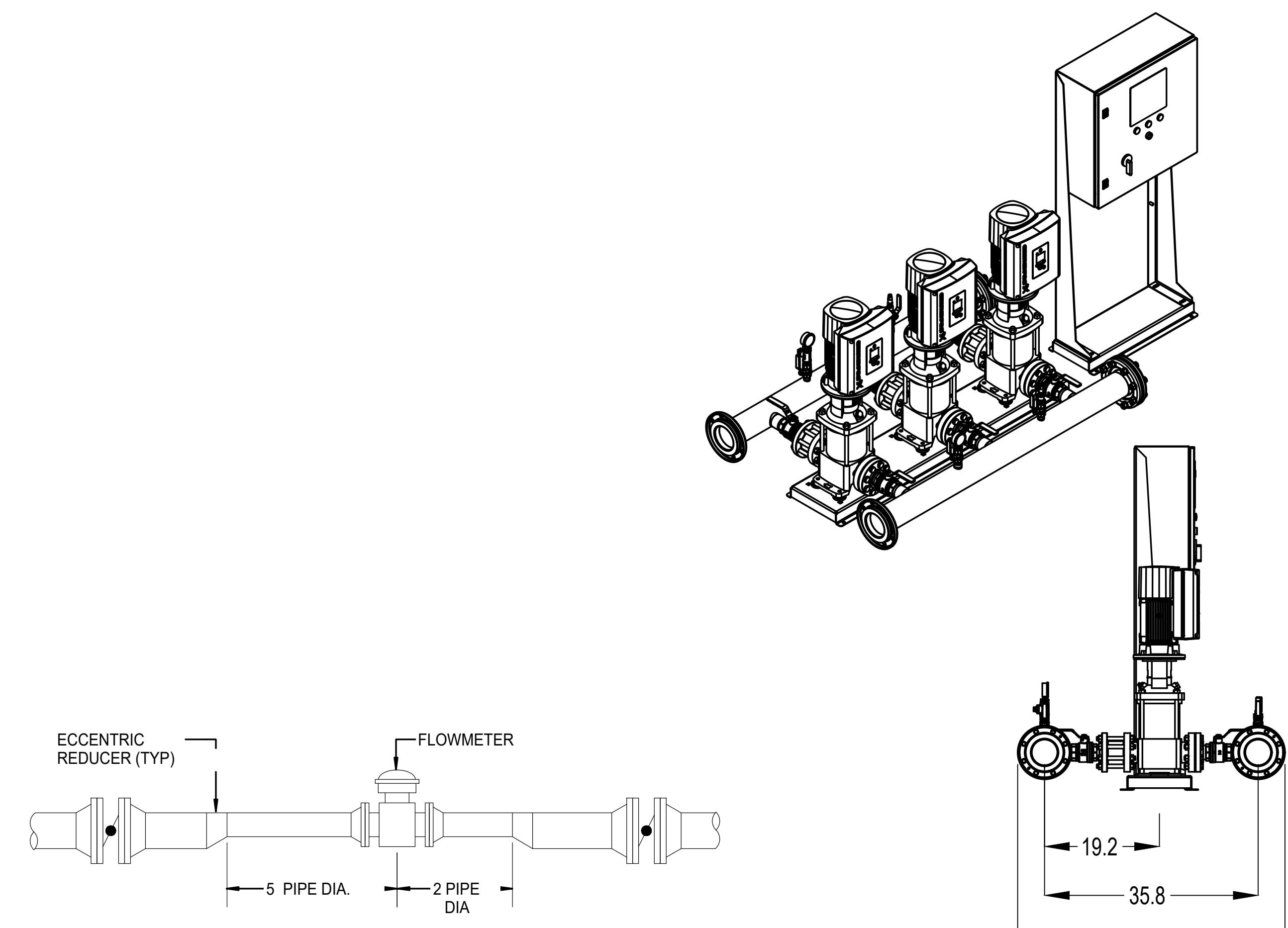
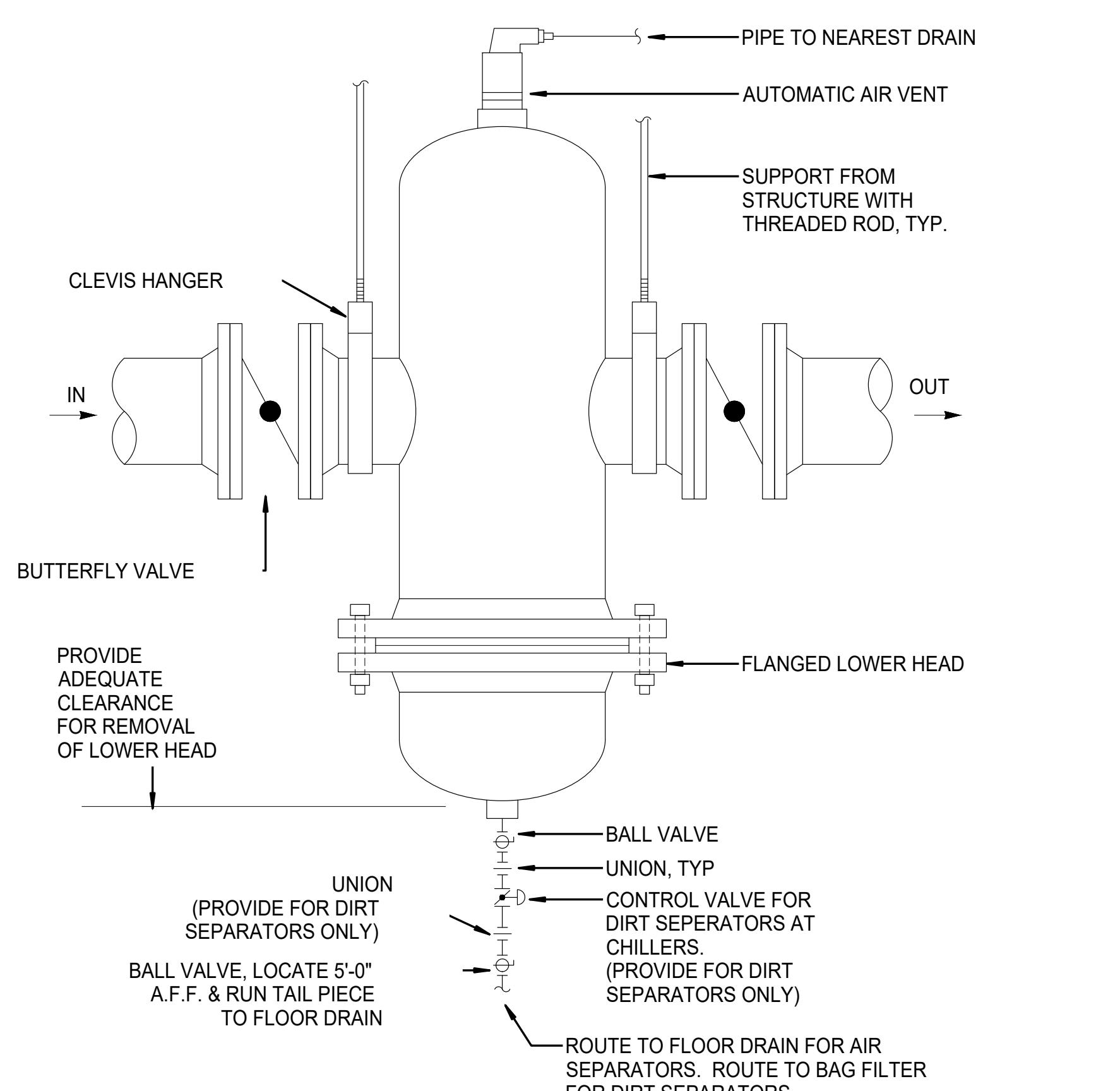
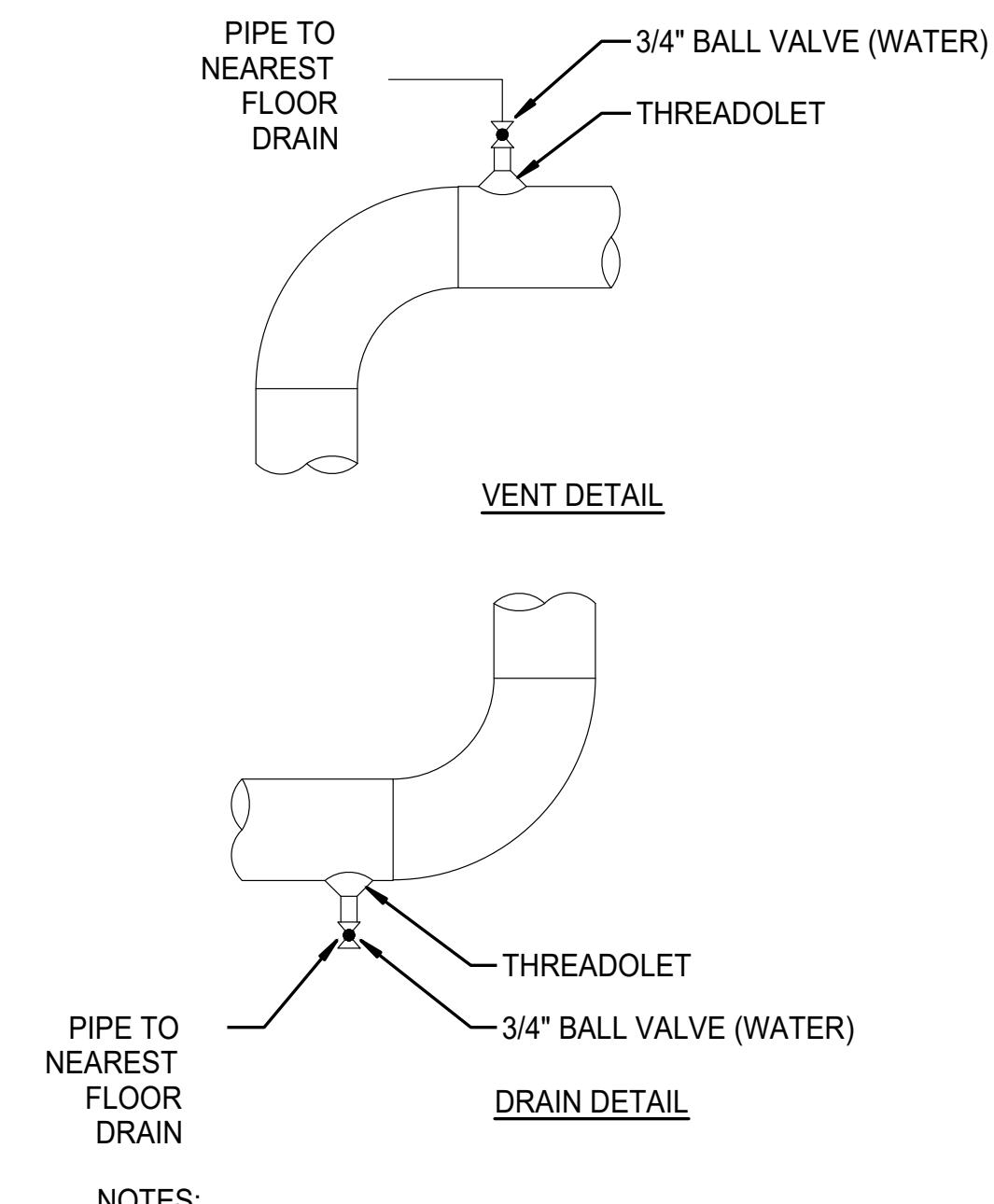
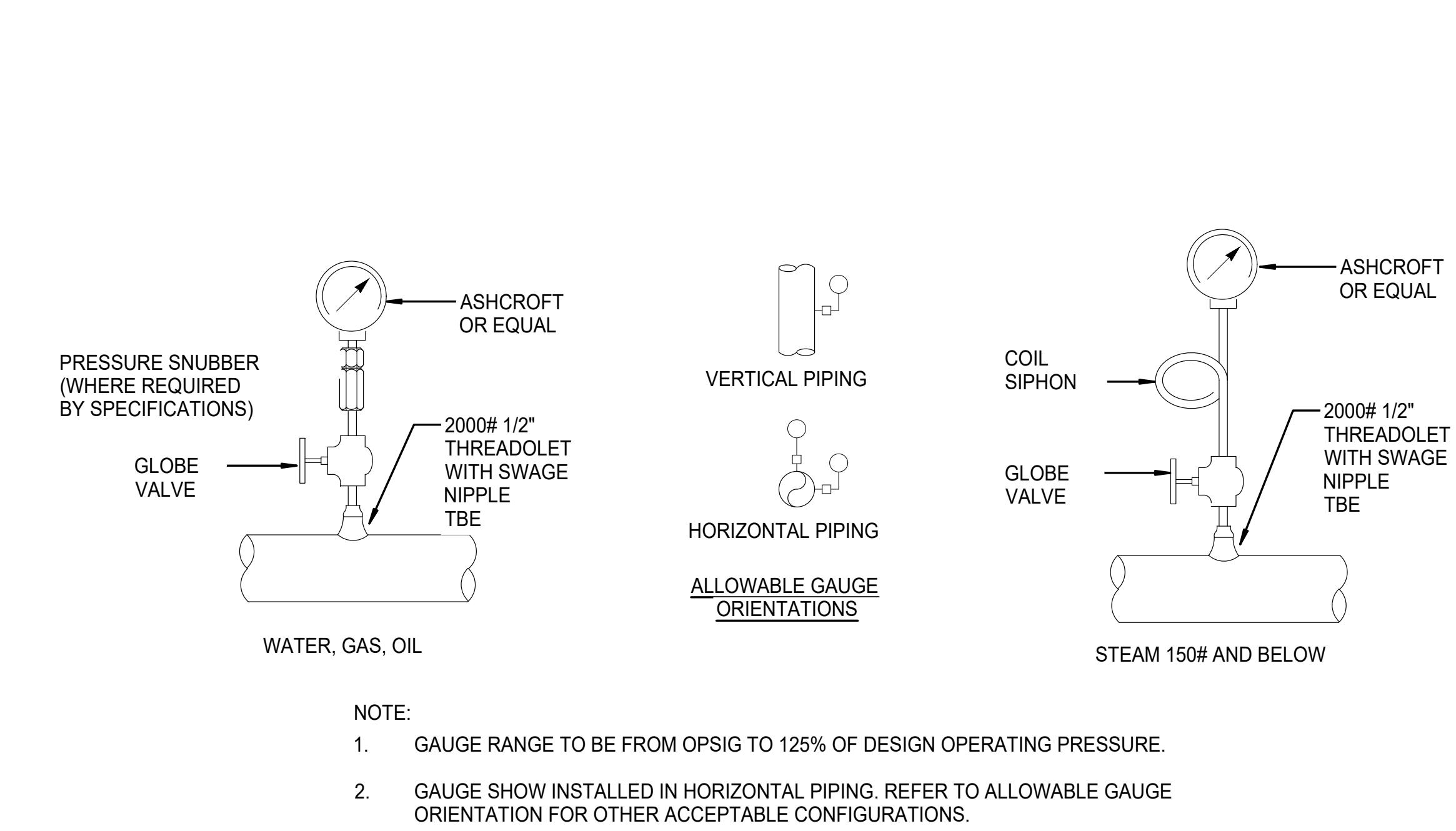
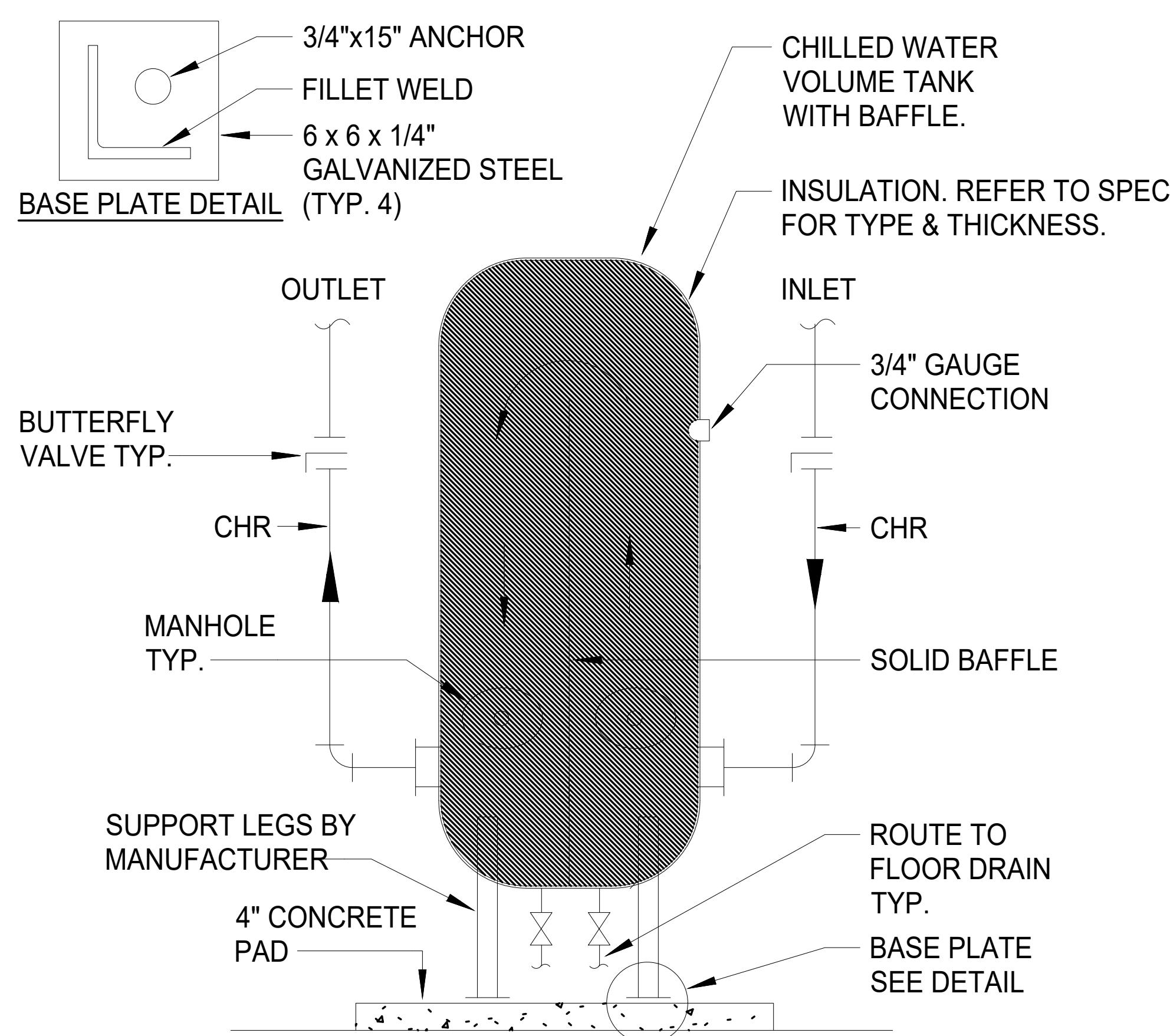
- 1 MODULATING 3-WAY WATER CONTROL VALVE
- 2 ISOLATION VALVE
- 3 THERMOMETER WELL
- 4 PRESSURE INDEPENDENT FLOW CONTROL VALVE
- 5 PETE'S PLUG
- 6 MANUAL AIR VENT (NEEDLE VALVE W/PLUG (CAP)) (IF COIL IS NON-AUTO VENTING TYPE)
- 7 3/4" DRAIN VALVE WHOSE ADAPTER & CAP (IF COIL IS NON-AUTO DRAIN TYPE)
- 8 UNION
- 9 BALL VALVE WITH HOSE ADAPTER & CAP
- 10 REMOVABLE CAP
- 11 "Y" STRAINER
- 12 ISOLATION VALVE W/MEMORY STOP (BALANCE)

