

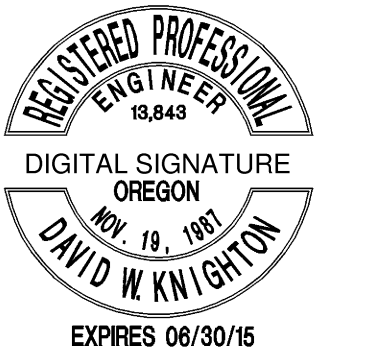
# UNIVERSITY OF OREGON

## 1900 MILLRACE INNOVATION CENTER

### LAB 113N AND LAB 113S RENOVATION



**BALZHISER & HUBBARD ENGINEERS**  
 MECHANICAL  
 ELECTRICAL  
 CIVIL  
 SURVEYORS  
 100 WEST 13TH AVENUE  
 EUGENE, OR 97401  
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### CONSULTANTS

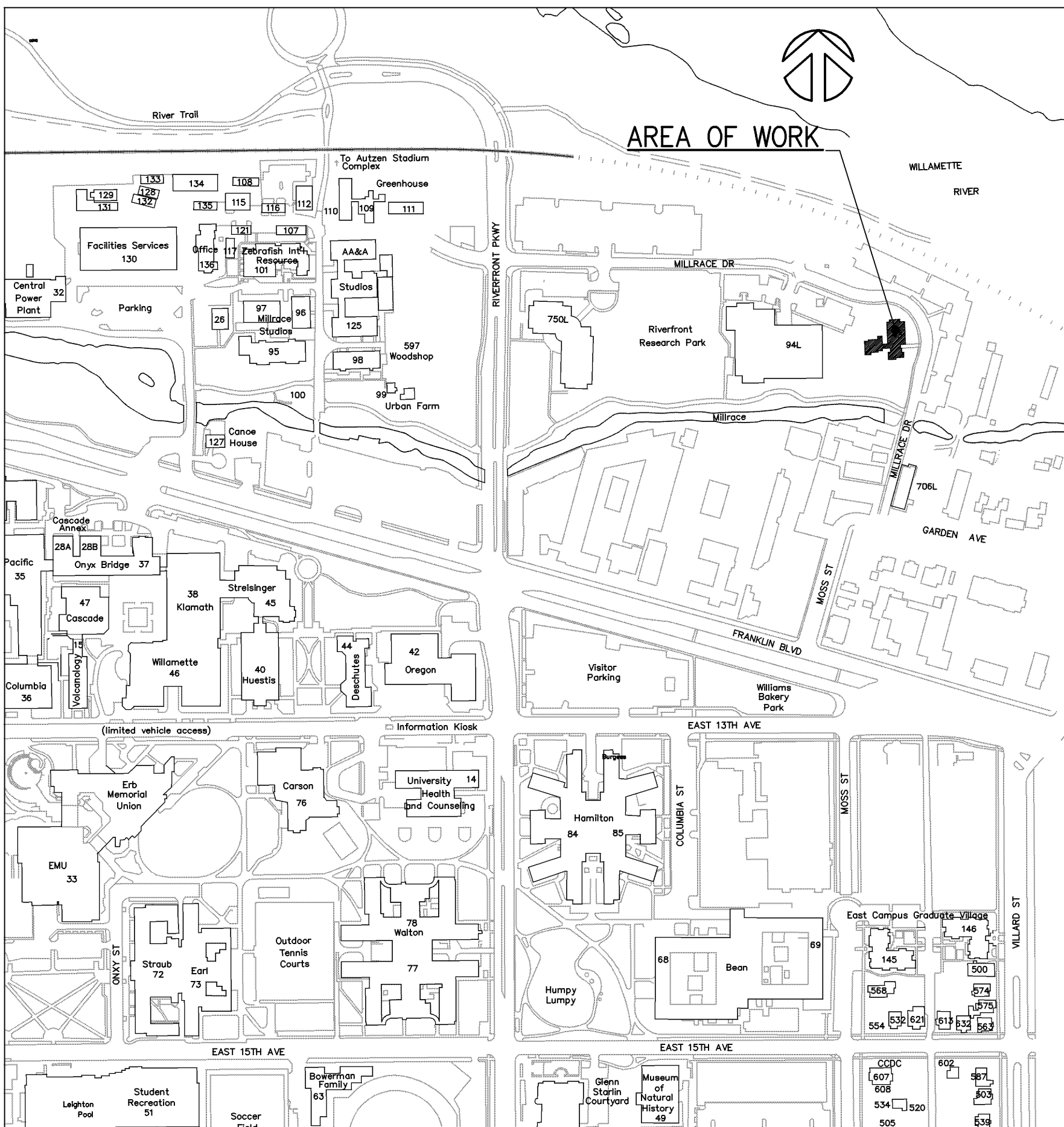
Prime Consultant, Mechanical Engineer, & Electrical Engineer:  
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### SHEET INDEX

NO.	TITLE
<u>Cover</u>	
G0	COVER SHEET, AREA MAP, AND SHEET INDEX
<u>Architectural</u>	
A1	ARCHITECTURAL PLANS, DETAILS
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M2	HVAC ATTIC AND FLOOR PLAN - NEW
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### VICINITY MAP



PROJECT TITLE  
**UNIVERSITY OF OREGON  
 1900 MILLRACE INNOVATION CENTER  
 LAB 113N AND LAB 113S RENOVATION**

SHEET TITLE  
**COVER SHEET, AREA MAP, SHEET INDEX**

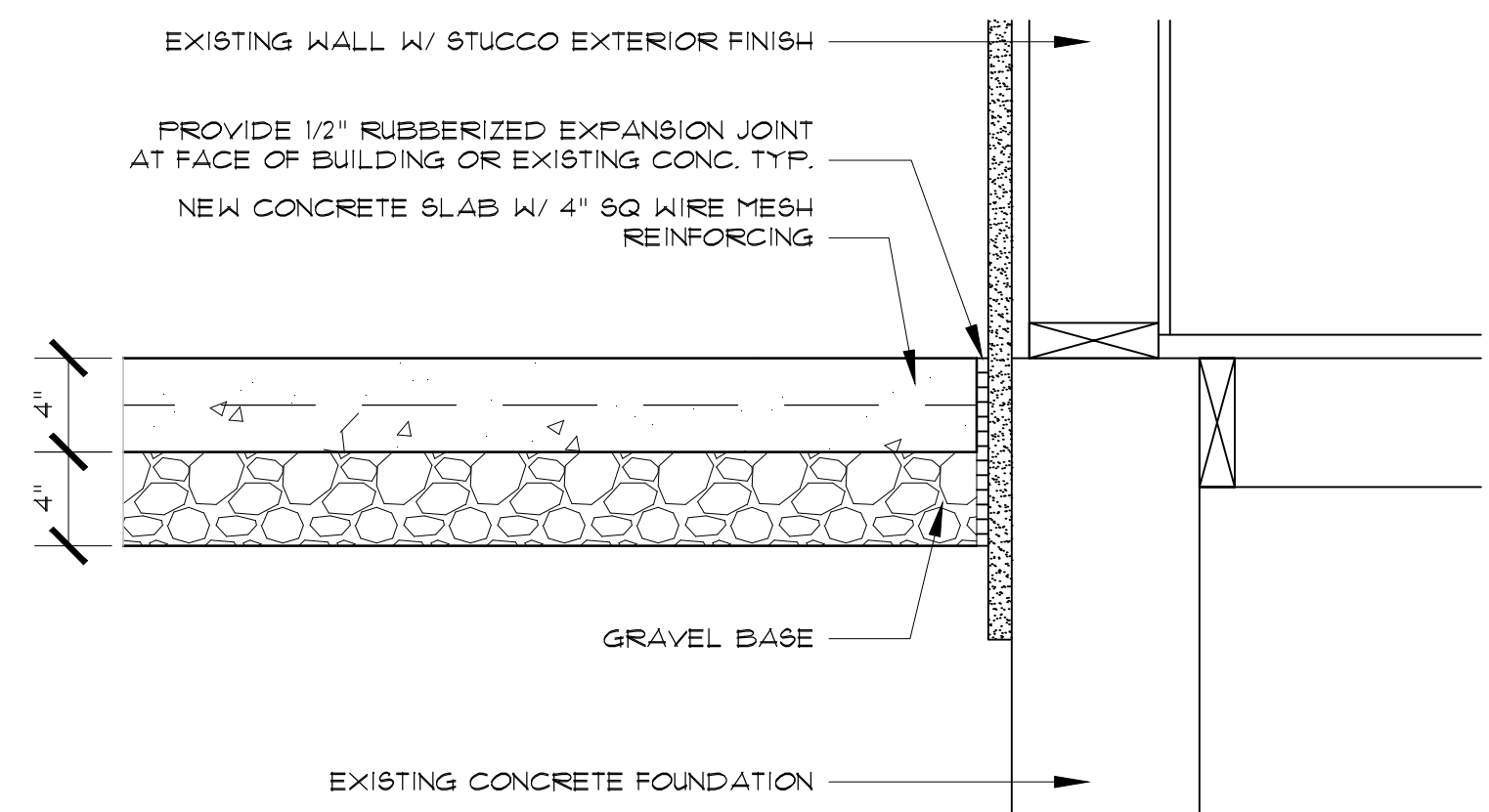
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DESIGNER  
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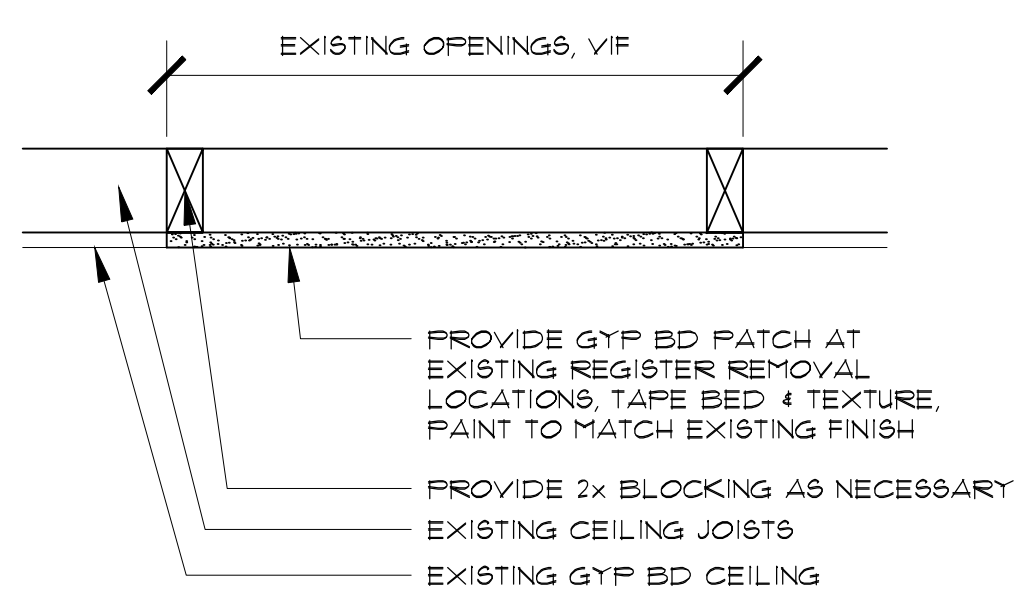
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FILENAME  
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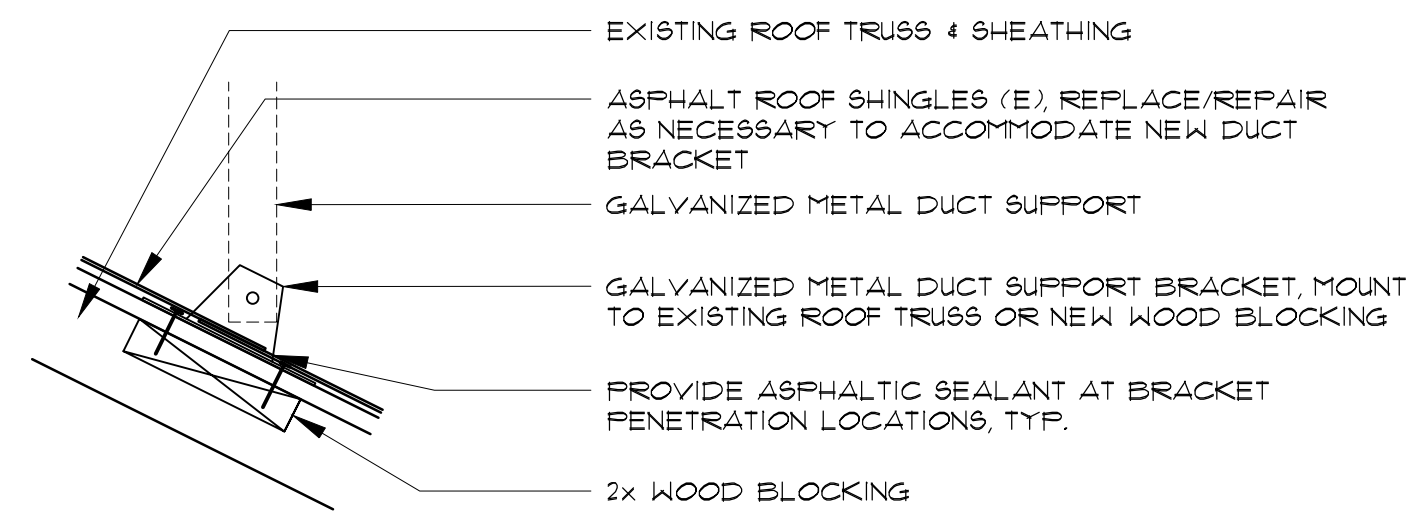
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**G0**



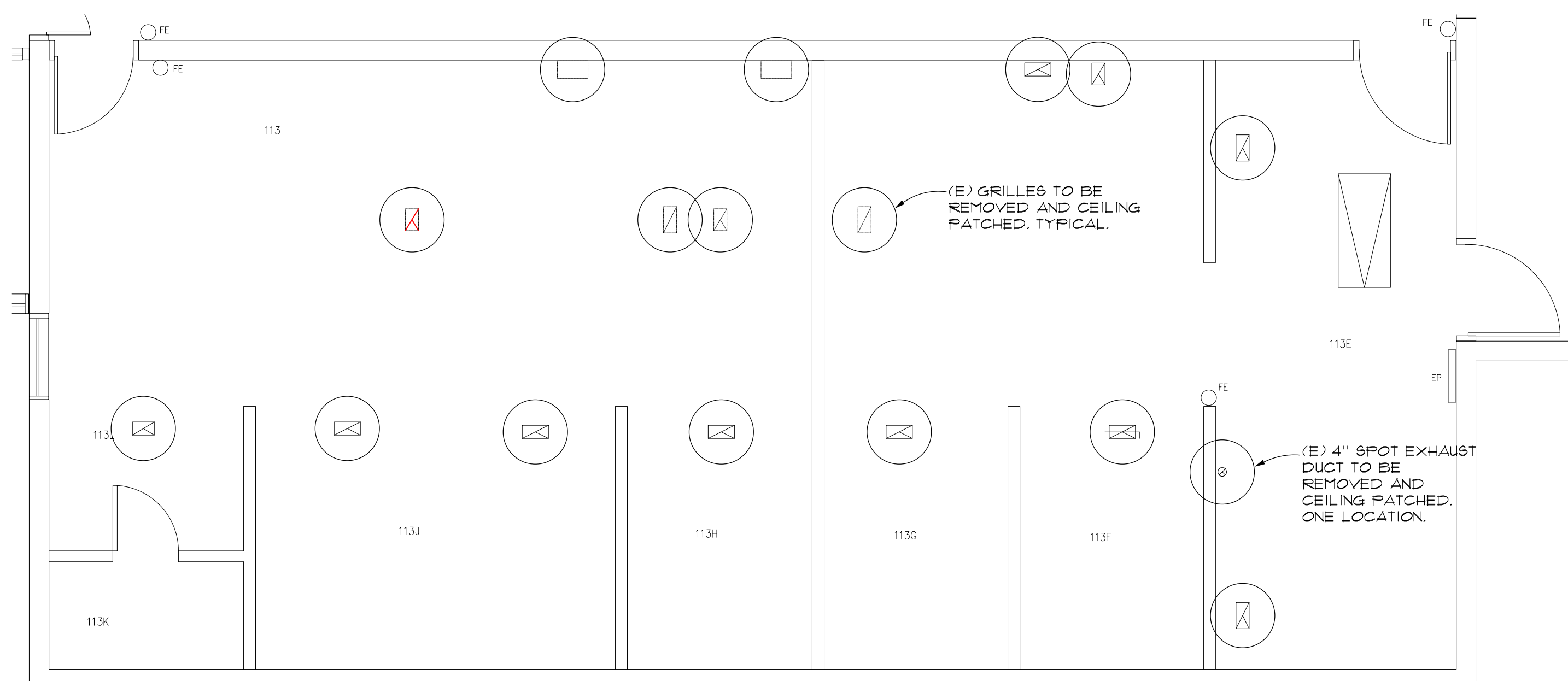
5 CONC SLAB @ BUILDING  
SCALE: 1 1/2" = 1'-0"



