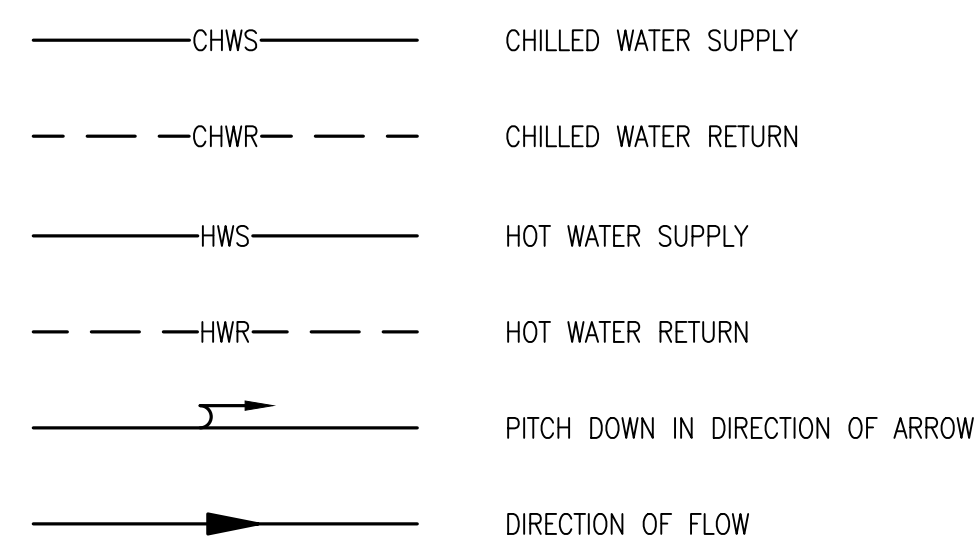


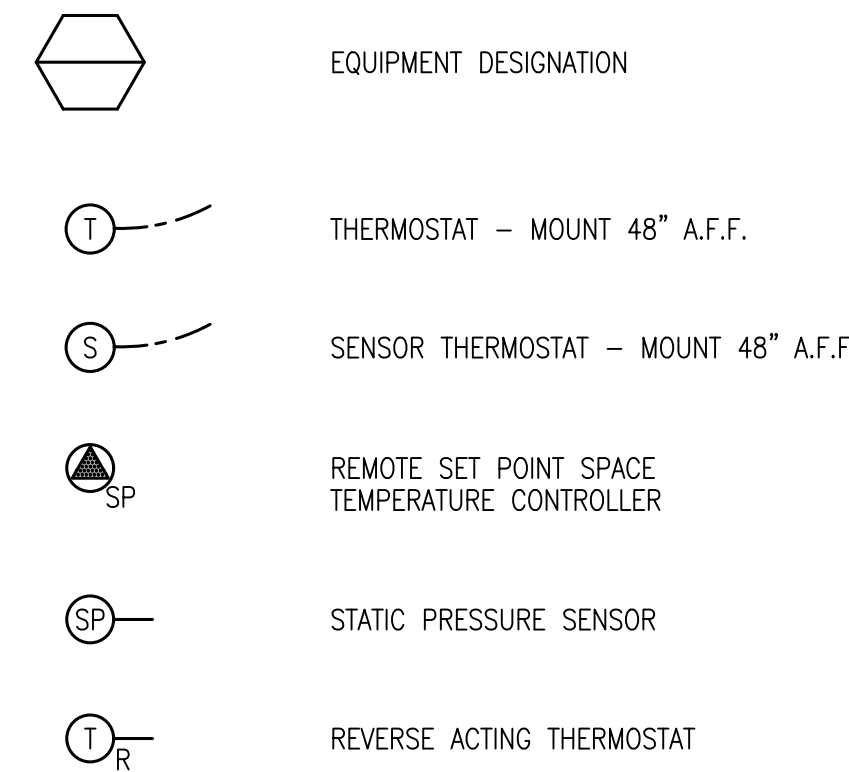
ABBREVIATIONS

ACC	AIR COOLED CHILLER	GPM	GALLONS PER MINUTE
AD	ACCESS DOOR	HVAC	HEATING, VENTILATING & AIR CONDITIONING CONTRACTOR
AFG	ABOVE FINISHED GRADE	LAT	LEAVING AIR TEMP. DEGREES F.
AFF	ABOVE FINISHED FLOOR	LWT	LEAVING WATER TEMP. DEGREES F.
AP	ACCESS PANEL	MAX	MAXIMUM
AS	AIR SEPARATOR	MIN	MINIMUM
ATC	TEMPERATURE CONTROL CONTRACTOR	OA	OUTSIDE AIR
CFM	CUBIC FEET PER MINUTE	P	PUMP
CO	CLEAN OUT	PC	PLUMBING CONTRACTOR
CP	CONDENSATE PUMP	PD	PRESSURE DROP (FEET OF WATER)
DB	DRY BULB TEMP. DEGREES F.	VFD	VARIABLE FREQUENCY DRIVE
EAT	ENTERING AIR TEMP. DEGREES F.	WB	WET BULB TEMP. DEGREES F.
EC	ELECTRICAL CONTRACTOR		
ET	EXPANSION TANK		
EWI	ENTERING WATER TEMP. DEGREES F.		
GC	GENERAL CONTRACTOR		

