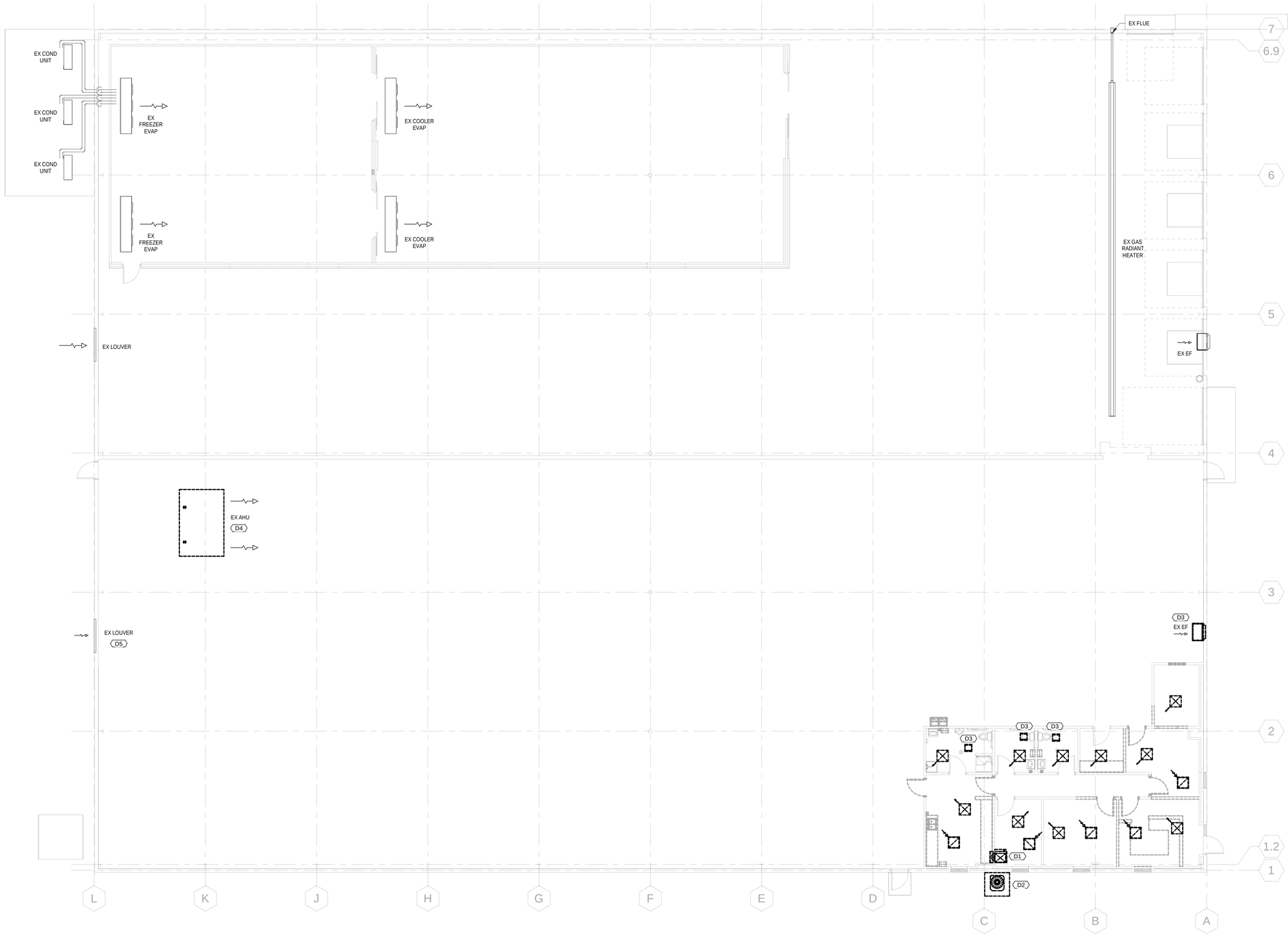

First Floor Mechanical Plan

1/8" = 1'-0"

Mechanical Symbols

NOTE: SOME SYMBOLS MAY NOT BE USED

ABBREVIATIONS:

ACCU	AIR COOLED CONDENSING UNIT
A.F.F.	ABOVE FINISHED FLOOR
AHU-	AIR HANDLER UNIT
ATV	AIR TURNING VANE
BDD	BACK DRAFT DAMPER
CAL-	COMBUSTION AIR LOUVER
CH-	CABINET HEATER
EAL-	EXHAUST AIR LOUVER
EAT	ENTERING AIR TEMPERATURE
EAV-	EXHAUST AIR VENTILATOR
EDB	ENTERING DRY BULB
EF-	EXHAUST FAN
EG-	EXHAUST GRILLE
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EX-	EXISTING EQUIPMENT
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FTR	FINNED TUBE RADIATION
GPM	GALLONS PER MINUTE
HP	HEAT PUMP
HVAC-	HTG, VENT, & AC UNIT
L-	LOUVER
LAT	LEAVING AIR TEMP
LDB	LEAVING DRY BULB
LWB	LEAVING WET BULB
MAT	MIXED AIR TEMP
MD	MANUAL DAMPER
MOD	MOTOR OPERATED DAMPER
MUA	MAKE-UP AIR UNIT
OAD	OUTSIDE AIR DAMPER
OAI	OUTSIDE AIR INTAKE
OAL	OUTSIDE AIR LOUVER
RAD-	RELIEF AIR DAMPER
RAL-	RELIEF AIR LOUVER
RHP	RADIANT HEATING PANEL
RTU-	ROOFTOP UNIT
RV	RELIEF VENT
SD	SUPPLY DIFFUSER
SF	SUPPLY FAN
SFD	SMOKE FIRE DAMPER
T-	THERMOMETER
TB-	TERMINAL BOX
TG-	TRANSFER GRILLE
TSP	TOTAL STATIC PRESSURE
UH-	UNIT HEATER
VAV-	VARIABLE AIR VOLUME BOX

SYMBOLS:

- A — AIR PIPING
- CHWR — CHILLED WATER RETURN
- CHWS — CHILLED WATER SUPPLY
- CD — CONDENSATE DRAIN
- CWR — CONDENSER WATER RETURN
- CWS — CONDENSER WATER SUPPLY
- EQUIP/PIPING TO BE DEMOLISHED
- EXISTING TO REMAIN
- FP — FIRE PROTECTION PIPING
- HWR — HOT WATER RETURN
- HWS — HOT WATER SUPPLY
- HPWR — HEAT PUMP WATER RETURN
- HPWS — HEAT PUMP WATER SUPPLY
- LPR — LOW PRESSURE STEAM RETURN
- LPS — LOW PRESSURE STEAM SUPPLY
- MPR — MED. PRESSURE STEAM RETURN
- MPS — MED. PRESSURE STEAM SUPPLY
- HG — REFRIGERANT HOT GAS
- RL — REFRIGERANT LIQUID
- RS — REFRIGERANT SUCTION
- VAC — VACUUM PIPING
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CAP LINE
- CHECK VALVE
- CONNECT NEW TO EXISTING
- DOUBLE BACKFLOW PREVENTER
- EXHAUST GRILLE/DIFFUSER
- FLEX DUCT
- FLOW SETTER
- GAS COCK
- GATE VALVE
- HORIZONTAL FIRE DAMPER
- H — HUMIDISTAT
- LINE STRAINER
- M — METER
- P — PRESSURE SENSOR
- RECTANGULAR SUPPLY DIFFUSER
- RETURN GRILLE/DIFFUSER
- ROUND DIFFUSER
- S — SENSOR
- SLOT DIFFUSER
- S — SWITCH
- TEMP WELL
- THERMOMETER
- T — THERMOSTAT
- VERTICAL FIRE DAMPER
- VOLUME DAMPER

Specific Plan Notes

D1	EXISTING DOWNFLOW FURNACE TO BE REMOVED. INCLUDE REMOVAL OF ASSOCIATED DUCTWORK, PIPING, CONTROLS, ETC. COORDINATE WITH ELECTRICAL FOR DISCONNECT.
D2	EXISTING CONDENSING UNIT TO BE REMOVED. INCLUDE REMOVAL OF ASSOCIATED PIPING AND CONTROLS. PATCH WALL PENETRATIONS. COORDINATE WITH ELECTRICAL FOR DISCONNECT.
D3	EXISTING EXHAUST FAN TO BE REMOVED. INCLUDE REMOVAL OF ASSOCIATED DUCTWORK. PATCH WALL/ROOF PENETRATIONS. COORDINATE WITH ELECTRICAL FOR DISCONNECT.
D4	EXISTING AIR HANDLING UNIT TO BE REMOVED. INCLUDE REMOVAL OF ASSOCIATED FLUE EXHAUST AND CONTROLS. COORDINATE WITH ELECTRICAL FOR DISCONNECT. PATCH ROOF PENETRATIONS.
D5	EXISTING LOUVER/OPENING TO BE MODIFIED FOR NEW DUCT PENETRATION.

