REVISION

**ABBREVIATIONS** AIR. AMP **ABOVE ABOVE FINISHED FLOOR AMBIENT** ATM **ATMOSPHERE AVERAGE** AVG **BLIND FLANGE BELOW FINISHED FLOOR BOTTOM HORIZONTAL DISCHARGE** BRAKE HORSEPOWER **BOTTOM OF PIPE BOTTOM OF STEEL** BTUH BRITISH THERMAL UNIT PER HOUR **COMMON** CAPACITY **COOLING COIL** CHILLER **CHILLED WATER PUMP CEILING, COOLING CENTRIFUGAL CONDENSATE** CLEANOUT **CONDENSER** CONTINUE, CONTINUATION **CONTR** CONTRACTOR COEFFICIENT OF PERFORMANCE CIRCULATING PUMP, CONDENSATE PUMP **CONDENSATE RECEIVER AND PUMPS CU FT CUBIC FOOT** VALVE SIZE (GPM AT 1 PSID) **DECIBLES** DRY BULB DOWN BURST DISCHARGE DOUBLE CHECK VALVE ASSEMBLY DCVA DIRECT DIGITAL CONTROL DIAMETER **DISCHARGE** DRAWING **EXHAUST AIR** ENTERING AIR TEMPERATURE ENTERING DRY BULB TEMPERATURE **ENERGY EFFICIENCY RATIO EXHAUST FAN EFFICIENCY ELEVATION ELECTRICAL ENTERING WET BULB TEMPERATURE** ENTERING WATER TEMPERATURE **EXHAUST EXPANSION** EXTERIOR/EXTERNAL **FAHRENHEIT** FLOOR CLEANOUT FLOOR DRAIN FIRE DEPARTMENT CONNECTION **FIRE HOSE CABINET FLOOR** FLTR **FILTER** FOIC **FURNISHED BY OWNER, INSTALLED** BY CONTRACTOR **FINS PER FOOT** FINS PER INCH FEET PER MINUTE **FEET PER SECOND FLOOR SINK FACE VELOCITY GALLONS** 