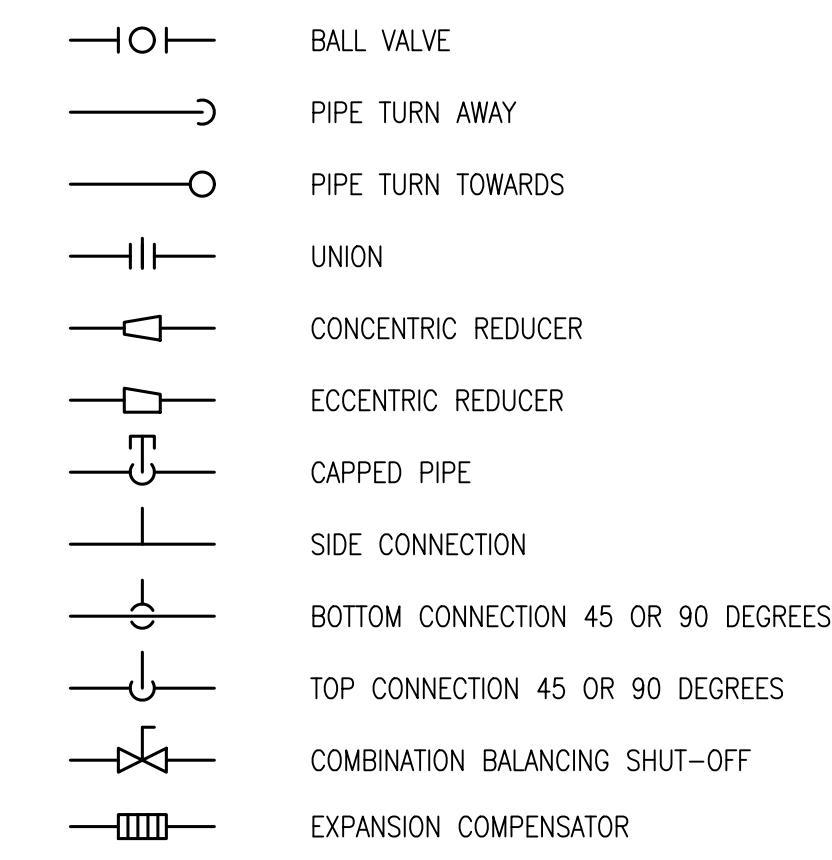
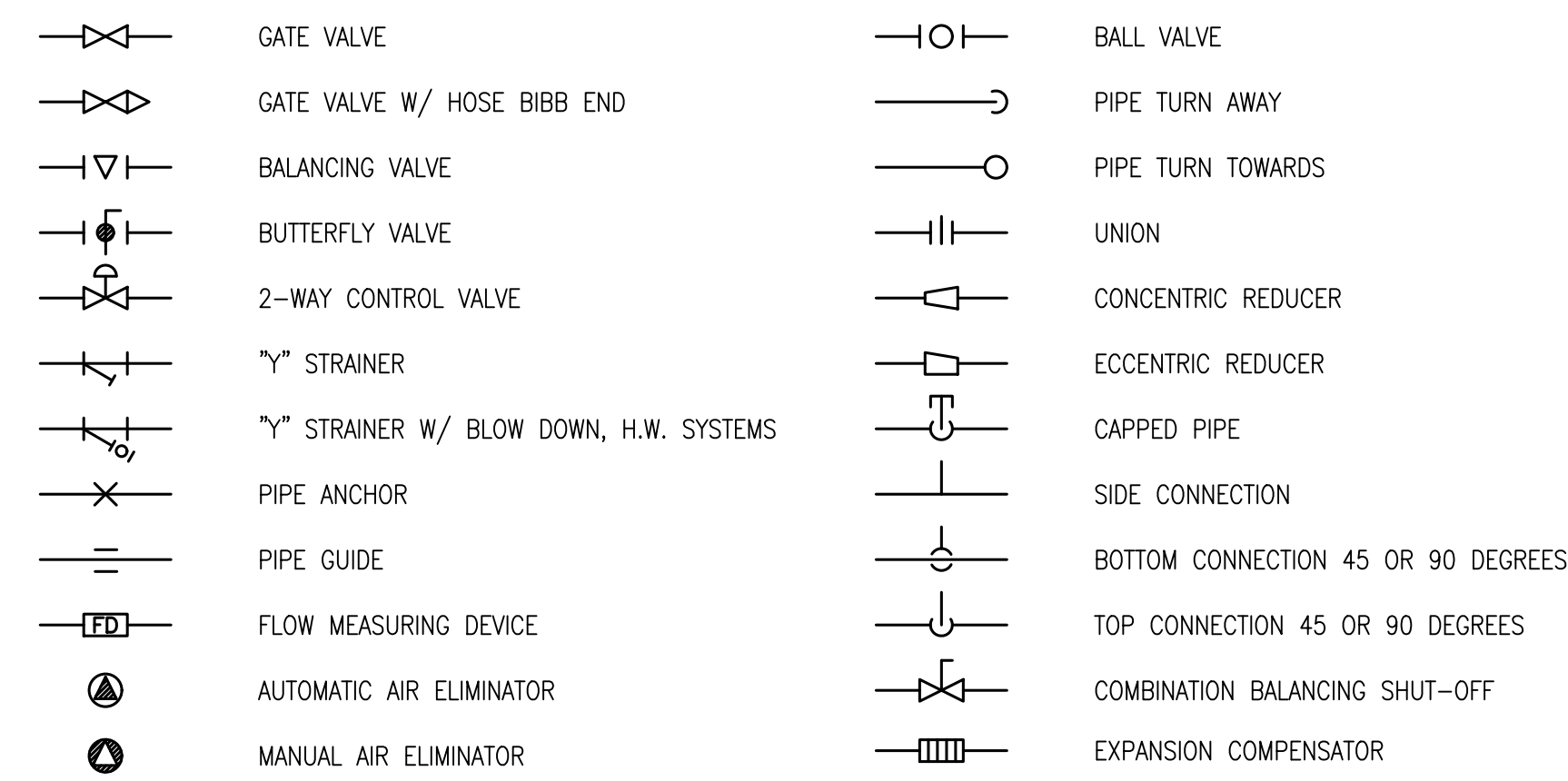
PIPING