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260.432.9337

930 North Meridian
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910 Progress Dr.
Richmond, Indiana 47374

PROJECT NO. 7745 | DATE 08-09-22

REV. | DATE

SET DESCRIPTION
Construction Set

SHEET TITLE
First Floor Mechanical Demolition Plan

SHEET NUMBER
M1-1

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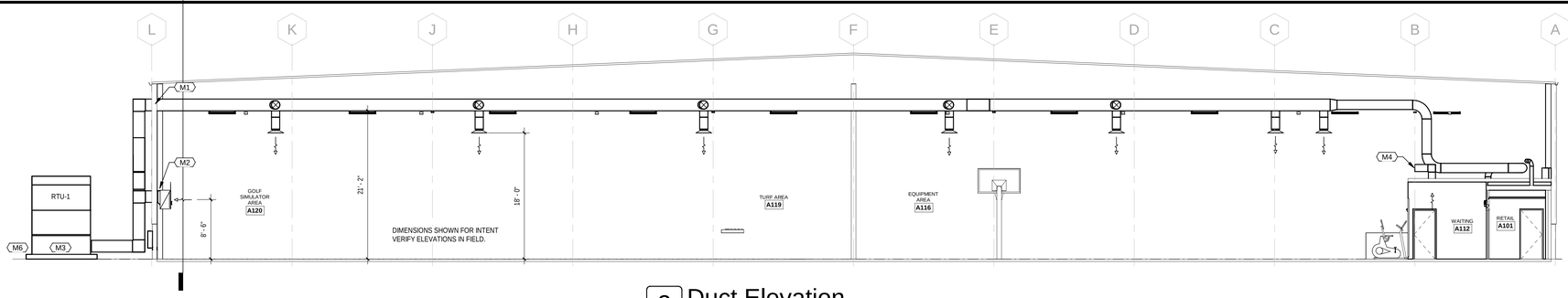
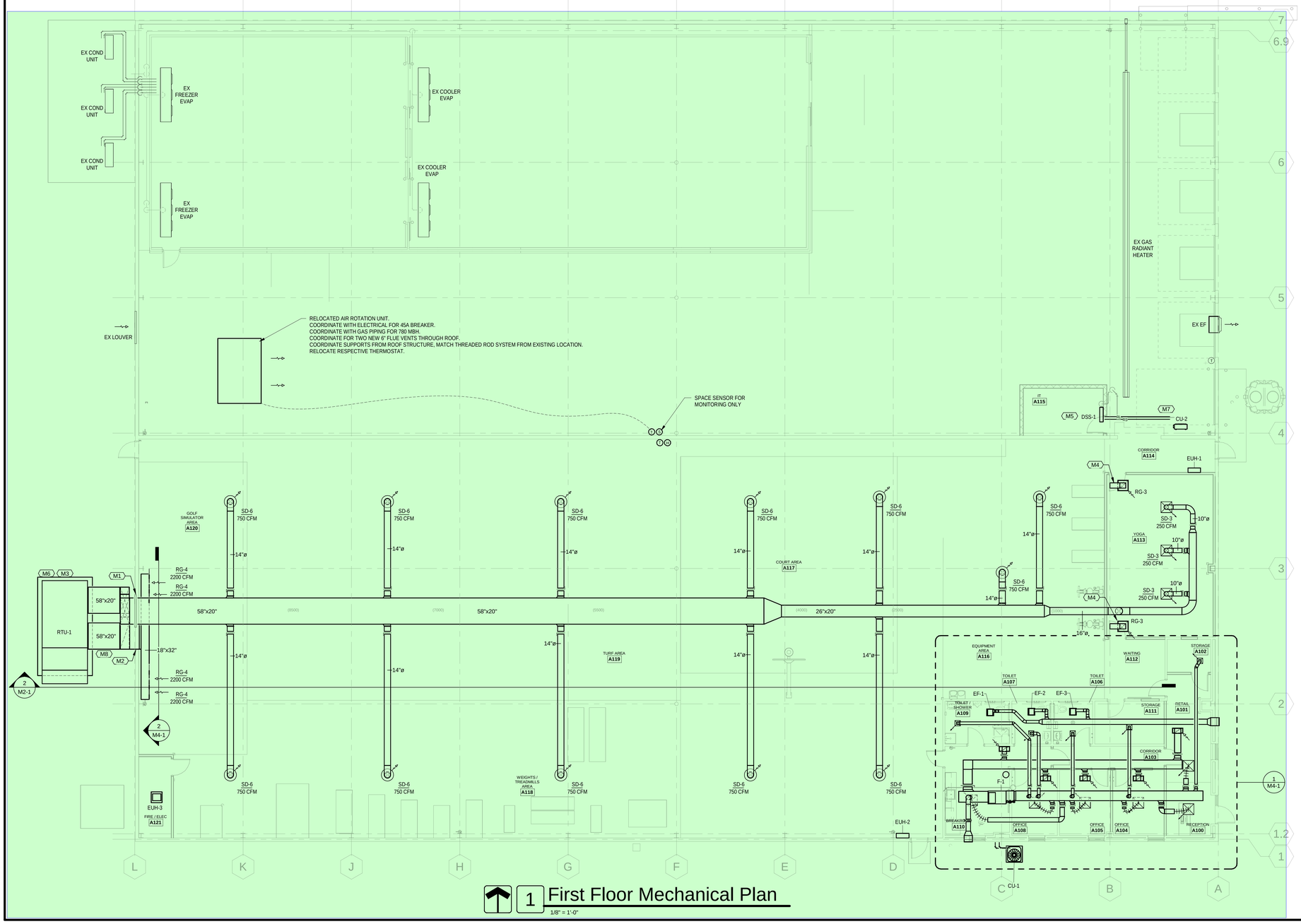


2 Duct Elevation

Not to Scale



1 First Floor Mechanical Plan

1/8" = 1'-0"

Specific Plan Notes

M1	ROUTE SUPPLY DUCT THROUGH EXISTING LOUVER OPENING. COORDINATE WITH GENERAL CONTRACTOR TO PATCH OPENING. PROVIDE RIGID INSULATION ON REMAINING AREA.
M2	COORDINATE DUCT PENETRATIONS WITH EXISTING WIND GIRTS AND "X" BRACING.
M3	RTU SET ON RAISED, INSULATED CURB TO ALLOW FOR SIDE DISCHARGE. CURB SHALL HAVE TURNING VANES AND INTERNAL DUCTING TO MINIMIZE PRESSURE DROP.
M4	PROVIDE 12"x12" LINED TRANSFER DUCT FROM RG IN YOGA.
M5	MOUNT DSS ABOVE DOOR.
M6	PROVIDE CONCRETE EQUIPMENT PAD WITH TURNDOWNS. PAD SHALL BE DESIGNED TO SUPPORT EQUIPMENT WEIGHT AND SHALL EXTEND 6" BEYOND FOOTPRINT OF UNIT IN ALL DIRECTIONS.
M7	MOUNT CONDENSING UNIT ON WALL AT APPROXIMATELY 12' A.F.F. PROVIDE SUPPORT FRAME AND MOUNTING SUFFICIENT FOR UNIT. EXTEND REFRIGERANT LINES TO DSS AND SIZE PER MANUFACTURER RECOMMENDATIONS.
M8	PROVIDE MOUNTING SUPPORT FOR EXTERIOR DUCTWORK. DUCTWORK/INSULATION SHALL BE SLIGHTLY PITCHED TO PREVENT PONDING OR DRAINAGE INTO UNIT OR BUILDING.

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260.432.9337

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SET DESCRIPTION
Construction Set

SHEET TITLE
First Floor Mechanical Plan

SHEET NUMBER
M2-1

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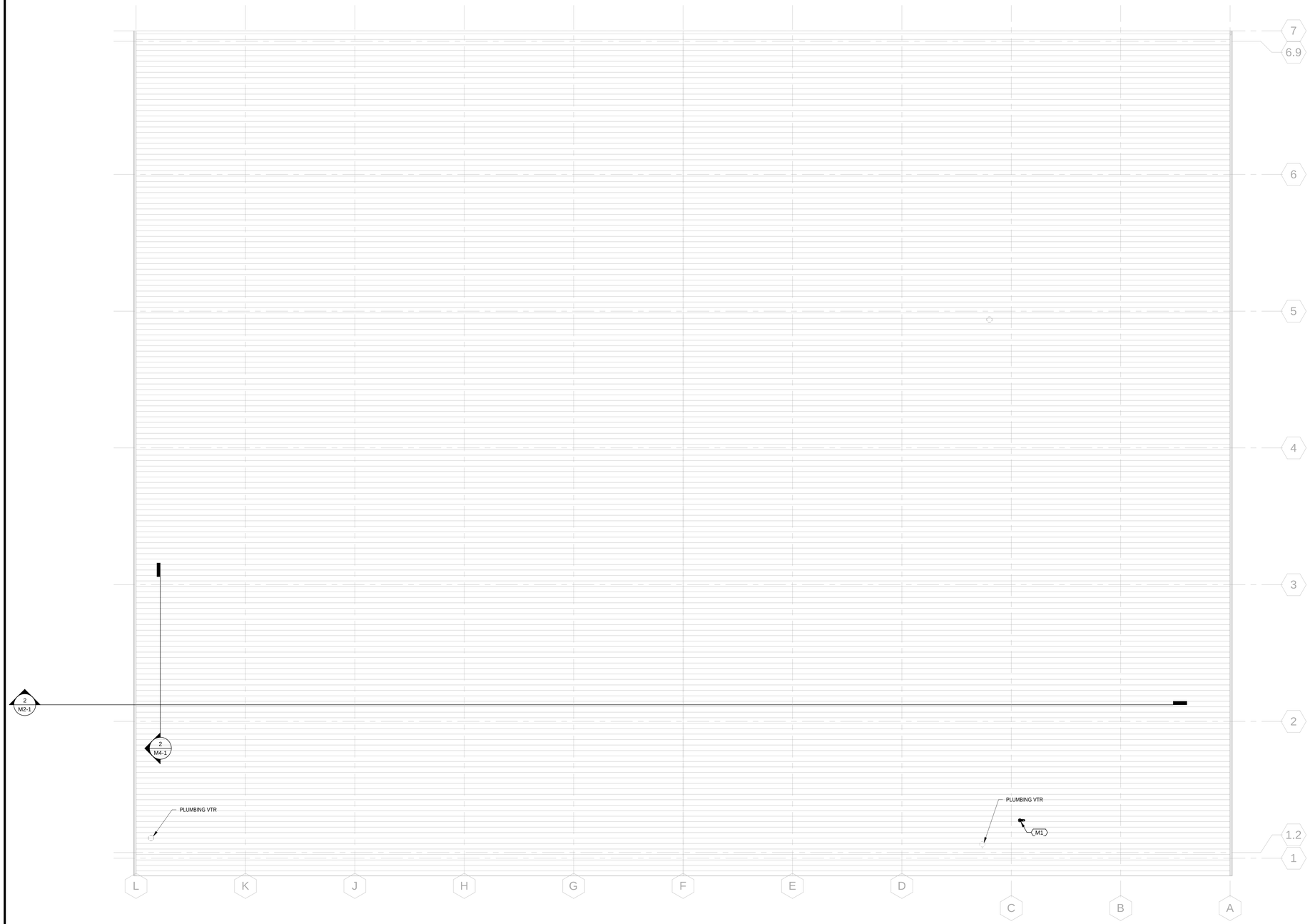

