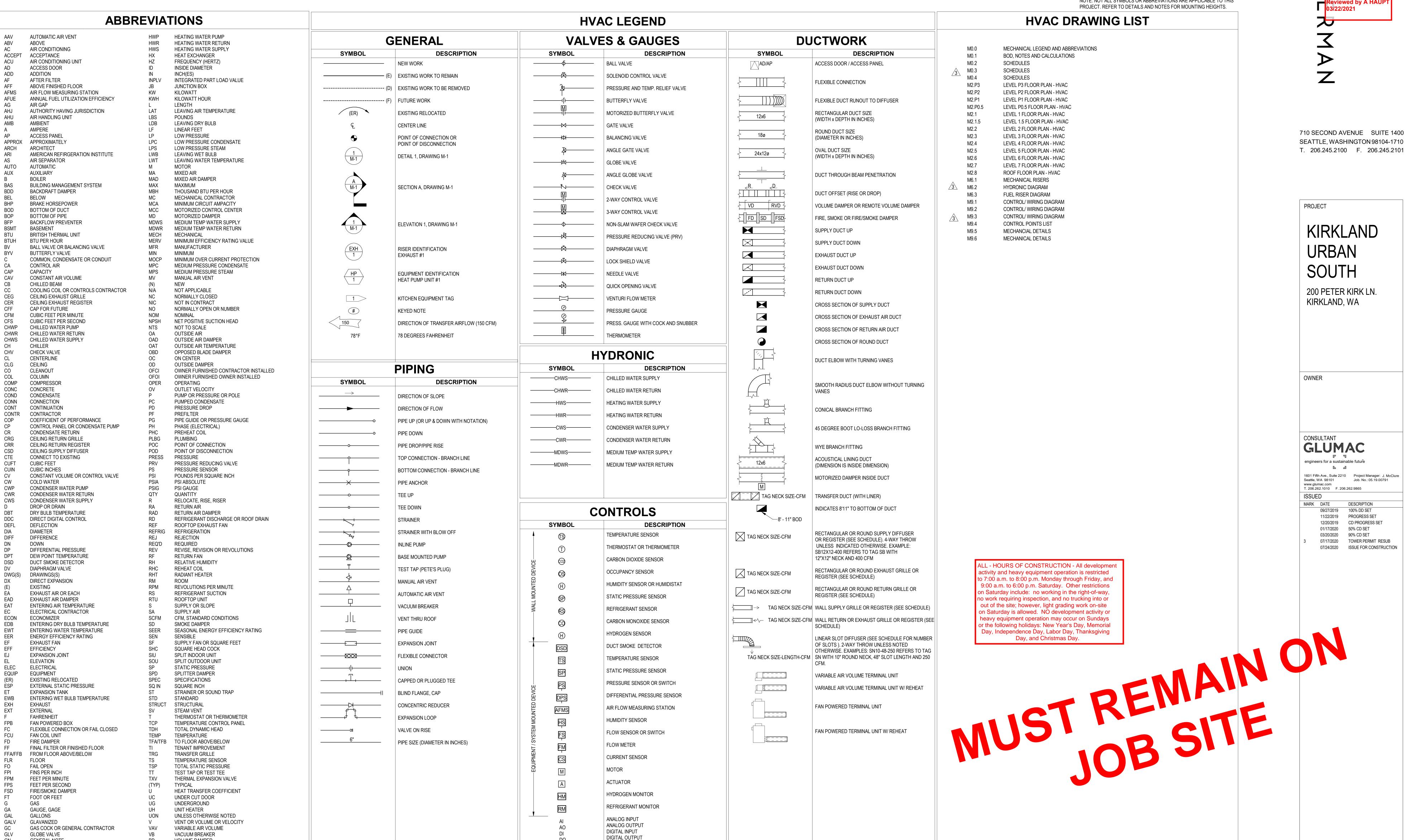
NOTE: NOT ALL SYMBOLS OR ABBREVIATIONS ARE APPLICABLE TO THIS



BUILDING AUTOMATION SYSTEM

REFRIGERANT DISCHARGE

PNEUMATIC CONTROL VALVE

REFRIGERANT SUCTION

**DESCRIPTION** 

PULSING INPUT

**MISCELLANEOUS** 

SOUND TRAP

COOLING COIL

HEATING COIL

RADIANT HEATER

CHILLED BEAM

THRUST BLOCK

BASEBOARD HEATER

SYMBOL

HC

CB

City of Kirkland 

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### **KIRKLAND URBAN** SOUTH

200 PETER KIRK LN. KIRKLAND, WA

OWNER

engineers for a sustainable future engineers

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865 **ISSUED** 

MARK DATE DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

07/24/2020 ISSUE FOR CONSTRUCTION

PROJECT NO. ISSUE DATE

CBRE03.18.095

SHEET TITLE / NUMBER **MECHANICAL** LEGEND AND **ABBREVIATIONS** 

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

GENERAL NOTE

GROUND

HOSE BIBB

**HEATING COIL** 

HORIZONTAL

HEAT PUMP

HOUR(S)

HOSE VALVE

**HEATING WATER** 

HIGH PRESSURE

HORSEPOWER

HIGH PRESSURE CONDENSATE

HEATING, VENTILATING AND AIR CONDITIONING

HIGH PRESSURE STEAM

HEAT RECOVERY UNIT

HUMIDITY SENSOR

**GATE VALVE** 

GALLONS PER MINUTE

VOLUME DAMPER

VARIABLE FREQUENCY DRIVE

WASTE OR WIDTH OR WATTS

WET BULB TEMPERATURE

WALL EXHAUST GRILLE

**WORKING PRESSURE** 

WATER PRESSURE DROP

WALL RETURN REGISTER

WALL SUPPLY REGISTER

WATER-SOURCE HEAT PUMP

VENTURI FLOW METER

VENT THROUGH ROOF

VERTICAL

WITH

WITHOUT

WATER COLUMN

WATER GAUGE

TRANSFORMER

ZONE DAMPER

ZONE

**VERT** 

VFD

VFM

VTR

W/O

WSR

WT XFMR

#### 2015 WSEC COMPLIANCE

- . HVAC EQUIPMENT SHALL HAVE A MINIMUM PERFORMANCE AT SPECIFIED RATING CONDITIONS NOT LESS THAN THE VALUES CALLED OUT IN SECTION C403.2.3, AND AS INDICATED IN TABLES C403.2.3(1)A THROUGH C403.2.3(9) OF THE WSEC AND AS INDICATED ON THE CONTRACT DOCUMENTS.
- PROVIDE DEAD BAND BETWEEN HEATING/COOLING SPACE SENSOR SETPOINTS OF 5 DEGREES AS REQUIRED BY SECTION C403.2.4.1.2 OF THE WSEC OR AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES.
- HVAC SYSTEMS SHALL BE EQUIPPED WITH AUTOMATIC CONTROLS CAPABLE OF ACCOMPLISHING SETBACK OR SHUTDOWN DURING UNOCCUPIED PERIODS AS REQUIRED BY SECTION C403.2.4.2 OF THE WSEC AND AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES.
- . PROVIDE BALANCING DEVICES IN ALL BRANCH DUCTS AND PIPE RUNS TO TERMINAL DEVICES AS INDICATED ON THE CONTRACT DOCUMENTS.
- 5. ALL DUCTWORK SHALL COMPLY WITH SMACNA STANDARDS FOR CONSTRUCTION OF GALVANIZED DUCTWORK. ALL DUCTWORK SHALL BE SEALED AS REQUIRED BY SECTION C403.2.8 OF THE WSEC.DUCTWORK STATIC PRESSURE AND SEAL CLASS:

WATER PRESSURE (IN. W.C.)	SEAL CLASS
< 0.2"	SEAL TRANSVERSE AND LONGITUDINAL JOINTS AND SEAMS AND DUCT PENETRATIONS (EXCEPT CONTINUOUSLY WELDED AND LOCKING-TYPE LONGITUDINAL JOINTS AND SEAMS).
0.2" - 0.3"	SEAL TRANSVERSE AND LONGITUDINAL JOINTS AND SEAMS AND DUCT PENETRATIONS.
> 0.3"	SEAL TRANSVERSE AND LONGITUDINAL JOINTS AND SEAMS AND DUCT PENETRATIONS; DUCTS AND PLENUMS LEAK-TESTED IN ACCORDANCE WITH SECTION C403.2.8.3.3

#### ALL DUCTWORK SHALL BE INSULATED AS REQUIRED BY SECTION C403.2.8 OF THE WSEC AND AS DESCRIBED IN THE SPECIFICATIONS.

DUCT TYPE	LOCATION	R-VALUES
	WITHIN A CONDITIONED SPACE (NOT CONSIDERED PART OF THE BUILDING ENVELOPE)	C402 BUILDING ENVELOPE REQUIRMENTS FOR METAL FRAMED WALLS (R-13+R-10)
OUTSIDE AIR	WITHIN CONDITIONED SPACE, SERVING INDIVIDUAL SUPPLY AIR UNITS WITH LESS THAN 2,800 CFM TOTAL SUPPLY AIR CAPACITY	R-7
	UNHEATED COMBUSTION ROOMS WITH AIR LOUVERS	ISOLATED FROM COOLED SPACE AT SIDES, TOP, AND BOTTOM WITH R-11
	WITHIN UNCONDITIONED SPACE	R-6
	OUTSIDE THE BUILDING	R-8
	WITHIN EQUIPMENT	(NOT REQUIRED)
SUPPLY & RETURN	WHERE DESIGN TEMPERATURE SUPPLY AND DIFFERENCE BETWEEN INTERIOR RETURN AIR AND EXTERIOR OF THE DUCT DOES NOT EXCEED 15F	(NOT REQUIRED)
	WITHIN CONDITIONED SPACE	(NOT REQUIRED)
	WITH CONDITIONED SPACE, SUPPLY TEMP.LESS THEN 55F OR GREATER THAN 105F	R-3.3 (EXCEPT IS EXPOSED WITHIN ZONE SERVED, NOT REQUIRED)

SYSTEM	INSULATION			PIPE DIAME	TER	
TEMP. (F)	CONDUCTIVITY	< 1.0"	1.0" - 1.5"	1.5" - 4.0"	4.0" - 8.0"	> 8.0"
, ,			INSULAT	ION THICK	NESS (IN.)	
> 350	0.32 - 0.34	4.5	5.0	5.0	5.0	5.0
251 - 350	0.29 - 0.32	3.0	4.0	4.5	4.5	4.5
201 - 250	0.27 - 0.30	2.5	2.5	2.5	2.5	3.0
141 - 200	0.25 - 0.29	1.5	1.5	2.0	2.0	2.0
105 - 140	0.21 - 0.28	1.0	1.0	1.5	1.5	1.5
40 - 60	0.21 - 0.27	0.5	0.5	1.0	1.0	1.0
< 40	0.20 - 0.26	0.5	1.0	1.0	1.0	1.5

- INDIVIDUAL ZONE TERMINAL UNITS AND HVAC SYSTEMS SERVING PORTIONS OF THE BUILDING HAVING LESS THAN 24-HOUR OPERATION SHALL BE SHUT OFF DURING UNOCCUPIED PERIODS AS REQUIRED BY SECTION C403.2.4.2 OF THE WSEC OR AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES.
- SUPPLY AIR AND WATER TEMPERATURES SHALL BE AUTOMATICALLY RESET AS REQUIRED IN SECTION C403.4.2.4 OF THE WSEC OR AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES.
- ALL AIR SYSTEMS SHALL BE PROVIDED WITH A 100% CAPABLE AIR ECONOMIZER CAPABILITY AS REQUIRED BY SECTION C403.3 (OR EXCEPTION) OF THE WSEC AND AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES.
- . AIR ECONOMIZERS SHALL BE CAPABLE OF PROVIDING PARTIAL COOLING EVEN WHEN ADDITIONAL MECHANICAL COOLING IS REQUIRED TO MEET THE REMAINDER OF THE COOLING LOAD.
- SIMULTANEOUS HEATING AND COOLING TO INDIVIDUAL ZONES SHALL BE PROHIBITED AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES AND AS DESCRIBED IN SECTION C403.2.4.1 OF THE WSEC.
- VARIABLE FREQUENCY DRIVES SHALL BE PROVIDED FOR VARIABLE FLOW HEATING AND AIR HANDLING SYSTEMS AS REQUIRED BY SECTION C403.2.13 OF THE WSEC AND AS DESCRIBED IN THE CONTRACT DOCUMENTS INCLUDING TEMPERATURE CONTROL SEQUENCES.

MOTOR EFFICIENCY SHALL NOT BE LESS THAN THE MINIMUM CALLOUTS PER SECTION

- C403.2.11 OF THE WSEC FOR FULL LOAD EFFICIENCIES.
- RECORD DRAWINGS SHALL BE PROVIDED TO THE OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE AS REQUIRED BY SECTION C408.3.2 OF THE WSEC. THE DRAWINGS SHALL INDICATE THE LOCATION AND PERFORMANCE DATA OF EQUIPMENT, GENERAL CONFIGURATION OF DUCTWORK AND PIPING DISTRIBUTION SYSTEMS, INCLUDING FLOW RATES AS A MINIMUM.
- OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED TO THE OWNER AS REQUIRED BY SECTION C103.6.2 OF THE WSEC. AS A MINIMUM, THE MANUALS SHALL INCLUDE:

### SUBMITTAL DATA

- A. OPERATION AND MAINTENANCE DATA FOR EQUIPMENT. B. NAMES AND ADDRESSES OF SERVICE AGENCIES.
- C. HVAC CONTROLS SYSTEM MAINTENANCE AND CALIBRATION INFORMATION. D. NARRATIVE OF HOW SYSTEM IS INTENDED TO OPERATE
- 10. HVAC SYSTEMS SHALL BE BALANCED AS REQUIRED BY SECTION C408.2.2 OF THE WSEC.
- . COMMISSIONING SHALL BE PROVIDED AND REPORT OF COMMISSIONING BE SUBMITTED TO THE OWNER AS REQUIRED BY SECTION C408 OF THE WSEC, AND AS CALLED OUT IN SPECIFICATIONS.
- 12. PROVIDE AMCA RATED LEAKAGE AND CONTROL TYPE FOR RETURN, OUTSIDE AIR, AND EXHAUST DAMPERS PER SECTION C403.2.4.3.
- 13. PROVIDE OCCUPANCY SENSOR CONTROL PER SECTION C403.2.6.3.
- 14. FOR LARGE VOLUME FAN SYSTEMS, PROVIDE AIRFLOW REDUCTION BASED ON HEATING AND COOLING EXHAUST DEMAND PER SECTION C403.2.11.5 AND C403.2.13.
- 15. PROVIDE APPROPRIATE LOW AND MEDIUM PRESSURE DUCTWORK CONSTRUCTION PER SECTION C403.2.8.3.1 AND C403.2.8.3.2.
- 16. ADJUST DUCT STATIC PRESSURE SETPOINT BASED ON ZONE REQUIRING THE MOST PRESSURE PER SECTION C403.4.1.2.
- 7. PROVIDE CONTROLS THAT AUTOMATICALLY RESET HVAC SUPPLY AIR TEMP IN RESPONSE TO LOADS PER SECTION C403.4.4.4.

### BASIS OF DESIGN

. THIS BUILDING IS A TWELVE (12) STORY BUILDING INCLUDING 8 STORIES OF OFFICE/RETAIL OVER A FOUR (4) STORY BELOW GRADE GARAGE. DESIGN IS SHELL AND

P. THE DESIGN INCLUDES THE FOLLOWING NOTABLE FEATURES, BUT IS NOT LIMITED TO THE SCOPE BELOW. CONTRACTOR IS RESPONSIBLE FOR ALL CONTRACT DOCUMENTS AND COORDINATING WITH ALL DISCIPLINES.

### A. OFFICE FLOORS (LEVELS 1.5-7)

B. RETAIL FLOORS (LEVEL 1 AND 1.5)

CORE ONLY.

a. AIR COOLED CHILLERS AND CENTRAL PLANT PUMPS LOCATED ON THE ROOF. b. TO BE VENTILATED VIA DOAS UNIT WITH HEAT WHEEL, CHILLED WATER COIL

UNITS. MEDIUM TEMPERATURE WATER WILL BE SERVED AT EACH FLOOR.

- 5. COORDINATE ALL WORK WITH VARIOUS TRADES IN INSTALLING ALL WORK TO CLEAR ARCHITECTURAL AND STRUCTURAL MEMBERS. NO AND GAS HEATING COIL LOCATED ON THE ROOF. WORK SUCH AS PIPE. DUCT, ETC., TO BE IN CONTACT WITH ANY EQUIPMENT OR BUILDING MEMBERS. c. FUTURE OFFICE TI WILL BE SENSIBLE ONLY PARALLEL VARIABLE AIR VOLUME
- FUTURE UNITS WILL HAVE ELECTRIC HEAT.
- a. AIR COOLED CHILLERS AND CENTRAL PLANT PUMPS LOCATED ON THE ROOF. b. TO BE VENTILATED VIA DOAS UNITWITH HEAT WHEEL, CHILLED WATER COIL AND GAS HEATING COIL LOCATED ON THE ROOF.

c. FUTURE RETAIL TI WILL BE FAN COILS SO CHILLED WATER WILL BE SERVED TO

#### THESE FLOORS. FUTURE UNITS WILL HAVE ELECTRIC HEAT. 3. CODES AND STANDARDS

A. THE PROJECT SHALL ADHERE TO THE BELOW CODES:

f. 2015 WASHINGTON STATE ENERGY CODE (WSEC)

- a. 2015 INTERNATIONAL BUILDING CODE (IBC) WITH WA AND LOCAL AMENDMENTS
- b. 2015 INTERNATIONAL MECHANICAL CODE (IMC) WITH WA AND LOCAL
- c. 2015 INTERNATIONAL FIRE CODE (IFC) WITH WA AND LOCAL AMENDMENTS d. 2015 UNIFORM PLUMBING CODE (UPC) WITH WA AND LOCAL AMENDMENTS e. 2014 NATIONAL ELECTRICAL CODE (NEC) WITH WA AND LOCAL AMENDMENTS
- g. THE AMERICANS WITH DISABILITIES ACT (ADA) WITH WA AND LOCAL AMENDMENTS
- h. WASHINGTON ADMINISTRATIVE CODE (WAC)
- a. AIR MOVING AND CONDITIONING ASSOCIATION (AMCA)

B. THIS PROJECT SHALL FOLLOW THE BELOW REFERENCES AND STANDARDS:

- b. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) c. AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI) d. AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING
- ENGINEERS (ASHRAE) e. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)
- f. ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA) g. MANUFACTURER'S STANDARDIZATION SOCIETY (MSS)
- h. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA) i. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
- k. UNDERWRITER'S LABORATORIES (UL) ALL EQUIPMENT AND DEVICES SHALL BE LISTED AND LABELED BY UL OR ANOTHER TESTING LAB ACCEPTABLE TO THE LOCAL AHJ'S AND SHALL BE ACCEPTABLE AS SUITABLE FOR THE USE AND LOCATION FOR WHICH THEY ARE
- 4. OUTDOOR DESIGN CONDITIONS

INTENDED.

- A. LOCATION: KIRKLAND, WASHINGTON
- a. SUMMER: 86°F DB / 66°F WB (ASHRAE 0.40% FOR SEATTLE, WA) b. WINTER: 24°F DB / 23°F WB (ASHRAE 99.6% FOR SEATTLE, WA)
- . INDOOR DESIGN CONDITIONS

A. ALL OCCUPIED AREA

- a. HEATING: 70°F +/- 3°F
- b. COOLING: 75°F +/- 3°F B. ELEVATOR MACHINE ROOM(S)
- a. HEATING: NONE b. COOLING: 72°F +/- 3°F (OR PER ELEVATOR CONSULTANT)
- C. ELECTRICAL AND TELECOM ROOM(S)
- a. HEATING: NONE b. COOLING: 85°F +/- 3°F
- . VENTILATION AND EXHAUST
- A. ALL OCCUPIED AREAS
- a. PER CHAPTER 4 OF THE 2015 SEATTLE MECHANICAL CODE
- BUILDING ENVELOPE (PER ARCHITECT'S DRAWINGS)

#### A. U-VALUES

- a. FLOOR: 0.031 BTU/HR-FT<sup>2</sup>-°F b. WALLS: 0.055 BTU/HR-FT<sup>2</sup>-°F c. WINDOWS: 0.290 BTU/HR-FT<sup>2</sup>-°F d. ROOF: 0.027 BTU/HR-FT<sup>2</sup>-°F
- 8. INTERNAL HEAT GAINS
- A. DIVERSITY: NONE

e. SHGC: 0.28

- B. ALL OCCUPIED AREAS a. LIGHTING PER 2015 WSEC
- b. RECEPTACLE POWER PER 2015 WSEC c. OCCUPANCY PER 2015 WSEC
- ELEVATOR MACHINE ROOM(S) a. VARIES PER ELEVATOR
- 9. DUCTWORK AND AIRFLOW DESIGN
- A. MAXIMUM ALLOWABLE AIR PRESSURE DROPS AND AIR VELOCITIES TO MEET HIGH EFFICIENCY OPERATION. DUCT STATIC PRESSURE FRICTION LOSS SHALL NOT EXCEED 0.2" PER 100 FEET. AIR VELOCITIES ABOVE STATED MAXIMUM VALUES REQUIRE ACOUSTICAL TREATMENT.
- B. SUPPLY DUCTWORK
- a. EXPOSED IN OCCUPIED SPACES AND CONSTANT VOLUME SYSTEMS AT 0.08" W.G. PER 100 FEET (FT) AND A MAXIMUM OF 1,300 FT PER MINUTE VELOCITY. b. ABOVE CEILING AND VARIABLE AIR VOLUME SYSTEMS AT MAX. OF 1,500 FT PER
- MIN. VELOCITY. c. IN SHAFT MAXIMUM VELOCITY OF 1,800 FT PER MINUTE
- C. RETURN DUCTWORK
- a. EXPOSED IN OCCUPIED SPACES AND CONSTANT VOLUME SYSTEMS AT 0.06" W.G. PER 100 FEET (FT) AND A MAXIMUM OF 1,000 FT PER MINUTE VELOCITY.
- b. ABOVE CEILING AND VARIABLE AIR VOLUME SYSTEMS AT MAX. OF 1,300 FT PER MIN. VELOCITY. c. IN SHAFT MAXIMUM VELOCITY OF 1,800 FT PER MINUTE.
- . EXHAUST DUCTWORK
- a. ALL SYSTEMS AT 0.08" W.G. PER 100 FEET (FT) AND A MAX. OF 1,300 FT PER MIN.
- E. ACOUSTICAL CRITERIA: PER ACOUSTICIAN'S REPORT
- 10. SEISMIC CRITERIA
- ANCHORAGE AND RESTRAINTS MUST BE COORDINATED WITH STRUCTURAL ENGINEER AND AUTHORITY HAVING JURISDICTION.

#### **GENERAL NOTES**

- CONTRACT DOCUMENT DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. DO NOT SCALE FOR MATERIAL QUANTITIES. ALL SCALING SHOULD BE REFERENCED TO ARCHITECTURAL PLANS ONLY.
- 2. GENERAL NOTES AND LEGEND APPLY TO ALL SHEETS. 3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED FEES, PERMITS AND INSPECTIONS. OBTAIN ALL FIELD APPROVALS ON WORK
- FROM REGULATING AGENCIES WHERE REQUIRED. 4. PROTECTION OF PUBLIC: THE CONTRACTOR SHALL PROTECT THE PUBLIC FROM INJURY DURING PROGRESS OF THE WORK BY POSTING
- WARNING SIGNS, GUARD LIGHTS AND BARRICADES AS REQUIRED.
- 6. THESE PLANS AND ACCOMPANYING SPECIFICATIONS HAVE BEEN DESIGNED TO SHOW SUBSTANTIAL COMPLIANCE WITH THE ENERGY STANDARDS. ALL EQUIPMENT SHALL MEET THE REQUIREMENTS OF THE BUILDING ENERGY EFFICIENCY STANDARDS.
- 7. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED. 8. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
- 9. ALL SUPPLY, RETURN AND EXHAUST AIR DUCTWORK SHALL BE GALVANIZED SHEET METAL IN ACCORDANCE WITH CMC AND LATEST EDITIONS OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS (HDCS) AND ASHRAE STANDARDS. DUCT GAUGE AND CONSTRUCTION SHALL BE SELECTED AT 1.5 TIMES THE DESIGN FAN SUPPLY STATIC. INSTALL SINGLE THICKNESS TURNING VANES AT EACH RECTANGULAR ELBOW OR PROVIDE 1.5 TIMES FOR RADIUSED ELBOWS. RECTANGULAR ELBOWS SHALL BE CONSTRUCTED PER SMACNA HDCS FIGURE 2-2. ROUND TEES SHALL BE CONSTRUCTED PER SMACNA HDCS FIGURE 3-5. TRANSVERSE JOINTS SHALL BE CONSTRUCTED PER SMACNA
- FIGURE 1-4 FOR TYPES T-7 THROUGH T-25. T-1 THROUGH T-6 JOINTS ARE NOT ALLOWED. 10. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- 11. IDENTIFY ALL NEW MECHANICAL EQUIPMENT WITH NAMEPLATES PERMANENTLY ENGRAVED WITH 1/2 INCH HIGH WHITE LETTERS ON A BLACK BACKGROUND. IDENTIFY EQUIPMENT WITH SYMBOLS SHOWN ON THE PLANS.
- 12. INSTALL VOLUME DAMPERS AS REQUIRED FOR PROPER BALANCING OF EACH DIFFUSER/GRILLE. PROVIDE EXTENDED REGULATORS OR ZIP SET REMOTE ACTUATORS TO OPERATE DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS.
- 13. CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- 14. COORDINATE ALL SUPPLY DIFFUSERS AND RETURN GRILLES WITH CEILING GRID, LIGHTS, SPRINKLER HEADS, SEISMIC BRACING, TELEPHONE EQUIPMENT, AREA DETECTORS, ETC.
- 15. CEILING DIFFUSER SIZES SHOWN INDICATE NECK SIZES. PROVIDE FRAMES AS REQUIRED TO MATCH MOUNTING SURFACE. 16. MOTOR STARTERS AND WIRING/CONDUIT SHALL BE PROVIDED BY ELECTRICAL INSTALLER.
- 17. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE HVAC SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- 18. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS AND FANS. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE
- 19. INDIVIDUAL RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED SEVEN (7) FEET.

SYSTEM TAG

ERV-P0.5.1/FCU-P0.5.1

ERV-P0.5.1/FCU-P0.5.2

ERV-P0.5.1FCU-P0.5.3

SVAV-1.1

SVAV-1.2

SVAV-1.5.1

SVAV-1.5.2

SVAV-1.5.3

- 20. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED, AND REQUIRED TO PROVIDE A VIBRATION FREE
- 21. PROVIDE VIBRATION ISOLATION DEVICES FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- 22. ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS. INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- 23. PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL FANS. SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS. VOLUME DAMPERS, HUMIDIFIERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK WHICH REQUIRE OPERATION, ADJUSTMENT AND MAINTENANCE.
- 24. DUCT MOUNTED PHOTOELECTRIC SMOKE DETECTORS SHALL BE INSTALLED WITH ONE REQUIRED FOR EACH HEATING OR COOLING SYSTEM SUPPLYING AIR IN EXCESS OF 2000 CFM PROVIDE D BY DIV 28 FIRE ALARM, INSTALLED BY DIV 23 MECHANICAL. DETECTOR SHALL BE PROVIDED WITH METAL SAMPLING TUBE AND BE MOUNTED IN THE SUPPLY AIR DUCTWORK. DETECTOR SHALL SHUT DOWN THE AIR-MOVING EQUIPMENT WHEN SMOKE IS DETECTED. PROVIDE REMOTE TEST AND RESET STATION FOR MOUNTING AT THE CEILING OR WALL IN THE VICINITY OF THE SMOKE DETECTOR
- 25. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL INSTALLER. THE MECHANICAL INSTALLER SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS.
- 26. EXTERIOR LOUVERS ARE INDICATED FOR INFORMATION ONLY. DETAILED DESCRIPTIONS ARE PROVIDED IN THE ARCHITECTURAL DOCUMENTS AND SHALL BE COORDINATED WITH GENERAL CONTRACTOR.
- 27. LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR RATED ACCURACY.
- 28. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE ELECTRICAL CODE AND THE SPECIFICATION SECTIONS.

SYSTEM TYPE

HX, FCU W/ COOL COIL & ELEC HEAT

HX, FCU W/ COOL COIL & ELEC HEAT

HX, FCU W/ COOL COIL & ELEC HEAT

SENSIBLE VAV

SENSIBLE VAV

SENSIBLE VAV

SENSIBLE VAV

SENSIBLE VAV

ERV-P0.5.2/FCU-P0.5.4 | HX W/ COOL COIL, FCU W/ ELEC HEAT

- 29. ALL PENETRATIONS THROUGH IN FIRE AND SMOKE RATED WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE AND SMOKE STOPPED WITH A UL APPROVED SEALANT SYSTEM.
- 30. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

ROOM/SPACE

P0.5 EAST CORRIDOR STORAGE RMS P14,15,16,17,20

EAST GARAGE ELEVATOR LOBBIES

P0.5 EAST LOBBY

LOCKER ROOM

STORAGE

P0.5 WEST CORRIDOR

P0.5 WEST LOBBY

WEST GARAGE LOBBIES

SECUTIY OFFICE AND TI

WEST LOBBY L1

110,111,117

EAST LOBBY

WEST LOBBY L1.5

Air	DOOM!	NEODMATION		\CHD\C	NOON VE		<del></del>											
Air System	KUUM I	NFORMATION	Az	ASHRAE	Rp	Ra		Pz		Vbz	Ez	Voz	Vpz	Zpz	Ev	Vot	Vot*1.3	ADJUSTED
			FLOOR	ROOM	_		Occupant		Actual				-	l •	LV	VOL	PER LEED	ADJUSTED
Equipment	NO	Danie Nama			People	Area	Occupant	Zone	Actual	Breathing	Zone Air	Zone	Zone	Primary			REQ'MT	
Tag	NO.	Room Name	AREA	TYPE	Outdoor	Outdoor	Density	Population	Population	Zone OA	Distribution	Outdoor		Outdoor			REQIVIT	
			sf		Air Rate	Air Rate		(person)	(person)	(cfm)	Effectiveness		Airflow	Air				
		T			(cfm/person)	(cfm/sf)	(#/1000 sf)			ļ		(cfm)		Fraction				
DOAS	7	OFFICE		OFFICE SPACE	5.0	0.06	5	69.5	104.0	1,354	0.8	1,693	N/A	N/A	N/A	1693	2201	2200
DOAS	7	TECH TALK		CONFERENCE	5.0	0.06	50	38.0	50.0	296	0.8	369	N/A	N/A	N/A	369	480	480
DOAS	7	LOUNGE	+	BREAK ROOM	5.0	0.12	25	41.8	42.0	411	0.8	513	N/A	N/A	N/A	513	667	670
DOAS	7	MASSAGE	981	CODDIDOD	7.5	0.06	10	9.8	7.0	111	0.8	139	N/A	N/A	N/A	139	181	185
DOAS	7	GENERAL SPACE		CORRIDOR	20.0	0.06	40	0.0	0.0	233	0.8	291	N/A	N/A	N/A	291	379	380
DOAS	1	FITNESS CENTER OFFICE		AEROBICS OFFICE SPACE	20.0	0.06	5	54.8	55.0	1,182	0.8	1,478 3,978	N/A	N/A	N/A	1478	1921	1925 5175
DOAS DOAS	6 5	OFFICE		OFFICE SPACE	5.0	0.06	5	164.3 164.3	242.0 242.0	3,182 3,182	0.8	3,978	N/A N/A	N/A N/A	N/A N/A	3978 3978	5171 5171	5175
DOAS	1	OFFICE		OFFICE SPACE	5.0	0.06	5	164.3	242.0	3,182		3,978	N/A N/A	N/A	N/A N/A	3978	5171	5175
DOAS	3	OFFICE		OFFICE SPACE	5.0	0.06	5	160.6	242.0	3,102		3,921	N/A N/A	N/A	N/A N/A	3978	5098	5100
DOAS	3	TECH TALK	+	CONFERENCE	5.0	0.06	50	37.5	50.0	295	0.8	369	N/A	N/A	N/A	369	479	480
DOAS	2	KITCHEN	1837	KITCHEN	7.5	0.12	20	36.7	18	355	0.8	444	N/A	N/A	N/A	444	578	580
DOAS	2	CAFÉ		SEATING	7.5	0.12	100	709.2	400.0	4,277	0.8	5,346	N/A	N/A	N/A	5346	6949	6950
DOAS	2	COFFEE BAR		COFFEE	5.0	0.06	20	20.8	15.0	137	0.8	172	N/A	N/A	N/A	172	223	225
DOAS	2	TECH TALK		CONFERENCE	5.0	0.06	50	255.6	310.0	1,857		2,321	N/A	N/A	N/A	2321	3017	3020
DOAS	2	CONFERENCE	521	CONFERENCE	5.0	0.06	50	26.1	17.0	116	0.8	145	N/A	N/A	N/A	145	189	190
DOAS	2	OFFICE	19034	OFFICE SPACE	5.0	0.06	5	95.2	132.0	1,802	0.8	2,253	N/A	N/A	N/A	2253	2928	2930
DOAS	2	AMENITY	910	BREAK ROOM	5.0	0.06	25	22.8	23.0	170	0.8	212	N/A	N/A	N/A	212	276	280
DOAS	2	LOUNGE	1877	BREAK ROOM	5.0	0.06	25	46.9	47.0	348	0.8	435	N/A	N/A	N/A	435	565	565
DOAS	2	MAIN LOBBY	912	MAIN LOBBY	5.0	0.06	10	9.1	10.0	105	0.8	131	N/A	N/A	N/A	131	170	170
DOAS	2	AMENITY	518	BREAK ROOM	5.0	0.06	25	13.0	13.0	96	0.8	120	N/A	N/A	N/A	120	156	160
DOAS	1.5	OFFICE 1		OFFICE SPACE	5.0	0.06	5	35.4	60.0	725	0.8	906	N/A	N/A	N/A	906	1178	1180
DOAS/VAV	1.5	WEST LOBBY	685	MAIN ENTRY LOBBIES	5.0	0.06	10	6.9	7	76	0.8	95		N/A	N/A	95	124	125
DOAS	1.5	OFFICE 2		OFFICE SPACE	5.0	0.06	5	11.4	33.0	302		377		N/A	N/A	377	490	490
DOAS/VAV	1.5	FOOD STORAGE		STORAGE	5.0	0.06	2	1.9	2.0	67	0.8	84	N/A	N/A	N/A	84	110	110
DOAS/VAV	1.5	GENERAL SPACE		CORRIDOR		0.06		0.0	0.0	102	0.8	128	N/A	N/A	N/A	128	166	170
DOAS/VAV	1.5	GENERAL SPACE	+	LOBBY	5.0	0.06	10	20.1	11.0	175		219	N/A	N/A	N/A	219	285	285
DOAS/VAV	1.5	EAST LOBBY	1391	MAIN ENTRY LOBBIES	5.0	0.06	10	13.9	14.0	153	0.8	192	N/A	N/A	N/A	192	249	250
DOS/SVAV	1	WEST LOBBY	739	MAIN ENTRY LOBBIES	5.0	0.06	10	7.4	8.0	84	0.8	105	N/A	N/A	N/A	105	137	140
DOAS/SVAV	1	WEST COORDIOR	789	CORRIDOR	0.0	0.06	0	0.0	0.0	47	0.8	59	N/A	N/A	N/A	59	77	80
DOAS/SVAV	1	DOCK MASTER	260	OFFICE SPACE	5.0	0.06	5	1.3	2.0	26	0.8	32	N/A	N/A	N/A	32	42	45
DOAS/SVAV	1	VESTIBULE	260	RECEIVING	10.0	0.12	2	0.5	1.0	41	0.8	52	N/A	N/A	N/A	52	67	70
TREF-1.5.1/DOAS/VAV	1.5	TRASH	394	TRASH ROOM	0.0	1	0	0.0	0.0	394	N/A	394	N/A	N/A	N/A	394	N/A	850
DOAS EXHAUST	2-7	RESTROOM (TYP 2-7)	50	RESTROOM	0.0	50/UNIT	0	0.0	0.0	50	N/A	50	N/A	N/A	N/A	50	N/A	100
DOAS EXHAUST	2-7	SHOWER/RR ROOM (TYP 2-7)	77	RESTROOM	0.0	50/UNIT	0	0.0	0.0	50	N/A	50	N/A	N/A	N/A	50	N/A	130
DOAS EXHAUST	2-7	JANITOR (TYP 2-7)	10	JANITOR	0.0	1	0	0.0	0.0	10	0.8	13	N/A	N/A	N/A	13	16	50
DOAS EXHAUST	2-7	MENS RR (TYP 2-7)	250	RESTROOM	0.0	50/UNIT	0	0.0	0.0	300		300	N/A	N/A	N/A	300	N/A	550
DOAS EXHAUST	2-7	WOMENS RR (TYP 2-7)	255	RESTROOM	0.0	50/UNIT	0	0.0	0.0	300		300	N/A	N/A	N/A	300	N/A	550
DOAS EXHAUST	1.5	MENS RR	216	RESTROOM	0.0	50/UNIT	0	0.0	0.0	150	N/A	150	N/A	N/A	N/A	150	N/A	500
DOAS EXHAUST	1.5	WOMENS RR	218	RESTROOM	0.0	50/UNIT	0	0.0	0.0	150	N/A	150	N/A	N/A	N/A	150	N/A	500
ERV/FCU	P0.5	SECURITY OFFICE	420	OFFICE	5.0	0.06	5	2.1	3.0	40	0.8	50	N/A	N/A	N/A	50	65	100
ERVFCU	P0.5	EAST LOBBY	331	MAIN ENTRY LOBBIES	5.0	0.06	10	3.3	4.0	40	0.8	50	N/A	N/A	N/A	50	65	340
ERVFCU	P0.5	EAST CORRIDOR	2520	CORRIDOR	0.0	0.06	0	0.0	0.0	151	0.8	189	N/A	N/A	N/A	189	246	850
ERV/FCU	P0.5	WEST LOBBY	312	MAIN ENTRY LOBBIES	5.0	0.06	10	3.1	4.0	39	0.8	48	N/A	N/A	N/A	48	63	65
ERVFCU	P0.5	WEST CORRIDOR	400	CORRIDOR	0.0	0.06	0	0.0	0.0	24	0.8	30	N/A	N/A	N/A	30	39	40
ERV/FCU	P0.5	LOCKER ROOM - OPEN AREA	1763	LOCKER ROOM	0.0	0.25	0	0.0	0.0	441	0.8	551	N/A	N/A	N/A	551	716	720
ERV/FCU	P0.5	LOCKER ROOM - SHOWER/RR RMS		LOCKER ROOM	0.0	50/UNIT	0	0.0	0.0	50	N/A	50		N/A	N/A	50	N/A	200
ERV/FCU	P0.5	LOCKER ROOM - JAN	20	LOCKER ROOM	0.0	1 50" YY	0	0.0	0.0	20	0.8	25		N/A	N/A	25	33	75
ERV/FCU	P0.5	LOCKER ROOM - RR	43	LOCKER ROOM	0.0	50/UNIT	0	0.0	0.0	50	N/A	50		N/A	N/A	50	N/A	75
ERV/FCU	P0.5	STORAGE 014	736	STORAGE	5.0	0.06	2	1.5	2.0	54	0.8	68	N/A	N/A	N/A	68	88	100
ERV/FCU	P0.5	STORAGE 016	2041	STORAGE	5.0	0.06	2	4.1	5.0	147		184	N/A	N/A	N/A	184	240	250 100
ERV/FCU ERV/FCU	P0.5 P0.5	STORAGE 016 STORAGE 017	667 1119	STORAGE STORAGE	5.0	0.06	2	1.3 2.2	3.0	50 82	0.8	103	N/A N/A	N/A N/A	N/A N/A	63 103	133	100
						0.06	2											50
ERV/FCU ERV/FCU	P0.5 P0.5	STORAGE STORGAE 020	294 807	STORAGE STORAGE	5.0	0.06	2	0.6 1.6	2.0	58 58		28 73	N/A N/A	N/A N/A	N/A N/A	28 73	95	100
ERV/FCU ERV/BEF-0.5.2	P0.5	STORAGE 020 STORAGE 004	1061	STORAGE	5.0	0.06	2	2.1	3.0	79	0.8	98	N/A N/A	N/A N/A	N/A	98	128	130
ERV/FCU	P0.5	GARAGE LOBBY P102	322	GARAGE LOBBY	0.0	1	0	0.0	0.0	322		322	N/A N/A	N/A	N/A	322	N/A	330
ERV/FCU	P2	GARAGE LOBBY P102  GARAGE LOBBY P202	322	GARAGE LOBBY	0.0	1	0	0.0	0.0	322		322	N/A N/A	N/A	N/A N/A	322	N/A	330
ERV/FCU	P3	GARAGE LOBBY P302	322	GARAGE LOBBY	0.0	1	0	0.0	0.0	322		322		N/A	N/A	322	N/A	330
ERV/FCU	P1	GARAGE LOBBY P101	726	GARAGE LOBBY	0.0	1	0	0.0	0.0	726		726		N/A	N/A	726	N/A	870
ERV/FCU	P2	GARAGE LOBBY P201	726	GARAGE LOBBY	0.0	1	0	0.0	0.0	726		726	N/A	N/A	N/A	726	N/A	870
ERV/FCU	P3	GARAGE LOBBY P301	726	GARAGE LOBBY	0.0	1	0	0.0	0.0	726		726	N/A	N/A	N/A	726	N/A	870
BEF-0.5.1	P0.5	BIKE	4121	STORAGE	5.0	0.06	2	8.2	9.0	292	-	292		N/A	N/A	292	N/A	1200
LDEF-1.1	1	LOADING DOCK	4836	LOADING DOCK	0.0	0.75	0		0.0	3,627		3,627		N/A	N/A	3627	N/A	12600
TREF-1.1	1	COMPOST	223	TRASH ROOM	0.0	1	0	0.0	0.0	223		223		N/A	N/A	223	N/A	500
GEF-P1.1/1.2	P1	GARAGE	89311	GARAGE	0.0	0.75	0	0.0	0.0	66,983	N/A	66,983	N/A	N/A	N/A	66983	N/A	68000
GEF-P2.1/2.2	P2	GARAGE	85140	GARAGE	0.0	0.75	0	0.0	0.0	63,855	N/A	·	N/A	N/A	N/A	63855	N/A	66000
GEF-P3.1/3.2	P3	GARAGE	85140	GARAGE	0.0	0.75	0	0.0	0.0	63,855	N/A	63,855		N/A	N/A	63855	N/A	66000
	•	•			1					*		*				1		

THE THE PARTY OF T

27,296

27,296

1000.0 N/A 1000 TONS @ 95 AMBIENT N/A 100 Y 1

12,550

ROOM VENTILATION CALCULATIONS

	NOMINAL		COOLIN	IG LOADS			HEATING LOADS			SPEC	IFIED EQUIPMENT		WSEC 2015	SYSTEM SIZING	
	FLOOR AREA	ENVELOPE	INTERNAL	VENTILATION	TOTAL	ENVELOPE	VENTILATION	TOTAL		COOLI	NG	HEATING	ALLOWANCE	COMPLIANCE	
LEVEL	FLOOR AREA	ENVELOPE	IINTERINAL	VENTILATION	TOTAL	EINVELOPE	VENTILATION	TOTAL	NOMINAL	SENSIBLE	TOTAL	TOTAL	ALLOWANCE	COMPLIANCE	NOTES
	[FT2]	[BTU/HR]	[BTU/HR]	[BTU/HR]	[BTU/HR]	[BTU/HR]	[BTU/HR]	[BTU/HR]	[TON]	[BTU/HR]	[BTU/HR]	[BTU/HR]	[%]	[Y/N]	
	1390														
P0.5/P1/P2/P3	5370				NOTE 3				10.0	98,000	99,000	150,128	100	v	3
FU.5/F1/F2/F5	2178				NOTE 3				10.0	38,000	33,000	130,128	100	1	3
	331														
P0.5	2528				NOTE 3				7.5	61,000	75,000	88,712	100	v	3
F0.5	294				NOTES				7.5	01,000	73,000	88,712	100	1	
	953														
P0.5/1	312				NOTE 3				7.5	60,000	73,000	40,944	100	Υ	3
	789														
P0.5	966				NOTE 4				3.0	30.8	37	11,000	100	Υ	2

SHELL AND CORE LOAD CALCULATIONS

3700

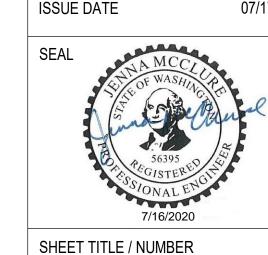
PEAK 850 TONS, BLOCK 835 TONS

CH-R.1/2 1. CLOSEST SIZE TO LOAD.

2. ERV SIZED FOR IDF ROOM LOAD AND FAN COIL SIZED FOR CALCULATED LOAD. HEAT COIL SIZED FOR DISCHARGE AIR TEMP. 3. UNIT IS 100% OSA. SIZED PER DISCHARGE AIR TEMP. CFM BASED ON CODE REQUIRED VENTILATION.

PROJECT NO.

