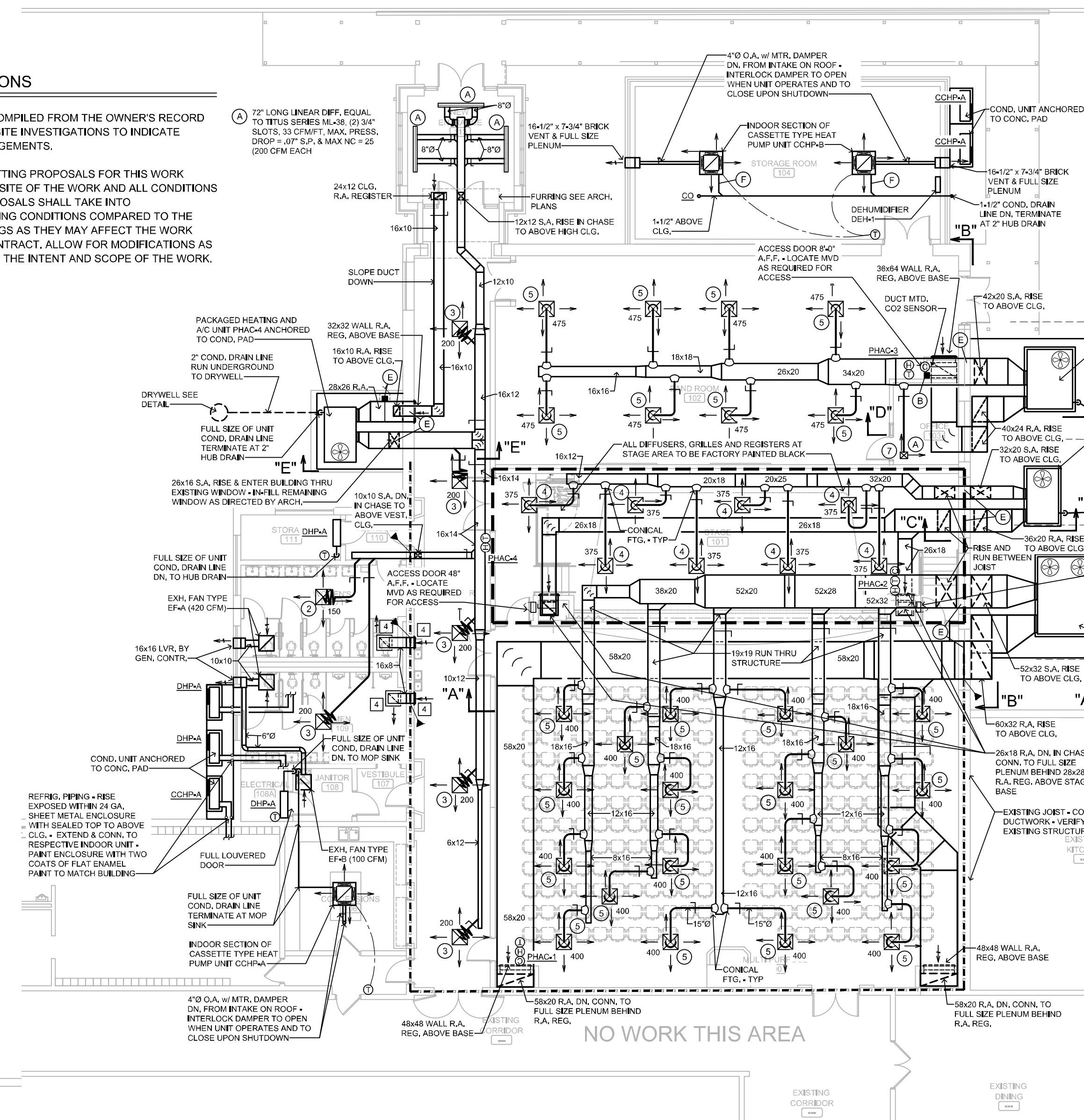
LEGEND

Symbol	Description	Abbreviation	Description
	MANUAL VOLUME DAMPER (MVD)	(4)	CEILING DIFFUSER DESIGNATOR
	MOTORIZED DAMPER (MD)	⟨4⟩	RETURN AIR GRILLE/REGISTER
	SMOKE DETECTOR	[4]	EXHAUST AIR GRILLE/REGISTER
	CONNECT TO EXISTING	ATD	AIR TRANSFER DUCT
	CEILING DIFFUSER	AD	AUXILIARY DRAIN
	RETURN AIR GRILLE/REGISTER EXHAUST AIR GRILLE/REGISTER	(T)	THERMOSTAT
12x12	DUCT W/ RECTANGULAR SIZE	(S)	REMOTE TEMPERATURE SENSOR
	RECTANGULAR SUPPLY DUCT TURNING UP	(H)	HUMIDISTAT
	RECTANGULAR SUPPLY AIR DUCT TURNING DOWN	(C)	CO2 SENSOR
	RECTANGULAR RETURN AIR OR EXHAUST DUCT TURNING UP	A.F.F.	ABOVE FINISH FLOOR
	RECTANGULAR RETURN AIR OR EXHAUST DUCT TURNING DOWN	C.D.	CEILING DIFFUSER
	RECTANGULAR SUPPLY AIR DUCT FLOOR OR ROOF PENETRATION	C.E.R.	CEILING EXHAUST REGISTER
	RECTANGULAR RETURN OR EXHAUST AIR DUCT FLOOR OR ROOF PENETRATION	CLG.	CEILING OR COOLING
		CONN.	CONNECT OR CONNECTION
		F.D.	FIRE DAMPER
		G.C.	GENERAL CONTRACTOR
		O.A.	OUTSIDE AIR
		R.A.	RETURN AIR
		S.A.	SUPPLY AIR

EXISTING CONDITIONS

THESE DRAWINGS WERE COMPILED FROM THE OWNER'S RECORD DRAWINGS AND FROM ON-SITE INVESTIGATIONS TO INDICATE BUILDING SYSTEMS ARRANGEMENTS.

ALL CONTRACTORS SUBMITTING PROPOSALS FOR THIS WORK SHALL FIRST EXAMINE THE SITE OF THE WORK AND ALL CONDITIONS AT THE FACILITY. ALL PROPOSALS SHALL TAKE INTO CONSIDERATION ALL EXISTING CONDITIONS COMPARED TO THE EXISTING RECORD DRAWINGS AS THEY MAY AFFECT THE WORK REQUIRED UNDER THIS CONTRACT. ALLOW FOR MODIFICATIONS AS REQUIRED TO ACCOMPLISH THE INTENT AND SCOPE OF THE WORK.



NOTES:

(A) 12x7 S.A. DN. THRU MEZZ. CONN. TO CLG. DIFFUSER (200 CFM)