GENERAL



VALVES



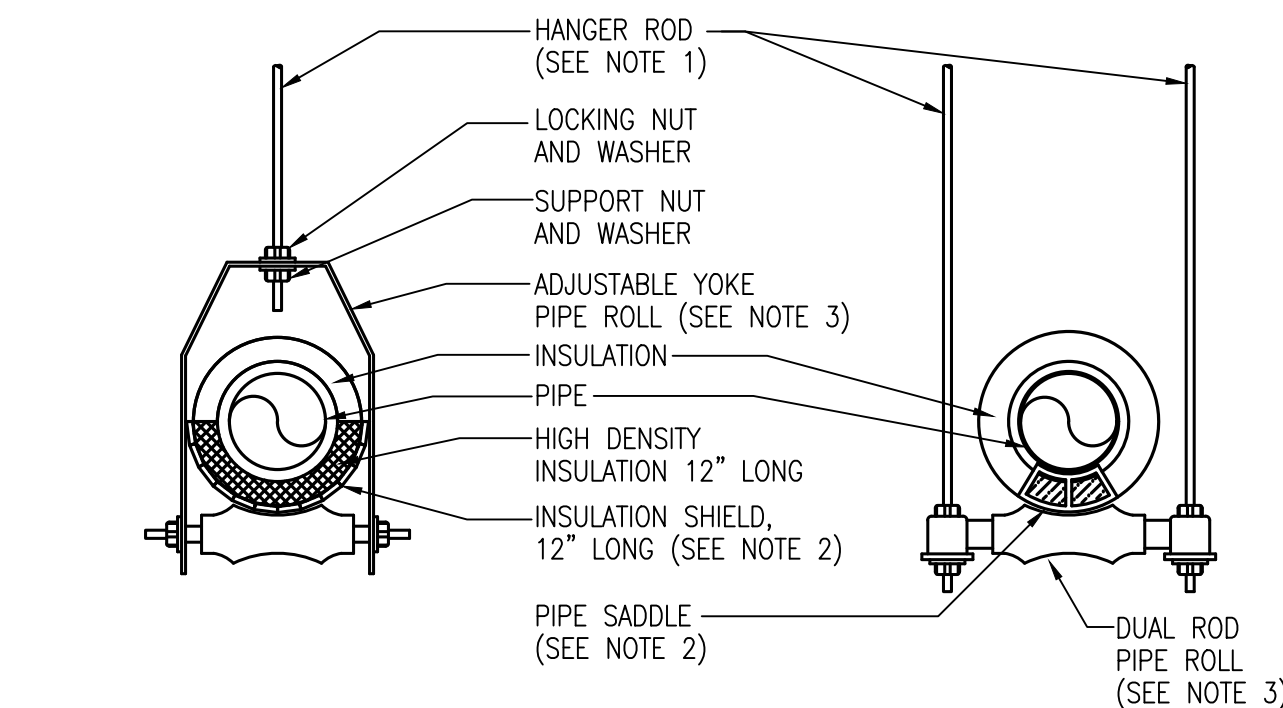
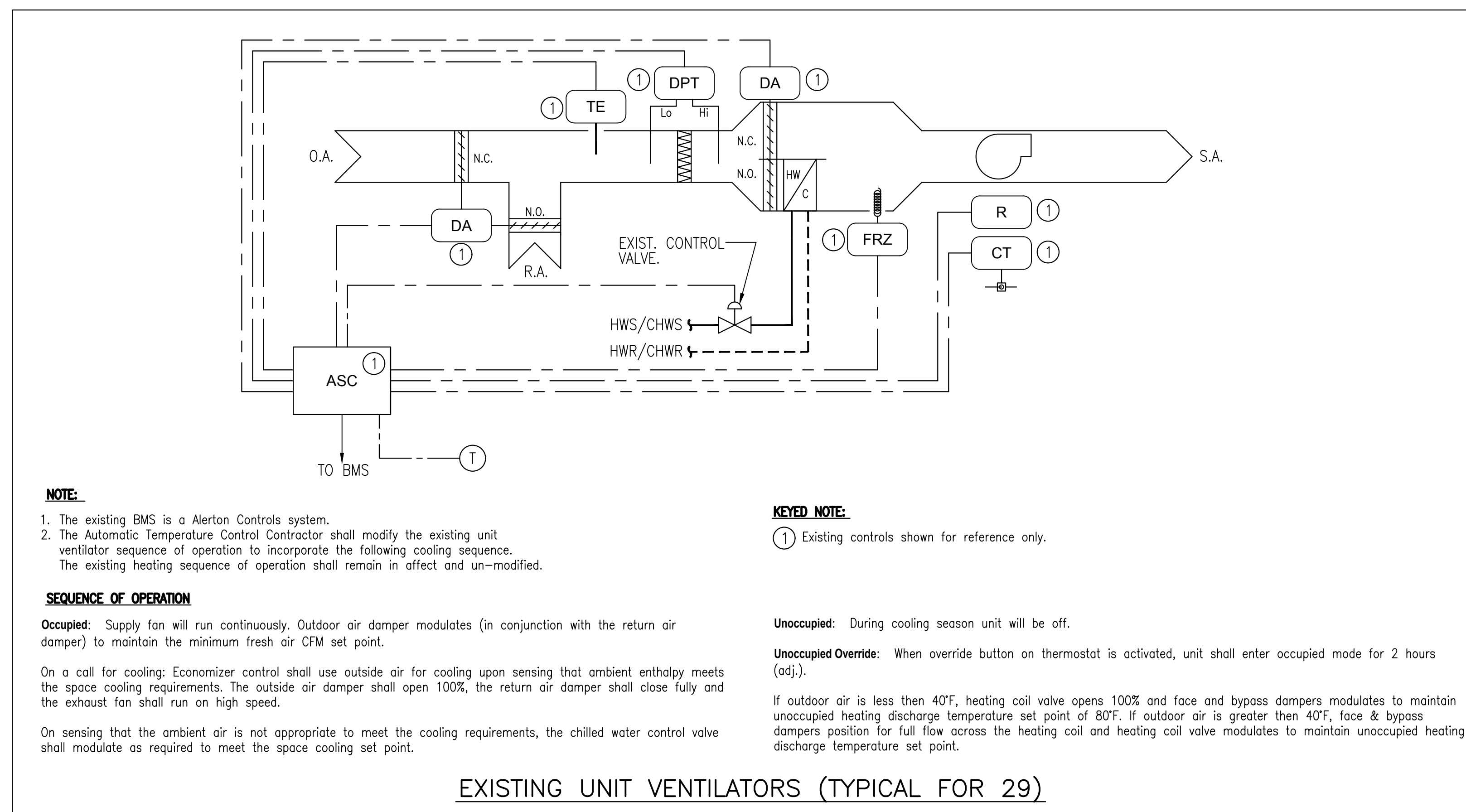
AIR COOLED CHILLER UNIT SCHEDULE

ITEM	MFG'R	MODEL	NOM. CAPACITY TONS	AMBIENT TEMP.	REFRIG. TYPE	COMPRESSOR DATA				CONDENSER FAN DATA				CHILLED WATER				ELECTRICAL DATA				INPUT kW	IPLV (EER)	SOUND DATA		REMARKS
						NO.	RLA	LRA	FLA (EA)	NO.	LRA (EA)	FLA (EA)	GPM	EWI	LWT	PD	VOLTS	Ø	HZ	MCA	MOCIP			SOUND PRESS. dB(A)@30'		
ACC-1	TRANE	CGAM 100	98.93	95.0°F	R410A	4	41.9 EA	260 EA	8	N/A	N/A	236.7	54.0°F	44.0°F	12.5'	460	3	60	206.5	225	114.4	15.4	68		(2)	

- (1) ACCEPTABLE ALT. MANUFACTURERS: YORK/JCI, DAIKIN OR APPROVED EQUAL.
 (2) CHILLER SHALL BE FURNISHED WITH UNIT MOUNTED DISCONNECT AND SERVICE OUTLET.