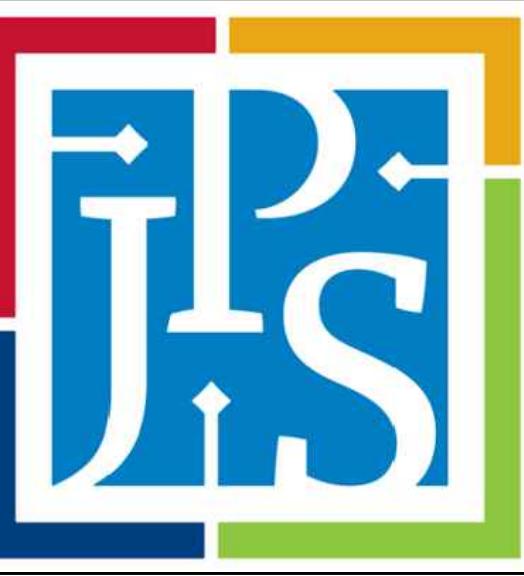
GENERAL NOTES:

1. REFER TO PLANS FOR LOCATIONS OF 3-WAY VALVES.
2. ALL COILS SHALL BE PIPED WITH WATER FLOW COUNTER TO AIR FLOW.
3. PIPE COILS WITH PROVISIONS FOR COIL AND FILTER REMOVAL & ACCESS.
4. PIPE DRAINS TO FLOOR DRAINS WHEN IN MECHANICAL ROOMS.
5. PROVIDE FOR AIR VENTS IN ALL HIGH POINTS OF PIPING AND DRAINS IN ALL LOW POINTS.
6. COIL DRAIN TO BE AT LOW POINT OF PIPING SYSTEM.
7. PIPE CONTROL VALVES AND OTHER VALVES WITH STEMS IN THE VERTICAL AND POINT UP.



