



**Purchasing Division**  
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**Addendum 1**  
**Solicitation 22-99418**  
**City Hall MEP Renewal Project**

This addendum serves to notify all bidders of the following changes to the solicitation documents:

1. The map of areas requiring BCA compliance is attached as Exhibit A-1.
2. The pre-bid meeting sign-in sheet has been uploaded to the Bid Express solicitation and the City Purchasing website.
3. The apparent award for the VRF equipment package is Trane Technologies with a Trane-Mitsubishi-VRF system. It included multiples of the following pieces: VRF Concealed Ducted Cassette, NCC 6 VRF Concealed Ducted Cassette, NCC 8 VRF Concealed Ducted Cassette, NCC 12 VRF Concealed Ducted Cassette, NCC 15 VRF Concealed Ducted Cassette, NCC 18 VRF Concealed Ducted Cassette, NCC 24 VRF Concealed Ducted Cassette, NCC 30 VRF Concealed Ducted Cassette, NCC 36 VRF Concealed Ducted Cassette, NCC 54 VRF Concealed Ducted Cassette, NCC 72 VRF Wall Mounted Ductless, NCC 4 VRF Multiposition AHU (downflow), NCC 54 Water source heat pump, NCC 120 Water source heat pump, NCC 144 Water source heat pump, NCC 192 Water source heat pump, NCC 216 Water source heat pump, NCC 240 Branch Circuit Controller, 8 Ports, Main Branch Circuit Controller, 8 Ports, Sub Branch Circuit Controller, 12 Ports, Main Branch Circuit Controller, 16 Ports, Main. This purchase is pending council approval on May 23, 2022. The attached Exhibit A-2 contains the cut sheets for this equipment.
4. Contracted installer of the VRF equipment package must be a Trane-certified installer. The training required for this is identified in the attached Exhibit A-3. Please note that a sample training event invitation is included, but that particular course is closed. Trainings occur on a regular basis and more information will be available using the link within the invitation.
5. The apparent award for the air handling components is SVL, Inc. and the components are two Daikin Air Handling and Energy Recovery Units, a Gunter Dry Fluid Cooler, and AAON Air-cooled refrigerant heat pumps. This purchase is pending council approve on May 23, 2022. The attached Exhibit A-4 contains the cut sheets for this equipment.
6. A rough timeline of the construction schedule is provided below. We anticipate that as

lead times are confirmed and contractors are brought on board, this schedule will be shorter and much more defined.

4 <sup>th</sup> Fl west and 3 <sup>rd</sup> FL west ceiling	10 weeks
3 <sup>rd</sup> Fl west and 2 <sup>nd</sup> Fl west ceiling	10 weeks
2 <sup>nd</sup> Fl west and 1 <sup>st</sup> Fl west ceiling	10 weeks
1 <sup>st</sup> Fl west and Gnd Fl west ceiling	10 weeks
Gnd Fl west	10 weeks

4 <sup>th</sup> Fl south and 3 <sup>rd</sup> FL south ceiling	10 weeks
3 <sup>rd</sup> Fl south and 2 <sup>nd</sup> Fl south ceiling	10 weeks
2 <sup>nd</sup> Fl south and 1 <sup>st</sup> Fl south ceiling	10 weeks
1 <sup>st</sup> Fl south and Gnd Fl south ceiling	10 weeks
Gnd Fl south	10 weeks

4 <sup>th</sup> Fl east and 3 <sup>rd</sup> FL east ceiling	10 weeks
3 <sup>rd</sup> Fl east and 2 <sup>nd</sup> Fl east ceiling	10 weeks
2 <sup>nd</sup> Fl east and 1 <sup>st</sup> Fl east ceiling	10 weeks
1 <sup>st</sup> Fl east and Gnd Fl east ceiling	10 weeks
Gnd Fl east	10 weeks

2 <sup>nd</sup> Fl north and 1 <sup>st</sup> Fl north ceiling	10 weeks
1 <sup>st</sup> Fl north and Gnd Fl north ceiling	10 weeks
Gnd Fl north	10 weeks

Total time: 180 weeks

Anticipated Start: August 1, 2022

Estimated Finish: February 1, 2026

7. The City Hall garage and driveway located on the 4<sup>th</sup> Avenue (East) side of the building will be the designated area for parking and laydown.
8. The City intends to reuse all existing office and corridor lighting, ceiling tiles, decorative vents and radiator covers. Contractors should take precautions to preserve these items.
9. Each trade contractor is responsible for their own core drilling.
10. The City, State and Federal governments encourage contracting with disadvantaged businesses; however, there is no DBE goal or preference on this project.
11. Changes and clarifications to the plans and specs are identified in Exhibit A-5.

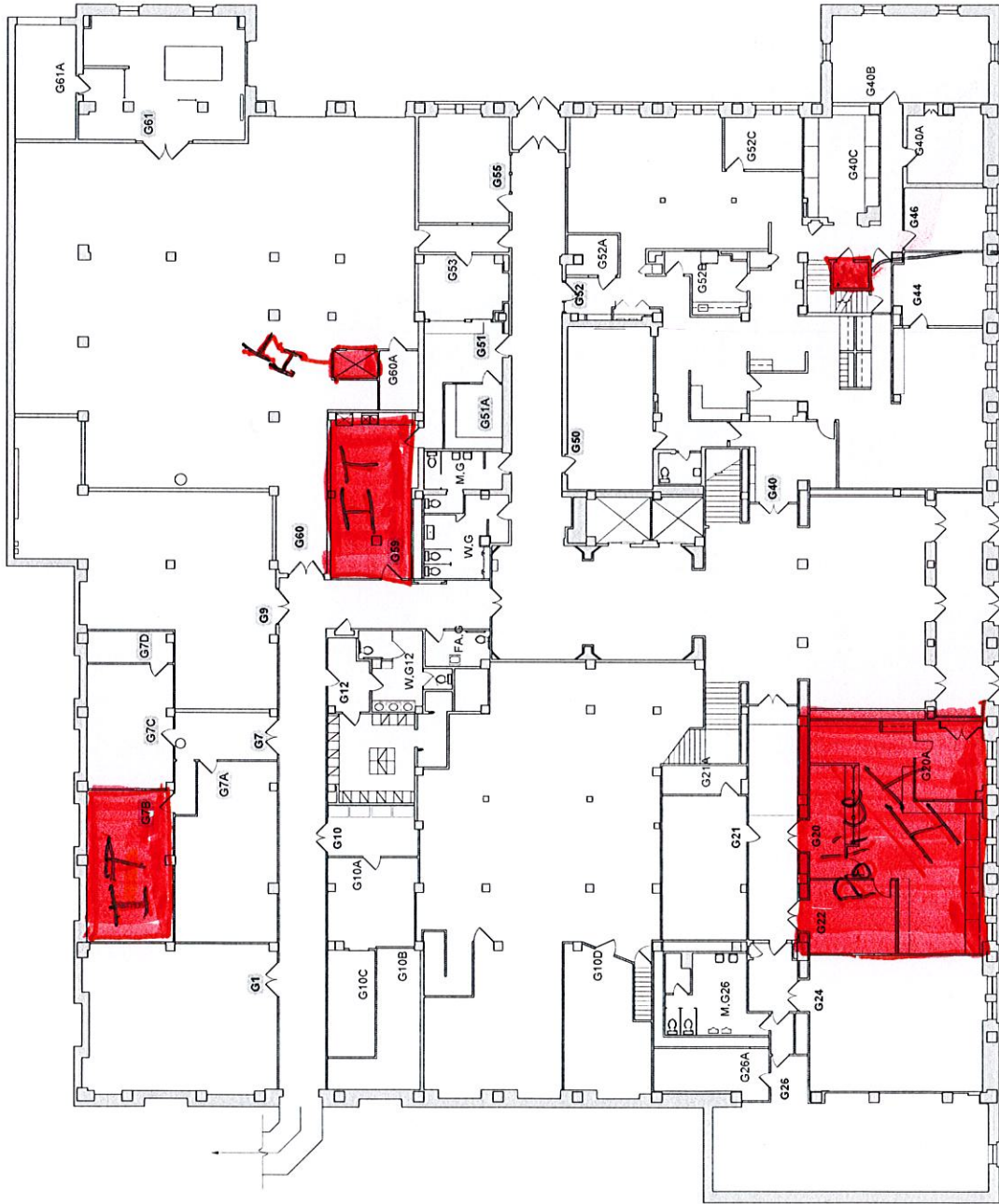
Please acknowledge receipt of this Addendum by checking the acknowledgment box within the [www.bidexpress.com](http://www.bidexpress.com) solicitation. Posted: **5/18/22**

Exhibit A-1



RW Fern Associates Inc. Architects, 5517 Grand Ave., Duluth, Minnesota 55807 (218) 722-8271  
DULUTH CITY HALL  
411 WEST FIRST STREET,  
DULUTH, MN. 55802

GROUND FLOOR

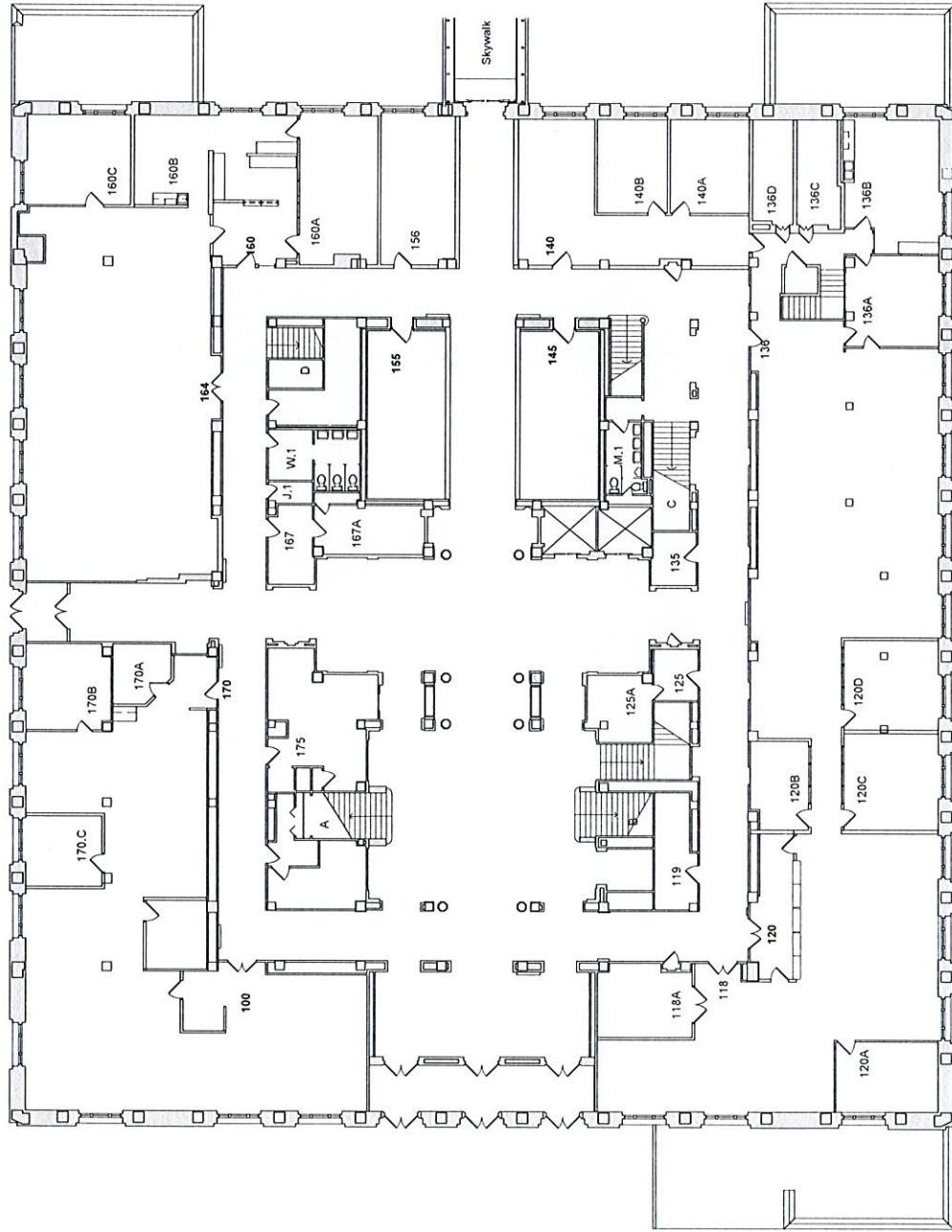


1/8" = 1'-0"

GROUND FLOOR  
A1



1. 1ST FLOOR PLAN

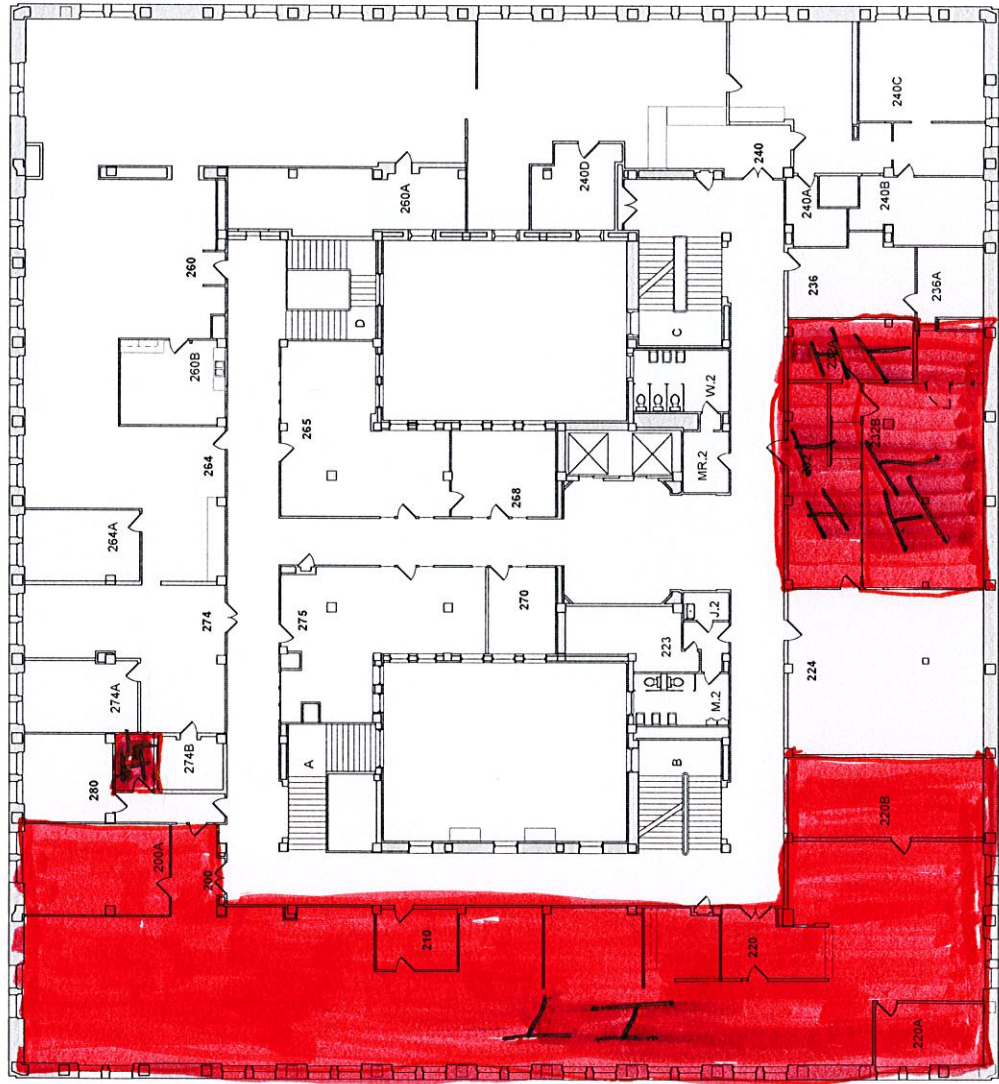


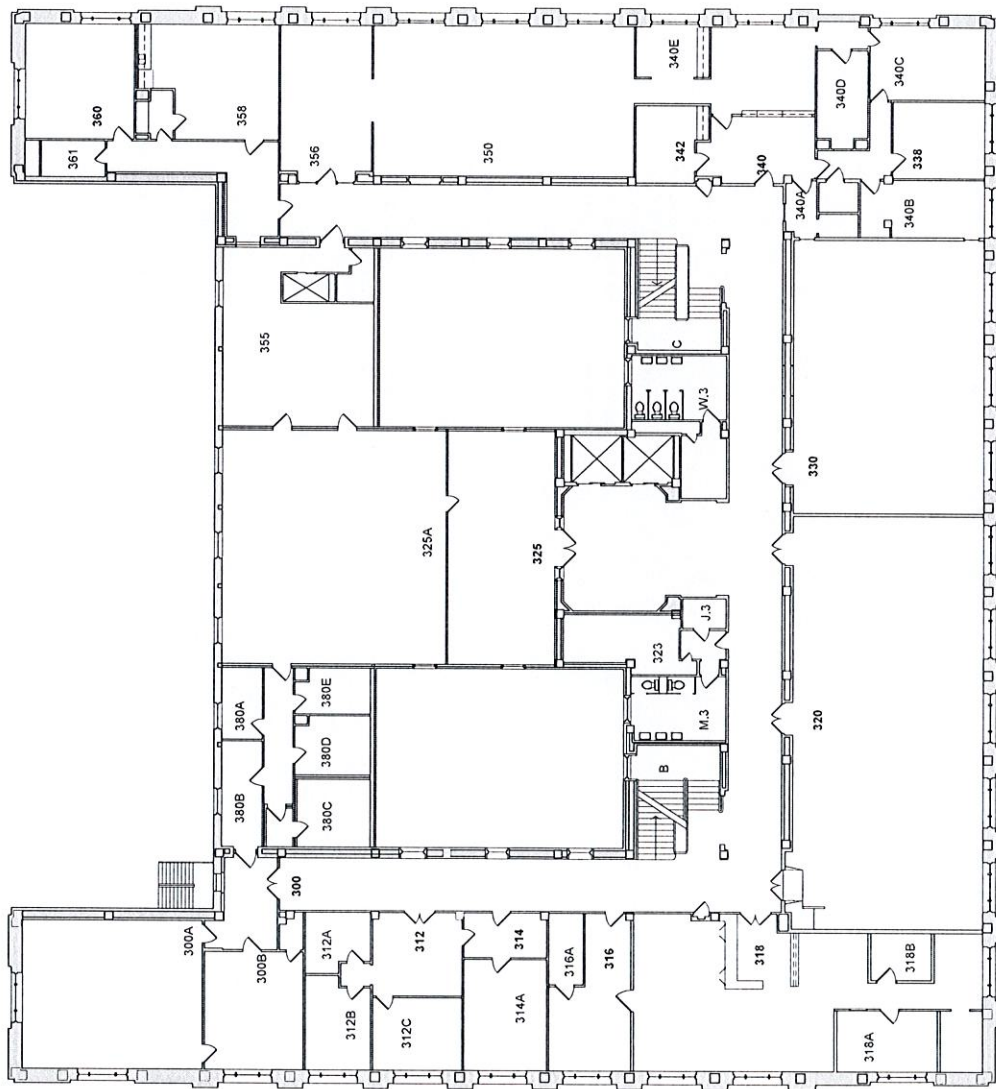




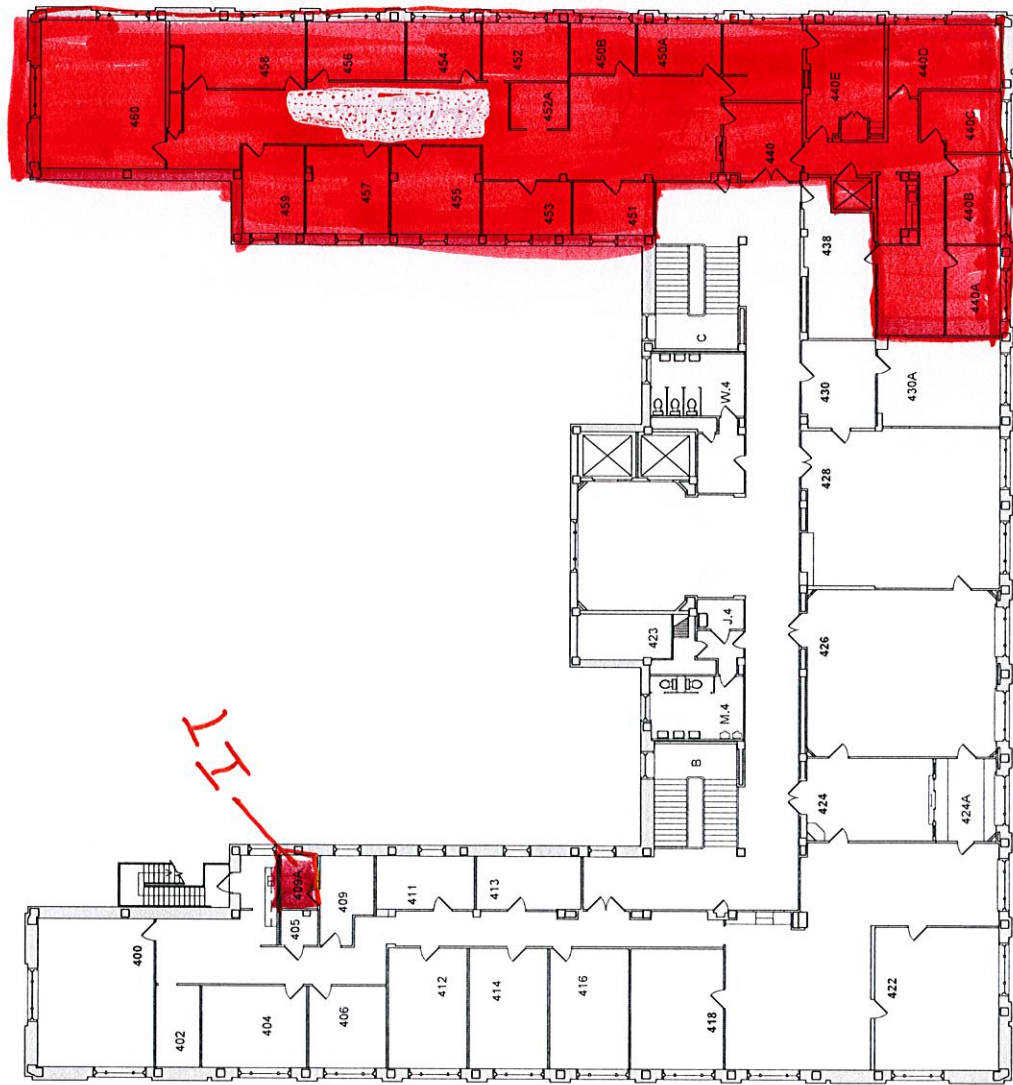
1/8" = 1'-0"

1. 2ND FLOOR PLAN





3RD FLOOR PLAN



4TH FLOOR PLAN

 $\frac{1}{8} = 12.5\%$

Job Name:

System Reference:

Date:



## GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			PEFY-P18NMAU-E4
Cooling capacity (Nominal) <sup>1</sup>		BTU/H	18,000
Heating capacity (Nominal) <sup>1</sup>		BTU/H	20,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.082
	Heating	kW	0.08
Current	Cooling	A	0.82/0.74
	Heating	A	0.82/0.74
MCA		A	2.94
Maximum Overcurrent Protection (MOCP)		A	15
External finish		Galvanized steel sheet	
External Dimensions		In. [mm]	35-7/16 x 28-7/8 x 9-7/8 [900 x 732 x 250]
Net weight		Lbs [kg]	58 [26]
Heat exchanger		Cross fin (Aluminum fin and copper tube)	
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0.2 In. WG
	Airflow rate	CFM	424–512–600
	Motor type	DC Motor	
	Motor Output	kW	0.121
	Motor FLA	A	2.35
Sound pressure level (Measured in anechoic room) <sup>3</sup>		dB(A)	29–33–37
Air filter		PP Honeycomb fabric	
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

<sup>1</sup>Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

## INDOOR UNIT ACCESSORIES: PEFY-P18NMAU-E4

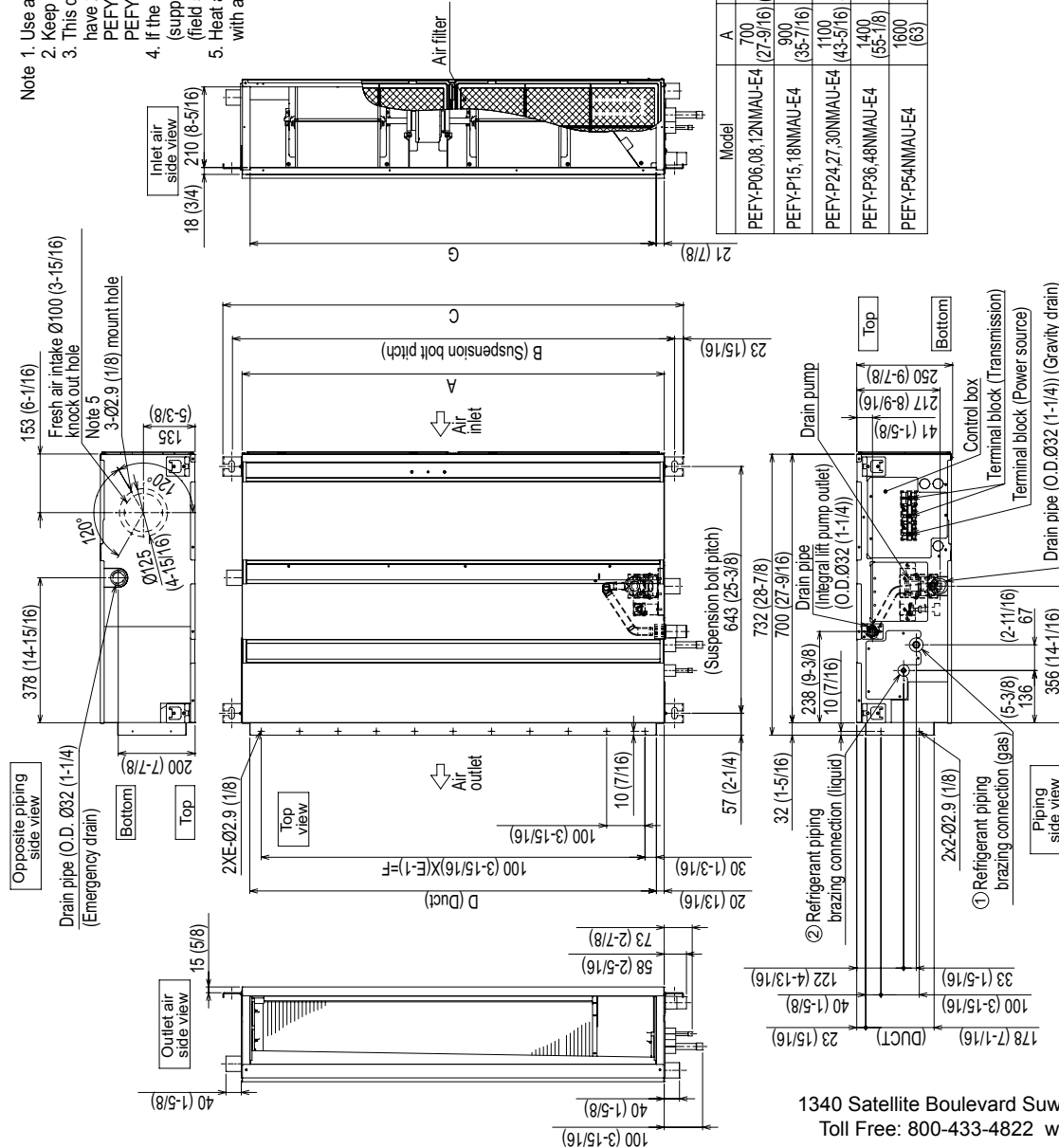
Control Interface	3-Pin Connector	PAC-715AD
	BACnet® and Modbus® Interface	PAC-UKPRC001-CN-1
	CN24 Relay Kit	CN24RELAY-KIT-CM3
	Connector and wire for Operation status/error using CN51	PAC-725AD
	IT Extender	PAC-WHS01IE-E
	kumo station® for kumo cloud®	PAC-WHS01HC-E
	Thermostat Interface	PAC-US444CN-1
	Wireless Interface for kumo cloud®	PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	PAC-USSEN001-FM-1
	Remote Temperature Sensor	PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	PAR-40MAAU
	Simple MA Remote Controller†	PAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	PAR-U01MEDU-K
	Touch MA Controller†	PAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	MHK2
	Wireless MA Controller Receiver	PAR-FA32MA-W
	Wireless MA Remote Controller	PAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	X86-003
	Blue Diamond MultiTank — collection tank for use with multiple pumps	C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	C13-103
	Sauermann Condensate Pump	SI30-230
Filter Box	Filter Box with MERV 13 Filter	FBM2-2-A



# INDOOR UNIT DIMENSIONS: PEFY-P18NMAU-E4

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).  
 2. Keep the service space for maintenance at the bottom.  
 3. This drawing is for PEFY-P24-27-30NMAU-E4 models, which have 2 fans. PEFY-P06-08-12NMAU-E4 models have 1 fan. PEFY-P15-18NMAU-E4 models have 2 fans. PEFY-P36-48-54NMAU-E4 models have 3 fans.  
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.  
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
PEFY-P06,08,12NMAU-E4	Ø12.7 (1/2)	Ø6.35 (1/4)
PEFY-P15,18NMAU-E4		
PEFY-P24,27,30NMAU-E4		
PEFY-P36,48NMAU-E4	Ø15.88 (5/8)	Ø9.52 (3/8)
PEFY-P54NMAU-E4		

Model	A	B	C	D	E	F	G
PEFY-P06,08,12NMAU-E4	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
PEFY-P15,18NMAU-E4	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
PEFY-P24,27,30NMAU-E4	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
PEFY-P36,48NMAU-E4	1400 (55-5/16)	1454 (57-1/4)	1500 (59-7/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
PEFY-P54NMAU-E4	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

1340 Satellite Boulevard Suwanee, GA 30024  
 Toll Free: 800-433-4822 www.mehvac.com



Job Name:

System Reference:

Date:

**208/230V MODULAR WATER-SOURCE VRF HEAT PUMP SYSTEM****ACCESSORIES**

Optical Relay for Flow Switch (One Piece)\* ..... RIBTE24B  
 Transformer 50VA (One Piece)\*\* ..... TR50VA015  
 1.5" Temp sensor, optional (One Piece)\*\* ..... ZM-TW150NPT KIT  
 1.5" EPIV Valve (One Piece)\* ..... EV150S396NRXME  
 Twinning Kit (Required) ..... CMY-Q200CBK  
 Twinning Kit (Required) ..... CMY-R100CBK2  
 BC Controller (Required) ..... for details see BC Controller Submittals  
 Joint Kit ..... for details see Pipe Accessories Submittal

\*Requires two EPIV valves

\*Requires two optical relays

\*\*Requires four transformers

\*\*Requires four temp sensors per two EPIV valves if optional temp sensors are used.

