

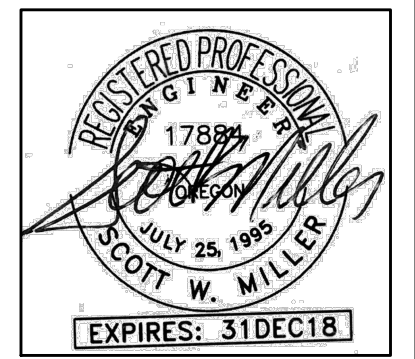
OREGON CONVENTION CENTER - CHILLER PLANT RE-DESIGN

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REV 1	ADDENDUM#02	07/20/2018
Proj No:	MFIA 9381	
Drawn By:	MG	
Chkd By:	SWM	
DSGN By:	MG	

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CHILLER PLANT REDESIGN
777 NE Martin Luther King Jr Blvd, Portland, OR 97232
COVER SHEET

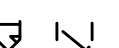
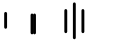
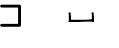
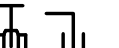
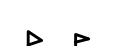
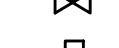
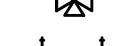
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SHEET
G0.00
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MECHANICAL LEGEND

(E)	EXISTING	AFF	ABOVE FINISH FLOOR
(N)	NEW	AHU	AIR HANDLING UNIT
(D)	DEMOLISH	B.D.	BOTTOM OF DUCT
(R)	REPLACE	BHP	BRAKE HORSEPOWER
	CONNECT TO EXISTING	BTU	BRITISH THERMAL UNITS
 AC-4	THERMOSTAT OR TEMP. SENSOR	CFM	CUBIC FEET PER MINUTE
	NOTE	CONN.	CONNECTION
 XX ?	EQUIPMENT DESIGNATOR	CONT.	CONTINUATION
	THERMOMETER	CW	DOMESTIC COLD WATER
	PRESSURE GAUGE	DB	DRY BULB
T	PETE'S PLUG	DIA.	DIAMETER
 VB	VACUUM BREAKER	DIST.	DISTRIBUTION
	DIRECTION OF FLOW	EA	EXHAUST AIR
 A	AUTOMATIC AIR VENT	EDB	ENTERING DRY BULB TEMPERATURE
	MANUAL AIR VENT	EWB	ENTERING WET BULB TEMPERATURE
	PUMP	EWT	ENTERING WATER TEMPERATURE
	PUMP	FF	FINISH FLOOR
	FLEX CONNECTOR	FIXT.	FIXTURE
	FLOW METER	FPM	FEET PER MINUTE
	PRESSURE RELIEF	FT.	FEET PER SECOND
	STRAINER	FT.	FEET / FOOT
	UNION	GA.	GAUGE
	CAP	GPM	GALLONS PER MINUTE
	PIPE SIZE REDUCER	H	HEIGHT
	SAFETY VALVE	HP	HORSEPOWER
	BUTTERFLY VALVE	I.D.	INSIDE DIAMETER
	GLOVE VALVE	IN.	INCHES
	BALL VALVE	L	LENGTH
	GATE VALVE	LBS.	POUNDS
	CHECK VALVE	LWB	LEAVING WET BULB
	BALANCING VALVE	LWT	LEAVING WATER TEMPERATURE
	BALANCING W/MEMORY STOP	MAX.	MAXIMUM
	PRESSURE REDUCING VALVE	MBH	THOUSANDS OF BTUs PER HOUR
	2-WAY CONTROL VALVE	MIN.	MINIMUM
	3-WAY CONTROL VALVE	NC	NOISE CRITERIA
	DOUBLE CHECK ASSEMBLY	N.C.	NORMALLY CLOSED
	SEISMIC BRACING	N.I.M.	NOT IN MECHANICAL
	LATERAL BRACING	NO.	NUMBER
	LONGITUDINAL BRACING	N.O.	NORMALLY OPEN
	LONGITUDINAL & LATERAL BRACING	OA	OUTSIDE AIR
	EQUIPMENT REQUIRED CLEARANCE SPACE FOR MAINTENANCE AND FUNCTIONALITY	P	PERSON
		PSI	POUNDS PER SQUARE INCH
		P/T	PRESSURE / TEMPERATURE
		RA	RETURN AIR
		RE	RELIEF AIR
		RECT.	RECTANGULAR
		REQ'D	REQUIRED
		SA	SUPPLY AIR
		S.P.	STATIC PRESSURE
		SQ.	SQUARE
		TEMP.	TEMPERATURE
		TYP.	TYPICAL
		VAV	VARIABLE AIR VOLUME
		W	WIDTH
		WB	WET BULB
		WPD	WATER PRESSURE DROP
		Ø	DIAMETER

GENERAL NOTES – DEMOLITION WORK

- COORDINATE LANDSCAPE ALTERATION WORK REQUIRED BY PROJECT DESIGN WITH OWNER.
- ALL ROOFING WORK MUST BE PERFORMED BY OWNER APPROVED ROOFING CONTRACTOR. EXISTING ROOFING CONSTRUCTION IS SIKA SARNAFIL 90 MIL PVC LIQUID APPLIED MEMBRANE. ROOFING WORK MUST MAINTAIN EXISTING ROOFING WARRANTY. CURRENT ROOFING CONTRACTOR IS SNYDER ROOFING
- CONTROL WORK MUST BE PERFORMED BY ENVIRONMENTAL CONTROLS .
- SEE FLOOR PLANS FOR ADDITIONAL DEMOLITION NOTES.

GENERAL NOTES – NEW WORK

- VERIFY ALL EXISTING CONDITIONS RELATIVE TO THE SCOPE OF WORK. REPORT DISCREPANCIES BACK TO THE ENGINEER.
- VERIFY INDICATED (E)PIPE SIZES PRIOR TO RECONNECTING NEW EQUIPMENT. EQUIPMENT SHALL NOT BE CONNECTED TO EXISTING PIPES OF SMALLER DIAMETER THAN NEW PIPES. REPORT DISCREPANCIES BACK TO ENGINEER.
- DO NOT FABRICATE EQUIPMENT SUPPORTS/BASES W/O CONFIRMING SPACE AND EXISTING PADS.
- COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.
- COORDINATE OTHER TRADES FOR PATCH/REPAIR OF WALLS WHERE EXISTING SENSORS ARE REMOVED OR MODIFIED.
- PATCH & REPAIR WALLS / FLOORS / CEILING WHERE OLD PIPES HAVE BEEN REMOVED TO MATCH EXISTING FINISHES.
- SEE DETAILS 1 & 2 ON SHEET M6.01 FOR PIPE SUPPORT.
- SEE SPECIFICATIONS FOR VIBRATION ISOLATION AND SEISMIC RESTRAINTS.
- ABOVE ROOF CONDENSER WATER PIPING SUPPLY AND RETURN SHALL BE POLYPROPYLENE (HEAT WELDED).
- ALTERNATE #1: UNDER ALT#1, PROVIDE THE MAGNETIC BEARING CHILLER IN PLACE OF THE BASE-BID SCREW CHILLER, SEE SCHEDULE FOR INFORMATION.
- ALTERNATE #2: REPLACE EXISTING PROCESS PIPING SERVING THE NORTH SIDE AS SHOWN ON SHEETS M1.12, M1.22 AND M2.22.
- ALTERNATE #3: ADD CHEMICAL FREE CONDENSING WATER TREATMENT SYSTEM TO PROCESS LOOP AND HVAC LOOP. SYSTEM SHOWN ON PLANS SHALL REMAIN UNDER BASE BID & ALTERNATE. SEE PIPING DIAGRAMS AND SPECIFICATIONS.

DIFFUSER AND REGISTER SCHEDULE

TAG	TYPE	LOCATION - NOTES	MANUFACTURER- MODEL
A	SUPPLY GRILLE - DOUBLE DEFLECTION	SIDEWALL - [1][2][3]	TITUS 300RL
B	RETURN/EXHAUST GRILLE - SIDEWALL	SIDEWALL -[1][2]	TITUS 350RL

- NOTES:
- PROVIDE NECK SIZE AS SHOWN ON PLANS.
 - PROVIDE BLADES PARALLEL TO THE FLOOR/CEILING LINE AT SIDEWALL GRILLES.
 - PROVIDE SURFACE MOUNT BORDER FOR HARD CEILINGS.

COOLING TOWER SCHEDULE

MARK NUMBER	CT-1, -2, -3	CT-4
SYSTEM	COOLING WATER	COOLING WATER
LOCATION	ROOF	ROOF
TYPE	OPEN-CROSSFLOW-MOD	OPEN-CROSSFLOW-MOD
NUMBER OF CELLS	3	1
FLUID TYPE	WATER	WATER
	WINTER	SUMMER
HEAT REJECTION CAPACITY (MBH)	4,000	11,952
TONS	333	996
DESIGN TEMPERATURE WB (F)	21	70
ENTERING WATER TEMP. (F)	50	94
LEAVING WATER TEMP. (F)	45	82
APPROACH (F)	24	12.0
RANGE (F)	5	12.0
DESIGN FLOW RATE (GPM)	1,600.0	1,992.0
MIN FLOW RATE (GPM)	1,600.0	800.0
WATER SIDE PRESSURE DROP - FT WG	5	5
INLET / OUTLET PIPE CONNECTIONS - (IN)	12/14	6/8
MAKE-UP WTR PIPE CONNECTIONS - (IN)	2	1
OVERFLOW WTR PIPE CONNECTIONS - (IN)	6	4
NUMBER PER UNIT	8	2
CFM PER FAN	21956	25796
MOTOR HP PER FAN	7.5	7.5
VFD CONTROL- NUMBER OF VFDS	YES - 4	YES - 2
SPRING VIBRATION ISOLATION	YES	YES
SEISMIC RESTRAINTS	YES	YES
PIPE CONNECTION	FLEX	FLEX
INERTIAL BASE	NO	NO
FLA/MODULE	98.4	24.4
MAX MOTOR CURRENT PER MODULE	108.2	28.1
VFD COMPATIBLE	YES	YES
ELECTRICAL (VOLT/PHASE/HERTZ)	480/3/60	480/3/60
TYPE	TEAO	TEAO
BASIN HEATER - KW(SEPARATE CONNECTION)	6 KW	6 KW
PANEL NEMA RATING	4	4
MIN. AIR INTAKE HEIGHT - (FT)	10	10
WEIGHT OPERATING/SHIPPING (LBS)	25780	10470
BASIS OF DESIGN, MODEL#	TOWER-TECH TTXL-0819XX	TOWER-TECH TTXL-1219XX
REMARKS/NOTES	1,2,3,4	1,2,3,4

- NOTES:
- PROVIDE BASIN HEATER
 - PROVIDE FOR VFD CONTROL APPLICATION; 2 MOTORS PER 1 VFD AND 2 MIN VFDS PER TOWER.
 - PROVIDE HEAT TRACING ON ALL EXPOSED PIPING
 - PROVIDE TOWER-TECH SUB-STRUCTURE WITH 4 FT HIGH LEGS FOR SEISMIC SUPPORT.

DUCT HEATING COIL SCHEDULE

MARK NUMBER	EDH-1214
SPACE SERVED	CHILLER ROOM
DUCT HEATER TYPE	OPEN COIL
TEMPERATURE CONTROL	14 STEPS
AIRFLOW CFM	1800
ENTERING AIR TEMPERATURE F	23
LEAVING AIR TEMPERATURE F	64.7
REQUIRE HEAT (BTUH)	90000
REQUIRED ELECTRICAL LOAD (KW)	27.0
DUCT HEATER KW	27.0
HEATER DUCT WIDTH (IN)	24
HEATER DUCT HEIGHT (IN)	18
AIRFLOW VELOCITY (FPM)	600
HEATER KW / SQ FT	9.0
HEATER MAX. PRESSURE DROP (IN WG)	0.05
HEATER AMPS(3 PH=WATTS/VOLTS/1.73)	75.04
HEATER AMPS(1 PH=WATTS/VOLTS)	129.8
ELECTRICAL (VOLTS/PH)	480/3/60
CONTROL FAN INTELOCK	SF-1214
CONTROLLED BY	T'STAT
UNIT WEIGHT (POUNDS)	
BASIS OF DESIGN:	Q'MARK
REMARKS. SEE NOTES:	1,2

- NOTES:
- CONTROL FROM SPACE THERMOSTAT.
 - INSTALL 2 FEET UPSTREAM OF ELBOWS OR DUCT TURNS.

OREGON CONVENTION CENTER

CHILLER PLANT REDESIGN

777 NE Martin Luther King Jr Blvd, Portland, OR 97232

MECHANICAL LEGEND AND NOTES

Issuance

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Date:
JUNE 05, 2018

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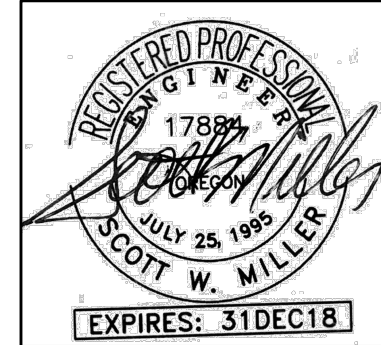
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SHEET

M0.01

Proj No: MFIA 9381 REV 1 ADDENDUM#02 07/20/2018

Drawn By: MG
Chkd By: SWM
DSN By: MG



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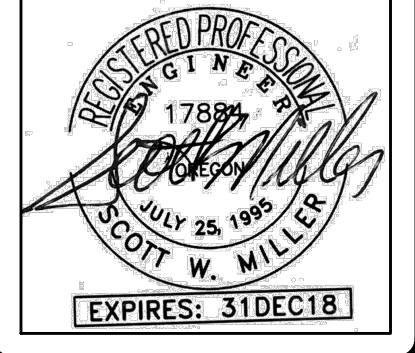
SUPPLY FAN SCHEDULE																	
DESIGN SYMBOL	SYSTEM	TYPE	DISCHARGE	MAX CFM	MIN ESP INCHES	MOTOR				MOUNTING	VIBRATION ISOLATION			INTER-LOCK / CONTROL WITH	REMARKS NOTES	DESIGN BASIS GREENHECK MODEL#	
						BHP	HP	RPM	VOLTS/PHASE /HERTZ		ISOLATOR TYPE NOTE	MIN. STATIC DEFLECTION	DBA/ SONES				
SF-1214	VENTILATION AIR	CENTRIFUGAL	ROOF	1800	0.45	0.45	3/4	1750	115/1/60	ROOF CURB	SEE SPECS	SEE SPECS	11.6	150	DUCT HEATER	1,2,3,4,5	RSF-90
NOTES:																	
1 DISCONNECT SWITCH BY ELECTRICAL																	
2 OPERATE FROM LIGHT SWITCH FOR OPERATION DURING OCCUPANCY.																	
3 PROVIDE MOTORIZED CONTROL DAMPER AT FAN INTAKE.																	
4 PROVIDE WITH FILTERS.																	
5 PROVIDE 12 INCH MINIMUM HEIGH ROOF CURB.																	
UPDATED: 5/22/2018 13:42																	

DAMPER SCHEDULE																			
DESIGN SYMBOL	SYSTEM	LOCATION	AIRFLOW DIRECTION	MIN AIRFLOW CFM	MAX AIRFLOW CFM	MAX PRESSURE DROP IN	BACKDRAFT DAMPER	SIZE			ELECTRICAL					INTERLOCK	REMARKS NOTES	DESIGN BASIS	
								WIDTH IN	HEIGHT IN	PERCENT FREE AREA	FREE AREA SF	DESIGN VELOCITY FPM	NUMBER OF SECTIONS	NUMBER OF ACTUATORS	EMERGENCY POWER			GREENHECK	
DS-1	HEAT / EMER	WALL	INTAKE	4000	21000	0.05	NO	108	54	95%	38.48	546	2	2	YES		1,2	ICD-45	
DS-2	VENTILATION	WALL	INTAKE	1800	1800	0.05	NO	20	20	95%	2.64	682	1	1	YES		2	VCD	
DE-2	EMERG. EXH	ROOF	EXHAUST	4000	4000	0.1	NO	22	22	95%	3.19	1253	1	1	YES		1,3	VCD	
NOTES: 1 PROVIDE INSULATED DAMPER BLADE CONSTRUCTION 2 PROVIDE 2 POSITION ACTUATOR, FAIL CLOSE. 3 VERIFY EXSTING EXHAUST FAN INSTALLATION OF ROOF OPENING. DUCT DAMPER EQUAL TO OR LARGER TO MATCH EXISTING ROOF OPENING.																			
UPDATED: 7/19/2018																			

WATER COOLED CHILLER SCHEDULE						
MARK NUMBER	CH-1	CH-2	BASE BID: CH-3	BASE BID: CH-4	ALT#1: CH-3	ALT#1: CH-4
SYSTEM	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER
LOCATION	CHILLER ROOM	CHILLER ROOM	CHILLER ROOM	CHILLER ROOM	CHILLER ROOM	CHILLER ROOM
CHILLER TYPE	CENTRIFUGAL	CENTRIFUGAL	SCREW	SCREW	MAGNETIC BEARING	MAGNETIC BEARING
CHILLER REFRIGERANT FLOW			VARIABLE SPEED	VARIABLE SPEED	VARIABLE SPEED	VARIABLE SPEED
REFRIGERANT TYPE	R-134A	R-134A	R-134A	R-134A	R-134A	R-134A
PART LOAD EFF 75%/50%/25%, NPLV KW/TON					0.4189 / 0.3092 / 0.3474	0.4189 / 0.3092 / 0.3474
FULL LOAD EFFICIENCY, KW/TON			0.3448	0.3448	0.3545	0.3545
TOTAL REFRIGERANT CHARGE (LBS)	2384	2384	1430	1430	1114	1114
EVAPORATOR	TOTAL COOLING (MBH)	9,600	9,600	6,000	6,000	6,000
	TOTAL COOLING (TONS)	800	800	500	500	500
	ENTERING WATER TEMP. (F)	56	56	56	56	56
	LEAVING WATER TEMP. (F)	42	42	42	42	42
	FLOW RATE (GPM)	1,372	1,372	858	854	854
	EVAP MINIMUM FLOW (GPM)	1372	1372	769	276	276
	LOAD BYPASS MINIMUM FLOW (GPM)	1372	1372	769	276	276
	PRESSURE DROP (FT WTR)	14	14	10.5	13.8	13.8
	FOULING FACTOR	0.0001	0.0001	0.0001	0.0001	0.0001
	GLYCOL MIXTURE (%)	0	0	0	0	0
CONDENSER	NUMBER OF PASSES		2	2	2	2
	WATER CONTENT (GAL PER MODULE)		156	156	105	105
	CHILLER HEAT REJECTION (MBH)	9,600	9,600	7,050	7,026	7,026
	ENTERING WATER TEMP. (F)	82	82	82	82	82
	LEAVING WATER TEMP. (F)	94	94	94	94	94
	FLOW RATE (GPM)	1600	1600	1175	1171	1171
	CONDENSER MINIMUM FLOW (GPM)	1600	1600	817	1,171	1,171
	LOAD BYPASS MINIMUM FLOW (GPM)	1600	1600	817	1171	1171
	PRESSURE DROP (FT WTR)	10	10	11.7	14.8	14.8
	FOULING FACTOR	0.00025	0.00025	0.00025	0.00025	0.00025
COMPRESSOR	GLYCOL MIXTURE (%)	0%	0%	0%	0%	0%
	NUMBER OF PASSES		2	2	2	2
	WATER CONTENT (GAL PER MODULE)		171	171	96	96
	TYPE-NO		SCREW-1	SCREW-1	CENTRIFUGAL	CENTRIFUGAL
	SPEED (EACH COMPRESSOR)		VFD	VFD	VFD	VFD
	WATER ECONOMIZER		NO	NO	NO	NO
	INPUT KW		302.5	302.5	281.7	281.7
	RLA/LRA (PER COMPRESSOR)		397/430.6	397/430.6	387/426	387/426
	MCA		496	496	487	487
	MOP				680	680
ELECT	ELECTRICAL (VOLT/PHASE/HERTZ)	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
	ELECTRICAL CONNECTION TYPE					
ISOLATION	VIBRATION ISOLATION		YES	YES	YES	YES
	SEISMIC RESTRAINTS		YES	YES	YES	YES
	RAIL BASE		YES	YES	YES	YES
	PIPE CONNECTION		FLEX	FLEX	FLEX	FLEX
OPERATING WEIGHT (LBS)	35000	35000	28730	28730	15680	15680
BASIS OF DESIGN, MODEL#	EXISTING	EXISTING	CARRIER 23XRVS656	CARRIER 23XRVS656	DAIKIN VME0501S	DAIKIN VME0501S
REMARKS/NOTES			1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5
NOTES: 1 PROVIDE SINGLE POINT POWER CONNECTION. 2 PROVIDE SPRING OR NEOPRENE ISOLATION. 3 PROVIDE WITH BACNET COMMUNICATION. 4 PROVIDE ACOUSTICAL SOUND INSULATION. 5 PROVIDE SEISMIC KIT FOR THE ENTIRE CHILLER TO REMAIN INTACT DURING SEISMIC EVENT PER 2014 OSSC REQUIREMENTS.						