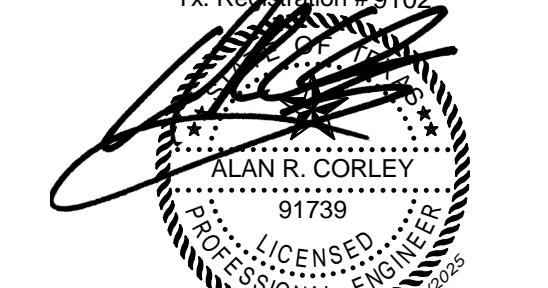
01 AIR-COOLED CHILLER DETAIL





ISSUES

REVISIONS



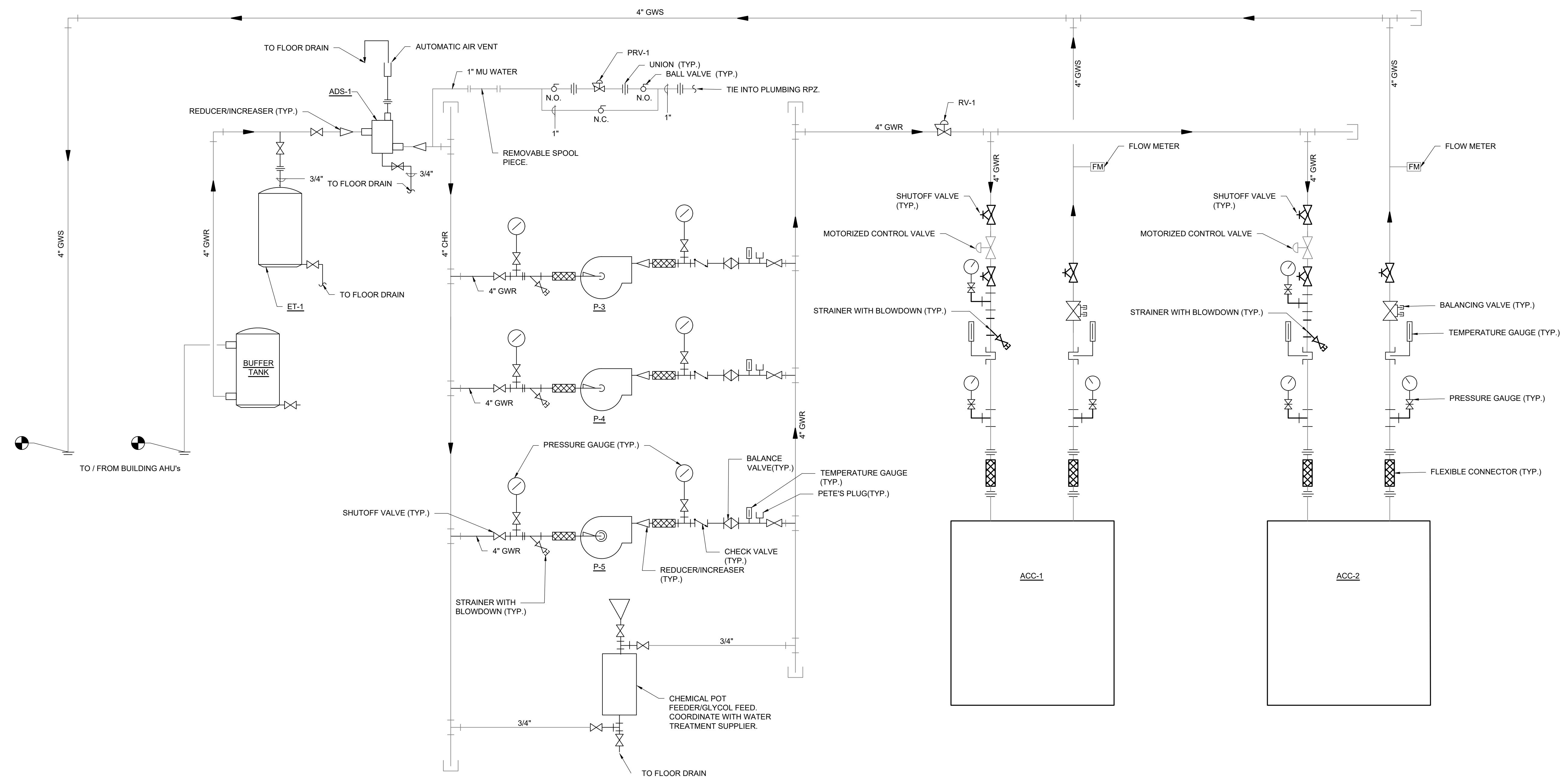
**JPS ARLINGTON SURGERY
OR HVAC REPLACEMENT PROJECT
4400 NEW YORK AVE.
ARLINGTON, TX 76018**

PROJECT #: 05194.09

SHEET TITLE:
MECHANICAL
DETAILS

SHEET #:

M-303



01 GLYCOL WATER PIPING FLOW DIAGRAM
SCALE: NONE



**JPS ARLINGTON SURGERY
OR HVAC REPLACEMENT PROJECT**
4400 NEW YORK AVE.
ARLINGTON, TX 76018

PROJECT #: 05194.09

SHEET TITLE:
MECHANICAL
SCHEDULES

SHEET #:

M-401

AIR-COOLED CHILLER SCHEDULE		
DESIGNATION	ACC-1	ACC-2
TYPE/REFRIGERANT	R-513A	R-513A
NOMINAL CAPACITY (TONS)	170	170
REFRIGERATION CAPACITY (TONS)	92.6	92.6
30% GLYCOL WATER FLOW (GPM)	237.7	237.7
30% GLYCOL WATER TEMP. IN (°F)	42.0	42.0
30% GLYCOL WATER TEMP. OUT (°F)	32.0	32.0
IPLV	16.83	16.83
EVAPORATOR		
MINIMUM GLYCOL WATER FLOW (GPM)	187	187
MAX. ALLOWABLE FOULING FACTOR (HR-SQ.FT. - °F/BTU)	0.000100	0.000100
WATER PD (FT H2O)	10.4	10.4
CONDENSER FAN(S)		
EDB CONDENSER AIR TEMPERATURE (°F)	115	115
NUMBER OF CONDENSER FAN	12	12
FAN POWER (kW)	10.69	10.69
COMPRESSOR		
COMPRESSOR TYPE	SCREW	SCREW
NUMBER OF COMPRESSORS	2	2
COMPRESSOR RLA EA (AMPS)	136	136
COMPRESSOR STARTER	VFD	VFD
UNIT ELECTRICAL DATA		
VOLTAGE/HZ/PHASE	460 / 3 / 60	460 / 3 / 60
UNIT POWER (kW)	179.0	179.0
MCA (AMPS)	321	321
MCOP (AMPS)	450	450
SHORT CIRCUIT CURRENT RATING (AMPS)	65,000	65,000
REFRIGERANT CHARGE		
NUMBER OF CIRCUITS	2	2
REFRIGERANT CHARGE PER CIRCUIT (LBS)	111.1 / 99.0	111.1 / 99.0
PHYSICAL DATA:		
DIMENSIONS L x W x H (INCH)	274 x 87 x 98	274 x 87 x 98
OPERATING WEIGHT (LBS)	10,200	10,200
MANUFACTURER	TRANE	TRANE
MODEL NUMBER	RTAF-170EU	RTAF-170EU
NOTES:		
1. PROVIDE CHILLER WITH STRUCTURAL HOUSEKEEPING PAD MINIMUM 6 INCH THICK AND MINIMUM 3 INCH LARGER THAN MOUNTED EQUIPMENT ON ALL SIDES.		
2. PROVIDE WIDE AMBIENT OPERATION RANGE (0-125 DEG F).		
3. PROVIDE AN ACCELERATED PERFORMANCE TEST AND SOUND TEST AT DESIGN CONDITIONS.		
4. PROVIDE FACTORY INSTALLED PROOF-OF-FLOW (FLOW SWITCH).		
5. PROVIDE FACTORY INSTALLED STRAINER WITH BLOW-DOWN.		
6. PROVIDE FACTORY INSTALLED EVAPORATOR HEATER FOR FREEZE PROTECTION. 120V CIRCUIT REQUIRED.		
7. MANUFACTURER SHALL PROVIDE FACTORY START-UP OF THE UNIT.		
8. PROVIDE FACTORY MOUNTED LOUVERED, GUARD PANELS.		
9. COMPLIANT WITH ASHRAE 90.1-2019.		
10. CHILLER EQUIPPED WITH ISOLATION VALVES TO STORE ENTIRE REFRIGERANT CHARGE IN CONDENSER OR PROVIDE RSR FOR ENTIRE REFRIGERANT CHARGE.		
11. CHILLER IS BEING PROVIDED BY CONTRACTOR.		
12. PROVIDE WITH SINGLE POINT OF ELECTRICAL POWER CONNECTION.		
13. DISCONNECT PROVIDED BY ELECTRICAL CONTRACTOR.		
14. COOLING MEDIUM IS 30% GLYCOL AND 70% WATER.		
15. CONTRACTOR SHALL PROVIDE A PLENUM RATED CURB. CONTRACTOR TO VERIFY REQUIREMENTS OF CURB ATTACHMENT PRIOR TO BIDDING. NEW UNITS HAVE A LARGER FOOTPRINT THAN THE EXISTING UNITS.		
16. CONTRACTOR TO PROVIDE PRE-MANUFACTURED STAIRS TO ACCESS THE VESTIBULE. FIELD VERIFY THE EXACT REQUIREMENTS.		

