

PLOTTED: MATT MCCORMICK 9/7/2021 6:46 PM
 X:\DWG\AD\5459\5459 MTO.1

MECHANICAL SYMBOLS AND ABBREVIATIONS		
SYMBOL	ABBREV.	DESCRIPTION
	(D)	PIPING / EQUIPMENT TO BE REMOVED
	(N)	PIPING / EQUIPMENT TO BE PROVIDED
	(E)	PIPING / EQUIPMENT TO REMAIN
	(F)	FUTURE PIPING / EQUIPMENT
	W	SANITARY DRAIN (ABOVE GRADE DRAIN)
	W	SANITARY DRAIN (BELOW GRADE DRAIN)
	W	SANITARY DRAIN (PUMPED)
	SD	STORM DRAIN (ABOVE GRADE DRAIN)
	SD	STORM DRAIN (BELOW GRADE DRAIN)
	V	VENT
	CW	COLD WATER
	HW	HOT WATER
	HWR	HOT WATER RETURN
	G	NATURAL GAS
	A	COMPRESSED AIR
	P	PROPANE
	O ₂	OXYGEN
	F	FIRE PROTECTION
	S	STEAM (15 PSIG)
	C	CONDENSATE RETURN
	PC	CONDENSATE RETURN (PUMPED)
	HWS	HEATING WATER SUPPLY (LOW TEMP)
	HWR	HEATING WATER RETURN
	RL	REFRIGERANT LIQUID LINE
	RS	REFRIGERANT SUCTION LINE
	CHS	CHILLED WATER SUPPLY
	CHR	CHILLED WATER RETURN
	CWS	CONDENSING WATER SUPPLY
	CWR	CONDENSING WATER RETURN
	D	DRAIN (INDIRECT)
		TRIPLE DUTY VALVE
		BALL VALVE
		BUTTERFLY VALVE
		CHECK, SWING VALVE
		CHECK, SPRING VALVE
		BALANCING VALVE
		FLOW CONTROL VALVE
		FLOAT VALVE
		GATE VALVE
		GATE ANGLE VALVE
		GLOBE ANGLE VALVE
		PLUG VALVE
		SAFETY RELIEF VALVE
		GLOBE VALVE
		PRESSURE REDUCING VALVE
		SOLENOID VALVE
		2-WAY CONTROL VALVE
		3-WAY CONTROL VALVE
		HOSE BIB
	FD	FLOOR DRAIN
	FS	FLOOR SINK
	WCO	WALL CLEAN OUT
	CB	CATCH BASIN
		WALL HYDRANT / HOSE BIB
		FIRE DEPARTMENT CONNECTION
		FIRE HYDRANT
		WATER HAMMER ARRESTOR
	BFP	BACKFLOW PREVENTER, DOUBLE CHECK
	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
		UNION
		EXPANSION JOINT
		FLEXIBLE JOINT
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER STRAIGHT INVERT
		ECCENTRIC REDUCER STRAIGHT CROWN
		STRAINERS/FILTERS Y-PATTERN W/ PLUG
		STRAINERS/FILTERS Y-PATTERN W/ BLOWOFF
		ANCHOR
		GUIDE
	AAV	AUTOMATIC AIR VENT
		PETE'S PLUG
		RISE
		TEE
		TEE, OUTLET UP
		TEE, OUTLET DOWN
		ELBOW
		ELBOW, OUTLET UP
		ELBOW, OUTLET DOWN
	/	AND/OR
	Ⓢ	CENTER LINE
	∅	DIAMETER/PHASE
	#	NUMBER/POUNDS

MECHANICAL SYMBOLS AND ABBREVIATIONS		
SYMBOL	ABBREV.	DESCRIPTION
	SA	SUPPLY DUCT TURN UP
	SA	SUPPLY DUCT TURN DOWN
	RA	RETURN AIR
	EXH	EXHAUST
	OSA	OUTSIDE AIR
	FSD	FIRE SMOKE DAMPER
	FD	FIRE DAMPER
	MVD	MANUAL VOLUME DAMPER
		MOTORIZED DAMPER
		BACKDRAFT DAMPER
		SENSOR
		WALL MOUNTED THERMOSTAT
		CEILING MOUNTED THERMOSTAT
		ACOUSTICAL LINER
		FLEXIBLE DUCT
		EQUIPMENT CONNECTION
		DUCT PRESSURE CLASS SYMBOL
		SUPPLY DIFFUSER/GRILLE
		RETURN DIFFUSER/GRILLE
		EXHAUST DIFFUSER/GRILLE
		LINEAR SLOT DIFFUSER
		SIDEWALL DIFFUSER/GRILLE
		DETAIL/SECTION NUMBER
		DETAIL/SECTION SYMBOL
		DRAWING WHERE DETAIL/SECTION APPEARS
		POINT OF CONNECTION TO (E)
		NEW EQUIPMENT IDENTIFICATION
		NEW EQUIPMENT MARK
		NEW EQUIPMENT NUMBER
		EXISTING EQUIPMENT IDENTIFICATION
		EXISTING EQUIPMENT MARK
		EXISTING EQUIPMENT NUMBER
		NECK SIZE (IN)
		DIFFUSER/GRILLE MARK
		CFM
	AD	ACCESS DOOR
	AFF	ABOVE FINISHED FLOOR
	APD	AIR PRESSURE DROP
	AVG	AVERAGE
	BHP	BRAKE HORSEPOWER
	BI	BACKWARD INCLINED (FAN)
	BLDG	BUILDING
	BOD	BOTTOM OF DUCT
	BOP	BOTTOM OF PIPE
	BTU	BRITISH THERMAL UNIT
	BTUH	BTU PER HOUR
	CFM	CUBIC FEET PER MINUTE
	CO	CLEAN OUT
	COTG	CLEAN OUT TO GRADE
	COND	CONDENS - (ER, ING, ATE)
	CONT	CONTINU - (E, ED, OUS, ATION)
	CU FT	CUBIC FEET
	dB	DECIBEL
	DB	DRY BULB
	DDC	DIRECT DIGITAL CONTROL(S)
	DEG	DEGREE
	DEMO	DEMOLISH(ED)
	DIA	DIAMETER
	DN	DOWN
	DS	DOWNSPOUT
	EA	EACH
	EAT	ENTERING AIR TEMPERATURE
	EFF	EFFICIENCY
	ELEV	ELEVATION
	ELEC	ELECTRIC(AL)
	ENT	ENTERING
	EQUIP	EQUIPMENT
	ESP	EXTERNAL STATIC PRESSURE
	EWT	ENTERING WATER TEMPERATURE
	EXH	EXHAUST (AIR)
	EXIST	EXISTING
	F	FAHRENHEIT

MECHANICAL ABBREVIATIONS	
ABBREV.	DESCRIPTION
FC	FORWARD CURVED (FAN)
FCO	FLOOR CLEAN OUT
FF	FINISHED FLOOR
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FA	FREE AREA
FT	FOOT OR FEET
GA	GAUGE
GAL	GALLON(S)
GALV	GALVANIZED
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HD	HEAD / HUB DRAIN
HG	MERCURY
HOA	HAND OFF AUTO
HP	HEAT PUMP / HORSEPOWER
HR	HOUR
HTG	HEATING
HZ	HERTZ (FREQUENCY)
IE	INVERT ELEVATION
IN	INCH(ES)
KW	KILOWATT
HHW	KILOWATT-HOUR
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LVG	LEAVING
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	BTU PER HOUR (THOUSANDS)
MECH	MECHANICAL
MIN	MINIMUM
N/A	NOT APPLICABLE
NC	NOISE CRITERIA / NORMALLY CLOSED
NIC	NOT IN CONTRACT
NIM	NOT IN MECHANICAL
NO	NORMALLY OPEN / NUMBER
NTS	NOT TO SCALE
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER / OVERFLOW DRAIN
OFCl	OWNER FURNISHED CONTRACTOR INSTALLED
OSA	OUTSIDE AIR
PD	PRESSURE DROP/ DIFFERENCE
PH	PHASE
PPM	PARTS PER MILLION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	PSI, ABSOLUTE
PSIG	PSI, GAUGE
P&T	PRESSURE & TEMPERATURE RELIEF VALVE
R	RADIUS
RA	RETURN (AIR)
RD	ROOF DRAIN
RECIRC	RECIRCULAT - (E, ING, OR)
REQ	REQUIRED
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY (AIR)
SAT	SATURATION
SCFM	CFM, STANDARD CONDITIONS
SD	SMOKE DAMPER / STORM DRAIN
SEC	SECOND
SF	SQUARE FEET
SP	STATIC PRESSURE
SPEC	SPECIFICATION(S)
SQ FT	SQUARE FEET
SS	STAINLESS STEEL
STD	STANDARD
STRUCT	STRUCTURAL
SYS	SYSTEM
TEMP	TEMPERATURE
TONS	TONS OF REFRIGERATION
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TYP	TYPICAL
VAC	VACUUM
VAV	VARIABLE AIR VOLUME (BOX/UNIT/SYSTEM)
VD	VOLUME DAMPER
VEL	VELOCITY
VENT	VENTILATION
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VTR	VENT THROUGH ROOF
VVT	VARIABLE VOLUME AND TEMPERATURE
W/	WITH
W	WASTE/WATT
WB	WET BULB
WPD	WATER PRESSURE DROP
WT	WEIGHT

DRAWING INDEX	
DWG.	DESCRIPTION
MT0.1	MECHANICAL TITLE SHEET
P0.1	PLUMBING SCHEDULES
P0.2	PLUMBING SCHEDULES
P2.1	PLUMBING FLOOR PLAN - EAST
P2.2	PLUMBING FLOOR PLAN - WEST
P2.3	PLUMBING ROOF PLAN
P4.1	GAS RISER DIAGRAM - PLUMBING
P5.1	PLUMBING DETAILS
P5.2	PLUMBING DETAILS
P5.3	PLUMBING DETAILS
P5.4	PLUMBING DETAILS
W0.1	MECHANICAL SCHEDULES
W0.2	MECHANICAL SCHEDULES
W0.3	MECHANICAL SCHEDULES
W2.1	MECHANICAL FLOOR PLAN - EAST
W2.2	MECHANICAL FLOOR PLAN - WEST
W4.1	MECHANICAL PROCESS FLOW DIAGRAMS
M5.1	MECHANICAL DETAILS
M5.2	MECHANICAL DETAILS
M5.3	MECHANICAL DETAILS
M9.1	MECHANICAL P&ID
M9.2	MECHANICAL P&ID
M9.3	MECHANICAL P&ID
M9.4	MECHANICAL P&ID

NOTE:

NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED.

AKAAN
 architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS		
Δ	DATE	DESCRIPTION

CONTENTS:
 MECHANICAL TITLE
 SHEET

SHEET NO:

MT0.1

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



101 ST HELENS ST
 ST HELENS, OR 97051
 T: 503.368.3050 F: 503.366.3055

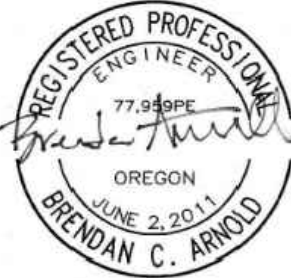
PLOTTED: MATT MCCORMICK 9/7/2021 6:47 PM
 X:\DWG\AD\5459\5459 P0.1

PLUMBING CONNECTION SCHEDULE										
SYMBOL MARK	FIXTURE TYPE	DESCRIPTION	MANUFACTURER (NOTE 1)	MODEL (NOTE 1)	TRIM / FITTINGS	W	V	CW	HW	COMMENTS
WC-1	WATER CLOSET	FLUSH VALVE, WALL HUNG	AMERICAN STANDARD	2257.001 "AFWALL"	FLUSH VALVE: SLOAN ROYAL 8111, 1.28 GPF, BATTERY-POWERED, SENSOR OPERATED SEAT: OLSONITE #95 - SOLID WHITE PLASTIC, OPEN FRONT, WITHOUT COVER CARRIER: ASME A112.6.1; ADJUSTABLE, EPOXY COATED, CAST IRON FRAME, INTEGRAL DRAIN HUB AND VENT	3	2	1	-	
WC-2	WATER CLOSET	FLUSH VALVE, WALL HUNG, ADA	AMERICAN STANDARD	2257.001 "AFWALL"	FLUSH VALVE: SLOAN ROYAL 8111, 1.28 GPF, BATTERY-POWERED, SENSOR OPERATED SEAT: OLSONITE #95 - SOLID WHITE PLASTIC, OPEN FRONT, WITHOUT COVER CARRIER: ASME A112.6.1; ADJUSTABLE, EPOXY COATED, CAST IRON FRAME, INTEGRAL DRAIN HUB AND VENT	3	2	1	-	
UR-1	URINAL	WALL HUNG	AMERICAN STANDARD	6042.001 "DECORUM"	FLUSH VALVE: SLOAN ROYAL 8186, 0.125 GPF, BATTERY-POWERED, SENSOR OPERATED CARRIER: ASME A112.6.1; CAST IRON AND STEEL FRAME WITH TUBULAR LEGS CLEANOUT: CAST IRON BODY FERRULE, THREADED BRASS COUNTER SUNK CLEANOUT PLUG	2	2	3/4	-	
LV-1	LAVATORY	WALL HUNG, RECTANGULAR, ADA	BRADLEY	GLX-1 "EXPRESS"	TRIM: BRADLEY MODEL SS3-3500 VERGE (OR EQUIVALENT BY SYMMONS, MOEN OR CHICAGO), SINGLE HANDLE, 4" CENTER SET, 0.5 GPM MANUFACTURER'S SUPPORT BRACKET MEETING ANSI LOAD REQUIREMENTS MIXING VALVE: SYMMONS 7-210-CK, THERMOSTATIC, ASSE 1070 (OR EQUIVALENT BY DELTA, ACORN, SLOAN OR SPEAKMAN) LAVATORY INSULATION KIT: TRUEBRO LAVGUARD 2 ACCESSORIES: CHROME PLATED BRASS OPEN GRID DRAIN, OFFSET TAILPIECE, P-TRAP AND ANGLE STOPS. RIGID SUPPLIES	1 1/2	1 1/4	1/2	1/2	
WF-1	WASHFOUNTAIN	WALL HUNG WASHFOUNTAIN W/2 FAUCETS, ADA	BRADLEY	GLX-2 "EXPRESS"	(2) TRIM: BRADLEY MODEL SS3-3500 VERGE (OR EQUIVALENT BY SYMMONS, MOEN OR CHICAGO), SINGLE HANDLE, 4" CENTER SET, 0.5 GPM MANUFACTURER'S SUPPORT BRACKET MEETING ANSI LOAD REQUIREMENTS (2) MIXING VALVE: SYMMONS 7-210-CK, THERMOSTATIC, ASSE 1070 (OR EQUIVALENT BY DELTA, ACORN, SLOAN OR SPEAKMAN) (2) LAVATORY INSULATION KIT: TRUEBRO LAVGUARD 2 ACCESSORIES: (2) CHROME PLATED BRASS OPEN GRID DRAIN, (2) OFFSET TAILPIECE, (2) P-TRAP AND ANGLE STOPS. (2) RIGID SUPPLIES	1 1/2	1 1/4	1/2	1/2	
WF-2	WASHFOUNTAIN	WALL HUNG WASHFOUNTAIN W/3 FAUCETS, ADA	BRADLEY	GLX-3 "EXPRESS"	(3) TRIM: BRADLEY MODEL SS3-3500 VERGE (OR EQUIVALENT BY SYMMONS, MOEN OR CHICAGO), SINGLE HANDLE, 4" CENTER SET, 0.5 GPM MANUFACTURER'S SUPPORT BRACKET MEETING ANSI LOAD REQUIREMENTS (3) MIXING VALVE: SYMMONS 7-210-CK, THERMOSTATIC, ASSE 1070 (OR EQUIVALENT BY DELTA, ACORN, SLOAN OR SPEAKMAN) (3) LAVATORY INSULATION KIT: TRUEBRO LAVGUARD 2 ACCESSORIES: (3) CHROME PLATED BRASS OPEN GRID DRAIN, (3) OFFSET TAILPIECE, (3) P-TRAP AND ANGLE STOPS. (3) RIGID SUPPLIES	1 1/2	1 1/4	1/2	1/2	
WF-3	WASHFOUNTAIN	WALL HUNG WASHFOUNTAIN W/3 FAUCETS, ADA	BRADLEY	SN2023 "SENTRY"	TRIM: 3 INTEGRAL 0.5GPM FAUCETS WITH INFRARED SENSOR ACTIVATION MANUFACTURER'S TYPE A DRAIN CONFIGURATION MIXING VALVE: SYMMONS 7-210-CK, THERMOSTATIC, ASSE 1070 (OR EQUIVALENT BY DELTA, ACORN, SLOAN OR SPEAKMAN) SIZED FOR 1.5 GPM ACCESSORIES: (2) INTEGRAL LIQUID SOAP DISPENSERS, BOLTED ON BACKSPLASH	1 1/2	1 1/4	1/2	1/2	
S-1	SINK	UNDERMOUNT, DOUBLE COMPARTMENT, ADA	ELKAY	ECTSRAD3326TBS "CROSSTOWN"	BOWL: 33 X 22 X 6 INCH, 18 GA. THICK, TYPE 304 STAINLESS STEEL TRIM: KOHLER MODEL K-22973 "CRUE" (OR EQUIVALENT BY MOEN, CHICAGO OR SPEAKMAN), SINGLE HANDLE, PULL-DOWN SPRAYHEAD, 1.5 GPM ACCESSORIES: CHROME PLATED BRASS P-TRAP WITH CLEANOUT PLUG, ESCUTCHEON, SCREWDRIVER STOP AND RIGID SUPPLIES	2	1 1/2	1/2	1/2	
S-2	SINK	UNDERMOUNT, SINGLE COMPARTMENT, ADA	JUST MANUFACTURING	US-ADA-1824-A	BOWL: 22 X 16 X 5-1/2 INCH, 18 GA. THICK, TYPE 304 STAINLESS STEEL TRIM: CHICAGO LABORATORY SINK (OR EQUIVALENT BY MOEN, CHICAGO OR SPEAKMAN), WRISTBLADE HANDLES, 1.5 GPM ACCESSORIES: CHROME PLATED BRASS P-TRAP WITH CLEANOUT PLUG, ESCUTCHEON, SCREWDRIVER STOP AND RIGID SUPPLIES	2	1 1/2	1/2	1/2	
GD-1	GARBAGE DISPOSAL	HEAVY DUTY, COMMERCIAL GRADE, SMALL CAPACITY	INSINKERATOR	SS-100	ENCLOSURE: STAINLESS STEEL, CAST-NICKEL, CHROME-ALLOY STATIONARY AND ROTATING SHREDDING ELEMENTS PACKAGE: MOUNTING BOWL ASSEMBLY, ELECTRICAL CONTROL, SYPHON BREAKER, SOLENOID VALVE AND FLOW CONTROL VALVE CONTROL: MANUAL WALL SWITCH. ELECTRICAL: 120V, 1PH.	2	-	1/2	-	
MS-1	MOP SINK	CORNER MOUNT	STERN-WILLIAMS	SBC-1700 "CORLOW"	TRIM: CAMBRIDGE/DELTA MODEL 28T9 (OR EQUIVALENT BY MOEN, CHICAGO OR SPEAKMAN), EXPOSED WITH CROSS HANDLES ACCESSORIES: VACUUM BREAKER, HOSE END SPOUT, INTEGRAL SCREWDRIVER STOPS, 5 FEET OF RUBBER HOSE WITH HOSE CLAMP HANGER AND MOP HANGER	3	2	1/2	1/2	
SH-1	SHOWER	ONE-PIECE SHOWER STALL, ADA	EVERFAB	SMODE S6336A	CABINET: 36 X 63 X 78-1/2 INCH HIGH, REMOVABLE CHROME-PLATED STRAINER, TAILPIECE, INTEGRAL SEAT, STAINLESS STEEL GRAB BARS TRIM: SYMMONS MODEL 1-25-FSB "SAFETYMIX" (OR EQUIVALENT BY DELTA, MOEN OR SPEAKMAN), 2.5 GPM, ADJUSTABLE SLIDE BAR AND 60" HOSE, WITH PRESSURE BALANCED MIXING VALVES	2	2	1/2	1/2	
DF-1	DRINKING FOUNTAIN / BOTTLE FILL STATION	WALL MOUNTED, SINGLE HEIGHT, ADA	ELKAY	MODEL LMABF8WSSK	CABINET: 18 GA. THICK, TYPE 304 STAINLESS STEEL, FRONT OR SIDE PUSHBAR BUBBLER ACTIVATION, FILTERED, 8 GPH CHILLED WATER @50°F CAPACITY TRIM: MOUNTING PLATE ELKAY MLP100 AND MOUNTING BOLTS ELECTRICAL: 120V/1Ø/60HZ, 6.0 FLA, 370W WEIGHT: 100 LBS	1 1/2	1 1/4	1/2	-	
EW-1	EMERGENCY EYEWASH STATION	WALL MOUNT	GUARDIAN	G1814P	WALL-MOUNTED EYEWASH WITH PLASTIC BOWL AND TWO SPRAY-TYPE OUTLET HEADS PROVIDE WALL MOUNTING BRACKET, HANDHELD SPRAY NOZZLE, BRASS TAILPIECE AND P-TRAP AND MANUFATURER'S THERMOSTATIC MIXING VALVE TO PROVIDE TEPID WATER AS REQUIRED BY ANSIZ358.1	1 1/2	1 1/4	1/2	1/2	
EW-2	EMERGENCY EYEWASH STATION	DECK MOUNT	GUARDIAN	G1805	DECK-MOUNTED EYEWASH WITH TWO SPRAY-TYPE OUTLET HEADS WITH ACTIVATION UPON SWINGING THE SPRAY HEAD ASSEMBLY 90° PROVIDE DECK-MOUNTING HARDWARE, INLINE STRAINER, AND MANUFATURER'S THERMOSTATIC MIXING VALVE TO PROVIDE TEPID WATER AS REQUIRED BY ANSIZ358.1	-	-	1/2	1/2	
H-1	WALL HYDRANT	RECESSED BOX TYPE, FREEZE PROOF	WOODFORD	MODEL B67C	PROVIDE WITH INTEGRAL BACKFLOW PREVENTER	-	-	3/4	-	
FD-1	FLOOR DRAIN	FINISHED FLOOR	JAY R. SMITH	2005-A / 2005-B	ADJUSTABLE NICKEL BRONZE STRAINER TRAP PRIMER CONNECTION (PROVIDE TRAP PRIMER)	2	2	-	-	
FD-2	FLOOR DRAIN	UTILITY	JAY R. SMITH	2110 / 2130	ADJUSTABLE CAST IRON STRAINER WITH ACID RESISTANT COATING TRAP PRIMER CONNECTION (PROVIDE TRAP PRIMER)	3	2	-	-	
FS-1	FLOOR SINK	SQUARE, ENAMELED CAST IRON	JAY R. SMITH	300 SERIES	BASIN: 12" SQUARE WITH ACID RESISTANT ENAMEL INTERIOR TRIM: DOME STRAINER, FLANGE, 1/2 GRATE TRAP PRIMER CONNECTION (PROVIDE TRAP PRIMER)	3	2	-	-	
HD-1	HUB DRAIN	FLOOR TYPE WITH HUB FUNNEL	WATTS	FD-100-DD	ADJUSTABLE CAST IRON FUNNEL TRAP PRIMER CONNECTION (PROVIDE TRAP PRIMER) PROVIDE P-TRAP	4	2	-	-	
TD-1	TRENCH DRAIN	PRECAST POLYMER	JAY R. SMITH	9818 SERIES	CHANNEL: 6" WIDE WITH INTEGRAL CAST-IN METAL RAIL EDGE GRATE: SLOTTED CAST IRON, LOAD CLASS C	4	2	-	-	
CO-1	CLEANOUT	EXTERIOR, TO GRADE	JAY R. SMITH	4250	ROUND CAST NICKEL BRONZE ACCESS FRAME AND NON-SKID COVER	-	-	-	-	
CO-2	CLEANOUT	INTERIOR, TO FINISHED FLOOR	JAY R. SMITH	4000 SERIES	PROVIDE WITH ROUND GASKETED SCORED COVER IN SERVICE AREAS PROVIDE WITH ROUND GASKETED DEPRESSED COVER TO ACCEPT FLOOR FINISH IN FINISHED FLOOR AREAS	-	-	-	-	
CO-3	CLEANOUT	WALL TYPE	JAY R. SMITH	4000 SERIES	LAQUERED CAST IRON BODY AND ROUND EPOXY COATED GASKETED COVER STAINLESS STEEL ACCESS COVER SECURED WITH MACHINE SCREW	-	-	-	-	
NOTES:										
1	EQUIVALENT MODELS BY ALTERNATE MANUFACTURERS ARE ALSO ACCEPTABLE. APPROVED MANUFACTURERS: AMERICAN STANDARD, KOHLER, TOTO, JUST, ELKAY, MOEN, FIBER-FAB, AQUAGLASS, LASCO, ELJER, STERN-WILLIAMS, HAWS, JAY R. SMITH, MIFAB, SIOUX CHIEF AND ZURN.									

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



AKAAAN
 architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS		
△	DATE	DESCRIPTION

CONTENTS:
 PLUMBING
 SCHEDULES

SHEET NO:

P0.1

101 ST HELENS ST
 ST HELENS, OR 97051
 T: 503.368.3050 F: 503.366.3055

PLOTTED: MATT MCCORMICK 9/7/2021 6:47 PM
 X:\DWG\AD\5459\5459 P0.2

ELECTRIC WATER HEATER											
SYMBOL MARK	DESCRIPTION	SERVICE	INPUT (KW)	VOLTAGE	PH.	MCA	FLA	STORAGE CAPACITY (GAL)	RECOVERY RATE AT 100° F (GPH)	OPERATING WEIGHT (LBS)	COMMENTS
WH-1	STORAGE TYPE WATER HEATER	OFFICE	12	240	1	-	-	50	49	700	1
NOTES: 1 PROVIDE SEISMIC BRACING PER CODE.											

EXPANSION TANK												
SYMBOL MARK	DESCRIPTION	SERVICE	TANK VOLUME (GAL)	MAX ACCEPTANCE VOLUME (GAL)	AIR PRECHARGE (PSIG)	CONNECTION SIZE (IN)	BUILDING SUPPLY PRESSURE (PSIG)	MAX. SYSTEM OPERATING PRESSURE (PSIG)	START TEMP (°F)	MAXIMUM TEMP (°F)	OPERATING WEIGHT (LBS)	COMMENTS
ET-1	EXPANSION TANK	WH-1	2.0	0.9	50	3/4	60	150	40	200	25	
NOTES: 												

DOMESTIC HOT WATER CIRCULATOR PUMP											
SYMBOL MARK	DESCRIPTION	SERVICE	GPM	HEAD (FT)	VOLTAGE	PH.	HP	MCA	FLA	RPM	WEIGHT (LBS)
CP-1	WET ROTOR RECIRCULATION PUMP	BUILDING HOT WATER RETURN	5	15	120	1	1/8	-	-	3,600	10
NOTES: 1 DESIGN BASIS: B&G ECOCIRC 2 PUMP TO BE OPERATED WITH MANUFACTURER'S OPTIONAL AQUASTAT											

GAS LOAD SUMMARY				
SYMBOL MARK	DESCRIPTION	SERVICE	MBH	COMMENTS
RTU-1	ROOFTOP UNIT	OFFICE (NORTH)	300	
RTU-2	ROOFTOP UNIT	OFFICE (SOUTH)	200	
RTU-3	ROOFTOP UNIT	SHOP (NORTH)	300	
RTU-4	ROOFTOP UNIT	SHOP (SOUTH)	300	
-	SINTER FURNACE (2a)	-	72	
-	FUTURE BBQ	-	100	ASSUMED PLACE HOLDER
-	FUTURE OUTDOOR RADIANT HEATER	-	100	ASSUMED PLACE HOLDER
-	FUTURE OUTDOOR FIRE TABLE	-	100	ASSUMED PLACE HOLDER
-	FUTURE LOAD	-	200	ASSUMED PLACE HOLDER
TOTAL MBH			1672	
DEVELOPED LENGTH (FT)			350	
PRESSURE (PSIG)			2	
MAIN SIZE (IN)			1 1/2	
NOTES: 				

WASTE SERVICE CALCULATION					
FIXTURE	PUBLIC USE QUANTITY	FIXTURE UNITS (DFU)	ASSEMBLY QUANTITY	FIXTURE UNITS (DFU)	TOTAL DFU
WATER CLOSET (FLUSH VALVE)	12	4		6	48
WATER CLOSET (FLUSH TANK)		4		6	0
DISHWASHER (DOMESTIC)		2		2	0
DRINKING FOUNTAIN	2	0.5		1	1
FLOOR DRAIN	6	2		2	12
LAVATORY	13	1		1	13
SINK	3	2		2	6
MOP SINK	1	3		3	3
SHOWER	1	2		2	2
URINAL (FLUSH VALVE)	2	2		5	4
WALL BOX (CLOTHES WASHER)		2		2	0
EMERGENCY EYEWASH	3	1		1	3
BLOW MOLDING MACHINE	1	6		6	30 GPM
MISCELLANEOUS EQUIPMENT	1	4		4	ASSUMED 20 GPM
BATH TUB		2		2	0
TOTAL DRAINAGE FIXTURE UNITS					102
PIPE SLOPE (%)					2
MAIN SIZE (IN)					4
NOTES: 					

WATER SERVICE CALCULATION - PARCEL 2 BUILDING						
FIXTURE	PUBLIC USE QUANTITY	FIXTURE UNITS (WSFU)	ASSEMBLY QUANTITY	FIXTURE UNITS (WSFU)	TOTAL WSFU	HOT WATER
WATER CLOSET (FLUSH VALVE)	12	5		8	60	0
WATER CLOSET (FLUSH TANK)		2.5		3.5	0	0
DISHWASHER (DOMESTIC)		1.5		1.5	0	0
DRINKING FOUNTAIN	2	0.5		0.75	1	0
HOSE BIBB		1		1	0	0
LAVATORY	13	1		1	13	9.75
SINK	3	1.5		1.5	4.5	3.375
MOP SINK	1	3		3	3	2.25
SHOWER	1	2		2	2	1.5
URINAL (FLUSH VALVE)	2	4		5	8	0
WALL BOX (CLOTHES WASHER)		4		4	0	0
EMERGENCY EYEWASH	3	2		2	6	4.5
BATH TUB		4		4	0	0
TOTAL WSFU					97.5	21.375
TOTAL GPM					65	15

PRESSURE CALCULATIONS:	DISTANCE (FT)	PRESSURE (PSIG)	COMMENTS
A. MINIMUM STATIC WATER PRESSURE AT STREET	-	66	
B. PRESSURE LOSS AT METER	-	8	ANTICIPATED
C. PRESSURE LOSS AT BACKFLOW PREVENTER	-	4	ANTICIPATED
D. PIPE DISTANCE FROM STREET TO FIRST TEE	70	-	
E. FRICTION LOSS IN PIPING (3/2"100' X.434 X D = PSIG)	-	1	1
F. PIPE DISTANCE FROM FIRST TEE TO SECOND TEE	120	-	
G. FRICTION LOSS IN PIPING (1.8/100' X.434 X D = PSIG)	-	1	1
H. PIPE DISTANCE FROM SECOND TEE TO THIRD TEE (NEW BLDG)	140	-	
G. FRICTION LOSS IN PIPING (1.8/100' X.434 X D = PSIG)	-	1	1
H. PIPE DISTANCE FROM THIRD TEE TO NEW BUILDING RISER	75	-	
G. FRICTION LOSS IN PIPING (.8/100' X.434 X D = PSIG)	-	0	1
F. ELEVATION PRESSURE LOSS FROM STREET TO RISER	10	4	2
G. PRESSURE AT RISER (A - B - C - E - F.)	-	45	
H. PIPE LENGTH FROM RISER TO REMOTE FIXTURE	250	-	1
I. FRICTION LOSS IN PIPING (4/100' X.434 X H = PSIG)	-	7	1
J. ELEVATION PRESSURE LOSS FROM RISER TO REMOTE FIXTURE	3	1	2
K. PRESSURE AVAILABLE AT REMOTE FIXTURE (G - I - J.)	-	37	
L. MINIMUM PRESSURE AT REMOTE FIXTURE	-	35	3

SERVICE SIZE (INCHES) = 3
NOTES: 1 TOTAL EQUIVALENT PIPE LENGTH = PIPE LENGTH X 1.5. 2 FT X .434 = PSIG

GAS PIPE SIZING SCHEDULE	
PIPE SIZE SCHEDULE 40	CFH
1/2"	232
3/4"	486
1"	869
1 1/4"	1790
1 1/2"	2670
NOTES: 1. SIZING PER 2017 OPSC APPENDIX C TABLE C402.4(5) BASED ON DELIVERY PRESSURE OF 2.0 PSI, A PRESSURE DROP OF 1.0 PSI, SPECIFIC GRAVITY OF 0.6 AND TOTAL DEVELOPED LENGTH OF 400 FT.	

