

SYMBOLS AND ABBREVIATIONS		
SYMBOL	ABBREVIATION	DESCRIPTION
-	AC-	AIR CONDITIONING UNIT
-	AD	ACCESS DOOR
-	AFF	ABOVE FINISHED FLOOR
-	AHC	ABOVE HUNG CEILING
-	AP	ACCESS PANEL
-	BHP	BRAKE HORSEPOWER
-	BTU	BRITISH THERMAL UNIT
-	CFM	CUBIC FEET PER MINUTE
-	COD	CABLE OPERATED DAMPER
-	DB	DRY BULB TEMPERATURE
-	DIA. OR Ø	DIAMETER
-	DX	DIRECT EXPANSION
-	EA	EXHAUST AIR
-	EAT	ENTERING AIR TEMPERATURE
-	ER	EXHAUST REGISTER
-	ESP	EXTERNAL STATIC PRESSURE
-	EWT	ENTERING WATER TEMPERATURE
-	FCU	FAN COIL UNIT
-	FPM	FEET PER MINUTE
-	FPS	FEET PER SECOND
-	GPM	GALLONS PER MINUTE
-	HP	HORSE POWER
-	LAT	LEAVING AIR TEMPERATURE
-	LF	LINEAR FEET
-	LWT	LEAVING WATER TEMPERATURE
-	MBH	1000 BRITISH THERMAL UNITS PER HOUR
-	MER	MECHANICAL EQUIPMENT ROOM
-	NIC	NOT IN CONTRACT
-	OAI	OUTSIDE AIR INTAKE
-	PSI	POUNDS PER SQUARE INCH
-	RA	RETURN AIR
-	RF-	RETURN FAN
-	RPM	REVOLUTIONS PER MINUTE
-	SA	SUPPLY AIR
-	SP	STATIC PRESSURE
-	TD	TRANSFER DUCT
-	TF-	TRANSFER FAN
-	TSP	TOTAL STATIC PRESSURE
-	TYP.	TYPICAL
-	U.O.N.	UNLESS OTHERWISE NOTED
-	WB	WET BULB TEMPERATURE
-	WG	INCHES OF WATER GAUGE
-	EX.	EXISTING TO REMAIN
-----	REL.	REMOVE AND RELOCATE
-	NEW	NEW WORK
-----	DEM.	EXISTING TO BE REMOVED
Ⓧ	-	THERMOSTAT
⊕	-	AIR INTO REGISTER
⊗	-	POINT OF CONNECTION DISCONNECTION
⊕	SR	SUPPLY REGISTER
⊗	CD	1-WAY
⊗	CD	2-WAY
⊗	CD	2-WAY
⊗	CD	3-WAY
⊗	CD	4-WAY
⊗	RR/RG/ER	RETURN REGISTER/GRILLE/EXHAUST REGISTER
⊗	-	SUPPLY DUCT UP
⊗	-	SUPPLY DUCT DOWN

SYMBOLS AND ABBREVIATIONS		
SYMBOL	ABBREVIATION	DESCRIPTION
	-	RETURN DUCT UP
	-	RETURN DUCT DOWN
	-	TRANSITION FROM SQUARE TO ROUND DUCT
	-	TRANSITION
	-	DUCT DROP
	-	DUCT RISE
	-	SQUARE VANED ELBOW
	-	DUCT RISE
	-	DUCT DROP
	-	DUCT TRANSITION
	-	ALUMINUM DUCT
	AL	ACOUSTIC LINING
	FD/AD	FIRE DAMPER W/ ACCESS DOOR
	SD/AD	SMOKE DAMPER W/ ACCESS DOOR
	CFSD	COMBINATION FIRE/SMOKE DAMPER W/ ACCESS DOOR
	VD	VOLUME DAMPER
	AL	ACOUSTIC LINING
	-	DUCT SIZE - 1ST FIGURE IS SIDE SHOWN
	FC	FLEXIBLE CONNECTION
	-	ALUMINUM DUCT
	-	EXHAUST REGISTER
	-	NEW CEILING DIFFUSER

- GENERAL NOTES**
- CONTRACT DRAWINGS, AS FAR AS THEY RELATE TO THE GENERAL ARRANGEMENT AND LOCATION OF EQUIPMENT, SHEET METAL, AND PIPING, SHALL BE UNDERSTOOD AS DIAGRAMMATIC. ANY CHANGES TO EQUIPMENT, SHEET METAL, AND PIPING LOCATIONS NECESSARY TO AVOID INTERFERENCE WITH OTHER TRADES SHALL BE MADE AT NO EXTRA COST, AND MUST BE APPROVED BY THE ENGINEER.
 - THE MECHANICAL CONTRACTOR SHALL INSTALL FIRE DAMPERS WITH ACCESS DOORS IN ALL DUCTS PENETRATING FIRE RATED WALLS, WHETHER SPECIFICALLY SHOWN ON THE DRAWINGS OR NOT.
 - THE MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL VOLUME DAMPERS IN DUCTWORK AS REQUIRED TO BALANCE THE AIRFLOW AT ALL REGISTERS AND DIFFUSERS TO THE CFM'S INDICATED ON PLAN, WHETHER SPECIFICALLY SHOWN ON THE DRAWINGS OR NOT.
 - PROVIDE ALL PIPE OPENINGS THROUGH PARTITIONS WITH PIPE SLEEVES. FOR PIPES PENETRATING FIRE RATED PARTITIONS, THE SPACE BETWEEN THE PIPE AND THE SLEEVE SHALL BE SEALED WITH FIRE STOPPING MATERIAL. PENETRATIONS FOR PIPING SHALL BE MADE BY CORE DRILLING WHENEVER POSSIBLE.
 - ACOUSTICALLY LINE ALL TRANSFER DUCTS. ACOUSTIC LINING SHALL BE 1" THICK. PROVIDE RETURN REGISTERS AT TRANSFER DUCT INLETS & OUTLETS LOCATED BELOW THE CEILING, OR IN AREAS WITH NO CEILING.
 - DUCT-MOUNTED SMOKE DETECTORS AND SAMPLING TUBES SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL INSTALL EACH SAMPLING TUBE IN THE DUCTWORK. THE ELECTRICAL CONTRACTOR SHALL INSTALL AND WIRE EACH SMOKE DETECTOR. THE MECHANICAL CONTRACTOR SHALL NOT BRANCH OFF ANY DUCT REQUIRING A DUCT SMOKE DETECTOR BEFORE THE DUCT SMOKE DETECTOR. LOCATE SMOKE DETECTORS IN SERVICEABLE AREAS, NOT IN SHAFTS.
 - ALL MOTOR STARTERS AND DISCONNECT SWITCHES FOR HVAC EQUIPMENT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED. DISCONNECT SWITCHES FURNISHED BY THE MECHANICAL CONTRACTOR FOR HVAC EQUIPMENT SHALL BE HEAVY DUTY TYPE.
 - THE MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO THE BEGINNING OF WORK, AND SHALL COORDINATE ALL WORK WITH OTHER TRADES.
 - DUCT DIMENSIONS SHOWN ON MECHANICAL DRAWINGS REFER TO INSIDE CLEAR DUCT DIMENSIONS. WHERE DUCTWORK IS LINED, THE MECHANICAL CONTRACTOR SHALL INCREASE THE SIZE OF DUCT TO COMPENSATE FOR LINING.
 - LOCATE THERMOSTATS AND TEMPERATURE SENSORS 5'-6" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. COORDINATE LOCATION WITH FURNITURE, CABINETS, ETC. FURNISH LOCKING TAMPERPROOF COVER FOR ALL NEW THERMOSTATS IN PUBLIC AREAS.
 - COORDINATE DUCTWORK, GRILLE, DIFFUSER AND REGISTER LOCATIONS WITH LIGHTS, SPRINKLER HEADS, SMOKE DETECTORS, AND THE ARCHITECTURAL PLANS.
 - THE MECHANICAL CONTRACTOR SHALL NOTE THAT, IN ADDITION TO THE SPECIFICATIONS AND DETAILS GIVEN IN THESE PLANS FOR PIPE HANGERS AND SUPPORTS, ALL HANGERS AND SUPPORTS SHALL BE DESIGNED AND INSTALLED IN COMPLIANCE WITH APPLICABLE SEISMIC CODES.
 - THE MECHANICAL CONTRACTOR SHALL SUBMIT FOR REVIEW A COMPOSITE SHOP DRAWING, FULLY COORDINATED WITH ALL OTHER TRADES, INDICATING DUCTWORK, PLUMBING, SPRINKLER PIPING, STRUCTURAL, LIGHTS, CONDUITS, SMOKE DETECTORS, DIFFUSERS, GRILLES, ETC.
 - ALL WORK SHALL COMPLY WITH STATE BUILDING CODE, LOCAL BUILDING CODE, AND ENERGY CODE REQUIREMENTS. IN CASE OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND A GOVERNING CODE OR ORDINANCE, THE MORE STRINGENT STANDARD SHALL APPLY.
 - DURING CONSTRUCTION, ALL OPEN OR INCOMPLETE DUCTWORK SHALL BE CAPPED AIRTIGHT WITH WITH HEAVY POLYETHYLENE PLASTIC. AFTER THE INSTALLATION OF DUCTWORK, REGISTERS, GRILLES, AND DIFFUSERS, THE CONTRACTOR SHALL BLANK OFF ALL REGISTERS, GRILLES, AND DIFFUSERS WITH HEAVY POLYETHYLENE PLASTIC AND TAPE AIR TIGHT, IN AREAS THAT ARE UNDER CONSTRUCTION, UNTIL WORK IS COMPLETE IN THOSE AREAS. FLOOR REGISTERS AND GRILLES SHALL ALSO BE COVERED WITH 1/8" MASONITE.
 - WHEN GENERAL CONSTRUCTION IS COMPLETE, VACUUM CLEAN ALL DIFFUSERS, REGISTERS, GRILLES, AND HVAC EQUIPMENT IN THE PROJECT AREA OR SERVING THE PROJECT AREA. REMOVE ANY CONSTRUCTION DEBRIS. REPLACE ALL AIR FILTERS WITH NEW.
 - THE OWNER'S PERMANENT HVAC EQUIPMENT SHALL NOT BE USED BY ANY CONTRACTOR DURING CONSTRUCTION FOR TEMPORARY HEATING, COOLING, OR VENTILATION. IF TEMPORARY HEATING, COOLING, OR VENTILATION IS REQUIRED AT ANY POINT DURING CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE TEMPORARY HEATING, COOLING, OR VENTILATION EQUIPMENT, DUCTWORK, CONTROLS, AND POWER AT HIS OWN EXPENSE.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY VENTILATION AND EXHAUST AIR WHEN WELDING OR SOLDERING OPERATIONS ARE PERFORMED, AS REQUIRED BY OSHA.
 - WHERE BUILDING STRUCTURAL COMPONENTS HAVE FIREPROOF MATERIAL, ANY AREA THAT IS DISTURBED OR DAMAGED AS A RESULT OF MECHANICAL WORK, INCLUDING THE INSTALLATION OF HANGERS FOR PIPING, DUCTWORK, OR EQUIPMENT, SHALL BE PATCHED WITH UL AND FM APPROVED FIREPROOFING TO MATCH EXISTING.
 - THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL NECESSARY PERMITS AND FOR PAYING RELATED FEES.
 - ALL DUCTWORK SHALL BE PRESSURE TESTED AND INSPECTED PRIOR TO CONCEALMENT IN GENERAL CONSTRUCTION OR INSTALLATION OF HUNG CEILINGS.
 - COORDINATE DUCTWORK AND PIPING PENETRATIONS THRU FLOORS/SLABS, WALLS, AND ROOF WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.