Specifications			System	
Unit Type			PQRV-P288TSLMU-A1	
Cooling Capacity (Nominal)		BTU/H	288,000	
Heating Capacity (Nominal)		BTU/H	323,000	
Net Weight		Lbs. [kg]	962 [436]	
Refrigerant Piping Diameter From Twinning Kit to First Joint or Header	Liquid (High Pressure)	In. [mm]	1-1/8 [28.58] Brazed	
	Gas (Low Pressure)	In. [mm]	1-3/8 [34.93] Brazed	
Max. Total Refrigerant Line Length		Ft.	2460	
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541	
Max. Control Wiring Length		Ft.	1640	
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity	
	Model/Quantity		P06~P96/2.0~50.0	
Sound Pressure Level		dB(A)	57.0/57.0	
Compressor Operating Range			9.0% to 100.0%	
AHRI Ratings (Ducted/Non-ducted)	EER		11.4/13.7	
	IEER		18.5/20.6	
	COP		4.9/5.25	
	SCHE		20.1/19.0	

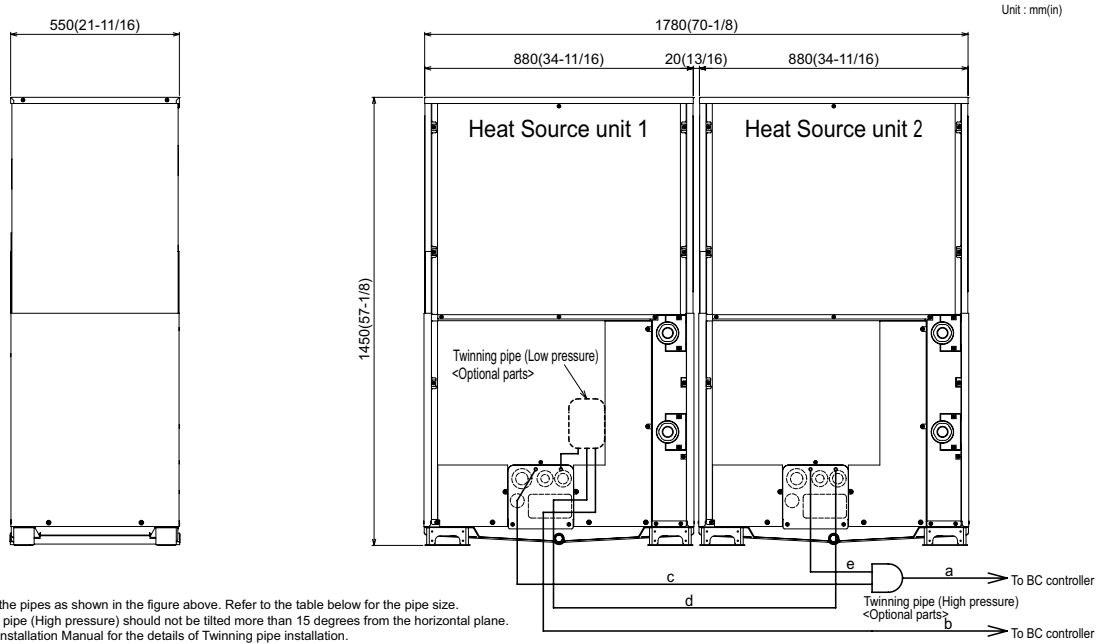
Specifications			Module 1	Module 2
Unit Type			PQRV-P144TLMU-A1	PQRV-P144TLMU-A1
Cooling Capacity (Nominal)		BTU/H	144,000	144,000
Heating Capacity (Nominal)		BTU/H	160,000	160,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59~75 [ 15.0~ 24.0]	59~75 [ 15.0~ 24.0]
	Heating (Indoor)	°F DB [°C DB]	59~81 [15.0~27.0]	59~81 [15.0~27.0]
Operating Water Temperature Range¹	Cooling/Heating	°F [°C]	50~113 [10~45]	50~113 [10~45]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	481 [218]	481 [218]
External Finish			Galvanized steel sheets	Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10	208/230, 3, 60, ±10
Minimum Circuit Ampacity		A	35.0/0.0	35.0/0.0
Maximum Overcurrent Protection		A	60/50	60/50
SCCR		kA	5	5
Flow Rate		G/min [gpm]	31.7	31.7
		L/min	120	120
Pressure Drop		psi	6.38	6.38
		Ft.	14.7	14.7
Operation Volume Range		G/min [gpm]	19.8~50.9	19.8~50.9
		m3/h	4.5~11.6	4.5~11.6
Refrigerant Piping Diameter (From Twinning Kit)	Liquid (High Pressure)	In. [mm]	7/8 [ 22.2] Brazed	7/8 [ 22.2] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed	1-1/8 [28.58] Brazed
Compressor	Type x Quantity		Inverter scroll hermetic x 1	Inverter scroll hermetic x 1
Compressor Motor Output		kW	9.5	9.5
Refrigerant	Type x Original Charge		R410A x 13 lbs. + 4.0oz. [6.0 kg]	R410A x 13 lbs. + 4.0oz. [6.0 kg]
Lubricant	Lubricant		MEL32	MEL32
Protection Devices	High Pressure Protection	High Pressure Protection	High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)	High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit	Inverter Circuit	Over-heat protection, Over-current protection	Over-heat protection, Over-current protection
	Compressor	Compressor	Over-heat protection	Over-heat protection

**NOTES:**

¹23°F EWT (Entering water temperature) is possible with glycol.

Each individual module requires a separate electrical connection. Refer to electrical data for each individual module.

# OUTDOOR UNIT: PQRYP288TSLMU-A1 – DIMENSIONS



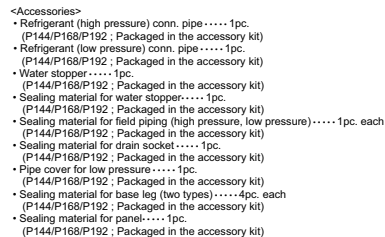
- Note 1. Connect the pipes as shown in the figure above. Refer to the table below for the pipe size.  
 2. Twinning pipe (High pressure) should not be tilted more than 15 degrees from the horizontal plane.  
 3. See the Installation Manual for the details of Twinning pipe installation.  
 4. Only use the Twinning pipe by Mitsubishi (optional parts).

Twinning pipe connection size

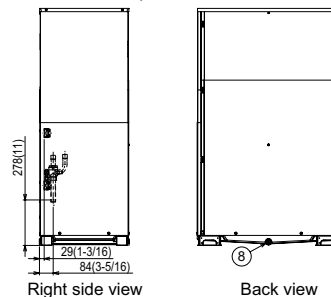
Package unit name		PQRY-P288TSLMU-A1	PQRY-P312TSLMU-A1	PQRY-P336TSLMU-A1
Component unit name	Heat Source unit 1	PQRY-P144TLMU-A1	PQRY-P168TLMU-A1	PQRY-P168TLMU-A1
	Heat Source unit 2	PQRY-P144TLMU-A1	PQRY-P144TLMU-A1	PQRY-P168TLMU-A1
Twinning pipe Kit(optional parts)		CMY-Q200CBK		
BC controller-Twinning pipe	High pressure	a	ø28.58(1-1/8)	
	Low pressure	b	ø34.93(1-3/8)	ø41.28(1-5/8)

	Unit model	High pressure	Low pressure
		c or e	d
Twinning pipe-Heat source unit	P144	ø22.2(7/8)	ø28.58(1-1/8)
	P168		

- Note1. Seal around the water piping, the refrigerant piping, the power supply, and the control wiring and plug unused knockout holes with putty, etc., to prevent moisture or dirt from entering cabinet.
- Note2. At the time of product shipment, the front side piping serves as the local drainage control.  
When connecting on the rear side, please remove the rear side plug sealing corks, and attach on the front side. Ensure there is no leak in piping system once connected.
- Note3. See Fig. A and Fig. B for service clearances.
- Note4. If piping is installed from the front of unit, provide clearances as shown in Fig. A and Fig. B.
- Note5. Environmental condition for installation: -20~40°C(DB) (-4~104°F) for indoor installation.
- Note6. In case the temperature around the heat source unit has possibility to drop under 0°C(32°F), be careful for the following point to prevent the pipe burst by the water pipe freeze-up.
  - Circulate the water all the time even if heat source unit is not in operation and provide glycol for freeze protection.
  - Drain the water from inside of the heat source unit when the heat source is not operating.
- Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.
- Note8. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).



Top of unit casing not suitable for supporting system modules stacked above - field framing required for stacking modules of additional systems



No	Usage	Specifications
①	For pipes	Front through hole 140 × 77 Knockout hole (5-9/16) (3-1/16)
②		Front through hole (Uses when turning kit (optional parts) is mounted.)
③		ø45 Knockout hole (1-13/16)
④	For wires	Front through hole ø62.7 or ø34.5 Knockout hole (2-1/2) (1-3/8)
⑤		Front through hole ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑥	For transmission cables	Front through hole ø34 Knockout hole (1-3/8)
⑦	Water pipe inlet	NPT-1/2 Screw
⑧	Water pipe outlet	NPT-1/2 Screw
⑨	Drain pipe	Rc3/4 Screw

Unit : mm(in)





Job Name:

System Reference:

Date:

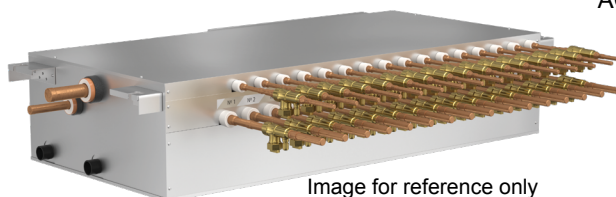


Image for reference only

## ACCESSORIES

Branch Joint (Downstream capacity ≤72,000 Btu/h)	CMY-Y102SS-G2*
Branch Joint (Downstream capacity 73,000-96,000 Btu/h)	CMY-Y102LS-G2*
Branch Joint (Downstream capacity ≤126,000 Btu/h)	CMY-R201S-G*
Branch Joint (Downstream capacity 127,000-216,000 Btu/h)	CMY-R202S-G*
Branch Joint (Downstream capacity 217,000-234,000 Btu/h)	CMY-R203S-G*
Branch Joint (Downstream capacity 235,000-360,000 Btu/h)	CMY-R204S-G*
Branch Joint (Downstream capacity ≥316,000 Btu/h)	CMY-R205S-G*
Condensate Pump (Blue Diamond)	X87-721
Condensate Pump (Sauerermann)	SI3100-230
Reducer (Between ODU and BC)	CMY-R302S-G1*
Reducer (Between Main and Sub BC)	CMY-R303S-G1

\*See Data Book or Install Manual for more details

## SPECIFICATIONS

Indoor Unit Capacity Connectable to 1 Branch	Btu/h	54,000
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Number Of Branches	12
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Electrical Requirements		
Electrical Power Requirements	208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)	A	1.57 / 1.82
Maximum Overcurrent Protection (MOCP)	A	15

Power Input (208 / 230V)		
Cooling	kW	0.198 / 0.255
Heating		0.106 / 0.137

Current Input (208 / 230V)		
Cooling	A	0.95 / 0.11
Heating		0.52 / 0.60

External Dimensions	In. (mm)	9-7/8 x 44-11/16 x 21-1/2 (250 x 1,135 x 545)
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Net Weight	Lbs. (kg)	156 (71)
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External finish	Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
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Connectable Outdoor / Heat Source Unit Capacity	72,000 to 336,000
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Refrigerant Piping Diameter to Indoor Unit (Brazed)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
	In. (mm)	3/8 (9.52)	5/8 (15.88)
	In. (mm)	3/8 (9.52)	3/4 (19.05)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	7/8 (22.2)

Field drain pipe size	In. (mm)	3/4 NPT
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Refrigerant	R410A
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Refrigerant Piping Diameter to Outdoor Unit (Brazed)			
		High Pressure	Low Pressure
P72	In. (mm)	5/8 (15.88)	3/4 (19.05)
P96	In. (mm)	3/4 (19.05)	7/8 (22.2)
P120	In. (mm)	3/4 (19.05)	7/8 (22.2) or 1-1/8 (28.58)
P144 to P192	In. (mm)	3/4 (19.05)	1-1/8 (28.58)
P216	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-1/8 (28.58)
P240	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-3/8 (34.93)
P264 to P288	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93)
P312	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93) or 1-5/8 (41.28)
P336	In. (mm)	1-1/8 (28.58)	1-5/8 (41.28)

Refrigerant Piping Diameter to other BC Controller (Brazed)				
		High Pressure	Liquid Pipe	Low Pressure Pipe
P72	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
P73 to P108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
P109 to P126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
P127 to P144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
P145 to P216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
P217 to P234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
P235 to P288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
P289 to P360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
P361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)		
Rated operation	dB(A)	68
Defrost		74

Sound pressure level (measured in anechoic room)		
Rated operation	dB(A)	50
Defrost		56

## NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

# DIMENSIONS: TCMBM1012JA11N4BV

TCMBM1012JA11N4BV  
TCMBM1016JA11N4BV  
TCMBM1018JA11N4BV

Unit: mm(in)

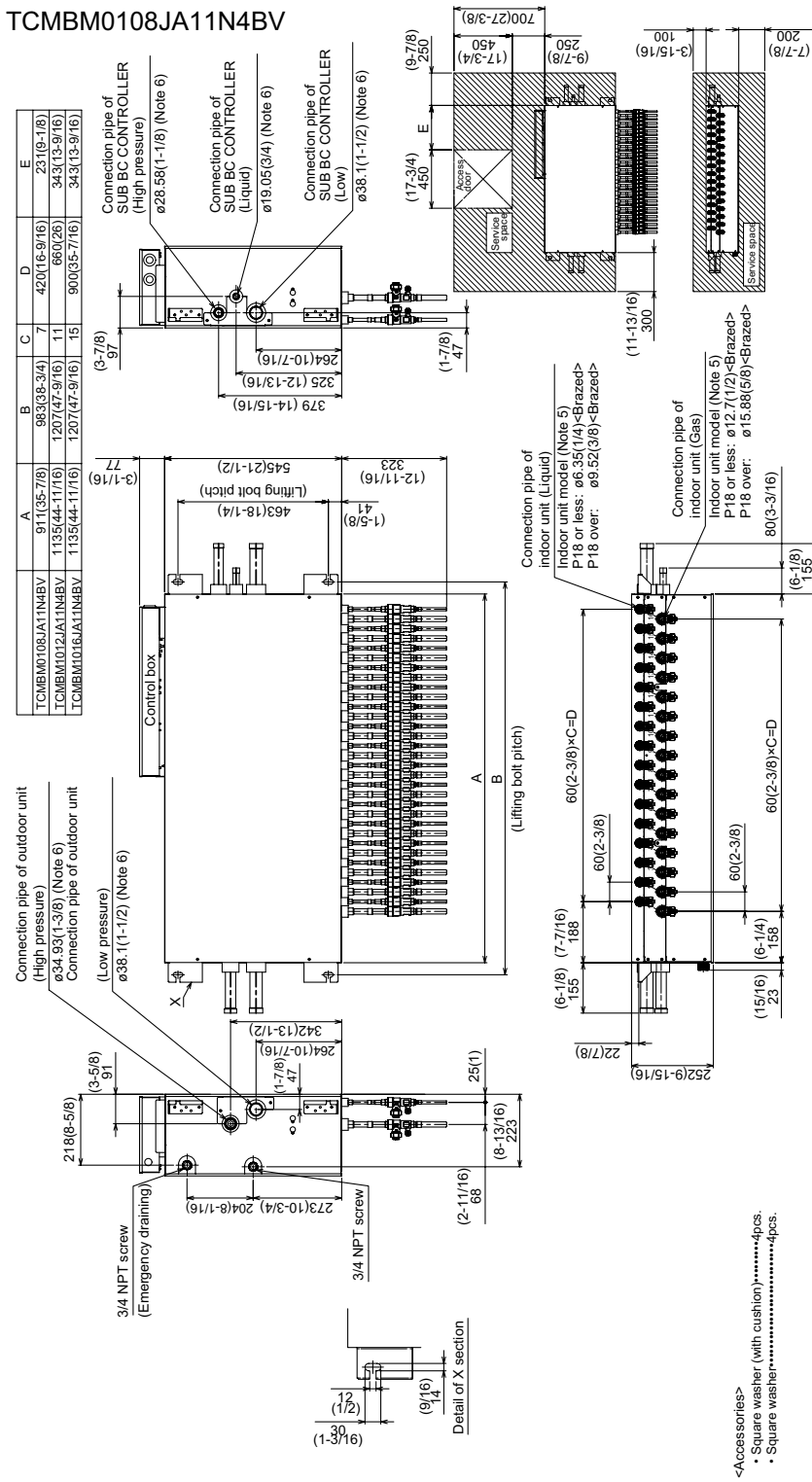


Table-1. To outdoor/heat source unit (Note 6)

Connectable unit capacity	High press. Pipe	Low press. Pipe
P72	ø15.88(5/8)	ø19.05(3/4)
P96	ø19.05(3/4)	ø22.27(7/8)
P120	ø19.05(3/4)	ø22.27(7/8) or ø28.58(1-1/8)
P144 to P192	ø22.27(7/8)	ø28.58(1-1/8)
P216	ø22.27(7/8) or ø28.58(1-1/8)	ø34.93(1-3/8)
P240	ø22.27(7/8) or ø28.58(1-1/8)	ø34.93(1-3/8) or ø41.28(1-5/8)
P264 to P288	ø28.58(1-1/8)	ø34.93(1-3/8) or ø41.28(1-5/8)
P312	ø28.58(1-1/8)	ø41.28(1-5/8)
P336	ø28.58(1-1/8)	ø41.28(1-5/8)

\*For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

Table-2. To other BC controller (Note 6)

Total downstream Indoor unit capacity	High press. Pipe	Liquid Pipe	Low press. Pipe
~P72	ø15.88(5/8)	ø9.52(3/8)	ø19.05(3/4)
P73~108	ø19.05(3/4)	ø9.52(3/8)	ø22.27(7/8)
P109~126	ø19.05(3/4)	ø12.7(1/2)	ø28.58(1-1/8)
P127~144	ø22.27(7/8)	ø12.7(1/2)	ø28.58(1-1/8)
P145~216	ø22.27(7/8)	ø15.88(5/8)	ø28.58(1-1/8)
P217~234	ø28.58(1-1/8)	ø15.88(5/8)	ø34.93(1-3/8)
P235~288	ø28.58(1-1/8)	ø19.05(3/4)	ø34.93(1-3/8)
P289~360	ø28.58(1-1/8)	ø19.05(3/4)	ø41.28(1-5/8)
P361~	ø34.93(1-3/8)	ø19.05(3/4)	ø41.28(1-5/8)

Note 1. Suspension bolt(ø10) and nut(M10) prepare in the field.

Note 2. Take notice of service space as shown.

Note 3. Please take service space for connection pipe of SUB BC CONTROLLER.

Note 4. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.

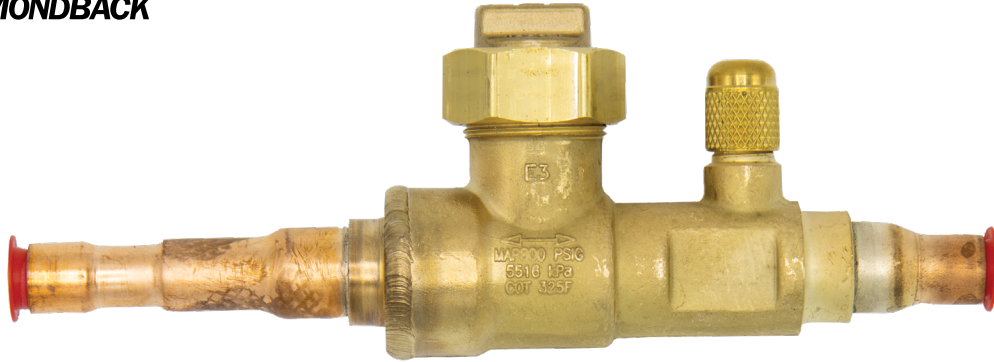
Note 5. Refer to the Installation Manual for refrigerant piping diameter size when connecting plural indoor units with 1 branch.

Note 6. Refer to the Table-1-2 connection pipe of outdoor unit or SUB BC CONTROLLER diameter size.

Note 7. Refer to the Installation Manual for insulation of connection pipe and drain piping.

Note 8. Do not place the BC controller directly on the floor.

# BV-BB SERIES BALL VALVES BRAZED CONNECTIONS



## SPECIFICATIONS

- Engineered for Mini-split and Multi-split HVAC Units
- Full Port Design
- 800 PSIG Rated
- R-410A Compatible
- Brazed Connections
- UL listed ball valves

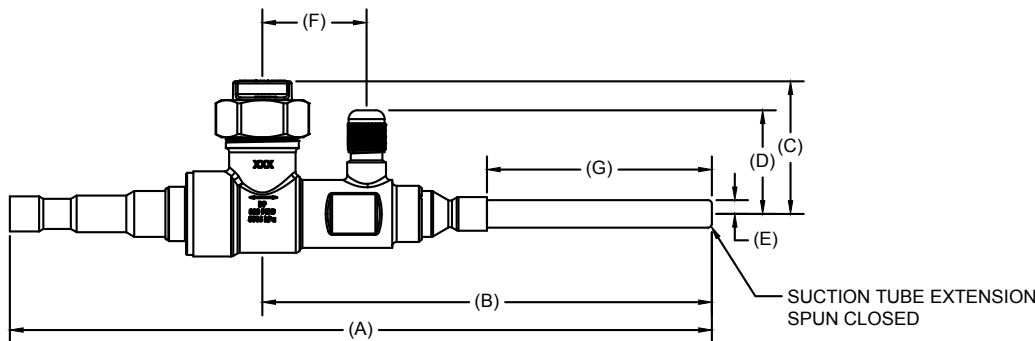
## MODEL NUMBERS:

BV38BBSI and BV58BBSI

- BV38BBSI pre-installed on each liquid line with a brazed straight-pipe extension
- BV58BBSI pre-installed on each gas line with a brazed straight-pipe extension
- Fully factory assembled
- Furnace brazed and pressure tested
- Each ball valve is equipped with Schrader Valve for refrigerant service—valve rated to 800 psi
- Design working pressure: 700 PSIG
- Temperature range: -40° F to +325° F (-40° C to +149° C)
- Forged brass body and seal cap
- PTFE seals and gaskets (no synthetic O-rings)
- Seal cap design permits valve operation without removal of seal cap
- One year limited materials and workmanship warranty on Ball Valves
- Made in the U.S.A

\*ball valves come with an insulation piece

Part Number	ODS	A	B	C	D	E	F	G
BV38BBSI (w/ Suction Tube)	3/8	9.57	6.13	1.81	1.41	0.19	1.42	3.07
BV58BBSI (w/ Suction Tube)	5/8	9.56	6.12	1.81	1.41	0.31	1.42	3.06



## Suction Tube Extension

1. Dimensions:
  - a. Outside: Ø 3/8" and 5/8" on the BV38BBSI and BV58BBSI respectively
  - b. Thickness: 0.035, ±0.01
2. 2500 PSI burst per UL
3. Free of sharp edges, burrs and wrinkles

# BV-BB SERIES BALL VALVES BRAZED CONNECTIONS (INSULATION DETAILS)



Product name: Ball valve insulation

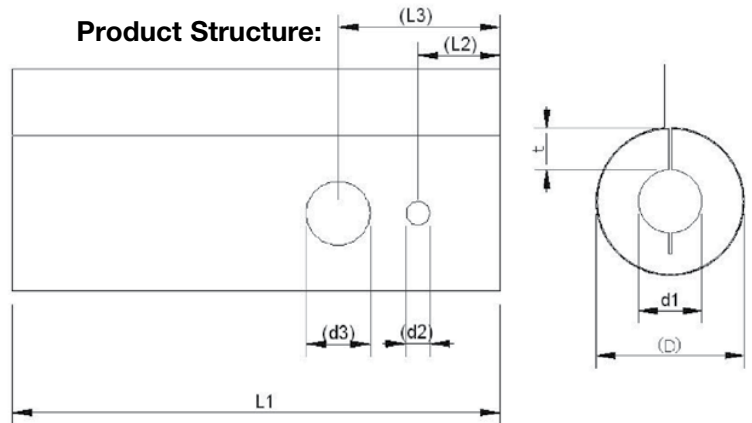
Product code: HKG-20HF

Materials:

1. Insulation: Inner and outer layer Polyethylene foam (PEF)
2. Covering: Adhesive tape of Polyvinyl chloride (PVC)
3. Separator: Soft film of Polyvinyl chloride (PVC)

Physical property:  
Insulation

**Product Structure:**



Product Code	d1	t	(D)	L1	(d2)	(d3)	(L2)	(L3)
HKG-20HF Unit: inches (mm)	1 3/8 (30)	3/4 (20)	2 3/4 (70)	8 9/16 220	7/8 (11)	1 9/64 (29)	1 15/32 (37)	2 7/8 (73)

Performance items	Unit	Performance
Density	lb/ft3 (kg/m3)	1.87 (30)
Heat Conductivity (at 23° C)	W/m•K	0.040
Tensile Strength	N/cm2	23
Heat Resistant	° F ( ° C)	≤176 ( ≤80)
UL-94	—	HF-1

## Exhibit A-3

The following information has been provided by our Trane Technologies representative and is being shared as a courtesy to bidders:

See below for the installers training course description. We host these trainings just about every month at our St. Paul Commercial sales office. Please note the attached invitation is for this month's class and registration is already closed. But the information in the invitation is still relevant. The class costs \$480 per person.

