MECHANICAL GENERAL NOTES

SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO SUPPLEMENT THE SPECIFICATIONS. INTHE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

1. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.
2. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE WRAPPED WITH 2" THICK DUCT WRAP WITH VAPOR BARRIER. INSULATION (INCLUDING FLEXIBLE DUCT INSULATION) SHALL HAVE A MINIMUM INSTALLED R-VALUE OF 6.0. ROOFTOP UNIT RETURN DUCTWORK AND TRANSFER DUCTS SHALL BE LINED WITH 1" THICK FIBERGLASS DUCT LINER FOR ACOUSTICAL PURPOSES. DUCT DIMENSIONS ON PLANS ARE FREE AREA SIZE.
4. ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE NORTH CAROLINA INTERNATIONAL MECHANICAL CODE. SEAL LOW PRESSURE SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST DUCTWORK FOR POSITIVE/NEGATIVE 2" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4.
5. ALL PIPING, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED AND COUNTERFLASHED IN A WATERPROOF MANNER.
6. ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS OF THE SPECIFICATIONS, TO AVOID INTERFERENCE.
7. THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TESTING AND BALANCING CONTRACTOR TO CONFIRM FILTERS ARE CLEAN, AND FREE OF DEBRIS PRIOR TO BEGINNING WORK. THE MECHANICAL CONTRACTOR SHALL REPLACE ANY DIRTY FILTERS, AS NEEDED. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.
8. UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER INSTALLATION INFORMATION INCLUDING RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS ADDRESSED) AND O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND PROGRAMMED SETPOINTS. IN ADDITION, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO HIRE A REGISTERED DESIGN PROFESSIONAL TO COMMISSION THE INSTALLED SYSTEM AND PROVIDE THE OWNER AND CODE REVIEWER A SEALED STATEMENT OF COMMISSIONING (PER 20128 NCECC APPENDIX C1).
9. PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DAY THE SYSTEM IS COMPLETELY OPERATIONAL AND ACCEPTABLE BY THE OWNER.
10. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND FILTER REMOVAL.
11. CONDENSATE DRAIN PIPING SHALL BE SCHEDULE 40 PVC PIPE AND FITTINGS. DRAINS FROM AIR HANDLING UNITS SHALL BE TRAPPED. CONDENSATE DRAINS SHALL BE INSULATED WITH 1" THICK ARMAFLEX INSULATION. MINIMUM DRAIN SIZE SHALL BE ¾". TERMINATE ROOFTOP UNIT DRAINS ON A CONCRETE SPLASHBLOCK.
12. ANY DEVICE REQUIRING A THERMOSTAT FOR CONTROL SHALL BE FURNISHED WITH A THERMOSTAT WHETHER INDICATED ON THE DRAWINGS OR NOT.
13. INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR. COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION. ANY DEVICE ON A PERIMETER WALL SHALL BE MOUNTED ON A FOAM-FILLED ELECTRICAL BOX, WITH ALL GAPS BETWEEN BOX AND WALL SEALED TO PREVENT INFILTRATION.
14. CONTRACTOR SHALL VERIFY LOCATION OF ALL ROOF PENETRATIONS WITH ARCHITECT & OWNER PRIOR TO INSTALLATION. NEW ROOF PENETRATIONS MADE THROUGH EXISTING ROOF SYSTEMS SHALL BE VERIFIED WITH THE OWNER'S EXISTING ROOF WARRANTY PRIOR TO INSTALLATION.
15. CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 10'-0" FROM ANY OUTSIDE AIR INTAKE.
16. ALL ISOLATION VALVES, TERMINAL UNITS, CONTROLS, ETC. REQUIRING ACCESS AND SERVICE SHALL BE INSTALLED WITHIN 18" OF THE CEILING FOR SERVICE ACCESSIBILITY. LOCATIONS SHALL BE INDICATED ON THE CEILING GRID PER THE SPECIFICATIONS.
17. DUCTWORK AND PIPING PASSING THROUGH/ABOVE ELECTRICAL ROOMS SHALL BE CLOSELY COORDINATED WITH THE ELECTRICAL CONTRACTOR. DUCTWORK OR PIPING SHALL NOT BE LOCATED ABOVE ELECTRICAL PANELS.
18. EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK, AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER.
19. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING RESTRAINTS TO RESIST THE EARTHQUAKE EFFECTS ON THE MECHANICAL SYSTEMS. THE REQUIREMENTS FOR THOSE RESTRAINTS ARE FOUND IN THE LOCAL BUILDING CODE AND ASCE 7. THE ANCHORAGE OF THE MECHANICAL SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE LOCAL BUILDING CODE AND ASCE 7.
20. ALL MECHANICAL EQUIPMENT SHALL BE U.L. LISTED AND LABELED AS A COMPLETE PACKAGE, NOT THOUGH INDIVIDUAL COMPONENTS OR PARTS. PROVIDE REQUIRED 3RD PARTY FIELD UL LISTING SERVICES AS REQUIRED TO COMPLY.

MECHANICAL DEMOLITION NOTES

1. THE MECHANICAL CONTRACTOR SHALL VISIT SITE PRIOR TO BEGINNING WORK TO DETERMINE THE LEVEL OF DEMOLITION REQUIRED AND INCLUDE ALL NECESSARY PRICING IN THEIR BID.
2. IT IS THE MECHANICAL CONTRACTORS RESPONSIBILITY TO FIELD VERIFY ALL EXISTING DUCTWORK AND PIPING. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND MECHANICAL PLANS SHOULD BE BROUGHT TO THE ATTENTION OF THE MECHANICAL ENGINEER.

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): DOAS-1

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOM (AGES 5-8)	7.5	0	25	-	5124	129	968	0	0
CORRIDOR	-	0.06	-	-	1198	0	0	72	0
				TOTAL OA REQUIRED (PEOPLE + AREA, CFM)/0.8			1300		
				TOTAL OUTSIDE AIR PROVIDED (CFM)			1400		
						TOTAL EXHAUST AIR REQUIRED (CFM)			-
						TOTAL EXHAUST AIR PROVIDED (CFM)			-

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): DOAS-2

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOM (AGES 5-8)	7.5	0	25	-	3374	85	638	0	0
CORRIDOR	-	0.06	-	-	1747	0	0	105	0
OFFICE	5	0.06	5	-	682	4	20	41	0
TOILET	-	-	-	70 CFM/FIXTURE	14 FIXTURES	0	0	0	980
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			1005		
				TOTAL OUTSIDE AIR PROVIDED (CFM)			1100		
						TOTAL EXHAUST AIR REQUIRED (CFM)			980
						TOTAL EXHAUST AIR PROVIDED (CFM)			1050

EQUIPMENT ABBREVIATIONS

AC	AIR CONDITIONING UNIT	EWH	ELECTRIC WATER HEATER
ACC	AIR COOLED CONDENSER	FCU	FAN COIL UNIT
ACCU	AIR COOLING CONDENSING UNIT	FP	FIRE PUMP
AHU	AIR HANDLING UNIT	GI	GREASE INTERCEPTOR
AS	AIR SEPARATOR	GRV	GRAVITY ROOF VENTILATOR
B	BOILER	HWP	HEATING WATER PUMP
CH	CHILLER	HX	HEAT EXCHANGER
CT	COOLING TOWER	HRU	HEAT RECOVERY UNIT
CUH	CABINET UNIT HEATER	PRV	POWER ROOF VENTILATOR
CWP	CONDENSER WATER PUMP	RE	RETURN/EXHAUST FAN
CHWP	CHILLED WATER PUMP	RTU	ROOFTOP UNIT
DBP	DOMESTIC WATER BOOSTER PUMP	SEP	SEWAGE EJECTOR PUMP
DC	DUCT MOUNTED COIL	SF	SUPPLY FAN
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER
ET	EXPANSION TANK		

ABBREVIATIONS

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MU/A	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FD	FIRE DAMPER	RH	RELATIVE HUMIDITY
FDV	FIRE DEPARTMENT VALVE	RL/A	RELIEF AIR
FL	FLOOR	RM	ROOM
FO	FUEL OIL	RPM	REVOLUTIONS PER MINUTE
FOV	FUEL OIL VENT	RW	RAIN WATER
FOR	FUEL OIL RETURN	SF	SQUARE FOOT
FOS	FUEL OIL SUPPLY	S/A	SUPPLY AIR
FPM	FEET PER MINUTE	SAN	SANITARY
FS	FLOOR SINK	SF	SQUARE FOOT
FT	FOOT/FEET	SD	SMOKE DAMPER
FTR	FIN TUBE RADIATION	SM	SURFACE MOUNT
GAL	GALLON	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

MECHANICAL DUCT SYMBOLS

SYMBOL	DESCRIPTION
16x8	SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)
16/8	OVAL DUCT SIZE TAG (WIDTH / HEIGHT)
16"Ø	ROUND DUCT SIZE TAG (DIAMETER)
(E)	EXISTING DUCT TAG
	DUCT BEING DEMOLISHED
S/A	SUPPLY AIR
O/A	OUTDOOR AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
L/A	RELIEF AIR
	SUPPLY AIR DIFFUSER (4-WAY)
	RETURN AIR GRILLE
	RETURN AIR GRILLE WITH SOUND BOOT
	EXHAUST AIR GRILLE
	POINT OF EXISTING TO NEW CONNECTION
	POINT OF DISCONNECT TO EXISTING CONNECTION
M.C.	MECHANICAL CONTRACTOR
E.C.	ELECTRICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
N.I.C.	NOT IN CONTRACT
(EX)	EXISTING
AFF	ABOVE FINISHED FLOOR
DN	DOWN
UP	UP
X / X	SECTION CUT — REFERRING DETAIL NUMBER — REFERRING SHEET NUMBER

MECHANICAL ACCESSORIES SYMBOL LEGEND

SYMBOL	DESCRIPTION
DD	ROUND DUCT MOUNTED SMOKE DETECTOR. FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR. CUTTING OF DUCT, INSTALLATION OF DETECTOR. AND DETERMINATION OF SAMPLING TUBE LENGTH SHALL BE THE MECHANICAL CONTRACTOR. PROVIDE REMOTE INDICATING LIGHT WITH EACH DETECTOR.
DD	RECTANGULAR DUCT MOUNTED DUCT DETECTOR. FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR. CUTTING OF DUCT, INSTALLATION OF DETECTOR. AND DETERMINATION OF SAMPLING TUBE LENGTH SHALL BE THE MECHANICAL CONTRACTOR. PROVIDE REMOTE INDICATING LIGHT WITH EACH DETECTOR.
M	RECTANGULAR DUCT MOUNTED MOTOR OPERATED DAMPER, INTERLOCK WITH FAN AS INDICATED. (DAMPER BY M.C.)
U	UNDERCUT DOOR (BY G.C.)

MECHANICAL PIPING SYSTEMS LEGEND

SYMBOL	DESCRIPTION
—D—	CONDENSATE DRAINAGE
—R—	REFRIGERANT

2018 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

C401 METHOD OF COMPLIANCE

- [x] 2018 NCECC CHAPTER 4
- [ ] COMCHECK PROVIDED (2018 NCECC)
- [ ] ASHRAE 90.1-2013 PRESCRIPTIVE
- [ ] COMCHECK PROVIDED (90.1-2013)
- [ ] ASHRAE 90.1-2013 PERFORMANCE
- [ ] ENERGY MODELING DATA PROVIDED
- [ ] N/A (EXISTING LIGHTING, HVAC, AND DOM. WATER HEATING SYSTEMS TO REMAIN)

C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

- [ ] C406.2 EFFICIENT MECH EQUIPMENT
- [ ] C406.5 ON-SITE RENEWABLE ENERGY
- [x] C406.3 REDUCED LTG DENSITY
- [ ] C406.6 DEDICATED OA SYSTEM
- [ ] C406.4 ENHANCED LTG CONTROLS
- [ ] C406.7 SERVICE WATER HEATING

C301 CLIMATE ZONE

4A - HARNETT COUNTY, NORTH CAROLINA

DESIGN CONDITIONS

EXTERIOR (ASHRAE 90.1-2013 TABLE D-1)

winter dry bulb	18° F.
summer dry bulb	91° F.
summer wet bulb	74° F.