Mechanical Roof Plan

1/8" = 1'-0"

Specific Plan Notes

M1	CONCENTRIC VENT KIT THROUGH ROOF. COMBUSTION AIR / FLUE EXHAUST DOWN TO F-1 BELOW.

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REGISTERED
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STATE OF
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7745	08-09-22

REV. DATE

SET DESCRIPTION
Construction Set

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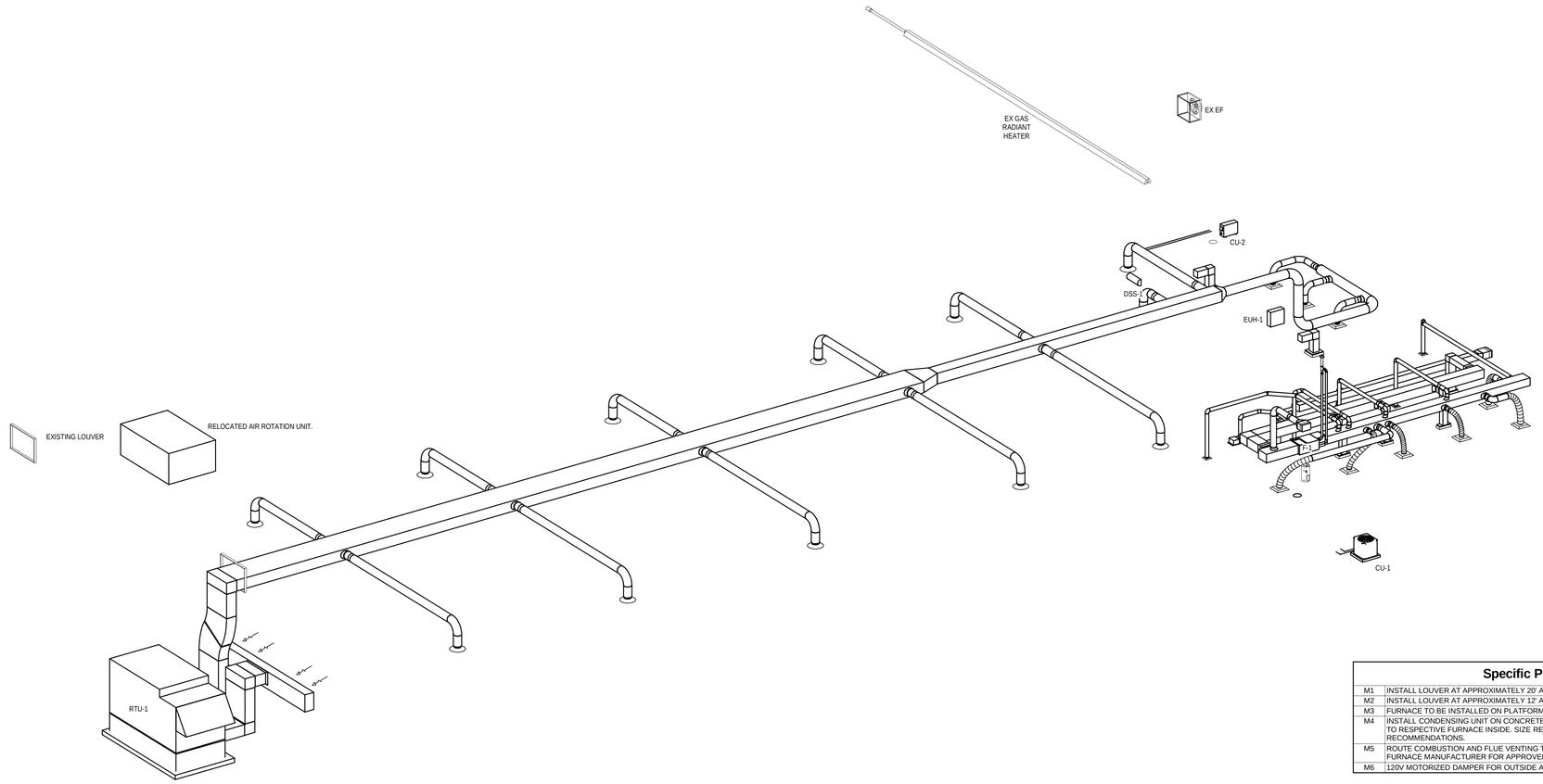
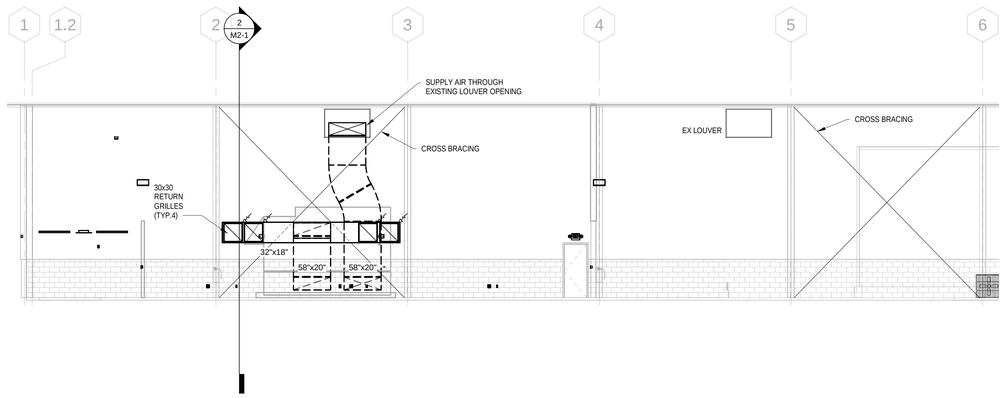


3 Duct Isometric

Not to Scale

Specific Plan Notes

M1	INSTALL LOUVER AT APPROXIMATELY 20' A.F.F.
M2	INSTALL LOUVER AT APPROXIMATELY 12' A.F.F.
M3	FURNACE TO BE INSTALLED ON PLATFORM ABOVE OFFICES WITH DRAIN PAN UNDER UNIT.
M4	INSTALL CONDENSING UNIT ON CONCRETE EQUIPMENT PAD. ROUTE REFRIGERANT PIPING TO RESPECTIVE FURNACE INSIDE. SIZE REFRIGERANT PIPING PER MANUFACTURER RECOMMENDATIONS.
M5	ROUTE COMBUSTION AND FLUE VENTING TO CONCENTRIC ROOF VENT. COORDINATE WITH FURNACE MANUFACTURER FOR APPROVED MATERIALS.
M6	120V MOTORIZED DAMPER FOR OUTSIDE AIR DUCT.