MECHANICAL CONTROL SEQUENCES - LEGEND

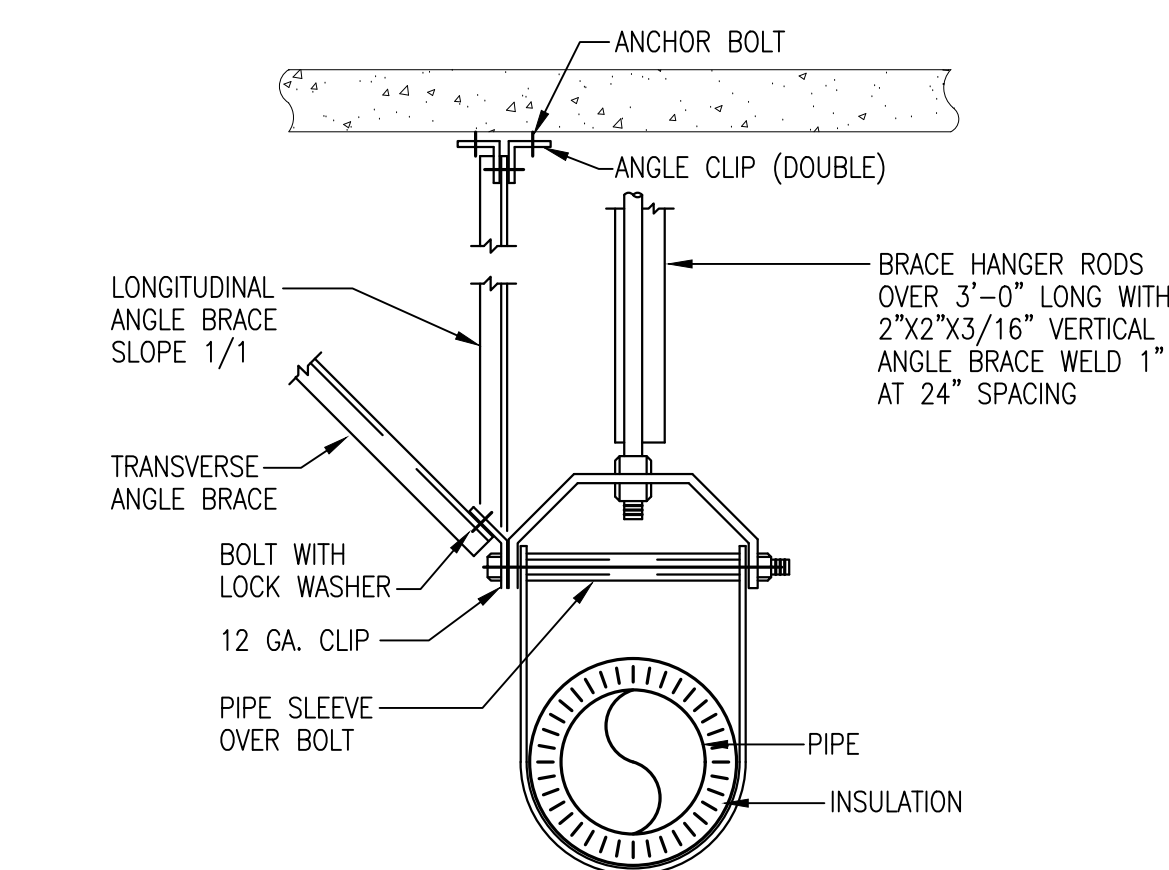
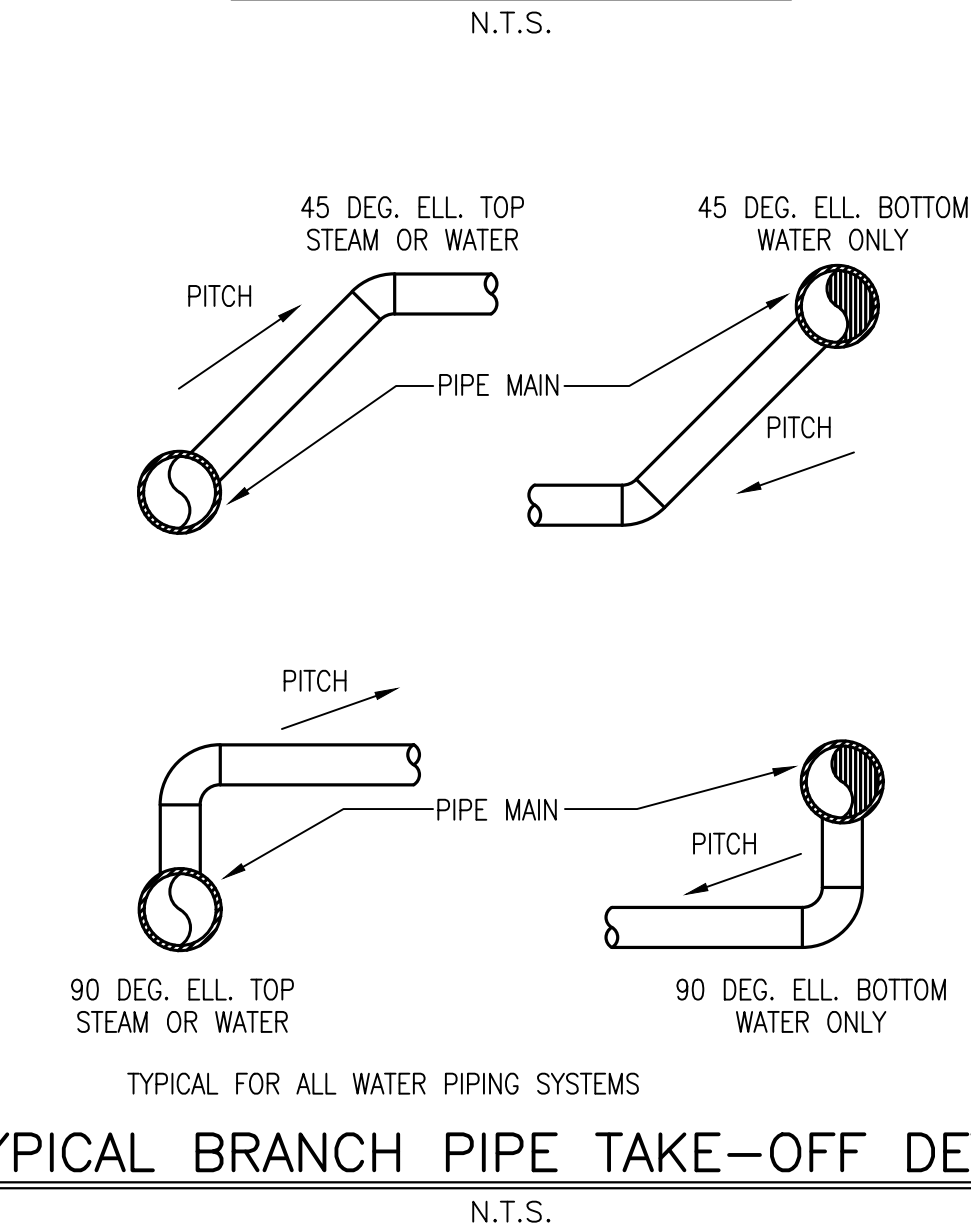
ATC	= AUTOMATIC TEMPERATURE CONTROLS	HT	= IN DUCT COMBINATION HUMIDITY/TEMPERATURE SENSOR
BMS	= BUILDING MANAGEMENT SYSTEM	SD	= SMOKE DETECTOR, INSTALLED BY MECHANICAL CONTRACTOR, FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR
2-W	= 2-WAY CONTROL VALVE	R	= RELAY, SPDT
UAT	= USER ADJUSTABLE THERMOSTAT	DA	= DAMPER ACTUATOR
TS	= BLANK STAINLESS STEEL WALL PLATE THERMISTOR SENSOR	DPT	= DIFFERENTIAL PRESSURE TRANSDUCER
DP	= DIFFERENTIAL PRESSURE SWITCH SET @ 1"WC	VFD	= VARIABLE FREQUENCY DRIVE
FRZ	= FREEZESTAT	RA	= REVERSE ACTING THERMOSTAT
CT	= SPLIT CORE CURRENT SENSOR	ASC	= APPLICATION SPECIFIC CONTROLLER FURNISHED BY ATC
TE	= INDUCT TEMPERATURE SENSOR		



HANGER ROD SCHEDULE		HANGER ROD SPACING	
PIPE SIZE	ROD SIZE	PIPE SIZE	MAX. ALLOWABLE SPACING
4"	5/8" DIA.	4"	10'
5"	5/8" DIA.	5"	10'
6"	3/4" DIA.	6"	10'
8"	7/8" DIA.	8"	10'
10"	7/8" DIA.	10"	10'
12"	7/8" DIA.	12"	10'

- NOTE:**
 1. REFER TO "TYPICAL METHOD OF SECURING HANGER RODS DETAIL" FOR ATTACHING HANGERS TO THE STRUCTURE.
 2. PROVIDE INSULATION SHIELD OR PIPE SADDLE BASED ON THE PIPING SYSTEM AND PIPE SIZE AS INDICATED IN THE SPECIFICATIONS.
 3. ADJUSTABLE YOKE PIPE ROLL SHALL BE USED ON 4" AND 5" PIPING. ON ALL PIPING 6" AND LARGER USE DUAL ROD PIPE ROLL.