INTERIOR (2018 NCECC SECTION C302.1)

winter dry bulb	72° F.
summer dry bulb	75° F.

C403.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING

BUILDING HEATING LOAD	263,900 BTUH (peak)
BUILDING COOLING LOAD	417,800 BTUH (peak)
INSTALLED HEATING CAPACITY	430,290 BTUH
INSTALLED COOLING CAPACITY	464,540 BTUH

C403.2.3 & C406.2 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

SYSTEM DESCRIPTION - SINGLE ZONE SPLIT SYSTEM HEAT PUMP UNITS

- [x] MINIMUM HVAC EQUIP EFFICIENCY COMPLIANCE - TABLE C403.2.3
- [ ] INCREASED HVAC EQUIP EFFICIENCY COMPLIANCE - 10% OVER TABLE C403.2.3

EQUIP TYPE	SIZE CATEGORY (BTUH)	SUBCATEGORY	C403.2.3 MINIMUM EFFICIENCY (a)	10% INCREASED EFF. (a)	DESIGN EFFIC.
TABLE C403.2.3(2) - ELECTRICALLY OPERATED UNITARY AND APPLIED HEAT PUMPS					
AIR COOLED COOL MODE	< 65,000 (<= 5 TONS)	SPLIT SYSTEM & SINGLE PACKAGE	14.0 SEER	15.4 SEER	SEE SCHEDULE

C403.2.4 THRU C403.2.11

- [x] HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.

C403.2.12 - AIR SYSTEM DESIGN AND CONTROL

- [x] ALL FANS INSTALLED ON THE PROJECT ARE 5 HP OR LESS AND ARE EXEMPT FROM THESE REQUIREMENTS.
- [ ] FANS ABOVE 5 HP MEET THE CFM LIMITATIONS SHOWN BELOW:

OPTION 1 - FAN SYSTEM MOTOR NAMEPLATE HP - TABLE C403.2.12.1(1)

ALLOWABLE NAMEPLATE MOTOR HP	CONSTANT VOLUME MINIMUM CFM	VARIABLE VOLUME MINIMUM CFM	DESIGN CFM
7.5	6,818 CFM	5,000 CFM	SEE SCHEDULE
10	9,091 CFM	6,667 CFM	SEE SCHEDULE
15	13,636 CFM	10,000 CFM	SEE SCHEDULE
20	18,182 CFM	13,333 CFM	SEE SCHEDULE
25	22,727 CFM	16,667 CFM	SEE SCHEDULE
30	27,272 CFM	20,000 CFM	SEE SCHEDULE
40	36,364 CFM	26,667 CFM	SEE SCHEDULE
50	45,455 CFM	33,333 CFM	SEE SCHEDULE

C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS).

- [x] ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMNTS PER C405.8, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE.

C408 - SYSTEM COMMISSIONING

- [x] PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.
- [ ] PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.

MECHANICAL SHEET INDEX

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040316 THOMAS A. LANDEN 01/28/2022

CONSTRUCTION DOCUMENTS

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North Carolina License Number C-0914

Harnett County Schools

Johnsonville Elementary School Addition/Renovation Phase 2

18495 NC-27, Cameron, NC 28326

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022

PROJECT #: 02103.000

DRAWN BY: TAL

CHECKED BY: GPK

MECHANICAL LEGEND AND NOTES

M1-001

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
1/28/2022 1:24:04 PM

INDOOR UNIT SCHEDULE

SYMBOL	CFM	NOMINAL TONNAGE	O.A. CFM	E.S.P.	COOLING CAPACITY TC (BTUH)	COOLING CAPACITY SHC (BTUH)	HEATING CAPACITY (BTUH)	ELECTRIC HEAT KW	ELECTRIC HEAT STAGES	ELECTRIC HEAT VOLTAGE	ELECTRIC HEAT PH	FAN MOTOR FLA	ELECRICAL DATA MCA	ELECRICAL DATA MOCP	ELECRICAL DATA VOLTAGE	ELECRICAL DATA PH	MANUFACTURER	MODEL	WEIGHT	REFRIGERANT TYPE	MATCHING OUTDOOR UNIT
IDU-1	1,200	3.0	205	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-1
IDU-2	1,200	3.0	215	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-2
IDU-3	1,200	3.0	215	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-3
IDU-4	1,500	4.0	270	0.4 in-wg	47,500	36,200	46,500	14.4	1	480	3	0.9	24.8	25.0	480 V	3	TRANE	TAM9A0C48	174 lb	R-410A	HP-4
IDU-5	1,200	3.0	215	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-5
IDU-6	1,500	4.0	270	0.4 in-wg	47,500	36,200	46,500	14.4	1	480	3	0.9	24.8	25.0	480 V	3	TRANE	TAM9A0C48	174 lb	R-410A	HP-6
IDU-7	1,200	3.0	215	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-7
IDU-8	1,200	3.0	215	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-8
IDU-9	1,200	3.0	210	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-9
IDU-10	1,200	3.0	210	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-10
IDU-11	1,000	2.5	140	0.4 in-wg	29,600	22,800	28,800	7.2	1	208	1	3.5	48.0	50.0	208 V	1	TRANE	TAM9A0B30	138 lb	R-410A	HP-11
IDU-12	1,200	3.0	120	0.4 in-wg	37,800	28,200	34,800	14.4	1	480	3	0.6	23.8	25.0	480 V	3	TRANE	TAM9A0C36	146 lb	R-410A	HP-12

NOTES:

1. COOLING CAPACITY BASED ON 80°/67° ENTERING AIR.
2. PROVIDE UNITS WITH: ELECTRONIC 7-DAY PROGRAMMABLE THERMOSTAT, 1" THICK DISPOSABLE FILTER (MERV 8 MINIMUM), FIELD INSTALLED HEATER, U.L. LABEL, SINGLE POINT ELECTRICAL CONNECTION, 1-INCH INSULATION.
3. SEQUENCE OF OPERATION: UNIT SHALL BE CONTROLLED BY ITS ELECTRONIC 7-DAY PROGRAMMABLE THERMOSTAT. UNIT SUPPLY FAN SHALL RUN CONTINUOUSLY IN THE OCCUPIED MODE, CYCLE WITH HEATING AND COOLING WHILE UNOCCUPIED. UPON A RISE IN SPACE TEMPERATURE, UNIT COMPRESSOR AND CONDENSER FAN SHALL ACTIVATE TO SATISFY SPACE. UPON A DROP IN SPACE TEMPERATURE, UNIT COMPRESSOR SHALL ACTIVATE IN REVERSE CYCLE FOR HEATING. UPON A FURTHER DROP IN SPACE TEMPERATURE, ELECTRIC HEAT SHALL BE ENERGIZED TO SATISFY SPACE TEMPERATURE. THERMOSTATS SHALL PROVIDE A DEADBAND OF 5°, WITHIN WHICH THE SUPPLY OF HEATING OR COOLING ENERGY TO THE ZONE CAN BE REDUCED TO THE MINIMUM. OCCUPANCY SCHEDULES SHALL BE SET TO OCCUPIED MONDAY THRU FRIDAY, 7 AM TO 7 PM, UNOCCUPIED NIGHTS AND WEEKENDS. THERMOSTATS SHALL BE SET FOR OCCUPIED COOLING 75°, OCCUPIED HEATING 70°, UNOCCUPIED COOLING 85°, UNOCCUPIED HEATING 55°. ALL TIME AND TEMPERATURE SETPOINTS SHALL BE VERIFIED BY THE OWNER PRIOR TO PROGRAMMING. THERMOSTATS SHALL BE PROGRAMMED BY MECHANICAL CONTRACTOR IN THE PRESENCE OF OWNER'S REPRESENTATIVE PRIOR TO PROJECT COMPLETION.
4. PROVIDE EACH UNIT WITH A IONIZATION TYPE SMOKE DETECTOR, INSTALLED IN THE RETURN DUCT WIRED TO SHUT DOWN THE UNIT UPON ACTIVATION. SMOKE DETECTOR SHALL BE SUPPLIED, WIRED FOR INTERFACE WITH FIRE ALARM SYSTEM AND UNIT SHUTDOWN BY THE ELECTRICAL CONTRACTOR. SMOKE DETECTOR SHALL BE INSTALLED IN THE RETURN DUCT BY THE MECHANICAL CONTRACTOR.

HEAT PUMP SCHEDULE (AIR COOLED)

SYMBOL	NOMINAL TONNAGE	COOLING COIL TC (BTUH)	COOLING COIL SHC (BTUH)	EFFICIENCY EER	EFFICIENCY SEER	HEATNG CAPACITY (BTUH)	EFFICIENCY COP	EFFICIENCY HSPF	COMPRESSOR LRA	COMPRESSOR RLA	FAN FLA	ELECTRICAL DATA MCA	ELECTRICAL DATA FUSE	ELECTRICAL DATA VOLTAGE	ELECTRICAL DATA PH	REFRIG. TYPE	MANUFACTURER TRANE MODEL	WEIGHT	MATCHING INDOOR UNIT
HP-1	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-1
HP-2	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-2
HP-3	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-3
HP-4	4.0	47,500	36,200	13	17.0	46,500	4.1	10	41.0	6.4	0.6	9.0	15.0	480 V	3	R-410A	4TWA7048A4	286 lb	IDU-4
HP-5	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-5
HP-6	4.0	47,500	36,200	13	17.0	46,500	4.1	10	41.0	6.4	0.6	9.0	15.0	480 V	3	R-410A	4TWA7048A4	286 lb	IDU-6
HP-7	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-7
HP-8	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-8
HP-9	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-9
HP-10	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-10
HP-11	2.5	28,600	22,500	13	16.0	27,800	3.8	9	67.8	12.8	0.7	17.0	25.0	208 V	1	R-410A	4TWR6030H	198 lb	IDU-11
HP-12	3.0	37,800	28,200	13	17.0	34,800	3.9	9.5	38.0	5.7	0.6	8.0	15.0	480 V	3	R-410A	4TWA7036A4	257 lb	IDU-12

NOTES:

1. COOLING CAPACITY @ 95 AMBIENT.
2. ALL UNITS SHALL BE U.L. LISTED AND HAVE A MINIMUM SEER OF 13.
3. HEAT PUMP SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL BE PROVIDED WITH CONTROLS TO PREVENT OPERATION WHEN THE REVERSE CYCLE HEAT CAN MEET HEATING LOAD. SUPPLEMENTAL ELECTRIC HEAT SHALL BE ALLOWED TO OPERATE DURING HEAT PUMP DEFROST CYCLE. SUPPLEMENTAL ELECTRIC HEAT SHALL BE LOCKED OUT WHEN THE OUTDOOR TEMPERATURE IS BETWEEN 35°F AND 40°F AND THE INDOOR TEMPERATURE SETPOINT IS INCREASED.
4. MOUNT UNITS ON A 4" THICK CONCRETE PAD AND PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND UNITS.
5. PROVIDE UNITS WITH CONDENSER COIL HAIL GUARDS AND LOW AMBIENT CONTROLS.
6. FOR REFRIGERANT LINE APPLICATIONS WITH A TOTAL EQUIVALENT LENGTH BETWEEN 50'-0" AND 175'-0".
   THE FOLLOWING ACCESSORIES SHALL BE PROVIDED;
   - -COMPRESSOR CRANKCASE HEATER
   - -FOR HORIZONTAL CONFIGURATION: PROVIDE LIQUID LINE SOLENOID WITHIN 2'-0" OUTDOOR UNIT WITH FLOW ARROW POINTING TOWARD OUTDOOR UNIT. VAPOR LINE SHOULD SLOPE TOWARD INDOOR UNIT.
   - -MECHANICAL CONTRACTOR & UNIT MANUFACTURER ARE TO REVIEW INSTALLATION, AND FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR LONG REFRIGERANT LINE APPLICATIONS (AS DEFINED BY UNIT MFGR).