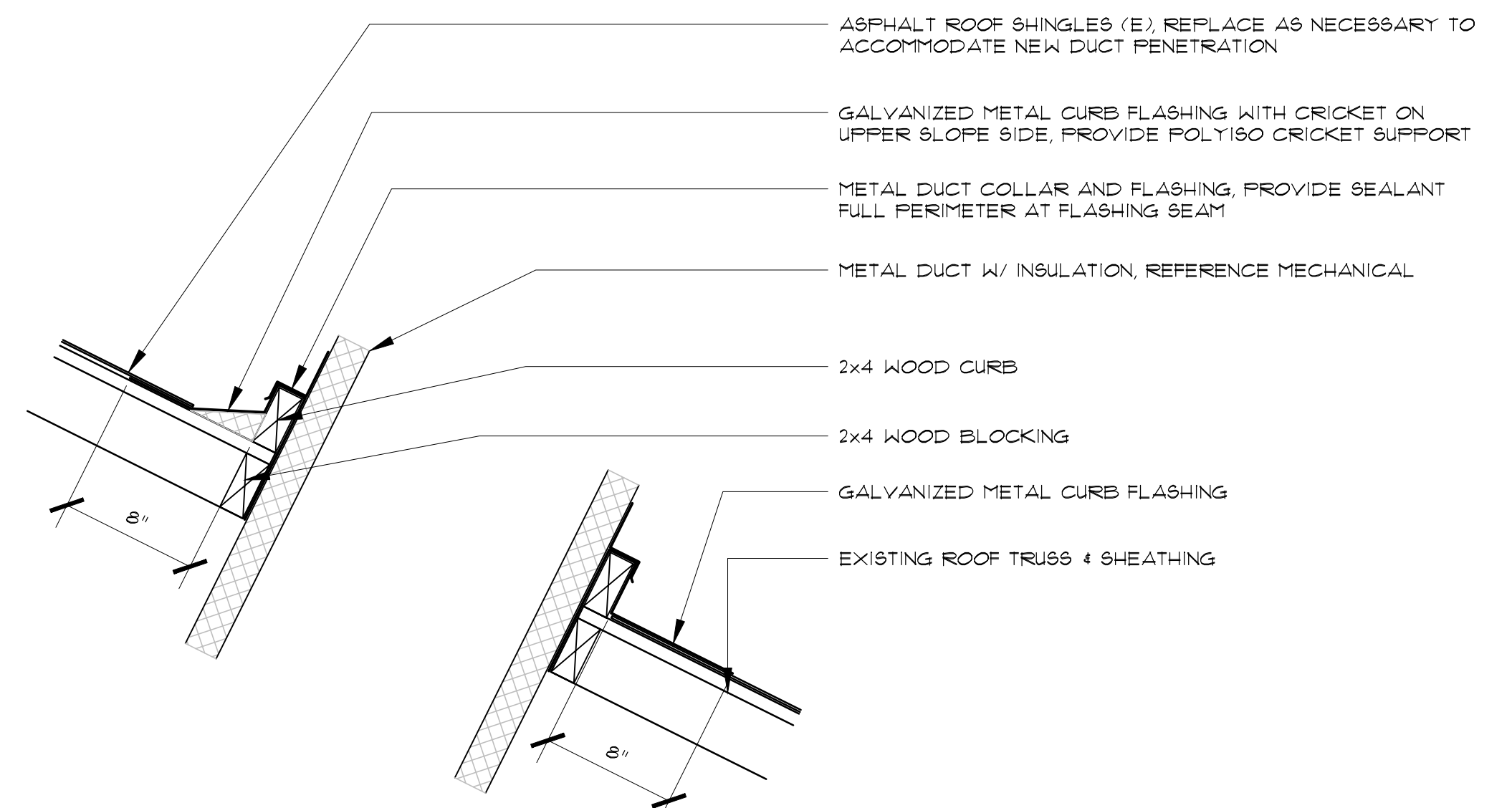
5 CEILING PATCH  
SCALE: 1 1/2" = 1'-0"



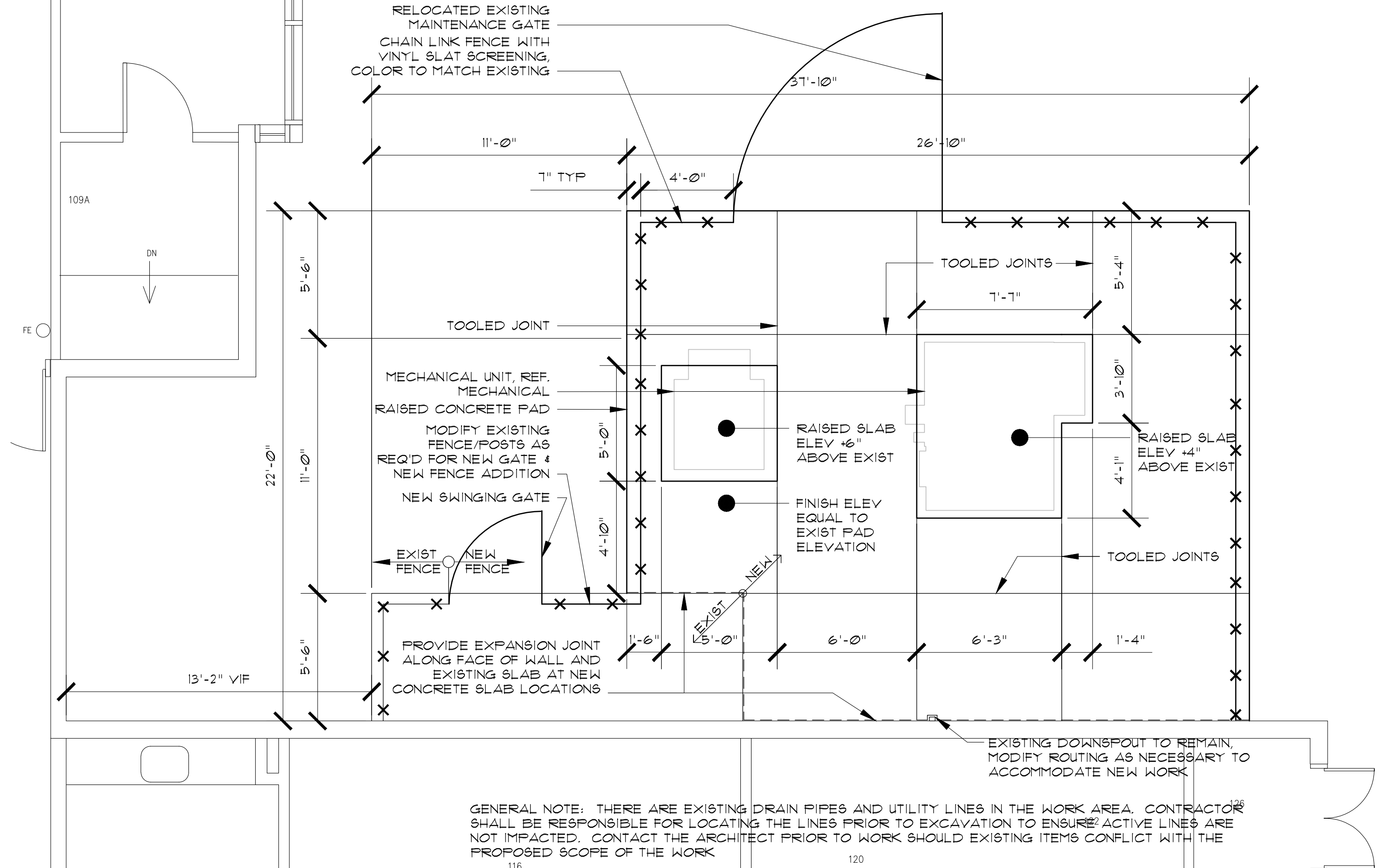
4 DUCT SUPPORT  
SCALE: 1 1/2" = 1'-0"



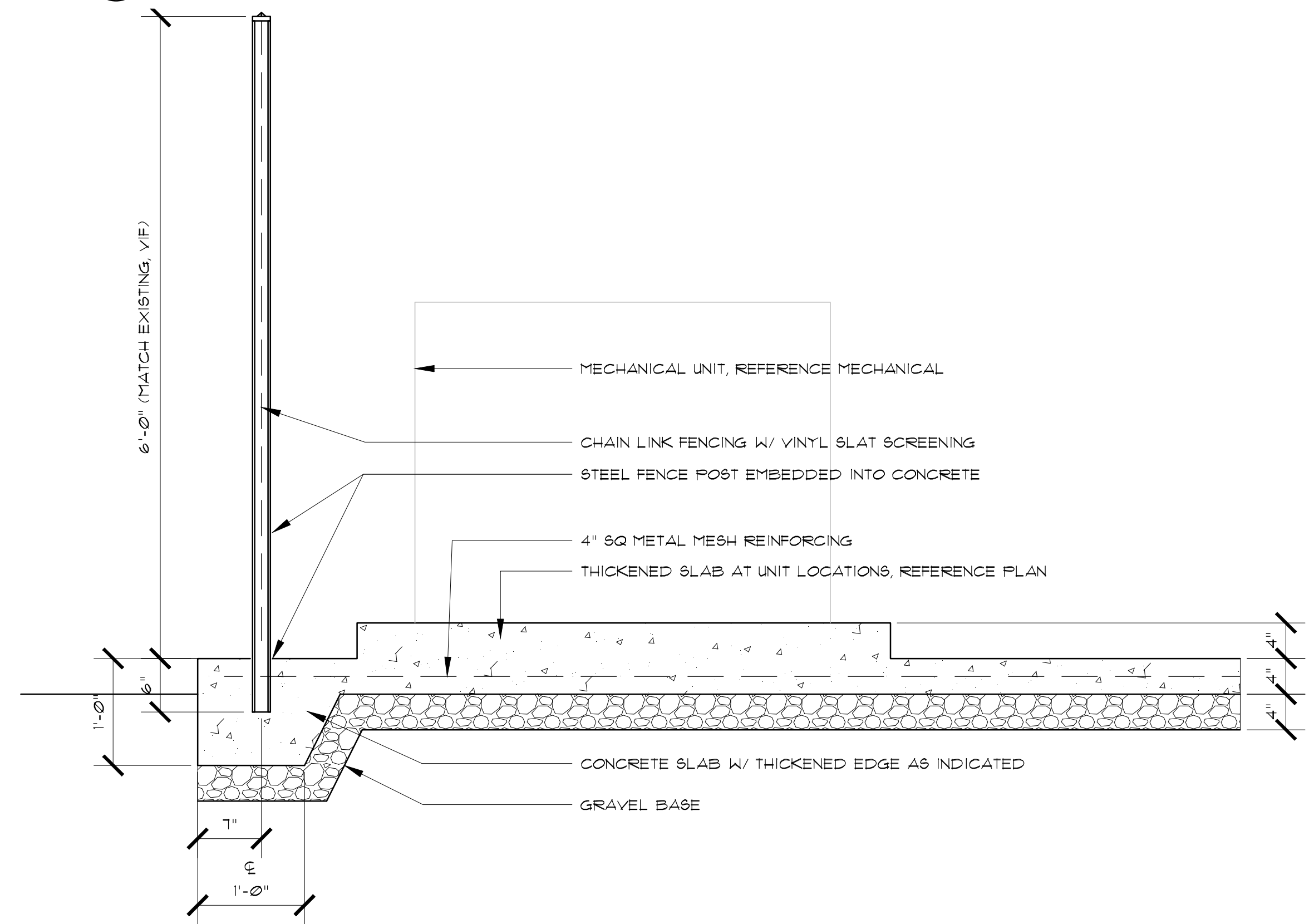
3 REFLECTED CEILING PLAN  
SCALE: 1/4" = 1'-0"



4 DUCT PENETRATION CURB  
SCALE: 1 1/2" = 1'-0"



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



2 MECHANICAL PAD SECTION  
SCALE: 1" = 1'-0"



**BALZHISER & HUBBARD ENGINEERS**

MECHANICAL & ELECTRICAL CIVIL SURVEYORS

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**MECHANICAL SYMBOLS LIST**

SYMBOL	ABBR.	DESCRIPTION	SYMBOL	ABBR.	DESCRIPTION	SYMBOL	ABBR.	DESCRIPTION	SYMBOL	ABBR.	DESCRIPTION
	CW	COLD WATER PIPE			PIPE TAKE OFF - DOWN			SUPPLY DUCT UP AND DOWN			DUCT TO BE REMOVED
	HW	HOT WATER PIPE			90 DEGREE ELBOW UP			EXHAUST DUCT UP AND DOWN			MANUAL DAMPER
	NCW	NON-POTABLE COLD WATER			90 DEGREE ELBOW DOWN			OUTSIDE AIR DUCT UP AND DOWN		MAU	MAKE-UP AIR UNIT
	NHW	NON-POTABLE HOT WATER			BRANCH TEE			RECTANGULAR DUCT - 1ST DIMENSION IS SIDE SHOWN		FEF	FUME HOOD EXHAUST FAN
		EXISTING SANITARY WASTE PIPE			TEE UP			ROUND DUCT		SDC	SUPPLY DIFFUSER CEILING
	V	VENT PIPE			TEE DOWN		SS	STAINLESS STEEL DUCT		EGC	EXHAUST GRILLE CEILING
	AW	ACID RESISTING WASTE PIPE			SLOPE PIPE DOWN IN DIRECTION OF ARROW			FLEXIBLE DUCT		AD	ACCESS DOOR
	AV	ACID RESISTING VENT PIPE			BREAK IN LINE - SHOWN FOR CLARITY			FLEXIBLE DUCT CONNECTOR		(E)	EXISTING
		PIPE TO BE REMOVED			PIPE CAP			DUCT WITH INTERNAL LINER		(R)	REMOVE
	CD	COOLING COIL CONDENSATE DRAIN			PIPE UNION			DUCT WITH RADIUS ELBOW			DETAIL & SHEET NUMBER
	F	FIRE SPRINKLER PIPE			BALL VALVE			DUCT WITH RECTANGULAR ELBOW AND TURNING VANES			SECTION & SHEET NUMBER
		SPRINKLER HEAD - UPRIGHT		PRV	PRESSURE REDUCING VALVE			TAKE-OFF WITH 45 DEGREE ENTRY			KEYED NOTE REFERENCE
	G	LOW PRESSURE GAS PIPE			GAS VALVE			DUCT TRANSITION			POINT OF CONNECTION BETWEEN NEW & EXISTING WORK
	MG	MEDIUM PRESSURE GAS PIPE		RPBP	REDUCED PRESSURE BACKFLOW PREVENTER			DUCT DROP/RISE			
	VTR	VENT THROUGH ROOF			AIR FLOW (CFM) - TYPE / NECK SIZE - PATTERN						
		VERTICAL PIPE DROP OR RISER			THERMOSTAT WITH ZONE/UNIT CONTROLLED						
		PIPE TAKE OFF - UP			DIRECTION OF AIR FLOW						

**MAKE-UP AIR UNITS**

TAG	MODEL NO.	LOCATION	SERVICE	SUPPLY FAN							HEATING (3)				COOLING (2)				HOT GAS REHEAT		ELECTRICAL					APPROX WEIGHT (LBS)	NOTES			
				CFM	ESP (IN. W.C.)	TSP (IN W.C.) (1)	RPM	BHP	HP (5)	SOUND DATA	HEATING TYPE	HEATING INPUT (MBH)	HEATING OUTPUT (MBH)	LAT (F) (4)	TEMP RISE (F)	COOLING TYPE	REFRIGERANT	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	LAT (DB/WB)	EER	TOTAL CAPACITY (MBH)	LAT (DB/WB)	VOLTS	HZ			PHASE	MCA (AMPS)	MROPD (AMPS)
MAU-1	DPS005A	SLAB ON GRADE	113N AND 113S	1,600	0.75	1.7	1,849	0.74	2	(6)	INDIRECT-NATURAL GAS	120	96	76.6	55.6	DX	R-410A	64.7	60.3	56.5 / 56.3	12.7	26.8	72.0 / 61.9	208	60	3	24	35	1361	