BRANCH PIPE SIZING CHART			
WATER PIPE SIZE	MAX SUPPLY FIXTURE UNITS PER 2017 OPSC - NO FLUSH VALVES	MAX SUPPLY FIXTURE UNITS PER 2017 OPSC - WITH FLUSH VALVES	MAX GPM
1/2"	2	-	2
3/4"	7.5	-	6
1"	10	-	8
1-1/4"	20	-	15
1-1/2"	35	5	22
2"	105	35	44
2-1/2"	270	155	80
3	650	550	150
SIZING PER 2017 OPSC APPENDIX A TABLE 103.1, CHARTS 103.1(1), 103.1(2), AND 105.1(1) AND THE BUILDING SUPPLY PRESSURE OF 60 PSIG AND PIPING MATERIALS OF TYPE L COPPER AND SMOOTH PIPE. A MAXIMUM PRESSURE DROP OF 2.0 PSI PER 100FT. A MAX VELOCITY OF 7FT/SEC.			



EXPIRES 12-31-21

PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS	
△	DATE DESCRIPTION

CONTENTS:

PLUMBING
 SCHEDULES

SHEET NO:

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979

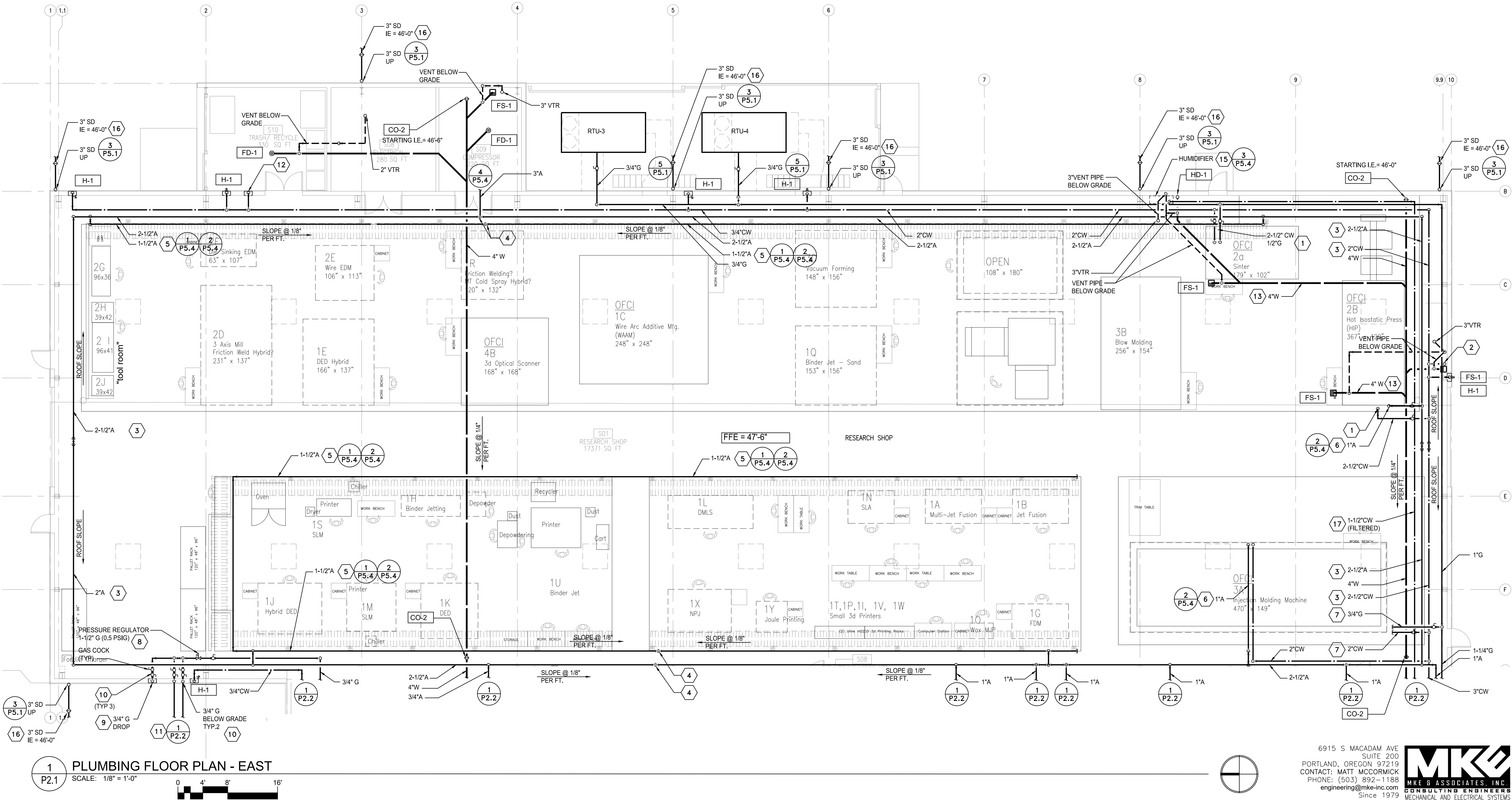


GENERAL NOTES:

A. SEE SHEET P0.1 FOR GENERAL NOTES

KEYED NOTES:

1. PROVIDE CW DROP WITH BALL VALVE TO MANUFACTURING EQUIPMENT AND CAP. OWNER TO PROVIDE BACKFLOW DEVICE AND ANY OTHER NECESSARY APPURTENANCES TO MAKE FINAL CONNECTION TO EQUIPMENT.
2. PROVIDE 3/4" CW DROP WITH BALL VALVE AND CAP. OWNER TO PROVIDE BACKFLOW DEVICE AND ANY OTHER NECESSARY APPURTENANCES TO MAKE FINAL CONNECTION TO EQUIPMENT. COORDINATE LOCATION OF DROP WITH OWNER.
3. ROUTE PIPING AS HIGH AS POSSIBLE, PARALLEL WITH THE ROOF SLOPE.
4. 3/4" A DROP AT LOW POINT IN COMPRESSED AIR LOOP, PROVIDE MANUAL BALL VALVE AND HOSE CONNECTION.
5. SUPPORT COMPRESSED AIR ON LADDER RACK AT 12'-0" AFF PER DETAIL XPS.01. DROPS TO EQUIPMENT SHALL BE INSTALLED BY OWNER AT THE TIME OF EQUIPMENT INSTALL.
6. PROVIDE DRIP LEG WITH MANUAL BALL VALVE AND HOSE CONNECTION. VERIFY LOCATION OF COMPRESSED AIR DROP WITH OWNER PRIOR TO INSTALL.
7. PROVIDE CAPPED G PIPE WITH BALL VALVE FOR FUTURE USE.
8. PROVIDE VENTLESS PRESSURE REGULATOR TO REDUCE PRESSURE FROM 2PSIG TO 0.5PSIG. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
9. 3/4" G DROP TO RECESSED GAS ISOLATION BOX. BURNABY MODEL BBQ-SS-75 OR APPROVED EQUAL.
10. PROVIDE EMERGENCY SHUT-OFF SOLENOID VALVE. ELECTRICAL CONTRACTOR TO MAKE WIRED CONNECTION TO EMERGENCY SHUT-OFF BUTTON.
11. ROUTE 3/4" G BELOW GRADE TO RECESSED VALVE BOX IN COURTYARD CONCRETE SLAB.
12. TRAP PRIMER MANIFOLD. ELECTRICAL TO PROVIDE 120V CONNECTION.
13. PROVIDE CAST IRON WASTE PIPE FOR BRANCH TO FLOOR SINK.
14. PROVIDE HUB DRAIN FOR HUMIDIFIER. SEE MECHANICAL DRAWINGS FOR MORE DETAIL.
15. PROVIDE 1/2" CW DROP TO HUMIDIFIER. PROVIDE RECESSED PRESSURE BACKFLOW DEVICE. ROUTE 1/2" D TO HUB DRAIN.
16. SEE CIVIL FOR CONTINUATION.
17. ROUTE CW (FILTERED) PEX PIPE IN GALVANIZED STEEL PIPE SUPPORT/TRAY FOR THE ENTIRE LENGTH OF THE PIPE. SECURE PEX PIPE TO PIPE SUPPORT/TRAY. (DESIGN BASIS: UPONOR PEX PIPE SUPPORTS OR APPROVED EQUAL)



AKAAN
architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	
DATE	DESCRIPTION

CONTENTS:
PLUMBING FLOOR
PLAN - EAST

SHEET NO:

P2.1

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979

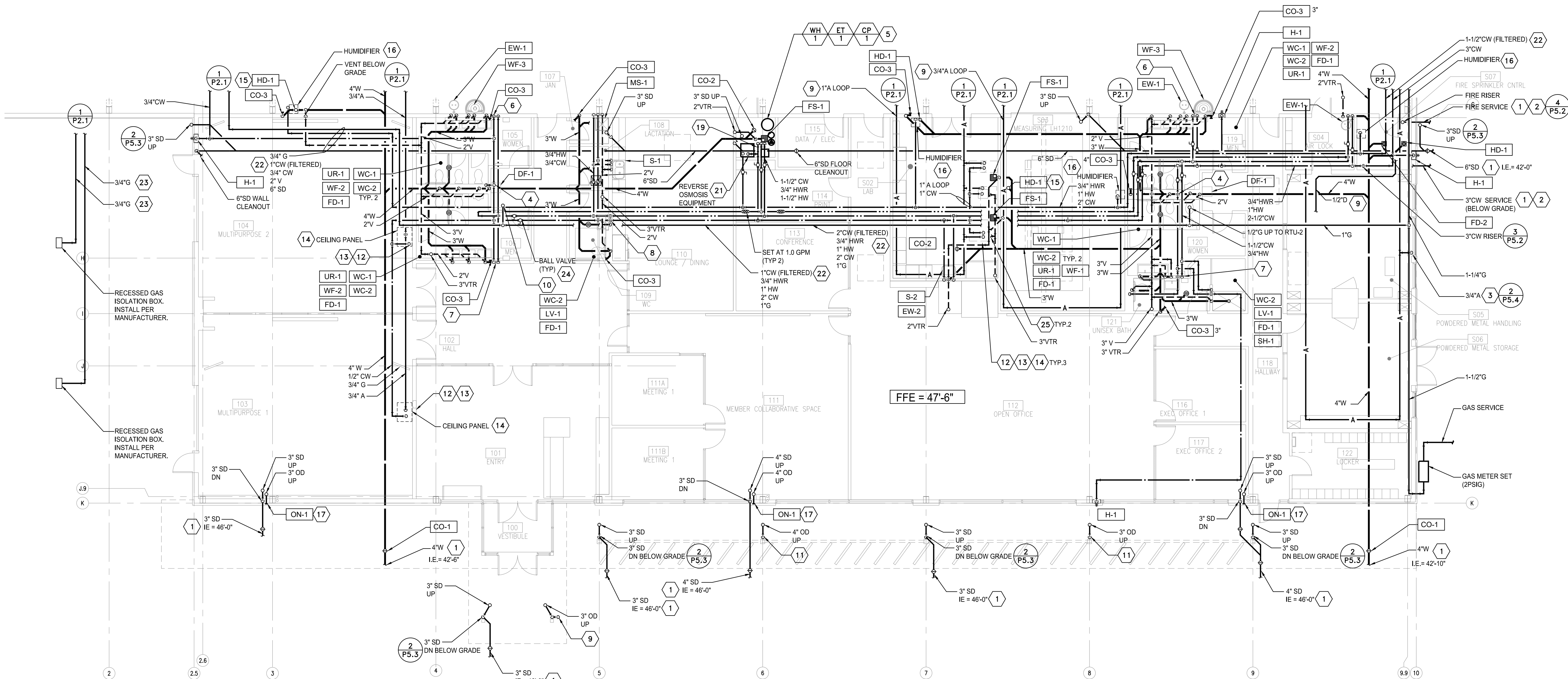


GENERAL NOTES:

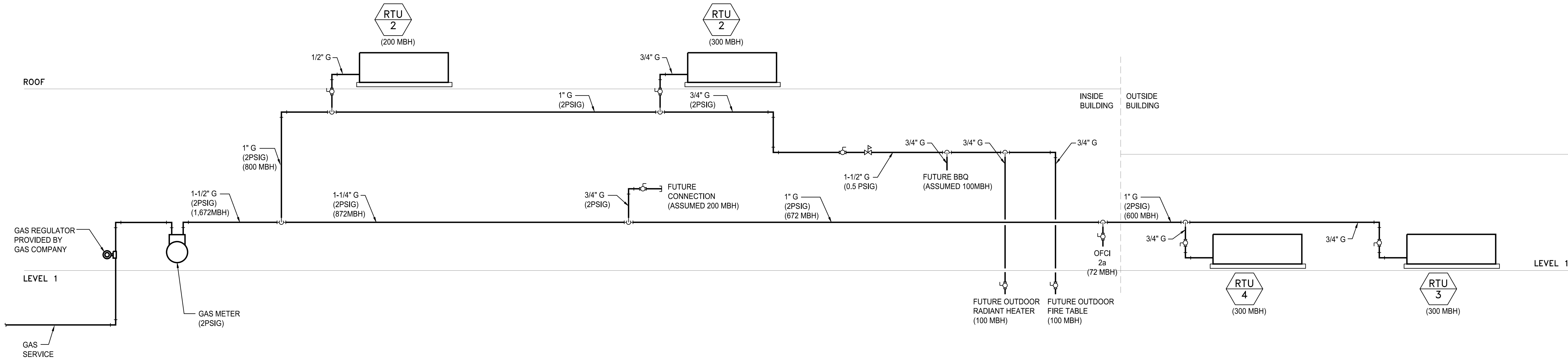
A. SEE SHEET P0.1 FOR GENERAL NOTES

KEYED NOTES:

- SEE CIVIL FOR CONTINUATION
- CIVIL TO PROVIDE BACKFLOW DEVICE
- PROVIDE DRIP LEG WITH MANUAL BALL VALVE AND HOSE CONNECTION. VERIFY LOCATION OF COMPRESSOR AIR DROP WITH OWNER PRIOR TO INSTALLATION. SEAL AROUND PENETRATION IN CEILING AIR TIGHT.
- PROVIDE 2" CW DROP TO WATER CLOSETS, URINAL AND DRINKING FOUNTAIN. PROVIDE WATER HAMMER ARRESTOR SIZED PER MANUFACTURER'S INSTRUCTIONS.
- PROVIDE WATER HEATER, EXPANSION TANK, AND CIRCULATION PUMP. SEISMICALLY RESTRAIN WATER HEATER. SEE DETAIL 6/P5.1 AND 2/P5.2. NOT SHOWN FOR CLARITY.
- 3/4" HW AND 3/4" CW DROP TO LAVATORIES, EYEWASH, AND WASH FOUNTAIN.
- 3/4" HW AND 3/4" CW DROP TO LAVATORIES.
- 1-1/2" CW AND 1/2" HW DROP TO LAVATORY AND WATER CLOSET.
- PROVIDE 1/2" D FROM DRAIN IN DUCT WORK AND TERMINATE 6" ABOVE HD-1 IN FIRE SPRINKLER CONTROL ROOM. SEE MECHANICAL DRAWINGS FOR CONTINUATION.
- 3/4" G UP TO RTU-1.
- TERMINATE 3" SD AT 2'-0" ABOVE LANDSCAPING. 1/2" G DOWN TO UTILITY PANEL
- PROVIDE 3/4" CW DOWN IN UTILITY PANEL. PROVIDE BALL VALVE AND REDUCED PRESSURE BACKFLOW ASSEMBLY. ROUTE DRAIN TO FLOOR SINK, OUTDOORS OR NEARBY LAVATORY /SINK P-TRAP WITH APPROVED AIR GAP FITTING.
- PROVIDE 3/4" A DOWN TO UTILITY PANEL. PROVIDE BALL VALVE. QUICK CONNECTS TO BE PROVIDED BY PANEL MANUFACTURER. CONTRACTOR TO PROVIDE FINAL CONNECTION TO EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.
- CEILING UTILITY PANEL. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND DETAILS. SEAL ALL PENETRATIONS IN CEILING PANEL AIR TIGHT.
- PROVIDE HUB DRAIN FOR HUMIDIFIER. SEE MECHANICAL DRAWINGS FOR MORE DETAILS.
- PROVIDE 3/4" CW (FILTERED) PEX PIPE DROP TO HUMIDIFIER, REFER TO DETAIL 3/P5.4 FOR MORE DETAIL.
- MOUNT OVERFLOW NOZZLE AT 2'-0" ABOVE FINISHED FLOOR.
- TERMINATE 3" SD AT 2'-0" ABOVE LANDSCAPING.
- PROVIDE 3/4" HWR, 1" HW AND 2" CW DROP TO WATER HEATER. SEE DETAIL 6/P5.1 AND 2/P5.2 FOR MORE PIPING DIAGRAM.
- PROVIDE 1-1/2" CW DROP TO REVERSE OSMOSIS EQUIPMENT. MECHANICAL CONTRACTOR TO FURNISH REVERSE OSMOSIS EQUIPMENT. PLUMBING CONTRACTOR TO MAKE ALL PLUMBING CONNECTIONS PER DETAIL 4/P5.3.
- ROUTE CW (FILTERED) PEX PIPE IN GALVANIZED STEEL PIPE SUPPORT/TRAY FOR THE ENTIRE LENGTH OF THE PIPE. SECURE PEX PIPE TO PIPE SUPPORT/TRAY. (DESIGN BASIS: UPONOR PEX PIPE SUPPORTS OR APPROVED EQUAL).
- ROUTE 3/4" G BELOW GRADE TO RECESSED VALVE BOX IN COURTYARD CONCRETE SLAB. BURNABY MODEL VGP-CD-75 OR APPROVED EQUAL. COORDINATE LOCATION WITH ARCHITECTURAL DRAWINGS.
- INSTALL BALL VALVES IN ACCESSIBLE LOCATION. PROVIDE ACCESS PANELS WITH A MINIMUM DIMENSION OF 12"x12" WHERE NECESSARY TO PROVIDE ACCESS.
- PROVIDE INDIVIDUAL CONNECTION FROM PASSIVE 3" VENT TO EACH PIECE OF EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.



PLOTTED: MATT MCCORMICK 9/7/2021 6:56 PM
 X:\DWG\AD\5459\5459 P41



1
 P4.1 GAS RISER DIAGRAM
 SCALE: NTS

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

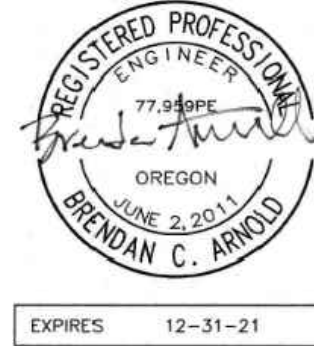
REVISIONS		
△	DATE	DESCRIPTION

CONTENTS:

SHEET NO:

P4.1

AKAAN
architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

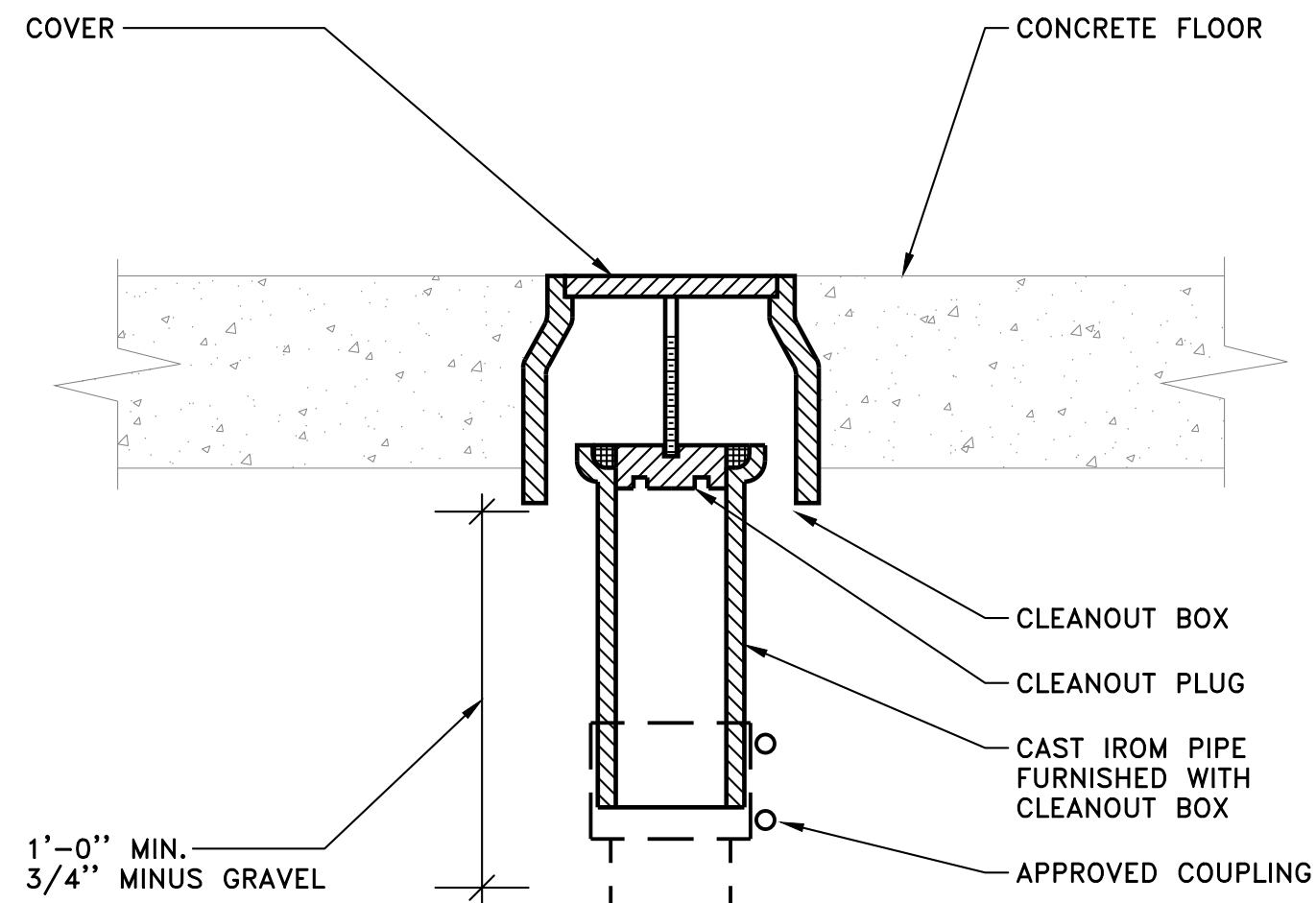
MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

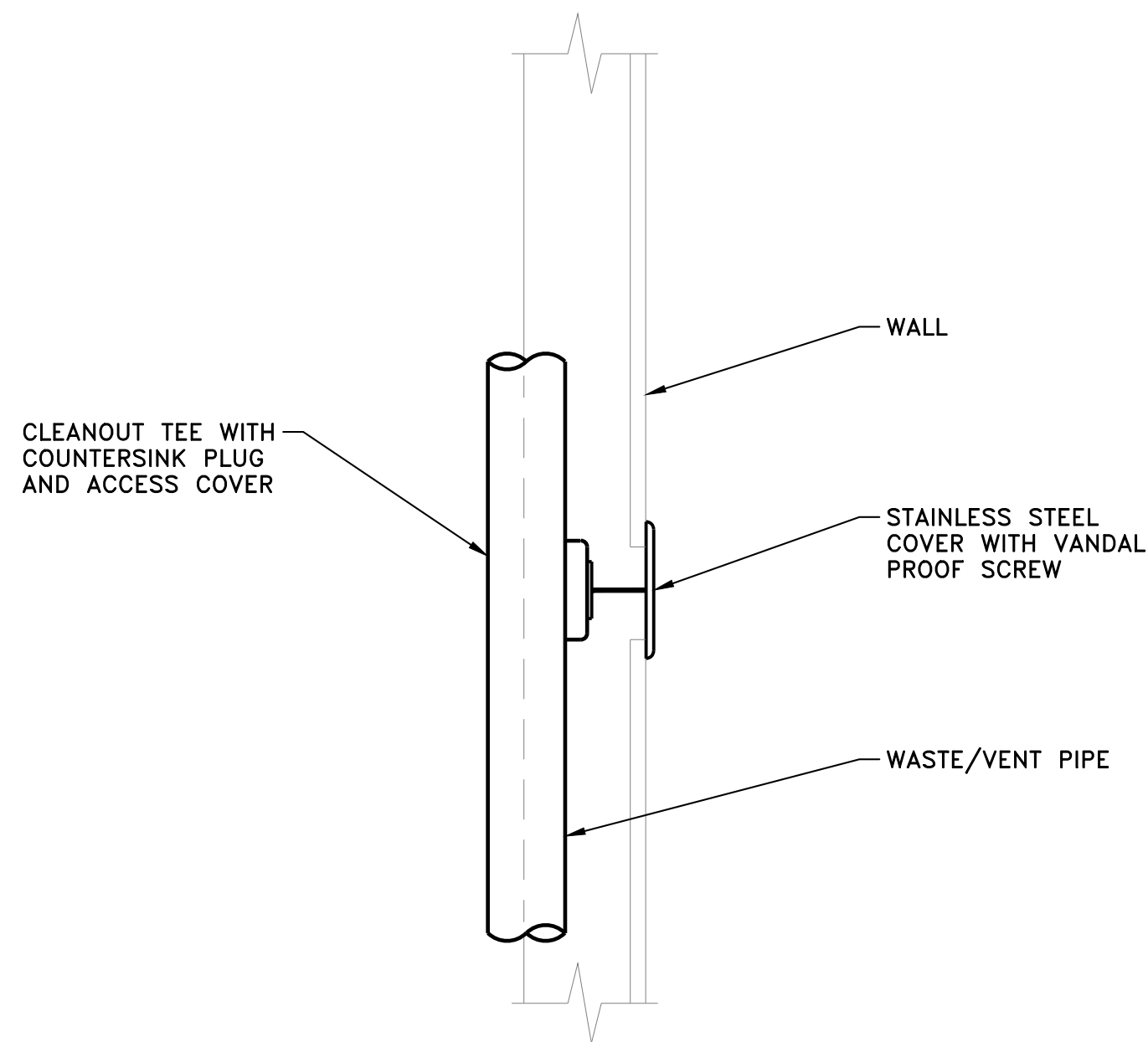
OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