**GALVANIZED** 

GPM

**GRADE CLEANOUT** 

**GALLONS PER HOUR** 

**GALLONS PER MINUTE** 

HAND-OFF AUTOMATIC

**HUMAN MACHINE INTERFACE** 

HORSEPOWER, HEAT PUMP

# **GENERAL NOTES:**

**INSIDE DIAMETER** 

**INDIRECT WASTE** 

**KILOWATT HOUR** 

**INCHES** 

INTERIOR

**KILOWATT** 

**LOCKSHIELD** 

MAXIMUM

MECHANICAL

**MODULATING** 

MINIMUM

MOUNTED

MOTOR

MTR

NO

NTS

S/S

TOP

TOS

WCO

STRUC

**MANUFACTURER** 

NORMALLY CLOSED

NOT IN CONTRACT

**NOT TO SCALE** 

**OUTDOOR AIR** 

**OUTSIDE DIAMETER** 

**OUTLET VELOCITY** 

PRESSURE DROP

POLYPROPYLENE

POINT OF CONNECTION

POLYVINYL CHLORIDE

**RELATIVE HUMIDITY** 

**ROUGH-IN-ONLY** 

START/STOP

**STRUCTURAL** 

**TOP OF PIPE** 

**TYPICAL** 

VALVE

**VENT, VOLT** 

**TOP OF STEEL** 

**TOTAL PRESSURE** 

**VELOCITY PRESSURE** 

**VENT THRU ROOF** 

**VARIABLE VOLUME** 

WASTE, WATT

WALL CLEANOUT

**WASHINGTON STATE ENERGY CODE** 

**WATER GAGE** 

**WET BULB** 

VARIABLE SPEED DRIVE

POUNDS PER SQUARE INCH

PRESSURE REDUCING VALVE

REVOLUTIONS PER MINUTE

STATIC PRESSURE, SUMP PUMP

TOP HORIZONTAL DISCHARGE

POUNDS PER SQUARE INCH GUAGE

POUNDS PER SQUARE INCH DIFFERENTIAL

REDUCED PRESSURE BACKFLOW ASSEMBLY

SEASONAL ENERGY EFFICIENCY RATING

STAINLESS STEEL, SANITARY SEWER

ON CENTER

OPENING

NUMBER, NORMALLY OPEN

NON-STANDARD PART LOAD VALUE

OWNER FURNISHED CONTRACTOR INSTALLED

**INVERT ELEVATION** 

INTEGRATED PART LOAD VALVE

**LEAVING AIR TEMPERATURE** 

LEAVING DRY BULB TEMPERATURE

LEAVING WET BULB TEMPERATURE

LEAVING WATER TEMPERATURE

THOUSAND BTU PER HOUR

MINIMUM CIRCUIT AMPACITY

- THE FOLLOWING NOTES APPLY TO ALL MECHANICAL DRAWINGS. ADDITIONAL NOTES MAY BE INDICATED ON INDIVIDUAL DRAWINGS.
- DRAWINGS INDICATE CONNECTIONS FOR EQUIPMENT TO BE FURNISHED BY THE OWNER OR AS THE WORK OF OTHER TRADES. VERIFY LOCATION OF EQUIPMENT, ROUGH-IN LOCATIONS, AND TYPE OF CONNECTIONS PRIOR TO PREPARATION OF SHOP DRAWINGS OR SUBMITTALS, AND PRIOR TO INSTALLATION OF SERVICE CONNECTIONS. DO NOT INTERFERE WITH ACCESS FOR MAINTENANCE AND REMOVAL OR REPLACEMENT OF EQUIPMENT.
- COORDINATE THE PHASING AND INSTALLATION OF NEW WORK WITH THE WORK OF ALL OTHER TRADES. BEAR THE TOTAL EXPENSE FOR ANY ADDITIONAL WORK WHICH MAY BE CAUSED BY IMPROPER SEQUENCING OF CONSTRUCTION ACTIVITIES.
- 4. LOCATE MECHANICAL DEVICES (E.G. TEMPERATURE AND HUMIDITY SENSORS, PANELS, AND SWITCHES), SO THAT THEY DO NOT CONFLICT WITH GENERAL CONSTRUCTION (E.G. WAINSCOT, DOOR HARDWARE), ELECTRICAL DEVICES (E.G. LIGHT SWITCHES, SPEAKERS, OUTLETS), AND THE WORK OF OTHER TRADES.
- REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR GENERAL CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, PENETRATION DETAILS, FLASHING AND SEALING DETAILS, AND OTHER ELEMENTS OF GENERAL CONSTRUCTION. COORDINATE THE SIZE AND LOCATION OF EQUIPMENT HOUSEKEEPING PADS WITH APPROVED EQUIPMENT SO THAT HOUSEKEEPING PADS ARE NOMINALLY 4" HIGH UNLESS INDICATED OTHERWISE, AND EXTEND 6" MINIMUM IN ALL DIRECTIONS FROM THE HORIZONTAL LIMITS OF THE EQUIPMENT WHICH THEY SUPPORT.
- MECHANICAL DRAWINGS SHOW APPROXIMATE LOCATIONS FOR FLOOR DRAINS. IN MECHANICAL EQUIPMENT AREAS, COORDINATE THE LOCATIONS OF FLOOR DRAINS WITH THE ACTUAL COORDINATED HOUSEKEEPING PAD LOCATIONS AND MECHANICAL EQUIPMENT DRAIN LOCATIONS. MECHANICAL EQUIPMENT SUPPORTS SHALL CONFORM TO SEISMIC RESTRAINT REQUIREMENTS AND SHALL MEET ALL SEISMIC DESIGN AND CODE REQUIREMENTS.
- COORDINATE EQUIPMENT POWER CONNECTION REQUIREMENTS AND ELECTRICAL CHARACTERISTICS WITH ELECTRICAL DRAWINGS AND CONNECTION REQUIREMENTS. COORDINATE VARIATION IN ELECTRICAL CHARACTERISTICS FROM SCHEDULED VALUES. CHANGES TO ELECTRICAL CHARACTERISTICS (E.G. VOLTAGE, AMPS, HORSEPOWER, ETC.) SHALL BE SUBJECT TO APPROVAL. BEAR THE TOTAL EXPENSE FOR REQUIRED REVISION TO THE ELECTRICAL SCOPE OF WORK CAUSED BY VARIATION FROM THE SCHEDULED REQUIREMENTS.
- EQUIPMENT SHORT CIRCUIT CURRENT RATINGS (SCCR) SHALL BE NOT LESS THAN THE INTERRUPTING RATING OF THE BRANCH CIRCUIT OVER CURRENT PROTECTIVE DEVICE SUPPLYING POWER TO THE EQUIPMENT. REFER TO ELECTRICAL SCHEDULES FOR BRANCH CIRCUIT OVER CURRENT DEVICE INTERRUPTING RATINGS.
- COORDINATE THE LOCATION OF WORK TO PROVIDE CLEARANCES OVER LIGHTING FIXTURES AND OTHER CEILING MOUNTED DEVICES AS REQUIRED TO ALLOW FOR REMOVAL AND MAINTENANCE ACCESS.
- 10. DO NOT RESTRICT ACCESS TO ELECTRICAL CABLE TRAYS. AT A MINIMUM, ALLOW 18" CLEAR ON ONE SIDE OF CABLE TRAYS UP TO AN ELEVATION OF 6" ABOVE THE TOP OF THE CABLE TRAY. MAINTAIN 12" MINIMUM CLEARANCE OVER TOP OF CABLE TRAYS EXCEPT WHERE PIPING OR CONDUIT CROSS PERPENDICULAR TO CABLE TRAY, THIS CLEARANCE MAY BE REDUCED TO 6" OVER A DISTANCE OF NO MORE THAN 36" ALONG THE CABLE TRAY. PROVIDE NO LESS THAN 36" BETWEEN AREAS OF REDUCED CLEARANCE AND MAINTAIN INDICATED ACCESS ON THE SAME SIDE OF THE CABLE TRAY EXCEPT WHERE OTHERWISE APPROVED DO NOT CONNECT OTHER TRADE ITEMS TO CABLE TRAYS, CABLE TRAY SUPPORTS OR CABLE TRAY SEISMIC RESTRAINTS.
- PROVIDE SUPPORTS AND SEISMIC RESTRAINTS FOR PIPES AND EQUIPMENT AS SPECIFIED, AS REQUIRED, AND AS SHOWN ON THE DRAWINGS, IF REQUIRED FOR INSTALLATION OF PIPES AND EQUIPMENT, DESIGN AND PROVIDE ADDITIONAL STRUCTURAL MEMBERS BETWEEN COLUMNS, JOISTS, AND STRUCTURAL FRAME TO MEET SUPPORT AND SEISMIC RESTRAINT REACTIONS (FORCES, MOMENTS, DEFLECTIONS). STRUCTURAL MEMBERS AND ANCHORAGES SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED. REFER TO STRUCTURAL DRAWINGS FOR DESIGN CRITERIA. SUBMIT STRUCTURAL MEMBER SHOP DRAWINGS AND CALCULATIONS FOR REVIEW. STRUCTURAL MEMBERS. BOLTS. AND WELDS SHALL BI IN ACCORDANCE WITH THE REQUIREMENTS SHOWN ON THE STRUCTURAL DRAWINGS AND INDICATED IN THE SPECIFICATIONS. NO WELDING, BOLTING, OR OTHER MEANS OF ATTACHMENT TO THE STRUCTURAL MEMBERS SHALL BE MADE ON PORTIONS OF STRUCTURAL MEMBERS AT OR NEAR CONNECTIONS BETWEEN STRUCTURAL MEMBERS ON ANY ELEMENTS DESIGNATED IN THE SEISMIC LOAD RESISTING SYSTEMS UNLESS APPROVED BY THE STRUCTURAL ENGINEER. SUPPORTS SHALL NOT INDUCE TORSIONAL LOADS INTO SUPPORTING STRUCTURAL FRAMING.
- 12. DO NOT CORE DRILL OR DRILL THROUGH BEAMS. COLUMNS OR SHEAR WALLS UNLESS INDICATED ON STRUCTURAL DRAWINGS OR AS APPROVED BY THE STRUCTURAL ENGINEER.
- 13. PROVIDE PIPE SLEEVES AND PENETRATION SEALS AS REQUIRED FOR THE INSTALLATION OF PIPING SYSTEMS. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
- 14. COORDINATE THE LAYOUT OF EQUIPMENT, PIPING, AND APPURTENANCES SO THAT IT FITS INTO THE SPACE ALLOTTED. PROVIDE SERVICE ACCESS AND CLEARANCES AS INDICATED ON DRAWINGS, AS REQUIRED BY CODES, AND AS RECOMMENDED BY THE MANUFACTURER FOR THE INSTALLATION, REMOVAL, ENTRY, SERVICING, AND MAINTENANCE OF EQUIPMENT. PRIOR TO INSTALLATION, COORDINATE LAYOUT OF EQUIPMENT, PIPING, AND APPURTENANCES WITH ALL OTHER TRADES TO AVOID BLOCKING SERVICE OR REPLACEMENT ACCESS FOR NEW AND EXISTING EQUIPMENT AND EQUIPMENT INSTALLED BY OTHERS.
- DRAWINGS ARE DIAGRAMMATIC AND SHOW APPROXIMATE LOCATIONS OF EQUIPMENT, PIPING, AND APPURTENANCES. DRAWINGS DO NOT SHOW REQUIRED TRANSITIONS, OFFSETS, FITTINGS, AND DEVICES. REFER TO DETAILS, DIAGRAMS, AND SPECIFICATIONS FOR REQUIRED SYSTEM APPURTENANCES, CONTROL DEVICES, ETC. INSTALL DEVICES IN ACCORDANCE WITH DEVICE MANUFACTURER RECOMMENDATIONS. CAREFULLY INVESTIGATE ELEMENTS OF CONSTRUCTION THAT COULD AFFECT THE WORK TO BE PERFORMED AND ARRANGE NEW WORK ACCORDINGLY. PREPARE COORDINATION DRAWINGS FOR NEW WORK, WHICH ARE COORDINATED WITH THE APPROVED AND INSTALLED WORK OF OTHER TRADES. PROVIDE REQUIRED OFFSETS, FITTINGS, TRANSITIONS. SUPPORTS AND OTHER APPURTENANCES AS REQUIRED. BEAR THE TOTAL EXPENSE OF RE-WORK THAT IS CAUSED BY FAILURE TO COORDINATE.
- PROVIDE MAXIMUM HEADROOM AND CLEARANCE BELOW PIPING AND EQUIPMENT AND ASSOCIATED SUPPORTS AND RESTRAINTS. UNLESS OTHERWISE INDICATED, INSTALL TIGHT TO STRUCTURAL SYSTEMS ABOVE. WHERE WALL MOUNTED, INSTALL AS CLOSE TO WALL AS POSSIBLE. PROVIDE ADDITIONAL FITTINGS AND OFFSETS AS REQUIRED.
- REFER TO EQUIPMENT SCHEDULES FOR DESIGN CAPACITIES. SCHEDULED VALUES SHALL BE CONSIDERED DESIGN CAPACITIES. PROVIDE EQUIPMENT WHICH MEETS OR EXCEEDS THE SCHEDULED VALUES. MARK THE CONTRACT DRAWING EQUIPMENT SCHEDULES TO INDICATE THE MANUFACTURER, MODEL AND CAPACITY OF THE ACTUAL APPROVED EQUIPMENT PROVIDED AND SUBMIT THIS INFORMATION WITH RECORD DRAWINGS AS PART OF PROJECT CLOSEOUT.
- 18. TO ENHANCE THE CLARITY OF PLAN DRAWINGS, AND WHERE NOT NECESSARY TO DESCRIBE THE REQUIRED SIZE, INDIVIDUAL SEGMENTS OF PIPE BETWEEN CONNECTIONS MAY BE SHOWN WITHOUT A SIZE INDICATED. WHERE SIZE IS NOT SHOWN ON PLANS, THAT SEGMENT SHALL BE THE SAME SIZE AS THE NEXT UPSTREAM SEGMENT WITH A SIZE INDICATED.
- 19. WHERE NOT INDICATED ON PLANS, REFER TO EQUIPMENT SCHEDULES AND DETAILS FOR INLET AND OUTLET PIPE SIZES. WHERE INDICATED ON PLANS. PLAN SIZES SHALL TAKE PRECEDENCE.
- 20. INSTALL DRAINS AT ALL LOW POINTS IN PIPING, INCLUDING ANY TRAPPED PORTIONS OF PIPING. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS IN CLOSED LOOP (MECHANICAL) PIPING SYSTEMS. IN GENERAL, THESE DEVICES ARE NOT INDICATED ON DRAWINGS. WHERE AUTOMATIC AIR VENTS ARE INDICATED ON DRAWINGS, EXTEND AUTOMATIC AIR VENT (AAV) DISCHARGE TO NEAREST FLOOR DRAIN USING INDIRECT DRAIN PIPING OF SAME SIZE AS AAV DISCHARGE. INDICATE THE ACTUAL LOCATION OF FIELD-LOCATED DRAINS, VENTS AND DRAIN PIPING ON THE RECORD DRAWINGS.
- 21. INSULATE ALL CHILLED WATER AND CONDENSER WATER PIPING WITH 1-INCH CLOSED CELL FOAM IN ACCORDANCE WITH TABLE C403.10.3 OF THE 2018 WASHINGTON STATE ENERGY CODE (WSEC).
- 22. THE FOLLOWING IS A LIST OF DEFERRED SUBMITTALS ITEMS. DO NOT INSTALL DEFERRED SUBMITTAL ITEMS UNTIL THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL.
- A. SEISMIC AND WIND RESTRAINT
- 22. CONTROLS CONTRACTOR TO PROVIDE UPDATED SEQUENCE OF OPERATION TO INCORPORATE NEW EQUIPMENT. DIRECT DIGITAL CONTROLS SEQUENCES SHALL COMPLY WITH THE REQUIREMENTS OF THE 2018 WSEC FOR WATERSIDE ECONOMIZER AND VARIABLE SPEED FAN/PUMP CONTROL.
- 23. PROVIDE COMMISSIONING IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2018 WSEC.
- 24. REFER TO THE WSEC COMPLIANCE FORMS FOR ADDITIONAL MECHANICAL REQUIREMENTS.