DOAS INDOOR UNIT SCHEDULE

SYMBOL	CFM	O.A. CFM	E.S.P.	COOLING CAPACITY TC (BTUH)	COOLING CAPACITY SHC (BTUH)	HEATING CAPACITY (BTUH)	REHEAT CAPACITY (BTUH)	ELECTRIC HEAT KW	ELECTRIC HEAT STAGES	ELECTRIC HEAT FLA	ELECTRIC HEAT VOLTAGE	ELECTRIC HEAT PH	ELECTRICAL DATA FLA	ELECTRICAL DATA MCA	ELECTRICAL DATA MOCP	ELECTRICAL DATA VOLTAGE	ELECTRICAL DATA PH	MANUFACTURER	MODEL	WEIGHT	REFRIGERANT TYPE	MATCHING OUTDOOR UNIT
DOAS-1	1,400	1400	1.00 in-wg	117,550	61,560	98,800	28,000	30.0	4	36.1	460	3	37.7	47.0	50.0	460 V	3	AAON	V3-BRB-3-0-162C-5T4	702 lb	R-410A	CU-1
DOAS-2	1,100	1100	1.00 in-wg	86,450	45,860	67,200	19,000	22.5	3	27.1	460	3	28.7	36.0	40.0	460 V	3	AAON	V3-BRB-3-0-162C-5S4	702 lb	R-410A	CU-2

NOTES:

1. COOLING CAPACITY BASED ON 95°/78° ENTERING AIR.
2. PROVIDE UNITS WITH: 1" THICK DISPOSABLE FILTER (MERV 8 MINIMUM), U.L. LABEL, SINGLE POINT ELECTRICAL CONNECTION, 1-INCH INSULATION.
3. SEQUENCE OF OPERATION: UNIT SHALL BE CONTROLLED BY BAS ON OCCUPIED/UNOCCUPIED BUILDING SCHEDULE. UPON A RISE IN SPACE TEMPERATURE, UNIT COMPRESSOR AND CONDENSER FAN SHALL ACTIVATE TO SATISFY SPACE. UPON A DROP IN SPACE TEMPERATURE, UNIT COMPRESSOR SHALL ACTIVATE IN REVERSE CYCLE FOR HEATING. UPON A FURTHER DROP IN SPACE TEMPERATURE, ELECTRIC HEAT SHALL BE ENERGIZED TO SATISFY SPACE TEMPERATURE. THERMOSTATS SHALL PROVIDE A DEADBAND OF 5°, WITHIN WHICH THE SUPPLY OF HEATING OR COOLING ENERGY TO THE ZONE CAN BE REDUCED TO THE MINIMUM. OCCUPANCY SCHEDULES SHALL BE SET TO OCCUPIED MONDAY THRU FRIDAY, 7 AM TO 7 PM, UNOCCUPIED NIGHTS AND WEEKENDS. THERMOSTATS SHALL BE SET FOR OCCUPIED COOLING 75°, OCCUPIED HEATING 70°, UNOCCUPIED COOLING 85°, UNOCCUPIED HEATING 55°. ALL TIME AND TEMPERATURE SETPOINTS SHALL BE VERIFIED BY THE OWNER PRIOR TO PROGRAMMING. THERMOSTATS SHALL BE PROGRAMMED BY MECHANICAL CONTRACTOR IN THE PRESENCE OF OWNER'S REPRESENTATIVE PRIOR TO PROJECT COMPLETION.

EXHAUST FAN SCHEDULE

SYMBOL	LOCATION	MANUFACTURER	MODEL NO.	TYPE	CFM	APPROX. ESP	DRIVE TYPE	FAN RPM	ELECTRICAL DATA WATTS	ELECTRICAL DATA HP	ELECTRICAL DATA VOLTAGE	ELECTRICAL DATA PH	ACCESSORIES	CONTROL TYPE
F-1	UTILITY 318	GREENHECK	SQ-120	INLINE	1050	1.00	DIRECT	1050	1127	0.50 hp	115 V	1	A,B,F,G	5
F-2	UTILITY 318	GREENHECK	SP-A1050	CEILING	800	0.25	DIRECT	1138	438	0.00 hp	115 V	1	A,B,F,G	1

EXHAUST FAN SCHEDULE ACCESSORIES:

A. DISCONNECT SWITCH
B. GRAVITY BACKDRAFT DAMPER
C. MOTORIZED BACKDRAFT DAMPER
D. PREFAB, ROOF CURB
E. BIRDSCREEN
F. ACOUSTICAL LINING
G. HANGING BRACKETS WITH VIBRATION ISOLATION
H. WL, WALL LOUVER DISCHARGE
I. RCC OR GRS ROOF CAP (FLAT ROOF) OR RJ ROOF CAP (PITCHED ROOF)
J. WALL MOUNTING COLLAR
K. INLET GAURD
M. 2" WASHABLE ALUMINUM FILTERS
N. MOTORSIDE FAN GUARD
O. EXHAUST GRILLE
P. U.L. 762
Q. VENTED ROOF CURB EXTENSION
R. COMBINATION KITCHEN HOOD FAN CURB
S. INTERLOCK WITH FUME HOOD
T. PROVIDE DRAIN PLUG ACCESSORY
U. ROOF SUPPORT RAILS
V. HINGED BRACKET KIT

EXHAUST FAN SCHEDULE CONTROLS:

1. WALL MOUNTED THERMOSTAT (REVERSE ACTING, SET FOR 80°)
2. INTERLOCK WITH ROOM LIGHT SWITCH (FAN SHALL OPERATE WHEN LIGHT IS ON IF ANY ROOM IS SERVED BY FAN)
3. WALL MOUNTED ON/OFF SWITCH WITH IDENTIFICATION LABEL
4. WALL MOUNTED MUSHROOM PUSH BUTTON SWITCH/STARTER WITH IDENTIFICATION LABEL
5. CONTROLLED BY BUILDING AUTOMATION SYSTEM
6. CONTINUOUS OPERATION
7. CONTROLLED BY THE FACP AND FIREMAN'S MANUAL OVER-RIDE CONTROL PANEL IN FIRE COMMAND ROOM. NO MECHANICAL CONTROL POINTS REQUIRED BY M.C. FOR SMOKE CONTROL FANS
8. INTERLOCK WITH DISHWASHER OPERATION

EXHAUST FAN SCHEDULE NOTES:

1. ALL FANS SHALL BE U.L. LISTED AND LABELED AND SHALL BE AMCA CERTIFIED FOR SOUND AND AIR FLOW. ALL FANS INSTALLED INSIDE, ABOVE, OR ADJACENT TO OCCUPIED SPACES SHALL HAVE A MAXIMUM 9.0 INLET SONE LEVEL.
2. ALL FANS SHALL BE SUPPLIED BY ONE MANUFACTURER UNLESS NOTED OTHERWISE.
3. MECHANICAL CONTRACTOR SHALL PROVIDE MAGNETIC STARTER WITH AUXILIARY CONTACTS AS REQUIRED.
4. PROVIDE ALL DIRECT DRIVE FANS WITH SPEED CONTROLLERS.

DOAS CONDENSING UNIT SCHEDULE

SYMBOL	COOLING COIL TC (BTUH)	COOLING COIL SHC (BTUH)	HEATNG CAPACITY (BTUH)	EFFICIENCY EER	EFFICIENCY COP	COMPRESSOR QTY	COMPRESSOR RLA-1	COMPRESSOR RLA-2	ELECTRICAL DATA FLA	ELECTRICAL DATA MCA	ELECTRICAL DATA FUSE	ELECTRICAL DATA VOLTAGE	ELECTRICAL DATA PH	REFRIG. TYPE	MANUFACTURER AAON MODEL	WEIGHT	MATCHING INDOOR UNIT
CU-1	117,550	61,560	98,800	9.9	2.44	2	9.7	10.6	24.0	27.0	35.0	460 V	3	R-410A	CFA-013-B-A-3-DJ00K	1123 lb	DOAS-1
CU-2	86,450	45,860	67,200	11.6	2.82	2	7.8	6.2	17.0	19.0	25.0	460 V	3	R-410A	CFA-009-B-A-3-DJ00K	1060 lb	DOAS-2

NOTES:

1. COOLING CAPACITY @ 95 AMBIENT.
2. ALL UNITS SHALL BE U.L. LISTED AND HAVE A MINIMUM SEER OF 13.
3. HEAT PUMP SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL BE PROVIDED WITH CONTROLS TO PREVENT OPERATION WHEN THE REVERSE CYCLE HEAT CAN MEET HEATING LOAD. SUPPLEMENTAL ELECTRIC HEAT SHALL BE ALLOWED TO OPERATE DURING HEAT PUMP DEFROST CYCLE. SUPPLEMENTAL ELECTRIC HEAT SHALL BE LOCKED OUT WHEN THE OUTDOOR TEMPERATURE IS BETWEEN 35°F AND 40°F AND THE INDOOR TEMPERATURE SETPOINT IS INCREASED.
4. MOUNT UNITS ON A 4" THICK CONCRETE PAD AND PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND UNITS.
5. PROVIDE UNITS WITH CONDENSER COIL HAIL GUARDS AND LOW AMBIENT CONTROLS.
6. FOR REFRIGERANT LINE APPLICATIONS WITH A TOTAL EQUIVALENT LENGTH BETWEEN 50'-0" AND 175'-0".
   THE FOLLOWING ACCESSORIES SHALL BE PROVIDED;
   - -COMPRESSOR CRANKCASE HEATER
   - -FOR HORIZONTAL CONFIGURATION: PROVIDE LIQUID LINE SOLENOID WITHIN 2'-0" OUTDOOR UNIT WITH FLOW ARROW POINTING TOWARD OUTDOOR UNIT. VAPOR LINE SHOULD SLOPE TOWARD INDOOR UNIT.
   - -MECHANICAL CONTRACTOR & UNIT MANUFACTURER ARE TO REVIEW INSTALLATION, AND FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR LONG REFRIGERANT LINE APPLICATIONS (AS DEFINED BY UNIT MFGR).

EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 7 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS, PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED.

(ALPHABETICAL ORDER)
DUCTED SPLIT SYSTEMS: CARRIER, TRANE, YORK
FANS: COOK, GREENHECK, PENN, TWIN CITY,
AIR DISTRIBUTION: CARNES, METAL*AIRE, NAILOR, PRICE, TITUS, TUTTLE & BAILEY, KRUEGER
FIRE DAMPERS: GREENHECK, NAILOR, RUSKIN, POTTORFF, NCA, SAFE-AIRE
LOUVER: GREENHECK, RUSKIN, SAFE-AIR, POTTORFF
DUCTLESS SPLIT SYSTEMS: DAIKIN, MITSUBISHI, TRANE
ELECTRIC WALL/UNIT HEATERS: MARKEL, MODINE, RAYWALL, BERKO, QMARK
DDC CONTROLS: RELIABLE CONTROLS CORPORATION (MACH-SYSTEM BY BUILDING AUTOMATION SERVICES), AUTOMATED LOGIC CONTROLS, JOHNSON CONTROLS INC.
100% OUTSIDE AIR MAKE-UP UNITS: AAON, ENGINEERED AIR, DESERT AIRE

NOTE:
ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF TH MECHANICAL CONTRACTOR.