(B) SMOKE DETECTOR IN VERTICAL PROVIDE ACCESS DOOR APPROX. 8'-0" A.F.F

(C) 14"Ø S.A. RISE AND RUN THRU JOIST

(D) 28x28 R.A. DN. WALL CONN. TO FULL SIZE PLENUM BEHIND 28x28 R.A. REG. ABOVE STAGE BASE

(E) S.A. & R.A. DUCT RISE AND ENTER BUILDING THRU EXISTING WINDOWS FILL-IN REMAINING WINDOW AS DIRECTED BY ARCHITECT

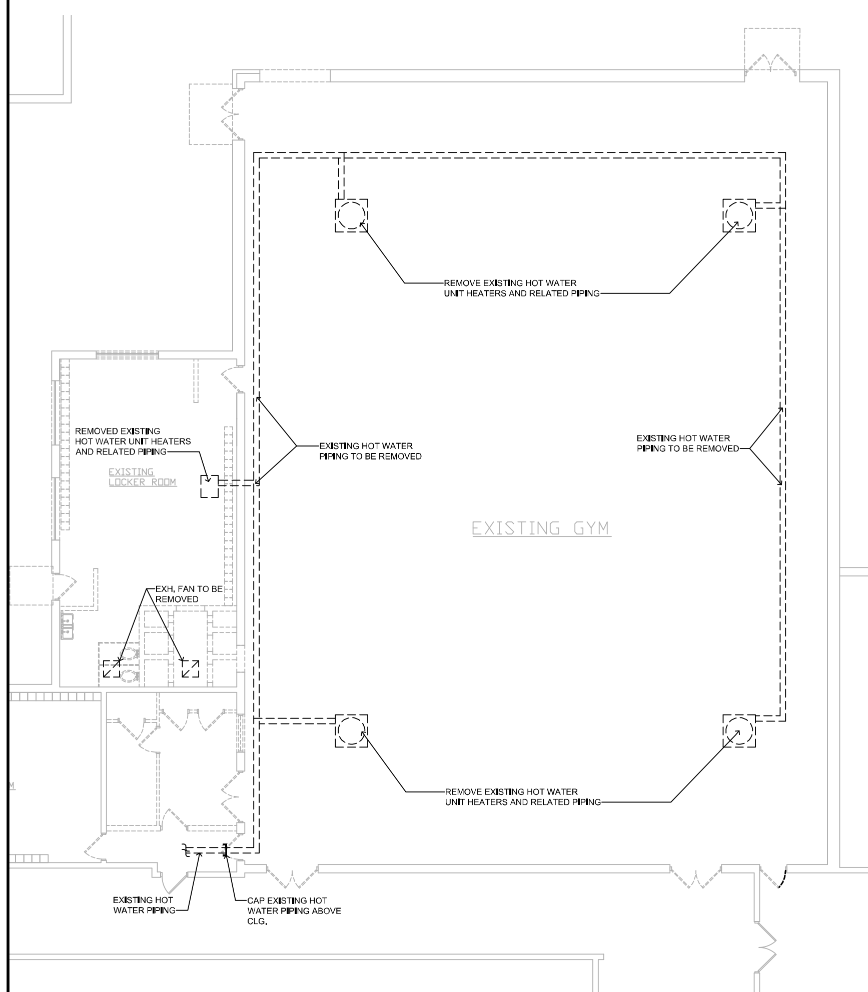
(F) FULL SIZE OF UNIT COND. DRAIN LINE CONN. TO 1-1/2" MAIN COND. DRAIN LINE ABOVE CLG.

NOTE!

1. ALL RECTANGULAR SUPPLY AIR DUCTWORK FROM THE POINT OF CONNECTION TO PHAC-1, PHAC-2, PHAC-3 AND PHAC-4 TO A POINT 5'-0" WITHIN THE FACILITY MUST BE THERMADUCT. SEE SPECS FOR REQUIREMENTS.
2. ALL DUCTWORK FROM A POINT 5'-0" INSIDE THE BUILDING WHICH IS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 MUST BE FACTORY FABRICATED AND INSULATED DOUBLE WALL DUCT AND FITTINGS - SEE SPECS.
3. ALL RUNOUTS TO DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 MUST BE FACTORY FABRICATED AND INSULATED DOUBLE WALL DUCT AND FITTINGS - SEE SPECS.
4. MAXIMUM ALLOWABLE FLEX DUCT TO DIFFUSER NECK CONNECTIONS SERVED BY PHAC-1, PHAC-2 AND PHAC-3 IS 10".
5. ALL BRANCH DUCT TAKE-OFFS TO DIFFUSERS SERVED BY PHAC-1, PHAC-2 AND PHAC-3 SHALL BE FACTORY FABRICATED AND INSULATED DOUBLE WALL CONICAL TYPE WITH MANUAL VOLUME DAMPER

HVAC FLOOR PLAN

SCALE: 1/8" = 1'-0"



HVAC DEMOLITION PLAN

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES

1.) THE CONTRACTOR SHALL NOT CONSIDER DEMOLITION AND ALTERATION NOTES TO BE ALL-INCLUSIVE. IT IS CONTRACTOR'S RESPONSIBILITY TO INSPECT AND ASSESS EACH AREA PRIOR TO BID AND TO FULFILL THE INTENT AND SCOPE OF THE DESIGN INDICATED BY THE CONTRACT DOCUMENTS. CONTRACTOR SHALL VERIFY ALL JOB CONDITIONS AND ALLOW FOR REQUIRED MODIFICATIONS TO ACCOMPLISH THE WORK. CONTRACTOR SHALL COORDINATE ARCHITECTURAL DEMOLITION DRAWINGS AND NOTES WITH HVAC AND PLUMBING DRAWINGS AND NOTES. PATCH OR REBUILD ANY AREAS TO REMAIN THAT HAVE BEEN DAMAGED OR DISTURBED BY HVAC AND PLUMBING DEMOLITION. FINISH ALL PATCHED/REBUILT AREAS TO MATCH ADJACENT SURFACES AND AS SPECIFIED ELSEWHERE WITHIN THE CONTRACT DOCUMENTS.

2.) THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS WITHIN THE CONTRACT LIMITS AND NOTIFY THE ARCHITECT IMMEDIATELY, IN WRITING, OF ANY DEVIATION FROM CONTRACT DOCUMENTS NECESSITATED BY FIELD CONDITIONS OR ITEMS NOT COVERED.

3.) ALL DEMOLITION SHALL BE PERFORMED IN A SAFE AND ACCEPTABLE MANNER TO ALL AUTHORITIES HAVING JURISDICTION, THE OWNER AND THE ARCHITECT. COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION FOR POLLUTION CONTROL. THOROUGHLY CLEAN ADJACENT AREAS AND ALL OTHER AFFECTED AREAS OF DUST, DIRT AND DEBRIS CAUSED BY DEMOLITION WORK. RETURN AREAS TO CONDITION FOUND PRIOR TO START OF DEMOLITION WORK BEFORE NEW WORK BEGINS.

4.) HAZARDOUS MATERIAL NOTE: IT IS ANTICIPATED THAT THERE WILL NOT BE ANY HAZARDOUS MATERIALS ON SITE. SHOULD ANY HAZARDOUS MATERIALS BE FOUND, THE CONTRACTOR SHALL STOP WORK AND INFORM THE ARCHITECT IMMEDIATELY, IN WRITING, OF ANY HAZARDOUS MATERIAL ENCOUNTERED OR THOUGHT TO BE HAZARDOUS MATERIAL. THE ARCHITECT, AFTER RECEIVING WRITTEN NOTICE SHALL INSTRUCT CONTRACTOR ON HOW TO PROCEED.

5.) CONTRACTOR SHALL REVIEW ALL ITEMS TO BE DEMOLISHED WITH ARCHITECT AND IDENTIFY ANY ITEMS TO BE SALVAGED PRIOR TO START OF DEMOLITION. SALVAGED ITEMS SHALL BE TRANSPORTED AND STORED AT A LOCATION DESIGNATED BY THE ARCHITECT. REMAINING ITEMS SHALL BE PROPERLY DISPOSED OF BY THE CONTRACTOR.

6.) REMOVE ALL EXISTING EQUIPMENT, DUCTWORK, TUBING, WIRING, PIPING, HANGERS, FITTINGS, SUPPORTS, DIFFUSERS, REGISTERS, CONTROLS, ETC., AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT. DO NOT REUSE EXISTING HANGERS, CONTROL WIRING, SUPPORTS, ETC. ALL ITEMS SHALL BE NEW. NO ITEMS SHALL BE ABANDONED IN PLACE.

7.) WHERE PIPING IS BEING REMOVED ON OR THROUGH THE ROOF, REMOVE ALL PIPING SUPPORTS. A CERTIFIED ROOFING CONTRACTOR MUST PROVIDE THE ROOF REPAIR AS REQUIRED TO MAINTAIN THE NEW/EXISTING ROOFING WARRANTY.