## **GENERAL SYMBOLS**

LIGHT LINE INDICATES BACKGROUND LIGHT LINE INDICATES EXISTING WORK **HEAVY LINE INDICATES NEW WORK** MATCHLINE OR PROPERTY LINE **FUTURE WORK** POINT OF CONNECTION 1>> **SHEET NOTE** 

REFERENCE CALLOUTS **DETAIL IDENTIFICATION** 

-NUMBER INDICATES DETAIL -SHEET NUMBER WHERE DETAIL IS DRAWN

DRAWING REVISION DESIGNATOR

PLAN AND DETAIL TITLE CALLOUT

REVISION NO.

(DRAWING/PLAN TITLE) SCALE: (DRAWING/PLAN SCALE)

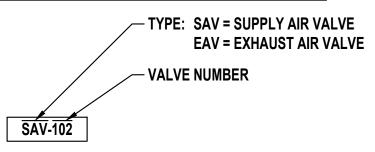
(DETAIL TITLE)

(REFERENCE DRAWING #)

**EQUIPMENT CALLOUTS** 

SCALE: (DETAIL SCALE)

LABORATORY SUPPLY / EXHAUST AIR VALVE CALLOUTS



### PIPING DIAGRAMS

S PIPING AIRFLOW > // // PNEUMATIC CONTROL AIR S CAPILLARY ---- ELECTRICAL CONNECTION  $\longrightarrow$  XXXX >FLOW CONTINUATION ARROW COMPLEX INTERLOCK (ELEC., PNEUMATIC, ETC.) CONNECTION TO CENTRAL MONITORING AND CONTROL SYSTEM (CMCS) FLEXIBLE TEMPERATURE PROBE  $\sim$ **CENTER LINE ELECTRIC MOTOR/STARTER ASSEMBLY** HANDWHEEL / PNEUMATIC OPERATOR

(VALVES AND DAMPERS) **ELECTRIC MOTOR OPERATOR SOLENOID OPERATOR** P-TRAP VARIABLE FREQUENCY DRIVE

PRESSURE / TEMPERATURE TAP

PIPING SUPPORTS

## PIPE ANCHOR (PA) PIPE GUIDE (PG) PIPE HANGER (PH) PIPE ROLLER (PR) PIPE SLIDE (PS) FLOOR STANCHION SUPPORT (FSS) **ROOF PIPE SUPPORT**

**SLOPE DIRECTION** SITE WORK THRUST BLOCK FIRE HYDRANT SHUT-OFF VALVE (SITE)

**ELEVATION SYMBOL** 

### PIPING VALVES / FITTINGS

<b>*</b>		<b></b>
	PRESSURE RELIEF VALVE	<u> </u>
	GATE VALVE	<u> </u>
	GLOBE VALVE	<u> </u>
	CHECK VALVE, SWING TYPE	<u> </u>
	CHECK VALVE, SWING TIPE CHECK VALVE, NON-SLAM TYPE	<u> </u>
	BALL VALVE	<b>5</b>
	BUTTERFLY VALVE	<u> </u>
	DOTTER! ET VALVE	<u> </u>
	ANGLE BALANCING VALVE	<u> </u>
, , , , , , , , , , , , , , , , , , ,	COMBINATION SHUT-OFF / BALANCING / FLOW MEASURING VALVE	⊱ <b>5</b> —
<b></b>	PLUG BALANCING VALVE	<b>S</b> —
	NEEDLE VALVE	C
\$	PRESSURE REDUCING VALVE, PILOT OPERATED	_
<u> </u>	PRESSURE REDUCING VALVE, SPRING OPERATED	
	AUTOMATIC CONTROL VALVE - TWO WAY (PNEUMATIC OPERATOR SHOWN)	
<u>M</u>	AUTOMATIC CONTROL VALVE - THREE WAY GLOBE (ELECTRIC OPERATOR SHOWN)	
<u>M</u>	AUTOMATIC CONTROL VALVE - TWO WAY GLOBE ELECTRIC OPERATOR SHOWN)	
M	AUTOMATIC CONTROL VALVE - TWO WAY BUTTERFLY	
<b>F</b>	ELECTRIC OPERATOR SHOWN)	
\$	SOLENOID VALVE (SHOWN WITH	
<b></b>	ELECTRIC MOTOR OPERATOR) RPBA	
	DCVA VALVE ASSEMBLY	
<u> </u>	REDUCER, ECCENTRIC, STRAIGHT INVERT	
\	REDUCER, ECCENTRIC, STRAIGHT CROWN	
$\leftarrow$	REDUCER, CONCENTRIC	
<b>\</b>	WYE STRAINER	
\$	WYE STRAINER WITH CAPPED HOSE END BLOWDOWN VALVE	
· ·	FIXED AIR GAP	