DUCTLESS A/C CONDENSING UNIT SCHEDULE

ID	NOMINAL TONNAGE	EER	SEER	COP	HSPF	SUMMER AMBIENT DBT	WINTER AMBIENT DBT	ELECTRICAL DATA MCA	ELECTRICAL DATA MOCP	ELECTRICAL DATA VOLTAGE	ELECTRICAL DATA PH	REFRIG. TYPE	MANUFACTURER	MODEL	WEIGHT
ODU-1	1.5	14.4	24.6	2.47	11	95.0 °F	0.0 °F	11.0	28.0	208 V	1	R410A	MITSUBISHI	PUZ-A18NKA7	100 lb
ODU-2	1.5	14.4	24.6	2.47	11	95.0 °F	0.0 °F	11.0	28.0	208 V	1	R410A	MITSUBISHI	PUZ-A18NKA7	100 lb

DUCTLESS A/C INDOOR UNIT SCHEDULE

ID	MANUFACTURER	MODEL NO.	OUTSIDE AIRFLOW	DESIGN AIRFLOW	COOLING CAPACITY NOMINAL	COOLING CAPACITY TOTAL (BTUH)	COOLING CAPACITY SENSIBLE (BTUH)	HEATING CAPACITY (BTUH)	UNIT WEIGHT
A/C-1	MITSUBISHI	PLA-A18EA7	0 CFM	600 CFM	1.5 ton	18000	15300	19000	46 lb
A/C-2	MITSUBISHI	PLA-A18EA7	0 CFM	600 CFM	1.5 ton	18000	15300	19000	46 lb

NOTES:

1. ALL UNITS SHALL BE U.L. LISTED AND HAVE A MINIMUM SEER OF 15.
2. COOLING CAPACITIES ARE BASED ON 95° AMBIENT, 80° ENTERING AIR DRY BULB, 67° ENTERING AIR WET BULB. AIRFLOWS INDICATED ARE AT 'HIGH' SPEED (DRY COIL).
3. HEATING CAPACITIES ARE BASED ON 17°F AMBIENT, 65°F ENTERING AIR.
4. MOUNT OUTDOOR UNIT ON EQUIPMENT SUPPORT RAILS.
5. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND OUTDOOR UNIT.
6. PROVIDE UNITS WITH MANUFACTURER'S LOW AMBIENT CONTROLS FOR OPERATION DOWN TO 0°F, INVERTER, 120V INTEGRAL CONDENSATE PUMP, COMPRESSOR, FACTORY THERMOSTAT, AND INTEGRAL MANUFACTURER NON-LOCKING DISCONNECT SWITCH FOR INDOOR UNIT.
7. INDOOR UNIT IS POWERED BY THE CONDENSING UNIT.
8. PROVIDE OUTDOOR UNIT WITH 6 YEAR EXTENDED COMPRESSOR WARRANTY.
9. SIZE AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS.

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

SYMBOL	DESCRIPTION	MANUF.	MODEL	MATERIAL	FACE SIZE	NECK SIZE	NECK WIDTH	NECK HEIGHT	NOTES
A	LOUVERED FACE DIFFUSER	TITUS	TDC	STEEL	24x24	6			
B	LOUVERED FACE DIFFUSER	TITUS	TDC	STEEL	24x24	8			
C	LOUVERED FACE DIFFUSER	TITUS	TDC	STEEL	24x24	10			
D	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	16			
F	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	12			
G	LOUVERED GRILLE	TITUS	4FL	ALUMINUM	24x24	12			
H	LOUVERED GRILLE	PRICE	4FL	ALUMINUM	12x12	6			
J	LOUVERED FACE DIFFUSER	TITUS	TDC	STEEL	12x12	6			

AIR DISTRIBUTION SCHEDULE NOTES:

1. ALL CEILING AND WALL MOUNTED DEVICES SHALL BE FURNISHED WITH AN ENAMEL BRIGHT WHITE FINISH UNLESS NOTED OTHERWISE.
2. ALL DEVICES SHALL BE FURNISHED WITH FRAMES SUITABLE FOR THE TYPE OF INSTALLATION REQUIRED.
3. ALL LINEAR DIFFUSERS IN LAY-IN CEILINGS SHALL BE FURNISHED WITH END CAPS. ALL LINEAR DIFFUSERS IN HARD CEILINGS SHALL BE FURNISHED WITH END BORDERS. ALL LINEAR SUPPLY DIFFUSERS SHALL BE PROVIDED WITH INTEGRAL AIRFLOW PATTERN ADJUSTMENT BARS FOR HORIZONTAL/VERTICAL PATTERN ADJUSTMENT AT EACH SLOT.
4. ALL DOUBLE DEFLECTION SUPPLY GRILLES SHALL HAVE DAMPER BLADES ADJUSTED TO PROVIDE AIRFLOW PATTERN INDICATED BY FLOW ARROWS ON PLANS. DAMPERS SHALL BE ADJUSTED TO A 30 DEGREE POSITION UNLESS NOTED OTHERWISE ON PLANS.

LOUVER SCHEDULE - MECHANICAL EQUIPMENT

SYMBOL	MANUFACTURER	MODEL NO.	DESIGN AIRFLOW	FREE AREA	FREE AREA VELOCITY	PD	DAMPER TYPE	DIMENSIONS WIDTH	DIMENSIONS HEIGHT	REMARKS
L-1	GREENHECK	ELF-375DX	1950 CFM	3.5 SF	557 FPM	0.02 in-wg	NONE	42"	24"	
L-2	GREENHECK	ELF-375DX	1100 CFM	2.5 SF	440 FPM	0.02 in-wg	NONE	30"	24"	
L-3	GREENHECK	ELF-375DX	1400 CFM	2.5 SF	560 FPM	0.02 in-wg	NONE	30"	24"	

LOUVER SCHEDULE NOTES:

1. PROVIDE BAKED ENAMEL FINISH, COLOR BY ARCHITECT.
2. PROVIDE WITH BIRDSCREEN.
3. PROVIDE WITH DAMPER AS NOTED IN SCHEDULE
4. INSTALL WITH 18" DEEP INSULATED PLENUM.
5. PROVIDE FRAME TYPE REQUIRED FOR MOUNTING LOCATION.

ELECTRIC WALL HEATER SCHEDULE

SYMBOL	LOCATION	CFM	BTUH	KW	MOTOR RPM	MOTOR H.P.	MOTOR VOLT	MOTOR PH	MANUFACTURER (MARKEL)	ACCESSORIES
EWH-1	UTILITY 318	175	13800	4.0	600	0.00	208 V	1	F3326TD-RP	A,B,G,H

NOTES:

1. HEATING CAPACITY BASED ON 65° F E.A.T.
2. SEE PLANS FOR TYPE OF THERMOSTAT REQUIRED (WALL MOUNTED OR UNIT MOUNTED). UNIT HEATERS SHOWN WITHOUT THERMOSTAT INDICATED SHALL BE PROVIDED WITH A UNIT MOUNTED THERMOSTAT.
3. SET TO MAINTAIN 45°F.

ELECTRIC UNIT HEATER ACCESSORIES:

A. DISCONNECT SWITCH
B. BUILT IN THERMOSTAT
C. WALL MOUNTED THERMOSTAT
D. WALL MOUNTING BRACKETS
E. CEILING MOUNTED BRACKETS
F. ADJUSTABLE DISCHARGE LOUVERS
G. PENCIL PROOF LOUVERS
H. CABINET FOR SURFACE MOUNTING

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CONSTRUCTION DOCUMENTS

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150 Fayetteville St., Suite 520, Raleigh, NC 27601
1927 South Tryon St., Suite 300, Charlotte NC 28203
Phone: 919-926-2200 - www.optimaengineering.com
North Carolina License Number C-0914

Harnett County Schools
Johnsonville Elementary School Addition/Renovation Phase 2
18495 NC-27, Cameron, NC 28326

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 01/28/2022
PROJECT #: 02103.000
DRAWN BY: TAL
CHECKED BY: GPK

MECHANICAL SCHEDULES

M1-002

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
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SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL DDC CONTROL SYSTEM (BAS) SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 230900) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 230900 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY. MECHANICAL CONTRACTOR SHALL COORDINATE ALL BAS INTEGRATION REQUIREMENTS WITH EQUIPMENT VENDORS AND CONTROLS CONTRACTOR PRIOR TO PURCHASING EQUIPMENT AND PROVIDE ALL EQUIPMENT WITH COMMUNICATION/INTERFACE CARDS AS REQUIRED FOR SYSTEM INTEGRATION.

SINGLE ZONE CLASSROOM HEAT PUMPS

ON A CALL FOR HEATING OR COOLING, UNIT SHALL ENERGIZE AND THE UNIT AND HEAT PUMP HEATING/COOLING SYSTEM SHALL START ON A TWO MINUTE DELAY.

WHEN PLACED IN THE OCCUPIED MODE BY THE BAS, THE UNITS SHALL BE INDEXED "ON". (SHALL BE STARTED TO PROVIDE CONSTANT VENTILATION WHILE IN THE OCCUPIED MODE AND PROVIDE FIRST STAGE OF HEATING AND COOLING AS OUTLINED BELOW).

SINGLE ZONE UNITS SHALL BE PROVIDED WITH A WALL MOUNTED DDC SENSOR FOR SPACE TEMPERATURE CONTROL. WHILE IN THE OCCUPIED MODE THE SUPPLY FAN AND HEAT PUMP HEATING/COOLING SYSTEM SHALL CYCLE ON UPON A CALL FOR HEATING OR COOLING AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. SENSOR SHALL ALSO SEND A SIGNAL TO ITS ZONE DEDICATED OUTSIDE AIR SYSTEM TO INDICATE WHETHER IT'S STATUS IS HEAT, COOL, OR SATISFIED.

WHILE IN THE UNOCCUPIED MODE, THE UNIT SHALL CYCLE AS NOTED ABOVE TO MAINTAIN SETBACK TEMPERATURES. IF ACTIVATED DURING THE UNOCCUPIED MODE, THE UNIT SHALL RUN FOR A MINIMUM OF 20 MINUTES AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF FIVE MINUTES FOLLOWING SHUT-DOWN.

UNITS PROVIDED WITH DUCT SMOKE DETECTORS (SEE PLANS) SHALL HAVE DUCT DETECTOR INSTALLED IN THE RETURN DUCT PRIOR TO THE O.A. DUCT CONNECTION. DUCT DETECTOR SHALL SHUT-DOWN UNIT AND ACTIVATE FIRE ALARM UPON DETECTION OF SMOKE.

FOR UNITS WITH HUMIDITY CONTROLS (SHOWN WITH HOT GAS REHEAT IN WSHP SCHEDULE, AND HUMIDISTATS INSTALLED IN THEIR ZONES), WITH SYSTEM IN OCCUPIED OR UNOCCUPIED MODE, HUMIDITY CONTROL SYSTEM SHALL BE CAPABLE OF BEING ACTIVATED. UNDER NORMAL OPERATION, UNIT SHALL BE CONTROLLED AS OUTLINED ABOVE. IF SPACE HUMIDITY REACHES 60% R.H. IN THE OCCUPIED MODE OR 65% IN THE UNOCCUPIED MODE (ADJUSTABLE), HUMIDITY CONTROL SEQUENCE SHALL BE ENERGIZED THROUGH THE DDC SYSTEM. UNIT OUTSIDE AIR DAMPER SHALL CLOSE TO MINIMUM POSITION. CONDENSER WATER CONTROL VALVE SHALL OPEN AND UNIT COMPRESSORS SHALL BE ACTIVATED IN COOLING (DEHUMIDIFICATION) MODE. HOT GAS REHEAT VALVE SHALL BE MODULATED TO REHEAT AIR TO MAINTAIN SPACE CONDITIONS, IF REQUIRED. WHEN SPACE HUMIDITY DROPS BELOW 55% R.H. IN THE OCCUPIED MODE OR 60% IN THE UNOCCUPIED MODE, BAS SHALL DEACTIVATE HUMIDITY CONTROL SEQUENCE, AND CONTROL OF UNITS SHALL REVERT BACK TO NORMAL OPERATION. IF SPACE HUMIDITY REACHES 65% IN THE OCCUPIED MODE OR 70% IN THE UNOCCUPIED MODE, AN ALARM SHALL BE SENT TO CENTRAL BAS.

CLASSROOM WING DEDICATED OUTSIDE AIR UNITS:

WHEN PLACED IN THE OCCUPIED MODE, DEDICATED OUTSIDE AIR UNIT (DOAS) SHALL BE INDEXED "ON". UNITS SHALL START TO SUPPLY CONDITIONED/NEUTRAL AIR

UNIT COMPRESSORS SHALL OPERATE IN HEATING OR COOLING MODE TO SUPPLY AIR AT NEUTRAL CONDITIONS (67-73° AND 45-55% RH). IF ALL SENSORS ON THE ZONE ARE CALLING FOR COOLING, DOAS COMPRESSOR SHALL OPERATE IN COOLING MODE WITHOUT ANY HOT GAS REHEAT, TO DISCHARGE AIR AT 55° AND SHALL FUNCTION AS THE FIRST STAGE OF COOLING FOR THE CLASSROOMS. WHEN ALL CLASSROOMS ARE CALLING FOR HEAT, COMPRESSOR SHALL OPERATE IN THE HEATING MODE,

UTILIZE REVERSE HEAT PUMP CYCLE TO HEAT OUTSIDE AIR TO 95° AND SERVE AS FIRST STAGE OF HEATING FOR THE CLASSROOMS. IF ALL SENSORS ARE SATISFIED, OR THERE IS A MIX OF CALLS FOR HEATING AND COOLING, DOAS UNIT SHALL OPERATE TO MAINTAIN NEUTRAL DISCHARGE CONDITIONS (67-73° AND 45-55% RH), UTILIZING COOLING, HEATING, REHEAT AS REQUIRED.