101 ST HELENS ST
 ST HELENS, OR 97051
 T: 503.368.3050 F: 503.366.3055

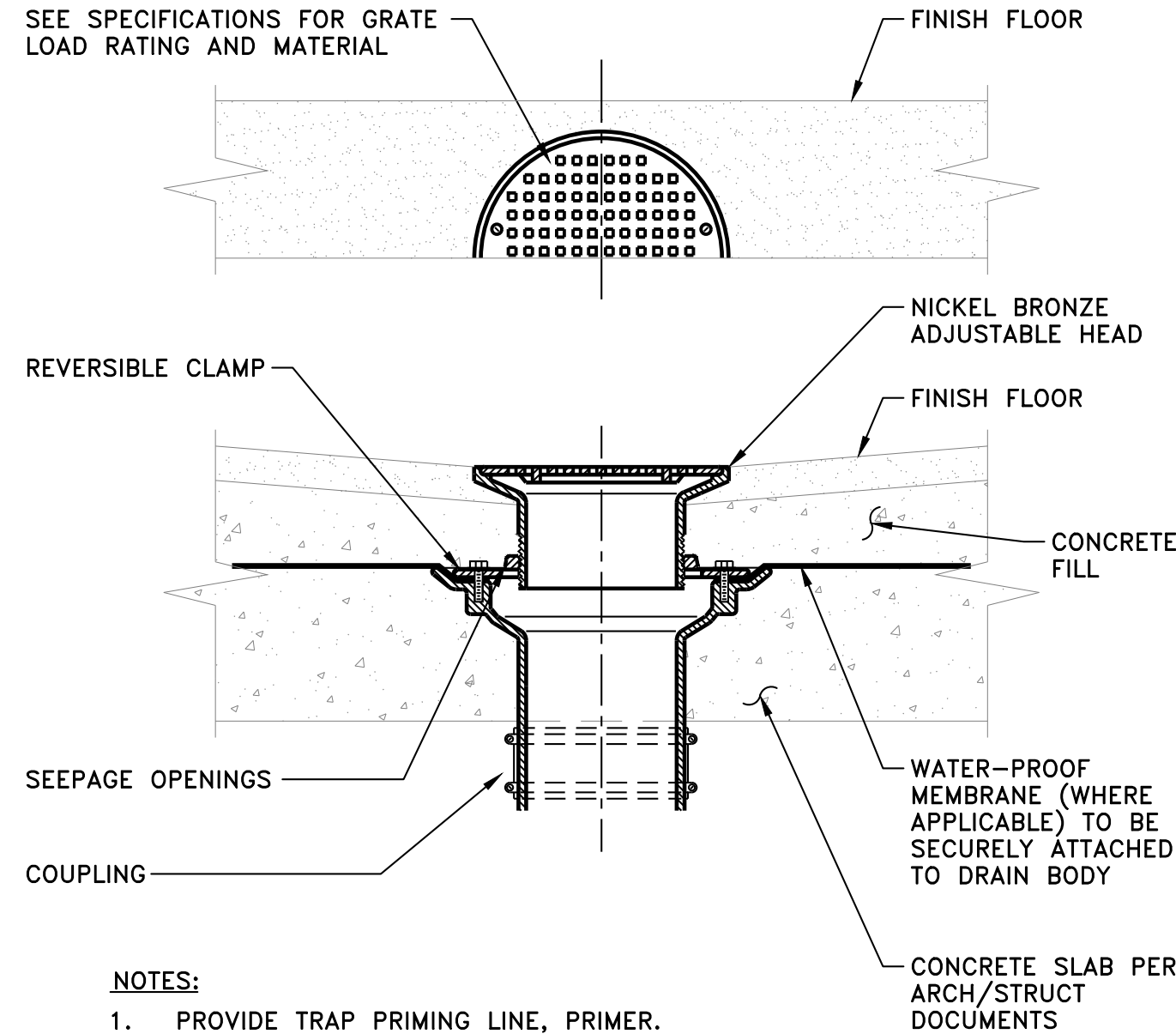
PLOTTED: MATT MCCORMICK 9/7/2021 6:56 PM
X:\DWG\AD\5459\5459 P5.1



1
P5.1
DETAIL -
INTERIOR CLEANOUT TO GRADE (CO-2)
SCALE: N.T.S.

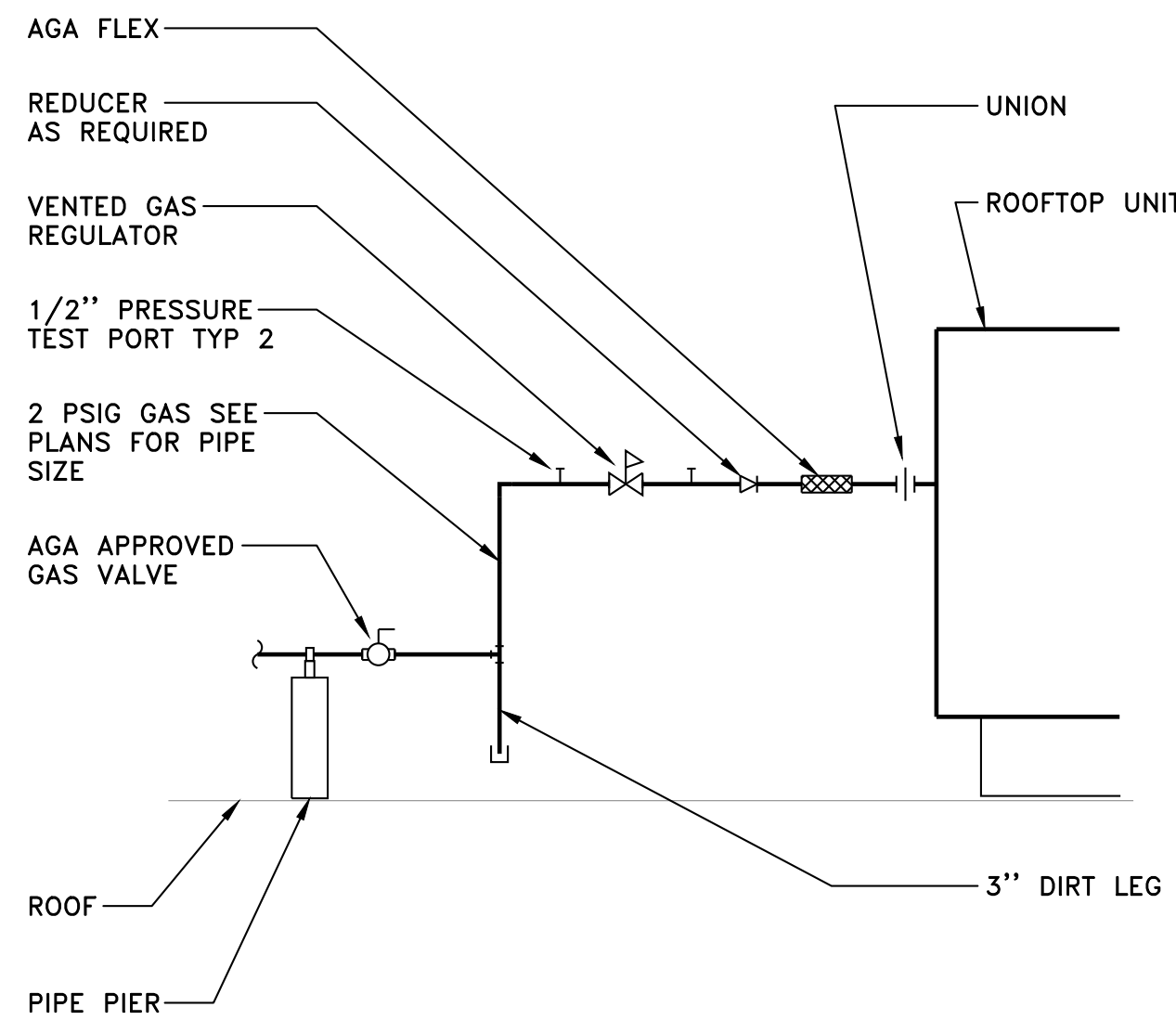


4
P5.1
DETAIL - WALL CLEANOUT (CO-3)
SCALE: N.T.S.

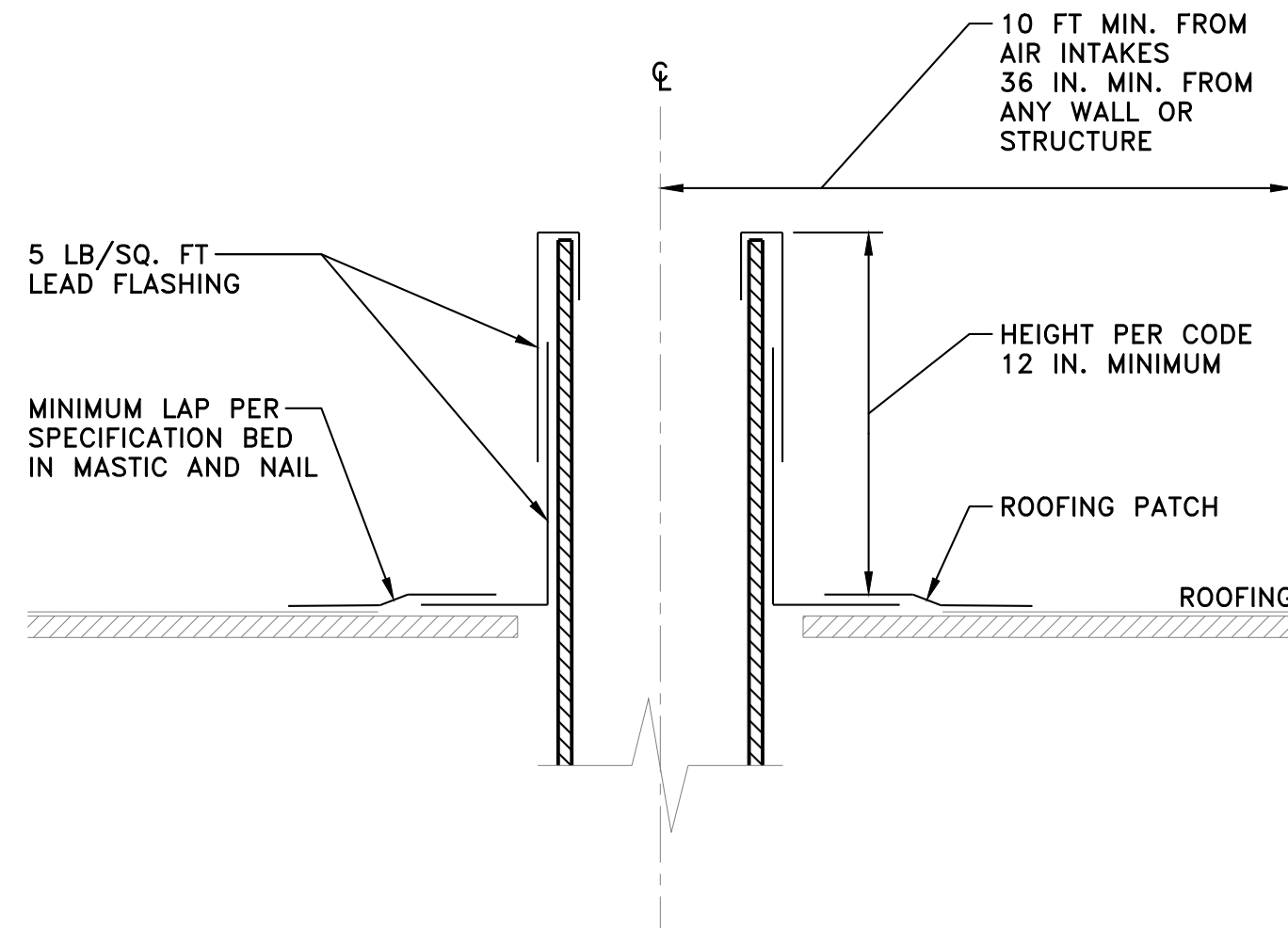


NOTES:
1. PROVIDE TRAP PRIMING LINE, PRIMER.

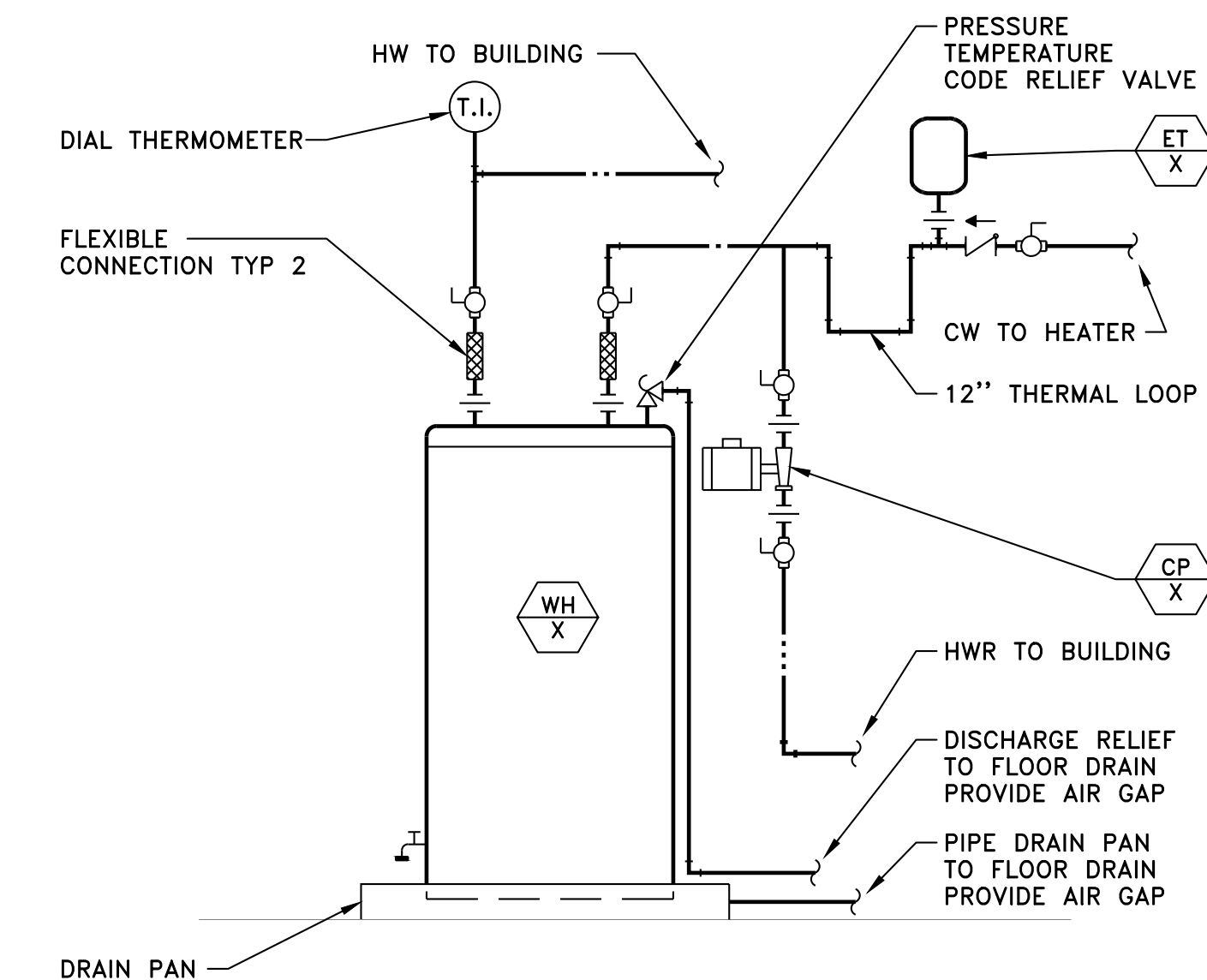
2
P5.1
DETAIL - FLOOR DRAIN
SCALE: N.T.S.



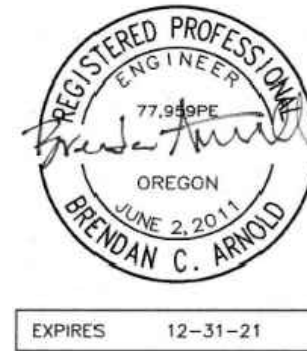
5
P5.1
DETAIL - ROOFTOP EQUIPMENT GAS PIPING
SCALE: N.T.S.



3
P5.1
DETAIL - VENT THROUGH ROOF (VTR)
SCALE: N.T.S.



6
P5.1
DETAIL - ELECTRIC WATER HEATER
SCALE: N.T.S.



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	
△	DESCRIPTION

CONTENTS:
PLUMBING
DETAILS

SHEET NO:

P5.1

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979





CIVIL ENGINEER:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P. 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 20
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS		
	DATE	DESCRIPTION

CONTENTS:

PLUMBING
DETAILS

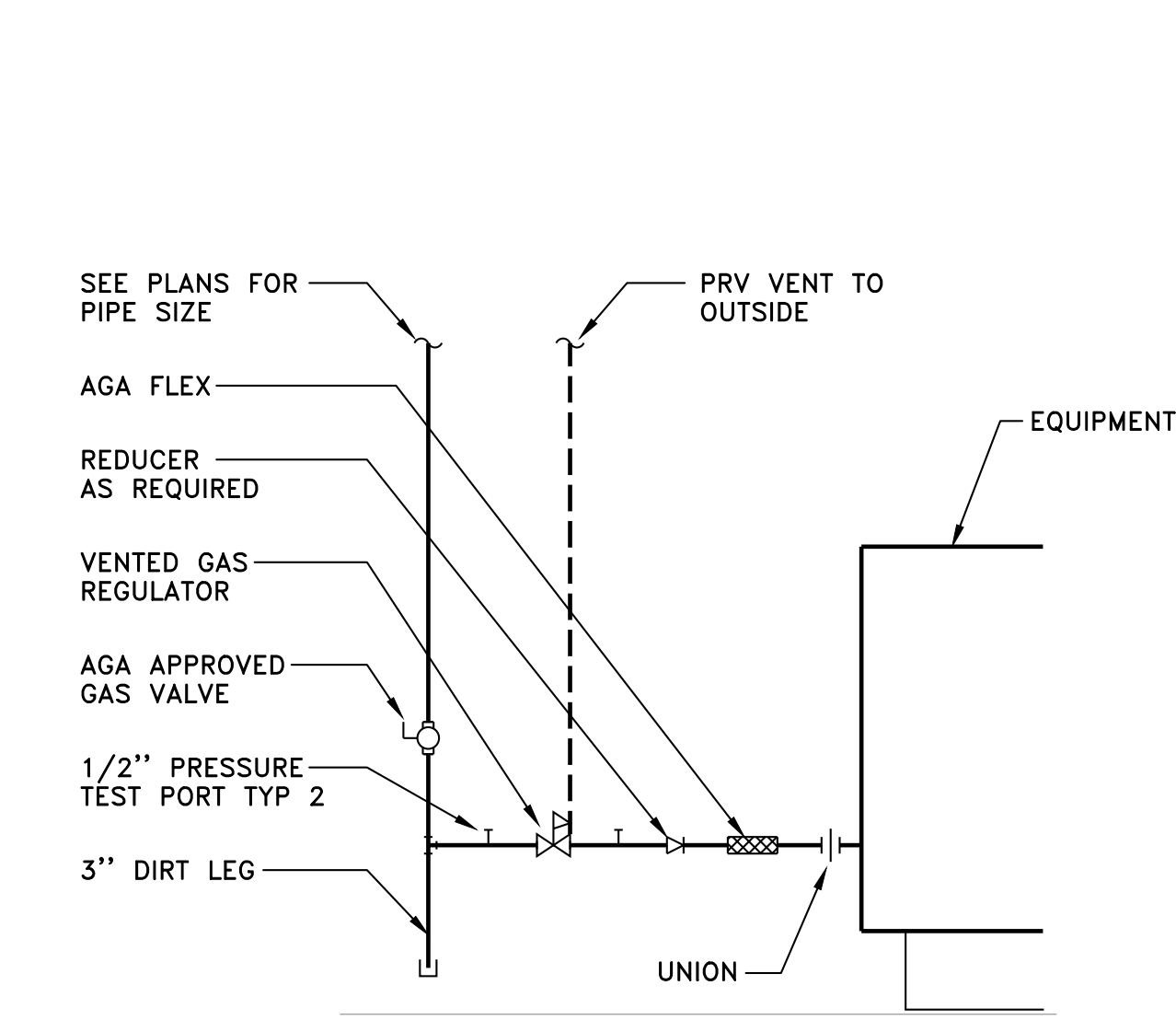
SHEET NO:

P5.2

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979

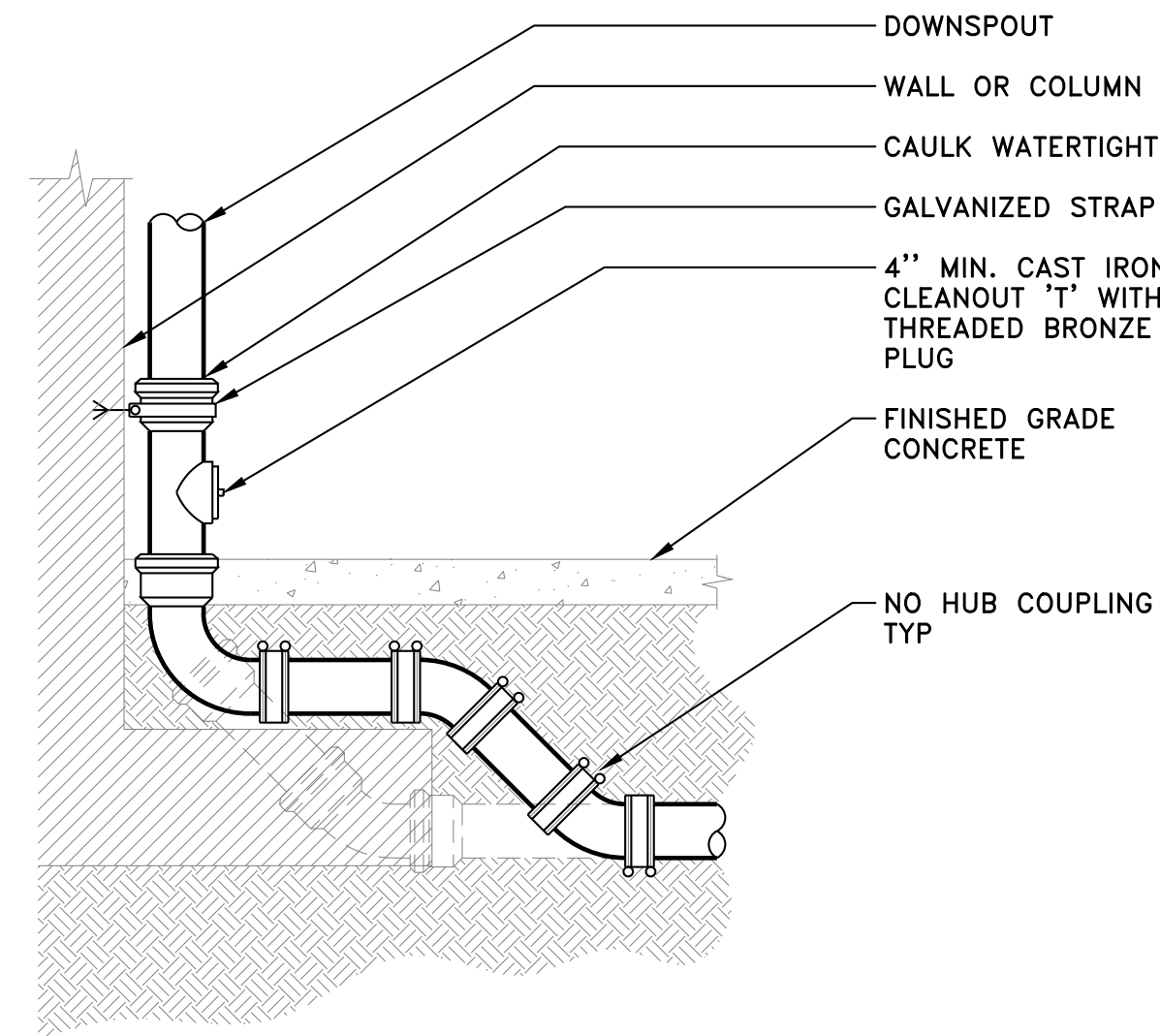


PLOTTED: MATT MCCORMICK 9/7/2021 6:55 PM
 X:\DWG\AD\5459\5459 P53



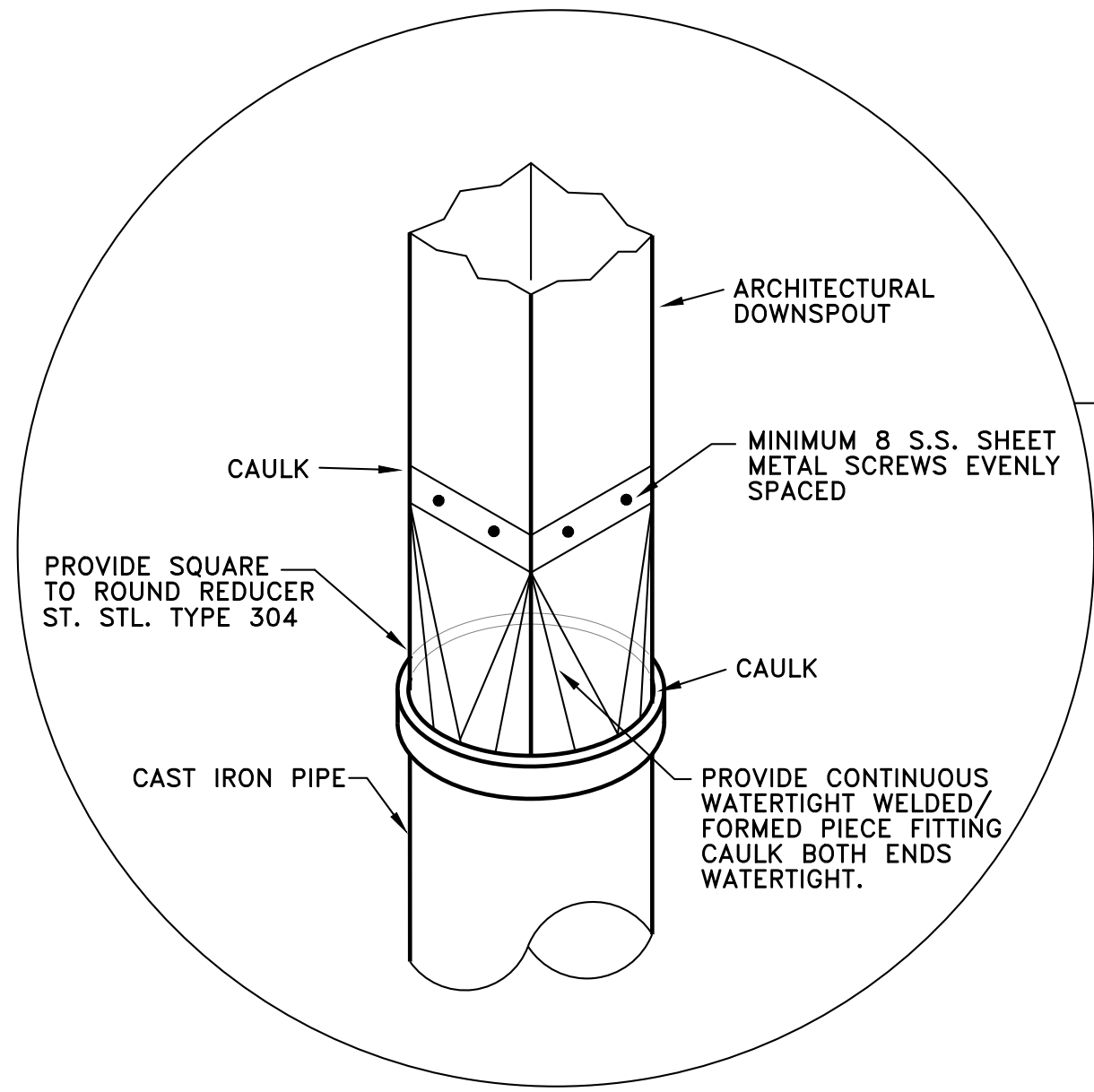
1
 P5.3
 DETAIL – INTERIOR EQUIPMENT GAS PIPING
 SCALE: N.T.S.

PDL02



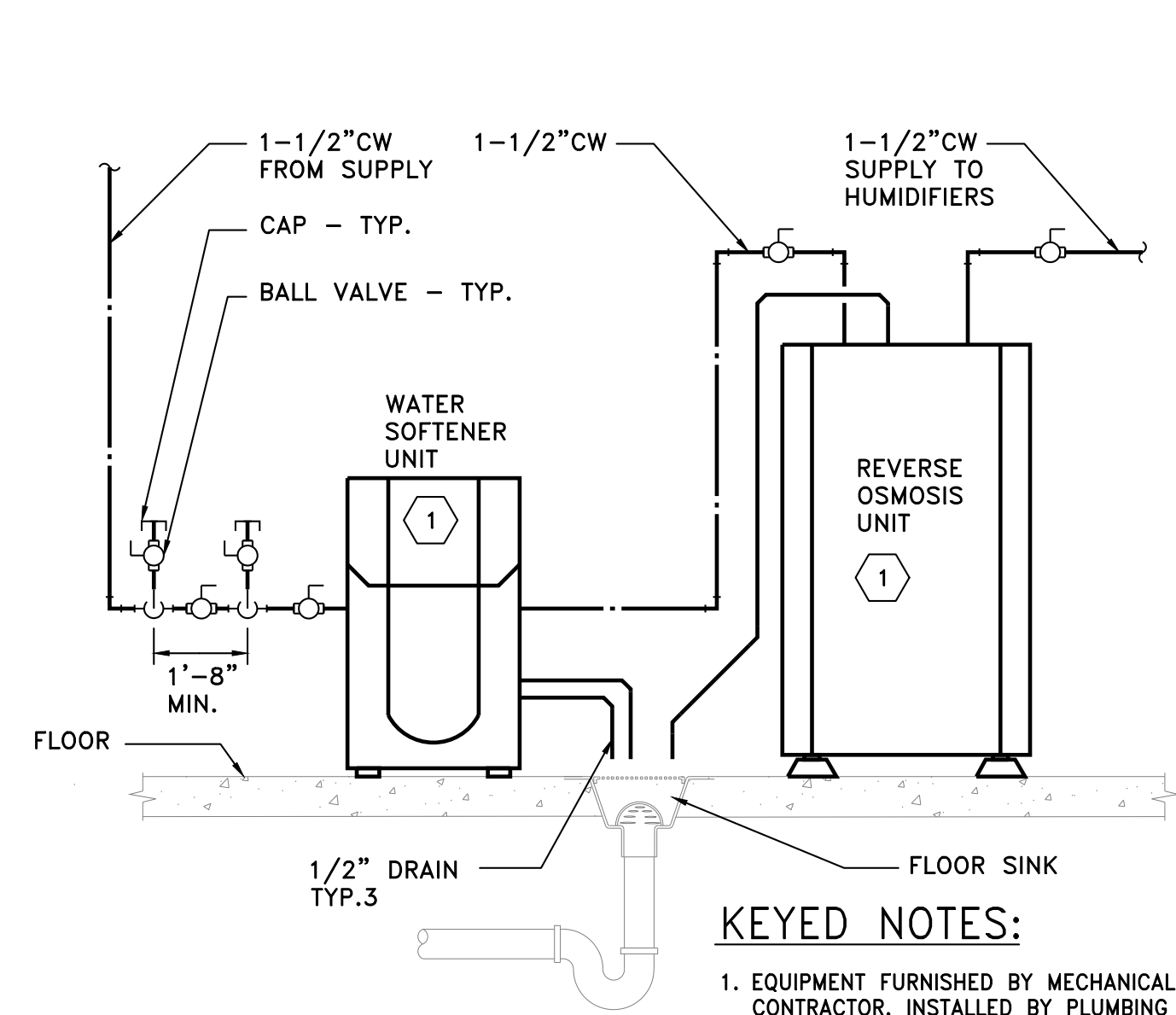
2
 P5.3
 DETAIL – EXTERIOR DOWNSPOUT CONNECTION
 SCALE: N.T.S.

PDJ01



3
 P5.3
 DETAIL – EXTERIOR DOWNSPOUT CONNECTION
 SCALE: N.T.S.

PDJ03



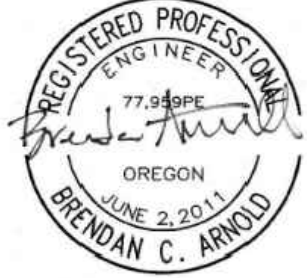
4
 P5.3
 DETAIL – REVERSE OSMOSIS UNIT
 SCALE: N.T.S.

KEYED NOTES:
 1. EQUIPMENT FURNISHED BY MECHANICAL CONTRACTOR. INSTALLED BY PLUMBING CONTRACTOR.

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com



AKAAN
 architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS	DATE	DESCRIPTION
△		

CONTENTS:
 PLUMBING
 DETAILS

SHEET NO:

P5.3

101 ST HELENS ST
 ST HELENS, OR 97051
 T: 503.368.3050 F: 503.366.3055



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

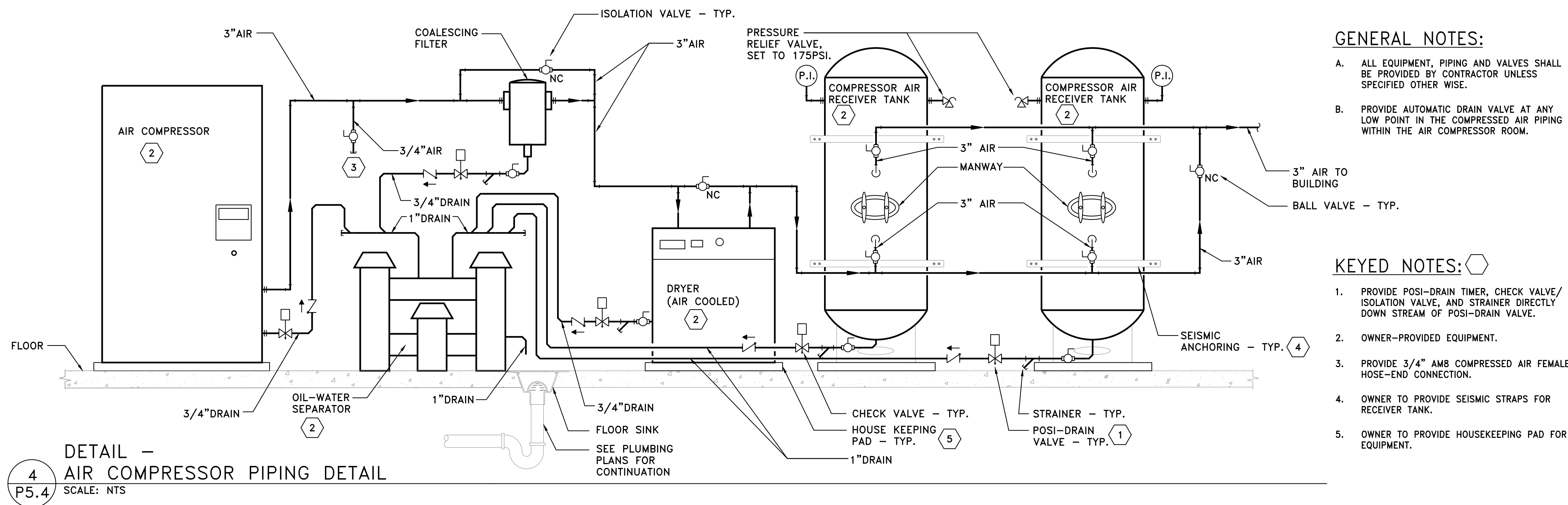
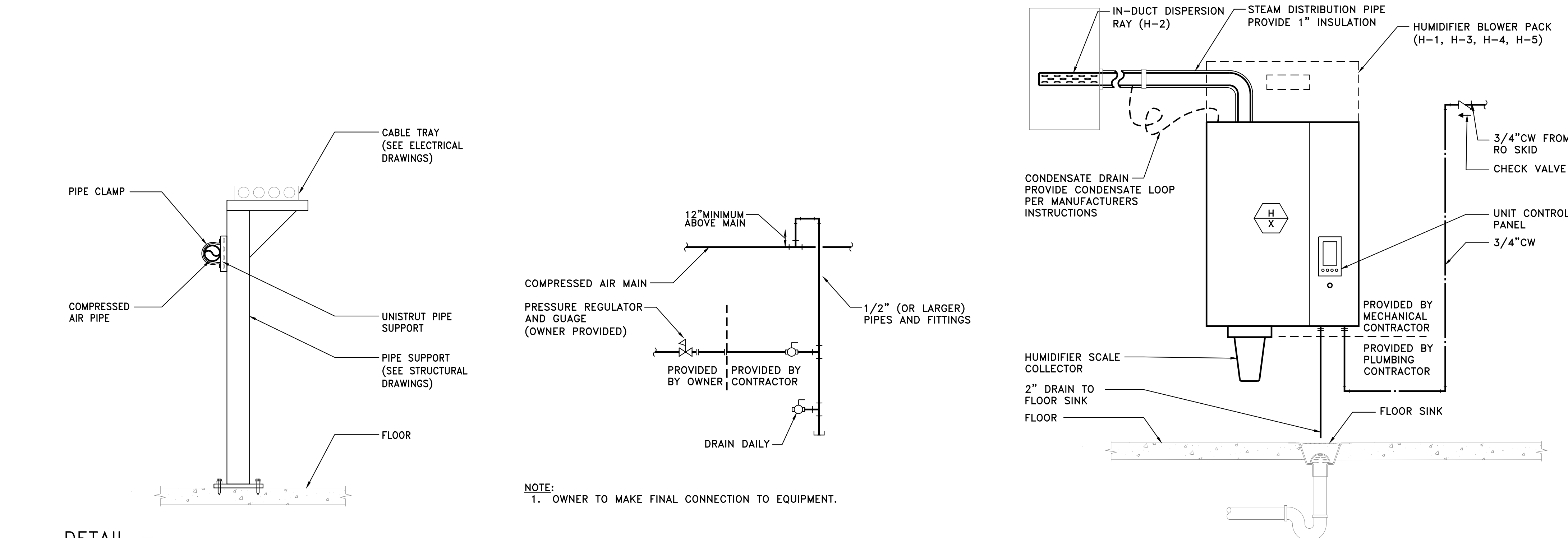
REVISIONS	DATE	DESCRIPTION
△		