Along with this, our technical specialist, Ryan Goss, will assist the installers throughout the process, and will submit the needed warranty information to Mitsubishi.

### Details

#### Description

This course provides hands-on experience building systems using Diamond System Builder™ design software. Participants learn Mitsubishi Electric's warranty process and the steps to register products once they have been installed. The concepts of integration and centralized control are discussed as well as the proper steps for system start-up. Proper service and diagnosis procedures are also covered.

**The pre-requisite to enroll in this class is CITY MULTI Installation Essentials eLearning course. Students must register for this pre-requisite online course on <https://meushvac.force.com/contractor/s/>**

**Students must have a laptop computer with Windows-based 8 or newer and installation of the following software available on MyLinkDrive.com: Diamond System Builder, Maintenance Tool Software and Maintenance Tool Drivers.**

#### Objectives

Students will be able to:

- Use Diamond System Builder to modify, layout and select specifications for a CITY MULTI system application
- Identify and discuss the extended warranty terms and submittal procedure
- Explain the settings and networking required to setup centralized control
- Discuss start-up faults and their resolution
- identify and discuss preventative maintenance tasks and the use of Maintenance Tool for system monitoring
- Discuss electrical operation and refrigerant flow paths
- Use Maintenance Tool to locate the key data points for monitoring equipment
- Resolve fault and error codes
- Perform system troubleshooting

#### Audience

installers and service technicians





## You're Invited to Trane CITY MULTI Start Up and Service Essentials

Do you want to receive hands-on, in-person training on your Variable Refrigerant Flow (VRF) System? Join us for a 2-day Trane CITY MULTI Start Up and Service Essentials interactive session. Sign up as early, as this class is limited to a maximum of 8 attendees!

### WHEN:

Tuesday, May 24, 2022 8:00 AM – 4:30 PM

Wednesday, May 25, 2022 8:00 AM – 4:30 PM

*Note: You must attend both days to receive your certification*

### WHERE:

Trane Commercial Sales Office  
775 Vandalia Street  
St. Paul, MN 55114

### PREREQUISITE WORK:

Complete CITY MULTI Installation Essentials, now a set of 4 online modules that are required to be completed prior to attending the 2 day in-person portion of the course.

1. Use a laptop or desktop with Google Chrome as your browser
2. Login or Create and Account: <https://meushvac.force.com/Contractor/s/>
3. Click on Learning > Find Learning
4. Select the Catalog: Commercial VRF
5. In Learning Plans, click on CITY MULTI Installation Essentials
6. Click Register and Launch

This course also requires you to bring a laptop with the following software pre-installed.

- Diamond System Builder: **Download**
- Maintenance Tool Software: **Download**
- Central Controllers AE-200, AE 50, EW-50 Initial and BACnet Setting Tool: **Download**

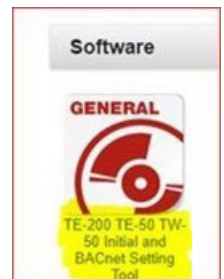
### WHO:

Contractors looking to qualify CITY MULTI VRF projects for the extended 10 year parts/compressor warranty

### COST:

\$480 per student

**REGISTER**





# Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

A1 A2 A3 A4 A5 1 2A 2B 3A 3B 4 5 6A 6B 6C 7 8A 8B 8C 8D 9 10 11 12 13 14 15 16 17 18 19 20 21 22

**CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB**

Tag: ACCU-1, 2 (air source HP) - Rev 1

## Job Information

Job Name: Duluth City Hall  
Job Number: Job #6  
Site Altitude: 0 ft  
Refrigerant: R-410A

## Unit Information

Approx. Op./Ship Weights: 1498 / 1498 lbs. (±5%)  
Suction Temperature: 50.00 °F  
Ambient Temperature: 95 °F DB / 75 °F WB

## Cooling Section

### Capacity (MBH)

Suction Temp Design (50°)	Total Unit	Circuit 1	Circuit 2
35°	301.9	152.1	149.8
40°	235.5	118.5	117.0
45°	256.8	129.3	127.5
50°	278.8	140.4	138.4
50°	301.9	152.1	149.8

## EER - ARI Listing Information

No ARI Rating Program Exists for Units Over 250 MBH  
All AAON Units Are Tested in Accordance With ARI Standards

EER @ AHRI Conditions: N/A  
Application EER @ Op. Conditions: 11.3

## Electrical Data

Rating:	208/3/60	Minimum Circuit Amp:	122				
Unit FLA:	110	Maximum Overcurrent:	150				
	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		208	3			48.1
Compressor 2:	1		208	3			48.1
Condenser Fans:	2	0.75	208	3	1140	3.4	
Condenser Fans:	2	0.75	208	3	1140	3.4	

## Connection Sizes

System	Suction Line	Liquid Line
1	1.38"	0.63"
2	1.38"	0.63"



# Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

**CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB**

Condensing Unit Tag:

## Job Information

Job Name:

Duluth City Hall

Job Number:

Job #6

## Factory Supplied / Factory Installed

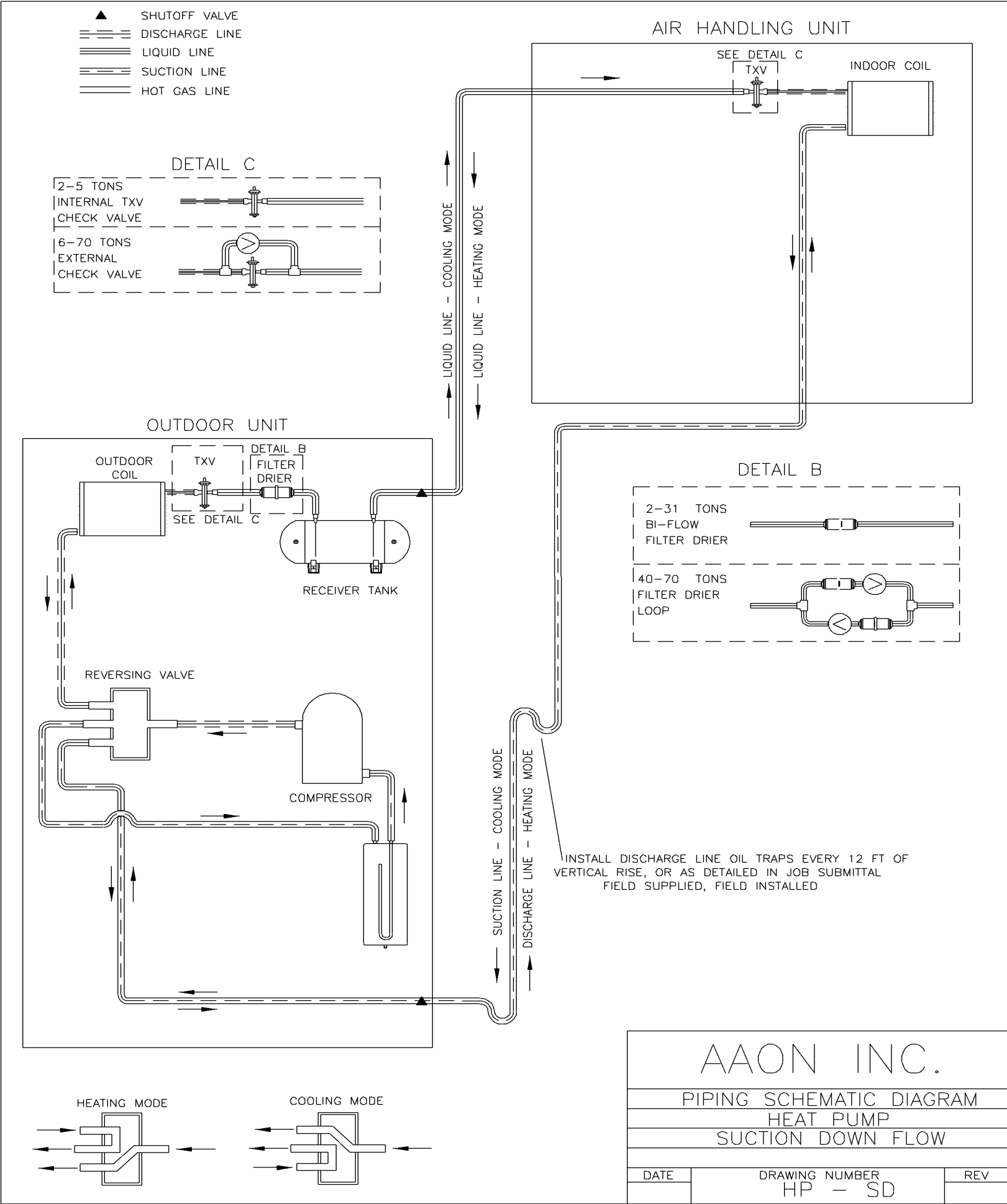
Quantity	Description	Part #:	Location

## Factory Supplied / Field Installed

Quantity	Description	Part #:	Location
-	N/A	-	-

## Field Supplied / Field Installed

Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU









# Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

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**CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB**

Tag: ACCU-1, 2 (air source HP) - Rev 1

Job Name:  
Job Number:

Duluth City Hall  
Job #6

Unit Submittal For:  
Unit Submittal Date:

January 27, 2022

	Base Option	Description
<b>CF</b>	Generation	CF - Condensing Unit
<b>A</b>	Major Rev	Major Revision
<b>025</b>	Unit Size	Twenty Five
<b>C</b>	Series	C Cabinet
<b>A</b>	Revision	Minor Revision
<b>8</b>	Voltage	208V/3Ø/60Hz
<b>D</b>	Compressor Style	R-410A Variable Capacity Scroll Comp
<b>J</b>	Condenser Style	Air-Source Heat Pump (Fin and Tube)
<b>0</b>	Configuration	Standard
<b>0</b>	Coating	Standard
<b>K</b>	Staging	1 Variable Refrig System + 1 On/Off Refrig System

	Feature Option	Description
<b>0</b>	1. Unit Orientation	Vertical Condenser Discharge with End Control Panel
<b>A</b>	2A. Refrigeration Control	5 Minute Compressor Off Timer & 20 Second Compressor Stage Delay
<b>0</b>	2B. Blank	Standard
<b>0</b>	3A. Refrigeration Options	Standard
<b>0</b>	3B. Blank	Standard
<b>C</b>	4. Refrigeration Accessories	Sight Glass + Compressor Isolation Valves
<b>0</b>	5. Blank	Standard
<b>A</b>	6A. Unit Disconnect Type	Single Point Power Non-Fused Disconnect
<b>R</b>	6B. Disconnect Size	150 Amps
<b>0</b>	6C. Blank	Standard
<b>1</b>	7. Accessories	Phase & Brown Out Protection + Suction Pressure Transducer on Each Refrigeration System + Compressor Sound Blanket
<b>N</b>	8A. Control Sequence	Field Installed DDC Controls Furnished by Others with Isolation Relays
<b>0</b>	8B. Control suppliers	Standard Terminal Block
<b>0</b>	8C. Control Supplier Options	Standard
<b>0</b>	BMS Connection and	
<b>0</b>	8D. Diagnostics	Standard
<b>0</b>	9. Blank	Standard
<b>0</b>	10. Blank	Standard
<b>B</b>	11. Maintenance Accessories	115VAC Convenience Outlet - Field Wired
<b>0</b>	12. Code Options	Standard ETL U.S.A. Listing
<b>J</b>	Air Cooled Condenser	
<b>0</b>	13. Accessories	Cond. Coil Guards + VFD Controlled Cond. Fans - Head Pressure Control
<b>0</b>	14. Blank	Standard
<b>0</b>	15. Blank	Standard
<b>C</b>	16. Electrical Options	10 KAIC
<b>A</b>	17. Shipping Options	Crating
<b>0</b>	18. Blank	Standard
<b>0</b>	19. Blank	Standard
<b>0</b>	20. Cabinet Material	Standard - Galvanized Steel Cabinet
<b>D</b>	21. Warranty	Extended Compressor Warranty - Years 2-5
<b>B</b>	22. Paint and SPAs	Premium AAON Gray Paint Exterior



# Points List

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094  
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

A1 A2 A3 A4 A5 1 2A 2B 3A 3B 4 5 6A 6B 6C 7 8A 8B 8C 8D 9 10 11 12 13 14 15 16 17 18 19 20 21 22

**CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB**

Tag: ACCU-1, 2 (air source HP) - Rev 1

Job Name: Duluth City Hall

For:

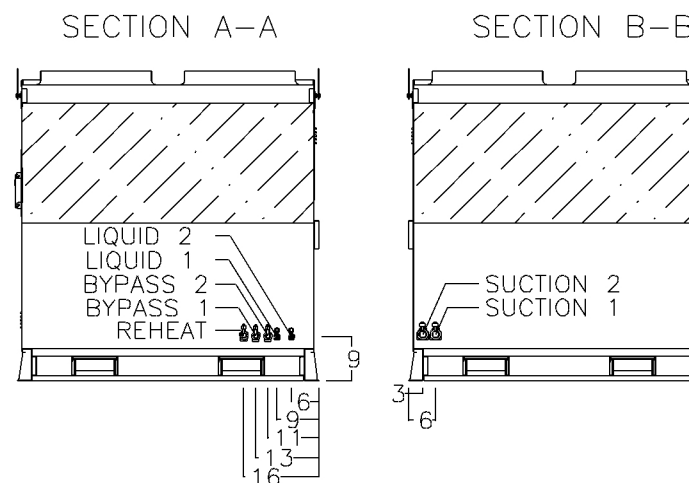
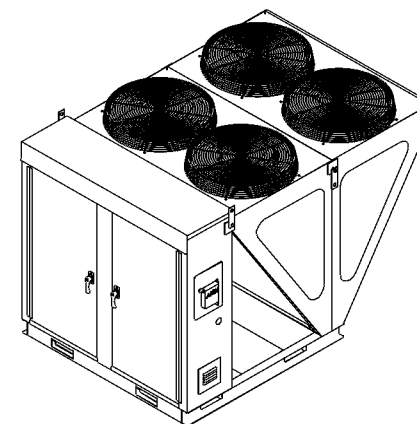
Job Number: Job #6

Date:

January 27, 2022

## Terminals Available/Required for Controlling the Unit

Terminal	Description
[C]	Common
[Y1], [Y2]	Cooling Stage Enable + Isolation Relay
[CC1-] & [CS1+]	Variable Capacity Compressor (0-5 VDC) Signal
[O]	Cool Enable for Heat Pump
[P51-] & [P61+], [P52-] & [P62+],	Suction Pressure Sensor (0-5 VDC)
[P3]	Suction Pressor Sensor Power (+5 VDC)
[W1]	Heat Enable Stage 1
[R+], [SH], [T-]	AAON Communications

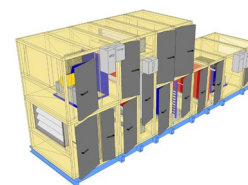


All dimensions are in units of inches



Job Name: Duluth City Hall				Unit Tag: ACCU-1, 2 (air source HP)				Rev 1
Configurator: CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB								
Shipping Weight: 1498 (±5%)			Operating Weight: 1498 (±5%)					
Clearances:	Compressor End: 36		Left: 30	Right: 36	Piping Connection End: 6		Top: OPEN	
Date: 1/27/2022						Software Ver. 4.316	v2.6.0.0	

Job Information		Technical Data Sheet
Job Name	Duluth City Hall	
Date	January 27 2022	
Submitted By	CV	
Software Version	12.71	
Unit Tag	DOAS-1, 2 - Rev 5 (with heat wheel)	



Unit Overview												
Model Number	Supply						Return/Exhaust					
	Air Volume cfm	Static Pressure		External Dimensions			Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in		External inWc	Total inWc	Height in	Width in	Length in
CAH018GDGM	7000	2.00	5.25	54*	68*	290	7000	1.50	3.26	54*	68*	150

\*Not including base rails, coil connectors, drain connectors and control boxes.

Unit		
Model Number:	CAH018GDGM	
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)	
Outer Panel:	Painted 24 gauge G60 Galvanized Steel	
Liner:	24 gauge Galvanized Steel (unless noted per section)	
Insulation:	R-13 Injected Foam	
Sound Baffles:	Included in Fan, Plenum, Access and Manual section (unless noted per section)	
Unit Configuration:	Stacked with opposed air flows	Drive (Handling) Location: Right
Base:	6" formed channel	Wall Thickness: 2 in
Altitude:	842 ft	Parts Warranty: Standard One Year

## Exhaust Air Stream

Mixing Box			Component: 1			Length: 28 in			Shipping Section: 8		
Portion	Damper					Blade Action	Rated CFM	Air Pressure Drop	Quantity		
	Size (length x width)		Location	Type	Actuation						
	Overall	Opening									
Outside Air	No opening	No opening		None		Opposed	7000 cfm		1		
Return Air	14 in x 64 in	14 in x 64 in	End	None	NA	None	7000 cfm	0.09 insWg	1		
Filter Data											
Type		Efficiency		Face Velocity		Face Area		Air Volume		Filter Loading	
Pleated		MERV 8		371 ft/min		18.9 ft²		7000 cfm		Side	
Air Pressure Drop					Number of Filters	Height	Width	Depth			
Clean Air	Mean Air	Dirty Air	User Spec								
0.15 inWc	0.58 inWc	1.00 inWc	N/A	4	24 in	24 in	2 in				
				2	24 in	12 in	2 in				
Door											
Location			Width				Opening				
Drive side			24 in				Outward				
Special Options											
Sound Baffle					Filter Gauge						
(As casing details)					Magnehelic 0-2"						
Special Text											
Extra filters 1 set(s)											

Recirculation Section		Component: 2		Length: 24 in		Shipping Section: 6			
Length	Width	Location		Dampers		Recirculation Air Volume		Air Pressure Drop	
20.00 in	58.00 in	Bottom		UltraSeal Low Leak		7000 cfm		0.00 inWc	

Energy Recovery		Component: 3			Length: 22 in			Shipping Section: 5	
Heat Wheel Model	Media Type	Wheel Diameter	Supply Air Volume	Face Velocity				Segmented Wheel	
				Supply Air		Return Air			
				Summer	Winter	Summer	Winter		
ECW 546-3A	Synthetic fiber - 3 angstrom	54 in	7000 cfm	858 ft/min	950 ft/min	869 ft/min	882 ft/min	No	
Electrical Supply	Bypass Damper Opening	Pressure Drop				Exhaust Air Volume	VFD	Adjustable Purge Plate	Motor Power
		Supply Air		Return Air					
		Summer	Winter	Summer	Winter				
115/60/1 V/Hz/Phase	16.00 x 64.00 / 16.00 x 64.00	0.97 insWg	0.97 insWg	0.94 insWg	0.94 insWg	7000 cfm	Yes	Yes	0.75 HP

## Summer Conditions

Outside Air		Return Air		Supply Air		Exhaust Air		Effectiveness			Total Energy Recovered
Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Latent	Sensible	Total	
88.0 °F	72.0 °F	75.0 °F	62.0 °F	80.0 °F	66.4 °F	83.1 °F	68.1 °F	57.97 %	63.75 %	60.27 %	
											139204 Btu/hr

## Winter Conditions

Outside Air		Return Air		Supply Air		Exhaust Air		Effectiveness			Total Energy Recovered
Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Latent	Sensible	Total	
-20.0 °F	-20.0 °F	70.0 °F	54.0 °F	34.1 °F	31.3 °F	11.0 °F	14.5 °F	60.73 %	66.61 %	65.41 %	
											522962 Btu/hr

## AHRI 1060 Certification

Application Rating is outside of the scope of AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.

## Door

Location	Width	Opening
Drive side	18 in	Outward

## Special Options

Sound Baffle	Static Pressure
(As casing details)	0.94 inWc

Access Section		Component: 4		Length: 22 in		Shipping Section: 2	
Air Pressure Drop							
0.00 inWc							
Door							
Location		Width			Opening		
Drive side		18 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							



Return/Exhaust Fan		Component: 5			Length: 54 in		Shipping Section: 1		
Fan Performance									
Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
7000 cfm	1.50 inWc	3.26 inWc	0.14 inWc	1.34	4.5 kW	5.21 BHP	1675 rpm	2403 rpm	0 ft/min
Fan Data									
Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location		
Centrifugal - Plenum	Airfoil / 2	1	22.25 in	Aluminum	9	-	Behind Fan		
Motor Data									
Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
7.5 HP	200/60/3 V/Hz/Phase	1750 rpm	Premium	ODP	213 T frame	Generic	4	162.28 A	23.30 A
Fan Options									
Wheel Guard:		Provided			Shaft Grounding Kit:		Provided		
Isolator Type:		Spring							
VFD/Starter/Disconnect Data									
Selection Type:		VFD			Vendor:		Daikin Applied		
Auxiliary Control:		Disconnect			Voltage:		200 v		
Disconnect Type:		Fused			Height x Width x Depth:		19.25 in x 7.36 in x 10.15 in		
Mounting:		Door Side			Enclosure:		NEMA 1		
VFD Quantity:		1							
Custom Openings									
Custom Opening		Location		Width		Height		Rainhood w/Screen	
1		End		48 in		28 in		None	
Door									
Location		Width			Opening			Light	
Drive side		24 in			Outward			LED marine light kit with GFI outlet	
Special Options									
Sound Baffle									
(As casing details)									
Special Text									
Add damper to EA opening									

## Supply Air Stream

Plenum Section		Component: 1		Length: 30 in		Shipping Section: 3	
Air Pressure Drop							
0.09 inWc							
Custom Dampers							
Custom Damper	Damper Type	Location	Size (Width x Height)		Material	Blade Action	Rainhood w/Screen
			Overall	Opening			
1	UltraSeal Low Leak	End	54 in x 28 in	44 in x 24 in	Galv. Steel	Parallel	None
Door							
Location		Width			Opening		
Drive side		26 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							

Combination Filter			Component: 2			Length: 22 in		Shipping Section: 3		
Access			Face Velocity			Face Area		Air Volume		
Side			371 ft/min			18.9 ft²		7000 cfm		
Portion	Type	Efficiency	Air Pressure Drop				Number of Filters	Height	Width	Depth
			Clean Air	Mean Air	Dirty Air	User Spec				
Pre-Filter	Pleated	MERV 8	0.15 inWc	0.58 inWc	1.00 inWc	N/A	4	24 in	24 in	2 in
							2	24 in	12 in	2 in
Filter	Pre Pleat	MERV 13	0.15 inWc	0.57 inWc	1.00 inWc	N/A	4	24 in	24 in	4 in
							2	24 in	12 in	4 in
Door										
Location			Width				Opening			
Drive side			12 in				Outward			
Special Options										
Sound Baffle			Pre-Filter Gauge				Final-Filter Gauge			
(As casing details)			Magnehelic				Magnehelic			
Special Text										
Extra filters 1 set(s)										

Access Section		Component: 3		Length: 24 in		Shipping Section: 4	
Air Pressure Drop							
0.00 inWc							
Door							
Location		Width			Opening		
Drive side		20 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							

Energy Recovery Section	Component: 4	Length: 22 in	Shipping Section: 5
See Exhaust Air Stream			

Recirculation Section		Component: 5		Length: 24 in		Shipping Section: 7	
Length	Width	Location		Dampers		Recirculation Air Volume	Air Pressure Drop
20.00 in	64.00 in	Top		UltraSeal Low Leak		7000 cfm	0.00 inWc

Direct Expansion Coil		Component: 6			Length: 34 in		Shipping Section: 9			
Coil Model	Total Capacity	Sensible Capacity	Number of Coils		Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)		
5EJ0806B	264502 Btu/hr	174594 Btu/hr	1		6	8	0.625 in	1.50 in x 1.299 in		
Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity	
	Entering		Leaving							
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb						
7000 cfm	80.0 °F	67.0 °F	56.5 °F	54.7 °F	0.58 insWg	42 in	55 in	16.04 ft²	436 ft/min	
Fluid			Sub-Cooled Refrigerant Liquid Temp.		Suction Vapor Superheat Temp. at Coil Outlet		Design Saturated Condensing Temp.		Total Refrigerant Weight	
Suction Temp.		Refrigerant								
46.0 °F		R410a		110.0 °F		8.0 °F		110.0 °F		51.00 lb
Connection [Data Per Coil]							Min. Fin Surface Temp.		Min. Tube Wall Surface Temp.	
Type	Liquid [Qty - Size]	Suction [Qty - Size]		Location	Material					
OD Sweat	2-0.88 in	2-1.63 in		Drive side	Copper tube	32.0 °F		32.0 °F		
Material						Drain Pan		Drain Side		
Fin	Tube		Header		Case					
Aluminum .0075 in	Copper .020 in		Copper		Galv. steel	Stainless steel		Drive side		

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

## AHRI 410 Certification

Coil is NOT certified by AHRI

## Door

Location	Width	Opening
Drive side	18 in	Outward

## Special Options

### Sound Baffle

(As casing details)