LIVED VIK RY **SUCTION DIFFUSER VENTURI FLOW MEASURING ELEMENT** (NO. INDICATES GPM)

**AUTOMATIC FLOW CONTROL VALVE** (NUMBERS INDICATE GPM & PSID SPRING RANGE) FLEXIBLE PIPE CONNECTION 廿▼ **AUTOMATIC AIR VENT (AAV)** MANUAL AIR VENT (MAV)

PRESSURE GAGE **THERMOMETER** QUICK DISCONNECT → PIPE DOWN

→ PIPE UP → + C + TEE DOWN → SCO SURFACE CLEANOUT —○ FCO FLOOR CLEANOUT ---- CO CLEANOUT

**⊢** WCO WALL CLEANOUT S PIPE CAP PIPE PLUG ──| FLANGE  $\rightarrow$  UNION

→ THREADOLET OR WELDOLET 1 [ 5 THERMOWELL

## PROJECT DESCRIPTION:

THIS PROJECT IS AN EXPANSION OF THE ORIGINAL PROJECT BUILD-OUT FOR A WATER-COOLED DATA CENTER INSTALLATION. WATER COOLED-CHILLERS, COOLING TOWERS, HEAT EXCHANGERS FOR WATERSIDE ECONOMIZER, AND PUMPS PROVIDE CHILLED WATER DIRECTLY TO SELF-CONTAINED SERVER RACK WITH BUILT-IN COOLING COILS. THE ORIGINAL SYSTEM CONSISTED OF TWO CHILLERS WITH DEDICATED PRIMARY CHILLED WATER PUMPS, TWO COOLING TOWERS WITH DEDICATED CONDENSER WATER PUMPS, AND A PLATE-AND-FRAME HEAT EXCHANGER ALONG WITH MANY OTHER SYSTEM COMPONENTS. THE ORIGINAL SYSTEM WAS BUILT WITH FUTURE CAPACITY FOR EXPANSION OF THIS WATER-COOLED SYSTEM.

THE SYSTEM IS SIZED FOR THE CUSTOMER'S ALLOTTED ALLOWANCE OF 4-MEGAWATTS OF SERVER CAPACITY. THE COOLING SYSTEM IS DESIGNED WITH N+1 REDUNDANCY TO PROVIDE THE TOTAL CAPACITY WITH ONE CHILLER AND COOLING TOWER ALONG WITH THEIR PUMPS AS A BACKUP IF ANY COMPONENT FAILS. HOWEVER, THE CONTROLS SEQUENCE WAS DEVELOPED TO ALLOW FOR ALL CHILLERS/TOWERS/PUMPS TO RUN AT A REDUCED LOAD TO OPTIMIZE EFFICIENCY AND REDUCE ENERGY CONSUMPTION.

### **PIPING TYPES**

5	CWR	<del></del>	CONDENSER WATER RETURN
5	CWS		CONDENSER WATER SUPPLY
5	—— CHR——		CHILLED WATER RETURN
5	—— CHS ——		CHILLED WATER SUPPLY
5	——HWS——	<del></del>	HEATING WATER SUPPLY
5	HWR	<del></del>	HEATING WATER RETURN
<b>5</b>	D	<del></del>	DRAIN (INDIRECT)
5			SANITARY WASTE
<u> </u>		<b>− − →</b>	SANITARY VENT
5			COLD WATER (CW)
5	NPW	<del></del>	NON-POTABLE WATER
<b>5</b>	—— CF ——	<del></del>	CHEMICAL FEED
5	—— RV ——	<del></del>	REFRIGERANT VENT

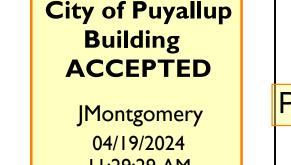
CONTROL	.S
DB	DRY BULB TEMPERATURE SENSOR
DP	DEW POINT TEMPERATURE SENSOR
T	TEMPERATURE SENSOR
F	FLOW SENSOR, INSERTION MAGMETER
~~	FLOW SENSOR, IN-LINE ULTRASONIC
$\bigcirc$	FLOW METER, MAGNETIC DRIVE VERTICAL TURBINE
BTU	BTU METER

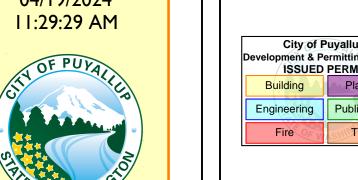
**DIFFERENTIAL PRESSURE SENSOR** 

PROVIDED BY THE PERMITTEE ON

SITE FOR ALL INSPECTIONS

(MIN. PLAN SIZE 24" X 36")





FULL SIZED LEDGIBLE COLOR PLANS ARE REQUIRED TO BE

DRWN CHKD

S

S

23025.00

SHEET 1 OF 8

IF SHEET IS LESS THAN
30"x42"
IT IS A REDUCED PRINT
SCALE REDUCED ACCORDING

EQUIPMENT NUMBER	(E)CH-1 [1]	(E)CH-2	CH-3
LOCATION	MECHANICAL ROOM	MECHANICAL ROOM	MECHANICAL ROOM
ТҮРЕ	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL
EVAPORATOR			
CAPACITY-TONS	575	575	575
FLUID	WATER	WATER	WATER
REFRIGERANT TYPE	R-134A	R-134A	R-134A
CAPACITY-GPM	587.7	587.7	587.7
ENT WATER TEMP-DEG F	78.5	78.5	78.5
LVG WATER TEMP-DEG F	55	55	55
MAX PRESS DROP-FT H20	15.9	15.9	15.9
FOULING FACTOR	0.0001	0.0001	0.0001
TUBE PASSES	3	3	3
CONNECTION SIZE-INCHES	8	8	8
CONDENSER-WATER COOLED			
FLUID	WATER	WATER	WATER
CAPACITY-GPM	1725	1725	1725
ENT WATER TEMP-DEG F	75	75	75
LVG WATER TEMP-DEG F	83.74	83.74	83.74
MAX PRESS DROP-FT H20	20.1	20.1	20.1
FOULING FACTOR	0.00025	0.00025	0.00025
TUBE PASSES	2	2	2
CONNECTION SIZE-INCHES	10	10	10
PERFORMANCE CRITERIA			
EFFICIENCY-KW/TON	0.343	0.343	0.343
NPLV-KW/TON	0.2111	0.2111	0.2111
SPEED CONTROL	VARIABLE	VARIABLE	VARIABLE
ELECTRICAL			
MAX RATED LOAD AMP-RLA	600	600	600
MAX LOCKED ROTOR AMP-LRA	1950	1950	1950
MIN CIRCUIT AMPACITY-AMPERES	316	316	316
VOLTS-PHASE-HERTZ	460-3-60	460-3-60	460-3-60
STANDARD OF ACCEPTANCE			
MAKE	YORK	YORK	YORK
MODEL	YKE3EQ7-EKG	YKE3EQ7-EKG	YKE3EQ7-EKG
MAX OPERATING WEIGHT-LBS	21882	21882	21882

REMARKS
[1] FURNISH w/ HOT GAS BYPASS.

REMARKS
[1] PROVIDE WITH INERTIA BASE.