WATER FILTER SCHEDULE		
SYSTEM	COND PROC WTR	COND CLG WTR
LOCATION	PUMP ROOM	PUMP ROOM
TYPE	AUTO, WITH CLOSED RECOVERY VESSEL	AUTO, WITH CLOSED RECOVERY VESSEL
MAXIMUM FLOW (GPM)	400	1128
MINIMUM FLOW (GPM)	200	800
FLUID TYPE	WATER	WATER
FLUID SPECIFIC GRAVITY	1	1
CENTRIF. SEPARATOR	EQUIPMENT TAG	CS-1
	FILTER EFF. AT +74 MICRON (SINGLE PASS)	76%
	INLET/OUTLET CONNECTION SIZE (INCHES)	4
	MAXIMUM PRESSURE (PSI)	150
	HEAD LOSS (FT)	16.40
	RINSE CYCLE FLOW (GPM)	40
	RINSE CYCLE MIN. PRESSURE (PSIG)	5
	DRAIN & PURGE VALVE SIZE (IN)	1 1/2
	PURGE VALVE	AUTOMATIC
	PURGE CYCLE, SECONDS	15
RECOVERY BAG FILTER	OPERATING WEIGHT - LBS	456
	BASIS OF DESIGN: PEP FILTERS	ICS2-0400
	EQUIPMENT TAG	RF-1
	INLET/OUTLET CONNECTIONS SIZE (INCHES)	2
	PERFORATED BASKET-PERFORATIONS	9/64
	BAG FILTER GRADE - MICRONS	50
	MAXIMUM PRESSURE (PSI)	100
	HEAD LOSS, FILTER+BAG (FT)	4.39
	RINSE CYCLE FLOW (GPM)	40
	RINSE CYCLE MIN. PRESSURE (PSIG)	5
PUMP	DRAIN CONNNECTION (IN)	1
	BAG CHANGE-OUT ALARM PRESS DIFF. PSI	20
	OPERATING WEIGHT - LBS	230
	BASIS OF DESIGN: PEP FILTERS	BGFS-100
	EQUIPMENT TAG	FP-1
	DESIGN FLOW RATE PER PUMP (GPM)	400
	MIN. SHUT OFF HEAD	49.6
	PUMP HEAD (FT WG)	44.00
	RPM	1200
	PUMP EFFICIENCY	80%
CONTROLLER	VFD CONTROL	YES
	MOTOR HP	7 1/2
	ELECTRICAL POWER	460/3/60
	PUMP WEIGHT - LBS	877
	BASIS OF DESIGN: B&G	E-1510 4EB
	LINE VOLTAGE	LINE VOLTAGE
	LINE VOLTAGE	LINE VOLTAGE
	1,2,3,4,5	1,2,3,4,5
	1,2,3,4,5	1,2,3,4,5
	1,2,3,4,5	1,2,3,4,5
	1,2,3,4,5	1,2,3,4,5

HYDRONIC PUMPS SCHEDULE									
MARK NUMBER	P-3,-4	P-10,-11,-12	P-15,-16	P-22,-23	HWB-1	CPB-1	OPB-2	CCB-1	CHB-1
SYSTEM	CHILL WATER	COND LOOP	PROCESS LOOP	PROCESS TOWER	CHEMICAL FEED	CHEMICAL FEED	CHEMICAL FEED	CHEMICAL FEED	CHEMICAL FEED
TYPE	END SUCTION	DBL SUCTION	END SUCTION	END SUCTION	PERM. MAGNET	PERM. MAGNET	PERM. MAGNET	PERM. MAGNET	PERM. MAGNET
MOUNTING	FLOOR SLAB	FLOOR SLAB	FLOOR SLAB	FLOOR SLAB	IN LINE	IN LINE	IN LINE	IN LINE	IN LINE
GLYCOL/WATER MIXTURE - % PROPYLENE	WATER	WATER	WATER	WATER	HEATING WATER	CONDENSER WTR	CONDENSER WTR	CONDENSER WTR	CHILL WATER
INTERLOCK	CHILLERS	CT-2,-3,-4	PROCESS EQUIP	CT-1	(E)BOILERS	CT-1	PROCESS EQUIP	CT-2,-3,-4	CHILLERS
AVERAGE FLUID TEMPERATURE	49	84	70	84	160	84	70	84	49
DESIGN CRITERIA	QUANTITY	1 EA	1 EA	1 EA	1	1	1	1	1
	DESIGN FLOW RATE PER PUMP (GPM)	858	1992	410	420	5	5	5	5
	MIN FLOW RATE PER PUMP (GPM)	769	800	205	200	5	5	5	5
	MIN. SHUT OFF HEAD	36	119	70.5	179	34	34	34	34
	PUMP HEAD (FT WG)	35	90	160	60	13	18	17	5
	MOTOR (HP)	15	60	30	10	1/4	1/4	1/4	1/4
	MOTOR TYPE	PREMIUM EFF	PREMIUM EFF	PREMIUM EFF	PREMIUM EFF	ECM	ECM	ECM	ECM
	VFD CONTROL	YES	YES	YES	YES	ELECTRONIC	ELECTRONIC	ELECTRONIC	ELECTRONIC
	RPM	1750	1750	1800	1800	1100-4400	1100-4400	1100-4400	1100-4400
	PUMP EFFICIENCY	77%	80%	68%	76%				
NET POSITIVE SUCTION HEAD REQUIRED (FT)	5.72	7.57	7.81	6.89	13.398	1.6863			
DESIGN WEIGHT (LBS) (NOTE 5)	1045	2282.5	896.5	437.8	10	10	10	10	10
MANUFACTURER-BASIS OF DESIGN:	BELL&GOSSETT	BELL&GOSSETT	BELL&GOSSETT	BELL&GOSSETT	TACO	TACO	TACO	TACO	TACO
MODEL-BASIS OF DESIGN:	E-1510 6G	HSC-S	E-1510 3GB	E-1510 3BD	VR3452	VR3452	VR3452	VR3452	VR3452
REMARKS/NOTES	2,4,5	2,4,5	1,2,5	1,2,5	3	3	3	3	3
NOTES: 1 INSTALL NEW INERTIA BASE OVER EXISTING HOUSEKEEPING PAD. 2 PROVIDE CONCRETE FILLED INERTIAL BASE WITH SPRING VIBRATION ISOLATORS. 3 PROVIDE DIFFERENTIAL PRESSURE CONTROL 4 PROVIDE NEW HOUSEKEEPING PAD. 5 PUMP WEIGHTS DOES NOT INCLUDE INERTIA BASE OR SUPPORTS.									



Proj No: MFIA 9381
Rev 1
ADDENDUM#02
07/20/2018
Drawn By: MG
Chkd By: SWM
DSN By: MG

OREGON CONVENTION CENTER
CHILLER PLANT REDESIGN
777 NE Martin Luther King Jr Blvd, Portland, OR 97232
MECHANICAL SCHEDULES

Issuance
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Date:
JUNE 05, 2018

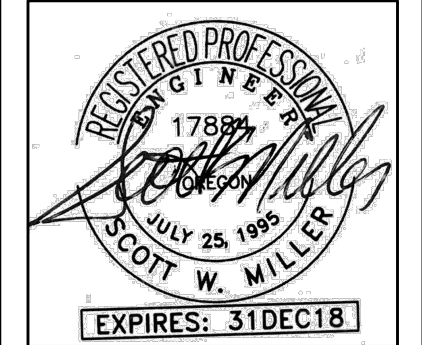


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MECHANICAL SEISMIC SUPPORT AND BRACING/RESTRAINT REQUIREMENTS								
EQUIPMENT SYMBOL	DESCRIPTION	MOUNTING LOCATION	BASIS OF DESIGN UNIT WEIGHT LBS (SEE NOTE 3)	COMPONENT IMPORTANCE FACTOR Ip	DEFERRED SEISMIC SUPPORT/RESTRAINT SUBMITTAL	SPECIAL INSPECTION REQUIRED	CERTIFICATE OF COMPLIANCE (SEE NOTE 5)	APPLICABLE NOTES (SEE NOTES: 1,2)
SF-1214	CABINET INLINE FAN	INLINE	150	1.0	X		FOR MOUNTING ONLY	
EF-1214	ROOF UPBLAST FAN	ROOF CURB	121	1.5	X	YES	CONTINUED OPERATION	FOR DUCTWORK & DAMPER PROVIDE Ip=1.5
CT-1	COOLING TOWER	ROOF	25780	1.0		YES	FOR MOUNTING ONLY	SEE STRUCTURAL PLANS AND CALCULATIONS
CT-2	COOLING TOWER	ROOF	24780	1.0		YES	FOR MOUNTING ONLY	SEE STRUCTURAL PLANS AND CALCULATIONS
CT-3	COOLING TOWER	ROOF	24780	1.0		YES	FOR MOUNTING ONLY	SEE STRUCTURAL PLANS AND CALCULATIONS
CT-4	COOLING TOWER	ROOF	10470	1.0		YES	FOR MOUNTING ONLY	SEE STRUCTURAL PLANS AND CALCULATIONS
CH-3, CH-4	CHILLER, BASE BID	FLOOR-NEOPRENE	28730	1.0	X	YES	FOR MOUNTING ONLY	
CH-3, CH-4	CHILLER, ALTERNATE#1	FLOOR-NEOPRENE	15680	1.0	X	YES	FOR MOUNTING ONLY	
CS-1	CENTRIFUGAL SEPARATOR	FLOOR	456	1.0	X		FOR MOUNTING ONLY	
CS-2	CENTRIFUGAL SEPARATOR	FLOOR	617	1.0	X		FOR MOUNTING ONLY	
FP-1	FILTER PUMP	FLOOR INERTIA BASE	877	1.0	X	YES	FOR MOUNTING ONLY	WEIGHT DOES NOT INCLUDE INERTIA BASE
FP-2	FILTER PUMP	FLOOR INERTIA BASE	1009	1.0	X	YES	FOR MOUNTING ONLY	WEIGHT DOES NOT INCLUDE INERTIA BASE
P-3 & P-4	CHILL WTR PUMP	FLOOR INERTIA BASE	1050	1.0	X	YES	FOR MOUNTING ONLY	WEIGHT DOES NOT INCLUDE INERTIA BASE
P-10, P-11 & P-12	CONDENSER WTR PUMP	FLOOR INERTIA BASE	2290	1.0	X	YES	FOR MOUNTING ONLY	WEIGHT DOES NOT INCLUDE INERTIA BASE
P-15, P-16	PROCESS LOOP PUMP	FLOOR INERTIA BASE	890	1.0	X	YES	FOR MOUNTING ONLY	WEIGHT DOES NOT INCLUDE INERTIA BASE
P-22, P-23	PROCESS TOWER PUMP	FLOOR INERTIA BASE	440	1.0	X	YES	FOR MOUNTING ONLY	WEIGHT DOES NOT INCLUDE INERTIA BASE
DUCTWORK	HVAC DUCTWORK	INTERIOR	SEE PLANS	[4]	X		FOR MOUNTING ONLY	
PIPING	CONDENSER WATER	INTERIOR	SEE PLANS	[4]	X		FOR MOUNTING ONLY	
PIPING	CHILL WATER	INTERIOR	SEE PLANS	[4]	X		FOR MOUNTING ONLY	
PIPING	PROCESS WATER	INTERIOR	SEE PLANS	[4]	X		FOR MOUNTING ONLY	
PIPING	VENT	INTERIOR	SEE PLANS	[4]	X		FOR MOUNTING ONLY	
NOTES:								
1 PROVIDE ENGINEERED STRUCTURAL DESIGN AND STRUCTURAL CALCULATIONS FOR THE SUPPORT AND SEISMIC REQUIREMENTS PER CODE.								
2 SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS: 230500								
3 EQUIPMENT WEIGHTS SHOWN IS FOR BASIS OF DESIGN EQUIPMENT, CALCULATIONS SHALL BE BASED ON ACTUAL EQUIPMENT OPERATING WEIGHTS INSTALLED.								
4 SEISMIC IMPORTANCE FACTOR FOR PIPING AND DUCTWORK SHALL BE BASED ON THE HVAC/PLUMBING EQUIPMENT BEING SERVED.								
5 CERTIFICATION BY ANALYSIS, TESTING OR EXPERIENCE DATA FOR NON-STRUCTURAL COMPONENTS AND DESIGNATED SEISMIC SYSTEMS PER ASCE7, SECTION 13.2.								
7/19/2018								

REFRIGERANT CALCULATIONS SCHEDULE	
REFRIGERANT USED	134a
REFRIGERANT TYPE	A1
HAZARD LEVEL	2-0-0
ALLOWED REFRIGERANT PER OCCUPIED SPACE	
ALLOWED REFRIGERANT (LB/1000CF)	13
ALLOWED REFRIGERANT (PPM)	50000
OCCUPATIONAL EXPOSURE LIMITS (OEL TLV-TWA)	1000
PPM	25%
IDLf	3.25
ROOM AREA (SF)	3528
ROOM HEIGHT (FT)	27
ROOM VOLUME (CF)	95,256
ALLOWED REFRIGERANT IN ROOM (LBS)	1,238
REFRIGERANT IN EACH EXISTING CHILLER (LBS)	2384
REFRIGERANT IN EACH NEW CHILLER (LBS)	1430
NUMBER OF OLD AND NEW CHILLERS	2
MAXIMUM AMOUNT OF REFRIGERANT IN SPACE (LBS)	7628
SPECIFIC VOLUME (CU.FT/LB)	13.675
AIR WEIGHT(LBS)	
G MASS OF REFRIGERANT (LARGEST MACHINE)-LBS	2384
EMERGENCY VENTILATION AIRFLOW (Q=100*G*0.5)	
Q AIRFLOW - CFM	4890
NORMAL VENTILATON AIRFLOW	
CODE REQUIRED (CFM/SF)	0.5
AIRFLOW REQUIRED (CFM)	1764
COOLING SPACE VENTILATON AIRFLOW	
TEMPERATURE GAIN	18
TOTAL HEAT GAIN (BTUH) OLD CHILLERS	361,221
TOTAL HEAT GAIN (BTUH) NEW CHILLERS	5000
TOTAL HEAT IN SPACE (BTUH)	366,221
MINIMUM AIRFLOW REQUIRED (CFM)	18,496
PROVIDED AIRFLOW BY EXISTING EXHAUST FAN (CFM)	22,250
NOTES:	1,2
1 MACHINERY ROOM COOLING VENTILATION AS PROVIDED BY THE EXISTING FAN. 2 MACHINERY ROOM IS EXISTING.	



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Drawn By: MC			
Chkd By: SWM			
DSGN By: MC			

OREGON CONVENTION CENTER

CHILLER PLANT REDESIGN

777 NE Martin Luther King Jr Blvd, Portland, OR 97232

MECHANICAL SCHEDULES

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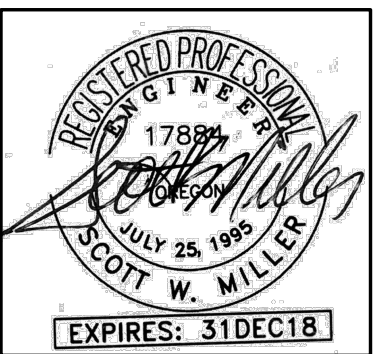
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REV 1 ADDENDUM#02 07/20/2018

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OREGON CONVENTION CENTER
CHILLER PLANT REDESIGN
777 NE Martin Luther King Jr Blvd, Portland, OR 97232
MECHANICAL CHILLER ROOM DEMO PLAN

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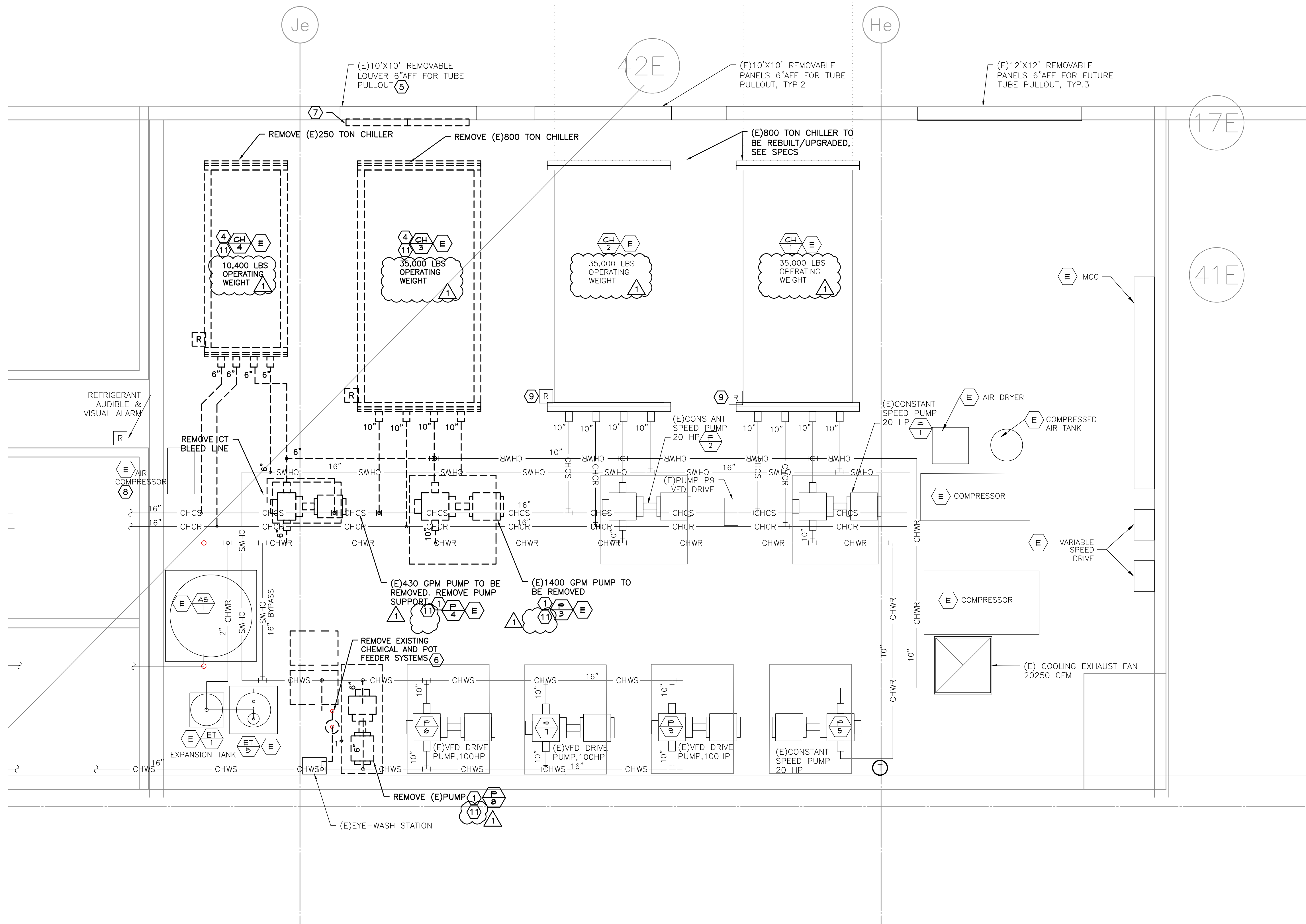
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GENERAL NOTES:

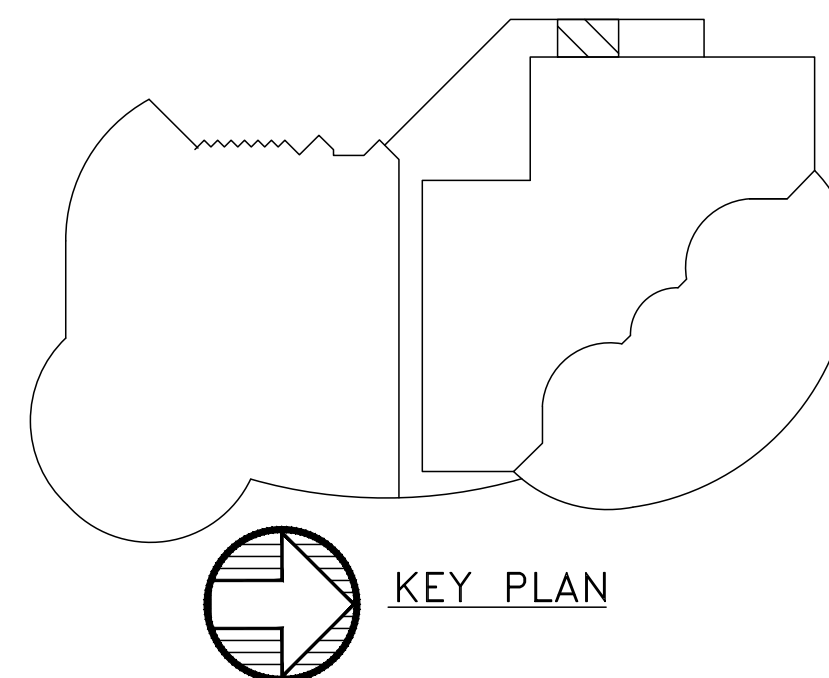
- VERIFY ALL EXISTING CONDITIONS RELATIVE TO THE SCOPE OF WORK. DO NOT FABRICATE PIPING/DUCTWORK WITHOUT CONFIRMING SPACE EXISTS, FOR SIZES REQUIRED.
- COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.
-

(X) MECHANICAL KEYED NOTES:

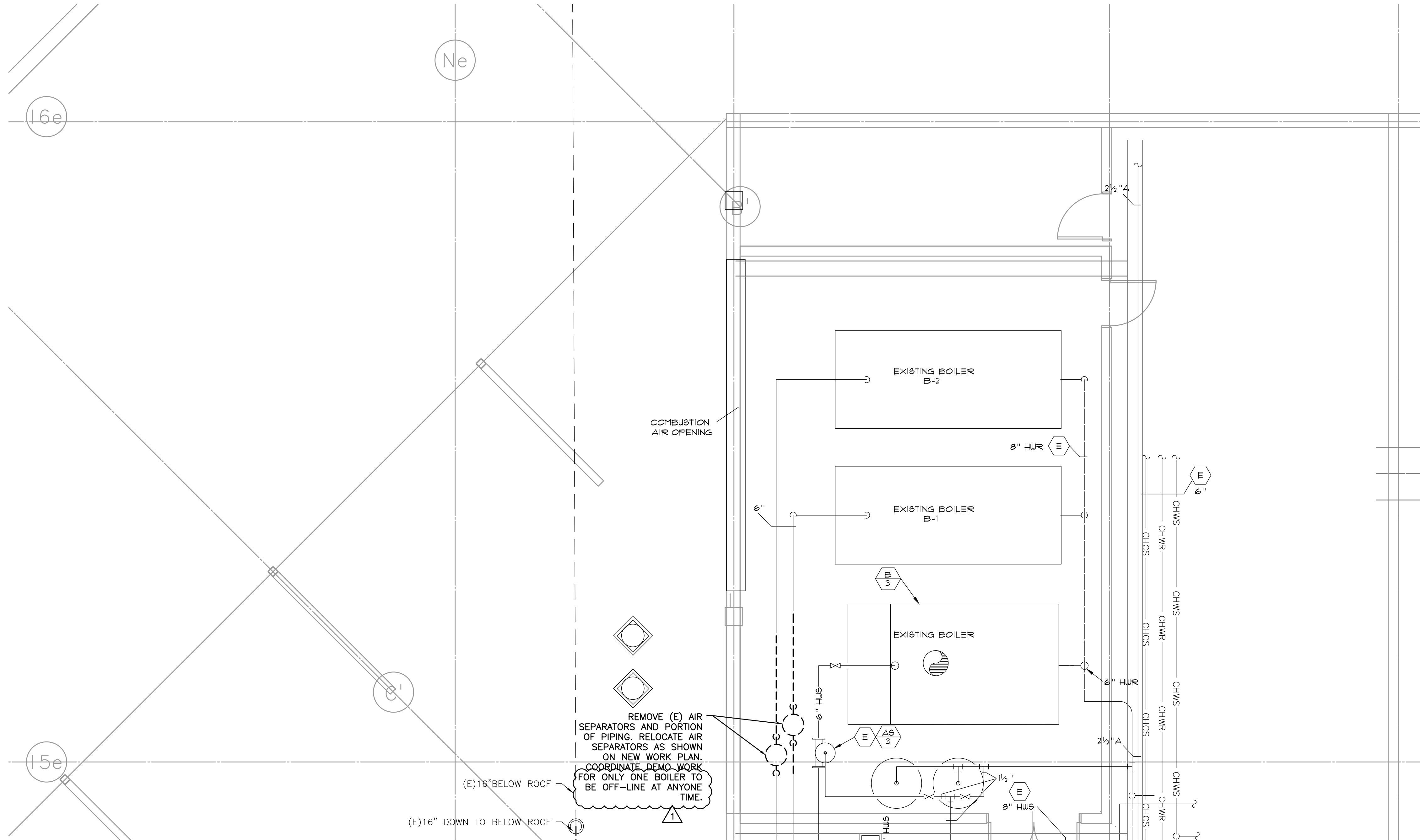
- REMOVE EXISTING PUMP, INERTIA BASE AND PERTAINING CONTROLS & WIRING; PIPING INCLUDING FITTINGS TO THE EXTENT SHOWN; AND HANGERS & SUPPORTS.
- REMOVE EXISTING COOLING TOWER, PERTAINING PIPING FITTINGS AND CONTROLS. REPLACE AS SHOWN ON NEW WORK PLANS.
- EXISTING ROOF PENETRATION. CAP AND PROVIDE WATERTIGHT CONSTRUCTION.
- REMOVE EXISTING CHILLER, AND PERTAINING SENSORS & CONTROLS; PRESSURE RELIEF PIPING, VALVES, & FITTINGS; AND SUPPORTS.
- EXISTING CHILLER ROOM WALL PANEL FOR REMOVAL AND INSTALLATION OF EQUIPMENT. PROTECT SIDEWALK AND RETAINING WALL. OWNER WILL REMOVE SHRUBS IN FRONT OF ACCESS. COORDINATE EXTERIOR LANDSCAPE AND SIDEWALK RETAINING WALL MODIFICATIONS WITH OWNER.
- REMOVE EXISTING CHEMICAL FEED SYSTEM AND PERTAINING PIPING AND CONTROLS. SALVAGE EXISTING PUMPS AND CONTROLLERS AND RETURN TO OWNER. SEE NEW WORK PLANS FOR NEW SYSTEM.
- REMOVE OUTSIDE AIR INTAKE DAMPER SEE NEW WORK PLANS FOR MODIFICATIONS.
- EXISTING CHILLER ROOM REFRIGERANT MONITOR STATION TO REMAIN.
- EXISTING REFRIGERANT SAMPLING SENSOR TO REMAIN.
- BASE BID: (E)PWS&R TO REMAIN AS IS. ALTERNATE #2: REMOVE EXISTING COOLING TOWER PROCESS WATER PIPING FITTINGS AND SUPPORTS AS SHOWN. SEE NEW WORK PLANS FOR REPLACEMENT WITH LARGER PIPING.
- REMOVE EXISTING HOUSEKEEPING PAD. SEE NEW PLANS FOR NEW INSTALLATION.
- EXISTING ROOF PIPE PENETRATION TO BE MODIFIED FOR RE-USE. SEE NEW PLANS FOR REQUIREMENTS.



1 ENLARGED MECHANICAL CHILLER ROOM PLAN — DEMOLITION
M1.11 SCALE: 1/4" = 1'-0"



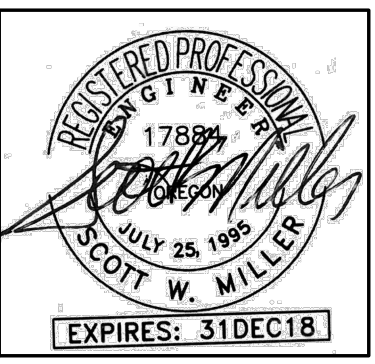
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ARCH expand D (24.00 x 36.00 Inches), 1:1



1 ENLARGED 2ND LEVEL WEST PLAN — DEMOLITION
M1.20 SCALE: 1/4" = 1'-0"

GENERAL NOTES:

- A. VERIFY ALL EXISTING CONDITIONS RELATIVE TO THE SCOPE OF WORK. DO NOT FABRICATE PIPING/DUCTWORK WITHOUT CONFIRMING SPACE EXISTS, FOR SIZES REQUIRED.
- B. COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.
- C. -.



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Chkd By:	SWM			
DSGN By:	MG			

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MECHANICAL 2ND LEVEL PLAN — DEMOLITION

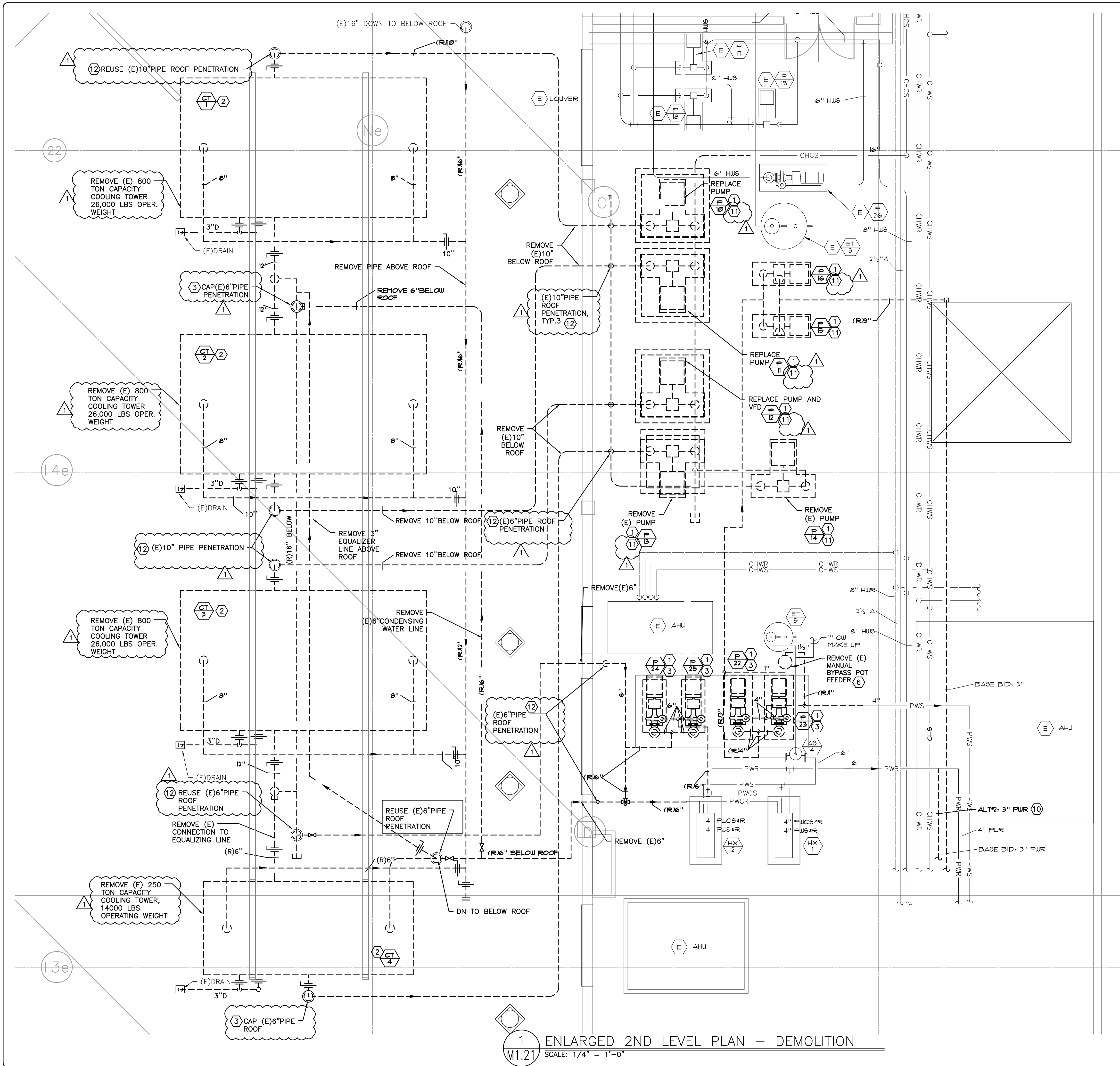
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M1.20

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GENERAL NOTES:

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- COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.
-

MECHANICAL KEYED NOTES:

- REMOVE EXISTING PUMP, INERTIA BASE AND PERTAINING CONTROLS & WIRING; PIPING INCLUDING FITTINGS TO THE EXTENT SHOWN; AND HANGERS & SUPPORTS.
- REMOVE EXISTING COOLING TOWER, PERTAINING PIPING FITTINGS AND CONTROLS. REPLACE AS SHOWN ON NEW WORK PLANS.
- EXISTING ROOF PENETRATION. CAP AND PROVIDE WATERTIGHT CONSTRUCTION.
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- REMOVE EXISTING CHEMICAL FEED SYSTEM AND PERTAINING PIPING AND CONTROLS. SALVAGE EXISTING PUMPS AND CONTROLLERS AND RETURN TO OWNER. SEE NEW WORK PLANS FOR NEW SYSTEM.
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MECHANICAL UPPER PLAN - DEMOLITION

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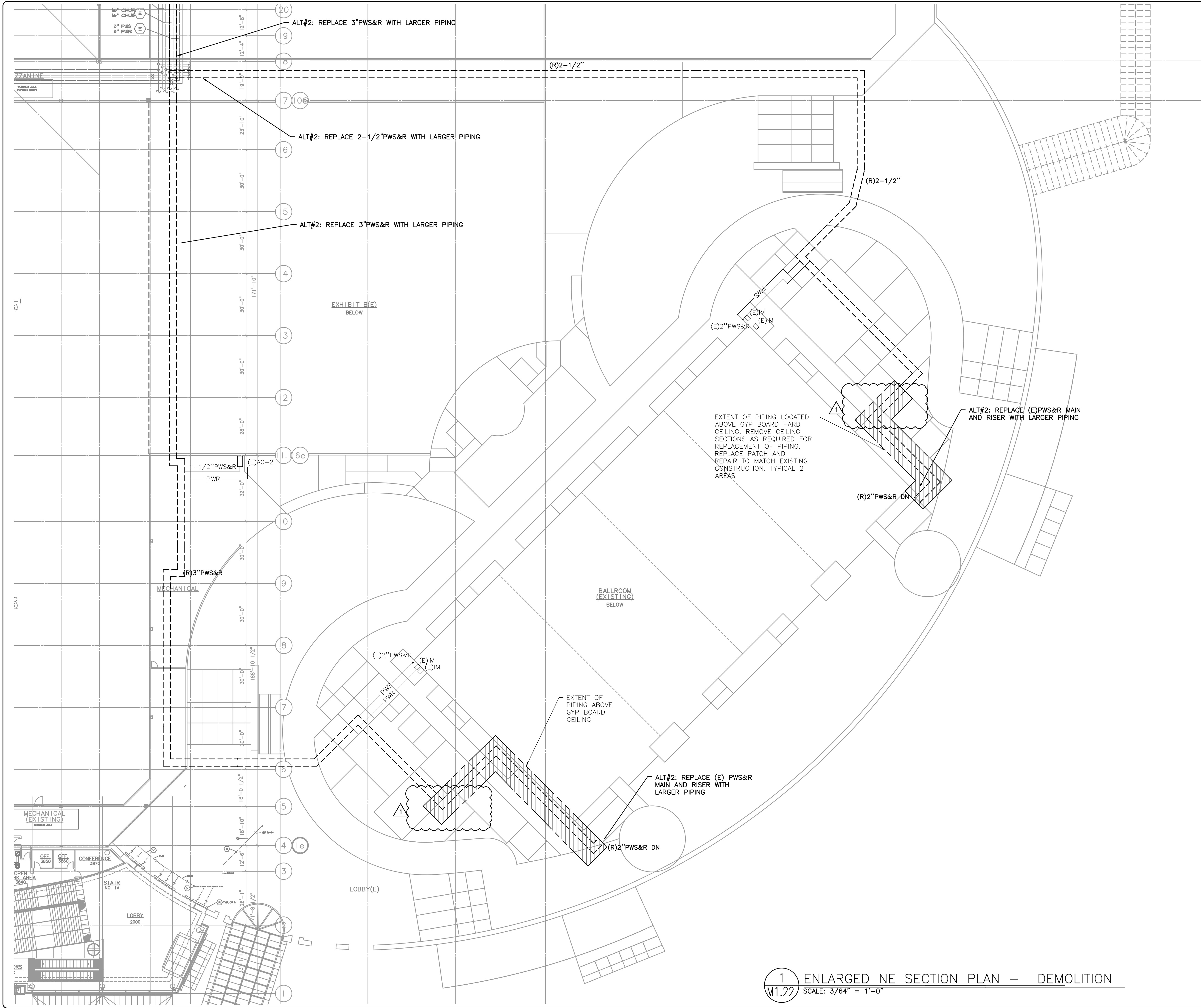
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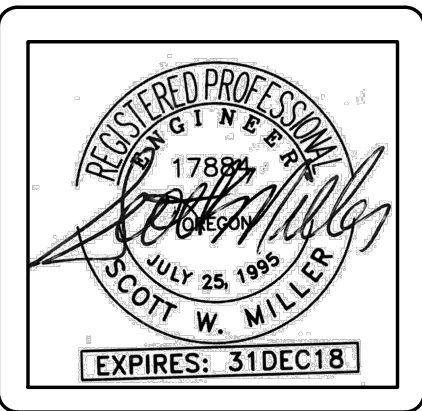
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- GENERAL NOTES:
- A. VERIFY ALL EXISTING CONDITIONS RELATIVE TO THE SCOPE OF WORK. DO NOT FABRICATE PIPING/DUCTWORK WITHOUT CONFIRMING SPACE EXISTS, FOR SIZES REQUIRED.
 - B. COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.
 - C. -.