ZGOUVAS, EIRING & ASSOCIATES
CONSULTING ENGINEERS
800 S McDONOUGH STREET
MONTGOMERY, AL. 36104
334.263.4406
ZEA PROJECT NUMBER 25-133

Goshen High Shool Arts Center Renovation

TO

Goshen High School

FOR THE

Pike County Board of Education

Troy, ALABAMA

McKEE and ASSOCIATES
ARCHITECTURE and INTERIOR DESIGN
631 SOUTH HULL STREET MONTGOMERY, ALABAMA 36104 (334) 834-9933

SHEET TITLE : HVAC FLOOR PLAN & DEMOLITION PLAN

MCKEE JOB # : 20.119

DRAWN BY : C. WARD

CHECKED BY : T. ZGOUVAS

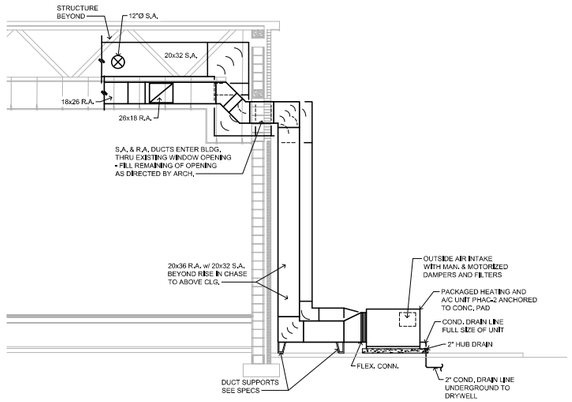
DATE: 10.10.2025

REVISED DATE:

REVISED DATE:

REVISED DATE:

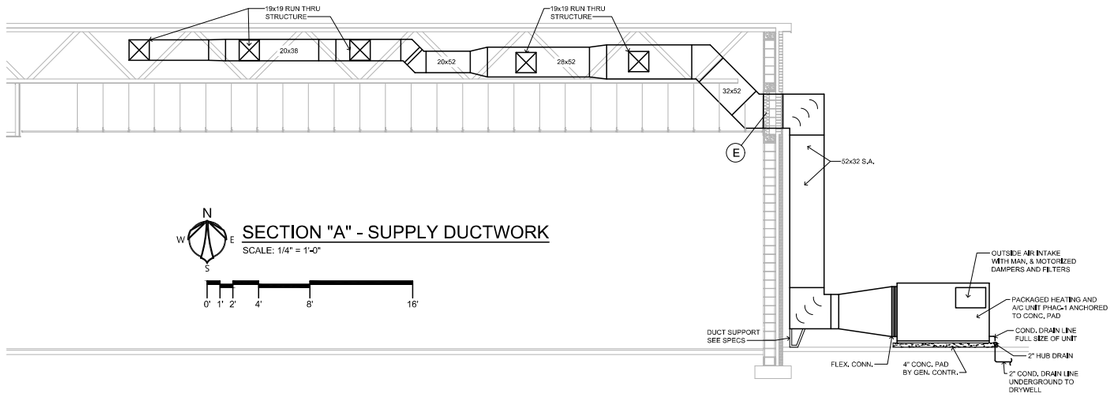
SHEET NO. : M1



SECTION "C"

SCALE: 1/4" = 1'-0"

0' 1' 2' 4' 8' 16'

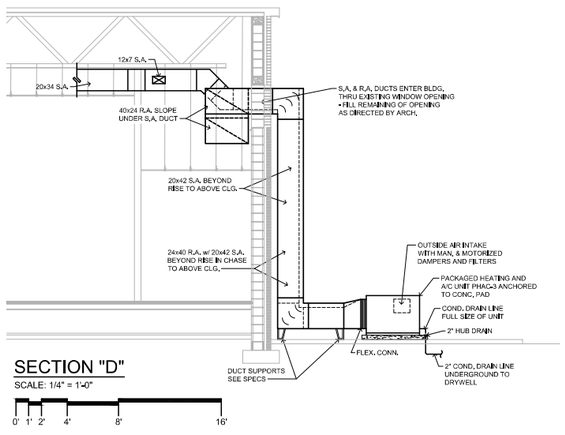


N W E S

SECTION "A" - SUPPLY DUCTWORK

SCALE: 1/4" = 1'-0"

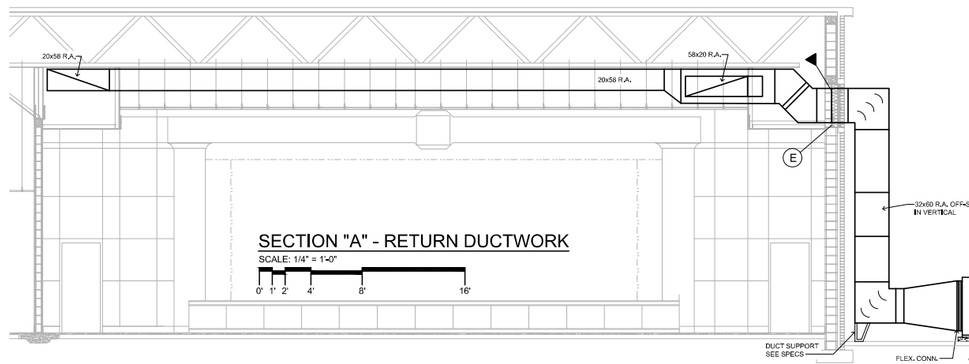
0' 1' 2' 4' 8' 16'



SECTION "D"

SCALE: 1/4" = 1'-0"

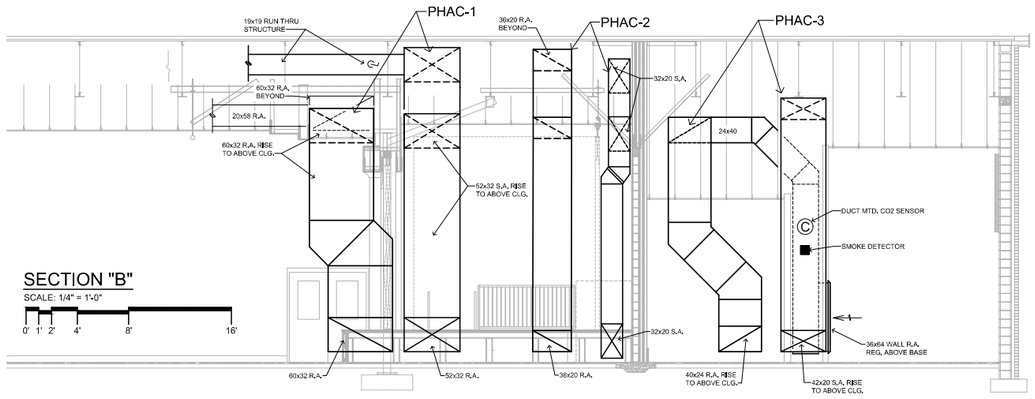
0' 1' 2' 4' 8' 16'



SECTION "A" - RETURN DUCTWORK

SCALE: 1/4" = 1'-0"

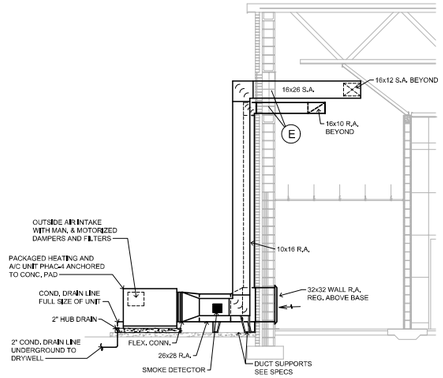
0' 1' 2' 4' 8' 16'



SECTION "B"

SCALE: 1/4" = 1'-0"

0' 1' 2' 4' 8' 16'



SECTION "E"

SCALE: 1/4" = 1'-0"

0' 1' 2' 4' 8' 16'

ZGOUVAS, EIRING & ASSOCIATES
CONSULTING ENGINEERS
800 S McDONOUGH STREET
MONTGOMERY, AL. 36104
334.263.4406
ZEA PROJECT NUMBER 25-133

Goshen High Shool Arts Center Renovation

TO

Goshen High School

FOR THE

Pike County Board of Education

Troy, ALABAMA

McKEE and ASSOCIATES
ARCHITECTURE and INTERIOR DESIGN
631 SOUTH HULL STREET MONTGOMERY, ALABAMA 36104 (334) 834-8933

JAMES S. EIRING
No. 23369
PROFESSIONAL
10.10.25
ENGINEER

SHEET TITLE : HVAC SECTIONS

MCKEE JOB # : 20.119

DRAWN BY : C. WARD

CHECKED BY : T. ZGOUVAS

DATE: 10.10.2025

REVISED DATE:

REVISED DATE:

REVISED DATE:

SHEET NO. : M2

PACKAGED ROOFTOP OR PAD MOUNTED HEATING AND AIR CONDITIONING UNIT SCHEDULE (LP GAS HEAT)