NOTES:  
BASIS OF DESIGN: DAIKIN APPLIED  
TEMPERATURES ARE IN DEGREES F.  
(1) TSP INCLUDES DUCTWORK, VOLUME DAMPERS, INLETS & OUTLETS, AND MANUFACTURERS INSTALLED OPTIONS.  
(2) COOLING CAPACITIES ARE BASED ON EAT OF 91/69 DEG F (DB/WB).  
(3) HEATING CAPACITIES ARE BASED ON EAT OF 21 DEG F (DB).  
(4) LAT NOT TO EXCEED 80 DEG F.  
(5) HIGH EFFICIENCY ELECTRONICALLY COMMUTATED (EC) MOTOR. ACTUAL MOTOR ENERGY USED IS LESS THAN STANDARD PSC MOTORS.  
(6) UNIT SOUND POWER PER OCTAVE BAND: 62.5 125 250 500 1000 2000 4000 8000

INLET SOUND POWER:	69	68	76	71	73	72	67	62
OUTLET SOUND POWER:	69	71	79	76	79	78	75	70
RADIATED SOUND POWER:	82	82	78	75	73	68	61	54

**HIGH-PLUME EXHAUST FAN**

TAG	MODEL NO.	LOCATION	SERVICE	PERFORMANCE				FAN (1)							MOTOR (4)				NOTES		
				BUILDING VOLUME (CFM)	FAN VOLUME (CFM)	BYPASS VOLUME (CFM)	EXTERNAL S.P. (IN W.C.) (2)	RPM	POWER (HP)	TIP SPEED (FT/MIN)	WHEEL DIA. (IN)	NOZZLE CV (FT/MIN)	PLUME HEIGHT (FT) (3)	WIND SPEED	DRIVE TYPE	SIZE (HP)	VOLTS	Hz		PHASE	RPM
FEF-2	QFE150C10	SLAB ON GRADE	113N AND 113S	2,600	3,350	750	1.00	2,382	2.65	11,381	18.25	6,204	28	10	BELT	3.0	208	60	3	1800	ARRANGEMENT 9, CLASS II

NOTES:  
BASIS OF DESIGN: TWIN CITY FAN & BLOWER  
(1) SOUND DATA PER OCTAVE BAND: 62.5 125 250 500 1000 2000 4000 8000 LwA Dba (5ft)  
INLET : 77 77 78 79 78 76 70 65 83 69  
OUTLET : 86 84 80 81 82 78 73 67 86 72  
(2) EXTERNAL STATIC PRESSURE OF DUCT SYSTEM UP TO FAN INLET. EXCLUDES INTERNAL FAN LOSSES OR EXIT VELOCITY PRESSURE.  
(3) EFFECTIVE PLUME HEIGHT SHOWN INCLUDES A 12" HIGH GENERIC ROOF CURB. SEE DETAIL 3 ON M5 FOR ADDITIONAL CURB HEIGHT, 6" CONCRETE BASE AND ANY STACK EXTENSION NEEDED TO ACHIEVE THE REQUIRED 30 FT OVERALL EFFECTIVE PLUME HEIGHT.  
(4) SEE FAN SPECIFICATION FOR MOTOR REQUIREMENTS TO ALLOW THE USE OF A FUTURE VARIABLE FREQUENCY DRIVE.

**VENTILATION AIR COMPLIANCE**

TAG	ROOM NUMBER / NAME	SPACE TYPE	USE AREA (SQ. FT.)	ZONE POPULATION	PEOPLE OA RATE - CFM / PERSON	AREA OA RATE - CFM / SF	UNCORRECTED OSA TOTAL - CFM	AIR DISTRIBUTION EFFECTIVENESS	REQUIRED OSA TO ROOM - CFM	OSA AIRFLOW PROVIDED TO ROOM - CFM	SUPPLY AIR PROVIDED TO ROOM - CFM	OSA / SUPPLY AIR %
MAU-1	113 NORTH	LABORATORY	552	5	10	0.18	150	1	150	900	900	100%
	113 SOUTH	LABORATORY	667	5	10	0.18	171	1	171	1500	1500	100%

NOTES:

**DRAINAGE FIXTURE UNIT LOADS (DFU)**

PLUMBING FIXTURE	DFU PER FIXTURE	FIXTURES REMOVED	FIXTURES ADDED	TOTAL DFU REMOVED	TOTAL DFU ADDED	NET CHANGE
CUP SINK	0.5	0	2	0.0	1.0	1.0
TOTALS		0.0	2.0	0.0	1.0	1.0

NOTES:  
FIXTURE UNITS VALUES (DFU) ARE BASED ON OPSC 2011, GENERAL USE, PUBLIC.  
NEGATIVE VALUES INDICATE A DECREASED LOAD.  
LEGEND: GPF=GALLONS PER FLUSH.

**MECHANICAL SHEET INDEX**

SHEET NO.	SHEET TITLE
M0	SYMBOLS LIST, SCHEDULES AND SHEET INDEX
M1	HVAC ATTIC AND FLOOR PLAN - DEMO
M2	HVAC ATTIC AND FLOOR PLAN - NEW
M3	ROOF AND SITE PLAN
M4	PLUMBING PLAN - DEMO AND NEW
M5	DETAILS AND SECTIONS
M6	DETAILS

PROJECT TITLE  
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1900 MILLRACE INNOVATION CENTER  
LAB 113N AND LAB 113S RENOVATION**

SHEET TITLE  
**SYMBOLS LIST, SCHEDULES AND SHEET INDEX**

DATE  
**12/4/13**

DESIGNER  
**DWK/CAS**

PROJECT  
**8900-001-13**

FILENAME  
**8900-001-13m0.dwg**

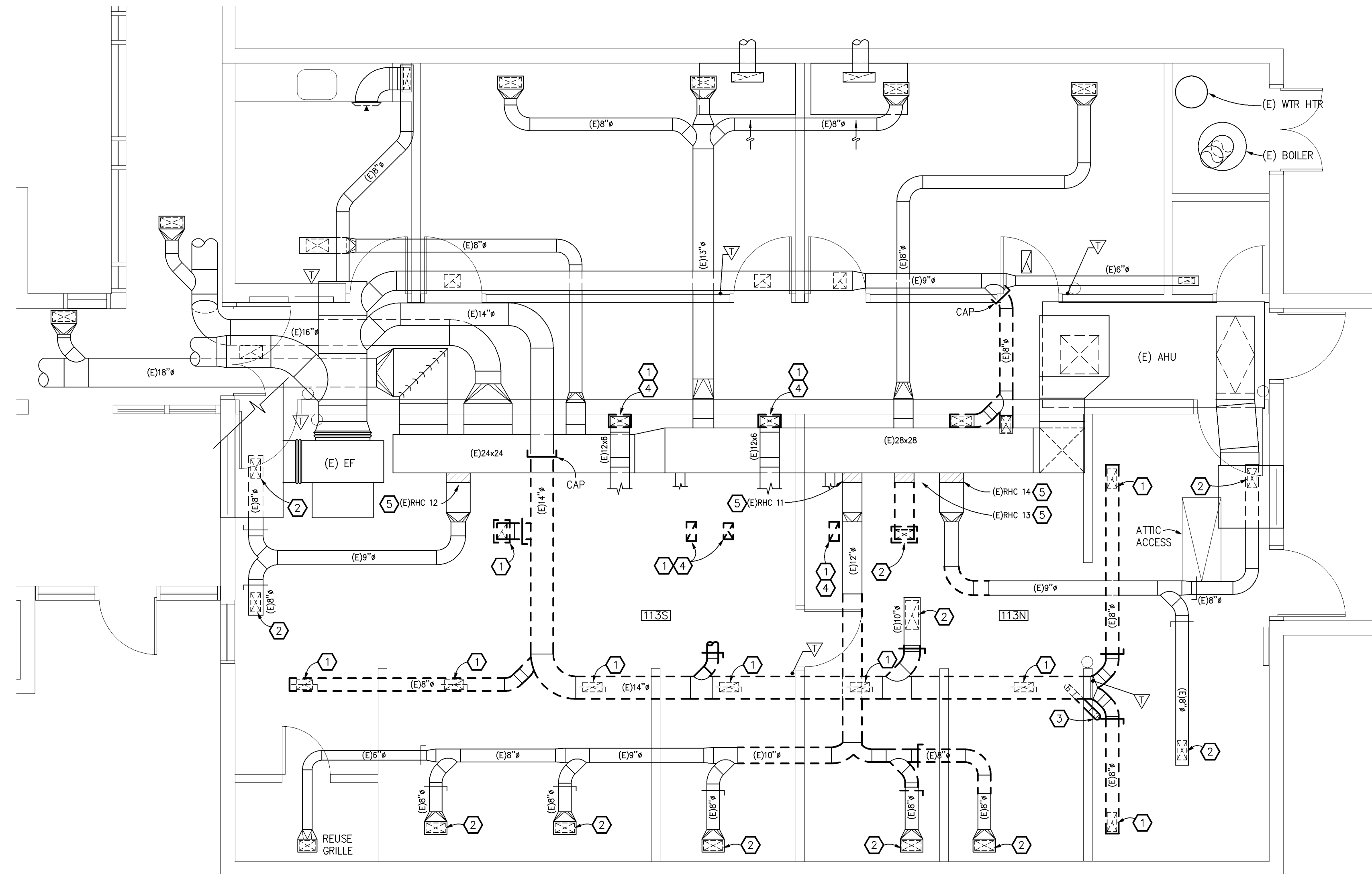
SHEET NO  
**M0**



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- GENERAL NOTES:**
1. THE LOCATION AND IDENTIFICATION OF DUCTS SHOWN ON THE DRAWINGS IS BASED ON EXISTING RECORD DRAWINGS. A FIELD SURVEY OF DUCTS HAS NOT BEEN CONFIRMED IN EVERY LOCATION. THE MECHANICAL CONTRACTOR WILL BE REQUIRED TO FIELD VERIFY THE EXACT LOCATION AND IDENTIFICATION OF EACH SERVICE PRIOR TO STARTING DEMOLITION OR NEW WORK.
  2. FIELD VERIFY GRILLES SIZES THAT ARE TO BE REPLACED.
  3. REMOVE DUCTWORK SUPPORTS ASSOCIATED WITH DUCTWORK SHOWN TO BE REMOVED.
  4. SEE ARCHITECTURAL DRAWINGS FOR PATCHING REQUIREMENTS FOR CEILINGS WHERE SUPPLY OR EXHAUST GRILLES ARE SHOWN REMOVED.
  5. SEE 4/M6 FOR DUST CONTROL MEASURE PLAN FOR REQUIREMENTS.

**1 HVAC ATTIC AND FLOOR PLAN - DEMO**

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

- KEYED NOTES:**
- 1 REMOVE GRILLE. PATCH CEILING TO MATCH EXISTING FINISH.
  - 2 REMOVE GRILLE. SEE M2 FOR NEW GRILLE.
  - 3 REMOVE SPOT EXHAUST DUCT. PATCH CEILING TO MATCH EXISTING FINISH.
  - 4 CAP BRANCH DUCT IN ATTIC.
  - 5 REMOVE REHEAT COIL WITHOUT DISTURBING HEATING WATER PIPING AND INSULATION. REMOVAL AND REPLACEMENT OF EXISTING CONNECTING DUCTWORK AND INSULATION MAY BE REQUIRED. TEMPORARILY SUPPORT PIPING. CLEAN COIL THOROUGHLY USING A CLEANING SOLUTION SUCH AS TRISODIUM PHOSPHATE (TSP). PRESENT CLEANED COILS TO OWNER'S REPRESENTATIVE FOR INSPECTION BEFORE REINSTALLATION.

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**HVAC ATTIC AND FLOOR PLAN - DEMO**

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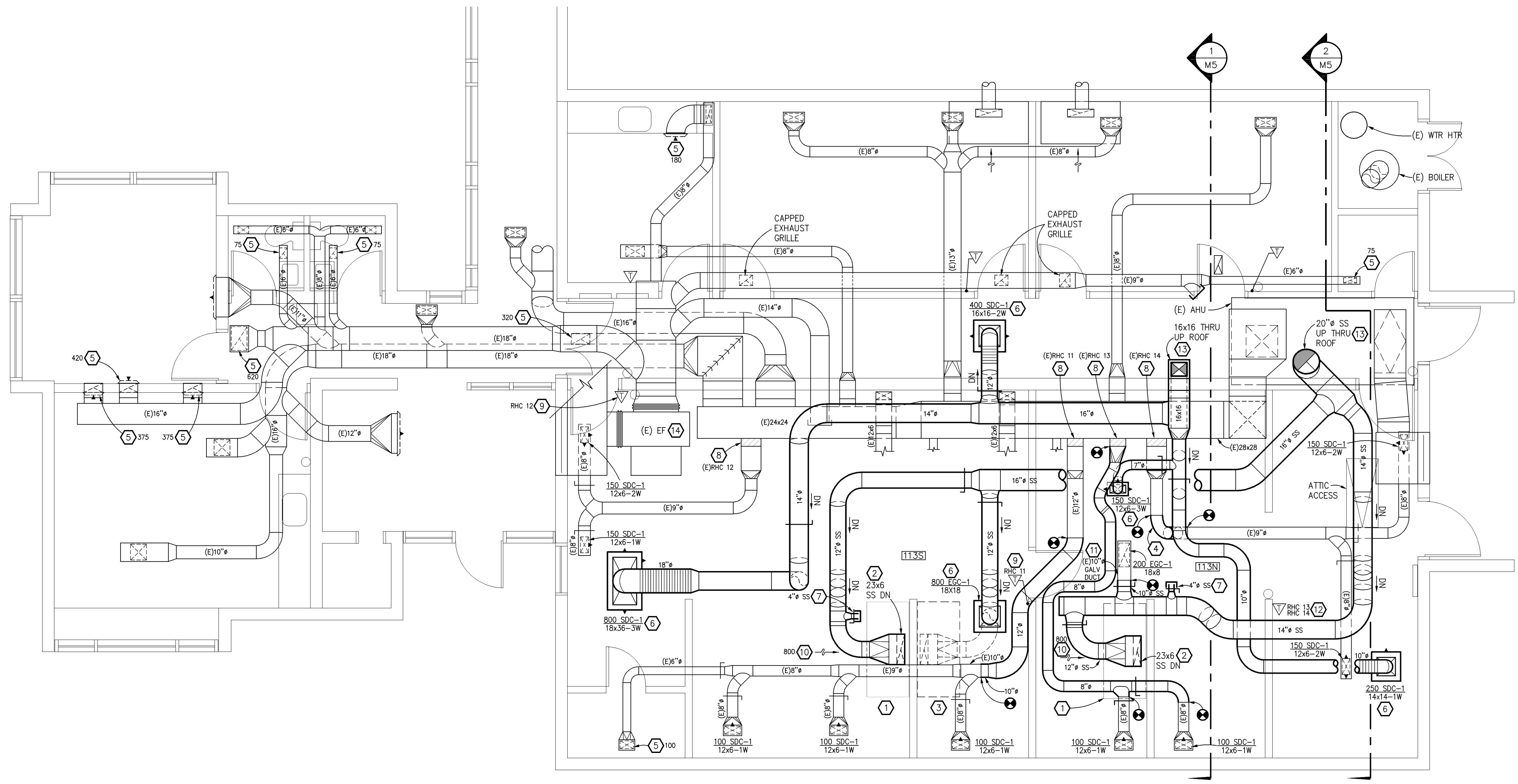
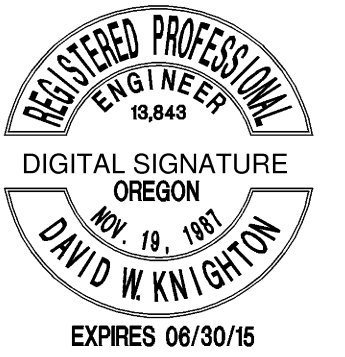
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SHEET NO  
**M1**



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**GENERAL NOTES:**

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2. SEE M6 FOR GENERAL DUCT CONSTRUCTION REQUIREMENT DETAILS.
3. DO NOT PENETRATE FUME HOOD STAINLESS STEEL DUCTS WITH FASTENERS. ATTACHMENTS AND ANCHORING OF THESE DUCTS SHALL BE TACK WELDED OR CLAMPED.
4. DUCTWORK SHOWN IS LOCATED IN THE ATTIC. ATTIC INSULATION IS UNDERSIDE OF THE ROOF. ATTIC IS NOT VENTILATED TO OUTDOORS. EXISTING EXHAUST FAN AND ABANDONED 7" DIA VENT THRU ROOF ARE AVAILABLE IN ATTIC. CONTRACTOR TO VERIFY SUITABILITY TO USE THESE ITEMS FOR VENTILATION IF REQUIRED.
5. SEE 4/M6 FOR DUST CONTROL MEASURE PLAN FOR REQUIREMENTS.
6. SEE SECTION 23 31 00 DUCTWORK FOR LEAKAGE TESTING OF NEW FUME EXHAUST DUCTWORK.