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ISSUED FOR CONSTRUCTION

KEY PLAN

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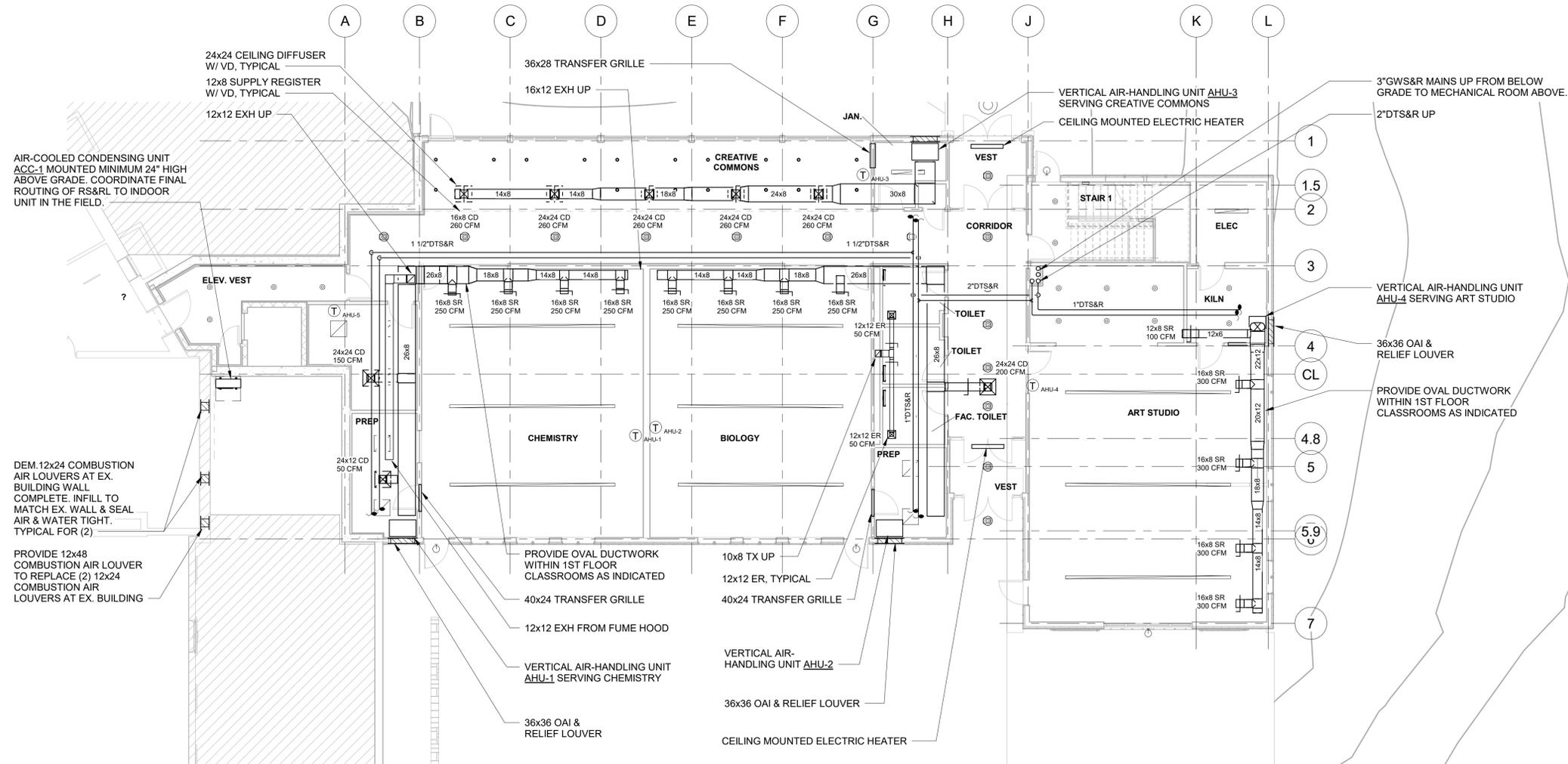
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No.	Date	Issue
7	08/12/2021	Issued for Construction
6	06/25/2021	Issued for Permit
5	02/24/2021	Issued for Bid
4	02/10/2021	Issued for Review
3	5/14/2020	90% Construction Documents
2	2/21/2020	Design Development
1	12/18/2019	Schematic Design

MECHANICAL SYMBOLS, ABBREVIATIONS & NOTES

Job No. NKGD0214.00 Date 06/25/2021
 Scale AS NOTED Drawn / Checked TV / RG
 Sheet Number **M001**



MECHANICAL 1ST FLOOR NEW WORK PLAN
SCALE: 1/8" = 1'-0"

KEY PLAN

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3	02/10/2021	Issued for Review
2	05/14/2020	90% Construction Documents
1	02/21/2020	Design Development

MECHANICAL 1ST FLOOR PLAN

Job No.	NKGD0214.00	Date	02/24/2021
Scale	AS NOTED	Drawn / Checked	Author Checker

Sheet Number
M201

KEY PLAN

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1	02/21/2020	Design Development

Sheet Title

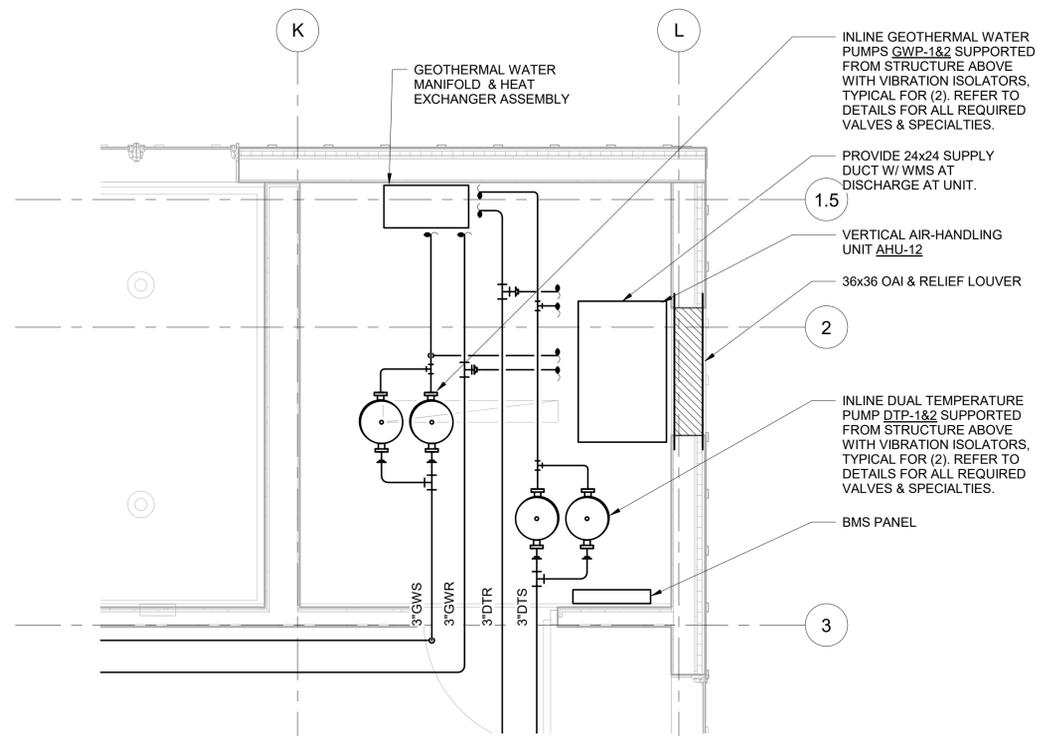
MECHANICAL 2ND FLOOR NEW
WORK PLAN BASE BID

Job No. NKG0214.00 Date 02/24/2021

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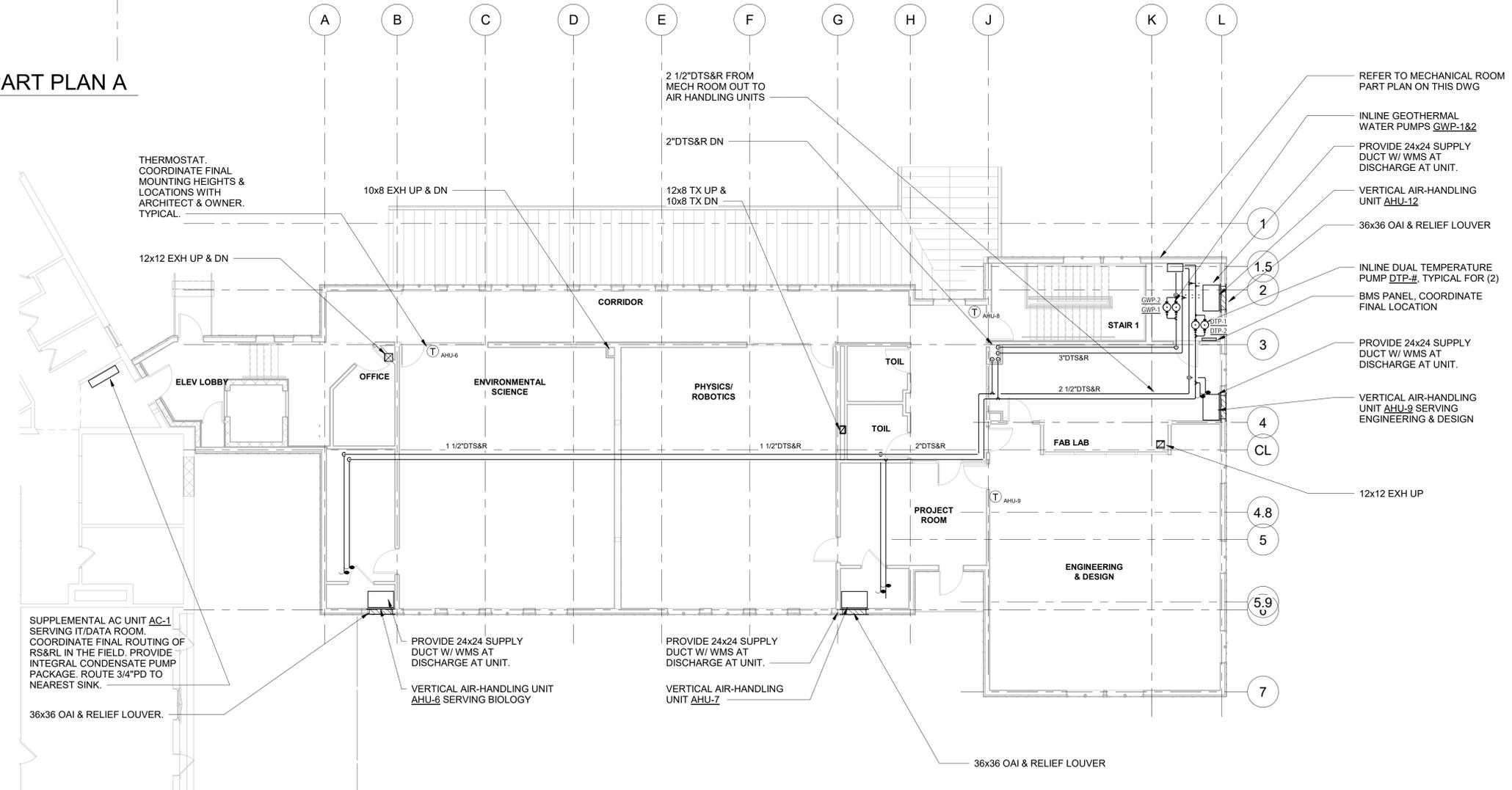
M202A



2ND FLOOR NOTES:

1. REFER TO DRAWING M-202B FOR ADD ALTERNATE 1: FULL 2ND FLOOR BUILD-OUT.
2. PROVIDE ALL AHU'S, PUMPS, MANIFOLDS, CONTROLS, AND PIPING AS REQUIRED FOR FULLY FUNCTIONING SYSTEMS UNDER THE BASE BID.
3. ROUTE ALL PIPING AS HIGH AS POSSIBLE TO ACCOMMODATE FUTURE CEILING INSTALLATION. PROVIDE HORIZONTAL SUPPLY DUCT TAP W/ WMS AT DISCHARGE OF EACH AHU AS INDICATED ON PLANS. REFER TO ARCHITECTURAL DRAWINGS FOR INFORMATION.