Future Hot Water Coil		Component: 7		Length: 28 in		Shipping Section: 10			
Number of Coils				Number of Rows					
1				1					
Coil Air Pressure Drop		Finned Height		Finned Width		Face Area		Face Velocity	
0.20 inWc		42 in		52 in		15.17 ft²		462 ft/min	
Connection Location				Connection Material					
Drive side				Carbon steel					
Coil Model		Drain Pan				Drain Pan Side			
Future Coil (Not Supplied)		None				-			
AHRI 410 Certification									
Coil is NOT certified by AHRI									
Door									
Location		Width				Opening			
Drive side		18 in				Outward			
Special Options									
Sound Baffle									
(As casing details)									
Special Text									
HGRH Coil									

Hot Water Coil		Component: 8			Length: 30 in		Shipping Section: 11	
Coil Model	Total Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter		Tube Spacing (Face x Row)	
5WH0903B	726205 Btu/hr	1	3	9	0.625 in		1.50 in x 1.299 in	
Air Volume	Air Temperature		Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity	
	Entering	Leaving						
	Dry Bulb	Dry Bulb						
7000 cfm	-20.0 °F	77.9 °F	0.21 inWc	42 in	55 in	16.04 ft²	436 ft/min	
Fluid		Flow Rate	Pressure Drop	Velocity	Volume	Weight		
Entering	Leaving							
160.0 °F	118.8 °F	37.50 gpm	3.80 ftHd	2.90 ft/s	7.0 gal	66.00 lb		
Connection [Data Per Coil]				Glycol Type	Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.	Fouling Factor	
Type	Size	Location	Material					
Threaded	2.00 in	Drive side	Carbon steel	Propylene (35%)	118.8 °F	118.8 °F	0.000	
Material								
Fin		Tube		Header		Case		
Aluminum .0075 in		Copper .020 in		Copper		Galv. steel		
AHRI 410 Certification								
Coil is NOT certified by AHRI								
Door								
Location		Width			Opening			
Drive side		18 in			Outward			
Special Options								
Sound Baffle								
(As casing details)								

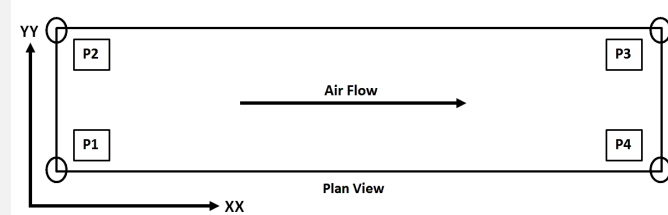
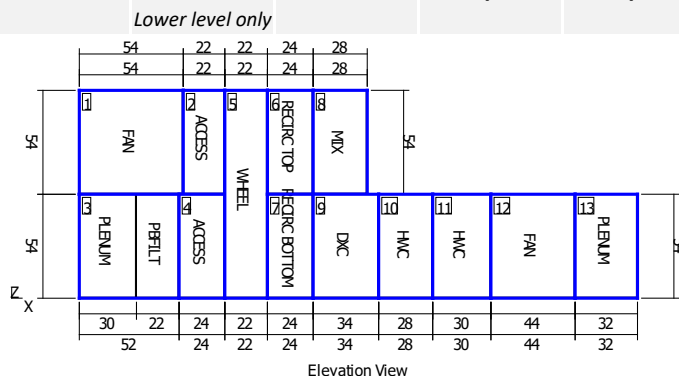
Supply Fan		Component: 9			Length: 44 in		Shipping Section: 12		
Fan Performance									
Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
7000 cfm	2.00 inWc	5.25 inWc	0.00 inWc	1.30	7.0 kW	8.30 BHP	1951 rpm	2403 rpm	0 ft/min
Fan Data									
Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location		
Centrifugal - Plenum	Airfoil / 2	1	22.25 in	Aluminum	9	Axial	Behind Fan		
Motor Data									
Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
10.0 HP	200/60/3 V/Hz/Phase	1750 rpm	Premium	ODP	215 T frame	Generic	4	193.29 A	29.50 A
Fan Options									
Wheel Guard:		Provided			Shaft Grounding Kit:		Provided		
Isolator Type:		Spring							
VFD/Starter/Disconnect Data									
Selection Type:		VFD			Vendor:		Daikin Applied		
Auxiliary Control:		Disconnect			Voltage:		200 v		
Disconnect Type:		Fused			Height x Width x Depth:		19.25 in x 7.36 in x 10.15 in		
Mounting:		Door Side			Enclosure:		NEMA 1		
VFD Quantity:		1							
Panel									
Location			Width			Opening			
Removable panels			- in			Outward			
Special Options									
Sound Baffle									
(As casing details)									

Plenum Section		Component: 10		Length: 32 in		Shipping Section: 13			
Air Pressure Drop									
0.05 inWc									
Custom Openings									
Custom Opening		Location		Width		Height		Rainhood w/Screen	
1		End		48 in		24 in		None	
Door									
Location		Width		Opening		Light			
Drive side		20 in		Inward		LED marine light kit with GFI outlet			

Unit Sound Power (dB)								
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	74	75	78	66	63	56	46	51
Unit Discharge:	78	75	82	77	78	76	70	64
Unit Return:	74	77	83	77	71	69	62	56

## Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	54	902	281	259	169	192	22	32	28
2	22	213	46	46	60	60	12	34	33
3	52	602	143	143	159	159	27	34	29
4	24	283	64	64	78	78	13	34	27
5	22	1015	234	234	254	254	11	34	57
6	24	199	49	49	61	61	13	34	33
7	24	261	64	64	76	76	13	34	26
8	28	326	74	74	88	88	15	34	33
9	34	767	240	226	143	158	13	33	28
10	28	367	95	95	89	89	14	34	26
11	30	582	187	176	105	115	11	33	29
12	44	862	251	225	180	205	20	32	25
13	32	470	117	117	117	117	16	34	29
Entire Unit	290	6849	n/a	n/a	n/a	n/a	n/a	n/a	n/a



NOTE: Special components aren't included in the corner weights and center of gravity data.

## Supply Static Pressure Drop

Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.09 insWg
Panel and Bag Filter	Panel and Bag Filter	1.15 insWg
Access Section	Access Section	
Energy Recovery Section	Summer	0.97 insWg
Bottom Recirc Section	Bottom Recirc Section	
DX Coil	DX Coil	0.58 insWg
Hot Water Coil	Hot Water Coil	0.20 insWg
Hot Water Coil	Hot Water Coil	0.21 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.05 insWg
External Static	External Static	2.00 insWg
Total Supply Fan Static		5.25 insWg

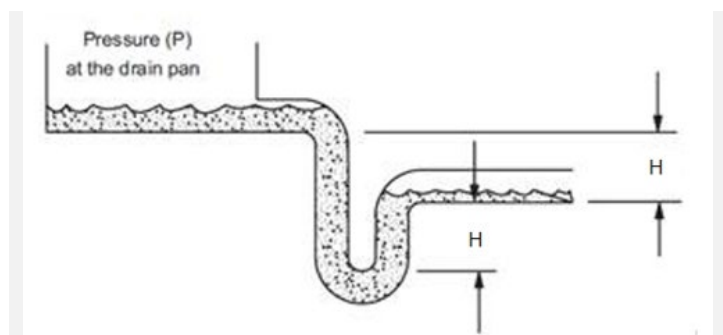


## Exhaust Static Pressure Drop

Component	Option	Static Pressure Drop
Mixing Box	Filter	0.58 insWg
Mixing Box	Mixing Box	0.10 insWg
Top Recirc Section	Top Recirc Section	
Energy Recovery Section	Summer	0.94 insWg
Access Section	Access Section	
Return Fan	Cabinet	0.14 insWg
External Static	External Static	1.50 insWg
<b>Total Return/Exhaust Fan Static</b>		<b>3.26 insWg</b>

## Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
9	DX Coil	7.52



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

## AHRI Certification



Certified in accordance with the AHRI Central Station Air-Handling Unit Certification Program, which is based on AHRI Standards 430/431. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

## Notes

### Important

1. This unit may not meet ASHRAE Standard 90.1 - 2007 fan motor power limitations for the year and system selected. If that code applies, alternate fan selections may be required.
2. The designer and installer must ensure compliance with applicable codes. A component supplier cannot determine the brake horsepower ("BHP") for other motors in the air handling system.
3. Before approving this unit, determine whether ASHRAE Standard 90.1 - 2007 has been adopted in the specific jurisdiction or contract specifications in which the unit will be installed.



Selection ID: 183953  
Date: 01/28/2022

## Dry Fluid Cooler

**GFW 090.2D06/6SA-E255U/04P.M**

Quantity: 1

Design Working Fluid Flow/Capacity:	255.0 GPM / 1203 MBH	Working Fluid:	35% Propylene Glycol
Rated Capacity vs. Design:	101.3 %	Entering Fluid Temperature:	110.0 °F
Air Flow per Unit:	93316 CFM	Leaving Fluid Temperature:	100.0 °F
Air Inlet Dry Bulb Temperature:	92.0 °F	Fluid Pres. Drop at Design Flow:	10.53 psig
Air Inlet Wet Bulb Temperature:	75.0 °F	Elevation:	0 ft

### Detailed Unitary Data

Fans:	6, suitable for 230V/3Ph/60Hz	Sound Pressure @ 3ft:	73 dB(A)
Total Fan Power in/out:	15.3 kW / 18.9 HP, nominal	Sound Pressure @ 30ft:	61 dB(A)
FLA:	46.8 A	Sound Power Level:	93 dB(A)
MCA:	48.8 A		
MOCP:	50.0 A		
Angular Fan Velocity:	1050 RPM		

Casing:	Galv. Powder coated	Interior Coil Volume:	12.8 ft³
Coil:	Copper	Max Operating Pressure:	232 psia
		Number of Support Anchors:	14
		Fin Material:	Aluminum
		Fin Spacing:	12.7 FPI

### Dimensions

Height:	5.7 ft
Width:	4.7 ft
Length, nominal:	26.4 ft

### Weights

Shipping:	6463 lbs
Operating:	6510 lbs

### Headers and Connections (Diameters)

#### Coil

Inlet Connections:	2 x 3.125 in
Outlet Connections:	2 x 3.125 in

#### Headers:

Inlet:	3.125 in
Outlet:	3.125 in

### Reference Information

S-GFWD 090.1/6-U(4)-G6/01/4P.M

### Options

Flange connections, ANSI 150#  
BACnet MSTP

Important Remarks / Explanatory Notes

Price does not include freight unless otherwise stated

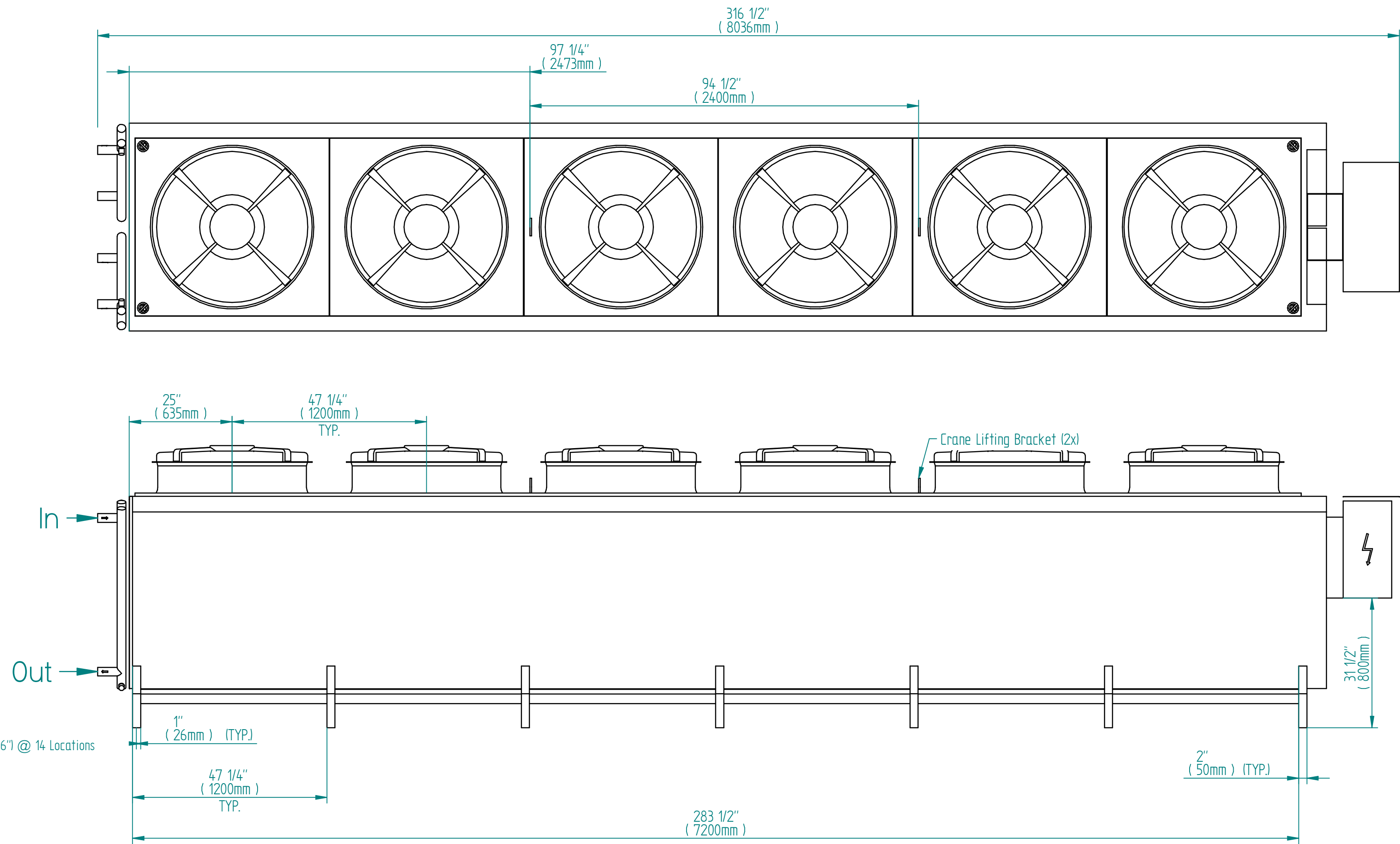
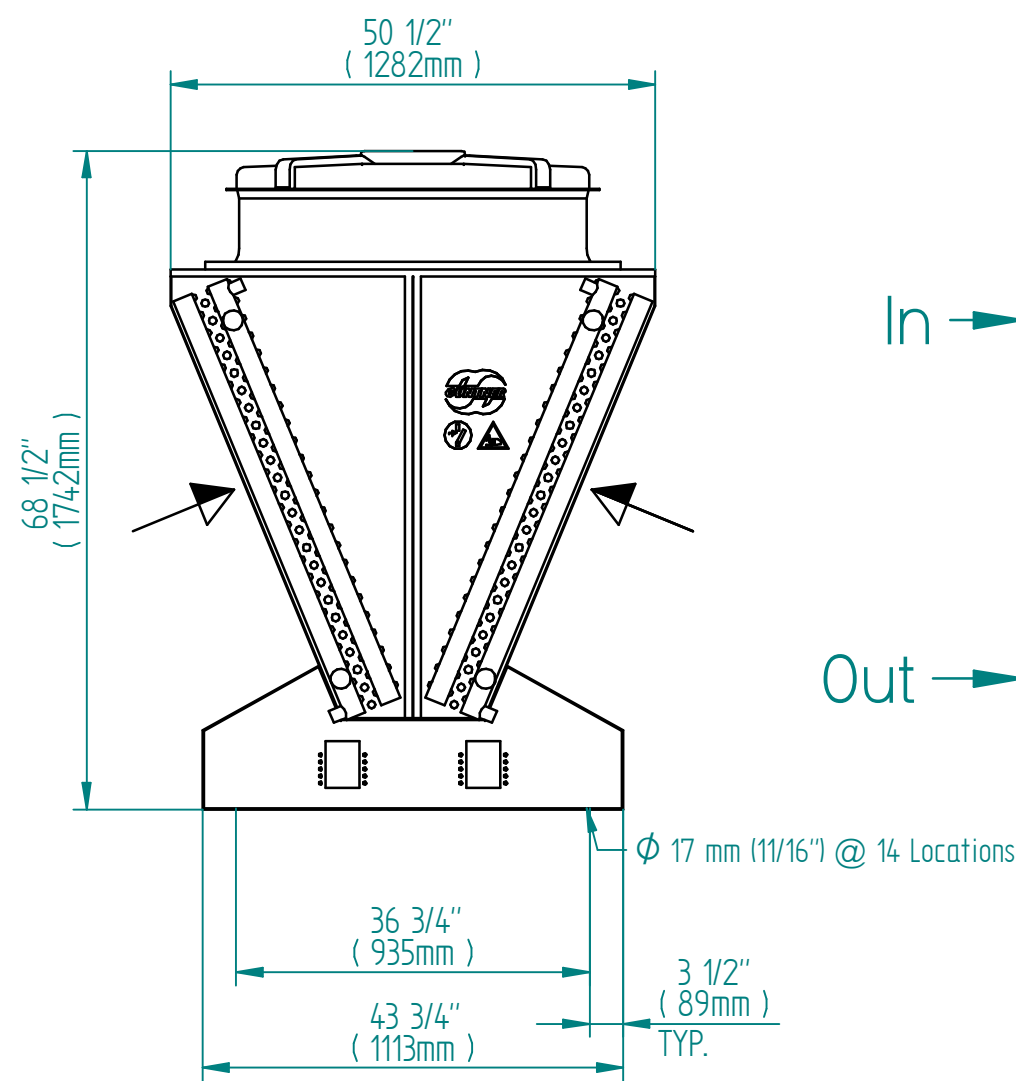
### Service

Terms of Delivery:	FCA Laredo, TX
Payment Cond:	.
Delivery Time:	.
Validity:	03/29/2022

Our general terms of sales and delivery apply.

**Güntner is not liable for unit and system damage due to lack of freeze protection for coils installed in freezing climates**

measures without specification of tolerances:  
welding / brazing: DIN EN ISO 15920, tolerance class 0  
general tolerances: DIN ISO 2768-1, tolerance class component parts m / assembly sg, tolerance class component parts K / assembly L, length >3m EN 1062, tolerance straightness and flatness 0002xl (length)  
general tolerances: DIN ISO 2768-2, tolerance class component parts m / assembly v, length >4m DIN 7168, tolerance class component parts m / assembly sg, tolerance class component parts K / assembly L, length >3m EN 1062, tolerance straightness and flatness 0002xl (length)



Reference #:		Project:						
Notes: Preliminary Drawing. Do not use for construction. Coil inlet and outlet details and quantities often vary from the sample shown above								
Güntner U.S. Ref. #:	Dimensions in inches (mm)		scale	1 : 20	sheet	1/1	size	DIN A2
			material					
			weight [kg]					
			notice					
			type	GWV-GFW 090.2/6				
			name	Condenser / Cooler				
			Baan-No.					
	revision	date	name	drawing number	1142021102544	index		
		date	name	customer				
drawn: 1/14/2021		cadbot	project/ quantity					
certified:			order/ position					

# ADDENDUM



**Date:** May 18, 2022  
**Project:** City of Duluth City Hall MEP Renewal  
**KFI Project Number:** 21-0486.00  
**Addendum Number:** 1

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THIS ADDENDUM IS A CONTRACT DOCUMENT AND MAY APPLY TO ANY OR ALL CONTRACTS AND SUBCONTRACTS UNLESS OTHERWISE SPECIFIED HEREIN OR SHOWN ON THE ATTACHED DRAWINGS (IF ANY). ALL WORK REQUIRED BY THIS ADDENDUM SHALL BE IN COMPLETE ACCORD WITH THE CONTRACT DOCUMENTS AND SUBSEQUENT ADDENDA THERETO. THE ITEMS LISTED IN THIS ADDENDUM ARE NOT IN ANY ORDER IN REGARD TO THE DRAWINGS OR THE SPECIFICATIONS. ALL CONTRACTORS ARE CAUTIONED TO EXAMINE EACH AND EVERY ITEM OF THIS ADDENDUM.

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THE FOLLOWING CHANGES OR CLARIFICATIONS TO THE PLANS & SPECIFICATIONS SHALL BE INCLUDED AS PART OF THE CONTRACT DOCUMENT

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## **BENTZ THOMPSON RIETOW (BTR) CHANGES:**

1. See attached BTR narrative, specification section 055200 and revised "A"-drawings.

## **PLAN SHEET CHANGES:**

1. Sheet M351 Hydronic Plan 3<sup>rd</sup> Floor Area A Rev 1. See attached for modifications.
2. Sheet M352 Hydronic Plan 3<sup>rd</sup> Floor Area B Rev 1. See attached for modifications.
3. Sheet M353 Hydronic Plan 3<sup>rd</sup> Floor Area C Rev 1. See attached for modifications.
4. Sheet M354 Hydronic Plan 3<sup>rd</sup> Floor Area D Rev 1. See attached for modifications.
5. Sheet M361 Hydronic Plan 4<sup>th</sup> Floor Area A Rev 1. See attached for modifications.
6. Sheet M364 Hydronic Plan 4<sup>th</sup> Floor Area D Rev 1. See attached for modifications.
7. Sheet M900 Mechanical Schedules R1. See attached for modifications.
8. Sheet M904 Mechanical Schedules R1. See attached for modifications.
9. Sheet E500 Luminaire Schedule R1. See attached for modifications.

*END OF ADDENDUM*

**May 17, 2022**

**BENTZ / THOMPSON / RIETOW, INC.**

Architects  
900 Second Avenue S.  
Minneapolis, MN 55402  
(612) 332-1234

**ADDENDUM NO. 1** of the Plans and Specifications for the construction of

**CITY HALL MEP RENEWAL CONSTRUCTION**

BTR Commission Number: 21075

This Addendum is added to and shall become part of the CD documents, dated June 2, 2022.

**A. Specifications**

- 1.) Section 05 52 00 HANDRAILS AND RAILINGS is added to the Project Manual.

**B. Drawings**

- 1.) Sheet A220: 1/A110 is changed to 1/A220.
- 2.) Sheet A230: 1/A110 is changed to 1/A230.
- 3.) Sheet A240
  - a. 1/A110 is changed to 1/A240.
  - b. 1/A240 is reissued to include the keynote tags.
- 4.) Sheet A250: 1/A110 is changed to 1/A250.
- 5.) Sheet A260: 1/A110 is changed to 1/A260.
- 6.) Sheet A300
  - a. Sheet name is changed from A443 to A300.
  - b. Keyplan hatch is revised to be more legible.
- 7.) Sheet A301 is added to the drawing set. Included in this is revision are the following:
  - a. 1/A301 Enlarged Plan – Third Floor Areas C & D.
  - b. 2/A301 Typical Roof Fall protection.
  - c. Keyplan.

Attachments: Sheets A220, A230, A240, A250, A260, A300 and A301.

**END OF ADDENDUM NO. 1**

## **SECTION 05 52 00**

### **ROOF EDGE PROTECTION**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Roof edge protection.

##### **1.2 ACTION SUBMITTALS**

- A. Product Data:
  - 1. Manufacturer's data sheets on each product to be used, including:
    - a. Preparation instructions and recommendations.
    - b. Storage and handling requirements and recommendations.
    - c. Installation methods.
- B. Shop Drawings: Include plans, elevations, sections, details of components, and attachments to other work.
- C. Selection Samples: For each finish product specified, two complete sets of color chips.

##### **1.3 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to the job site in good condition and adequately protected against damage.
- B. Inspect rail section for damage before signing the receipt from the trucking company. Truck driver must note damaged goods on the bill of lading if damaged product is found.
- C. Store products in manufacturer's unopened packaging until ready for installation.

##### **1.4 PROJECT CONDITIONS**

- A. Field measurements: Check actual dimensions of other adjoining construction and existing conditions by accurate field measurements before fabrication.

##### **1.5 Warranty**

- A. Provide manufacturer's warranty: 2-year minimum.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
    - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.

### 2.2 SYSTEM

- A. Basis of Design: BlueWater Mfg., Inc., 4064 Peavey Rd.; Chaska, MN 55318: Phone: 866-933-2935 or 952-448-2935. Email: [info@bluewater-mfg.com](mailto:info@bluewater-mfg.com); Web: [www.bluewater-mfg.com](http://www.bluewater-mfg.com).
1. SafetyRail 2000 Roof Edge Protection: Provide non-penetrating guardrail system. System shall have top and mid rail in accordance with OSHA Standards 29 CFR 1920.20 (b)(1)(2).
  2. Height: 42" minimum.
  3. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
  4. Mounting Bases: Class 30 gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
  5. Receiver Posts: Shall have a positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed. Receiver posts shall have drain holes.
  6. Hardware: Securing pins shall be 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and lanyard that connects to lynch pin
  7. Finish: Factory finished powder coat paint.
  8. Color: Custom color to be selected by Architect.
- B. Other acceptable manufacturers and products:
1. Unistrut Loregard.

### 2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

## 2.4 STEEL RAILINGS

- A. Tubing: **ASTM A500/A500M (cold formed)**.
- B. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C. Plates, Shapes, and Bars: ASTM A36/A36M.
- D. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

## 2.5 FITTINGS

- A. Type: Provide fittings required for a complete operational system that meets OSHA requirements.

## 2.6 FASTENERS

- A. Fastener Materials:
  - 1. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
- B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193[ or **ICC-ES AC308**].
  - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

## 2.7 MISCELLANEOUS MATERIALS

- A. Roof Pads: Provide the following pad under each base to protect roof membrane.
  - 1. EPDM Roof Pad.

## 2.8 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately.
  - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated.
  - 2. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.