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Chkd By:	SWM
DSN By:	MG

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MECHANICAL UPPER NE SECTION - DEMOLITION PLAN

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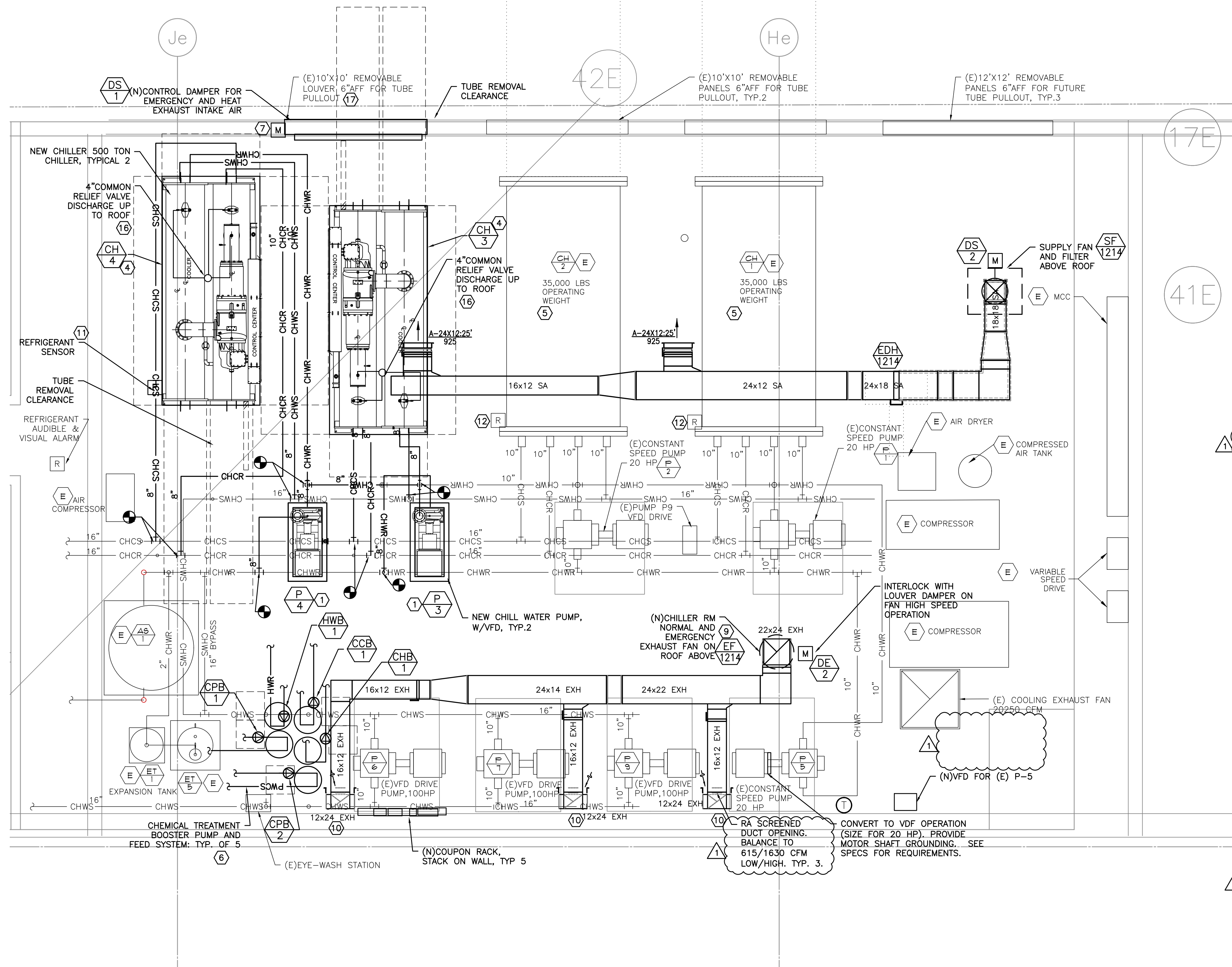
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M1.22

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M1.22 ENLARGED NE SECTION PLAN - DEMOLITION
SCALE: 3/64" = 1'-0"



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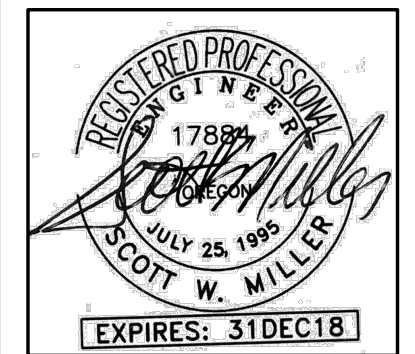
1 ENLARGED MECHANICAL CHILLER ROOM PLAN — NEW WORK
M2.11 SCALE: 1/4" = 1'-0"

GENERAL NOTES:

- VERIFY ALL EXISTING CONDITIONS RELATIVE TO THE SCOPE OF WORK. DO NOT FABRICATE PIPING/DUCTWORK WITHOUT CONFIRMING SPACE EXISTS, FOR SIZES REQUIRED.
- COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.

(X) MECHANICAL KEYED NOTES:

- NEW PUMP AND INERTIA BASE. INSTALL ON NEW FLOOR PAD.
- NEW COOLING TOWER. MOUNT ON RIGID STRUCTURAL RAIL BASE. PROVIDE SEISMIC AND VIBRATION ISOLATION AT STRUCTURE. PROVIDE LADDER AND TOP RAILING TO MAINTENANCE PLATFORM ON SOUTH END FOR ACCESS ON TOP. SEE STRUCTURAL FOR INSTALLATION DETAILS.
- NEW PUMP AND INERTIA BASE. INSTALL ON EXISTING FLOOR PAD.
- NEW CHILLER: PROVIDE WITH SEISMIC SUPPORT AND SECURE TO NEW 6" HOUSEKEEPING PAD WITH VIBRATION ISOLATORS. PROVIDE VIBRATION ISOLATION ON ALL PIPE CONNECTIONS.
- EXISTING CHILLER. UPGRADE CONTROLS SEE SPECIFICATIONS.
- NEW CHEMICAL FEED ZONE LOOP BOOSTER PUMP. PROVIDE 55 GALLON CHEMICAL STORAGE TANKS AND CHEMICAL PUMP FEEDER PER SPECS. SEE SPECS FOR WATER TREATMENT REQUIREMENTS.
- NEW MOTORIZED CONTROL DAMPER FOR COOLING VENTILATION AND EMERGENCY VENTILATION SYSTEM.
- EXISTING CHILLER ROOM COOLING VENTILATION EXHAUST FAN. PROVIDE NEW CONTROL INTERLOCK WITH NEW INTAKE AIR CONTROL DAMPER AND EXISTING SPACE THERMOSTAT.
- NEW CHILLER ROOM NORMAL AND EMERGENCY EXHAUST FAN.
- EXHAUST AIR DUCT DOWN TO SCREENED OPENING. INSTALL 21 INCH ABOVE FLOOR.
- NEW REFRIGERANT SENSOR. INSTALL 18 INCHES ABOVE FLOOR. ROUTE SAMPLING TUBE TO EXISTING REFRIGERANT MONITOR PANEL.
- EXISTING REFRIGERANT SENSOR. CALIBRATE DEVICE.
- EXISTING HEAT EXCHANGER. REBALANCE FOR NEW FLOW.
- NEW CONDENSER WATER FILTRATION SYSTEM INCLUDING CENTRIFUGAL SEPARATOR, RECOVERY FILTER AND PUMP. INSTALL PUMP ON INERTIA BASE WITH VIBRATION ISOLATION. INSTALL THE CENTRIFUGAL SEPARATOR AND BAG FILTER HOUSING VERTICALLY ON LEGS WITH ANCHORS. THE SEPARATOR MUST BE ELEVATED TO ALLOW GRAVITY FLOW OF DRAIN LINE TO THE BAG FILTER INLET CONNECTION.
- NEW COOLING TOWER PROCESS WATER PIPING, REPLACE PIPING AS SHOWN.
- CHILLER PRESSURE RELIEF VALVE. CONNECT THE EVAPORATOR AND CONDENSER RELIEF VALVE, PIPE TO THROUGH ROOF AND DISCHARGE 1 FT ABOVE ROOF PARAPET WALL. PROVIDE WATERTIGHT ROOF PENETRATION. PROVIDE DRIP LEG AND FLEX CONNECTION AT EACH DISCHARGE PIPE CONNECTION.
- REINSTALL (E)WALL ACCESS LOUVER TO MAINTAIN STRUCTURAL/SECURITY INTEGRITY OF EXISTING CONSTRUCTION. REPLACE SEALANTS/GASKETS TO PROVIDE A WATERTIGHT AND AIRTIGHT CONSTRUCTION. OWNER TO REPAIR LANDSCAPE AFTER CONTRACTOR LEVELS PLANTING BED.
- ENLARGE EXISTING PIPING PENETRATION TO ACCOUNT FOR LARGER PIPING. PROVIDE NEW FLOOR/ROOF PIPE SLEEVE AND INSTALLATION TO MAINTAIN FIRE/SMOKE RATING OF EXISTING BLDG. CONSTRUCTION AS REQUIRED BY CODE AND PER SPECS.
- REUSE EXISTING PIPING FLOOR/ROOF PENETRATION. PROVIDE NEW PENETRATION INSTALLATION TO MAINTAIN FIRE/SMOKE RATING OF EXISTING BLDG. CONSTRUCTION AS REQUIRED BY CODE AND PER SPECS.



REV 1	ADDENDUM#02	07/20/2018
Proj No:	MFA 9381	
Drawn By:	MG	
Chkd By:	SWM	
DSN By:	MG	

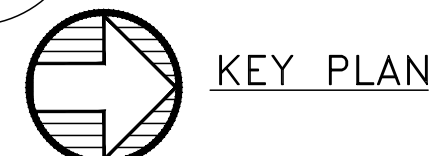
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CHILLER PLANT REDESIGN
777 NE Martin Luther King Jr Blvd, Portland, OR 97232
CHILLER MECHANICAL ROOM PLAN

Issuance
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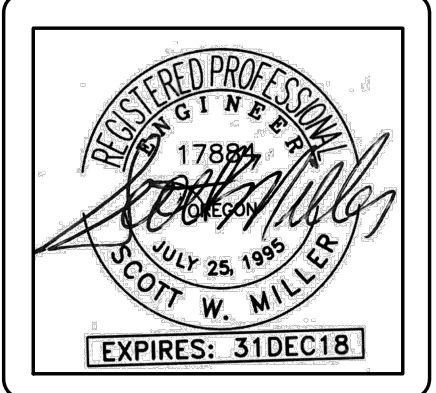
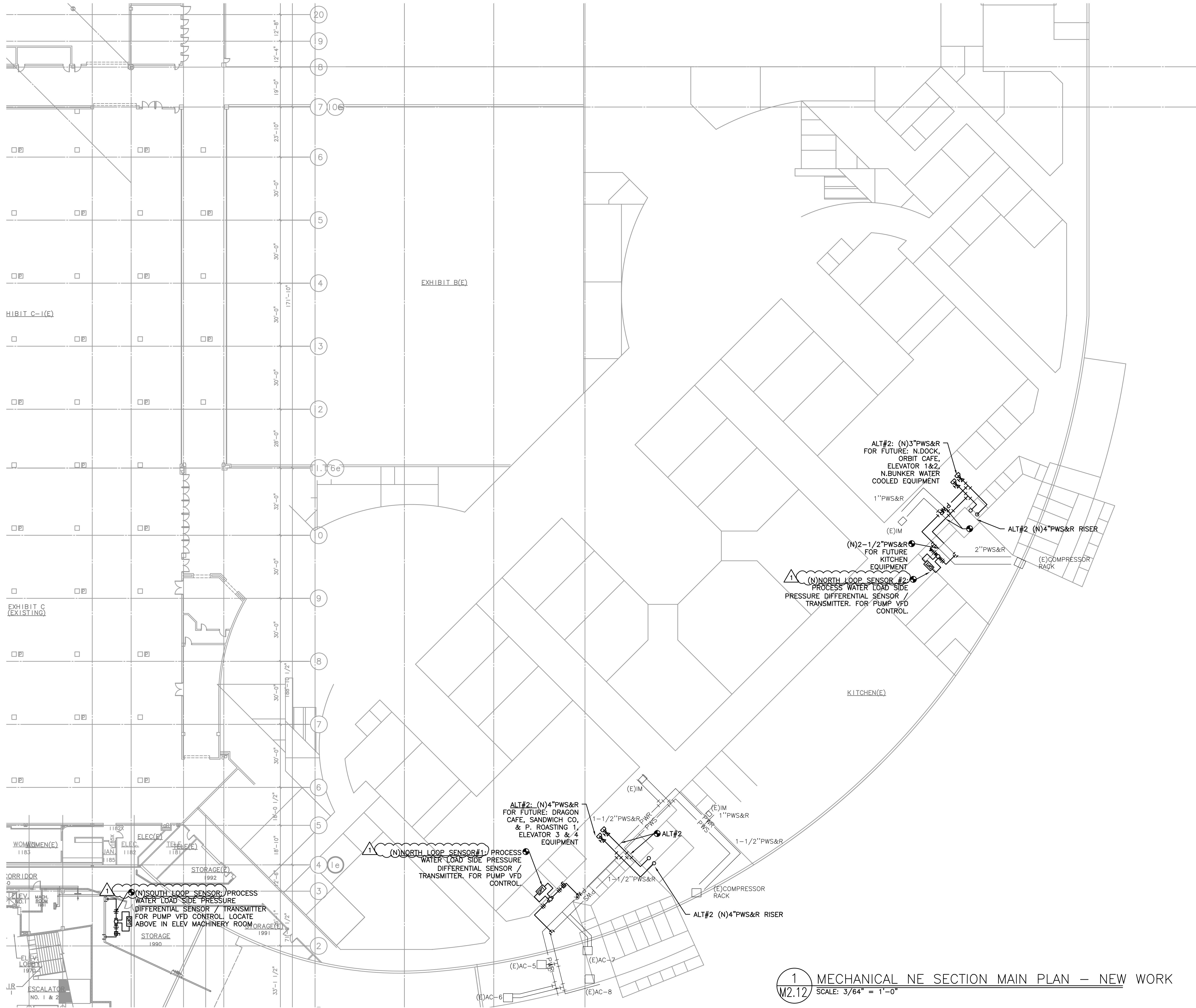


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SHEET
M2.11



G:\Metro\9381_Oregon Convention Center Chiller Plant\Mech\9381_OCC-CP_M20.dwg, M2.12, 7/19/2018 6:23:09 PM,
ARCH expand D (24.00 x 36.00 Inches), 1:1



Proj No:	MFA 9381	REV 1	ADDENDUM#02	07/20/2018
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Chkd By:	SWM			
DSGN By:	MG			

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NE SECTION MAIN PLAN - NEW WORK

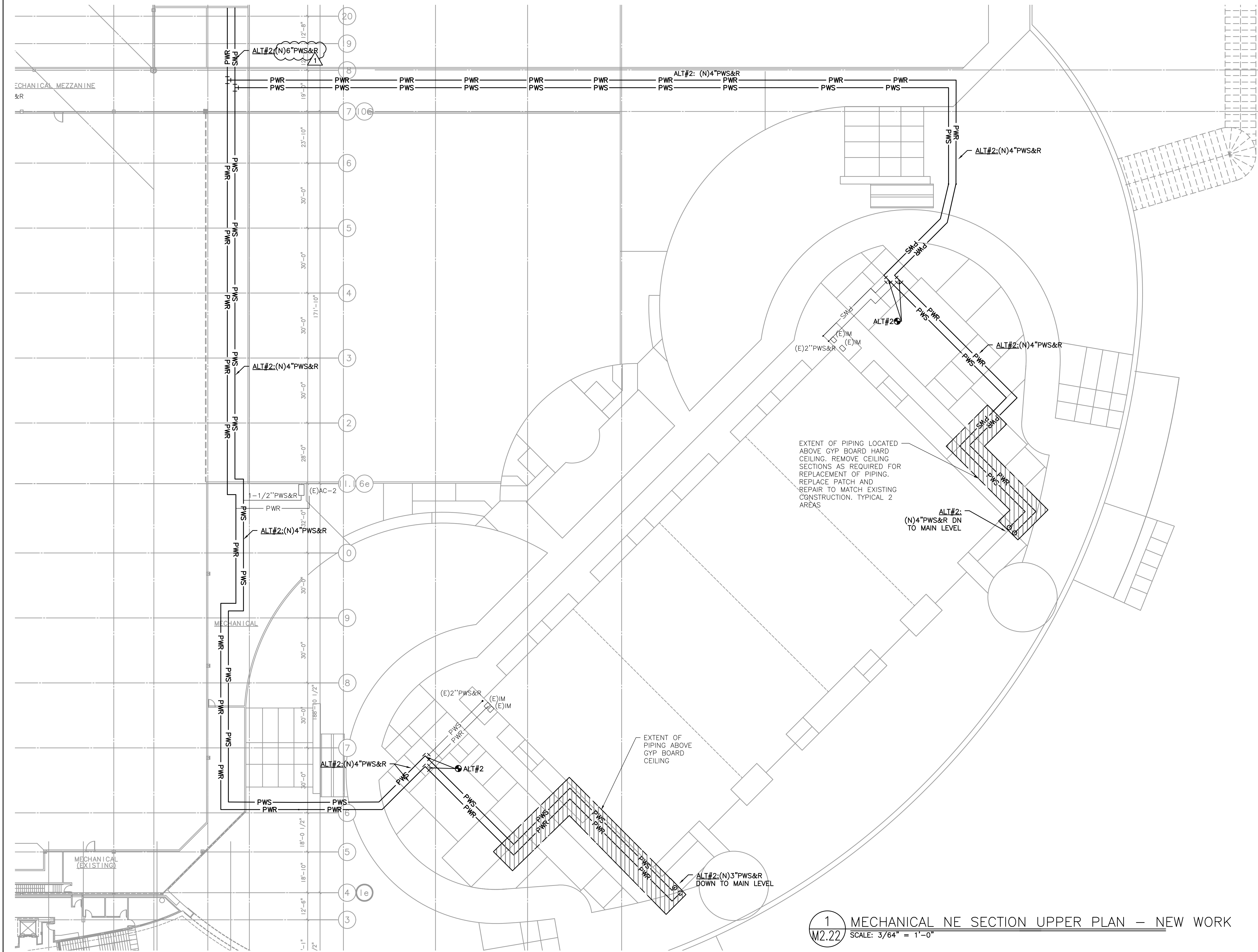
Issuance
PERMIT SET
Date:
JUNE 05, 2018



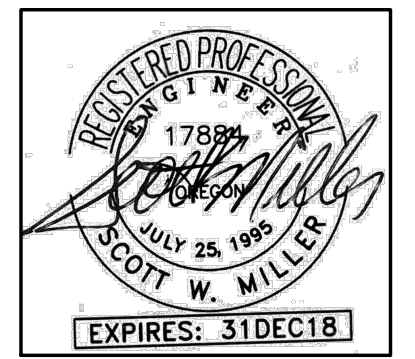
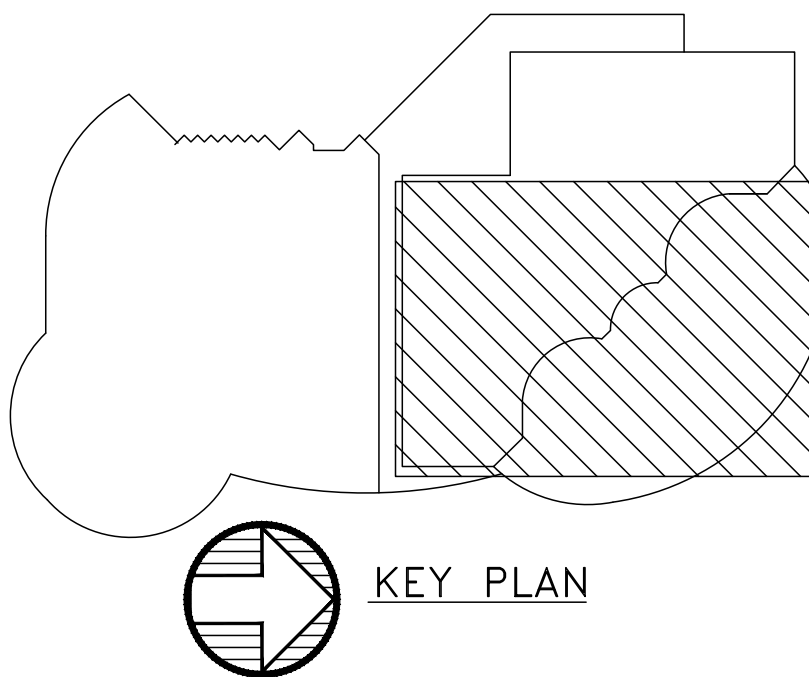
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SHEET
M2.12