IN THE UNOCCUPIED MODE, UNIT SHALL REMAIN OFF UNLESS THE ZONE IS SCHEDULED ON VIA THE DDC SYSTEM OVERRIDE PANEL, OR ACTIVATED BY THE DEHUMIDIFICATION SEQUENCE.

NOTE: COORDINATE EXACT SEQUENCE OF OPERATION FOR ENERGY RECOVERY UNITS WITH MANUFACTURER, MANUFACTURER AND ENGINEER TO APPROVE FINAL SEQUENCE PRIOR TO PROGRAMMING. BAS VENDOR SHALL VERIFY ALL OPERATION/MONITORING POINTS COMPATIBILITY AT SUBMITTAL PHASE.

THERMOSTATS & TEMPERATURE SENSORS

THERMOSTATS AND TEMPERATURE SENSORS SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS, AND PER THE SPECIFICATIONS. THERMOSTATS TO 70°. THERMOSTATS SHALL HAVE A 3° RANGE IN WHICH THEY ARE SATISFIED (IF SET TO 70°, SATISFIED ANYWHERE BETWEEN 68.5° AND 71.5°). SLIDE BAR SHALL HAVE THE CAPABILITY TO ADJUST THE HEATING AND COOLING SETPOINTS BY 3° IN EITHER DIRECTION, BUT MAINTAIN A MINIMUM 4° SPREAD BETWEEN THE HEATING AND COOLING SETPOINT. UNOCCUPIED SETTINGS SHALL BE 85° COOLING AND 60° HEATING. ALL SETPOINTS SHALL BE VERIFIED WITH THE OWNER BEFORE PROGRAMMING, AND FULLY ADJUSTABLE THROUGH THE BAS.

WALL/UNIT HEATERS

A BUILT-IN THERMOSTAT SHALL OPERATE WALL/UNIT HEATER AND FAN TO MAINTAIN A SETPOINT OF 49° (ADJ). ONCE THE UNIT HEATER IS ENERGIZED, IT WILL RUN FOR AT LEAST FIVE MINUTES TO AVOID SHORT CYCLING. BAS DOES NOT INTERFACE WITH UNIT HEATERS.

MISC. EXHAUST FANS

PROVIDE WALL SWITCHES, WALL THERMOSTATS, INTERLOCKS, ETC. AS INDICATED ON THE FAN SCHEDULE TO CONTROL FANS AS INDICATED ON PLANS. UTILITY ROOM AND ELECTRICAL ROOM THERMOSTATS SHALL BE SET AT 85° F. (USER ADJUSTABLE, BAS REMOTE).

TOILET EXHAUST FANS

CENTRAL BAS SHALL OPERATE EXHAUST FANS ON A PROGRAMMED SCHEDULE. FANS SHALL RUN WHEN ASSOCATED ZONE IS IN THE OCCUPIED MODE, AND BE OFF WHEN ASSOCIATED ZONE IS IN THE UNOCCUPIED MODE.

INPUT/OUTPUT SUMMARY

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	INPUTS: ANALOG MEASURED: TEMPERATURE	PRESSURE	RH	AIR FLOW	WATER FLOW	HERTZ	VOLTS	AMPS	KW/KWH	ENTHALPY	RUN TIME	REFERENCE	INPUTS: ANALOG CALC.	INPUTS: BINARY: STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	MOTOR	OVER-RIDE	OUTPUTS: DIGITAL: OFF-ON	OFF-AUTO-ON	OPEN-CLOSE	OUTPUTS: ANALOG: DMPR. POS.	VALVE POS.	SETPOINT ADJ.	SEQ. CONTROL	SYSTEM FEATURES: ALARMS: HI ANALOG	LO ANALOG	HI BINARY	CHANGE OF STATE	PROOF	SYSTEM FEATURES: PROGRAMS: TIME SCHEDULING	DEMAND LIMITING	DUTY CYCLE	ENTHALPY OPT.	SMOKE CNT.	TIMED OVERRIDE	ALARM INSTRUCT.	MAIN. W/K. ORD.	GENERAL: COLOR GRAPHIC	SUPPLIMENT. NOTES
WSHP																																										
Supply Fan														X							X									X											
Compressor #1														X							X									X											
Compressor #2														X							X									X											WHERE APPLICABLE
Space Temp	X																																								
Space RH		X																																						
Supply Temp	X																																							
Over-ride																				X																				
Setpoint Adjust																										X														
Return Air Smoke (by elec. contr.)															X																								X		WHERE INDICATED
Hot Gas Reheat Valve																										X															WHERE INDICATED
Filter Status															X																										
DOAS																																									
Supply Fan														X							X									X											
Compressor #1														X							X									X											
Compressor #2														X							X									X											
Entering Supply Air Temp	X																																							
Leaving Supply Air Temp																																								
Leaving Supply Air RH		X																																						
Override																				X																				
Setpoint Adjust																										X														
Supply Filter Status															X																										
Fans																																							X		
Misc. Fans																					X																				SEE FAN SCHEDULE

GENERAL NOTE:

THE POINTS LIST PROVIDED IS INTENDED TO COMMUNICATE THE GENERAL DESIGN INTENT TO THE CONTROLS SUBCONTRACTOR AND IS NOT INTENDED TO BE COMPLETE. IN THE CONTROLS SUBMITTAL, THE SUBCONTRACTOR SHALL FULLY DEVELOP THE POINTS LIST FOR ALL SYSTEMS IDENTIFIED AND SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, AND ALARM POINTS. THE CONTROLS SUBCONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS FROM SETPOINTS TO PREVENT EQUIPMENT FROM SHORT CYCLING WHEN NEAR SETPOINTS. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO HAVING TO TAKE CORRECTIVE ACTIONS OR EQUIPMENT SHUTDOWNS. TRANSMITTERS SHALL INCLUDE OUT-OF-RANGE, FAIL-SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION. CONTROL CONTRACTOR SHALL SPECIFY TO FAIL DE-ENERGIZER, HOLD LAST STATE, OR DEFAULT TO A PREDETERMINED SETPOINT. THESE BASIC FEATURES THAT ARE NECESSARY AND ARE PART OF A COMPLETE CONTROLS INSTALLATION SHALL BE INCLUDED IN THE SCOPE OF SERVICES FOR DELIVERABLES AT NO ADDITIONAL COSTS TO THE OWNER.

CONTROL SYSTEM NOTES

1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. HVAC CONTROLS FOR CLASSROOM ADDITION PROJECT TO BE INTEGRATED IN TO SCHOOLS EXISTING BAS. ALL POINTS AND EQUIPEMENT TO BE ACCESSIBLE FROM THE EXISTING BAS FRONT END AS INDICATED WITH ADDITIONAL GRAPHICS FOR EQUIPMENT AND FLOORPLANS. EXISTING CONTROLS BY RELIABLE CONTROLS CORPORATION.
3. ALL CONTROL SETPOINTS SHALL BE ADJUSTABLE AND TRENDABLE BY THE USER AND MAINTENANCE DEPARTMENT. INDICATED SCHEDULES AND SETPOINTS SHOULD BE USED FOR ORIGINAL SYSTEM SET-UP. ANY CHANGES IN SETPOINT SETTINGS REQUIRED FOR INTENDED SYSTEM OPERATION SHALL BE APPROVED BY THE ENGINEER AND SHALL BE DISCREETLY INDICATED ON THE AS-BUILT DRAWINGS.
4. ELECTRICAL CONTRACTOR SHALL PROVIDE A DEDICATED 120V CIRCUIT IN A J-BOX FOR CONTROL POWER. CONTROLS CONTRACTOR SHALL EXTEND 120V POWER FROM J-BOX TO CONTROL PANELS, DAMPER ACTUATORS, TRANSFORMERS, ETC. AS REQUIRED FOR INSTALLATION OF THE CONTROL SYSTEM. ALL CONTROL TRANSFORMERS SHALL BE SEPARATELY INTERNALLY FUSED OR HAVE MANUAL RESETS.
5. CONTROLS CONTRACTOR SHALL PROVIDE A MINIMUM OF 24 HOURS OF OWNER TRAINING PROVIDED BY A FACTORY CERTIFIED REPRESENTATIVE. COORDINATE THROUGH THE MECHANICAL CONTRACTOR AND CONSTRUCTION MANAGEMENT FIRM.
6. ALL CONTROL AND POWER WIRING SHALL BE PLENUM-RATED WITH A MINIMUM FIRE SPREAD RATING OF 25 AND A MINIMUM SMOKE DEVELOPED RATING OF 50 PER ASTM E84.
7. THE SEQUENCE OF OPERATION OF OPERATION AND POINTS LIST IS INTENDED TO COMMUNICATE THE MINIMUM REQUIREMENTS AND GENERAL DESIGN INTENT TO THE CONTROLS CONTRACTOR AND IS NOT INTENDED TO BE A FULLY DEVELOPED OR COMPLETE SEQUENCE OF OPEARTION. IN THE CONTROLS SUBMITTAL THE CONTROLS CONTRACTOR SHALL FULLY DEVELOP THE SEQUENCE OF OPERATIONS FOR ALL SYSTEMS IDENTIFIED AN SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, TIME DELAYS, ALARM POINTS, ETC. AS REQUIRED TO COMPLY WITH THE DESIGN INTENT. THE CONTROLS CONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS TO PREVENT SHORT CYCLING. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO REQUIRED CORRECTIVE ACTIONS OR UNIT SHUT-DOWNS. CONTROL CONTRACTOR SHALL SPECIFY IN THE CONTROL SUBMITTAL FAIL SAFE POSITION FOR OUT OF RANGE, FAIL SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION.
8. ALARMS THROUGH THE BAS SYSTEM SHALL BE VISIBLE ON THE INDIVIDUAL GRAPHICS THEMSELVES, NOT ONLY ON THE SUMMARY PAGE.
9. LOCATE MAIN CONTROL HUBS FOR ADDITION CONTROLS IN ELECTRICAL ROOM. COORDINATE EXACT LOCATION OF PANELS WITH ALL OTHER TRADES AND BUILDING OWNER'S FACILITIES DEPARTMENT PRIOR TO INSTALLATION.