CONTENTS:
PLUMBING
DETAILS

SHEET NO:

P5.4

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979



CODE SUMMARY		
2019 OREGON STRUCTURAL SPECIALTY CODE		
CODE SECTION	CODE STATEMENT	DESIGN APPROACH
414.5.1	EXPLOSION CONTROL	REQUIRED PER TABLE 414.5.1. DEFLAGRATION VENTING PROVIDED. SEE ARCHITECTURAL FOR MORE INFORMATION
415.4.1	AUTOMATIC SPRINKLER SYSTEM REQUIREMENTS	PROVIDED
415.5.1	MANUAL EMERGENCY ALARM SYSTEM SHALL BE PROVIDED OUTSIDE OF EACH EXIT AND TRIGGER VISUAL AND AUDIO ALARMS.	BY OTHERS
415.5.2	LOCAL MANUAL ALARM STATION	BY OTHERS
415.12.3.1.2	MECHANICAL VENTILATION SHALL BE PROVIDED AT A RATE OF 1 CFM/SQ. FT. OR HIGHER OF FLOOR AREA.	MECHANICAL VENTILATION PROVIDED IN EXCESS OF 1CFM/SQ. FT.
415.12.3.1.3	MECHANICAL VENTILATION SHALL OPERATE CONTINUOUSLY.	MECHANICAL VENTILATION SYSTEM OPERATES CONTINUOUSLY.
415.12.3.1.4	A MANUAL SHUT OFF CONTROL SHALL BE PROVIDED OUTSIDE OF ROOM ADJACENT TO ACCESS DOOR.	BREAK-GLASS SWITCH PROVIDED FOR MANUAL SHUTDOWN OF MECHANICAL VENTILATION EQUIPMENT.
415.12.3.1.5	EXHAUST VENTILATION SHALL BE DESIGNED TO CONSIDER THE DENSITY OF THE POTENTIAL VAPORS RELEASED.	THIS HAS BEEN TAKEN INTO CONSIDERATION. ALL DUSTS ARE DENSER THAN AIR. EXHAUST WILL BE PROVIDED AT FLOOR LEVEL.
415.12.3.1.6	LOCATION OF EXHAUST AND INLET AIR OPENINGS DESIGNED TO PROVIDE AIR MOVEMENT ACROSS ALL PORTIONS OF THE FLOOR.	THIS HAS BEEN TAKEN INTO CONSIDERATION. LOCATION OF EXHAUST AND INLET OPENINGS "SWEEP" THE BOTTOM OF THE FLOOR.
415.12.3.1.7	EXHAUST AIR SHALL NOT BE RECIRCULATED IF THE MATERIALS STORED ARE CAPABLE OF EMITTING HAZARDOUS VAPORS, FUMES OR DUSTS AND CONTAMINANTS HAVE NOT BEEN REMOVED.	EXHAUST AIR WILL NOT BE RECIRCULATED
415.12.6	STANDBY OR EMERGENCY POWER FOR MECHANICAL VENTILATION EQUIPMENT	EMERGENCY POWER WILL BE PROVIDED TO MECHANICAL VENTILATION EQUIPMENT. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.
NFPA 484 - STANDARD FOR COMBUSTIBLE MATERIALS		
CODE SECTION	CODE STATEMENT	DESIGN APPROACH
10.5.4	STATIC DISSIPATIVE BELTS SHALL BE USED ON BELT-DRIVEN EQUIPMENT	MECHANICAL BELT-DRIVEN EQUIPMENT IS DOWNSTREAM OF DUST FILTRATION AND IS LOCATED IN THE CLEAN AIRSTREAM.
10.6.1.1	BALL OR ROLLER BEARINGS SHALL BE SEALED AGAINST DUST	
10.6.2.2	FANS AND BLOWERS USED TO MOVE AIR OR INERT GAS IN CONVEYING DUCTS SHALL BE OF SPARK-RESISTANT DESIGN AND COMPATIBLE WITH THE MATERIAL TO BE CONVEYED	EXHAUST FAN WILL HAVE SPARK B RESISTANT CONSTRUCTION PER AMCA 99-0401-86
10.6.2.3	THE DESIGN OF THE FAN OR BLOWER SHALL NOT ALLOW THE TRANSPORTED COMBUSTIBLE METAL POWDER TO PASS THROUGH THE FAN BEFORE ENTERING THE FINAL COLLECTOR, UNLESS THE COMBUSTIBLE METAL POWDER-CONVEYING SYSTEM IS INERTED	EXHAUST FAN IS DOWNSTREAM OF DUST FILTRATION AND IS LOCATED IN THE CLEAN AIRSTREAM.
10.6.2.4	FANS OR BLOWERS SHALL BE EQUIPPED WITH BALL OR ROLLER BEARINGS	PROVIDED
10.6.2.4.1	BEARINGS SHALL BE EQUIPPED WITH TEMPERATURE INDICATING DEVICES	PROVIDED
10.6.2.4.2	BEARINGS SHALL BE ARRANGED TO SOUND AN ALARM IN CASE OF OVERHEATING	PROVIDED
10.6.2.5	FANS AND BLOWERS SHALL BE ELECTRICALLY INTERLOCKED WITH POWDER-PRODUCING MACHINERY SO THAT THE MACHINES CAN OPERATE ONLY IF THE FANS ARE OPERATING.	PROVIDED
NFPA 652		
CODE SECTION	CODE STATEMENT	DESIGN APPROACH
9.3.5.4	WHERE AN AIR MOVEMENT DEVICE IS LOCATED IN THE DIRTY AIR STREAM AND THE DUST/AIR STREAM CONCENTRATION IS HIGHER THAN 10 PERCENT OF THE MEC, FANS AND BLOWERS SHALL BE OF TYPE A OR TYPE B SPARK-RESISTANT CONSTRUCTION PER AMCA 99-0401-86, CLASSIFICATION FOR SPARK RESISTANT CONSTRUCTION, OR TYPE C SPARK-RESISTANT CONSTRUCTION PROTECTED WITH SPARK DETECTION AND EXTINGUISHMENT LOCATED DOWNSTREAM OF THE FAN	EXHAUST FAN IS DOWNSTREAM OF DUST FILTRATION AND IS LOCATED IN THE CLEAN AIRSTREAM.
9.3.6.2	DUCT SYSTEMS - CHANGES IN DUCT SIZES SHALL BE DESIGNED TO PREVENT THE ACCUMULATION OF MATERIAL BY UTILIZING A TAPERED TRANSFORMATION PIECE. WITH THE INCLUDED ANGLE OF THE TAPER NOT MORE THAN 30 DEGREES.	DUCT ROUTING WILL BE DESIGNED TO REDUCE ACCUMULATION OF DUST INCLUDING A MAXIMUM TAPER ANGLE OF 30 DEGREES ON ALL SIZE REDUCTIONS/INCREASES.

OUTSIDE AIR VENTILATION MULTIPLE ZONE SYSTEMS																				
ROOM DESCRIPTION	EQUIPMENT TAG	A ₂ ROOM AREA (SF)	OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY (PEOPLE/1000 SF)	CODE MAX OCCUPANCY (PEOPLE)	P ₂ ACTUAL OCCUPANCY (PEOPLE)	R ₀ VENTILATION FACTOR (CFM/PERSON)	R _A AREA OUTDOOR AIR RATE (CFM/SF)	V ₀₂ BREATHING ZONE VENTILATION (CFM)	E ₂ AIR DISTRIBUTION EFFECTIVENESS	V ₀₂ ZONE OUTDOOR AIRFLOW (CFM)	V ₀₂ PRIMARY AIRFLOW (CFM)	Z _p PRIMARY OUTDOOR AIR FRACTION	EXHAUST AIRFLOW RATE REQUIRED	EXHAUST AIRFLOW RATE (CFM/UNIT)	EXISTING EXHAUST AIRFLOW (CFM)	NATURAL VENTILATION			COMMENTS
																	YES OR NO	AREA REQUIRED (SF)	AREA AVAILABLE (SF)	
MULTIPURPOSE #1 - 104	FTU-1-1	1,000	OFFICE - CONFERENCE ROOM	50	50	50	5	0.06	310	0.8	388	1,500	0.26	0.00	0.00	0	NO	N/A	0	
MULTIPURPOSE #2 - 103	FTU-1-2	1,000	OFFICE - CONFERENCE ROOM	50	50	50	5	0.06	310	0.8	388	1,650	0.24	0.00	0.00	0	NO	N/A	0	
ENTRY/RECEPTION - 101	FTU-1-3	600	OFFICE - MAIN ENTRY LOBBIES	10	6	6	5	0.06	66	0.8	83	950	0.09	0.00	0.00	0	NO	N/A	0	
HALL - 102	VAV-1-1	665	PUBLIC - CORRIDORS	0	0	0	0	0.06	40	0.8	50	600	0.08	0.00	0.00	0	NO	N/A	0	
MEN - 106	VAV-1-1	165	PUBLIC - TOILET ROOMS	0	0	0	0	0.00	0	0.8	0	250	0.00	0.00	0.00	300	NO	N/A	0	
WOMEN - 105	VAV-1-1	165	PUBLIC - TOILET ROOMS	0	0	0	0	0.00	0	0.8	0	250	0.00	0.00	50/70	300	NO	N/A	0	
JANITOR -107	VAV-1-1	40	MISCELLANEOUS	0	0	0	0	0.00	0	0.8	0	50	0.00	0.00	0.00	50	NO	N/A	0	
WC - 109	VAV-1-1	65	PUBLIC - TOILET ROOMS	0	0	0	0	0.00	0	0.8	0	75	0.00	0.00	50/70	100	NO	N/A	0	
LACTATION - 108	VAV-1-1	40	OFFICE - OFFICE SPACE	5	1	1	5	0.06	8	0.8	10	50	0.20	0.00	0.00	0	NO	N/A	0	
LOUNGE / DINING - 110	VAV-1-2	530	FOOD - DINING ROOMS	70	38	20	8	0.18	246	0.8	308	600	0.51	0.00	0.00	0	NO	N/A	0	
MEETING 1 - 111A	VAV-1-3	155	OFFICE - CONFERENCE ROOM	50	8	8	5	0.06	50	0.8	63	300	0.21	0.00	0.00	0	NO	N/A	0	
MEETING 2 - 111B	VAV-1-4	155	OFFICE - CONFERENCE ROOM	50	8	8	5	0.06	50	0.8	63	175	0.36	0.00	0.00	0	NO	N/A	0	
MEMBER COLLABORATIVE SPACE - 110	VAV-1-5	700	OFFICE - OFFICE SPACE	5	4	15	5	0.06	117	0.8	147	700	0.21	0.00	0.00	0	NO	N/A	0	
PRINT - 114	VAV-1-6	190	OFFICE - OFFICE SPACE	5	1	1	5	0.06	17	0.8	22	150	0.15	0.00	0.00	0	NO	N/A	0	
CONFERENCE - 113	VAV-1-6	230	OFFICE - CONFERENCE ROOM	50	12	12	5	0.06	74	0.8	93	300	0.31	0.00	0.00	0	NO	N/A	0	
SYSTEM SERVING ROOMS:	RTU-1											7,600								
SYSTEM POPULATION P _S :	171																			
MAX PRIMARY OSA FRACTION Z _p :	0.51																			
SYSTEM VENTILATION EFFICIENCY E _v :	0.60																			
OCCUPANT DIVERSITY D:	1.00																			
UNCORRECTED OSA INTAKE V ₀₂ :	1,288																			
OSA FLOW RATE (CFM) V ₀₂ :	2,147																			
EXH FLOW RATE (CFM):	750																			
CORRIDOR	FTU-2-1	275	PUBLIC - CORRIDORS	0	0	0	0	0.06	17	0.8	22	150	0.15	0.00	0.00	0	NO	N/A	0	
OPEN OFFICE - 111	FTU-2-1	1,325	OFFICE - OFFICE SPACE	5	7	40	5	0.06	280	0.8	350	1,200	0.29	0.00	0.00	0	NO	N/A	0	
HALLWAY - 120	VAV-2-1	410	PUBLIC - CORRIDORS	0	0	0	0	0.06	25	0.8	32	175	0.18	0.00	0.00	0	NO	N/A	0	
WOMEN - 122	VAV-2-1	175	PUBLIC - TOILET ROOMS	0	0	0	0	0.00	0	0.8	0	250	0.00	0.00	50/70	300	NO	N/A	0	
MEN - 121	VAV-2-1	190	PUBLIC - TOILET ROOMS	0	0	0	0	0.00	0	0.8	0	250	0.00	0.00	50/70	300	NO	N/A	0	
UNISEX BATH - 123	VAV-2-1	115	PUBLIC - TOILET ROOMS	0	0	0	0	0.00	0	0.8	0	125	0.00	0.00	50/70	150	NO	N/A	0	
EXECUTIVE OFFICE 1	VAV-2-2	155	OFFICE - OFFICE SPACE	5	1	1	5	0.06	15	0.8	19	150	0.13	0.00	0.00	0	NO	N/A	0	
EXECUTIVE OFFICE 2	VAV-2-3	155	OFFICE - OFFICE SPACE	5	1	1	5	0.06	15	0.8	19	200	0.10	0.00	0.00	0	NO	N/A	0	
LOCKER - 124	VAV-2-4	200	EDUCATION - SPORTS LOCKER ROOMS	0	0	0	0	0.00	0	0.8	0	100	0.00	0.50	0.00	200	NO	N/A	0	
SYSTEM SERVING ROOMS:	RTU-2											2,600								
SYSTEM POPULATION P _S :	42																			
MAX PRIMARY OSA FRACTION Z _p :	0.29																			
SYSTEM VENTILATION EFFICIENCY E _v :	0.80																			
OCCUPANT DIVERSITY D:	1.00																			
UNCORRECTED OSA INTAKE V ₀₂ :	352																			
OSA FLOW RATE (CFM) V ₀₂ :	440																			
EXH FLOW RATE (CFM):	950																			
NOTES:																				

OUTSIDE AIR VENTILATION SINGLE ZONE SYSTEMS																	
ROOM DESCRIPTION	A _z ROOM AREA (SF)	OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY (PEOPLE/1000 SF)	CODE MAX OCCUPANCY (PEOPLE)	P _z ACTUAL OCCUPANCY (PEOPLE)	R ₀ VENTILATION FACTOR (CFM/PERSON)	R ₄ AREA OUTDOOR AIR RATE (CFM/SF)	V _{0z} BREATHING ZONE VENTILATION (CFM)	E _z AIR DISTRIBUTION EFFECTIVENESS	V _{0z} ZONE OUTDOOR AIRFLOW (CFM)	EXHAUST AIRFLOW RATE (CFM/SF)	EXHAUST AIRFLOW RATE (CFM/UNIT)	EXHAUST AIRFLOW (CFM)	NATURAL VENTILATION			COMMENTS
														YES OR NO	AREA REQUIRED (SF)	AREA AVAILABLE (SF)	
RESEARCH/SHOP	17,500	STORAGE - WAREHOUSE	0	0	0	10	0.06	1,050	0.8	1,313	0.00	0	0	NO	N/A	0	
SYSTEMS SERVING ROOMS: RTU-3/4									OSA FLOW RATE (CFM) VOT: 1,313		EXH FLOW RATE (CFM): 0						
LAB - S002	400	MISCELLANEOUS	0	0	11	0	0.00	0	0.8	0	0.00	0	0	NO	N/A	0	
SYSTEMS SERVING ROOMS: RTU-5									OSA FLOW RATE (CFM) VOT: 0		EXH FLOW RATE (CFM): 0						
MEASURING LH1210 - S003	570	MISCELLANEOUS	0	0	0	0	0.00	0	0.8	0	0.75	0	428	NO	N/A	0	
SYSTEMS SERVING ROOMS: RTU-6									OSA FLOW RATE (CFM) VOT: 0		EXH FLOW RATE (CFM): 428						
AIR LOCK - S004	110	MISCELLANEOUS	0	0	0	0	0.00	0	0.8	0	0.00	0	0	NO	N/A	0	
POWDERED METAL HANDLING - S005	380	MISCELLANEOUS	0	0	0	0	0.00	0	0.8	0	1.00	0	380	NO	N/A	0	
POWDERED METAL STORAGE - 125	370	MISCELLANEOUS	0	0	0	0	0.00	0	0.8	0	1.00	0	370	NO	N/A	0	
SYSTEMS SERVING ROOMS: RTU-7									OSA FLOW RATE (CFM) VOT: 0		EXH FLOW RATE (CFM): 750						
NOTES:																	
1 VENTILATION CALCULATION PERFORMED PER THE 2019 OREGON MECHANICAL SPECIALTY CODE																	

AIR CONDITIONING UNIT																	
SYMBOL MARK	DESCRIPTION	SERVICE	DESIGN BASIS		CFM	VOLTAGE	PH.	HP	MCA	FLA	TSP (IN WC)	RPM	WHEEL TYPE	TOTAL MBH	EAT DB/WB (°F)	WEIGHT (LBS)	COMMENTS
			MANUFACTURER	MODEL													
FC-1	DUCTLESS WALL MOUNTED	SERVER / IT ROOM	DAIKIN	FTXS24LVJU	650	230	1	-	-	-	-	-	-	24	80	50	1.2
FC-2	DUCTLESS WALL MOUNTED	SERVER / IT ROOM	DAIKIN	FTXS24LVJU	650	230	1	-	-	-	-	-	-	24	80	50	1.2
<u>NOTES:</u>																	
1	PROVIDE CONDENSATE PUMP LITTLE GIANT VCMA-20ULS, OR EQUAL, 1/30 HP, 208V, 1PH																
2	POWERED BY OUTDOOR UNIT																

OUTDOOR CONDENSING UNIT																
SYMBOL MARK	DESIGN BASIS		NOMINAL TONS	VOLTAGE	PHASE	MCA	MOCp	SUCTION TEMP ("F)	CONDENSING TEMP ("F)	CAPACITY TO MATCH	REFRIG.	EER	NOISE RATING (DBA)	LOW AMBIENT CONTROL	WEIGHT (LBS)	COMMENTS
	MANUFACTURER	MODEL														
CU-1	DAIKIN	RXS24LVJU	2	230	1	18	20	-	-	FC-1	R-410A	12.5	66.0	YES	200	1
CU-2	DAIKIN	RXS24LVJU	2	230	1	18	20	-	-	FC-1	R-410A	12.5	66.0	YES	200	1
<u>NOTES:</u>																
1	PROVIDE EMERGENCY POWER TO UNIT															

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979



AKAAN
architecture + design llc



EXPIRES	12-31-21
---------	----------

PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P. 503 292 1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Service
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	
△	DESCRIPTION

CONTENTS:

**MECHANICAL
SCHEDULES**

SHEET NO:

MO.1

PLOTTED: MATT MCCORMICK 9/7/2021 6:43 PM
 X:\DWG\AD\5459\5459 M0.3

VAV TERMINAL BOX																		
SYMBOL MARK	DESCRIPTION	SERVICE	CFM			INLET STATIC PRESSURE (IN. W.C.)	RATED PRESSURE DROP (IN. W.C.) NOTE 1	MAX RADIATED SOUND (NC) NOTE 2	MAX DISCHARGE SOUND (NC) NOTE 2	INLET SIZE (IN)	HEATING COIL						WEIGHT (LBS)	COMMENTS
			CLG	HTG	MIN.						KW	STEPS	VOLTAGE	PH.	EAT (°F)	LAT (°F)		
VAV-1-1	SINGLE DUCT W ELEC REHEAT	RR/JANITOR/ HALL	2,225	1,150	950	1.0	0.500	25	25	14	15	SCR	480	3	55	95	65	
VAV-1-2	SINGLE DUCT W ELEC REHEAT	LOUNGE/DINING	500	325	325	1.0	0.5	25	25	8	4	SCR	480	3	55	95	55	
VAV-1-3	SINGLE DUCT W ELEC REHEAT	CONFERENCE 2	350	175	75	1.0	0.5	25	25	6	2	3	277	1	55	95	50	
VAV-1-4	SINGLE DUCT W ELEC REHEAT	CONFERENCE 1	175	100	75	1.0	0.5	25	25	4	1	2	277	1	55	95	40	
VAV-1-5	SINGLE DUCT W ELEC REHEAT	MEMBER COLLABORATIVE SPACE	700	350	225	1.0	0.5	25	25	8	4	SCR	480	3	55	95	55	
VAV-1-6	SINGLE DUCT W ELEC REHEAT	PRINT/CONFERENCE	400	200	120	1.0	0.5	25	25	6	3	3	480	3	55	95	50	
VAV-1-7	SINGLE DUCT W ELEC REHEAT	MULTIPURPOSE 2	1,550	800	500	1.0	0.5	25	25	12	10	SCR	480	3	55	95	65	
VAV-1-8	SINGLE DUCT W ELEC REHEAT	MULTIPURPOSE 1	1,700	850	600	1.0	0.5	25	25	12	11	SCR	480	3	55	95	65	
VAV-2-1	SINGLE DUCT W ELEC REHEAT	RR/HALL	800	625	625	1.0	0.5	25	25	8	8	SCR	480	3	55	95	55	
VAV-2-2	SINGLE DUCT W ELEC REHEAT	EXECUTIVE OFFICE 1	150	75	50	1.0	0.5	25	25	4	1	2	277	1	55	95	40	
VAV-2-3	SINGLE DUCT W ELEC REHEAT	EXECUTIVE OFFICE 2	200	125	75	1.0	0.5	25	25	6	2	3	277	1	55	95	50	
VAV-2-4	SINGLE DUCT W ELEC REHEAT	LOCKER	150	75	75	1.0	0.5	25	25	4	1	2	277	1	55	95	40	
VAV-2-5	SINGLE DUCT W ELEC REHEAT	OPEN OFFICE	1,300	650	425	1.0	0.5	25	25	10	8	SCR	480	3	55	95	60	
NOTES:																		

DIFFUSER, REGISTER, AND GRILLE SCHEDULE							
SYMBOL	TYPE	FACE	FRAME	DAMPER	FINISH	MODEL #	COMMENTS
SG-1	SUPPLY	DOUBLE DEFLECTION	SURFACE	NOTE 1	WHITE	PRICE S20D	
CD-1	SUPPLY	PERFORATED	LAY-IN	NOTE 1	WHITE	PRICE PMDC	
CD-2	SUPPLY	PERFORATED	SURFACE	NOTE 1	WHITE	PRICE PMDC	
CD-3	SUPPLY	SLOT, NOTE 2	SURFACE/DRYWALL	NOTE 1	WHITE	PRICE SDS	
SD-1	SUPPLY	ROUND CONE	DUCT	NOTE 1	WHITE	PRICE RCD	
SD-2	SUPPLY	SLOT, NOTE 3	DRYWALL	NOTE 1	WHITE	PRICE SOB	
SD-3	SUPPLY	DOUBLE DEFLECTION	IN-DUCT	NOTE 1	WHITE	PRICE SDG	
SD-4	SUPPLY	NOZZLE	DUCT	NOTE 1	WHITE	PRICE ND	
SD-5	SUPPLY	ROUND CONE	LAY-IN	NOTE 1	WHITE	PRICE RCD	NOTE 4
RG-1	RETURN	EGG CRATE	LAY-IN	NOTE 1	WHITE	PRICE 80	
RG-2	RETURN	EGG CRATE	SURFACE	NOTE 1	WHITE	PRICE 80	
RG-3	RETURN	SINGLE DEFLECTION	SURFACE	NOTE 1	WHITE	PRICE 500	
RG-4	RETURN	EGG CRATE	DUCT	NOTE 1	WHITE	PRICE 80	
TG-1	TRANSFER	TRANSFER GRILLE	SURFACE	-	WHITE	PRICE STG	
EG-1	EXHAUST	SINGLE DEFLECTION	DUCT	NOTE 1	WHITE	PRICE 500	
EG-2	EXHAUST	SINGLE DEFLECTION	SURFACE	NOTE 1	WHITE	PRICE 500	
NOTES:							
1. PROVIDE ACCESSIBLE DAMPER IN DUCT BRANCH TO DIFFUSER							
2. 2 SLOT, 1" WIDTH, 48" LONG, FULL-SIZE PLENUM INLET FROM SUPPLY BRANCH							
3. 3 SLOT, 1" WIDTH, 48" LONG, FULL-SIZE PLENUM INLET FROM SUPPLY BRANCH							
4. MOUNT IN ARCHIECTURAL HEXAGONAL CEILING TILE							

HUMIDIFICATION UNIT														
SYMBOL MARK	DESCRIPTION	SERVICE	DESIGN BASIS		ELECTRICAL				HUMIDIFICATION LOAD (LBS/HR)	FILL RATE (GPM)	DRAIN RATE (GPM)	SUPPLY WATER CONN. SIZE (IN)	WEIGHT (LBS)	COMMENTS
			MANUFACTURER	MODEL	VOLTAGE	PHASE	MCA	MOCP						
H-1	STEAM HUMIDIFIER W/ UNIT-MOUNTED BLOWERPACK	S02 - LAB	CONDAIR	RS-015	480	3	6	15	15	4	7	1/2	100	1
H-2	STEAM HUMIDIFIER W/ IN-DUCT DISPERSION RAY	POWDERED METAL STORAGE/HANDLING	CONDAIR	RS-020	480	3	8	15	20	1	7	1/2	150	1
H-3	STEAM HUMIDIFIER W/ UNIT-MOUNTED BLOWERPACK	SHOP AREA	CONDAIR	RS-030	480	3	13	20	30	4	7	1/2	200	1
H-4	STEAM HUMIDIFIER W/ UNIT-MOUNTED BLOWERPACK	SHOP AREA	CONDAIR	RS-030	480	3	13	20	30	4	7	1/2	200	1
H-5	STEAM HUMIDIFIER W/ UNIT-MOUNTED BLOWERPACK	S03 - MEASURING LAB	CONDAIR	RS-010	480	3	5	15	10	4	7	1/2	100	1
NOTES:														
1	PROVIDE BACNET CARD													
2														
3														

REVERSE OSMOSIS UNIT													
SYMBOL MARK	DESCRIPTION	SERVICE	DESIGN BASIS		ELECTRICAL			PURE WATER OUTPUT (GPD)	PURE WATER TANK CAPACITY (GAL)	PUMP CAPACITY (GPM)	WATER CONN. SIZES (IN)	WEIGHT (LBS)	COMMENTS
			MANUFACTURER	MODEL	VOLTAGE	PHASE	WATTS						
RO-1	REVERSE OSMOSIS UNIT	HUMIDIFIERS	CONDAIR	RO-A100	120	1	600	635	4.75	3	3/4	150	1,2,3
NOTES:													
1	PROVIDE MANUFACTURER'S WATER SOFTENER, MODEL KINETICO CC 206 AND LOW FLOW NOZZLE												
2	PROVIDE CONTROL WIRING TO AND FROM EACH HUMIDIFIER AND WATER SOFTENER												
3	MECHANICAL CONTRACTOR TO FURNISH ALL EQUIPMENT WITH HUMIDIFIERS. PLUMBING CONTRACTOR TO MAKE CONNECTIONS FROM HUMIDIFER TO REVERSE OSMOSIS EQUIPMENT												

ROOF HOOD									
SYMBOL MARK	DESCRIPTION	SERVICE	CFM	THROAT SIZE		THROAT VELOCITY (FPM)	PRESSURE DROP (IN WC)	WEIGHT (LBS)	COMMENTS
				WIDTH (IN)	LENGTH (IN)				
RH-1	INTAKE ROOF HOOD	ELECTRICAL S08	2,000	26	26	426	0.05	100	2,3
RH-2	INTAKE ROOF HOOD	COMPRESSOR S09	8,500	48	60	425	0.05	250	1,3
RH-3	EXHAUST ROOF HOOD	COMPRESSOR S09	8,500	48	60	425	0.05	350	1,4
NOTES:									
1 PROVIDE MOTORIZED DAMPER AND INTERLOCK WITH AIR COMPRESSOR									
2 PROVIDE MOTORIZED DAMPER AND INTERLOCK WITH EF-7									
3 DESIGN BASIS: GREENHECK MODEL FGI									

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



AKAAN
 architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS		
△	DATE	DESCRIPTION

CONTENTS:
 MECHANICAL
 SCHEDULES

SHEET NO:

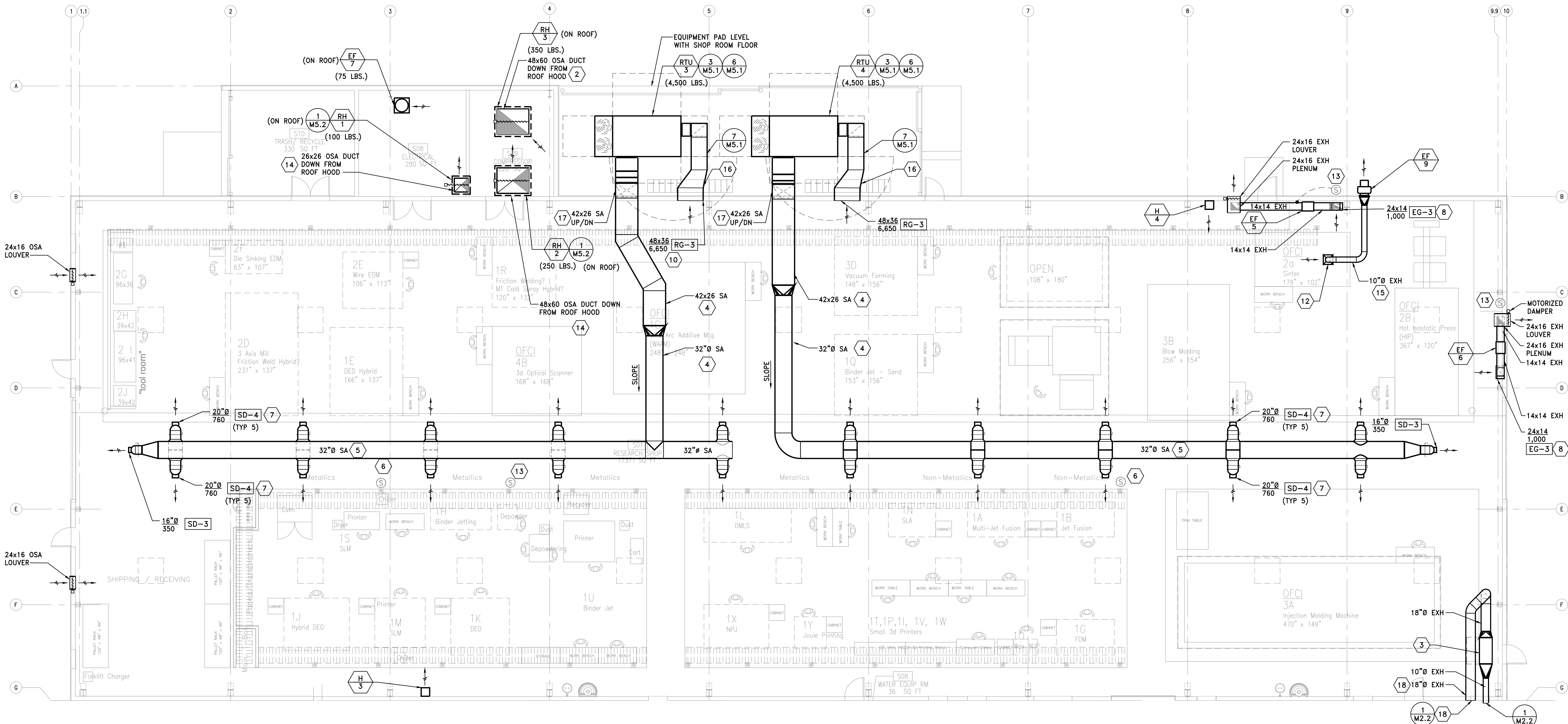
M0.3

GENERAL NOTES:

A. SEE SHEET M0.1 FOR GENERAL NOTES

KEYED NOTES:

1. PROVIDE CONDAIR BLOWER PACK IN-ROOM HUMIDIFIER. ROUTE STEAM PIPING FROM HUMIDIFIERS IN FIRE RISER ROOM TO BLOWER PACK.
2. FULL SIZE EXH DUCT FROM 36"x30" AIR COMPRESSOR COOLING AIR OUTLET UP TO ROOF HOOD, PROVIDE MOTORIZED DAMPER AND INTERLOCK WITH AIR COMPRESSOR.
3. FIELD CONSTRUCT FILTER RACK WITH MERV 8 PRE-FILTERS AND MERV 16 FILTERS. ENSURE CONSTRUCTION IS ADEQUATE UP TO 8" W.C. PROVIDE A MINIMUM OF 36" OF CLEARANCE ACCESS IN FRONT OF FILTER HOUSING.
4. ROUTE DUCT PARALLEL WITH THE SLOPE OF THE ROOF. ROUTE AS HIGH AS POSSIBLE AND KEEP CLEAR OF CRANE.
5. ROUTE DUCT AS HIGH AS POSSIBLE BELOW ROOF RIDGELINE.
6. PROVIDE COMBINATION HUMIDITY AND TEMPERATURE SENSOR
7. INSTALL SUPPLY DIFFUSER PARALLEL WITH ROOF SLOPE (APPROXIMATELY 10° BELOW HORIZONTAL)
8. INSTALL GRILLE 12" ABOVE FINISHED FLOOR
9. INSTALL LOUVER 24" ABOVE FINISHED FLOOR. INTERLOCK MOTORIZED DAMPER WITH EF-5/6.
10. BOTTOM OF GRILLE 6" ABOVE FINISHED FLOOR
11. PROVIDE COMBINATION HUMIDITY AND TEMPERATURE SENSOR FOR CONTROL OF HVAC UNIT.
12. CONNECT 10"Ø CLASS B VENT TO MANUFACTURER PROVIDED AFTERBURNER HOOD.
13. PROVIDE OXYGEN DEFICIENCY SENSOR AND INTERLOCK WITH EF-5 AND EF-6
14. OSA DUCT DOWN FROM ROOF HOOD. TERMINATE 12"
- BELOW ROOF DECK. PROVIDE MOTORIZED DAMPER AND INTERLOCK WITH AIR COMPRESSOR.
15. PROVIDE DOUBLE WALL CLASS B VENT WITH STAINLESS STEEL OR GALVANIZED STEEL INNER DUCT MATERIAL
16. PROVIDE DUCT TRANSITION BELOW STAIRS (PROVIDED BY OTHERS).
17. ROUTE DUCTWORK UP THE SIDE OF BUILDING. PROVIDE DUCT SUPPORTS ALONG THE ENTIRE RUN OF DUCT PER SMACNA.
18. ROUTE DUCTWORK ABOVE FILTER BANK ACCESS CLEARANCE AND THROUGH SHOP WALL TO OFFICE ROOF



1 MECHANICAL FLOOR PLAN - EAST
M2.1 SCALE: 1/8" = 1'-0"



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

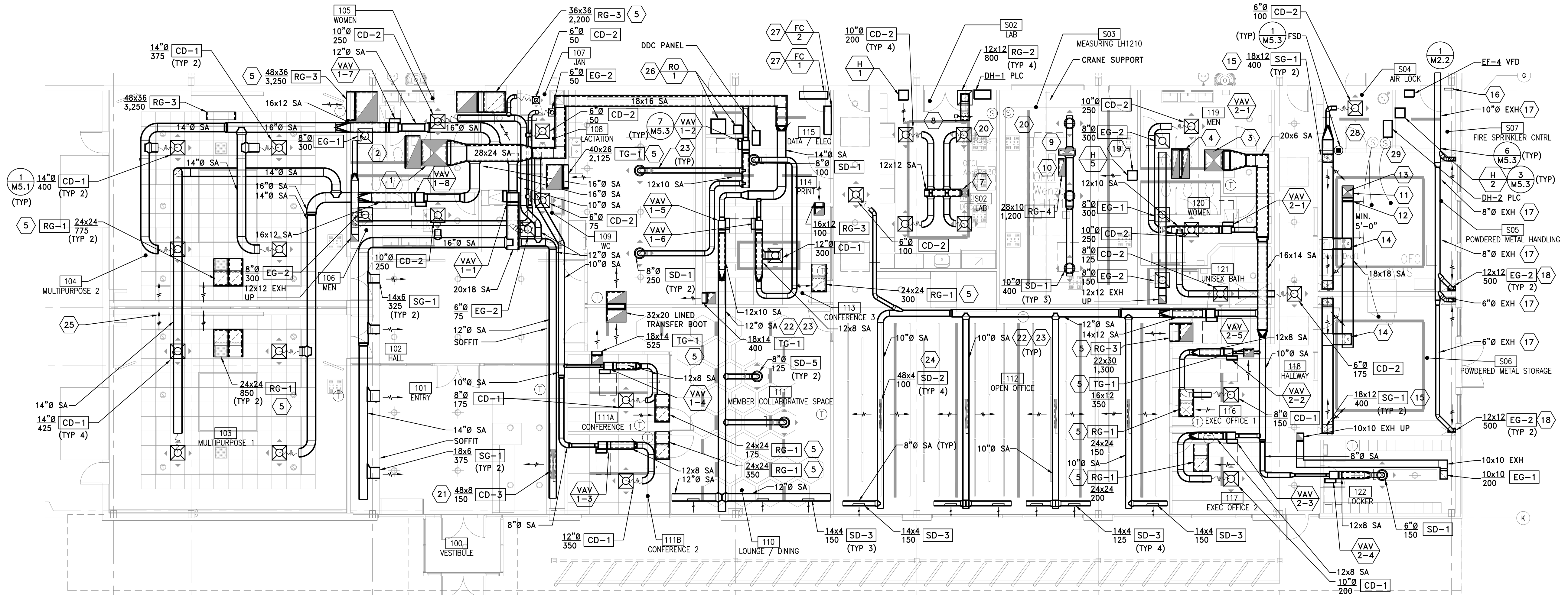
REVISIONS	
DATE	DESCRIPTION

CONTENTS:
MECHANICAL FLOOR
PLAN - EAST

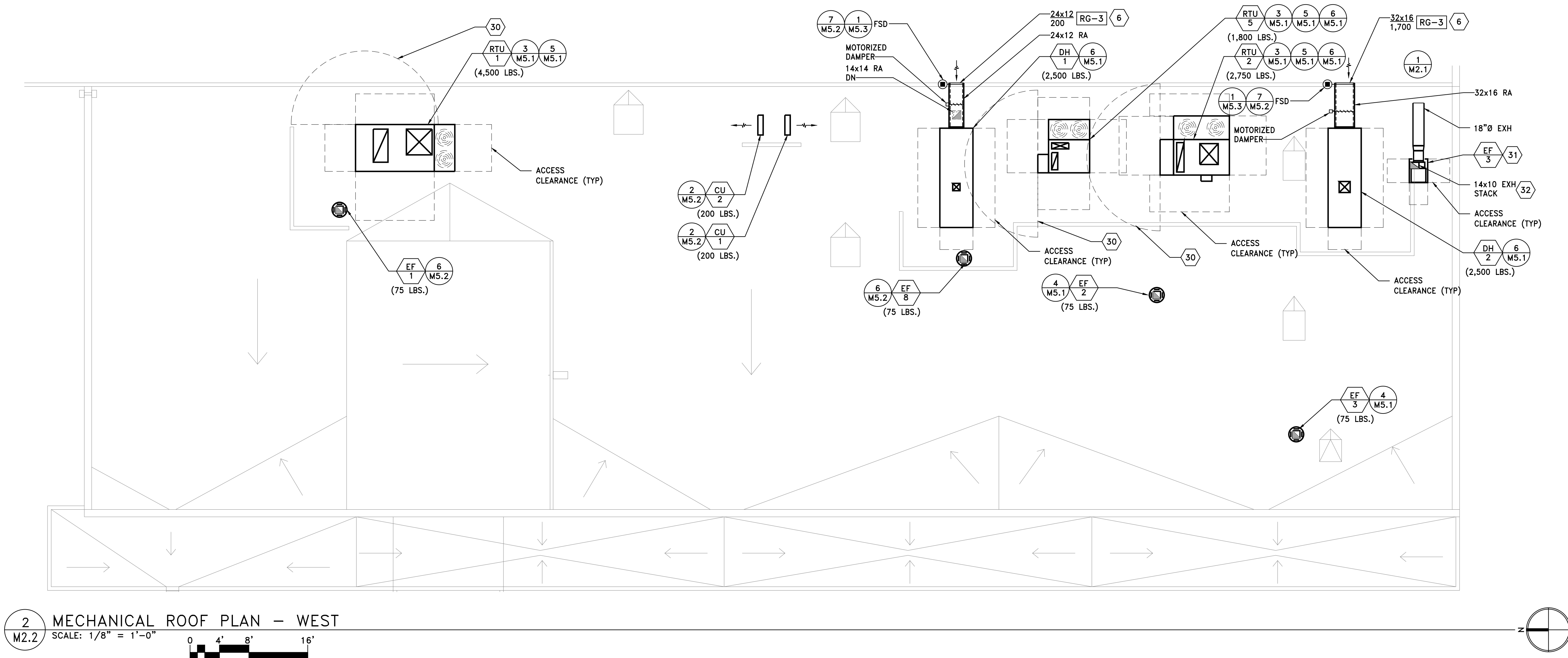
SHEET NO:

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979





1 MECHANICAL FLOOR PLAN - WEST
SCALE: 1/8" = 1'-0"



2 MECHANICAL ROOF PLAN - WEST
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. SEE SHEET M0.1 FOR GENERAL NOTES

KEYED NOTES:

- 42x42 SA (LINED) UP TO ROOFTOP UNIT
- 54x24 RA (LINED) UP TO ROOFTOP UNIT
- 30x34 SA (LINED) UP TO ROOFTOP UNIT
- 48x12 RA (LINED) UP TO ROOFTOP UNIT
- PROVIDE LINED RETURN BOOT WITH ELBOW UP IN RETURN PLENUM
- PROVIDE RETURN GRILLE IN SHOP AREA
- 12x12 SA (LINED) UP TO DEHUMIDIFICATION UNIT
- 14x14 RA (LINED) UP TO DEHUMIDIFICATION UNIT
- 28x10 SA (LINED) UP TO ROOFTOP UNIT
- 28x10 RA (LINED) UP TO ROOFTOP UNIT
- 12x12 SA UP TO DEHUMIDIFICATION UNIT
- HUMIDIFYING STEAM DISPERSION RAY IN DUCT. PROVIDE AT LEAST 10'-0" OF DUCT WITHOUT ANY OBSTRUCTIONS DOWNSTREAM OF DISPERSION RAY. SLOPE DUCT TOWARD DISPERSION RAY AT A MINIMUM OF 1% SLOPE.
- 3/4" CONDENSATE DRAIN AT THE BOTTOM OF SUPPLY AIR RISER. SEE P2.2 FOR CONTINUATION
- VERTICAL 18x12 SA TAP OFF OF MAIN
- 18x12 DROP IN FURRED OUT WALL TO GRILLE. INSTALL GRILLE @ 0'-6" ABOVE FINISHED FLOOR. PROVIDE MANUAL VOLUME DAMPER ACTUATOR IN ACCESSIBLE LOCATION.
- 1 KW WALL HEATER (BY DIVISION 26).
- DUCTWORK TO BE RATED TO AT LEAST 10" W.C.
- PROVIDE 4"Ø EXH DROP IN FURRED OUT WALL TO RECTANGULAR 12x6. INSTALL GRILLE ON RECTANGULAR DUCT @ 0'-6" ABOVE FINISHED FLOOR. PROVIDE MANUAL VOLUME DAMPER ACTUATOR IN ACCESSIBLE LOCATION.
- PROVIDE CONDAIR BLOWER PACK IN-ROOM HUMIDIFIER. ROUTE STEAM PIPING FROM ON-WALL HUMIDIFIER.
- PROVIDE COMBINATION HUMIDITY AND TEMPERATURE SENSOR FOR CONTROL OF HVAC UNIT.
- PROVIDE 48x8 DUCT DOWN TO 4-SLOT LINEAR SLOT DIFFUSER. PROVIDE MANUAL VOLUME DAMPER WITH ACTUATOR IN AN ACCESSIBLE LOCATION.
- ALL EXPOSED DUCTWORK IN AREAS TO BE ROUTED AS HIGH AS POSSIBLE.
- ALL EXPOSED DUCTWORK TO BE PAINTED. SEE ARCHITECTURAL DRAWINGS FOR MORE INFORMATION.
- PROVIDE 48x4 DUCT DOWN TO 2-WAY, 2-SLOT LINEAR SLOT DIFFUSER. PROVIDE MANUAL VOLUME DAMPER. BOTTOM OF DIFFUSER TO BE AT THE SAME ELEVATION AS ACOUSTICAL Baffle SYSTEM (SEE ARCH DWGS).
- RETURN AIR TO BE CONVEYED FROM CEILING SPACE OF MULTIPURPOSE ROOM 1 TO MULTIPURPOSE ROOM 2 VIA THE 10" VOID SPACE ABOVE STRUCTURAL BEAM
- MECHANICAL CONTRACTOR TO PROVIDE RO-1 AND ACCESSORIES. PLUMBING CONTRACTOR TO PROVIDE ALL PLUMBING TO/FROM REVERSE OSMOSIS EQUIPMENT.
- PROVIDE CONDENSATE PUMP AND SECONDARY CONDENSATE DEVICE CONFORMING TO UL508 TO SHUT DOWN UNIT UPON HIGH LEVEL. PUMP CONDENSATE DRAIN TO FLOOR SINK IN WATER HEATER ROOM.
- PROVIDE REMOTE SENSOR TUBING, WIRING AND PROBES FOR FUTURE, OPOI COMBINATION TEMPERATURE, HUMIDITY AND PRESSURE SENSORS. SEAL AROUND EVERY PENETRATION IN ROOM CEILING/WALL AIR TIGHT.
- PROVIDE INTRINSICALLY SAFE COMBINATION TEMPERATURE AND HUMIDITY SENSOR WITH REMOTE SENSING ELEMENTS. PROVIDE REMOTE SENSOR TUBING, WIRING AND PROBES. SEAL AROUND EVERY PENETRATION IN ROOM CEILING/WALL AIR TIGHT.
- PROVIDE A MINIMUM OF 10'-0" IN BETWEEN ANY SOURCE OF EXHAUST OR PLUMBING VENT AND ANY MECHANICAL AIR INTAKE.
- INSTALL EXHAUST FAN ON MANUFACTURER-PROVIDED SPRING ISOLATORS (1" DEFLECTION MIN.).
- PROVIDE EXHAUST STACK ON DISCHARGE OF UTILITY SET EXHAUST FAN, EE-4. TERMINATION OF EXHAUST STACK SHALL BE AT LEAST 6'-0" OFF OF ROOF LEVEL

AKAAN
architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	
△	DESCRIPTION

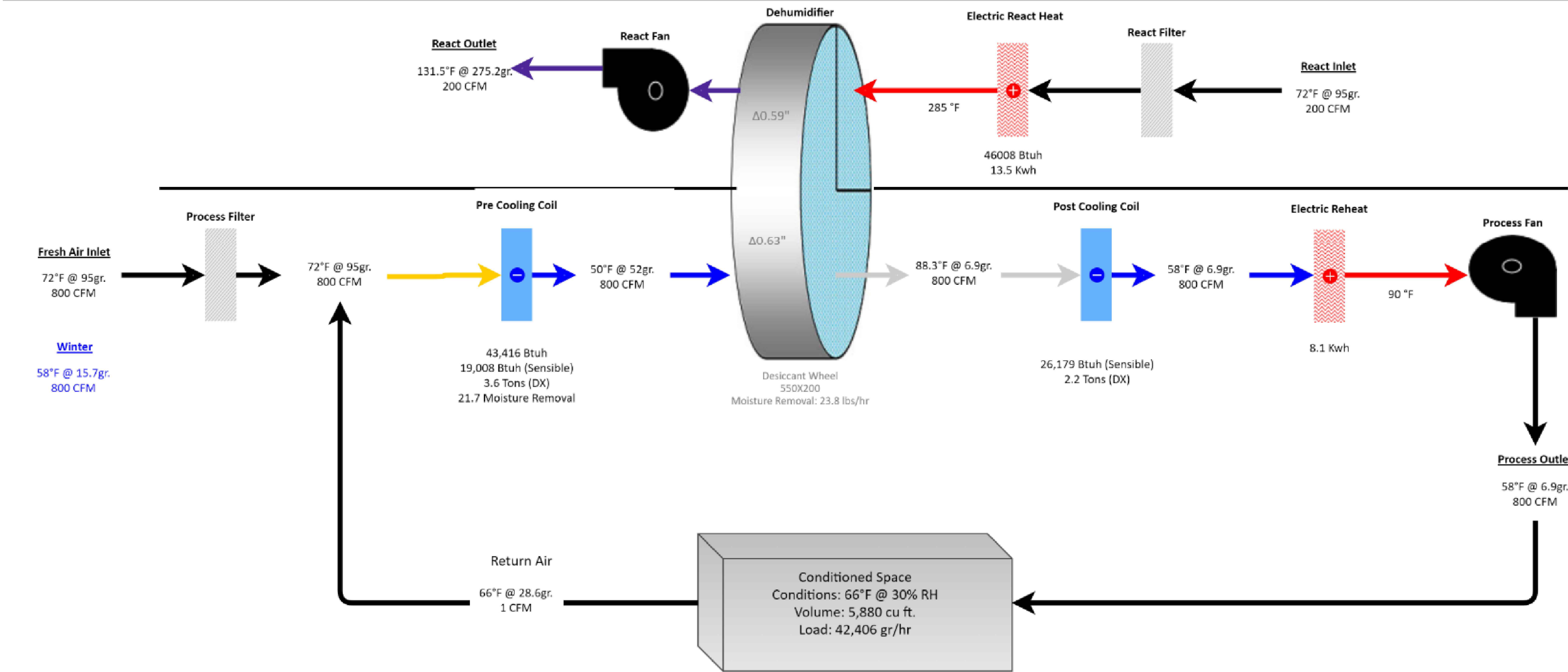
CONTENTS:
**MECHANICAL FLOOR
PLAN - EAST**

SHEET NO:

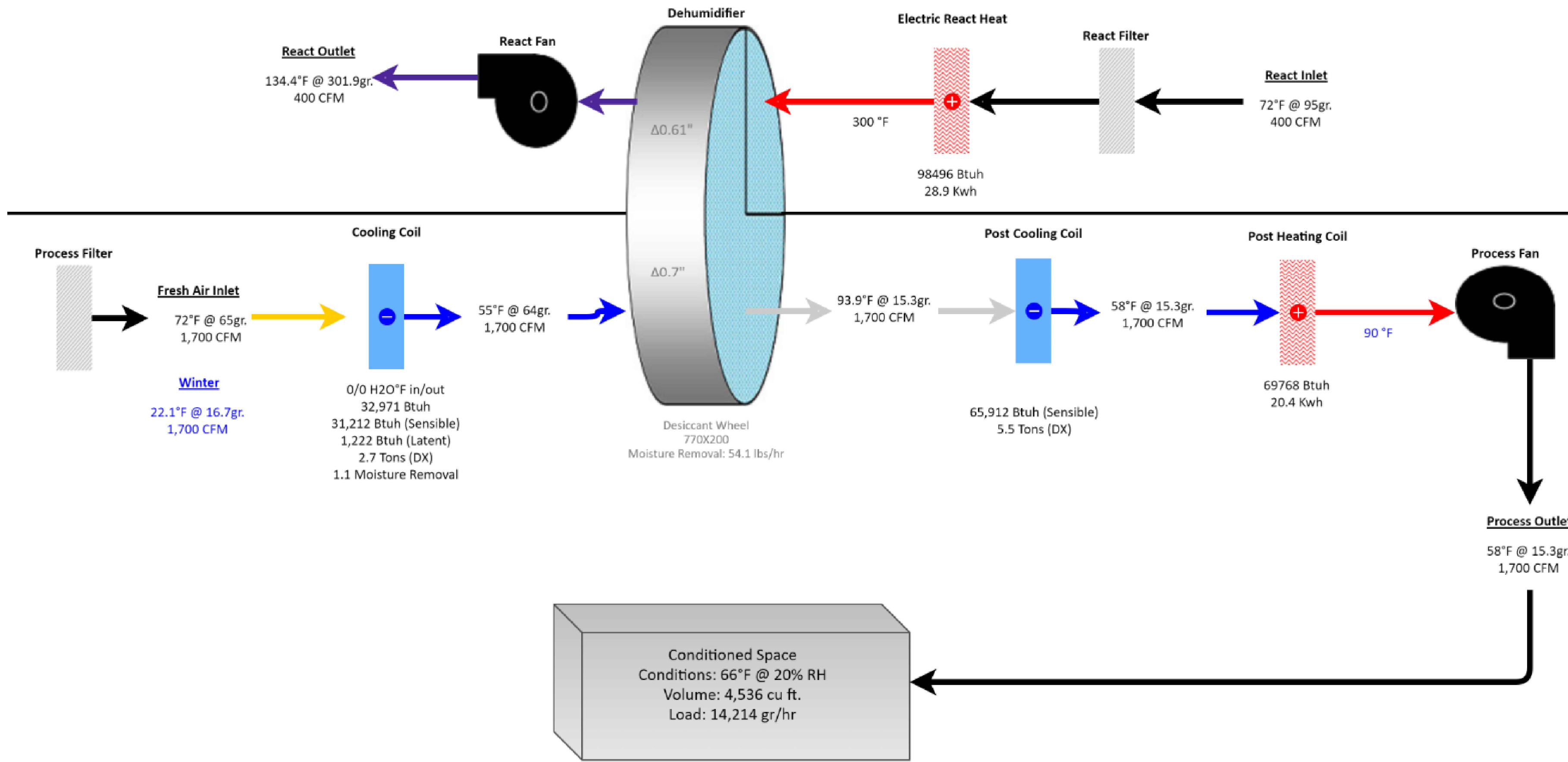
M2.2

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979





1 DEHUMIDIFICATION UNIT PROCESS FLOW DIAGRAM – DH-1
M4.1 SCALE: NTS



2 DEHUMIDFCATION UNIT PROCESS DIAGRAM – DH-2
M4.1 SCALE: NTS

PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	
Δ	DESCRIPTION

CONTENTS:
MECHANICAL PROCESS
FLOW DIAGRAMS

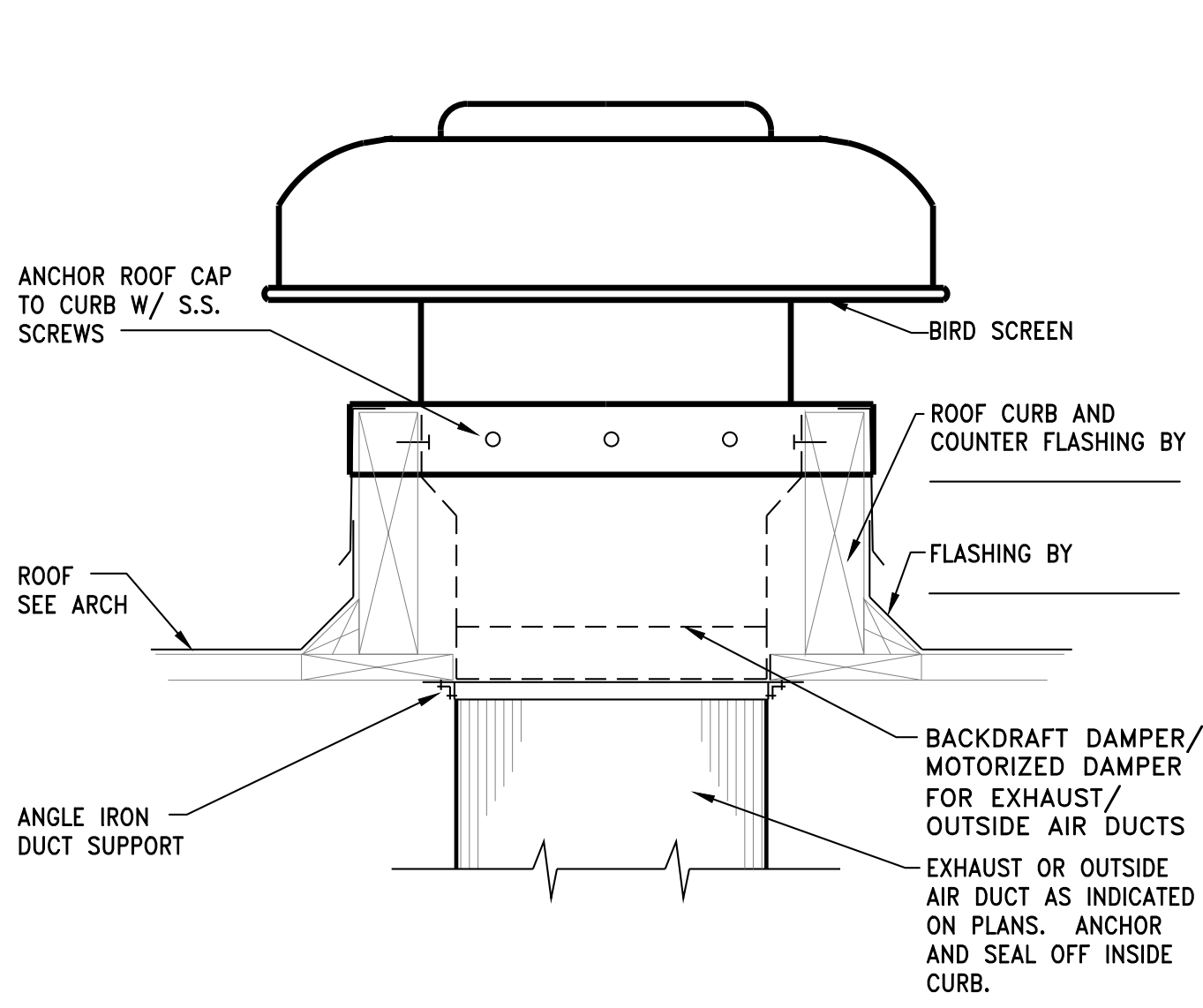
SHEET NO:

M4.1

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979

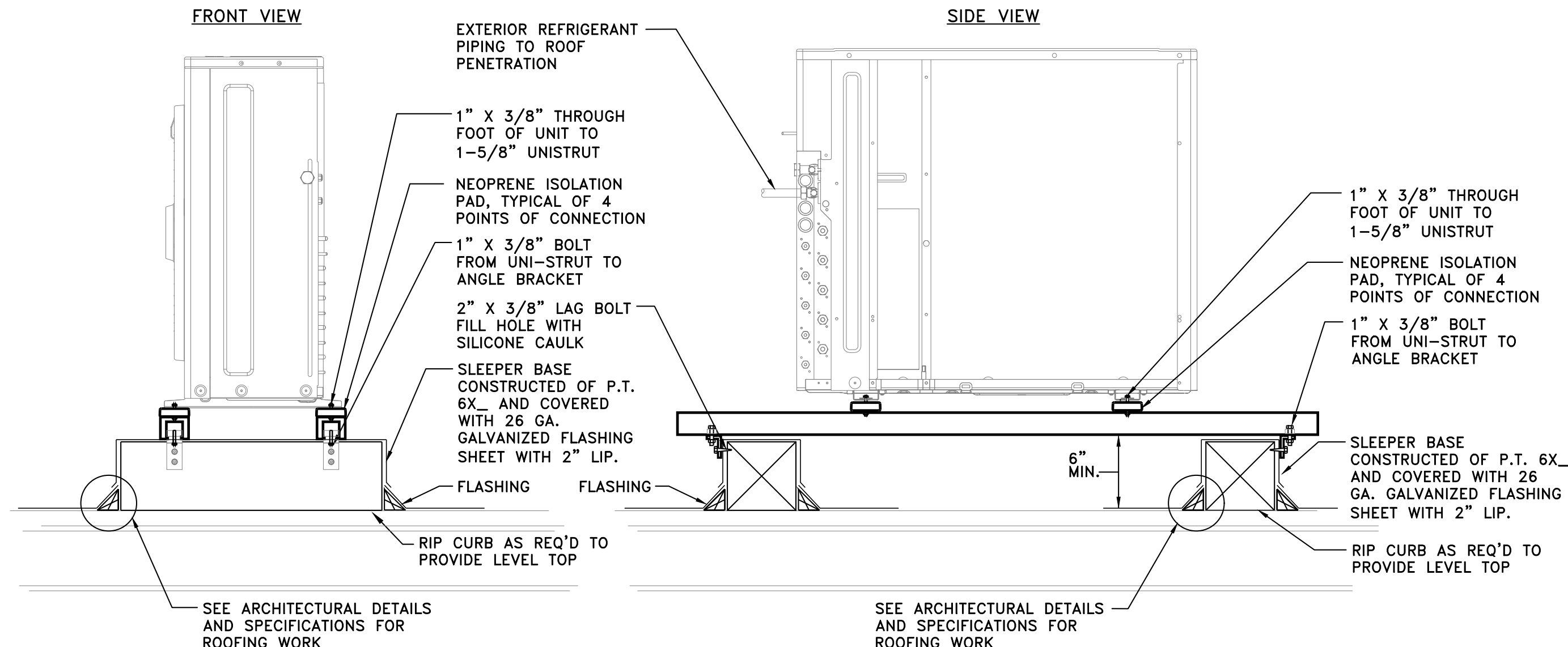


PLOTTED: MATT MCCORMICK 9/7/2021 6:45 PM
 X:\DWG\AD\5459\5459 M52



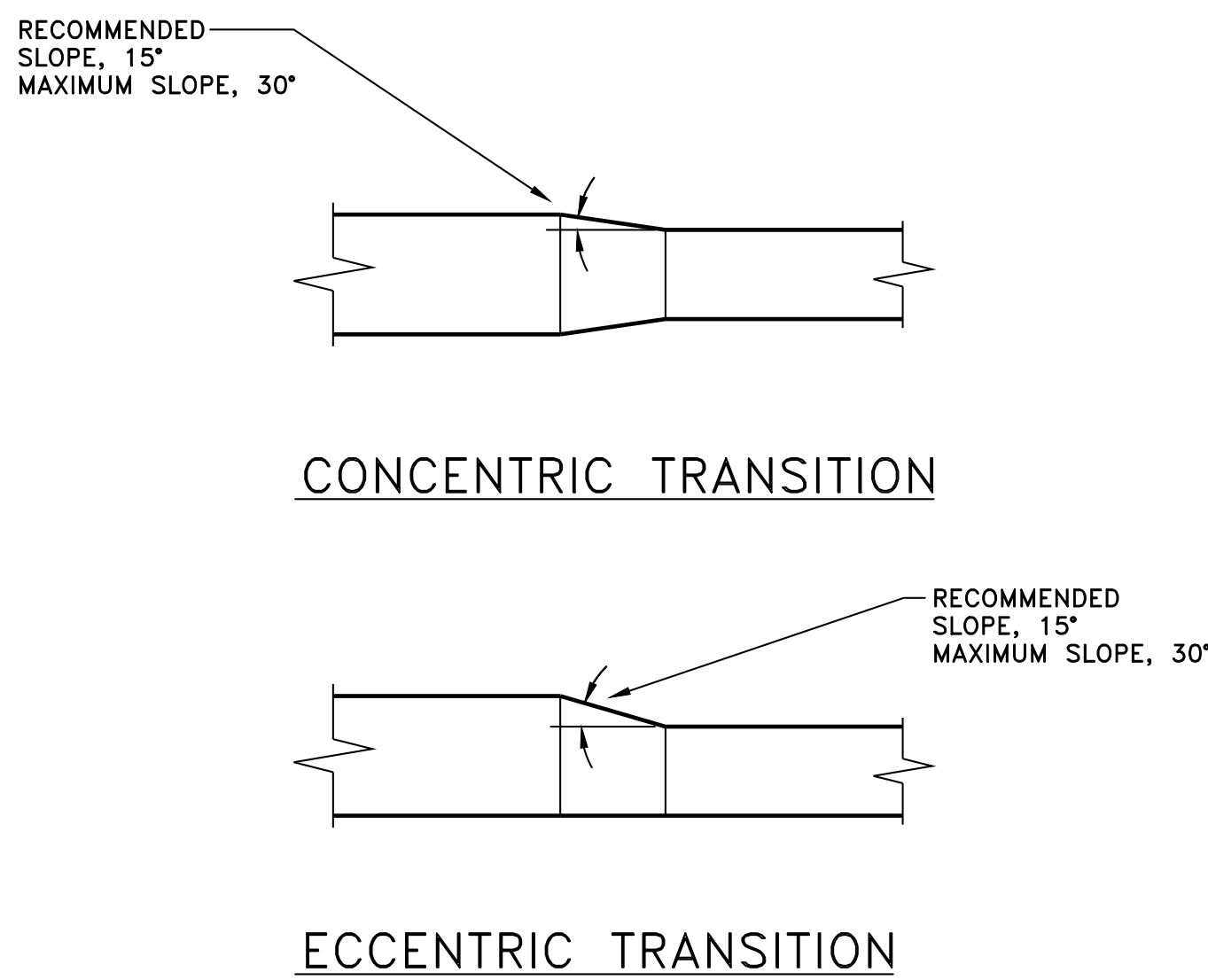
1
 M5.2
 DETAIL – ROOF HOOD
 SCALE: N.T.S.