CBRE03.18.095



© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

1,3

1,3

1,3

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710

T. 206.245.2100 F. 206.245.2101

200 PETER KIRK LN

OWNER

KIRKLAND, WA

engineers for a sustainable future 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure

T. 206.262.1010 F. 206.262.9865

Seattle, WA 98101

www.glumac.com

MARK DATE DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

Job. No.: 05.19.00791

BOD, NOTES AND

				FIRE SMOKE DA	<b>MPER</b>	SCHE	DULE		
<b>TAG</b> 1.1	MANUFACTURER RUSKIN	MODEL FSD-60	LOCATION LEVEL 1	SYSTEM SERVED SVAV-1.1	SIZE WIDTH (IN.) 42	SIZE HEIGHT (IN.)	VOLTAGE/ PHAS 120/1	EMERG POWER	NOTES 1,2,3,4,5
1.1	RUSKIN	FSD-60	LEVEL 1	SVAV-1.1	20	10	120/1	Yes Yes	1,2,3,4,5
1.4	RUSKIN	FSD-60	LEVEL 1	SVAV-1.1	10	8	120/1	Yes	1,2,3,4,5
1.5	RUSKIN	FSD-60	LEVEL 1	EEF-1.1	18	18	120/1	Yes	1,2,3,4,5
1.5.1	RUSKIN	FSD-60	LEVEL 1.5	DOAS SUPPLY	38	20	120/1	Yes	1,2,3,4,5
<u>1.5.1</u> √1. <del>5</del> .2·~~							120/1	Yes	1,2,3,4,5
	RUSKIN					-	3 120/1	Yes	
1.5.3 1.5.4	RUSKIN	FSD-60 FSD-60	LEVEL 1.5 LEVEL 1.5	VAV-1.5.4	12 24	12	120/1		1,2,3,4,5
1.5.4	RUSKIN	FSD-60	LEVEL 1.5	SVAV-1.5.1	16	10	120/1	Yes	1,2,3,4.5
1.5.5	RUSKIN	FSD-60	LEVEL 1.5				120/1	Yes Yes	1,2,3,4.5 1,2,3,4.5
	RUSKIN	FSD-60	LEVEL 1.5		16	10	120/1		
1.5.7 1.5.8	RUSKIN	FSD-60	LEVEL 1.5	SVAV-1.5.2 SVAV-1.5.2	0	14	120/1	Yes	1,2,3,4,5
					\	14	15	Yes	1,2,3,4,5
1.5.9	RUSKIN	FSD-60	LEVEL 1.5	SVAV-1.5.3	1		120/1	Yes	1,2,3,4.5
1.5.10	RUSKIN	FSD-60	LEVEL 1.5	SVAV-1.5.3	16	16	120/1	Yes	1,2,3,4.5
1.5.11	RUSKIN	FSD-60	LEVEL 1.5	TREF-1.5.1	14	14	120/1	Yes	1,2,3,4.5
7.5.12		FSD-60	LEVEL 1.5	EEF-1.5 EXHAUST AIR	++	12	120/1	Yes	1,2,3,4,5
1.5.13	RUSKIN	FSD-60	LEVEL 1.5	EEF-1.5 TRANSFER AIR	12	8	120/1	Yes	1,2,3,4,5
2.1	RUSKIN	FSD-60	LEVEL 2	DOAS SUPPLY	<u>}</u> 50	38	120/1	Yes	1,2,3,4.5
2.2	RUSKIN	FSD-60	LEVEL 2	DOAS RETURN	3 50	34	120/1	Yes	1,2,3,4.5
2.3	RUSKIN	FSD-60	LEVEL 2	FUTURE GENERAL EXHAUST	38	38	120/1	Yes	1,2,3,4,5
	RUSKIN				_	20	120/1	Yes	1,2,3,4,5
2.5	RUSKIN	FSD-60	LEVEL 2	FUTURE KITCHEN MAKE UP AIR	32	32	120/1	Yes	1,2,3,4,5
3.1	RUSKIN	FSD-60	LEVEL 3	DOAS SUPPLY	50	22	120/1	Yes	1,2,3,4.5
3.2	RUSKIN	FSD-60	LEVEL 3	DOAS RETURN	50	20	120/1	Yes	1,2,3,4.5
4.1	RUSKIN	FSD-60	LEVEL 4	DOAS SUPPLY	50	20	120/1	Yes	1,2,3,4.5
4.2	RUSKIN	FSD-60	LEVEL 4	DOAS RETURN	50	18	120/1	Yes	1,2,3,4.5
5.1	RUSKIN	FSD-60	LEVEL 5	DOAS SUPPLY	50	20	120/1	Yes	1,2,3,4.5
5.2	RUSKIN	FSD-60	LEVEL 5	DOAS RETURN	50	18	120/1	Yes	1,2,3,4.5
6.1	RUSKIN	FSD-60	LEVEL 6	DOAS SUPPLY	50	20	120/1	Yes	1,2,3,4.5
6.2	RUSKIN	FSD-60	LEVEL 6	DOAS RETURN	30	28	120/1	Yes	1,2,3,4,5
7.1	RUSKIN	FSD-60	LEVEL 7	DOAS SUPPLY	50	20	120/1	Yes	1,2,3,4,5
7.2	RUSKIN	FSD-60	LEVEL 7	DOAS RETURN	40	20	120/1	Yes	1,2,3,4,5
P0.5.1	RUSKIN	FSD-60	LEVEL P0.5	ERV-P0.5.1	36	16	120/1	Yes	1,2,3,4,5
P0.5.2	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
P0.5.3	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.1	30	8	120/1	Yes	1,2,3,4,5
P0.5.4	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
P0.5.5	RUSKIN	FSD-60	LEVEL P0.5	XEF-1.5.1	20	20	120/1	Yes	1,2,3,4,5,6
P0.5.6	RUSKIN	FSD-60-3	LEVEL P0.5	XEF-15.2	18	18	120/1	Yes	1,2,3,4,5,6
P0.5.7	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.3	14	14	120/1	Yes	1,2,3,4,5
P0.5.8	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.3	0	12	120/1	Yes	1,2,3,4,5
P0.5.9	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.3	18	14	120/1	Yes	1,2,3,4,5
P0.5.10	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.3	12	8	120/1	Yes	1,2,3,4,5
P0.5.11	RUSKIN	FSD-60	LEVEL P0.5	ERV-P0.5.1 RETURN	18	30	120/1	Yes	1,2,3,4,5
P0.5.12	RUSKIN	FSD-60	LEVEL P0.5	ERV-P0.5.1 RETURN	42	18	120/1	Yes	1,2,3,4,5
P0.5.13	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.1	30	8	120/1	Yes	1,2,3,4,5
P0.5.14	RUSKIN	FSD-60	LEVEL P0.5	ERV-P0.5.1	26	10	120/1	Yes	1,2,3,4,5
P0.5.15	RUSKIN	FSD-60	LEVEL P0.5	FCU-P0.5.1	12	8	120/1	Yes	1,2,3,4,5
P0.5.17	RUSKIN	FSD-60	LEVEL P0.5	ERV-P0.5.2	14	14	120/1	Yes	1,2,3,4,5
P1.1	RUSKIN	FSD-60	LEVEL P1	FCU-P0.5.4	8	22	120/1	Yes	1,2,3,4,5
P1.2	RUSKIN	FSD-60	LEVEL P1	FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
P1.3	RUSKIN	FSD-60	LEVEL P1	FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
P1.5	RUSKIN	FSD-60	LEVEL P1	TRANSFORMER MAKE UP AIR	60	16	120/1	Yes	1,2,3,4,5,6
P1.6	RUSKIN	FSD-60	LEVEL P1	TRANSFORMER MAKE UP AIR	60	16	120/1	Yes	1,2,3,4,5,6
P1.7	RUSKIN	FSD-60	LEVEL P1	ELEVATOR LOBBY P102	8	22	120/1	Yes	1,2,3,4,5
P1.8	RUSKIN	FSD-60	LEVEL P1	EEF-P1.1 MAKE UP AIR	16	8	120/1	Yes	1,2,3,4,5
P1.9	RUSKIN	FSD-60	LEVEL P1	EEF-P1.1	12	12	120/1	Yes	1,2,3,4,5
P2.1	RUSKIN	FSD-60	LEVEL P2	FCU-P0.5.4	8	22	120/1	Yes	1,2,3,4,5
P2.1	RUSKIN	FSD-60	LEVEL P2	FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
P2.3	RUSKIN	FSD-60	LEVEL P2	FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
P2.5 P2.5	RUSKIN	FSD-60	LEVEL P2	ELEVATOR LOBBY P202 RELIEF	8	22	120/1	Yes	1,2,3,4,5
P3.1	RUSKIN	FSD-60	LEVEL P2	FCU-P0.5.4	8	22	120/1	Yes	1,2,3,4,5
P3.1	RUSKIN	FSD-60	LEVEL P3	FCU-P0.5.4 FCU-P0.5.1	20	10	120/1	Yes	
P3.2 P3.3	RUSKIN	FSD-60	LEVEL P3	FCU-P0.5.1 FCU-P0.5.1	20	10	120/1	Yes	1,2,3,4,5
									1,2,3,4,5
P3.4	RUSKIN	FSD-60	LEVEL P3	EEF-P3.1	18	18	120/1	Yes	1,2,3,4,5
P3.5	RUSKIN	FSD-60	LEVEL P3	MAKE UP AIR	48	16	120/1	Yes	1,2,3,4,5
P3.6	RUSKIN	FSD-60	LEVEL P3	EEF-P3.2	20	20	120/1	Yes	1,2,3,4,5
P3.7	RUSKIN	FSD-60	LEVEL P3	MAKE UP AIR	60	16	120/1	Yes	1,2,3,4,5
P3.9	RUSKIN	FSD-60	LEVEL P3	ELEVATOR LOBBY P302 RELIEF	6	22	120/1	Yes	1,2,3,4,5

NOTES

1. REFER TO SPECIFICATIONS FOR ADDITIONAL DAMPER REQUIREMENTS.

2. DAMPER ACTUATOR TO BE LOCATED OUTSIDE OF AIRSTREAM.

6. FIRE/SMOKE DAMPERS SHALL FAIL CLOSED.

2. DAMPER ACTUATOR TO BE LOCATED OUTSIDE OF AIRSTREAM.
3. ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH SMOKE DETECTOR MOUNTED EXTERNALLY ON SLEEVE UPSTREAM OF DAMPER.
4. ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH FIRE ALARM SYSTEM, COORDINATE WITH FLECTRICAL DESIGN

ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH FIRE ALARM SYSTEM. COORDINATE WITH ELECTRICAL DESIGN.
 FIRE DAMPER ACTUATION DEVICE SHALL MEET ONE OF THE FOLLOWING: THE OPERATING TEMPERATURE SHALL BE APPROXIMATELY 50 DEGREES F ABOVE THE NORMAL TEMPERATURE WITHIN THE DUCT SYSTEM, BUT NOT LESS THAN 160 DEGREES F. OR, THE OPEATING TEMPERATURE SHALL BE NOT MORE THAN 350 DEGREES F WHERE LOCATED IN A SMOKE CONTROL SYSTEM COMPLYING WITH SECTION 909.

					DAMPER S	SCHED	ULE				
TAG	#	MANUFACTURER	MODEL	LOCATION	LEAKAGE RATING	SIZE WIDTH (IN.)	SIZE HEIGHT (IN.)	SLEEVE LENGTH	VOLT/PH	EMERG POWER	NOTES
MD	1.1	RUSKIN	CD-60	LEVEL 1 COMPOST	CLASS 1	30	30	16	120/1	No	1,2
MD	1.2	RUSKIN	CD-60	LEVEL 1 ELEC 113	CLASS 1	18	18	16	120/1	No	1
MD	1.3	RUSKIN	CD-60	LEVEL 1 TENANT 105	CLASS 1	14	14	16	120/1	No	1
MD	1.4	RUSKIN	CD-60	LEVEL 1 ELEC 113	CLASS 1	18	18	16	120/1	No	1
MD	1.5	RUSKIN	CD-60	LEVEL 1 TENANT 107	CLASS 1	12	16	16	120/1	No	1
MD	1.6	RUSKIN	CD-60	LEVEL 1 FCC	CLASS 1	33	45	16	120/1	Yes	1
MD	1.7	RUSKIN	CD-60	LEVEL 1 TENANT 104	CLASS 1	12	16	16	120/1	No	1
MD	1.5.1	RUSKIN	CD-60	LEVEL 1.5 FOOD STORAGE	CLASS 1	20	20	16	120/1	Yes	1
MD	1.5.2	RUSKIN	CD-60	LEVEL 1.5 FOOD STORAGE	CLASS 1	18	18	16	120/1	Yes	1
MD	1.5.3	RUSKIN	CD-60	LEVEL 1.5 GENERATOR	CLASS 1	174	100	16	120/1	Yes	1
MD	1.5.4	RUSKIN	CD-60	LEVEL 1.5 GENERATOR	CLASS 1	78	68	16	120/1	Yes	1
MD	1.5.5	RUSKIN	CD-60	LEVEL 1 THEATER NEAR FOOD STORAGE	CLASS 1	18	10	16	120/1	No	1
$\sim$ MD $\sim$	~~1.5.6~	RUSKIN	~~~CD-60~~~	LEVEL1.5	CLASS 1	20	34	16	120/1	No	1
MD	1.5.7	RUSKIN	CD-60	GENERATOR ROOM	CLASS 1	9	9	16	120/1	Yes	1
MD	1.5.8	RUSKIN	CD-60	GENERATOR ROOM	CLASS 1	9	9	16	120/1	Yes	1
MD	2.1	W RUSKIN W W	CD-60	LEVEL 2	CLASS 1	50	34	16	120/1	No	1
MD	3.1	RUSKIN	CD-60	LEVEL 3	CLASS 1	50	20	16	120/1	No	1
MD	4.1	RUSKIN	CD-60	LEVEL 4	CLASS 1	50	18	16	120/1	No	1
MD	5.1	RUSKIN	CD-60	LEVEL 5	CLASS 1	50	18	16	120/1	No	1
MD	6.1	RUSKIN	CD-60	LEVEL 6	CLASS 1	30	28	16	120/1	No	1
MD	7.1	RUSKIN	CD-60	LEVEL 7 S2 STAIR	CLASS 1	36	36	16	120/1	Yes	1
MD	7.2	RUSKIN	CD-60	LEVEL 7	CLASS 1	40	20	16	120/1	No	1,2
MD	R.1	RUSKIN	CD-60	√ROOF	CLASS 1	26	26	16	120/1	Yes	1,2
MD	R.2	RUSKIN	CD-60		CLASS 1	26	26	16	120/1	Yes	1,2
MD	R.3	RUSKIN	ČD-60	WALLE TO STATE OF THE PROPERTY	CLASS 1	36	20	16	120/1	Yes	1,2
MD	R.4	RUSKIN	CD-60	ROOF STAIR S1	CLASS 1	54	44	16	120/1	Yes	1,2
MD	R.5	RUSKIN	CD-60	ROOF MECH ROOM	CLASS 1	36	36	16	120/1	No	1
MD	R.7	RUSKIN	CD-60	ROOF MECH ROOM	CLASS 1	22	22	16	120/1	No	1
MD <del>IOTES</del>	R.8	RUSKIN	CD-60	ROOF MECH ROOM	CLASS 1	28	28	16	120/1	Yes	1,2

CLASS 1 DAMPERS SHALL HAVE A MAXIMUM LEAKAGE RATE OF 4 CFM/SQFT PER AMCA STD 511.
 DAMPER AND ACTUATOR SHALL BE RATED AT SMOKE CONTROL SYSTEMS. DAMPER SHALL FAIL IN OPEN POSITION.

TAG	#	MANUFACTURER	MODEL	LOCATION	SYSTEM SERVEED	SIZE WIDTH (IN.)	SIZE HEIGHT (IN.)		NOTES
BDD	1.1	RUSKIN	CBD2	TENANT 107	LDEF-1.1	30	30	1	
BDD	1.2	RUSKIN	CBD2	TENANT 107	TREF-1.1	10	10	1	
BDD	1.3	RUSKIN	CBD2	TENANT 105	REF-1.1	12	16	1	
BDD	P0.5.1	RUSKIN	CBD2	LEVEL P0.5	ERV-P0.5.1	36	16	1	
BDD	P1.1	RUSKIN	CBD2	P1 GARAGE	GEF-P1.1	62	62	1	
BDD	P1.2	RUSKIN	CBD2	P1 GARAGE	GEF-P1.2	62	62	1	
BDD	P1.3	RUSKIN	CBD2	ELEV P102	ELEV LOBBY P102 RELIEF	8	22	1	
BDD	P1.4	RUSKIN	CBD2	P1 GARAGE	ELEV P101 RELIEF	42	6	1	
BDD	P2.1	RUSKIN	CBD2	P2 GARAGE	GEF-P2.1	62	62	1	
BDD	P2.2	RUSKIN	CBD2	P2 GARAGE	GEF-P2.2	62	62	1	
BDD	P2.3	RUSKIN	CBD2	ELEV P202	ELEV LOBBY P202 RELIEF	8	22	1	
BDD	P2.4	RUSKIN	CBD2	P2 GARAGE	ELEV P301 RELIEF	42	6	1	
BDD	P3.1	RUSKIN	CBD2	P3 GARAGE	GEF-P3.1	84	84	1	
BDD	P3.2	RUSKIN	CBD2	P3 GARAGE	GEF-P3.2	68	68	1	
BDD	P3.3	RUSKIN	CBD2	ELEV P302	ELEV LOBBY P302 RELIEF	6	22	1	
BDD	P3.4	RUSKIN	CBD2	P3 GARAGE	ELEV P301 RELIEF	42	6	1	
BDD	7.1	RUSKIN	BD6	STAIR S2	STAIR RELIEF	36	36	1	
BDD	R.1	RUSKIN	BD6	STAIR S1	STAIR RELIEF	54	44	1	
BDD	R.2	RUSKIN	BD6	MECH 810	STAIR RELIEF	28	28	1	

NOTEC
NOTES

Γ								FAN	SCH	EDU	LE										
																ELECTRICA	\L				
			MANUFACTUR	2						AIR FLOW	SP	FAN	MTR				VFD	EMERG POWER	UNIT SIZE	OPER. WT.	
	TAG BEF	# P0.5.1	<b>ER</b> GREENHECK	MODEL NUMBER SE1-14-436-VG	AREA SERVED BIKE STORAGE P022	LOCATION BIKE STOR P022	DISCH HORIZ	TYPE PROP	<b>DRIVE</b> ECM	( <b>CFM</b> ) 1200	(IN WG) 0.3	<b>RPM</b> 1290	<b>RPM</b> 1725	<b>BHP</b> 0.15	<b>HP</b> 1/2	<b>VOLTS PH</b> 120 1	(Y/N)	(Y/N) No	( <b>L"xW"xH"</b> ) 26x21x21	(LBS) 80	NOTES 1,3,6,7,11,12,18
												1		1				N.			
<del></del>	EEF	<u>1.1.</u> 1.5.1	GREENHECK GREENHECK	SQ-98-VG	MAIN ELEC ROOM 022, 023A	GENERATOR 023	HORIZ	INLINE	ECM	250	<del>~~Q.4~~~</del> 0.8	1487	1725	0.12	1/4	120 1	No	Yes	24x17x17 24x15x15	60	1,3,6,7,13
	EEF EEF	P1.1 P1.2	GREENHECK GREENHECK	SE1-8-440-VG SE1-8-440-VG	MPOP P124 MPOE 120	MPOP 124 MPOE 120	HORIZ HORIZ	SÍDÉWÁLL SIDEWALL	DIRECT	250 250	0.18 0.18	1651		0.04		120 1		No No	17x17x19 17x17x19		1,3,6,7,11,13 1,3,6,7,11,13
<u> </u>	EEF	P3.1	GREENHECK	SE1-12-432-VG	EV P330	EV P330	HORIZ	PROP	ECM	1100	0.10	1651 1671	1651 1725	0.04 0.15	1/15 1/4	120 1 120 1	No No	No	23x22x22	50 75	1,3,6,7,11,13
	EEF	P3.2	GREENHECK	SE1-14-436-VG	EV P331	EV P331	HORIZ	PROP	ECM	2000	0.3	1682	1725	0.29	1/2	120 1	No	No	26x24x24	100	1,3,6,7,11,13
	EF EF	1.1	GREENHECK GREENHECK	SQ-140-VG SQ-140-VG	FUTURE TI RESTROOM FUTURE TI RESTROOM	LEVEL 1	HORIZ HORIZ	INLINE	ECM ECM	2000	1.0	1498 1498	1500 1500	0.60	3/4	120 1 120 1	No No	No No	25x23x23 25x23x23		1,3,6,7 1,3,6,7
	FSF	1.1	GREENHECK	SQ-100-VG	FIRE COMMAND CENTER	FCC	HORIZ	INLINE	ECM	800	0.4	1275	1725	0.10	1/4	277 1		Yes	24x17x17		1,3,6,7,21
	FTF	P3.1	GREENHECK	SE1-18-429-VG	FIRE PUMP ROOM	FIRE PUMP ROOM	HORIZ	INLINE	ECM	3000	0.20	1273	1725	0.10	3/4	120 1	No	Yes	28x28x28		1,3,6,7,13
	GEF	P1.1	GREENHECK	SBE-3H54 2	LEVEL P1 GARAGE	LEVEL P1 GARAGE	HORIZ	INLINE	BELT			1							52x69x69		1,2,3,7,10,11,17
	GEF	P1.1	GREENHECK	SBE-3H54	LEVEL P1 GARAGE	LEVEL P1 GARAGE	HORIZ	INLINE	BELT	34000 34000	0.5 0.5	643 643	780 780	6.69 6.69	7.5 7.5	460 3 460 3		No No	52x69x69 52x69x69	800 800	1,2,3,7,10,11,17
	GEF GEF	P2.1 P2.2.	GREENHECK GREENHECK	SBE-3H54 SBE-3H54	LEVEL P2 GARAGE LEVEL P2 GARAGE	LEVEL P2 GARAGE LEVEL P2 GARAGE	HORIZ HORIZ	INLINE	BELT BELT	33000 33000	0.5	631 631	780 780	6.36 6.36	7.5 7.5	460 3 460 3	Yes Yes	No No	52x69x69 52x69x69	800	1,2,3,7,10,11,17 1,2,3,7,10,11,17
	GEF	P3.1	GREENHECK	SBE-3H72	LEVEL P3 GARAGE	LEVEL P3 GARAGE	VERT	INLINE	BELT	52000 /	0.5	454	560	9.40	15	460 3	Yes	No	60x92x92	2000	1,2,3,7,10,11,17
$\hat{2}$	GEF	P3.2	GREENHECK	SBE-3H60	LEVEL P3 GARAGE	LEVEL P3 GARAGE	VERT	INLINE	BELT	39000	0.5	555	660	7.30	10	460 3	Yes	No	54x77x77	1000	1,2,3,7,10,11,17
/2	GTF	P2.1 P2.2	GREENHECK	GJI-25-LP	GARAGE	GARAGE	HORIZ HORIZ	TRANSFER TRANSFER	ECM	2100	0	1680	1680	0.00	2/3	208 1	No	No	50X32X12 50X32X12	260	1,6,7,12
	GTF GTF	P2.2 P2.3	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ	TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	GTF GTF	P2.4 P2.5	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ HORIZ	TRANSFER TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	GTF	P2.5 P2.6	GREENHECK	GJI-25-LP	GARAGE	GARAGE	HORIZ	TRANSFER	ECM	2100	0	1680	1680	0.00	2/3	208 1	No No	No	50X32X12 50X32X12	260	1,6,7,12
	GTF GTF	P2.7 P3.1	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ HORIZ	TRANSFER TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	GTF	P3.2	GREENHECK	GJI-25-LP	GARAGE	GARAGE	HORIZ	TRANSFER	ECM	2100	0	1680	1680	0.00	2/3	208 1	No	No	50X32X12	260	1,6,7,12
	GTF GTF	P3.3 P3.4	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ HORIZ	TRANSFER TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	GTF	P3.5	GREENHECK	GJI-25-LP	GARAGE	GARAGE	HORIZ	TRANSFER	ECM	2100	0	1680	1680	0.00	2/3	208 1	No	No	50X32X12	260	1,6,7,12
	GTF GTF	P3.6 P3.7	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ HORIZ	TRANSFER TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	GTF	P3.8	GREENHECK	GJI-25-LP	GARAGE	GARAGE	HORIZ	TRANSFER TRANSFER	ECM	2100	0	1680	1680	0.00	2/3	208 1	No	No	50X32X12	260	1,6,7,12
	GTF GTF	P3.9 P3.10	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ HORIZ	TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	GTF GTF	P3.11 P3.12	GREENHECK GREENHECK	GJI-25-LP GJI-25-LP	GARAGE GARAGE	GARAGE GARAGE	HORIZ HORIZ	TRANSFER TRANSFER	ECM ECM	2100 2100	0	1680 1680	1680 1680	0.00	2/3 2/3	208 1 208 1	No No	No No	50X32X12 50X32X12	260 260	1,6,7,12 1,6,7,12
	LDEF	1.1	GREENHECK	TBI-FS-4L30	LOADING DOCK	LOADING DOCK	HORIZ	AXIAL	BELT	12600	1	1308	1308	5.32	7.5	460 3	Yes	Yes	33x31x33	550	1,3,6,7,14,17,19
	MEF	R.1	GREENHECK	SE1-14-436-VG	MECH ROOM	MECH ROOM	HORIZ	PROP	ECM	1500	0.3	1393	1725	0.18	1/2	120 1	No	No	26x24x24	100	1,3,6,7,11,13
	REF	1.1	PANASONIC	FV-0511VKS2	108 UNI	108	HORIZ	INLINE	DIRECT	100	0.25	1182	1182	0.04	1/15	120 1	No	No	13x13x10	30	1,3,6,12
	QDE .	D 1	GREENHECK	AV 63 100 0625	STAID DDESSLIDE EAN	POOE	HORIZ	ΛΥΙΛΙ	DIDECT	8500	1	1770	1770	2 88	2	460 3	Voc	Voc	32v25v30	300	123457820
	SPF SPF	R.1 R.2	GREENHECK	AX-63-190-0625 AX-63-190-0625	STAIR PRESSURE FAN STAIR PRESSURE FAN	ROOF ROOF	HORIZ	AXIAL AXIAL	DIRECT DIRECT	8500 8500	1	1770 1170	1770	2.88 2.88	3	460 3 460 3		Yes Yes	32x25x30 32x25x30	300	1,2,3,4,5,7,8,20 } 1,2,3,4,5,7,8,20 }
	SPF	R.3	GREENHECK	AX-63-190-0623	STAIR PRESSURE FAN	ROOF	HORIZ	AXIAL	DIRECT	8000	1	1170	1770	2.62	3	460 3	Yes	Yes	32x25x30	700	1,2,3,4,5,7,8,20
	TEF	P0.5.1	GREENHECK	SE1-8-440-VG	STORAGE P004	STORAGE P004	HORIZ	PROP	ECM	150	0.15	1350	1350	0.16	1/50	120 1	No	No	17x17x19		1,3,6,7,11,13,18
	TEF TEF	P1.1 P1.2	GREENHECK GREENHECK	SE1-8-440-VG SE1-8-440-VG	STORAGE P110 STORAGE P130	P110 P130	HORIZ HORIZ	SIDEWALL SIDEWALL	DIRECT DIRECT	250 250	0.18 0.18	1651 1651	1651 1651	0.04 0.04	1/15 1/15	120 1 120 1	No No	No No	17x17x19 17x17x19	50 50	1,3,6,7,13 1,3,6,7,13
	TEF	P1.3	GREENHECK	SE1-8-440-VG	STORAGE P131	P131	HORIZ	SIDEWALL	DIRECT	250	0.18	1651	1651	0.04	1/15	120 1	No	No	17x17x19	50	1,3,6,7,13
	TEF TEF	P2.1 P2.2	GREENHECK GREENHECK	SE1-8-440-VG SE1-8-440-VG	STORAGE P210 STORAGE P211	P210 P211	HORIZ HORIZ	SIDEWALL SIDEWALL	DIRECT DIRECT	250 250	0.18 0.18	1651 1651	1651 1651	0.04 0.04	1/15 1/15	120 1 120 1	No No	No No	17x17x19 17x17x19	50 50	1,3,6,7,13 1,3,6,7,13
	TEF TEF	P2.3 P2.4	GREENHECK GREENHECK	SE1-8-440-VG SE1-8-440-VG	STORAGE P222 STORAGE P224	P222 P224	HORIZ HORIZ	SIDEWALL SIDEWALL	DIRECT	250	0.18 0.18	1651 1651	1651	0.04	1/15	120 1	No	No No	17x17x19 17x17x19	50 50	1,3,6,7,13
	TEF	P2.4 P2.5	GREENHECK	SE1-8-440-VG SE1-8-440-VG	STORAGE P225	P224 P225	HORIZ	SIDEWALL	DIRECT	250 250	0.18	1651 1651	1651 1651	0.04 0.04	1/15 1/15	120 1 120 1	No No	No No	17x17x19 17x17x19	50 50	1,3,6,7,13 1,3,6,7,13
	TEF TEF	P2.6 P2.7	GREENHECK GREENHECK	SE1-8-440-VG SE1-8-440-VG	STORAGE P226 STORAGE P220	P226 P220	HORIZ HORIZ	SIDEWALL SIDEWALL	DIRECT DIRECT	250 250	0.18 0.18	1651 1651	1651 1651	0.04 0.04	1/15 1/15	120 1 120 1	No No	No No	17x17x19 17x17x19	50 50	1,3,6,7,13 1,3,6,7,13
	TEF	P2.8	GREENHECK	SE1-8-440-VG	STORAGE P221	P221	HORIZ	SIDEWALL	DIRECT	250	0.18	1651	1651	0.04	1/15	120 1	No	No	17x17x19	50	1,3,6,7,13
	TEF TEF	P3.1 P3.2	GREENHECK GREENHECK	SE1-8-440-VG SE1-8-440-VG	STORAGE P310 STORAGE P311	P310 P311	HORIZ HORIZ	SIDEWALL SIDEWALL	DIRECT	250 250	0.18 0.18	1651 1651	1651 1651	0.04	1/15 1/15	120 1 120 1	No No	No No	17x17x19 17x17x19	50 50	1,3,6,7,13 1,3,6,7,13
	TEF	P3.3	GREENHECK	SE1-8-440-VG	CISTERN P324	P324	HORIZ	SIDEWALL	DIRECT	250	0.18	1651	1651	0.04	1/15	120 1	No	No	17x17x19	50	1,3,6,7,13
	TREF	1.1	GREENHECK	SQ-95-VG	COMPOST	COMPOST	HORIZ	INLINE	ECM	500	0.5	1594	1725	0.11	1/6	120 1	No	No	19x15x15		1,3,6,7,12
	TREF	1.5.1	GREENHECK	SQ-100-VG	TRASH HOLD	TRASH HOLD	HORIZ	INLINE	ECM	850	0.5	1391	1725	0.13	1/4	120 1	No	No	24x17x17	50	1,3,6,7,12
	XEF XEF	1.5.1 1.5.2	GREENHECK GREENHECK	SQ-160-VG SQ-160-VG	TRANSFORMER ROOM TRANSFORMER ROOM	FOOD STORAGE FOOD STORAGE	HORIZ HORIZ	INLINE	ECM ECM	4000 3200	1	1638 1429	1725 1725	1.58 1.08	2	208 1 208 1	No No	No No	29x26x26 29x26x26		1,3,6,7,13,15 1,3,6,7,13,15
	XEF NOTES	1.5.2	GKEENHEUK	SQ-10U-VG	I KANSFUKIVIEK KUUM	FUUD STURAGE	MUKIZ	INLINE	EUM	3200	1	1429	1725	1.U8		ZU8   1	INO	NO	ZYXZOXZO	150	1,3,0,1,13,13

,	ELECTRIC DI ICT LEATER SCHERI ILE
20. EACH STAIR PRE	ESSURIZATION FAN IS TO BE PROVIDED WITH ONE DUCT MOUNTED SMOKE DETECTOR TO BE DE-ENERGIZED THE ASSOCIATED FAN WHEN SMOKE IS DETECTED.
	OMBUSTIBLE SUPPORTS FOR ALL SMOKE CONTROL FANS TO THE STRUCTURE WITH APPROPRIATE SEISMIC BRACING.
	BACKDRAFT DAMPER.
17. FAN SHALL BE A7	T MINIMUM FAN SPEED AND RAMP UP PER CO/NOX SENSORS.
16. FAN TO BE CONT	TROLLED BY TIMER SWITCH.
15. FAN SHALL HAVE	E SPARK RESISTANT CONSTRUCTION.
14. FAN SHALL BE UI	IL LISTED FOR USE IN SMOKE CONTROL SYSTEMS AND SHALL COMPLY WITH BUILDING CODE REQUIREMENT INCLUDING HIGH TEMPERATURE RATING, SMOKE PROOF BEARINGS AND MULTIPLE FAN BELTS.
13. FAN SHALL BE CO	CONTROLLED BY AN TEMPERATURE SENSOR.
12. FAN SHALL RUN	CONTINIOUSLY VIA SCHEDULE.
11. PROVIDE OSHA I	INLET / OUTLET GUARD.
10. PROVIDE OSHA F	BELT AND MOTOR GUARD.
9. PROVIDE FACTO	DRY ACOUSTIC ROOF CURB AND CURB SEAL.
8. MOTOR MINIMUM	M SERVICE FACTOR OF 1.15.
7. PROVIDE VIBRAT	TION ISOLATION AND SEISMIC RESTRAINT PER SPECIFICATIONS.
6. PROVIDE ECM (E	ELECTRONICALLY COMMUTATED MOTOR) WITH FACTORY MOUNTED POTENTIOMETER FOR SPEED ADJUSTMENT.

1. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED.

5. PROVIDE INVERTER READY MOTOR WITH SHAFT GROUNDING SYSTEM.

LOUVER TO HAVE DRAINABLE BLADES / HEADER.
 COORDINATE COLOR AND FRAME WITH ARCHITECTURAL DRAWINGS.
 BLANK OFF UNUSED PORTION OF LOUVER.

3. PROVIDE NEMA PREMIUM EFFICIENCY MOTOR.

4. INTERLOCK FAN TO GENERATOR.

2. VARIABLE FREQUENCY DRIVE (VFD) PROVIDED BY MECHANICAL. WIRED BY ELECTRICAL.

									E	LECTRICA	L					
TAG	#	MANUFACTURER	MODEL NUMBER	SYSTEM SERVED	LOCATION	AIR FLOW (CFM)		LAT (°F)	HEAT CAP (KW)	VOLTS	PH	EMERG POWER (Y/N)	DUCT DIMENSIONS (IN)		NOTES	
DH	1.1	INDECCO	QUZ	FSF-1.1	106 FIRE CMD	800	21	50	7.5	460	3	Yes	14x14	1,2,3		
DH	1.2	INDECCO	QUZ	SVAV-1.1	LOADING DOCK	1650	55	85	15	460	3	No	18x14	1,2,3		
DH	P0.5.1	INDECCO	QUZ	FCU-P0.5.2	MECH P030	2390	60	86	20	460	3	No	30x10	1,2,3		
DH	P0.5.2	INDECCO	QUZ	FCU-P0.5.3	GARAGE P0.5	1600	60	90	15	460	3	No	18x14	1,2,3		

					LO	UVER SCHEDUL	.E			
TAG	***************************************	MANUFACTURER	MODEL NUMBER	AREA SERVED	LOCATION	SYSTEM SERVED	MATERIAL	BLADE ANGLE	SIZE (W"xH")	NOTES
L	1.1	RUSKIN }	ELF6350DMP	MAIN ELEC ROOM	LEVEL 1	MAKE UP AIR	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.2a	RUSKIN	ELF6350DMP	GARAGE	LEVEL 1	GEF-P1.2/P2.2/P3.2	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.2b	RUSKIN	ELF6350DMP	LOADING DOCK	LEVEL 1	LDEF-1.1	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.2c	RUSKIN }	ELF6350DMP	GARAGE	LEVEL 1	GEF-P1.2/P2.2/P3.2	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.3	RUSKIN	ELF6350DMP	FCC	LEVEL 1	FSF-1.1	ALUMINUM	45	COORD WITH ARCH	1,2
ur	1.5.1	RUSKIN	ELF445DXH	P0.5	LEVEL 1.5	ERV-P0.5.1	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.2	RUSKIN	ELF6350DMP	GARAGE	LEVEL 1.5	GEF-P1.1P/2.1/P3.1	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.3a	RUSKIN	ELF6350DMP	GARAGE	LEVEL 1.5	GEF-P1.2/P2.2/P3.2	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.3b	RUSKIN	ELF6350DMP	GARAGE	LEVEL 1.5	GEF-P1.2/P2.2/P3.2	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.3c	RUSKIN	ELF6350DMP	GARAGE	LEVEL 1.5	GEF-P1.2/P2.2/P3.2	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.4a	RUSKIN	ELF6350DMP	GENERATOR	LEVEL 1.5	GENERATOR MAKE UP AIR	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.4b	RUSKIN	ELF6350DMP	GENERATOR	LEVEL 1.5	GENERATOR MAKE UP AIR	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.4c	RUSKIN	ELF6350DMP	GENERATOR	LEVEL 1.5	GENERATOR EXHAUST	ALUMINUM	45	COORD WITH ARCH	1,2,3
L	1.5.4d	RUSKIN	ELF6350DMP	GENERATOR	LEVEL 1.5	GENERATOR EXHAUST	ALUMINUM	45	COORD WITH ARCH	1,2
L	1.5.5	RUSKIN	ELF6350DMP	TRANFORMER ROOMS/GENERATOR	LEVEL 1.5	GENERATOR EX/XEF-1.5.1/1.5.2	ALUMINUM	45	COORD WITH ARCH	1,2,3
L	R.1	RUSKIN	ELF6350DMP	MECH ROOM MAKE UP AIR	ROOF	MEF-R.1 MAKE UPA IR	ALUMINUM	45	COORD WITH ARCH	1,2
L	R.2	RUSKIN	ELF6350DMP	MECH ROOM	ROOF	MEF-R.1	ALUMINUM	45	COORD WITH ARCH	1,2
L	R.3	RUSKIN	ELF6350DMP	STAIR S03 PRESSURIZATION RELIEF	ROOF	STAIR S03PRESSURIZATION RELIEF	ALUMINUM	45	COORD WITH ARCH	1,2
L	R.4	RUSKIN	ELF6350DMP	STAIR S01 PRESSURIZATION RELIEF	ROOF	STAIR S01 PRESSURIZATION RELIEF	ALUMINUM	45	COORD WITH ARCH	1,2

City of Kirkland
Reviewed by A HAUPT
03/22/2021

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

KIRKLAND URBAN SOUTH

200 PETER KIRK LN.

KIRKLAND, WA

OWNED

CONSULTANT

GLUMAC

engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure
Seattle, WA 98101 Job. No.: 05.19.00791
www.glumac.com
T. 206.262.1010 F. 206.262.9865

 MARK
 DATE
 DESCRIPTION

 2
 07/10/2020
 GARAGE PERMIT RESUB

 3
 07/17/2020
 TOWER PERMIT RESUB

 07/24/2020
 ISSUE FOR CONSTRUCTION

 09/03/2020
 RFI 019

 09/04/2020
 RFI 021

 Date 23
 Revision 23

 10/06/2020
 RFI 033

 11/09/2020
 RFI 038

 11/09/2020
 RFI 047

 11/09/2020
 RFI 045

 4
 11/19/2020
 PERMIT RESUBMITTAL

 12/23/2020
 RFI 062

12/23/2020 RFI 062 12/23/2020 RFI 064 6 01/22/2021 TOWER PERMIT RESUBMITTAL

ROJECT NO. C



SHEET TITLE / NUMBER

SCHEDULES

M0.2

DEDICATED OUTSIDE AIR SYSTEM SCHEDULE **EXHAUST AIR FAN** WHEEL TYPE HEAT EXCHANGER (SENSIBLE AND LATENT) **COOLING COIL** WHEEL TYPE HEAT EXCHANGER (LATENT) 
 CAP
 CAP
 EAT
 LAT

 TOTAL
 SENS.
 DB/WB
 DB/WB

 (MBH)
 (°F)
 (°F)

 2606
 1957
 78/64
 49/48
 VFD POWER POC UNIT SIZE WT. 
 (°F)
 (GPM)
 EWT
 LWT
 (BTUH)
 (BTUH)
 (%)
 (°F)
 (°F)
 VOLTS
 PH
 (A)
 (A)

 49/48
 427
 44
 60
 1800000
 1440000
 80
 30
 55
 460
 3
 281
 351
 TAG # | MANUFACTURER | MODEL NUMBER | AREA SERVED | LOCATION | (CFM) | DRIVE | (IN WG) | (IN WG) | BHP | HP | (CFM) (DB/WB °F) (DB/WB °F) EFFECTIVENESS (Y/N) (Y/N) (L"xW"xH") (LBS) (DB/WB °F) DRIVE | (IN WG) | (IN WG) | BHP | 77/63 DOAS R.1 SEMCO CUSTOM OFFICES 1-7 ROOF 58000 DIRCET 3.0 7.5 22.2 4 AT 30 52200 DIRECT 2.0 5.35 14.9 4 AT 20 77/63 25 42/36 55/49 42/36 400

1. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED. 2. PRE-FILTER SHALL BE 2" MERV 13. FINAL FILTER TO BE 12" CARBON.

3. GAS COIL ONLY FOR EMERGENCY OPERATION.

4. VFD PER FAN. 5. BACNET INTERFACE. CONTROLS BY MANUFACTURER.

6. FANS TO BE N+1. 7. EC TO PROVIDE SEPERATE 20 AMP 115/1 CONNECTION FOR GFI OUTLETS AND UNIT LIGHTS.

10. PROVIDE WITH RETURN, EXHAUST, SUPPLY, AND OUTSIDE AIR TEMPERATURE SENSORS.

8. PROVIDE OUTSIDE AIR MONITORING PER MECHANICAL SPECIFICATIONS. 9. DOAS SHALL SHUTDOWN DURING SMOKE CONTROL MODE DURING REAL EVENT AND WEEKLY SELF-TEST OF THE SMOKE CONTROL SYSTEMS.

										T	WO F	PIPE F	FAN (	COIL V	WITH E	LECT	TRIC HEA	AT UNI	T SCHI	EDULE	ı											
												COC	DLING COIL					HEATING COIL		FIL	ΓER		ELI	ECTRICAL			ELECTRICAL					
						CHIDDLY AID	004	ECD	CAD TOTAL	CAD SENS	EAT DD/MD I A	T DD/MD	-\A/T     \A/T	F FLOW	FACE	WDD			FAT LAT						VED		ELECTRICAL EMERG POWER	LINIT CIZE				
TAG	#	MANUFACTURER	MODEL NUMBER	AREA SERVED	LOCATION	SUPPLY AIR (CFM)	(CFM)	ESP (IN WG)	(MBH)	(MBH)	(°F)	(°F)	(°F) (°F)	) (GPM)	VELOCITY (FT/MIN)	(FT WG)	CAP TOTAL (KW)	CONTROL	EAT LAT (°F)	TYPE	MERV	ВНР	НР	VOLTS PH	VFD I (Y/N) MC/	A MOP	(Y/N)	UNIT SIZE (L"xW"xH")	WEIGHT		NOTES	
FCU	P0.5.1	TRANE	UCCAG12C	P0.5 CORRIDOR, EAST GARAGE LOBBIES, STORAGES	STOR P014	4510	4510	1.0	100.26	96.6	80/67	60/60	44 60	12.5	367	0.50	44	SCR	60 90	2"	13	3.10	5	460 3	Yes 75	80	No	84x71x42	1350	1,2,3,5		
FCU	P0.5.2	TRANE	BCHD090G2	LOCKER ROOM	STOR P017	2400	2400	1.3	79.2	60.8	80/67	57/56	44 60	11.1	384	2.51				2"	13	1.70	3	460 3	No 7	15	No	44x48x29	550	1,2,3,5,6		
FCU	P0.5.3	TRANE	BCHD054G2	P0.5 CORRIDOR AND WEST LOBBY	P1 GARAGE	1590	1590	1.5	52.9	40.3	80/67	57/56	44 60	11.8	398	2.02				2"	13	0.96	1	460 3	No 4	15	No	42x40x23	350	1,2,3,5,6		
FCU	P0.5.4	TRANE	BCHD024	SECURITY OFFICE	P1 GARAGE	600	100	1.0	20.1	15.5	80/67	56/56	44 60	2.51	360	1.33	3	2-STAGE	70 85	2"	13	0.29	1	460 3	No 8	15	No	34x28x18	200	1,2,3,4,5		
NOTES	_				_		_						·													_		_		_	_	

. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED.

. PROVIDE WITH ECM MOTOR OR VFD. 3. CONTROLS BY CONTROLS CONTRACTOR. 4. PROVIDE WITH MIXING BOX.

5. PROVIDE WITH CONDENSATE FLOW SWITCH FOR SECONDARY CONDENSATE. 6. HEAT PROVIDE BY DUCT COIL. SEE CUCT COIL SCHEDULE ON SHEET M0.2

															ENE	RG	/ REC	OVEF	RYV	ENTI	LA1	OR S	СН	EDU	LE																			
							SUPPLY A	IR FAN			EXHAU	ST AIR FAN			El	NERGY REC	OVERY WHEEL					C	OOLING C	OIL				ELECTRIC	C HEAT				ELECTF	RICAL										
														5	UMMER		WINTER		TO	OTAL SEN	ISIBLE					FACE												EMERG	SINGLE		OPER.			
						FLOW	NO.	ESP		FLOW	N	IO. ESP		EAT	LAT	EAT	LAT	MEASUR	RED CAF	PACITY CAP	PACITY	EAT L	AT E	WT LWT	FLOW	VELOCITY	WPD C	CAPACITY	EAT LAT								VF	D POWER	POC	UNIT SIZE	WT.			
TAG	#	MANUFACTURER	MODEL NUMBER	AREA SERVED	LOCATION	(CFM) DR	VE FANS	(IN WG)	BHP HP	(CFM)	DRIVE F	ANS (IN W	G) BHP F	P (DB/WB	°F) (DB/WB	F) (DB/WB	°F) (DB/WB °	F) EFFECTIVE	ENESS (N	MBH) (N	ИВH) ([	B/WB F) (DB/	WB F)	F) (F)	(GPM)	(FT/MIN)	(IN H20)	(KW)	(°F) (°F)	VOLTS 1	PH 1 MC	CA 1 (A) M	OCP 1 (A)	VOLTS 2 F	PH 2 MC	A 2 (A) MOCP	2 (A) (Y/I	N) (Y/N)	(Y/N)	(L"xW"xH")	(LBS)		NOTES	
ERV	P0.5.1	SCOTT SPRINGFIELD	CSAA-H HX@2	LEVEL P0.5 AND GARAGE ELEVATOR LOBBIES	P0.5	8500 DIR	ECT 1	2.0	12.2 15	4500	DIRECT	1 2.0	3.6 5	0 86	80	23	46	72%										40	46 60	460	3	85	100	0	0	0 0	Ye	s No	Yes	281x104x91	7300 1,	2,3,4,5,6		
ERV	P0.5.2	TRANE	CSAA004	SECRITY OFFICE AND IDF	P1 GARAGE	1200 DIR	ECT 1	1.5	1.2 1.5	1200	DIRECT	1 1.0	0.5 1	0 86/67	77/64	24/21	1 60/47	84%	3	37.2	30.8	77/64 55	5/54	14 60	4.63	281	0.28			460	3	7	15	120	1	1 15	5 Ye	s No	No	189x44x59	2228 1,	2,3,4,5,6,7		
NOTES									·		·	·							·		·	·	·	·				·				·		·	·	·	·				·			

. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED.

. PROVIDE WITH ECM OR VFD. 3. CONTROLS BY CONTROLS CONTRACTOR.

. PROVIDE OUTSIDE AIR MONITORING PER MECHANICAL SPECIFICATIONS 5. PROVIDE WITH MANUFACTUTER PURGE SECTION TO REDUCE CROSS CONTANIMATION.

6. PRE-FILTER SHALL BE 2" MERV 13. FINAL FILTER TO BE 12" CARBON. 7. PROVIDE WITH CONDENSATE FLOW SWITCH FOR SECONDARY CONDENSATE.

																	AIR	-CO	OLED	CHIL	LER S	SCHE	DUL	.E					
										WATER					COC	LING				ELECTRI	CAL			EL	ECTRICAL.				
																									SINGLE	EMERG			
						NOM. CAF	P. AMB. DB	DESIGN FLOW	MIN FLOW	MAX FLOW	LWT	EWT	P.D.			REFRIG	REFRIG		MCA	MOP					POC	POWER	UNI	IIT SIZE OPER. WT.	<b>,</b>
TAG #	MANUFACTUR	RER	MODEL NUMBER	AREA SERVED	LOCATION	(TONS)	(°F)	(GPM)	(GPM)	(GPM)	(°F)	(°F)	(FT WG)	EER	NPLV	TYPE	(LBS)	VOLTS	PH (A)	(A)	MCA	A N	OP	VFD	(Y/N)	(Y/N)	(L"x\	xW"xH") (LBS)	NOTES
CH R.1	YORK	YVA	/AA0523JPV46BHVDXX	WHOLE BUILDING	ROOF	500	95	750	185	1440	44	60	22	9.235	18.48	R-513A	890.6	460	3 535	700	528	8	00	No	No	No	50'x 7	7' 6" x 8' 50000 1,2,3	3,4
CH R.2	YORK	YVA	/AA0523JPV46BHVDXX	WHOLE BUILDING	ROOF	500	95	750	185	1440	44	60	22	9.235	18.48	R-513A	890.6	460	3 535	700	528	8	00	No	No	No	50'x 7	7' 6" x 8' 50000 1,2,3	3,4

1. INTEGRAL STARTER BY MANUFACTURER. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED. 2. PROVIDE HEAT TRACE PACKAGE. PROVIDE WITH SEPERATE POWER CONNECTION FOR HEAT TRACE. THIS CONENCTION SHALL BE ON EMERGENCY POWER.