**1 HVAC ATTIC AND FLOOR PLAN - NEW**

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

**KEYED NOTES:**

- 1 NEW 6FT FUME HOOD FURNISHED AND INSTALLED BY OWNER.
- 2 CONNECT TO RECTANGULAR FUME HOOD COLLAR WITH STAINLESS STEEL SHEET METAL SCREWS. SEAL JOINT WITH SPECIFIED SOLVENT RESISTANT SEALER.
- 3 LOCATION OF FUTURE FUME HOOD.
- 4 NEW ELBOW TO OFFSET DN TO ALLOW NEW DUCT PATH.
- 5 BALANCE EXISTING OUTLET TO QUANTITY SHOWN.
- 6 PROVIDE ROUND TO RECTANGULAR TRANSITION AT DIFFUSER. CUT CEILING AND PROVIDE BLOCKING BETWEEN EXISTING FRAMING AROUND PENETRATION.
- 7 EXHAUST TAP FOR POSSIBLE FUTURE LOCAL EXHAUST IN THE LAB.
- 8 SEE DEMOLITION DRAWING M1 FOR CLEANING OF REHEAT COILS.
- 9 EXISTING PNEUMATIC THERMOSTAT. FIELD VERIFY PNEUMATIC TUBING IS CONNECTED TO THE CORRECT REHEAT COIL. CONTROL VALVE FOR EACH LAB SERVED. REROUTE AND CORRECT TUBING AS NEEDED. AIR BALANCER TO VERIFY THERMOSTAT IS OPERATING CORRECTLY.
- 10 BALANCE FUME HOOD TO AIR QUANTITY SHOWN WITH SASH HEIGHT SET AT 18 INCH OPERATING HEIGHT AND 100 FPM FACE VELOCITY.
- 11 PROVIDE GASKETED FLANGE AT STAINLESS STEEL TO GALVANIZED GENERAL EXHAUST DUCT CONNECTION.
- 12 REVISE THERMOSTAT CONTROL TUBING TO INCLUDE CONTROL OF BOTH RHC-13 AND RHC-14.
- 13 SEE SECTIONS FOR ELBOW RADIUS.
- 14 BALANCE EXHAUST FAN FOR TOTAL NEW AIRFLOW.

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SHEET TITLE  
**HVAC ATTIC AND FLOOR PLAN - NEW**

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8900-001-13

FILENAME  
8900-001-13m2.dwg

SHEET NO  
**M2**



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PROJECT TITLE  
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SHEET TITLE  
**ROOF AND SITE PLAN**

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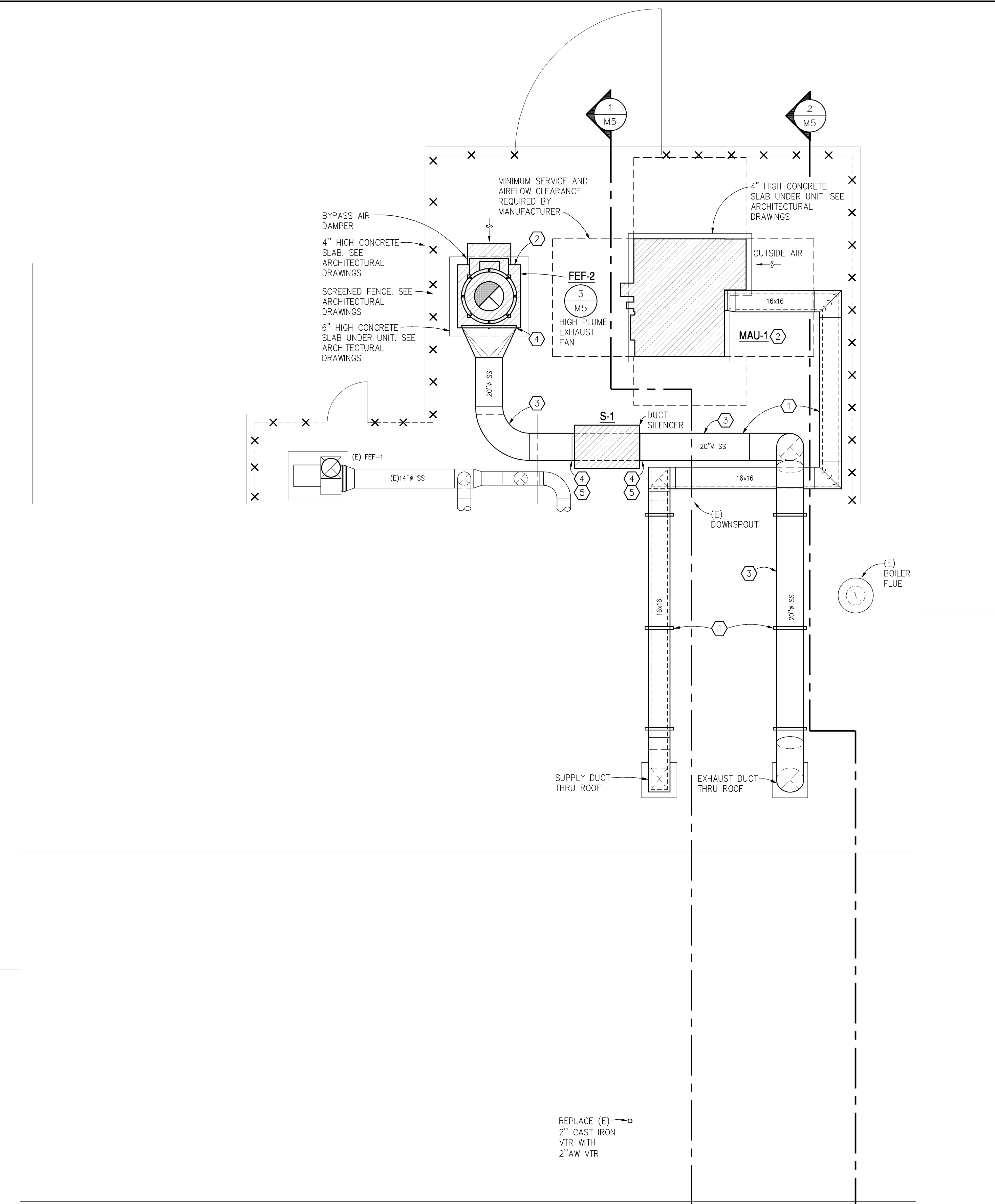
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PROJECT  
8900-001-13

FILENAME  
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SHEET NO

**M3**



- GENERAL NOTES:**
- SEE M6 FOR GENERAL DUCT CONSTRUCTION REQUIREMENT DETAILS.
  - DO NOT PENETRATE FUME HOOD STAINLESS STEEL DUCTS WITH FASTENERS. ATTACHMENTS AND ANCHORING OF THESE DUCTS SHALL BE TACK WELDED OR CLAMPED.
  - SEE ARCHITECTURAL DRAWINGS FOR DUCT SUPPORT ATTACHMENT TO EXISTING ROOF.
  - SEE SECTION 23 31 00 DUCTWORK FOR LEAKAGE TESTING OF NEW FUME EXHAUST DUCTWORK.

**1 ROOF AND SITE PLAN**  
SCALE: 1/4"=1'-0"

- KEYED NOTES:**
- DUCTWORK ON ROOF AND ON CONCRETE PAD TO BE SUPPORTED ON GALVANIZED STEEL CHANNEL. SUPPLY DUCTWORK TO BE PROVIDED WITH SPECIFIED CLEATS OVER FLANGED JOINTS AND STAINLESS STEEL DUCT JOINTS TO BE FULLY WELDED TO PREVENT WATER LEAKAGE INTO DUCTS.
  - ANCHOR EQUIPMENT TO CONCRETE BASE AS REQUIRED BY SECTION 20 42 00 SEISMIC RESTRAINTS. MAINTAIN MANUFACTURER'S MINIMUM SERVICE CLEARANCE REQUIREMENTS AROUND EQUIPMENT.
  - STAINLESS STEEL DUCTWORK OUTDOORS TO BE FULLY WELDED STAINLESS
  - PROVIDE A FLANGE WITH SPECIFIED TEFLON GASKET WHERE STAINLESS STEEL DUCT CONNECTS TO EQUIPMENT.
  - SEAL SILENCER PITTSBURG SEAMS AIR AND WATERTIGHT. PROVIDE CLEATS OVER THE FLANGE CONNECTIONS TO PREVENT WATER PENETRATION.



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SHEET TITLE  
**PLUMBING PLAN - DEMO AND NEW**

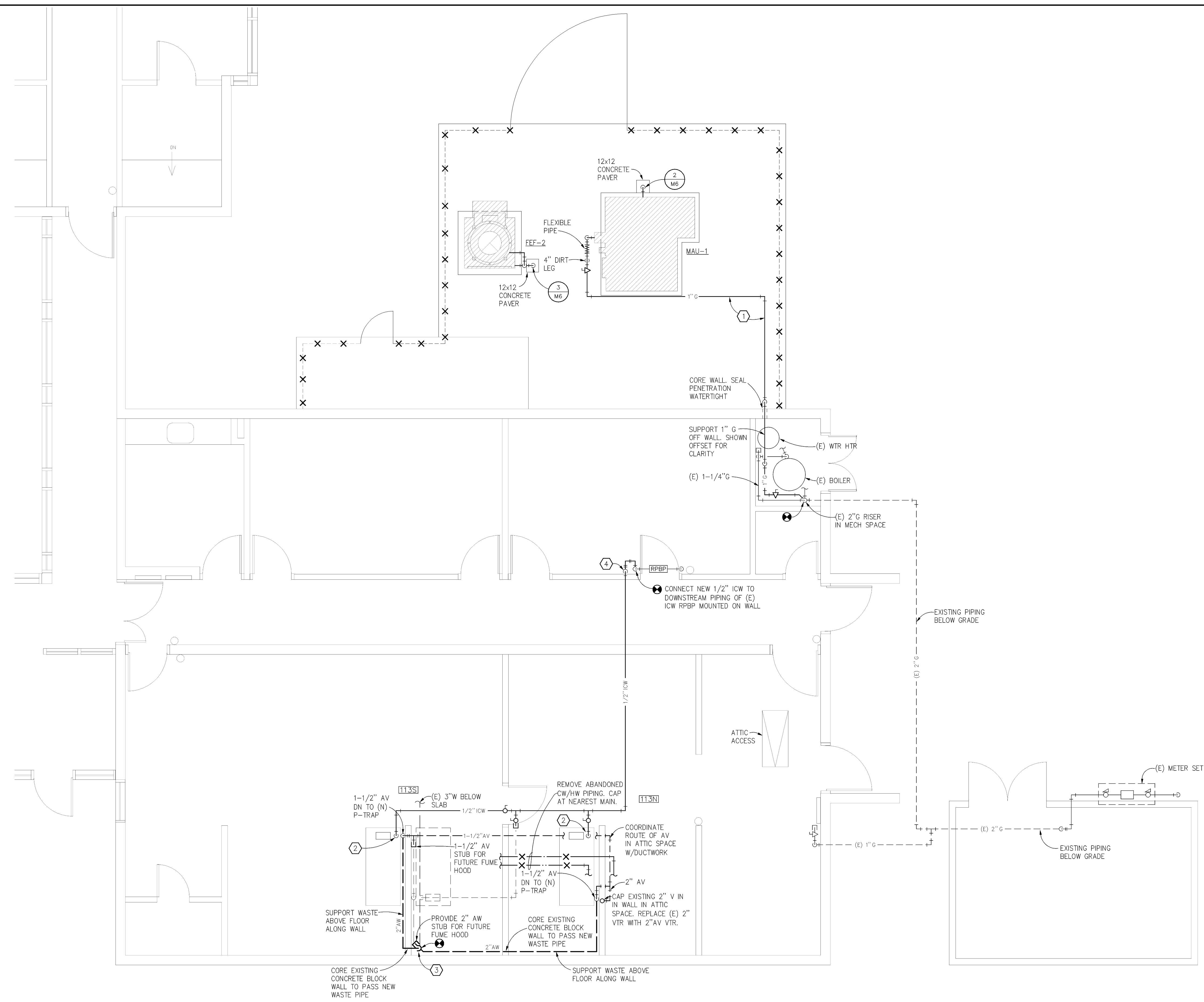
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PROJECT  
**8900-001-13**

FILENAME  
**8900-001-13m4.dwg**

SHEET NO  
**M4**



**GENERAL NOTES:**

1. THE LOCATION AND IDENTIFICATION OF PIPING SHOWN ON THE DRAWINGS IS BASED ON EXISTING RECORD DRAWINGS. A FIELD SURVEY OF PIPING HAS NOT BEEN CONFIRMED IN EVERY LOCATION. THE MECHANICAL CONTRACTOR WILL BE REQUIRED TO FIELD VERIFY THE EXACT LOCATION AND IDENTIFICATION OF EACH SERVICE PRIOR TO STARTING DEMOLITION OR NEW WORK.
2. SEE 4/M6 FOR DUST CONTROL MEASURE PLAN FOR REQUIREMENTS.

**1 PLUMBING PLAN - DEMO AND NEW**

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

**KEYED NOTES:**

- 1 SUPPORT GAS PIPING ON GALVANIZED STEEL CHANNEL.
- 2 CONNECT TO EXISTING ICW AT TOP OF FUME HOOD. ICW SERVES ONE (1) CUP SINK IN FUME HOOD.
- 3 EXISTING 3" WASTE SERVING ORIGINAL FLOOR DRAIN NOW REMOVED IS CAPPED BELOW FLOOR SLAB. REMOVE SLAB AREA SUFFICIENT TO EXCAVATE DOWN TO APPROXIMATELY 2 FT BELOW FLOOR. REMOVE P-TRAP. CONNECT NEW ACID WASTE TO EXISTING WASTE WITH ADAPTOR PROVIDED BY AW MANUFACTURER.
- 4 ROUTE NEW ICW UP THROUGH CEILING. FINISH PENETRATION WITH ESCUTCHEON.