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ENERGY STAR PARTNER

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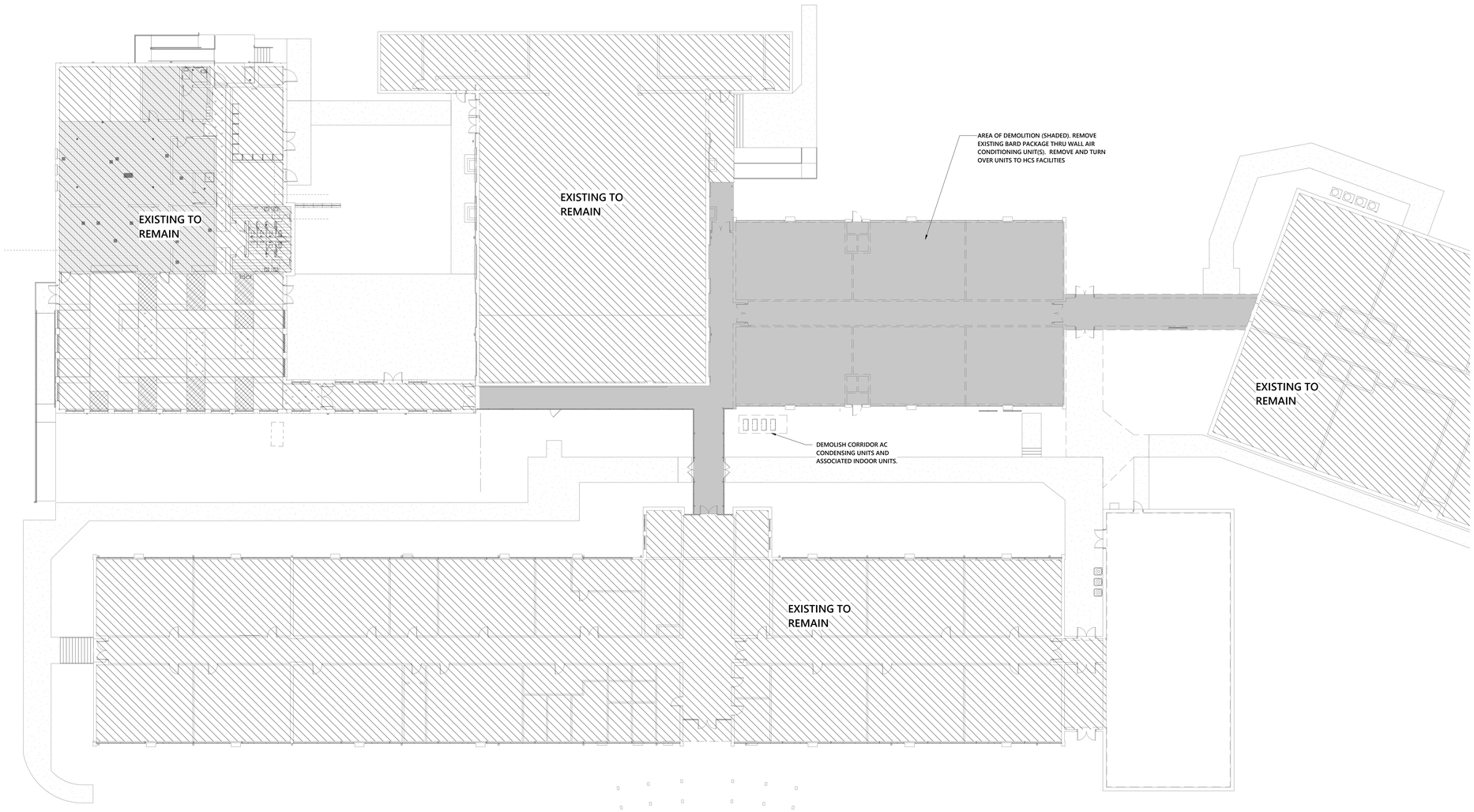
MECHANICAL CONTROLS SEQUENCE OF OPERATION

M1-003

Sheet No. 3 of 7

OPTIMA # 21-0266R



1 OVERALL MECHANICAL PLAN - DEMOLITION - PHASE 2
1/16" = 1'-0"

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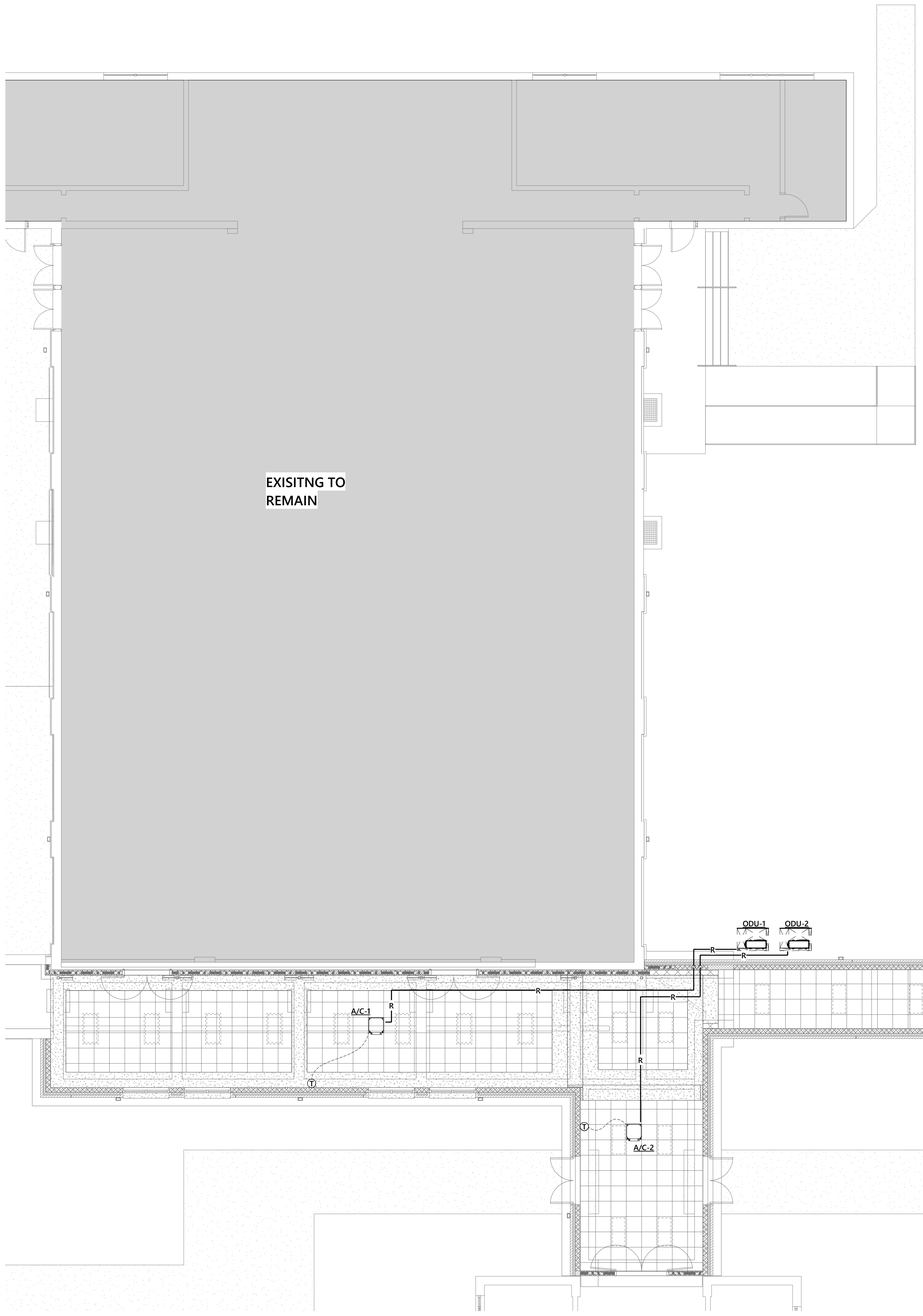
MECHANICAL DEMOLITION PLAN

M1-101

Sheet No. 4 of 7

OPTIMA # 21-0266R



1 FIRST FLOOR MECHANICAL DUCTWORK PLAN - PHASE 2
1/8" = 1'-0"

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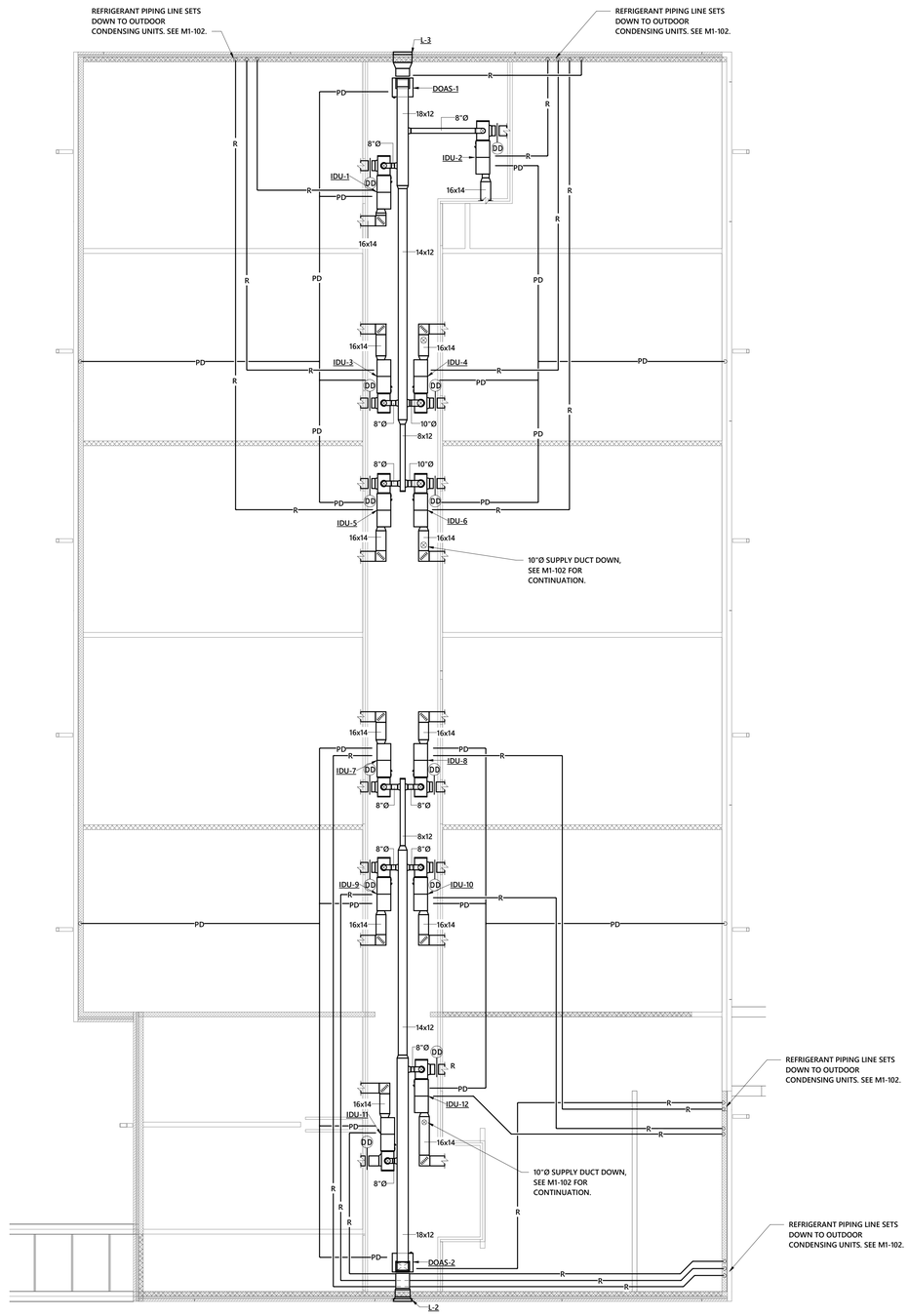
FIRST FLOOR MECHANICAL PLAN - NEW WORK

M1-102
Sheet No. 5 of 7

OPTIMA # 21-0266R



1 MECHANICAL LOFT MECHANICAL PLAN - PHASE 2
1/8" = 1'-0"

NOTICE TO CONTRACTOR
All construction must comply with current NC Building Codes and is subject to field inspection and verification.