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1 MECHANICAL NE SECTION UPPER PLAN — NEW WORK
M2.22 SCALE: 3/64" = 1'-0"



Proj No:	MFA 9381	REV 1	ADDENDUM#02	07/20/2018
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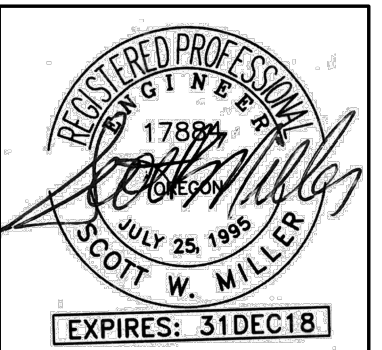
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NE SECTION UPPER PLAN — NEW WORK

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M2.22



Proj No:	MFA 9381
REV	1
ADDENDUM	#02
DATE	07/20/2018
Drawn By:	MG
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DSGN By:	MG

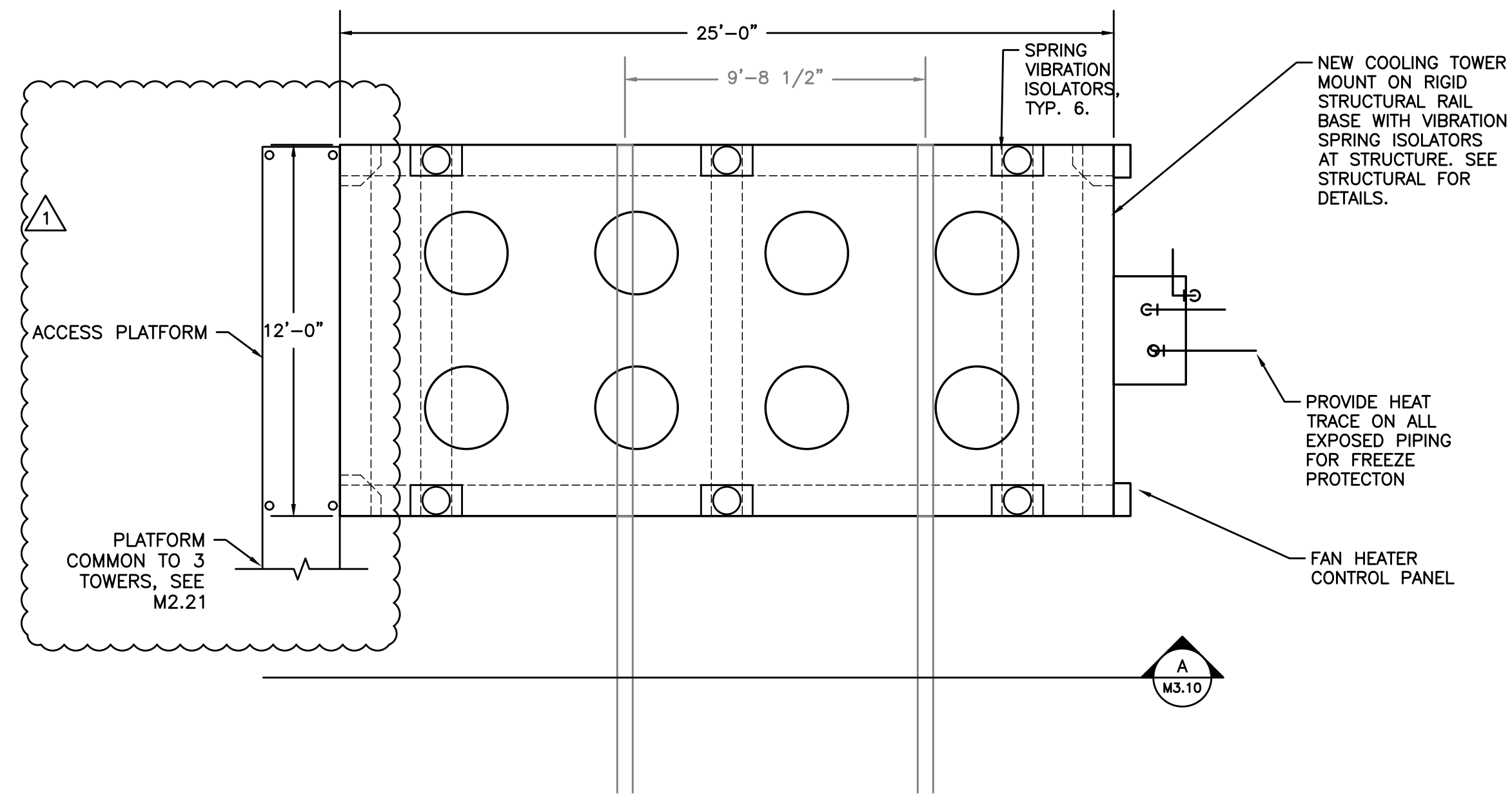
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MECHANICAL SECTIONS AND PLAN DETAILS

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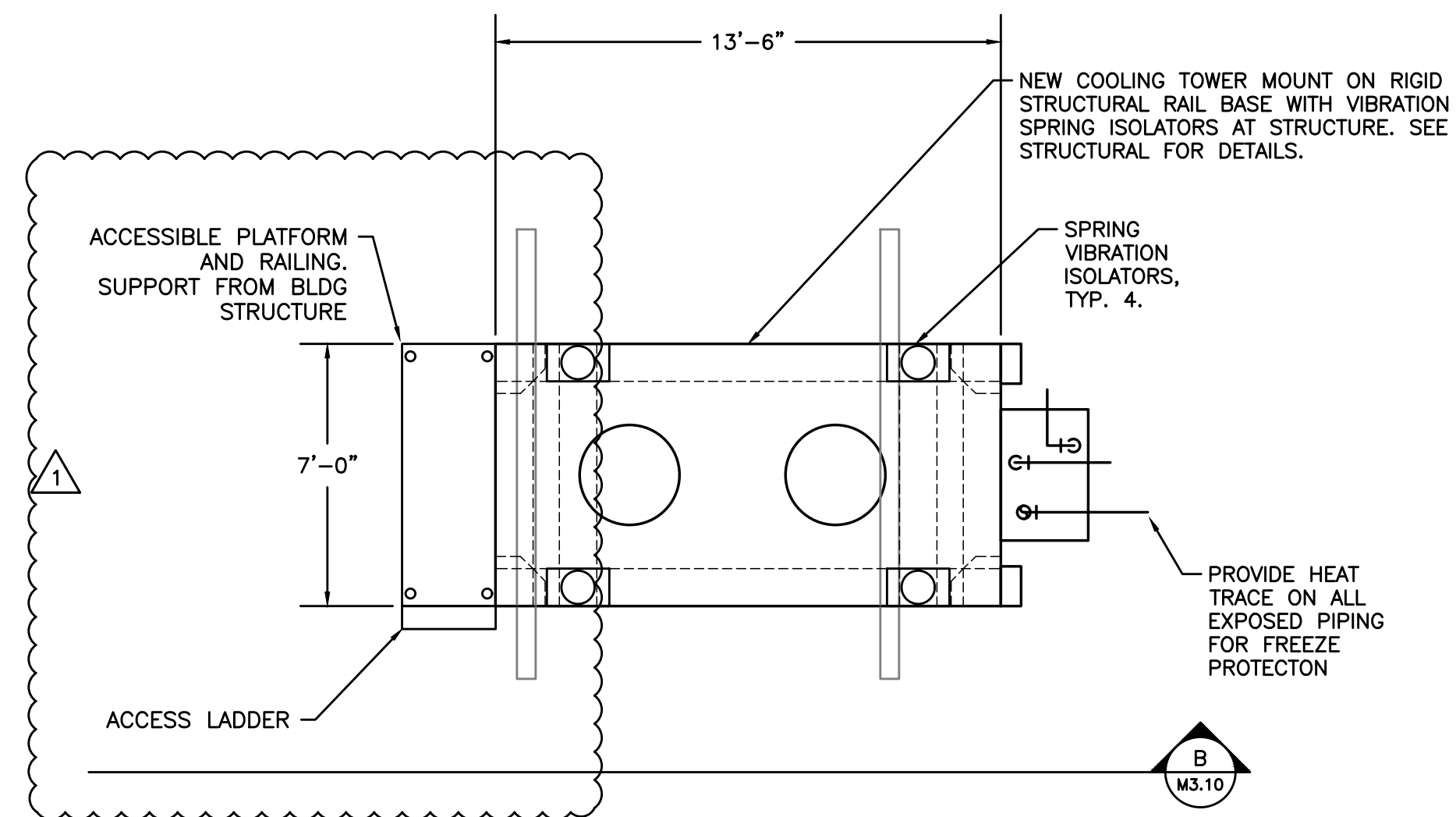


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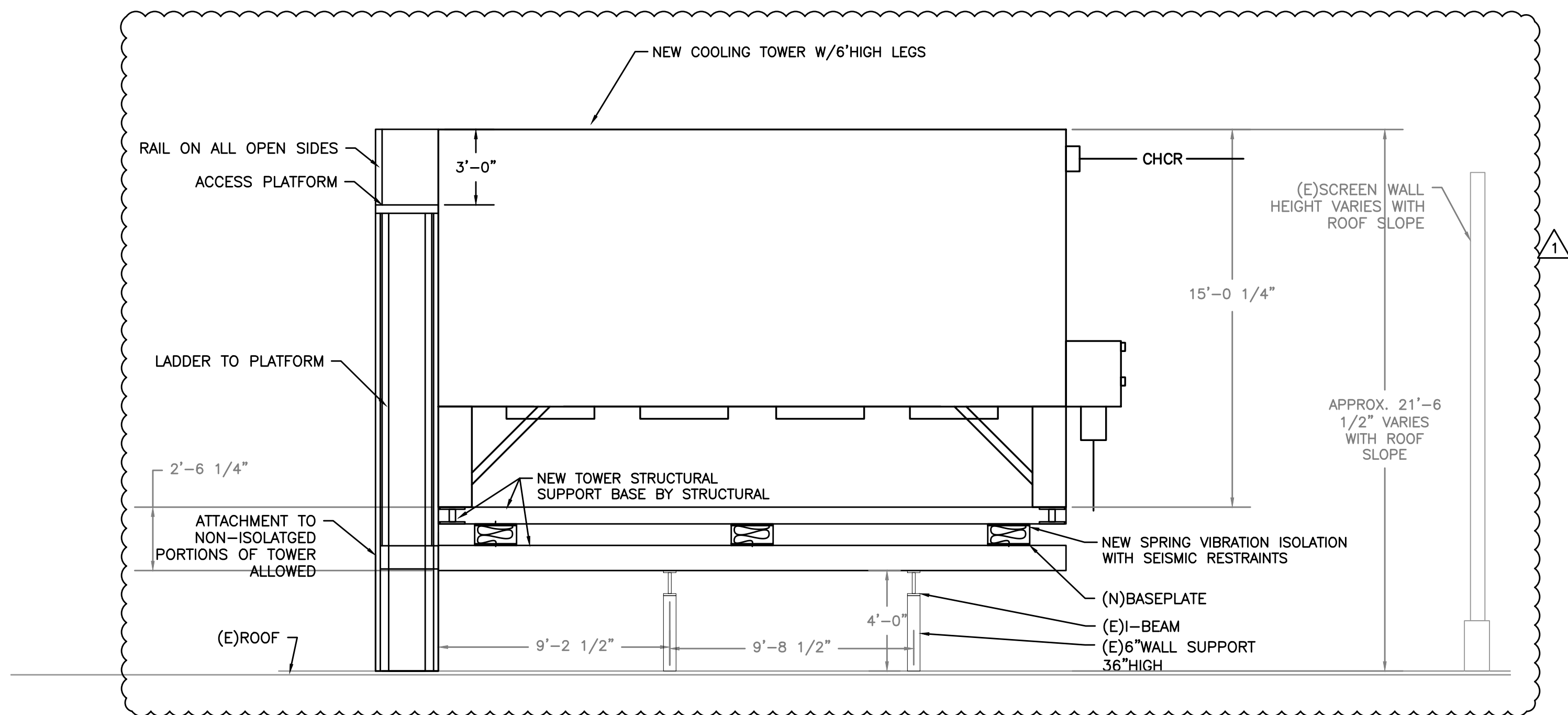
SHEET
M3.10



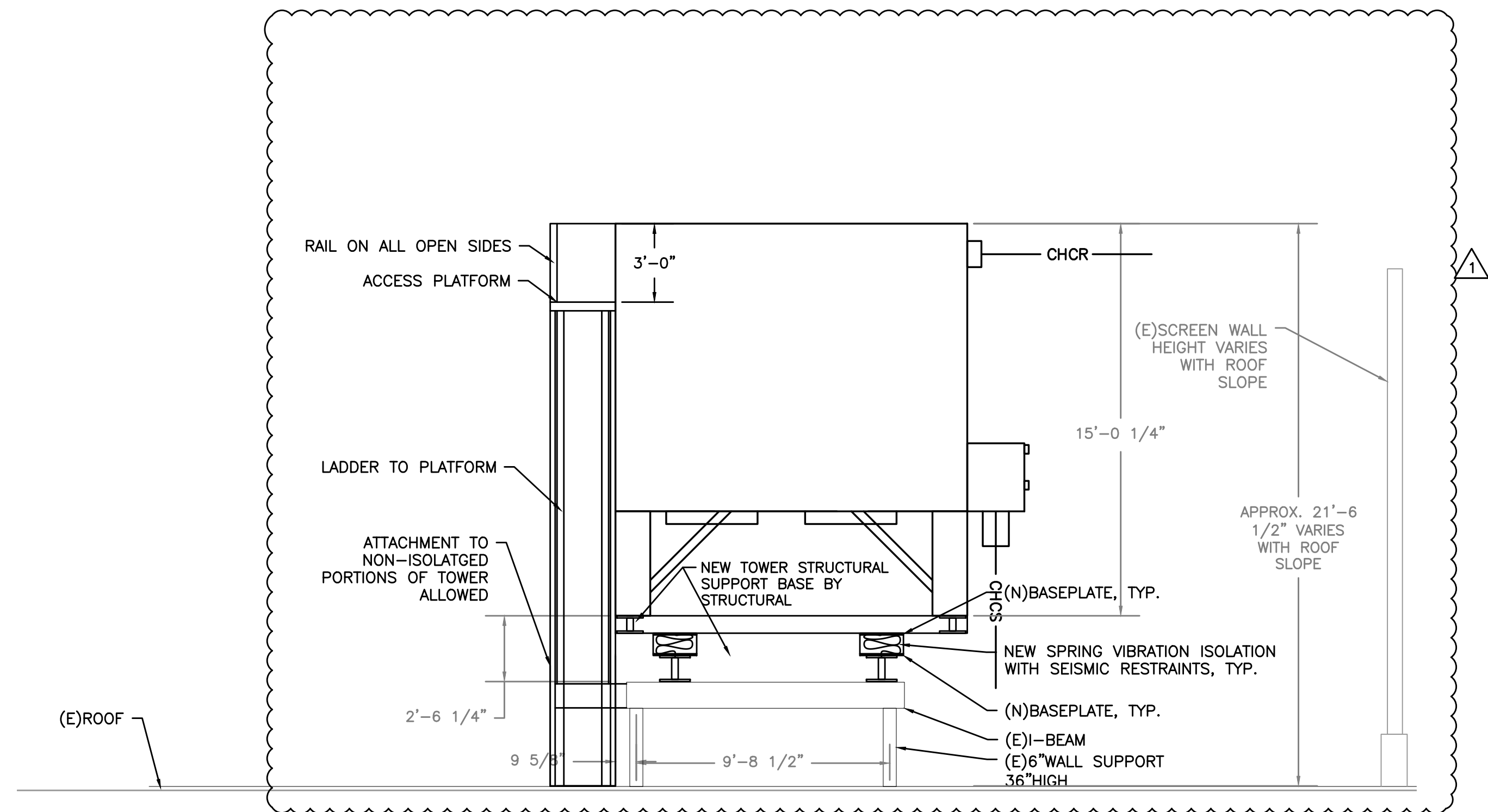
1
M3.10 8-FAN COOLING TOWER INSTALLATION DETAIL
SCALE: 1/4" = 1'-0"