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**DETAILS AND SECTIONS**

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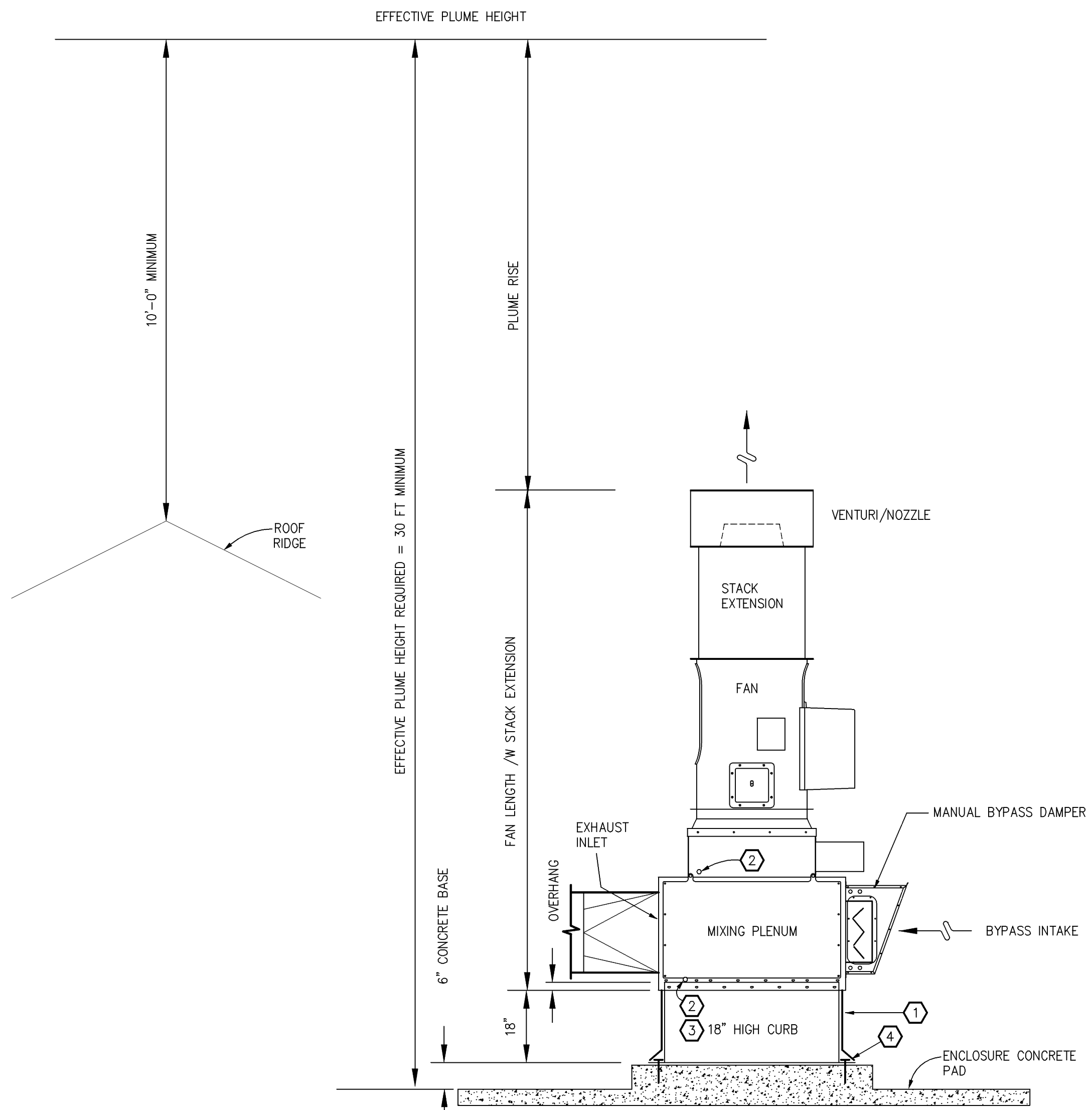
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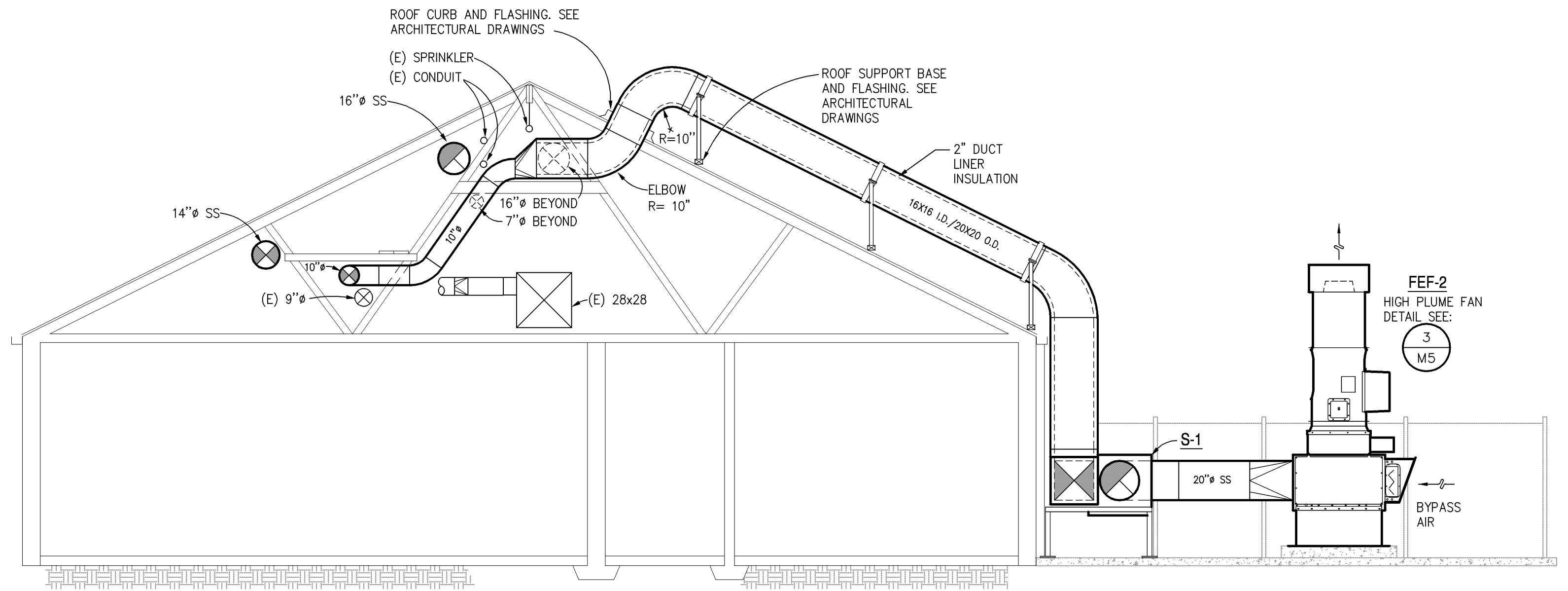
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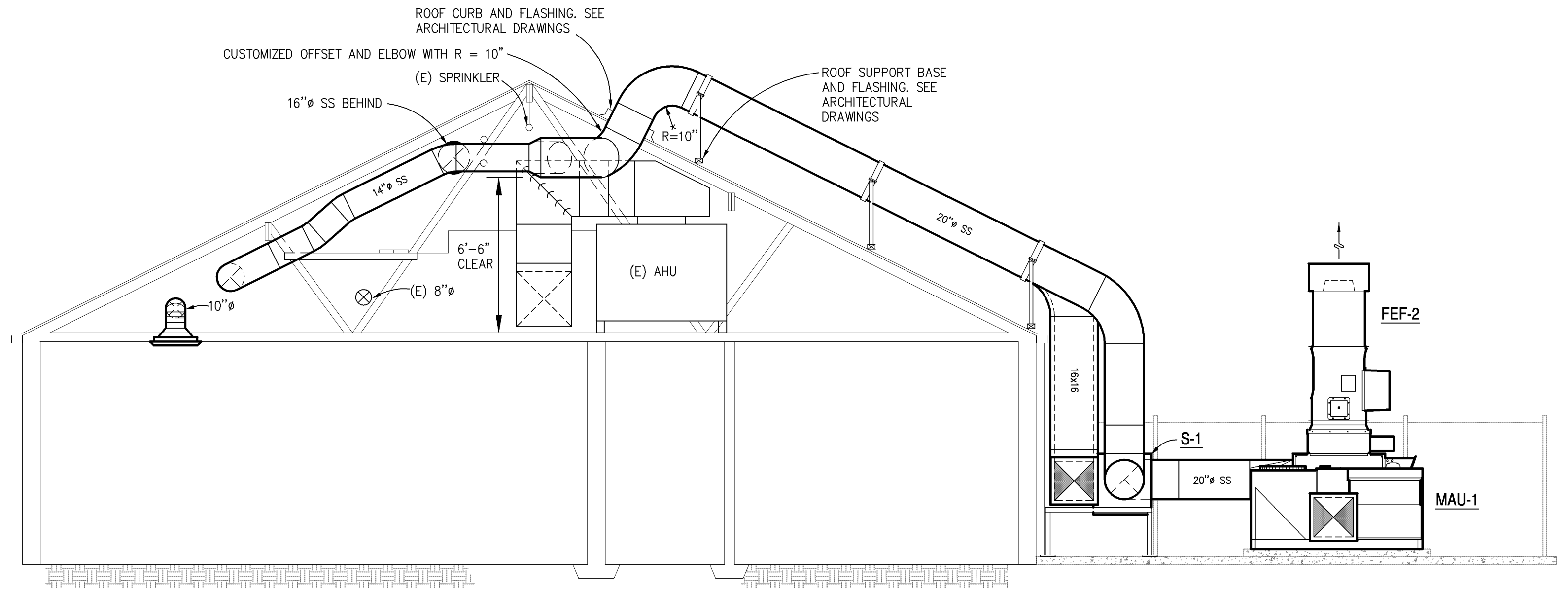


- KEYED NOTES:**
- 1 FINISH CURB WITH GALVANIZED SHEET METAL FLASHING.
  - 2 SEE DETAIL 3/M6 FOR DRAIN CONNECTION.
  - 3 ADJUST HEIGHT OF FAN CURB AND PROVIDE A STACK EXTENSION TO ENSURE 30 FT MINIMUM OVERALL EFFECTIVE PLUME HEIGHT.
  - 4 ANCHOR FAN TO CONCRETE BASE AS DIRECTED BY SECTION 20 42 00 SEISMIC RESTRAINTS

**3 HIGH PLUME EXHAUST FAN**  
 NO SCALE



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



**2 SECTION**  
 SCALE: 1/4"=1'-0"





**BALZHISER & HUBBARD ENGINEERS**  
MECHANICAL  
ELECTRICAL  
CIVIL  
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PROJECT TITLE  
**UNIVERSITY OF OREGON  
1900 MILLRACE INNOVATION CENTER  
LAB 113N AND LAB 113S RENOVATION**

SHEET TITLE  
**DETAILS**

DATE  
12/4/13

DESIGNER  
DWK / CAS

PROJECT  
8900-001-13

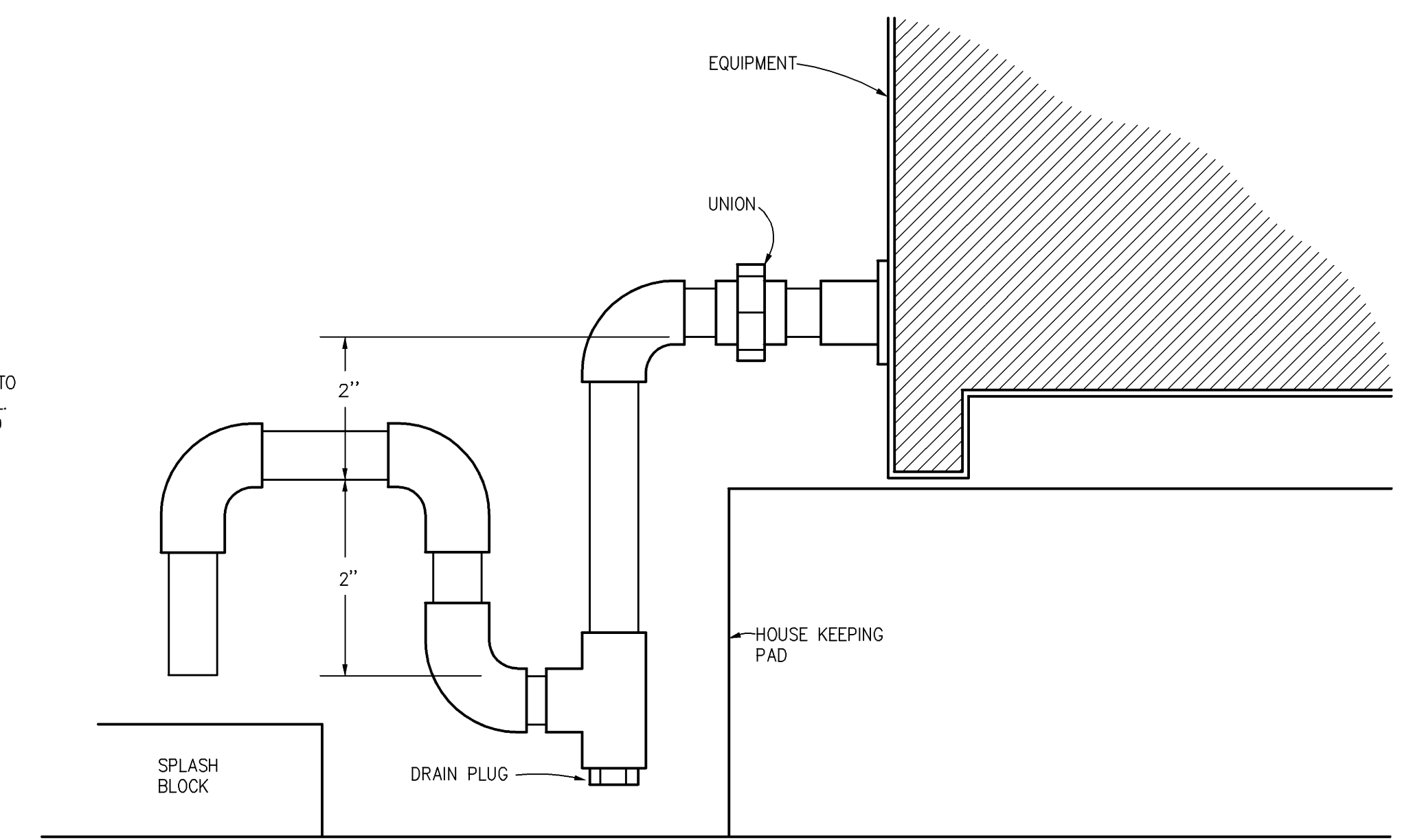
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SHEET NO

**M6**

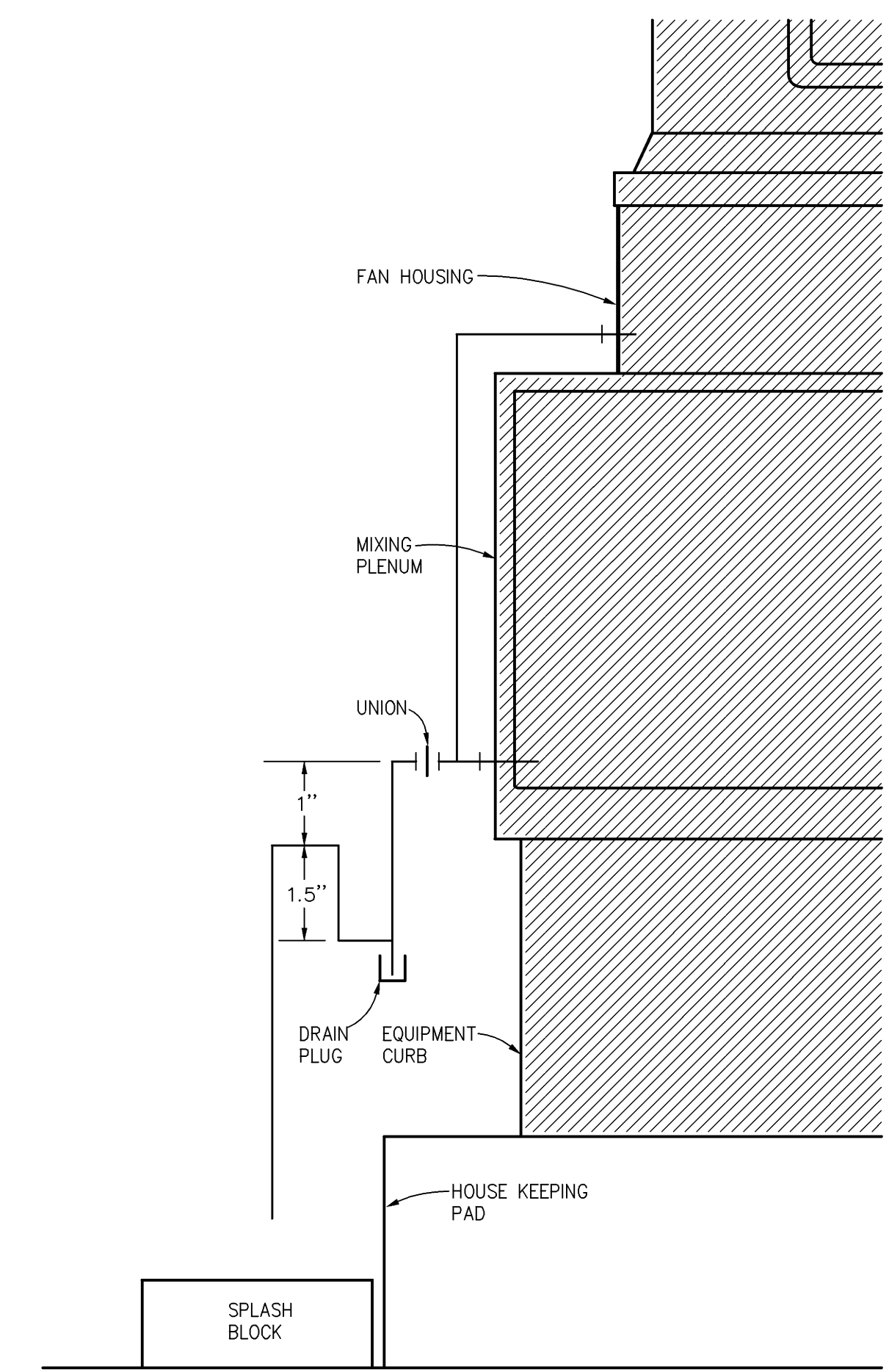
DESCRIPTION	PLAN VIEW - DOUBLE LINE	DESCRIPTION	PLAN VIEW - DOUBLE LINE
RECTANGULAR TO RECTANGULAR BRANCH WITH 45° ENTRY		OPTIONAL RECTANGULAR TO ROUND BRANCH	
RECTANGULAR TO ROUND BRANCH WITH 45° ENTRY		ROUND OR OVAL RADIUS ELBOW	
RECTANGULAR RADIUS ELBOW		ROUND TO ROUND OR OVAL TO OVAL TEE WITH 45° ENTRY - LOW LOSS (FULL BODY)	
RECTANGULAR RADIUS OFFSET		ROUND TO ROUND, OVAL TO OVAL OR OVAL TO ROUND BRANCH WITH 45° ENTRY - LOW LOSS (FULL BODY)	
RECTANGULAR OR OVAL MITERED ELBOW WITH TURN VANES		ROUND TO ROUND, OVAL TO OVAL OR OVAL TO ROUND CONICAL BRANCH (FULL BODY)	
RECTANGULAR OR OVAL TO ROUND TRANSITION		ROUND TO ROUND OR OVAL TO ROUND 45° LATERAL BRANCH (FULL BODY)	
RECTANGULAR CONCENTRIC TRANSITION		ROUND TO ROUND OR OVAL TO OVAL CONCENTRIC TRANSITION	
RECTANGULAR ECCENTRIC TRANSITION		ROUND TO ROUND OR OVAL TO OVAL ECCENTRIC TRANSITION	
SIDE WALL GRILLE OR REGISTER			