UNIT NUMBER	TOTAL AIR CFM	OUTSIDE AIR CFM			APPROXIMATE EXTERNAL STATIC PRESS. IN. OF WATER	FAN MOTOR				MINIMUM TOTAL COOLING CAPACITY AT A.R.I. CONDS. BTU/HR	MINIMUM CAPACITY REDUCTION - PERCENT OF TOTAL LOAD	MINIMUM EFFICIENCY AT A.H.R.I. CONDITIONS	MINIMUM I.E.E.R. AT A.H.R.I. CONDITIONS	MIN. TOTAL HEATING CAPACITY INPUT-MBH	COMPRESSOR MOTOR(S)				CONDENSER FAN(S)				APPROX. MCA	APPROX. MOCP	REMARKS
		MINIMUM SETPOINT	MAXIMUM SETPOINT	MAXIMUM SETPOINT (ECONOMIZER)		APPROX. H.P.	VOLTS	PHASE	HERTZ						APPROX. F.L.A.	VOLTS	PHASE	HERTZ	APPROX. F.L.A.	VOLTS	PHASE	HERTZ			
PHAC-1	8000	200	2150	8000	1.39	6.0	208	3	60	240,000	100 - 50 - 0	11.0	15,8	250.0	70,0	208	3	60	5,0	208	1	60	108.0	150.0	
PHAC-2	3000	100	760	3000	1.10	3.0	208	3	60	90,000	100 - 50 - 0	12.0	17,2	120.0	28,0	208	3	60	4,0	208	1	60	43,0	50.0	
PHAC-3	4000	110	1000	4000	0,90	3,0	208	3	60	120,000	100 - 50 - 0	11,6	15,8	150,0	40,0	208	3	60	7,0	208	1	60	60,0	80,0	
PHAC-4	3000	400	400	3000	0.84	3.0	208	3	60	90,000	100 - 50 - 0	12.0	17,2	120.0	28,0	208	3	60	4,0	208	1	60	43,0	50.0	

NOTES:
1. ALL UNITS SHALL BE FACTORY WIRED FOR SINGLE POINT POWER CONNECTIONS (208V., 3 PH., 60 HZ.)
2. EER RATINGS BASED ON ARI 340/360
3. EACH UNIT SHALL BE PROVIDED WITH A REFRIGERANT HOT GAS REHEAT COIL, RELATED MODULATING HOT GAS REHEAT COIL VALVE AND LOCATED IN THE REHEAT POSITION. COIL SHALL BE PROVIDED COMPLETE WITH REFRIGERANT PIPING, PIPE INSULATION, VALVES, CONTROLS, ETC., ALL AS REQUIRED FOR HUMIDITY CONTROL - PROVIDE MANUAL REFRIGERANT ISOLATION VALVES FOR HOT GAS AND LIQUID LINES - FURNISH FOR APPROVAL DETAILED REFRIGERANT PIPING CONN. DIAGRAM AND CONTROL WIRING DIAGRAM - SEE SPECS FOR ADDITIONAL DETAILED REQUIREMENTS.
4. HEATER MINIMUM THERMAL EFFICIENCY SHALL BE MINIMUM 80%.
5. ALL UNITS SHALL HAVE MINIMUM OF TWO COMPRESSORS WITH 2-STAGES OF COOLING AS REQUIRED BY ASHRAE 90.1.
6. ALL UNITS SHALL BE PROVIDED WITH TWO SPEED CONTROL OF THE SUPPLY FAN SUCH THAT THE FAN AIRFLOW WILL VARY AS A FUNCTION OF LOAD AS REQUIRED BY ASHRAE 90.1 - 2013.

CEILING CASSETTE TYPE HEAT PUMP UNIT SCHEDULE

UNIT TYPE	CCHP-A	CCHP-B
MINIMUM TOTAL COOLING CAP. AT A.R.I. CONDITIONS - BTU/HR	24,000	12,000
MINIMUM HEATING CAP. (COMPRESSOR ONLY) AT 70°F INDOOR & 47°F AMBIENT - BTU/HR	26,000	14,000
INDOOR FAN CFM AT HIGH SPEED (WET COIL)	770	490
OUTSIDE AIR CFM	75	60
INDOOR UNIT MCA - POWER	1.5 A - 208 V., 1 PH. , 60 HZ.	1.5 A - 208 V., 1 PH., 60 HZ.
OUTDOOR UNIT MCA (COMPRESSOR AND COND. FAN) - POWER	19.0 A - 208 V., 1 PH., 60 HZ.	11.0 A - 208 V., 1 PH., 60 HZ.
OUTDOOR UNIT MOCP	26.0 A - 208 V., 1 PH., 60 HZ.	28.0 A - 208 V., 1PH., 60HZ.
MINIMUM HSPF AT AHRI 210/240 CONDS.	11.2	12.8
MINIMUM S.E.E.R. AT AHRI 210/240 CONDS	24.2	27.0

FANS SCHEDULE

FAN TYPE	EF-A	EF-B
C.F.M.	420	100
MINIMUM FAN SIZE - INCHES	10.0	8.0
APPROX. FAN ROOF/WALL OPENING - INCHES	N/A	N/A
MAXIMUM FAN SPEED - RPM	1050	1050
APPROX. EXTERNAL STATIC PRESSURE - IN. OF WATER	.30	.30
MINIMUM FAN MOTOR H.P. - POWER	275 WATTS - 120V, 1PH., 60 HZ.	84 WATTS - 120V, 1PH., 60HZ.
CONTROL INTERLOCK	LIGHTING CIRCUIT	LIGHTING CIRCUIT
DESCRIPTION	CLG. MOUNTED, CENTRIFUGAL, DRIVEN, ECM	CLG. MOUNTED, CENTRIFUGAL, DRIVEN, ECM

WALL MOUNTED DUCTLESS HEAT PUMP UNIT SCHEDULE

UNIT TYPE	DHP-A
MINIMUM TOTAL COOLING CAP. AT A.R.I. CONDITIONS - BTU/HR	9,000
MINIMUM HEATING CAP. (COMPRESSOR ONLY) AT 70°F INDOOR & 47°F AMBIENT - BTU/HR	10,900
INDOOR FAN CFM AT HIGH SPEED (WET COIL)	340
INDOOR UNIT MCA - POWER	1.5 A - 208 V., 1 PH., 60 HZ.
OUTDOOR UNIT MCA (COMPRESSOR AND COND. FAN) - POWER	10.0 A - 208 V., 1 PH., 60 HZ.
OUTDOOR UNIT MOP (COMPRESSOR AND COND. FAN) - POWER	15.0 A - 208 V., 1 PH., 60 HZ.
MINIMUM HSPF AT AHRI 210/240 CONDS.	12.8
MINIMUM S.E.E.R. AT AHRI 210/240 CONDS	27.0
BASIS OF DESIGN	MITSUBISHI MSZ / MUZ

IMC 1103.1 REFRIGERANT CALCULATIONS

UNIT NUMBER	SPACE SERVED	UNIT COOLING CAPACITY BTU/HR	MFGR. LISTED CHARGE POUNDS	SPACE SQUARE FOOT	SPACE CLG. HEIGHT	SPACE CUBIC FEET	MAXIMUM ALLOWABLE PER IMC 1103.1 POUNDS PER MCF	MAXIMUM ALLOWABLE REFRIGERANT CHARGE FOR ZONE POUNDS	COMPLIES WITH IMC 1103.1	REMEDY TO COMPLY WITH IMC 1103.1
CCHP-A	CONCESSIONS 106	24,000	7	340	9	3,060	3.1	9.486	YES	N/A
DHP-A	ELECTRICAL 108A	9,000	2.6	42	9	378	3.1	1.1718	NO	FULL LOUVERED DOOR
PHAC-1	MULTI-PURPOSE 100	240,000	14.6	2,800	18	50,400	3.1	156.2	YES	N/A
PHAC-2	STAGE 101	90,000	8.2	1,200	17	20,400	3.1	63.2	YES	N/A
PHAC-3		120,000	9.4						YES	N/A
	BAND ROOM 102			1,400	17	23,800	3.1	73.8		
	INSTRUMENT STORAGE 104			150	8	1,200	3.1	3.7		
	OFFICE 103			90	8	720	3.1	2.2		
	TOTALS					25,720.00		79.7		
PHAC-4		90,000	8.2						YES	N/A
	CORRIDOR 105			1,040	11	11,440	3.1	35.5		
	TOILETS 109,112			150	9	1,350	3.1	4.2		
	STORAGE 111			90	9	810	3.1	2.5		
	NEW ENTRANCE 113			200	26	5,200	3.1	16.1		
	TOTALS					13,600.00		42.2		