2 West Duct Elevation

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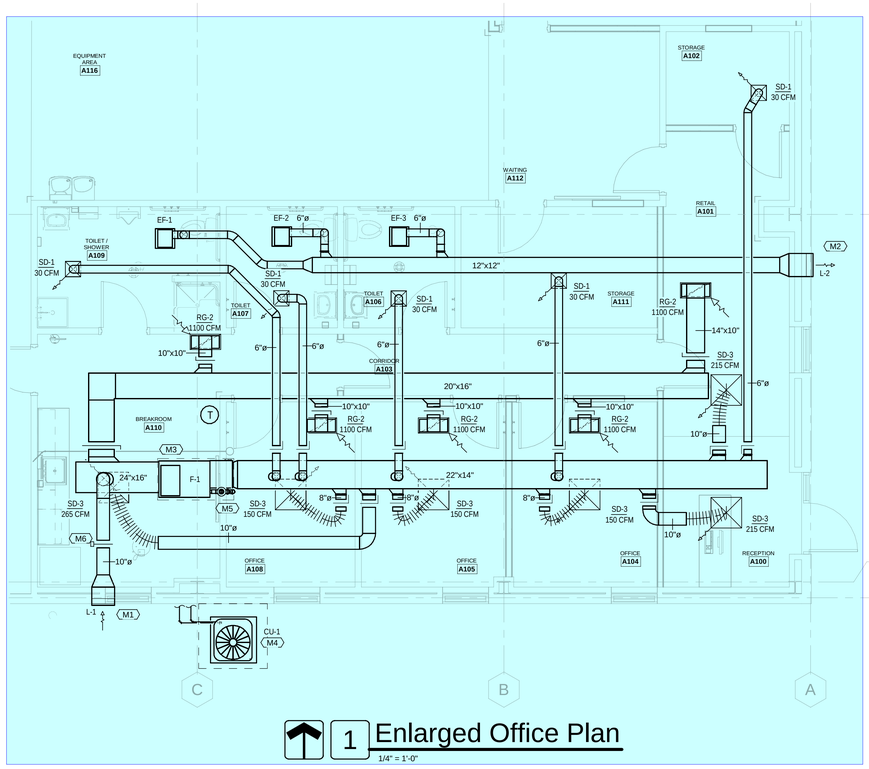

1 Enlarged Office Plan

1/4" = 1'-0"

MSKTD
& Associates
Architecture | Engineering | Interior Design
1715 Magnavox Way
Fort Wayne, IN 46804
260.432.9337
930 North Meridian
Indianapolis, IN 46204
317.917.1190
www.msktd.com

CHRISTOPHER J. BEAM
REGISTERED
No. PE11100259
STATE OF
INDIANA
PROFESSIONAL ENGINEER

A Project for:
Reid Health - Sports Medicine Renovation
910 Progress Dr.
Richmond, Indiana 47374

PROJECT NO. 7745
DATE 08-09-22
REV.
DATE

SET DESCRIPTION
Construction Set

SHEET TITLE
Enlarged Plans, Isometrics, Sections

SHEET NUMBER
M4-1

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General Mechanical Notes

ALL WORK SHALL CONFORM TO ALL APPLICABLE STATE, LOCAL, AND NATIONAL CODES.

ALL WORK SHALL BE IN ACCORDANCE WITH LOCAK BUILDING CODES. PROVIDE TESTS AND ARRANGE INSPECTIONS AS REQUIRED. THE CODE SHALL BE FOLLOWED AT A MINIMUM. PROVIDE HIGHER GRADES OF MATERIAL AND WORKMANSHIP WHERE REQUIRED.

THIS CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION.

ALL MATERIALS AND OR EQUIPMENT SHALL BE NEW UNLESS NOTED OTHERWISE.

ANY PRODUCT MANUFACTURER NOT LISTED ON THE DRAWINGS BUT WISHING TO BID MUST BE SUBMITTED TO ENGINEER FOR APPROVAL NOT LESS THAN 7 DAYS PRIOR TO BID DATE.

MECHANICAL CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING FIELD CONDITIONS WHICH MAY HAVE AN EFFECT ON HIS WORK PRIOR TO SUBMISSION OF BID.

SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION PURCHASE AND/OR INSTALLATION.

THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING DIFFUSER LOCATIONS WITH ARCHITECT'S REFLECTED CEILING PLANS. DIFFUSER LOCATIONS ON SHOP DRAWINGS ARE SUBJECT TO APPROVAL BY THE ARCHITECT.

SUBMIT FOR APPROVAL PRODUCT DATA FOR ALL EQUIPMENT LISTED ON THE MECHANICAL SCHEDULE SHEET AND THIS SPECIFICATION. SUBMITTALS TO INCLUDE RATED CAPACITIES, FURNISHED SPECIALITIES, WIRING DIAGRAMS, ACCESSORIES, CERTIFIED FAN-PERFORMANCE CURVES, CERTIFIED PUMP-PERFORMANCE CURVES, AS PERTAINS TO THAT PIECE OF EQUIPMENT.

DRAWINGS (PLANS, SCHEMATICS, AND DIAGRAMS) INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING, DUCTWORK, AND EQUIPMENT. THE LOCATION AND ARRANGEMENT TAKE INTO CONSIDERATION PIPE SIZING AND FRICTION LOSS, EXPANSION, AND OTHER DESIGN PARAMETERS. CLEARANCES ABOVE CEILINGS IN CERTAIN AREAS ARE LIMITED AND MAY NECESSITATE ALTERNATE DUCTWORK AND/OR PIPING ROUTINGS. WHERE POSSIBLE, PIPING, DUCTWORK, AND EQUIPMENT SHALL BE INSTALLED AS INDICATED. CHANGES REQUIRED TO MEET ARCHITECTURAL AND STRUCTURAL CONDITIONS ARE TO BE APPROVED BY THE ENGINEER.

THE DRAWINGS AND SPECIFICATIONS ARE NOT INTENDED TO SHOW ALL DETAILS. THE CONTRACTOR SHALL SECURE SATISFACTORY INFORMATION BEFORE SUBMITTING THEIR BID PROPOSAL AND INCLUDE IN THE PROPOSAL A SUM SUFFICIENT TO COVER ALL ITEMS OF LABOR AND MATERIAL REQUIRED FOR THE COMPLETE INSTALLATION OF THE DEVICES AND SYSTEM DESCRIBED.

THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THAT OF ALL OTHER TRADES PRIOR TO FABRICATION AND INSTALLATION.

ROOF PENETRATIONS REQUIRE COORDINATION WITH GENERAL CONTRACTOR. APPROVE PENETRATION, FLASHING MATERIALS, AND CURBS WITH ROOFING CONTRACTOR RESPONSIBLE FOR ROOF WARRANTY, PRIOR TO INSTALLATION OF PENETRATIONS. M.C. IS RESPONSIBLE FOR ALL SUPPLEMENTAL STEEL REQUIRED TO SUPPORT EQUIPMENT CURBS.

ALL ROOFTOP MOUNTED EQUIPMENT SHALL BE INSTALLED LEVEL, PLUMB, AND FIRMLY ANCHORED IN LOCATIONS INDICATED. OBSERVE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND RECOGNIZED INDUSTRY PRACTICES TO INSURE THAT PRODUCTS SERVE THEIR INTENDED FUNCTION.

MAXIMUM STRAIGHT LENGTH OF FLEX DUCT SHALL BE 4 FEET.

FLEXIBLE DUCT SHALL NOT BE USED IN PLACE OF ELBOWS.

TAKE-OFFS SHALL NOT BE PLACED CLOSER THAN 12" FROM THE END OF A TRUNK OR LESS THAN 24" DOWNSTREAM FROM AN ELBOW.

PROVIDE AND INSTALL DUCT TRANSITIONS TO ALL TERMINAL DEVICES FOR CONNECTIONS TO EITHER SIDE AS REQUIRED. SEE PLANS FOR DUCT SIZES AND REFER TO TERMINAL UNIT SCHEDULE FOR RECOMMENDED INLET AND OUTLET SIZE.

MANUAL VOLUME DAMPERS ARE TO BE PROVIDED IN ALL DUCT RUN OUTS FOR SUPPLY DIFFUSERS, RETURN AND EXHAUST GRILLES. PROVIDE SQUARE-TO-ROUND AND ROUND-TO-ROUND DUCT TRANSITIONS AT SUPPLY DIFFUSERS AS REQUIRED FOR PROPER CONNECTION.

DUCT LAYOUT IS DIAGRAMMATIC IN NATURE. ADJUST TO FIELD CONDITIONS. ADD OFFSETS WHERE NEEDED. RELOCATE MINOR INTERFERENCES (I.E. SPRINKLER, ELECTRICAL, CONDUIT, SMALLER HYDRONIC PIPING).

INSTALL INSULATION PRODUCTS ON SPECIFIED DUCTWORK, PIPING, AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO INSURE THAT THE INSULATION SERVES ITS INTENDED PURPOSE.

MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL HAVE A FLAME-SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED RATING OF NOT MORE THAN 50 IN ACCORDANCE WITH SECTION 102 (A), IMC (675 IAC 18-1). ANY PLASTIC PIPING, ROUTED IN SUCH LOCATION SHALL BE COVERED WITH INSULATION AS REQUIRED TO COMPLY WITH ABOVE INDICATED FLAME-SPREAD AND SMOKE-DEVELOPED RATING.

AIR SMOKE DETECTORS FOR AIR HANDLING UNIT SHUTDOWN AND FOR SMOKE DAMPER CONTROL WILL BE PROVIDED AS PART OF THE FIRE ALARM SYSTEM. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING THE DETECTORS AND FOR PREPARING THE DUCTWORK FOR MOUNTING THE DETECTORS.

CONTRACTOR SHALL INSTALL CONSTRUCTION FILTERS ON ALL AIR DISTRIBUTION EQUIPMENT SERVING NEW OR REMODELED AREAS TO INSURE THAT COILS AND INTERNAL COMPONENTS ARE PROTECTED. BY COMPLETION OF THE PROJECT THE M.C. SHALL REPLACE CONSTRUCTION FILTERS WITH NEW FILTERS.

THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPERATURE CONTROL WIRING, THERMOSTATS, RELAYS, AND INTERLOCKS ETC. AS REQUIRED.