**1 DUCT CONSTRUCTION**  
NO SCALE



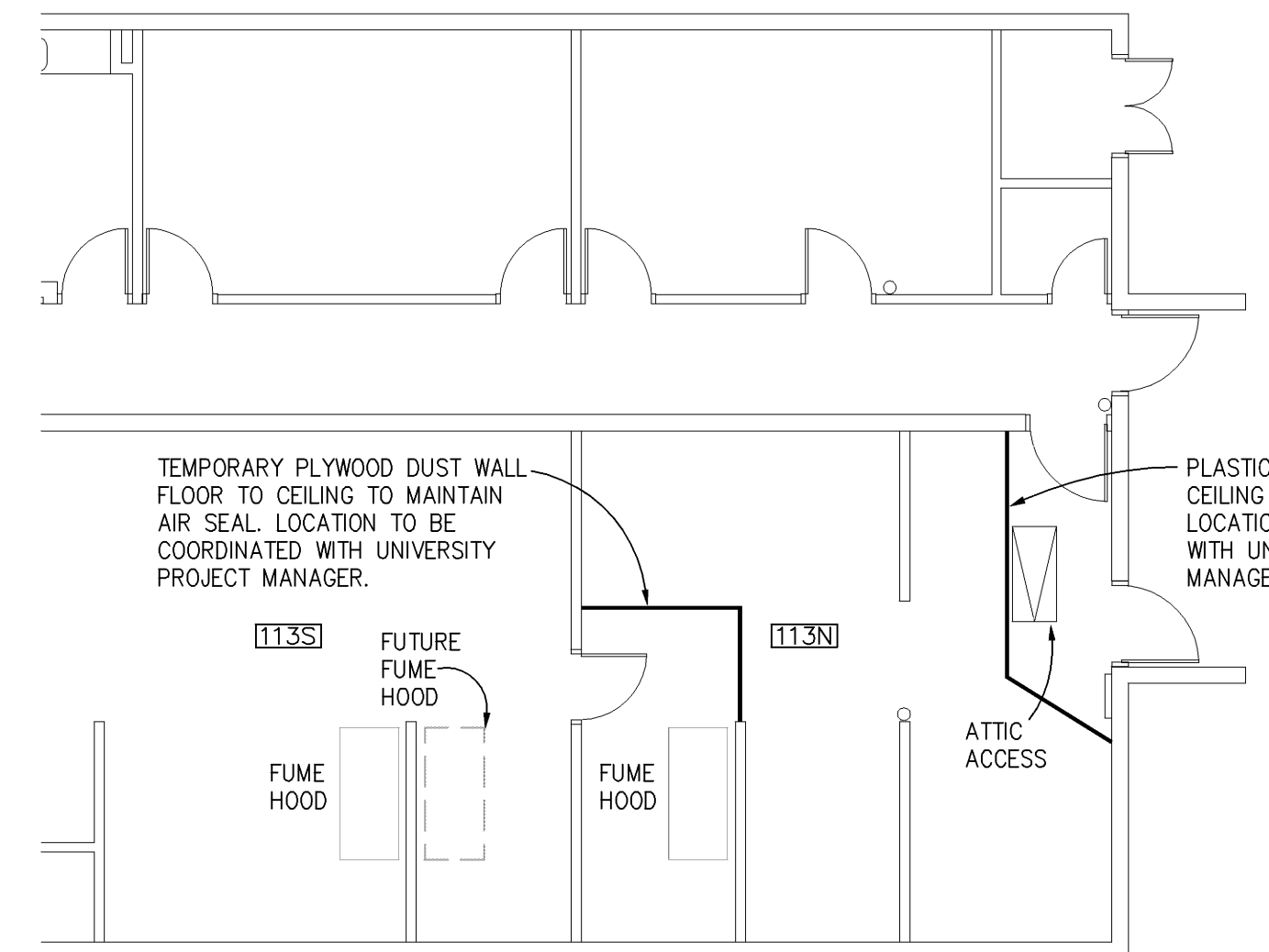
- NOTES:  
1. PIPING SIZE TO MATCH EQUIPMENT DRAIN CONNECTION.  
2. CONFIRM P-TRAP REQUIREMENTS WITH MANUFACTURER'S RECOMMENDATIONS.

**2 COOLING COIL CONDENSATE DRAIN**  
NO SCALE

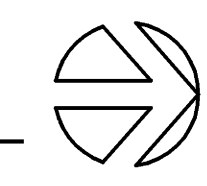


- NOTES:  
1. PIPING SIZE TO MATCH EQUIPMENT DRAIN CONNECTION.  
2. CONFIRM P-TRAP REQUIREMENTS WITH MANUFACTURER'S RECOMMENDATIONS.

**3 LEF MIXING BOX AND FAN HOUSING DRAIN**  
NO SCALE



**4 DUST CONTROL MEASURE PLAN**  
NO SCALE





**BALZHISER & HUBBARD**  
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PROJECT TITLE  
**UNIVERSITY OF OREGON  
1900 MILLRACE INNOVATION CENTER  
LAB 113N AND LAB 113S RENOVATION**  
SHEET TITLE  
**ELECTRICAL SYMBOLS, AND SCHEDULES**

DATE  
**12/4/13**

DESIGNER  
**MBR**

PROJECT  
**8900-001-13**

FILENAME  
**8900-001-13e0.dwg**

SHEET NO  
**E0**

**PANEL SCHEDULE**

PANEL: D (NEW)  
VOLTS: 120/208  
LOCATION: HALLWAY H104  
MOUNTING: SEM-RECESSED  
NOTES:

LOAD CLASS	Conn. VA	Demand Factor	Demand Load VA
LIGHTING	1175	125%	1469
OUTLETS	0	*	0
MOTOR LOADS	10629	**	12332
RESISTANCE LOADS	0	100%	0
SUBFEED	0	100%	0
MISC. LOADS	500	100%	500
SUBFEED BREAKER	0		0
TOTAL VOLT-AMPS		Connected	Demand
MAXIMUM PHASE AMPS		12.304	14.300
		39.3	46.5

BREAKER A	P	DESCRIPTION	WATTS	CIR. NO.	PHASE	CIR. NO.	WATTS	DESCRIPTION	BREAKER P	A
30	3	FEF-2	1273	1	A	2		SPARE	1	20
		OUTSIDE WEST SIDE	1273	3	B	4	500	FUME HOOD RM 113J	1	20
			1273	5	C	6	1175	LTG - RM 113	1	20
30	3	MAU-1	2270	7	A	8		SPARE	1	20
		OUTSIDE WEST SIDE	2270	9	B	10		SPARE	1	20
			2270	11	C	12		SPARE	1	20
20	1	SPARE		13	A	14		SPARE	1	20
20	1	SPARE		15	B	16		SPARE	1	20
20	1	SPARE		17	C	18		SPARE	1	20
20	1	SPARE		19	A	20		SPARE	1	20
20	1	SPARE		21	B	22		SPARE	1	20
20	1	SPARE		23	C	24		SPARE	1	20
20	1	SPARE		25	A	26		SPARE	1	20
20	1	SPARE		27	B	28		SPARE	1	20
20	1	SPARE		29	C	30		SPARE	1	20
20	1	SPARE		31	A	32		SPARE	1	20
20	1	SPARE		33	B	34		SPARE	1	20
20	1	SPARE		35	C	36		SPARE	1	20
20	1	SPARE		37	A	38		SPARE	1	20
20	1	SPARE		39	B	40		SPARE	1	20
20	1	SPARE		41	C	42		SPARE	1	20

PHASE TOTALS	Connected VA	A	B	C	Notes
	3543	4043	4718		* 10kVA at 100%, remainder at 50%
	Demand VA	4111	4611	5579	** 100% plus 25% of the largest Motor
	Connected Amps	29.5	33.7	39.3	
	Demand Amps	34.3	38.4	46.5	

**PANEL SCHEDULE**

PANEL: C (EXISTING)  
VOLTS: 120/208  
LOCATION: RM 113E  
MOUNTING: SURFACE  
NOTES: (E) INDICATES EXISTING CIRCUIT BREAKER. (N) INDICATES NEW CIRCUIT BREAKER. NEW BREAKERS TO MATCH EXISTING.

LOAD CLASS	Conn. VA	Demand Factor	Demand Load VA
LIGHTING	0	125%	0
OUTLETS	0	*	0
MOTOR LOADS	0	**	0
RESISTANCE LOADS	0	100%	0
SUBFEED	0	100%	0
MISC. LOADS	500	100%	500
SUBFEED BREAKER	0		0
TOTAL VOLT-AMPS		Connected	Demand
MAXIMUM PHASE AMPS		500	500
		4.2	4.2

BREAKER A	P	DESCRIPTION	WATTS	CIR. NO.	PHASE	CIR. NO.	WATTS	DESCRIPTION	BREAKER P	A
20	1	(E) DOM HOT WATER PUMP RM 126		1	A	2		(E) LIGHTS - ATTIC	1	20
20	1	(E) AIR COMPRESSOR RM 126		3	B	4		(E) FAN ROOM #113A	1	20
20	1	(E) OUTSIDE LTS. NE CORNER		5	C	6			1	20
20	2	(E) HEAT ROOM 113A		7	A	8		(E) EXHAUST FAN ATTIC	3	20
				9	B	10				
20	2	(E) HEAT ROOM 113B		11	C	12				
				13	A	14		(E) COMPRESSOR ROOM 113A & B (IN ATTIC)	3	20
20	1	(E) RECEPT 113A		15	B	16				
20	1	(E) RECEPT 113A		17	C	18				
20	3	(E) HEAT CIRCULATION PUMP		19	A	20		(E) SUPPLY FAN (ATTIC)	3	70
				21	B	22				
				23	C	24				
20	3	(E)		25	A	26		(E) FAN UNIT - OUTSIDE WEST SIDE	1	20
				27	B	28	600	(N) FUME HOOD RM 113G	1	20
				29	C	30		SPACE		
20	1	(E) BOILER CONTROL		31	A	32		(E) RECEPT 113N	1	20
20	1	(E) VENT FAN #122		33	B	34		(E) RECEPT 113N	1	20
20	1	(E) COMPRESSOR CTL #126		35	C	36		(E) RECEPT 113N	1	20

PHASE TOTALS	Connected VA	A	B	C	Notes
	0	500	0	0	* 10kVA at 100%, remainder at 50%
	Demand VA	0	500	0	** 100% plus 25% of the largest Motor
	Connected Amps	0.0	4.2	0.0	
	Demand Amps	0.0	4.2	0.0	

**ELECTRICAL SYMBOLS LIST**

SYMBOL	ABBR.	DESCRIPTION
		LINEAR FIXTURE, SURFACE MOUNT.
		EXIT SIGN, CEILING MOUNTED. SHADED AREAS INDICATE FACES.
		120 VOLT, DUPLEX RECEPTACLE, MOUNTED AT STANDARD HEIGHT.
		120 VOLT, DUPLEX RECEPTACLE, MOUNTED ABOVE STANDARD HEIGHT.
		EQUIPMENT CONNECTION.
		JUNCTION BOX.
		MOTOR CONNECTION.
		DISCONNECT SWITCH.
		POWER PACK.
		BRANCH PANEL. SURFACE MOUNTED.
		FIRE ALARM SMOKE DETECTOR.
		WIRING IN OR ON CEILING OR WALLS.
		CONDUCTORS IN CONDUIT. THREE SHOWN, #12 U.O.N.
		FLEXIBLE CONDUIT.
		HOME RUN TO PANEL.
		LOW VOLTAGE WIRING.
		FEEDER DESIGNATOR. SEE SCHEDULE FOR DETAILS.
		SWITCH. LOW VOLTAGE TYPE.
		OCCUPANCY SENSOR. CEILING MOUNT.
		NOTE REFERENCE.
(N)		INDICATES NEW DEVICE.
(E)		INDICATES EXISTING DEVICE TO REMAIN.
(R)		INDICATES EXISTING DEVICE TO BE REMOVED.
(RL)		INDICATES EXISTING DEVICE TO BE RELOCATED.
(NL)		INDICATES EXISTING DEVICE AT NEW LOCATION.
GFI		GROUND FAULT INTERRUPTER.
WP		WEATHERPROOF.
U.O.N.		UNLESS OTHERWISE NOTED.
A.F.G.		ABOVE FINISHED GRADE.

**MECHANICAL EQUIPMENT CONNECTION SCHEDULE**

TAG	DESCRIPTION	VOLTAGE	PHASE	HP	KW	AMP	FEEDER DESCRIPTION	CIRCUIT BREAKER	CIRCUIT NUMBER	STARTER	STARTER SIZE	DISCONNECT	VFD	NOTES
FEF-2	EXHAUST FAN	208	3	3		10.6	3 #12 CU, 1 #12 GND. IN 3/4" C.	30/3	D - 1,3,5	N/A	N/A	N/A	N/A	1
MAU-1	MAKEUP AIR UNIT	208	3		6.8	18.9	3 #10 CU, 1 #10 GND. IN 3/4" C.	30/3	D - 7,9,11	N/A	N/A	N/A	N/A	1,2,3

NOTES:  
1. DISCONNECT SWITCH SHALL BE PROVIDED WITH MECHANICAL UNIT.  
2. SINGLE-POINT CONNECTION UNIT.  
3. UNIT SUPPLIED WITH INTEGRAL MAINTENANCE RECEPTACLE.

**LUMINAIRE SCHEDULE**

TYPE	DESCRIPTION	MANUFACTURER	LAMP	BALLAST	VOLTAGE	MOUNTING	FINISH	REMARKS
A4	NOMINAL 48" x 12" SURFACE MOUNTED STEEL HOUSING WITH 2 LAMPS IN CROSS SECTION, ROUND HOLE METAL DIFFUSER AND ROUND HOLE UPLIGHT DISTRIBUTION	LITHONIA AVSM SERIES	F32T8/835/XP5	ELECTRONIC PROGRAM START 0.71 BF	MVOLT	SURFACE	TBD - ARCHITECT	
A8	NOMINAL 96" x 12" SURFACE MOUNTED STEEL HOUSING WITH 2 LAMPS IN CROSS SECTION, ROUND HOLE METAL DIFFUSER AND ROUND HOLE UPLIGHT DISTRIBUTION	LITHONIA TAVSM SERIES	F32T8/835/XP5	ELECTRONIC PROGRAM START 0.71 BF	MVOLT	SURFACE	TBD - ARCHITECT	

**ELECTRICAL LOAD SUMMARY**

EXISTING SERVICE DEMAND AT "MDA" (@120/208V)	46.0 KVA
NEW CONNECTED LOADS, THIS PROJECT:	
LIGHTING	1.5 KVA
RECEPTACLES	0.0 KVA
MOTORS	12.3 KVA
MISCELLANEOUS	1.0 KVA
TOTAL NEW CONNECTED LOAD	14.8 KVA
HIGH DEMAND @ CODE 125%	57.5 KVA
CODE HIGH DEMAND PLUS NEW CONNECTED LOAD	72.3 KVA
SYSTEM ANTICIPATED AMPERES @ SERVICE VOLTAGE 208/120 3 PH	201 AMPS