PUMP SKID SCHEDULE		
DESIGNATION	CWP-4 5.6	
SERVICE	30% GLYCOL CHW	
TYPE	VERTICAL MULTI-STAGE	
QUANTITY OF PUMPS	2 ACTIVE + 1 STANDBY	
GPM	237.7	
HEAD (FT)	100.0	
FULL LOAD EFFICIENCY, %	67.26	
RPM	3600	
MANIFOLD SIZE (IN)	4	
IMPELLER SIZE (IN)	FULL SIZE	
MAXIMUM PRESSURE (PSI)	67.55	
WEIGHT (LBS)	850	
HP	(3) 7.5	
VOLTAGE/HZ/PHASE	460 / 60 / 3	
DRIVE	DIRECT	
MANUFACTURER	GRUNDFOS	
PUMP MODEL	DELTA HCU CRE 20-3	
NOTES:		
1. PROVIDE A PRE-MANUFACTURED (BY PUMP MANUFACTURER) ENCLOSURE FOR PUMPING SKID, EXPANSION TANK, A/D SEPARATOR, GLYCOL FILL STATION, AND OTHER APPURTENCES. THE ENCLOSURE SHALL BE PRE-ASSEMBLED AND READY FOR CONNECT ON THE EXTERIOR OF THE ENCLOSURE, INCLUDING MAKEUP WATER.		
2. INSULATE ALL PIPING AND EQUIPMENT PER SPECIFICATIONS.		
3. PROVIDE 6" CONCRETE HOUSEKEEPING PAD FOR THE ENCLOSURE TO SIT ON.		
4. PROVIDE 6" EXTRAS ON EACH SIDE OF CONCRETE PAD.		
5. CONTRACTOR TO INSULATE ENCLOSURE WALLS. MIN. R-16.		
6. ENCLOSURE SHALL BE PROVIDED BY THE MANUFACTURER WITH A 2-TON PACKAGED AHU FOR HEATING AND COOLING.		

AIR/DIRT SEPARATOR SCHEDULE		
DESIGNATION	ADS-1	
SERVICE	GLYCOL WATER SYSTEM	
TOTAL SYSTEM FLOW (GPM)	237.7	
SHELL MATERIAL	CARBON STEEL	
MAX. PRESSURE (PSIG)	175	
MAX. TEMP. (DEG. F)	375	
PRESSURE DROP (FT H2O)	4	
ASME SECTION VIII. DIV. I	YES	
CONNECTION SIZE (INCH)	4	
WEIGHT (LBS)	250	
MANUFACTURER	GRUNDFOS	
SERIES	GBHR	
MODEL NO.	GBHR-040-W	
NOTES:		
1. FULL ACCEPTANCE BLADDER TYPE.		
2. ASME CERTIFIED.		
3. DIAPHRAGM MATERIAL - HEAVY DUTY BUTYL RUBBER.		
4. SYSTEM CONNECTED TO MATERIAL - FORGED STEEL.		
5. COOLING MEDIUM IS 30% GLYCOL AND 70% WATER.		

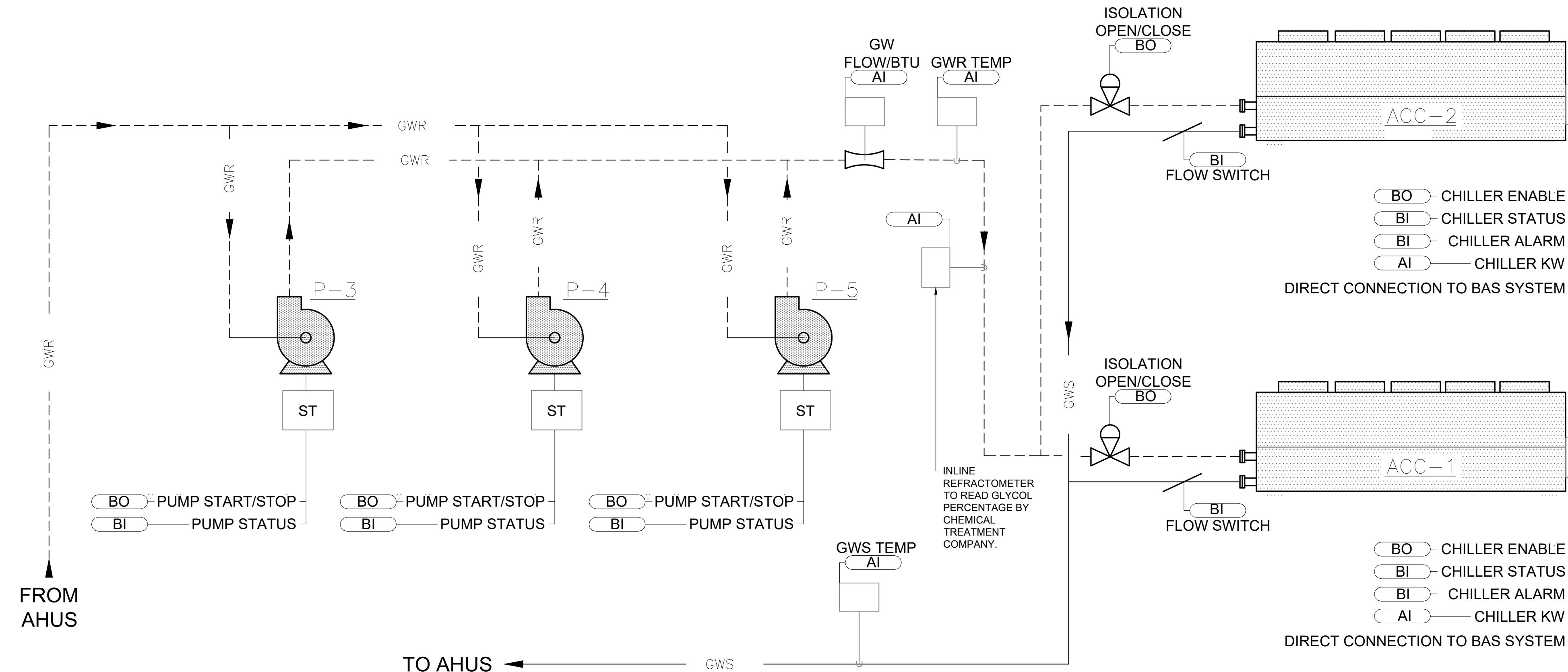
EXPANSION TANK SCHEDULE		
DESIGNATION	ET-1	
SERVICE	GLYCOL WATER SYSTEM	
TYPE	REMOVABLE BLADDER	
TANK VOLUME (GAL.)	23	
ACCEPTANCE VOLUME (GAL.)	23	
SHELL MATERIAL	CARBON STEEL	
MAX. PRESSURE (PSIG)	150	
MAX. TEMPERATURE (DEG. F)	240	
ASME SECTION VIII. DIV. I	YES	
FLOODED WEIGHT (LBS)	135	
MANUFACTURER	GRUNDFOS	
SERIES	GNLA-85	
NOTES:		