1
M3.10 2-FAN COOLING TOWER INSTALLATION DETAIL
SCALE: 1/4" = 1'-0"

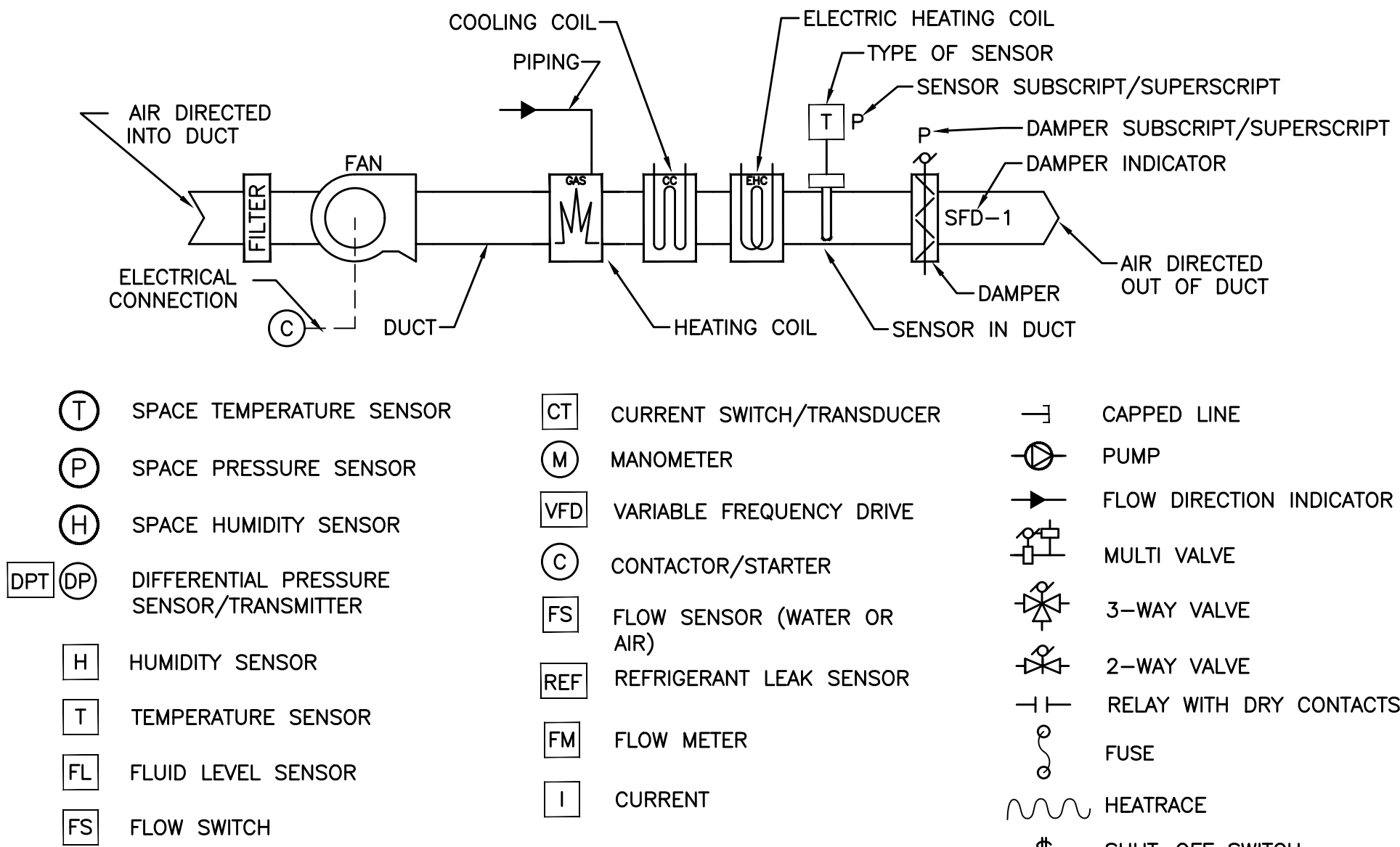


A
M3.10 COOLING TOWER INSTALLATION DETAIL
SCALE: 1/4" = 1'-0"



B
M3.10 COOLING TOWER INSTALLATION DETAIL
SCALE: 1/4" = 1'-0"

LEGEND



EQUIPMENT ABBREVIATIONS:

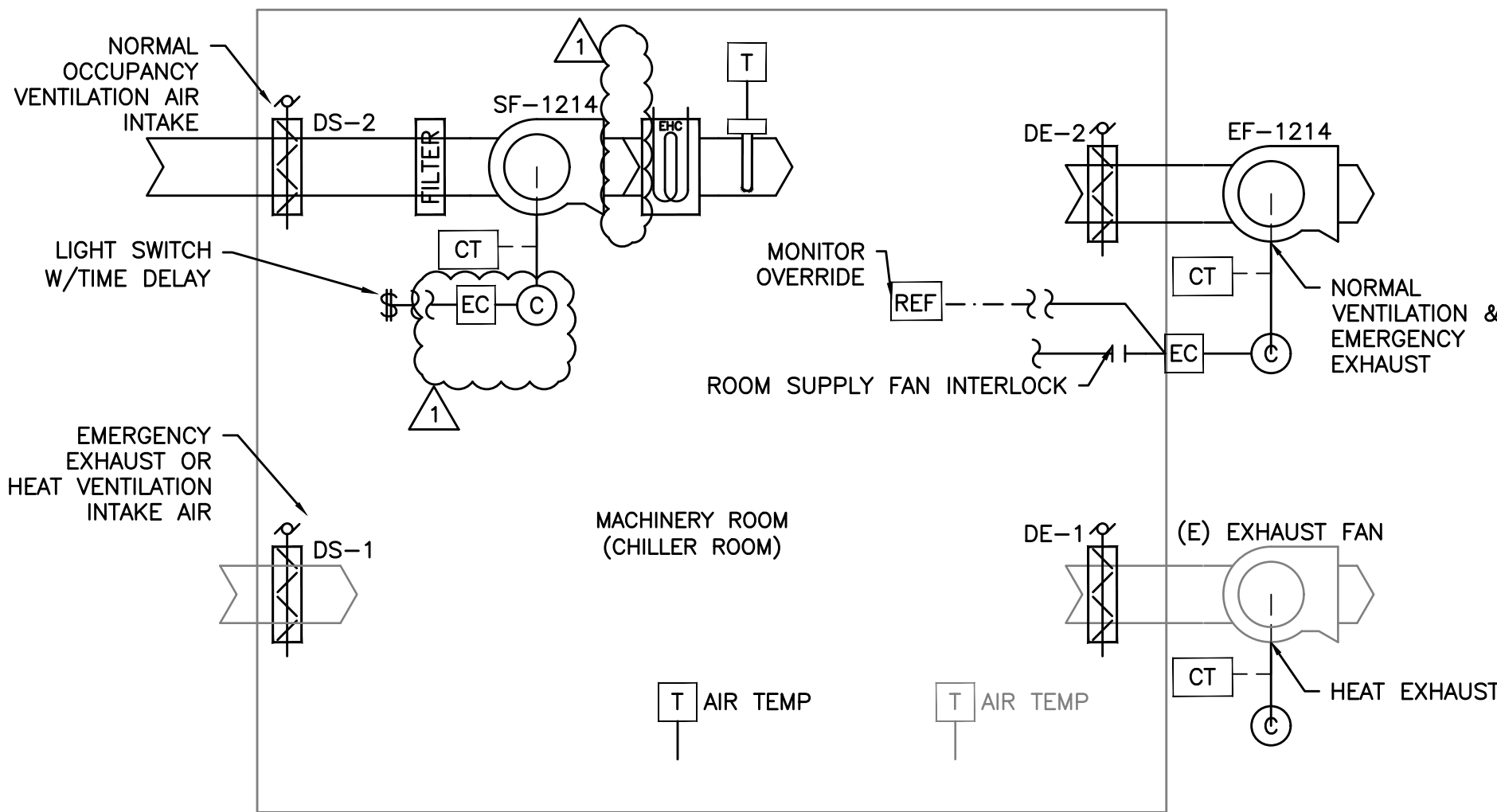
P - PUMP
CHP - CHILLED WATER PUMP
CDP - CONDENSING WATER PUMP
VFD - VARIABLE FREQUENCY DRIVE
CT - CONTACTOR
CH - CHILLER
B - BOILER
EF - EXHAUST FAN
RF - RETURN/RELIEF FAN
AH - AIR HANDLER
SD - SMOKE DAMPER
SFD - FIRE SMOKE COMBINATION DAMPER
H - HUMIDIFIER
V - VALVE
BAS - BUILDING AUTOMATION SYSTEM

PIPING ABBREVIATIONS:

CHS - CHILL WATER SUPPLY
CHR - CHILL WATER RETURN
CS - CONDENSER WATER SUPPLY
CR - CONDENSER WATER RETURN
HWS - HEATING WATER SUPPLY
CW - DOMESTIC COLD WATER
GPM - GALLONS PER MINUTE
DB - DOUBLE VALVE OPERATOR

AIR FLOW ABBREVIATIONS:

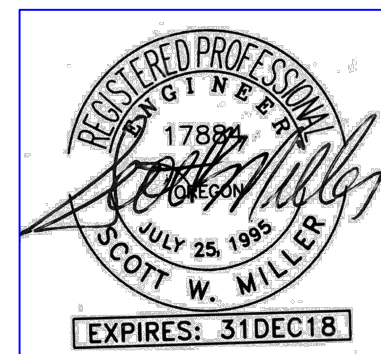
OSA - OUTSIDE AIR
RA - RETURN AIR
SA - SUPPLY AIR
EXH - EXHAUSTED AIR



1 M5.01 MACHINERY ROOM HVAC CONTROLS SCHEMATIC

CONTROL INPUT/OUTPUT SCHEDULE						
POINT NAME	HARDWARE POINTS				ALARM	TREND
	INPUT	OUTPUT	ALARM	TREND		
DIGITAL	ANALOG	DIGITAL	ANALOG			SHOW ON GRAPHIC
5/M5.01 MACHINERY ROOM HVAC CONTROLS						
REFRIGERANT ALARM	X				X	DCV
EXHAUST FAN, HEAT EXHAUST: EXISTING						
CONTROL DAMPER		X				
FAN START/STOP		X				COV
FAN STATUS PROOF	X				X	
DAMPER POSITON O/C	X					15 MIN
HIGH ZONE TEMP					X	
SUPPLY FAN W/ELECTRIC COIL AND FILTER: SF-1214						
ELECTRIC COIL MODULATION			X			15 MIN
CONTROL DAMPER		X				COV
DAMPER POSITON O/C	X					15 MIN
SPACE TEMP		X				15 MIN
SUPPLY FAN STATUS	X					COV
SUPPLY FAN START/STOP		X				COV
FAN STATUS PROOF	X				X	
SCHEDULE						
SUPPLY AIR HEATING SETPOINT						+/-1 DEG F
SUPPLY FAN FAILURE					X	
SUPPLY FAN IN HAND					X	
SUPPLY FAN RUNTIME EXCEEDED					X	
HIGH DISCHARGE AIR TEMP					X	
EXHAUST FAN NORMAL AND EMERGENCY: EF-1214						
CONTROL DAMPER		X				
FAN START/STOP		X				COV
FAN STATUS PROOF	X				X	
DAMPER POSITON O/C	X					15 MIN
SWITCH ENABLE	X					COV
FAN SPEED			X			DCV

DEFINITIONS
AI ANALOG INPUT TO CONTROL
DI DIGITAL INPUT TO CONTROL
AO ANALOG OUTPUT TO SYSTEM
DO DIGITAL OUTPUT TO SYSTEM
AV ANALOG VALUE
DVC DIGITAL VALUE
COV CHANGE OF VALUE FOR DIGITAL POINTS
DVC DIFFERENTIAL VALUE CHANGE FOR ANALOG POINTS.



Proj No: MFA 9381 REV 1 ADDENDUM#02 07/20/2018
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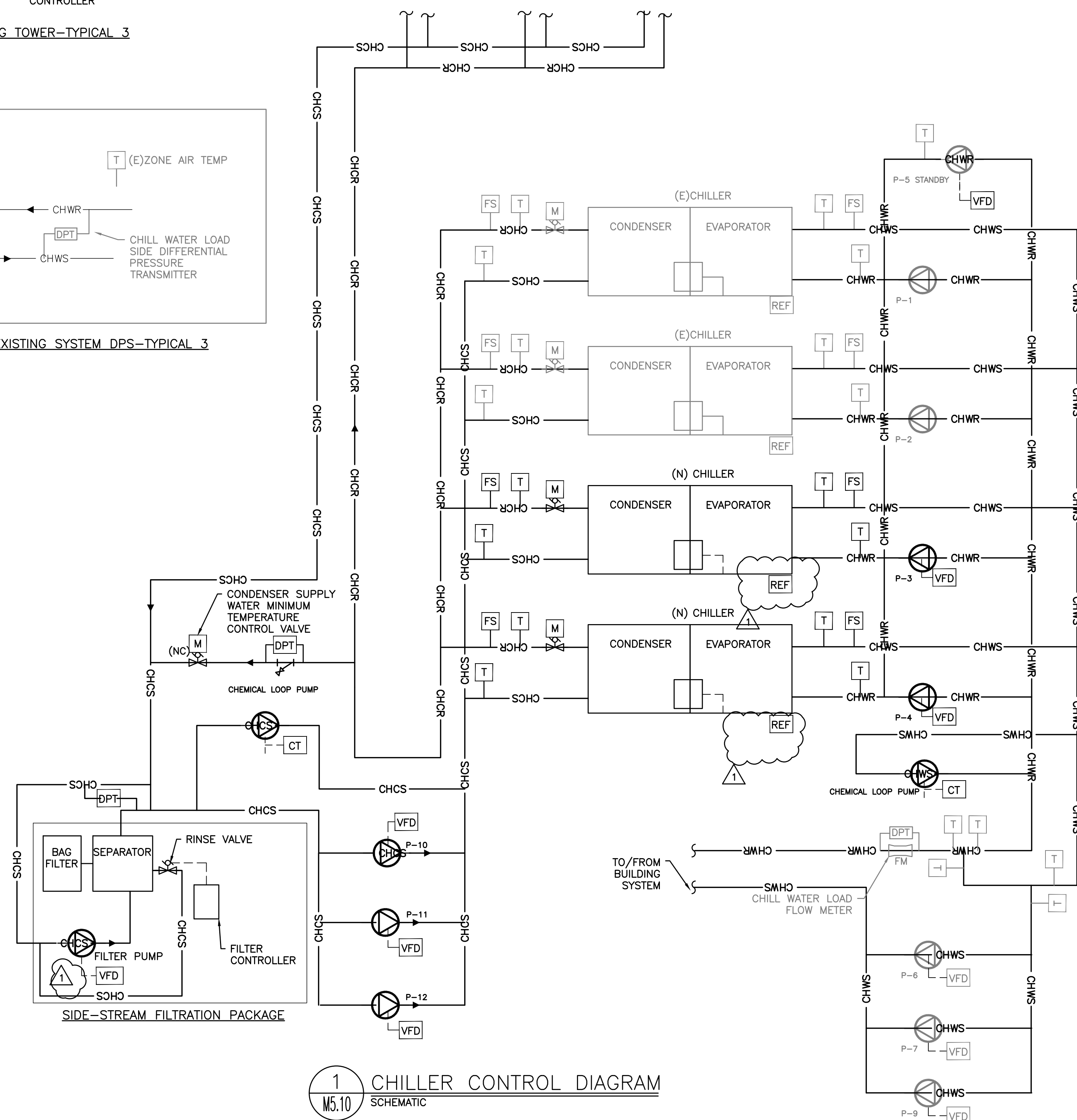
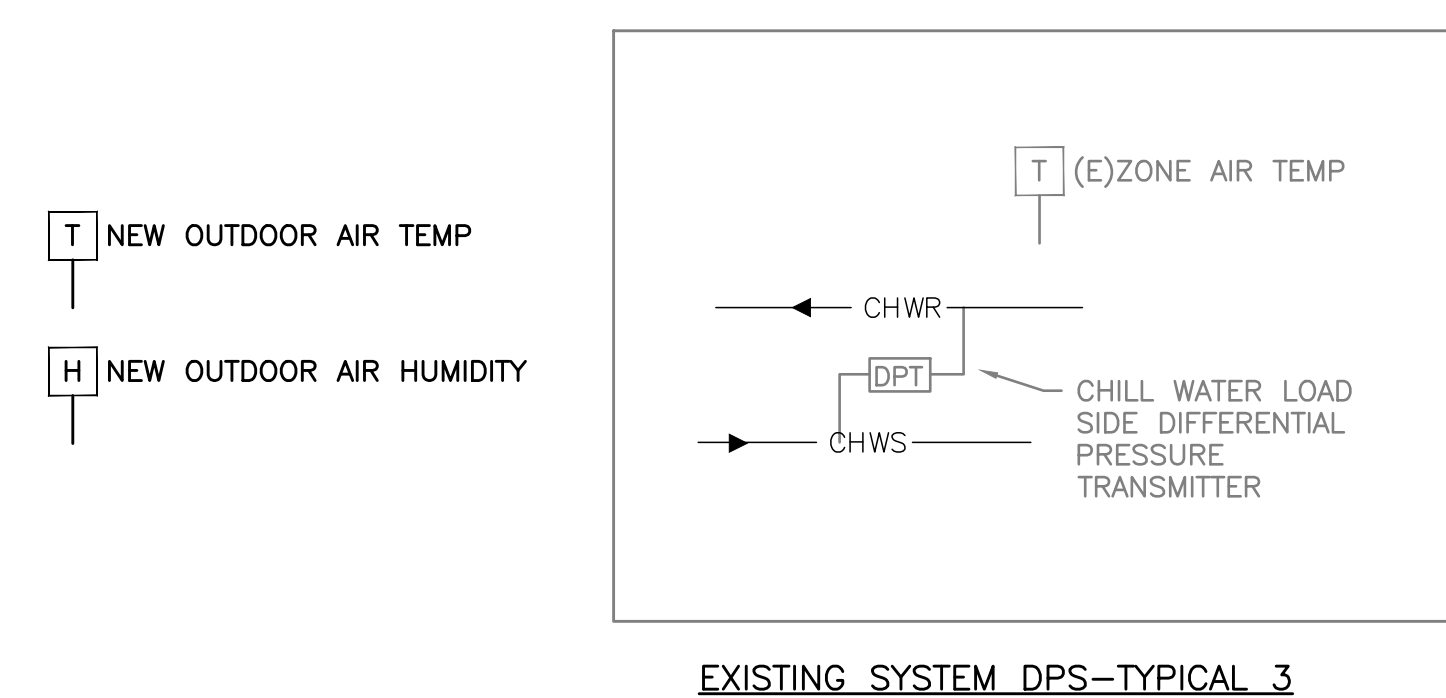
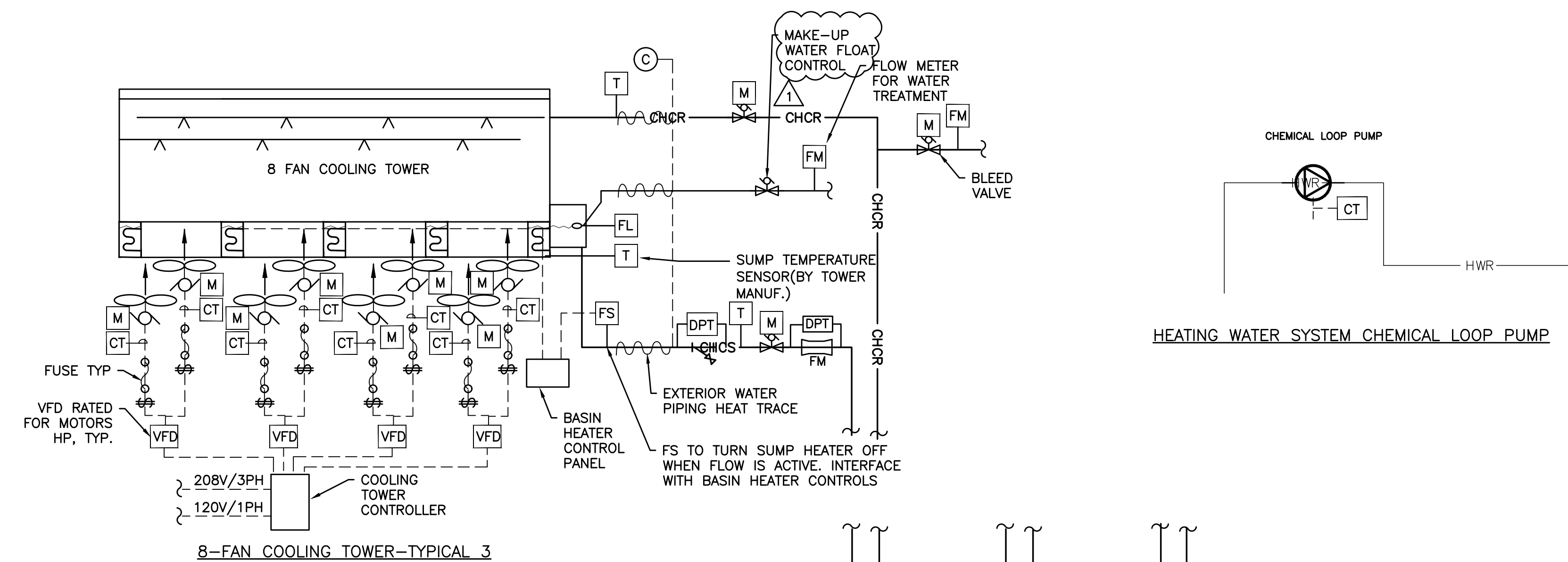
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MECHANICAL CONTROL DIAGRAMS