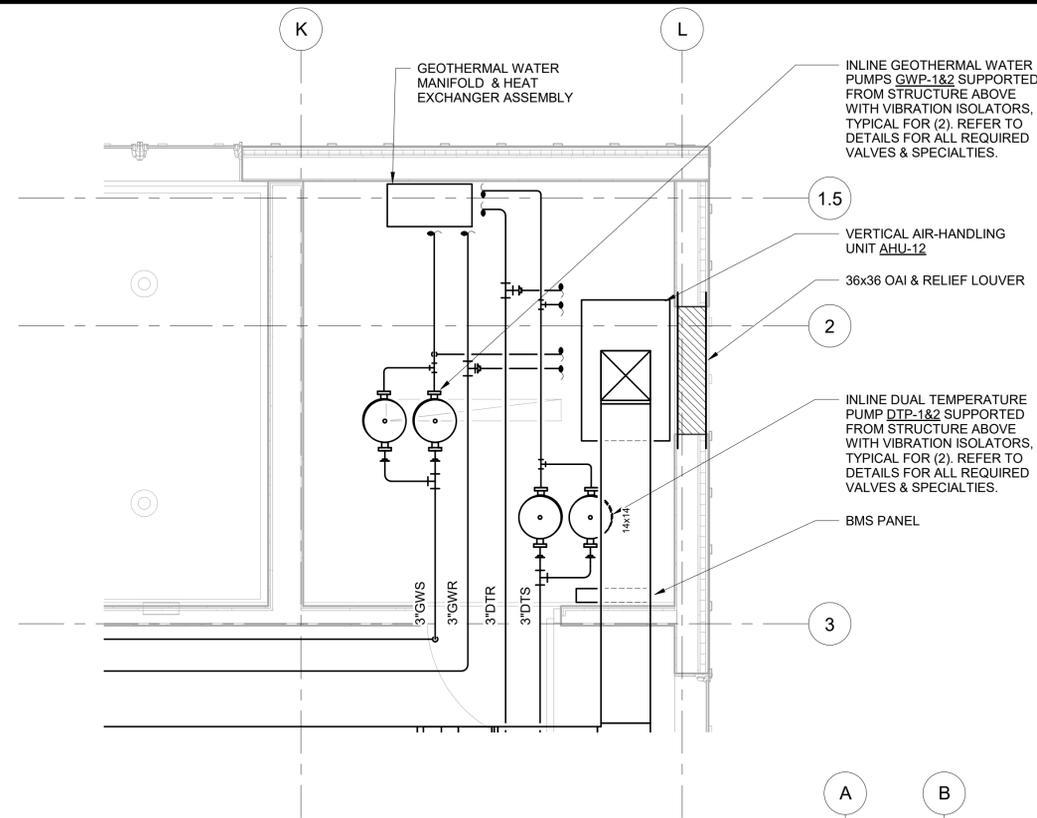
2 MECHANICAL ROOM PART PLAN A
SCALE: 1/2" = 1'-0"
NORTH



1 MECHANICAL 2ND FLOOR NEW WORK PLAN BASE BID
SCALE: 1/8" = 1'-0"
NORTH

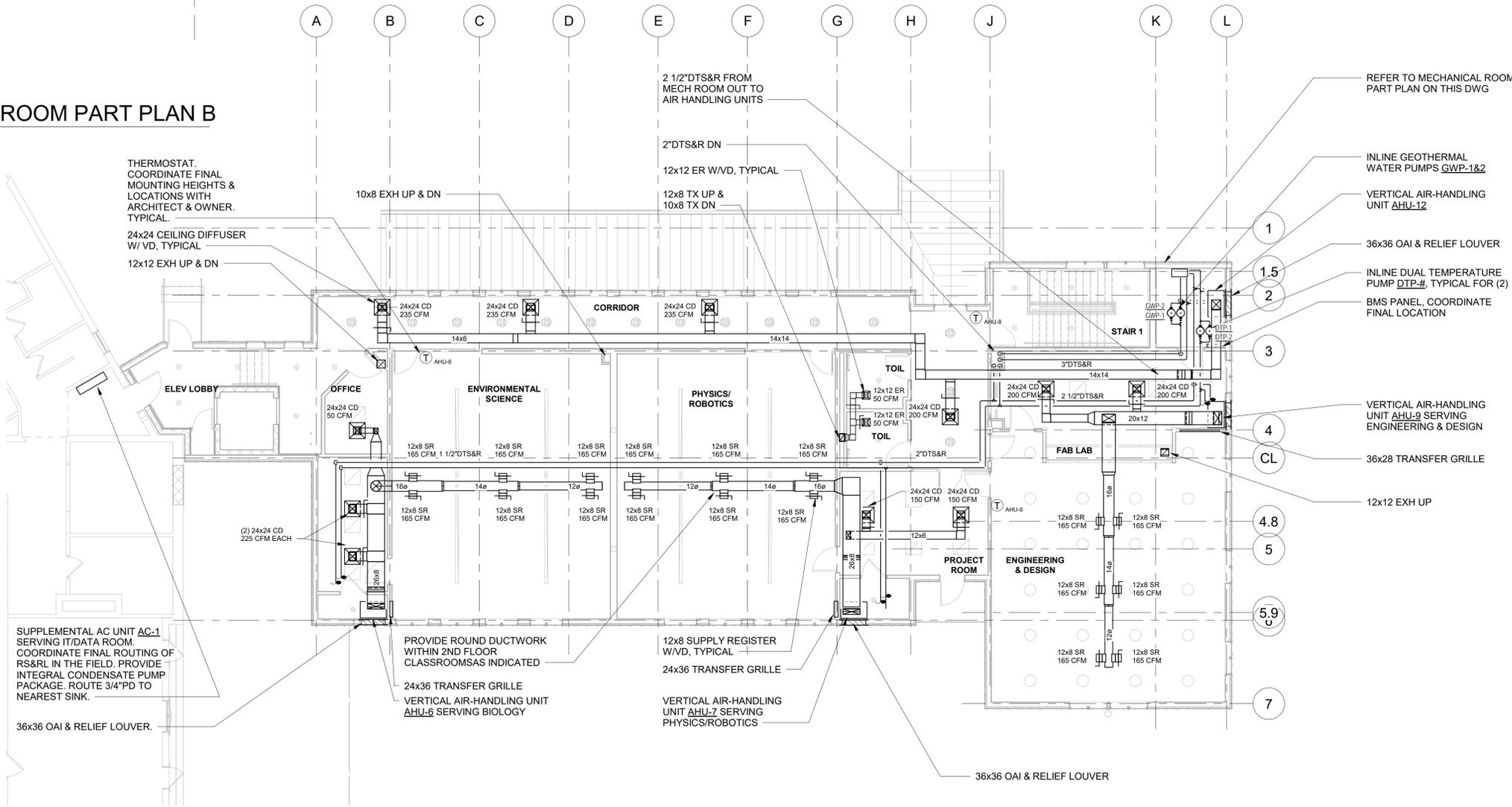
2ND FLOOR NOTES:

- COORDINATE FINAL CEILING DIFFUSER LOCATIONS & ACCESS PANELS WITH ARCHITECTURAL RCP AND ALL OTHER TRADES.



2 MECHANICAL ROOM PART PLAN B
SCALE: 1/2" = 1'-0"

THERMOSTAT COORDINATE FINAL MOUNTING HEIGHTS & LOCATIONS WITH ARCHITECT & OWNER. TYPICAL.
24x24 CEILING DIFFUSER W/ VD, TYPICAL
12x12 EXH UP & DN



SUPPLEMENTAL AC UNIT AC-1 SERVING IT/DATA ROOM. COORDINATE FINAL ROUTING OF RS&RL IN THE FIELD. PROVIDE INTEGRAL CONDENSATE PUMP PACKAGE. ROUTE 3/4" PD TO NEAREST SINK.
36x36 OAI & RELIEF LOUVER.

PROVIDE ROUND DUCTWORK WITHIN 2ND FLOOR CLASSROOMS AS INDICATED
24x36 TRANSFER GRILLE
VERTICAL AIR-HANDLING UNIT AHU-6 SERVING BIOLOGY

12x8 SUPPLY REGISTER W/VD, TYPICAL
24x36 TRANSFER GRILLE
VERTICAL AIR-HANDLING UNIT AHU-7 SERVING PHYSICS/ROBOTICS

- REFER TO MECHANICAL ROOM PART PLAN ON THIS DWG
- INLINE GEOTHERMAL WATER PUMPS GWP-1&2
- VERTICAL AIR-HANDLING UNIT AHU-12
- 36x36 OAI & RELIEF LOUVER
- INLINE DUAL TEMPERATURE PUMP DTP-#, TYPICAL FOR (2)
- BMS PANEL, COORDINATE FINAL LOCATION
- VERTICAL AIR-HANDLING UNIT AHU-9 SERVING ENGINEERING & DESIGN
- 36x28 TRANSFER GRILLE
- 12x12 EXH UP



1 MECHANICAL 2ND FLOOR NEW WORK PLAN - ADD ALT
SCALE: 1/8" = 1'-0"

KEY PLAN

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Professional Seal

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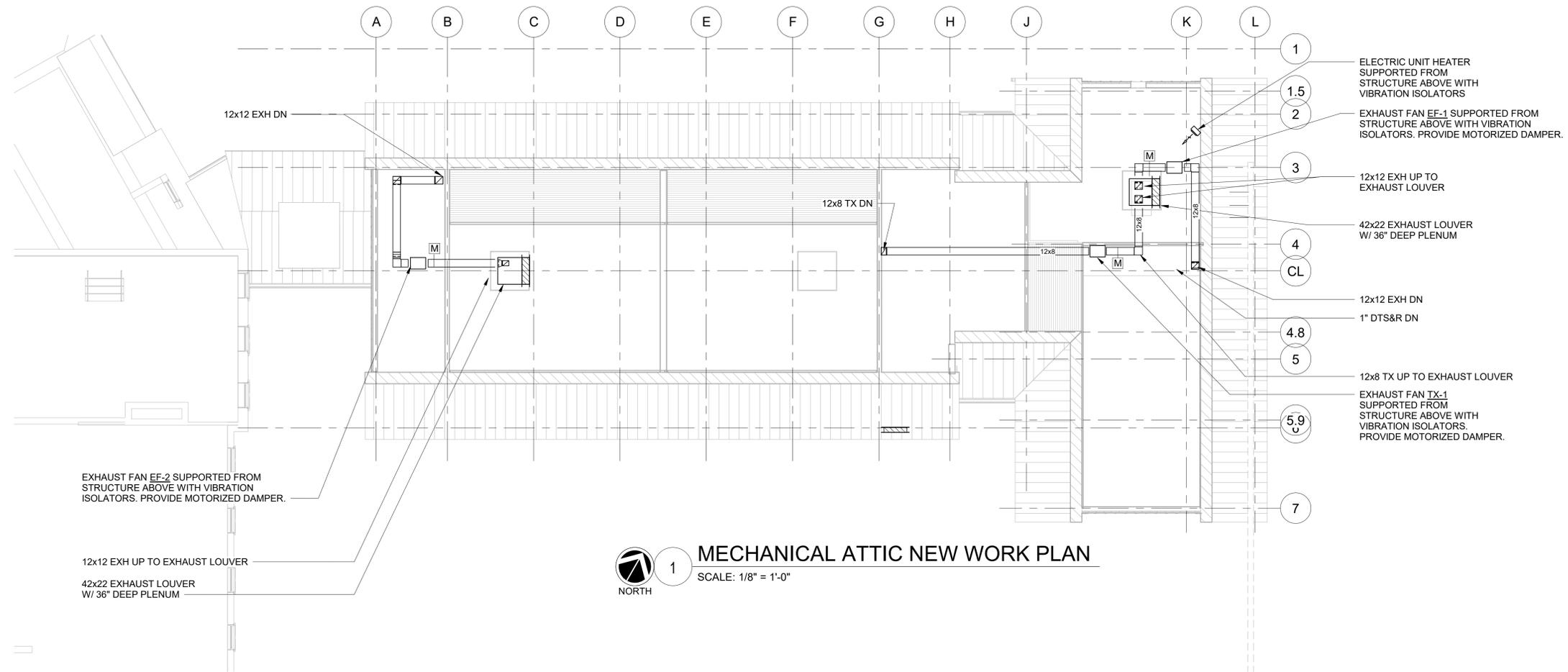
MECHANICAL 2ND FLOOR NEW WORK PLAN

Job No. NKG0214.00 Date 02/24/2021

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Sheet Number

M202B



MECHANICAL ATTIC NEW WORK PLAN
SCALE: 1/8" = 1'-0"
NORTH

KEY PLAN

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MECHANICAL ATTIC NEW WORK PLAN

Job No.	NKGD0214.00	Date	02/24/2021
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M203

KEY PLAN

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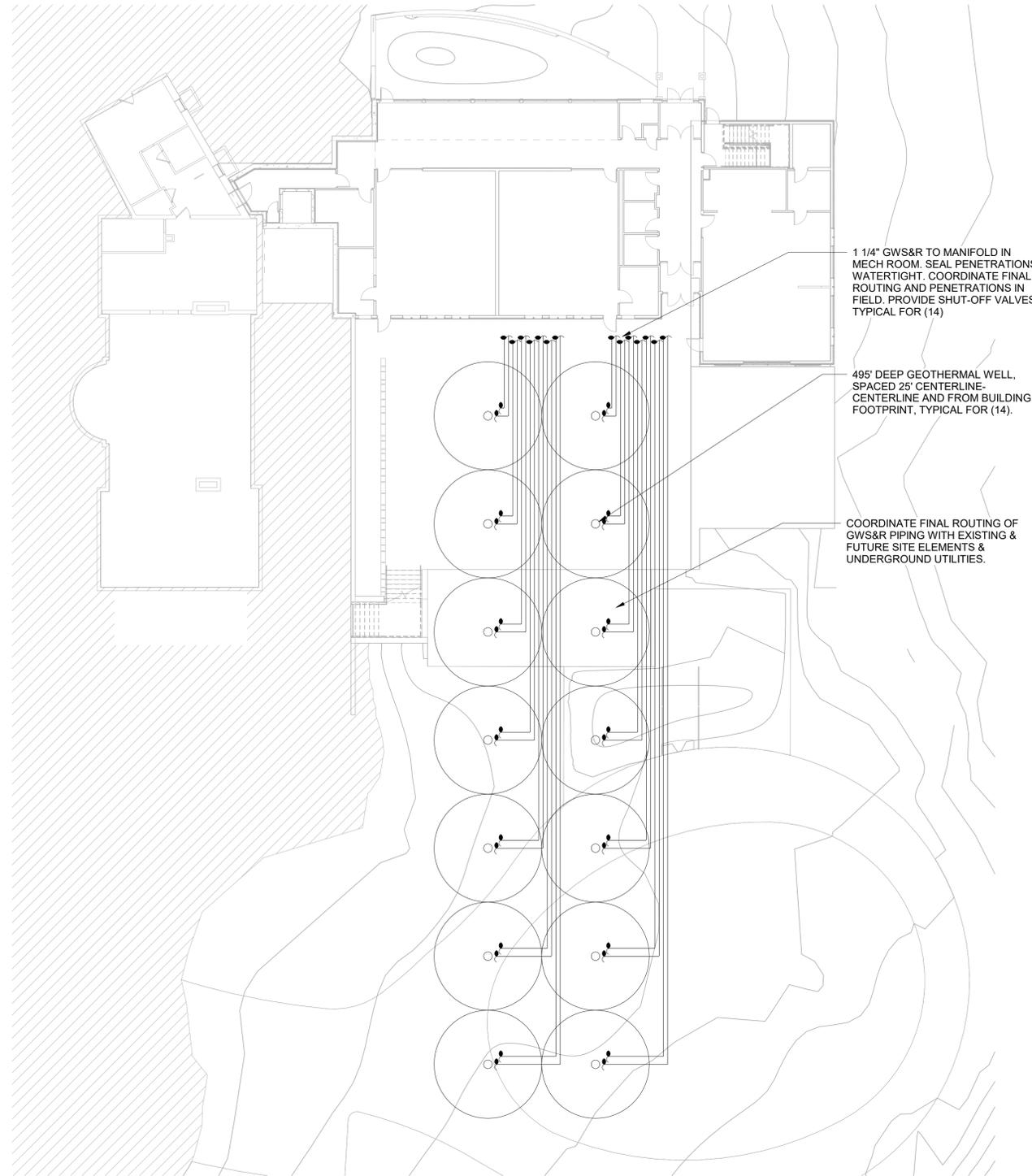
MECHANICAL SITE PLAN

Job No. NKG0214.00 Date 02/24/2021

Scale AS NOTED Drawn / Checked TV / RG

Sheet Number

M401



GEOTHERMAL SPECIFICATIONS

SUMMARY

A. THIS SECTION INCLUDES PIPING FOR VERTICAL, DIRECT-BURIED, GROUND-LOOP, HEAT-PUMP SYSTEMS THAT OPERATE BETWEEN 23 AND 104 DEG F (MINUS 5 AND PLUS 40 DEG C).

PERFORMANCE REQUIREMENTS

A. COMPONENTS AND INSTALLATION SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING MINIMUM WORKING PRESSURE, UNLESS OTHERWISE INDICATED:

A.1. GROUND-LOOP, HEAT-PUMP PIPING: 200 PSIG.