EXHAUST/RETURN AIR REGISTER SCHEDULE

SYMBOL EXH.	SYMBOL R.A.	CFM RANGE	SIZE - IN. x IN.	DESCRIPTION	MAXIMUM NC RATING	BRANCH DUCT SIZE
1	1	0 - 140	9x9	CEILING EXH. OR RETURN REG.	20	9x6
2	2	141 - 240	12x12	CEILING EXH. OR RETURN REG.	20	12x7
3	3	241 - 340	14x14	CEILING EXH. OR RETURN REG.	20	14x7
4	4	341 - 460	16x16	CEILING EXH. OR RETURN REG.	20	16x9
5	5	461 - 600	18x18	CEILING EXH. OR RETURN REG.	20	18x10
6	6	601 - 760	20x20	CEILING EXH. OR RETURN REG.	20	20x12
7	7	761 - 940	24x24	CEILING EXH. OR RETURN REG.	20	24x12
8	8	941 - 1200	30x24	CEILING EXH. OR RETURN REG.	20	24x14
9	9	1201 - 1400	36x24	CEILING EXH. OR RETURN REG.	20	28x14

NOTES
1.) RUNOUTS/BRANCH DUCTS SHALL BE AS SCHEDULED ABOVE UNLESS NOTED OTHERWISE ON THE PLANS.
2.) 8 (8) & 9 (9) SHALL BE IN INTEGRAL 48x24 METAL CEILING PANEL AS SPECIFIED, ALL OTHERS SHALL BE IN INTEGRAL 24x24 METAL CEILING PANEL AS SPECIFIED.
3.) CONTRACTOR SHALL INSULATE THE BACK SIDE OF CEILING MOUNTED EXHAUST & RETURN AIR GRILLES/REGISTERS WITH 1" THICKNESS EXTERNAL DUCT INSULATION WITH CHARACTERISTICS SPECIFIED FOR EXTERNAL DUCT INSULATION.

CEILING DIFFUSER SCHEDULE

SYMBOL	CFM RANGE	NECK SIZE INCHES	FACE SIZE INCHES	BRANCH DUCT SIZE	MAXIMUM NC VALUE	BASIS OF DESIGN
1	10 - 95	6" ROUND	24x24	6"Ø	20	TITUS TMS
2	100 - 180	8" ROUND	24x24	8"Ø	20	TITUS TMS
3	185 - 270	10" ROUND	24x24	10"Ø	20	TITUS TMS
4	375	15" ROUND	24x24	15"Ø	15	TITUS TMS
5	400	15" ROUND	24x24	15"Ø	15	TITUS TMS
6	460	15" ROUND	24x24	15"Ø	15	TITUS TMS
7	95 - 200	9x9	9x9	10x7	20	TITUS TDC

NOTES
1.) RUNOUTS/BRANCH DUCTS SHALL BE AS SCHEDULED ABOVE UNLESS NOTED OTHERWISE ON THE PLANS
2.) CONTRACTOR SHALL INSULATE THE EXTERIOR (BACK SIDE OF DIFFUSER PANEL) WITH 1" THICKNESS EXTERNAL DUCT INSULATION WITH CHARACTERISTICS SPECIFIED FOR EXTERNAL DUCT INSULATION.

PACKAGED DEHUMIDIFIER SCHEDULE

SYMBOL	TOTAL CAPACITY PINTS/DAY	ELECTRICAL						EQUAL TO SANTA FE
		VOLTAGE	MCA	MFS	NO. OF COMP.	RLA EA.	LRA EA.	KW	
DEH-1	33	120/1/60 (PLUG)	15		1	2,8		,61	ULTRA AIRE MD-33

PHAC-1 OUTDOOR AIR AND EXHAUST CALCULATIONS

	Area	Peo/1000SF	# People	CFM/SF	Area CFM	CFM/Person	People CFM	Voz	Ez	# Fixtures	CFM/Fixt	CFM/SF	Min Exhaust	Supply Air	Zp EQ 4-5
MULIT-PURPUSE	2650	100	265	0.06	159	7.5	1988	2147	1				0	8000	0.268375
Total			265		159		1988								
							Cumulative CFM	2147							

PHAC-2 OUTDOOR AIR AND EXHAUST CALCULATIONS

	Area	Peo/1000SF	# People	CFM/SF	Area CFM	CFM/Person	People CFM	Voz	Ez	# Fixtures	CFM/Fixt	CFM/SF	Min Exhaust	Supply Air	Zp EQ 4-5
STAGE	1000	70	70	0.06	60	10	700	760	1				0	3000	0.253333
Total			70		60		700								
							Cumulative CFM	760							

PHAC-3 OUTDOOR AIR AND EXHAUST CALCULATIONS

	Area	Peo/1000SF	# People	CFM/SF	Area CFM	CFM/Person	People CFM	Voz	Ez	# Fixtures	CFM/Fixt	CFM/SF	Min Exhaust	Supply Air	Zp EQ 4-5
BAND ROOM	1400	35	87	0.06	84	10	870	954	1				0	3700	0.257838
OFFICE	120	5	1	0.06	8	5	5	16.25	0.8				0	150	0.108333
INSTRUMENT STORAGE	180	0	0	0.06	11	0	0	13.75	0.8				0	150	0.091667
Total			88		103		875								

PHAC-4 OUTDOOR AIR AND EXHAUST CALCULATIONS

	Area	Peo/1000SF	# People	CFM/SF	Area CFM	CFM/Person	People CFM	Voz	Ez	# Fixtures	CFM/Fixt	CFM/SF	Min Exhaust	Supply Air	Zp EQ 4-5
CORRIDOR	1100	5	6	0.06	66	5	30	120	0.8				0	600	0.2
WOMENS	160									6	70		420	150	0
MENS	160									6	70		420	150	0
ENTRY	200	10	2	0.06	12	5	10	27.5	0.8				0	200	0.1375
Total			8		78		40								

PHAC-5 OUTDOOR AIR AND EXHAUST CALCULATIONS

	Area	Peo/1000SF	# People	CFM/SF	Area CFM	CFM/Person	People CFM	Voz	Ez	# Fixtures	CFM/Fixt	CFM/SF	Min Exhaust	Supply Air	Zp EQ 4-5
CONCESSIONS	300	25	8	0.06	18	5	40	72.5	0.8				0	250	0.29
STORAGE 104	800	0	0	0.12	96	0	0	120	0.8				0	250	0.48
Total			8		18		40								

Goshen High Shool Arts Center Renovation
TO
Goshen High School
FOR THE
Pike County Board of Education
Troy, ALABAMA

McKEE and ASSOCIATES
ARCHITECTURE and INTERIOR DESIGN
631 SOUTH HULL STREET MONTGOMERY, ALABAMA 36104 (334) 834-8633

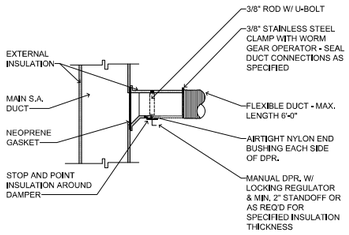
No. 22369 PROFESSIONAL 10.10.25 ENGINEER J.R. ERING

SHEET TITLE : HVAC SCHEDULES

MCKEE JOB # : 20.119
DRAWN BY : C. WARD
CHECKED BY : T. ZGOUVAS
DATE: 10.10.2025
REVISED DATE:
REVISED DATE:
REVISED DATE:

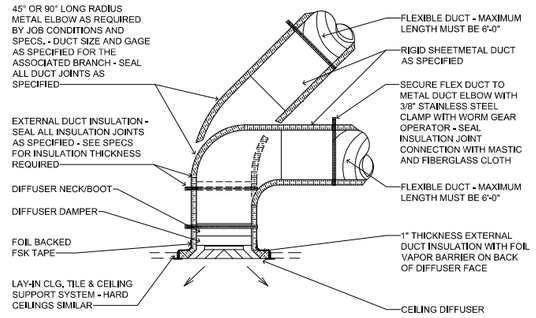
ZEA
ZGOUVAS, ERING & ASSOCIATES
CONSULTING ENGINEERS
800 S McDONOUGH STREET
MONTGOMERY, AL. 36104
334.263.4406
ZEA PROJECT NUMBER 25-133