3. BACNET INTERFACE, CONTROLS BY MANUFACTURER. 4. EFFICIENCY AT AHRI RATINGS.

													F	PACK	AGE	) HEA	AT PU	JMP L	JNIT S	CHEI	DULE							
								SUPPL	Υ					ELECT	RICAL			COOLIN	IG (AT 85°F AMBII	ENT)		HEATING (A	AT 47°F AMI	BIENT)	FILTER			
					NOMINAL											EMERG						-					OPER.	
					CAPACITY	AIR	MIN OSA	ESP	MOT	OR	VFD	AIR ECONOMIZER		MCA	MOCP	POWER	TOTAL	SENS	EAT DB/WB		REFRIG	OUTPUT	AUX			UNIT SIZE	WT.	
TAG #	MANUFACTURER	MODEL NUMBER	AREA SERVED	LOCATION	(TONS)	(CFM)	(CFM)	(IN WG)	DRIVE AMI	PS   F	IP (Y/N)	(Y/N)	VOLTS P	H (A)	(A)	(Y/N)	(MBH)	(MBH)	(°F)	EER	TYPE	(MBH)	(KW)	COP TY	E MER	V (L"xW"xH"	(LBS)	NOTES
HP R.1	BARD	W36HB-C	CONTROL RM 801	ROOF	3	1250	0	0.3	ECM 1	1	/2 No	Y	460 3	25	25	Yes	39.1	28.1	80/67	11.0	410A	31.6	9	3.3	13	39x18x75	500 1,2,3,4	

1. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED.

2. SET THERMOSTAT TO MAINTAIN MINIMUM 50°F SPACE TEMPERATURE. 3. PROVIDE WITH ECONMIZER. 4. CONTROLS BY CONTROLS CONTRACTOR.

												SENS	IBLE (	ONLY '	VARI/	ABLE A	IR VO	OLUME	E TER	RMINA	L UNIT SC	CHEDU	ILE		
												SENSIBLE COC	LING COIL				HEATING C	OIL				ELECTRICAL			SINGLE EMERG
								MIN OSA	MAX OSA	COOL MAX	COOL MIN	SENSIBLE				HEAT MAX	HEAT CAP		LAT		MIN FAN POWER				POC POWER OPER. WT.
TAG	# MA	NUFACTURER	MODEL NUMBER	LOCATION	AREA SERVED	INLET SIZE (IN)	STATIC PRESSURE	E (CFM)	(CFM)	(CFM)	(CFM)	(MBH)	EWT/LWT	LAT (F)	FLOW (GPM)	(CFM)	(KW)	CONTROL	(°F) AIF	R P.D. (IN WG)	(W/CFM)	MCA	MOCP	VOLTS PH	PH (Y/N) (Y/N) (LBS) NOTES
SVAV	1.1	TRANE	VDCF06SQ	LOADING DOCK	W LOBBY 103	6	0.5	300	300	1650	700	28.0	57/63	60	7.2	1650				.028	0.1	7	15	277 1	1 Yes No 200 1,2,3,4,5,6,7
SVAV	1.2	TRANE	LDEF06DS	MAIL 110	110,111,117	6	0.5	140	140	650	140	9.2	58/60	57	8	650	4.5	SCR	86	0.024	0.1	24	25	277 1	1 Yes No 135 1,2,3,4,5,6
SVAV	1.5.1	TRANE	LDEF06DS	LEVEL 1.5	E LOBBY 101	6	0.5	200	200	1000	500	14.2	57/60	58	8	1000	7	SCR	87	0.028	0.1	38	40	277 1	1 Yes No 143 1,2,3,4,5,6
SVAV	1.5.2	TRANE	LDEF06DS	LEVEL 1.5	E LOBBY 101	6	0.5	200	200	1005	500	14.2	57/60	58	8	1000	7	SCR	87	0.028	0.1	38	40	277 1	1 Yes No 143 1,2,3,4,5,6
SVAV	1.5.3	TRANE	LDEF06DS	LEVEL 1.5	W LOBBY 002	6	0.5	150	150	660	150	9.0	58/60	57	8	660	4.5	SCR	86	0.027	0.1	24	25	277 1	1 Yes No 135 1,2,3,4,5,6

NOTES

1. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED.

2. PROVIDE SCR CONTROL FOR ELECTRIC COILS. 3. PROVIDE NEMA 2 ELECTRIC HEAT & CONTROLS ENCLOSURE.

4. PROVIDE UL CLASS II 24VAC TRANSFORMER AS REQUIRED. COORDINATE WITH ELECTRICAL FOR LINE VOLTAGE POWER. 5. PROVIDE MINIMUM FIVE (5) FOOT LONG SOUND LINED DUCT PLENUM. INSIDE CLEAR DIMENSION SHALL BE 2" HIGHER THAN TERMINAL HEIGHT AND 4" WIDER THAN TERMINAL WIDTH. REFER TO DETAILS.

6. UNIT SHALL BE CONTOLLED BY TEPERATURE, HUMIDITY, AND CO2 DEMAIND. 7. ELECTRIC HEAT IS SEPARATE FROM UNIT. SEE ELECTRIC DUCT HEATER SCHEDULE.