SUBMITTALS

A. PRODUCT DATA: FOR THE FOLLOWING:

- A.1. PIPE AND FITTINGS.
- A.2. JOINING METHOD AND EQUIPMENT.
- A.3. PROPYLENE GLYCOL SOLUTION.
- B. FIELD QUALITY-CONTROL TEST REPORTS.

PRODUCTS

PIPES AND FITTINGS

- A. PIPE: SDR-11
- B. U-BEND ASSEMBLY: FACTORY FABRICATED WITH EMBOSSED DEPTH STAMP EVERY 24 INCHES.

BOREHOLE BACKFILL

- A. SURFACE SEAL: BENTONITE OR CEMENT WITH THERMAL CONDUCTIVITY GREATER THAN 1.2 BTU/H X SQ. FT. X DEG F (0.7 W/SQ. M X K).
- B. BACKFILL BELOW SURFACE SEAL: NATURAL OR MANUFACTURED SAND.

ANTIFREEZE SOLUTION

- A. PROPYLENE GLYCOL: MINIMUM 25 PERCENT FOOD GRADE PROPYLENE GLYCOL WITH CORROSION INHIBITORS AND ENVIRONMENTAL STABILIZER ADDITIVES TO BE MIXED WITH WATER TO PROTECT THE PIPING CIRCUIT AND CONNECTED EQUIPMENT FROM PHYSICAL DAMAGE FROM FREEZING OR CORROSION.
- B. QUANTITY: SUFFICIENT SOLUTION FOR INITIAL SYSTEM STARTUP AND FOR PREVENTIVE MAINTENANCE FOR ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION.
- C. DILUTION WATER: CHLORIDE CONTENT SHALL BE LESS THAN 25 PPM, SULFATE LESS THAN 25 PPM, AND HARDNESS LESS THAN 100 PPM.

HORIZONTAL PIPING INSTALLATION

- A. SEPARATE TRENCHES BY 10 FEET MINIMUM, UNLESS OTHERWISE INDICATED. REMOVE ROCKS IN TRENCHES THAT COULD CONTACT PIPE.
- B. BACKFILL TO 24 INCHES ABOVE PIPE WITH MUD DEVELOPED FROM EXCAVATED ROCK-FREE SOIL OR WITH SAND, PEA GRAVEL, OR FLY ASH. BACKFILL FROM SLURRY LEVEL TO GRADE WITH EXCAVATED SOIL, COMPACTING AS REQUIRED FOR PIPE BURIAL.
- C. INSTALL PE PIPING IN TRENCHES ACCORDING TO ASTM D 2774 OR ASTM F 645.
- C.1. CLEAN PE PIPE AND FITTINGS AND MAKE HEAT-FUSION JOINTS ACCORDING TO ASTM D 2657. MINIMIZE NUMBER OF JOINTS.
- D. PURGE, FLUSH, AND PRESSURE TEST PIPING BEFORE BACKFILLING TRENCHES.
- E. INSTALL CONTINUOUS DETECTABLE WARNING TAPE FOR UNDERGROUND PIPING. LOCATE TAPE A MINIMUM OF 24 INCHES BELOW FINISHED GRADE, DIRECTLY OVER PIPING.

VERTICAL PIPING INSTALLATION

- A. INSTALL PE PIPING IN BOREHOLES ACCORDING TO ASTM D 2774 OR ASTM F 645.
- A.1. CLEAN PE PIPE AND FITTINGS AND MAKE HEAT-FUSION JOINTS ACCORDING TO ASTM D 2657. MINIMIZE NUMBER OF JOINTS.
- B. PURGE, FLUSH, AND PRESSURE TEST PIPING BEFORE BACKFILLING BOREHOLES.
- C. AFTER INSTALLATION OF LOOP PIPE IN BOREHOLE, FILL PIPING LOOP WITH WATER OR ANTIFREEZE SOLUTION, AND PUMP BACKFILL INTO BOREHOLE TO DISCHARGE AT BASE OF BOREHOLE.
- D. FILL BOREHOLE WITH BACKFILL TO A POINT AT LEAST 60 INCHES BELOW GRADE AND BACKFILL REMAINDER WITH SURFACE SEAL MATERIAL.
- E. EXTEND PIPING AND CONNECT TO WATER-SOURCE, GROUND-LOOP, HEAT-PUMP PIPING SYSTEMS AT OUTSIDE FACE OF BUILDING WALL IN LOCATIONS AND PIPE SIZES INDICATED.
- E.1. TERMINATE WATER-SERVICE PIPING AT BUILDING WALL UNTIL BUILDING WATER-SOURCE, GROUND-LOOP, HEAT-PUMP PIPING SYSTEMS ARE INSTALLED. TERMINATE PIPING WITH CAPS. MAKE CONNECTIONS TO BUILDING WATER-SOURCE, GROUND-LOOP, HEAT-PUMP PIPING SYSTEMS WHEN THOSE SYSTEMS ARE INSTALLED.

ANTIFREEZE SOLUTION FILL

- A. FILL SYSTEM WITH REQUIRED QUANTITY OF PROPYLENE GLYCOL AND WATER AS INDICATED ON DRAWINGS.
- B. TEST THE DILUTE SOLUTION USING GAS CHROMATOGRAPHY TO VERIFY CONCENTRATION OF PROPYLENE GLYCOL AND FORWARD REPORT TO ARCHITECT AND ENGINEER.

CONNECTIONS

A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES.

FIELD QUALITY CONTROL

- A. PIPING TESTS: FILL PIPING 24 HOURS BEFORE TESTING AND APPLY TEST PRESSURE TO STABILIZE PIPING. USE POTABLE WATER ONLY.
- B. HYDROSTATIC TESTS: TEST AT NOT LESS THAN 1-1/2 TIMES THE PIPE WORKING-PRESSURE RATING ALLOWING FOR STATIC PRESSURE OF BOREHOLE DEPTH.
- B.1. INCREASE PRESSURE IN 50-PSIG INCREMENTS AND INSPECT EACH JOINT BETWEEN INCREMENTS. HOLD AT TEST PRESSURE FOR 30 MINUTES. SLOWLY INCREASE TO NEXT TEST PRESSURE INCREMENT AND HOLD FOR 30 MINUTES. AFTER TESTING AT MAXIMUM TEST PRESSURE, REDUCE PRESSURE TO 30 PSIG. HOLD FOR 90 MINUTES, AND MEASURE PRESSURE AT 30-MINUTE INTERVALS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
- C. PREPARE REPORTS OF TESTING ACTIVITY



MECHANICAL SITE NEW WORK PLAN

SCALE: 1/16" = 1'-0"

NORTH

WATER SOURCE HEAT PUMP AIR HANDLER UNIT SCHEDULE

DESIGNATION	AHU-1	AHU-2	AHU-3	AHU-4	AHU-6	AHU-7	AHU-9	AHU-12
LOCATION	1ST FLOOR	1ST FLOOR	1ST FLOOR	1ST FLOOR	2ND FLOOR	2ND FLOOR	2ND FLOOR	2ND FLOOR
SERVES	CHEMISTRY	BIOLOGY	CREATIVE COMMONS	ART STUDIO	ENVIRONMENT SCIENCE	PHYSICS/ROBOTICS	ENG DESIGN	2ND FL CORRIDOR
MANUFACTURER	SYSTEMAIR	SYSTEMAIR	SYSTEMAIR	SYSTEMAIR	SYSTEMAIR	SYSTEMAIR	SYSTEMAIR	SYSTEMAIR
MODEL	EWHP30	EWHP30	WHP48	WHP48	WHP30	WHP30	EWHP30	WHP30
CFM	1000	1000	1400	1400	950	950	950	700
MIN OA CFM	450	450	250	450	250	250	350	250
FAN HP	½	½	½	½	½	½	½	¼
ESP (IN H ₂ O)	0.45"	0.45"	0.55"	0.58"	0.45"	0.45"	0.45"	0.53
COOLING COIL:								
E.A.T. (°F) DB/WB	80 / 67	80 / 67	77.5 / 65	80 / 67	80 / 67	80 / 67	80 / 67	80 / 67
L.A.T. (°F) DB/WB	59 / 56.5	59 / 56.5	58.5 / 55.8	55 / 54	55 / 54	55 / 54	55 / 54	55 / 54
GPM	9.5	9.5	8.8	10.0	9.5	9.5	9.5	6
EWT/LWT (°F)	90 / 97.8	90 / 97.8	90 / 97.8	90 / 97.8	90 / 97.8	90 / 97.8	90 / 97.8	90 / 97.8
W.P.D. (FT H ₂ O)	11	11	7.5	10.3	11	11	11	4.4
SENS. CAP. (MBH)	22.9	22.9	27	27.3	24.2	24.2	24.2	21.4
TOTAL CAP. (MBH)	32.5	32.5	36.2	34.9	32.6	32.6	32.6	21.4
HEATING COIL:								
E.A.T./L.A.T. (°F)	50 / 104	50 / 104	55 / 104	50 / 95	50 / 95	50 / 95	50 / 95	50 / 95
GPM	8	8	8	10	8	8	8	8
EWT/LWT (°F)	120 / 100	120 / 100	120 / 100	120 / 100	120 / 100	120 / 100	120 / 100	120 / 100
W.P.D. (FT H ₂ O)	8.2	8.2	7.5	10.3	8.2	8.2	8.2	7.5
CAPACITY (MBH)	37.1	37.1	59	73.1	37.1	37.1	37.1	28.3
SUPPLEMENTAL ELECTRIC HEAT COIL:								
FLA	16.7	16.7	-	-	-	-	13.9	-
FILTERS DATA:								
TYPE	-	-	-	-	-	-	-	-
No./SIZE	18X18	18X18	18X18	18X18	18X18	18X18	18X18	18X18
ELECTRICAL DATA:								
VOLTS/Ø/Hz	208/3/60	208/3/60	208/1/60	208/1/60	208/1/60	208/1/60	208/1/60	208/1/60
MCA	29.75	29.75	6.8	6.8	6.8	6.8	6.8	4.0
MAX FUSE SIZE	30	30	15	15	15	15	15	15
NOTES: 1. BASED ON 2. FURNISH THE FOLLOWING OPTIONAL EQUIPMENT: • SINGLE POINT POWER CONNECTION. • ALL UNITS SHALL BE HIGH EFFICIENCY. • HIGH STATIC DRIVE MOTOR • DISCONNECT SWITCH. • SPARE SET OF FILTERS AND BELTS. • CONDENSATE PUMP PACKAGE • SHEETMETAL DRIP PAIN WITH LEAK DETECTION 3. MOTOR STARTER WITH PHASE LOSS PROTECTION & DISCONNECT SWITCH FOR EACH UNIT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR & INSTALLED BY THE ELECTRICAL CONTRACTOR. EACH UNIT SHALL BE FURNISHED WITH UNIT-MOUNTED LOCAL DISCONNECT SWITCH. 4. COORDINATE SIDE OR END SUPPLY/RETURN AIR CONFIGURATION.								

FAN SCHEDULE			
DESIGNATION	TX-1	EF-1	EF-2
LOCATION	ATTIC	ATTIC	ATTIC
AREA SERVED	BATHROOMS	SEE PLANS	SEE PLANS
MODEL	SQ-75 (VARI-GREEN)	SQ-85 (VARI-GREEN)	SQ-100 (VARI-GREEN)
CFM	250	430	1200
BHP	.04	.08	.24
HP	¼	¼	¼
FAN RPM	1725	1725	1725
FAN (IN H ₂ O)	.3	.375	.5
VOLTS/Ø/Hz	115/1/60	115/1/60	115/1/60
INTERLOCK	-	-	-
NOTES: 1. FANS BASED ON GREENHECK. 2. FURNISH MOTOR STARTERS AND DISCONNECT SWITCHES FOR EACH FAN. 3. FURNISH RUBBER IN SHEAR OR SPRING VIBRATION ISOLATORS. SEE PLAN FOR INLET AND DISCHARGE ORIENTATION.			

PUMP SCHEDULE		
DESIGNATION	GWP-1&2	DTP-1&2
LOCATION	MECH ROOM	MECH ROOM
SYSTEM SERVED	GEO THERMAL	AHU'S
ARRANGEMENT	INLINE	INLINE
MANUFACTURER	BELL & GOSSET	BELL & GOSSET
TYPE	INLINE	INLINE
MODEL	E-80	E-80
IMPELLER DIA. (IN.)	6.625	6.625
GPM	120	120
TOTAL DYNAMIC HEAD (FT H ₂ O)	100	135
RPM	3600	3600
NPSH (FT. H ₂ O)	18.3	18.3
MOTOR BHP	2.75	2.75
MOTOR HP	3	3
VOLTAGE/Ø/Hz	208/3/60	208/3/60
STARTER TYPE		
STARTER LOCATION	MECH ROOM	MECH ROOM
DISCONNECT SWITCH AT PUMP (Y/N)	Y	Y
INTERLOCK	WSHP-1,2,3,4	WSHP-1,2,3,4
NOTES: 1. ALL PUMPS SHALL BE CAST IRON BODY, BRONZE FITTED, BRONZE IMPELLER. REFER TO SPECIFICATION FOR PUMP CONSTRUCTION. 2. ALL MOTORS 1 HP OR GREATER SHALL BE PREMIUM EFFICIENCY. 3. ALL MOTORS FURNISHED WITH VARIABLE FREQUENCY DRIVES SHALL BE INVERTER DUTY RATED & APPROVED FOR VARIABLE SPEED AND TORQUE APPLICATIONS. 4. MOTOR STARTERS AND DISCONNECT SWITCHES SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.		