SHEET NO. : M3



ROUND BRANCH DUCT TAKE-OFF DETAIL

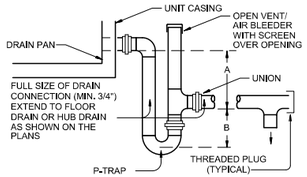
NOT TO SCALE
RECTANGULAR RUNOUTS SIMILAR EXCEPT WITH RECTANGULAR DUCT



DIFFUSER BOOT/PLENUM CONNECTION DETAIL

NOT TO SCALE

1. DIFFUSERS PANELS SHALL BE INSULATED PRIOR TO INSTALLING INTO THE CEILING GRID
2. DO NOT COVER STAINLESS STEEL BAND AND WORM GEAR OPERATOR UNTIL THE ENGINEER HAS INSPECTED THE INSTALLATION.
3. BRANCH DUCTS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 ARE SPECIFIED AS FACTORY FABRICATED AND INSULATED DOUBLE WALL DUCT AND FITTINGS AND REQUIRED MANUAL VOLUME DAMPER. INSTALLATION IS SIMILAR TO ABOVE EXCEPT SUPPORTS ARE TO HAVE ARMAFLEX BETWEEN METAL DUCT AND THE SPECIFIED SUPPORT ASSEMBLY. SEE SPECS FOR ADDITIONAL SUPPORT REQUIREMENTS. CEILING DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 DO NOT REQUIRE THE INDICATED DAMPER MOUNTED ON THE DIFFUSER NECK
4. FOR DUCT CONNECTIONS TO DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3, THE REQUIRED STRAIGHT DUCT LENGTH AFTER THE ELBOW MUST BE A MINIMUM OF THREE DUCT DIAMETERS.



UNIT TYPE	A	B
DRAW-THRU	2" PLUS "X"	"X" PLUS 1"
BLOW-THRU	1" MINIMUM	2X PLUS 1"

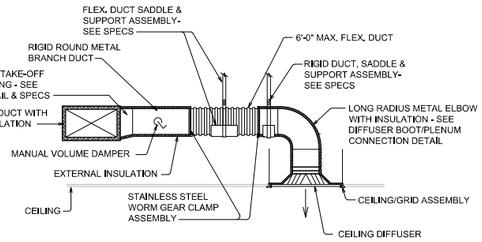
WHERE "X" = UNIT STATIC PRESSURE

TYPICAL EVAPORATOR COIL CONDENSATE DRAIN DETAIL

NOT TO SCALE

NOTES:

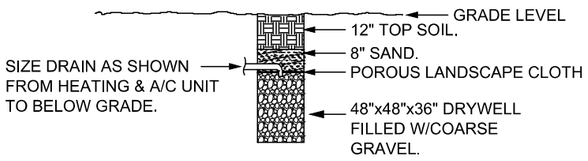
1. CONTRACTOR SHALL PROVIDE DRAIN ARRANGEMENT AS REQUIRED BY THE UNIT MANUFACTURER. IN ABSENCE OF THOSE REQUIREMENTS, CONTRACTOR SHALL PROVIDE DRAIN AS DETAILED ABOVE.
2. CONTRACTOR SHALL RAISE THE RESPECTIVE UNIT AS REQUIRED TO ALLOW FOR INSTALLATION OF THE DRAIN AS DETAILED ABOVE.
3. PROVIDE AN ELECTRIC SWITCH IN THE AUXILIARY CONDENSATE DRAIN LINE ON THE UNIT, THAT CONFORMS TO UL 508 AND UL 2043 (AS APPLICABLE), TO SHUT DOWN THE UNIT AND ALARM TO THE BUILDING ENERGY MANAGEMENT SYSTEM (BAS) OPERATOR CONSOLE (IF APPLICABLE) SHOULD THE LINE BECOME OBSTRUCTED.
4. PROVIDE UNIONS AT EACH CONDENSATE DRAIN LINE TRAP ASSEMBLY FOR ALL MINI-SPLIT SYSTEMS.
5. DUCTLESS MINI-SPLIT EQUIPMENT THAT PRODUCES CONDENSATE SHALL BE PROVIDED WITH AN INLINE CHECK VALVE LOCATED IN THE DRAIN LINE OR A TRAP AS REQUIRED BY IMC 307.2.4.1.
6. PER IMC 307.2.5, CONDENSATE DRAIN LINES SHALL BE CONFIGURED TO PERMIT THE CLEARING OF BLOCKAGES AND PERFORMANCE OF MAINTENANCE WITHOUT REQUIRING THE DRAIN LINE TO BE CUT.



TYPICAL DIFFUSER RUN-OUT CONN.

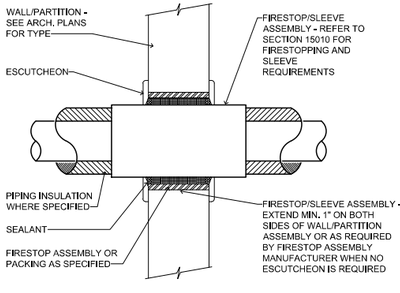
NOT TO SCALE

1. REFER TO THE DUCT SPECIFICATIONS AND THE ADJACENT DIFFUSER BOOT/PLENUM CONNECTION DETAIL FOR REQUIREMENTS OF RUNOUTS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3.
2. MAXIMUM ALLOWABLE FLEXIBLE DUCT LENGTH ALLOWED FOR DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 IS 10"
3. PROVIDE FACTORY FABRICATED AND INSULATED DOUBLE WALL CONICAL TEE FITTINGS WITH MANUAL DAMPER FOR ALL BRANCH DUCT TAKE-OFFS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3



DRYWELL DETAIL

NO SCALE

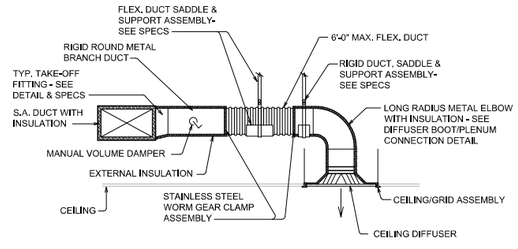


INTERIOR WALL PIPING PENETRATION DETAIL

NOT TO SCALE

NOTES:

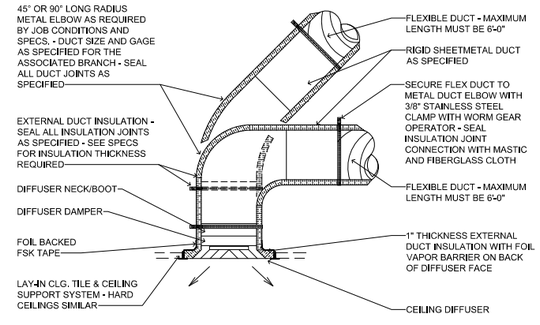
1. SEE SPEC SECTION 15010 FOR FIRESTOP AND SLEEVE REQUIREMENTS
2. DETAIL APPLIES TO ALL PIPING.
3. ONLY ONE PIPE PER ASSEMBLY ALLOWED.
4. WHERE PIPING IS EXPOSED IN FINISHED AREAS, PROVIDE ESCUTCHEONS OVER PENETRATIONS AND DELETE REQUIREMENT FOR EXTENDING OF THE SLEEVE/FIRESTOP ASSEMBLY 1" ON EACH SIDE OF THE PARTITION. TERMINATE FLUSH WITH WALL. DO NOT USE SPLIT TYPE ESCUTCHEONS NOR SPLIT TYPE SLEEVES.



TYPICAL DIFFUSER RUN-OUT CONN.

NOT TO SCALE

1. REFER TO THE DUCT SPECIFICATIONS AND THE ADJACENT DIFFUSER BOOT/PLENUM CONNECTION DETAIL FOR REQUIREMENTS OF RUNOUTS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3.
2. MAXIMUM ALLOWABLE FLEXIBLE DUCT LENGTH ALLOWED FOR DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 IS 10"
3. PROVIDE FACTORY FABRICATED AND INSULATED DOUBLE WALL CONICAL TEE FITTINGS WITH MANUAL DAMPER FOR ALL BRANCH DUCT TAKE-OFFS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3



DIFFUSER BOOT/PLENUM CONNECTION DETAIL

NOT TO SCALE

1. DIFFUSERS PANELS SHALL BE INSULATED PRIOR TO INSTALLING INTO THE CEILING GRID
2. DO NOT COVER STAINLESS STEEL BAND AND WORM GEAR OPERATOR UNTIL THE ENGINEER HAS INSPECTED THE INSTALLATION.
3. BRANCH DUCTS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 ARE SPECIFIED AS FACTORY FABRICATED AND INSULATED DOUBLE WALL DUCT AND FITTINGS AND REQUIRED MANUAL VOLUME DAMPER. INSTALLATION IS SIMILAR TO ABOVE EXCEPT SUPPORTS ARE TO HAVE ARMAFLEX BETWEEN METAL DUCT AND THE SPECIFIED SUPPORT ASSEMBLY. SEE SPECS FOR ADDITIONAL SUPPORT REQUIREMENTS. CEILING DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3 DO NOT REQUIRE THE INDICATED DAMPER MOUNTED ON THE DIFFUSER NECK
4. FOR DUCT CONNECTIONS TO DIFFUSERS ASSOCIATED WITH PHAC-1, PHAC-2 AND PHAC-3, THE REQUIRED STRAIGHT DUCT LENGTH AFTER THE ELBOW MUST BE A MINIMUM OF THREE DUCT DIAMETERS.