- C. Form changes in direction as follows:
  - 1. As detailed.
- D. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- E. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

### **PART 3 - EXECUTION**

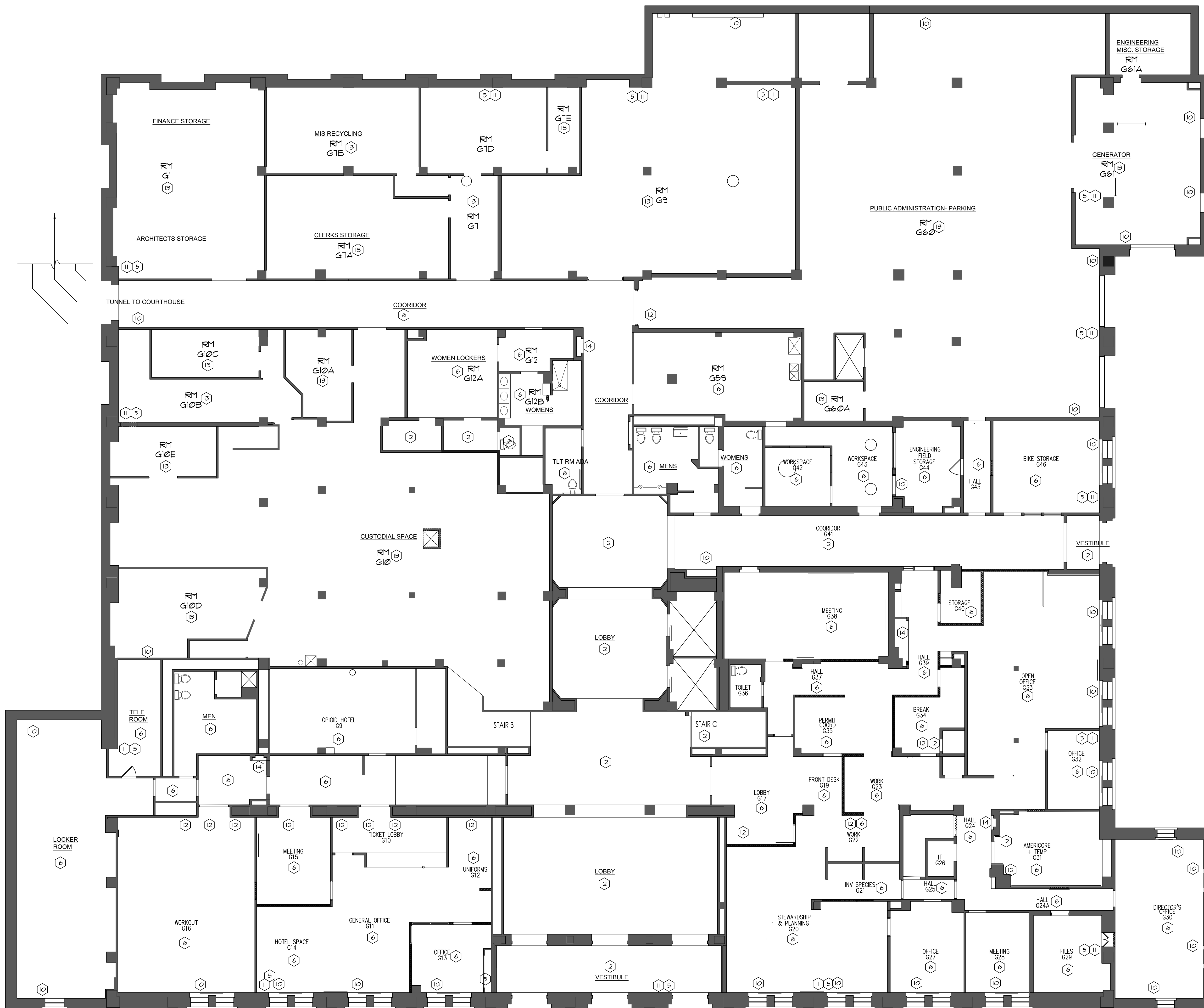
#### **3.1 INSTALLATION, GENERAL**

- A. Install in accordance with manufacturer's instructions.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
  - 1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

#### **3.2 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION 055213**

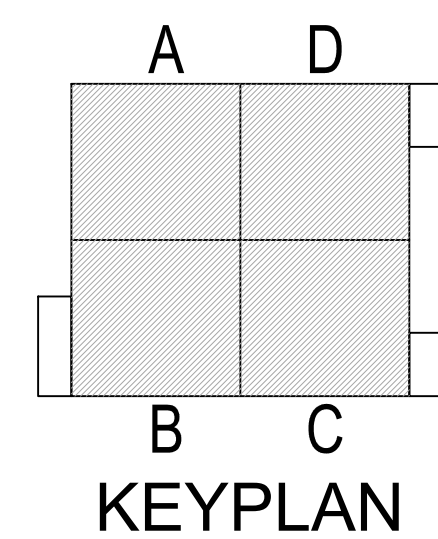


DRAWING LEGEND	
	EXISTING TO REMAIN
	DEMOLITION
	NEW PLASTER CEILING
	NEW GYPSUM BOARD SOFFIT

REFLECTED CEILING PLAN KEYNOTES	
(ALL KEYNOTES DO NOT APPEAR ON EVERY PLAN)	
1	DEMOLITION PATCH AND REPAIR OF EXISTING PLASTER CEILING WHERE EXIST MECHANICAL DUCT WORK IS REMOVED AND/OR NEW MECHANICAL DUCT WORK RUNS ABOVE CEILING. DEMO AS LITTLE AS POSSIBLE. SEE MECHANICAL DRAWINGS FOR DUCT SIZES AND LOCATIONS.
2	EXIST PLASTER CEILING TO REMAIN.
3	REMOVE EXIST GYP BD SOFFIT.
4	EXIST PLASTER OR GYP BD SOFFIT TO REMAIN.
5	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR CONSTRUCTION WHERE WORK OCCURS TO INSTALL NEW CONDENSATE PIPE.
6	REMOVE AND SALVAGE ACOUSTICAL CEILING TILE, GRID, HANGER WIRES, ETC. ONLY AS REQUIRED FOR MECHANICAL AND ELECTRICAL WORK. REINSTALL IN SAME LOCATION. REPLACE CEILING TILES DAMAGED DURING CONSTRUCTION.
7	REMOVE AND REPLACE SUSPENDED ACOUSTICAL CEILING SYSTEM IN PLACE.
8	EXIST COFFERED CEILING TO REMAIN. DO NOT DISTURB THE EXISTING CEILING FINISHES AND STRUCTURE.
9	NEW GYP BD SOFFIT TO ENCLOSE NEW MECHANICAL DUCTS.
10	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR WHERE WORK OCCURS TO REMOVE A STEAM RADIATOR, CAP ABANDONED STEAM PIPE OR NEW HYDRONIC PIPING IS INSTALLED. SEE MECHANICAL DRAWINGS.
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13	EXPOSED STRUCTURE AT CEILING IS EXISTING TO REMAIN. FIRESTOP ALL NEW PENETRATIONS IN EXISTING FLOOR STRUCTURE.
14	PROVIDE NEW PLYWOOD BACKING PANEL, SECURED TO EXISTING WALL. SEE ELECTRICAL DRAWING DETAIL VET00, AND ARCHITECTURAL DETAIL ON SHEET E300.
15	DEMOLITION PATCH AND REPAIR OF EXISTING PLASTER CEILING WHERE HYDRONIC PIPING RUNS ABOVE EXISTING PLASTER CEILING. DEMO AS LITTLE AS POSSIBLE TO ALLOW FOR INSTALL OF THE NEW PIPING. SEE MECHANICAL DRAWINGS FOR PIPE SIZES AND LOCATIONS.
16	EXISTING SKYLIGHT TO REMAIN.

ARCHITECTURAL GENERAL NOTES	
1.	CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY ARCHITECT OF ANY CONFLICT AND/OR DISCREPANCIES PRIOR TO COMMENCING WORK.
2.	CONTRACTOR SHALL VISIT THE SITE AND INVESTIGATE ALL FIELD CONDITIONS PRIOR TO BIDDING AND CONSTRUCTION.
3.	THE GENERAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS IN THE DRAWINGS THAT ARE BASED ON FIELD MEASURING/OBSERVATION OF EXISTING CONSTRUCTION.
4.	EXISTING CONSTRUCTION SCHEDULED TO REMAIN THAT IS DAMAGED AS A RESULT OF THE WORK SHALL BE REPAIRED TO AN EXTENT AND AS REQUIRED TO MATCH ADJACENT EXISTING UNDAMAGED CONSTRUCTION.
5.	OWNER WILL OCCUPY THE PREMISES DURING ENTIRE CONSTRUCTION PERIOD. COOPERATE WITH OWNER DURING CONSTRUCTION OPERATIONS TO MINIMIZE CONFLICTS AND FACILITATE OWNER USAGE. PERFORM THE WORK SO AS NOT TO INTERFERE WITH OWNER'S OPERATIONS.
6.	MAINTAIN ACCESS TO EXISTING EXITS, WALKWAYS, CORRIDORS, OR OTHER OCCUPIED OR USED FACILITIES. DO NOT CLOSE OR OBSTRUCT WALKWAYS, CORRIDORS, OR OTHER OCCUPIED OR USED FACILITIES WITHOUT WRITTEN PERMISSION FROM OWNER AND AUTHORITIES HAVING JURISDICTION.
7.	THE BUILDING AND SITE IS A HISTORIC PROPERTY. FINISHES IN PUBLIC AREAS MUST BE REPLACED TO MATCH EXISTING FINISHES AND CONSTRUCTION.

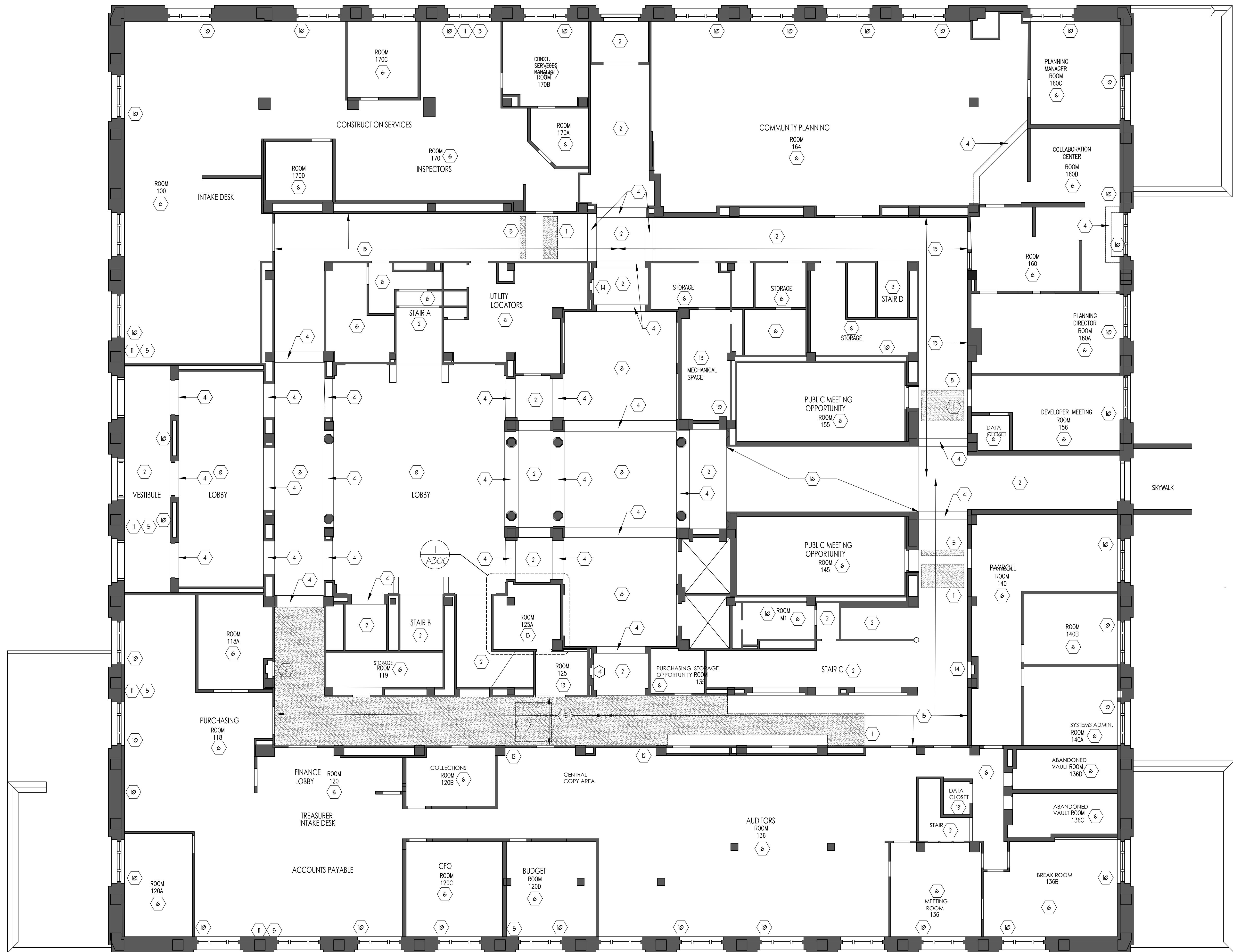
REFLECTED CEILING PLAN GENERAL NOTES	
A.	ALL SUSPENDED ACOUSTICAL CEILING TILE (ACT) SYSTEMS THAT ARE REMOVED MUST EITHER BE PUT BACK IN PLACE OR REPLACED AS REQUIRED BY THE SCOPE OF THE MECHANICAL AND ELECTRICAL WORK.
B.	ALL PLASTER CEILINGS THAT ARE REMOVED SHALL BE REPLACED IN THE EXACT SAME LOCATION AND MUST MATCH AND ALIGN WITH ADJACENT PLASTER CEILINGS.
C.	SEE MECHANICAL AND ELECTRICAL FOR ADDITIONAL INFORMATION.
D.	EXISTING LIGHT FIXTURES TO REMAIN UNLESS OTHERWISE NOTED. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.
E.	PROVIDE FIRESTOPPING AT ALL RATED FLOOR AND WALL PENETRATIONS. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS.
F.	PROVIDE JOINT SEALANT AT ALL LOCATIONS WHERE DISSIMILAR MATERIALS ADJOIN.
G.	ALL EXISTING CEILING AND WALL CONSTRUCTION AND FINISHES IMPACTED BY THE MECHANICAL AND ELECTRICAL WORK SHALL BE PATCHED AND REPAIRED TO MATCH EXISTING CONDITIONS.



1 A220 REFLECTED CEILING PLAN-GROUND FLOOR  
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DRAWING LEGEND	
	EXISTING TO REMAIN
	DEMOLITION
	NEW PLASTER CEILING
	NEW GYPSUM BOARD SOFFIT

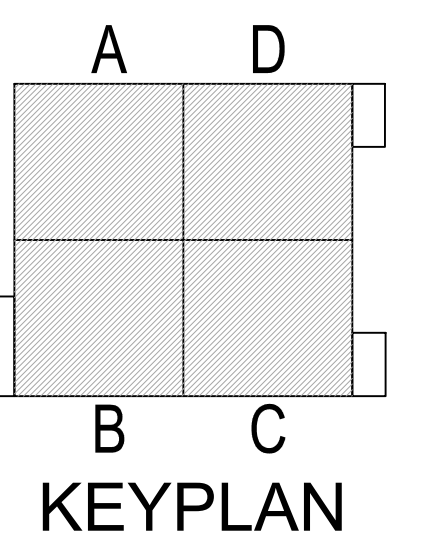
#### REFLECTED CEILING PLAN KEYNOTES

(ALL KEYNOTES DO NOT APPEAR ON EVERY PLAN)

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- PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR WHERE TRANSFER FAN IS REMOVED.
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- EXISTING SKYLIGHT TO REMAIN.

- #### ARCHITECTURAL GENERAL NOTES
- CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY ARCHITECT OF ANY CONFLICT AND/OR DISCREPANCIES PRIOR TO COMMENCING WORK.
  - CONTRACTOR SHALL VISIT THE SITE AND INVESTIGATE ALL FIELD CONDITIONS PRIOR TO BIDDING AND CONSTRUCTION.
  - THE GENERAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS IN THE DRAWINGS THAT ARE BASED ON FIELD MEASUREMENTS/OBSERVATION OF EXISTING CONSTRUCTION.
  - EXISTING CONSTRUCTION SCHEDULED TO REMAIN THAT IS DAMAGED AS A RESULT OF THE WORK SHALL BE REPAIRED TO AN EXTENT AND AS REQUIRED TO MATCH ADJACENT EXISTING UNDAMAGED CONSTRUCTION.
  - OWNER WILL OCCUPY THE PREMISES DURING ENTIRE CONSTRUCTION PERIOD. COOPERATE WITH OWNER DURING CONSTRUCTION OPERATIONS TO MINIMIZE CONFLICTS AND FACILITATE OWNER USAGE. PERFORM THE WORK SO AS NOT TO INTERFERE WITH OWNER'S OPERATIONS.
  - MAINTAIN ACCESS TO EXISTING EXITS, WALKWAYS, CORRIDORS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES. DO NOT CLOSE OR OBSTRUCT WALKWAYS, CORRIDORS, OR OTHER OCCUPIED OR USED FACILITIES WITHOUT WRITTEN PERMISSION FROM OWNER AND AUTHORITIES HAVING JURISDICTION.
  - THE BUILDING AND SITE IS A HISTORIC PROPERTY. FINISHES IN PUBLIC AREAS MUST BE REPLACED TO MATCH EXISTING FINISHES AND CONSTRUCTION.

- #### REFLECTED CEILING PLAN GENERAL NOTES
- ALL SUSPENDED ACOUSTICAL CEILING TILE (ACT) SYSTEMS THAT ARE REMOVED MUST EITHER BE PUT BACK IN PLACE OR REPLACED AS REQUIRED BY THE SCOPE OF THE MECHANICAL AND ELECTRICAL WORK.
  - ALL PLASTER CEILINGS THAT ARE REMOVED SHALL BE REPLACED IN THE EXACT SAME LOCATION AND MUST MATCH AND ALIGN WITH ADJACENT PLASTER CEILINGS.
  - SEE MECHANICAL AND ELECTRICAL FOR ADDITIONAL INFORMATION.
  - EXISTING LIGHT FIXTURES TO REMAIN UNLESS OTHERWISE NOTED. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.
  - PROVIDE FIRESTOPPING AT ALL RATED FLOOR AND WALL PENETRATIONS. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS.
  - PROVIDE JOINT SEALANT AT ALL LOCATIONS WHERE DISSIMILAR MATERIALS ADJOIN.
  - ALL EXISTING CEILING AND WALL CONSTRUCTION AND FINISHES IMPACTED BY THE MECHANICAL AND ELECTRICAL WORK SHALL BE PATCHED AND REPAIRED TO MATCH EXISTING CONDITIONS.



1 A230 REFLECTED CEILING PLAN—FIRST FLOOR  
1/4" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.	
PRINT NAME: RANDY MOE	DATE: 05-17-2022 REG. NO.: 20116
No. 1	5/17/22
By: ADDENDUM 1	Revision:

BENTZ THOMPSON RIETOW	
900 SECOND AVENUE S, SUITE 400 MINNEAPOLIS, MN 55402 612.332.1234	

KFI ENGINEERS	670 County Road B West St. Paul, Minnesota 55113 Tel: (651) 771-0880 Fax: (651) 771-0878 Email: kfi@kfi-eng.com
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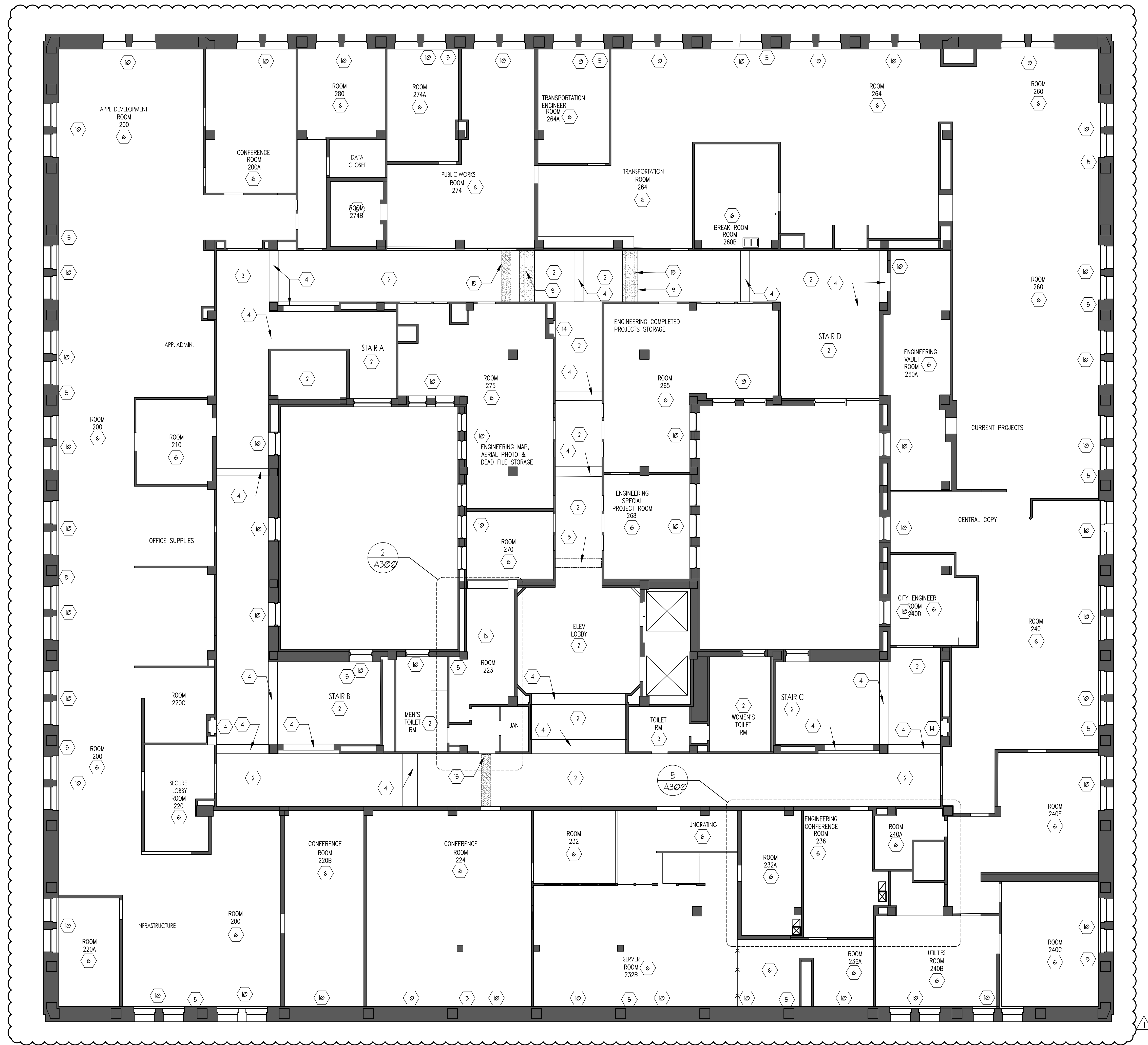
Project Title:	CITY OF DULUTH CITY HALL MEP RENEWAL DESIGN
	411 WEST 1ST STREET DULUTH, MN 55802

Sheet Title:	REFLECTED CEILING PLAN FIRST FLOOR
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Date:	05-17-2022
Drawn By:	BTR
Checked By:	RLM
Project No:	21-0486
DWG Scale:	AS NOTED
Sheet Size:	30x42

Revision Number:	1
Sheet Number:	A230



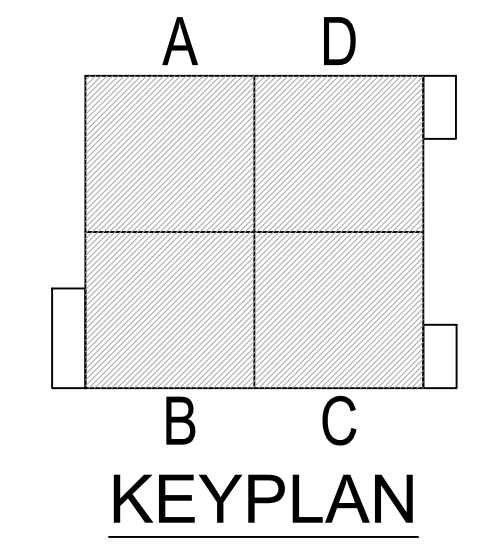


DRAWING LEGEND	
	EXISTING TO REMAIN
	DEMOLITION
	NEW PLASTER CEILING
	NEW GYPSUM BOARD SOFFIT

REFLECTED CEILING PLAN KEYNOTES	
(ALL KEYNOTES DO NOT APPEAR ON EVERY PLAN)	
1	DEMOLITION, PATCH AND REPAIR OF EXISTING PLASTER CEILING WHERE EXIST MECHANICAL DUCT WORK IS REMOVED AND/OR NEW MECHANICAL DUCT WORK RUNS ABOVE CEILING. DEMO AS LITTLE AS POSSIBLE. SEE MECHANICAL DRAWINGS FOR DUCT SIZES AND LOCATIONS.
2	EXIST PLASTER CEILING TO REMAIN.
3	REMOVE EXIST GYP BD SOFFIT.
4	EXIST PLASTER OR GYP BD SOFFIT TO REMAIN.
5	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR CONSTRUCTION WHERE WORK OCCURS TO INSTALL NEW CONDENSATE PIPE.
6	REMOVE AND SALVAGE ACOUSTICAL CEILING TILE, GRID, HANGER WIRES, ETC., ONLY AS REQUIRED FOR MECHANICAL AND ELECTRICAL WORK. REINSTALL IN SAME LOCATION. REPLACE CEILING TILES DAMAGED DURING CONSTRUCTION.
7	REMOVE AND REPLACE SUSPENDED ACOUSTICAL CEILING SYSTEM IN FACTV.
8	EXIST COFFERED CEILING TO REMAIN. DO NOT DISTURB THE EXISTING CEILING FINISHES AND STRUCTURE.
9	NEW GYP BD SOFFIT TO ENCLOSE NEW MECHANICAL DUCTS.
10	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR WHERE WORK OCCURS TO REMOVE A STEAM RADIATOR, CAP ABANDONED STEAM PIPE OR NEW HYDRONIC PIPING IS INSTALLED. SEE MECHANICAL DRAWINGS.
11	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR WHERE TRANSFER FAN IS REMOVED.
12	PATCH & REPAIR PLASTER WALL TO MATCH EXISTING WHERE WALL SUPPLY OR RETURN DIFFUSERS ARE REMOVED AND/OR REINSTALLED.
13	EXPOSED STRUCTURE AT CEILING IS EXISTING TO REMAIN. FIRESTOP ALL NEW PENETRATIONS IN EXISTING FLOOR STRUCTURE.
14	PROVIDE NEW PLYWOOD BACKING PANEL SECURED TO EXISTING WALL. SEE ELECTRICAL DRAWING DETAIL 1E100, AND ARCHITECTURAL DETAIL ON SHEET E300.
15	DEMOLITION, PATCH AND REPAIR OF EXISTING PLASTER CEILING WHERE HYDRONIC PIPING RUNS ABOVE EXISTING PLASTER CEILING. DEMO AS LITTLE AS POSSIBLE TO ALLOW FOR INSTALL OF THE NEW PIPING. SEE MECHANICAL DRAWINGS FOR PIPE SIZES AND LOCATIONS.
16	EXISTING SKYLIGHT TO REMAIN.

ARCHITECTURAL GENERAL NOTES	
1.	CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY ARCHITECT OF ANY CONFLICT AND/OR DISCREPANCIES PRIOR TO COMMENCING WORK.
2.	CONTRACTOR SHALL VISIT THE SITE AND INVESTIGATE ALL FIELD CONDITIONS PRIOR TO BIDDING AND CONSTRUCTION.
3.	THE GENERAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS IN THE DRAWINGS THAT ARE BASED ON FIELD MEASURING/OBSERVATION OF EXISTING CONSTRUCTION.
4.	EXISTING CONSTRUCTION SCHEDULED TO REMAIN THAT IS DAMAGED AS A RESULT OF THE WORK SHALL BE REPAIRED TO AN EXTENT AND AS REQUIRED TO MATCH ADJACENT EXISTING UNDAUNAGED CONSTRUCTION.
5.	OWNER WILL OCCUPY THE PREMISES DURING ENTIRE CONSTRUCTION PERIOD. COOPERATE WITH OWNER DURING CONSTRUCTION OPERATIONS TO MINIMIZE CONFLICTS AND FACILITATE OWNER USAGE. PERFORM THE WORK SO AS NOT TO INTERFERE WITH OWNER'S OPERATIONS.
6.	MAINTAIN ACCESS TO EXISTING EXITS, WALKWAYS, CORRIDORS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES. DO NOT CLOSE OR OBSTRUCT WALKWAYS, CORRIDORS, OR OTHER OCCUPIED OR USED FACILITIES WITHOUT WRITTEN PERMISSION FROM OWNER AND AUTHORITIES HAVING JURISDICTION.
7.	THE BUILDING AND SITE IS A HISTORIC PROPERTY. FINISHES IN PUBLIC AREAS MUST BE REPLACED TO MATCH EXISTING FINISHES AND CONSTRUCTION.