EQUIPMENT NOTES

- FIRE DAMPERS: SHALL BE RUSKIN MODEL DIBD-2, 1-1/2 HOUR UL555 RATED, SUITABLE FOR INSTALLATION IN WALL AND FLOOR PARTITIONS WITH FIRE RATINGS OF LESS THAN 3 HOURS. DAMPER SHALL BE A COMPLETE FACTORY PACKAGE INCLUDING U.L. APPROVED ANGLES, WALL SLEEVE, AND BREAKAWAY CONNECTIONS. DAMPER SHALL BE RATED FOR DYNAMIC AIRFLOW CONDITIONS OF 2,000 FPM AND 4.0" SP.
- SMOKE DAMPERS: SHALL BE POTTORFF MODEL SD-141, CLASS 1 UL555S RATED, SUITABLE FOR INSTALLATION IN RATED WALL AND FLOOR PARTITIONS. DAMPER SHALL BE A COMPLETE FACTORY PACKAGE INCLUDING U.L. APPROVED ANGLES, WALL SLEEVE, AND BREAKAWAY CONNECTIONS. 120V POWER OPEN SPRING CLOSED ACTUATOR. PROVIDE CLOSURE DEVICE WITH MANUAL RESET (PROVIDE INDICATOR SWITCH PACKAGE). DAMPER SHALL BE RATED FOR DYNAMIC AIRFLOW CONDITIONS OF 2,000 FPM AND 4.0" SP. INSTALL DUCT SMOKE DETECTOR WITHIN 5' OF DAMPER. DUCT SMOKE DETECTOR SHALL BE PURCHASED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTOR SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR.
- COMBINATION FIRE SMOKE DAMPERS: SHALL BE POTTORFF MODEL FSD-151, UL 555 CLASS I, WITH AIRFOIL BLADES. ACTUATOR AND CONTROLS SHALL BE SIDE MOUNT, 120V POWERED OPEN SPRING CLOSED, HORIZONTAL OR VERTICAL MOUNT, COORDINATE APPLICATION IN FIELD. OPTIONAL DRS-30 CLOSURE DEVICE WITH PI 50 INDICATOR SWITCH PACKAGE. OPTIONAL 18 GAGE SLEEVE COORDINATE LENGTH REQUIRED IN FIELD. (1) SIDE OR (2) SIDE RETAINING ANGLES. INSTALL DUCT SMOKE DETECTOR WITHIN 5' OF DAMPER. DUCT SMOKE DETECTOR SHALL BE PURCHASED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTOR SHALL BE WIRED BY THE ELECTRICAL CONTRACTOR.
- VOLUME CONTROL DAMPERS: FOR ALL ROUND & RECTANGULAR VOLUME CONTROL DAMPERS THAT ARE LOCATED ABOVE INACCESSIBLE CEILINGS, PROVIDE CABLE OPERATED DAMPERS. ROUND DAMPERS SHALL BE YOUNG BOWDEN MODEL 5020-CC. RECTANGULAR DAMPERS SHALL BE MODEL 830-CC2. CABLE CONTROLS SHALL BE MODEL 270-275 FOR CONCEALED LOCATIONS & MODEL 270-896C FOR LOCATIONS WHERE CABLES TERMINATE IN FINISHED SPACES. COORDINATE LOCATIONS IN THE FIELD.
- MOTORIZED DAMPERS: SHALL BE RUSKIN MODEL CD40, 4" DEEP EXTRUDED ALUMINUM AIRFOIL DAMPER. DAMPER SHALL HAVE OPPOSED BLADES, MOTOR AND LINKAGE. DAMPERS SHALL BE 120V/1Ø/60Hz, 3 AMPS MAX. FURNISH DISCONNECT SWITCH.
 - OUTSIDE AIR INTAKE & EXHAUST DAMPERS SHALL BE CLASS 1 MOTORIZED DAMPERS WITH MAXIMUM LEAKAGE RATE OF 4 CFM/FT2 @ 1.0" W.G.; TESTED IN ACCORDANCE WITH AMCA 500D & IN COMPLIANCE WITH SECTION C403.2.4.3 OF THE 2015 IECC. DAMPERS SHALL BE CONFIGURED TO CLOSE AUTOMATICALLY WHEN THE SYSTEMS OF SPACE SERVED ARE NOT IN USE.

FURNISH ALL REQUIRED PIPE AND ENCLOSURE SUPPORTS, BRACKETS, AND FASTENERS ETC. FURNISH VALVE ACCESS DOORS AND KNOCK OUT FOR ELECTRICAL RECEPTACLES. FURNISH END CAPS AND CORNER ANGLES. RUN ENCLOSURES CONTINUOUS WALL TO WALL. FINISH SHALL BE BAKED ON ENAMEL, SUBMIT COLOR CHART FOR REVIEW AND APPROVAL.

EXPANSION TANKS EXP-1&2: TO BE AMTROL MODEL AX-120V, 68 GALLON TANK AND 34 GALLON ACCEPTANCE VOLUME, 48" HIGH, 24" DIAMETER AND WEIGH APPROXIMATELY 515 POUNDS AT FULL CAPACITY.

AIR SEPARATOR AS-1: SHALL BE BELL & GOSSET MODEL R-5F, 700 GPM MAXIMUM CAPACITY, 5" FLANGED INLET AND OUTLET, CV OF 398, REMOVABLE GALVANIZED STEEL SYSTEM STRAINER, INTERNAL STAINLESS STEEL AIR COLLECTOR TUBE WITH NPT CONNECTION AND BLOWDOWN CONNECTION. THE AIR SEPARATOR MUST BE DESIGNED, CONSTRUCTED, AND STAMPED FOR 125 PSIG @ 350°F IN ACCORDANCE WITH SECTION VIII, DIVISION I OF THE ASME BOILER AND PRESSURE VESSEL CODE, AND REGISTERED WITH THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS. THE AIR SEPARATOR SHALL BE PAINTED WITH ONE SHOP COAT OF LIGHT GRAY AIR DRY ENAMEL.

PIPE INSULATION JACKETING: SHALL BE WHITE ZESTON 2000 PVC COVERS FOR PIPING AND FITTINGS. JACKET ALL PIPING AND FITTING THAT ARE EXPOSED IN ANY ROOM.

PIPE LABELS: SHALL BE SETON ULTRA-MARK WEATHER RESISTANT FOR OUTDOOR APPLICATION AND OPTI-CODE FOR INDOOR APPLICATION. LETTERS AND ARROWS SHALL BE 2 1/2" HIGH AND SHALL BE WHITE ON A GREEN BACKGROUND AND SHALL CONFORM TO ANSI AND OSHA STANDARDS. APPLY OVER INSULATION ONLY.

ALL HVAC EQUIPMENT SHALL HAVE 3" HIGH BLACK LAMACOID NAME PLATES WITH WHITE ENGRAVED LETTERS PERMANENTLY FASTENED TO EQUIPMENT. TYPICAL FOR ALL BOILERS, PUMPS, AIR HANDLERS, AC UNITS AND CONDENSERS.

REFRIGERANT PIPE INSULATION: SHALL BE AP ARMAFLEX PIPE INSULATION, 1" THICK UNSLIT, TO BE INSTALLED BEFORE FINAL CONNECTION. FIELD FABRICATE FITTING INSULATION WITH MITER-CUTS. ALL BUTT JOINTS AND SEAMS ARE TO BE SEALED WITH ARMSTRONG 520 ADHESIVE. ALL INSULATION INSTALLED OUTDOORS SHALL BE COATED WITH ARMSTRONG ARMAFLEX FINISH, AS PER THE MANUFACTURERS RECOMMENDATIONS.

ELECTRIC UNIT HEATERS: SHALL BE INDECO COMMERCIAL UNIT HEATER, RATED FOR 300 CFM, 3 KW, 208/1/60, 12 AMPS. PROVIDE THE FOLLOWING OPTIONS: FAN GUARD, AIR DEFLECTION LOUVER, SUMMER FAN SWITCH, HEAT PURGE FAN DELAY SWITCH, DISCONNECT SWITCH & WALL THERMOSTAT.

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KEY PLAN

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No.	Date	Issue
7	08/12/2021	Issued for Construction
6	06/25/2021	Issued for Permit
5	02/24/2021	Issued for Bid
4	02/10/2021	Issued for Review
3	5/14/2020	90% Construction Documents
2	2/21/2020	Design Development
1	12/18/2019	Schematic Design

Sheet Title

MECHANICAL EQUIPMENT NOTES & SCHEDULES

Job No. NKGD0214.00	Date 06/25/2021
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Scale AS NOTED	Drawn / Checked TV / RG
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Sheet Number

M601

SUPPLY REGISTER SCHEDULE

DESIGNATION	SR-1	
MODEL	300RL	
MAX NK VEL (FT/MIN)	550	
MAX NC	25	
CONSTRUCTION	ALUMINIUM	
BORDER/FRAME	SURFACE MOUNTED	
DEFLECTION	DOUBLE	
SPACING	3/4"	
	CFM RANGE	NOMINAL NECK SIZE
	0-200	8x8
	201-300	10x10
	301-500	12x12
	501-850	16x16
	851-1100	18x18
	1101-1700	22x22
	1701-2000	24x24

NOTES:
 1. SUPPLY REGISTERS BASED ON TITUS.
 2. THE ABOVE SCHEDULE INDICATES NOMINAL REGISTER NECK SIZES. THE CONTRACTOR SHALL COORDINATE THE REGISTER SIZE IN THE FIELD ACCORDING TO THE ACTUAL DUCT DIMENSIONS AND MAINTAIN EQUIVALENT CORE AREA.
 3. ALL REGISTERS SHALL BE EQUIPPED WITH AN OPPOSED BLADE VOLUME DAMPER.
 4. SUBMIT COLOR CHART FOR REVIEW AND APPROVAL BY ARCHITECT.
 5. SUPPLY REGISTERS SHALL HAVE FRAMES AND BORDERS SUITABLE FOR THE CONSTRUCTION IN WHICH THEY WILL BE INSTALLED, CONTRACTOR TO COORDINATE.

DUCTLESS SPLIT-SYSTEM AC UNIT SCHEDULE

INDOOR/OUTDOOR UNIT DESIGNATION	AC-1/ACC-1	
MANUFACTURER	DAIKIN	
MODEL	FTXB12AXVJU	
NOMINAL COOLING CAPACITY (TONS)	1	
COOLING CAPACITY (BTU/HR)	11,000	
HEATING CAPACITY (BTU/HR)	11,300	
CFM (H/M/L)	360/282/232	
SEER	17	
RS PIPE SIZE (IN)	3/8	
RL PIPE SIZE (IN)	1/4	
CONDENSATE DRAIN PIPE SIZE (IN)	3/4	
ELECTRICAL DATA:		
MCA / MOCP	7.95 / 15	
COMPRESSOR RLA	7.75	
VOLTS/Ø/Hz	208/1/60	
INDOOR EVAPORATOR UNIT DATA		
LOCATION	IT/DATA ROOM	
MODEL	FTXB12AXVJU	
HEIGHT x WIDTH x DEPTH (IN)	11.8x35x8.2	
WEIGHT (LBS)	20	
OUTDOOR CONDENSING UNIT DATA:		
LOCATION	ROOF	
MODEL	RXB12AXVJU	
HEIGHT x WIDTH x DEPTH (IN)	21.6x25.9x10.8	
WEIGHT (LBS)	57	
REFRIGERANT TYPE	R-410A	

NOTES:
 1. PROVIDE THE FOLLOWING OPTIONS FOR EACH UNIT:
 - 0° LOW AMBIENT CONTROLS.
 - 7-DAY PROGRAMMABLE SYSTEM CONTROLLER.
 2. FIELD SUPPLIED LOCAL DISCONNECT SWITCH AT EACH INDOOR UNIT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR & INSTALLED BY THE ELECTRICAL CONTRACTOR.
 3. FIELD SUPPLIED WEATHERPROOF LOCAL DISCONNECT SWITCH AT EACH OUTDOOR UNIT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR & INSTALLED BY THE ELECTRICAL CONTRACTOR.
 4. SINGLE POINT EXTERNAL POWER CONNECTION FOR EACH INDOOR/OUTDOOR SET OF UNITS SHALL BE AT THE OUTDOOR UNIT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE POWER WIRING FROM THE OUTDOOR UNIT TO THE INDOOR UNIT.
 5. THE AUTOMATIC TEMPERATURE CONTROLS CONTRACTOR SHALL PROVIDE CONTROL WIRING BETWEEN THE OUTDOOR UNIT AND INDOOR UNIT.
 6. CONDENSATE PUMP PACKAGE ACCESSORY.

RETURN REGISTER / TRANSFER GRILLE SCHEDULE

DESIGNATION	RR / TG	
MODEL	3 FS	
MAX NK VEL (FT/MIN)	500	
MAX NC	25	
CONSTRUCTION	ALUMINIUM	
BORDER/FRAME	SURFACE MOUNTED	
DEFLECTION	45° FIXED	
SPACING	3/4"	
	CFM RANGE	NOMINAL NECK SIZE
	0-150	8x8
	151-250	10x10
	251-350	12x12
	351-725	18x18
	726-950	22x22
	951-1100	24x24
	1101-1400	24x30

NOTES:
 1. RETURN REGISTERS ARE BASED ON TITUS.
 2. THE ABOVE SCHEDULE INDICATES NOMINAL REGISTER NECK SIZES. THE CONTRACTOR SHALL COORDINATE THE REGISTER SIZE IN THE FIELD ACCORDING TO THE ACTUAL DUCT DIMENSIONS AND MAINTAIN AN EQUIVALENT CORE AREA.
 3. ALL REGISTERS SHALL BE EQUIPPED WITH AN OPPOSED BLADE VOLUME DAMPER.
 4. SUBMIT COLOR CHART FOR REVIEW AND APPROVAL BY ARCHITECT.
 5. RETURN REGISTERS SHALL HAVE FRAMES AND BORDERS SUITABLE FOR THE CONSTRUCTION IN WHICH THEY WILL BE INSTALLED, CONTRACTOR TO COORDINATE.