														,	VARIAI	BLE AIR VOLUME TERMINAL UNIT SCHEDULE
TAG	4	#	MANUFACTURER	MODEL NUMBER	LOCATION	AREA SERVED	SYSTEM	INLET (IN)	AIRFLOW (CFM)	) FAT (F)	LAT (F)	EATING CAPACITY (KW)		ELECTRICAL (V/PH)	AIR PD WT	R.
VAV	1.5	51	PRICE	SDV5		RESTROOMS	DOAS EXHAUST	8	1100	LAT (I)	LAT (I)	(IXVV)	CONTROL	120/1	0.5 15	1,2,3,4,5,6,7,8,9
VAV	1.5	.5.2	PRICE	SDV5	LEVEL 1.5	RESTROOMS	DOAS SUPPLY	8	950	55	70	6	SCR	460/3	0.5 15	1,2,3,4,5,6,7,8,9
VAV		.5.3	PRICE	SDV5	FOOD 024	024,022	DOAS SUPPLY	8	600	55	70	3	SCR	460/3	0.5 15	1,2,3,4,5,6,7,8,9
VAV		.5.4	PRICE	SDV5	LEVEL 1.5	TRASH 026	DOAS SUPPLY	8	750	55	70	4	SCR	460/3	0.5 15	1,2,3,4,5,6,7,8,9
VAV	2.	2.1	TITUS	SDV5	LEVEL 2	RESTROOMS	DOAS EXHAUST	12	1400			-		120/1	0.5 20	1,2,3,4,5,6,7,8,9
~~~~\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	·····2:	2:2~~~	~~~~TITUS~~~~		LEVEL 2	RESTROOMS	DOAS SUPPLY	12	1400	55	70	7	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	2.	2.3	TITUS	→ SDV5	LEVEL 2	RESTROOMS	DOAS EXHAUST	12	1200					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	2.	2.4	TITUS	3 SDV5	LEVEL 2	RESTROOMS	DOAS SUPPLY	12	1050	55	70	5	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	3.	3.1	TITUS	SDV5	LEVEL 3	RESTROOMS	DOAS EXHAUST	12	1400					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	3.	3.2	TITUS	SDV5	LEVEL 3	RESTROOMS	DOAS SUPPLY	12	1400	55	70	7	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	4.	4.1	TITUS	SDV5	LEVEL 4	RESTROOMS	DOAS EXHAUST	12	1400					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	4.	4.2	TITUS	SDV5	LEVEL 4	RESTROOMS	DOAS SUPPLY	12	1400	55	70	7	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	5.	5.1	TITUS	SDV5	LEVEL 5	RESTROOMS	DOAS EXHAUST	12	1400					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	5.	5.2	TITUS	SDV5	LEVEL 5	RESTROOMS	DOAS SUPPLY	12	1400	55	70	7	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	6.	6.1	TITUS	SDV5		RESTROOMS	DOAS EXHAUST	12	1400					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	6.	6.2	TITUS	SDV5	LEVEL 6	RESTROOMS	DOAS SUPPLY	12	1400	55	70	7	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	7.	7.1	TITUS	SDV5	LEVEL 7		DOSA EXHAUST	12	1400					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV		7.2	TITUS	SDV5	LEVEL 7	RESTROOMS	DOAS SUPPLY	12	1400	55	70	7	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV		7.3	TITUS	SDV5	LEVEL 7	RESTROOMS	DOAS EXHAUST	8	400			_		120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	7.	7.4	TITUS	SDV5	LEVEL 7	RESTROOMS	DOAS SUPPLY	8	300	55	70	2	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	7.	7.5	TITUS	SDV5	LEVEL 7	RESTROOMS	DOAS EXHAUST	12	1350					120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	7.	7.6	TITUS	SDV5	LEVEL 7		DOAS EXHAUST	12	1350		0.5	40	202	120/1	0.5 20	1,2,3,4,5,6,7,8,9
VAV	7.	1./	TITUS	SDV5	LEVEL 7	RESTROOMS	DOAS SUPPLY	12	1275	55	85	12	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9
VAV	7.	7.8	TITUS	SDV5	LEVEL 7	RESTROOMS	DOAS SUPPLY	12	1275	55	85	12	SCR	460/3	0.5 20	1,2,3,4,5,6,7,8,9

NOTES:

1. PROVIDE PRESSURE INDEPENDENT TERMINAL UNIT.

2. CONSTANT VOLUME. 3. PROVIDE NEMA 1 CONTROLS ENCLOSURE.

4. COORDINATE WITH BUILDING AUTOMATION SYSTEM.

5. PROVIDE UL CLASS II 24VAC TRANSFORMER AS REQUIRED. COORDINATE WITH ELECTRICAL FOR LINE VOLTAGE POWER. 6. PROVIDE MINIMUM FIVE (5) FOOT LONG SOUND ATTENUATION DISCHARGE PLENUM. INSIDE CLEAR DIMENSION SHALL BE 2" HIGHER THAN TERMINAL HEIGHT AND 4" WIDER THAN TERMINAL WIDTH. REFER TO DETAILS.

1. INSULATION LINING TYPE SHALL BE MINIMUM 1" THICK OR R-4.2, WHICHEVER IS GREATER, WITH NON-FIBER, ANTI-MICROBIAL COATING. REFER TO SPECIFICATIONS. 8. PROVIDE NON-POROUS COVER OVER INSULATION DUCT LINER IN TERMINAL UNITS SERVING HEALTH CARE SPACES. 9. MAXIMUM NC-30 DISCHARGE AND RADIATED SOUND LEVELS AT 0.5" STATIC PD. NOISE RATING IN ACCORDANCE WITH ARI STANDARD 880.

											SPL	IT SY	YSTE	M SC	CHEDUL	E - IN	DOOR AND OUTDOOR
				COOLING	CAPACITY			SUPI	PLY		ELECTRICA	<b>AL</b>					
COND												EMERO	RG			OPER.	
UNIT					SENSIBLE	HEAT TOTAL	AIR FLOW	MIN OSA	ESP		MCA	POWE	-11		UNIT SIZE	WT.	
TAG # TAG MANUFACTURER	MODEL NUMBER	AREA SERVED	LOCATION	TOTAL (MBH)	(MBH)	(MBH)	(CFM)	(CFM)	(IN WG)	VOLTS	PH (A)	(Y/N)	) SEER	COP	(L"xW"xH")	(LBS)	NOTES
SFCU 2.1 AC-P1.2 MITSUBISHI	PLA-A30/PUY-A30	233 ELEV MACH RM	233/ P1 GARAGE	30	24	0	780	0	0	208	1 19	Yes	22.8	0	34x34x12/38x15x38	60/151 1,2	,2,3
SFCU P0.5.1 AC-P1.1 MITSUBISHI	PLA-A12/PUY-A12	P019 EVTR CTR	P019 EVTR CTR	12	10.6	0	490	0	0	208	1 11	Yes	27	0	34x34x12/33x12x25	60/100 1,2	,2,3
SFCU P0.5.2 AC-P1.3 MITSUBISHI	PLA-A12/PUY-A12	031 EVTR CTR	031 EVTR CTR	12	10.6	0	490	0	0	208	1 11	Yes	27	0	34x34x12/33x12x25	60/100 1,2	,2,3
SFCU P3.1 SHP-P3.1 MITSUBISHI	PLA-A18/PUZ-A18	P303 EVTR CTR	P303 EVTR CTR	18	15.3	18	570	0	0	120	1 11	Yes	24.6	4.28	34x34x12/33x12x25	60/100 1,2	,2,3,4
SFCU P3.2 SHP-P3.2 MITSUBISHI	PLA-A18/PUZ-A18	P303 EVTR CTR	P303 EVTR CTR	18	15.3	18	570	0	0	208	1 11	Yes	24.6	4.28	34x34x12/33x12x25	60/100 1,2	,2,3,4

. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED. POWER IS ROUTED FROM THE OUTDOOR UNIT TO THE INDOOR UNIT.

PROVIDE PROGRAMMABLE THERMOSTAT WITH TEMPERATURE SETPOINTS FOR AT LEAST FOUR SCHEDULING PERIODS WITHIN 24 HOURS.

3. CEILING CASSETTE FAN COIL. PROVIDE MINIMUM 5 DEGREE DEADBAND FOR ALL HEAT PUMP EQUIPMENT.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

**URBAN** 

200 PETER KIRK LN. KIRKLAND, WA

**L** 2 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791

www.glumac.com T. 206.262.1010 F. 206.262.9865 MARK DATE DESCRIPTION 2 07/10/2020 GARAGE PERMIT RESUB 07/17/2020 TOWER PERMIT RESUB 07/24/2020 ISSUE FOR CONSTRUCTION 09/04/2020 RFI 022 10/06/2020 RFI 033 10/23/2020 ASI-02 11/09/2020 RFI 044 01/22/2021 TOWER PERMIT RESUBMITTAL

ISSUE DATE

SHEET TITLE / NUMBER SCHEDULES

				SUB ME	ETER SCHEDULE - NA	TURAL GAS	
LEVEL	TAG	MAKE	MODEL	LOCATION		SYSTEM SERVING	
LEVEL 1					·		
LEVEL 1	M-G-M1	PSE		GAS ALCOVE	HOUSE METER - COORD W/ UTILITY		
LEVEL 3	•	•					
LEVEL 3	M-G-3.1	ONICON	F-5500	CORE	FUTURE KITCHEN		
LEVEL 7							
LEVEL 7	M-G-7.1	ONICON	F-5500	CORE	FUTURE KITCHEN		
ROOF	•						
ROOF	M-G-R.1	ONICON	F-5500	ROOF	MECHANICAL GAS HEATING		
ROOF	M-G-R.3	ONICON	F-5500	MECHANICAL ROOM	DOMESTIC HOT WATER HEATER		
ROOF	M-G-R.2	ONICON	F-5500	MECHANICAL ROOM	DOMESTIC HOT WATER HEATER		
NOTEQ.			•				

1. COORDINATE SUB METERS WITH BUILDING BMS SYSTEM, COORD W/ CONTROLS.

			RE	EGULA	TOR	SCHE	DULE -	NATURAL GAS
							PRESSURE IN	
LEVEL	TAG	LOCATION	SYSTEM SERVING	MAKE	MODEL	LOAD (CFH)	(PSI)	PRESSURE OUT (WC)
ROOF								
ROOF	GR-R.1	MECHANICAL ROOM	GAS WATER HEATER	MAXITROL	325	399	2	10
ROOF	GR-R.2	MECHANICAL ROOM	GAS WATER HEATER	MAXITROL	325	399	2	10
ROOF	GR-R.3	MECHANICAL ROOM	DOAS	MAXITROL	325	1,410	2	10

			HE	AT TRA	CE SCHE	DULE							
				SYSTEM	MAINTENANCE		APPROX.	TOTAL	ELECT	RICAL	EMERG		
TAG	MANUFACTURER	MODEL NUMBER	LOCATION	SERVED	TEMPERATURE	WATTS/LF	LENGTH	WATTS	VOLTS	PH	POWER	NOTES	
					(°F)		(FT.)				(Y/N)		
HT-CHWS-R.1	RAYCHEM	12XL2	ROOF	CHILLER	40	2 @ 12	150	3600	277	1	Y	1,2,3,4	
HT-CHWS-R.2	RAYCHEM	12XL2	ROOF	CHILLER	40	2 @ 12	150	3600	277	1	Y	1,2,3,4	
HT-CHWR-R.1	RAYCHEM	12XL2	ROOF	DOAS	40	1 @ 12	100	1200	277	1	Y	1,2,3,4	
HT-CHWR-R.2	RAYCHEM	12XL2	ROOF	DOAS	40	1 @ 12	100	1200	277	1	Y	1,2,3,4	

1. COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED.

2. COORDINATE POINT OF CONNECTION WITH ELECTRICAL. 3. HEAT TRACE ROUTES ON PLANS ARE SHOWN AS A GUIDE. ACTUAL ROUTING MAY DIFFER. COORDINATE IN FIELD.

4. PROVIDE WITH AMBIENT SENSING THERMOSTAT AND DISTRIBUTION / CONTROL PANEL.

**EXPANSION TANK SCHEDULE** TANK ACCEPT. SYSTEM FILL OPER. RELIEF VOL. VOL. VOL. PRESS. PRESS. PRESS. MIN. MAX. SYSTEM 
 (GAL)
 (GAL)
 (PSIG)
 (PSIG)
 (PSIG)
 TEMP. (°F)
 CONN. (IN)
 SIZE (DIA x H IN)
 (LBS)

 44
 23
 8500
 10
 100
 12
 44
 65
 1/2"
 24X29
 300
 1,2,3
 TAG LEVEL.# MANUFACTURER MET R.1 AMTROL DIAPHRAGM ASME AX-80V 1. PROVIDE TANK RATED FOR ASME WORKING PRESSURE OF 125 PSIG. PROVIDE TANK WITH VERTICAL CONFIGURATION. 3. ÁNCHÓR TO HOUSEKEEPING PAD. COORDINATE WITH STRUCTURAL DÉSIGN.

MECHANICAL PUMP SCHEDULE ELECTRICAL EMERG OPER. POWER WT. MANUFACTURER MODEL NUMBER AREA SERVED (Y/N) END SUCTION Bell & Gossett E1510-5GB-SS-326T-L BUILDING No 3000 1,2,3,4,5,6,7,8 Bell & Gossett E1510-5GB-SS-326T-L BUILDING **END SUCTION** 1670 35.4 50 460 3 No 3000 1,2,3,4,5,6,7,8 1050 125 1775 49.0 60 460 3 No 4000 1,2,3,4,5,6,7,8 Bell & Gossett VSC-5X6X13P5A-364TTS-STL LEVELS 1-7 DOUBLE SUCTION SPLIT CASE Bell & Gossett VSC-5X6X13P5A-364TTS-STL LEVELS 1-7 DOUBLE SUCTION SPLIT CASE 1050 125 1775 49.0 60 460 3 Yes

COORDINATE WITH ELECTRICAL FOR POWER AND DISCONNECT AS REQUIRED. PROVIDE NON-OVERLOADING NEMA PREMIUM EFFICIENCY, INVERTER READY MOTOR.

FOR PUMPS LOCATED INDOORS PROVIDE OPEN DRIPPROOF (ODP) MOTORS. PROVIDE VARIABLE FREQUENCY DRIVE (VFD) BY MECHANICAL AND WIRED BY ELECTRICAL. PROVIDE MOTOR SHAFT GROUNDING SYSTEM FOR MOTOR CONTROLLED BY VFD.

PROVIDE INLET SUCTION DIFFUSER AND STRAINER. SEE PIPING DESIGN. PROVIDE VIBRATION ISOLATION AND SEISMIC RESTRAINT PER SPECIFICATIONS. PUMPS TO RUN IN PARALLEL, SIZED AT 60% OF PEAK LOAD.

					AIR SEP	<b>ARAT</b>	OR SC	HEDU	LE			
TAG	#	MANUFACTURER	MODEL NUMBER	LOCATION	SYSTEM SERVED	FLOW (GPM)	CONN. SIZE (IN)	INTEGRAL STRAINER (Y/N)	SIZE DIA x H (IN)	OPER. WT. (LBS)		NOTES
AS	R.1	Spirotherm	VSR1200	ROOF MECH ROOM	MD WATER LOOP	1500	12"	N	24x57	1500	1,2,3	

PROVIDE WITH AUTOMATIC AIR VENT AND ROUTE TO FLOOR SINK. 3. PROVIDE FLOOR STAND WITH SEISMIC RESTRAINT. ANCHOR TO HOUSEKEEPING PAD. 4. SUSPEND FROM STRUCTURE ABOVE.

										ELECTRIC	AL						
						AIR FLOW	TEMP RISE	FAN	HEAT CAP			MCA	EMERG POWER	UNIT SIZE	OPER. WT.		
AG	#	MODEL NUMBER	AREA SERVED	LOCATION	TYPE	(CFM)	(°F)	(HP)	(KW)	VOLTS	PH	(A)	(Y/N)	(L"xW"xH")	(LBS)		NOTES
EH	P0.5.1	CUH900	STAIR	BIKE STAIR	CABINET	250	30	,	2	277	1	0	No	35" x 10" x 27"	120	1,2,3,4	
EH	P3.1	CUH900	STAIR	STAIR S1	CABINET	250	30		2	277	1	10	No	35" x 10" x 27"	120	1,2,3,4	
EH	P3.2	CUH900	STAIR	STAIR S2	CABINET	250	30		2	277	1	0	No	35" x 10" x 27"	120	1,2,3,4	
EH	P3.3	CUH900	STAIR	STAIR S3	CABINET	250	30		2	277	1	0	No	35" x 10" x 27"	120	1,2,3,4	
					ı												
UH	1.1	5100	104 FUTURE RETAIL	104 FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.2	5100	105 FUTURE RETAIL	105 FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.3	5100	106 FUTURE RETAIL	106 FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.4	5100	COMPOST 114	COMPOST 114	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.5	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.6	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.7	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.8	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.9	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.10	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.11	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.12	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.13	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.14	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.5.1	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.5.2	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.5.3	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	1.5.4	5100	FUTURE RETAIL	FUTURE RETAIL	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P0.5.1	5100	P0.5 TI AREA	P0.5 TI SPACE	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P0.5.2	5100	P0.5 TI AREA	P0.5 TI SPACE	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P0.5.3	5100	P0.5 TI AREA	P0.5 TI SPACE	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P0.5.4	5100	BIKE STORAGE P029	BIKE STORAGE P029	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P0.5.5	5100	P0.5 TI AREA	P0.5 TI AREA	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P0.5.6	5100	STORAGE P004	STORAGE P004	UNIT	400	26		3.3	277	1	0	No	15" x 7' x 18"	25	1,2,3,4	
UH	P1.1	5100	P111 WATER ENTRY	P111 WATER ENTRY	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	P1.2	5100	P123	P123	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	P2.1	5100	P223	P223	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	P3.1	5100	P320 FIRE PUMP	P320 FIRE PUMP	UNIT	400	26		3.3	277	1	16	Yes	15" x 7' x 18"	25	1,2,3,4	
UH	P3.2	5100	CISTERN PUMP ROOM	CISTERN PUMP ROOM	UNIT	400	26		3.3	277	1	16	No	15" x 7' x 18"	25	1,2,3,4	
UH	R.1	5100	MECHANICAL ROOM	MECHANICAL ROOM	UNIT	400	26		3.3	277	1	0	Yes	15" x 7' x 18"	25	1,2,3,4	

2. MOUNT PER MANUFACTURER'S REQUIREMENTS AND MAINTAIN REQUIRED CLEARANCES. 3. UNIT SHALL BE PROVIDED WITH ADJUSTABLE DISCHARGE BLADES OR LOUVERS TO ALLOW DIRECTIONAL CONTROL OF AIRFLOW. 4. PROVIDE WITH UNIT MOUNTED THERMOSTAT. SET TO MAINTAIN MINIMUM 50°F SPACE TEMPERATURE.

									THROAT SIZE		WEIGHT		
AG	#	MANUFACTURER	MODEL NUMBER	AREA SERVED	LOCATION	TYPE	HOOD SIZE (IN)	HOOD SIZE (IN)	(IN)	HEIGHT (IN)	(LBS)		NOTES
V	R.1	GREENHECK	FGR	STAIR S2 RELIEF	ROOF	RELIEF	48	54	36x36	36	300	1,2,3,4	

2. PROVIDE MOTORIZED DAMPER (WITH END SWITCH). 3. PROVIDE BIRDSCREEN 4. COLOR PER ARCHITECTURAL DRAWINGS.

	DIFFUSER AND GRILLE SCHEDULE													
TAG	MANUFACTURER	MODEL	DESCRIPTION	FACE TYPE	COLOR	MATERIAL		NOTES						
EA	TITUS	350 RS	EXHAUST GRILLE CEILING	3/4" SPACING, SGL DEFLECTION	WHITE	STEEL	1,2,3,4							
EB	TITUS	350 RS	EXHAUST GRILLE SIDEWALL/DUCT	3/4" SPACING, SGL DEFLECTION	WHITE	STEEL	1,2,3,4							
LG	TITUS	CT 480	LINEAR BAR GRILLE	LINEAR BAR	WHITE	ALUMINUM	1,2,3,4							
RA	TITUS	350 RS	RETURN GRILLE SIDEWALL/DUCT	3/4" SPACING, SGL DEFLECTION	WHITE	STEEL	1,2,3,4							
RB	TITUS	350 FS	RETURN GRILLE CEILING	3/4" SPACING, SGL DEFLECTION	WHITE	ALUMINUM	1,2,3,4							
RC	TITUS	350 FS	RETURN GRILLE SIDEWALL/DUCT	3/4" SPACING, SGL DEFLECTION	WHITE	ALUMINUM	1,2,3,4							
SA	TITUS	300 RS	DIFFUSER CEILING	3/4" SPACING, DOUBLE DEFL.	WHITE	STEEL	1,2,3,4							
SB	TITUS	300 FS	DIFFUSER SIDEWALL	3/4" SPACING, DOUBLE DEFL.	WHITE	ALUMINUM	1,2,3,4							
SC	TITUS	300 RS	DIFFUSER SIDEWALL	3/4" SPACING, DOUBLE DEFL.	WHITE	STEEL	1,2,3,4							
SD	TITUS	ML-39	LINEAR SLOT DIFFUSER	TWO (2) 1" SLOT	WHITE	STEEL	1,3,4,5							
TG	TITUS	350 RS	RETURN GRILLE SIDEWALL/DUCT	3/4" SPACING, SGL DEFLECTION	WHITE	STEEL	1,2,3,4							

NOTES: 1. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLANS FOR BORDER TYPES.

. NECK SIZE AND CFM SHOWN ARE ON PLANS (EXAMPLE: SA12x12-400 REFERS TO TAG "SA" WITH 12x12 NECK AND 400 CFM).

3. PROVIDE RECTANGULAR/SQUARE TO ROUND TRANSITION AS REQUIRED.

4. ADJUSTABLE HORIZONTAL / VERTICAL DISCHARGE 5. PLENUM CONNECTION SIZE, SLOT LENGTH, AND CFM SHOWN ON PLANS (EXAMPLE: SL8-120-2000 REFERS TO TAG "SL" WITH 8" ROUND CONNECTION, 120" CONTINUOUS SLOT LENGTH AND 2000 CFM).

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

# KIRKLAND

200 PETER KIRK LN. KIRKLAND, WA

L 2 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865 MARK DATE DESCRIPTION

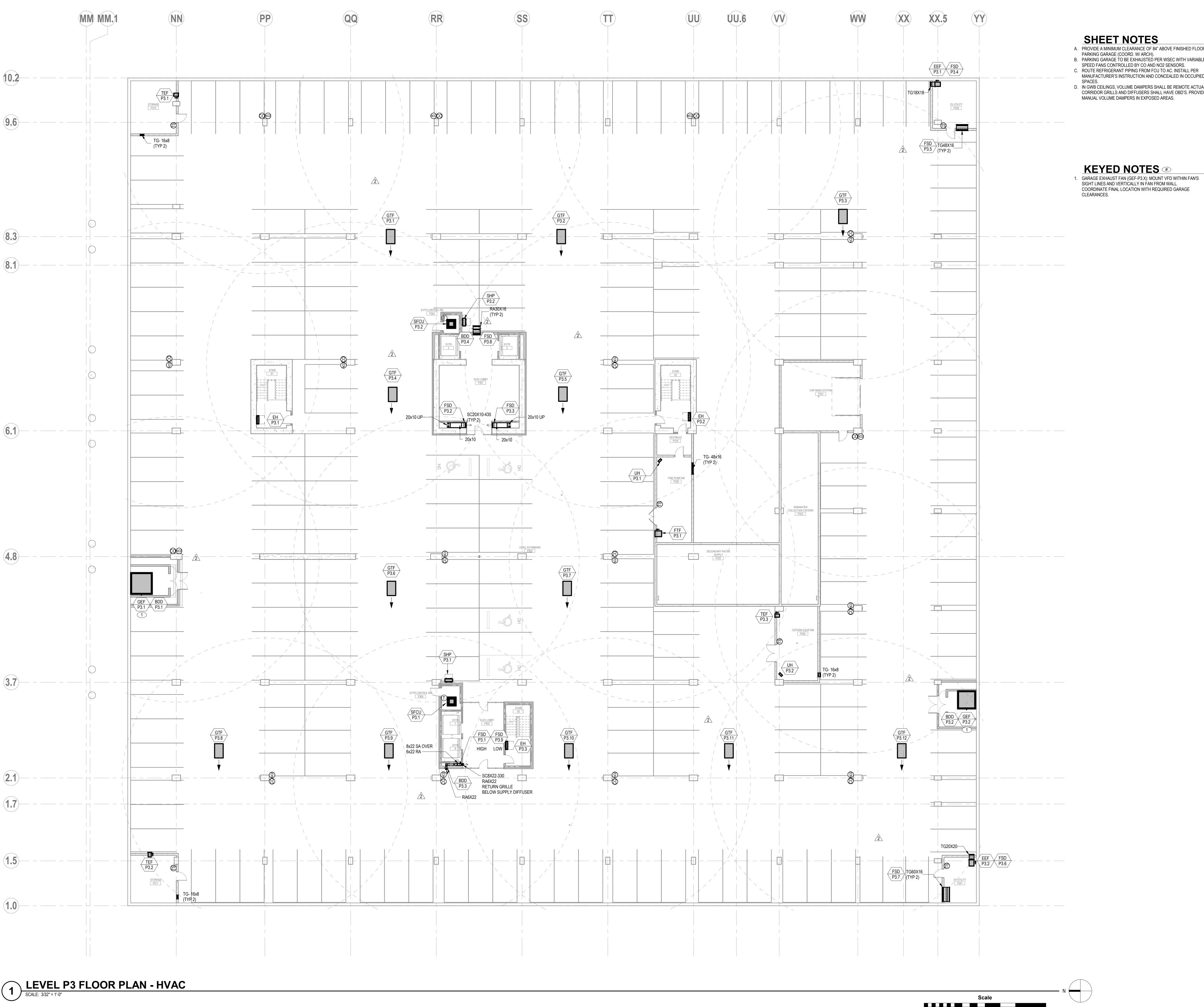
3 07/17/2020 TOWER PERMIT RESUB 07/24/2020 ISSUE FOR CONSTRUCTION 09/03/2020 RFI 017 12/03/2020 RFI 046 01/22/2021 TOWER PERMIT

RESUBMITTAL

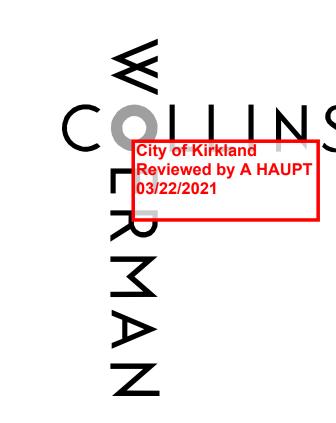
ISSUE DATE



SHEET TITLE / NUMBER SCHEDULES



- A. PROVIDE A MINIMUM CLEARANCE OF 84" ABOVE FINISHED FLOOR IN PARKING GARAGE (COORD. W/ ARCH).
  B. PARKING GARAGE TO BE EXHAUSTED PER WSEC WITH VARIABLE SPEED FANS CONTROLLED BY CO AND NO2 SENSORS.
  C. ROUTE REFRIGERANT PIPING FROM FCU TO AC. INSTALL PER MANUFACTURER'S INSTRUCTION AND CONCEALED IN OCCUPIED
- D. IN GWB CEILINGS, VOLUME DAMPERS SHALL BE REMOTE ACTUATED. CORRIDOR GRILLS AND DIFFUSERS SHALL HAVE OBD'S. PROVIDE MANUAL VOLUME DAMPERS IN EXPOSED AREAS.



710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

KIRKLAND URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

L 2 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION
09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET

07/10/2020 GARAGE PERMIT RESUB

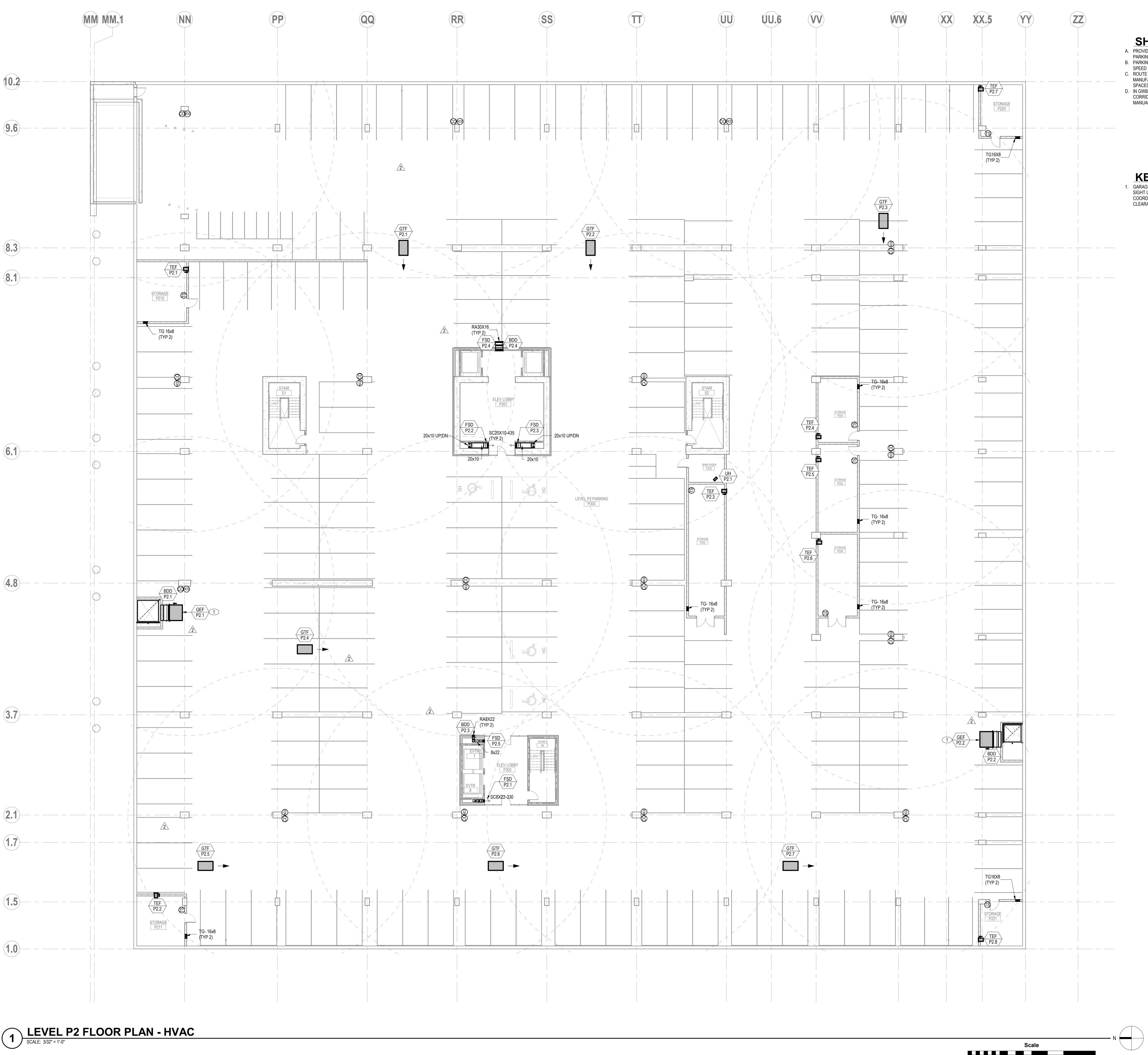
CBRE03.18.095 ISSUE DATE

SHEET TITLE / NUMBER LEVEL P3 FLOOR

PLAN - HVAC

M2.P3

10' - 8" 21' - 4" 32' - 0" 42' - 8"



A. PROVIDE A MINIMUM CLEARANCE OF 84" ABOVE FINISHED FLOOR IN PARKING GARAGE (COORD. W/ ARCH).
B. PARKING GARAGE TO BE EXHAUSTED PER WSEC WITH VARIABLE SPEED FANS CONTROLLED BY CO AND NO2 SENSORS.
C. ROUTE REFRIGERANT PIPING FROM FCU TO AC. INSTALL PER MANUFACTURER'S INSTRUCTION AND CONCEALED IN OCCUPIED

D. IN GWB CEILINGS, VOLUME DAMPERS SHALL BE REMOTE ACTUATED.
CORRIDOR GRILLS AND DIFFUSERS SHALL HAVE OBD'S. PROVIDE
MANUAL VOLUME DAMPERS IN EXPOSED AREAS.



KEYED NOTES # SI

GARAGE EXHAUST FAN (GEF-P2.X): MOUNT VFD WITHIN FAN'S SIGHT LINES AND VERTICALLY IN FAN FROM WALL.
 COORDINATE FINAL LOCATION WITH REQUIRED GARAGE CLEARANCES.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

KIRKLAND URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

ER

GLUMAC engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

ISSUED

ISSUED

MARK DATE DESCRIPTION

09/27/2019 100% DD SET

11/22/2019 PROGRESS SET

12/20/2019 CD PROGRESS SET

01/17/2020 50% CD SET

03/20/2020 90% CD SET

12/20/2019 CD PROGRESS SET
01/17/2020 50% CD SET
03/20/2020 90% CD SET
07/10/2020 GARAGE PERMIT RESUB

PROJECT NO. CBRE03.18.095
DRAWN BY NJ/JM
ISSUE DATE 07/17/2020

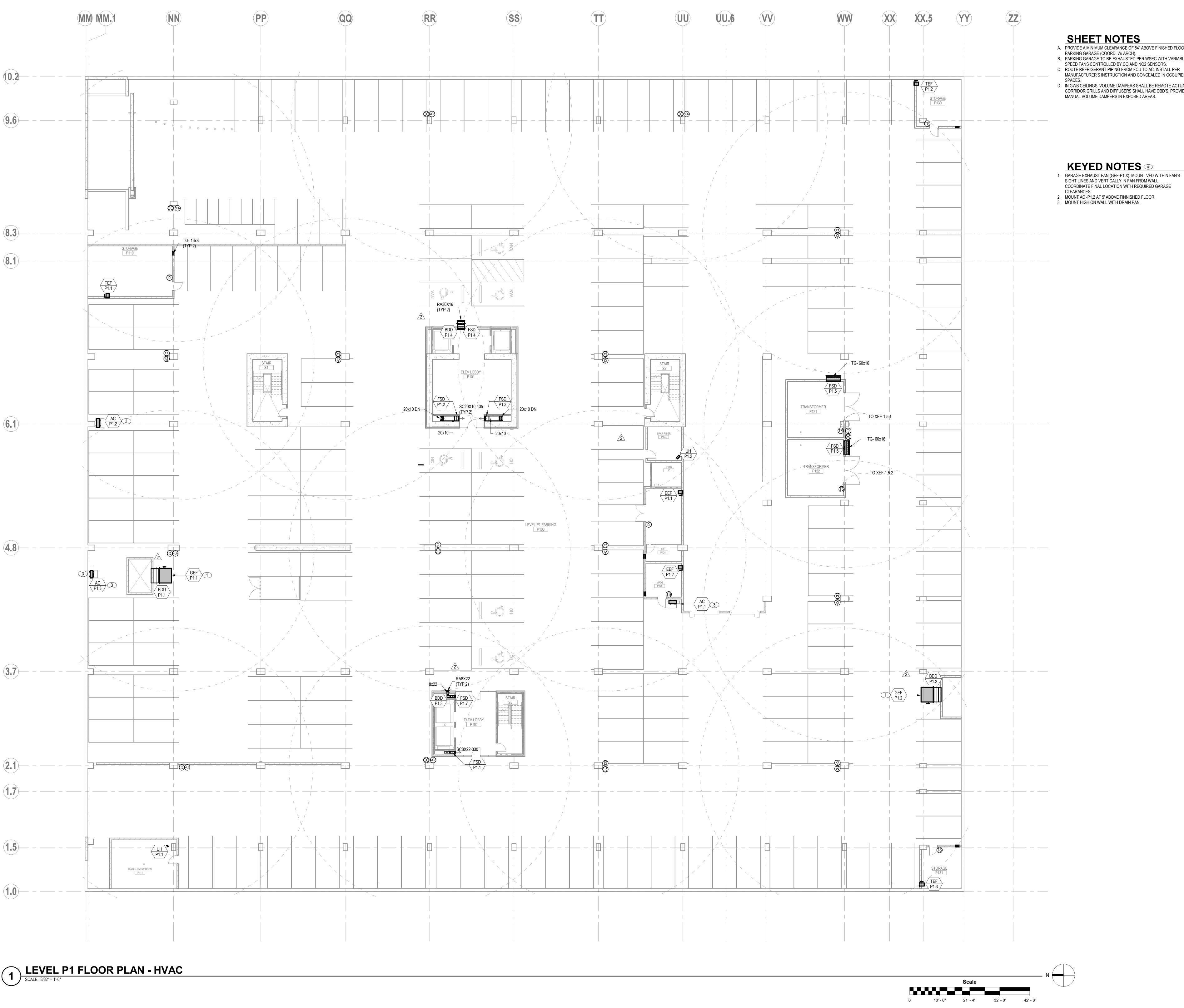
SHEET TITLE / NUMBER

LEVEL P2 FLOOR PLAN - HVAC

M2.P2

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

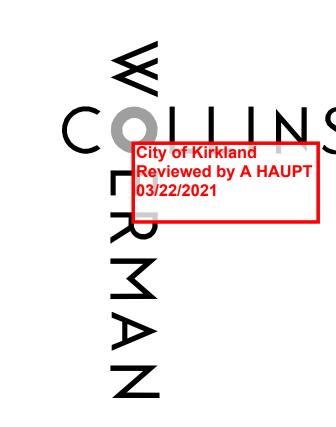
10' - 8" 21' - 4" 32' - 0" 42' - 8"



A. PROVIDE A MINIMUM CLEARANCE OF 84" ABOVE FINISHED FLOOR IN PARKING GARAGE (COORD. W/ ARCH).
B. PARKING GARAGE TO BE EXHAUSTED PER WSEC WITH VARIABLE SPEED FANS CONTROLLED BY CO AND NO2 SENSORS.

C. ROUTE REFRIGERANT PIPING FROM FCU TO AC. INSTALL PER MANUFACTURER'S INSTRUCTION AND CONCEALED IN OCCUPIED

D. IN GWB CEILINGS, VOLUME DAMPERS SHALL BE REMOTE ACTUATED. CORRIDOR GRILLS AND DIFFUSERS SHALL HAVE OBD'S. PROVIDE MANUAL VOLUME DAMPERS IN EXPOSED AREAS.



710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

KIRKLAND URBAN SOUTH

200 PETER KIRK LN.

KIRKLAND, WA

CONSULTANT
GLUMAC
engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION
09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET

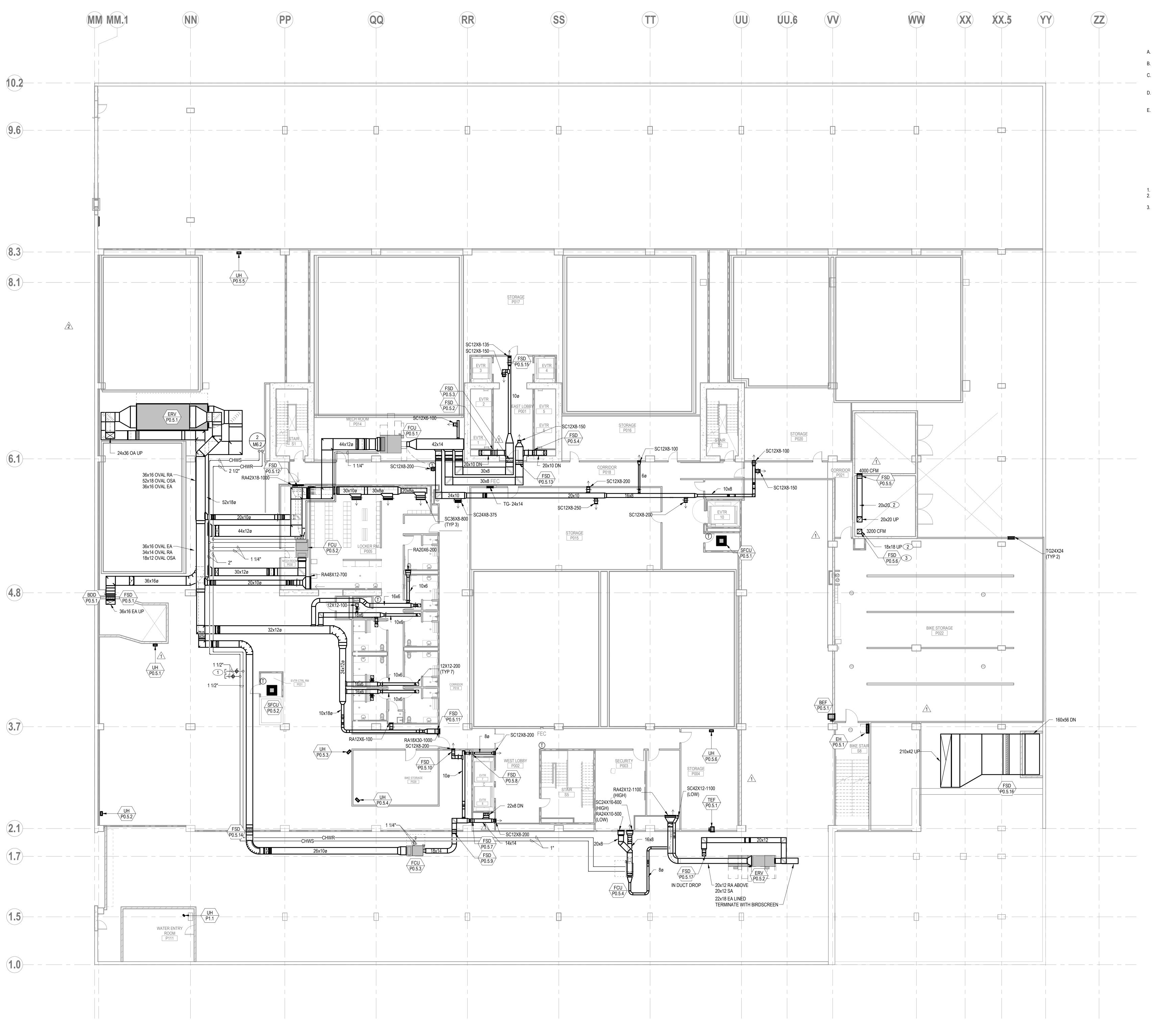
07/10/2020 GARAGE PERMIT RESUB

CBRE03.18.095 ISSUE DATE

SHEET TITLE / NUMBER LEVEL P1 FLOOR

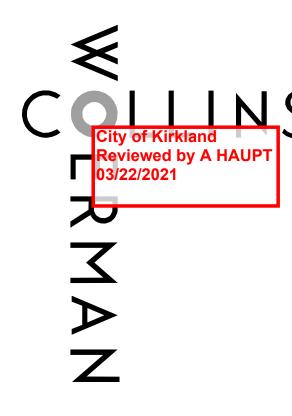
PLAN - HVAC

M2.P1



- A. PROVIDE A MINIMUM CLEARANCE OF 84" ABOVE FINISHED FLOOR IN PARKING GARAGE (COORD. W/ ARCH).
  B. PARKING GARAGE TO BE EXHAUSTED PER WSEC WITH VARIABLE SPEED FANS CONTROLLED BY CO AND NO2 SENSORS.

  C. ROUTE REFRIGERANT PIPING FROM FCU TO AC. INSTALL PER MANUFACTURER'S INSTRUCTION AND CONCEALED IN OCCUPIED
- D. IN GWB CEILINGS, VOLUME DAMPERS SHALL BE REMOTE ACTUATED. CORRIDOR GRILLS AND DIFFUSERS SHALL HAVE OBD'S. PROVIDE
- MANUAL VOLUME DAMPERS IN EXPOSED AREAS. E. AIR VENTS SHALL BE INSTALLED AT ALL HIGH POINTS IN HYDRONIC



KEYED NOTES **#** 

- CAP FOR FUTURE TI.
   TRANSFORMER EXHAUST DUCT TO BE ENCLOSED IN 3 HOUR RATED SOFFIT.
- 3. FIRE SMOKE DAMPER LOCATED IN DUCT DROP.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

KIRKLAND URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 PERMIT RESUBMITTAL 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET

03/20/2020 90% CD SET 07/10/2020 GARAGE PERMIT RESUB

ISSUE DATE

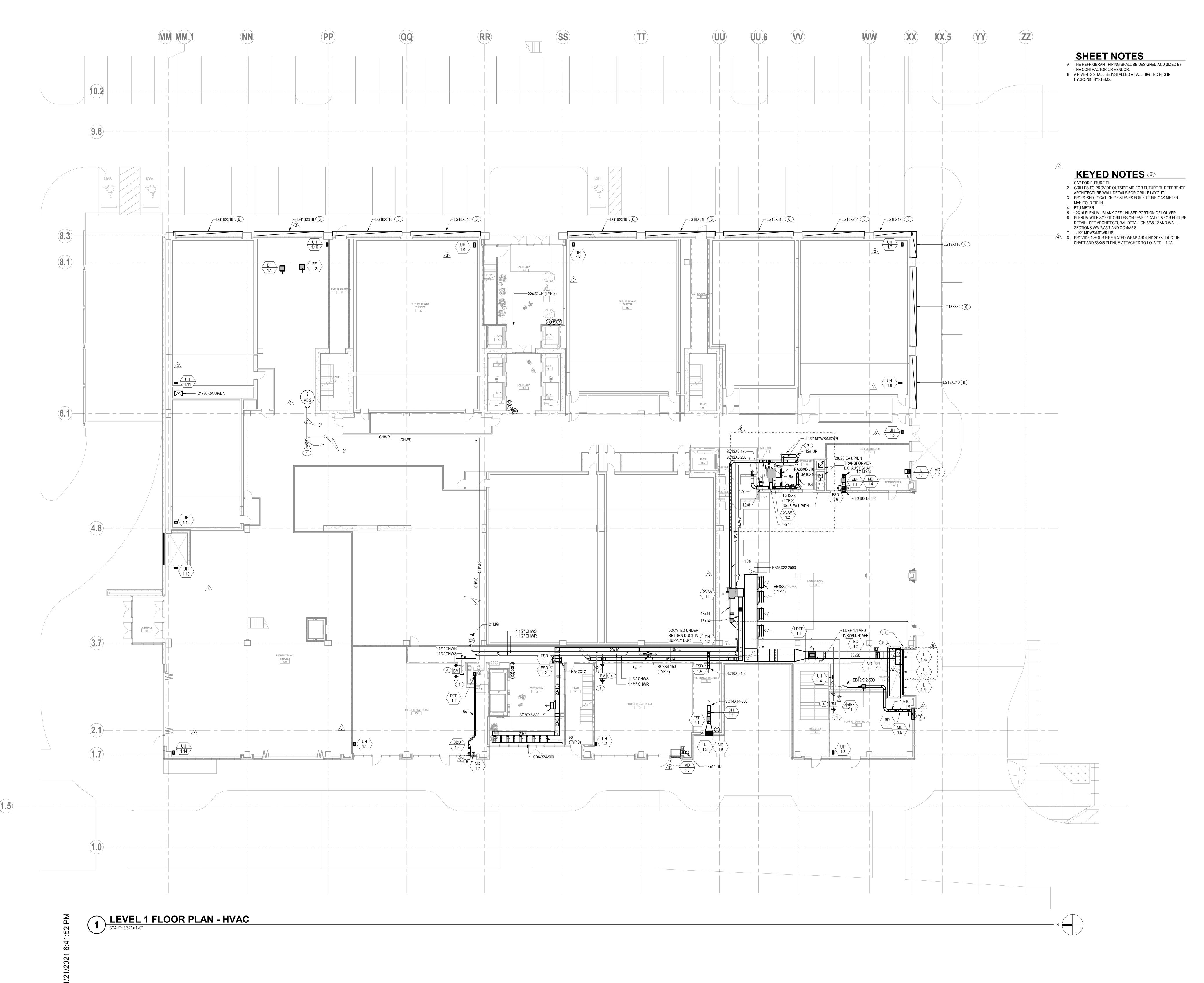
SHEET TITLE / NUMBER LEVEL P0.5 FLOOR PLAN -HVAC

M2.P0.5

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

1 LEVEL P0.5 FLOOR PLAN - HVAC

SCALE: 3/32" = 1'-0"





710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### KIRKLAND URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

WNER

GLUMAC engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

| ISSUED | | MARK | DATE | DESCRIPTION | | 3 | 07/17/2020 | TOWER PERMIT RESUB | 07/24/2020 | ISSUE FOR CONSTRUCTION | 09/03/2020 | RFI 019 | 11/09/2020 | RFI 045 | 11/09/2020 | RFI 043 | 11/19/2020 | RFI 032 | RFI 032

11/09/2020 RFI 043 11/19/2020 RFI 032 11/19/2020 PERMIT RESUBMITTAL 12/03/2020 RFI 046 01/22/2021 TOWER PERMIT RESUBMITTAL

PROJECT NO. CBRE03.1
DRAWN BY

SEAL

A MCC

WASHING

SEAL

SEAL

A MCC

WASHING

SEAL

SEAL

SEAL

TO F WASHING

SEAL

SEAL

TO F WASHING

SEAL

SEAL

SEAL

TO F WASHING

SEAL

TO F WASHING

SEAL

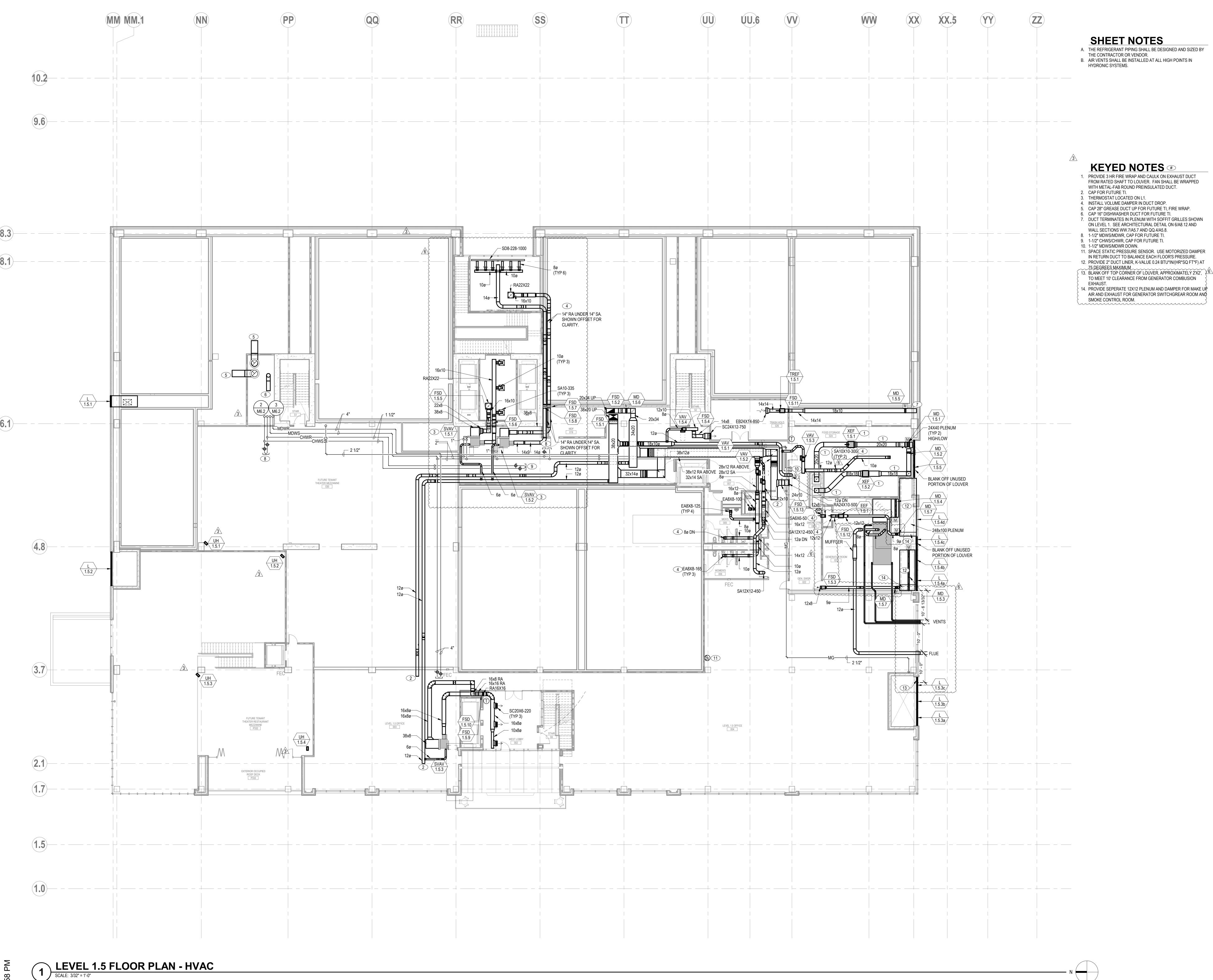
SE

SHEET TITLE / NUMBER

LEVEL 1 FLOOR

PLAN - HVAC

M2.1





A. THE REFRIGERANT PIPING SHALL BE DESIGNED AND SIZED BY THE CONTRACTOR OR VENDOR. B. AIR VENTS SHALL BE INSTALLED AT ALL HIGH POINTS IN

KEYED NOTES **#** 

1. PROVIDE 3 HR FIRE WRAP AND CAULK ON EXHAUST DUCT FROM RATED SHAFT TO LOUVER. FAN SHALL BE WRAPPED WITH METAL-FAB ROUND PREINSULATED DUCT.

2. CAP FOR FUTURE TI.

3. THERMOSTAT LOCATED ON L1. 4. INSTALL VOLUME DAMPER IN DUCT DROP. 5. CAP 28" GREASE DUCT UP FOR FUTURE TI, FIRE WRAP. 6. CAP 16" DISHWASHER DUCT FOR FUTURE TI.7. DUCT TERMINATES IN PLENUM WITH SOFFIT GRILLES SHOWN

- ON LEVEL 1. SEE ARCHITECTURAL DETAIL ON 6/A8.12 AND WALL SECTIONS WW.7/A5.7 AND QQ.4/A5.8. 8. 1-1/2" MDWS/MDWR, CAP FOR FUTURE TI. 9. 1-1/2" CHWS/CHWR, CAP FOR FUTURE TI.
- 10. 1-1/2" MDWS/MDWR DOWN. 11. SPACE STATIC PRESSURE SENSOR. USE MOTORIZED DAMPER IN RETURN DUCT TO BALANCE EACH FLOOR'S PRESSURE. 12. PROVIDE 2" DUCT LINER, K-VALUE 0.24 BTU\*IN/(HR\*SQ FT\*F) AT
- TO MEET 10' CLEARANCE FROM GENERATOR COMBUSION 14. PROVIDE SEPERATE 12X12 PLENUM AND DAMPER FOR MAKE UP AIR AND EXHAUST FOR GENERATOR SWITCHGREAR ROOM AND

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

KIRKLAND URBAN

200 PETER KIRK LN.

KIRKLAND, WA

CONSULTANT

GLUMAC

engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

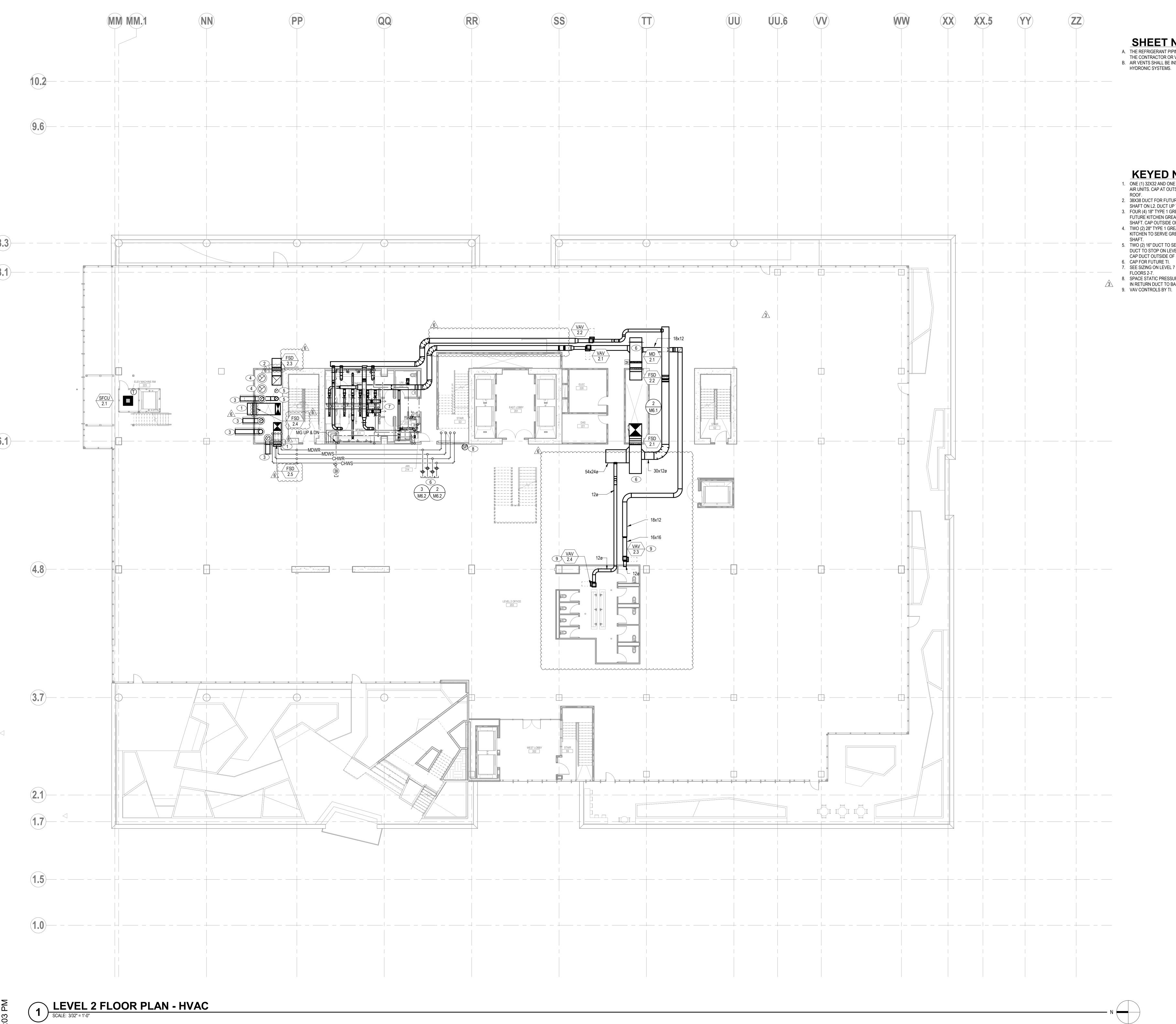
 
 DATE
 DESCRIPTION

 09/27/2019
 100% DD SET
 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET

07/17/2020 TOWER PERMIT RESUB 07/24/2020 ISSUE FOR CONSTRUCTION 12/03/2020 RFI 046 01/22/2021 TOWER PERMIT RESUBMITTAL

LEVEL 1.5 FLOOR PLAN - HVAC

M2.1.5



A. THE REFRIGERANT PIPING SHALL BE DESIGNED AND SIZED BY THE CONTRACTOR OR VENDOR.

B. AIR VENTS SHALL BE INSTALLED AT ALL HIGH POINTS IN HYDRONIC SYSTEMS.

KEYED NOTES **#** 

 ONE (1) 32X32 AND ONE (1) 48X20 DUCT FOR FUTURE MAKE UP AIR UNITS. CAP AT OUTSIDE OF SHAFT ON ROOF. DUCTS UP TO 2. 38X38 DUCT FOR FUTURE GENERAL EXHAUST. CAP OUTSIDE OF SHAFT ON L2. DUCT UP TO ROOF. 3. FOUR (4) 18" TYPE 1 GREASE DUCTS UP TO ROOF. SERVES L2 FUTURE KITCHEN GREASE HOODS. FIRE WRAP DUCTS IN SHAFT. CAP OUTSIDE OF SHAFT ON L2. 4. TWO (2) 28" TYPE 1 GREASE DUCTS DOWN TO L1.5 FUTURE KITCHEN TO SERVE GREASE HOODS. FIRE WRAP DUCTS IN

5. TWO (2) 16" DUCT TO SERVE FUTURE DISHWASHERS. ONE DUCT TO STOP ON LEVEL 2 AND ONE TO TO STOP ON LEVEL 1.5. CAP DUCT OUTSIDE OF SHAFT ON LEVEL 2.

CAP FOR FUTURE TI. 7. SEE SIZING ON LEVEL 7 FOR RESTROOMS. TYPICAL FOR 8. SPACE STATIC PRESSURE SENSOR. USE MOTORIZED DAMPER IN RETURN DUCT TO BALANCE EACH FLOOR'S PRESSURE. 710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

URBAN

200 PETER KIRK LN.

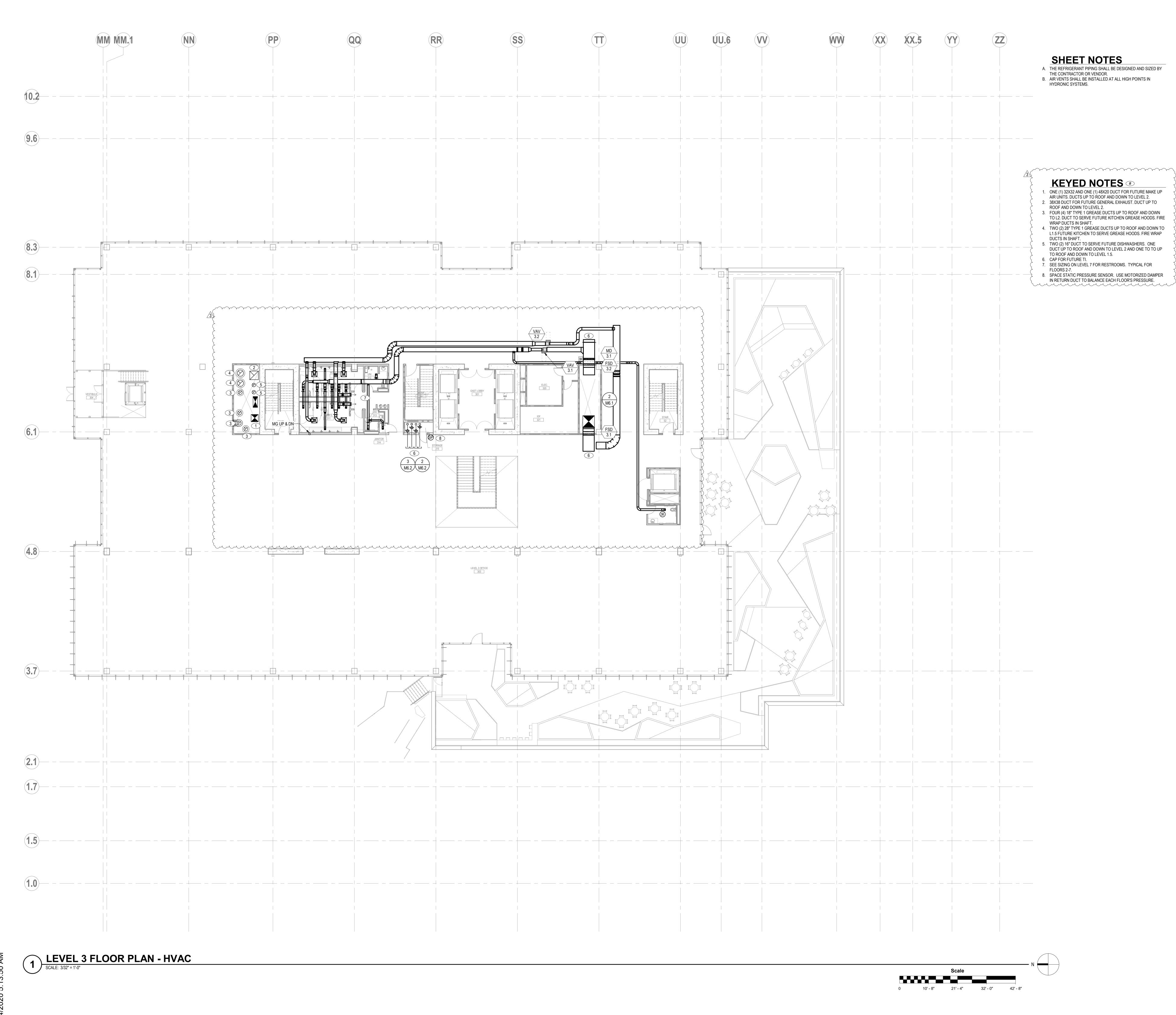
KIRKLAND, WA

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB 07/24/2020 ISSUE FOR CONSTRUCTION 10/23/2020 ASI-02 11/09/2020 RFI 047 01/22/2021 TOWER PERMIT RESUBMITTAL



LEVEL 2 FLOOR PLAN - HVAC



City of Kirkland
Reviewed by A HAUPT
03/22/2021

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### KIRKLAND URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

VNER

# CONSULTANT GLUMAC engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

ISSUED

ISSUED

MARK DATE DESCRIPTION

09/27/2019 100% DD SET

11/22/2019 PROGRESS SET

12/20/2019 CD PROGRESS SET

01/17/2020 50% CD SET

01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

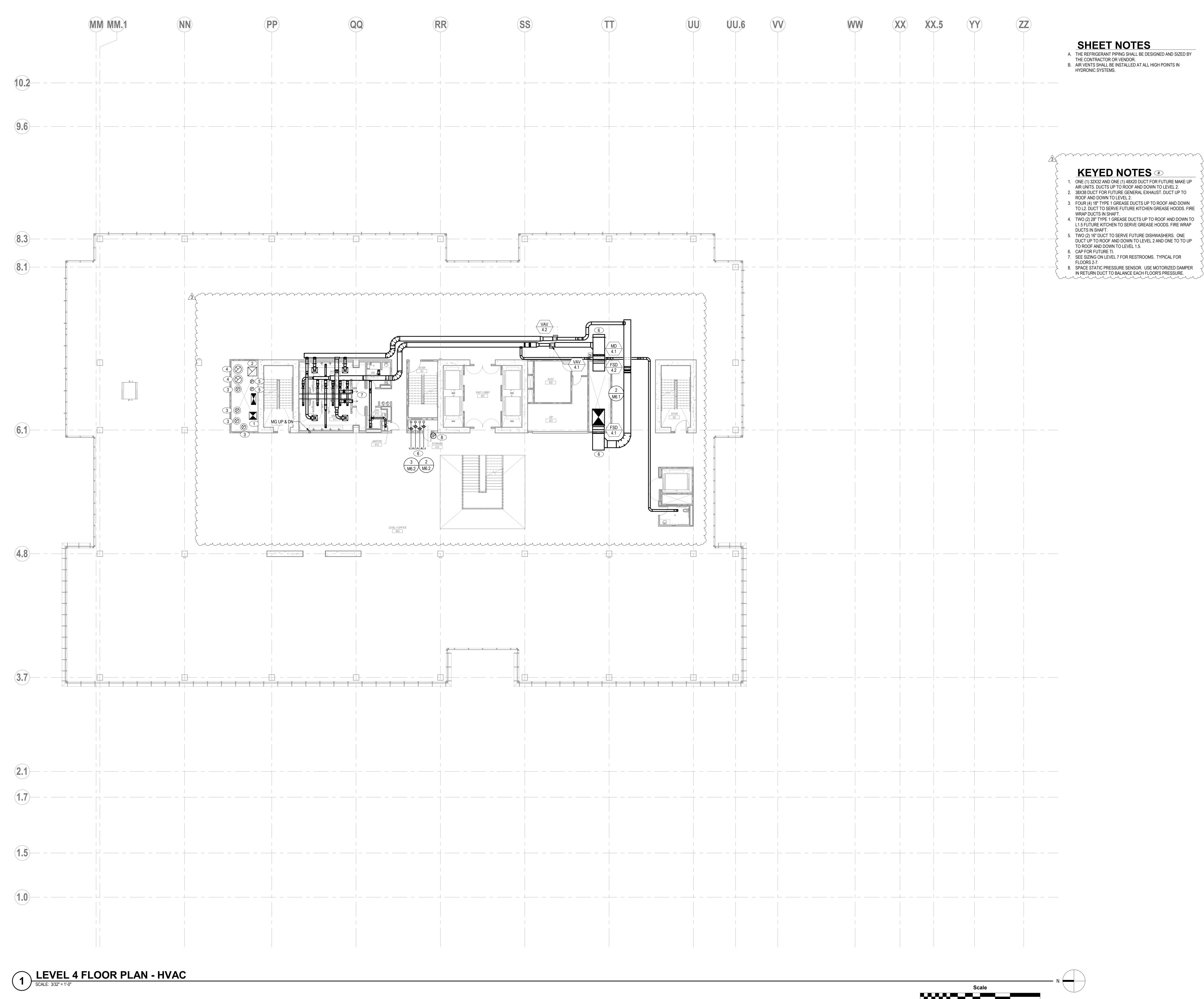
PROJECT NO. CBRE03.18

DRAWN BY N



LEVEL 3 FLOOR
PLAN - HVAC

M2.3



A. THE REFRIGERANT PIPING SHALL BE DESIGNED AND SIZED BY THE CONTRACTOR OR VENDOR. B. AIR VENTS SHALL BE INSTALLED AT ALL HIGH POINTS IN HYDRONIC SYSTEMS.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

**KIRKLAND** URBAN SOUTH

KIRKLAND, WA

200 PETER KIRK LN.

CONSULTANT

GLUMAC

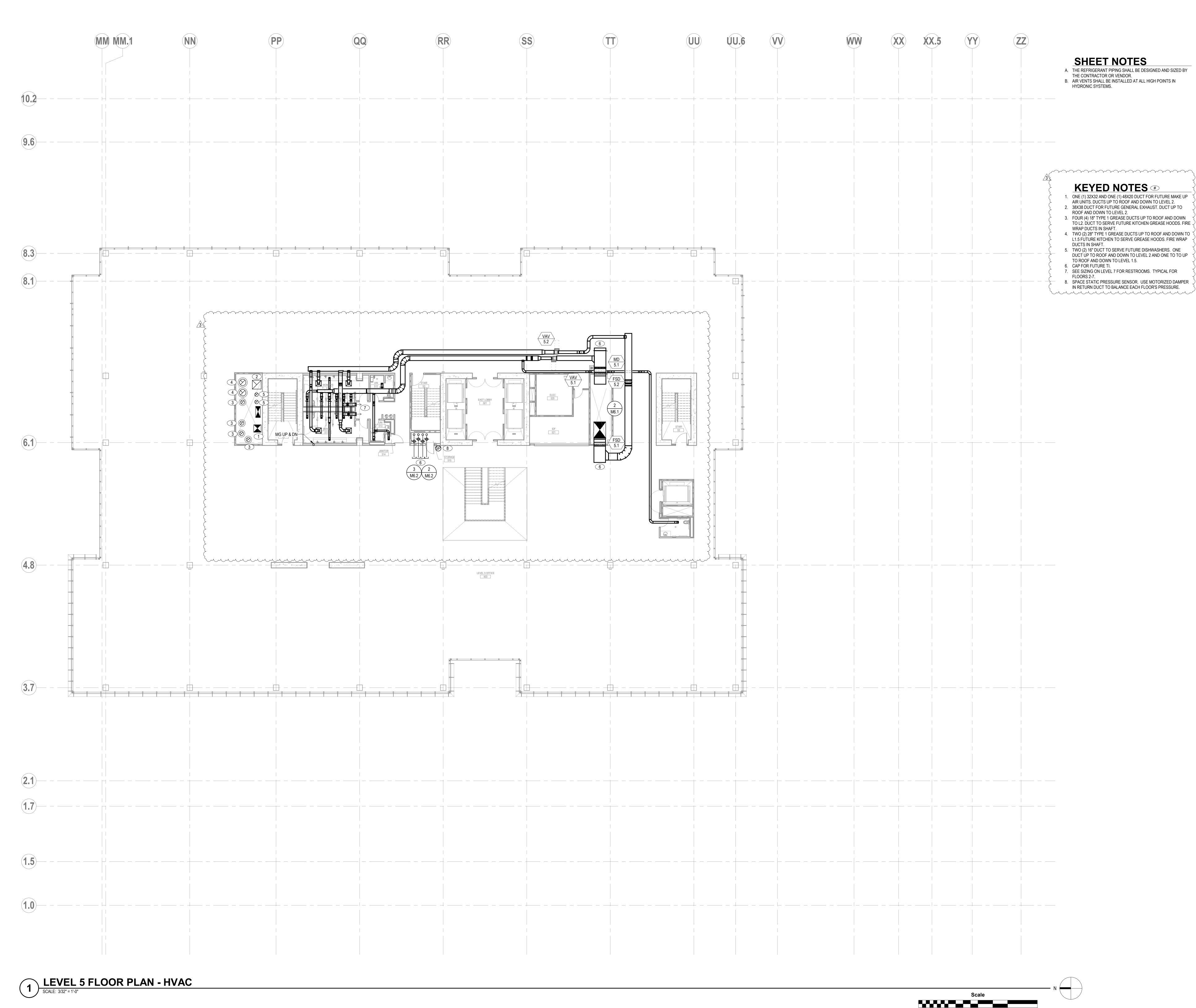
engineers for a sustainable future

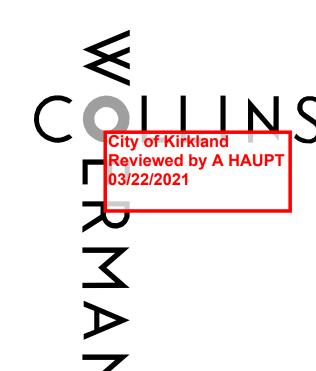
1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION
09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB



LEVEL 4 FLOOR PLAN - HVAC