REFLECTED CEILING PLAN GENERAL NOTES	
A.	ALL SUSPENDED ACOUSTICAL CEILING TILE (ACT) SYSTEMS THAT ARE REMOVED MUST EITHER BE PUT BACK IN PLACE OR REPLACED AS REQUIRED BY THE SCOPE OF THE MECHANICAL AND ELECTRICAL WORK.
B.	ALL PLASTER CEILING THAT ARE REMOVED SHALL BE REPLACED IN THE EXACT SAME LOCATION AND MUST MATCH AND ALIGN WITH ADJACENT PLASTER CEILING.
C.	SEE MECHANICAL AND ELECTRICAL FOR ADDITIONAL INFORMATION.
D.	EXISTING LIGHT FIXTURES TO REMAIN, UNLESS OTHERWISE NOTED. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.
E.	PROVIDE FIRESTOPPING AT ALL RATED FLOOR AND WALL PENETRATIONS. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS.
F.	PROVIDE JOINT SEALANT AT ALL LOCATIONS WHERE DISSIMILAR MATERIALS ADJOIN.
G.	ALL EXISTING CEILING AND WALL CONSTRUCTION AND FINISHES IMPACTED BY THE MECHANICAL AND ELECTRICAL WORK SHALL BE PATCHED AND REPAIRED TO MATCH EXISTING CONDITIONS.



1 REFLECTED CEILING PLAN—SECOND FLOOR  
1/4" = 1'-0"



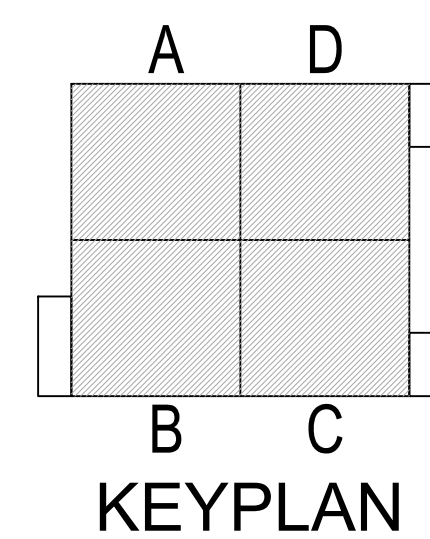


DRAWING LEGEND	
	EXISTING TO REMAIN
	DEMOLITION
	NEW PLASTER CEILING
	NEW GYPSUM BOARD SOFFIT

REFLECTED CEILING PLAN KEYNOTES	
(ALL KEYNOTES DO NOT APPEAR ON EVERY PLAN)	
1	DEMOLITION, PATCH AND REPAIR OF EXISTING PLASTER CEILING WHERE EXIST MECHANICAL DUCT WORK IS REMOVED AND/OR NEW MECHANICAL DUCT WORK RUNS ABOVE CEILING. DEMO AS LITTLE AS POSSIBLE. SEE MECHANICAL DRAWINGS FOR DUCT SIZES AND LOCATIONS.
2	EXIST PLASTER CEILING TO REMAIN.
3	REMOVE EXIST GYP BD SOFFIT.
4	EXIST PLASTER OR GYP BD SOFFIT TO REMAIN.
5	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR CONSTRUCTION WHERE WORK OCCURS TO INSTALL NEW CONDENSATE PIPE.
6	REMOVE AND SALVAGE ACOUSTICAL CEILING TILE, GRID, HANGER WIRES, ETC. ONLY AS REQUIRED FOR MECHANICAL AND ELECTRICAL WORK. REING ALL IN SAME LOCATION. REPLACE CEILING TILES DAMAGED DURING CONSTRUCTION.
7	REMOVE AND REPLACE SUSPENDED ACOUSTICAL CEILING SYSTEM IN PACTV.
8	EXIST COFFERED CEILING TO REMAIN. DO NOT DISTURB THE EXISTING CEILING FINISHES AND STRUCTURE.
9	NEW GYP BD SOFFIT TO ENCLOSE NEW MECHANICAL DUCTS.
10	PATCH & REPAIR PLASTER WALL, CEILING OR FLOOR WHERE WORK OCCURS TO REMOVE A STEAM RADIATOR, CAP ABANDONED STEAM PIPE OR NEW HYDRONIC PIPING IS INSTALLED. SEE MECHANICAL DRAWINGS.
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12	PATCH & REPAIR PLASTER WALL TO MATCH EXISTING WHERE WALL SUPPLY OR RETURN DIFFUSERS ARE REMOVED AND/OR REINSTALLED.
13	EXPOSED STRUCTURE AT CEILING IS EXISTING TO REMAIN. FIRESTOP ALL NEW PENETRATIONS IN EXISTING FLOOR STRUCTURE.
14	PROVIDE NEW PLYWOOD BACKING PANEL SECURED TO EXISTING WALL. SEE ELECTRICAL DRAWING DETAIL 1E100, AND ARCHITECTURAL DETAIL ON SHEET E300.
15	DEMOLITION, PATCH AND REPAIR OF EXISTING PLASTER CEILING WHERE HYDRONIC PIPING RUNS ABOVE EXISTING PLASTER CEILING. DEMO AS LITTLE AS POSSIBLE TO ALLOW FOR INSTALL OF THE NEW PIPING. SEE MECHANICAL DRAWINGS FOR PIPE SIZES AND LOCATIONS.
16	EXISTING SKYLIGHT TO REMAIN.

ARCHITECTURAL GENERAL NOTES	
1.	CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND NOTIFY ARCHITECT OF ANY CONFLICT AND/OR DISCREPANCIES PRIOR TO COMMENCING WORK.
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3.	THE GENERAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS IN THE DRAWINGS THAT ARE BASED ON FIELD MEASURING/OBSERVATION OF EXISTING CONSTRUCTION.
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5.	OWNER WILL OCCUPY THE PREMISES DURING ENTIRE CONSTRUCTION PERIOD. COOPERATE WITH OWNER DURING CONSTRUCTION OPERATIONS TO MINIMIZE CONFLICTS AND FACILITATE OWNER USAGE. PERFORM THE WORK SO AS NOT TO INTERFERE WITH OWNER'S OPERATIONS.
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7.	THE BUILDING AND SITE IS A HISTORIC PROPERTY. FINISHES IN PUBLIC AREAS MUST BE REPLACED TO MATCH EXISTING FINISHES AND CONSTRUCTION.

REFLECTED CEILING PLAN GENERAL NOTES	
A.	ALL SUSPENDED ACOUSTICAL CEILING TILE (ACT) SYSTEMS THAT ARE REMOVED MUST EITHER BE PUT BACK IN PLACE OR REPLACED AS REQUIRED BY THE SCOPE OF THE MECHANICAL AND ELECTRICAL WORK.
B.	ALL PLASTER CEILING THAT ARE REMOVED SHALL BE REPLACED IN THE EXACT SAME LOCATION AND MUST MATCH AND ALIGN WITH ADJACENT PLASTER CEILING.
C.	SEE MECHANICAL AND ELECTRICAL FOR ADDITIONAL INFORMATION.
D.	EXISTING LIGHT FIXTURES TO REMAIN, UNLESS OTHERWISE NOTED. SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.
E.	PROVIDE FIRESTOPPING AT ALL RATED FLOOR AND WALL PENETRATIONS. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS.
F.	PROVIDE JOINT SEALANT AT ALL LOCATIONS WHERE DISSIMILAR MATERIALS ADJOIN.
G.	ALL EXISTING CEILING AND WALL CONSTRUCTION AND FINISHES IMPACTED BY THE MECHANICAL AND ELECTRICAL WORK SHALL BE PATCHED AND REPAIRED TO MATCH EXISTING CONDITIONS.



1 REFLECTED CEILING PLAN—THIRD FLOOR  
1/4" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.	
DATE: 05-17-2022	REG. NO.: 20116
PRINT NAME: RANDY MOE	
ADDENDUM 1	
1	5/17/22
No:	Date:
By:	Revision:

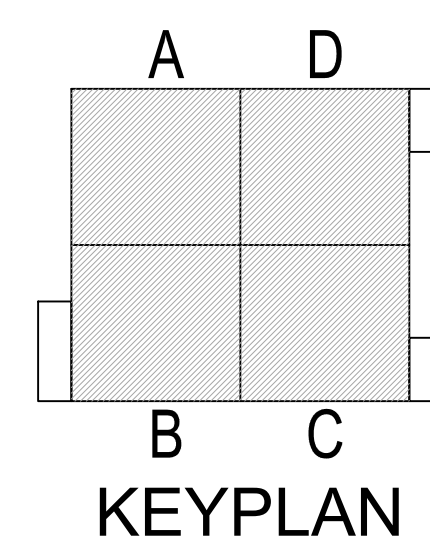
BENTZ THOMPSON RIETOW	
900 SECOND AVENUE S, SUITE 400 MINNEAPOLIS, MN 55402 612.332.1234	
KFI ENGINEERS 670 County Road B West St. Paul, Minnesota 55113 Tel: (651) 771-0880 Fax: (651) 771-0878 Email: kfi@kfi-eng.com	

Project Title:	CITY OF DULUTH CITY HALL MEP RENEWAL DESIGN
411 WEST 1ST STREET DULUTH, MN 55802	

Sheet Title:	REFLECTED CEILING PLAN THIRD FLOOR
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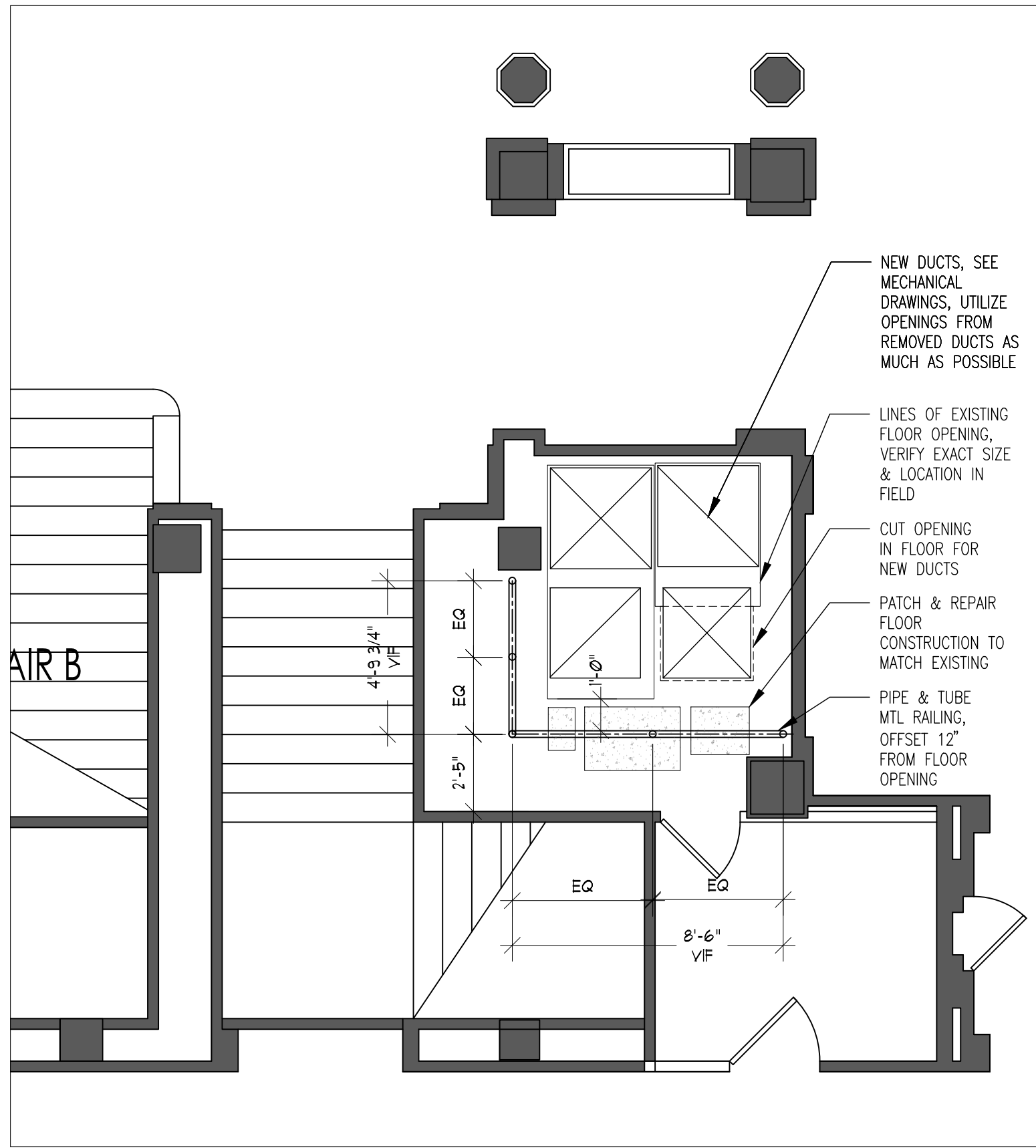
Date:	05-17-2022
Drawn By:	BTR
Checked By:	RLM
Project No:	21-0486
DWG Scale:	AS NOTED
Sheet Size:	30x42
Revision Number:	1
Sheet Number:	A250



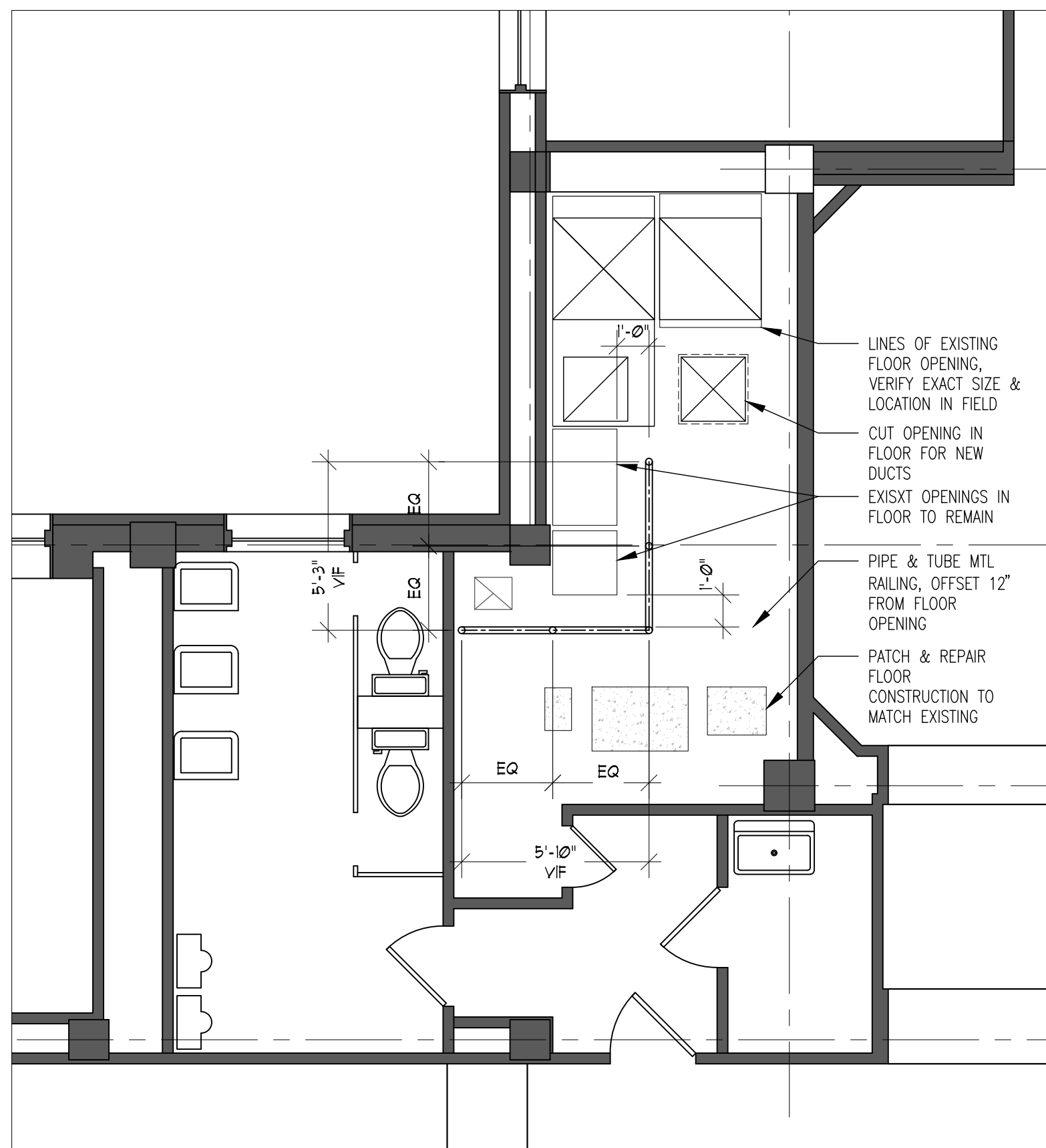


A260

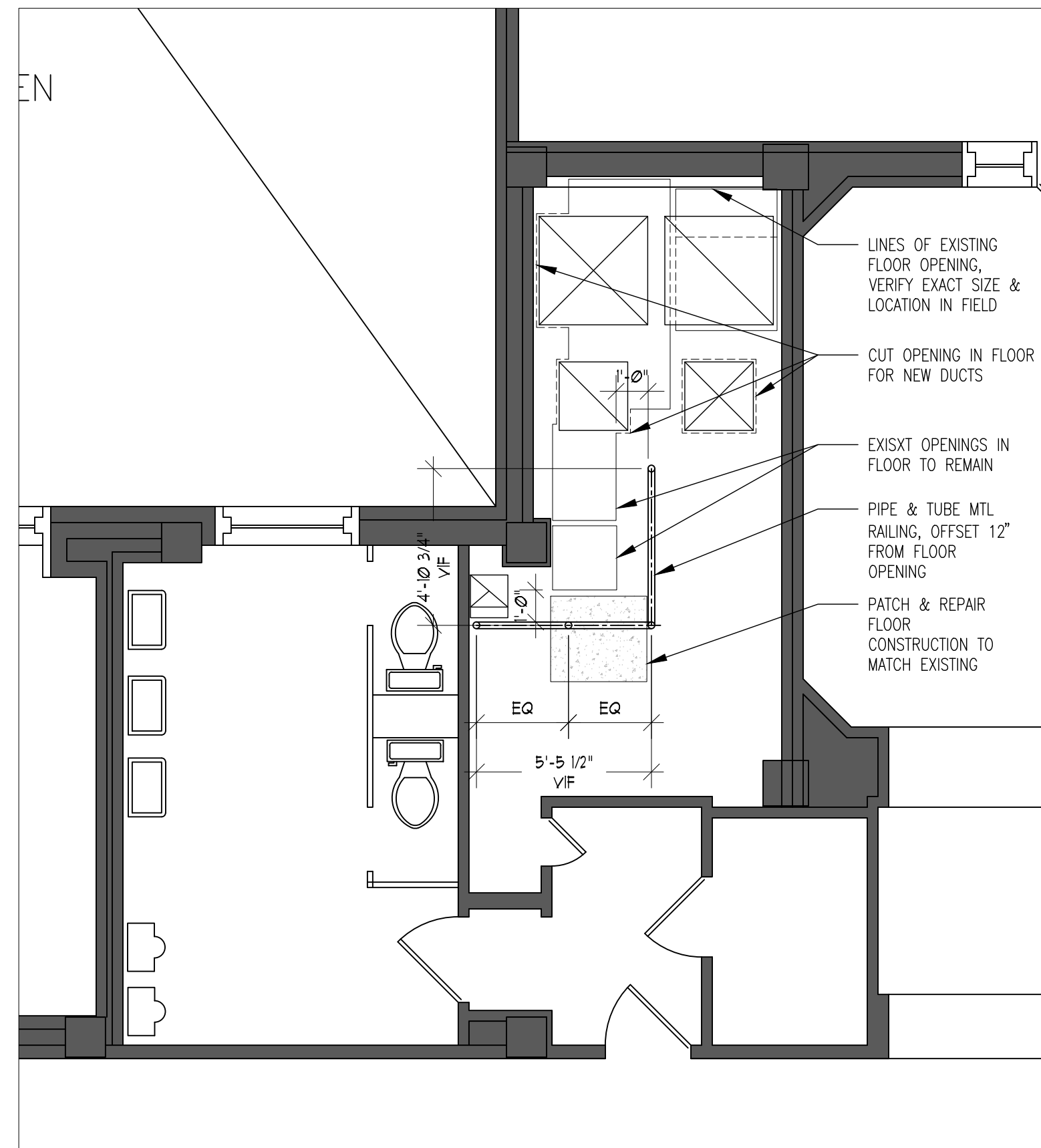




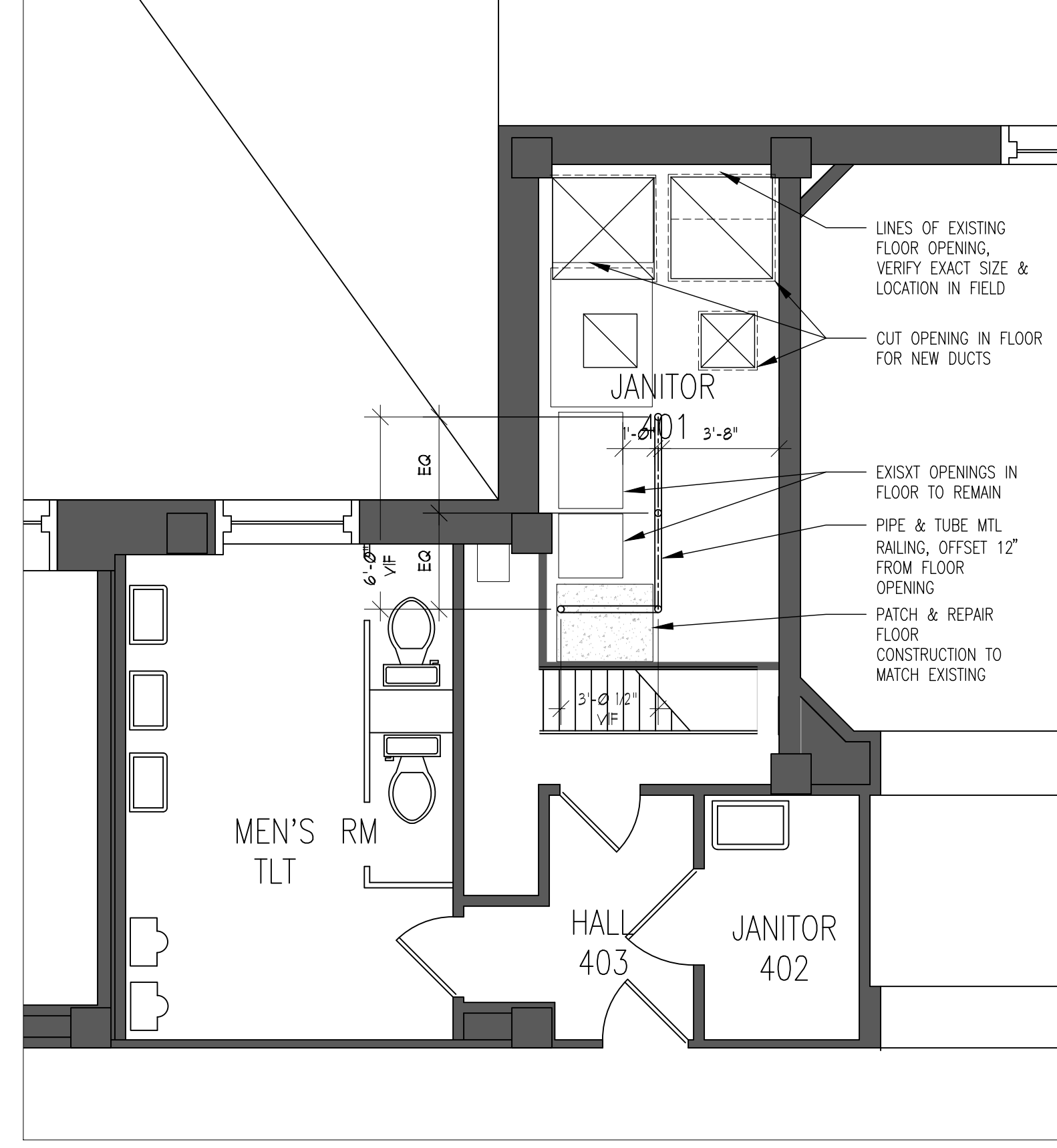
1 ENLARGED FLOOR PLAN—FIRST FLOOR AREA B  
A300 1/4" = 1'-0"



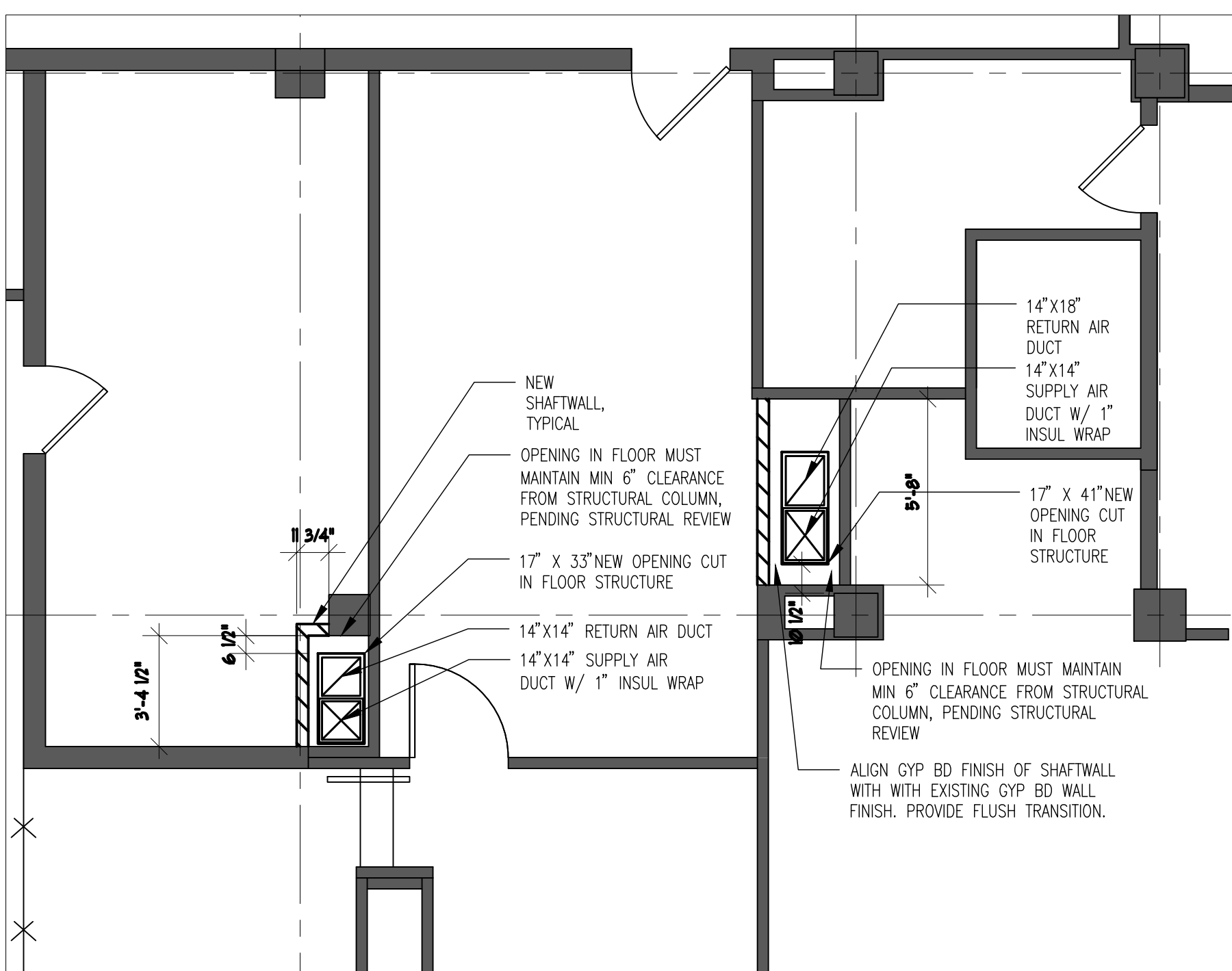
2 ENLARGED FLOOR PLAN—SECOND FLOOR AREA B  
A300 1/4" = 1'-0"