CEILING DIFFUSER SCHEDULE

DESIGNATION	CD-1			
MODEL	OMNI			
MAX CORE VEL (FT/MIN)	550			
MAX NC	25			
CONSTRUCTION	STEEL			
FRAME	LAY-IN			
DEFLECTION	4 WAY			
FACE SIZE	24x24 / 12x12			
	CFM RANGE	NECK SIZE Ø	CFM RANGE	NECK SIZE Ø
	0-100	6"	0-100	6"
	101-200	8"	101-200	8"
	201-350	10"	201-350	10"
	351-450	12"	351-450	12"
	451-600	14"	451-600	14"
	601-700	15"	601-700	15"

NOTES:
 1. CEILING SUPPLY DIFFUSERS ARE BASED ON TITUS.
 2. ALL DIFFUSERS SHALL BE EQUIPPED WITH AN OPPOSED BLADE VOLUME DAMPER.
 3. COORDINATE COLOR SELECTION WITH ARCH PLANS.
 4. SUPPLY DIFFUSERS SHALL HAVE FRAMES AND BORDERS SUITABLE FOR THE CONSTRUCTION IN WHICH THEY WILL BE INSTALLED, CONTRACTOR TO COORDINATE.
 5. ALL LAY-IN DIFFUSERS SHALL HAVE A MODULE SIZE OF 24x24. FACE SIZES SHOWN IN SCHEDULE ARE FOR SURFACE MOUNT DIFFUSERS. NECK SIZES VARY ACCORDING TO THE SCHEDULE.
 6. DIFFUSER BLOW PATTERN IS AS SHOWN ON DRAWINGS.

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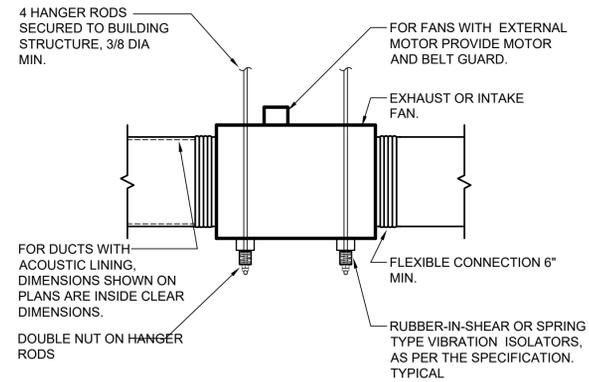
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MECHANICAL SCHEDULES

Job No.	NKGD0214.00	Date	06/25/2021
Scale	AS NOTED	Drawn / Checked	TV / RG

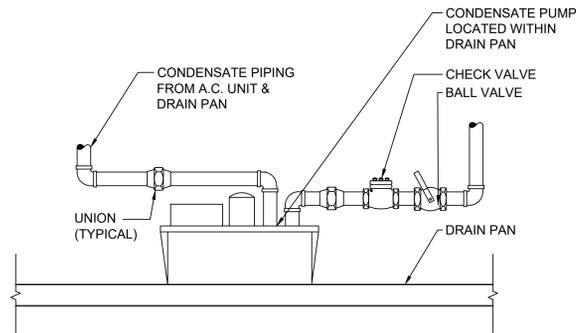
Sheet Number

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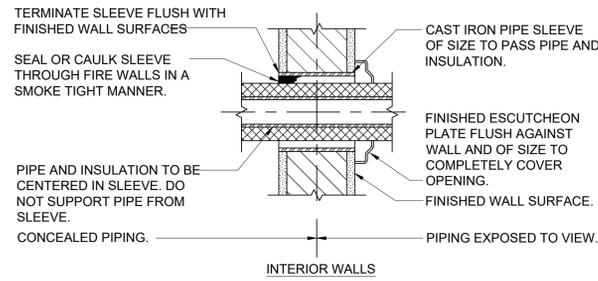
ALL DUCTWORK, PIPES AND CONDUIT SUPPORTED BY THE CEILING SLAB SHOULD USE HILTI HY-200 OR HVA ADHESIVE ANCHORS, DRILLED INTO THE SLAB

8 **INLINE FAN DETAIL**
SCALE: NONE

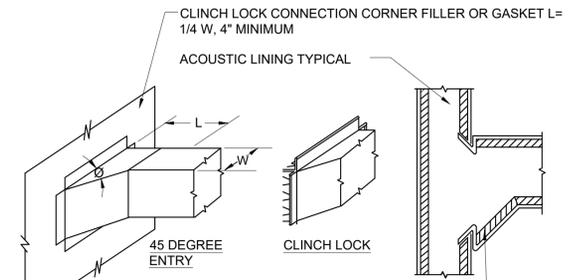


NOTE: FIELD INSTALL CONDENSATE PUMP IN AC UNIT, MAKE ALL INTERNAL PIPE CHANGES AS REQUIRED.

6 **CONDENSATE PUMP DETAIL**
SCALE: NONE

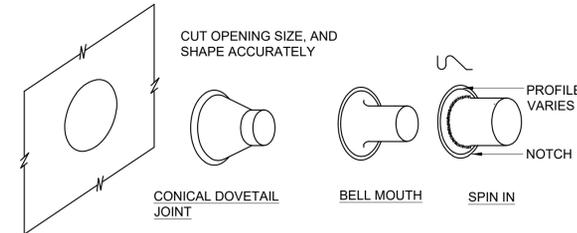


4 **PIPE SLEEVES THROUGH WALL**
SCALE: NONE

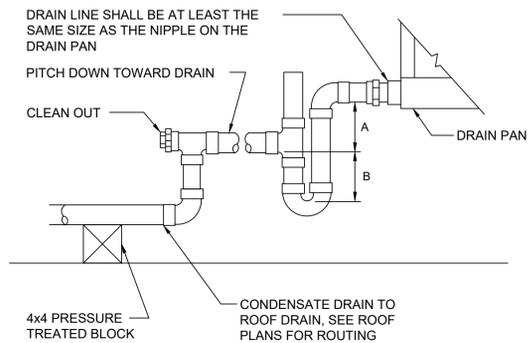


TYPICAL FOR LINED OR UNLINED DUCT CONNECTIONS USE BULL NOSE ON ALL EXPOSED LINING EDGES.

CLOSE ALL OPENINGS AT CORNERS WITH FILLER PIECE OR GASKET.



2 **DUCT BRANCH CONNECTION DETAIL**
SCALE: NONE

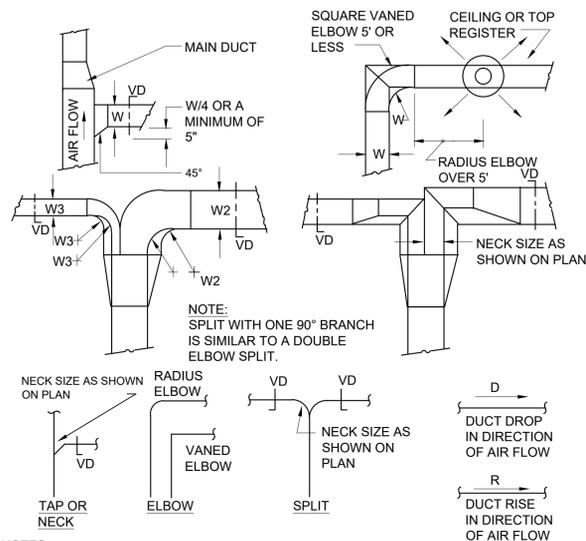


DESIGNER'S NOTE:

UNIT TYPE	A	B
DRAW THRU	2" (50 MM) PLUS X	X
BLOW THRU	1" (25 MM) MINIMUM	2X

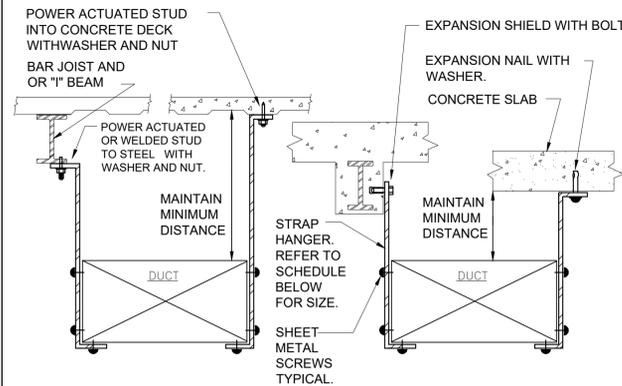
WHERE X = STATIC PRESSURE IN PAN

7 **CONDENSATE DRAIN TRAP DETAIL**
SCALE: NONE



- NOTES:
- 1.) SINGLE LINE REPRESENTATIONS REFER TO DOUBLE LINE DETAILS.
 - 2.) USE RADIUS OR SQUARE VANED BENDS FOR BOTH ELBOWS AND SPLITS AS DETERMINED BY SPACE LIMITATIONS, AND THE DISTANCE FROM AIR OUTLETS.
 - 3.) ALL SQUARE ELBOWS SHALL HAVE FACTORY TURNING VANES, AND MAINTAIN A CONSTANT WIDTH.
 - 4.) WHERE DUCTS SPLIT, THE SOLID LINE REPRESENTATION IS PREFERRED, UNLESS PRECLUDED BY SPACE, OR OTHERWISE INDICATED.
 - 5.) USE ELBOW SPLIT FOR BRANCH CONNECTIONS ONLY WHERE NECK SIZE IS GIVEN.

5 **DUCT BRANCH TAKE-OFF DETAIL**
SCALE: NONE

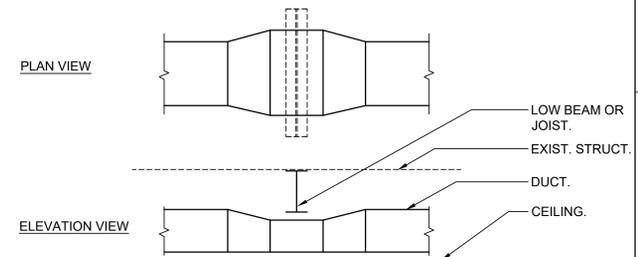


HANGER STRAP SCHEDULE		
DUCT SIZE	HANGER SIZE	MAXIMUM SPACING
UP TO 2 SQ.FT.	1" X 1/16"	8'-0"
2 SQ.FT. TO 4 SQ.FT.	1" X 1/8"	8'-0"
4 SQ.FT. TO 10 SQ.FT.	1" X 1/8"	6'-0"
OVER 10 SQ.FT.	1" X 1/8"	4'-0"

- NOTES:
- THE MECHANICAL CONTRACTOR SHALL ADHERE TO FINISH CEILING HEIGHTS NOTED ON ARCHITECTURAL REFLECTED CEILING PLANS (RCP'S). ANY DEVIATION FROM FINISH CEILING HEIGHTS NOTED ON RCP'S - EITHER HIGHER OR LOWER - SHALL BE REVIEWED AND APPROVED BY ARCHITECT BEFORE EXECUTION OF THE WORK

ALL DUCTWORK, PIPES AND CONDUIT SUPPORTED BY THE CEILING SLAB SHOULD USE HILTI HY-200 OR HVA ADHESIVE ANCHORS, DRILLED INTO THE SLAB

3 **DUCT HANGER DETAIL**
SCALE: NONE



- NOTES:
- 1.) WHERE INDICATED ON THE PLANS, OR REQUIRED DUE TO FIELD CONDITIONS, THE CONTRACTOR SHALL ROUTE DUCTWORK UNDER LOW BEAMS OR JOISTS IN THE MANNER INDICATED ABOVE.
 - 2.) REDUCE DUCT HEIGHT AT THE CROSSING IN ORDER TO FIT UNDER THE BEAM OR JOIST.
 - 3.) INCREASE DUCT WIDTH AT THE CROSSING IN ORDER TO MAINTAIN THE SAME CROSS SECTIONAL AREA.
 - 4.) USE SMACNA APPROVED TRANSITIONS.
 - 5.) THE MECHANICAL CONTRACTOR SHALL ADHERE TO FINISH CEILING HEIGHTS NOTED ON ARCHITECTURAL REFLECTED CEILING PLANS (RCP'S). ANY DEVIATION FROM FINISH CEILING HEIGHTS NOTED ON RCP'S - EITHER HIGHER OR LOWER - SHALL BE REVIEWED AND APPROVED BY ARCHITECT BEFORE EXECUTION OF THE WORK

1 **DUCT UNDER LOW BEAM DETAIL**
SCALE: NONE

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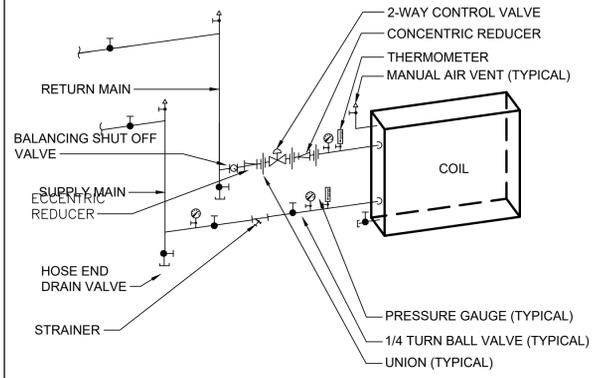
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MECHANICAL DETAILS

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NKGD0214.00	06/25/2021
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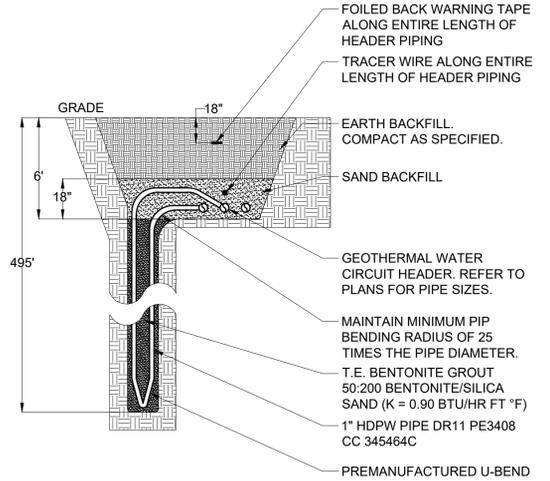
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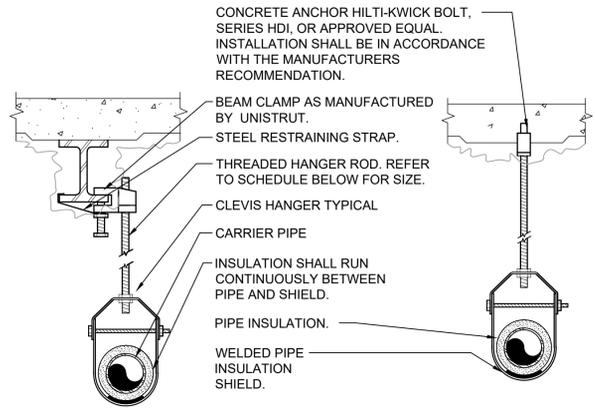
- NOTES:**
- LOCATE ALL COIL UNIONS CLOSE TO, AND CLEAR OF, COIL. ARRANGE PIPING SO AS NOT TO INTERFERE WITH COIL REMOVAL.
 - DETAIL IS TYPICAL FOR UNIT VENTILATORS, CABINET UNIT HEATERS, FAN COIL UNITS, AND AIR HANDLING UNITS.
 - PROVIDE FLEXIBLE CONNECTION FOR THOSE COILS MOUNTED IN UNITS ON VIBRATION ISOLATORS.