MDA09



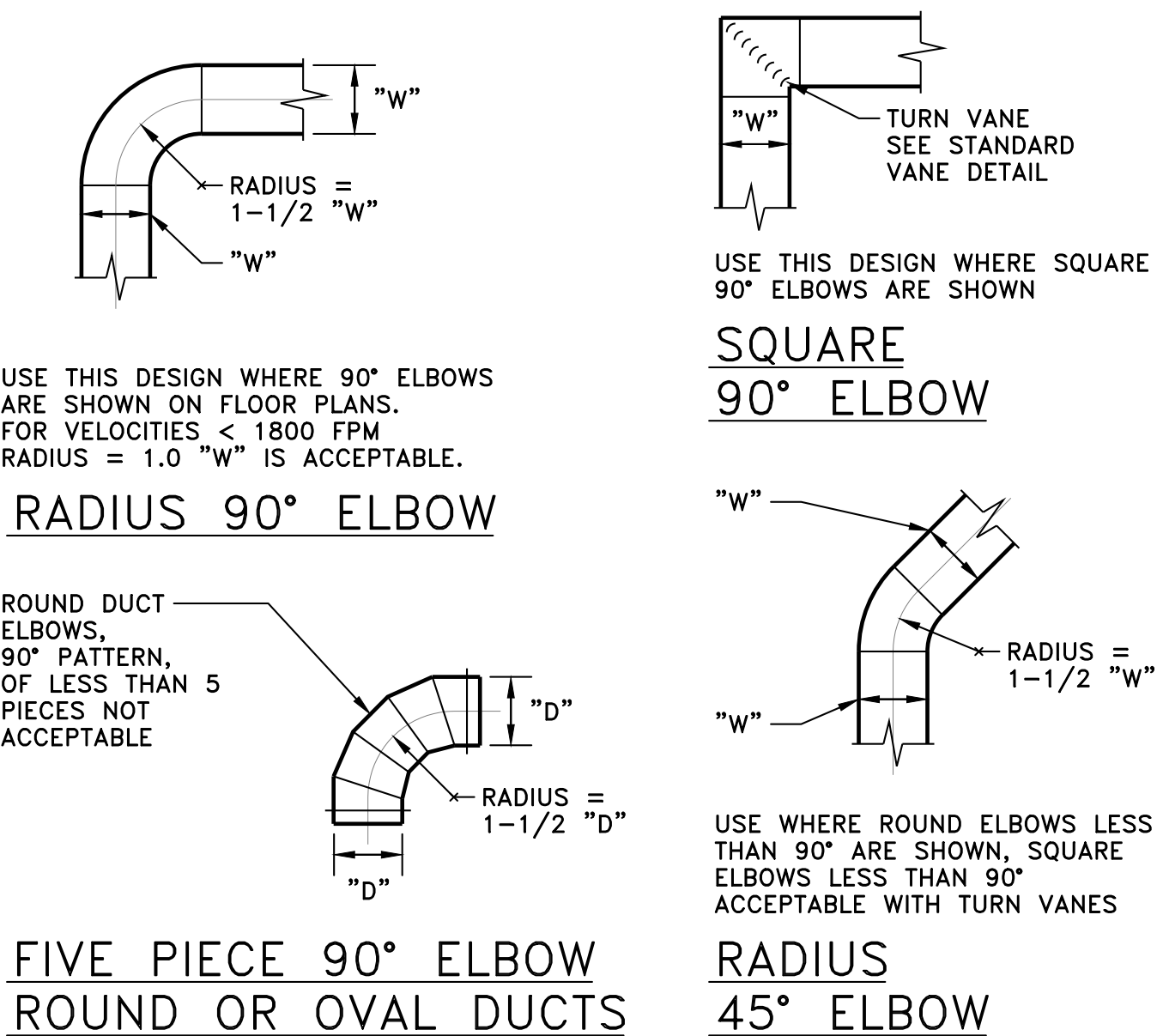
2
 M5.2
 DETAIL – ROOFTOP HEAT PUMP CURB
 SCALE: N.T.S.

MDC09



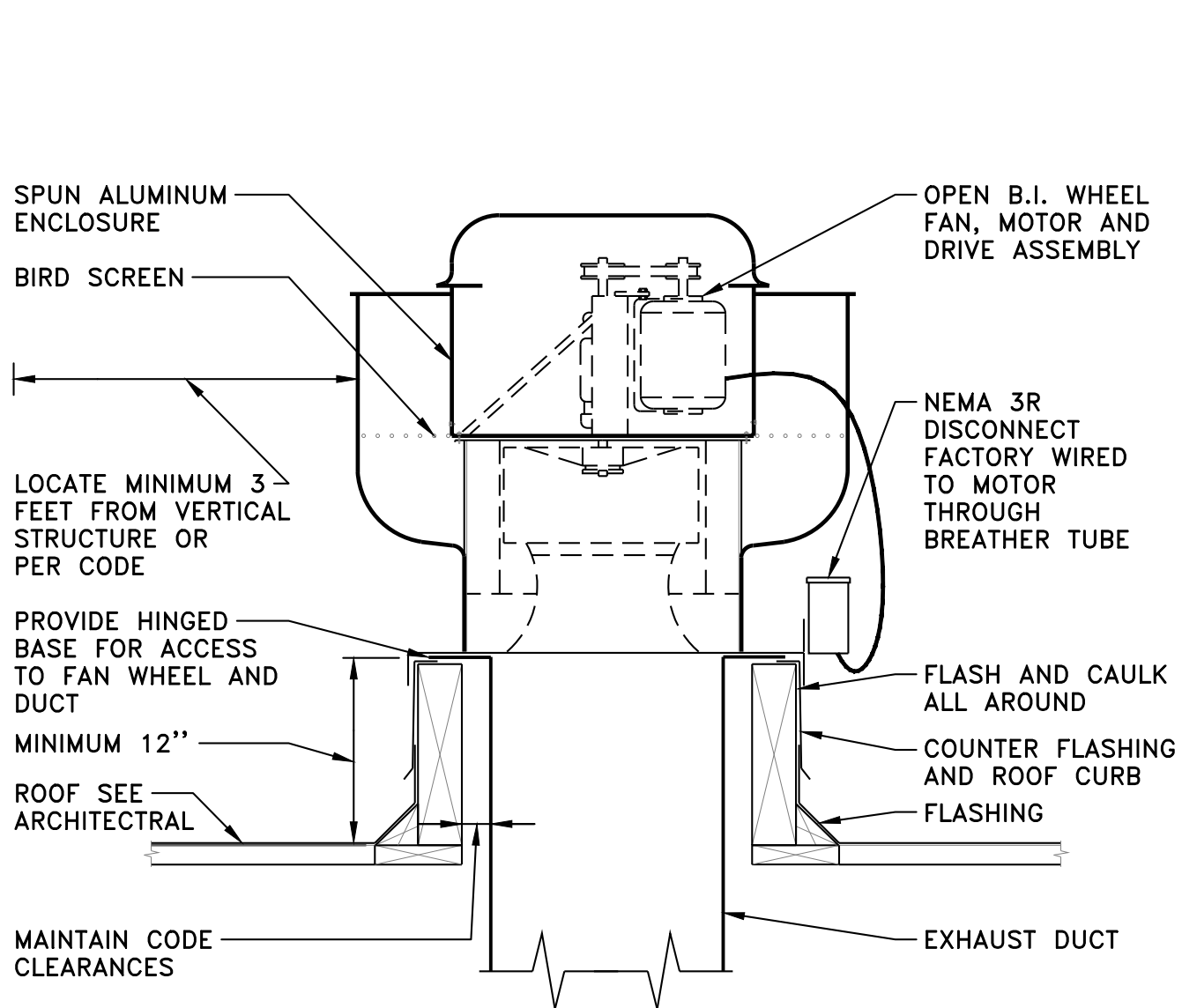
4
 M5.2
 DETAIL – DUCT TRANSITIONS
 SCALE: N.T.S.

MDD03



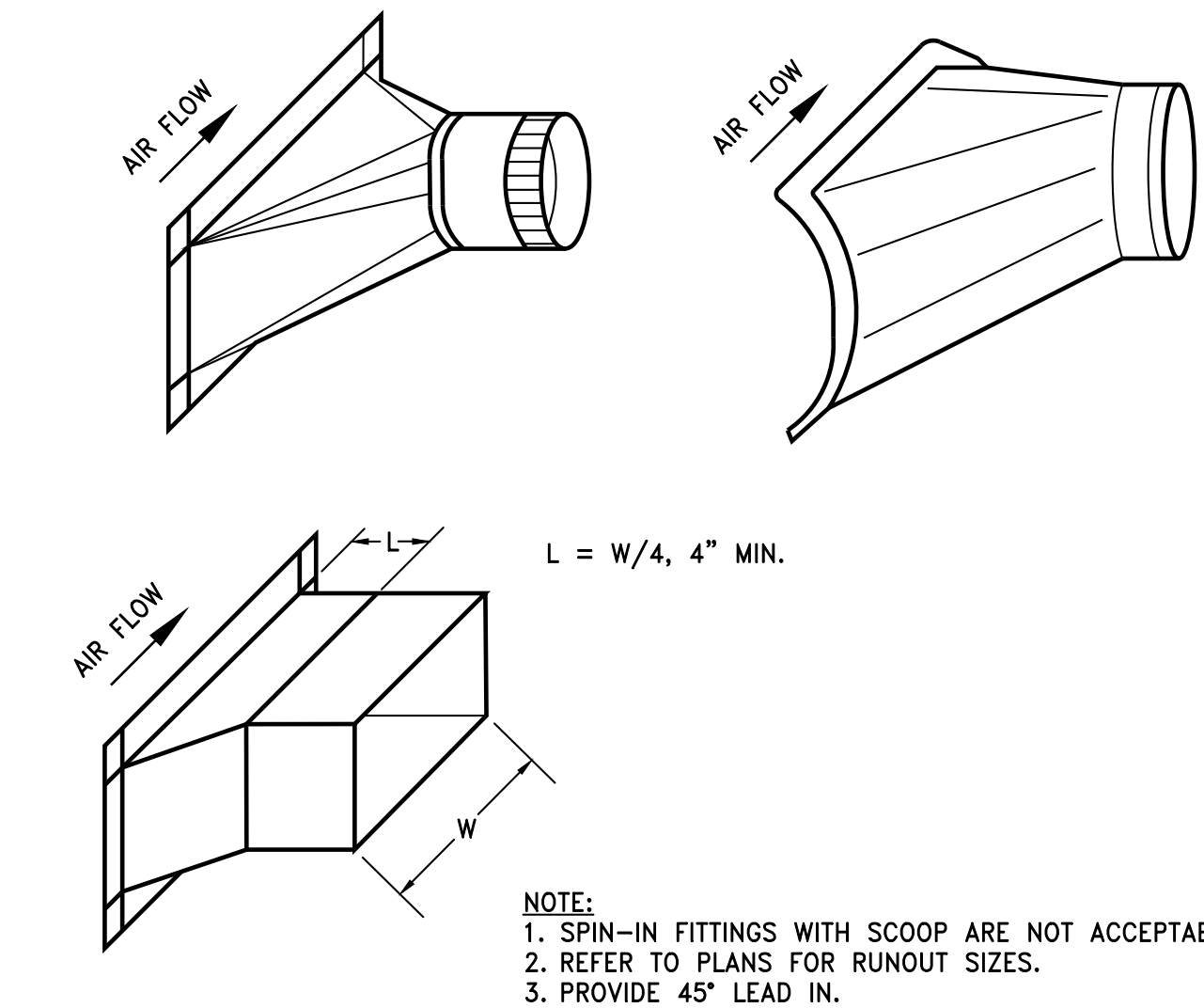
5
 M5.2
 DETAIL – DUCT ELBOWS
 SCALE: N.T.S.

MDD02



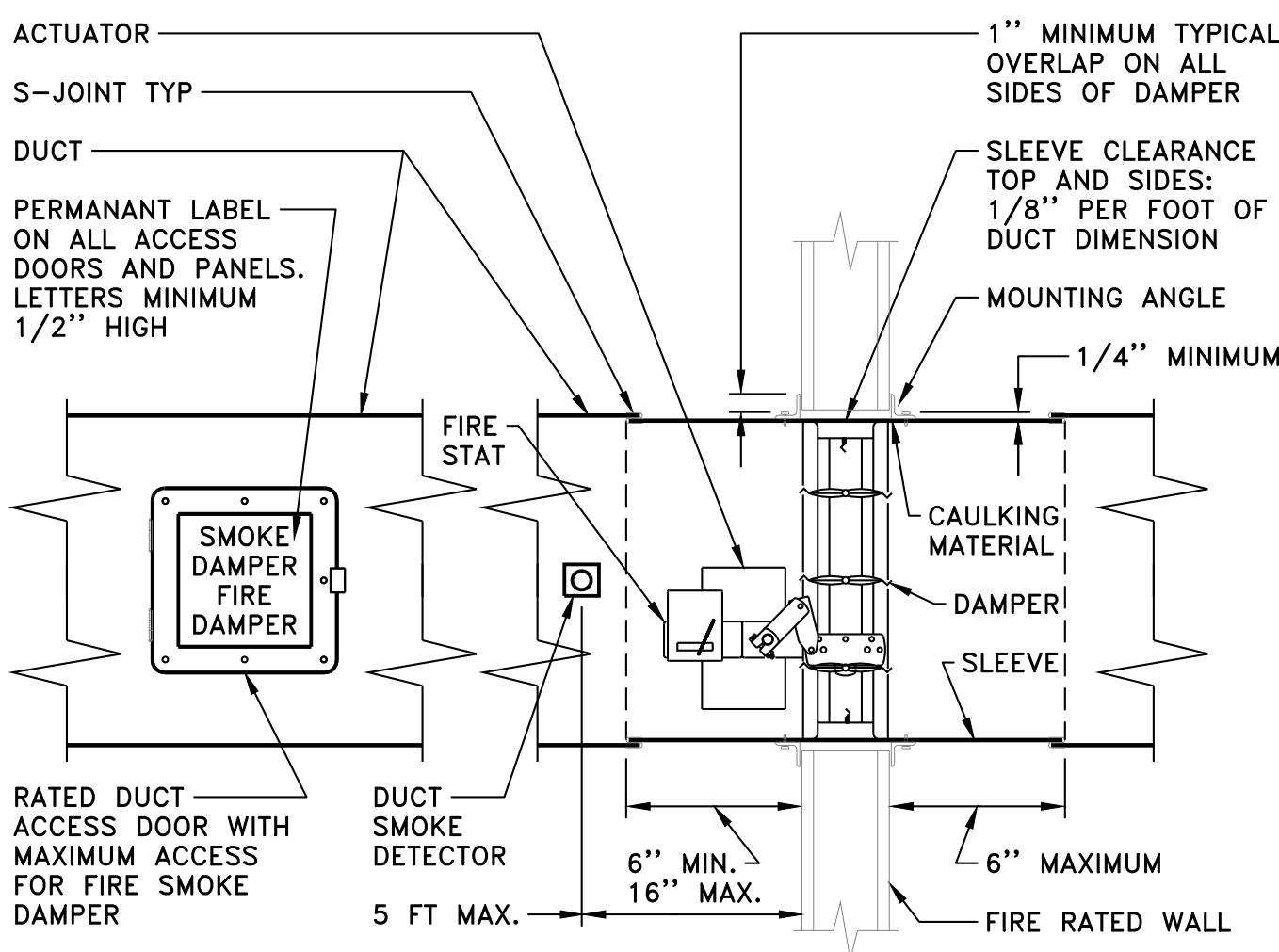
6
 M5.2
 DETAIL – ROOF EXHAUST FAN – UPBLAST
 SCALE: N.T.S.

MDE01



3
 M5.2
 DETAIL – BRANCH DUCT FITTING
 SCALE: N.T.S.

MDD01



NOTES:
 1. PROVIDE CEILING AND/OR WALL ACCESS PANEL(S) AS NEEDED TO ACCESS DAMPER ACTUATOR, DUCT SMOKE DETECTOR, AND DUCT ACCESS DOOR FOR INSPECTION AND MAINTENANCE. COORDINATE EXACT LOCATION AND TYPE WITH ARCHITECT.

7
 M5.2
 DETAIL – FIRE/SMOKE DAMPER
 SCALE: N.T.S.

MDF05



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.882.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS		
Δ	DATE	DESCRIPTION

CONTENTS:
 MECHANICAL
 DETAILS

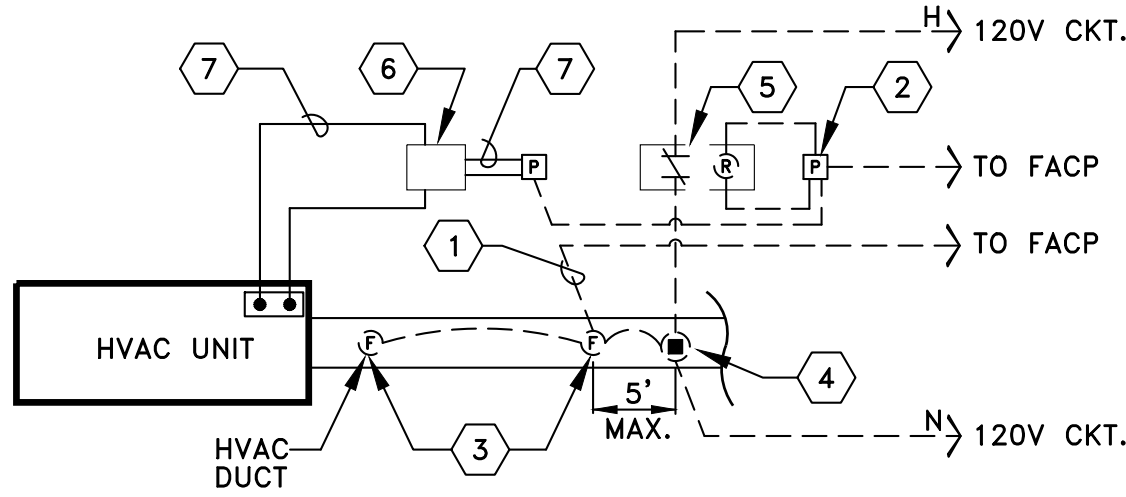
SHEET NO:

M5.2

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



PLOTTED: MATT MCCORMICK 9/7/2021 6:45 PM
 X:\DWG\AD\5459\5459 M53



SEQUENCE OF OPERATION:

- DUCT SMOKE DETECTOR SHALL REPORT "TROUBLE" TO FACP UPON DETECTION OF SMOKE.
- FACP TO INITIATE SIGNAL TO FSD CONTROL RELAY AND HVAC CONTROL DEVICE TO INITIATE HVAC UNIT SHUTDOWN AND TIME DELAYED CLOSURE OF FSD.

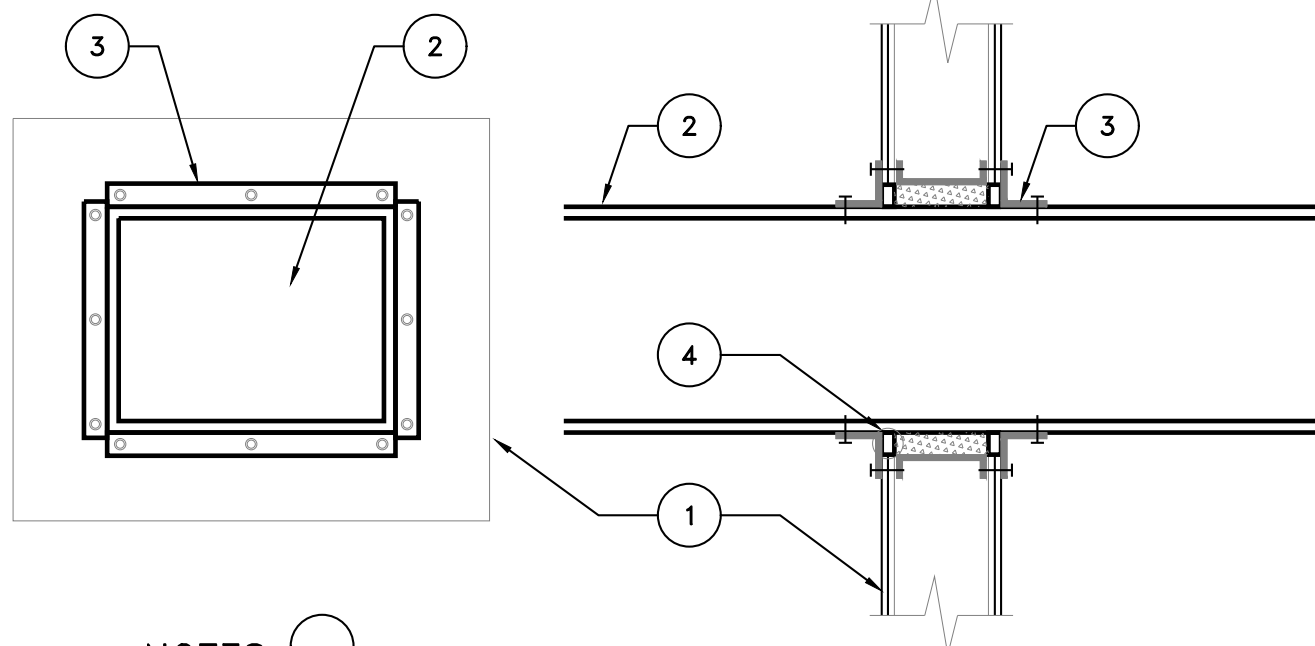
GENERAL NOTE:

- COORDINATE FINAL SEQUENCE OF OPERATION WITH LOCAL AUTHORITY HAVING JURISDICTION.

KEYED NOTES:

- FIRE ALARM SYSTEM COMMUNICATIONS LOOP & 24 VDC, BY ELECTRICAL
- ADDRESSABLE REMOTE CONTROL MODULE. (CM), PROVIDED BY ELECTRICAL
- DUCT SMOKE DETECTOR FURNISHED BY ELECTRICAL AND INSTALLED BY MECHANICAL CONDUCTOR AND CONNECTION TO FACP, BY ELECTRICAL
- FIRE/SMOKE DAMPER PROVIDED BY MECHANICAL 120V CONNECTION PROVIDED BY ELECTRICAL
- SUPERVISED FIRE/SMOKE DAMPER CONTROL TIME DELAY RELAY. 24V COIL, 120V N.C. CONTACTS, 0-1 MIN. ADJUSTABLE TIME DELAY PROVIDED BY ELECTRICAL UNLESS OTHERWISE NOTED PROVIDE ONE RELAY FOR EACH FIRE/SMOKE DAMPER.
- HVAC SHUT-DOWN DEVICE PROVIDED BY MECHANICAL CONTROL DEVICE MAY BE BUILDING ENERGY MANAGEMENT SYSTEM (DDC). DEVICE IS CONTROLLED BY 24VDC CONTACTS ON (CM) AS PROVIDED BY ELECTRICAL
- HVAC SHUT-DOWN CONTROL WIRING BY MECHANICAL

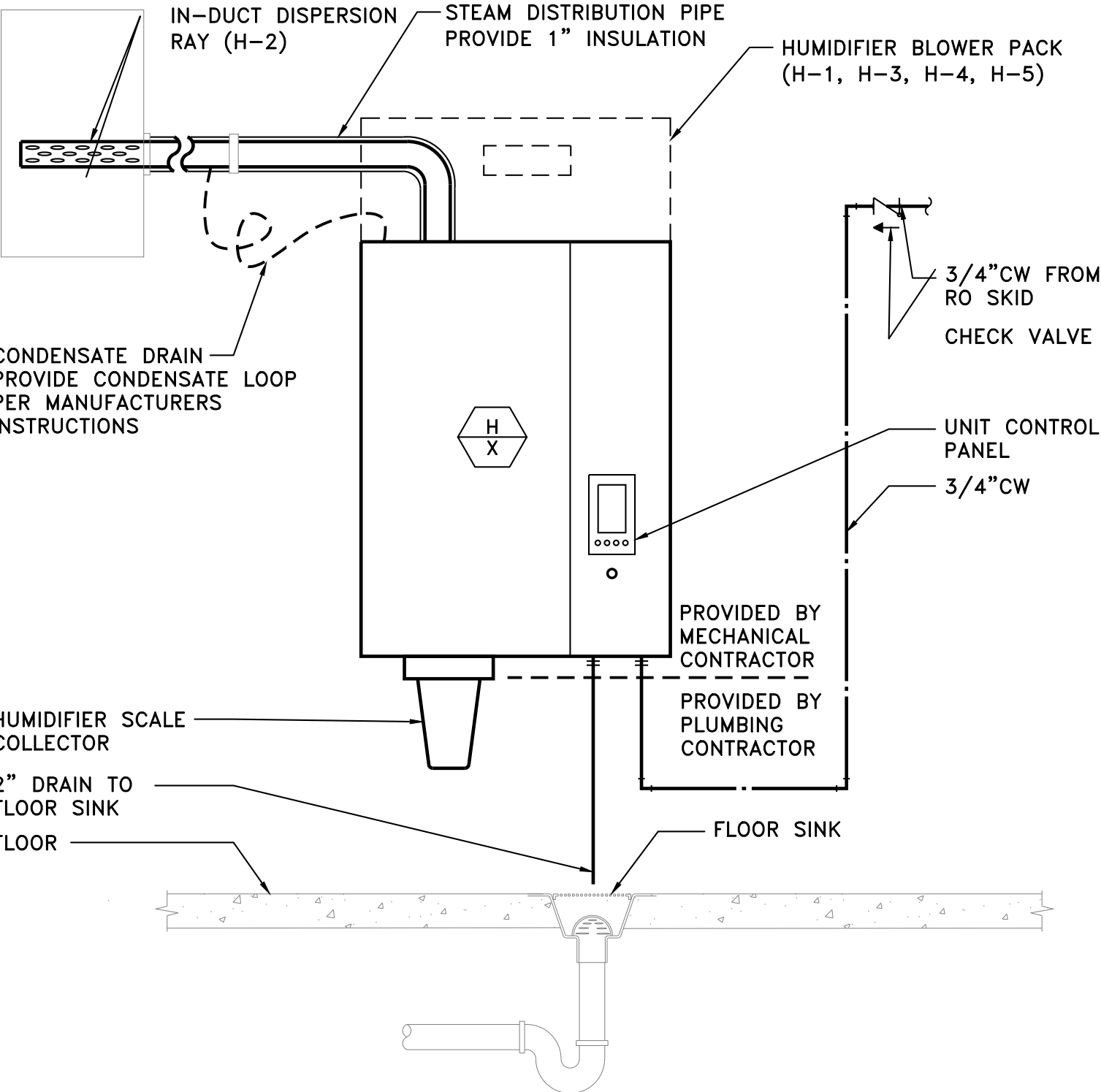
1
 M5.3
 SCALE: N.T.S.



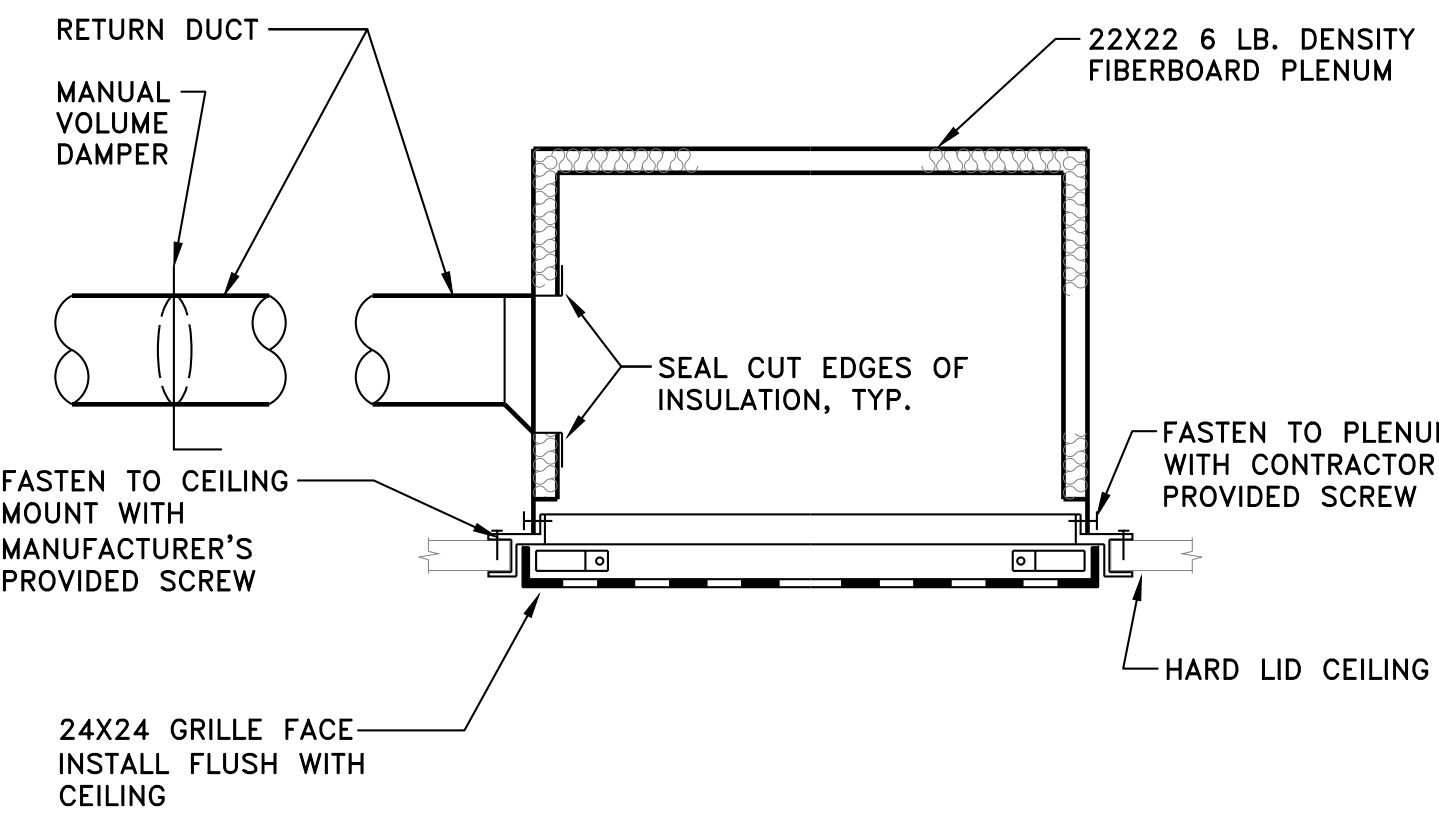
NOTES:

- RATED GYPSUM WALL BOARD ASSEMBLY
- STEEL HVAC RECTANGULAR DUCT.
- NOMINAL 22 GAGE STEEL FLANGES. ANGLES MUST OVERLAP WALL BOARD BY 1". FASTEN ANGLES INTO FRAMING STUDS USING 2" TYPE S STEEL SCREWS 6" O.C. SECURE TO STEEL DUCT WITH #8 X 3/4" STEEL SCREWS 4" O.C. A MINIMUM OF TWO SCREWS SHALL FASTEN EACH ANGLE INTO BOTH THE WALL BOARD AND THE DUCT.
- SPECSEAL SERIES 100 SEALANT INSTALLED TO FULL WALL BOARD DEPTH WITH MINERAL WOOL, NOMINAL 4 PCF, PACKED BETWEEN. ANNULUS RANGING FROM 1/4" MINIMUM TO 3" MAXIMUM.