**ELECTRICAL SHEET INDEX**

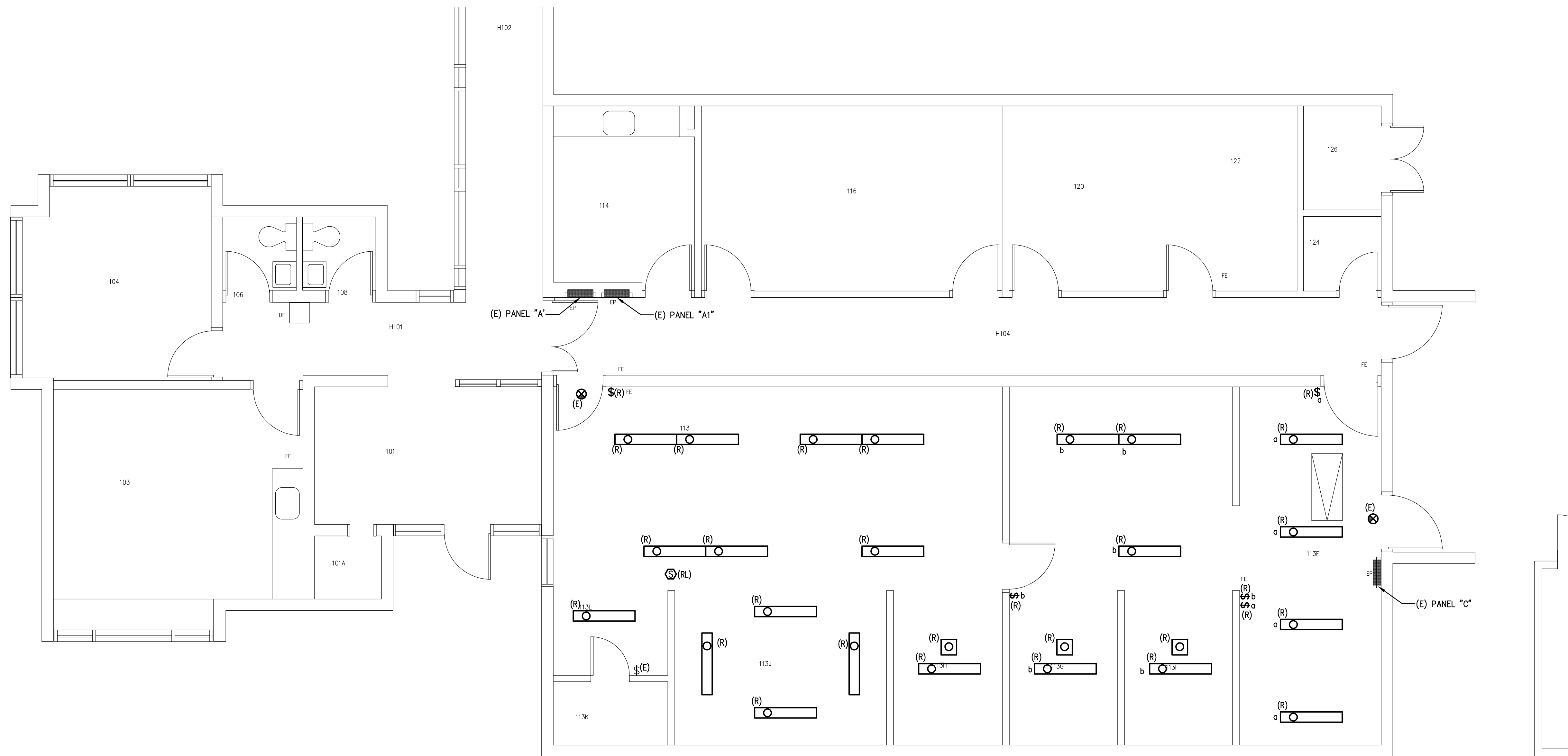
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E0	ELECTRICAL SYMBOLS, AND SCHEDULES
E1	FLOOR PLAN - ELECTRICAL DEMOLITION
E2	FLOOR PLAN - LIGHTING
E3	FLOOR PLAN - POWER/FIRE ALARM
E4	ELECTRICAL DETAILS AND DIAGRAMS



**BALZHISER  
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**1 FLOOR PLAN - ELECTRICAL DEMOLITION**

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

**GENERAL NOTES**

1. ALL DEVICES SHOWN ARE TO BE REMOVED UNLESS OTHERWISE NOTED.
2. EXTENT AND CONFIGURATION OF EXISTING EQUIPMENT BASED ON ORIGINAL DRAWINGS AND LIMITED FIELD VERIFICATION. CONTRACTOR SHALL VERIFY ACTUAL CONDITIONS IN FIELD.

PROJECT TITLE  
**UNIVERSITY OF OREGON  
1900 MILLRACE INNOVATION CENTER  
LAB 113N AND LAB 113S RENOVATION**

SHEET TITLE  
**FLOOR PLAN - ELECTRICAL DEMOLITION**

DATE  
**12/4/13**

DESIGNER  
**MBR**

PROJECT  
**8900-001-13**

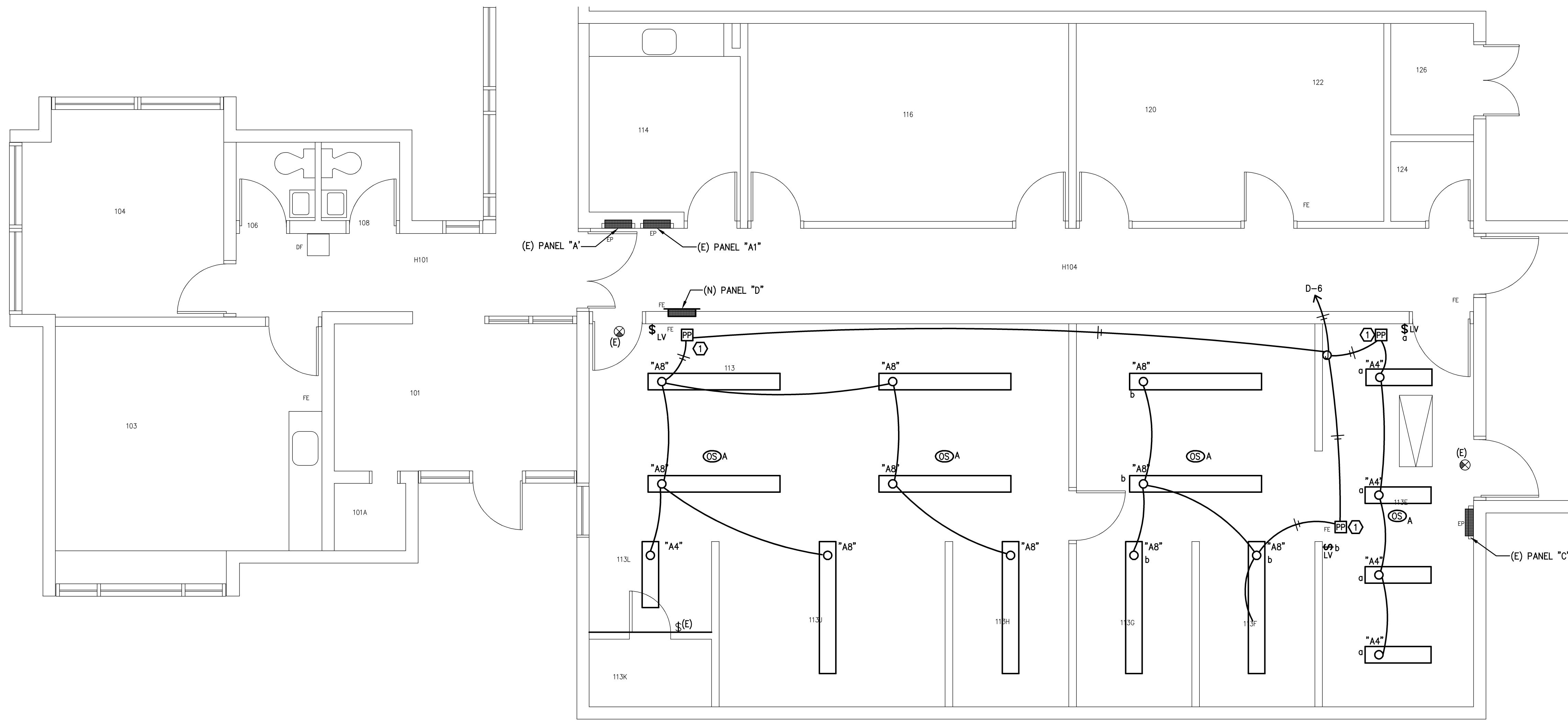
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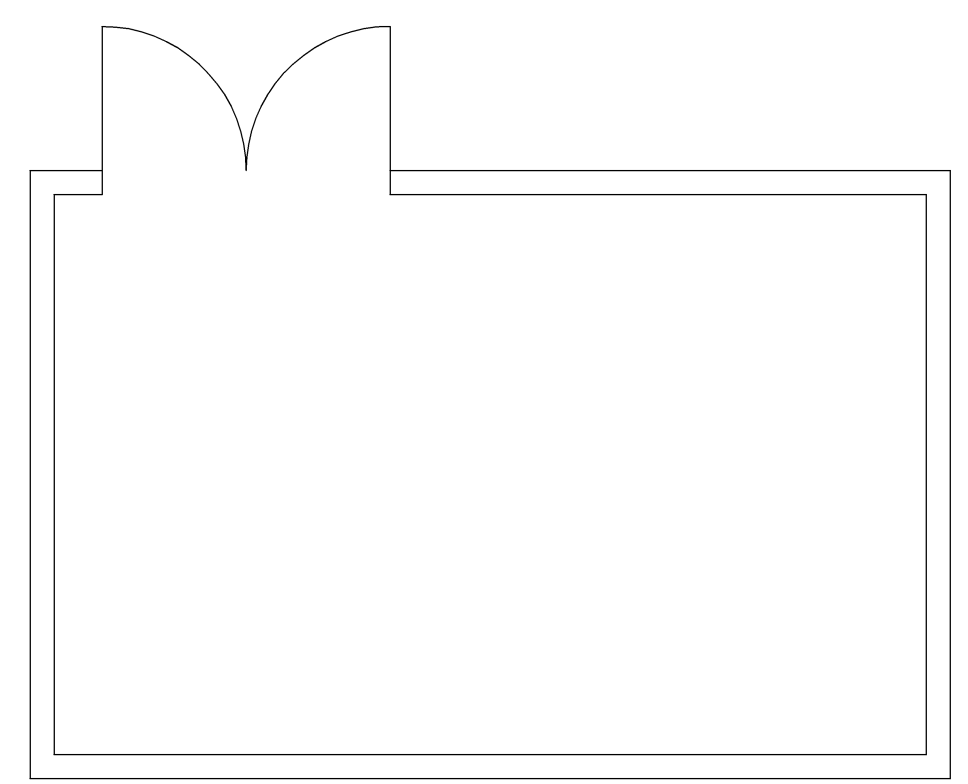


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LIGHTING PLAN NOTES:  
 ① POWER PACK LOCATED ABOVE CEILING IN ACCESSIBLE ATTIC SPACE. REFERENCE DETAIL 2/E4 FOR WIRING INFORMATION.



**1 FLOOR PLAN - LIGHTING** 

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

PROJECT TITLE  
**UNIVERSITY OF OREGON  
 1900 MILLRACE INNOVATION CENTER  
 LAB 113N AND LAB 113S RENOVATION**

SHEET TITLE  
**FLOOR PLANS - LIGHTING**

DATE  
**12/4/13**

DESIGNER  
**MBR**

PROJECT  
**8900-001-13**

FILENAME  
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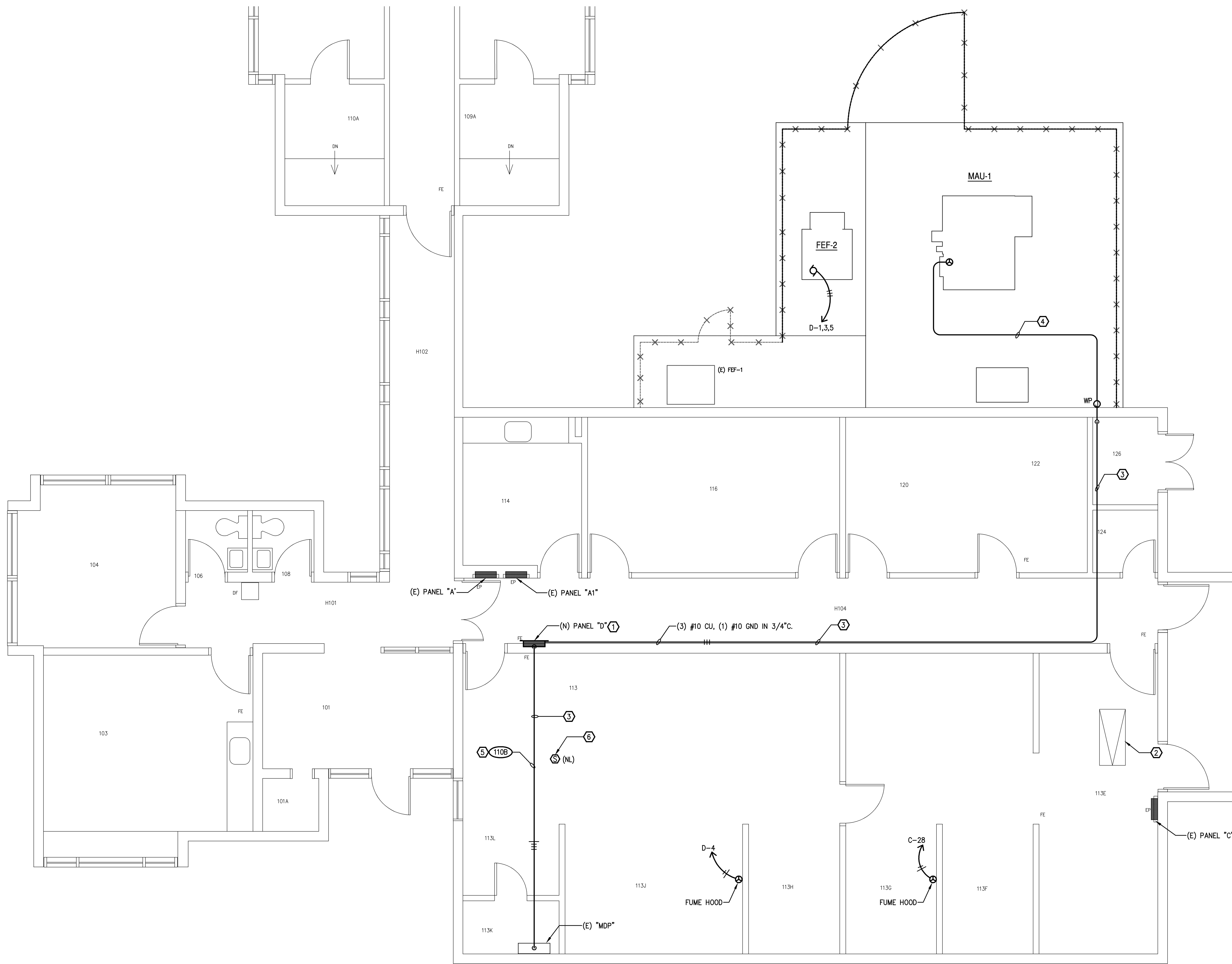
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**E2**



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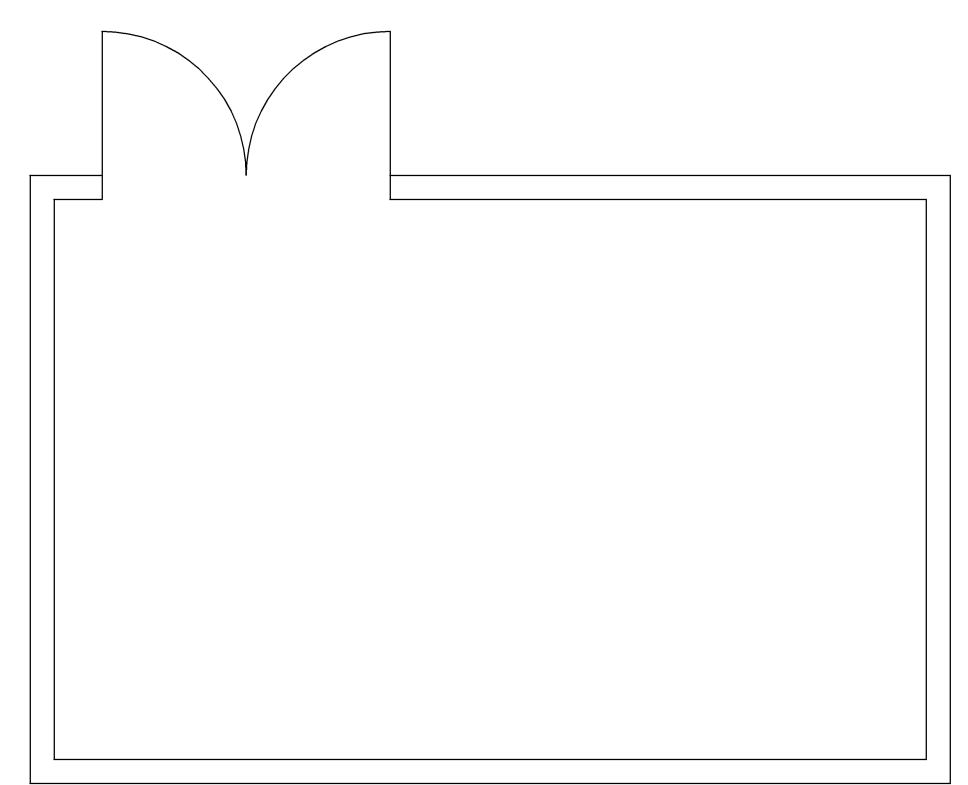
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ELECTRICAL  
CIVIL  
SURVEYORS

100 WEST 13TH AVENUE  
EUGENE, OR 97401  
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GENERAL NOTES:  
1. WHERE EXTERIOR CONDUITS ARE ROUTED EXPOSED, PROVIDE WIRING ROUTED IN RIGID CONDUIT.