EQUIPMENT NUMBER	(E)CT-1	(E)CT-2	CT-3
SYSTEM	CHILLED WATER	CHILLED WATER	CHILLED WATE
LOCATION	MECHANICAL YARD	MECHANICAL YARD	MECHANICAL YA
ТҮРЕ	OPEN TOWER	OPEN TOWER	OPEN TOWER
TOWER SECTION			
CAPACITY-GPM	1725	1725	1725
ENT WATER TEMP-DEG F	81.3	81.3	81.3
LVG WATER TEMP-DEG F	73.4	73.4	73.4
ENT AIR TEMP-DEG F DB	66.8	66.8	66.8
ENT AIR TEMP-DEG F WB	77.0	77.0	77.0
TOTAL CAPACITY-TONS	567.8	567.81	567.81
FAN SECTION			
FAN UNITS-NUMBER	1	1	1
CAPACITY-CFM PER FAN (MIN)	178,600	178,600	178,600
STATIC PRESS-INCHES WG	-	-	-
HORSEPOWER-PER FAN	50	50	50
SPEED-RPM	1800	1800	1800
SPEED CONTROL	VSD	VSD	VSD
SUMP HEATER	1		
ELECTRIC-KW (QTY. 2)	15	15	15
VOLTS-PHASE-HERTZ	460/3/60	460/3/60	460/3/60
MAXIMUMS			
DIMENSION (LxWxH)-FEET	12x21x12	12x21x12	12x21x12
STANDARD OF ACCEPTANCE			
MAKE	MARLEY	MARLEY	MARLEY
MODEL	NC8407UAN1	NC8407UAN1	NC8407UAN1
MAX OPERATING WEIGHT-LBS	24,430	24,430	24,430

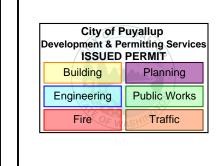
ENT WATER TEMP-DEG F: 60.5, LVG WATER TEMP-DEG F: 52.5, AMBIENT TEMP-DEG F WB: 45.7

HEAT EXCHANGERS		<b>,</b>
EQUIPMENT NUMBER	(E)HX-1	HX-2
SYSTEM	CHILLED WATER	CHILLED WATE
LOCATION	MECHANICAL ROOM	MECHANICAL RO
TYPE	PLATE AND FRAME	PLATE AND FRAI
··· <del>-</del>		
HIGH TEMPERATURE SIDE		
FLUID	WATER	WATER
FLOW-GPM	590	590
EWT TEMP-DEG F	78.5	78.5
LWT TEMP-DEG F	55	55
MAX PD-PSIG	1.29	1.29
MIN SURFACE AREA - SQ. FT.	1791.4	1408.2
COLD TEMPERATURE SIDE		
FLUID	WATER	WATER
FLOW-GPM	1725	1725
EWT TEMP-DEG F	52.5	52.5
LWT TEMP-DEG F	60.5	60.5
MAX PD-PSIG	9.79	9.79
MIN SURFACE AREA - SQ. FT.	1791.4	1408.2
PERFORMANCE CONDITIONS		
TOTAL CAPACITY - MBH	6,922	6,922
DESIGN BASIS		
	ALFA LAVAL	ALFA LAVAL
MAKE	1	
MAKE MODEL	AQ8-P	AQ8-P

EQUIPMENT NUMBER	(E)ET-1
SYSTEM	CHILLED WATER
UNIT LOCATION	MECHANICAL ROO
TANK CONDITIONS	
CAPACITY-GALLONS	44
ACCEPTANCE-GALLONS	27
CHARGE-PSIG	12.0
CONFIGURATION	
RATING	ASME
TANK SIZE	
MAX DIAMETER-INCHES	24
MAX LENGTH-INCHES	82.5
DESIGN BASIS	
MAKE	B&G
MODEL	B-165LA
MAX OPERATING WEIGHT-LBS	503

MARK NO	SS-1
TYPE	CENTRIFUGAL
SYSTEM	CONDENSER WATE
LOCATION	MECHANICAL ROO
SERVICE CONDITIONS	
FLOW GPM	810
PUMP CONDITIONS	
MOTOR BRAKE HORSEPOWER	7.5
VOLTS-PHASE-HERTZ	460-3-60
SPEED CONTROL	CONSTANT
STANDARD OF ACCEPTANCE	
MAKE	LAKOS
MODEL	ETCX-0910-SRV
MAX OPERATING WEIGHT-LBS	2250
REMARKS	
[1] FURNISH W/ SOLIDS RECOVERY	Y VESSEL, BACNET
INTERFACE, & ALARM CONTAC	ΓS
[2] PUMP SELECTION PROVIDED B	Y VENDOR