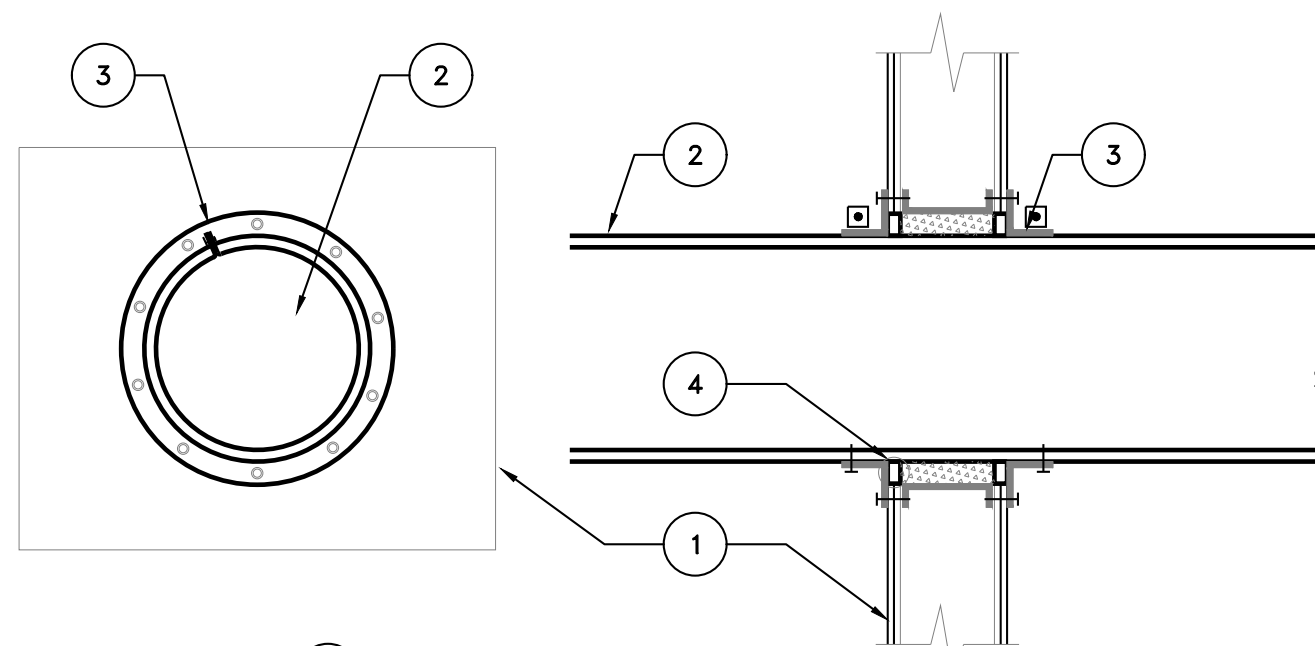
2
 M5.3
 SCALE: N.T.S.



3
 M5.3
 SCALE: N.T.S.



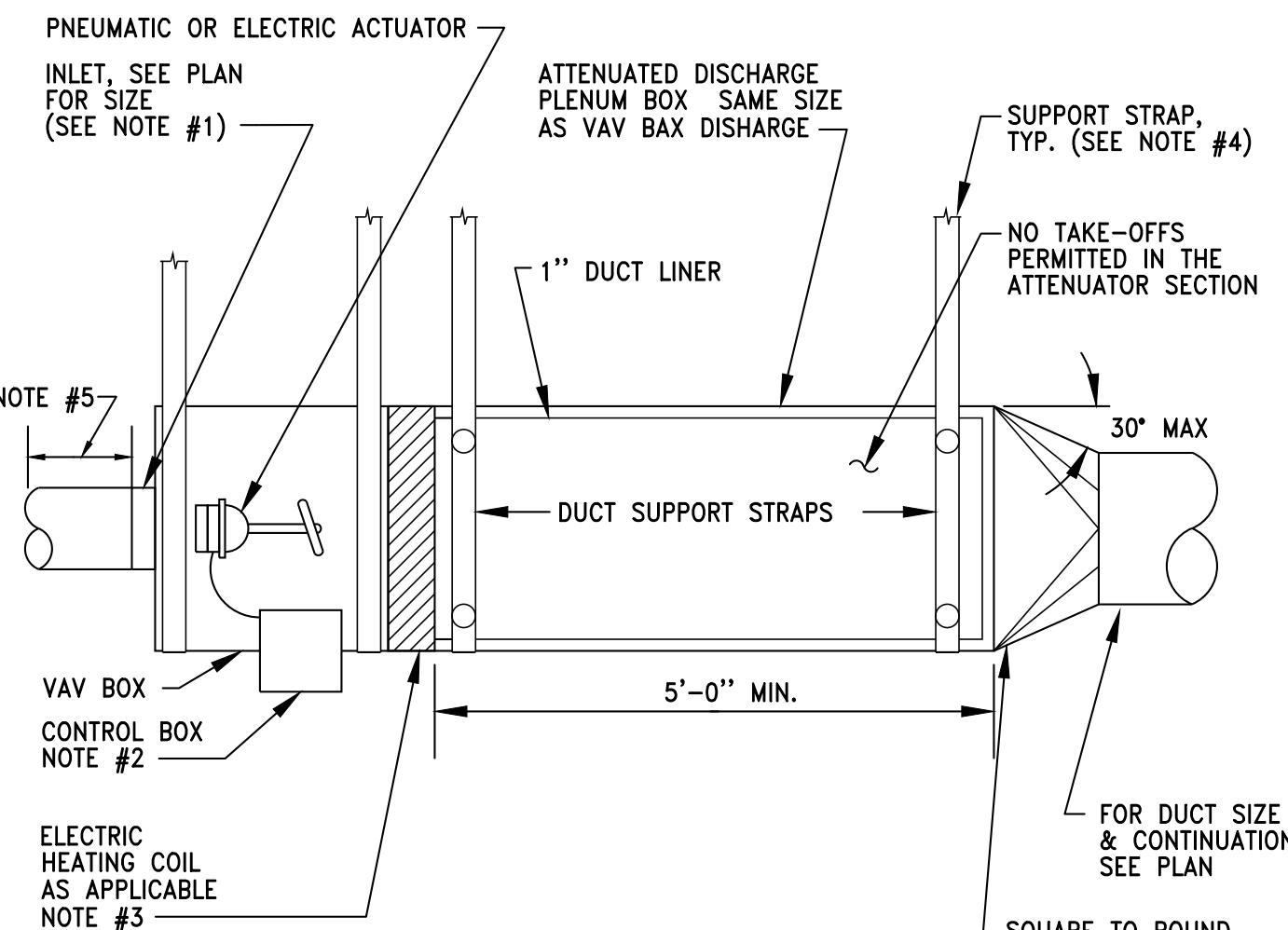
4
 M5.3
 SCALE: N.T.S.



NOTES:

- RATED GYPSUM WALL BOARD ASSEMBLY
- STEEL HVAC ROUND DUCT.
- NOMINAL 22 GAGE STEEL FLANGES. ANGLES MUST OVERLAP WALL BOARD BY 1". FASTEN ANGLES INTO FRAMING STUDS USING 2" TYPE S STEEL SCREWS 6" O.C. SECURE TO STEEL DUCT WITH STEEL DUCT CLAMP. A MINIMUM OF TWO SCREWS SHALL FASTEN EACH ANGLE INTO BOTH THE WALL BOARD.
- SPECSEAL SERIES 100 SEALANT INSTALLED TO FULL WALL BOARD DEPTH WITH MINERAL WOOL, NOMINAL 4 PCF, PACKED BETWEEN. ANNULUS RANGING FROM 1/4" MINIMUM TO 3" MAXIMUM.

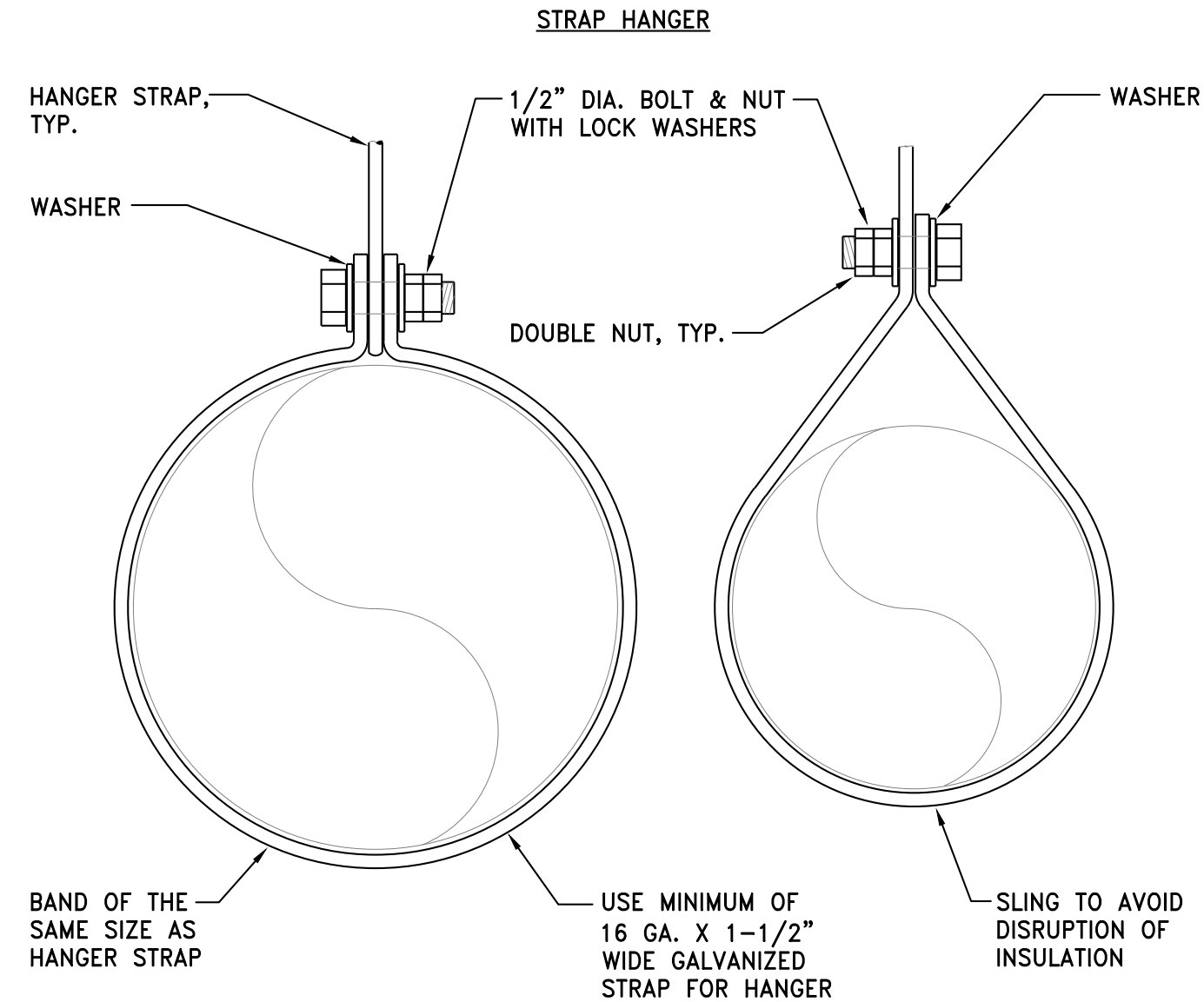
5
 M5.3
 SCALE: N.T.S.



NOTES:

- FLEXIBLE DUCTS ARE NOT PERMITTED UPSTREAM OF A VAV BOX
- PROVIDE 30" CLEAR SPACE AT THE CONTROL BOX FOR SERVICING.
- PROVIDE NECESSARY REQUIRED CLEARANCE IN FRONT OF ELECTRIC HEATING SECTION AND CONTROLLER.
- SUPPORT VAV BOX INDEPENDENTLY FROM DUCTWORK.
- THREE EQUIVALENT DIAMETERS UPSTREAM OF VAV WITHOUT OBSTRUCTIONS.

7
 M5.3
 SCALE: N.T.S.

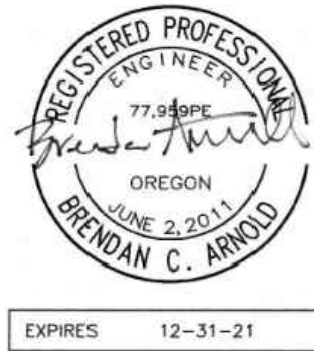


8
 M5.3
 SCALE: N.T.S.

6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



AKAAAN
 architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

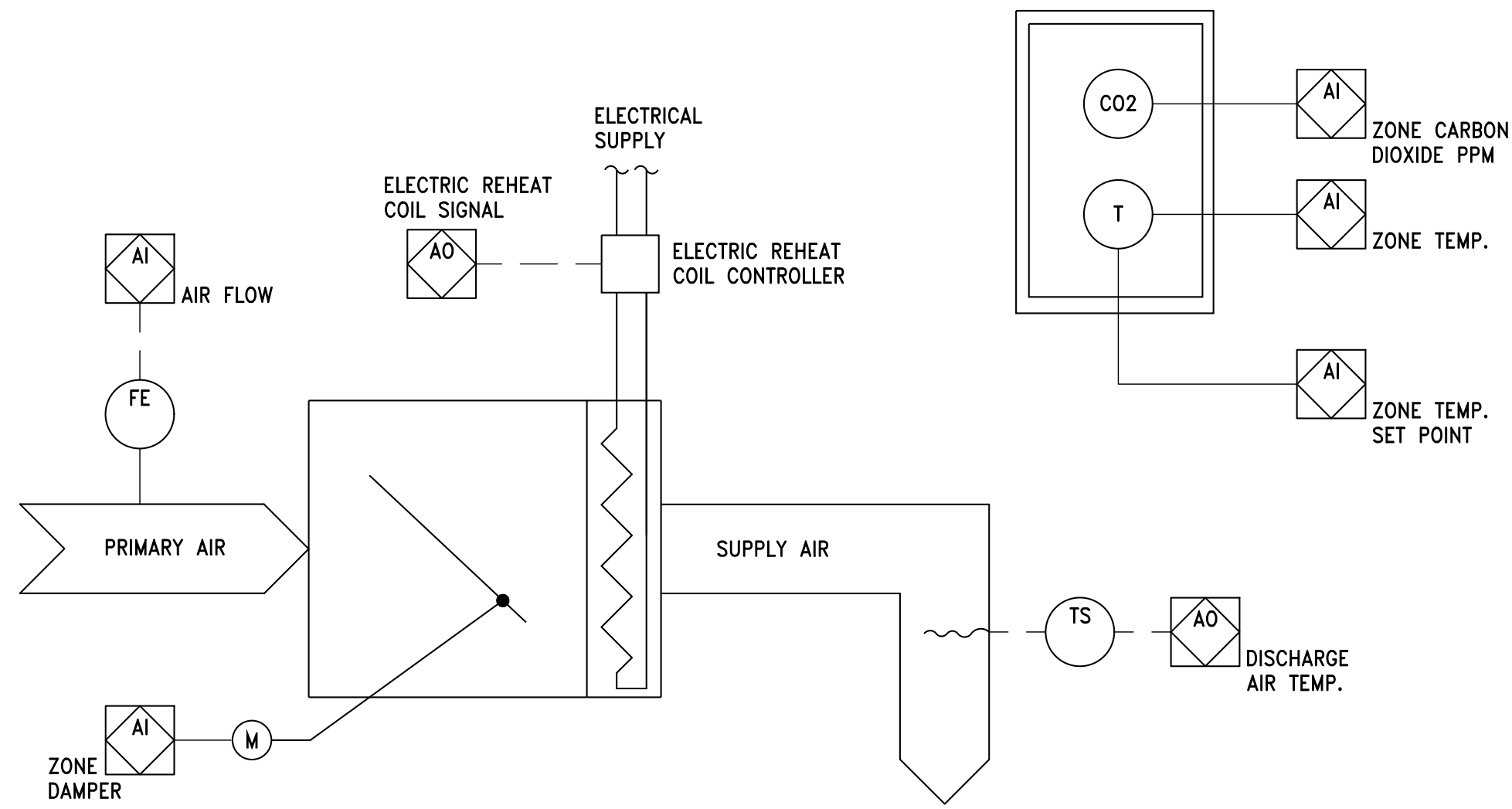
SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

REVISIONS	DATE	DESCRIPTION
△		

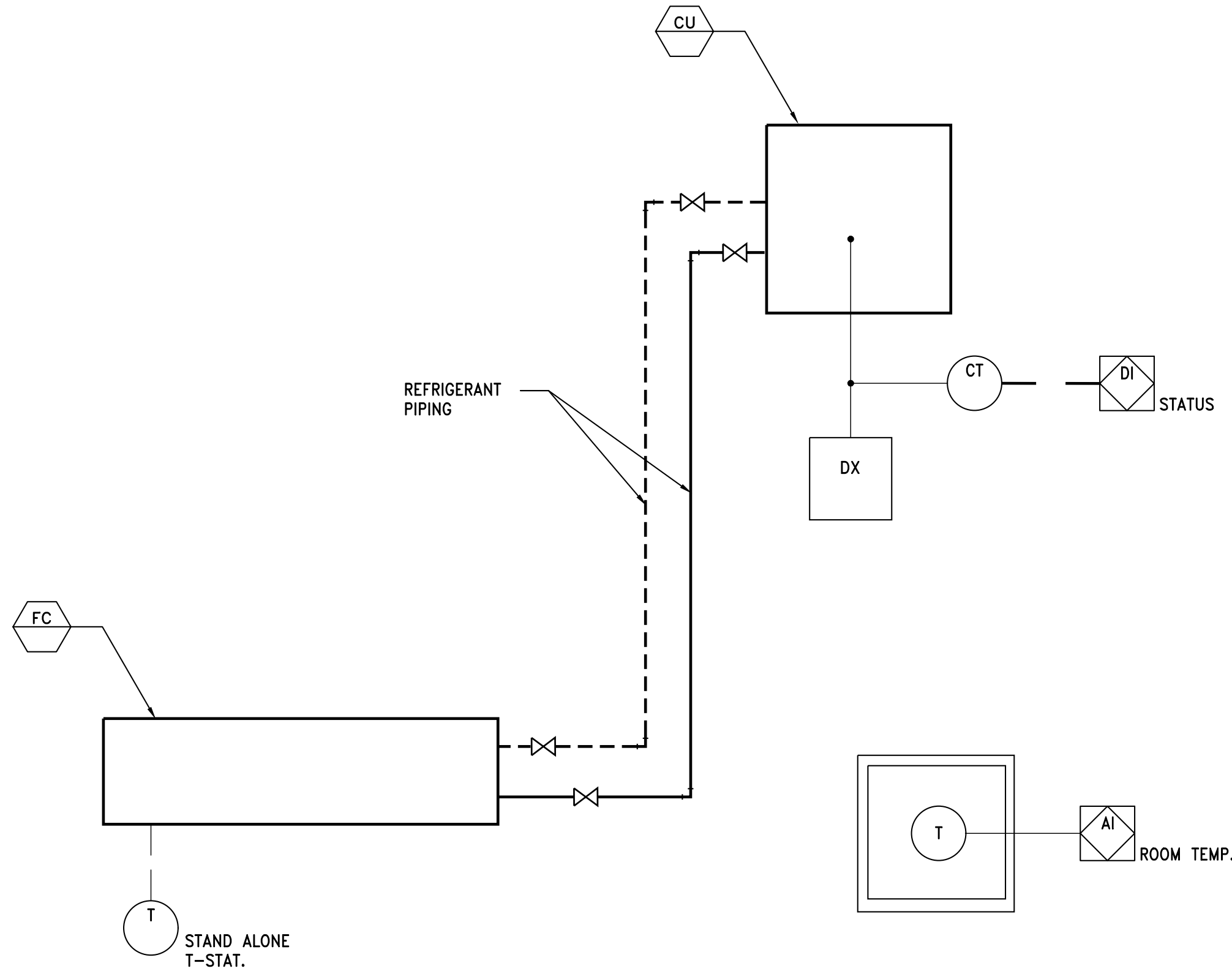
CONTENTS:
 MECHANICAL
 DETAILS

SHEET NO:

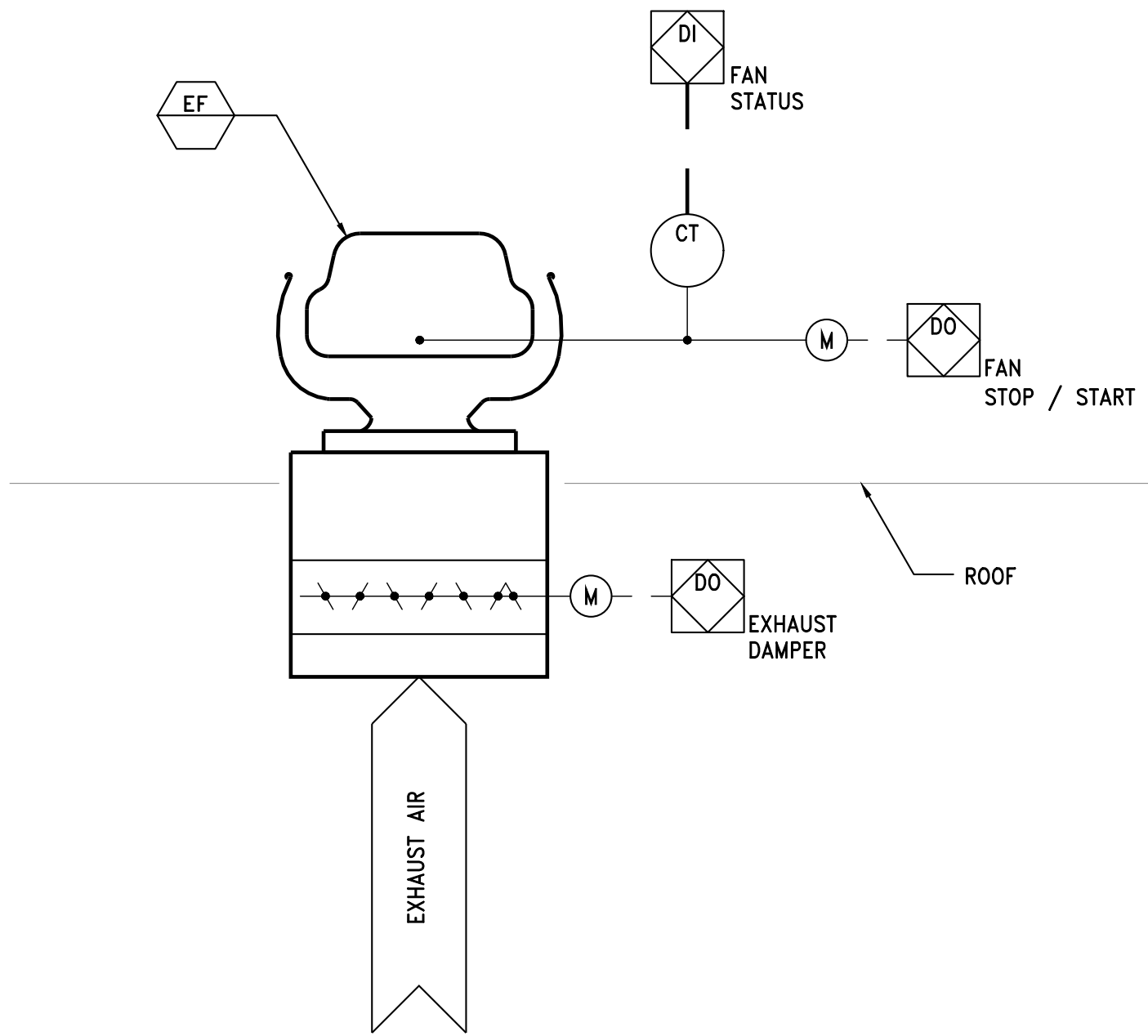
M5.3



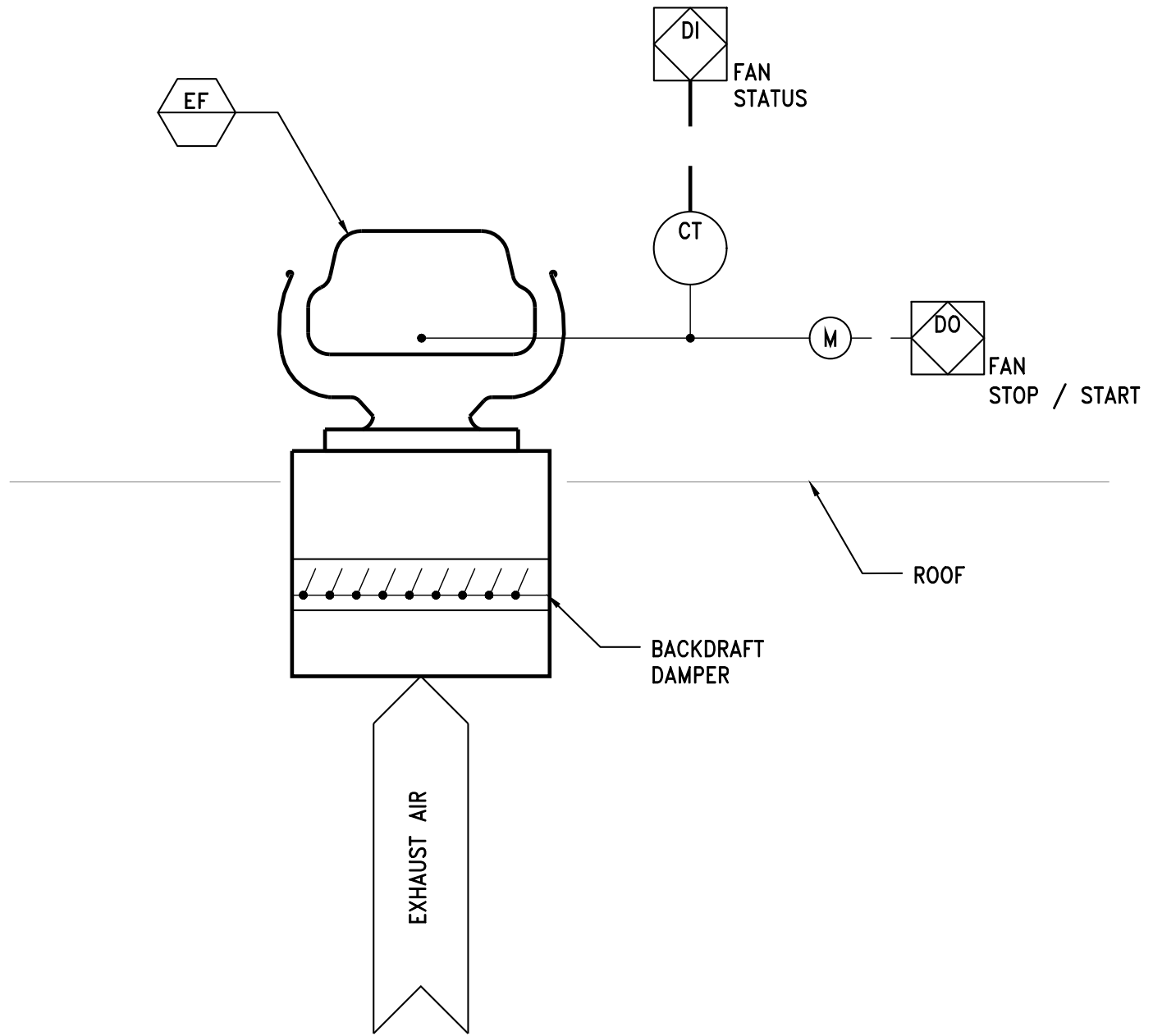
1
M9.1 P&I DIAGRAM – TYPICAL VAV TERMINAL UNIT
SCALE: N.T.S.



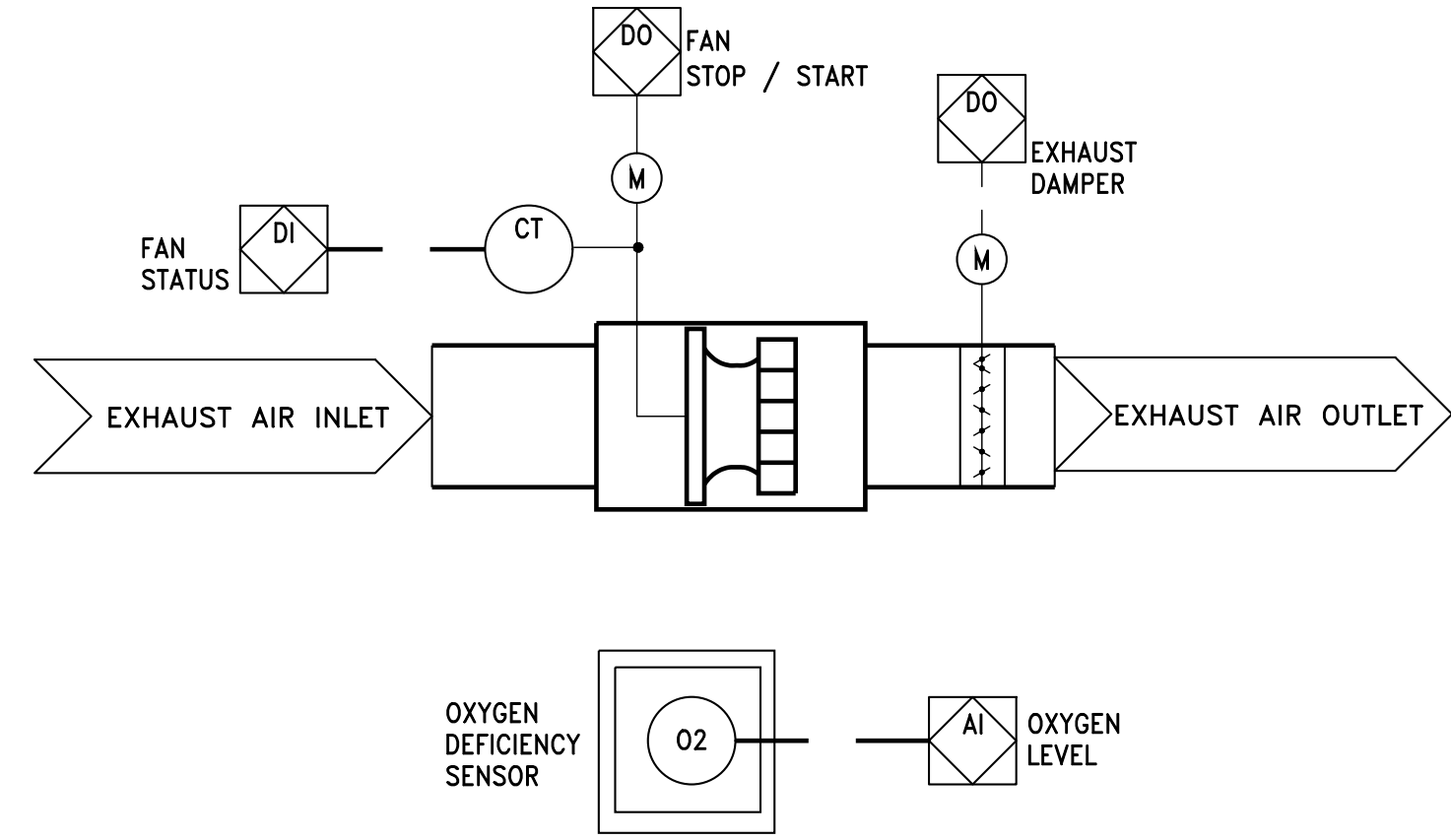
4
M9.1 P&I DIAGRAM – DUCTLESS SPLIT SYSTEM (CU-1/AC-1, CU-2/AC-2)
SCALE: N.T.S.



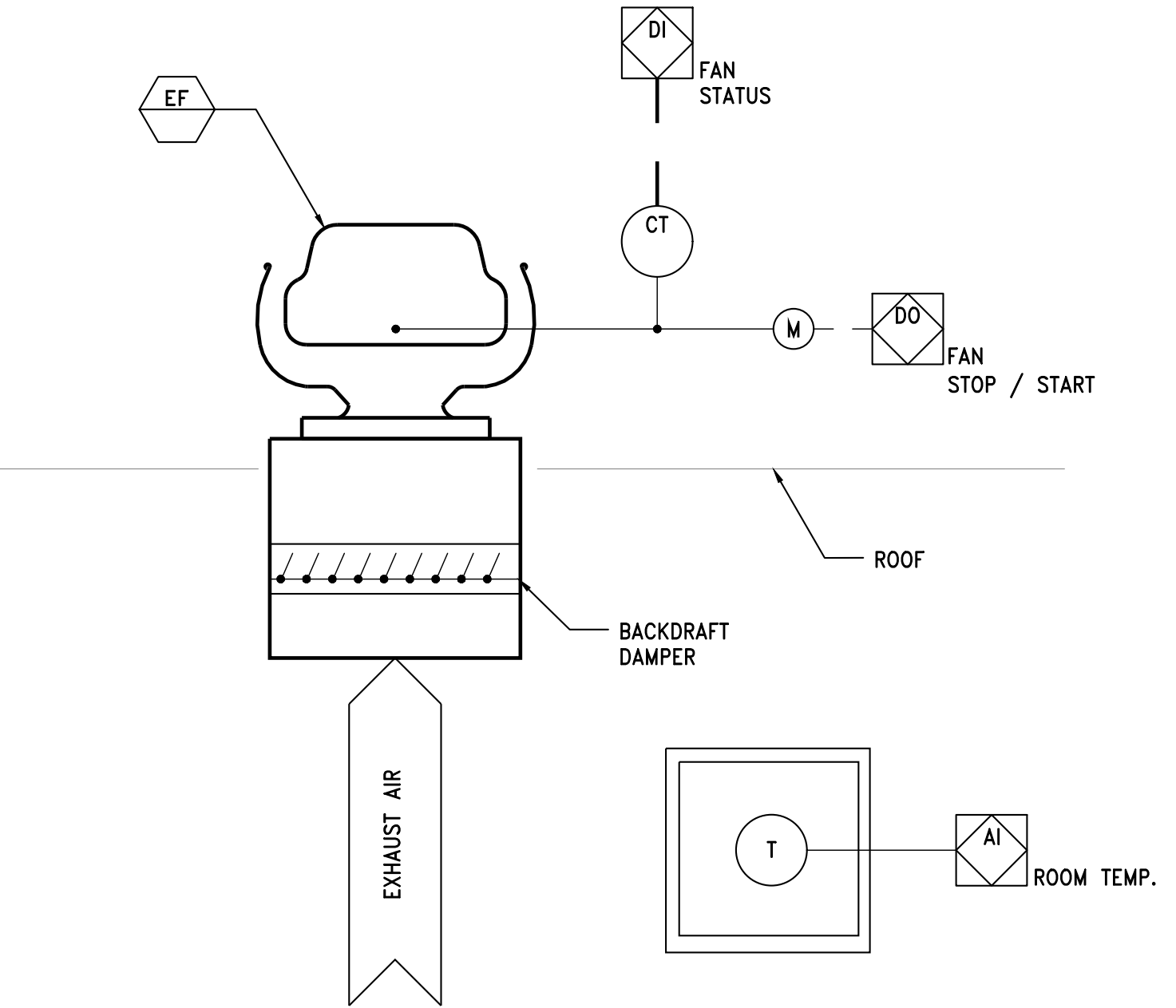
2
M9.1 P&I DIAGRAM – RR EXH FANS (EF-1, EF-2)
SCALE: N.T.S.