PIPE SIZE SCHEDULE											
PIPE SIZE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6
MAX. GPM	2	3.5	7	13	22	45	70	130	260	480	750

8 HYDRONIC COIL WITH 2-WAY VALVE PIPING SCHEMATIC
SCALE: NONE



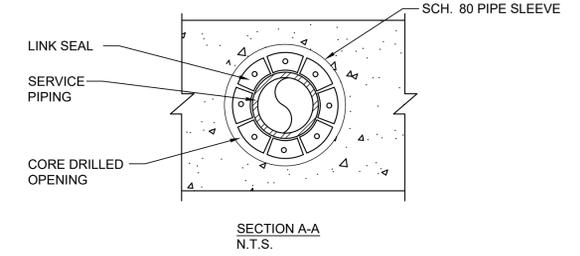
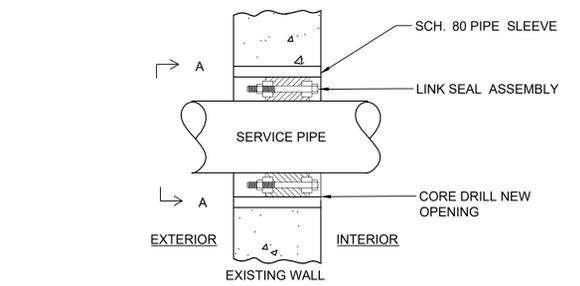
6 GEOTHERMAL WELL DETAIL
SCALE: N.T.S.



PIPE HANGER SCHEDULE					
PIPE DIA.	3/4"-2"	2 1/2"-3"	4"-5"	6"	8"-12"
HANGER DIA.	3/8"	1/2"	5/8"	3/4"	7/8"

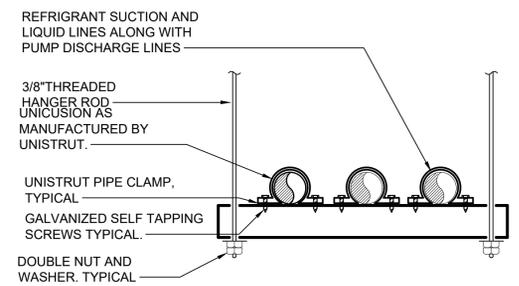
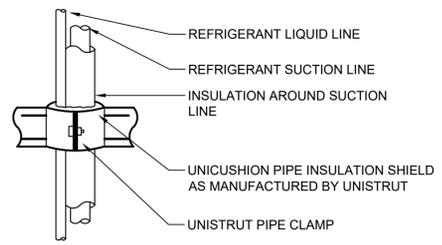
- NOTES:**
- CLEVIS HANGERS WITH WELDED INSULATION SHIELDS SIMILAR TO RAUCH FIG. 100SH ON ALL PIPES LARGER THAN 1". FOR PIPES 1" OR SMALLER, A BAND HANGER WITH INSULATION SHIELD MAY BE USED SIMILAR TO RAUCH FIG. NO. 1ASH.
 - FOR NON-INSULATED PIPE, INSULATION SHIELDS MAY BE OMITTED.
 - ALL PIPE HANGERS SHALL BE GALVANIZED STEEL OR FACTORY PAINTED BLACK WITH ENAMEL.
 - FOR NON FERROUS PIPING WITHOUT INSULATION, ALL HANGERS SHALL BE COPPER PLATED OR FURNISHED WITH A DI-ELECTRIC BETWEEN PIPE AND HANGERS.
 - WHERE EXISTING BUILDING STRUCTURAL COMPONENTS HAVE FIREPROOF MATERIAL, ANY AREA THAT IS DISTURBED OR DAMAGED AS A RESULT OF HANGER INSTALLATION SHALL BE PATCHED WITH UL AND FM APPROVED FIREPROOFING TO MATCH EXISTING.
 - ALL ANCHORS AND INSERTS SHALL HAVE NEW YORK CITY BOARD OF STANDARD AND APPEALS, (BSA) APPROVAL.

4 PIPE HANGER DETAIL
SCALE: NONE



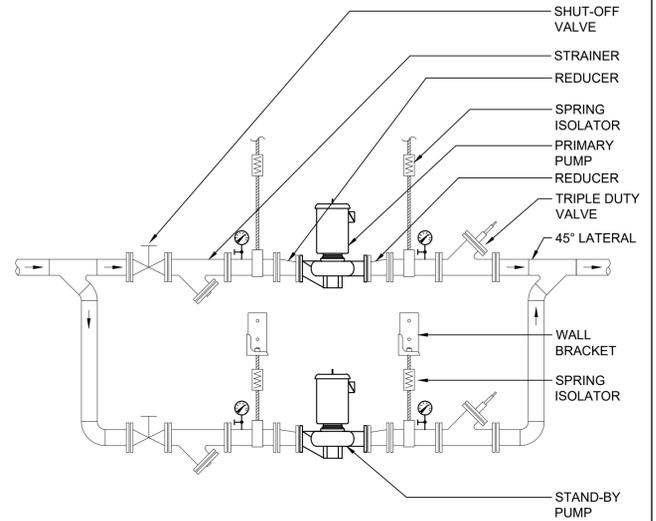
- NOTES:**
- SEAL ASSEMBLY BASED ON THUNDERLINE MODEL "C" LINK-SEAL MODULAR SEAL, WITH EPDM SEAL ELEMENT, COMPOSITE PRESSURE PLATES, STEEL WITH 2-PART ZINC DICHROMATE & ORGANIC COATED NUTS AND BOLTS RATED FOR AN OPERATING TEMPERATURE RANGE OF -40°F TO +250°F.
 - USE LINK SEAL AT ALL LOCATIONS WHERE PIPES PENETRATE EXTERIOR WALLS, ABOVE GRADE OR BELOW GRADE.

2 PIPE LINK SEAL DETAIL FOR EXTERIOR WALLS
SCALE: NONE



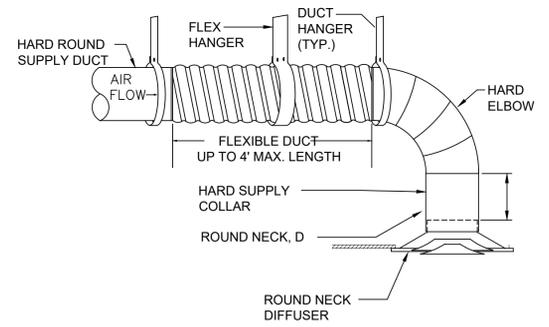
- NOTES:**
- LIQUID AND SUCTION LINES MAY BE ROUTED TOGETHER FOR CONVENIENCE, BUT MUST BE COMPLETELY INSULATED FROM EACH OTHER. DO NOT SOLDER LIQUID AND SUCTION LINES TOGETHER. DO NOT ALLOW METAL TO METAL CONTACT.
 - LINES SHOULD BE INSTALLED WITH AS FEW BENDS AS POSSIBLE, ALLOWING SERVICE ACCESS TO THE INDOOR COIL.
 - USE LONG RADIUS ELBOWS WHEREVER POSSIBLE, EXCEPT IN OIL RETURN TRAPS, WHERE SHORT RADIUS ELBOWS SHOULD BE USED.
 - SLOPE HORIZONTAL SUCTION LINES 1 INCH EVERY 20 FEET TOWARD THE OUTDOOR UNIT.

7 REFRIGERANT PIPE SUPPORT DETAIL
SCALE: NONE

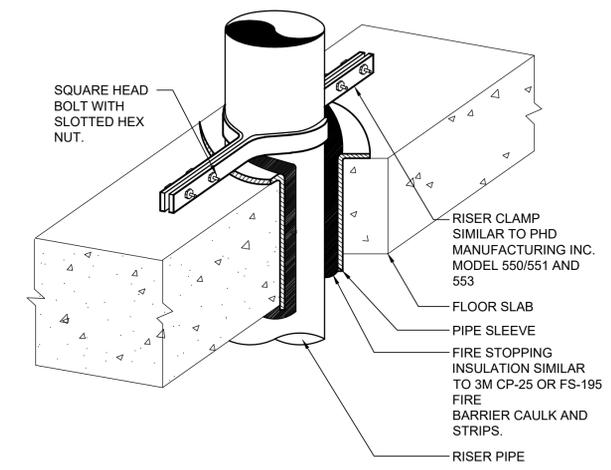


- NOTES:**
- HANG PRIMARY PUMP FROM BUILDING STRUCTURE WITH SPRING-TYPE VIBRATION ISOLATORS.
 - HANG STAND-BY PUMP FROM BUILDING STRUCTURE OR SUPPORT FROM WALL BRACKETS SIMILAR TO F&M FIGURE #151.