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JUNE 05, 2018

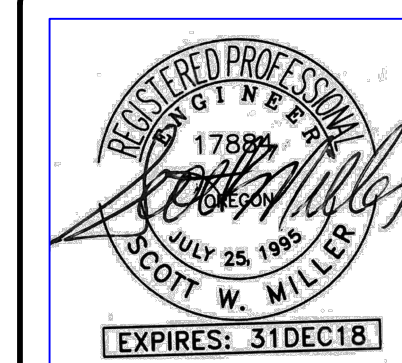


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M5.01



CONTROL INPUT/OUTPUT SCHEDULE										
POINT NAME	HARDWARE POINTS				BACNET POINTS			ALARM	TREND	SHOW ON GRAPHIC
	INPUT		OUTPUT		READ	WRITE	READ/ WRITE			
	DIGITAL DI	ANALOG AI	DIGITAL DO	ANALOG AO						
ENVIROMENTAL CONDITIONS										
SCHEDULE										X
REFRIGERANT ALARM(2)	X							X	DCV	X
CHEMICAL LOOP WATER PUMPS										
PUMP START/STOP (TYP 3)			X						COV	
PUMP STATUS (TYP 3)	X							X	COV	X
CHILL WATER SYSTEM STANDBY PUMP: P-5										
PUMP VFD START/STOP			X						COV	
PUMP VFD STATUS	X							X	COV	X
PUMP VFD SPEED CONTROL				X					DCV	X
CONDENSER WATER PUMPS: P-10, P-11, P-12										
PUMP VFD START/STOP			X						COV	
PUMP VFD STATUS	X							X	COV	X
PUMP VFD SPEED CONTROL				X					DCV	X
CHILLED WATER PRIMARY PUMPS: P-3, P-4										
PUMP VFD START/STOP			X						COV	X
PUMP VFD STATUS	X							X	COV	X
PUMP VFD SPEED CONTROL				X					DCV	X
COOLING TOWER 8 FAN: CT-1,-2,-3										
FAN STATUS (TYP 8)	X							X	COV	X
TOWER VFD SPEED CONTROL (TYP. 4)				X					DCV	X
TOWER VFD START/STOP (TYP.4)			X						COV	X
TOWER VFD STATUS (TYP 4)	X							X	COV	X
CONDENSER WATER SUPPLY TEMPERATURE		X							15 MIN	X
CONDENSER WATER RETURN TEMPERATURE		X							15 MIN	X
MAKE-UP WATER FLOW METER		X							DCV	X
PIPING HEAT TRACE ON/OFF			X						COV	X
CS ISOLATION VALVE POSITION	X								COV	X
CONDENSER WATER SUPPLY FLOW RATE		X						X	DCV	X
CR ISOLATION VALVE POSITION	X								COV	X
BASIN LOW WATER SWITCH	X							X	COV	X
CS WATER FLOW SWITCH INDICATOR		X						X	DCV	X
CR ISOLATION VALVE OPEN/CLOSE			X						COV	X
CS ISOLATION VALVE OPEN/CLOSE			X						COV	X
CONDENSER WATER PRESSURE DIFFERENTIAL		X							DCV	X
BLEED VALVE OPEN/CLOSE			X						COV	X
BLEED WATER FLOW METER		X							DCV	X
CHILLERS: CH-3, CH-4										
ENABLE/DISABLE								X	COV	X
RESET SIGNAL						X				X
CHILLER ALARM						X			DCV	X
COMPRESSOR RUN TIME						X			DCV	X
CHILLER RUN TIME						X			DCV	X
CHILLER STATUS						X				X
CHILL WATER SUPPLY TEMPERATURE						X			15 MIN	X
CHILL WATER RETURN TEMPERATURE						X			15 MIN	X
CHILL WATER TEMPERATURE SETPOINT							X		+/-1 DEG F	X
CS WATER SUPPLY TEMPERATURE						X			15 MIN	X
CR WATER RETURN TEMPERATURE						X			15 MIN	X
CHILL WATER SUPPLY FLOW SENSOR						X			DCV	X
CS WATER FLOW SENSOR						X			DCV	X
CHILL WATER MINIMUM FLOWRATE		X							COV	X
CR ISOLATION VALVE OPEN/CLOSE			X						COV	X
CONDENSER WATER DISTRIBUTION										
CONDENSER WATER PRESSURE DIFFERENTIAL		X							DCV	X
CONDENSER WATER SUPPLY TEMP. SETPOINT									+/-1 DEG F	X
CS WATER MIN.TEMP. CONTROL VALVE				X					DCV	X
WATER FILTER										
FILTER PRESSURE DIFFERENTIAL		X						X	DCV	X
RINSE VALVE POSITION INDICATOR	X								COV	X
CS WATER PRESSURE DIFFERENTIAL		X						X	DCV	X
PUMP STATUS	X							X	COV	X
PUMP VFD START/STOP			X					X	COV	X
PUMP VFD SPEED CONTROL				X					DCV	X
DEFINITIONS										
AI ANALOG INPUT TO CONTROL										
DI DIGITAL INPUT TO CONTROL										
AO ANALOG OUTPUT TO SYSTEM										
DO DIGITAL OUTPUT TO SYSTEM										
AV ANALOG VALUE.										
DVC DIGITAL VALUE.										
COV CHANGE OF VALUE FOR DIGITAL POINTS.										
DVC DIFFERENTIAL VALUE CHANGE FOR ANALOG POINTS.										



Proj No: MFIA 9381 REV 1 APPENDUM #02 07/20/2018

[illegible]

Drawn By: MG

Checked By: SWM

OSGN By: MG

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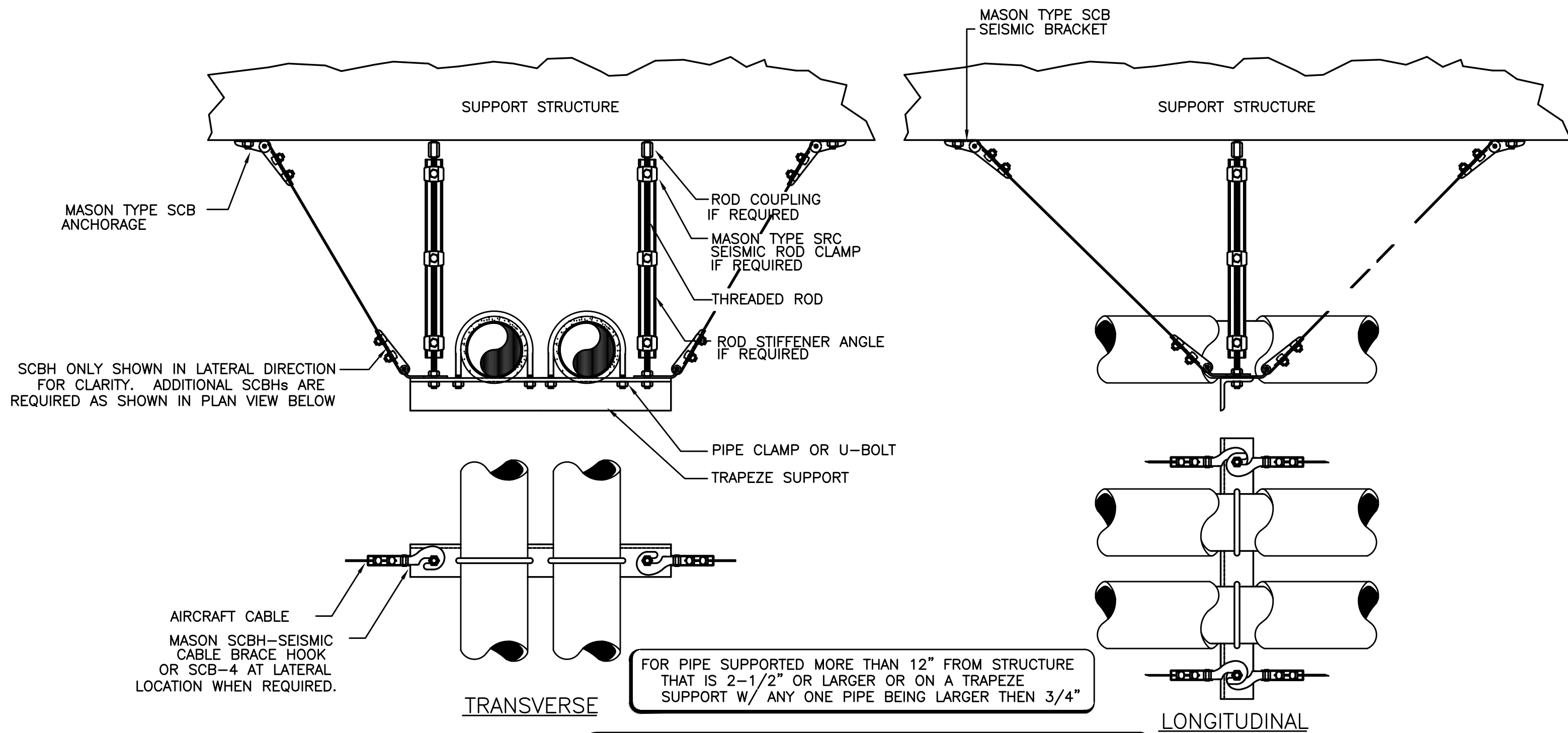
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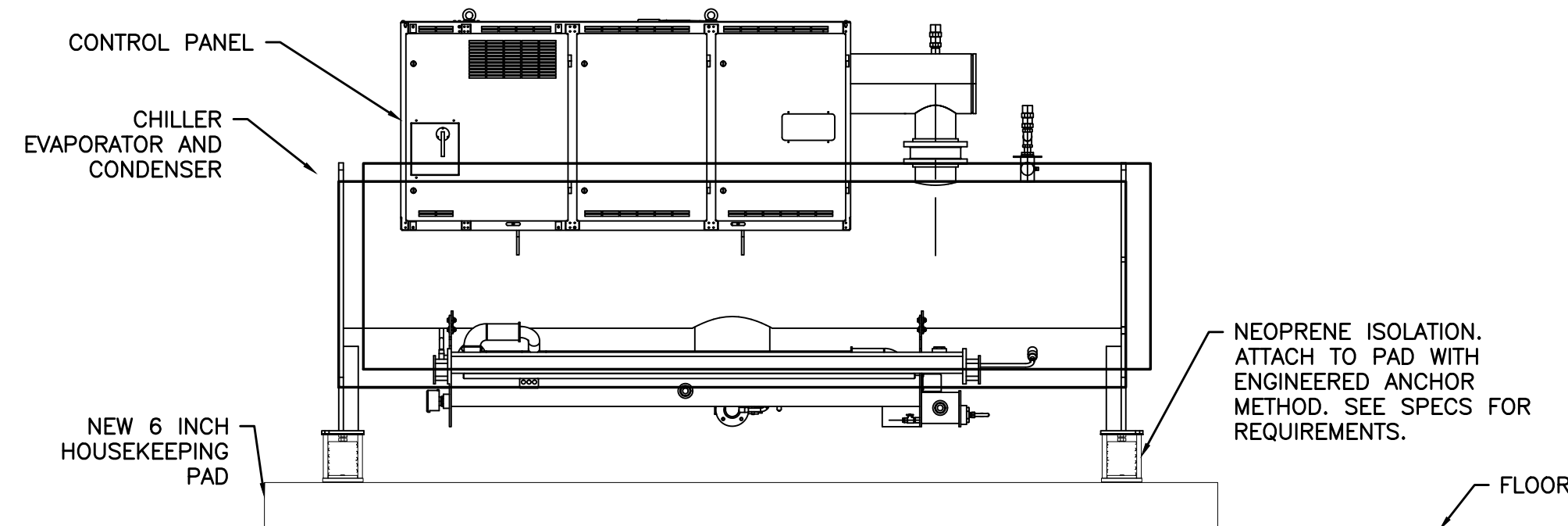
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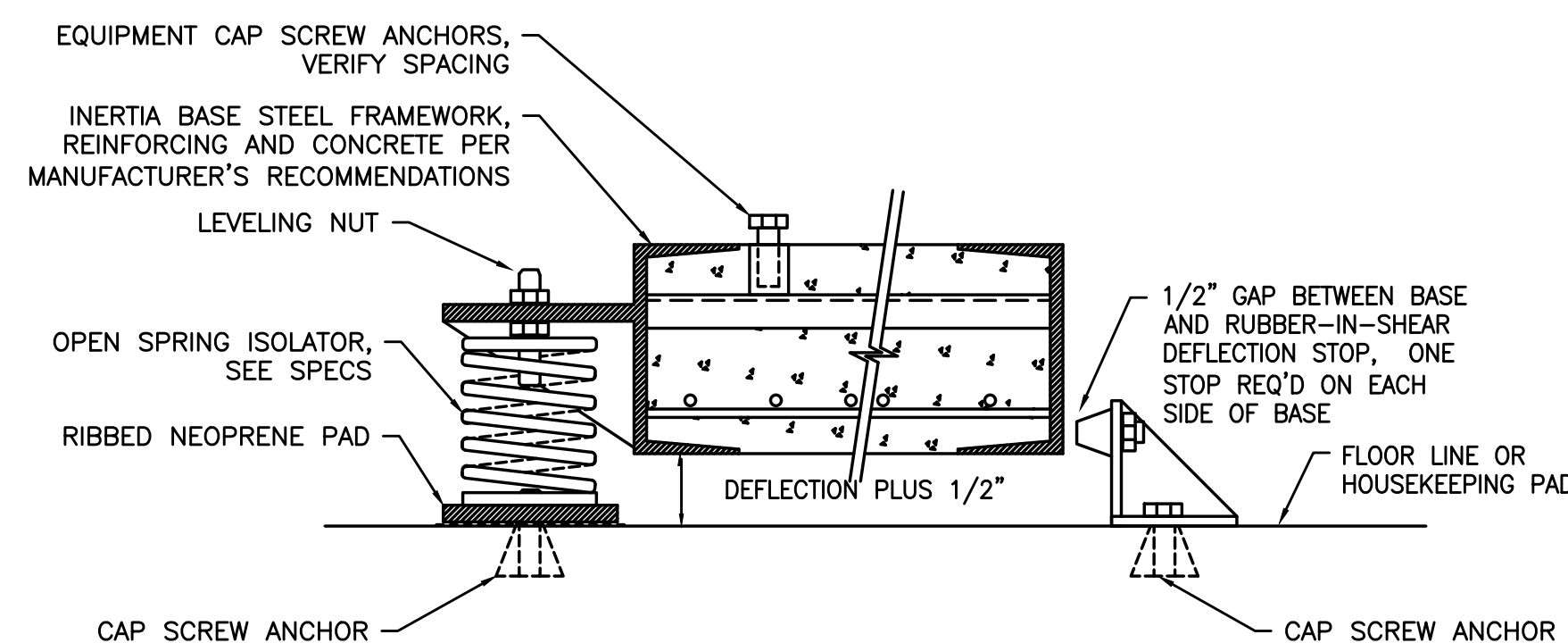


1 SEISMIC PIPE SUPPORT
M6.01 SCALE: DETAIL

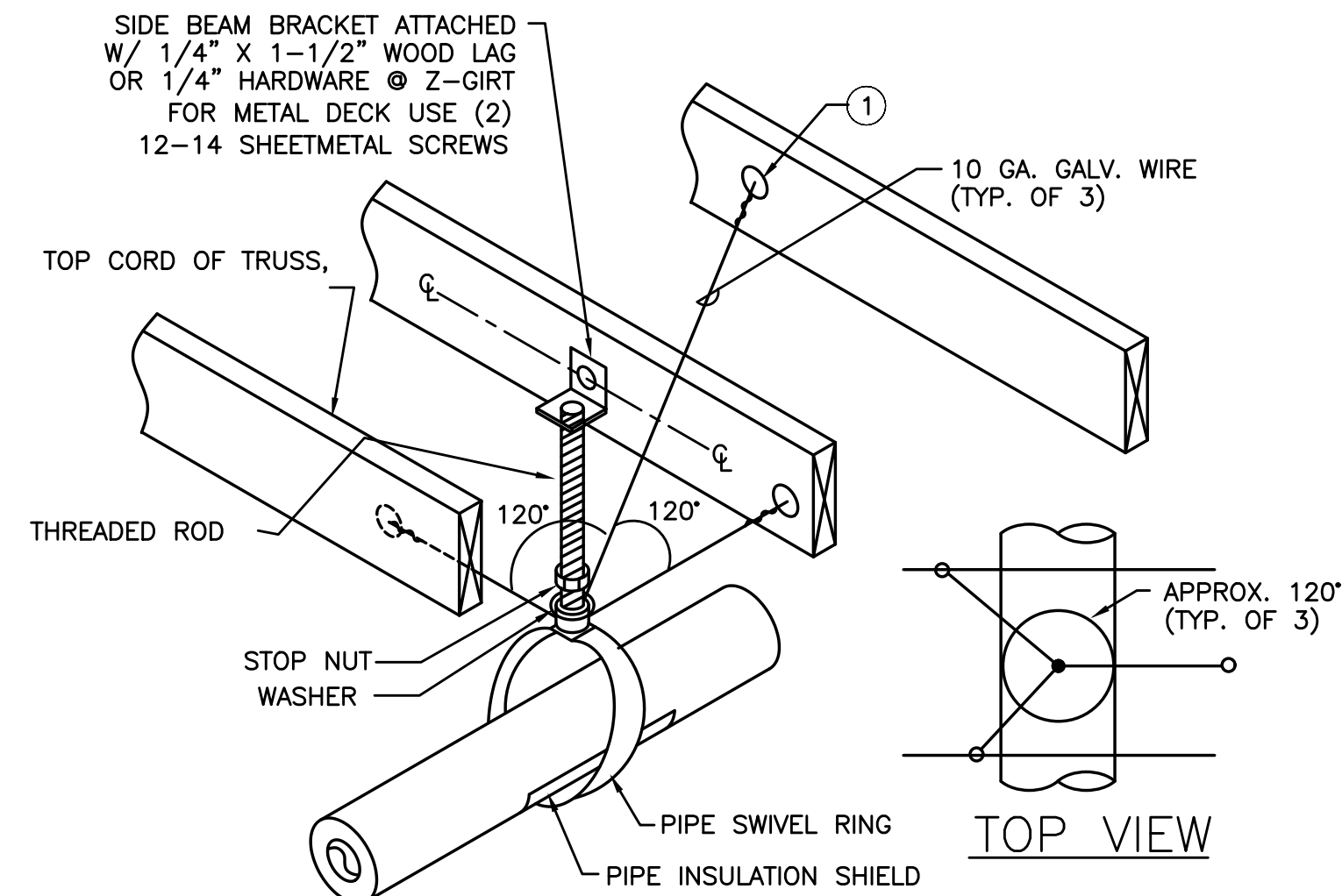


DETAIL NOTES:
1. PROVIDE FLEXIBLE PIPE CONNECTION TO CHILLER
2. PROVIDE REFRIGERANT RELIEF, CONNECT TO RUPTURE DISK OF EVAPORATOR AND PIPE TO ATMOSPHERE.