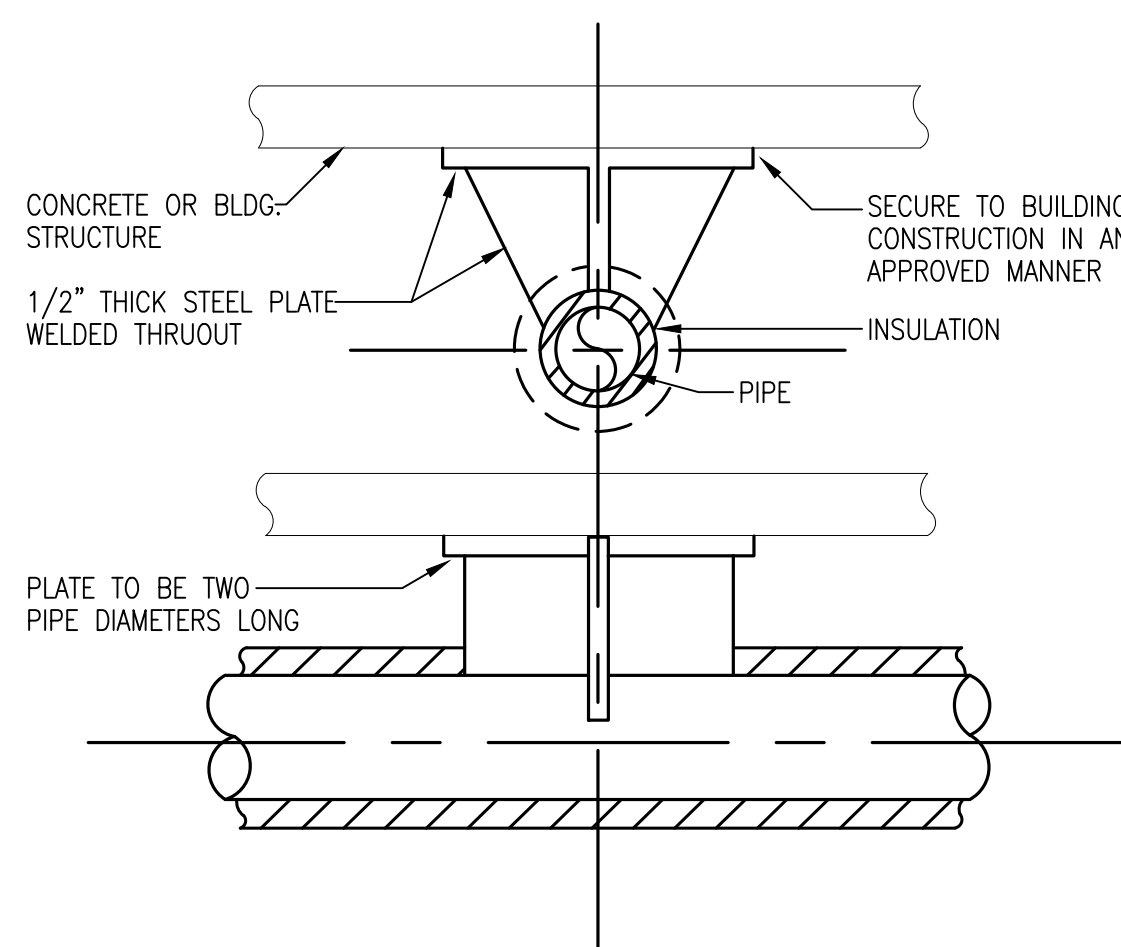
PIPE ROLL TYPE PIPE HANGER INSTALLATION DETAIL



PIPE SIZE	* ANGLE BRACE	BOLT TO ANGLE	ANGLE CLIP	ANCHOR BOLT OR INSERT
2-1/2"	2"x2" 16 GA.	3/8"	3"x3"x1/4"	3/8"
3-1/4"	2-1/2"x2-1/2" 16 GA.	3/8"	3"x3"x1/4"	1/2"
5", 6"	2-1/2"x2-1/2" 16 GA.	1/2"	5"x3"x1/2"	3/4"
8"	3"x3" 12 GA.	5/8"	2-5"x3"x1/2"	2-5/8"
10"	3"x3" 12 GA.	3/4"	2-5"x3"x1/2"	2-3/4"

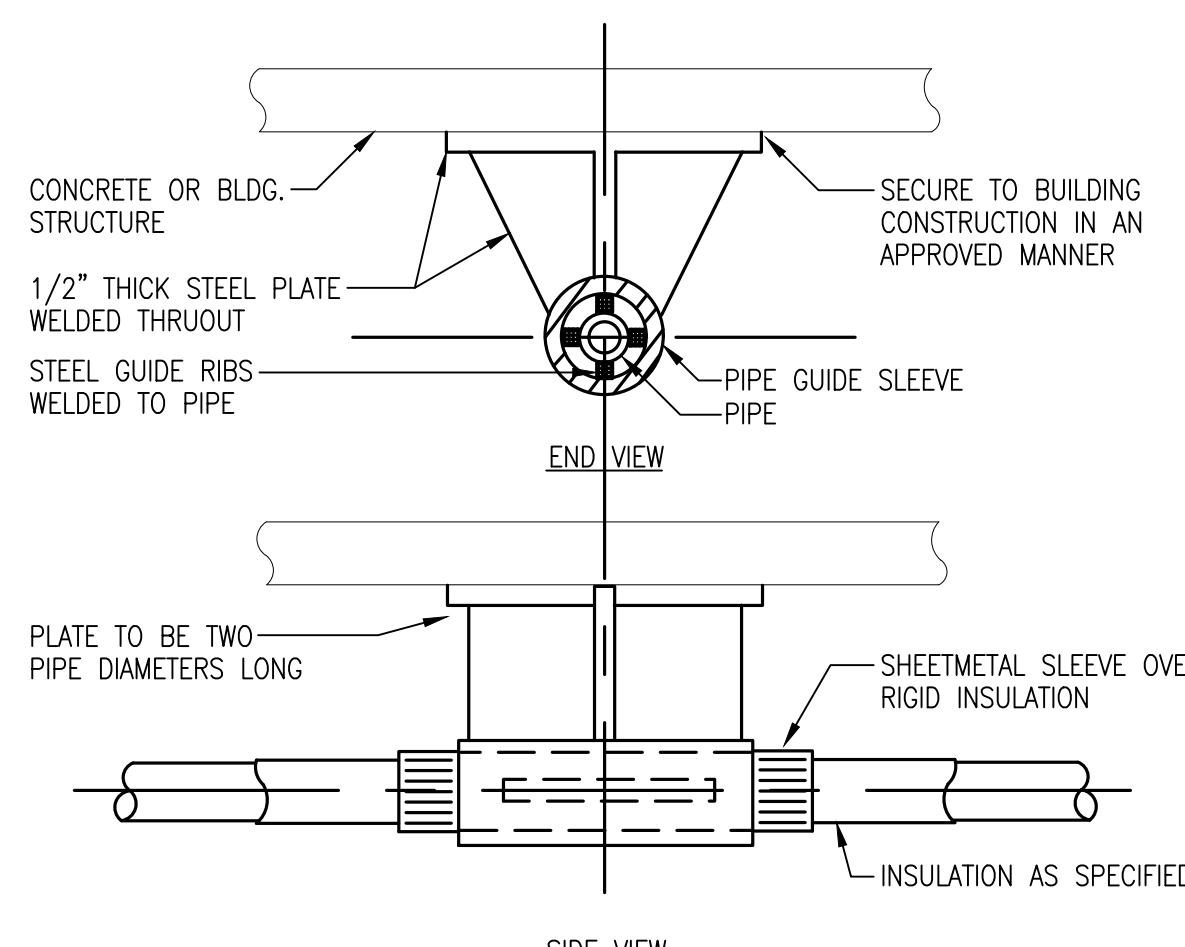
* 1 5/8 X 1 5/8 X 12 GAGE CHANNEL MAY BE USED.