- POWER PLAN NOTES:
- ① RECESS PANEL "D" IN CMU WALL. PANEL SHALL SIT NO MORE THAN 4 INCHES PROUD OF WALL. REFERENCE DETAIL 1/E4. PROVIDE (2) 3/4" SPARE CONDUITS STUBBED ABOVE CEILING INTO ATTIC SPACE.
  - ② ATTIC ACCESS.
  - ③ CONDUIT ROUTED ABOVE CEILING IN ATTIC SPACE.
  - ④ CONDUIT ROUTING SHALL PARALLEL NATURAL GAS ROUTING AND UTILIZE SAME UNISTRUT RACK FOR MOUNTING. COORDINATE EXACT LOCATION WITH MECHANICAL PRIOR TO ROUGH-IN.
  - ⑤ REFERENCE FEEDER SCHEDULE DETAIL 4/E4.
  - ⑥ RELOCATE SMOKE DETECTOR AS SHOWN. INTERCEPT AND EXTEND WIRING TO FACILITATE RELOCATION.



**1 FLOOR PLAN - POWER\FIRE ALARM**

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

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1900 MILLRACE INNOVATION CENTER  
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DATE  
**12/4/13**

DESIGNER  
**MBR**

PROJECT  
**8900-001-13**

FILENAME  
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SHEET NO  
**E3**

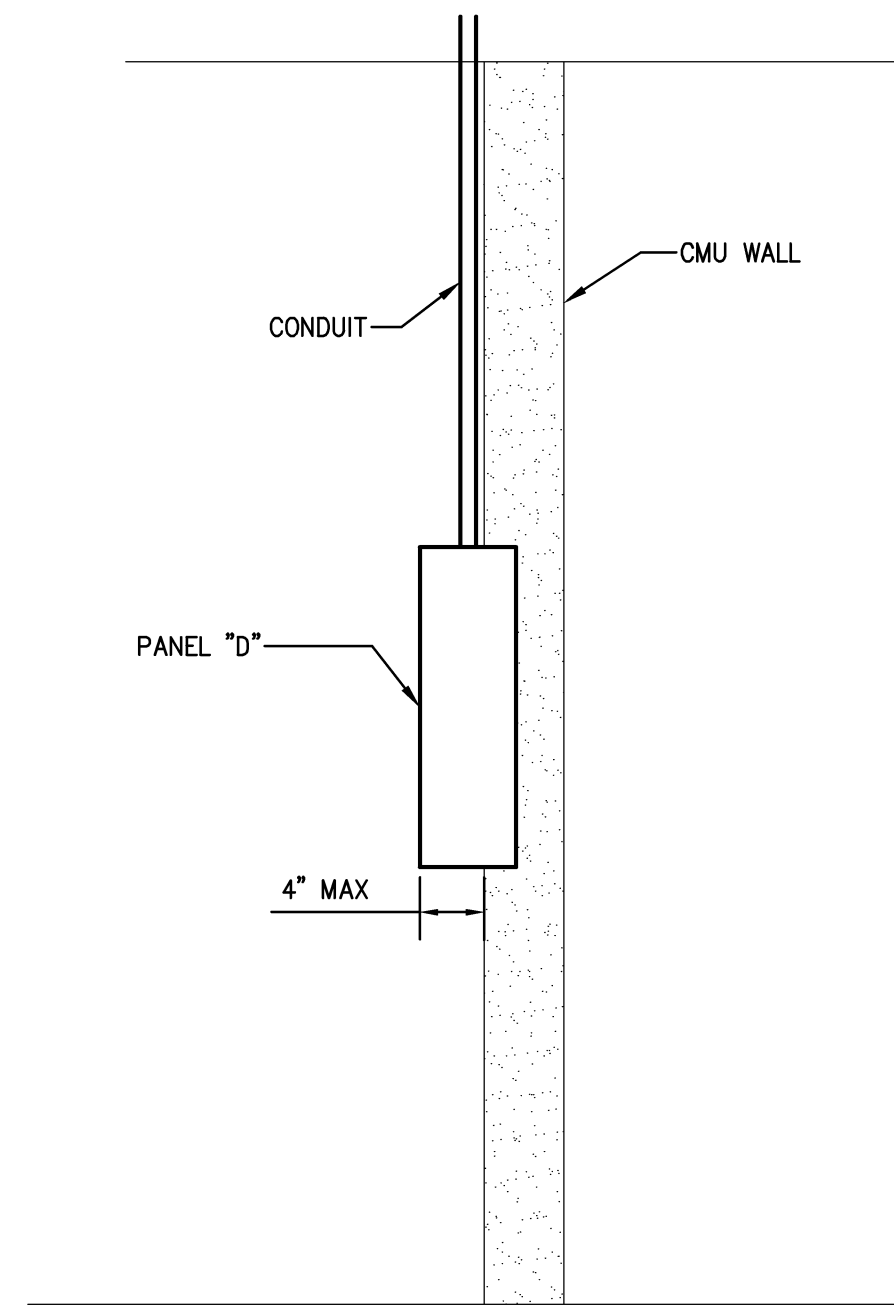
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**FLOOR PLAN - POWER\FIRE ALARM**



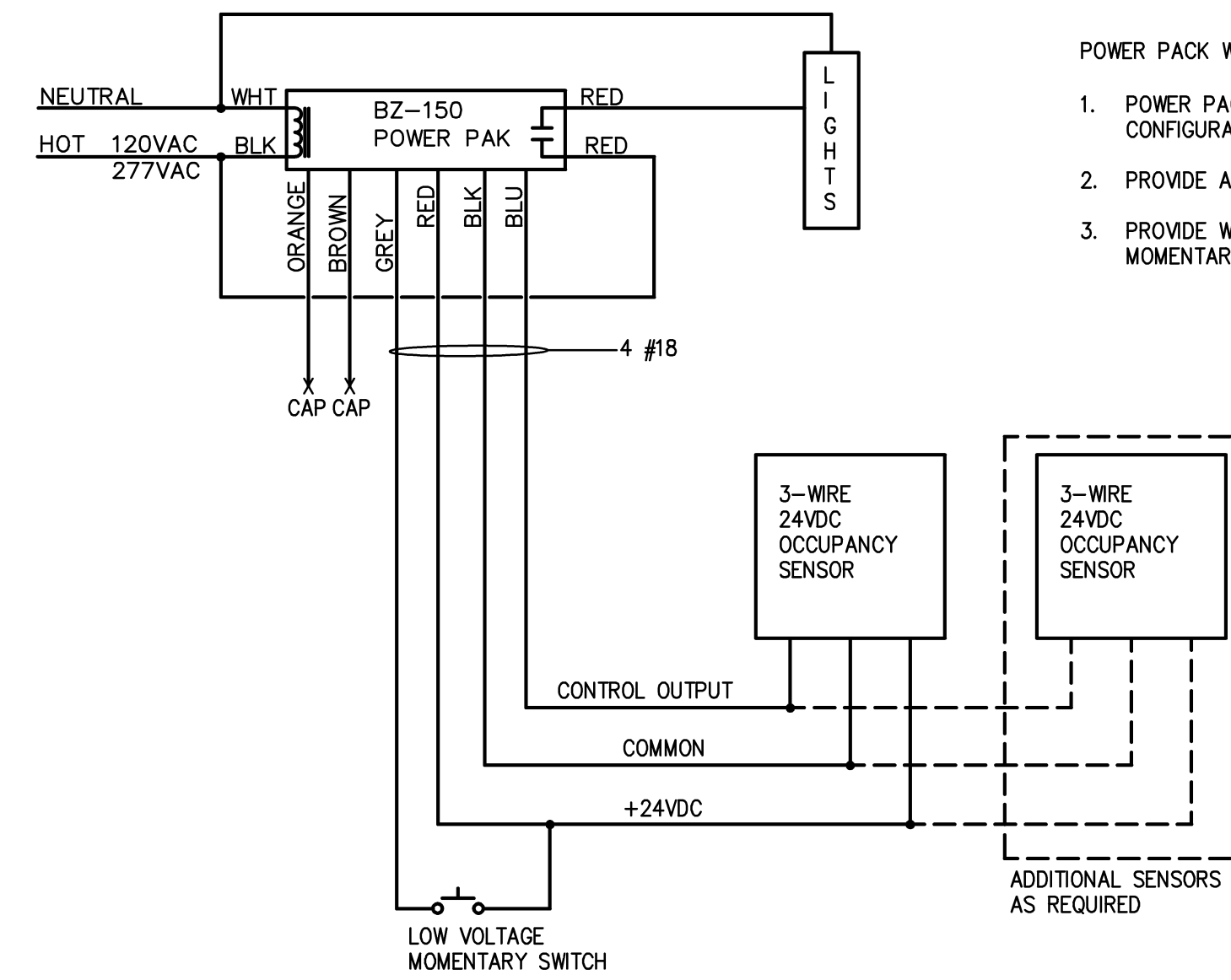
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**1 ELEVATION - PANEL "D"**  
SCALE: NONE

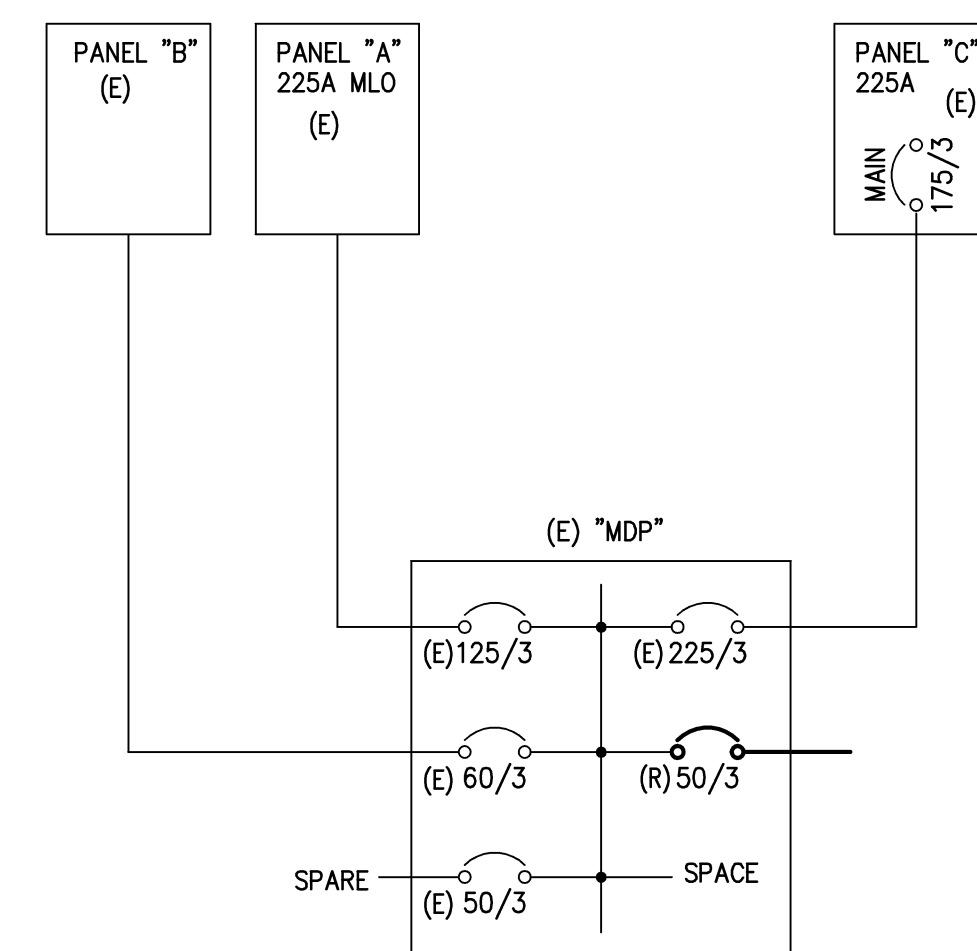


POWER PACK WIRING DIAGRAM GENERAL NOTES:

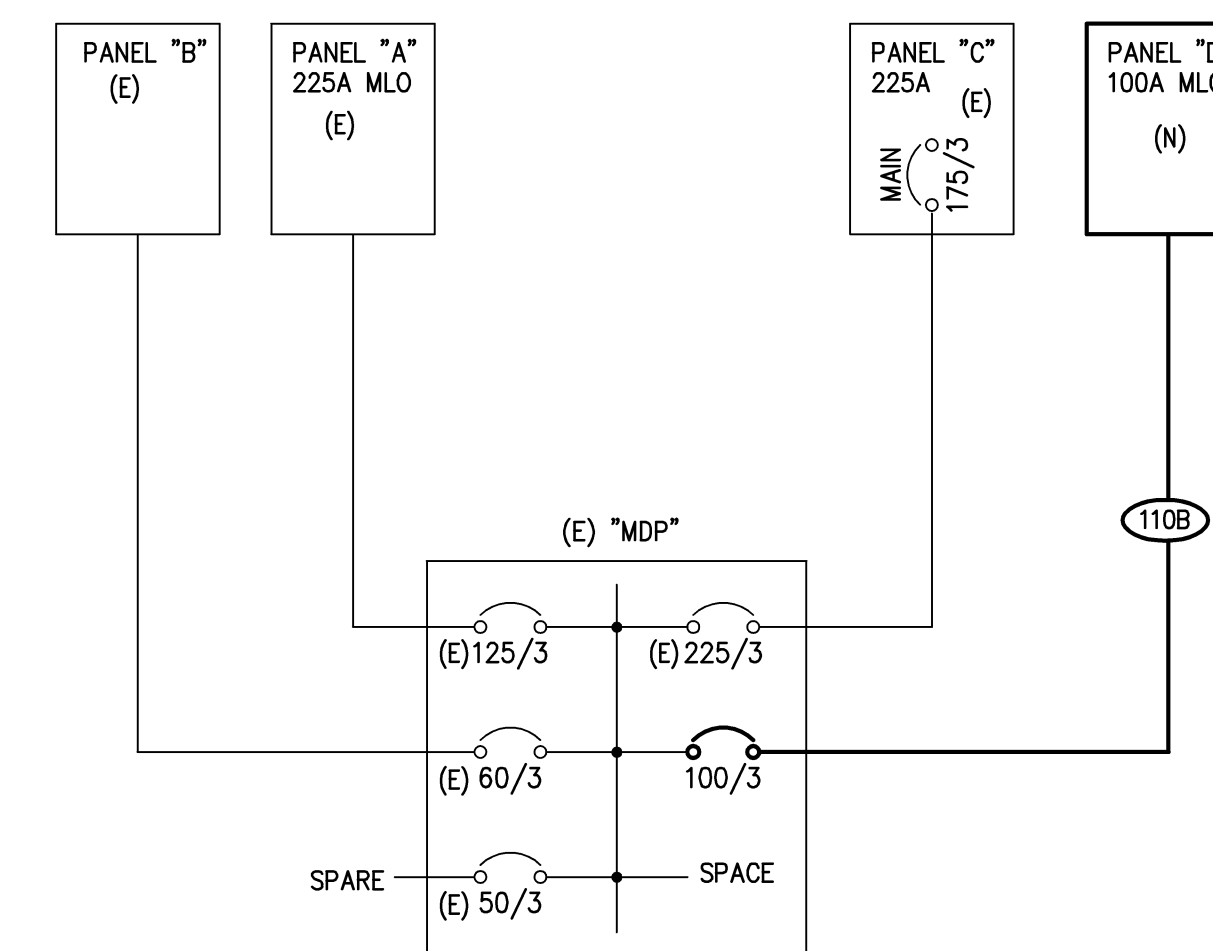
1. POWER PACK TO OPERATE IN MANUAL ON/AUTO OFF CONFIGURATION.
2. PROVIDE ADDITIONAL POWER PAKS AS REQUIRED.
3. PROVIDE WATTSTOPPER LVS-1, LOW VOLTAGE MOMENTARY TOGGLE SWITCHES AS REQUIRED.

**2 POWER PACK WIRING DIAGRAM**  
SCALE: NONE

FEEDER SCHEDULE		
DESIG.	DESCRIPTION	COMMENTS
110B	4 #2 CU, 1 #6 GND. IN 1 1/2" C.	



**3 PARTIAL ONE LINE DIAGRAM - DEMOLITION**  
SCALE: NONE



**4 PARTIAL ONE LINE DIAGRAM - NEW**  
SCALE: NONE

PROJECT TITLE  
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LAB 113N AND LAB 113S RENOVATION**

SHEET TITLE  
**ELECTRICAL DETAILS**

DATE  
12/4/13

DESIGNER  
MBR

PROJECT  
8900-001-13

FILENAME  
8900-001-13e4.dwg

SHEET NO

**E4**