HYDRONIC PRESSURE REDUCING VALVE SCHEDULE		
DESIGNATION	PRV-1	
SERVES	GLYCOL WATER SYSTEM	
LOCATION	MECHANICAL ROOM	
SET PRESSURE (PSI)	15.8	
SIZE (IN)	1"	
MANUFACTURER	WATTS	
MODEL	LFU5B	
NOTES:		

AIR HANDLING UNIT SCHEDULE		
DESIGNATION	AHU-04	AHU-05
DESCRIPTION	CUSTOM ROOF MOUNTED VAV W/ VESTIBULE	CUSTOM ROOF MOUNTED VAV W/ VESTIBULE
AREA SERVED	OPERATING ROOMS	OPERATING ROOMS
LOCATION	ROOF	ROOF
TYPE	WATER COOLED	WATER COOLED
TOTAL CFM	10,000	7,000
DESIGN Q/A CFM	2,000	1,400
SUPPLY FAN		
TYPE	PLUNER FAN ARRAY W/ VFD PER FAN	PLUNER FAN ARRAY W/ VFD PER FAN
ESP (IN. WG)	3.0	3.0
TSP (IN. WG)	6.85	5.67
FAN RPM	4,404	3,978
TOTAL BHP	16.52	9.80
FAN QTY	4 (N-1)	4 (N-1)
DRIVE	DIRECT	DIRECT
EXHAUST FAN		
TYPE	PLUNER FAN ARRAY W/ VFD PER FAN	PLUNER FAN ARRAY W/ VFD PER FAN
ESP (IN. WG)	1.5	1.5
TSP (IN. WG)	2.04	1.76
FAN RPM	1,669	3,096
TOTAL BHP	4.94	4.19
FAN QTY	4 (N-1)	4 (N-1)
DRIVE	DIRECT	DIRECT
COOLING COIL		
COIL CFM	10,000	7,000
TOTAL CAPACITY (MBH)	652,517	457,973
SENS. CAPACITY (MBH)	400,662	280,714
MAX. FACE VELOC. (FPM)	516	336
ROWS/FACE	8 / 12	6 / 12
EAT DBWB (°F)	80.0	80.0
LAT DBWB (°F)	67.0	67.0
AIR PD (IN. WG)	1.12	0.46
EWT (°F)	32.0	32.0
MIN. LWT (°F)	42.0	42.0
GPM	136.61	95.63
WATER PD (FT H2O)	12.36	12.78
FILTERS		
PREFILTER MEDIA	2" - MERV-A13 PLEATED	2" - MERV-A13 PLEATED
EFFICIENCY	90%	90%
MID-LIFE DIRTY (IN.)	0.895	0.895
FINAL FILTER MEDIA (AFTER SUPPLY FAN)	15" - MERV-A15 BAG	15" - MERV-A15 BAG
EFFICIENCY	95%	95%
MID-LIFE DIRTY (IN.)	0.95	0.95
MAX. VEL. (FPM)	350	350
ELECTRICAL		
UNIT VOLT/HZ/TYP/PHASE	480 / 60 / 3	480 / 60 / 3
SUPPLY FAN ARRAY CIRCUIT		
FLA (PER VFD W/ VFD PER FAN)	4.8	4.8
MAX FUSE SIZE</		

SEQUENCE OF OPERATION	
GLYCOL WATER SYSTEM	
A. New chilled water system includes two chillers, chilled water pumping skid (3 pumps), new control panel and system controls. Existing chiller, pump skid, and control panel will be upgraded in order to perform sequence of operation as detailed below. New controls shall be BacNet compatible and be able of integrating into existing Building Automation System (BAS) and into future campus-wide Johnson control sys.	H. Alarm setpoints - Alarm signal shall be sent to BAS and chiller(s) shall be de-energized if one of the following conditions occur: 1. Chiller is commanded ON, but status is OFF. 2. Chiller is commanded OFF, but status is ON. 3. Chiller supply water temperature is greater than 38 deg. F (adj.). 4. Chiller supply water temperature is less than 28 deg. F (adj.). 5. Chilled water return temperature is greater than 50 deg. F (adj.). 6. Chilled water pump is commanded ON, but status is OFF. 7. Chilled water pump is commanded OFF, but status is ON. 8. Chilled water pump is commanded OFF, but status is ON. 9. Water flow through chiller is less than chiller minimum flow of 825 gpm. Confirm with chiller manufacturer. 10. If a chiller is operating and there is no flow as indicated by its associated flow switch.
B. Chiller(s) shall be controlled and monitored by a factory-provided stand-alone chiller control panel compatible with campus-wide building automation system (BAS). Existing chilled water system control software residing on Central Computer Workstation Central Plant shall be upgraded as required by this sequence of operation. All chiller control points listed in the control sequence shall be able to be remotely monitored and adjusted at the BAS workstation. Chillers and pumps are designed to be one run, one standby at all times.	I. Failure positions - When BAS component or power failure occurs: 1. Pumps shall remain in the last commanded state. 2. Chiller shall remain at the last commanded state. 3. Valves shall remain at the last commanded position.
C. System Off - When the system is off: 1. The chilled water and condenser water pumps shall be off. 2. The chillers shall be disabled. 3. The chillers' isolation valves shall be closed. 4. All control loops shall be disabled.	K. Indicate the following on the operator's workstation display terminal: 1. DDC system graphic. 2. DDC system status, ON/OFF. 3. Low-level cooling-tower sump alarm. 4. Outdoor temperature. 5. Chilled water pump(s) ON/OFF status (enabled or disabled). 6. Condenser water pump(s) ON/OFF indication (operating or not operating). 7. Condenser water flow indication. 8. Chilled water pump(s) ON/OFF status (enabled or disabled). 9. Chilled water pump(s) ON/OFF indication (operating or not operating). 10. Chilled water pump(s) ON/OFF indication (operating or not operating). 11. Chilled water flow indication. 12. Refrigeration machine ON/OFF indication (operating or not operating). 13. Chilled water supply temperature. 14. Chilled water return temperature. 15. Chilled water return temperature set-point adjustment. 16. Chiller(s) ON/OFF status (enabled or disabled). 17. Chiller(s) ON/OFF indication (operating or not operating). 18. Chiller "failure-to-start" indication. 19. Chiller(s) pump(s) ON/OFF status (enabled or disabled). 20. Chiller pressure drop through chiller. 21. Chilled water flow through chiller. 22. Chiller condenser water supply and return temperature. 23. Chiller chilled water supply and return temperature. 24. System capacity in tons.
D. Initiation of System Start-Up - The system shall be started: 1. By an operator manually entered command at the BAS. 2. Automatically by the BAS based on time schedule or demand by any of the air-handling units.	
E. System Operation - When the system start-up has been initiated, the following sequences shall be performed: 1. The BAS shall send an enable signal to the lead chiller. 2. Upon receiving the enable signal the chiller shall enable the chiller isolation valves. 3. The isolation valves shall be controlled to 100% open. 4. When the isolation valves are confirmed to be 100% open, the control system shall start the lead primary chilled water pump. 5. Once water flow has been proven through the lead chiller then the chiller shall start under control of its factory unit controller.	
F. Sequencing: 1. Chiller sequencing: a. Chillers and corresponding primary chilled water pumps shall be alternated as lead and lag chillers and pumps to evenly distribute run time. b. The lead chiller shall load up to 100% to maintain chilled water supply temperature. c. Monitor flow rate through the chiller(s) with water flow meter in the chilled water circuit. De-energize chiller and chilled water pumps when water flow rate through evaporator(s) is less than minimum scheduled value. Return to a single chiller operation when both chillers are at a minimum evaporator flow rate. d. Once the primary chiller has failed the control system shall shut down the failed chiller immediately close isolation valves and initiate the start of the next chiller in the rotation sequence. e. The control system shall control individual chiller setpoints to maintain the system supply water temperature at setpoint. 2. Chilled water pump sequencing: a. Primary chilled water pumps P-3 and P-4 shall be alternated as lead and lag pumps to evenly distribute run time.	
F. Setpoints - The chilled water setpoints for the system shall be determined as follows: 1. The chilled water supply temperature setpoint shall be set initially at 32 deg. F. (operator adjustable) with temperature differential of 10 deg. F. (adj.).	
G. Initiation of System Shutdown - System shutdown shall be initiated: 1. By operator entered manual command. 2. Automatically by the BAS based on a time schedule basis. 3. Local emergency power shut off switch is activated. If the emergency plant shutdown button is activated, provide for an orderly shutdown of all equipment within the Central Plant. Coordinate shutdown sequence of chillers with the chiller manufacturer.	