710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### KIRKLAND URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

WNER

# GLUMAC engineers for a sustainable future

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

ISSUED

MARK DATE DESCRIPTION

09/27/2019 100% DD SET

11/22/2019 PROGRESS SET

12/20/2019 CD PROGRESS SET

01/17/2020 50% CD SET

03/20/2020 90% CD SET

01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

PROJECT NO. CBRE03.18

DRAWN BY N.

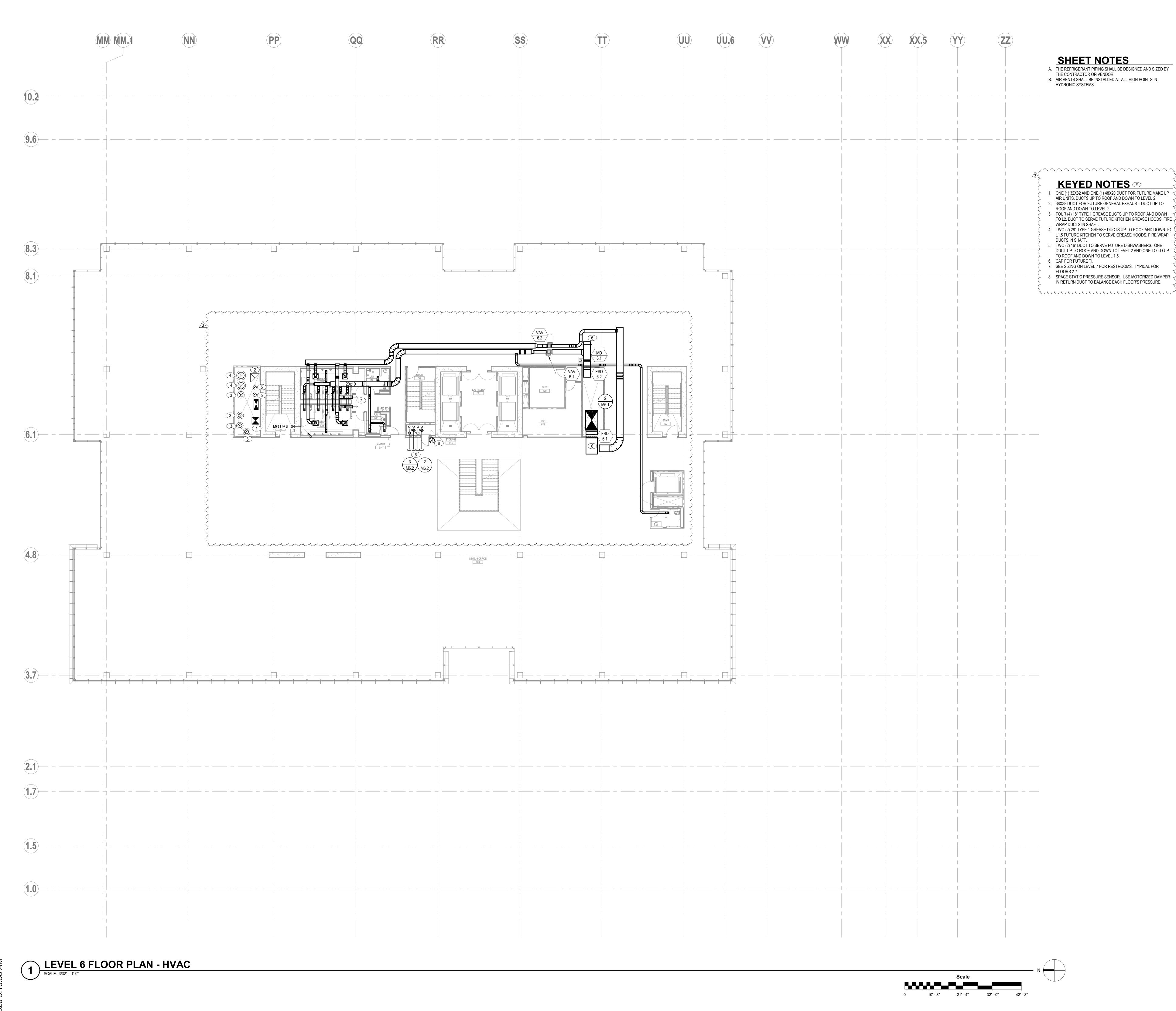
ISSUE DATE 07/17/2



SHEET TITLE / NUMBER

LEVEL 5 FLOOR
PLAN - HVAC

M2.5



710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### **KIRKLAND** URBAN SOUTH

200 PETER KIRK LN. KIRKLAND, WA

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION
09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET

07/17/2020 TOWER PERMIT RESUB



LEVEL 6 FLOOR PLAN - HVAC





A. THE REFRIGERANT PIPING SHALL BE DESIGNED AND SIZED BY THE CONTRACTOR OR VENDOR. B. AIR VENTS SHALL BE INSTALLED AT ALL HIGH POINTS IN

### KEYED NOTES **#**

- AIR UNITS. DUCTS UP TO ROOF AND DOWN TO LEVEL 2. 2. 38X38 DUCT FOR FUTURE GENERAL EXHAUST. DUCT UP TO
- ROOF AND DOWN TO LEVEL 2. 3. FOUR (4) 18" TYPE 1 GREASE DUCTS UP TO ROOF AND DOWN TO L2. DUCT TO SERVE FUTURE KITCHEN GREASE HOODS. FIRE
- WRAP DUCTS IN SHAFT. 4. TWO (2) 28" TYPE 1 GREASE DUCTS UP TO ROOF AND DOWN TO
- 5. TWO (2) 16" DUCT TO SERVE FUTURE DISHWASHERS. ONE DUCT UP TO ROOF AND DOWN TO LEVEL 2 AND ONE TO TO UP
- TO ROOF AND DOWN TO LEVEL 1.5.
- 7. 24X24 STAIR RELIEF DUCT UP, TERMINATE WITH BIRDSCREEN. 8. 36X20 STAIR PRESSURIZATION DUCT UP, TERMINATE WITH
- 9. SEE SIZING ON LEVEL 7 FOR RESTROOMS. TYPICAL FOR
- 10. 6" CHWS/CHWR UP TO DOAS ON ROOF. 11. SPACE STATIC PRESSURE SENSOR. USE MOTORIZED DAMPER IN RETURN DUCT TO BALANCE EACH FLOOR'S PRESSURE.
- IN VAV ACCESS AREA.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

# KIRKLAND URBAN

200 PETER KIRK LN. KIRKLAND, WA

### 

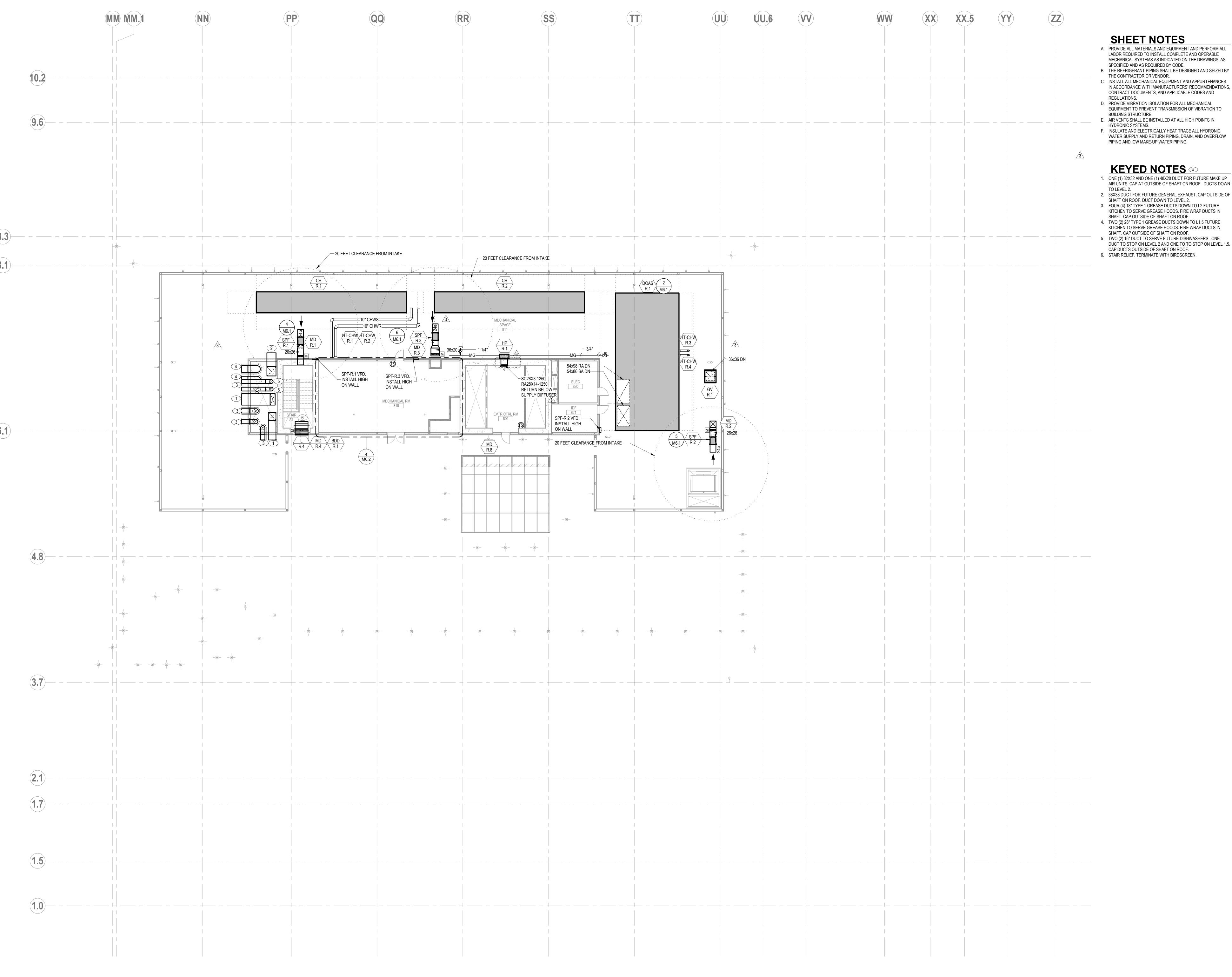
1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION
09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB 07/24/2020 ISSUE FOR CONSTRUCTION

10/23/2020 ASI-02 12/03/2020 RFI 046 01/22/2021 TOWER PERMIT RESUBMITTAL



LEVEL 7 FLOOR PLAN - HVAC





- A. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- B. THE REFRIGERANT PIPING SHALL BE DESIGNED AND SEIZED BY THE CONTRACTOR OR VENDOR. C. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND
- REGULATIONS. D. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO
- BUILDING STRUCTURE. E. AIR VENTS SHALL BE INSTALLED AT ALL HIGH POINTS IN
- HYDRONIC SYSTEMS. F. INSULATE AND ELECTRICALLY HEAT TRACE ALL HYDRONIC WATER SUPPLY AND RETURN PIPING, DRAIN, AND OVERFLOW PIPING AND ICW MAKE-UP WATER PIPING.

### KEYED NOTES **#**

1. ONE (1) 32X32 AND ONE (1) 48X20 DUCT FOR FUTURE MAKE UP AIR UNITS. CAP AT OUTSIDE OF SHAFT ON ROOF. DUCTS DOWN 38X38 DUCT FOR FUTURE GENERAL EXHAUST. CAP OUTSIDE OF SHAFT ON ROOF. DUCT DOWN TO LEVEL 2. 3. FOUR (4) 18" TYPE 1 GREASE DUCTS DOWN TO L2 FUTURE KITCHEN TO SERVE GREASE HOODS. FIRE WRAP DUCTS IN SHAFT. CAP OUTSIDE OF SHAFT ON ROOF. 4. TWO (2) 28" TYPE 1 GREASE DUCTS DOWN TO L1.5 FUTURE KITCHEN TO SERVE GREASE HOODS. FIRE WRAP DUCTS IN SHAFT. CAP OUTSIDE OF SHAFT ON ROOF. 5. TWO (2) 16" DUCT TO SERVE FUTURE DISHWASHERS. ONE

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

# KIRKLAND URBAN

200 PETER KIRK LN. KIRKLAND, WA

CONSULTANT
GLUMAC
engineers for a sustainable future

L 4 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

 
 MARK
 DATE
 DESCRIPTION

 09/27/2019
 100% DD SET

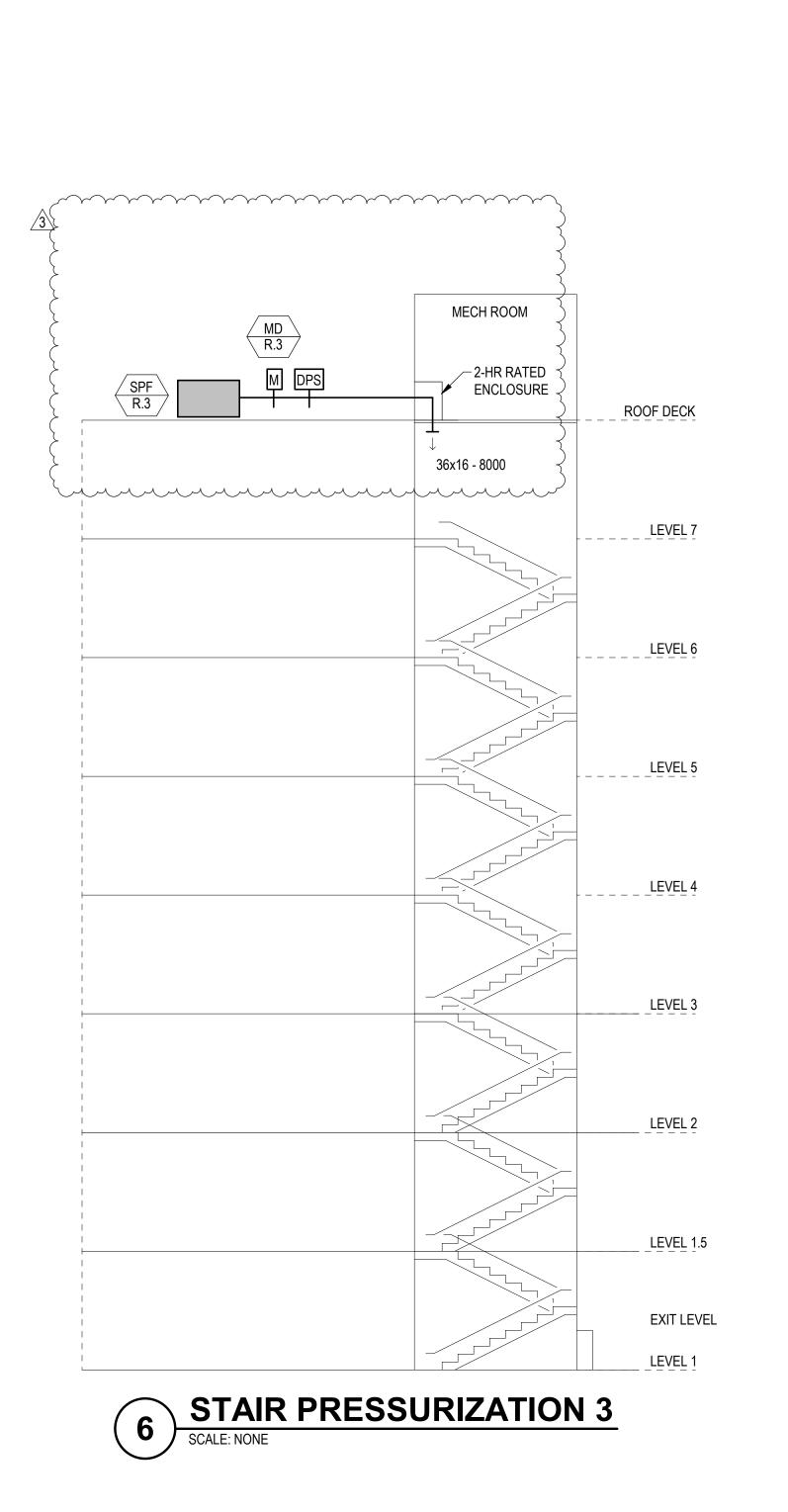
 11/22/2019
 PROGRESS SET
 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB 07/24/2020 ISSUE FOR CONSTRUCTION 12/23/2020 RFI 062 01/22/2021 TOWER PERMIT RESUBMITTAL

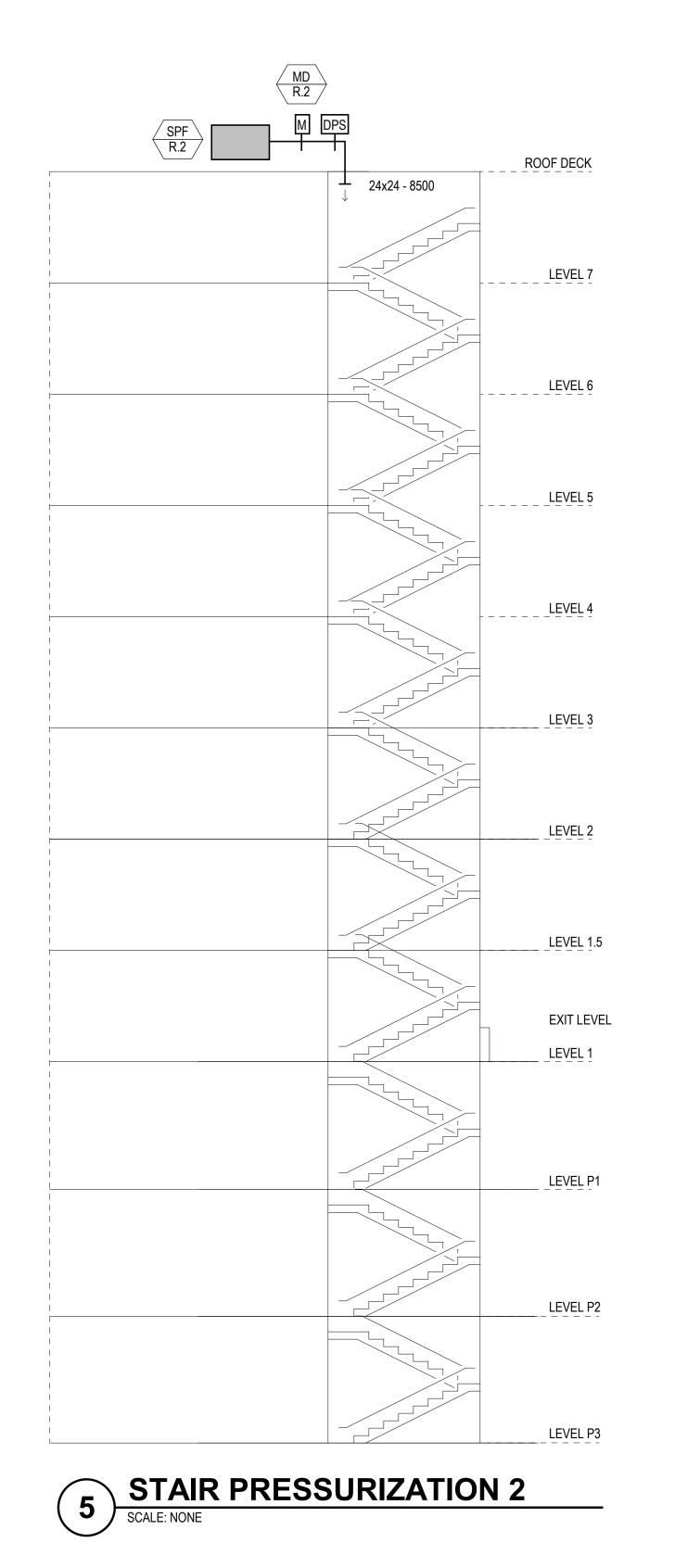


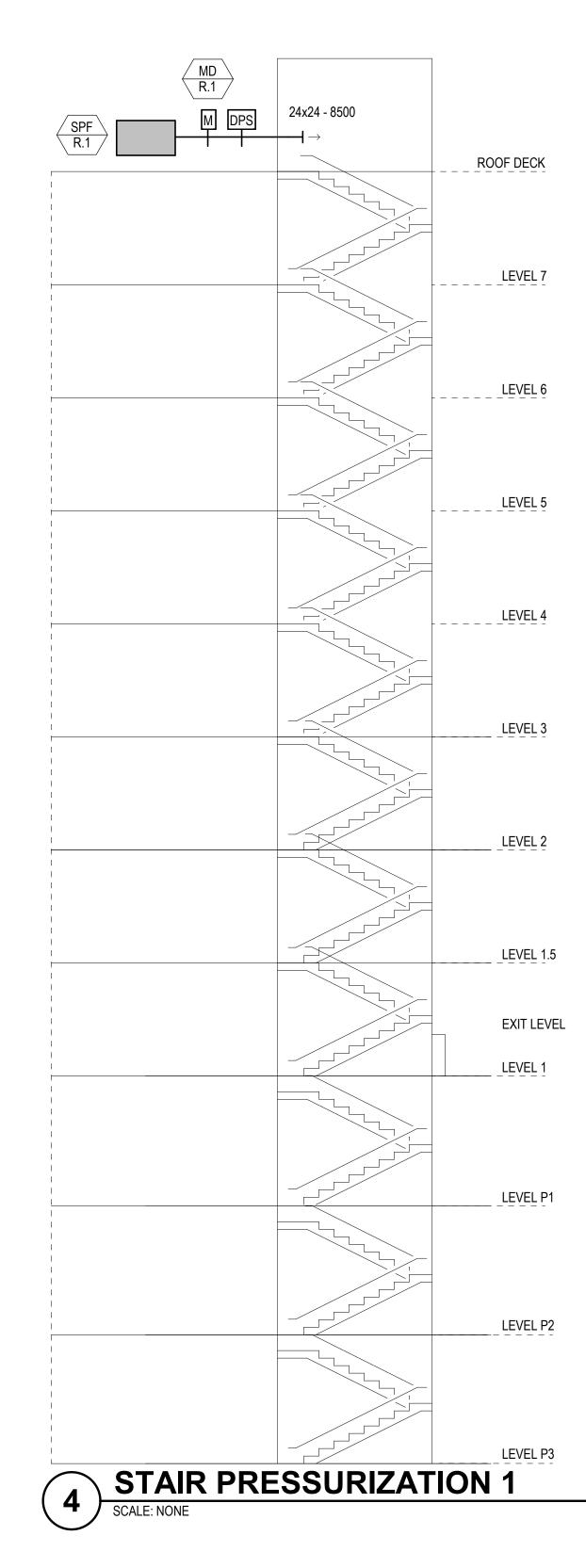
ROOF FLOOR PLAN - HVAC

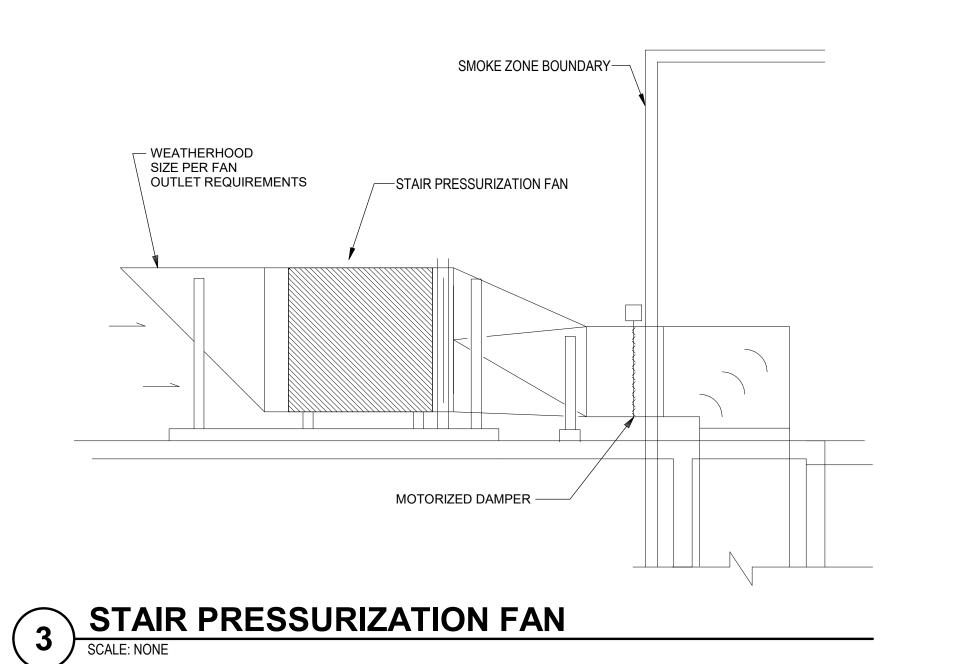
ROOF PLAN - HVAC

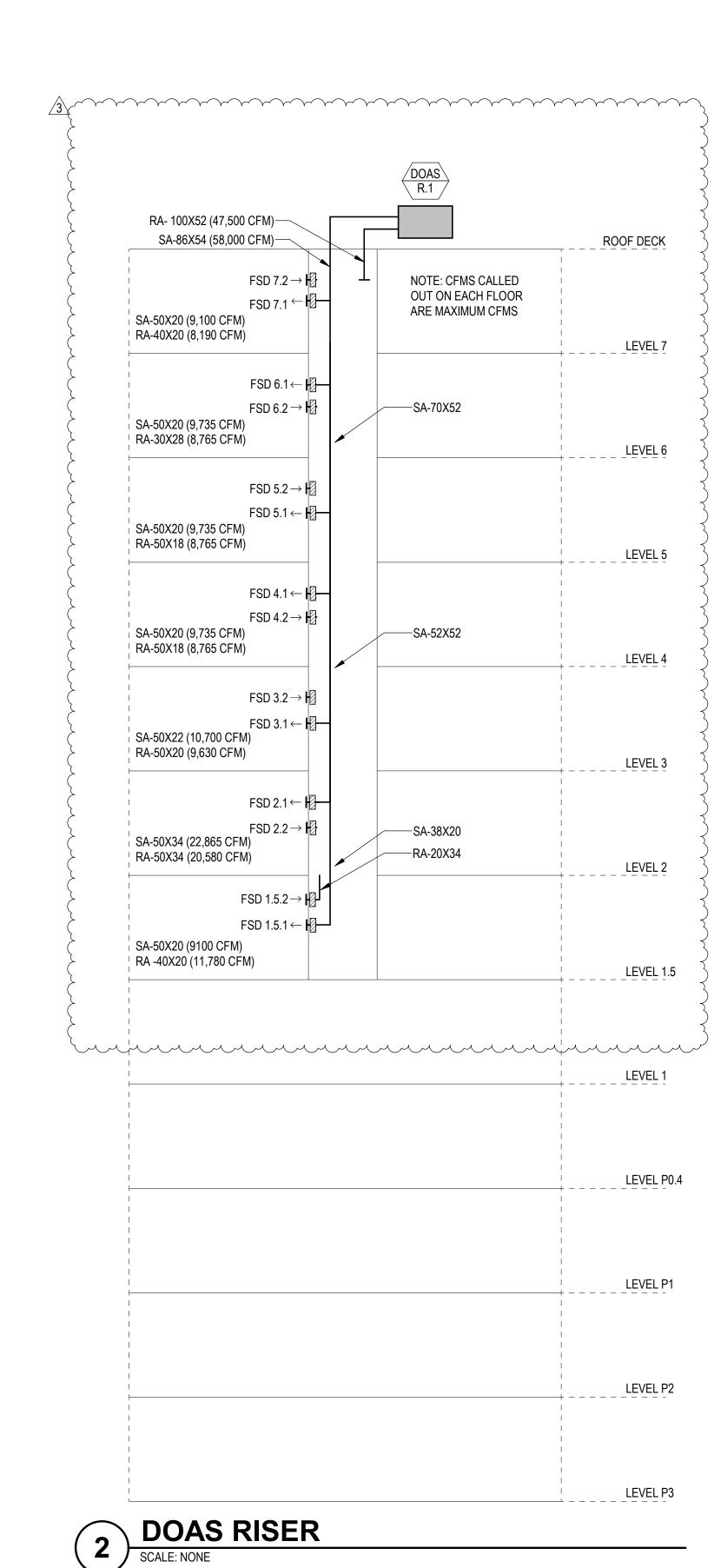
SCALE: 3/32" = 1'-0"









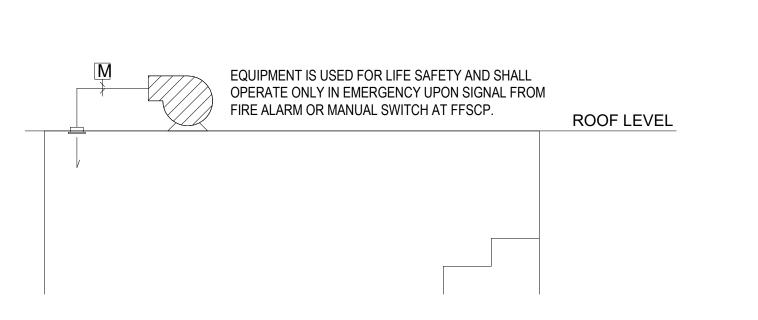


LIFE SAFETY SEQUENCE OF OPERATION

PRESSURIZATION FANS - LIFE/SAFETY:

OPERATE AUTOMATICALLY UPON ACTIVATION OF ANY FIRE ALARM INITIATING DEVICE (SPRINKLER WATERFLOW, SPRINKLER PRESSURE ALARM, AREA SMOKE DETECTOR, MANUAL PULL STATION) AND OPERATE MANUALLY FROM THE FIREFIGHTER'S SMOKE CONTROL PANEL. FIRE/SMOKE DAMPERS WILL OPEN/CLOSE BASED ON SELECTED ALARM AREA. PRESSURE DIFFERENTIAL SWITCHES SHALL BE USED FOR POSITIVE CONFIRMATION OF STAIRWELL SHAFT PRESSURIZATION SYSTEMS. MC TO PROVIDE AND INSTALL, FIRE ALARM CONTRACTOR TO CONNECT.

- A. FANS TO BE UTILIZED IN LIFE SAFETY SMOKE CONTROL SYSTEM SHALL COMPLY WITH IBC 909.10.5 AND 909.18.5. LOADING DOCK FAN SHALL INCLUDE HIGH TEMPERATURE RATING, SMOKE PROOF BEARINGS, AND MULTIPLE FAN BELTS. VFD SHALL BE USED FOR SYSTEM BALANCING PER THE SMOKE CONTROL PLAN.
- SWITCHES REQUIRED FOR FULLY-OPEN AND FULLY-CLOSED POSITION. DAMPER TO OPEN UPON SIGNAL OF FIRE ALARM.
- D. AIRFLOW SHALL BE MONITORED VIA CURRENT TRANSDUCER AND POWER DOWNSTREAM OF THE DISCONNECT SHALL BE MONITORED PER IBC 909.12.



**STAIR PRESSURIZATION** 



710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### KIRKLAND **URBAN** SOUTH

200 PETER KIRK LN. KIRKLAND, WA

GLUMAC **L** 2 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791

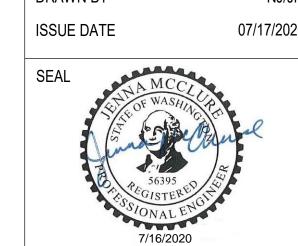
www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE 
 DATE
 DESCRIPTION

 09/27/2019
 100% DD SET
 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

SMOKE CONTROL NOTES

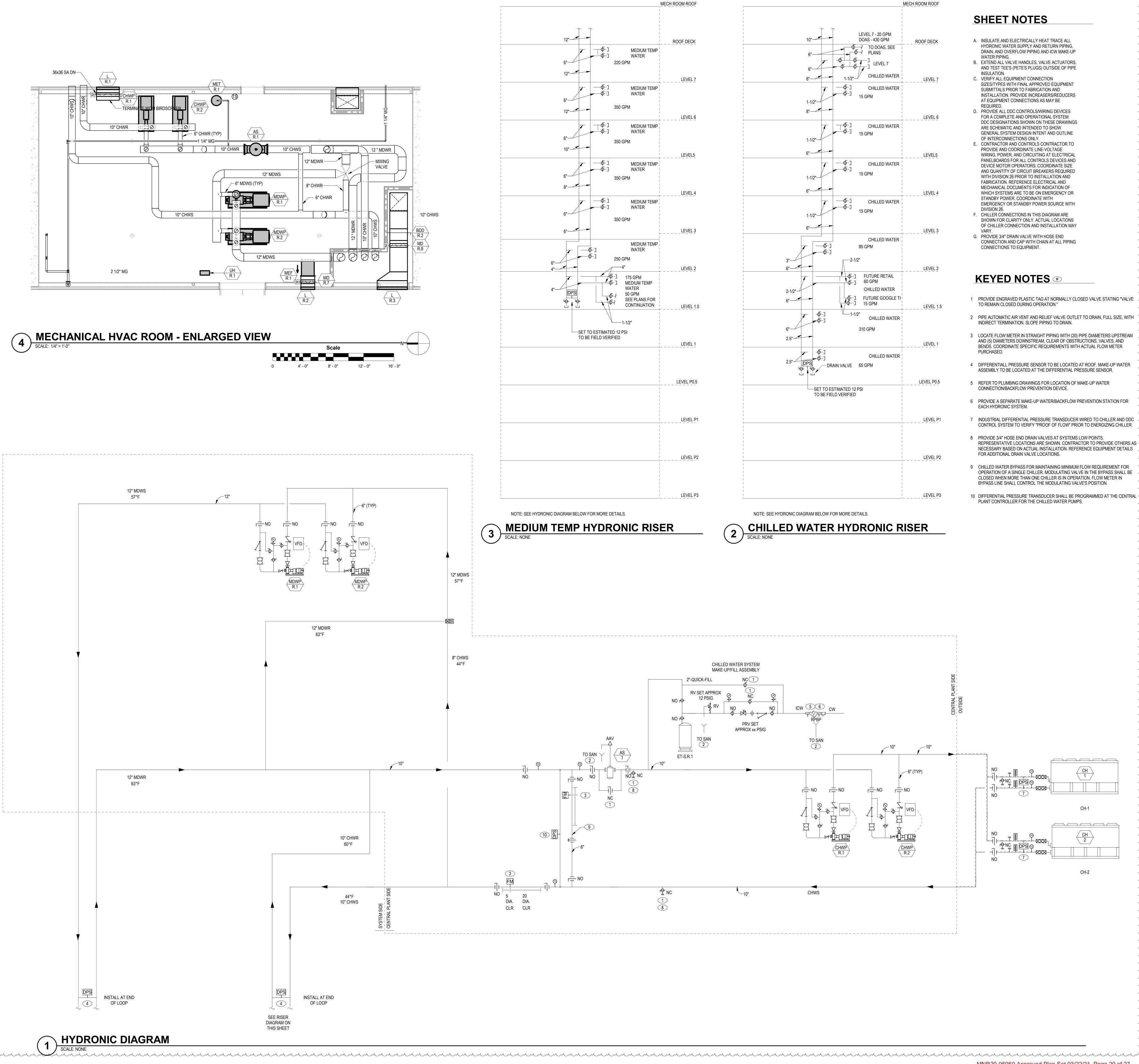
B. PROVIDE NORMALLY CLOSED MOTORIZED DAMPER WITH END SWITCH. DAMPER SHALL FAIL-OPEN. BLADE POSITION C. AIR INLET AND TERMINATION SHALL COMPLY WITH IBC 909.10.3.



CBRE03.18.095

SHEET TITLE / NUMBER MECHANICAL RISERS

PROJECT NO.



- 1 PROVIDE ENGRAVED PLASTIC TAG AT NORMALLY CLOSED VALVE STATING "VALVE
- 3 LOCATE FLOW METER IN STRAIGHT PIPING WITH (20) PIPE DIAMETERS UPSTREAM AND (5) DIAMETERS DOWNSTREAM, CLEAR OF OBSTRUCTIONS, VALVES, AND
- 4 DIFFERENTIALL PRESSURE SENSOR TO BE LOCATED AT ROOF. MAKE-UP WATER
- REPRESENTATIVE LOCATIONS ARE SHOWN. CONTRACTOR TO PROVIDE OTHERS AS -
- 9 CHILLED WATER BYPASS FOR MAINTAINING MINIMUM FLOW REQUIREMENT FOR OPERATION OF A SINGLE CHILLER. MODULATING VALVE IN THE BYPASS SHALL BE
- 10 DIFFERENTIAL PRESSURE TRANSDUCER SHALL BE PROGRAMMED AT THE CENTRAL

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

### KIRKLAND URBAN SOUTH

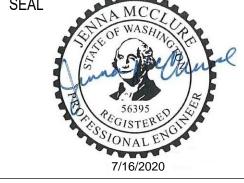
200 PETER KIRK LN. KIRKLAND, WA

CONSULTANT

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

ISSUE DATE



HYDRONIC DIAGRAM

				SUB ME	ETER SCHEDULE - NATURAL GAS	
LEVEL	TAG	MAKE	MODEL	LOCATION	SYSTEM SERVING	
/EL 1						
LEVEL 1	M-G-M1	PSE		GAS ALCOVE	HOUSE METER - COORD W/ UTILITY	
/EL 3			·			
LEVEL 3	M-G-3.1	ONICON	F-5500	CORE	FUTURE KITCHEN	
/EL 7						
LEVEL 7	M-G-7.1	ONICON	F-5500	CORE	FUTURE KITCHEN	
OF						
ROOF	M-G-R.1	ONICON	F-5500	ROOF	MECHANICAL GAS HEATING	
ROOF	M-G-R.3	ONICON	F-5500	MECHANICAL ROOM	DOMESTIC HOT WATER HEATER	
ROOF	M-G-R.2	ONICON	F-5500	MECHANICAL ROOM	DOMESTIC HOT WATER HEATER	
OTES:						

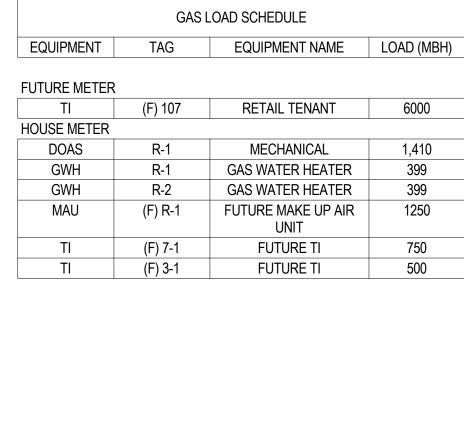
NOTES:	
1. COORDINATE SUB METERS WITH BUILDING BMS SYSTEM, COORD W/ C	ONTROLS.

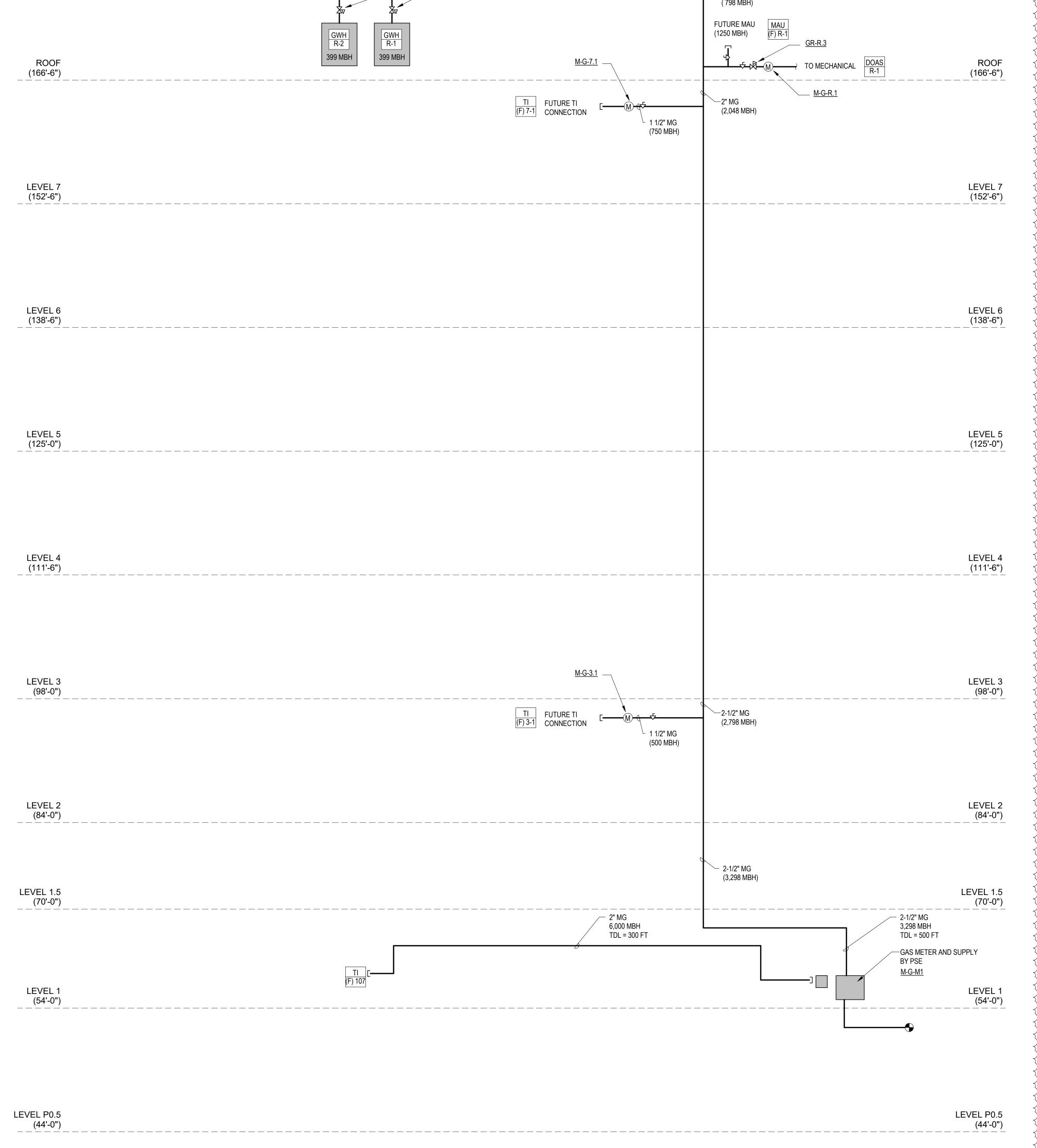
			RE	EGULA	TOR	SCHE	DULE - NA	TURAL GAS
LEVEL	TAG	LOCATION	SYSTEM SERVING	MAKE	MODEL	LOAD (CFH)	PRESSURE IN (PSI)	PRESSURE OUT (WC)
ROOF								
ROOF	GR-R.1	MECHANICAL ROOM	GAS WATER HEATER	MAXITROL	325	399	2	10
ROOF	GR-R.2	MECHANICAL ROOM	GAS WATER HEATER	MAXITROL	325	399	2	10
ROOF	GR-R.3	MECHANICAL ROOM	DOAS	MAXITROL	325	1,410	2	10

	1 PRESSURE L GAS SIZING		SURE NATU SSIZING
SIZE	MAX CFH (MBH)	SIZE	MAX CFH (N
3/4"	281	1/2"	199
1"	530	3/4"	353
1 1/4"	1,088	1"	664
1 1/2"	1,631	1-1/4"	1,364
2"	3,143	1-1/2"	2,043
2 1/2"	5,011	2"	3,935
3"	8,861	2-1/2"	6,272
4"	18,129	10" W.C.	BASED ON 50 FT 2
2# BASED	ON 500 FT 0.5 PSI LOSS		

	GAS	LOAD SCHEDULE	
EQUIPMENT	TAG	EQUIPMENT NAME	LOAD (MBH)
FUTURE METER			
TI	(F) 107	RETAIL TENANT	6000
HOUSE METER			
DOAS	R-1	MECHANICAL	1,410
GWH	R-1	GAS WATER HEATER	399
GWH	R-2	GAS WATER HEATER	399
MAU	(F) R-1	FUTURE MAKE UP AIR UNIT	1250
TI	(F) 7-1	FUTURE TI	750
TI	(F) 3-1	FUTURE TI	500

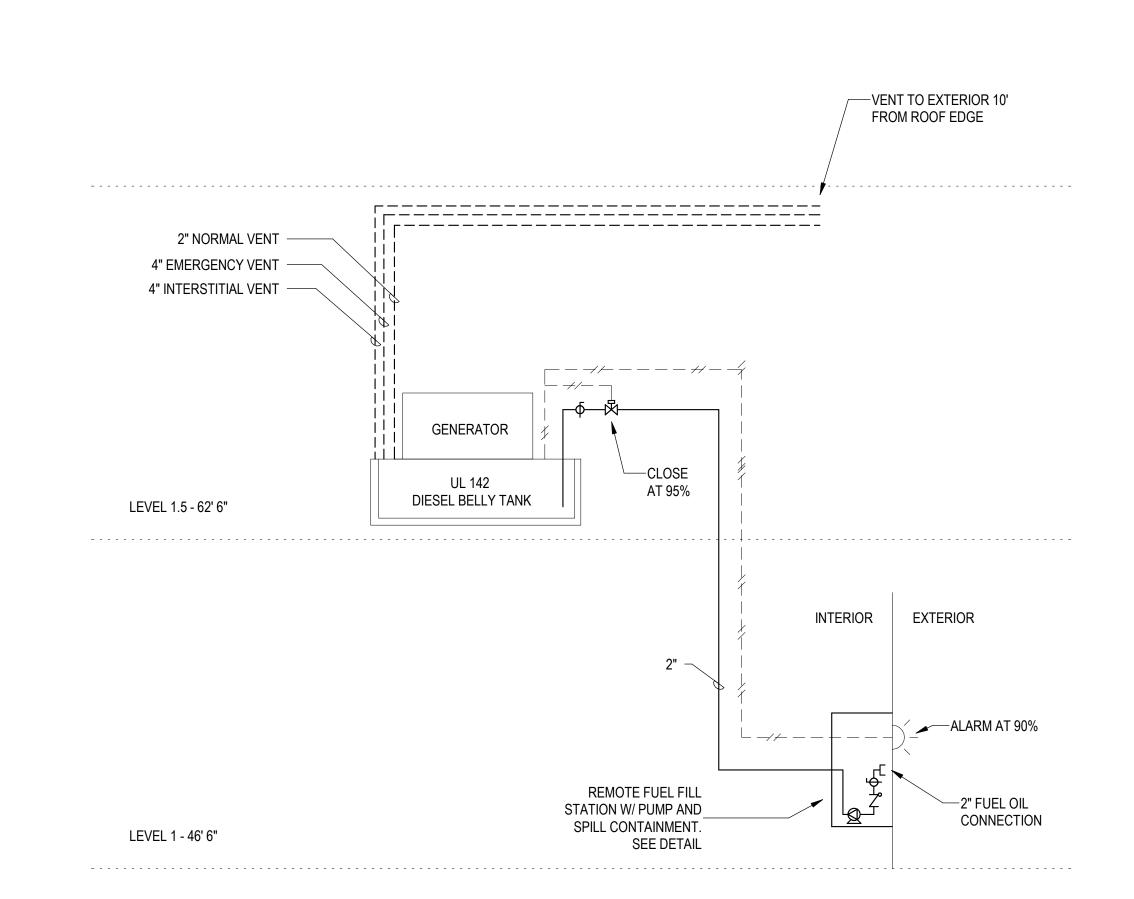
TO WATER HEATER ROOM





M-G-R.2 M-G-R.3

\_\_2" (798 CFH)



ALARM AT 90% FILL.
 ALARM AND AUTOMATIC SHUT OFF AT 95% FILL.
 LEVEL SIGNAL PROVIDED BY DIVISION 26.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

KIRKLAND URBAN SOUTH

200 PETER KIRK LN.

KIRKLAND, WA

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com
T. 206.262.1010 F. 206.262.9865

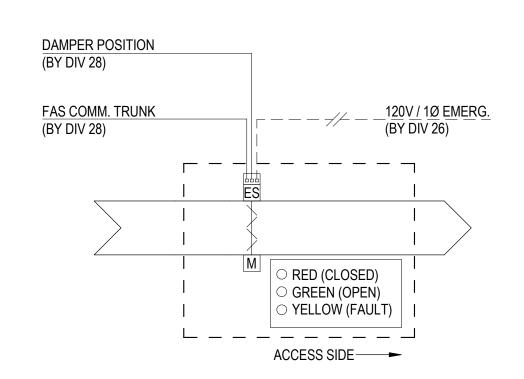
01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

ISSUE DATE

#### SEQUENCE OF OPERATIONS:

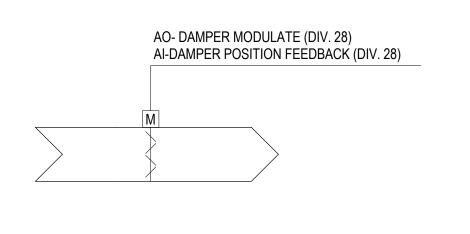
- A. RUN CONDITIONS: UNIT TO BE CONTROLLED BY INTERNAL TAMPERPROOF THERMOSTAT SET TO 55°F.
- B. THERE WILL BE NO COMMUNICATION WITH THE BMS.

# **LECTRIC HEATER**



- . REFER TO FIRE/LIFE SAFETY DRAWINGS FOR SEQUENCE OF OPERATIONS. 2. ADDRESSABLE FIRE ALARM SYSTEM MONITOR MODULE TO INDICATE DAMPER POSITION STATUS VIA END SWITCHES, BY DIV 28.
- 3. END SWITCHES TO PROVE/MONITOR DAMPER POSITION. END SWITCHES/DAMPER POSITION SHALL ALSO BE MONITORED BY THE BMS, BY DIV 4. FAIL SAFE POSITION UPON LOSS OF POWER IS CLOSED AND MONITORED VIA
- THE FIRE ALARM SYSTEM. MONITOR PANEL LOCATION AS APPROVED BY THE FIRE MARSHALL/FIRE DEPARTMENT. 5. LEDS SHALL BE VISIBLE ON ACCESS SIDE OF FIRE SMOKE DAMPER. RED/GREEN LEDS NOT REQUIRED ON FRONT ACCESS DAMPERS.

### FIRE SMOKE DAMPER



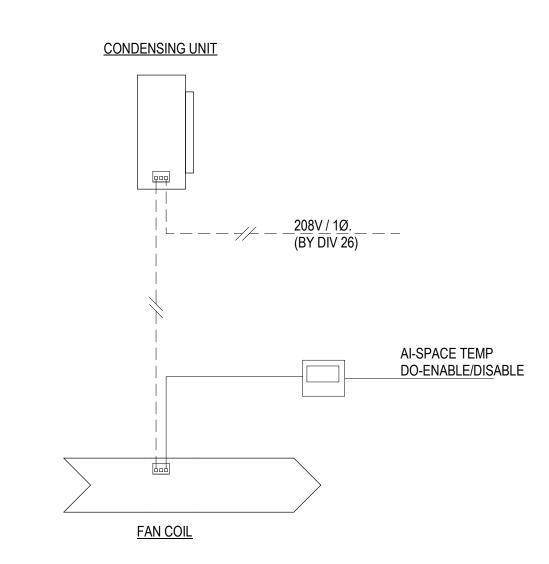
CARD

- 1. REFER TO PLANS FOR DUCTWORK ARRANGEMENT.
- SEQUENCE OF OPERATIONS (DIV. 23):

DAMPER POSITION (DIV. 28)

- A. RUN CONDITIONS SHALL OPERATE ON THE SAME SCHEDULE AS THE DOAS UNIT.
- B. MAINTAIN CONSTANT VOLUME AIR SETPOINTS. C. HEATER (WHERE APPLICABLE) TO PROVIDE 85 DEGREE DISCHARGE AIR TEMPERATURE.

## **RESTROOM SUPPLY & EXHAUST VAV UNIT**



1. REFER TO PLANS AND HEAT PUMP SCHEDULE FOR LOCATIONS AND SYSTEM COMPONENTS.

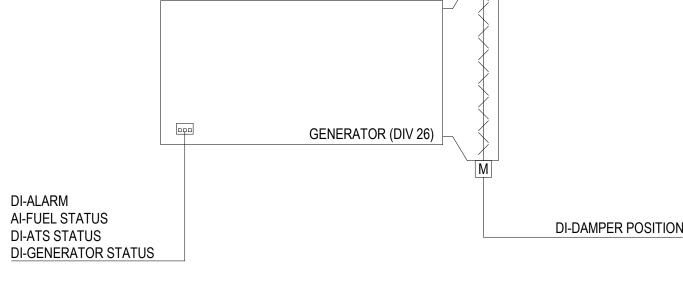
### SEQUENCE OF OPERATIONS:

- A. RUN CONDITIONS:
- UNIT SERVES ELEVATOR MAHCINE ROOM. 2. TEMPERATURE SETPOINT IS 85 DEGREES F WITH 5 DEGREE DEADBAND. 3. FAN TO RUN WHENEVER HEATING OR COOLING IS REQUIRED.
- B. HEATING/COOLING: THE BAS SHALL MEASURE THE ZONEE TEMPERATURE AND CYCLE THE COMPRESSOR TO MAINTAIN ITS SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJUSTABLE) MINIMUM RUNTIME. THE COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES ADN CONTROLS. 1. THE HEATING SHALL BE ENABLED WHENEVER:
- a. OUTSIDE AIR TEMP IS LESS THAN 65DEG F. (ADJUSTABLE) b. AND THE REVERSING VALVE IS IN HEAT MODE.
- c. AND THE FAN IS ON. 2. THE COOLING COIL SHALL BE ENABLED WHENEVER:
- a. OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG. F. (ADJUSTABLE)
- b. AND THE ECONOMIZER MODE (IF PRESENT) IS DISABLED OR FULLY OPEN. c. AND THE FAN IS ON.
- d. AND THE REVERSING VALVE IS IN COOL MODE. 3. ON MOED CHANGES, THE COMPRESSOR SHALL BE DISCABLE AND REMAIN OFF UNIT AFTER THE REVERSING VALVE HAS CHANGED POSITION.
- 4. ALARMS SHALL BE PROVIDED AS FOLLOWS: COMPRESSOR RUNTIME EXCEEDED: THE COMPRESOR RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE).
- C. UNIT WILL BE CONTROLLED VIA LOCAL THERMOSTAT.
- D. FAN STATUS: THE BAS SHALL MONITOR THE FAN STATUS.
- E. ALARMS SHALL BE PROVIDED AS FOLLOWS:

d. FREEZE STAT ACTIVATED.

- a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, GENERATE HVAC ALARM 1 CRITICAL. b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON GENERATE HVAC ALARM - 3 - HIGH.
- c. IF THE SPACE TEMPERATURE IS ABOVE (OR BELOW) THE COOLING (OR HEATING) SETPOINT BY MORE THAN 4 DEG. F FOR MORE THAN 5 MINUTES, GENERATE A HVAC ALARM - 3 - HIGH.

### SPLIT SYSTEM HEAT PUMP



AND THE TO THE T

NOTES: 1. DAMPERS TO BE FAIL-OPEN.

CONTROL SEQUENCE:

- A. GENERATOR OPERATION: 1. ALL ASPECTS OF THE EQUIPMENT OPERATION SHALL BE CONTROLLED BU THE EQUIPMENT MANUFACTURER'S CONTROL PANEL.
- 2. THE BAS SHALL HAVE THE CAPABILITY OF DISABLING THE EMERGENCY GENERATOR NORMAL START/STOP OF GENERATOR SHALL BE THROUGH ATS SWITCH STATUS VIA GENERATOR CONTROL PANEL. GENERATOR CONTROL PANEL SHALL OPEN/CLOSE MOTORIZED DAMPERS AT LOUVERS. 4. THE EMERGENCY GENERATOR SHALL BE DISBLED UPON ACTIVATION OF THE EMERGENCY POWER OFF SWITCH OR CLOSURE OF HTE INTAKE OR DISCHARGE

MOTORIZED DAMPERS IN THE ROOM. UPON SHUT-DOWN OF UNIT VIA EPO SWITCH,

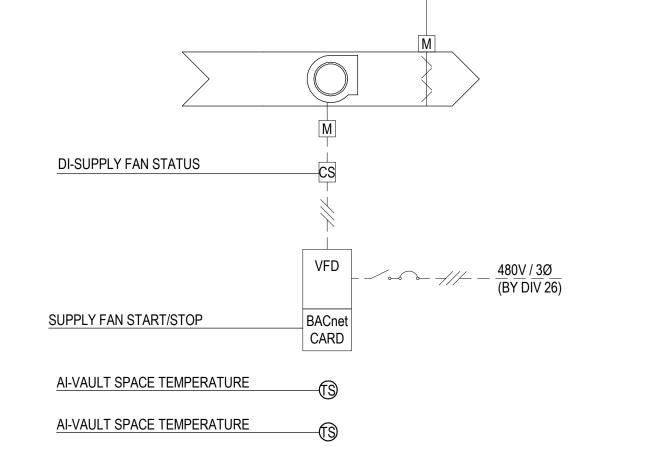
- AUDIBLE AND VISUAL ALARM SHALL BE ANNUNCIATED. B. MONITORING 1. EQUIPMENT SYSTEM MONITORING:
  - a. GENERATOR STATUS b. AUTOMATIC TRANSFER SWITCH STATUS

a. PRIORITY 1: LIFE SAFETY SYSTEMS & CRITICAL BRANCH

- 2. ENERGY MONITORING: ENERGY PRODUCED (kWhr) 3. ALARMS SHALL BE AS FOLLOWS:
- a. GENERATOR CONTROL PANEL ALARM
- C. CHANGE-OVER OPERATION RESTART OF EQUIPMENT SHALL BE BASED UPON LOSS ID POWER SIGNAL FROM THE AUTOMATIC TRANSFER SWITCH. UPON LOSS OF POWER, EQUIPMENT SHALL BE RESTARTED IN THE CENTRAL UTILITY PLANT BASED UPON PRIORITY AS FOLLOWS. TIME INTERVAL IN BETWEEN RESTARTS SHALL BE 10 SECONDS (ADJUSTABLE).
- b. PRIORITY 2: CRITICAL MEP SYSTEMS. c. PRIORITY 3: NON-CRITICAL MEP SYSTEMS
- d. PRIORITY 4: MANUAL RESTART. GENERATOR LOAD REDUCTION SHALL NOT SHED LIFE SAFETY BRANCH LOADS, CRITICAL CARE AREAS, FIRE PROTECTION PUMPS, GENERATOR FUEL PUMPS, OR OTHER GENERATOR ACCESSORIES

### **GENERATOR**

#### DO-DAMPER POSITION DI-DAMPER STATUS OPEN/CLOSED (DIV. 23)

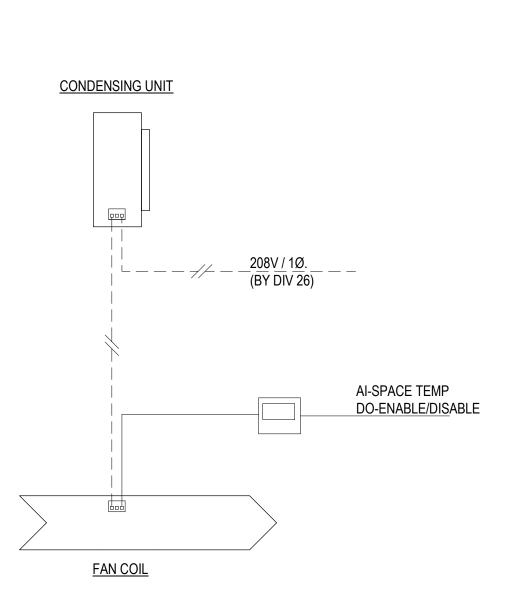


1. REFER TO PLANS FOR DUCTWORK ARRANGEMENT. 2. BMS CONTRACTOR DOES NOT CONTROL FAN.

- SEQUENCE OF OPERATIONS: A. RUN CONDITIONS - FAN SHALL BE CONTROLLED BY
- THERMOSTAT. FAN TO TURN ON AT 86°F AND TURN OFF AT 140°F PER PSE REQUIREMENTS.
- B. FAN STATUS: THE BAS SHALL MONITOR THE FAN STATUS.
- C. ALARMS SHALL BE PROVIDED AS FOLLOWS: a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. GENERATE HVAC ALARM - 1 - CRITICAL.
- b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON, GENERATTE HVAC ALARM - 3- HIGH. c. VAULT ROOM TEMPERATURE EXCEEDS 140°F, GENERATE

HVAC ALARM - 1 - CRITICAL.

### TRANSFORMER EXHAUST FAN (XEF)



1. INDOOR UNIT TO BE POWERED THROUGH OUTDOOR UNIT, BY DIV 27. 2. SAT AND RAT SENSOR OPTIONS TO BE PROVIDED WHEN AVAILABLE.

### SEQUENCE OF OPERATIONS

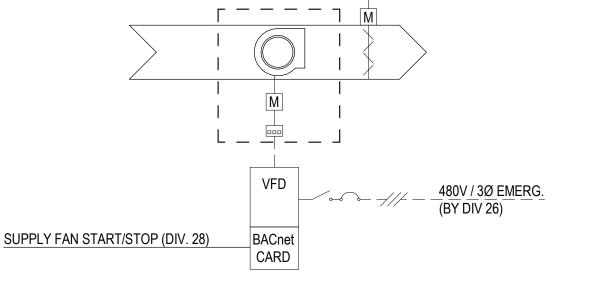
- A. GENERAL: 1. THE SPLIT SYSTEM FAN COIL AND CONDENSING UNITS SERVE ELEVATOR
- MACHINE ROOMS. 2. ALL ASPECTS OF THE SYSTEM OPERATION SHALL BE CONTROLLED BY
- THE EQUIPMENT MANUFACTURER'S CONTROL PANEL. 3. THE BAS SHALL ENABLE THE EQUIPMENT AND MONITOR EQUIPMENT
- STATUS, ALARM AND ROOM TEMPERATURE. B. RUN CONDITIONS:
- 1. THE UNITS SHALL BE ALWAYS ENABLED (ADJUSTABLE) 2. THE UNIT SHALL MAINTAIN:
- a. ELEVATOR MACHINE ROOMS: 85F (ADJUSTABLE) COOLING SETPOINT. C. COOLING: THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND CYCLE OR STAGE THE COMPRESSOR(S) TO MEET SETPOINT TEMPERATURE. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE
- (ADJUSTABLE) MINIMUM RUNTIME. THE COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS. D. ALARMS SHALL BE PROVIDED AS FOLLOWS: 1. HIGH ZONE TEMPERATURE: IF THE ZONE TEMPERATURE IS GREATER THAN THE
- COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJUSTABLE). GENERATE HVAC ALARM - 1 - CRITICAL.

### SPLIT SYSTEM



A. SEE GOOGLE STANDARDS 2.8 FOR MORE DETAIL AND ADDED B. VERIFY ALL CONTROL SEQUENCES AND POINT LIST WITH OWNER PRIOR TO INSTALL.

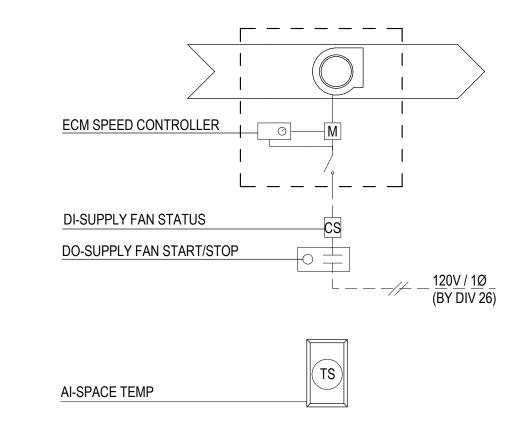
### DO-OUTSIDE AIR DAMPER POSITION (DIV. 28) DI-DAMPER STATUS OPEN/CLOSED (DIV. 28)



REFER TO PLANS FOR DUCTWORK ARRANGEMENT.

SEQUENCE OF OPERATIONS (DIV. 23):

A. RUN CONDITIONS - REFERENCE DIV. 28



FANS: EEF - X.X, FTF-P3.1, MEF-R.1, TEF-X.X

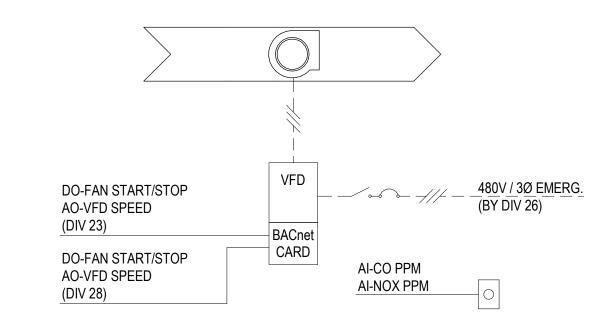
SEQUENCE OF OPERATIONS:

- A. RUN CONDITIONS: SUPPLY OR EXHAUST FAN TO BE CONTROLLED BY
- TEMPERATURE SENSOR. a. FAN TO TURN ON ABOVE 80°F (ADJUSTABLE).
- b. FAN TO TURN OFF BELOW 75°F (ADJUSTABLE) B. FAN SHALL HAVE A MINIMUM RUNTIME OF 10 MINUTES.
- C. FAN STATUS: THE ALC SYSTEM SHALL MONITOR THE FAN STATUS.
- D. ALARMS AS FOLLOWS:

GENERATE HVAC ALARM - 1 - CRITICAL.

- a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, GENERATE HVAC ALARM - 1 - CRITICAL.
- b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON, GENERATE HVAC ALARM - 3 - HIGH. c. SPACE TEMPERATURE IS ABOVE SETPOINT FOR MORE THAN 5 MINUTES,

# ELECTRICAL EXHAUST OR TRANSFER FAN SCALE: NONE



ECM SPEED CONTROLLER

DI-SUPPLY FAN STATUS

DO-SUPPLY FAN START/STOP

**SEQUENCE OF OPERATIONS:** 

DO-SUPPLY FAN START/STOP

FANS: BEF-P0.5.1, GTF-P2.X & P3.X, REF-1.1, TREF - 1.1, TREF-1.5.1

REFER TO PLANS FOR DUCTWORK ARRANGEMENT.

B. MOTORIZED DAMPER SHALL OPEN PRIOR TO FAN BEING

C. FAN STATUS: THE ALC SYSTEM SHALL MONITOR THE FAN

a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF,

b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON,

**GENERAL & TOILET EXHAUST FAN** 

**ELECTRIC DUCT** 

FLOW SWITCH

(BY DIV 26)

B. ELECTRIC DUCT HEATER TO RUN VIA DISCHARGE AIR TEMPERATURE.

C. MOTORIZED DAMPER SHALL OPEN PRIOR TO THE FAN BEING ENABLED.

a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, GENERATE

b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON, GENERATE

c. DISCHARGE AIR TEMP BELOW 60 DEGREES LONGER THAN 5 MINUTES,

FCC SUPPLY FAN W/ ELECTRIC HEAT (FSF-1.1)

SCALE: NONE

TEMPERATURE SET TO 60 DEGREES. DUCT HEATER TO BE INTERLOCKED TO SUPPLY FAN OR PROOF OF FLOW BEFORE BEING ENABLED BY LOCAL

- <u>460V / 3Ø</u> (BY DIV 26)

AO-TEMPERATURE SETPOINT

AI-DISCHARGE AIR TEMPERATURE

L — — —// -

A. RUN CONDITIONS: FAN SHALL RUN DURING AN EVENT.

SEQUENCE OF OPERATIONS:

D. ALARMS AS FOLLOWS:

HVAC ALARM - 1 - CRITICAL.

GENERATE HVAC ALARM - 1 - HIGH.

HVAC ALARM - 3 - HIGH.

A. RUN CONDITIONS - SCHEDULE PER OWNER.

D. ALARMS SHALL BE PROVIDED AS FOLLOWS:

GENERATE HVAC ALARM - 1 - CRITICAL.

GENERATE HVAC ALARM - 3 - HIGH.

ENABLED (WHERE APPLICABLE)

NOTES: 1. REFER TO PLANS FOR QUANTITY AND DUCTWORK ARRAGEMENT. 2. SENSOR MAY BE SINGLE OR MULTIPLE DEVICES. ENSURE SINGLE DEVICE DOES NOT AFFECT READINGS OF CO2 OR NOX.

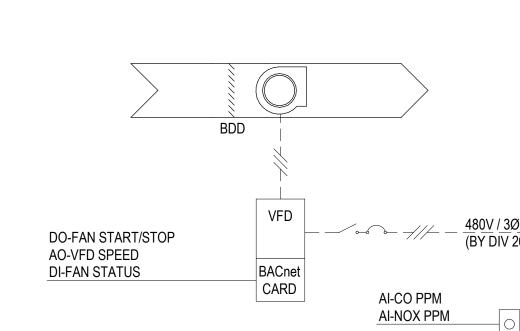
- A. FANS SHALL OPERATE FROM CO AND NO<sub>2</sub> CONTROLLER OUTPUT TO PROVIDE RELAY CLOSURES TO CONTROL EXHAUST AND VENTILATION SUPPLY FANS AS REQUIRED TO MAINTAIN CO AND NO<sub>2</sub> CONCENTRATIONS.
- B. LOADING DOCK EXHAUST FAN SHALL BE CAPABLE OF BEING MONITORED AND CONTROLLED BY
- C. MOTORIZED DAMPER SHALL OPEN PRIOR TO FAN BEING ENABLED.

PORPORTIONALLY TO 25 PPM.

SEQUENCE OF OPERATIONS

- D. FANS SHALL BE INITIATED TO OPERATE WITHIN 60 SECONDS OF MEETING/EXCEEDING CO OR NO<sub>2</sub> LEVEL SETPOINTS.
- E. DURING A SMOKE CONTROL EVENT THE FANS SHALL COMMAND TO RUN AT DESIGN MAX CFM BY THE FIRE ALARM SYSTEM. REFERENCE DIV. 28 FOR FULL SEQUENCE. F. CARBON MONOXIDE (CO) SENSING AND OPERATION OF THE FANS SHALL BE ADDITIONALLY
- CONTROLLED TO PROVIDE THE FOLLOWING SEQUENCING: a. BELOW 25 PPM EXHAUST FANS SHALL RUN CONTINUOUSLY AT MINIMUM FLOW SETTING.
- b. AT 25 PPM WITH CO CONCENTRATION INCREASING THE EXHAUST FANS SHALL INCREASE SPEED PROPORTIONATELY TO 50 PPM. c. AT 50 PPM, AND GREATER, EXHAUST FANS SHALL OPERATE AT HIGH SPEED d. AT 50 PPM WITH CO CONCENTRATION DECREASING THE EXHAUST SHALL REDUCE SPEED
- G. THE SYSTEM SHALL BE PROVIDED WITH DUAL CO LEVEL ALARMS TO THE BAS AS FOLLOWS: a. LOW ALARM LEVEL SHALL BE NOMINALLY SET AT 50 PPM (PARTS PER MILLION) CO. b. HIGH ALARM LEVEL SHALL BE SET AT 100 PPM CO, AND BOTH LEVELS SHALL BE FIELD ADJUSTABLE. INITIATE AUDIBLE HORNS/BUZZERS AND VISUAL LIGHTS.
- H. NITROGEN DIOXIDE (NO2) SENSING AND OPERATION OF THE FANS SHALL BE ADDITIONALLY CONTROLLED TO PROVIDE THE FOLLOWING SEQUENCING: a. BELOW 2 PPM EXHAUST FANS SHALL RUN CONTINUOUSLY AT MINIMUM FLOW SETTING. b. AT 2 PPM WITH NO<sub>2</sub> CONCENTRATION INCREASING THE EXHAUST FANS SHALL BE ENERGIZED TO LOW SPEED AS DEFINED BY MINIMUM VENTILATION RATE. FANS SHALL
- INCREASE SPEED PROPORTIONATELY TO 5 PPM. c. AT 5 PPM, AND GREATER, EXHAUST FANS SHALL OPERATE AT HIGH SPEED. d. AT 5 PPM WITH NO<sub>2</sub> CONCENTRATION DECREASING THE EXHAUST SHALL REDUCE SPEED PORPORTIONALLY TO 2 PPM.
- I. THE SYSTEM SHALL BE PROVIDED WITH DUAL NO2 LEVEL ALARMS TO THE BAS AS FOLLOWS: LOW ALARM LEVEL SHALL BE NOMINALLY SET AT 5 PPM (PARTS PER MILLION) NO2. HIGH ALARM LEVEL SHALL BE SET AT 8 PPM NO<sub>2</sub>, AND BOTH LEVELS SHALL BE FIELD ADJUSTABLE. INITIATE AUDIBLE HORNS/BUZZERS AND VISUAL LIGHTS.

### LOADING DOCK EXHAUST FAN (LDEF-1.1)



1. REFER TO PLANS FOR QUANTITY AND DUCTWORK ARRAGEMENT. 2. SENSOR MAY BE SINGLE OR MULTIPLE DEVICES. ENSURE SINGLE DEVICE DOES NOT AFFECT READINGS OF CO2 OR NOX.

SEQUENCE OF OPERATIONS

- A. FANS SHALL OPERATE FROM CO AND NO<sub>2</sub> CONTROLLER OUTPUT TO PROVIDE RELAY CLOSURES TO CONTROL EXHAUST AND VENTILATION SUPPLY FANS AS REQUIRED TO MAINTAIN CO AND NO<sub>2</sub> CONCENTRATIONS.
- B. GARAGE EXHAUST SHALL BE CAPABLE OF BEING MONITORED AND CONTROLLED BY THE BAS
- C. FANS SHALL BE INITIATED TO OPERATE WITHIN 60 SECONDS OF MEETING/EXCEEDING CO OR NO<sub>2</sub> LEVEL SETPOINTS.
- D. DURING A SMOKE CONTROL EVENT THE FANS SHALL COMMAND OFF.
- E. CARBON MONOXIDE (CO) SENSING AND OPERATION OF THE FANS SHALL BE ADDITIONALLY CONTROLLED TO PROVIDE THE FOLLOWING SEQUENCING: a. BELOW 25 PPM EXHAUST FANS SHALL RUN CONTINUOUSLY AT MINIMUM FLOW SETTING. b. AT 25 PPM WITH CO CONCENTRATION INCREASING THE EXHAUST FANS SHALL INCREASE
- SPEED PROPORTIONATELY TO 50 PPM. c. AT 50 PPM, AND GREATER, EXHAUST FANS SHALL OPERATE AT HIGH SPEED. d. AT 50 PPM WITH CO CONCENTRATION DECREASING THE EXHAUST SHALL REDUCE SPEED PORPORTIONALLY TO 25 PPM.
- G. THE SYSTEM SHALL BE PROVIDED WITH DUAL CO LEVEL ALARMS TO THE BAS AS FOLLOWS: a. LOW ALARM LEVEL SHALL BE NOMINALLY SET AT 50 PPM (PARTS PER MILLION) CO. b. HIGH ALARM LEVEL SHALL BE SET AT 100 PPM CO, AND BOTH LEVELS SHALL BE FIELD ADJUSTABLE. INITIATE AUDIBLE HORNS/BUZZERS AND VISUAL LIGHTS.
- H. NITROGEN DIOXIDE (NO2) SENSING AND OPERATION OF THE FANS SHALL BE ADDITIONALLY CONTROLLED TO PROVIDE THE FOLLOWING SEQUENCING: a. BELOW 2 PPM EXHAUST FANS SHALL RUN CONTINUOUSLY AT MINIMUM FLOW SETTING. b. AT 2 PPM WITH NO₂ CONCENTRATION INCREASING THE EXHAUST FANS SHALL BE
- ENERGIZED TO LOW SPEED AS DEFINED BY MINIMUM VENTILATION RATE. FANS SHALL INCREASE SPEED PROPORTIONATELY TO 5 PPM. c. AT 5 PPM, AND GREATER, EXHAUST FANS SHALL OPERATE AT HIGH SPEED. d. AT 5 PPM WITH NO₂ CONCENTRATION DECREASING THE EXHAUST SHALL REDUCE SPEED

I. THE SYSTEM SHALL BE PROVIDED WITH DUAL NO2 LEVEL ALARMS TO THE BAS AS FOLLOWS: • LOW ALARM LEVEL SHALL BE NOMINALLY SET AT 5 PPM (PARTS PER MILLION) NO2. HIGH ALARM LEVEL SHALL BE SET AT 8 PPM NO<sub>2</sub>, AND BOTH LEVELS SHALL BE FIELD ADJUSTABLE. INITIATE AUDIBLE HORNS/BUZZERS AND VISUAL LIGHTS.

GARAGE EXHAUST FAN (GEF-X.X)

PORPORTIONALLY TO 2 PPM.

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710

T. 206.245.2100 F. 206.245.2101

PROJECT

**KIRKLAND URBAN** 

200 PETER KIRK LN. KIRKLAND, WA

OWNER

engineers for a sustainable future engineers 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.con

T. 206.262.1010 F. 206.262.9865 MARK DATE DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET

03/20/2020 90% CD SET

07/17/2020 TOWER PERMIT RESUB

CBRE03.18.095

ISSUE DATE

SHEET TITLE / NUMBER CONTROL/

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

MNR20-06959 Approved Plan Set 03/22/21 Page 22 of 27

A. SEE GOOGLE STANDARDS 2.8 FOR MORE DETAIL AND ADDED

B. VERIFY ALL CONTROL SEQUENCES AND POINT LIST WITH OWNER PRIOR TO INSTALL.



710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

200 PETER KIRK LN. KIRKLAND, WA

1. THE BAS SHALLL MEASURE THE MEDIUM TEMPERATURE WATER DIFFERENTIAL PRESSUR EAND MODULATE THE MDWP VDF 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure SETPOINTS SHALL BE FIELD ADJUSTED DURING COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD T. 206.262.1010 F. 206.262.9865 a. THE BMS SHALL MODEULATE THE MDWP SPEEDS TO MAINTAIN A DIFFERENTIAL PRESSURE OF 12 PSI (ADJUSTABLE) OR  $_{\prec}$ 