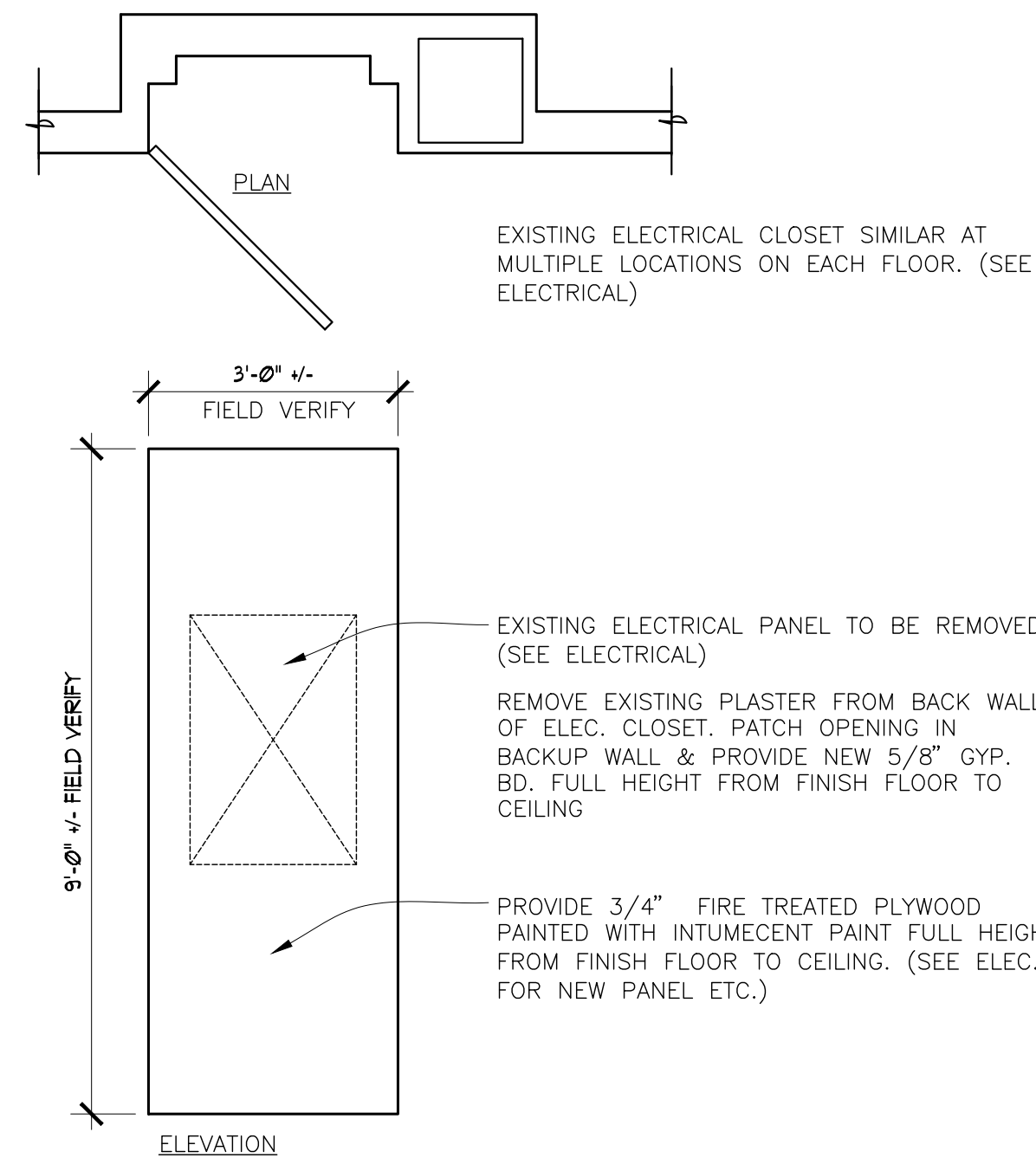
3 ENLARGED FLOOR PLAN—THIRD FLOOR AREA B  
A300 1/4" = 1'-0"



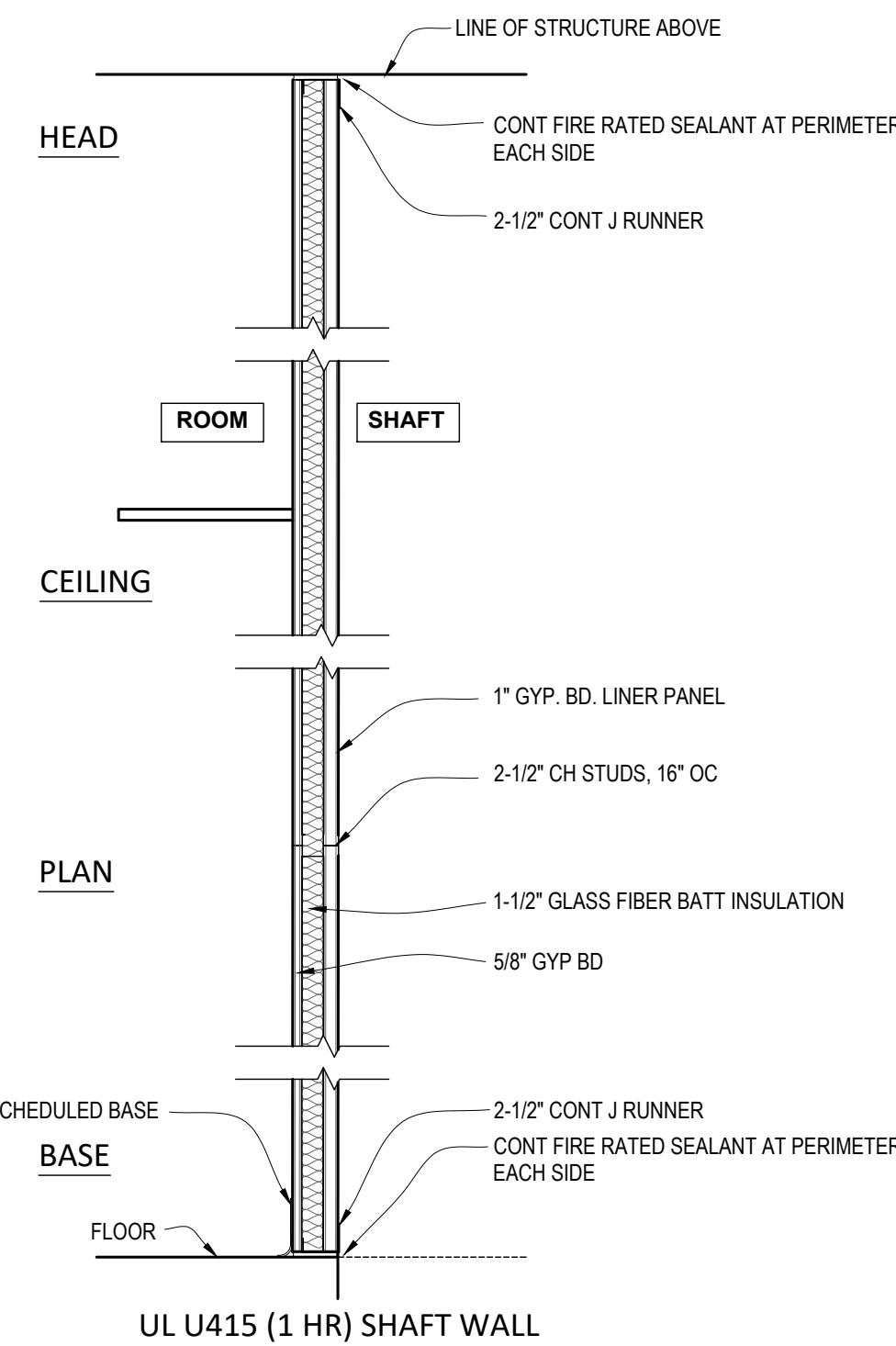
4 ENLARGED FLOOR PLAN—FOURTH FLOOR AREA B  
A300 1/4" = 1'-0"



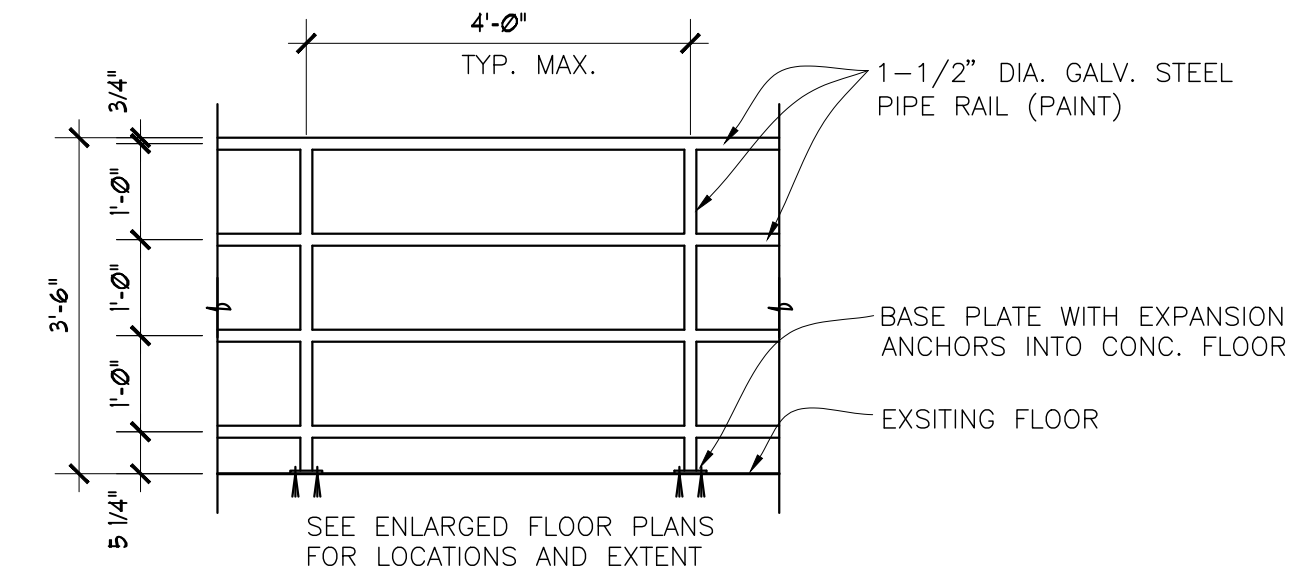
5 ENLARGED FLOOR PLAN—SECOND FLOOR AREA C  
A300 1/4" = 1'-0"



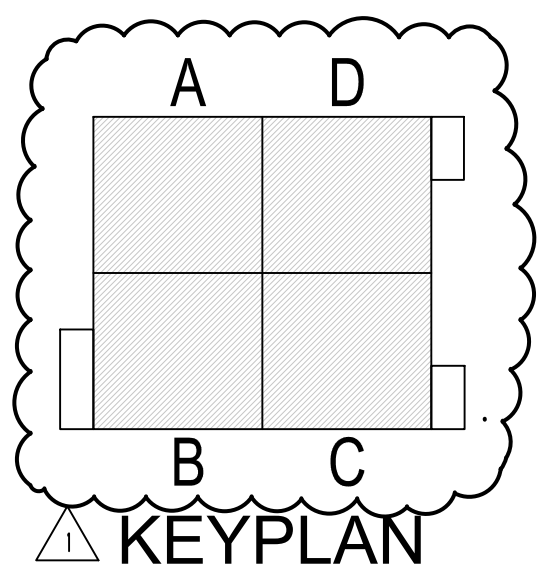
6 TYPICAL ELECTRICAL CLOSET  
A300 1/2" = 1'-0"



7 TYPICAL NEW SHAFT WALL  
A300 1" = 1'-0"



8 TYPICAL RAILING PARTIAL ELEVATION  
A300 1/2" = 1'-0"



No.	5/17/22	By:	ADDENDUM 1	Revision:	
No.	5/17/22	By:	ADDENDUM 1	Revision:	

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.  
PRINT NAME: RANDY MOE  
DATE: 05-17-2022 REG. NO.: 20116

BENTZ THOMPSON RIETOW  
900 SECOND AVENUE S, SUITE 400  
MINNEAPOLIS, MN 55402  
612.332.1234

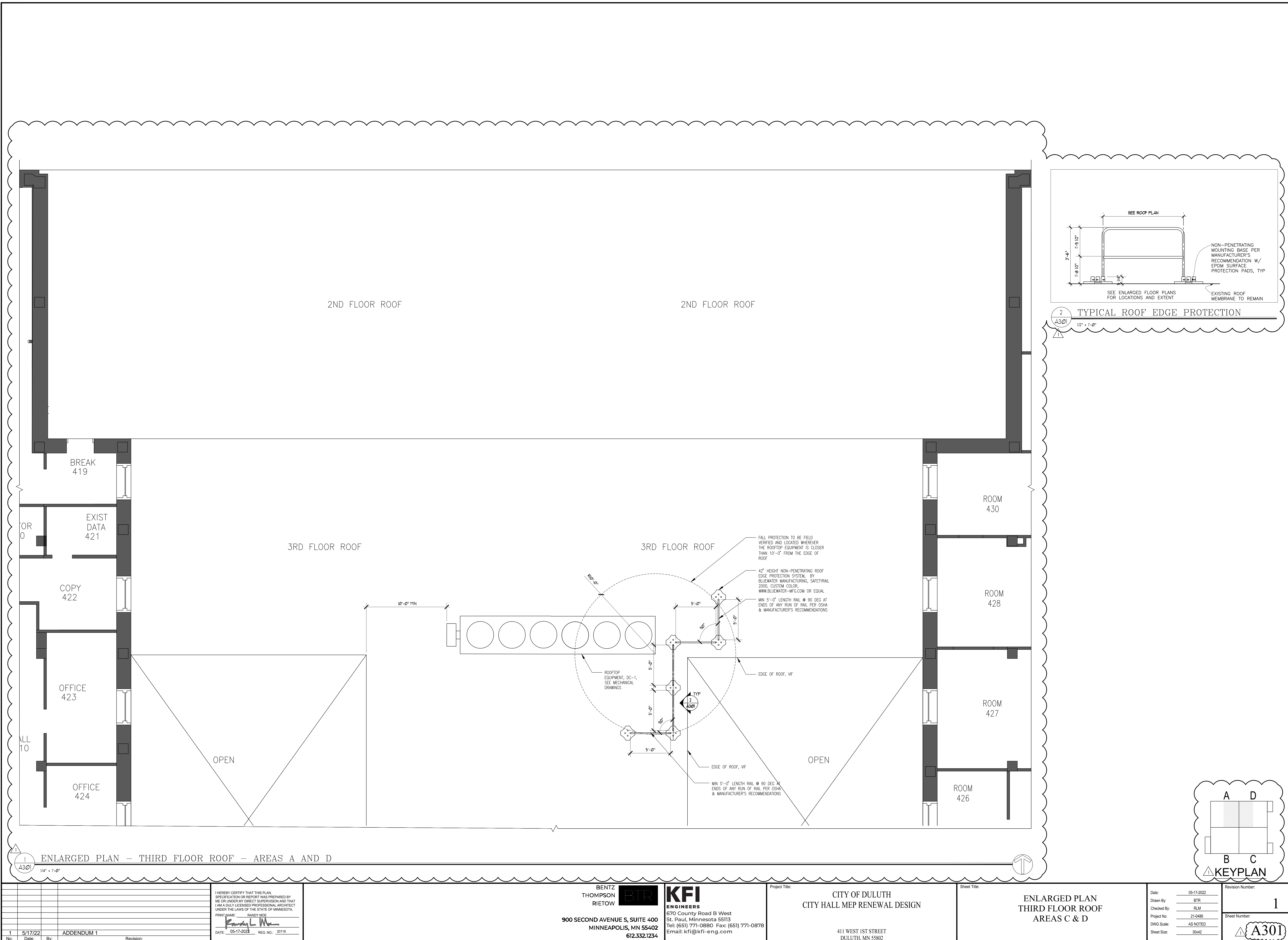
KFI ENGINEERS  
670 County Road B West  
St. Paul, Minnesota 55113  
Tel: (651) 771-0880 Fax: (651) 771-0878  
Email: kfi@kfi-eng.com

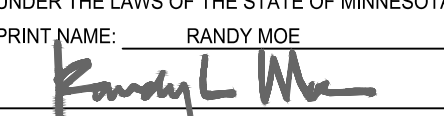
Project Title: CITY OF DULUTH  
CITY HALL MEP RENEWAL DESIGN  
411 WEST 1ST STREET  
DULUTH, MN 55802

Sheet Title: ENLARGED FLOOR PLANS & DETAILS

Date: 05-17-2022  
Drawn By: BTR  
Checked By: RLM  
Project No: 21-0486  
DWG Scale: AS NOTED  
Sheet Size: 30x42

Revision Number: 1  
Sheet Number: A300



1		5/17/22	By:	ADDENDUM 1	Revision:
No.	Date:				
1	5/17/22			ADDENDUM 1	
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.					
PRINT NAME: RANDY MOE		DATE: 05-17-2022		REG. NO.: 20116	
					

BENTZ THOMPSON RIETOW

900 SECOND AVENUE S, SUITE 400  
MINNEAPOLIS, MN 55402  
612.332.1234



ENGINEERS

670 County Road B West  
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Email: kfi@kfi-eng.com

Project Title:

CITY OF DULUTH  
CITY HALL MEP RENEWAL DESIGN

411 WEST 1ST STREET  
DULUTH, MN 55802

Sheet Title:

ENLARGED PLAN  
THIRD FLOOR ROOF  
AREAS C & D

Date: 05-17-2022

Drawn By: BTR

Checked By: RLM

Project No: 21-0486

DWG Scale: AS NOTED

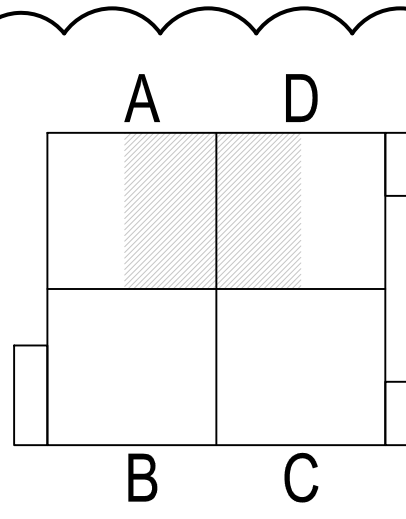
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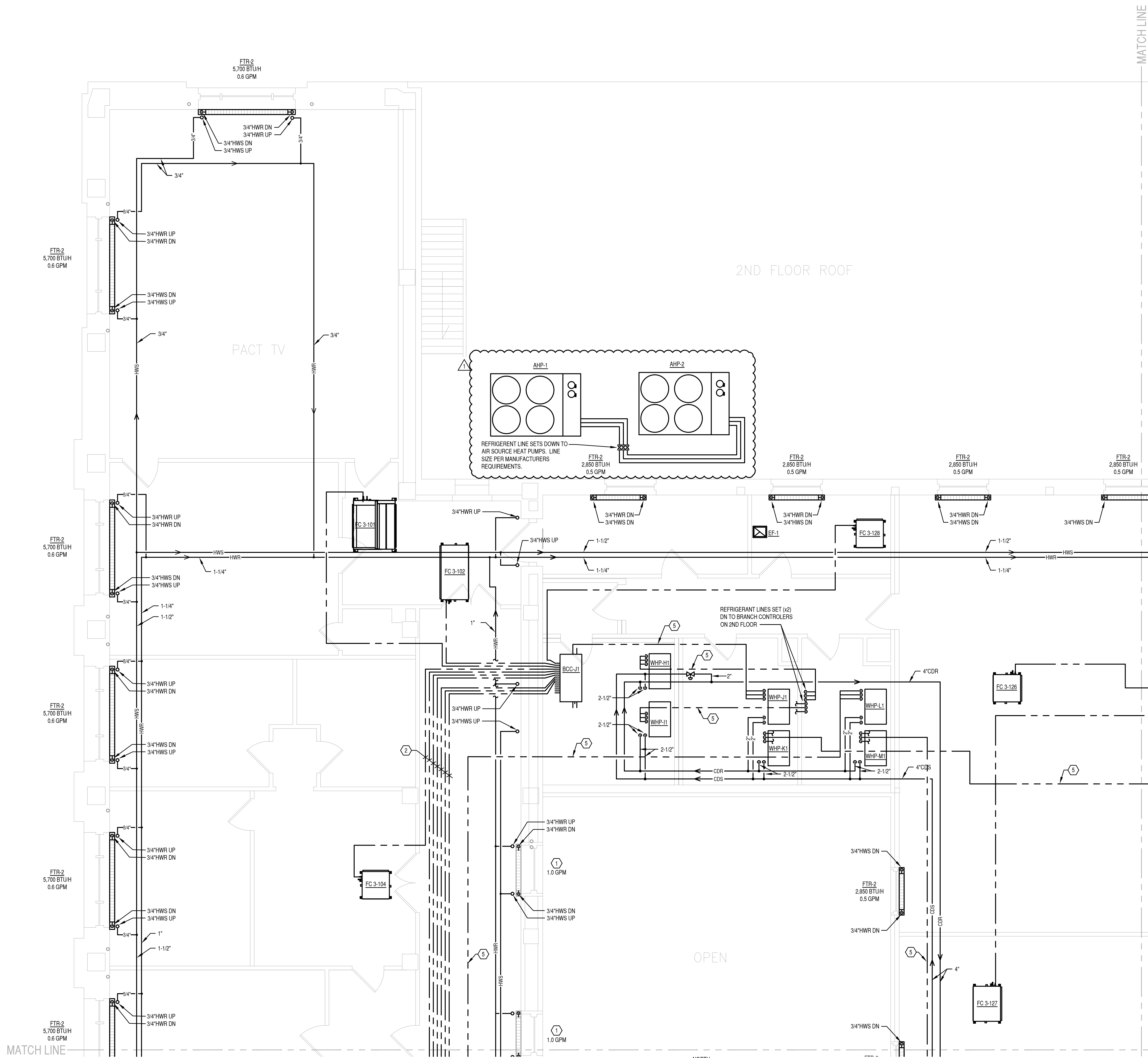
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 KEYPLAN

A301





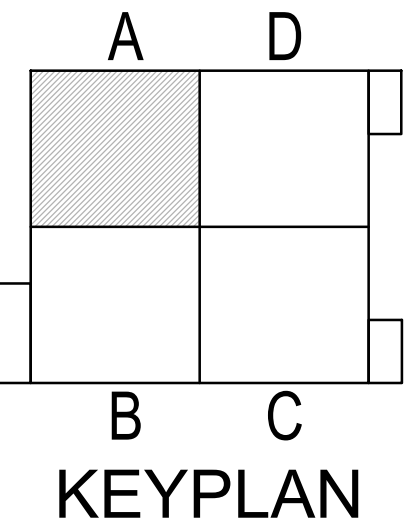
GENERAL NOTES

- A. THE NEW HOT WATER SUPPLY AND RETURN LOOP SHALL BE RUN IN THE INTERSTIAL SPACE BELOW THE FLOOR ABOVE TO SERVE THE FTR ON THE FLOOR ABOVE. BRANCH PIPING TO FTR SHALL PENETRATE THE FLOOR ABOVE THROUGH THE EXISTING FLOOR PENETRATIONS FOR THE LPS AND LGR PIPING REMOVED DURING DEMOLITION.
- B. PROVIDE OFFSETS IN THE BRANCH HOT WATER SUPPLY AND RETURN PIPING BELOW THE NEW FTR COVER AS NEEDED.

KEY NOTES:

- ① CONNECT NEW 3/4\"/>

1 HYDRONIC PLAN 3RD FLOOR AREA A  
1/4\"/>



No.	Date	CRE	ADDENDUM #1
1	5-17-22	CRE	

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
PRINT NAME: RANDY P. CHRISTENSON  
DATE: 05-03-2022 REG. NO.: 40493

**KFI**  
ENGINEERS  
570 County Road B West  
St. Paul, Minnesota 55113  
Tel: (651) 771-0880 Fax: (651) 771-0878  
Email: kfi@kfi-eng.com

Project Title: CITY OF DULUTH  
CITY HALL MEP RENEWAL DESIGN  
411 WEST 1ST STREET  
DULUTH, MN 55802

Sheet Title: HYDRONIC PLAN  
3RD FLOOR  
AREA A

Date: 05-03-2022  
Drawn By: CRE  
Checked By: MDP  
Project No: 21-0486  
DWG Scale: AS NOTED  
Sheet Size: 30x42

Revision Number: 1  
Sheet Number: M351

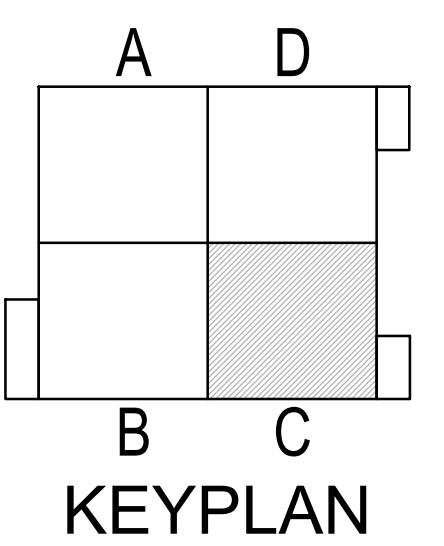
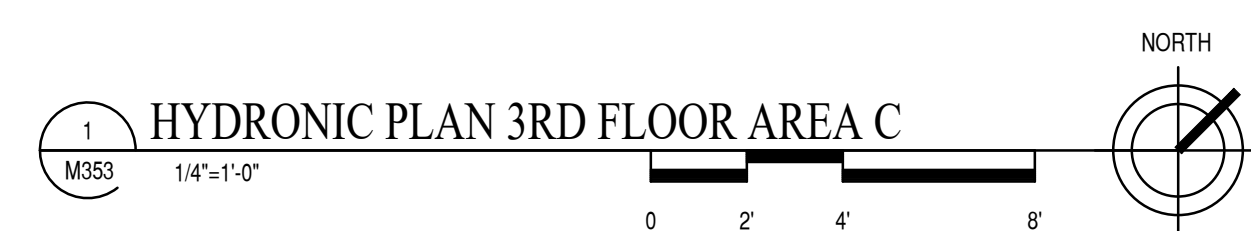




A. THE NEW HOT WATER SUPPLY AND RETURN LOOP SHALL BE RUN IN THE INTERSTIAL SPACE BELOW THE FLOOR ABOVE TO SERVE THE FTR ON THE FLOOR ABOVE. BRANCH PIPING TO FTR SHALL PENETRATE THE FLOOR ABOVE THROUGH THE EXISTING FLOOR PENETRATIONS FOR THE LPS AND LCR PIPING REMOVED DURING DEMOLITION.