GLYCOL WATER SYSTEM POINT LIST										
POINT DESCRIPTION	POINT TYPE	GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	SOFTWARE POINTS	HARDWARE INTERLOCK	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	NOTES
OUTDOOR AIR TEMPERATURE	X	AI								
OUTDOOR AIR RELATIVE HUMIDITY	X	AI								
CHILLER START / STOP	X	BO								
CHILLER STATUS	X	BI								
CHILLER TIME	X	AI								CALCULATED VALUE
GLYCOL WATER SUPPLY TEMPERATURE	X	AI								
GLYCOL WATER RETURN TEMPERATURE	X	AI								
GLYCOL WATER SUPPLY TEMP. SETPOINT	X	AO								
GLYCOL PERCENTAGE	X	AI								
GLYCOL WATER FLOW RATE	X	AI	BO							CHILLER ISOLATION VALVE OPEN/CLOSE ALL POINTS & ALARMS
PUMPING SKID	X		X							
PRIMARY GP START / STOP	X	BO								
PRIMARY GP STATUS	X	BI								X PUMP FAILURE
GLYCOL FEED STATION	X	AI								
COMMON GLYCOL WATER SUPPLY TEMPERATURE	X	AI								
COMMON GLYCOL WATER RETURN TEMPERATURE	X	AI								



01 GLYCOL WATER SYSTEM CONTROL SCHEMATIC

SCALE: NONE

01 GLYCOL WATER SYSTEM CONTROL SCHEMATIC

SCALE: NONE



ISSUES

REVISIONS

Tx. Registration #9102

**JPS ARLINGTON SURGERY
OR HVAC REPLACEMENT PROJECT
4400 NEW YORK AVE.
ARLINGTON, TX 76018**

PROJECT #: 05194.09

MEET TITLE: MECHANICAL CONTROL DIAGRAM

M-502

SEQUENCE OF OPERATION

CONSTANT VOLUME (CAV) AIR-HANDLING UNIT

THIS SEQUENCE IS FOR GENERAL GUIDANCE. USE EXISTING SEQUENCES IF APPLICABLE.

- A. OCCUPIED MODE: ON A START COMMAND, SMOKE DAMPERS OPEN & SUPPLY FANS RUN CONTINUOUSLY DURING OCCUPIED MODE. THE OUTSIDE AIR IS CONTROLLED BY THE CONTROLS SYSTEM VIA SUPPLY AND RETURN AIR FAN TRACKING TO MAINTAIN OUTSIDE AIR QUANTITY AND BUILDING POSITIVE PRESSURE (0.01" W.G., ADJUSTABLE). THE COIL VALVE AND THE HEATING COIL ARE MODULATED TO MAINTAIN UNIT SUPPLY FAN TEMPERATURE.
- B. SAFETY SHUTDOWN OF THE FANS. THE CONTROL SYSTEM SHUTS DOWN THE FANS IN THE FOLLOWING ORDER:
 1. LOW COOLING COIL TEMPERATURE DETECTION: ON A FALL IN TEMPERATURE FROM THE COOLING COIL TEMPERATURE SETPOINT (35°), THE CONTROL SYSTEM SHALL SHUTDOWN. THE OUTSIDE AIR DAMPER SHALL CLOSE, THE CHILLED WATER COIL VALVE SHALL OPEN AND THE HEATING WATER CONTROL VALVE SHALL OPEN. THE COOLING COIL TEMPERATURE PROTECTION INDICATOR AT THE CONTROL PANEL MUST BE MANUALLY RESET.
 2. SMOKE DETECTION: DUCT SUPPLY AND RETURN SMOKE DETECTORS SHALL ACTIVATE THE RETURN FANS VIA THE HARDWIRED INTERLOCK WHENEVER THE PRESENCE OF SMOKE IS DETECTED. THE OUTSIDE AIR DAMPERS SHALL CLOSE, THE CHILLED WATER COIL VALVE SHALL CLOSE, THE HEATER WATER CONTROL VALVE SHALL CLOSE, THE RELIEF DAMPERS SHALL CLOSE. TO RESTART THE FANS, THE SMOKE DETECTORS AND THE COOLING COIL TEMPERATURE PROTECTION INDICATOR MUST BE MANUALLY RESET.
- C. SUPPLY AIR TEMPERATURE CONTROL: PREHEATING COIL WILL BE ACTIVE TO RAISE THE OUTSIDE AIR TEMPERATURE TO 50F WHEN IN HEATING MODE. CHILLED WATER COIL VALVE WILL BE MODULATED TO CONTROL LEAVING TEMPERATURE TO 54F. GLYCOL COIL WILL MODULATE TO RAISE THE OUTSIDE AIR TEMPERATURE TO 50F WHEN IN COOLING MODE.
- D. VARIABLE FREQUENCY DRIVE (VFD) CONTROL. THE DIFFERENTIAL PRESSURE TRANSMITTER, LOCATED AS SHOWN ON PLANS, WILL WORK TOGETHER WITH THE DIFFERENTIAL PRESSURE TRANSMITTER TO PROVIDE INFORMATION TO THE VFD. THE VFD WILL VARY THE AIR HANDLER SUPPLY FAN SPEED TO MAINTAIN A CONSTANT (ADJUSTABLE) STATIC PRESSURE WITHIN THE MEDIUM PRESSURE DUCTWORK, SETPOINT DETERMINED BY THE TAB.
- E. VENTILATION AIR CONTROL: REFER TO TABLE 1 BELOW. A CONTROL ALGORITHM WILL MONITOR THE CARBON DIOXIDE SENSORS (LOCATED ON PLANS) ONCE EVERY 5 MINUTES AND WILL SHUTDOWN THE OUTDOOR AIR DAMPER WHENEVER THE CO2 LEVEL EXCEEDS THE SCHEDULED VALUES TO MAINTAIN THE CRITICAL ZONE SETPOINT (ZONE WITH THE HIGHEST CO2 LEVEL), WHICH IS 500 PPM (ADJUSTABLE) ABOVE THE OUTDOOR AIR LEVEL.