Goshen High Shool Arts Center Renovation
TO
Goshen High School
FOR THE
Pike County Board of Education
Troy, ALABAMA

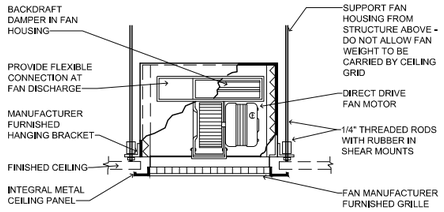
McKEE and ASSOCIATES
ARCHITECTURE and INTERIOR DESIGN
631 SOUTH HULL STREET MONTGOMERY, ALABAMA 36104 (334) 834-8833

SHEET TITLE : HVAC DETAILS

MCKEE JOB # : 20.119
DRAWN BY : C. WARD
CHECKED BY : T. ZGOUVAS
DATE: 10.10.2025
REVISED DATE:
REVISED DATE:
REVISED DATE:

ZEA
ZGOUVAS, EBRING & ASSOCIATES
CONSULTING ENGINEERS
900 S McDONOUGH STREET
MONTGOMERY, AL. 36104
334.263.4406
ZEA PROJECT NUMBER 25-133

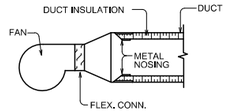
SHEET NO. : M4



CEILING MOUNTED EXHAUST FAN CONN. DETAIL

NO SCALE

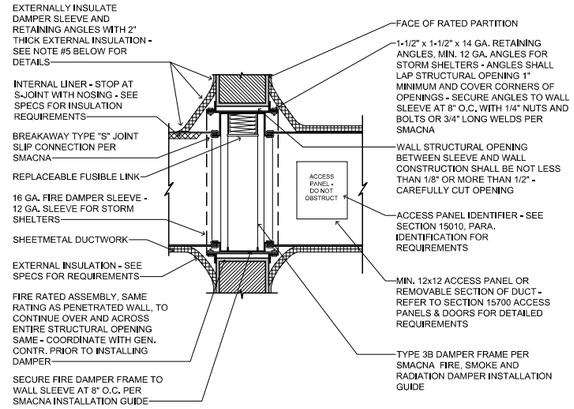
PROVIDE BONDING JUMPER ACROSS FLEXIBLE CONNECTION AS SPECIFED SECTION 15700, PARAGRAPH FLEXIBLE CONNECTIONS AND BONDING JUMPERS



TYPICAL DUCT LINER INTERRUPTION DETAIL

NOT TO SCALE

NOTE !! THIS DETAIL APPLIES TO FIRE DAMPER INSTALLATION, WHERE DUCTS CONNECT TO FAN SECTION, ANYWHERE BARE DUCT LINER PROTRUDES INTO THE AIRSTREAM, ANY POINT WHERE LINED DUCT IS PRECEDED BY UNLINED DUCT, BARE DUCT INSULATION EDGES THAT ARE EXPOSED IN THE RETURN AIR PLENUM, ETC. - SEE SPECS FOR ADDITIONAL REQUIREMENTS



WALL MOUNTED FIRE DAMPER DETAIL

NOT TO SCALE

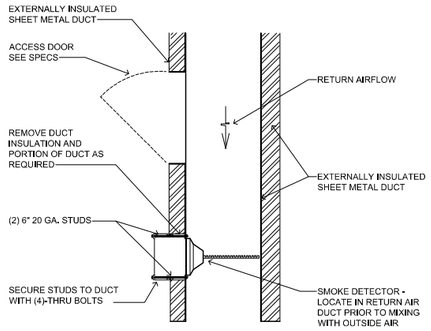
SYMBOLS

DENOTES VERTICAL ACTION FIRE DAMPER

DENOTES HORIZONTAL ACTION FIRE DAMPER

NOTES:

1. PROVIDE FIRE DAMPERS IN ALL DUCTS PENETRATING FIRE RATED WALLS, CEILINGS, FLOORS AND ANY TYPE OF RATED ASSEMBLY - REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FIRE RATINGS.
2. VERTICAL ACTION INSTALLATION SHOWN. HORIZONTAL ACTION DAMPER INSTALLATION SIMILAR.
3. PROVIDE ACCESS PANEL/DOOR IN DUCT AND IN INACCESSIBLE (HARD) CEILINGS FOR EACH FIRE DAMPER.
4. DO NOT EXTERNALLY INSULATE THE FIRE DAMPER ANGLES UNTIL THE ENGINEER HAS INSPECTED THE FIRE DAMPER INSTALLATION.
5. APPLY MINIMUM 1/4" THICKNESS LAYER OF SEALANT TO WALL WHERE INSULATION IS TO BE ATTACHED, EMBED FIBERGLASS CLOTH COMPLETELY AROUND THE INSULATION TO THE WALL, OVERLAPPING THE INSULATION AND THE WALL A MINIMUM OF 3". TO PROVIDE THE REQUIRED MINIMUM OF 3" OVERLAP, PROVIDE MULTIPLE SEGMENTS OF THE FIBERGLASS CLOTH AS REQUIRED. THEN APPLY A MINIMUM OF 1/8" THICKNESS LAYER OF SEALANT OVER FIBERGLASS CLOTH, AND INSTALL AN ADDITIONAL LAYER OF FIBERGLASS CLOTH AND SEAL AGAIN WITH MINIMUM 1/8" THICKNESS OF SEALANT. SEALANT SHALL BE CHILDERS CHIL-TUFF CP-181 OR EQUIVALENT. FIBERGLASS CLOTH SHALL BE CHILDERS CHIL GLAS #10 OR EQUIVALENT. ALL AS SPECIFIED SECTION 15700, PART DUCT INSULATION WORK (EXTERNAL) AS IT PERTAINS TO SEALING OF EXTERNAL DUCT INSULATION JOINTS.



SMOKE DETECTOR MOUNTING DETAIL

NOT TO SCALE

Goshen High Shool Arts Center Renovation
TO
Goshen High School
FOR THE
Pike County Board of Education
Troy, ALABAMA

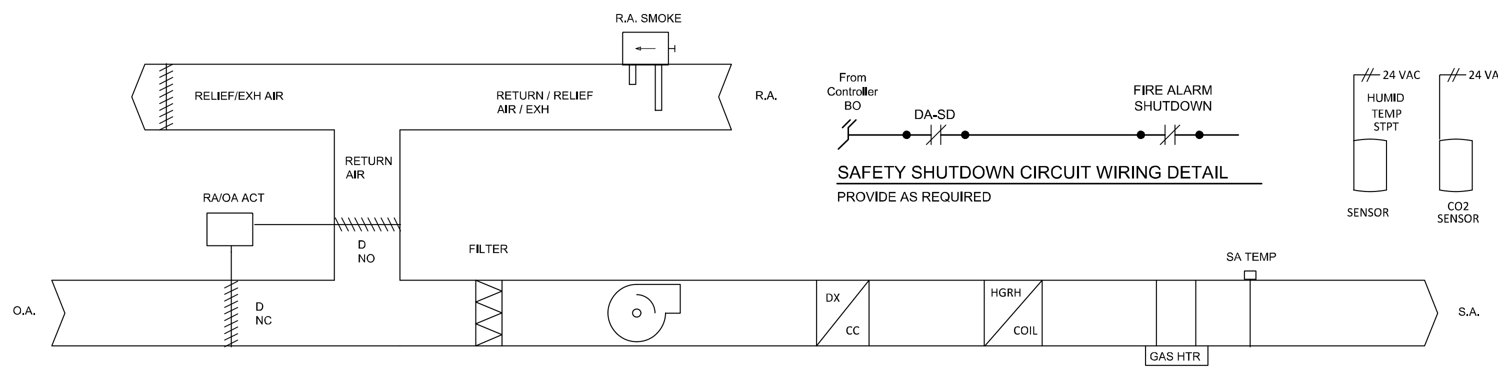
McKEE and ASSOCIATES
ARCHITECTURE and INTERIOR DESIGN
631 SOUTH HULL STREET MONTGOMERY, ALABAMA 36104 (334) 834-8833