INSTALL PLASTIC PIPE MARKERS ON ALL PIPING, AND INCLUDE ARROWS TO SHOW NORMAL DIRECTION OF FLOW.

PROVIDE A VALVE TAG ON EVERY VALVE, COCK AND CONTROL DEVICE IN EACH PIPING SYSTEM. EXCLUDE CHECK VALVES, VALVES FROM FACTORY-FABRICATED EQUIPMENT UNITS, PLUMBING FIXTURE FAUCETS, HOSE-BIBS, HVAC TERMINAL DEVICES, AND SIMILAR ROUGH-IN CONNECTIONS OF END-USE FIXTURES AND UNITS.

ALL CONNECTIONS BETWEEN DISSIMILAR PIPING MATERIAL SHALL BE MADE WITH "EPCO" OR BRASS FITTINGS TO PREVENT GALVANIC ACTION.

INSTALL CHROME-PLATED PIPE ESCUTCHEONS ON EACH PIPE PENETRATION THROUGH FLOORS, WALLS, PARTITIONS, AND CEILINGS WHERE PENETRATION IS EXPOSED TO VIEW.

IINSTALL HANGERS, SUPPORTS, CLAMPS AND ATTACHMENTS TO SUPPORT PIPING PROPERLY FROM BUILDING STRUCTURE; COMPLY WITH MSS SP-69. ARRANGE FOR GROUPING OF PARALLEL RUNS OF HORIZONTAL PIPING TO BE SUPPORTED TOGETHER ON TRAPEZE HANGERS WHERE POSSIBLE. ALL PIPING HANGER AND SUPPORTS SHALL BE UL OR FM APPROVED.

UNIONS AND VALVES SHALL BE PROVIDED AT CONNECTIONS TO ALL EQUIPMENT.

REFRIGERANT PIPING SHALL BE TYPE ACR DRAWN COPPER TUBING WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS ABOVE GROUND WITHIN BUILDING. USE TYPE K, ANNEALED TEMPER COPPER TUBING FOR 2 INCH AND SMALLER WITHOUT JOINTS BELOW GROUND AND WITHIN SLABS. MECHANICAL FITTINGS (CRIMP OR FLAIR) ARE NOT PERMITTED.

REFRIGERANT SUCTION LINES SHALL BE INSULATED WITH ELASTOMERIC INSULATION, 3/4" THICKNESS FOR UP TO 1-1/2" PIPE SIZE. USE 1" THICKNESS FOR 2" AND LARGER PIPE SIZE. ANY INSULATION LOCATED OUTSIDE SHALL BE COVERED WITH ALUMINUM JACKET OR PVC COVER. HANGING OF PIPING SHALL BE ON NOT MORE THAN 10'-0" CENTERS WITH 3/8" RODS.

ALL ABOVE GRADE CONDENSATE DRAIN PIPING SHALL BE COVERED WITH 1/2" PRE-FORMED ELASTOMERIC FOAM INSULATION.

VOLTAGE FOR ALL EQUIPMENT IS TO BE VERIFIED BY THE MECHANICAL CONTRACTOR. ALL FINAL POWER (LINE VOLTAGE) WIRING OF ALL EQUIPMENT WILL BE EXECUTED BY THE ELECTRICAL CONTRACTOR.

ALL THERMOSTATS SHALL BE MOUNTED NEAR DOORS OR CORNERS OF WALLS UNLESS SHOWN OTHERWISE. ALL THERMOSTATS TO BE MOUNTED AT 48" A.F.F.

ALL HVAC EQUIPMENT SHALL BE SUSPENDED PER MANUFACTURER'S RECOMMENDATIONS. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION OF VIBRATION CONTROL ON ALL MECHANICAL EQUIPMENT. ADJUST TO ENSURE THAT UNITS HAVE EQUAL DEFLECTION, DO NOT BOTTOM OUT UNDER LOADING, AND ARE NOT SHORT-CIRCUITED BY OTHER CONTACTS OR BEARING POINTS.

SPRING VIBRATION ISOLATION SHALL BE PROVIDED FOR ALL SUSPENDED UNITS.

A COMPLETE AIR TEST AND BALANCE SHALL BE PERFORMED IN COMPLETE ACCORDANCE WITH NEBB OR AABC NATIONAL STANDARDS FOR FIELD MEASUREMENTS AND INSTRUMENTATION.
MECHANICAL CONTRACTOR SHALL CHANGE BELTS AND SHEAVES ON AIR HANDLING EQUIPMENT AS DIRECTED BY BALANCING CONTRACTOR, IF REQUIRED, TO ACHIEVE DESIGN PARAMETERS WITH NO EXTRA COST TO THE OWNER.

THE CONTRACTOR SHALL PROVIDE A COMPETENT OPERATING TECHNICIAN TO INSTRUCT THE OWNER IN THE OPERATION AND MAINTENANCE REQUIREMENTS OF THE INSTALLED EQUIPMENT.

THE CONTRACTOR SHALL ASSEMBLE AND SUBMIT THREE COPIES OF PRINTED INSTRUCTIONS, INCLUDING EQUIPMENT CUTS AND WIRING DIAGRAMS FOR THE OPERATION AND MAINTENANCE OF EACH ITEM OF INSTALLED EQUIPMENT.

THE CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR ONE YEAR AFTER DATE OF ACCEPTANCE AGAINST ALL DEFECTS OF MATERIALS, EQUIPMENT AND WORKMANSHIP.

INSTALL ENGRAVED PLASTIC LAMINATE SIGN OR PLASTIC EQUIPMENT MARKER ON OR NEAR EACH MAJOR ITEM OF MECHANICAL EQUIPMENT.

Air Diffusers, Registers & Grille Schedule

Tag	Mfr.	Model	Round Neck Size (In.)	Square Neck Size (In.)	Module Size (In.)	Material	Color	Mounting	Description	Notes
RG-2	PRICE	80	-	22x10	24x12	ALUMINUM	WHITE	LAY-IN	1/2" X 1/2" EGGCRATE	
RG-3	PRICE	80	-	22x22	24x24	ALUMINUM	WHITE	LAY-IN	1/2" X 1/2" EGGCRATE	
RG-4	PRICE	500	-	-	30x30	STEEL	WHITE	DUCT	LOUVERED	
SD-1	PRICE	SPD	6	-	12x12	STEEL	WHITE	SURFACE	ARCHITECTURAL SQUARE PLAQUE DIFFUSER	1
SD-3	PRICE	SPD	8	-	24x24	STEEL	WHITE	LAY-IN	ARCHITECTURAL SQUARE PLAQUE DIFFUSER	1
SD-6	PRICE	RCD	12	-	27"	STEEL	WHITE	DUCT	ROUND CONE	

NOTES:
1. DIFFUSER SHALL BE PROVIDED WITH FACTORY OR FIELD-INSULATED BACK PAN.

HVAC Power Ventilator Exhaust Schedule

Tag	Mfr.	Model	Airflow (CFM)	ESP (In. WC)	Watts	Mounting	Drive Type	Sound	Electrical					Weight (Lbs.)	Notes
								Sones	Voltage	Phase	Freq.	MCA	MOP		
EF-1	GREENHECK	SP-B110	75	0.5	80	CEILING	DIRECT	3.0	115	1	60	1.15	15	10	1,2,3,4,5,6
EF-2	GREENHECK	SP-B110	75	0.5	80	CEILING	DIRECT	3.0	115	1	60	1.15	15	10	1,2,3,4,5,6
EF-3	GREENHECK	SP-B110	75	0.5	80	CEILING	DIRECT	3.0	115	1	60	1.15	15	10	1,2,3,4,5,6

NOTES:
1. ELECTRICAL CONTRACTOR TO PROVIDE DISCONNECT SWITCH.
2. PROVIDE WITH VIBRATION ISOLATORS AND HANGING BRACKETS.
3. PROVIDE WITH DECORATIVE GRILLE.
4. PROVIDE WITH BACKDRAFT DAMPER.
5. PROVIDE WITH ELECTRONICALLY COMMUTATED MOTOR WITH UNIT-MOUNTED SPEED ADJUSTMENT DIAL.
6. FAN SHALL BE OPERATED BY OCCUPANCY SENSOR IN RESPECTIVE ROOM.

Split System Air Conditioner - Heat Pump Schedule

Tag	Mfr.	Model	Mounting Style	Supply Airflow (CFM)	Cooling Capacity (MBH)	Heating Capacity (MBH)	Refrig.	Paired Heat Pump Unit	Electrical				Weight (lbs)	Notes
									Voltage	Phase	Freq.	MOP		
DSS-1	FUJITSU	ASU18RLF	WALL	435	18	-	R-410A	CU-2	208	1	60	-	40	1,2,3,4,5

NOTES:
1. ELECTRICAL CONTRACTOR TO PROVIDE DISCONNECT SWITCH.
2. PROVIDE THERMOSTAT AND FACTORY MOUNTED CONTROLS.
3. INDOOR UNIT IS POWERED FROM RESPECTIVE HEAT PUMP/CONDENSING UNIT.
4. SIZE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM CAPACITY LOSS.
5. PROVIDE WITH CONDENSATE PUMP.