TYPICAL SEISMIC BRACING FOR PIPE DETAIL



- NOTES:**
 1. CONCRETE ATTACHMENTS SHALL BE HILTI OR APPROVED EQUAL.
 2. STEEL ATTACHMENTS SHALL BE WELDED OR BOLTED.
 3. FOR PIPES W/ CENTERLINE LESS THAN 18" BELOW SLAB OR BEAM

PIPE ANCHOR DETAIL



- NOTES:**
 1. CONCRETE ATTACHMENTS SHALL BE HILTI OR APPROVED EQUAL.
 2. STEEL ATTACHMENTS SHALL BE WELDED OR BOLTED.
 3. FOR PIPES W/ CENTERLINE LESS THAN 18" BELOW SLAB OR BEAM.

PIPE GUIDE DETAIL

DALLIN ELEMENTARY SCHOOL CHILLER PROJECT

Town of Arlington, Massachusetts

Notes:

North Arrow

Keyplan

Mechanical Legend, Details and Schedules

**DALLIN
 ELEMENTARY
 SCHOOL
 CHILLER
 PROJECT**
 Town of Arlington,
 Massachusetts

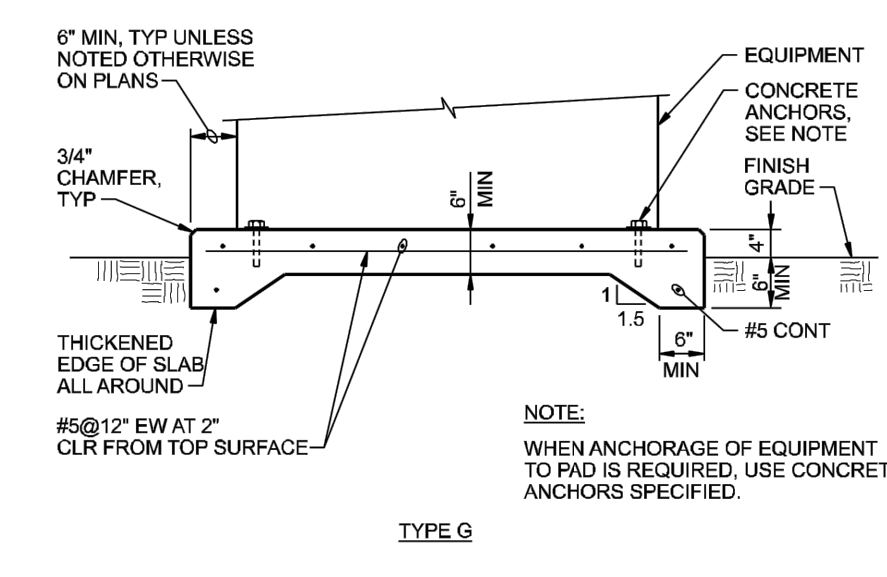
Notes:

MECHANICAL CONTRACTOR SHALL EXCAVATE AREA TO INSTALL NEW PRE-INSULATED PIPING IN THIS AREA AND SHALL PROPERLY BACKFILL, COVER AND GRADE AREA AFTER INSTALLATION AND PRESSURE TESTING OF PIPING.

ELECTRICAL CONTRACTOR SHALL CONFIRM EXACT LOCATION OF INTEGRAL DISCONNECT SWITCH IN FIELD.

MECHANICAL CONTRACTOR SHALL VERIFY SERVICE CLEARANCE REQUIREMENTS WITH CHILLER MANUFACTURER PRIOR TO INSTALLATION OF FENCE. TYPICAL FOR ALL SIDES.

CONCRETE PAD BY MECHANICAL CONTRACTOR COORDINATE PAD REQUIREMENTS WITH CHILLER MANUFACTURER. REFER TO PAD DETAIL (THIS DWG).



- NOTES:**
- PAD SIZE SHALL BE MINIMUM INDICATED OR AS SHOWN ON THE PLANS OR AS INDICATED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER.
 - THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE DETERMINED BY THE EQUIPMENT MANUFACTURER AND AS APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE HELD IN POSITION WITH A TEMPLATE OR OTHER ACCEPTABLE MEANS, MATCHING THE BASE PLATE, WHILE PAD IS BEING PLACED.
 - ANCHOR BOLT SLEEVES SHALL BE USED TO PROVIDE MINIMUM ANCHOR BOLT MOVEMENT OF 1/2" IN ALL HORIZONTAL DIRECTIONS. THE MINIMUM SLEEVE LENGTH SHALL BE 8 TIMES THE BOLT DIAMETER.
 - ANCHOR BOLT SLEEVES SHALL HAVE A MINIMUM INTERNAL DIAMETER 1" GREATER THAN BOLT DIAMETER AND A MAXIMUM INTERNAL DIAMETER 2" GREATER THAN ANCHOR BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT AFTER BOLT'S ARE ALIGNED.
 - EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS INDICATED OTHERWISE.
 - WEDGES, SHIMS, OR LEVELING NUTS SHALL BE USED TO SUPPORT THE BASE WHILE THE NON-SHRINK GROUT IS PLACED. WEDGES OR SHIMS THAT ARE LEFT IN PLACE SHALL NOT BE EXPOSED TO VIEW.
 - HEIGHT OF PADS SHALL BE MINIMUM REQUIRED FOR ANCHOR BOLT CLEARANCE TO KEEP ANCHOR BOLT ABOVE SUPPORTING SLAB (SEE TABLE BELOW). WHERE EQUIPMENT OR PIPING ELEVATION REQUIRE PAD HEIGHT LESS THAN THE MINIMUM SHOWN, USE TYPE 'B' EQUIPMENT PAD WITH BLOCKOUT.
 - AT CONTRACTOR'S OPTION, CONCRETE ANCHORS MAY BE USED IN LIEU OF CAST-IN-PLACE ANCHOR BOLTS FOR EQUIPMENT ANCHORS BOLTS LESS THAN 3/4" DIAMETER WHEN APPROVED BY THE EQUIPMENT MANUFACTURER AND APPROVED BY THE ENGINEER. ANCHORS SHALL BE INSTALLED WITH 4" MINIMUM EDGE DISTANCE IN EACH DIRECTION.