Seattle, WA 98101 Job. No.: 05.19.00791 MARK DATE DESCRIPTION 09/27/2019 100% DD SET

11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

AMOUNT, ON PUMP SHALL STAGE OFF. b. IF THE SETPOINT IS MAINTAINDE ADN THE SPEED OF THE REMAINING PUMPS DROPS BY A USER DEFINABLE AMOUNT, AN ADDITIONAL PUMP SHALL STAGE OFF. c. THE BAS SHALL CONTINUE TO MODULATE THE LEAD PUMP TO MAINTAIN SETPOINT. d. TO PREVENT SHORT CYCLING, THERE SHALL HAVE A USER DEFINABLE (ADJUSTABLE) MINIMUM RUNTIME.

3. ALARMS SHALL BE PROVIDED AS FOLLOWS: A. HIGH MEDIUM TERMPERATURE WATER DIFFERENTIAL PRESSURE: IF THE MEDIUM TEMP WATER DIFFERENTIAL PRESSURE IS 25% (ADJUSTABLE) GREATER THAN SETPOINT.

A. MEDIUM TEMPERATURE WATER PUMP (MDWP) SYSTEM - RUN CONIDTIONS: THE MDWP SHALL EB ENABLED WHENEVER:

2. TO PREVENT SHORT CYCLING, THE MDWP SYSTEM SHALL RUN FOR OR BE OFF FOR 10 MINUTE TIME PERIODS

b. IF ANY PUMP FAILS, THE NEXT AVAILABLE PUMP SHALL STAGE ON AND HTE FAILED PUMP SHALL BE REMOVED FROM

c. ADDITIONAL PUMS SHALL STAGE ON AS REQUIRED TO MAINTAIN MEDIUM TEMP WATER DIFFERENTIAL PRESSURE.

IN SEQUENCE TO MAINTAIN ITS PRESSURE SETPOINT. THE FOLLOWING SETPOINTS ARE RECOMMENDED VALUES. AL

AS DETERMINED BY THE TEST AND BALANCE AGENCY. THE VFD MINIMUM SPPED SHALL NOT DROP BELOW 25%

IF THE LEAD PUMP CANNOT MAINTAIN SETPOINT AND ITS SPEED RISES ABOVE 90% (ADJUSTABLE), ADDITIONAL

b. THE LEAD PUMP SHALL RUN ANYTIME THE MANAGER IS ENABLED. ON DROPPING THE DIFFERENTIAL PRESSURE,

a. IF THE SETPOINT IS MAINTAINED AND THE SPEED OF THE ALL OPERTING PUMPS DROPS BY A USER DEFINABLE

ADDITIONAL PUMPS SHALL STAGE ON AND MODULATE TO MAINTAIN SETPOINTS AS FOLLOWS:

PUMPS SHALL STAGE ON ADN MODULATE IN UNISON WITH THE LEAD PUMP.

ON RISING MEDIUM TEMP WATER DIFFERENTIAL PRESSURE, THE PUMPS SHALL STAGE AS FOLLOWS:

2. THE DESIGNATED STAGING ORDER (USER DEFINABLE) OF THE PUMPS SHALL ROTATE ON A WEEKLY BASIS (USER

1. A DEFINABLE NUMBER OF MEDIUM TEMPERATURE WATER COILS NEED COOLING.

B. MDWP OPERATION - MULTIPLE EQUAL SIZED PUMPS RUNNING IN PARALLEL:

1. PROVIDE A LEAD/LAG ALGORITHM TO OPERATE MULTIPLE MDWP.

FAILURE: COMMANDED ON, BUT THE STATUS IS OFF

RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.

THE BAS SHALL MODULATE THE LEAD PUMP TO MAINTAIN SETPOINT

B. LOW MEDIUM TERMPERATURE WATER DIFFERENTIAL PRESSURE: IF THE MEDIUM TEMP WATER DIFFERENTIAL PRESSURE IS 25% (ADJUSTABLE) LESSTHAN SETPOINT.

D. MEDIUM TEMPERATURE WATER TEMPERATURE MONITORING: THE FOLLOWING TEMPERATURE SHALL BE MONITORED: a. MEDIUM TEMP WATER SUPPLY

b. MEDIUM TEMP WATER RETURN c. ALARMS SHALL BE AS FOLLOWS: HIGH MEDIUM TEMP WATER SUPPLY TEMP: IF THE WATER SUPPLY TEMP IS GREATER THAN 60 DEG. F (ADJUSTABLE). LOW MEDIUM TEMP WATER SUPPLY TEMP: IF THE WATER SUPPLY TEMP IS LESS THAN 55 DEG. F (ADJUSTABLE).

CHILLED WATER PUMPS

A. CHILLED WATER PUMP (CHWP) SYSTEM - RUN CONIDTIONS: THE CHWP SHALL BE ENABLED WHENEVER:

1. A DEFINABLE NUMBER OF CHILLED WATER COILS NEED COOLING. 2. TO PREVENT SHORT CYCLING, THE CHWP SYSTEM SHALL RUN FOR OR BE OFF FOR 10 MINUTE TIME PERIODS (ADJUSTABLE).

B. CHWP OPERATION - MULTIPLE EQUAL SIZED PUMPS RUNNING IN PARALLEL: PROVIDE A LEAD/LAG ALGORITHM TO OPERATE MULTIPLE CHWP.

MEDIUM TEMPERATURE WATER PUMPS

a. THE LEAD PUMP SHALL RUN FIRST.

3. ALARMS SHALL BE PROVIDED AS FOLLOWS:

C. MEDIUM TEMPERATURE DIFFERENTIAL PRESSURE CONTROL

VFD FAULT

LOOP DP

(ADJUSTABLE).

a. THE LEAD PUMP SHALL RUN FIRST. b. IF ANY PUMP FAILS, THE NEXT AVAILABLE PUMP SHALL STAGE ON AND HTE FAILED PUMP SHALL BE REMOVED FROM c. ADDITIONAL PUMS SHALL STAGE ON AS REQUIRED TO MAINTAIN CHILLED WATER DIFFERENTIAL PRESSURE.

THE DESIGNATED STAGING ORDER (USER DEFINABLE) OF THE PUMPS SHALL ROTATE ON A WEEKLY BASIS (USER DEFINABLE). . ALARMS SHALL BE PROVIDED AS FOLLOWS:

a. CHWP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

 RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT. VFD FAULT

C. CHILLED WATER DIFFERENTIAL PRESSURE CONTROL

1. THE BAS SHALLL MEASURE THE CHILLED WATER DIFFERENTIAL PRESSURE AND MODULATE THE CHWP VDF IN SEQUENCE TO MAINTAIN ITS PRESSURE SETPOINT. THE FOLLOWING SETPOINTS ARE RECOMMENDED VALUES. AL SETPOINTS SHALL BE FIELD ADJUSTED DURING COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS. a. THE BMS SHALL MODEULATE THE CHWP SPEEDS TO MAINTAIN A DIFFERENTIAL PRESSURE OF 12 PSI (ADJUSTABLE) OR arrhoAS DETERMINED BY THE TEST AND BALANCE AGENCY. THE VFD MINIMUM SPEED SHALL NOT DROP BELOW 25%

b. THE LEAD PUMP SHALL RUN ANYTIME THE MANAGER IS ENABLED. ON DROPPING THE DIFFERENTIAL PRESSURE. ADDITIONAL PUMPS SHALL STAGE ON AND MODULATE TO MAINTAIN SETPOINTS AS FOLLOWS: THE BAS SHALL MODULATE THE LEAD PUMP TO MAINTAIN SETPOINT

 IF THE LEAD PUMP CANNOT MAINTAIN SETPOINT AND ITS SPEED RISES ABOVE 90% (ADJUSTABLE), ADDITIONAL PUMPS SHALL STAGE ON ADN MODULATE IN UNISON WITH THE LEAD PUMP. 2. ON RISING CHILLED WATER DIFFERENTIAL PRESSURE, THE PUMPS SHALL STAGE AS FOLLOWS: a. IF THE SETPOINT IS MAINTAINED AND THE SPEED OF THE ALL OPERTING PUMPS DROPS BY A USER DEFINABLE

AMOUNT. ON PUMP SHALL STAGE OFF. b. IF THE SETPOINT IS MAINTAINDE ADN THE SPEED OF THE REMAINING PUMPS DROPS BY A USER DEFINABLE AMOUNT,

AN ADDITIONAL PUMP SHALL STAGE OFF. c. THE BAS SHALL CONTINUE TO MODULATE THE LEAD PUMP TO MAINTAIN SETPOINT.

d. TO PREVENT SHORT CYCLING, THERE SHALL HAVE A USER DEFINABLE (ADJUSTABLE) MINIMUM RUNTIME. ALARMS SHALL BE PROVIDED AS FOLLOWS: A. HIGH CHILLED WATER DIFFERENTIAL PRESSURE: IF THE CHILLED WATER DIFFERENTIAL PRESSURE IS 25%

(ADJUSTABLE) GREATER THAN SETPOINT. B. LOW CHILLED WATER DIFFERENTIAL PRESSURE: IF THE CHILLED WATER DIFFERENTIAL PRESSURE IS 25% (ADJUSTABLE) LESSTHAN SETPOINT.

D. CHILLED WATER TEMPERATURE MONITORING: THE FOLLOWING TEMPERATURE SHALL BE MONITORED: a. CHILLED WATER SUPPLY b. CHILLED WATER RETURN

c. ALARMS SHALL BE AS FOLLOWS: HIGH CHILLED WATER SUPPLY TEMP: IF THE WATER SUPPLY TEMP IS GREATER THAN 55 DEG. F (ADJUSTABLE).

LOW CHILLED WATER SUPPLY TEMP: IF THE WATER SUPPLY TEMP IS LESS THAN 38 DEG. F (ADJUSTABLE).

SHEET TITLE / NUMBER CONTROL

PROJECT NO.

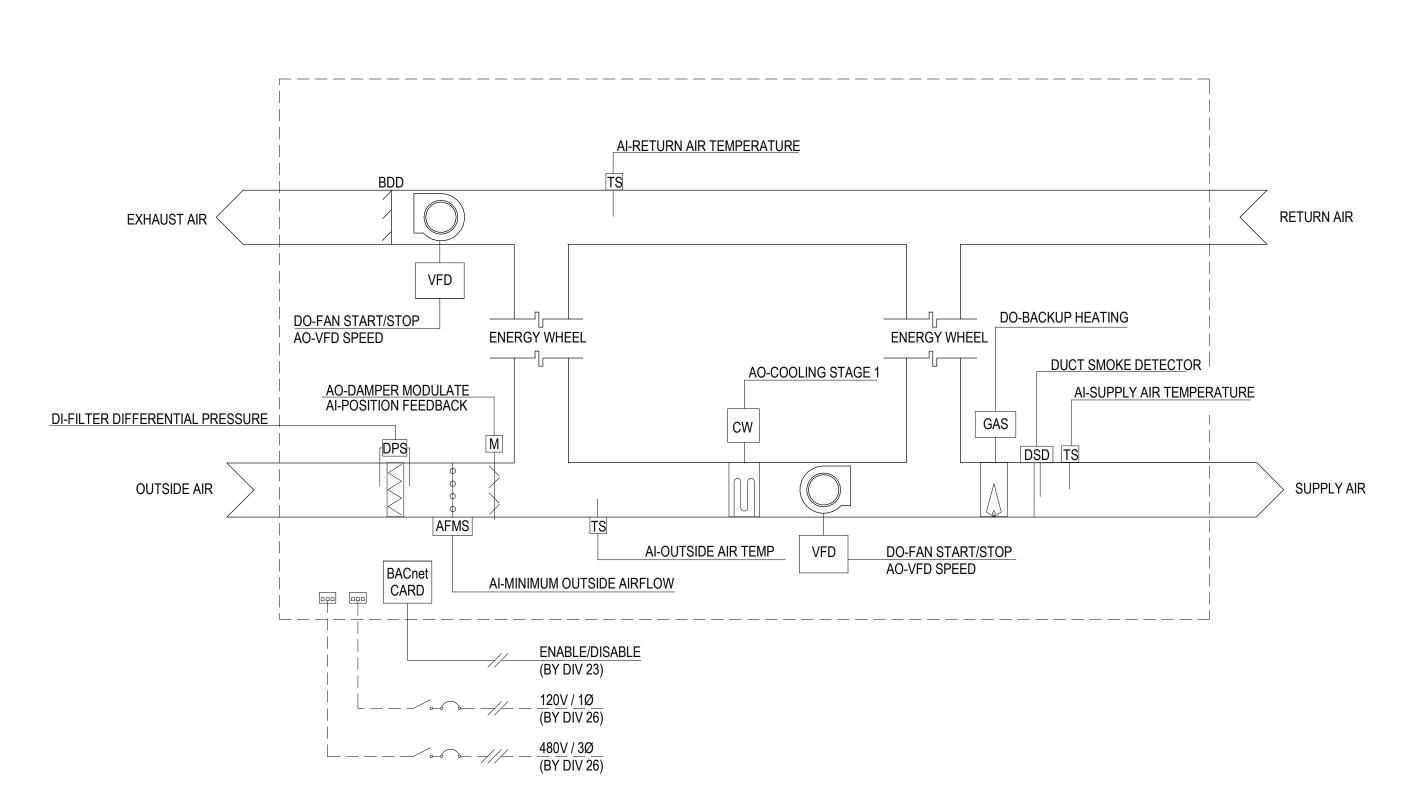
DRAWN BY

ISSUE DATE

CBRE03.18.095

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

AIR COOLED CHILLER, CHWP, & MDWP



#### CONTROL SEQUENCE

- PRESSURE DROP SETPOINTS. WHEN THE ENTHALPY WHEEL IS IN ECONOMIZER MODE (#2 ABOVE) BOTH ENTHALPY WHEEL BYPASS DAMPERS WILL BE OPENED 100%. OTHERWISE, DAMPERS ARE CLOSED. K. PD WHEEL SPEED CONTROL:
- 1. IN WINTER HEATING MODE THE PD WHEEL MODULATES BETWEEN 1.5 AND 6 RPM AS THE 2ND STAGE OF HEATING. THE PD WHEEL IS THE 2ND STAGE OF HEAT, AFTER THE ENTHALPY WHEEL. 2. THE PD WHEEL WILL BE SLOWED AS NEEDED TO MAINTAIN THE MINIMUM ENTERING COOLING COIL TEMPERATURE, OR IN RESPONSE TO THE ENTHALPY WHEEL FROST CONTROL LOOP.
- 3. IF THE COOLING COIL IS ON FOR DEHUMIDIFCATION, THE PD WHEEL ROTATES AT THE RPM SHOWN ONT HE LATENT WHEEL PERFORMANCE PAGE OF THE SUBMITTAL. 4. IF THE PD WHEEL IS NOT CALLED FOR HEATING OR DEHUMIDIFCATION, THE WHEEL TURNS AT A CONSTANT 1/4 RPM.
- L. PD WHEEL BYPASS DAMPER CONTROL: THE SUPPLY AND EXHASUT SIDE PD WHEEL BYPASS DAMPERS WILL MODULATE OPEN AS NEEDED TO CONTROL TO THEIR INDIVIDUAL MAXIMUM PD WHEEL PRESSURE DROP SETPOINTS. IF THERE IS NOT COOLING DEMAND AND NO DH DEMAND AND NO PD WHEEL HEATING DEMAND, THEN BOTH PD WHEEL BYPASS DAMPERS WILL BE OPENED 100%. OTHERWISE THE DAMPERS ARE CLOSED.
- M. CHILLED WATER COOLING CONTROL: THE COOLING COIL CHILLED WATER VALVE IS MODULATED TO SATISFY THE MAXIMUM DEMAND FROM THE TEMPERATURE CONTROL AND HUMIDITY CONTROL LOOPS. THE CONTROL VALVE SIGNAL IS CONFIGURABLE FOR A DIRECT OR REVERSE ACTING, 0-10vdc OR 2-10vdc CONTROL SIGNAL. NOTE, THE CHILLED WATER CONTROL VALVE IS PROVIDE, INSTALLED, AND WIRED BY OTHERS.
- N. COOLING COIL FREEZESTAT: AN AUTO RESET FREEZESTAT IS LCOATED ON THE ENTERING AIR SIDE OF THE CHW COOLING COIL. IF THE FREEZESTAT TRPS, AFTER AN ADJUSTABLE TIME DELAY, A FREEZESTAT ALARM IS GENERATED, THE FANS STOP, THE CHW VALVE IS COMMANDED FULL OPEN, AND ONEMINUTE LATER THE DAMPERS CLOSE.
- O. INDIRECT GAS BURNER CONTROL: a. THE INDIRECT GAS BURNER IS ONLY TO BE USED IF A WHEEL FAILS.
- P. FAN AIRFLOW STATUS: ALL FANS HAVE INTEGRAL PIEZOMETER AIR FLOW STATIONS WITH PRESSURE TRANSMITTERS WIRED TO THE CONTROLLER. THE CONTROLLER CALCULATEDS FAN AIRFLOWS IN CFM, DISPLAYS THE INDIVIDUAL AND TOTAL AIRFLOW VALUES ON THE UNIT TOUCHPAD, AND PROVIDES STATUS TO THE BAS. IF A FAN AIRFLOW MEASUREMENET IS BELOW THE LOW FAN CFM SETPOINT (ADJUSTABLE) THREE MINUTES AFTER THE FAN IS CALLED TO START, A LOW AIRFLOW ALARM IS GENERATED.
- Q. SUPPLY AIRFLOW SWICTH: SUPPLY AIRFLOW IS PROVEN WITH A DIFFERENTIAL PRESSURE SWITCH ACROSS THE SUPPLY FAN WALL. AN ALARM IS MADE IF THE AIRFLOW PROVING SWITCH DOES NOT MAKE WITHIN TWO MINUTES OF THE FANS BEING CALLED. THE SWITCH MUST BE MADE BEFORE THE GAS FURNACE CAN BE UTILIZED.
- R. WHEEL STATUS: EACH WHEEL INCLUDES A ROTATION DETECTOR. IF A WHEEL IS CALLED TO RUN AND ROTATION STATUS IS NOT PICKED UP FOR 15 MINUTE TIEM DELAY, AN ALRM IS GENERATED.
- S. FILTER STATUS: PRESSURE TRANSMITTERS ARE MOUNTED ACROSS EACH OUTDOOR, SUPPLY, AND RETURN AIR FILTER BANKS. THE PROGRAM CONTAINS ADJUSTABLE FILTER CLOGGED SETPOINTS FOR EACH FILTER BANK. IF THE FILTER PRESSURE DROP EXCEEDS THE SETPOINT FOR 1 CONTINIOUS MINUTE THE ALARM IS GENERATED.
- T. SMOKE DETECTOR: A SMOKE DETECTOR IS FACTORY MOUNTED IN THE SUPPLY AIR PLENUM. IF THE SMOKE DETECTOR TRIPS, THE SAFETY RELAY CIRCUIT IS BROKEN, AN ALARM IS DELIVERED TO THE BAS, THE FANS STOP, AND THE DAMPERS ARE CLOSED AFTER A SHORT TIME DELAY.
- U. VFD STATUS: A MODBUS NETWORK COLLECTS RUN, FAULT, FREQUENCY REFERENCE, FREQUENCY OUTPUT, AMPS OUTPUT, AND KW OUTPUT DATA FROM THE FAN AND WHEEL VFDS.
- V. ALARMS: 1. ALARMS ARE BASED ON FAN AIRFLOW STATUS, SAFETY RELAY STATUS, DAMPER POSITION STATUS, SUPPLY AIRFLOW SWITCH STATUS, WHEEL ROTATION STATUS, FREEZESTAT STATUS, FILTER PRESSURE STATUS, AND VFD FAULT STATUS. 2. IF ANY ALARM IS ON, A LIGHT ILLUMINATES ON THE CONTROL PANEL, THE ALARM CAN BE READ AT THE TOUCHPAD, AND THE ALARM STATUS IS DELIVERED TO THE BAS.
- MOST ALARMS ARE CONFIGURABLE AS "STATUS ONLY" OR "CRITICAL". a. ALARMS CONFIGURED AS "STATUS ONLY" WOULD ENERGIZED THE ALARM LIGHT WHEN THE ALARM WAS GENERATED, BUT THE UNIT WILL CONTINUE TO RUN.
- b. ALARMS CONFIGURED AS "CRITICAL" WOULD ALSO SHUT DOWN THE UNIT WHEN GENERATED, REQUIRING THE ALARM TO BE CLEARED BEFORE THE UNIT COULD RESTART.
- W. DISPLAY: INPUTS, OUTPUTS, AND SETPOINTS MAY BE VIEWED AT THE UNIT MOUNTED TOUCHPAD DISPLAY. SETPOINTS ARE ADJUSTED EITHER AT THE UNIT TOUCHPAD OR THROUGH THE BAS.
- X. STATUS: SEE SENSORS PROVIDED ON THE POINTS LIST. ALL INPUTS, OUTPUTS, SETPOINTS AND STATUS POINTS ARE VISIBLE TO BAS.

A. UNIT DESCRIPTION: 1. CONTAINS 4 PARALLEL VARIABLE SPEED SUPPLY FANS, 2 PARALLEL SPEED EXHAUST FANS, VARIABLE SPEED TOTAL ENERGY RECOVERY WHEEL, VARIABLE SPEED PASSIVE DEHUMIDICATION WHEEL, CHILLED WATER COIL, INDIRECT GAS FURNACE, MOTORIZED 2-POSITION OUTDOOR AND EXHAUST DAMPERS, MODULATING ENTHALPY WHEEL BYPASS DAMPER AND MODULATING PD WHEEL BYPASS DAMPER. 2. THE UUNIT CONTROLS ARE DESIGNED TO SEQUENCE THE FANS AND DAMPERS, TO CONTROL SUPPLY TEMPERATURE AND DEWPOINT, AND SUPPLY AND EXHAUST AIRFLOW. B. START SEQUENCE AND DAMPER CONTROL 1. THE UNIT IS STARTED BY EITHER PLACING THE HOA IN THE HAND POSITION, OR BY PLACING THE HOA IN THE AUTO POSITION WITH A COMMUNICATION BASED RUN COMMAND FROM THE BAS. 2. UPON RECEIVING START COMMAND, IF THE UNIT SAFETY RELAYIS MADE AND THERE ARE NO CRITICAL ALAARMS, THE DAMPERS ARE ENERGIZED AND THE WHEEL VFDS ARE ENABLED. 3. WHEN THE PROPER DAMPER POSITION IS PROVEN, THE FANS ARE ENABLED AND STARTED. 4. THE ENTHALPY WHEEL DEMAND IS OVERRIDEN TO FULL SPEED ON STARTUP. 5. THE PD WHEEL SPEED IS OVERRIDEN TO MINIMUM ON STARTUP. 6. THE WHEEL OVERRIDES ARE GRADUALLY RELEASED OVER A 10 MINUTE INTERVAL. C. SAFETY RELAY: ANY EXTERNAL LOCKOUTS FOR THE UNIT SUCH AS EXTERNAL DAMPER LIMIT SWITCHES, FIRE ALARMS, OR SMOKE DETECTORS SHOULD BE WIRED IN SESRIES USING THE PROVIDED SAFETY RELAY TERMINALS. IF THE SAFETY RELAY IS NOT ENERGIZED, THE FANS ARENOT ENABLED, AND ALL THE DAMPERS WILL CLOSE AFTER A SHORT TIME DELAY. STATUS OF THE RELAY ISPROVIDED. D. KEY SETPOINTS: 1. UNIT START (ON, OFF) 2. SUPPLY AIR TEMPERATURE SETPOINT 3. DEWPOINT SETPOINT 4. DEWPOINT CONTROL BASIS (SUPPLY OR RETURN AIR) 5. SUPPLY FAN CONTROL BASIS (DUCT P OR CFM) 6. SUPPLY DUCT PRESSURE SETPOINT 7. SUPPLY CFM SETPOINT 8. PRESSURIZATION CFM SETPOINT MINIMUM ENTERING COOLING COIL SETPOINT. E. TEMPERATURE CONTROL: THE ENTHALPY WHEEL SPEED, COOLING COIL FLOW, AND PD WHEEL SPEED ARE MODULATED AS NEEDED TO MAAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. GAS FURNACE TO BE USED F. HUMIDITY CONTROL: THE COOLING COIL FLOW AND THE PD WHEEL UTILIZED TO MAINTAIN THE DEWPOINT SETPOINT. THE DEWPOINT CONTROL BASIS IS SELECTABLE (SUPPLY OR RETURN AIR). 1. THE CONTROLLER WILL MODULATE THE SUPPLY FAN VFDS TO CONTROL TO THE SUPPLY DUCT PRESSURE SETPOINT, OR TO THE SUPPLY CFM SETPOINT, DEPENDING ON WHICH CONTROL BASIS IS CHOSEN. 2. IF THE SUPPLY DUCT PRESSURE CONTROL IS CHOSEN, A DUCT PRESSURE TRANSMITTER IS SHIPPED LOOSE FOR FIELD INSTALLATION IN THE SUPPLY DUCT AND MUST BE WIRED BACK TO THE CONTROLLER. 3. THE 4 SUPPLY FANS ARE ARRANGED IN PARALLEL, AND EACH FAN VFD RECEIVES THE SAME SPEED SIGNAL. H. EXHAUST FAN CONTROL 1. THE CONTROLLER WILL MODULATE THE EXHAUST FAN VFDS TO CONTROL TO THE PRESSURIZATION CFM SETPOINT. CURRENT SUPPLY CFM - PRESSURIZATION CFM = CURRENT EXHAUST CFM SETPOINT. 2. THE BAS IS EXPECTED TO RESET THE PRESSURIZATION CFM SETPOINT AS NEEDED TO CONTROL THE BUILDING PRESSURE IF NEEDED. 3. THE 2 EXHAUST FANS ARE ARRANGED IN PARALLEL AND EACH FAN VFD RECEIVES THE SAME SPEED SIGNAL. I. ENTHALPY WHEEL 1. IF THE OUTDOOR ENTHALPY IS GREATE RTHEN THE EW RETURN AIR ENTHALPY, OR IF THE OUTDOOR TEMPERATURE IS GREATER THAN 75 DEG. F, THEN THE MODE IS SUMMER COOLING AND THE WHEEL IS FULL 2. IF THE OUTDOOR ENTHALPY IS LESS THAN THE EW RETURN AIR ENTHALPY AND THE OUTDOOR TEMPERATURE IS LES THAN 75 DEG. F, AND THE OUTDOOR TEMPERATURE IS GREATER THAN THE SUPPLY SETPOINT, THE ENTHALPY WHEEL WILL ROTATE AT MINIMUM SPEED (1/4 RPM). MINIMUM SPEED RECOVERS ESSENTIALLY NO MOISTURE OR TEMPERATURE, WHILE PROTECTING BEARINGS AND MAINTAINING THE SELF-CLEANING 3. IF OUTDOOR AIR IS LESS THAN THE SUPPLYTEMPERATURE SETPOINT, THE WHEEL MODULATES IN HEATING MODE TO MAINTAIN THE SUPPLY TEMPERATURE SETPOINT. 4. THE ENTHALPY WHEEL EXHAUST AIR TEMPERATURE MUST BE MAINTAINED NO LOWER THAN THE FROST (CONDENSATION) CONTROL TEMPERATURE SETPOINT (SETPOINT IS AUTOMATICALLY CALCULATED BASED ON OUTDOOR AIR TEMP AND EW RETURN AIR %RH, CAN BE MANUALLY SET, OR CONDENSATION CONTROL CAN BE DISABLED). J. ENTHALPY WHEEL BYPASS DAMPER CONTROL: THE SUPPLY AND EXHAUST SIDE ENTHALPY WHEEL BYPASS DAMPERS WILLMODULATE OPEN AS NEEDED TO CONTROL THEIR INDIVIDUAL MAXIMUM ENTHALPY WHEEL

480V / 3Ø (BY DIV 26) AI-CHWS TEMPERATURE AI-CHW FLOW AO-CHW BYPASS VALVE POSITION DI-CHW VALVE STATUS (OPEN) DI-CHW VALVE STATUS (CLOSED) AI-CHW DIFFERENTIAL PRESSURE AI-CHW BYPASS FLOW AI-CHW DIFFERENTIAL PRESSURE **──** FROM BUILDING AI-CHWR TEMPERATURE

CHWP-1

CARD

(TYPICAL FOR EACH PUMP)

\_\_\_\_\_\_\_

L – – – – – – – – – – + + – .

DO-CHILLER ENABLE/DISABLE

DI-CHILLER STATUS

DI-CHILLER ALARM

AI-CHW DIFFERENTIAL PRESSURE

DO, DO-CHW ISOLATION VALVE POSITION

DI-VALVE STATUS (OPEN)

DI-VALVE STATUS (CLOSED

TO SECOND

CHILLER

AI-CHWS TEMPERATURE

AI-CHWR TEMPERATURE

DI-PUMP STATUS

DO-PUMP START/STOP

AO-VFD SPEED

1. REFER TO PLANS AND PIPING SCHEMATICS FOR CHILLED WATER PIPING ARRANGEMENT.

2. PROVIDE FLOATING POINT CONTROL FOR ISOLATION VALVE. 3. EACH PUMP SHALL BE OPERATED BY A DEDICATED VFD. 4. VFD BACnet CARD SHALL PROVIDE VFD SPEED OUTPUT, VFD FAULT AND VFD KW AS MINIMUM INPUTS TO BAS HEADEND. 5. PROVIDE A MINIMUM OF TWO DIFFERENTIAL PRESSURE SENSORS: ONE LOCATED

NEAR BYPASS VALVE, AS SHOWN IN SCHEMATIC, AND ONE LOCATED AS REMOTE COIL LOCATION IN BUILDING. PROVIDE ADDITIONAL REMOTE PRESSURE SENSORS AS SHOWN ON PLANS OR AS REQUIRED BY ENERGY CODE. CHILLER MANUFACTURER SHALL PROVIDE HARDWIRED FLOW SENSOR FOR INTERNAL PROOF OF FLOW. PROVIDE ADDITIONAL DIFFERENTIAL PRESSURE SENSORS AS REQUIRED BY DESIGN FOR EXTERNAL FLOW MONITORING AT BAS FOR GPM.

7. CHILLER CONTROL PANEL BACnet CARD SHALL PROVIDE CHILLED WATER SUPPLY TEMPERATURE SETPOINT, CHILLER FAULTS, CHILLER ELECTRICAL DEMAND AND CHILLER OUTPUT CAPACITY AS MINIMUM INPUTS TO BAS HEADEND.

AIR COOLED CHILLER A. CHILLER RUN CONDITIONS:

1. TEH CHILLER SHALL BE ENABLED TO RUN WHENEVER: a. A DEFINABLE NUMBER OF CHILLED WATER COILS NEED COOLING. AND, THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 54 DEGREES (ADJUSTABLE).

2. TO PREVENT SHORT CYCLING, THE CHILLER SHALL RUN FOR AND BE OFF FOR MINIMUM TIME PERIODS OF 10 MINUTES (ADJUSTABLE), UNLESS SHUTDOWN ON SAEFTIES OR OUTSIDE AIR CONDITIONS. 3. THE CHILLER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS. 4. CHILLED WATER PUMP LEAD/LAG OPERATION: THE TWO CHILLED WATER PUMPS SHALL RUN ANYTIME THE CHILLER IS

CALLED TO RUN. THE CHILLED WATER PUMP SHALL ALSO RUN FOR FREEZE PROTECTION WHENEVER THE OUTSIDE AIR IS LESS THAN 38 DEGREES F (ADJUSTABLE). 5. THE LEAD PUMP SHALL START PRIOR TO THE CHILLER BEING ENABLED AND SHALL STOP ONLY AFTER THE CHILLER IS DISABLED. THE PUMPS SHALL THEREFORE HAVE:

a. A USER ADJUSTABLE DELAY ON START b. AND. A USER ADJUSTABLE DELAY ON STOP THE DELAY TIMES SHALL BE SET APPROXIMATELY TO ALLOW FOR ORDERLY CHILLE WATER SYSTEM START-UP. SHUTDOWN, AND SEQUENCING.

c. THE TWO PUMPS SHALL OPERATE IN A LEAD/LAG FASHION. THE LEAD PUMP SHALL RUN FIRST. ON FAILURE OF THE LEAD PUMP, THE LAG PUMP SHALL RUN AND THE LEAD PUMPP SHALL TURN OFF. THE DESIGNATED LEAD PUMP SHALL ROTATE ON A WEEKLY BASIS (USER DEFINABLE).

7. ALARMS SHALL BE PROVIDED AS FOLLOWS: CHILLED WATER PUMP A. FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. B. RUNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

C. RUNTME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

D. VFD FAULT. B. CHILLED WATER BY-PASS VALVE - MINIMUM FLOW CONTROL: THE BAS SHALL MEASURE CHILLED WATER FLOW THROUGH THE CHILLER AND AS THE CHILLED WATER FLOW DROPS BELOW SETPOINT, THE BAS SHALL MODULATE THE CHILLED WATER BYPASS VALVE OPEN TO MAINTAIN THE MINIMUM CHILLED WATER FLOW SETPOINT.

C. CHILLER: THE CHILLER SHALL BE ENABLED A USER ADJUSTABLE TIME AFTER PUMP STATUSES ARE PROVEN ON. THE CHILLER SHALL THEREFORE HAVE A USER ADJUSTABLE DELAY ON START. 1. THE DELAY TIME SHALL BE SET APPROXIMATELY TO ALLOW FOR ORDERLY CHILLED WATER SYSTEM START UP,

a. LOW-CHILLED WATER FLOW: IF THE CHILLED WATER FLOW IS 25% (ADJUSTABLE) LESS THAN SETPOINT.

SHUTDOWN AND SEQUENCING. 2. THE CHILLER SHALL RUN SUBJECT TO ITS OWN SAFETIES AND CONTROLS. 3. ALARMS SHALL BE AS FOLLOWS:

c. CHILLER RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT. D. CHILLER CHILLED WATER SUPPLY SETPOINT: THE CHILLER SHALL MAINTAIN A CHILLED WATER SUPPLY TEMPERATURE SETPOINT AS DETERMINED BY ITS OWN INTERNAL MANUFACTURER CONTROLS.

a. CHILLER FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.

b. CHILLER RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

E. CHILLED WATER TEMPERATURE MONTIROING: THE FOLLOWING TEMPERATURE SHALL BE MONITORED. a. CHILLED WATER SUPPLY b. CHILLED WATER RETURN

c. ALARMS SHALL BE AS FOLLOWS: HIGH CHILLED WATER SUPPLY TEMP: IF THE WATER SUPPLY TEMP IS GREATER THAN 55 DEG. F (ADJUSTABLE). LOW CHILLED WATER SUPPLY TEMP: IF THE WATER SUPPLY TEMP IS LESS THAN 38 DEG. F (ADJUSTABLE).

**\ DOAS CONTROL SEQUENCE** 

LOCATE MOISTURE DETECTOR IN SECONDARY CONDENSATE-

REFER TO PLANS AND FAN COIL SCHEDULE FOR LOCATIONS AND SYSTEM COMPONENTS.

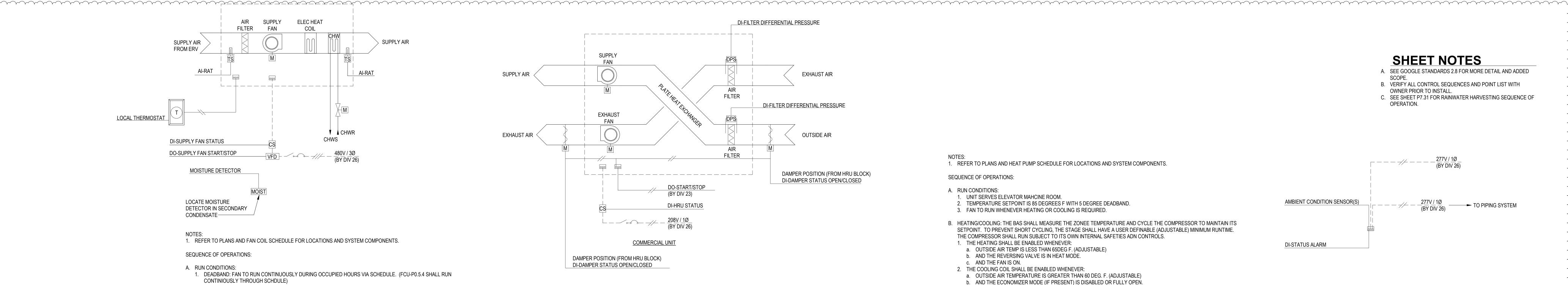
SEQUENCE OF OPERATIONS:

- A. RUN CONDITIONS: 1. DEADBAND: FAN TO RUN CONTINUOUSLY DURING OCCUPIED HOURS VIA SCHEDULE. (FCU-P0.5.4 SHALL RUN CONTINIOUSLY THROUGH SCHDULE)
- 2. HEAT/COOL: FAN TO RUN TO MAINTAIN SETPOINT. 3. UNOCCUPIED MODE: FAN IS COMMANDED ON IF THE ZONE TEMPERATURE IS 3 DEG. F ABOVE THE ZONE UNOCCUPIED COOLING SETPOINT FOR MORE THAN 5 MINUTES OR IF THE ZONE TEMPERATURE IS 3 DEG. F BELOW THE ZONE UNOCCUPIED HEATING SETPOINT FOR MORE THAN 5 MINUTES.
- B. DESIGN AIR TEMPERATURE SETPOINT: MAC SAT SETPOINT: DESIGN HEATING COIL LEAVING AIR TEMPERATURE PER COIL SCHEDULE
- 2. DEADBAND SAT SETPOINT: AVERAGE OF CURRENT COOLING AND HEATING SPACE TEMP SETPOINTS. 3. MIN SAT SETPOINT: DESIGN COOLING COIL LEAVING AIR TEMP PER COIL SCHEDULE.
- 4. SUPPLY AIR TEMPERATURE CONTROLLED TO SETPOINT USING PID LOOP WHOSE OUTPUT IS MAPPED TO SEQUENCE CHILLED WATER VALVE.
- 5. CONTOL LOOP IS ENABLED WHEN THE SUPPLY AIR IS PROVEN ON, AND DISABLED AND OUTPUT SET TO ZERO
- C. UNIT WILL BE CONTROLLED VIA LOCAL THERMOSTAT.
- D. FAN STATUS: THE BAS SHALL MONITOR THE FAN STATUS.
- E. SMOKE DETECTOR: THE UNIT SHALL SHUTDOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR
- F. COOLING COIL VALVE: THE BASE SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE COOLING COIL VALVE TO MAINTAIN ITS COOLING SETPOINT.
- 1. THE COOLING COIL SHALL BE ENABLED WHENEVER: a. OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG. F. (ADJUSTABLE)
- b. AND THE ZONE TEMPERATURE IS ABPVE THE COOLING SETPOINT. c. AND THE FAN IS ON. 2. THE COOLING COIL VALVE SHALL OPEN WHENEVER THE FREEZESTAT IS ON.
- G. ELECTRIC HEAT: THE BAS SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE SCR CONTROL OF THE
- 1. OUTSIDE AIR TEMP IS LESS THAN 65DEG F. (ADJUSTABLE) 2. AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
- H. ALARMS SHALL BE PROVIDED AS FOLLOWS:
- a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, GENERATE HVAC ALARM 1 CRITICAL

and open the ventilation air damper to its Maximum Primary Airflow setpoint, until condensate is no longer detected and the zone dew point drops back below the Unoccupied Dew Point Low Limit.

- b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON GENERATE HVAC ALARM 3 HIGH. c. IF THE SPACE TEMPERATURE IS ABOVE (OR BELOW) THE COOLING (OR HEATING) SETPOINT BY MORE THAN 4 DEG. F. FOR MORE THAN 5 MINUTES, GENERATE A HVAC ALARM - 3 - HIGH.
- d. FREEZE STAT ACTIVATED.

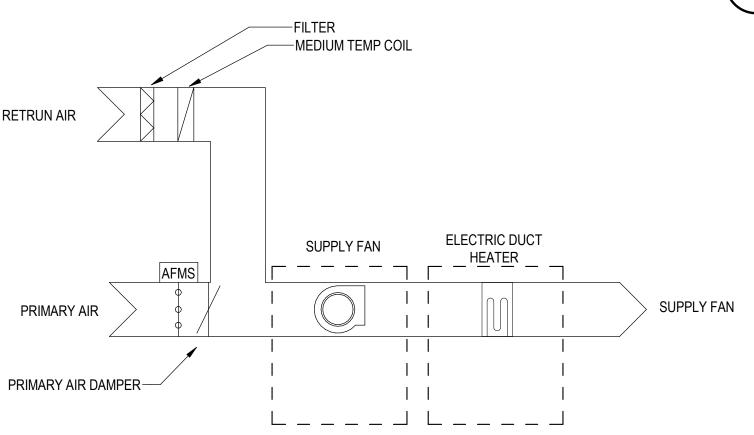
3. AND THE FAN IS ON.



SEQUENCE OF OPERATIONS A. RUN CONDITIONS - SCHEDULED:

- 1. THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING
- a. OCCUPIED MODE: THE UNIT SHALL MAINTAIN RUN ACCORDING TO A USER DEFINED OCCUPANCY SCHEDULE. THE SCHEDULE WILL VARY TO MATCH THE ZONE AND HEAT PUMPS EACH SPECIFIC UNIT SERVES. (ERV-P0.5.2 SHALL RUN CONTINIOUSLY THROUGH SCHEDULE)
- b. UNOCCUPIED MODE: THE UNIT COMMAND OFF. 2. FAN: THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON
- B. THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE WHEN THE UNIT IS OFF C. ALARMS
- STATUS ALARM:
- a. UNIT FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. b. UNIT IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- a. ALARM SHALL BE PROVIDED IF OUTSIDE AND EXHAUST AIR DAMPERS ARE COMMANDED CLOSE BUT END SWITCH IS CLOSED.
- . SMOKE DETECTOR: THE UNIT SHALL SHUTDOWN AND GENERATE AN ALARM UPON RECEIVING A
- SMOKE DETECTOR STATUS.
- D. COOLING COIL VALVE: THE BASE SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE COOLING COIL VALVE TO MAINTAIN ITS COOLING SETPOINT. (ERV-P0.5.2 ONLY)
- 1. THE COOLING COIL SHALL BE ENABLED WHENEVER: a. OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG. F. (ADJUSTABLE)
- b. AND THE ZONE TEMPERATURE IS ABPVE THE COOLING SETPOINT.
- c. AND THE FAN IS ON. 2. THE COOLING COIL VALVE SHALL OPEN WHENEVER THE FREEZESTAT IS ON.
- E. ELECTRIC HEAT: THE BAS SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE SCR CONTROL OF THE ELECTRIC HEAT. (ERV-P0.5.1)
- 1. OUTSIDE AIR TEMP IS LESS THAN 65DEG F OR DISCHARGE AIR IS BELOW 60 DEG. F. (ADJUSTABLE) 2. AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT. 3. AND THE FAN IS ON.

**ENERGY RECOVERY UNIT** 



**SEQUENCE OF OPERATIONS:** NOTE: VERIFY SEQUENCE WITH MANUFACTURER.

FAN COIL

**Building Automation System Interface:** 

The Building Automation System (BAS) shall send the controller Occupied, and Unoccupied commands, space temperature setpoint. If communication is lost with the BAS, the controller shall operate using its local