Air-Cooled Refrigerant Condensing Unit Schedule

Tag	Mfr.	Model	Nominal Capacity (Tons)	Fan Qty.	Fan HP	EER	SEER	Paired Indoor Unit	Electrical					Weight (Lbs.)	Notes
									Voltage	Phase	Freq.	MCA	MOP		
CU-1	TRANE	4TTA3042	3.5	1	1/5	-	14	F-1	208	3	60	15	25	215	1,2,3,5
CU-2	FUJITSU	AOU18	1.5	1	-	-	20	DSS-1	208	1	60	17	20	152	1,2,4,5,6

NOTES:
1. ELECTRICAL CONTRACTOR TO PROVIDE DISCONNECT SWITCH.
2. PROVIDE WITH ANTI-SHORT CYCLE TIMER, TX VALVE, LOW AMBIENT COOLING KIT, AND DEFROST CONTROL.
3. PROVIDE CONCRETE EQUIPMENT PAD FOR MOUNTING UNIT.
4. PROVIDE WALL MOUNTING SUPPORT.
5. SIZE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM CAPACITY LOSS.
6. MECHANICAL CONTRACTOR TO PROVIDE INTERLOCK CABLE BETWEEN DSS-1 AND CU-2.

Cabinet Unit Heater - Electric Schedule

Tag	Mfr.	Model	Mounting Style	Supply Fan		Electric Heat			Electrical			Notes
				Airflow (CFM)	HP	Input (kW)	EAT (DB)	LAT (DB)	Voltage	Phase	Freq.	
EUH-1	REZNOR	EMC	WALL	250	1/15	3	60	97	480	3	60	1,2,3,4
EUH-2	REZNOR	EMC	WALL	250	1/15	3	60	97	480	3	60	1,2,3,4
EUH-3	REZNOR	ECR	CEILING/HUNG	250	1/15	3	60	97	480	3	60	1,3,4,5

NOTES:
1. PROVIDE WITH THREE PHASE FACTORY-WIRED, UNIT-MOUNTED DISCONNECT.
2. PROVIDE WITH SURFACE MOUNTING KIT.
3. PROVIDE WITH UNIT-MOUNTED THERMOSTAT.
4. PROVIDE WITH BAKED ENAMEL FINISH, COLOR TO BE SELECTED BY ARCHITECT. SUBMIT A HARD COPY COLOR CHART WITH SHOP DRAWING.
5. PROVIDE HANGER SUPPORTS FOR UNIT.

Fixed Louver Schedule

Tag	Mfr.	Model	Width (In.)	Height (In.)	Frame Depth (In.)	Free Area (Ft^2)	Max Flow (CFM)	Velocity (Ft./Min.)	Material	Color	Notes
L-1	RUSKIN	ELF6375DX	18	12	6	0.6	120	200	ALUMINUM	TBD	1,2,3
L-2	RUSKIN	ELF6375DX	18	12	6	0.6	225	375	ALUMINUM	TBD	1,2,3

NOTES:
1. PROVIDE WITH BIRD SCREEN.
2. COLOR TO BE SELECTED BY ARCHITECT. SUBMIT COLOR CHART WITH SHOP DRAWING.
3. PROVIDE WITH FLANGED FRAME.

Duct Insulation Schedule

Service	Minimum Thermal Resistance (R-Value)	Duct Type	Insulation Thickness (in)	Insulation Material	Density (lb/ft^3)	100% Vapor Barrier	Jacketing	Notes
EXHAUST DUCT	NONE	RECTANGULAR	NONE	NONE	---	NO	NONE	---
	NONE	ROUND	NONE	NONE	---	NO	NONE	
EXHAUST DUCT WITHIN 15'-0" OF EXTERIOR WALL OR ROOF	3.5	RECTANGULAR	1-1/2"	FIBER WRAP	1	YES	FSKP	---
	3.5	ROUND	1-1/2"	FIBER WRAP	1	YES	FSKP	
OUTSIDE AIR DUCT	6	RECTANGULAR	2"	FIBER WRAP	1	YES	NONE	---
	6	ROUND	2"	FIBER WRAP	1	YES	NONE	
RELIEF DUCT EXPOSED WITHIN AN INDOOR, CONDITIONED SPACE	3.5	RECTANGULAR	1-1/2"	FIBER WRAP	1	YES	FSKP	---
	3.5	ROUND	1-1/2"	FIBER WRAP	1	YES	FSKP	
RETURN DUCT OUTDOORS	3.5	RECTANGULAR	1-1/2"	FIBER WRAP	1	NO	TAOB	1
	3.5	ROUND	1-1/2"	FIBER WRAP	1	NO	TAOB	
RETURN DUCT WITHIN AN INDOOR CONDITIONED SPACE	NONE	RECTANGULAR	NONE	NONE	---	NO	NONE	1
	NONE	ROUND	NONE	NONE	---	NO	NONE	
SUPPLY DUCT CONCEALED WITHIN AN INDOOR, CONDITIONED SPACE	1.9	RECTANGULAR	1"	FIBER WRAP	1	YES	FSKP	1
	1.9	ROUND	1"	FIBER WRAP	1	YES	FSKP	
SUPPLY DUCT EXPOSED WITHIN AN INDOOR, CONDITIONED SPACE	1.9	RECTANGULAR	1"	LINER	---	YES	FSKP	1
	1.9	ROUND	1"	FIBER WRAP	---	YES	FSKP	
SUPPLY DUCT OUTDOORS	6	RECTANGULAR	2"	FIBER WRAP	1	YES	TAOB	1
	6	ROUND	2"	FIBER WRAP	1	YES	TAOB	

GENERAL NOTES:
- SEE SPECIFICATIONS FOR ADDITIONAL INSULATION REQUIREMENTS AND DRAWINGS FOR SPECIAL INSTALLATIONS.
- PASJ = PAINTABLE ALL SERVICE JACKET COMPOSED OF WHITE KRAFT BOND PAPER BONDED TO ALUMINUM FOIL AND REINFORCED WITH A FIBERGLASS SCRIM.
- FSKP = FOIL SCRIM KRAFT PAPER
- TAOB = TEXTURED ALUMINUM OUTSIDE OF BUILDING
- FLEX. ELAST. = FLEXIBLE ELASTOMERIC

NOTES:
1. DUCTWORK WITHIN 15' OF SUPPLY OR RETURN FAN SHALL HAVE 1" DUCT LINER AS SOUND ABSORBTION. THIS SHALL NOT BE INCLUDED IN INSULATION VALUE. SEE SPECS.
2. WHERE OPTIONS ARE GIVEN FOR DUCTWORK INSULATION, CONTRACTOR SHELL SELECT (1) OF THE OPTIONS AND PROVIDE THAT TYPE OF INSULATION THROUGHOUT THE PROJECT FOR CONSISTANCY,
3. PROVIDE THIS INSULATION IN MECHANICAL, ELECTRICAL, FIRE PROTECTION, AND OTHER UTILITY TYPE ROOMS.

Mechanical Pipe Insulation Schedule

Service	Temperature Range (°F)	Conductivity (Btu·in./h·ft²·°F)	Mean Rating Temp. (°F)	Nominal Pipe Size (in.)	Insulation Thickness (in.)	Insulation Material	100% Vapor Barrier	Jacketing	Notes
REFRIGERANT LIQUID & SUCTION (SPEC SECTION 232300)	<40	0.22-0.28	100	LESS THAN 1"	1/2"	FLEX. ELAST.	YES	TAOB	1,2,3,4
	<40	0.22-0.28	100	1" to 1 1/2"	1"	FLEX. ELAST.	YES	TAOB	
	<40	0.22-0.28	100	2" TO 8"	1 1/2"	FLEX. ELAST.	YES	TAOB	
	40-60	0.22-0.28	100	1 1/2" OR LESS	1"	FLEX. ELAST.	YES	TAOB	
	40-60	0.22-0.28	100	2" TO 8"	1 1/2"	FLEX. ELAST.	YES	TAOB	

GENERAL NOTES:
- USE 2" THICKNESS CLACIUM SILICATE ON UNINSULATED FLUES, GENERATOR EXHAUST AND OTHER HIGH TEMPERATURE APPLICATIONS. ON GENERATOR EXHAUST, PROVIDE 304 SS, 0.016" THICK Z-SHAPED LOCKING SEAM JACKET.
- ASJ IS AN ALL SERVICE JACKET COMPOSED OF WHITE KRAFT BOND PAPER BONDED TO ALUMINUM FOIL AND REINFORCED WITH A FIBERGLASS SCRIM.
- TAOB = TEXTURED ALUMINUM OUTSIDE OF BUILDING
- FLEX. ELAST. = FLEXIBLE ELASTOMERIC

NOTES:
1. PROVIDE MINIMUM 2" LONGITUDINAL AND END LAPS FOR MINERAL FIBER INSULATION.
2. USE PREFORMED AND PREMOLDED SHAPES.
3. PROVIDE REMOVABLE INSULATION SECTIONS TO COVER PARTS OF EQUIPMENT THAT MAY REQUIRE PERIODIC ACCESS.
4. SEE SPECIFICATIONS FOR ADDITIONAL INSULATION REQUIREMENTS AND DRAWINGS FOR SPECIAL INSTALLATIONS.