AB DIA (IN.)	1/2	5/8	3/4	7/8	1	1 1/4	1 3/8	1 1/2	1 3/4	2
MIN PAD HT (IN.)	7	8 1/2	10	11	12 1/2	15	16 1/2	18	21	24

Sequence of Operation

Air-Cooled Chiller

- The chiller plant shall be controlled by a networked DDC system. Functions shall include chiller sequencing, chilled water pump speed control and monitoring of all sensors.
 - All set points given in written sequence(s) of operation shall be field adjustable and subject to software reset.
 - Local chiller control panel provided by the chiller manufacturer shall control all operating functions associated with starting, stopping and unloading of the chiller. All safety and high/low limits shall be interlocked within the local chiller control panels.
 - Communication between BMS and chiller shall be via BACnet interface to the chiller's digital control panels. Chiller shall be brought on line via a signal from the DDC system in addition, chilled water set point and demand limit levels shall be controlled by the DDC system.
 - The DDC system shall enable chilled water plant operation whenever outdoor ambient temperature is above 65°F (adj.) and a requirement for chilled water exists from the air handling units.
 - The DDC system shall continuously monitor chilled water demand and enable and stage chiller capacity as needed.
 - The DDC system shall be capable of resetting chilled water supply temperature via operator command from the system front end. Normal chilled water supply temperature shall be 44°F.
- Chiller Start Sequence:**
- When the chiller is brought online, its 2-way control valve shall modulate open.
 - The chilled water pump shall start and ramp up to 100% speed via its associated variable frequency drive.
 - By-pass control valve shall modulate open as necessary to maintain 100% design flow rate through the chiller as sensed by flow meter. Refer to "Minimum Evaporator Control" below.
 - Chillers chilled water D/P switch must prove "ON" to enable chiller.
 - If any of the status points fail to prove, an alarm shall be issued to the operator's workstation.
 - If the above status points all prove, the chiller shall be commanded to start.
 - The chiller shall operate under control of its packaged control panel.
 - After the chiller has started, and the leaving chilled water temperature has reached setpoint and is stable, the chilled water pump speed control shall switch to differential pressure control (See below).
 - At the same time that the chilled water pump control switches to differential pressure control, the control of by-pass valve shall switch to minimum evaporator flow control (See below).

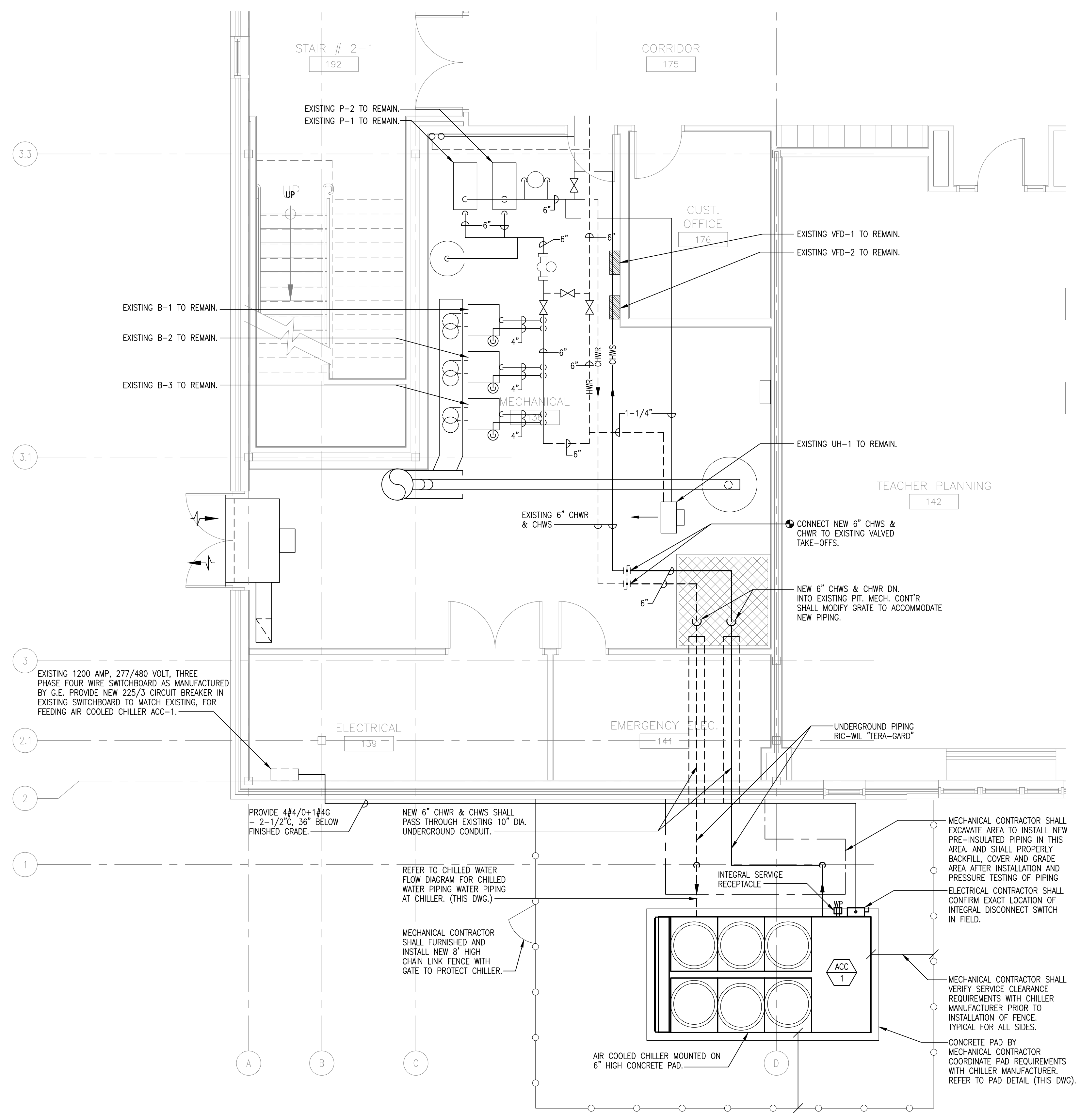
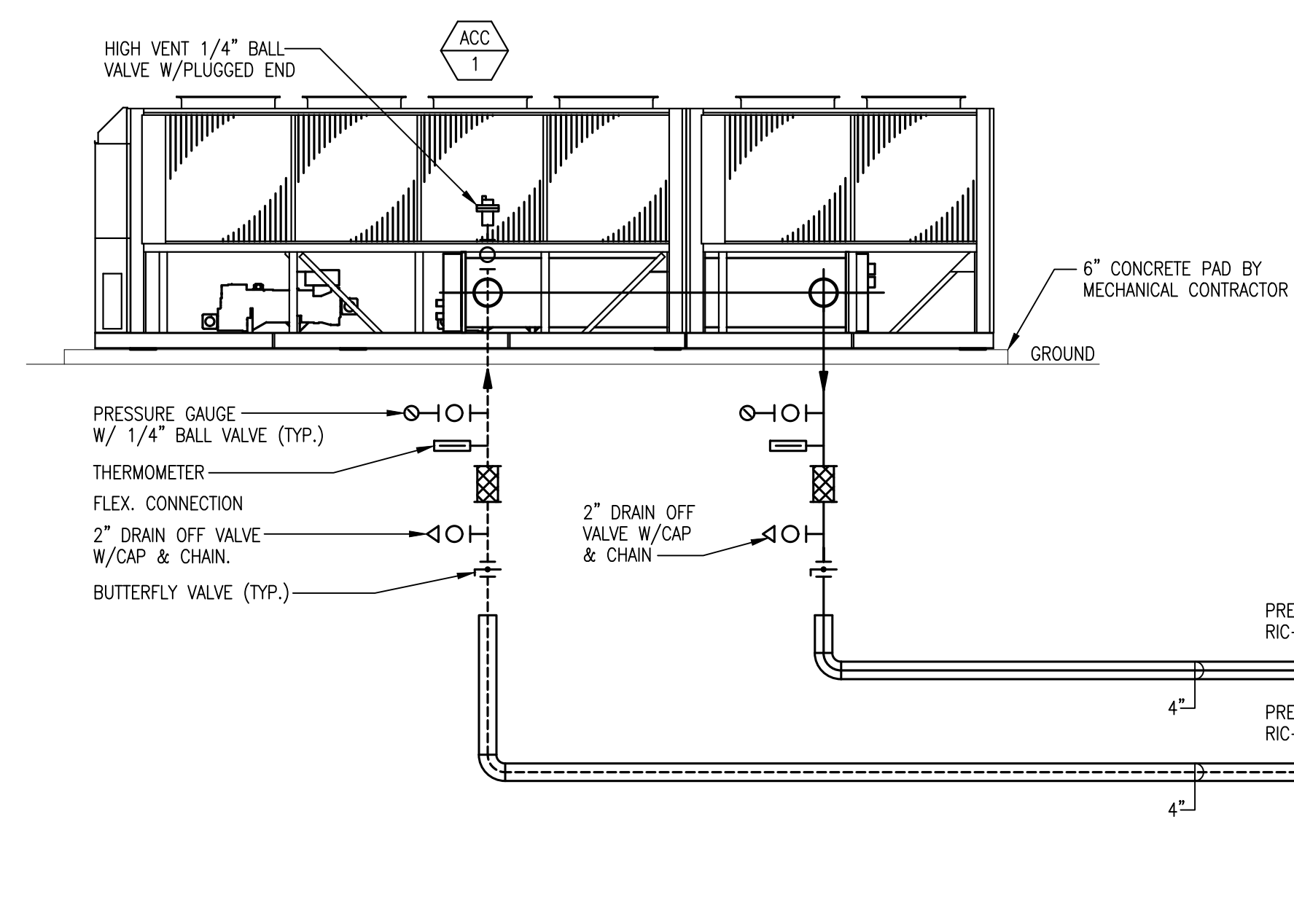
4. Minimum Evaporator Flow Control:

- Chiller Operation**
 - After setpoint is achieved and chilled water temperature is stable, the by-pass valve shall modulate to maintain minimum chilled water flow through the evaporator of the lead chiller, as verified by chiller manufacturer. The flow rate shall be measured by the flow meter.
 - On a drop below minimum flow setpoint, the by-pass valve shall modulate open.
 - If the by-pass valve reaches 100% open position and the flow rate remains below setpoint, differential pressure setpoints shall be reset to their initial settings (See "Differential Pressure Control" below).
 - On start up of the chiller, the setpoint for the evaporator flow shall be 100% of design flow for that chiller.

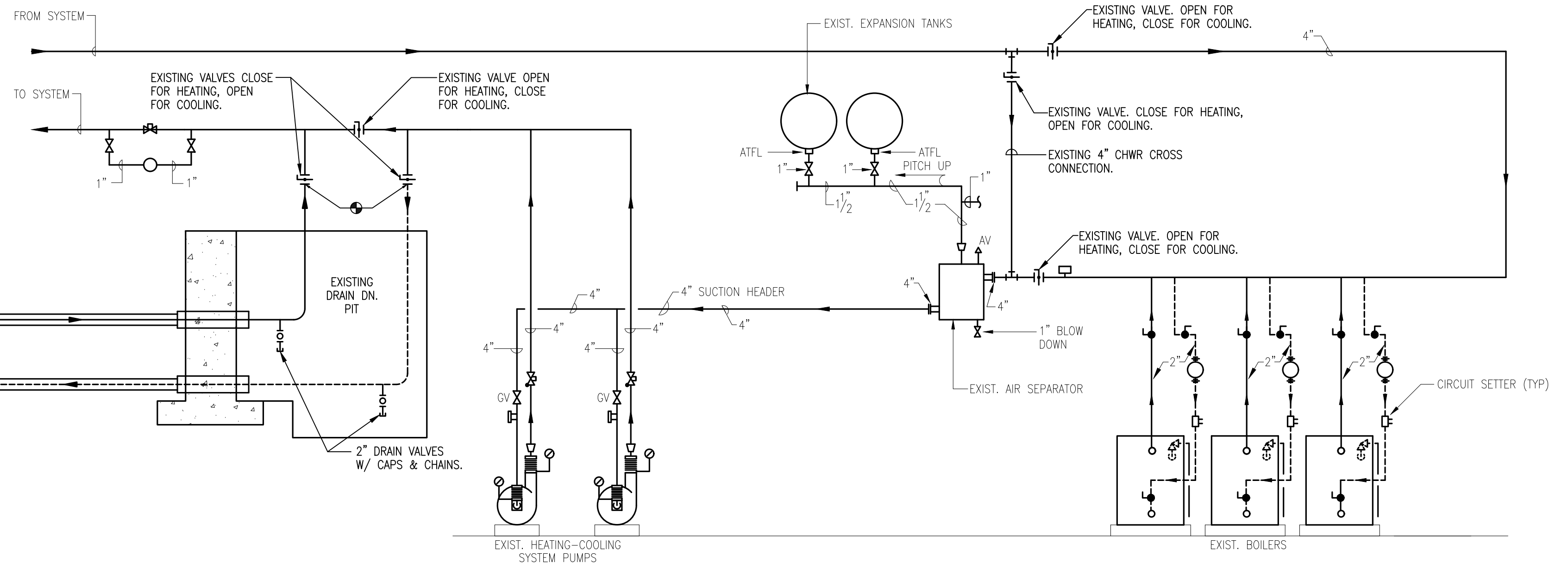
5. Chilled Water Pump Differential Pressure Control:

- Differential pressure sensors located at the ends of the chilled water mains shall be the basis chilled water pump control.
- The differential pressure sensor shall have a distinct set point to be determined during testing and balancing and confirmed during the commissioning phase of the project (initially 10 ps).
- The chilled water pump speed shall be modulated via its associated variable frequency drive to maintain the sensor (As defined above) at its setpoint.

CHILLER SEQUENCE OF OPERATION
 SCALE: N.T.S.



MECHANICAL ROOM PART PLAN
 SCALE: 1/4"=1'-0"



CHILLED WATER FLOW DIAGRAM
 N.T.S.

North Arrow

Keyplan

**MECHANICAL
 ROOM PART PLAN
 & CHILLED WATER
 FLOW DIAGRAM**