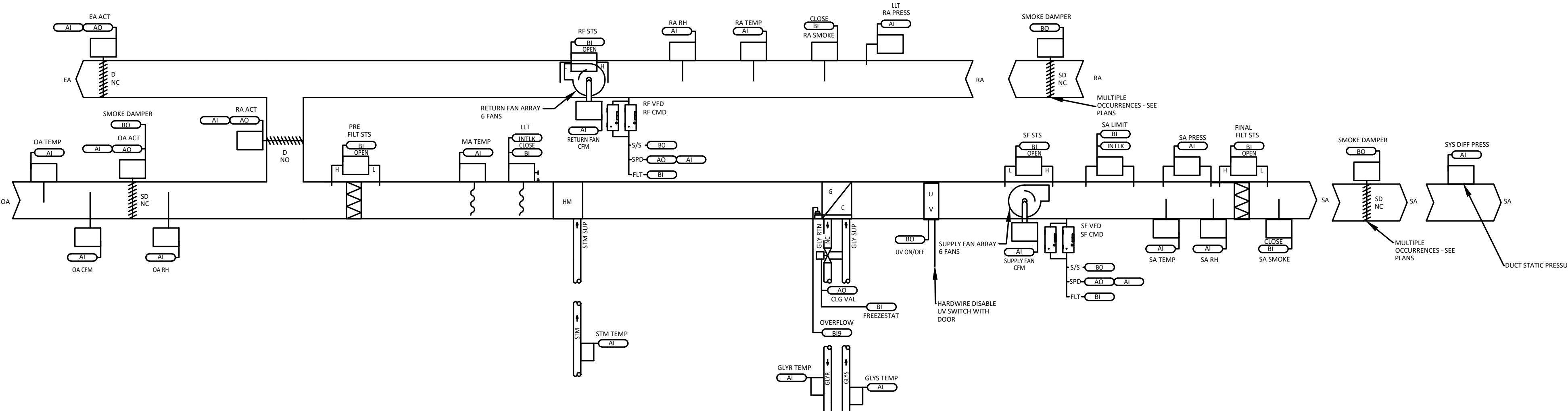
MINIMUM CFM	MAXIMUM CFM	OA DAMPER MIN. POSITION	OA DAMPER MAX. POSITION
AS SCHEDULED	AS SCHEDULED	DET. BY TAB	DET. BY TAB

TABLE 1 - OUTSIDE AIR CFM RESET

AT NO POINT WILL THE SYSTEM ALLOW THE BUILDING PRESSURE TO GO NEGATIVE.

- F. ECONOMIZER CONTROL: THE ECONOMIZER SHALL BE ENABLED WHENEVER:
 1. OUTSIDE AIR TEMPERATURE IS LESS THAN 65° F (ADJUSTABLE)
 2. AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE
 3. AND THE SUPPLY FANS ARE ENABLEDWHEN ECONOMIZER IS ENABLED AND THE AIR HANDLING UNIT IS IN COOLING MODE, THE ECONOMIZER DAMPER SHALL MODULATE BETWEEN ITS MINIMUM POSITION AND ITS MAXIMUM POSITION TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.
THE ECONOMIZER SHALL BE DISABLED AND ECONOMIZER DAMPER SHALL MAINTAIN ITS MINIMUM POSITION WHENEVER:
 1. THE MIXED AIR TEMPERATURE FALLS BELOW THE LOW TEMPERATURE LIMIT (38 DEG. F (ADJUSTABLE))
 2. OR THE FREEZESTAT ALARM IS ENABLED
 3. OR THE SUPPLY FANS ARE DISABLED
- G. FILTER CONDITION: FILTER CONDITION IS MONITORED BY A PRESSURE GAUGE AND A DIFFERENTIAL PRESSURE SWITCH. WHEN THE PRESSURE DROP ACROSS THE FILTER REACHES THE SWITCH SETPOINT, THE SWITCH ENABLES AN ALARM AT THE CONTROL SYSTEM.
- H. FAN CONDITION: IF THE CONTROLS SYSTEM DETECTS FAN FAILURE, AN ALARM SHALL BE SENT TO THE BAS.
- I. LOW TEMPERATURE ALARM: AN ALARM SHALL BE SENT TO THE BAS IF THE OUTSIDE AIR TEMPERATURE FALLS TO OR BELOW 40F.
- J. ECONOMIZER CONTROL: IF THE OUTSIDE AIR TEMPERATURE IS BETWEEN 50° F AND 65° F (ADJUSTABLE), AND THE RETURN AIR ENTHALPY IS GREATER THAN THE OUTSIDE AIR ENTHALPY, THE AIR HANDLING UNIT SHALL OPERATE IN ECONOMIZER MODE. THE OUTSIDE AIR DAMPERS SHALL BE MODULATED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE RELIEF DAMPERS SHALL MODULATE TO MAINTAIN THE SPACE PRESSURE SETPOINT. IF THE RETURN DAMPERS ARE FULLY OPEN AND THE SUPPLY AIR TEMPERATURE CAN NOT BE MAINTAINED, THEN THE CHILLED WATER COIL SHALL MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT.
- K. ULTRAVIOLET LIGHTING SHALL BE ENGAGED WHEN THE UNIT IS RUNNING.

POINT DESCRIPTION	POINT TYPE					ALARMS			NOTES
	GRAPHIC	DIGITAL INPUT	DIGITAL OUTPUT	SOFTWARE POINT	DIGITAL INTERLOCK	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	
SUPPLY FAN START / STOP	X		BO						
SUPPLY FAN SPEED COMMAND	X		AO						
SUPPLY FAN SPEED FEEDBACK	X	AI							
SUPPLY FAN STATUS	X	BI							AIRFLOW PROOF
SUPPLY FAN VFD FAULT	X	BI							
SUPPLY FAN CFM	X	AI							
RETURN FAN START / STOP	X		BO						
RETURN FAN SPEED COMMAND	X		AO						
RETURN FAN SPEED FEEDBACK	X	AI							
RETURN FAN STATUS	X	BI							AIRFLOW PROOF
RETURN FAN VFD FAULT	X	BI							
RETURN FAN CFM	X	AI							
DUCT STATIC PRESSURE LOCAL	X	AI							X
DISCHARGE AIR HIGH STATIC LIMIT	X	BI							X
DISCHARGE AIR TEMPERATURE	X	AI							HARDWIRE SHUTDOWN
GLYCOL COOLING COIL VALVE COMMAND	X		AO						
GLYCOL SUPPLY TEMPERATURE	X	AI							
GLYCOL RETURN TEMPERATURE	X	AI							
FREEZESTAT	X	BI							X
MIXED AIR TEMPERATURE LOCAL	X	AI							
MIXED AIR LOW TEMPERATURE CUTOUT ALARM	X	BI							
STEAM HUMIDIFIER VALVE COMMAND	X		AO						
RETURN AIR TEMPERATURE	X	AI							
RETURN AIR RELATIVE HUMIDITY	X	AI							
RETURN AIR PRESSURE LOW LIMIT SENSOR	X	AI							
SYSTEM DIFFERENTIAL PRESSURE SENSOR	X	AI							
RETURN AIR DAMPER COMMAND	X		AO						
RETURN AIR DAMPER POSITION	X	AI							
RELIEF AIR DAMPER COMMAND	X		AO						
RELIEF AIR DAMPER POSITION	X	AI							
OUTSIDE AIR DAMPER COMMAND	X		AO						
OUTSIDE AIR DAMPER POSITION	X	AI							
OUTSIDE AIR TEMPERATURE	X	AI							
OUTSIDE AIR CFM	X	AI							
OUTSIDE AIR RELATIVE HUMIDITY	X	AI							
CONDENSATE OVERFLOW INPUT	X	BI							X
SUPPLY AIR TEMPERATURE	X	AI							
SUPPLY AIR RELATIVE HUMIDITY	X	AI							
SUPPLY AIR SMOKE ALARM	X	BI							
RETURN AIR SMOKE ALARM	X	BI							
SMOKE DAMPER COMMAND (MULTIPLE)	X		BO						
DISCHARGE AIR TEMPERATURE SETPOINT	X	AI							
PREFILTER STATUS	X	BI							X
FINAL FILTER STATUS	X	BI							X
UV LIGHT ON/OFF	X		BO						
HUMIDIFIER	X			X		X			ALL POINTS TO BMS



01 CAV AIR HANDLING UNIT AHU-04 & AHU-05 CONTROL DIAGRAM