Normal operating mode for occupied spaces or daytime operation. When the unit is in the Occupied Mode the controller shall maintain the zone temperature at the Active Occupied Mode the controller shall be enforced. The occupied mode shall be the default mode of the terminal unit.

Occupied Standby: When the unit is equipped with an occupancy sensor (optional), that sensor shall be used to indicate that people are not currently present, even though the unit is in the Occupied Standby mode, the controller shall maintain the zone temperature at the Occupied Standby Cooling and Heating Setpoints (see below), and close the ventilation air damper to its Standby Ventilation Airflow setpoint.

When in the Unoccupied Mode, the controller shall turn off the fan, close the chilled-water valve, turn off the electric heater, and close the ventilation air damper, unless unoccupied cooling, heating, or dehumidification is needed. If the zone temperature drops below its Unoccupied Heating Setpoint, the controller shall turn on the fan and operate at its Maximum Heating Fan Airflow setpoint, activate the electric heater at full capacity, close the chilled-water valve, and close the ventilation air damper, until the zone temperature rises back to 2.0 deg. If the zone temperature rises above its Unoccupied Cooling Setpoint, the controller shall turn on the fan and operate at its Maximum Cooling Fan Airflow setpoint, fully open the chilled-water valve, turn off the electric heater, and close the ventilation air damper, until the zone temperature drops back to 2.0 deg. F below the Unoccupied Cooling Setpoint. [ALTERNATE: If the zone temperature rises above its Unoccupied Cooling Setpoint, the controller shall turn on the fan and operate at its Maximum Fan Airflow setpoint, close the chilled-water valve, turn off the electric heater, and open the ventilation air damper to its Maximum Primary

If the zone dew point rises above its Unoccupied Dew Point High Limit, but the zone temperature is between the Unoccupied Cooling Setpoints, the controller shall turn on the fan and operate at its Maximum Fan Airflow setpoint, close the chilled-water valve, turn off the electric heater, and open the ventilation air damper to its Maximum Primary Airflow setpoint, until the zone dew point drops back below the Unoccupied Dew Point Low Limit. Occupied Bypass: Mode used to temporarily place the unit into the occupied operation. Tenants shall be able to override the unoccupied mode from the space sensor. The override shall last for a maximum of 4 hours (adj.). The tenants shall be able to cancel the override from the space sensor at any time. During the override the unit shall operate in occupied mode. To prevent condensation when transitioning from Unoccupied Mode to any of the Occupied Modes, if the zone temperature is more than 3.0 deg. F below the active cooling setpoint the controller shall execute a startup sequence. During this startup sequence, the controller shall keep the chilled-water valve closed and

Airflow setpoint, until the zone temperature drops back to 2F below the Unoccupied Cooling Setpoint]. If condensate is detected in the drip pan or if the zone dew point (measured with the optional space humidity sensor) rises above the Unoccupied Dew Point High Limit, the controller shall close the chilled-water valve

Occupied Mode. Heat/Cool Mode: The Heat/Cool mode shall be automatically determined by the terminal unit controller or set by a communicated value from the BAS. In standalone or auto mode the controller shall compare the current zone temperature to the active heating and cooling setpoints. At start-up, the controller shall operate in Cool Mode if the zone temperature is above the active heating setpoint, otherwise it shall operate in Heat Mode. The controller shall transition to Heat Mode when the fan is at its Minimum Fan Airflow setpoint, the chilled-water valve is closed, and the zone temperature drops below

electric heater off, open the ventilation air damper to its Maximum Primary Airflow setpoint, and turn on the fan and operate it at its Minimum Fan Airflow setpoint (whichever is highest). After 5 minutes of operating in this startup sequence, the controller will transition to the

the active heating setpoint. The controller shall transition to Cool Mode when the fan is at its Minimum Fan Airflow setpoint, the electric heater is off, and the zone temperature rises above the active cooling setpoint. **Heat/Cool Setpoint:** 

The zone temperature setpoint shall be determined either by a local (e.g., thumbwheel) setpoint, the default setpoint in the controller, or a communicated value from the BAS. The controller shall use the locally-stored default setpoints when neither a local setpoint nor communicated setpoint is present. If both a local setpoint and communicated setpoint exist, the controller shall use the communicated value. Cooling Mode:

When in the Occupied Mode, the controller shall use the measured space temperature and the active cooling capacity of the unit. The outputs shall be controlled based on the unit configuration and the requested cooling capacity.

When the unit is in Cool Mode, the controller shall maintain the zone temperature at the active cooling setpoint by modulating both the terminal fan speed and medium-temp-water valve, while the ventilation air damper is controlled to its minimum ventilation setpoint and the electric heater remains off. The controller shall modulate the med-temp-water valve to maintain zone temperature at its active cooling setpoint, while the fan operates at its Minimum Fan Airflow setpoint. When the requested cooling capacity has increased to the point where the medium-temp-water valve is fully open, the controller shall modulate the fan between its Minimum Fan Airflow and Maximum Cooling Fan Airflow setpoint, while the chilled-water valve remains fully open. If the fan reaches its Maximum Cooling Fan Airflow setpoint, but the unit requires even more cooling capacity, the controller shall modulate the ventilation air damper between its active minimum ventilation airflow and Maximum Primary Airflow setpoints to maintain zone temperature at its active cooling setpoint, while the chilled-water valve remains fully open and the fan operates at its Maximum Cooling Fan Airflow setpoint.

When in the Occupied Mode, the controller shall use the measured zone temperature and the active heating capacity of the unit. The outputs shall be controlled based on the unit configuration and the requested heating capacity. When the unit is in Heat Mode, the controller shall maintain the zone temperature at the active heating setpoint by modulating both the terminal fan speed and the SCR electric heater, while the ventilation air damper is controlled to its minimum ventilation setpoint, and the chilled-water valve remains closed. The controller shall modulate the fan between its Minimum Fan Airflow and Maximum Heating Fan Airflow setpoints to maintain zone temperature at its active heating setpoint, while the electric heater remains off. When the requested heating capacity has increased to the point where the fan has reached its Maximum Heating Fan Airflow setpoint, the controller shall modulate the SCR electric heater to maintain zone temperature at its active heating setpoint, while the fan continues to operate at its Maximum Heating Fan Airflow setpoint.

The terminal unit fan shall operate continuously in all Occupied Modes. During the Unoccupied Modes, the fan shall cycle off, unless needed to maintain zone dry-bulb temperature at the Unoccupied Heating or Cooling Setpoints or to maintain zone dew point below the Unoccupied Dew Point High Limit. **Ventilation Control:** 

When the unit is in unoccupied mode, the ventilation airflow setpoint will be zero. When the unit is in occupied mode, the ventilation airflow setpoint shall be equal the design outdoor airflow and reset based on occupancy and CO2.

OCCUPANCY SENSOR: When the unit is in occupied mode, and the occupancy sensor indicates that the space is currently unoccupied, the ventilation airflow setpoint shall be the "occupied standby" outdoor airflow (see VAV schedule).

CO2 SENSOR: When the unit is in occupied mode, the ventilation airflow setpoint will be continuously calculated using the measured CO2 concentration in the space. The current ventilation airflow setpoint shall be communicated to the BAS for control of the system outdoor-air intake.

**Continuous Fan Control:** 

**Condensate Avoidance:** If the condensate detector indicates the presence of condensate in the drip pan, the controller shall close themedium-temp-water valve, and continue operating the terminal fan and ventilation air damper as normal. The unit shall return to normal operation when condensate is no longer detected. If the measured zone dew point from the optional space humidity sensor exceeds the entering medium-temp-water temperature (communicated from the BAS or measured with the optional entering water temperature sensor), the controller shall close the medium-temp-water valve, and continue operating the terminal fan and ventilation air damper as normal. The unit shall return to normal operation when the zone dew point is less than 5.0 deg. F below the entering medium-temp-water temperature. If the zone dew point rises above its Occupied Dew Point High Limit, the ventilation air damper shall be modulated further open until the zone dew point drops back below the Occupied Dew Point Low Limit.

Space Sensor Failure: If there is a fault with the operation of the zone temperature sensor, an alarm shall be annunciated at the BAS and the controller shall operate the fan at its Minimum Fan Airflow setpoint, close the ventilation air damper to its active minimum ventilation airflow setpoint, close the chilled-water valve, and turn off the electric

**SHEET NOTES** 

A. SEE GOOGLE STANDARDS 2.8 FOR MORE DETAIL AND ADDED B. VERIFY ALL CONTROL SEQUENCES AND POINT LIST WITH OWNER PRIOR TO INSTALL. C. SEE SHEET P7.31 FOR RAINWATER HARVESTING SEQUENCE OF OPERATION.

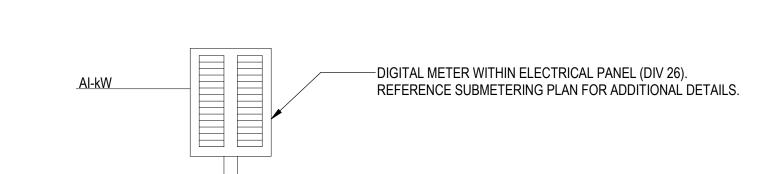
DI-STATUS ALARM

SEQUENCE OF OPERATIONS

ALL ASPECTS OF THE SYSTEM OPERATION SHALL BE CONTROLLED BY THE

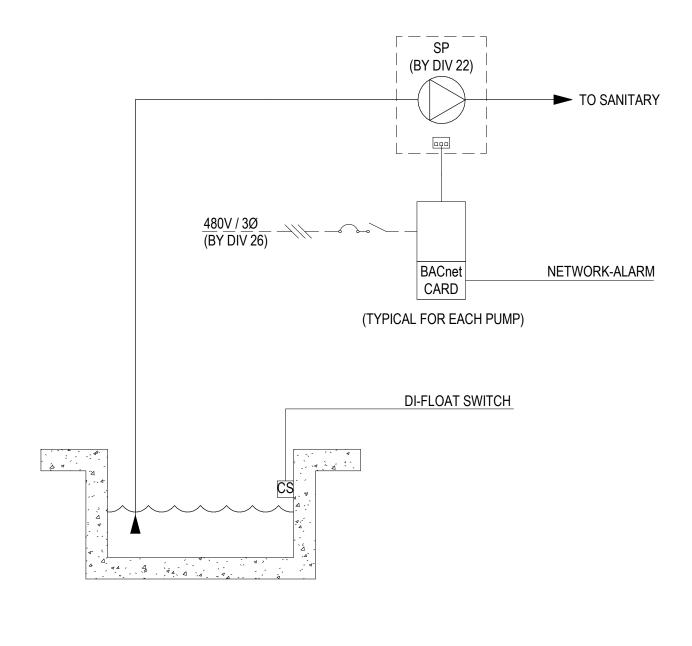
EQUIPMENT MANUFACTURERS CONTROL PANEL/SYSTEM. RUN CONDITIONS: 1. THE UNITS SHALL BE ALWAYS ENABLED.

2. THE UNIT SHALL RUN WHEN TEMPERATURE IS BELOW SETPOINT OF 37°F 3. FOR GREASE WASTE, THE UNIT SHALL RUN WHEN TEMPERATURE IS BELOW SETPOINT OF 107 (ADJUSTABLE) AFTER A TWO MINUTE DELAY.



- 1. REFER TO DRAWINGS FOR LOCATION/QUANTITY 2. ELECTRIC SUBMETER: THE ELECTRICAL DISTRIBUTION PANELS ON THE PROJECT CONTAIN SUBMETERS FOR INDIVIDUAL CIRCUITS AND ARE BEING SPECIFIED WITH A BACNET CONNECTION. THE CONTROLLER SHALL MONITOR THE ELECTRIC SUBMETERS FOR ELECTRIC CONSUMPTION ON A CONTINUAL BASIS. THESE VALUES SHALL BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES.
- 3. VISUAL ALARM AND BAS SYSTEM FRONT END ALARMS SHALL BE GENERATED TO INDICATE A LOSS OF PULSE OUTPUT FROM THE ELECTRIC SUBMETER.
- 4. PEAK DEMAND HISTORY: THE CONTROLLER SHALL MONITOR AND RECORD THE PEAK (HIGH AND LOW) DEMAND READINGS FROM THE ELECTRIC SUBMETER SEPARATELY FOR ALL OF THE USES DESCRIBED ABOVE. PEAK READINGS SHALL BE RECORDED ON A 15-MINUTE, DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.
- . USAGE HISTORY: THE CONTROLLER SHALL MONITOR AND RECORD ELECTRIC SUBMETER READINGS SO AS TO PROVIDE A POWER CONSUMPTION HISTORY FOR ALL OF THE USES DESCRIBED ABOVE. USAGE READINGS SHALL BE RECORDED ON AN EVERY 15-MINUTE, DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

**ELECTRIC SUB METER** 

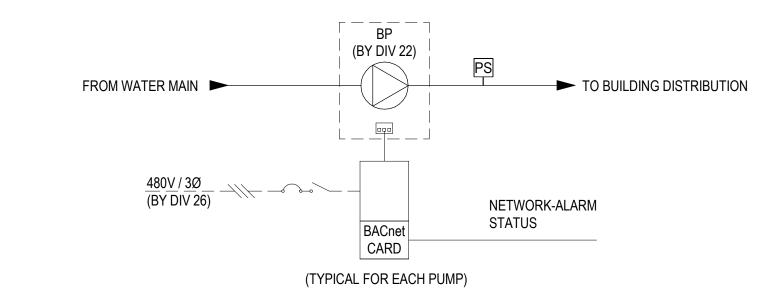


SEQUENCE OF OPERATIONS A. GENERAL: 1. REFER TO DIV 22 PLANS AND PIPING SCHEMATICS FOR DHW PIPING ARRANGEMENT.

. REFER TO PLUMBING SEQUENCE FOR ADDITIONAL REQUIREMENTS

3. MAKE UP WATER FLOW SWITCH SHALL BE LOCATED UPSTREAM OF DIVERTING

**ELEVATOR SUMP PUMP** 



SEQUENCE OF OPERATIONS

IS WEEKLY (USER DEFINABLE)

- 1. REFER TO DIV 22 PLANS AND PIPING SCHEMATICS FOR DHW PIPING ARRANGEMENT. 2. REFER TO PLUMBING SEQUENCE FOR ADDITIONAL REQUIREMENTS. B. PUMPS SHALL HAVE A LEAD/LAD SCHEDULE BY PUMP SKID CONTROL PANEL. SCHEDULE
- DOMESTIC WATER BOOSTER PUMP

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

**URBAN** 

200 PETER KIRK LN.

KIRKLAND, WA

OWNER

engineers for a sustainable future engineers 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Job. No.: 05.19.00791 Seattle, WA 98101 www.glumac.con T. 206.262.1010 F. 206.262.9865

DESCRIPTION 09/27/2019 100% DD SET 11/22/2019 PROGRESS SET 12/20/2019 CD PROGRESS SET 01/17/2020 50% CD SET 03/20/2020 90% CD SET 07/17/2020 TOWER PERMIT RESUB

PROJECT NO.

ISSUE DATE

CBRE03.18.095

SHEET TITLE / NUMBER

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

**SENSIBLE ONLY VAV** mammunimente de la contration de la cont

1. REFER TO PLANS AND HEAT PUMP SCHEDULE FOR LOCATIONS AND SYSTEM COMPONENTS.

THE COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES ADN CONTROLS.

a. OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG. F. (ADJUSTABLE)

b. AND THE ECONOMIZER MODE (IF PRESENT) IS DISABLED OR FULLY OPEN.

B. HEATING/COOLING: THE BAS SHALL MEASURE THE ZONEE TEMPERATURE AND CYCLE THE COMPRESSOR TO MAINTAIN ITS

SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJUSTABLE) MINIMUM RUNTIME.

3. ON MOED CHANGES, THE COMPRESSOR SHALL BE DISCABLE AND REMAIN OFF UNIT AFTER THE REVERSING VALVE

4. ALARMS SHALL BE PROVIDED AS FOLLOWS: COMPRESSOR RUNTIME EXCEEDED: THE COMPRESOR RUNTIME EXCEEDS

AIR ECONOMIZER (HP-R.1 ONLY): TEH BAS SHALL MEASURE HTE ZONE TEMPERATURE AND MODULATE MIXED AIR DAMPERS

IN SEQUENCE TO MAINTAIN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPER SHALL MAINTAIN A MINIMUM

a. OUTSIDE AIR TEMPERATURE IS A LEAST 3 DEGREES F (ADJUSTABLE) LESS THAN THE ZOE TEMPERATURE.

D. THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF THE

OPTIMAL START UP IS AVAILABLE. THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIDE MODE

E. MINIMUM OUTSIDE AIR VENTILATION - FIXED PERCENTAGE: SET AT CLOSED DURING ALL HOURS SINCE SSPACE IS NOT

c. IF THE SPACE TEMPERATURE IS ABOVE (OR BELOW) THE COOLING (OR HEATING) SETPOINT BY MORE THAN 4 DEG. F

► TO BUILDING DISTRIBUTION

NETWORK-ALARM

STATUS

b. AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 75 DEGREES F (ADJUSTABLE).

a. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, GENERATE HVAC ALARM - 1 - CRITICAL.

(TYPICAL FOR EACH PUMP)

2. REFER TO PLUMBING SEQUENCE FOR ADDITIONAL REQUIREMENTS.

1. REFER TO DIV 22 PLANS AND PIPING SCHEMATICS FOR DHW PIPING ARRANGEMENT.

B. PUMPS SHALL HAVE A LEAD/LAD SCHEDULE BY PUMP SKID CONTROL PANEL. SCHEDULE

b. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON GENERATE HVAC ALARM - 3 - HIGH.

2. THE ECONOMIZER SHALL CLOSE WHEN EVER THE FREEZESTAT IS ON.

EXCEPT THAT THEY OUTSIDE AIR DAMPER SHALL MODEULATE FULLY OPEN.

FOR MORE THAN 5 MINUTES, GENERATE A HVAC ALARM - 3 - HIGH.

TEMPERATURE SETPOINT IS 85 DEGREES F WITH 5 DEGREE DEADBAND

3. FAN TO RUN WHENEVER HEATING OR COOLING IS REQUIRED.

a. OUTSIDE AIR TEMP IS LESS THAN 65DEG F. (ADJUSTABLE)

SEQUENCE OF OPERATIONS:

1. UNIT SERVES ELEVATOR MAHCINE ROOM.

1. THE HEATING SHALL BE ENABLED WHENEVER:

c. AND THE FAN IS ON.

c. AND THE FAN IS ON.

b. AND THE REVERSING VALVE IS IN HEAT MODE.

2. THE COOLING COIL SHALL BE ENABLED WHENEVER:

d. AND THE REVERSING VALVE IS IN COOL MODE.

A USER DEFINABLE LIMIT (ADJUSTABLE).

ADJUSTABLE POSITION OF 10% (ADJUSTABLE)

F. UNIT WILL BE CONTROLLED VIA LOCAL THERMOSTAT.

H. ALARMS SHALL BE PROVIDED AS FOLLOWS:

d. FREEZE STAT ACTIVATED.

G. FAN STATUS: THE BAS SHALL MONITOR THE FAN STATUS.

SEQUENCE OF OPERATIONS

DHW RECIRC PUMP

1. REFER TO DRAWINGS FOR LOCATION/QUANTITY.

WATER SUBMETER

SEPARATE GAS SUBMETER THROUGHOUT

THE PROJECT FOR EACH GAS SERVICE.—

1. REFER TO DRAWINGS FOR LOCATION/QUANTITY.

FROM THE GAS METER.

FROM THE WATER METER.

IS WEEKLY (USER DEFINABLE)

AI-WATER FLOW RATE

A 15-MINUTE DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

ON A 15-MINUTE DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

2. THE CONTROLLER SHALL MONITOR THE WATER METER FOR WATER CONSUMPTION ON A

CONTINUAL BASIS. THESE VALUES SHALL BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES.

3. ALARM SHALL BE GENERATED IF SENSOR READING INDICATES A LOSS OF READING OR OUTPUT

4. PEAK DEMAND HISTORY: THE CONTROLLER SHALL MONITOR AND RECORD THE PEAK (HIGH AND

5. USAGE HISTORY: THE CONTROLLER SHALL MONITOR AND RECORD WATER METER READINGS

LOW) DEMAND READINGS FROM THE WATER METER. PEAK READINGS SHALL BE RECORDED ON

SO AS TO PROVIDE A WATER CONSUMPTION HISTORY, USAGE READINGS SHALL BE RECORDED

AI-GAS FLOW RATE

2. THE CONTROLLER SHALL MONITOR THE GAS METER FOR GAS CONSUMPTION ON A CONTINUAL

BASIS. THESE VALUES SHALL BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES. BOILERS,

3. ALARM SHALL BE GENERATED IF SENSOR READING INDICATES A LOSS OF READING OR OUTPUT

4. PEAK DEMAND HISTORY: THE CONTROLLER SHALL MONITOR AND RECORD THE PEAK (HIGH AND

5. USAGE HISTORY: THE CONTROLLER SHALL MONITOR AND RECORD GAS METER READINGS SO AS

TO PROVIDE A GAS CONSUMPTION HISTORY. USAGE READINGS SHALL BE RECORDED ON A 15-

LOW) DEMAND READINGS FROM THE GAS METER. PEAK READINGS SHALL BE RECORDED ON A 15-

WATER HEATERS, AND KITCHEN GAS LOADS SHALL BE METERED AND REPORTED SEPARATELY

A. GENERAL

THE ECONOMIZER SHALL BE ENABLED WHENEVER:

A. RUN CONDITIONS:

OCCUPIED.

**GAS SUB METER** 

MINUTE DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

MINUTE DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

MNR20-06959 Approved Plan Set 03/22/21 Page 24 of 27

(FAN					NTS LIST IW & ELEC HEAT)
POINT NAME			ГТҮРЕ		COMMENTS
POINT NAME	Al	AO	BI	ВО	COMMENTS
SUPPLY AIR TEMP	Х				FOR MONITORING; UNIT CONTROLLED TO ZONE TEMP
RETURN AIR TEMP	Х				
FAN START-STOP (SUPPLY)				Х	
FAN STATUS (SUPPLY)			х		IF VFD, STATUS PROVIDED THROUGH THE VFD HERTZ (HARDWIRED OUTPUT FROM THE VFD). IF NOT VFD, STATUS SHALL BE PROVIDED BY A CURRENT SWITCH/RELAY.
SUPPLY FAN SPEED - (VFD OR ECM)				Х	
FAN VFD OR ECM FAULT (IF AVAILABLE)			X		
CHW VALVE CONTROL	Χ				
ELEC HEAT SCR CONTROL	Х				
ZONE TEMPERATURE			х		ZONE TEMP SENSOR SHALL BE ALC LATEST VERSION BASE TYPE FOR IDF, UPS, MDF, AND ELECTRICAL ROOMS. AND A PLUS TYPE WITH CO2 FOR DESIGNATED ZONES (WITH CO2)
ZONE TEMPERATURE SENSOR SET POINT ADJUSTMENT					TEMP SLIDE BAR ADJUSTMENT. INITIALLY SET TO 0 DEG. F; ADMIN ADJUSTABLE ONLY
ZONE TEMPERATURE SENSOR LOCAL OVERRIDE					FOR OCCUPANCY MODE OVERRIDE
NOTES:  1. THESE UNITS SHALL HAVE FUL	L ALC CONTI	ROL (NO LOC	AL CONTROL	).	

(ELECI					NTS LIST ND TRANSFER FAN)
POINT NAME		POINT	ГТҮРЕ		COMMENTS
POINT NAME	Al	AO	BI	ВО	COMMENTS
EXHASUST FAN START-STOP				Х	
EXHAUST FAN STATUS			Х		
ZONE TEMP	Х				SENSOR SHALL BE ALC LATEST BASE TYPE VERSION, NO SLIDER (80 DEG. F SETPOINT, ADJ)

POINT NAME		POINT	TYPE		COMMENTS
POINT NAME	Al	AO	BI	ВО	COMMENTS
EXHASUST FAN START-STOP				Х	
EXHAUST FAN STATUS	Х		X*		IF VFD (FOR BALANCING OR OTHER RESONS), STATUS PROVIDE THROUGH THE VFD HERTZ. (HARDWIRED OUTPUT FROM THE VFI *IF NO VFD, STATUS SHALL BE PROVIDED BY A CURRENT SWITC RELAY.
EXHAUST FAN VFD SPEED		Х			MINIMUM SPEED SHALL BE 20 HZ.
COMMAND (IF APPLICABLE)					33% SIGNAL
EXHAUST FAN VFD FAULT (IF APPLICABLE)	Х				
XHAUST DAMDPER COMMAND (IF APPLICABLE)				Х	
EXHAUST DAMPER STATUS FEEDBACK (IF APPLCIABLE)			Х		

CO	NTR	OL P	OINT	S LIS	T (HEAT PUMP)
POINT NAME		POINT	TYPE		COMMENTS
POINT NAME	Al	AO	BI	ВО	COMMENTS
SUPPLY AIR TEMP	Х				FOR MONITORING; UNIT CONTROLLED TO ZONE TEMP
RETURN AIR TEMP	Х				
MIXED AIR TEMP	Х				
FAN START-STOP (SUPPLY)				Х	
FAN STATUS (SUPPLY)			Х		CURRENT SWITCH
ECONOMIZER/OA DAMPER COMMAND		X			PROVIDE ONE CONTROL POINT FOR THE ECONOMIZER (OUTSIDE AIR AND RETURN AIR DAMPER CONTROLLED BY ONE ACTUATOR).
COMPRESSOR (COOLING) ENABLE				Х	MULTIPLE POINTS IF MULI-STAGE COMPRESSOR
COMPRESSOR STATUS			Х		CURRENT SWITCH. PROVIDE STATUS FOR EACH COMPRESSOR, IF MULTIPLE COMPRESSORS.
ZONE TEMPERATURE	Х				ZONE TEMP SENSOR SHALL BE ALC LATEST VERSION BASE TYPE FOR IDF, UPS, MDF, AND ELECTRICAL ROOMS.
ZONE TEMPERATURE SENSOR SET-POINT ADJUSTMENT	Х				TEMP SLIDE BAR ADJUSTMENT. INITIALLY SET TO 0 DEG. F; ADMIN ADJUSTABLE ONLY
ZONE TEMPERATURE SENSOR LOCAL OVERRIDE			Х		FOR OCCUPANCY MODE OVERRIDE

CONTROL	. POI	NTS I	LIST (	(SPLI	T DX AC OR HP UNITS)
DOINT NAME		POINT	Г ТҮРЕ		NOTES
POINT NAME	Al	AO	BI	ВО	NOTES
SUPPLY AIR TEMP	Х				FOR MONITORING; UNIT CONTROLLED TO ZONE TEMP
RETURN AIR TEMP	Х				
FAN START-STOP (SUPPLY)				Х	
FAN STATUS (SUPPLY)			Х		CURRENT SWITCH
COMPRESSOR (COOLING) ENABLE				x	MULTIPLE POINTS IF MULI-STAGE COMPRESSOR
COMPRESSOR STATUS			Х		ZONE TEMP SENSOR SHALL BE ALC LATEST VERSION BASE TYPE FOR IDF, UPS, MDF, AND ELECTRICAL ROOMS.
ZONE TEMPERATURE	Х				TEMP SLIDE BAR ADJUSTMENT. INITIALLY SET TO 0 DEG. F; ADMIN ADJUSTABLE ONLY
ZONE TEMPERATURE SENSOR SET-POINT ADJUSTMENT	Х				FOR OCCUPANCY MODE OVERRIDE

1. THESE UNITS SHALL HAVE FULL ALC CONTROL (NO LOCAL CONTROL). THE POINTS LISTED ABOVE SHALL BE HARD-WIRED, NOT THROUGH BACNET

2. IF THE AC UNIT MANUFACTURER DOES NOT PROVIED ANY OF THE SENSORS OR CONTROL DEVICES LISTED BELOW, THEN THE CONTROLS

CONTRACTOR SHALL PROVIDE AND INNSTALL.

ZONE TEMPERATURE SENSOR LOCAL OVERRIDE

1. THESE UNITS SHALL HAVE FULL ALC CONTROL (NO LOCAL CONTROL). THE POINTS LISTED ABOVE SHALL BE HARD-WIRED, NOT THROUGH BACNET 2. IF THE AC UNIT MANUFACTURER DOES NOT PROVIED ANY OF THE SENSORS OR CONTROL DEVICES LISTED BELOW, THEN THE CONTROLS CONTRACTOR SHALL PROVIDE AND INNSTALL.

CON	ITRO	L PO	INTS	LIST	(SENSIBLE VAV)
DOINT NAME		POINT	TYPE		NOTEC
POINT NAME	Al	AO	BI	ВО	NOTES
SUPPLY AIRFLOW	Х				
ZONE TEMPERATURE	Х				ZONE TEMP SENSOR SHALL BE ALC LATEST VERSION BASE TYPE FOR IDF, UPS, MDF, & ELECTRICAL ROOMS, AND A PLUS TYPE WITH CO2 AND HUNIDITY FOR DESIGNED ZONES (WITH CO2 AND HUMIDITY)
ZONE CO2	Х				SEE ABOVE
ZONE HUMIDITY	Х				SEE ABOVE
ZONE TEMPERATURE SENSOR SET-POINT ADJUSTMENT	Х				TEMP SENSOR SLIDE BAR ADJUSTMENT INITAILLY SET TO 0 DEG. F. ADMIN ADJUSTABLE ONLY.
ZONE TEMPERATURE SENSOR LOCAL OVERRIDE			Х		FOR OCCUPANCY MODE OVERRIDE
VAV DAMPER CONTROL		Х			MODULATING ACTUAOR (AO), NO FLOATING DOs ALLOWED
ELECTRIC REHEAT		Х			MODULATING ACTUAOR (AO), NO FLOATING DOs ALLOWED
COOLING COIL VALVE		Х			
DISCHARGE AIR TEMPERATURE (FOR VAVS W/ REHEAT)	Х				

NOTES:
1. IF A VAV BOX SERVES MORE THAN ONE ENCLOSED OFFICE OR ROOM, THE OTHER OFFICES/ROOMS SHALL HAVE A TEMPERATURE SENSOR
INSTALLED. AND THE AVERAGE TEMPERTURE SHALLL BE USED FOR CONTROLLING THE VAV BOX.

(CHILL	.ED				ITS LIST P WATER SYSTEM)
POINT NAME	Δ1		TYPE	DO	COMMENTS
CHILLER ENABLE (HARD-WIRED)	Al	AO	BI	BO X	
CHILLER ISOLATION VALVE CONTROL		X*		X*	*CHW VALVES SHALL BE MODULATING AO FOR CHW PRIM. VARIABLE FLOR SYSTEMS AND *CW VALVES TO BE MODULATIN AO IF HEAD PRESSURE CONTROL IS REQUIRED (RECOMMENDE FOR MOST APPLICATIONS) BO OTHERWISE
CHILLER ISOLATION VALVE FEEDBACK STATUS	Х		X		T GIVINGSTALL ELGAMENTS, BC G TILEIWING
CHILLER ALARM (HARD-WIRED PLUS BACNET*)	х		X		*HARD-WIRED BI ALARM POINT FROM CHILLER PANEL AND AN' CRITICAL ALARM POINTS FROM THE BACNET INTERFACE (WHIC MAY BE AI POINTS INSTEAD OF BI), WITH SPECIFIC DESCRIPTION DISPLAYED ON ALC GRAPHICS.
CHILLER STATUS (HARD-WIRED PLUS BACNET*)	Х		X		*HARD-WIRED BI ALARM POINT FROM CHILLER PANEL AND AN' CRITICAL ALARM POINTS FROM THE BACNET INTERFACE (WHICE MAY BE AI POINTS INSTEAD OF BI), WITH SPECIFIC DESCRIPTION DISPLAYED ON ALC GRAPHICS.
CHILLER DEMAND LIMIT (%) CHILLER CHS SUPPLY TEMP		X*			TO CHILLER CONTROLLER, HAR-WIRED
SETPOINT - TO CHILLER CHILLER CHW SUPPLY TEMP	X	X			PREFER HARD-WIRED, CAN BE THROUGH BACNET INTERFACE
CHILLER CHW RETURN TEMP	X				
CHILLER KW	X				RFOM BACMNET INTERFACE
CHW PUMP START-STOP				Х	
CHW PUMP STATUS (VFD - HERTZ)	Х		Х		STATUS PROVIDED THROUGH THE VFD HERTZ (HARDWIRED OUTPUT FROM THE VFD). IF NO VFD, STATUS SHALL BEPROVIDE BY A CURRENT SWITCH/RELAY. VFDS RECOMMENDED FOR ALI PUMPS.
CHW PUMP VFD SPEED OUTPUT CHW PUMP VFD FAULT (IF VFD) CHW SECONDARY OR BUILDING		X	Х		MINIMUM SPEED SHALL BE 20 HZ AT 33% SIGNAL