Reviewed for Code Compliance

03/17/2022

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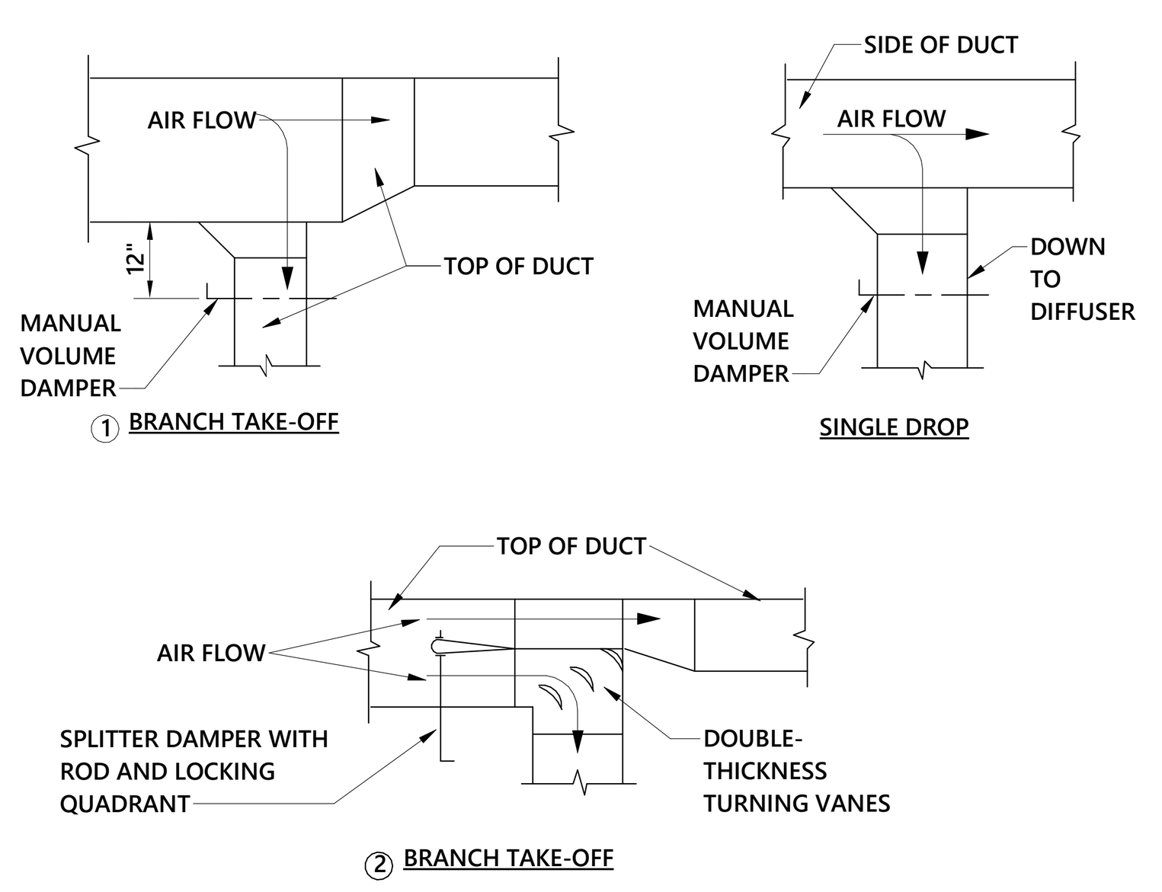
MECHANICAL LOFT MECHANICAL PLAN - NEW WORK

M1-103

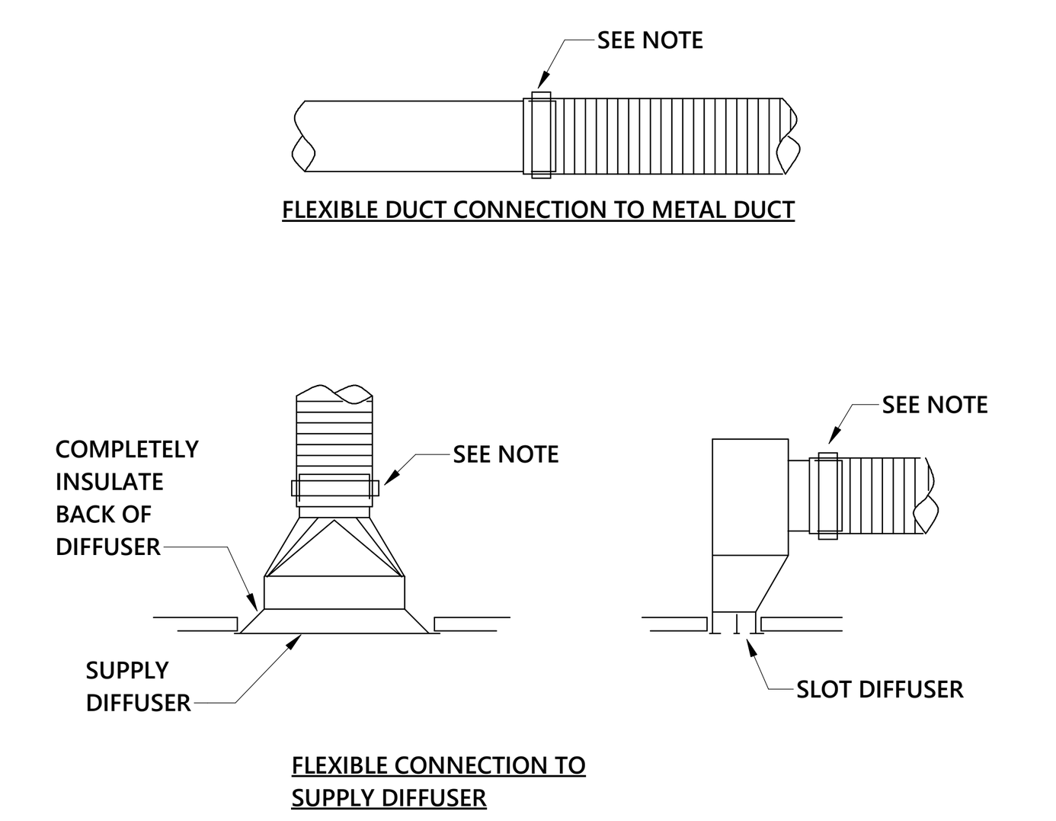
Sheet No. 6 of 7

OPTIMA # 21-0266R



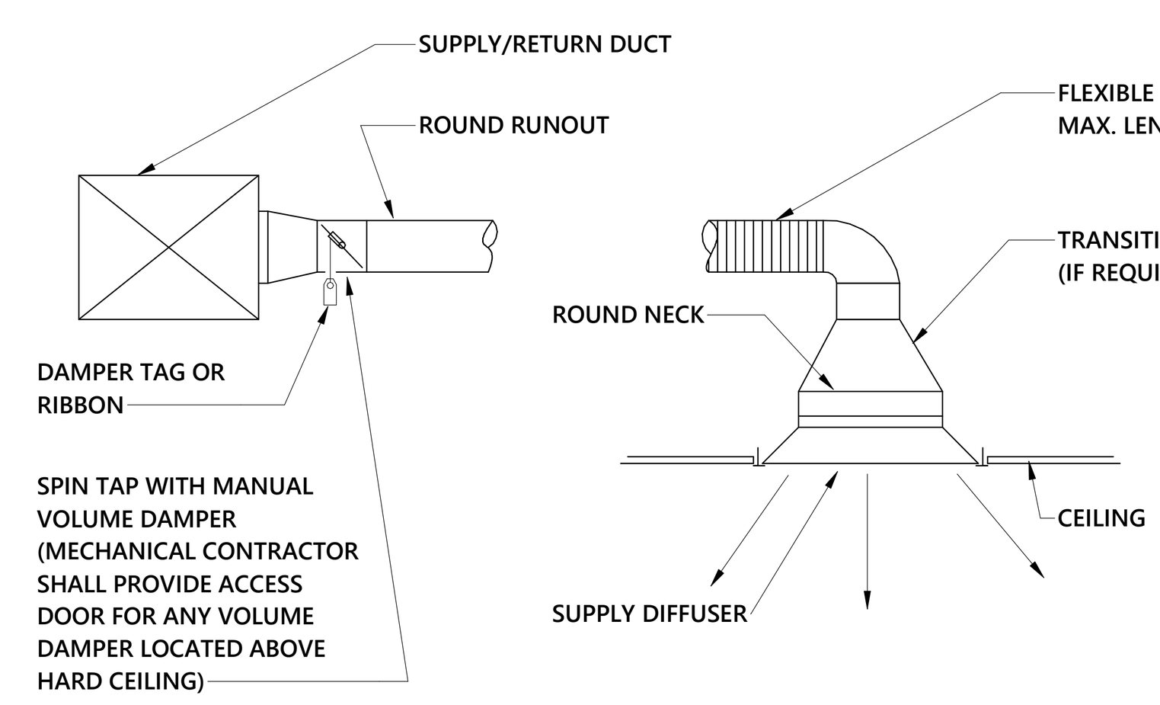
NOTE:
1. USE BRANCH TAKE-OFF 1 WHEN MAIN AND BRANCH DUCTS ARE DIFFERENT DEPTHS.
2. USE BRANCH TAKE-OFF 2 WHEN MAIN AND BRANCH DUCTS ARE SAME DEPTHS.
3. MANUAL VOLUME DAMPERS SHALL BE PROVIDED FOR ALL SUPPLY, RETURN AND GENERAL EXHAUST SINGLE DROP DUCT RUNS.

1 DUCTWORK DETAILS
NOT TO SCALE



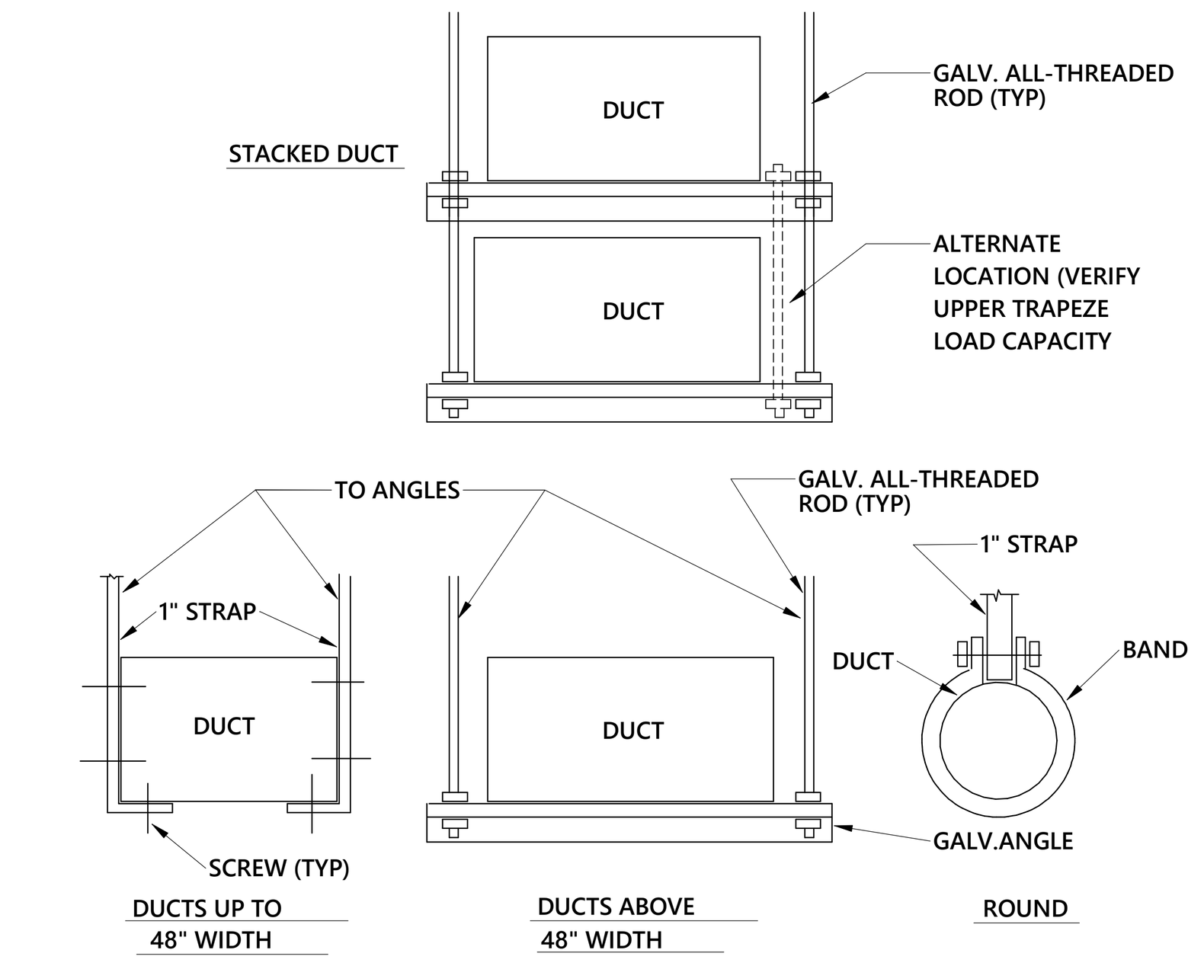
NOTE:
ALL FLEXIBLE DUCT CONNECTIONS TO SHEET METAL SHALL BE SECURED WITH APPROVED STRAP AND SEALANT.