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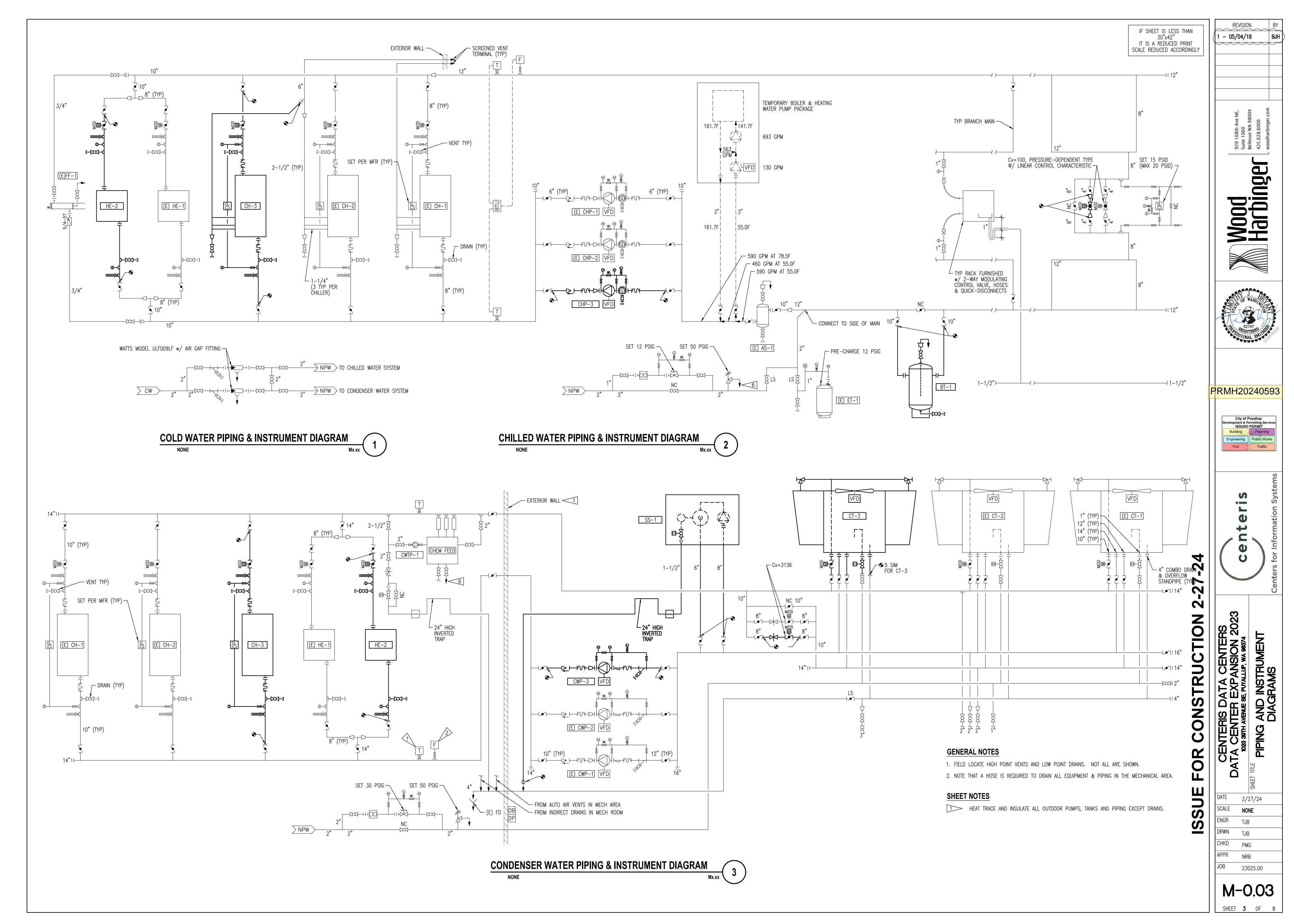
PUMPS			_	_	_			
EQUIPMENT NUMBER	(E)CHP-1 [1]	(E)CHP-2 [1]	CHP-3 [1]	(E)CWP-1	(E)CWP-2	CWP-3	CP-1, CP-2	(E)CWTP-1
SYSTEM	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	CONDENSATE	CONDENSER WATER
LOOP SERVED	PRIMARY	PRIMARY	PRIMARY	CONDENSER	CONDENSER	CONDENSER	<u>-</u>	TREATMENT CONDENSER
LOCATION	MECHANICAL ROOM	MECHANICAL ROOM	MECHANICAL ROOM	MECHANICAL YARD	MECHANICAL YARD	MECHANICAL YARD	MECHANICAL ROOM 105	MECHANICAL ROOM 105
- COATION	IVILOTI/ II VIO/ (L TOOW)	WEST IN INTO AE TOOM	WEST IN INTO A E ROOM	WIEGH / WIGHE TA WE	WEST // (NO/LE 17 (NE)	WEOTH WORL THE	WEST IN THUS AE TROOM TOO	WEOTH (MO) LE PROONT TOO
ТҮРЕ	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION	END SUCTION
SERVICE CONDITIONS								
CAPACITY-GPM	593	593	593	1725	1725	1725	20	54
TOTAL HEAD-FT	92	92	92	103	103	103	15	20
FLUID	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
TEMPERATURE-DEG F	68	68	68	68	68	68	68	68
NPSH REQUIRED-FT MIN	7.6	7.6	7.6	12.1	12.1	12.1	-	-
PUMP CONDITIONS								
SPEED-RPM	1737	1737	1737	1757	1757	1757	1550	-
IMPELLER DIA-INCHES	10.375	10.375	10.375	11.25	11.25	11.25	-	-
BRAKE HORSEPOWER	17.1	17.1	17.1	53.8	53.8	53.8	-	420 WATTS
MINIMUM EFFICIENCY-%	72	72	72	82	82	82	-	-
ELECTRICAL								
MOTOR ENCLOSURE TYPE	ODP	ODP	ODP	ODP	ODP	ODP	ODP	ODP
HORSEPOWER-MINIMUM	20.0	20.0	20.0	60	60	60	3/10	1/2
VOLTS-PHASE-HERTZ	460-3-60	460-3-60	460-3-60	460-3-60	460-3-60	460-3-60	115-1-60	115-1-60
SPEED CONTROL	VARIABLE	VARIABLE	VARIABLE	VARIABLE	VARIABLE	VARIABLE	CONSTANT	VARIABLE
STANDARD OF ACCEPTANCE								
MAKE	B&G	B&G	B&G	B&G	B&G	B&G	ZOELLER	GRUNDFOS
MODEL	e-1510 4EB	e-1510 4EB	e-1510 4EB	e-1510 6G	e-1510 6G	e-1510 6G	MIGHTY-MATE 59	GEO-FLO MAGNA3
MAX OPERATING WEIGHT-LBS	600	600	600	1410	1410	1410	15	68
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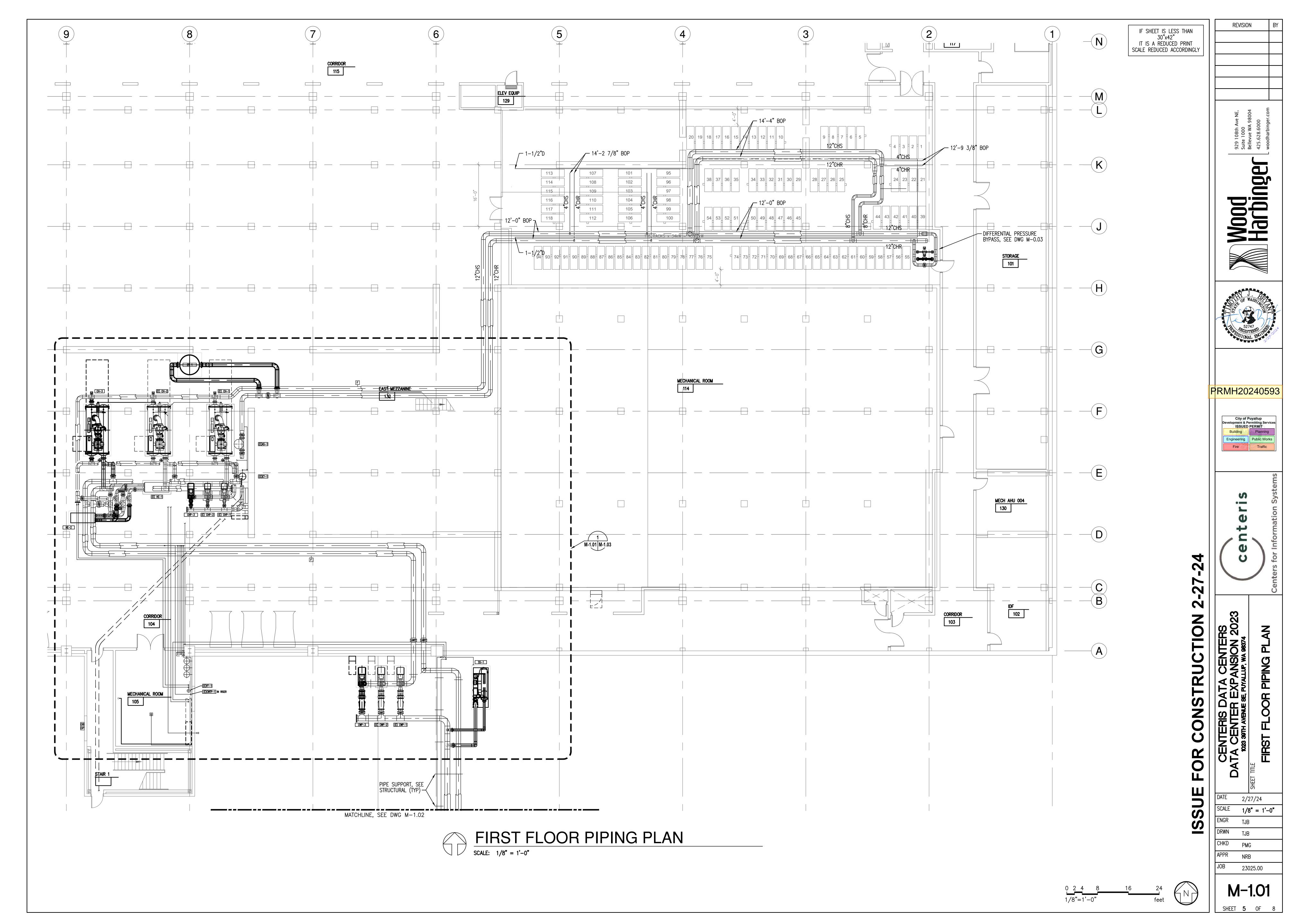
BUFFER TANK	
EQUIPMENT NUMBER.	BT-1
SYSTEM	CHILLED WATER
LOCATION	MECHANICAL ROOM
TYPE	
MATERIAL	STEEL
CAPACITY	
VOLUME-GALLONS	1040
OPERATING CONDITIONS	
FLUID	WATER
TEMPERATURE-DEG F	55
DIMENSIONS-INCHES	
DIAMETER	54
LENGTH	62
HEIGHT	110
CODE STAMP	
ASME	YES
REMARKS [1] TWO 12-INCH CHILLED WAT	ER CONNECTIONS