5
M9.1 P&I DIAGRAM – LOCKER EXHAUST FAN (EF-3)
SCALE: N.T.S.



3
M9.1 P&I DIAGRAM – ARGON EXHAUST FANS (EF-5, EF-6)
SCALE: N.T.S.



6
M9.1 P&I DIAGRAM – ELECTRICAL ROOM EXHAUST
SCALE: N.T.S.

AKAAN
architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	DATE	DESCRIPTION

CONTENTS:
MECHANICAL
P&I DIAGRAMS

SHEET NO:

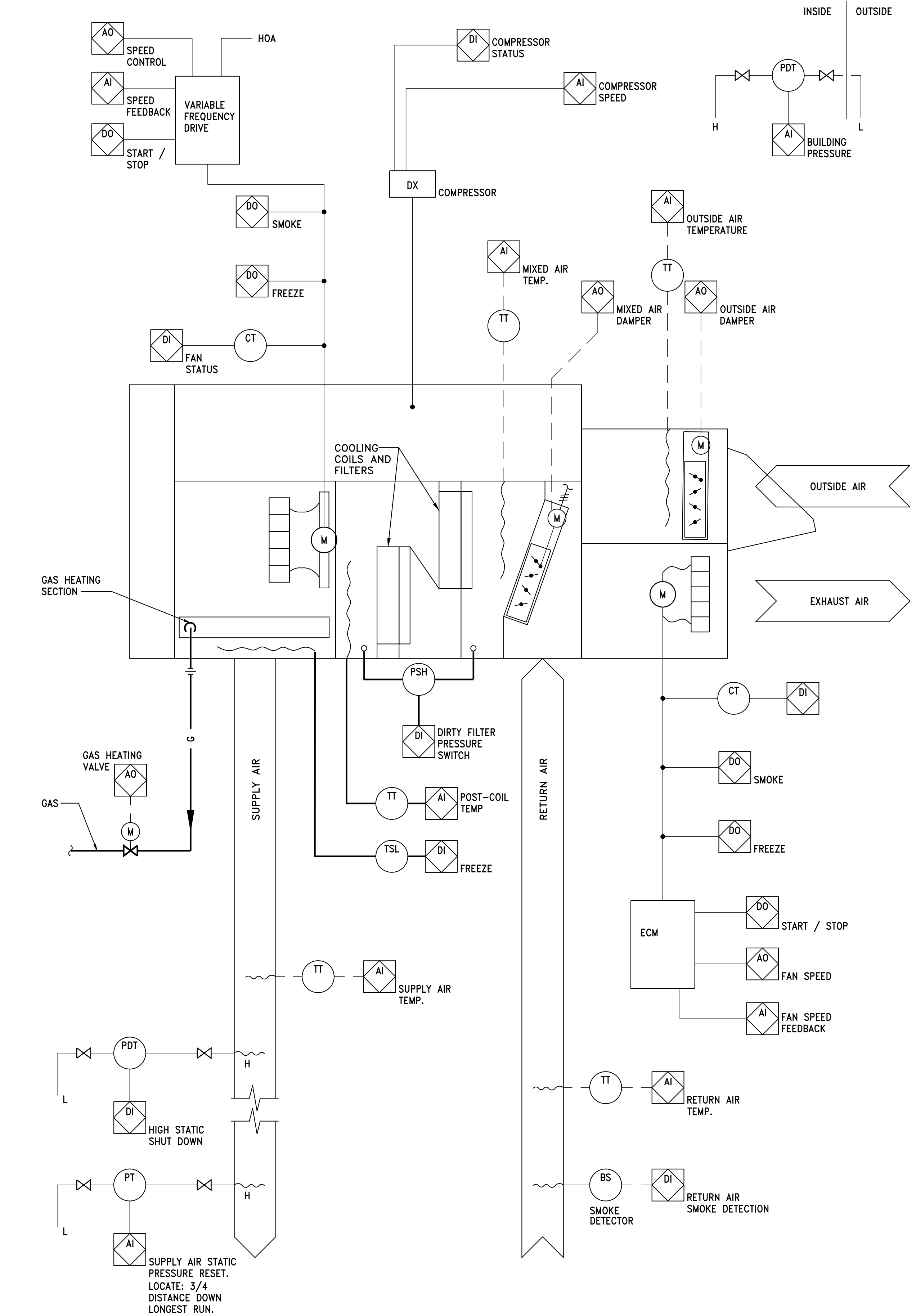
M9.1

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979

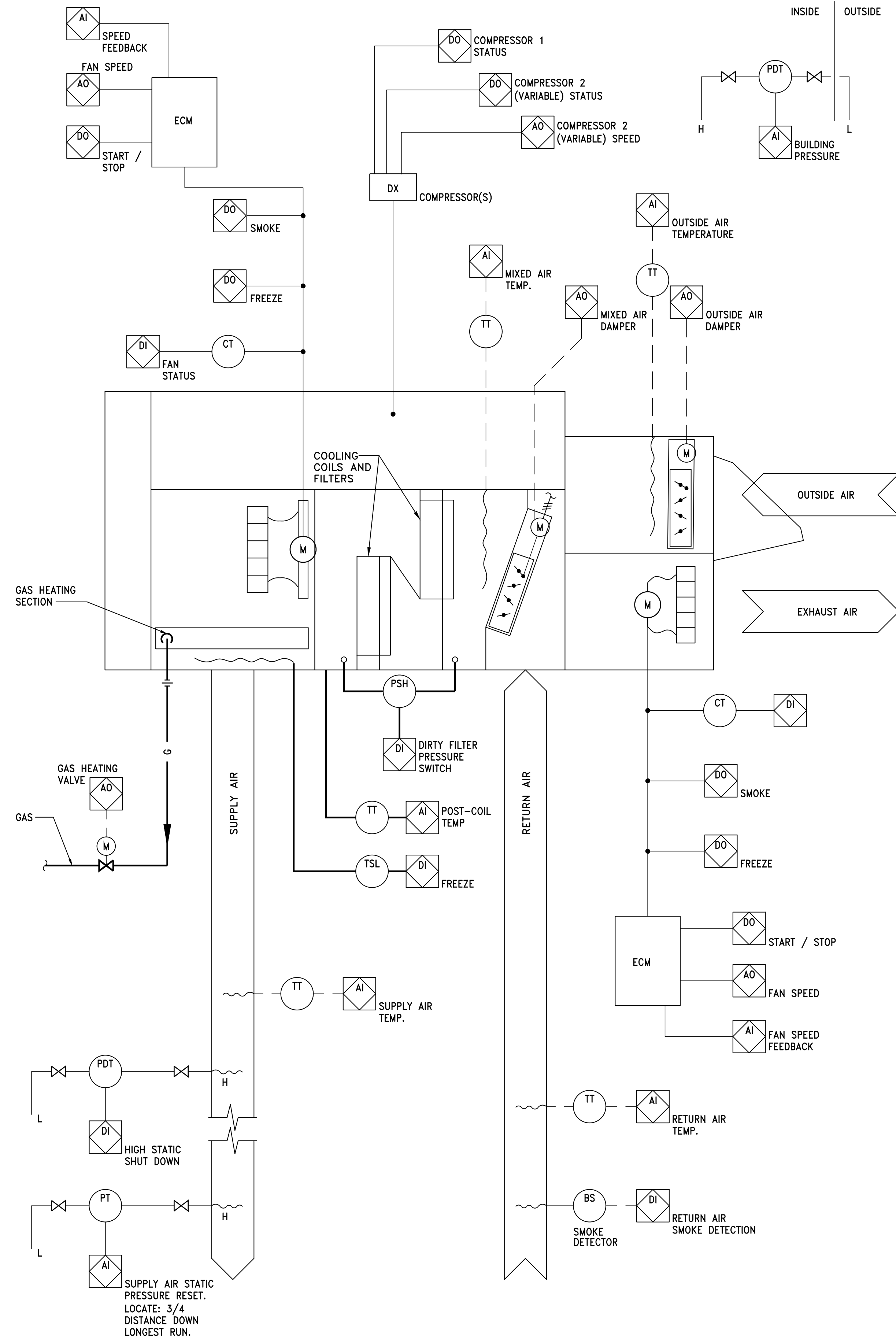


101 ST HELENS ST
ST HELENS, OR 97051
T: 503.368.3050 F: 503.366.3055

PLOTTED: MATT MCCORMICK 9/7/2021 6:44 PM
X:\DWG\AD\5459\5459 M9.2



1 P&I DIAGRAM – OFFICE TERMINAL UNIT AIR HANDLER (RTU-1)
M9.2 SCALE: N.T.S.



2 P&I DIAGRAM – OFFICE TERMINAL UNIT AIR HANDLER (RTU-2)
M9.2 SCALE: N.T.S.

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979



AKAAN
architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	
Δ	DESCRIPTION

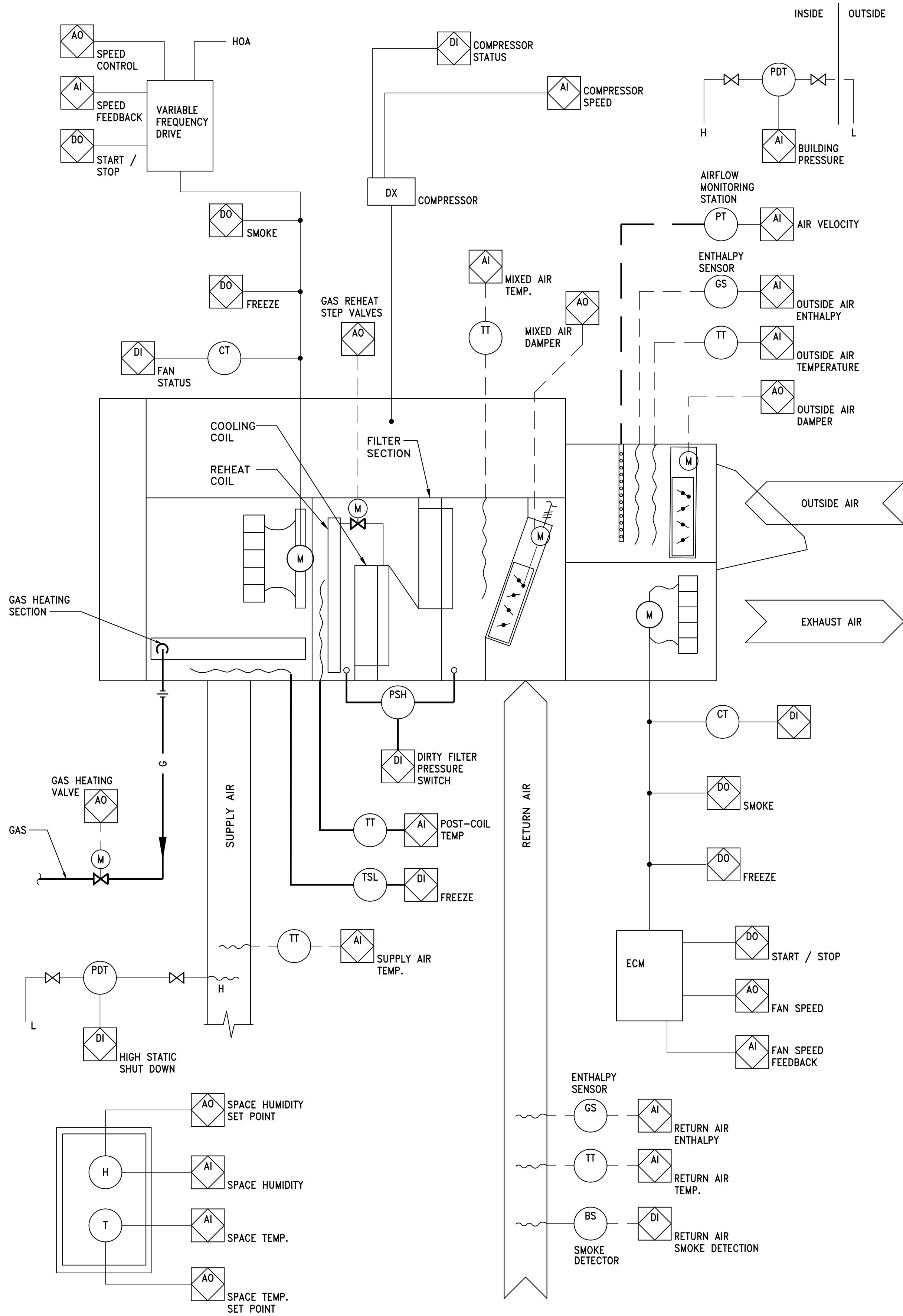
CONTENTS:
MECHANICAL
P&I DIAGRAMS

SHEET NO:

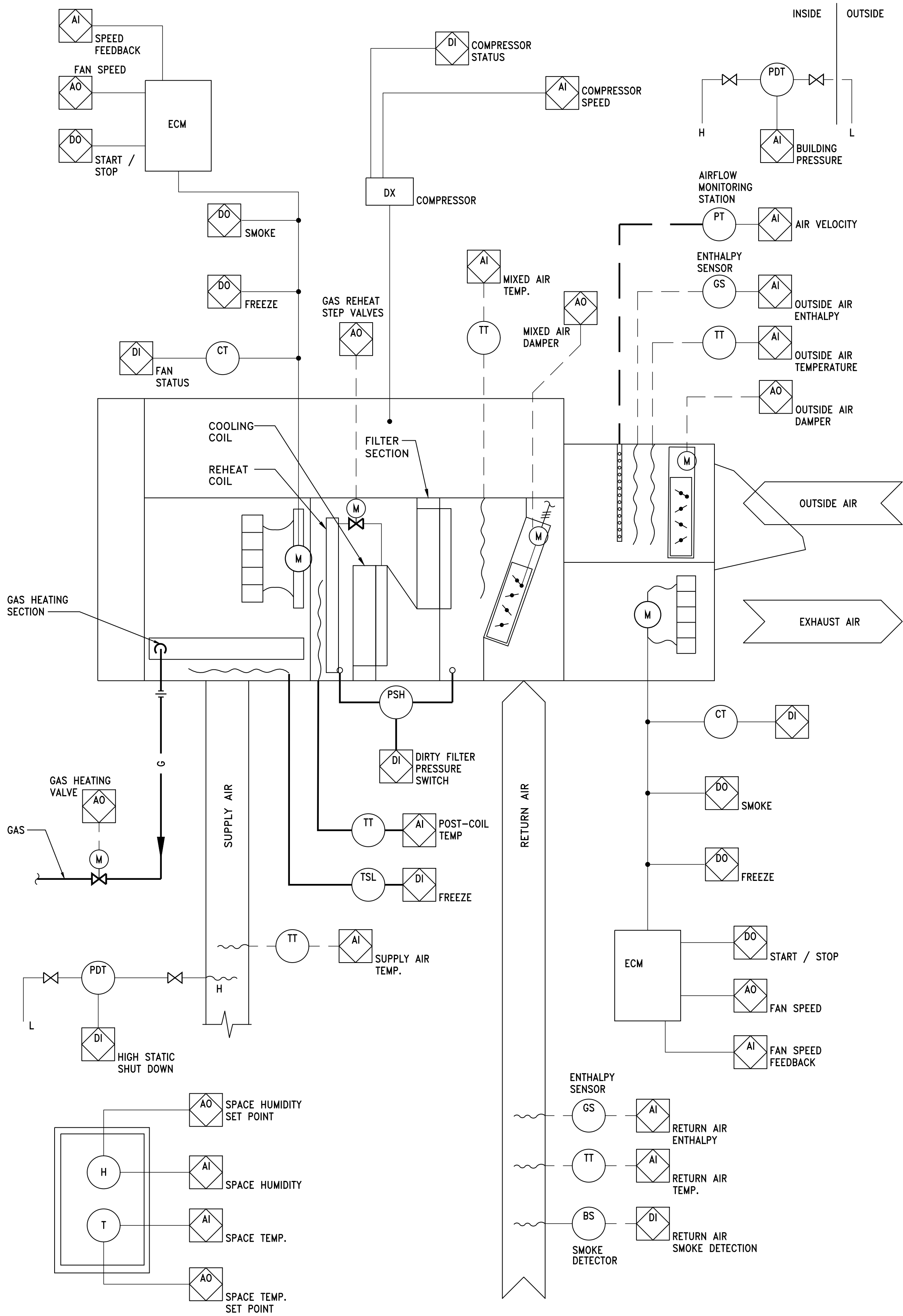
M9.2

PLOTTED: MATT MCCORMICK 9/7/2021 6:44 PM
 X:\DWG\AD\5459\5459 M9.3

1
 M9.3 P&I DIAGRAM – SHOP AREA ROOFTOP UNITS (RTU-3, RTU-4)
 SCALE: N.T.S.



2
 M9.3 P&I DIAGRAM – MEASURING LAB ROOFTOP UNIT (RTU-5)
 SCALE: N.T.S.



6915 S MACADAM AVE
 SUITE 200
 PORTLAND, OREGON 97219
 CONTACT: MATT MCCORMICK
 PHONE: (503) 892-1188
 engineering@mke-inc.com
 Since 1979



AKAAN
 architecture + design llc



PROJECT TEAM:

CIVIL ENGINEER:
 AKS ENGINEERING & FORESTRY
 12965 SW Herman Road, Suite 100
 Tualatin, OR 97062
 P: 503.563.6151
 F: 503.563.6152

STRUCTURAL ENGINEER:
 PETERSON STRUCTURAL ENGINEERS
 9400 SW Barnes Road, Suite 100
 Portland, OR 97225
 P: 503.292.1635

MEP ENGINEER:
 MKE & Associates, Inc.
 6915 SW Macadam Ave, Suite 200
 Portland, OR 97219
 P: 503.892.1188

OWNER:
 OMIC R&D / OREGON TECH.
 Procurement and Contract Services
 27500 SW Parkway Avenue
 Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
 CRAIG CAMPBELL, Executive Director
 OMIC R&D
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056
 503-983-0573

OMIC R&D - Building 2
 Additive Manufacturing Center
 33701 Charles T. Parker Way
 Scappoose, Oregon 97056

SCALE: AS NOTED
 DRAWN BY: MM
 CHECKED BY: BA
 CAD FILE:
 DATE: 09/07/2021

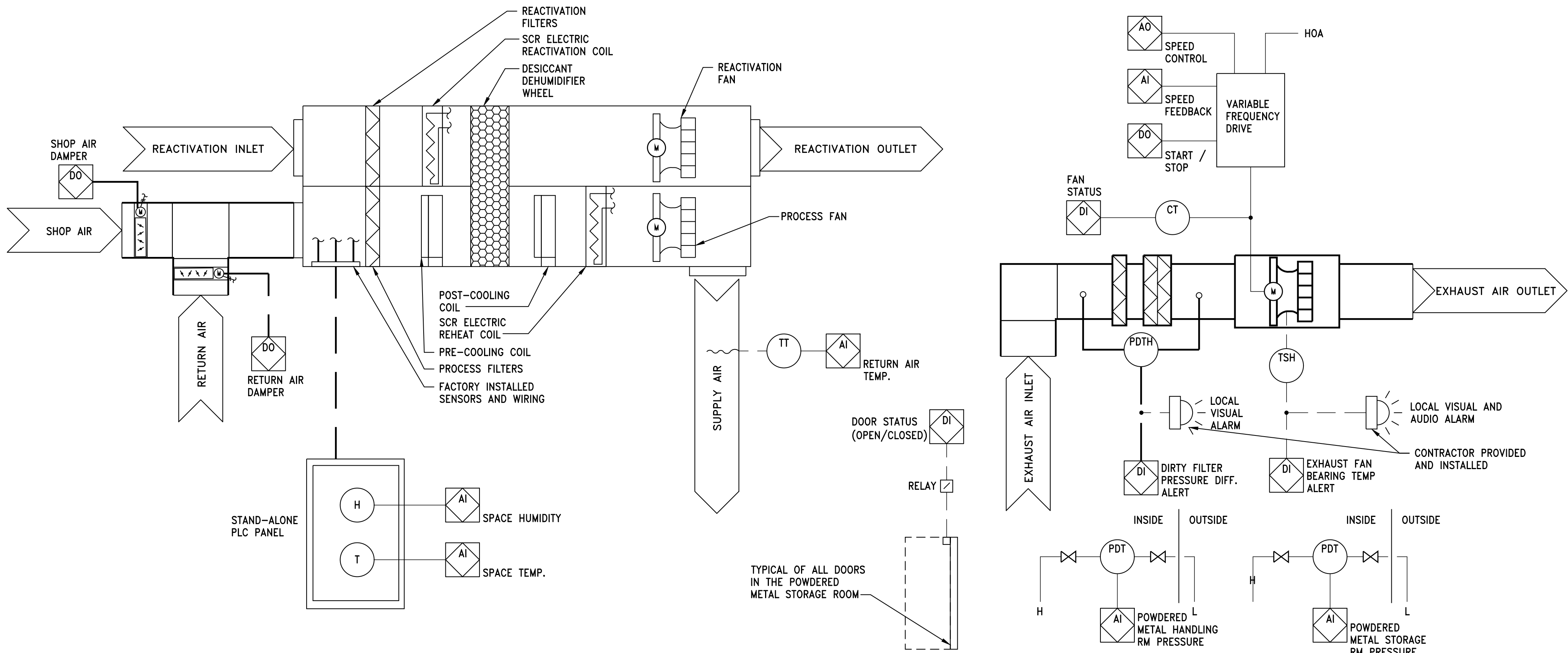
REVISIONS	DATE	DESCRIPTION

CONTENTS:
 MECHANICAL
 P&I DIAGRAMS

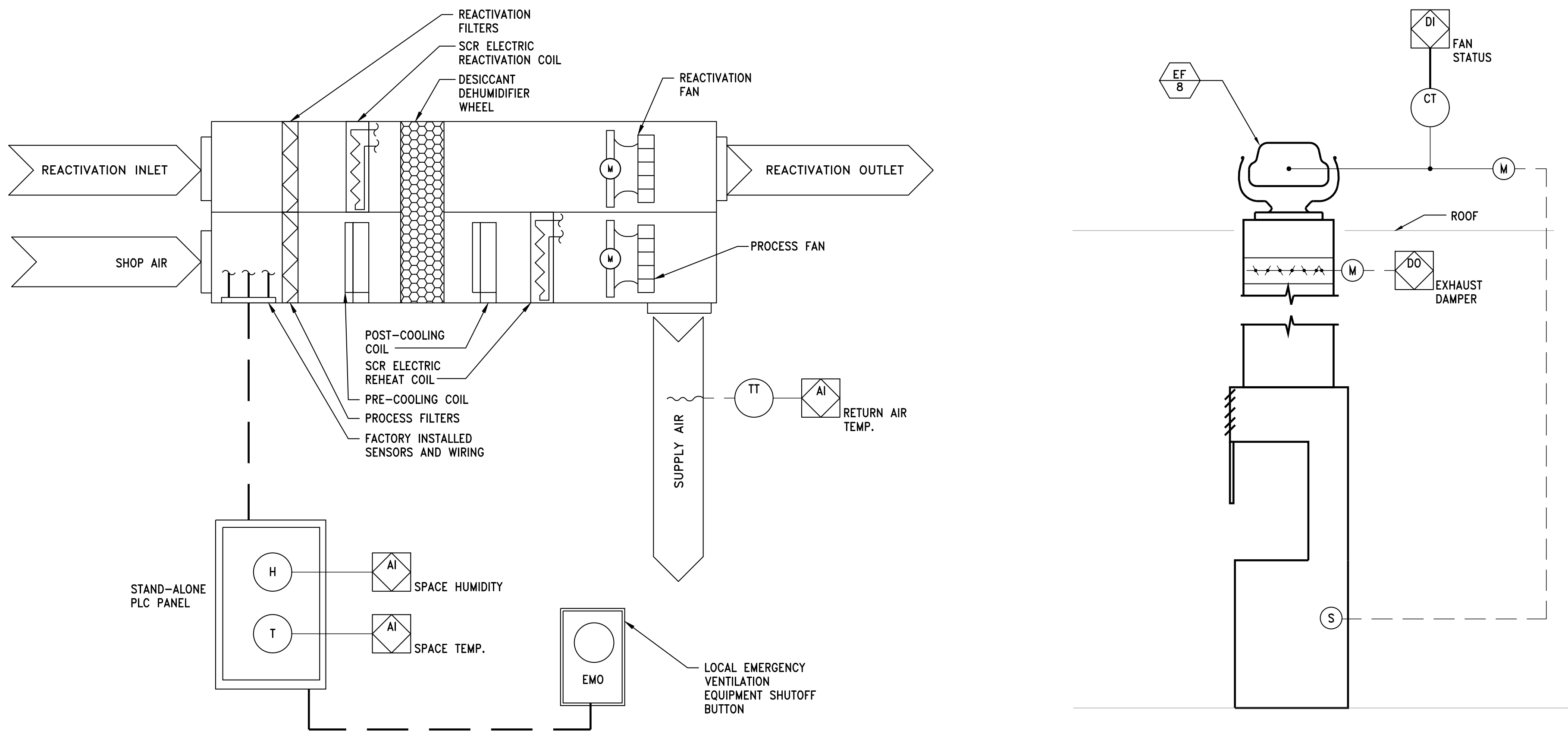
SHEET NO:

M9.3

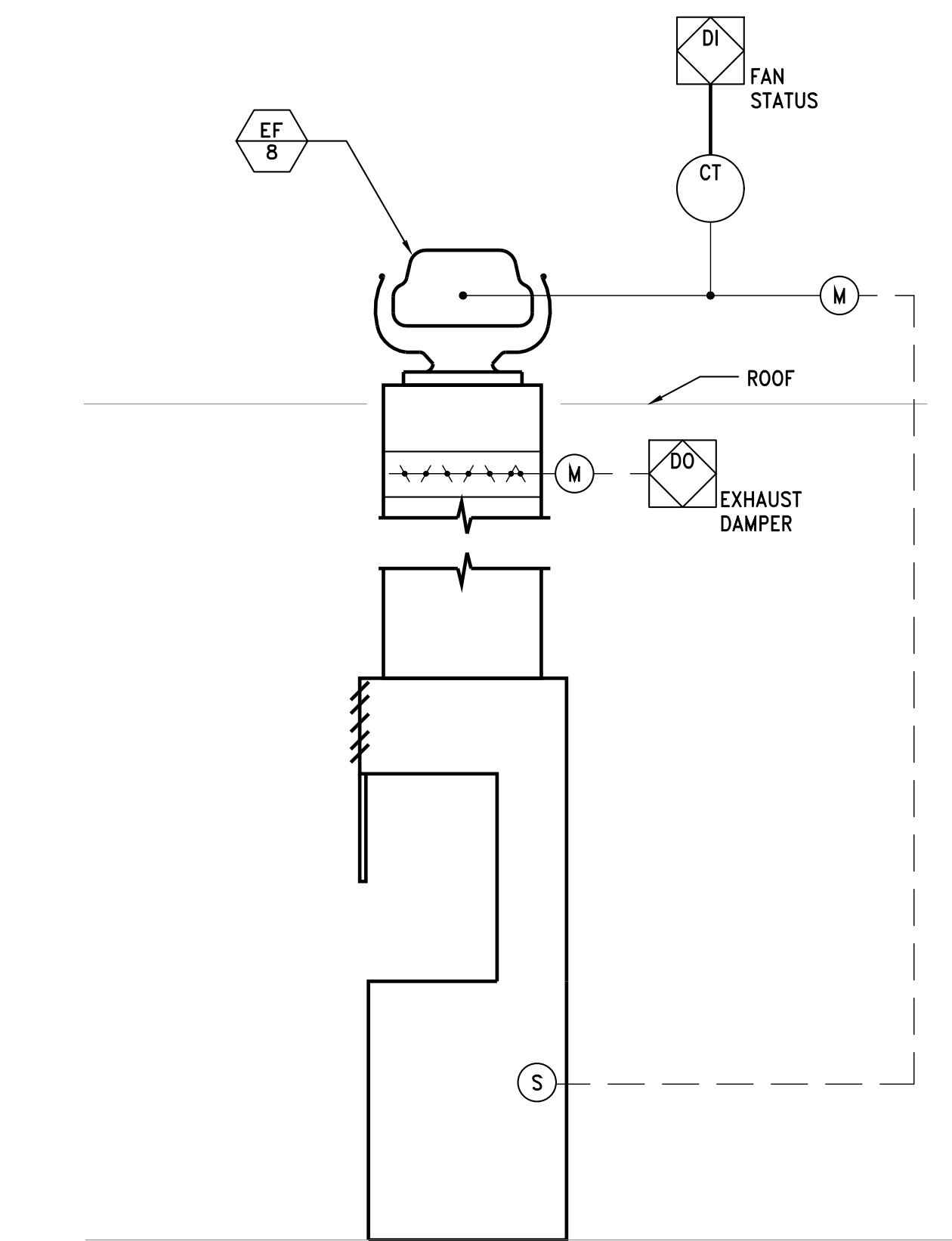
101 ST HELENS ST
 ST HELENS, OR 97051
 T: 503.368.3050 F: 503.366.3055



1 P&I DIAGRAM – POWDERED METAL ROOMS DEHUMIDIFCATION UNIT AND EXHAUST FAN – DH-1 AND EF-4
M9.4 SCALE: N.T.S.



2 P&I DIAGRAM – LAB DEHUMIDIFICATION UNIT – DH-2
M9.4 SCALE: N.T.S.



4 P&I DIAGRAM – FUME HOOD EXHAUST FAN (EF-8)
M9.4 SCALE: N.T.S.

PROJECT TEAM:

CIVIL ENGINEER:
AKS ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
P: 503.563.6151
F: 503.563.6152

STRUCTURAL ENGINEER:
PETERSON STRUCTURAL ENGINEERS
9400 SW Barnes Road, Suite 100
Portland, OR 97225
P: 503.292.1635

MEP ENGINEER:
MKE & Associates, Inc.
6915 SW Macadam Ave, Suite 200
Portland, OR 97219
P: 503.892.1188

OWNER:
OMIC R&D / OREGON TECH.
Procurement and Contract Services
27500 SW Parkway Avenue
Wilsonville, OR 97070

OWNER'S REPRESENTATIVE:
CRAIG CAMPBELL, Executive Director
OMIC R&D
33701 Charles T. Parker Way
Scappoose, Oregon 97056
503-983-0573

OMIC R&D - Building 2
Additive Manufacturing Center
33701 Charles T. Parker Way
Scappoose, Oregon 97056

SCALE: AS NOTED
DRAWN BY: MM
CHECKED BY: BA
CAD FILE:
DATE: 09/07/2021

REVISIONS	DATE	DESCRIPTION
△		

CONTENTS:
MECHANICAL
P&I DIAGRAMS

SHEET NO:

M9.4

6915 S MACADAM AVE
SUITE 200
PORTLAND, OREGON 97219
CONTACT: MATT MCCORMICK
PHONE: (503) 892-1188
engineering@mke-inc.com
Since 1979