SUPPLY TEMP (AFTER BYPASS/DECOUPLER)  CHW PRIMARY OR COMMON	X				
HEADER SUPPLY TEMP (BEFORE BYPASS/DECOUPLER)  CHW SECONDARY OR BUILDING	X				
RETURN TEMP (AFTER BYPASS/DECOUPLER) CHW PRIMARY OR COMMON	X				
HEADER RETURN TEMP (BEFORE BYPASS/DECOUPLER)	Х				
CHW DIFFERENTIAL PRESSURE	Х				NEAR THE FURTHEST COIL; SHALL BE ACCESIBLE. IDENTIFY THE SENSOR LOCATION IN THE AS-BUILT CONTROL DRAWINGHS WIT A FLOOR PLAN MAP OR SCREEN CAPTURE. THE SENSOR LCOATION SHALL ALSO BE IDENTIFIED ON WEBCTRL FLOOR PLA GRAPHIC.
CHW FLOW	Х				IF USED FOR CONTROL PURPOSES, PROVIDE ELECTROMAGNETIC FLOW METER FOR PRIMARY CHW FLOW AND AN ELECTROMAGNETIC F-3500 ONICON FLOW METER AS BACKUP CHW FLOW. AN ELECTROMAGNETIC F-3500 ONICON INSERTION FLOWMETER IF FOR MONITORING PURPOSES ONLY OR AS A BACUP TO THE ELECTROMAGNETIC.
CHW TONS CALCULATED (FROM FLOW AND DELTA T)  CHW BYPASS VALVE COMMAND (IF APPLCABLE; CHILLER MIN FLOW OF PRIM. VARIABLE FLOW)	Х	Х			SOFTWARE POINT
CHILLER CW SUPPLY TEMP	X				
CHILLER CW RETUNRN TEMP	X				
CW COMMON SUPPLY TEMP	Х				
CW COMMON RETURN TEMP	Х				
EMERGENCY POER OFF (EPO) BUTTON STATUS			Х		OPTIONAL; TO BE REVIEWED BY PROJECT.
REFRIG. MONITORING ALARM			X		
MDW PUMP START-STOP				Х	
MDW PUMP STATUS (VFD - HERTZ)	х		Х		STATUS PROVIDED THROUGH THE VFD HERTZ (HARDWIRED OUTPUT FROM THE VFD). IF NO VFD, STATUS SHALL BEPROVIDE BY A CURRENT SWITCH/RELAY. VFDS RECOMMENDED FOR ALL PUMPS.
MDW PUMP VFD SPEED OUTPUT		X			MINIMUM SPEED SHALL BE 20 HZ AT 33% SIGNAL
MDW PUMP VFD FAULT (IF VFD)			Х		
MDW SUPPLY TEMP	X				
MDW RETURN TEMP	Х				NEAR THE FURTHEST COIL; SHALL BE ACCESIBLE. IDENTIFY TH SENSOR LOCATION IN THE AS-BUILT CONTROL DRAWINGHS WIT
MDW DIFFERENTIAL PRESSURE	Х				A FLOOR PLAN MAP OR SCREEN CAPTURE. THE SENSOR LCOATION SHALL ALSO BE IDENTIFIED ON WEBCTRL FLOOR PLAGRAPHIC.
MDW FLOW	Х				IF USED FOR CONTROL PURPOSES, PROVIDE ELECTROMAGNET FLOW METER FOR PRIMARY CHW FLOW AND AN ELECTROMAGNETIC F-3500 ONICON FLOW METER AS BACKUP CHW FLOW. AN ELECTROMAGNETIC F-3500 ONICON INSERTION FLOWMETER IF FOR MONITORING PURPOSES ONLY OR AS A BACUP TO THE ELECTROMAGNETIC.
MDW TONS CALCULATED (FROM FLOW AND DELTA T)	Х				SOFTWARE POINT
MDW MIXING VALVE COMMAND (IF APPLICABLE; CHILLER MIN FLOW		X			

CONTROLS POINT LIST (OUSIDE AIR TEMP & RELATIVE HUMIDITY MONITORING)						
POINT NAME		POINT TYPE NOTES		NOTES		
FOINT NAME	Al	AO	BI	ВО	NOTES	
OA DRY-BULB TEMP	Х				SHIELDED SENSORS, INSTALLED IN A SHADED AREA (NO DIRECT SUNLIGHT) AWAY FROM ANY HEAT SOURCE, OR INSTALLED 10	
OA RELATIVE HUMIDITY	Х				FEET ABOVE THE ROOF LINE.	

mountains mounta

1		DOI: 17.75		<u> </u>
POINT NAME	AI	POINT TYPE AO BI	ВО	COMMENTS
HAND SWITCH INPUT	7.11	X		
AUTO SWITCH INPUT SAFETY RELAY		X		
OUTDOOR AIR DAMPER LIMIT				
SWITCH STATUS		X		
EXHAUST AIR DAMPER LIMIT SWITCH STATUS		X		
ENTHALP ROTATION DETECTOR		X		
PD WHEEL ROTATION DETECTOR		X		
SUPPLY PLENUM SMOKE DETECTOR STATUS		Х		
SUPPLY AIRFLOW SWITCH		X		
STATUS AUTO-RESET FREEZESTAT		^ X		
ENTHALPY WHEEL SUPPLY SIDE		X		
BYPASS DAMPER POSITION FEEDBACK	X			
ENTHALPY WHEEL EXHAUST SIDE				
BYPASS DAMPER POSITION FEEDBACK	Х			
PD WHEEL SUPPLY SIDE BYPASS DAMPER POSITION FEEDBACK	X			
PD WHEEL EXHAUST SIDE BYPASS	V			
DAMPER POSITION FEEDBACK	Х			
ENTHALPY WHEEL SUPPLY SIDE DP PRESSURE TRANSMITTER	Х			
ENTHALPY WHEEL EXHAUST SIDE DP PRESSURE TRANSMITTER	Х			
PD WHEEL SUPPLY SIDE DP PRESSURE TRANSMITTER	X			
PD WHEEL EXHAUST SIDE DP	Х			
PRESSURE TRANSMITTER OUTDOOR AIR FILTER PRESSURE				
TRANSMITTER	Х			
SUPPLY AIR FILTER PRESSURE TRANSMITTER	Х			
RETURN AIR FILTER PRESSURE TRANSMITTER	Х			
SUPPLY FAN PIEZOMETER	X			
PRESSURE TRANSMITTER EXHAUST FAN PIEZOMETER	^			
PRESSURE TRANSMITTER	Х			
SUPPLY DUCT PRESSURE TRANSMITTER	X			
OUTSIDE AIR TEMP/RH - COMBO	Х			
SENSOR ENTHALPY WHEEL SUPPLY AIR				
TEMPERATURE	X			
ENTERING OOLING COIL SUPPLY AIR TEMP	X			
GAS FURNACE ENTERING AIR	Х			
TEMP UNIT SUPPLY AIR TEMP/RH -				
COMBO SENSOR	Х			
RETURN AIR TEMP/RH - COMBO SENSOR	Х			
PD WHEEL EXHAUST AIR TEMP/RH - COMBO SENSOR	Х			
ENTHALPY WHEEL EXHAUST AIR	X		1	
TEMP	^			
OUTDOOR & EXHAUST DAMPER ENABLE			X	
ENTHALPY WHEEL SUPPLY SIDE BYPASS DAMPER SIGNAL		х		
ENTHALPY WHEEL EXHAUST SIDE BYPASS DAMPER SIGNAL		X		
PD WHEEL SUPPLY SIDE BYPASS		Х		
DAMPER SIGNAL PD WHEEL EXHAUST SIDE BYPASS				
DAMPER SIGNAL		X	X	
SUPPLY FAN VFD ENABLE & SPEED SIGNALS		X	X	
EXHASUT FAN VFD ENABLE & SPEED SIGNALS		Х	Х	
ENTHALPY WHEEL VFD ENABLE & SPEED SIGNALS		xx	Х	
PD WHEEL VFD ENABLE & SPEED		X	X	
SIGNALS  CHILLED WATER COIL CONTROL		X		
VALVE SIGNAL INDIRECT GAS FURNACE ENABLE		^		
& CONTROL SIGNAL		X	X	

### **SHEET NOTES**

- A. SEE GOOGLE STANDARDS 2.8 FOR MORE DETAIL AND ADDED
- B. VERIFY ALL CONTROL SEQUENCES AND POINT LIST WITH OWNER PRIOR TO INSTALL.

  C. POINT LISTS NOT ON THIS SHEET SHALL BE COORDINATED WITH OWNER.



710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

# URBAN SOUTH

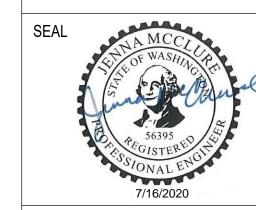
200 PETER KIRK LN. KIRKLAND, WA

# engineers for a sustainable future≀

L 2 1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION
3 07/17/2020 TOWER PERMIT RESUB

ISSUE DATE



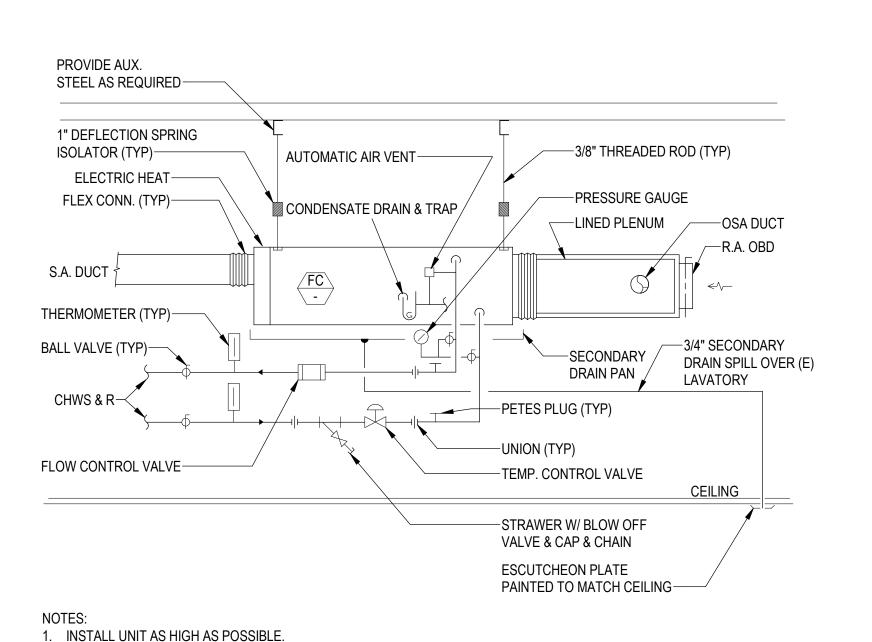
SHEET TITLE / NUMBER POINTS LIST

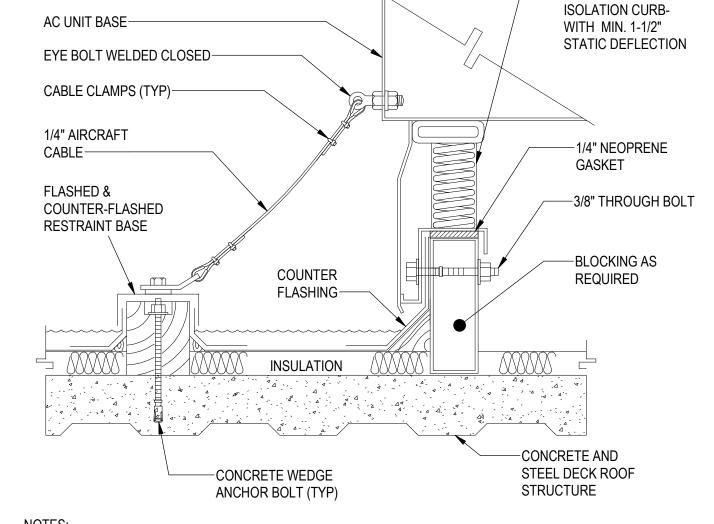
© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

MNR20-06959 Approved Plan Set 03/22/21 Page 25 of 27

NOTES: (#) DAMPER BLADES 2. ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH SMOKE DETECTOR OR FIRE ALARM SYSTEM. COORDINATE WITH ELECTRICAL DESIGN FOR POWER, CONTROL WIRING AND SEQUENCE OF OPERATION. 3. ELECTRIC RESETTABLE FUSIBLE LINK CLOSES AND LOCKS THE DAMPER WHEN TEMPERATURE EXCEEDS PRESET

- TEMPERATURE. DAMPER MAY BE RESET BY PRESSING RESET BUTTON. INTEGRAL DAMPER BLADE INDICATOR SWITCH FOR REMOTE MONITORING OF OPEN AND CLOSED POSITIONS 4. STEEL RETAINING ANGLES, MINIMUM 1-1/2"x1-1/2"x0.060", FASTENED TO FIRE DAMPER SLEEVE. ANGLES SHALL BE INSTALLED ON ALL FOUR SIDES OF DAMPER AND ON EACH SIDE OF THE WALL. FASTEN ANGLE TO SLEEVE WITH #10 SHEET METAL SCREWS (MINIMUM). ANGLE GAUGE AND FASTENING METHOD AS PERMITTED AS A CONDITION OF DAMPER LISTING. REFER TO MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. MINIMUM 1" ANGLE OVERLAP ON ALL SIDES OF PARTITION
- 5. DAMPER SLEEVE ON OPPOSITE SIDE OF WALL FROM ACTUATOR MUST BE MINIMUM 3" AND MAXIMUM OF 6" LONG. 6. DUCT CONNECTION AS PERMITTED AS A CONDITION OF DAMPER LISTING. FLANGED BREAK-AWAY STYLE DUCT/SLEEVE CONNECTIONS ARE SHOWN.
- 7. ACCESS DOOR SHOWN ON BOTTOM OF SLEEVE FOR ACCESS TO FIRE DAMPER BLADES. PANEL TO BE HINGED WITH AIRTIGHT SEAL. ACCESS SIZE MUST BE MINIMUM OF 12" BY 12" OR THE WIDTH OF DUCT IF SMALLER THAN 12" WIDE. ACCESS PANEL MUST BE LABELED WITH THE WORDS, "FIRE DOOR - DO NOT OBSTRUCT" IN LETTERS NO LESS THAN 1" IN HEIGHT. EXTERNAL INSULATION SHALL NOT CONCEAL ACCESS UNLESS A LABEL IS ATTACHED TO THE INSULATION WHICH INDICATES THE EXACT LOCATION OF THE OPENING.
- 8. DUCT SMOKE DETECTOR MOUNTED IN SLEEVE ON OPPOSITE SIDE FROM ACTUATOR WITHIN FIVE FEET OF DAMPER. OR, AREA SMOKE DETECTORS CONNECTED TO CENTRAL FIRE ALARM SYSTEM. SMOKE DETECTORS SHALL BE ADDRESSABLE AND UNIQUELY TAGGED.
- 9. LOCATE 3/4" HIGH WHITE PLASTIC LAMINATE SIGNS WITH 3/8" HIGH BLACK LETTERING WITH THE INITIALS "FSD" AND UNIQUE NUMBER ON THE WALL DAMPER ACCESS PANEL. ATTACH WITH EPOXY ADHESIVE. 10. FIRE/SMOKE DAMPER DETAIL FOR REFERENCE ONLY. FIRE DAMPER SHALL BE STATE FIRE MARSHAL APPROVED. INSTALL
- PER MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS WHICH SHALL BE MADE AVAILABLE TO INSPECTION
- 11. UL 555 & 555S COMPLIANT. LISTINGS: RUSKIN#R5531, GREENHECK#R13317, POTTORFF#R11767, NAILOR#R9492,
- CESCO#R6462. 12. REFER TO SPECIFICATION SECTION 233113 FOR ADDITIONAL REQUIREMENTS.





-CONTINUOUS SPRING

710 SECOND AVENUE SUITE 1400

SEATTLE, WASHINGTON 98104-1710

T. 206.245.2100 F. 206.245.2101

**KIRKLAND** 

**URBAN** 

SOUTH

KIRKLAND, WA

engineers for a sustainable future engineers 

T. 206.262.1010 F. 206.262.9865

Seattle, WA 98101

www.glumac.com

MARK DATE

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure

DESCRIPTION

07/17/2020 TOWER PERMIT RESUB

Job. No.: 05.19.00791

OWNER

200 PETER KIRK LN.

PROJECT

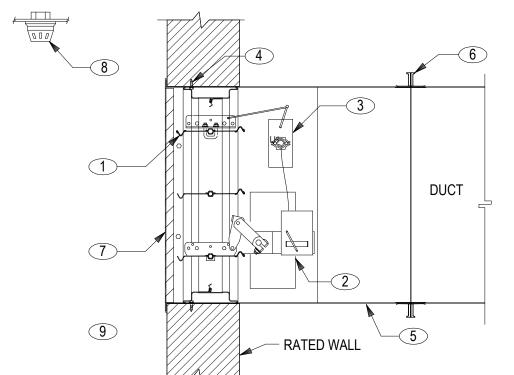
1. SEISMIC RESTRAINT ASSEMBLY SHALL BE INSTALLED DIAGONALLY AT EACH CORNER FOR SMALL UNITS OR ON ALL SIDES OF LARGE UNIT, THREE ASSEMBLIES AT LONG SIDES AND ONE AT SHORT

2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL

**CURB DETAIL-CONC SEISMIC** 

- 3. ALL ANCHORING AND SEISMIC RESTRAINTS SHALL BE REVIEWED BY STRUCTURAL ENGINEER. 4. FLASHING AND COUNTER FLASHING SHALL BE COORDINATED W/ ROOFING CONTRACTOR. THE WORK SHALL NOT VOID THE ROOF WARRANTY.
- 5. ROOFTOP EQUIPMENT SHALL BE INSTALLED ON ROOF IN THE LOCATION WITH ADEQUATE STRENGTH TO SAFELY SUPPORT THE ENTIRE WEIGHT OF THE UNIT AND SERVICE PERSONNEL. CARE SHALL BE TAKEN NOT TO DAMAGE THE ROOF, COORDINATE WITH STRUCTURAL ENGINEER.

# 9 FSD FLOOR AIRFOIL BLADE



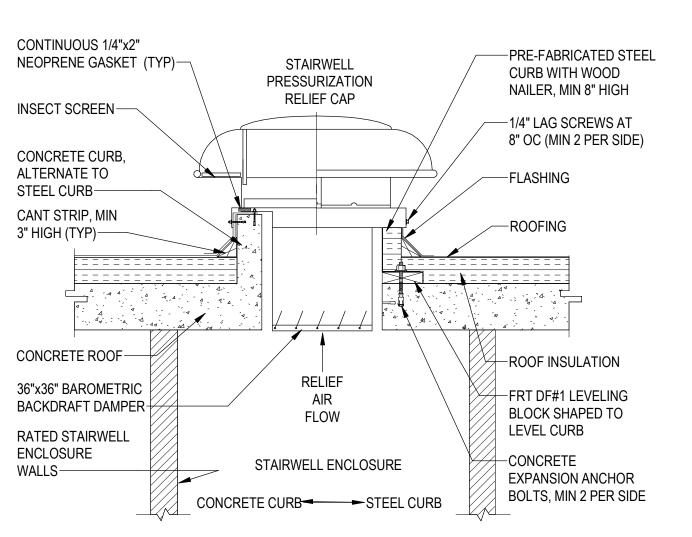
NOTES: # DAMPER BLADES

8 FSD WALL GRILLE ACCESS
SCALE: NONE

- 2. ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH SMOKE DETECTOR OR FIRE ALARM SYSTEM. COORDINATE WITH ELECTRICAL DESIGN FOR POWER, CONTROL WIRING AND SEQUENCE OF OPERATION. ACTUATOR AND CONTROLS LOCATED IN SIDE PANEL (OUT OF AIRFLOW) AND ACCESSIBLE THROUGH REMOVAL GRILLE.
- 3.  $\,$  ELECTRIC RESETTABLE FUSIBLE LINK CLOSES AND LOCKS THE DAMPER WHEN TEMPERATURE EXCEEDS PRESET TEMPERATURE. DAMPER MAY BE RESET BY PRESSING RESET BUTTON. INTEGRAL DAMPER BLADE INDICATOR SWITCH FOR REMOTE MONITORING OF OPEN AND CLOSED POSITIONS.
- 4. SLEEVE SECURED TO WALL WITH #10 LAG SCREWS AT 6" ON CENTER (MAXIMUM) ALL SIDES MAXIMUM OF 2" FROM CORNERS AND MINIMUM OF 2 PER SIDE. FASTENING METHOD AS PERMITTED AS A CONDITION OF DAMPER LISTING. REFER TO MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS
- 5. DAMPER SLEEVE ON OPPOSITE SIDE OF WALL FROM GRILLE MUST NOT EXCEED 16" LONG. 6. DUCT CONNECTION AS PERMITTED AS A CONDITION OF DAMPER LISTING. FLANGED BREAK-AWAY STYLE DUCT/SLEEVE CONNECTIONS ARE SHOWN.
- WALL GRILLE. SIZED TO ALLOW ACCESS TO DAMPER ACTUATOR, FUSABLE LINK AND INDICATOR. 8. AREA SMOKE DETECTOR CONNECTED TO CENTRAL FIRE ALARM SYSTEM. SMOKE DETECTORS SHALL BE ADDRESSABLE AND UNIQUELY TAGGED.
- 9. FIRE/SMOKE DAMPER DETAIL FOR REFERENCE ONLY. FIRE DAMPER SHALL BE STATE FIRE MARSHAL APPROVED. INSTALL PER MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS WHICH SHALL BE MADE AVAILABLE TO INSPECTION AUTHORITIES.
- 10. UL 555 & 555S COMPLIANT. LISTINGS: RUSKIN#R5531, GREENHECK#R13317, POTTORFF#R11767, NAILOR#R9492 CESCO#R6462. 11. REFER TO SPECIFICATION SECTION 233113 FOR ADDITIONAL REQUIREMENTS.

# FAN COIL UNIT

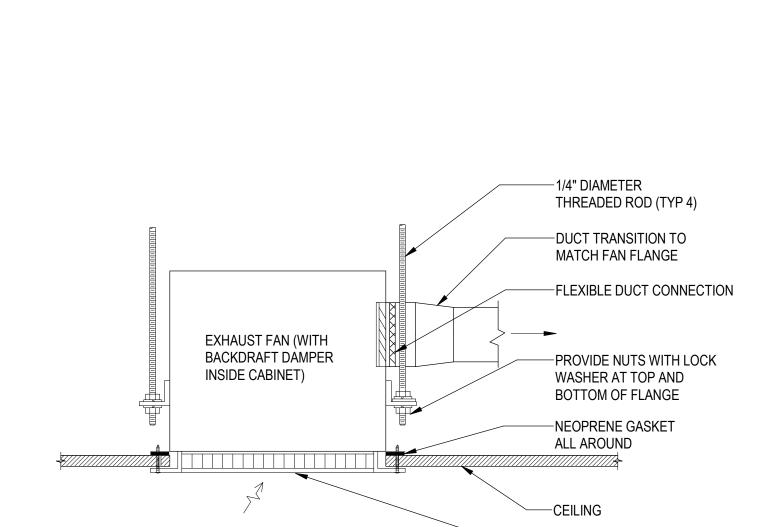
2. REFER TO PLANS FOR SIZES AND CONTINUATION.



- 1. STAIRWELL SMOKE EXHAUST VENT WITH BAROMETRIC RELIEF DAMPER WITH ADJUSTABLE COUNTERWEIGHTS TO BE SET BY TEST AND BALANCE AGENCY. SET TO MAINTAIN 2500 CFM (MINIMUM)
- BASED ON MAINTAINING 0.05" SP (MINIMUM) AT ALL STAIRWELL DOORS. . COORDINATE ROOF OPENING, BLOCKING, CURBING, CANT STRIPS & FLASHING WITH ROOFING INSTALLER. ROOF PENETRATIONS SHALL NOT VOID ROOF WARRANTY.
- 3. MAINTAIN 10' CLEARANCE FROM OUTSIDE AIR INTAKE. PROVIDE PACKING AND SEALING MATERIALS AS REQUIRED BY ROOF RATING.

STAIRWELL RELIEF VENT-CONCRETE ROOF

1. COORDINATE ANCHORAGE REQUIREMENTS WITH STRUCTURAL DESIGN. 5. ALL SIZING, LOCATION, AND ANCHORING SHALL BE COORDINATED WITH STRUCTURAL DESIGN. 2. REFER TO EQUIPMENT SCHEDULE FOR ADDITIONAL FEATURES.



-EXHAUST GRILLE

**EXHAUST FAN-CEILING MOUNTED** 

NOTES:

# SPLIT SYSTEM REFRIGERANT PIPING SCHEMATIC

1. USE PRE-CHARGED LINE SETS. LENGTHS ARE TO BE KEPT AS SHORT AS POSSIBLE. COILING

OF LINES THAT ARE TOO LONG WILL NOT BE ACCEPTABLE.

FAN COIL

SUPPORT ON WALL.—

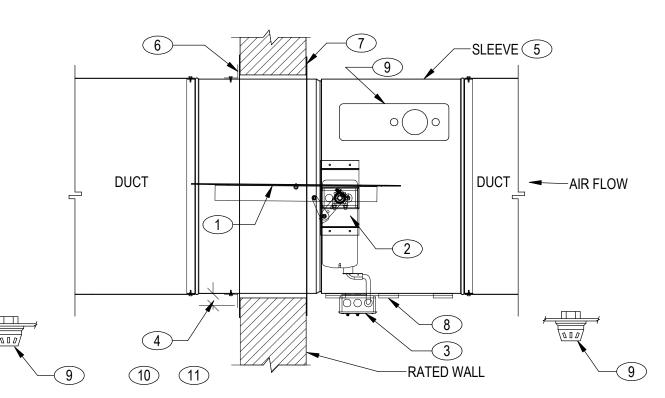
RADIUS ALL BENDS,

3/4" CONDENSATE

TERMINATE 6" ABOVE

4" MINIMUM—

DRAIN LINE,



-WALL PENETRATION. SEAL WATERTIGHT.

-REFRIGERANT-LIQUID LINE

-REFRIGERANT-SUCTION LINE

-20 GAUGE SHEET METAL PAN

AROUND REFRIGERANT LINES.

PAINT PAN TO MATCH BUILDING COLOR WITH PRIMER AND TWO

COATS OF OIL BASE PAINT.

**FASTEN SECURELY TO WALL** 

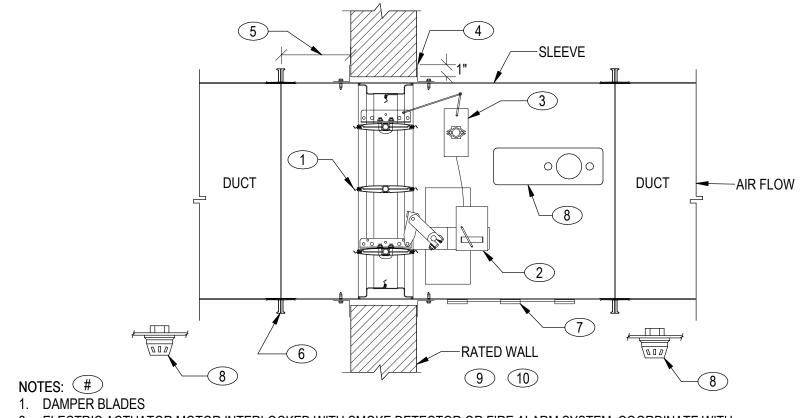
-CONCRETE BASE, 4"

MINIMUM THICKNESS

 DAMPER BLADE 2. ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH SMOKE DETECTOR OR FIRE ALARM SYSTEM. COORDINATE WITH ELECTRICAL DESIGN FOR POWER, CONTROL WIRING AND SEQUENCE OF OPERATION. 3. ELECTRIC RESETTABLE FUSIBLE LINK CLOSES AND LOCKS THE DAMPER WHEN TEMPERATURE EXCEEDS PRESET TEMPERATURE. DAMPER MAY BE RESET BY PRESSING RESET BUTTON. INTEGRAL DAMPER BLADE INDICATOR SWITCH FOR REMOTE MONITORING OF OPEN AND CLOSED POSITIONS.

4. MINIMUM 7/8" GAP BETWEEN WALL AND SLEEVE.

- 5. MAXIMUM 6" SLEEVE ON OPPOSITE SIDE OF WALL FROM ACTUATOR. MAXIMUM 16" SLEEVE ON ACTUATOR SIDE OF WALL. DUCT CONNECTIONS AS PERMITTED AS CONDITION OF DAMPER LISTING. 6. STEEL RETAINING ANGLES, MINIMUM 1-1/2"x1-1/2"x0.060", FASTENED TO FIRE DAMPER SLEEVE. ANGLES SHALL BE INSTALLED ON ALL FOUR SIDES OF DAMPER AND ON EACH SIDE OF THE WALL. FASTEN ANGLE TO SLEEVE WITH #10 SHEET METAL SCREWS (MINIMUM). ANGLE GAUGE AND FASTENING METHOD AS PERMITTED AS A CONDITION OF DAMPER LISTING. REFER TO MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. DAMPER SLEEVE ON OPPOSITE SIDE OF WALL FROM ACTUATOR MUST BE MINIMUM 3" AND MAXIMUM OF 6"
- 7. RETAINING PLATE ON BOTH SIDES OF WALL. MINIMUM 20 GAUGE WITH MINIMUM 1-1/2" FLANGE. 8. ACCESS DOOR SHOWN ON BOTTOM OF SLEEVE FOR ACCESS TO FIRE DAMPER BLADES. PANEL TO BE HINGED WITH AIRTIGHT SEAL. ACCESS SIZE MUST BE MINIMUM OF 12" BY 12" OR THE WIDTH OF DUCT IF SMALLER THAN 12" WIDE. ACCESS PANEL MUST BE LABELED WITH THE WORDS, "FIRE DOOR - DO NOT OBSTRUCT" IN LETTERS NO LESS THAN 1" IN HEIGHT. EXTERNAL INSULATION SHALL NOT
- CONCEAL ACCESS UNLESS A LABEL IS ATTACHED TO THE INSULATION WHICH INDICATES THE EXACT LOCATION OF THE OPENING. 9. DUCT SMOKE DETECTOR MOUNTED IN DUCT ON OPPOSITE SIDE FROM ACTUATOR WITHIN FIVE FEET OF DAMPER. OR, AREA SMOKE DETECTORS CONNECTED TO CENTRAL FIRE ALARM SYSTEM. SMOKE DETECTORS SHALL BE ADDRESSABLE AND UNIQUELY TAGGED. 10. LOCATE 3/4" HIGH WHITE PLASTIC LAMINATE SIGNS WITH 3/8" HIGH BLACK LETTERING WITH THE INITIALS "FSD" AND UNIQUE NUMBER ON
- THE CEILING ACCESS DOOR OR T-BAR CEILING GRID IN THE AREA OF THE DAMPER ACCESS PANEL. ATTACH TO CEILING WITH EPOXY 11. FIRE/SMOKE DAMPER DETAIL FOR REFERENCE ONLY. FIRE DAMPERS SHALL BE STATE FIRE MARSHAL APPROVED AND COMPLETE INSTALLATION SHALL BE PER MANUFACTURER'S PRINTED INSTRUCTIONS WHICH SHALL BE MADE AVAILABLE TO INSPECTION



 DAMPER BLADES 2. ELECTRIC ACTUATOR MOTOR INTERLOCKED WITH SMOKE DETECTOR OR FIRE ALARM SYSTEM. COORDINATE WITH ELECTRICAL DESIGN FOR POWER, CONTROL WIRING AND SEQUENCE OF OPERATION.

3. ELECTRIC RESETTABLE FUSIBLE LINK CLOSES AND LOCKS THE DAMPER WHEN TEMPERATURE EXCEEDS PRESET TEMPERATURE. DAMPER MAY BE RESET BY PRESSING RESET BUTTON. INTEGRAL DAMPER BLADE INDICATOR SWITCH FOR REMOTE MONITORING OF OPEN AND CLOSED POSITIONS. 4. STEEL RETAINING ANGLES, MINIMUM 1-1/2"x1-1/2"x0.060", FASTENED TO FIRE DAMPER SLEEVE. ANGLES SHALL BE INSTALLED ON ALL FOUR SIDES OF DAMPER AND ON EACH SIDE OF THE WALL. FASTEN ANGLE TO SLEEVE WITH #10 SHEET METAL

5. DAMPER SLEEVE ON OPPOSITE SIDE OF WALL FROM ACTUATOR MUST BE MINIMUM 3" AND MAXIMUM OF 6" LONG. 6. DUCT CONNECTION AS PERMITTED PER DAMPER LISTING. FLANGED BREAK-AWAY STYLE DUCT/SLEEVE CONNECTIONS ARE

SCREWS (MINIMUM). ANGLE GAUGE AND FASTENING METHOD AS PERMITTED AS A CONDITION OF DAMPER LISTING. REFER

TO MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. MINIMUM 1" ANGLE OVERLAP ON ALL SIDES OF PARTITION

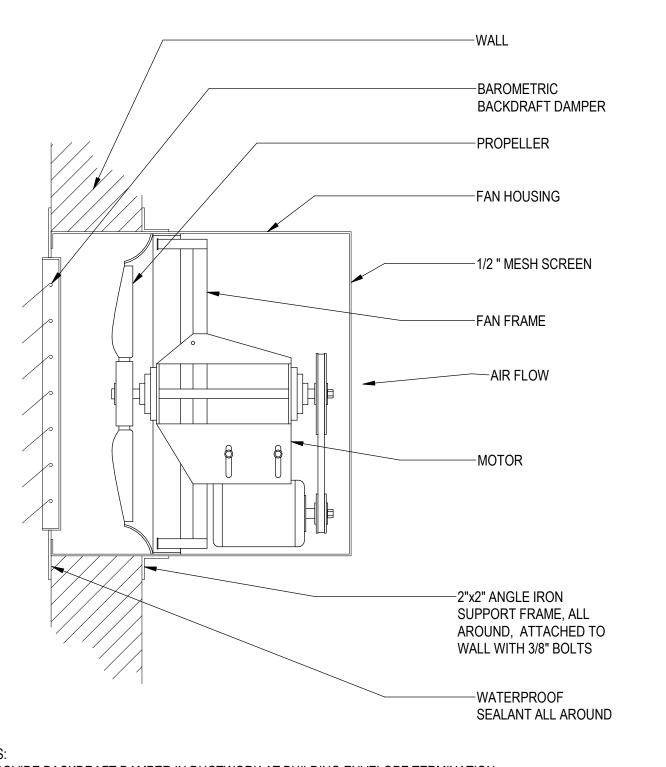
7. ACCESS DOOR SHOWN ON BOTTOM OF SLEEVE FOR ACCESS TO FIRE DAMPER BLADES. PANEL TO BE HINGED WITH AIRTIGHT SEAL. ACCESS SIZE MUST BE MINIMUM OF 12" BY 12" OR THE WIDTH OF DUCT IF SMALLER THAN 12" WIDE. ACCESS PANEL MUST BE LABELED WITH THE WORDS, "FIRE DOOR - DO NOT OBSTRUCT" IN LETTERS NO LESS THAN 1" IN HEIGHT. EXTERNAL INSULATION SHALL NOT CONCEAL ACCESS UNLESS A LABEL IS ATTACHED TO THE INSULATION WHICH INDICATES THE EXACT LOCATION OF THE OPENING.

8. DUCT SMOKE DETECTOR MOUNTED IN SLEEVE ON OPPOSITE SIDE FROM ACTUATOR WITHIN FIVE FEET OF DAMPER. OR, AREA SMOKE DETECTORS CONNECTED TO CENTRAL FIRE ALARM SYSTEM. SMOKE DETECTORS SHALL BE ADDRESSABLE AND UNIQUELY TAGGED. 9. LOCATE 3/4" HIGH WHITE PLASTIC LAMINATE SIGNS WITH 3/8" HIGH BLACK LETTERING WITH THE INITIALS "FSD" AND UNIQUE

NUMBER ON THE CEILING ACCESS DOOR OR T-BAR CEILING GRID IN THE AREA OF THE DAMPER ACCESS PANEL. ATTACH TO CEILING WITH EPOXY ADHESIVE 10. FIRE/SMOKE DAMPER DETAIL FOR REFERENCE ONLY. FIRE DAMPER SHALL BE STATE FIRE MARSHAL APPROVED. INSTALL PER MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS WHICH SHALL BE MADE AVAILABLE TO INSPECTION

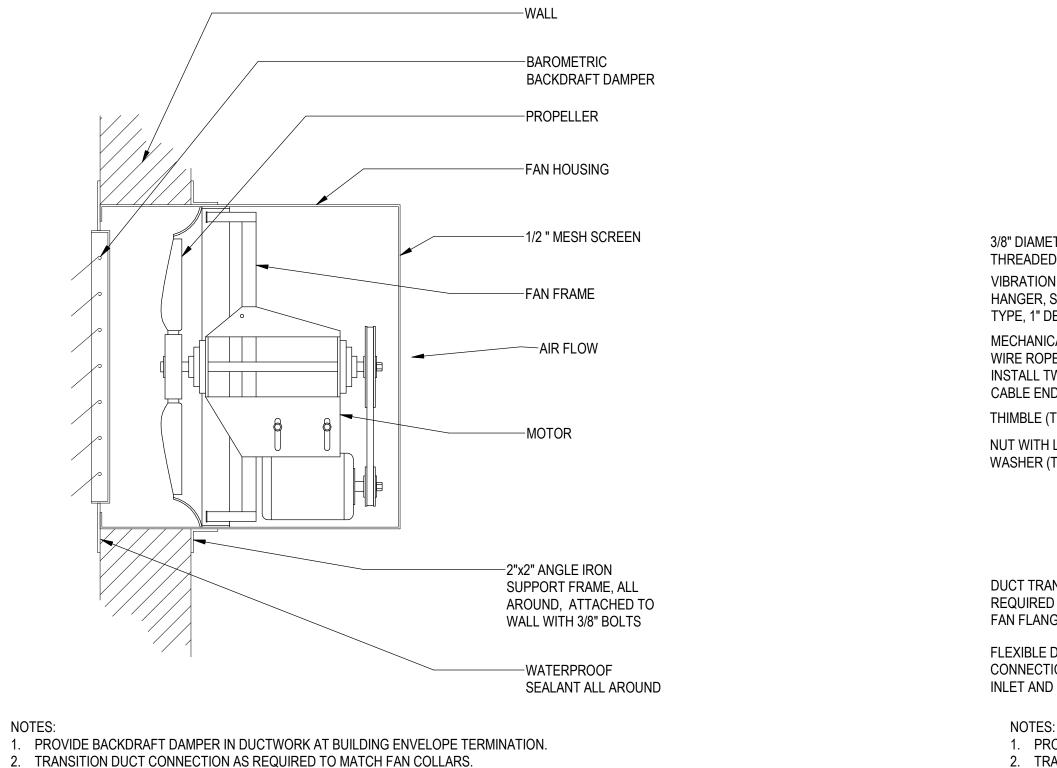
11. UL 555 & 555S COMPLIANT. LISTINGS: RUSKIN#R5531, GREENHECK#R13317, POTTORFF#R11767, NAILOR#R9492,

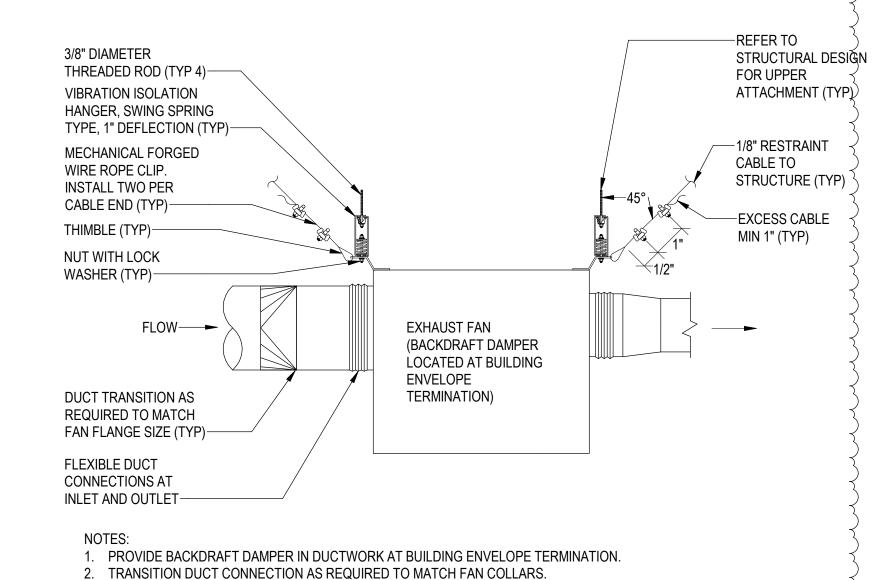
12. REFER TO SPECIFICATION SECTION 233113 FOR ADDITIONAL REQUIREMENTS.



3. REFER TO STRUCTURAL DESIGN FOR ATTACHMENT REQUIREMENTS AND ADDITIONAL SUPPORT OPTIONS.

4. REFER TO PLANS FOR SIZES AND LOCATIONS.





3. REFER TO STRUCTURAL DESIGN FOR ATTACHMENT REQUIREMENTS AND ADDITIONAL SUPPORT

SIDEWALL PROPELLER EXHAUST FAN

SCALE: NONE

EXHAUST FAN INLINE
SCALE: NONE

SHEET TITLE / NUMBER MECHANCIAL DETAILS

DRAWN BY

ISSUE DATE

CBRE03.18.095

\$ .... 

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

FSD WALL ROUND
SCALE: NONE

NOTES: (#)

7 FSD WALL AIRFOIL BLADE
SCALE: NONE

MNR20-06959 Approved Plan Set 03/22/21 Page 26 of 27

710 SECOND AVENUE SUITE 1400 SEATTLE, WASHINGTON 98104-1710 T. 206.245.2100 F. 206.245.2101

PROJECT

# KIRKLAND **URBAN**

200 PETER KIRK LN. KIRKLAND, WA

OWNER

### engineers for a sustainable future engineers for a sustainable f

1601 Fifth Ave., Suite 2210 Project Manager: J. McClure Seattle, WA 98101 Job. No.: 05.19.00791 www.glumac.com T. 206.262.1010 F. 206.262.9865

MARK DATE DESCRIPTION 07/17/2020 TOWER PERMIT RESUB

-INSULATION JACKET ON ALL EXPOSED SURFACES ←CLEVIS PIPE HANGER ATTACHED TO STRUCTURE (TYP) —CALCIUM SILICATE INSULATION WITH GALVANIZED STEEL

—CONNECT TO SIDE

OF RETURN PIPE

—BALL VALVE (TYP)

—ANTI-THERMOSYPHON

LOOP, 12" DEEP (MIN)

-12" DIRT LEG WITH 3/4"

HOSE BIBB DRAIN AND

-ASME PRESSURIZED

-3/4" HOSE BIBB DRAIN

AND CAP

-CONCRETE

HOUSEKEEPING

PAD, 4" THICK (MIN)

**BLADDER-TYPE** 

**EXPANSION TANK** 

VERTICAL PRE-CHARGED

1. INSULATE ALL SURFACES OF AIR SEPARATOR AND PIPING. REFER TO SPECIFICATION. 2. INSTALL HIGH CAPACITY AUTOMATIC AIR VENT ON TOP OF AIR SEPARATOR AND ROUTE DRAIN LINE TO FLOOR SINK.

COORDINATE WITH STRUCTURAL DESIGN FOR ATTACHMENT REQUIREMENTS TO STRUCTURE.

# AIR SEPARATOR SCALE: NONE

MANUAL AIR VENT-

PRESSURE GAUGE-

AIR CHARGING VALVE-

LIFTING LUGS-

FACTORY MOUNTING

CONCRETE EXPANSION

BOLT, MIN 1/2" (TYP)----

3. PRE-CHARGE TANK AS SCHEDULED.

← 6" MIN ← ELEVATION

1. COORDINATE WITH STRUCTURAL DESIGN FOR CONCRETE ATTACHMENT.

2. TANK INSULATION IS NOT REQUIRED WHEN USING AN ANTI-THERMOSYPHON LOOP.

ANGLE (TYP)----

3 EXPANSION TANK
SCALE: NIONIE

ROUTE DRAIN TO FLOOR

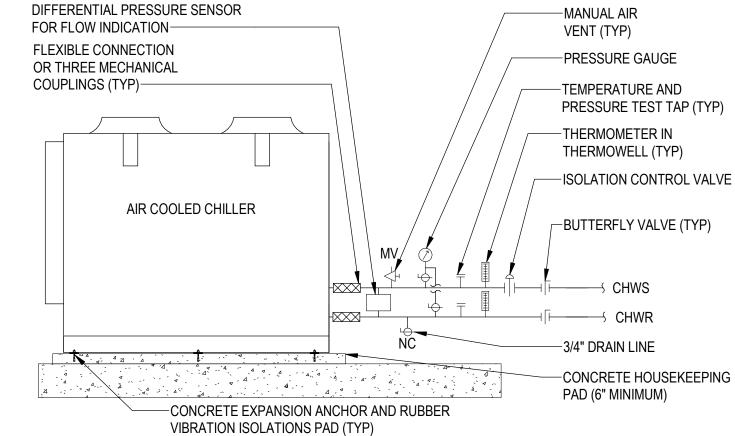
DRAIN OR FLOOR SINK-

AUTOMATIC AIR VENT-

DRAIN PIPE ROUTED TO FLOOR SINK-

HIGH CAPACITY

FLOW



9. PROVIDE ADDITIONAL FLOW SWITCHES OR PRESSURE SENSORS AS REQUIRED BY CHILLER MANUFACTURER FOR WATER FLOW PROOF CONNECTED DIRECTLY TO CHILLER CONTROL PANEL.

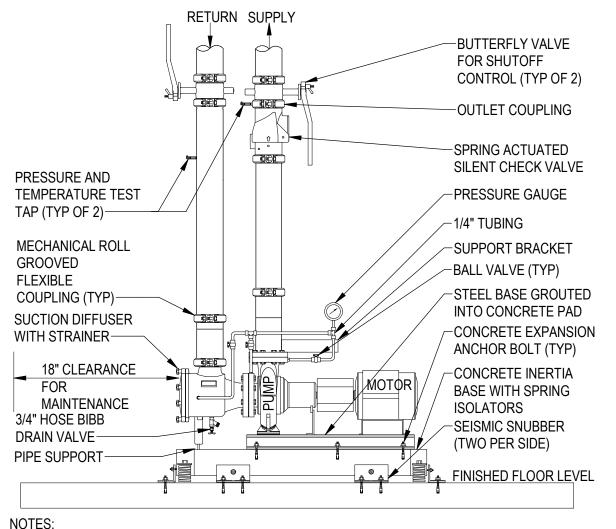
PUMP FACE VIEW -BUTTERFLY VALVE WITH HANDWHEEL GEAR OPERATOR FOR SHUTOFF CONTROL (TYP OF 2) PRESSURE AND —OUTLET COUPLING TEMPERATURE TEST TAP (TYP OF 2) TOP DISCHARGE TO THE TOTAL PROPERTY OF THE PROPERT —SPRING ACTUATED SILENT CHECK VALVE —PRESSURE GAUGE MECHANICAL ROLL **GROOVED FLEXIBLE** —SUPPORT BRACKET COUPLING (TYP)----——1/4" TUBING SUCTION DIFFUSER —BALL VALVE (TYP) WITH STRAINER-3/4" HOSE BIBB -STEEL BASE GROUTED DRAIN VALVE-INTO CONCRETE PAD -4"x1/2" THICK PLATE 18" CLEARANCE —CONCRETE INERTIA BASE WITH SPRING ISOLATORS. MAINTENANCE -SEISMIC SNUBBER PIPE SUPPORT— (TWO PER SIDE) FINISHED FLOOR LEVEL -CONCRETE EXPANSION ANCHOR

> 1. INSULATE ALL FITTINGS, VALVES, STRAINER, CHECK VALVE, PIPE AND PUMP IMPELLER. EXTEND MEASUREMENT PORTS TO EXTERIOR OF INSULATION. 2. PROVIDE CONCRETE PAD, 4" HIGH (MINIMUM), WITH DIMENSIONS AS NECESSARY TO SUPPORT PUMP. . REMOVE FINE MESH STRAINER PRIOR TO FINAL WATER BALANCE. 4. PROVIDE MINIMUM THREE FLEXIBLE MECHANICAL COUPLINGS ON EACH SIDE OF PUMP FOR VIBRATION ISOLATION. USE MECHANICAL VIBRATION ISOLATOR IF PIPE JOINTS ARE FLANGED OR WELDED.

BOLT (TYP)

5. MAINTAIN MINIMUM FIVE TIMES PIPE DIAMETER STRAIGHT LENGTH PRIOR TO CHECK VALVE. 6. TRIPLE DUTY VALVES NOT ALLOWED. 7. COORDINATE ANCHORAGE REQUIREMENTS WITH STRUCTURAL DESIGN.

# 6 SPLIT CASE PUMP W INERTIA BASE SCALE: NONE



- 1. INSULATE ALL FITTINGS, VALVES, STRAINER, CHECK VALVE, PIPE AND PUMP IMPELLER. EXTEND MEASUREMENT PORTS TO EXTERIOR OF INSULATION. PROVIDE CONCRETE PAD, 4" HIGH (MINIMUM), WITH DIMENSIONS AS NECESSARY TO SUPPORT PUMP. REMOVE FINE MESH STRAINER PRIOR TO FINAL WATER BALANCE. 4. PROVIDE MINIMUM THREE FLEXIBLE MECHANICAL COUPLINGS ON EACH SIDE OF PUMP FOR
- VIBRATION ISOLATION. USE MECHANICAL VIBRATION ISOLATOR IF PIPE JOINTS ARE FLANGED OR 5. MAINTAIN MINIMUM FIVE TIMES PIPE DIAMETER STRAIGHT LENGTH PRIOR TO CHECK VALVE. 6. TRIPLE DUTY VALVES NOT ALLOWED. 7. COORDINATE ANCHORAGE REQUIREMENTS WITH STRUCTURAL DESIGN.

# 5 BASE MOUNTED END SUCTION PUMP W INERTIA BASE SCALE: NONE

QUICK FILL BYPASS

BALL VALVE. CLOSE

AND REMOVE HANDLE—

AFTER INITIAL FILL

1. INSULATE DOMESTIC COLD WATER PIPING AND FITTINGS IF REQUIRED TO PREVENT

(FULL LINE SIZE)—

—COLD WATER MAKE

DESIGN FOR

3/4" to 2"

-STRAINER WITH

HOSE BIBB AND CAP

-REDUCED PRESSURE

SHUTOFF VALVES

—FIXED AIR GAP FITTING

WITH 2" DRAIN TO

FLOOR SINK

BACKFLOW PREVENTER (RP) WITH INTEGRAL CHECK

VALVES, TEST PORTS, AND

CONTINUATION

UP. SEE PLUMBING



- SHUTOFF VALVE (TYP)— MANUAL BALANCING VALVE-CHWR CHWS MANUAL AIR VENT-----2 PIPE DIAMETERS -MIN STRAIGHT LENGTH -5 PIPE DIAMETERS -MIN STRAIGHT LENGTH -2-WAY MODULATING AIR FLOW FLOW CONTROL VALVE CHILLED WATER COIL -PRESSURE AND TEMPERATURE TEST UNION (TYP)-TAP (TYPICAL) -STRAINER W/ FLEXIBLE (EPDM/KEVLAR) HOSE BIBB DRAIN REINFORCED HOSE WITH BRAIDED VALVE STAINLESS STEEL JACKET, MINIMUM 12" LONG (TYP)-
- 1. WATER SHALL BE PIPED COUNTER FLOW TO AIRFLOW, SUPPLY AT BOTTOM. 2. LOCATE PIPING TO CLEAR ACCESS DOORS. 3. SHUTOFF VALVES TO BE BALL TYPE FOR SIZE 2" AND BELOW, AND BUTTERFLY FOR 2-1/2" AND ABOVE. 4. INSULATE PIPING, VALVES AND FITTINGS FROM PIPE MAINS TO COIL CONNECTIONS. 5. MULTIPLE DUTY VALVES ARE NOT ALLOWED. 6. MOUNT STRAINER AT LOW POINT. IF NOT POSSIBLE, PROVIDE SEPARATE DRAIN VALVE.
- 7. INSTALL ANCHORS AND SUPPORTS TO ALLOW COIL MOVEMENT IN ALL DIRECTIONS WITH MINIMAL PIPE STRESS. 8. REFER TO SPECIFICATIONS FOR ADDITIONAL VALVE REQUIREMENTS.

MAKEUP WATER RP DEVICE

SCALE: NONE

PRESSURE RELIEF

PRESSURE GAUGE

(TYPICAL)-

CONNECT TO

PRESSURE

HYDRONIC SYSTEM-

BALL VALVE (TYPICAL)-

REGULATING VALVE-

VALVE, ROUTE DRAIN

PIPE TO FLOOR SINK-

7 CHILLED WATER COIL 2-WAY
SCALE: NONE

2. PROVIDE DRAIN LINES, MINIMUM 1/2", FROM VENTS AND RELIEF VALVES AND ROUTE TO NEAREST FLOOR SINK. 3. SET PRESSURE REGULATOR TO A MINIMUM OF 4 PSI GREATER STATIC HEAD AT HIGH POINT OF SYSTEM. REFER TO EXPANSION TANK SCHEDULE FOR PRESSURE SETTINGS.

1 AIR COOLED CHILLER
SCALE: NONE

1. MAINTAIN MANUFACTURER REQUIRED CLEARANCES. 2. ALL SENSORS AND THERMOSTATS SHALL BE LOCATED 7'AFF (MAX) AND EASILY READABLE FROM STANDING POSITION. 3. FOR PIPE SIZES & CONTINUATION SEE DRAWINGS. 4. INSULATE ALL CHILLED WATER PIPING AND FITTINGS PER SPECIFICATIONS. 5. DIFFERENTIAL PRESSURE MAY BE CALIBRATED TO BAS FOR FLOW RATES. 6. COORDINATE ANCHORAGE REQUIREMENTS WITH STRUCTURAL DESIGN. 7. COORDINATE SHUTOFF VALVES WITH PUMP 8. PROVIDE THERMOWELLS AND PIPE TAP FITTINGS AS REQUIRED FOR CONTROL SYSTEM DEVICES.

MECHANICAL DETAILS

© 2019 COLLINSWOERMAN, ALL RIGHTS RESERVED

SHEET TITLE / NUMBER

PROJECT NO.

DRAWN BY

ISSUE DATE

CBRE03.18.095