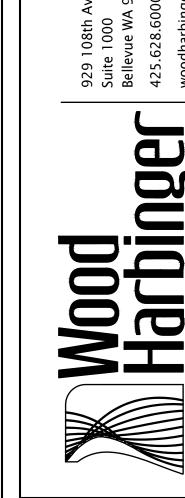
AIR SEPERATOR	
EQUIPMENT NUMBER	(E)AS-1
SYSTEM	CHILLED WATER
LOCATION	MECHANICAL ROOM
ТҮРЕ	CENTRIFUGAL
SERVICE CONDITIONS	
DESIGN PRESSURE PSIG	125
FLOW GPM	1,180
MAX PD-FT HD	0.6
CONNECTION SIZE, IN.	
DIA.	10
STANDARD OF ACCEPTANCE	
MAKE	B&G
MODEL	RL-10
MAX OPERATING WEIGHT-LBS	2052

DATA CENTER DESIGN MLC CALCULATION		
DESIGN MECHANICAL ENERGY CONSUMPTION - 100%	EACH	TOTAL
[1] COOLING DESIGN POWER (KW)	261.63	523.27
HEAT REJECTION PEAK FAN POWER (KW)	37.29	74.57
[2] AIR HANDLER UNIT FAN DESIGN POWER (KW)	0.18	25.67
TOTAL	299.10	623.50
DATA CENTER DESIGN ITE POWER - 100%		
IT LOAD (KW)	4000	4000
DESIGN MLC @ 100%	WSEC	ACTUAL
MECHANICAL LOAD / IT LOAD	0.22	0.16
DESIGN MECHANICAL ENERGY CONSUMPTION - 50%	EACH	TOTAL
[1] COOLING DESIGN POWER (KW) +	59.81	119.62
HEAT REJECTION PEAK FAN POWER (KW) +	6.25	12.50
[2] AIR HANDLER UNIT FAN DESIGN POWER (KW)	0.02	3.08
TOTAL	66.08	135.20
DATA CENTER DESIGN ITE POWER - 50%		
IT LOAD (KW)	2000	2000
DESIGN MLC @ 50%	WSEC	ACTUAL
MECHANICAL LOAD / IT LOAD	0.18	0.07
i i		

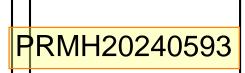
- REMARKS
  [1] COOLING DESIGN POWER INCLUDES CHILLERS, PRIMARY PUMPS, AND CONDENSER
- [2] SERVER RACK COOLING COIL FAN POWER