Indoor Air-Handling Unit - DX/Gas Fired Schedule

Tag	Mfr.	Model	Supply Airflow (CFM)	Outside Airflow (CFM)	Supply Fan			DX Cooling										Gas Heating					Electrical					Weight (Lbs.)	Notes
					ESP (In. WC)	HP	BHP	Coil Model	Total Capacity (MBH)	Sensible Capacity (MBH)	EAT (DB / WB)	LAT (DB / WB)	APD (In. WC)	Rows	Fins / In.	Refrig.	Paired Outdoor Condensing Unit	Input (MBH)	Output (MBH)	Heating Efficiency (%)	EAT (DB)	LAT (DB)	Voltage	Phase	Freq.	MCA	MOP		
F-1	TRANE	S9X2B080	1,295	115	0.9	3/4	-	4PXCB004DS3	39	33	74 / 60	50 / 48	0.3	3	14	R-410A	CU-1	80	77	96	64	120	115	1	60	10.3	15	135	1,2,3,4,5

NOTES:
1. ELECTRICAL CONTRACTOR TO PROVIDE DISCONNECT SWITCH.
2. PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT.
3. PROVIDE FILTER RACK WITH 1" PLEATED MERV 8 FILTERS
4. SIZE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM CAPACITY LOSS.
5. PROVIDE CONCENTRIC VENTING KIT FOR ROOF PENETRATION.

Rooftop Air-Conditioning Unit - DX/Gas-Fired Schedule

Tag	Mfr.	Model	Supply Airflow (CFM)	Outside Airflow (CFM)	Supply Fan					Relief Fan					DX Cooling									Gas Heating					Electrical					Weight (Lbs.)	Notes
					ESP (In. WC)	TSP (In. WC)	Fan Qty.	HP	BHP	ESP (In. WC)	TSP (In. WC)	Fan Qty.	HP	BHP	Total Capacity (MBH)	Sensible Capacity (MBH)	EAT (DB / WB)	LAT (DB / WB)	Rows	Fins / In.	Refrig.	EER	SEER	Input (MBH)	Output (MBH)	Heating Efficiency (%)	EAT (DB)	LAT (DB)	Voltage	Phase	Freq.	MCA	MOP		
RTU-1	AAON	RN-040	10,000	3,150	0.9	3.24	2	5	2.98	0.15	0.3	2	1	0.34	422.1	279.4	80.0 / 67.0	51.8 / 52.5	6	12	R-410A	10.2	-	810	648	80	48.2	108.2	460	3	60	105	125	6,331	1,2,3,4,5,6,7,8,9,10,11,12,13

NOTES:
1. ELECTRICAL CONTRACTOR TO PROVIDE DISCONNECT.
2. PROVIDE UNIT WITH 0-100%, COMPARATIVE ENTHALPY ECONOMIZER.
3. PROVIDE MOTORIZED OUTSIDE AIR DAMPER AND POWERED RELIEF FOR ECONOMIZER OPERATION.
4. PROVIDE 2" PLEATED MERV 14 FILTERS.
5. PROVIDE STAINLESS STEEL HEAT EXCHANGER WITH MODULATING GAS TEMPERATURE CONTROL.
6. PROVIDE WITH INSULATED CURB WITH HORIZONTAL DUCT TRANSITIONS WITH TURNING VANES TO REDUCE STATIC PRESURE LOSS.
7. UNIT CONTROLS TO BE PROVIDED BY TCC WITH BACNET IP COMMUNICATION TO BMS. CONTROLS MUST HAVE DUAL 10/100BASE-TX (RJ45) ETHERNET CONNECTION WITH SPANNING TREE PROTOCOL CAPABILITY.PROVIDE LOW AMBIENT COOLING KIT, CRANKCASE HEATER, AND FROSTAT.
8. PROVIDE WITH VARIABLE FREQUENCY DRIVE ON SUPPLY FAN.
9. PROVIDE UNIT WITH MODULATING, VARIABLE CAPACITY COMPRESSORS.
10. PROVIDE UNIT WITH CONDENSER FAN VFD FOR HEAD PRESSURE CONTROL.
11. PROVIDE UNIT WITH FACTORY WIRED GFI CONVENIENCE OUTLET.
12. SMOKE DETECTORS WITH WIRING TO FIRE ALARM BY ELECTRICAL CONTRACTOR, DUCT SMOKE DETECTOR SHALL SHUTDOWN UNIT.
13. PROVIDE HOT GAS REHEAT COIL CAPABLE OF PROVIDING AT LEAST 70 DEG AIR.

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1715 Magnavox Way
Fort Wayne, IN 46804
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930 North Meridian
Indianapolis, IN 46204
317.917.1190
www.msktd.com
CHRISTOPHER J. BIEN
REGISTERED
No. PE11100259
STATE OF INDIANA
PROFESSIONAL ENGINEER

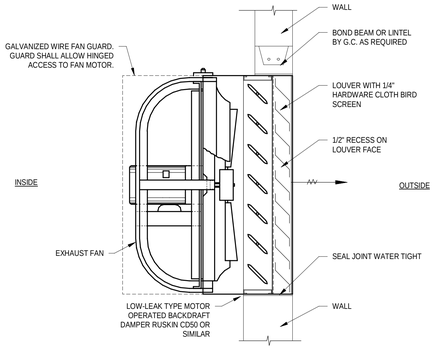
A Project for:
Reid Health - Sports Medicine Renovation
910 Progress Dr.
Richmond, Indiana 47374

PROJECT NO. 7745
DATE 08-09-22
REV.
DATE

SET DESCRIPTION
Construction Set

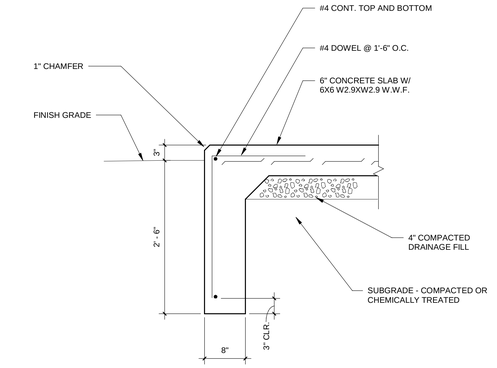
SHEET TITLE
Mechanical Schedules

SHEET NUMBER
M5-1



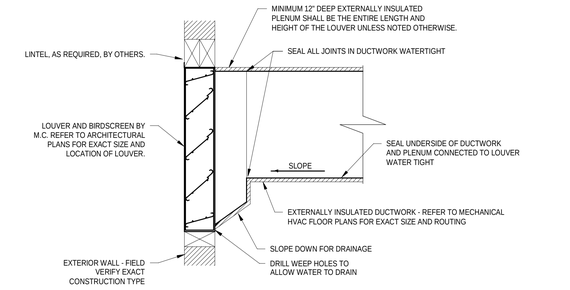
7 Sidewall Exhaust Fan (Typ.)

Not to Scale



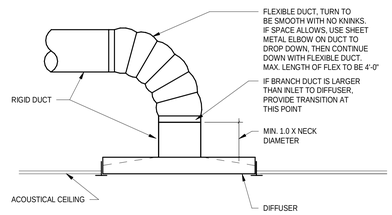
4 Equipment Pad Detail

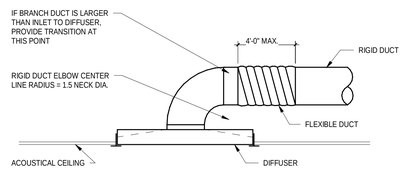
Not to Scale



3 Duct to Louver

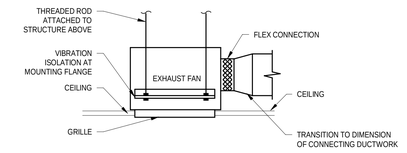
1/8" = 1'-0"





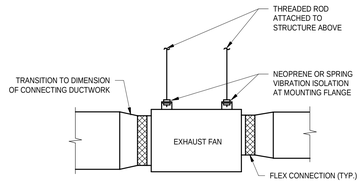
6 Diffuser/Duct Connection

1/8" = 1'-0"



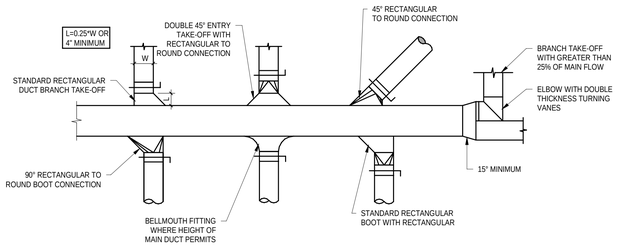
2 Ceiling Exhaust Fan Detail (Typ.)

1/8" = 1'-0"



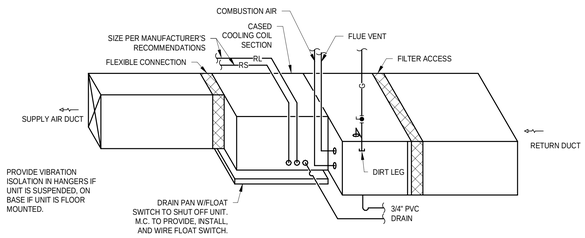
8 In-Line Exhaust Fan (Typ.)