B. PROVIDE OFFSETS IN THE BRANCH HOT WATER SUPPLY AND RETURN PIPING BELOW THE NEW FTR COVER AS NEEDED.

- 1 CONNECT TWO 3/4" HWS AND 3/4" HWIR FROM CEILING SPACE OF THE FLOOR BELOW TO EXISTING RADIACTOR. ROUTE BRANCH PIPING THROUGH EXISTING LPS AND LPC FLOOR OPENINGS.
- 2 VRF LINE SET (NOTE: ONE SINGLE LINE REPRESENTS BOTH THE SUCTION LINE AND LIQUID LINE) TO THE VRF CASSETTE. REFER TO ONE LINE DIAGRAMS BY MANUFACTURE FOR SIZES.
- 3 COORDINATE ROUTING OF HYDRONIC HEATING AND REFRIGERANT LINES ACROSS THE DUCT CHASE WITH THE DUCTWORK PLANS.
- 4 INSTALL WET/WET DIFFERENTIAL PRESSURE SENSOR. COORDINATE EXACT LOCATION ON SITE.
- 5 VRF LINE SET (NOTE: ONE SINGLE LINE THREE (3) REFRIGERANT LINES) FROM THE INDOOR HEAT PUMP TO THE BRANCH CIRCUIT CONTROLLER.




				I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINT NAME: RANDY P. CHRISTENSEN  DATE: 05-03-2022 REG. NO.: 40493				 670 County Road B West St. Paul, Minnesota 55113 Tel: (651) 771-0880 Fax: (651) 771-0878 Email: kfi@kfi-eng.com				Project Title: CITY OF DULUTH CITY HALL MEP RENEWAL DESIGN  411 WEST 1ST STREET DULUTH, MN 55802				Sheet Title: HYDRONIC PLAN 3RD FLOOR AREA C				Date: 05-03-2022 Drawn By: CRE Checked By: MDP Project No: Z1-0486 DWG Scale: AS NOTED Sheet Size: 30x42				Revision Number: 1 Sheet Number: M353			
1	5-17-22	CRE	ADDENDUM #1	Revision:																							
No:	Date:	By:																									

- A. THE NEW HOT WATER SUPPLY AND RETURN LOOP SHALL BE RUN IN THE INTERSTIAL SPACE BELOW THE FLOOR ABOVE TO SERVE THE FTR ON THE FLOOR ABOVE. BRANCH PIPING TO FTR SHALL PENETRATE THE FLOOR ABOVE THROUGH THE EXISTING FLOOR PENETRATIONS FOR THE LPS AND LCR PIPING REMOVED DURING DEMOLITION.
- B. PROVIDE OFFSETS IN THE BRANCH HOT WATER SUPPLY AND RETURN PIPING BELOW THE NEW FTR COVER AS NEEDED.

- ① CONNECT NEW 3/4" HWS AND 3/4" HWR FROM CEILING SPACE OF THE FLOOR CATCHER TO EXISTING PACHOR. ROUTE BRANCH PIPING THROUGH EXISTING LPS AND LPS FLOOR OPENINGS.
- ② VRF LINE SET (NOTE: ONE SINGLE LINE REPRESENTS BOTH THE SUCTION LINE AND LIQUID LINE) TO THE VRF CASSETTE. REFER TO ONE LINE DIAGRAMS BY MANUFACTURE FOR SIZES.
- ③ COORDINATE ROUTING OF HYDRONIC HEATING AND REFRIGERANT LINES ACROSS THE DUCT CHASE WITH THE DUCTWORK PLANS.
- ④ INSTALL WET WET DIFFERENTIAL PRESSURE SENSOR COORDINATE EXACT LOCATION ON SITE.
- ⑤ VRF LINE SET (NOTE: ONE SINGLE LINE THREE (3) REFRIGERANT LINES) FROM THE INDOOR HEAT PUMP TO THE BRANCH CIRCUIT CONTROLLER.



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PRINT NAME: RANDY P. CHRISTENSON  
  
DATE: 05-03-2022 REG. NO.: 40493

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411 WEST 1ST STREET  
DULUTH, MN 55802

Date:	05-03-2021
Drawn By:	CRE
Checked By:	MDP
Project No:	21-0486
DWG Scale:	AS NOTED
Sheet Size:	30x42

Revision Number: 1  
Sheet Number: M354

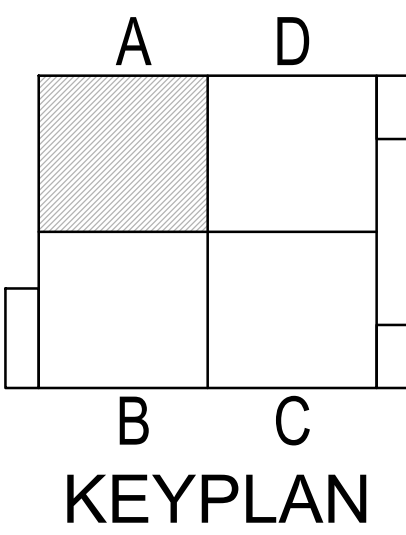
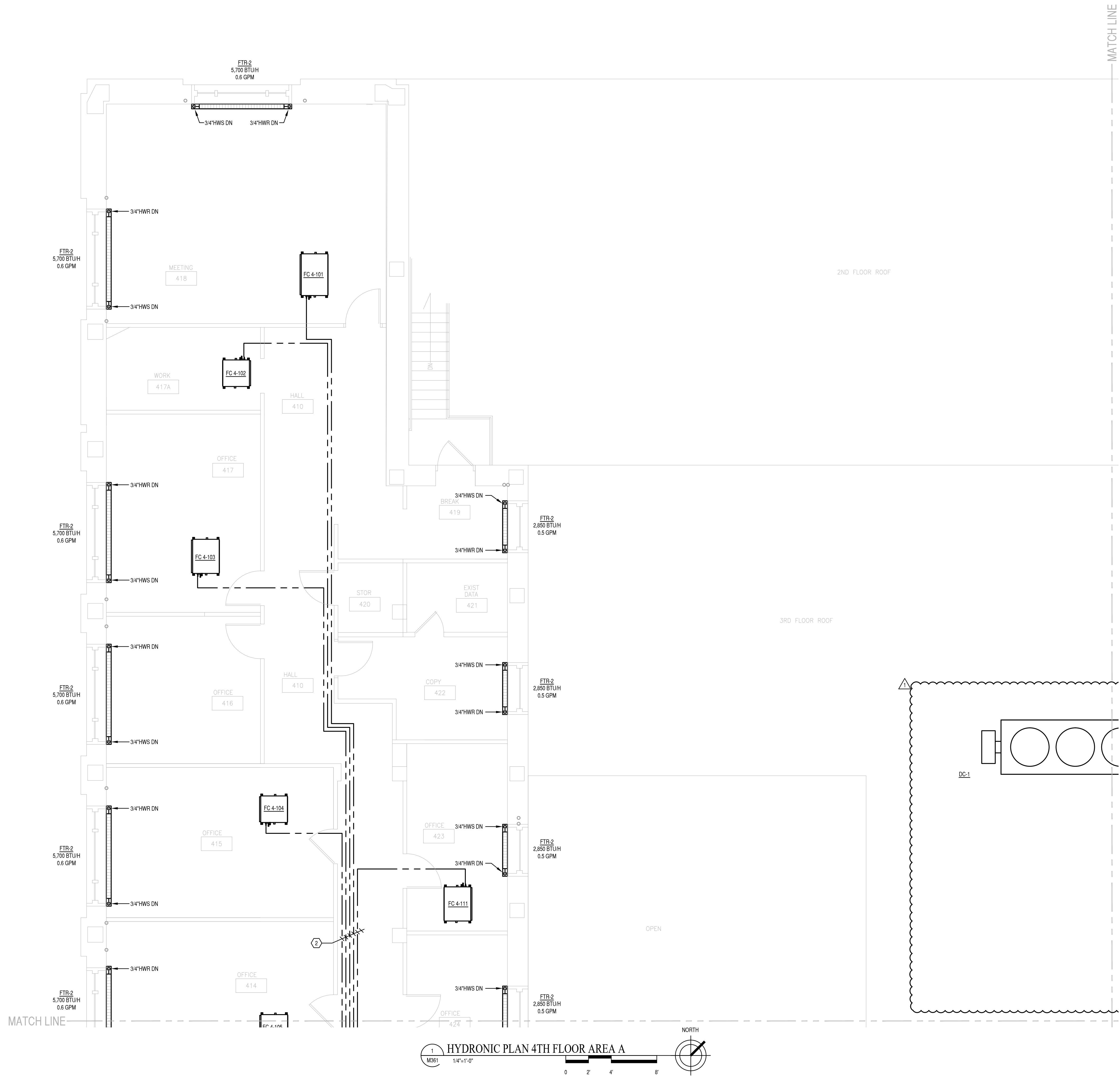


GENERAL NOTES

- A. THE NEW HOT WATER SUPPLY AND RETURN LOOP SHALL BE RUN IN THE INTERSTIAL SPACE BELOW THE FLOOR ABOVE TO SERVE THE FTR ON THE FLOOR ABOVE. BRANCH PIPING TO FTR SHALL PENETRATE THE FLOOR ABOVE THROUGH THE EXISTING FLOOR PENETRATIONS FOR THE LPS AND LOR PIPING REMOVED DURING DEMOLITION.
- B. PROVIDE OFFSETS IN THE BRANCH HOT WATER SUPPLY AND RETURN PIPING BELOW THE NEW FTR COVER AS NEEDED.

KEY NOTES:

- ① CONNECT NEW 3/4" HWS AND 3/4" HWR FROM CEILING SPACE OF THE FLOOR BELOW TO EXISTING RADIATOR. ROUTE BRANCH PIPING THROUGH EXISTING LPS AND LPC FLOOR OPENINGS.
- ② VRF LINE SET (NOTE: ONE SINGLE LINE REPRESENTS BOTH THE SUCTION LINE AND LIQUID LINE) TO THE VRF CASSETTE. REFER TO ONE LINE DIAGRAMS BY MANUFACTURE FOR SIZES.
- ③ VRF LINES SET (NOTE: ONE SINGLE LINE REPRESENTS THREE (3) REFRIGERANT LINES) FROM THE INDOOR HEAT PUMP TO THE BRANCH CIRCUIT CONTROLLER.
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No.	Date	CRE	ADDENDUM #1
1	5-17-22	CRE	

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Project Title: CITY OF DULUTH  
CITY HALL MEP RENEWAL DESIGN  
411 WEST 1ST STREET  
DULUTH, MN 55802

Sheet Title: HYDRONIC PLAN  
4TH FLOOR  
AREA A

Date: 05-03-2022  
Drawn By: CRE  
Checked By: MOP  
Project No: 21-0486  
DWG Scale: AS NOTED  
Sheet Size: 30x42

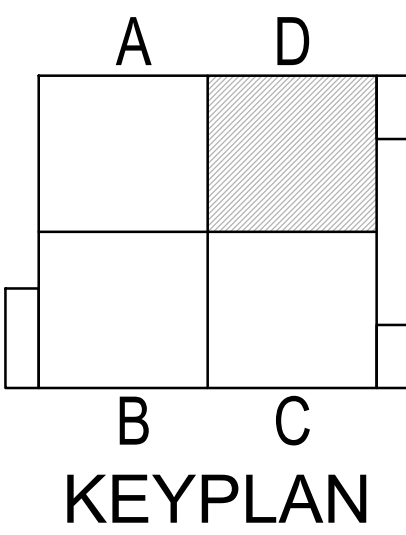
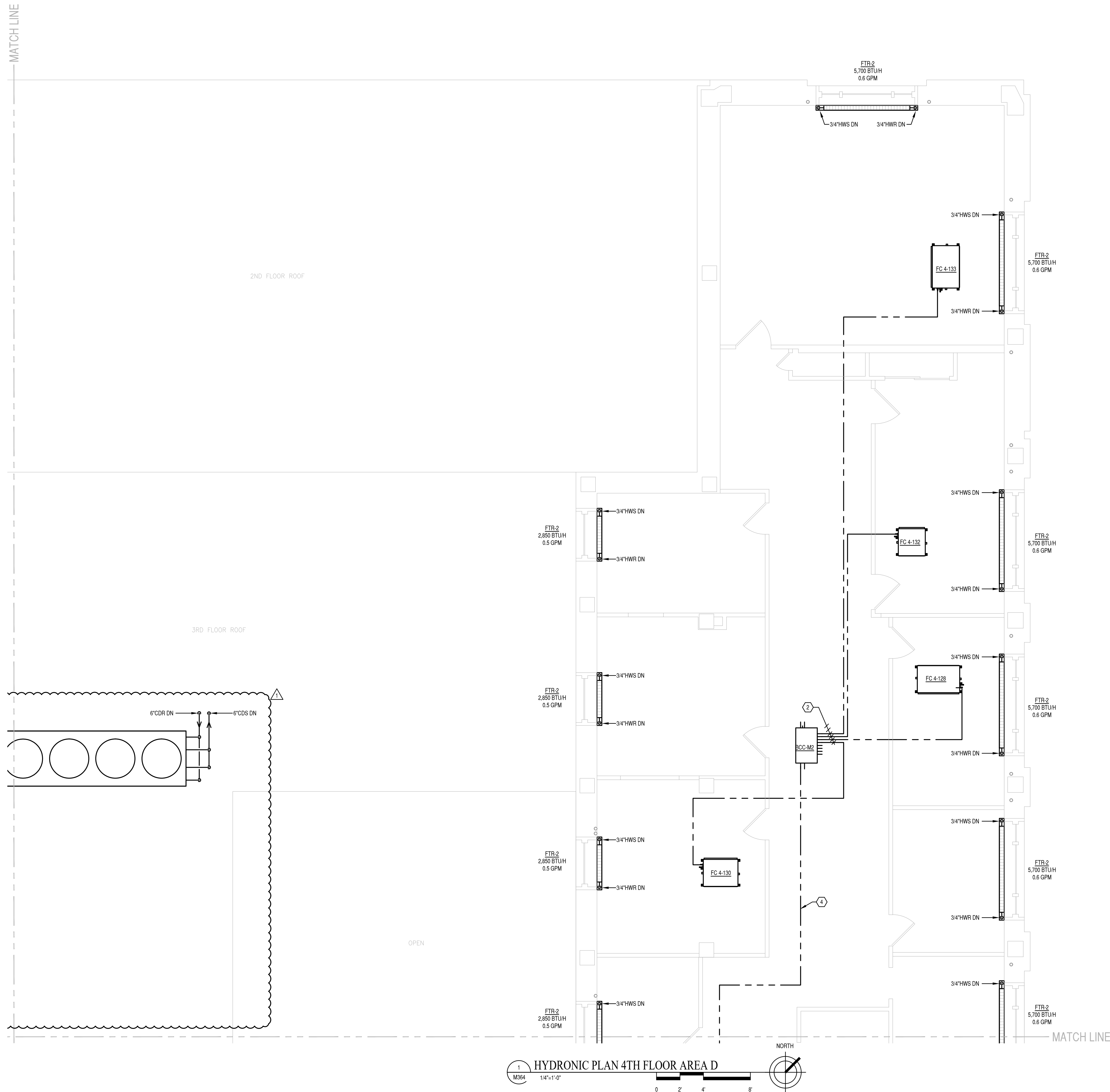
Revision Number: 1  
Sheet Number: M361

GENERAL NOTES

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- B. PROVIDE OFFSETS IN THE BRANCH HOT WATER SUPPLY AND RETURN PIPING BELOW THE NEW FTR COVER AS NEEDED.

KEY NOTES:

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PRINT NAME: RANDY P. CHRISTENSON

*Randy Christenson*

DATE: 05-03-2022 REG. NO.: 40493

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Project Title: CITY OF DULUTH  
CITY HALL MEP RENEWAL DESIGN

411 WEST 1ST STREET  
DULUTH, MN 55802

Sheet Title: HYDRONIC PLAN  
4TH FLOOR  
AREA D

Date: 05-03-2022  
Drawn By: CRE  
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Sheet Size: 30x42

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VARIABLE AIR VOLUME BOX SCHEDULE

GENERAL				MECHANICAL																
EQUIP NO.	SERVES CASSETTES	MANUFACTURER	MODEL NO.	TYPE	INLET SIZE (IN)	MIN STATIC PRES.(IN WC) INLET	COOLING DESIGN CFM	MIN. CFM	HEATING DESIGN CFM	HEATING COIL OUTPUT MBH	EAT (F)	LAT (F)	GPM (F)	EWT (F)	LWT (F)	FLUID TYPE	COIL ROWS	CONTROL VALVE	NOTES	
VAV 0-1	0-102	TITUS	DESV	SERIES	4	1	120	0	120	2.6	55	75	0.3	140	120	35% PG	1	24V	ALL	
VAV 0-2	0-103, 0-105, 0-107	TITUS	DESV	SERIES	6	1	180	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-3	0-118	TITUS	DESV	SERIES	6	1	230	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-4	0-106	TITUS	DESV	SERIES	4	1	50	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-5	0-108, 0-109, 0-110, 0-111	TITUS	DESV	SERIES	6	1	210	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-6	0-112, 0-113	TITUS	DESV	SERIES	6	1	120	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-7	0-114, 0-116, 0-117	TITUS	DESV	SERIES	6	1	260	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-8	0-119, 0-120, 0-121	TITUS	DESV	SERIES	6	1	170	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-9	0-115, 0-123, 0-115	TITUS	DESV	SERIES	6	1	160	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 0-10	GARAGE	TITUS	DESV	SERIES	16	1	2480	0	2480	53.6	55	75	5.4	140	120	35% PG	1	24V	ALL	
VAV 1-1	1-101, 1-102, 1-103, 1-104, 1-106, 1-108	TITUS	DESV	SERIES	8	1	610	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-2	1-110, 1-113, 1-114	TITUS	DESV	SERIES	6	1	160	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-3	1-112, 1-115, 1-116	TITUS	DESV	SERIES	6	1	290	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-4	1-117, 1-118	TITUS	DESV	SERIES	6	1	190	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-5	1-119, 1-120, 1-121, 1-123	TITUS	DESV	SERIES	6	1	250	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-6	1-122, 1-124, 1-125, 1-127, 1-128,1-129, 1-131	TITUS	DESV	SERIES	10	1	630	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-7	1-109A	TITUS	DESV	SERIES	6	1	240	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 1-8	CORRIDOR	TITUS	DESV	SERIES	6	1	200	0	200	4.3	55	75	0.4	140	120	35% PG	1	24V	ALL	
VAV 2-1	2-101, 2-112, 2-114, 2-115, 2-116, 2-117	TITUS	DESV	SERIES	6	1	280	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-2	2-102, 2-103, 2-104, 2-111, 2-135	TITUS	DESV	SERIES	6	1	320	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-3	2-118, 2-120	TITUS	DESV	SERIES	4	1	80	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-4	2-121, 2-122, 2-123	TITUS	DESV	SERIES	8	1	400	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-5	2-136	TITUS	DESV	SERIES	4	1	40	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-6	2-124, 2-125, 2-126, 2-127	TITUS	DESV	SERIES	6	1	180	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-7	2-108, 2-131, 2-132, 2-130, 2-129	TITUS	DESV	SERIES	6	1	300	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-8	2-106, 2-110, 2-133, 2-134	TITUS	DESV	SERIES	6	1	320	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 2-9	CORRIDOR	TITUS	DESV	SERIES	6	1	280	0	280	6.0	55	75	0.6	140	120	35% PG	1	24V	ALL	
VAV 3-1	3-101, 3-102, 3-103, 3-104	TITUS	DESV	SERIES	6	1	220	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-2	3-129, 3-128, 3-127, 3-126, 3-125, 3-124	TITUS	DESV	SERIES	6	1	290	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-3	3-109, 3-103, 3-106, 3-107, 3-108	TITUS	DESV	SERIES	6	1	220	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-4	3-112, 3-114	TITUS	DESV	SERIES	6	1	60	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-5	3-115, 3-116, 3-119, 3-122	TITUS	DESV	SERIES	6	1	330	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-6	3-120, 3-121, 3-123	TITUS	DESV	SERIES	6	1	350	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-7	3-111	TITUS	DESV	SERIES	10	1	440	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-8	3-110	TITUS	DESV	SERIES	10	1	660	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 3-9	CORRIDOR	TITUS	DESV	SERIES	6	1	200	0	200	4.3	55	75	0.4	140	120	35% PG	1	24V	ALL	
VAV 4-1	4-101,4-102,4-103,4-104,4-105,4-106,4-107,4-111	TITUS	DESV	SERIES	6	1	320	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 4-2	4-108,4-110,4-112,4-113,4-114	TITUS	DESV	SERIES	6	1	150	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 4-3	4-115,4-116,4-118,4-119,120	TITUS	DESV	SERIES	8	1	570	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 4-4	4-121,4-123,4-124,4-125	TITUS	DESV	SERIES	6	1	280	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 4-5	4-126,4-127,4-128,4-129,4-130,4-131,4-132,4-133	TITUS	DESV	SERIES	6	1	330	0	-	-	-	-	-	-	-	-	-	-	ALL	
VAV 4-6	CORRIDOR	TITUS	DESV	SERIES	6	1	200	0	200	4.3	55	75	0.4	140	120	35% PG	1	24V	ALL	

- NOTES:  
1. W/ BOTTOM ACCESS PANEL  
2. FIBER FREE LINING  
3. BOX ACTUATOR 24V SPRING RETURN OPEN. INCLUDE DISCONNECT SWITCH

GRILLES, REGISTERS, AND DIFFUSERS SCHEDULE

EQUIP NO.	SERVICE	MANUFACTURER	MODEL NO.	TYPE	FACE SIZE (IN)	NECK SIZE (IN)	MAX CFM	MAX NC	MATERIAL	THROW/ PATTERN	REMARKS/NOTES
S-1	SUPPLY	TITUS	TMS	LAY-IN	24X24	6	220	25	ALUMINUM	4-WAY	LAY-IN CEILING DIFFUSER, FRAME TYPE 3, NOTE 3
S-2	SUPPLY	TITUS	TMS	LAY-IN	24X24	8	320	25	ALUMINUM	4-WAY	LAY-IN CEILING DIFFUSER, FRAME TYPE 3, NOTE 3
S-3	SUPPLY	TITUS	TMS	LAY-IN	24X24	10	500	25	ALUMINUM	4-WAY	LAY-IN CEILING DIFFUSER, FRAME TYPE 3, NOTE 3
S-4	SUPPLY	TITUS	300RL	SURFACE	12X10	12X10	430	25	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3
S-5	SUPPLY	TITUS	300RL	SURFACE	12X8	12X8	350	25	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3
S-6	SUPPLY	TITUS	300RL	SURFACE	14X10	14X10	620	32	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3
R-1	RETURN	TITUS	PAR	LAY-IN	24X24	22X22	900	25	ALUMINUM	ADJUSTABLE	PERFORATED CEILING RETURN, FRAME TYPE 3
R-2	RETURN	TITUS	PAR	LAY-IN	24X12	22X10	500	25	ALUMINUM	ADJUSTABLE	PERFORATED CEILING RETURN, FRAME TYPE 3
R-3	RETURN	TITUS	350RL	SURFACE	12X8	12X8	400	25	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3
E-1	EXHAUST	TITUS	350RL	SURFACE	14X10	14X10	620	25	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3
E-2	EXHAUST	TITUS	350RL	SURFACE	24X12	22X10	950	20	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3
T-1	TRANSFER	TITUS	350RL	SURFACE	12X8	12X8	400	25	ALUMINUM	ADJUSTABLE	3/4" SPACING, 35' DEFLECTION, BLADES PARALLEL TO LONG DIMENSION, 1,3

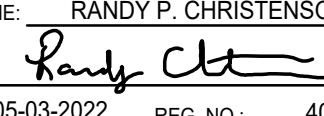
- NOTES:  
1. DOUBLE DEFLECTION  
2. WITH FILTER  
3. WITH OPPOSED BLADE, VOLUME DAMPER  
4. COORDINATE ALL FRAMES AND BORDER TYPES FOR DUCT CONNECTION AND CEILING/WALL INSTALLATION PROVIDE TRANSITIONS AS NECESSARY TO ACCOMPLISH CONNECTION

PUMP SCHEDULE

GENERAL						MECHANICAL										ELECTRICAL		NOTES
EQUIP NO.	LOCATION	APPLICATION	MANUFACTURER	MODEL NO.	TYPE	FLUID	GPM	TOTAL DISCHARGE HEAD (FT)	NPSHR (FT)	BHP	MOTOR RPM	IMPELLER SIZE (IN)	SUCTION SIZE (IN)	DISCHARGE SIZE (IN)	HP OR LOAD	VOLTAGE & PHASE		
P-1	GROUND FLOOR MECH ROOM	HEATING WATER	BELL & GOSSET	1510E	END-SUCTION	35% PG	274	85	10.7	8.1	1800	10.625	3"	2"	10	208/3	ALL	
P-2	GROUND FLOOR MECH ROOM	HEATING WATER	BELL & GOSSET	1510E	END-SUCTION	35% PG	274	85	10.7	8.1	1800	10.625	3"	2"	10	208/3	ALL	
P-3	GROUND FLOOR MECH ROOM	CONDENSER WATER	BELL & GOSSET	1510E	END-SUCTION	35% PG	320	55	7.4	5.2	1800	8.75	3"	2.5"	7.5	208/3	ALL	
P-4	GROUND FLOOR MECH ROOM	CONDENSER WATER	BELL & GOSSET	1510E	END-SUCTION	35% PG	320	55	7.4	5.2	1800	8.75	3"	2.5"	7.5	208/3	ALL	

- NOTES:  
1. PROVIDE SUCTION DIFFUSER AND TRIPLE DUTY VALVE  
2. VFD BY DIV 23, INSTALLED BY DIV 26. CONTROLS BY DIV 25  
3. MECHANICAL SEALS RATED FOR GLYCOL

1	5-17-22	CRE	ADDENDUM #1	
No.	Date	By:		Revision:

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Project Title:  
CITY OF DULUTH  
CITY HALL MEP RENEWAL DESIGN

411 WEST 1ST STREET  
DULUTH, MN 55802

Sheet Title:  
MECHANICAL SCHEDULES

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DWG Scale: AS NOTED  
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Revision Number:

1

Sheet Number:

M900