5 IN-LINE PUMP DETAIL
SCALE: NONE



3 ROUND CONNECTION TO ROUND NECK DIFFUSER
SCALE: NONE



1 VERTICAL PIPE SUPPORT DETAIL
SCALE: NONE

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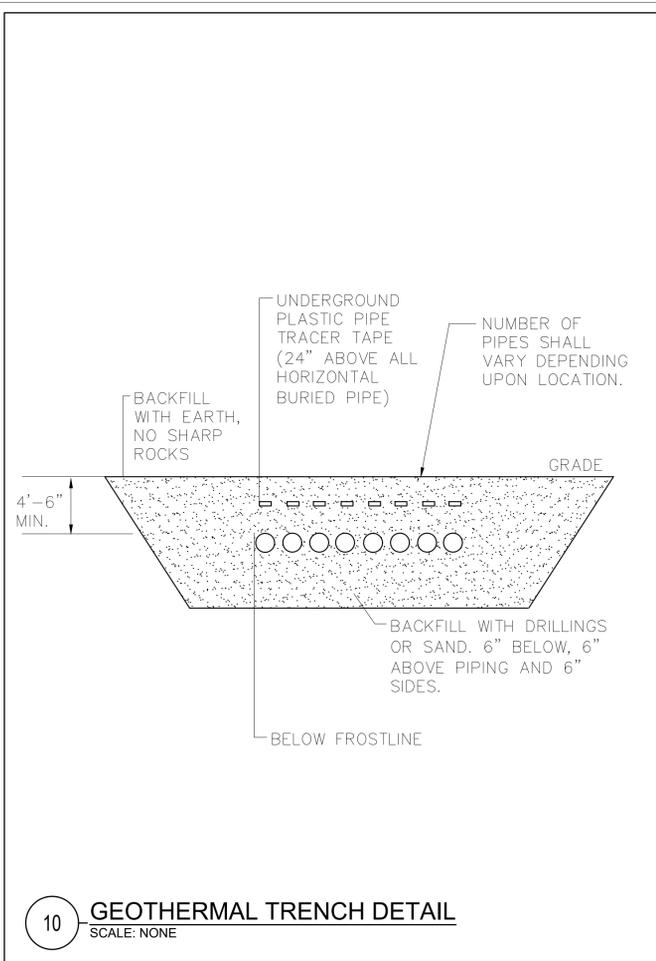
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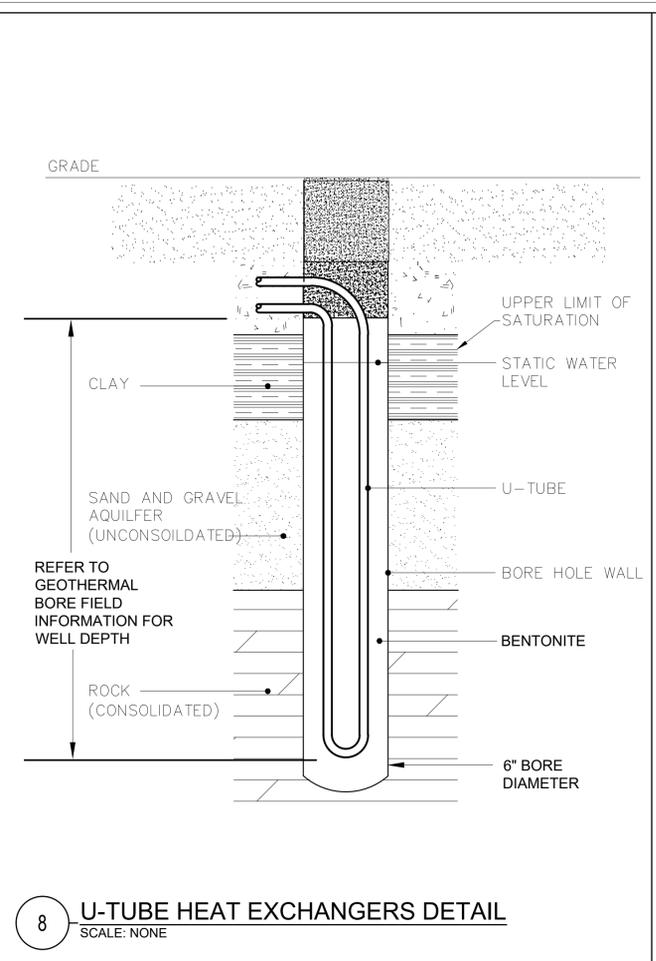
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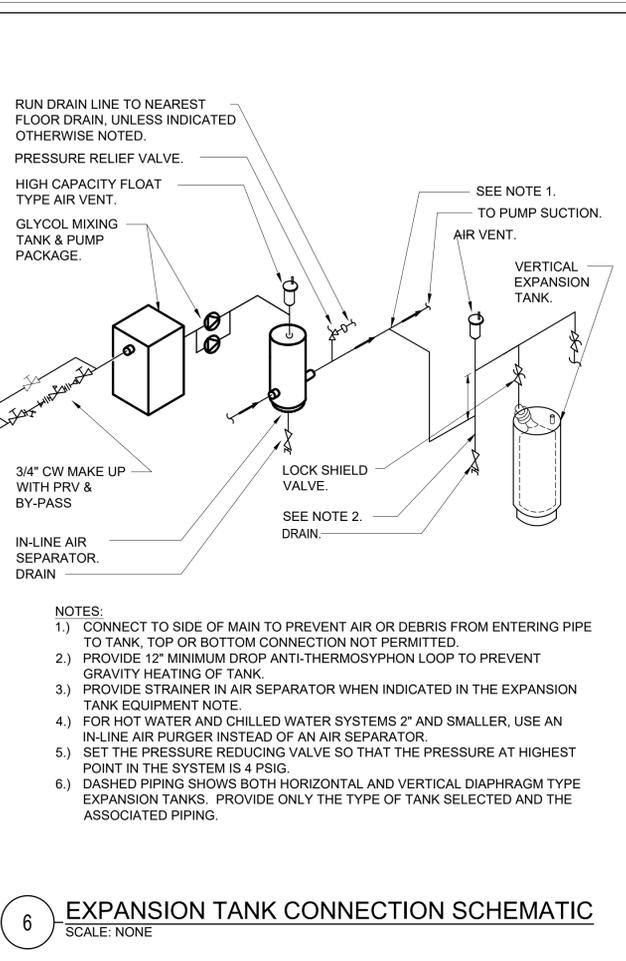
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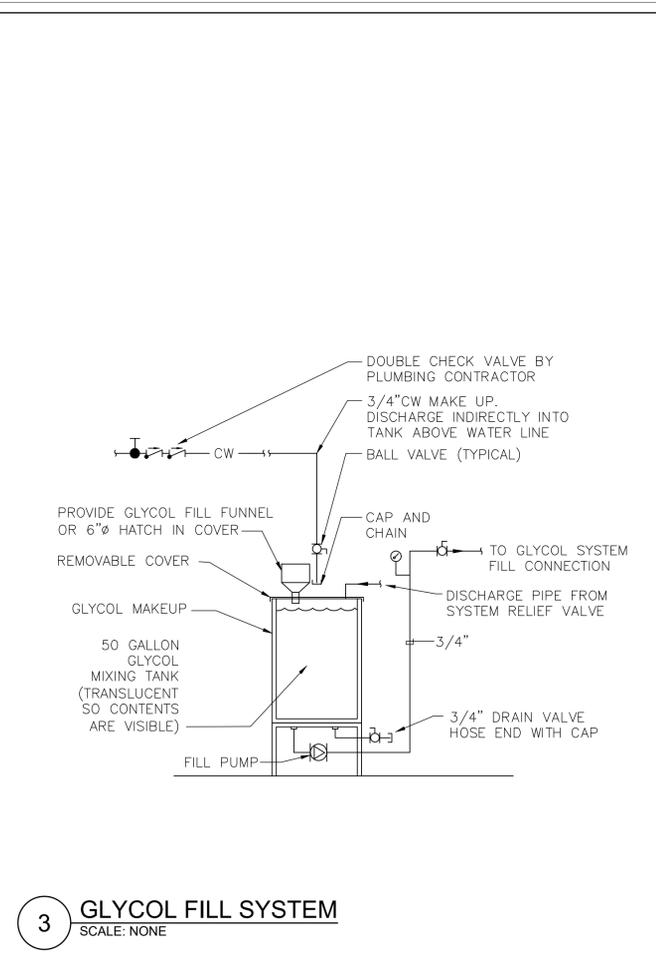
10 GEOTHERMAL TRENCH DETAIL
SCALE: NONE



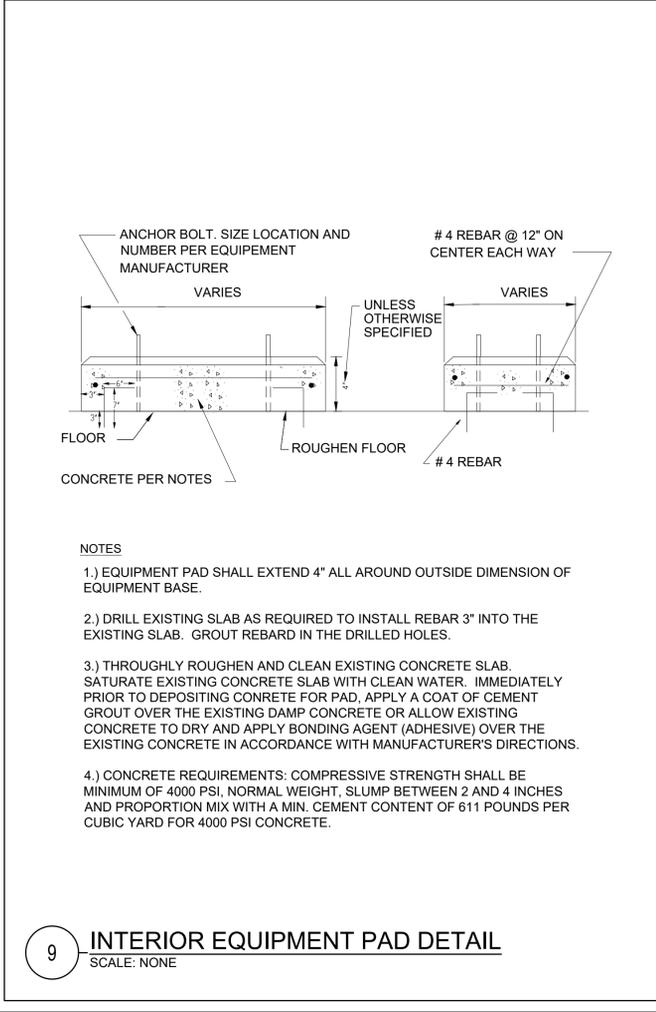
8 U-TUBE HEAT EXCHANGERS DETAIL
SCALE: NONE



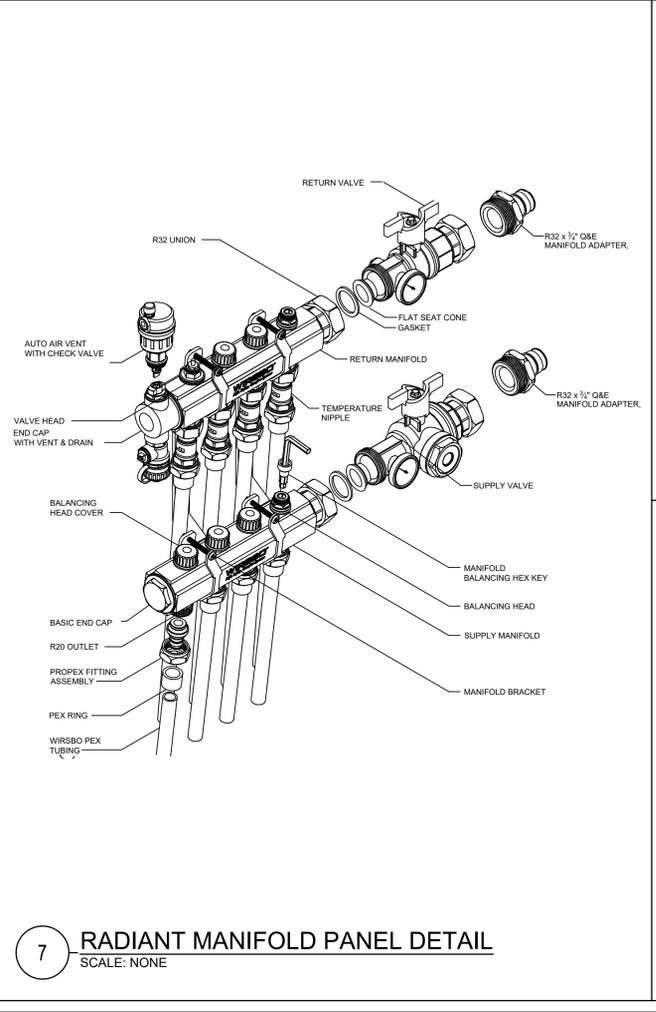
6 EXPANSION TANK CONNECTION SCHEMATIC
SCALE: NONE



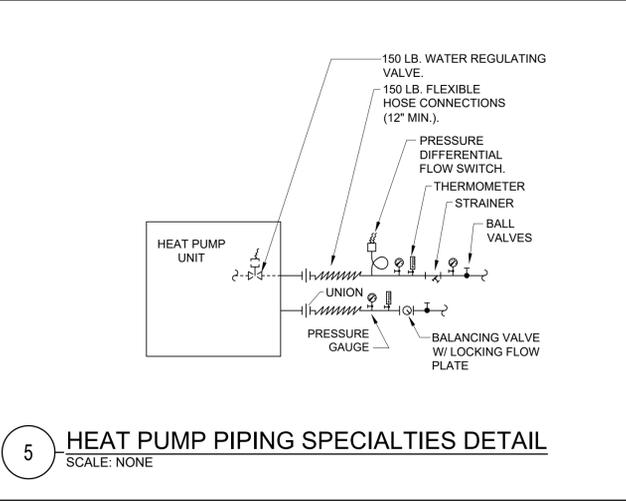
3 GLYCOL FILL SYSTEM
SCALE: NONE



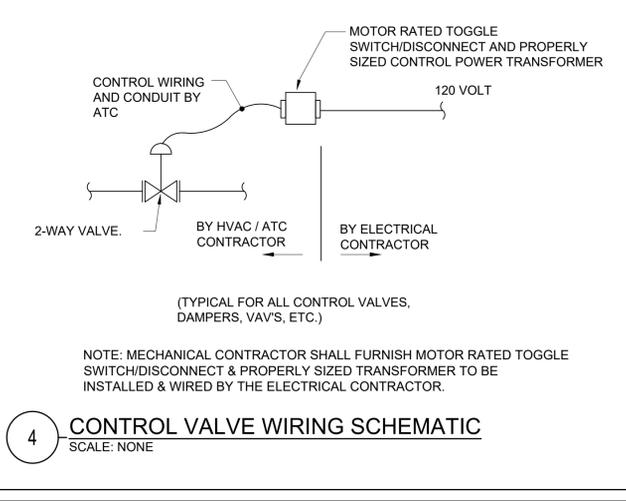
9 INTERIOR EQUIPMENT PAD DETAIL
SCALE: NONE



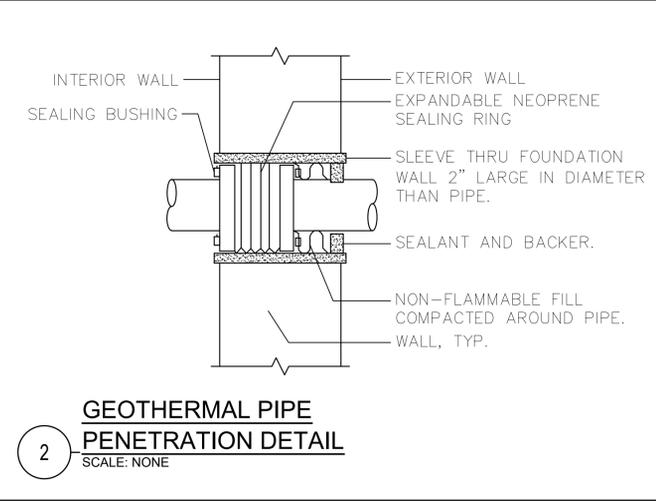
7 RADIANT MANIFOLD PANEL DETAIL
SCALE: NONE



5 HEAT PUMP PIPING SPECIALTIES DETAIL
SCALE: NONE



4 CONTROL VALVE WIRING SCHEMATIC
SCALE: NONE



2 GEOTHERMAL PIPE PENETRATION DETAIL
SCALE: NONE

CHILLED WATER AND HOT WATER PIPE SIZE SCHEDULE

PIPE SIZE	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6
MAX. GPM	2	3.5	7	13	22	45	70	130	260	480	750

NOTES:
1.) WHERE CHILLED WATER AND HOT WATER PIPE SIZES ARE NOT SPECIFICALLY CALLED OUT ON PLAN, PIPE SIZES SHALL BE BASED ON DESIGN FLOWRATE ACCORDING TO THIS CHART.

1 CHILLED WATER AND HOT WATER PIPE SIZE SCHEDULE
SCALE: NONE

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