Not to Scale



5 Duct Take Off (Typ.)

1/8" = 1'-0"



1 DX Air Handler - Horizontal (Typ.)

1/8" = 1'-0"

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930 North Meridian
Indianapolis, IN 46204
317.917.1190
www.msktd.com

CHRISTOPHER T. BLUM REGISTERED No. PE11100259 STATE OF INDIANA PROFESSIONAL ENGINEER

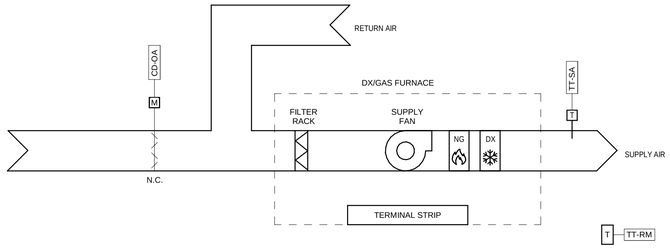
A Project for:
Reid Health - Sports Medicine Renovation
910 Progress Dr.
Richmond, Indiana 47374

PROJECT NO. 7745 | DATE 08-09-22
REV. | DATE

SET DESCRIPTION
Construction Set

SHEET TITLE
Mechanical Details

SHEET NUMBER
M6-1



2 Split DX/Gas Furnace Controls

Not to Scale

SPLIT DX/GAS FIRED FURNACE (F-1)

OCCUPIED MODE:
THE OUTSIDE AIR DAMPER SHALL OPEN. SUPPLY FAN WILL BE STARTED AND RUN CONTINUOUSLY. ONCE FAN STATUS IS GAINED, THE CONTROL LOOPS WILL BE INITIATED.

HEATING MODE:
HEATING WILL BE ENABLED WHENEVER OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.) AND THE SUPPLY FAN STATUS IS ON AND THE COOLING IS NOT ACTIVE. MODULATING NATURAL GAS FURNACE HEAT SHALL BE ENABLED TO MAINTAIN SPACE TEMPERATURE.

COOLING MODE:
THE UNIT SHALL BE IN THE COOLING MODE WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SET POINT (74F ADJ.).

UNOCCUPIED MODE:
THE SUPPLY FAN WILL BE OFF, THE OUTSIDE AIR DAMPER WILL BE CLOSED.

WHEN THE SPACE TEMPERATURE FALLS BELOW THE NIGHT SETBACK HEATING SET POINT OF 60 F (ADJ.) OR RISES ABOVE THE COOLING SET POINT OF 85 F (ADJ.), THE SUPPLY FAN WILL BE STARTED AND OPERATED THE SAME AS DURING THE OCCUPIED PERIOD. THE EXHAUST FAN SHALL REMAIN OFF AND THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. ONCE THE SPACE TEMPERATURE RETURNS TO SET POINT, THE UNIT WILL SHUT DOWN.

AN UNOCCUPIED OVERRIDE PUSHBUTTON WILL WHEN PUSHED, PLACE THE UNIT IN THE OCCUPIED MODE FOR AN OPERATOR DETERMINED PERIOD OF TIME.

THERMOSTAT:
1. SHALL HAVE A 5 DEGREE DEADBAND WITH SETBACK CONTROL.
2. SHALL PREVENT SIMULTANEOUS HEATING AND COOLING.
3. SHALL BE EQUIPPED WITH MINIMUM (1) AUTOMATIC SHUTDOWN CONTROL.

Additional Sequence of Operations

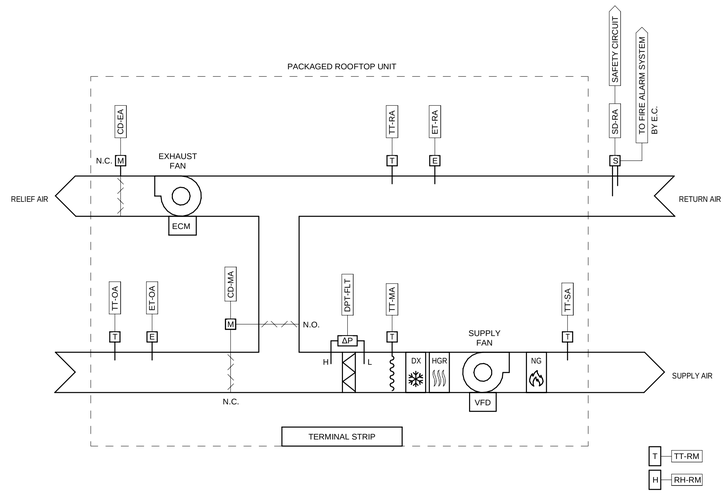
EXHAUST FAN CONTROL (EF-1,2,3) :
FAN SHALL OPERATE BASED ON OCCUPANCY SENSOR IN RESPECTIVE ROOM.

ELECTRIC SURFACE MOUNTED CABINET HEATERS:
INTEGRAL THERMOSTAT SHALL CYCLE FAN/HEATER AS NEEDED TO MAINTAIN SPACE TEMPERATURE.

EXISTING GAS FIRED RADIANT HEATER:
MAINTAIN EXISTING CONTROL.

EXISTING AIR ROTATION UNIT:
MAINTAIN EXISTING CONTROL.. UNIT NOT TIED TO BMS. PROVIDE SEPARATE SPACE SENSOR FOR MONITORING ONLY.

CONTROLS SHALL BE PROVIDED AND INSTALLED BY PRECISION CONTROLS OF INDIANAPOLIS.
CONTACT:
MATT MANOR
1-317-872-4242 X 4020
MMANOR@SHAMBAUGH.COM



1 Packaged DX/Gas RTU Controls

Not to Scale

PACKAGED DX/GAS FIRED UNIT (RTU-1)

OCCUPIED MODE:
THE OUTSIDE AIR DAMPER SHALL OPEN TO ITS MINIMUM POSITION. SUPPLY FAN WILL BE STARTED AND RUN CONTINUOUSLY. ONCE FAN STATUS IS GAINED, THE CONTROL LOOPS WILL BE INITIATED.

MORNING WARM UP:
UTILIZE AN OPTIMUM START ROUTINE BASED ON OUTSIDE AND INSIDE AIR TEMPERATURES TO ADJUST THE AIR HANDLER START TIME SO THAT THE SPACE SHALL BE AT SET POINT AT ITS SCHEDULED OCCUPANCY TIME. DURING MORNING WARM-UP, SUPPLY FAN SHALL BE AT FULL SPEED AND SET DISCHARGE AIR TEMPERATURE TO 110 F (ADJ.) UNTIL SPACE HAS REACHED SET POINT.

SINGLE ZONE VAV CONTROLLER: (BY RTU MANUFACTURER):
UNIT SHALL UTILIZE VARIABLE CAPACITY COOLING, HEATING, AND FAN SPEED TO MODULATE THE AIRFLOW TO MAINTAIN SPACE TEMPERATURE.

HEATING MODE:
HEATING WILL BE ENABLED WHENEVER OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.) AND THE SUPPLY FAN STATUS IS ON AND THE COOLING IS NOT ACTIVE. MODULATING NATURAL GAS FURNACE HEAT SHALL BE ENABLED TO MAINTAIN SPACE TEMPERATURE.

ECONOMIZER:
AS THE FIRST STAGE OF COOLING, THE CONTROLLER WILL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SET POINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SET POINT. THE ECONOMIZER WILL BE ENABLED WHENEVER: OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.) AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE AND THE SUPPLY AND EXHAUST FAN STATUS IS ON. THE ECONOMIZER WILL CLOSE WHENEVER THE MIXED AIR TEMPERATURE DROPS TO 35°F (ADJ) OR ON LOSS OF SUPPLY FAN STATUS.

COOLING MODE:
THE UNIT SHALL BE IN THE COOLING MODE WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SET POINT (74F ADJ.).

MODULATE/STAGE THE DX COOLING COMPRESSORS AS SECOND STAGE COOLING TO MAINTAIN SPACE TEMPERATURE WHEN ECONOMIZER COOLING IS NOT AVAILABLE.

DEHUMIDIFICATION MODE:
UNIT SHALL ENTER DEHUMIDIFICATION MODE UPON CALL FROM SPACE SENSOR AND SHALL ENABLE COOLING MODE AND HOT GAS REHEAT.

RELIEF FAN/RELIEF DAMPER:
RELIEF DAMPER/FAN SHALL MODULATE PROPORTIONALLY WITH OUTSIDE AIR DAMPER. COORDINATE WITH TEST AND BALANCE CONTRACTOR FOR SET POINTS.

UNOCCUPIED MODE:
THE SUPPLY AND RELIEF FAN WILL BE OFF, THE OUTSIDE AND RELIEF AIR DAMPER WILL BE CLOSED AND THE RETURN AIR DAMPER WILL BE FULL OPEN.

WHEN THE SPACE TEMPERATURE FALLS BELOW THE NIGHT SETBACK HEATING SET POINT OF 60 F (ADJ.) OR RISES ABOVE THE COOLING SET POINT OF 85 F (ADJ.), THE SUPPLY FAN WILL BE STARTED AND OPERATED THE SAME AS DURING THE OCCUPIED PERIOD. THE EXHAUST FAN SHALL REMAIN OFF AND THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. ONCE THE SPACE TEMPERATURE RETURNS TO SET POINT, THE UNIT WILL SHUT DOWN.

AN UNOCCUPIED OVERRIDE PUSHBUTTON WILL WHEN PUSHED, PLACE THE UNIT IN THE OCCUPIED MODE FOR AN OPERATOR DETERMINED PERIOD OF TIME.

THERMOSTAT:
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2. SHALL PREVENT SIMULTANEOUS HEATING AND COOLING.
3. SHALL BE EQUIPPED WITH MINIMUM (1) AUTOMATIC SHUTDOWN CONTROL.

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Construction Set

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SHEET NUMBER
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