2 FLEX CONNECTION DETAIL
NOT TO SCALE



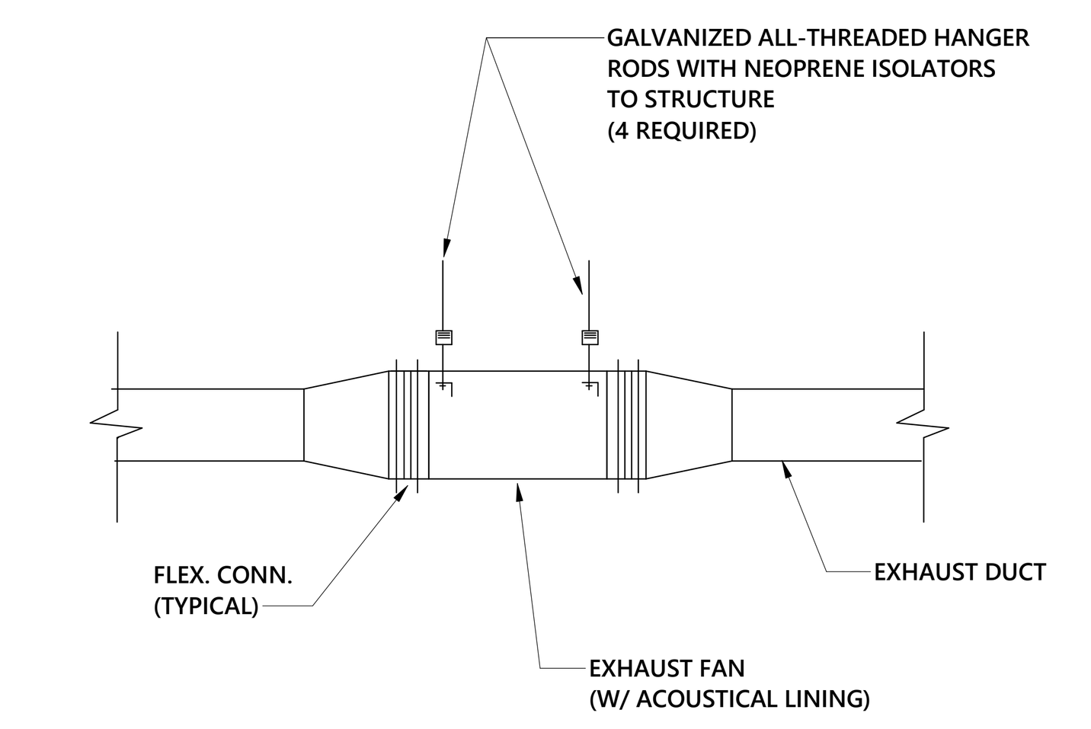
NOTE:
1. ALL MANUAL VOLUME DAMPERS (FOR INSULATED DUCTWORK) SHALL BE PROVIDED WITH AN ELEVATED REGULATOR (STAND-OFF) EQUAL TO DURO DYNE SRST SERIES. STAND SHALL EXTEND A MINIMUM OF 2" BEYOND DUCTWORK WITH EXTENDED TAB/SHAFT.
2. MANUAL VOLUME DAMPERS SHALL BE PROVIDED FOR ALL SUPPLY, RETURN, AND GENERAL EXHAUST RUNOUTS.

3 SPIN TAP TO ROUND NECK DIFFUSER
NOT TO SCALE



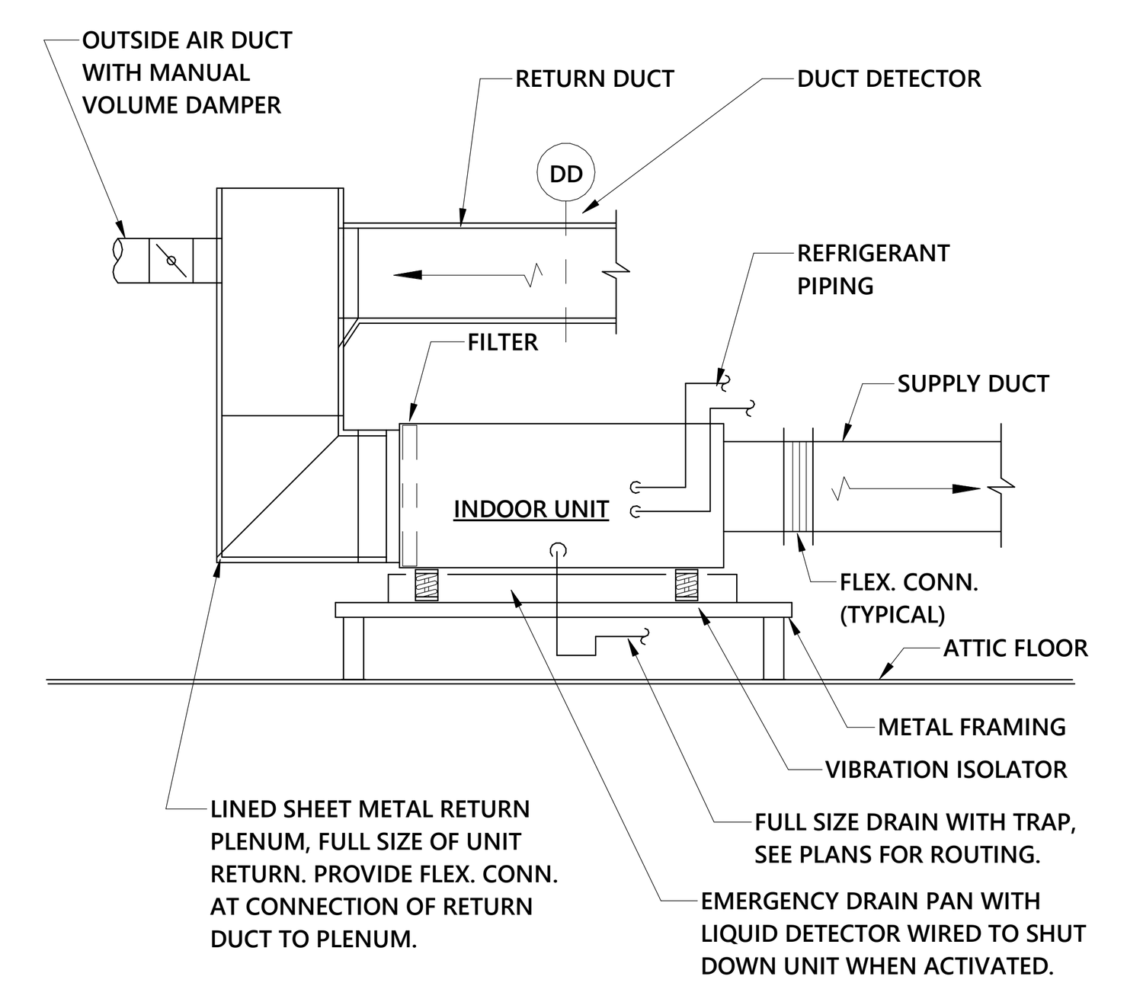
NOTE:
ALL DUCTWORK AND EQUIPMENT HANGERS AND SUPPORTS MUST BE PURCHASED THRU THE METAL DECKING MANUFACTURER. HANGERS SCREWED INTO THE DECK WILL NOT BE ACCEPTABLE. COORDINATE WITH GENERAL CONTRACTOR.

4 DUCTWORK HANGER DETAILS
NO SCALE



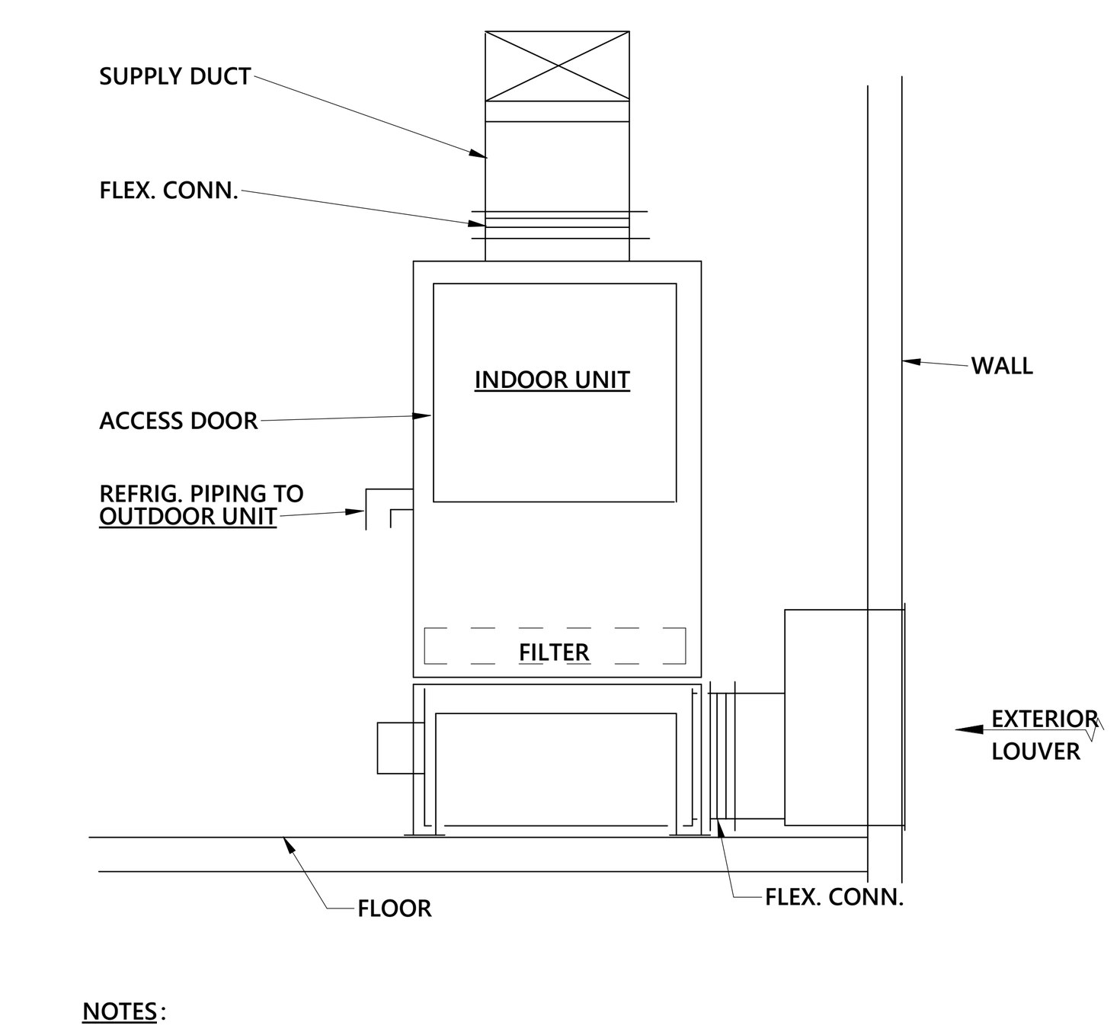
NOTES:
1. COORDINATE LOCATION OF FAN WITH OTHER TRADES TO INSURE SERVICE CLEARANCES.
2. MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS DOOR IN CEILING IF REQUIRED.
3. DO NOT HANG FAN FROM UNISTRUT SUPPORTS

5 INLINE EXHAUST FAN DETAIL
NO SCALE



NOTE:
1. MECHANICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION OF FAN COIL UNIT WITH DUCTWORK, PLUMBING, ELECTRICAL, ETC. TO MAINTAIN FILTER AND MAINTENANCE ACCESS CLEARANCES.

6 IDU - HORIZONTAL ON ATTIC FLOOR
NOT TO SCALE



NOTES:
1. PROVIDE FULL SIZE CONDENSATE DRAIN WITH TRAP, SEE PLANS FOR ROUTING.

7 DOAS - VERTICAL ELEC. UNIT
NOT TO SCALE

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MECHANICAL DETAILS

M1-501

OPTIMA # 21-0266R

Autodesk Docs://Johnsonville ES Addition Renovation/21-0266R_Johnsonville Classroom Addition_MEPFP_R22.rvt
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