3 CHILLER DETAIL
M6.01 SCALE: DETAIL

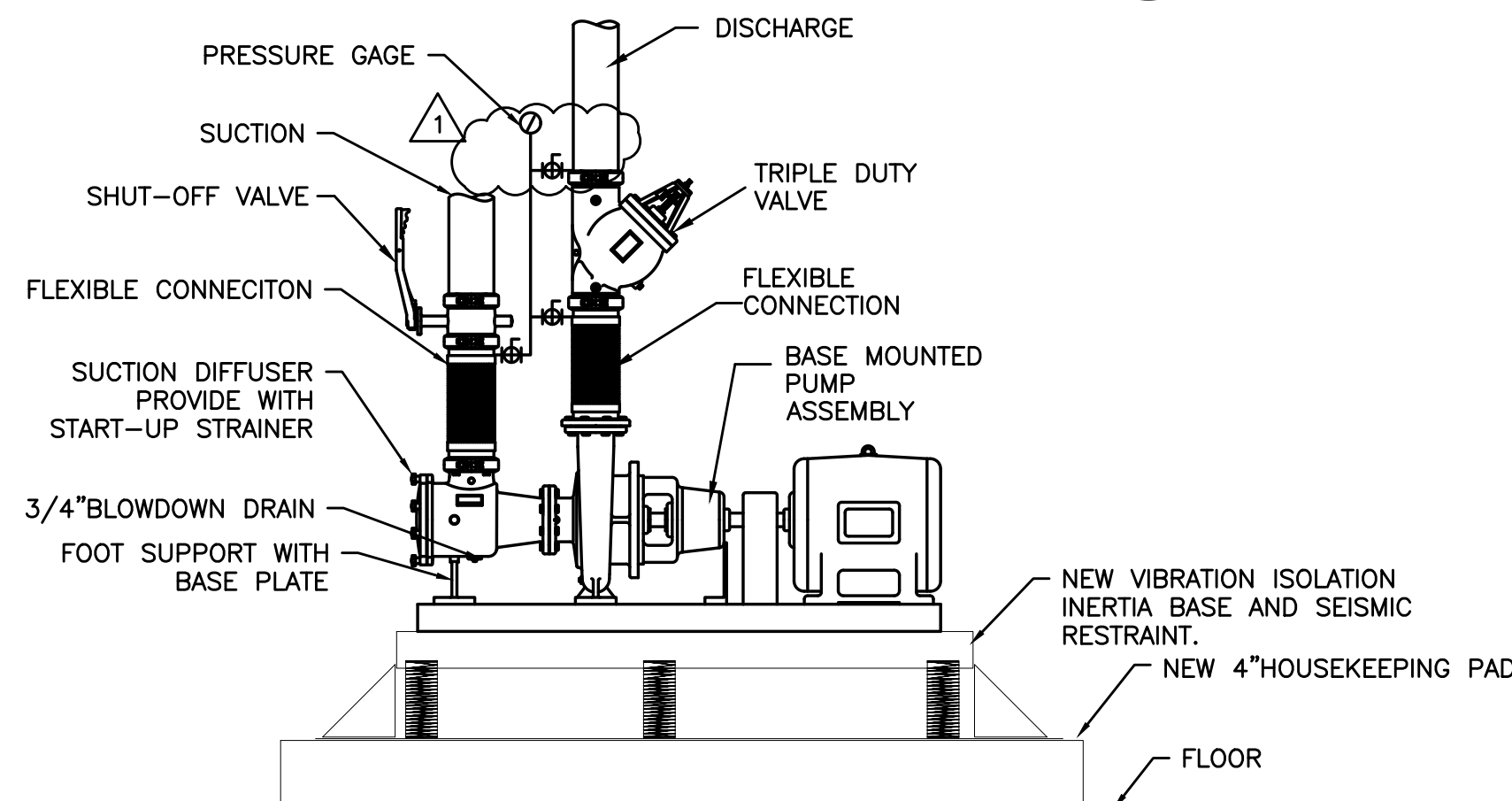


5 PUMP INERTIA BASE
M6.01 SCALE: DETAIL



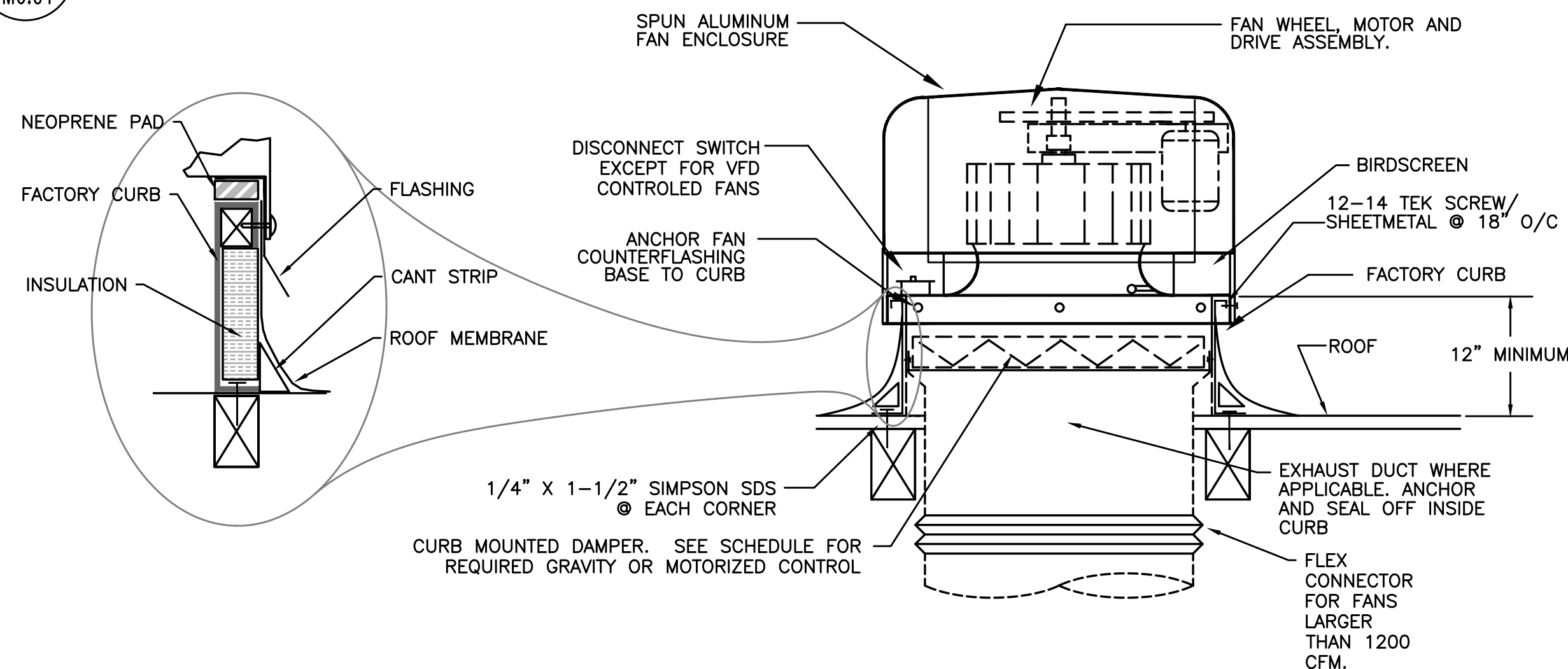
DETAIL NOTES
1. 1/4" GALV. THREADED EYE BOLT @ CENTER OF WOOD MEMBER (TYP. OF 3). FOR 2 GIRT USE MACHINE THREAD EYE BOLT W/ JAMB NUT & 1/4" WASHER @ EACH SIDE OF GIRT USE 12 SHEETMETAL SCREWS & 16 GA MIN. 16 GA. MIN STRUT ANGLE CLIP
• FOR SINGLE 1-1/2" TO 3" STEEL LINES
• FOR SINGLE 2" COPPER LINES

2 PIPE SUPPORT
M6.01 SCALE: DETAIL

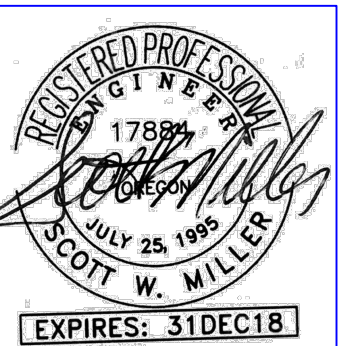


DETAIL NOTES:
1. PROVIDE PIPE FLEXIBLE CONNECTION.
2. SUPPORT PIPING INDEPENDENT OF PUMP, FIRST 3 HANGERS SHALL BE SPRING AND NEOPRENE TYPE, PROVIDE RIGID PIPE CONNECTORS FOR THE REST OF THE SUPPORTS.
3.

4 FLOOR MOUNTED PUMP DETAIL
M6.01 SCALE: DETAIL



6 ROOF MOUNT EXHAUST FAN
M6.01 SCALE: DETAIL



Proj No: MFIA 9381	REV 1	ADDENDUM#02	07/20/2018
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DSN By: MG			

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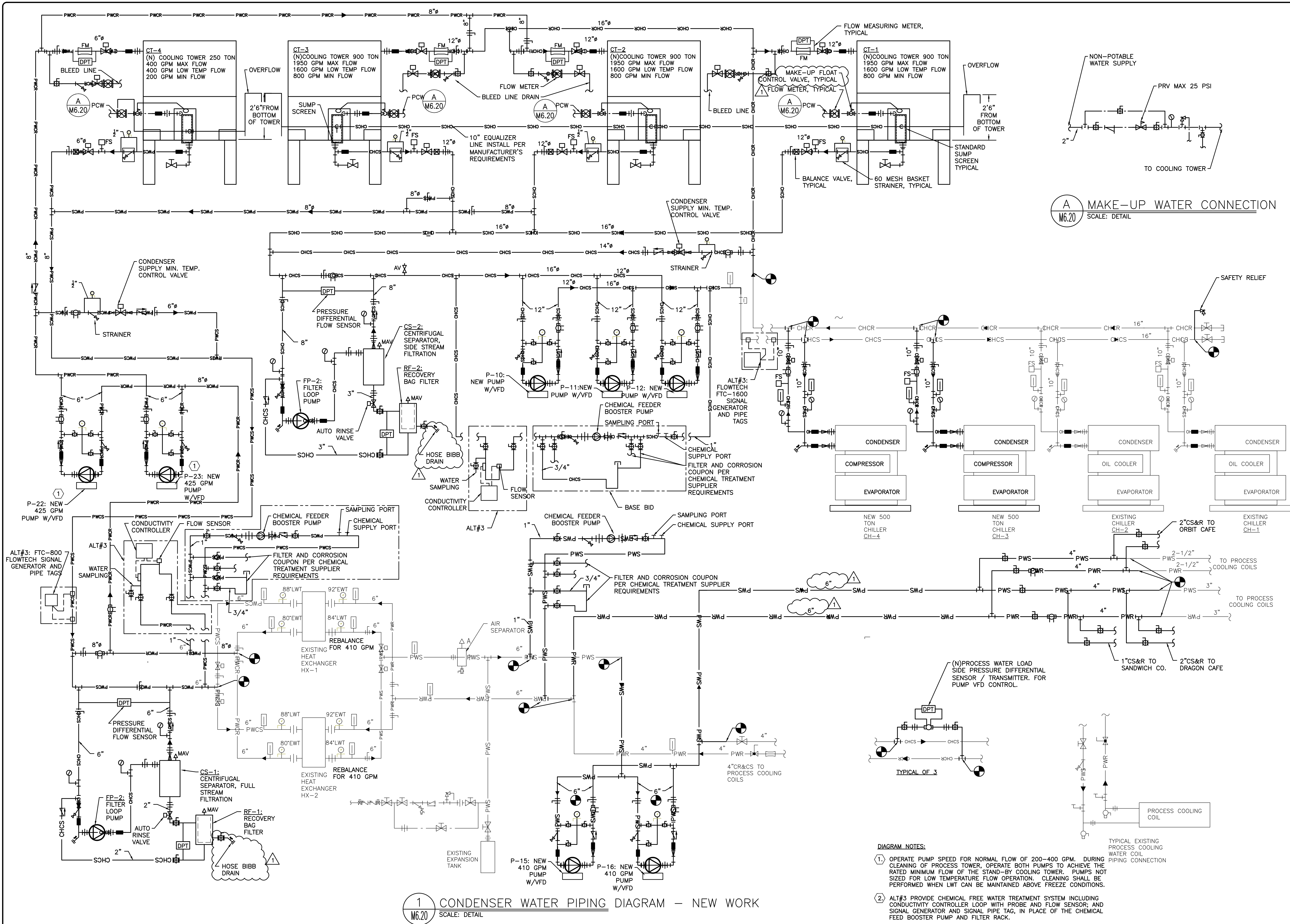
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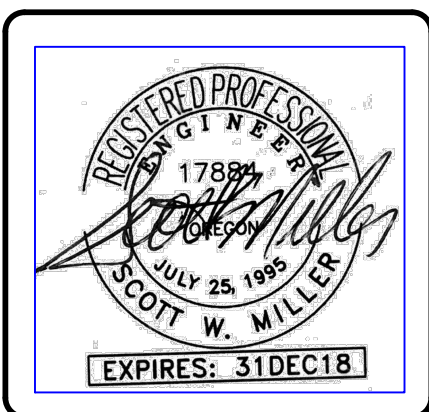
SHEET
M6.01

G:\Metro\9381_Oregon Convention Center Chiller Plant\Mech\9381_OCC-CP_M62.dwg, M620 7/19/2018 6:24:03 PM, ARCH full bleed D (24.00 x 36.00 inches), 1:1



1 CONDENSER WATER PIPING DIAGRAM - NEW WORK
SCALE: DETAIL

- DIAGRAM NOTES:
1. OPERATE PUMP SPEED FOR NORMAL FLOW OF 200-400 GPM. DURING CLEANING OF PROCESS TOWER, OPERATE BOTH PUMPS TO ACHIEVE THE RATED MINIMUM FLOW OF THE STAND-BY COOLING TOWER. PUMPS NOT SIZED FOR LOW TEMPERATURE FLOW OPERATION. CLEANING SHALL BE PERFORMED WHEN LWT CAN BE MAINTAINED ABOVE FREEZE CONDITIONS.
 2. ALT#3 PROVIDE CHEMICAL FREE WATER TREATMENT SYSTEM INCLUDING CONDUCTIVITY CONTROLLER LOOP WITH PROBE AND FLOW SENSOR, AND SIGNAL GENERATOR AND SIGNAL PIPE TAGS, IN PLACE OF THE CHEMICAL FEED BOOSTER PUMP AND FILTER RACK.



Proj No: MFIA 9381
Rev 1 ADDENDUM#02 07/20/2018
Drawn By: MG
Chkd By: SWM
DSN By: MG

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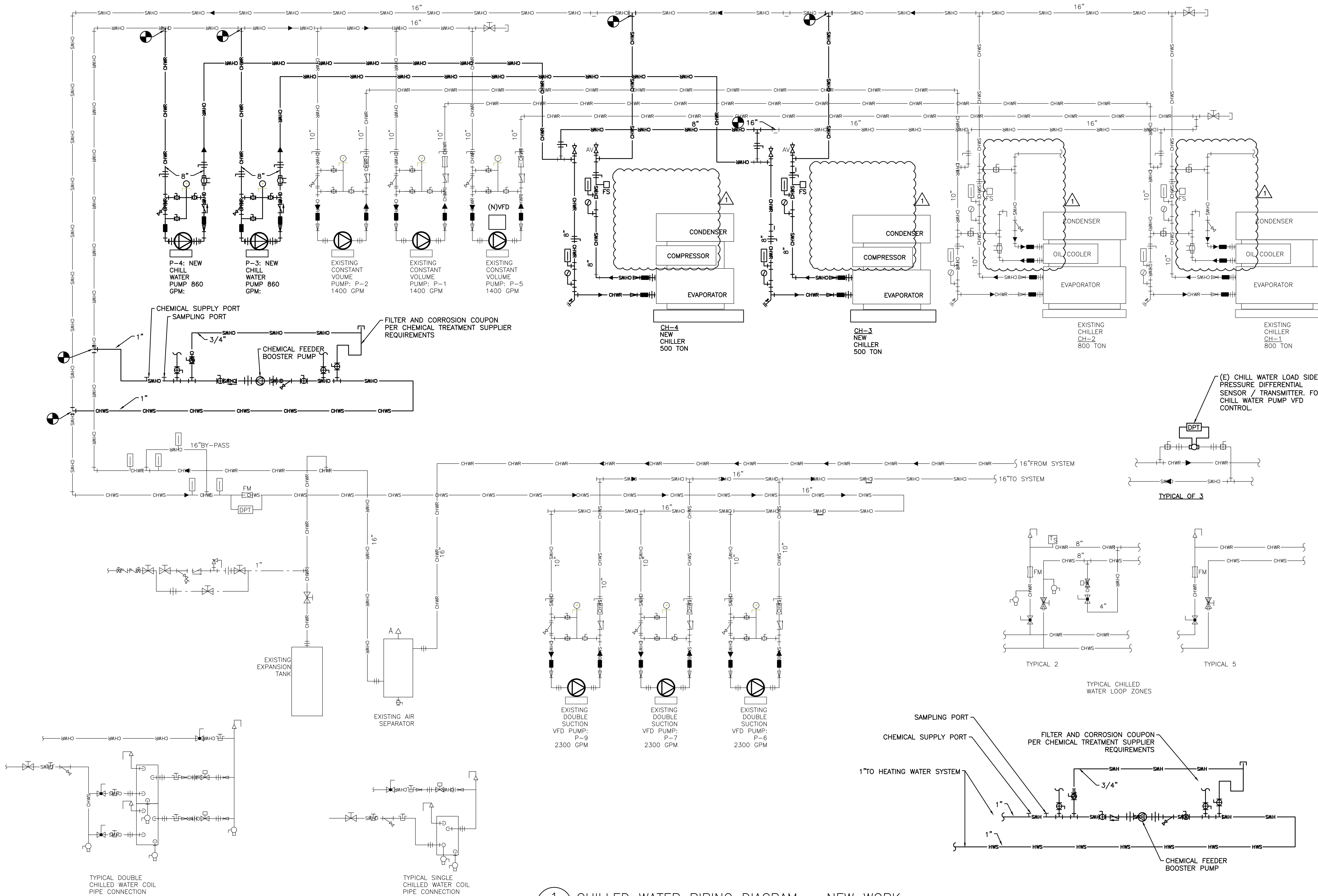
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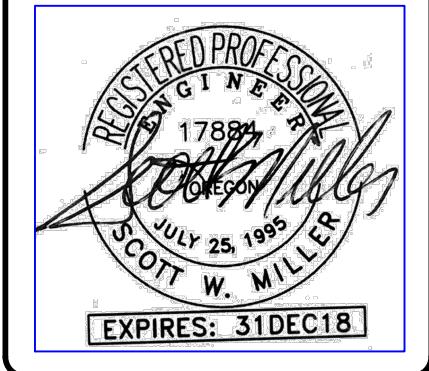
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SHEET
M6.20

G:\Metro\9381_Oregon Convention Center Chiller Plant\Mech\9381_OCC-CP_M62.dwg, M621, 7/19/2018 6:24:05 PM, ARCH full bleed D (24.00 x 36.00 inches), 1:1



1 CHILLED WATER PIPING DIAGRAM – NEW WORK
M6.21 SCALE: DETAIL



Proj No:	MFA 9381
REV	1
ADDENDUM#	02
DATE	07/20/2018
Drawn By:	MG
Chkd By:	SWM
DSN By:	MG

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M6.21