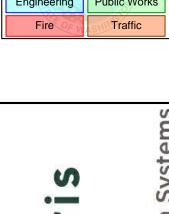


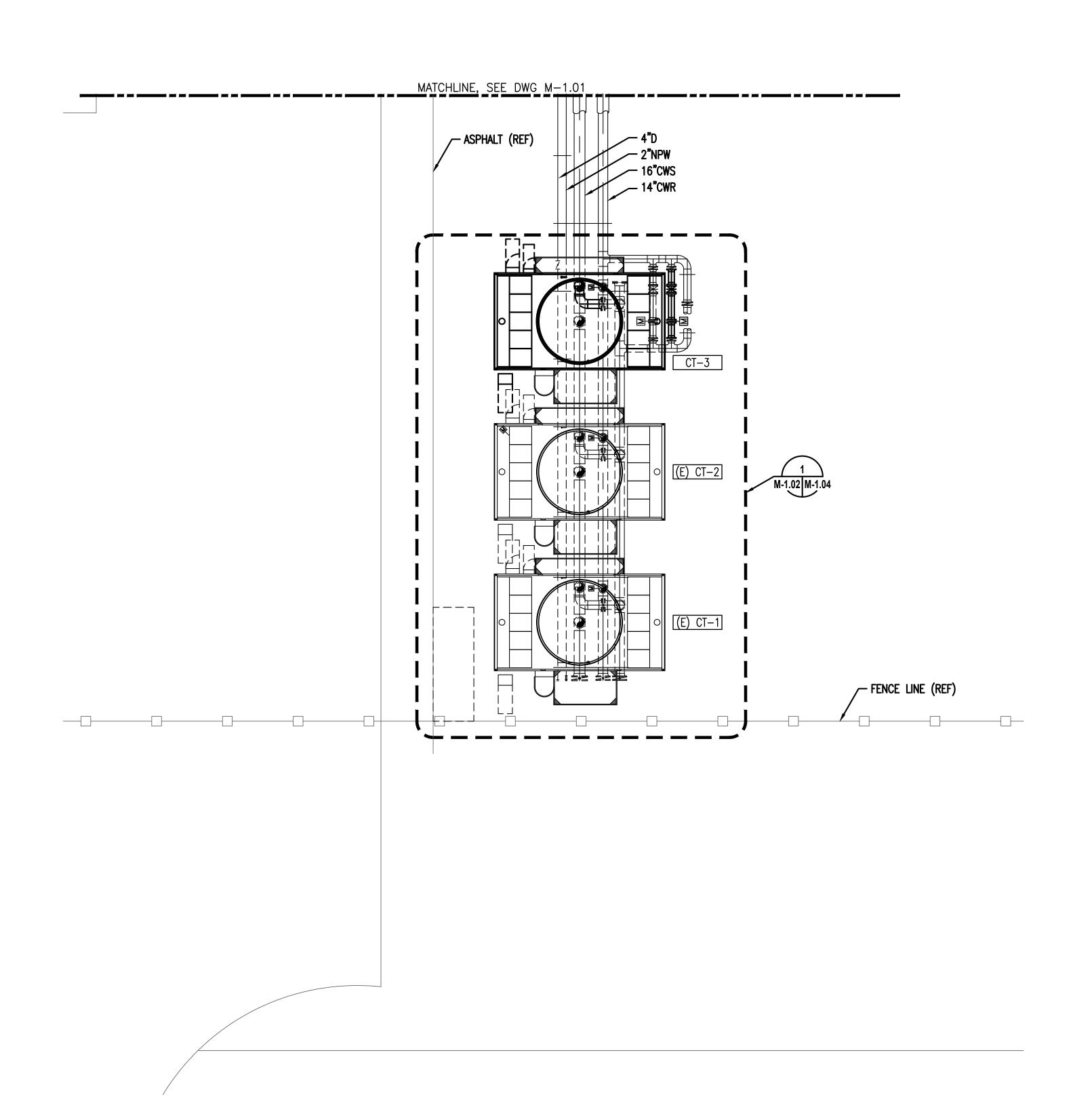






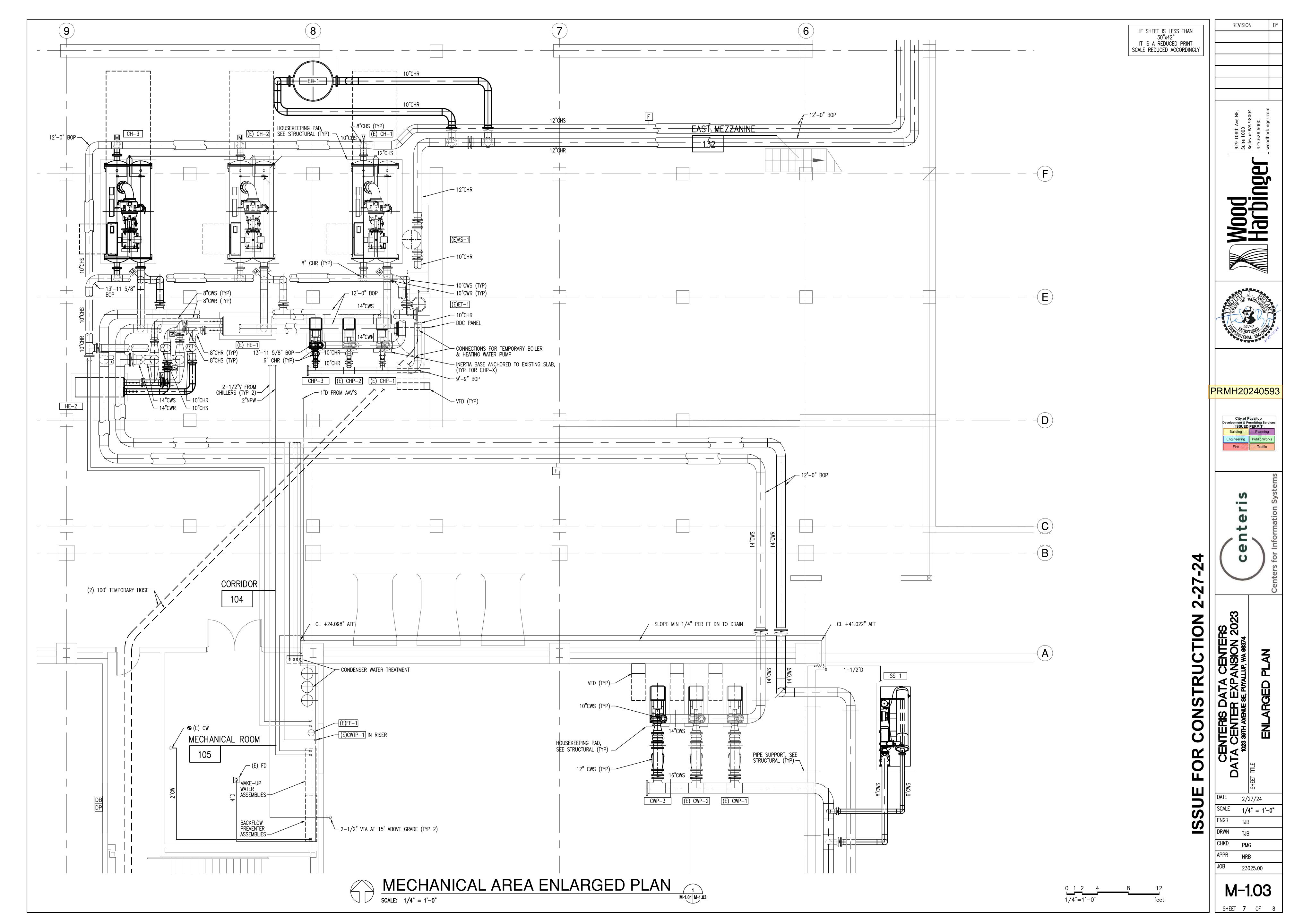


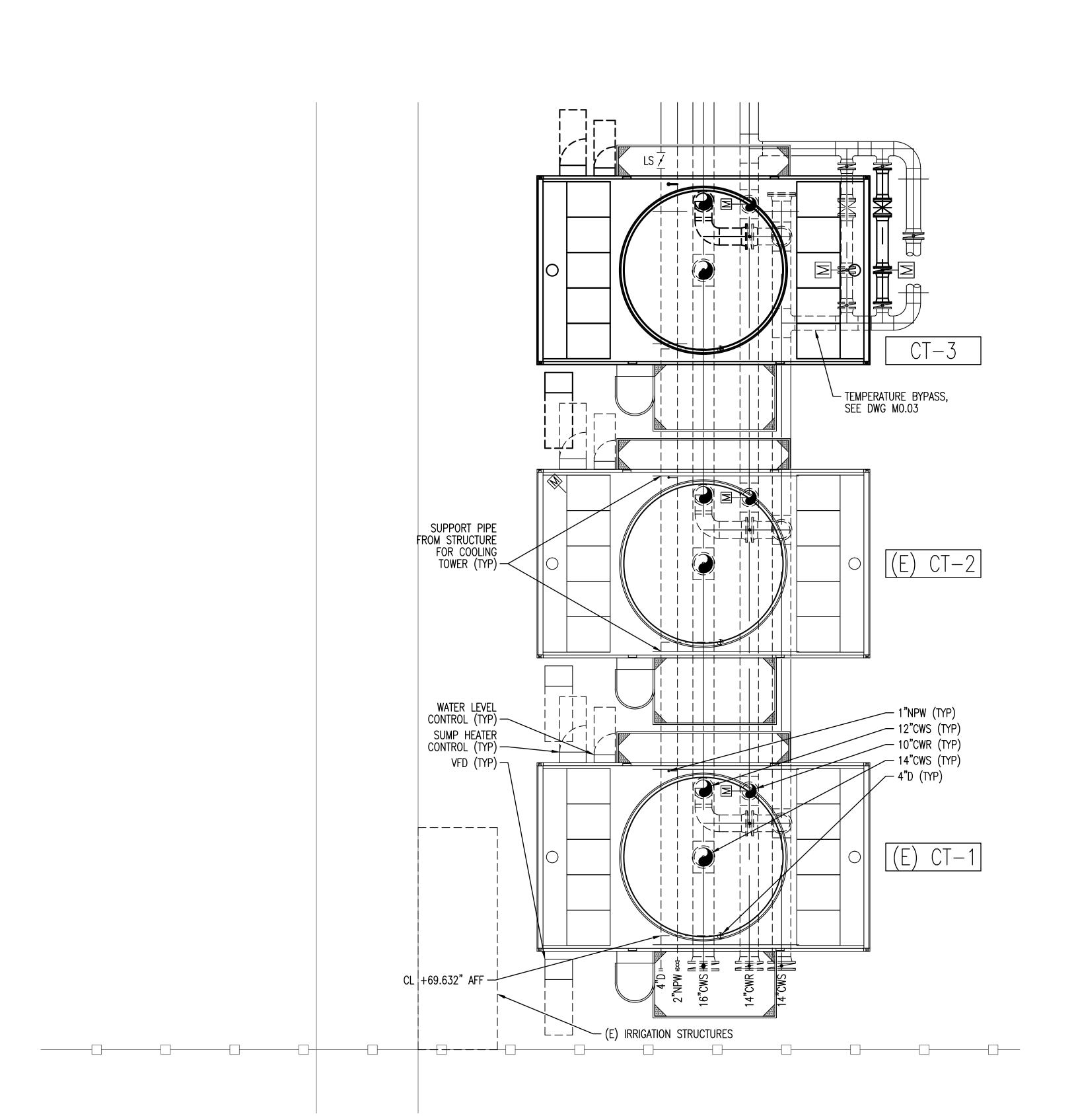




COOLING TOWER AREA PLAN

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

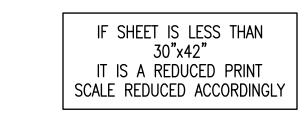




COOLING TOWER AREA ENLARGED PLAN

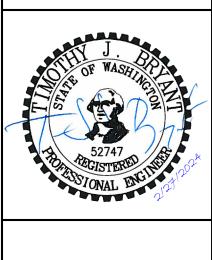
SCALE: 1/4" = 1'-0"

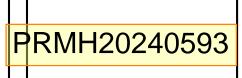
M-1.01 M-1.04

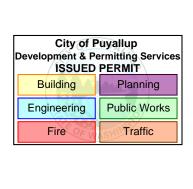


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centers for Information Sy

NTER EXPANSION 202:
AMENIE SE, PUTALLUP, WA 98374

ALARGED PLAN

ATE 2/27/24

CALE 1/4" = 1'
NGR TJB

ENGR TJB

DRWN TJB

CHKD PMG

APPR NRB

JOB 23025.00 M-1.04

M-I.C

1 2 4 8 12 /4"=1'-0" feet