SHEET TITLE : HVAC DETAILS

MCKEE JOB # : 20.119
DRAWN BY : C. WARD
CHECKED BY : T. ZGOUVAS
DATE: 10.10.2025
REVISED DATE:
REVISED DATE:
REVISED DATE:

SHEET NO. : M5

ZGOUVAS, ERING & ASSOCIATES
CONSULTING ENGINEERS
800 S McDONOUGH STREET
MONTGOMERY, AL. 36104
334.263.4406
ZEA PROJECT NUMBER 25-133



SAFETY SHUTDOWN CIRCUIT WIRING DETAIL

PROVIDE AS REQUIRED

CONSTANT VOLUME PACKAGED PAD MOUNTED GAS HEATING AND AIR CONDITIONING UNIT UNIT WITH HOT GAS REHEAT AND DEMAND CONTROL VENTILATION CONTROLS SCHEMATIC

NOT TO SCALE

Constant Volume Packaged Rooftop Unit Sequence of Operation

Building Interface:

The supply air fan shall be started only upon satisfaction of all safeties, upon a call from individual thermostats/sensors.

Smoke Detector Shutdown:

The unit shall shut down in response to a signal from the smoke detector in the return air ducts indicating the presence of smoke. The smoke detectors shall be interlocked to the unit through the dry contacts of the smoke detector. A manual reset of the smoke detector shall be required to restart the unit. Coordinate the quantity of smoke detectors required with the plans. Smoke detectors are furnished and wired by Division 16. Installation into the duct by the Mechanical Contractor. Coordinate all prior to bid and provide as specified.

Occupied Mode:

During occupied periods, the supply fan shall run, the normally closed (NC) outside air damper and normally open (NO) return air damper(s) shall open to their respective setpoints to provide for their minimum scheduled outside air setpoint. The heat pump DX cooling or heating cycle shall stage to maintain the occupied space temperature setpoint.

Unoccupied Mode:

When the space temperature is below the unoccupied heating setpoint of 60.0 deg. F (adj.) the supply fan shall start, the NC outside air damper shall remain closed, the NO return air damper (as applicable) shall remain open and the DX heating cycle shall be enabled. When the space temperature rises above the unoccupied heating setpoint of 60.0 deg. F (adj.) plus the unoccupied differential of 4.0 deg. F (adj.), the heating cycle shall be disabled, the supply fan shall stop, the NC outside air damper shall remain closed and the NO return air damper (as applicable) shall remain in its NO position.

When the space temperature is above the unoccupied cooling setpoint of 85.0 deg. F (adj.), the supply fan shall start, the NC outside air damper shall remain closed, the NO return air damper (as applicable) shall remain open and the DX cooling cycle shall be enabled. When the space temperature falls below the unoccupied cooling setpoint of 85.0 deg. F (adj.) minus the unoccupied differential of 4.0 deg. F (adj.) the cooling cycle shall be disabled, the supply fan shall stop, the NC outside air damper shall remain closed and the NO return air damper (as applicable) shall remain open.

Occupied Bypass:

The thermostat shall monitor the status of the “on” and “cancel” buttons of the space temperature sensor. When an occupied bypass request is received from a space sensor, the unit shall transition from its current occupancy mode to occupied mode and the unit shall maintain the space temperature to the occupied setpoints (adj.).

Cooling Mode:

The unit controller shall use space temperature and space temperature setpoint to determine when to initiate requests for cooling. When the space temperature rises above the setpoint, the unit controller shall stage the DX cooling as required to maintain the space temperature setpoint. The first compressor (as applicable) shall energize after its minimum 3-minute off time has expired. If additional cooling capacity is required the second stage (as applicable) of cooling shall be enabled. Once the space temperature falls below the setpoint the compressors shall be deactivated and system returns to its occupied/unoccupied cooling schedule.

Heating Mode:

The unit thermostat shall use the space temperature and space temperature setpoint to determine when to initiate requests for heat. When the space temperature drops below the setpoint, the unit thermostat shall enable the heating stage when ambient temperature is below 50°F (adj.), to maintain the space temperature setpoint. The gas valve shall then modulate as required to maintain setpoint.

Dehumidification/Humidity Control:

Factory installed hot gas reheat coil or the heat pump auxiliary heater shall allow for the application of dehumidification.

The outside air damper shall drive to between its minimum and maximum scheduled outside air setpoint based on the CO2 readings (as applicable) during dehumidification.

On a call for dehumidification, the compressor shall be locked out of the heating mode, the compressor cooling mode shall be enabled and the auxiliary heater (for units less than 40 MBH scheduled cooling capacity) or the hot gas reheat valve (for units greater than 40 MBH scheduled cooling capacity) shall modulate the hot gas reheat coil valve or energize the first stage of the auxiliary resistance heater as required to maintain space temperature. When the humidity control setpoint is satisfied, the hot gas reheat coil valve shall close or the auxiliary heater shall modulate off and the compressor shall be disabled. If there is a call for cooling from the space temperature thermostat, while in reheat, the reheat valve shall be de-energized and the compressor continues to run.

CO2 Control/Demand Ventilation:

Where indicated on the plans, a space CO2 sensor shall modulate the motorized outside air and return air damper(s) in sequence to maintain a minimum concentration of 800 PPM (adj.). Where the plans indicate two (2) CO2 sensors for one system, the CO2 concentration levels shall be averaged. Upon satisfaction of the CO2 sensor setpoint, the outside air damper shall return to its minimum scheduled outside air setpoint and the the return air damper shall modulate up or down based on the outside air damper requirement

Powered Exhaust/Relief Air:

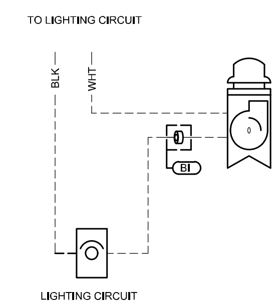
The power exhaust/relief shall be enabled when the economizer damper position is equal to or greater than the exhaust fan setpoint (adj.). The power exhaust/relief shall be enabled while unit is in economizer mode and shall be de-energized when unit returns to standard return air operation. During normal unit operation the power exhaust/relief shall be enabled when the demand control ventilation is activated by the CO2 sensor and de-energized when the demand control ventilation system has satisfied the space CO2 set point

Condensate Drain Blockage:

Provide an electronic switch in the condensate drain line and in the auxiliary drain pan. Provide switch with interface as required to shut down the unit should an obstruction occur in the condensate drain line or the auxiliary drain pan. Upon detection of an obstruction in the condensate drain line or the auxiliary drain pan, the unit shall shutdown.

UV-C Lights:

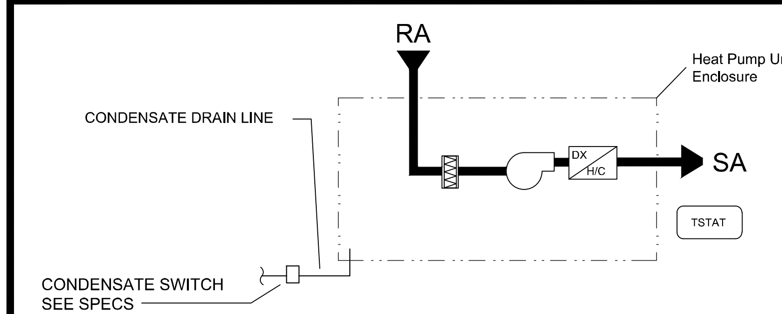
Units with UV-C lights shall cycle/operate and be located as required by the UV-C lighting Manufacturer.



OCCUPIED/UNOCCUPIED MODE:

TOILET/JAN. CLOSET EXHAUST FAN SHALL OPERATE ANYTIME THE LIGHTING SWITCH IS TURNED ON. FAN SHALL OPERATE FOR A MAXIMUM OF 10 MINUTES (ADJ.) AFTER LIGHT SWITCH HAS TURNED OFF OR, IN ABSENCE OF THE SWITCH BEING TURNED OFF, FOR A MAXIMUM OF 10 MINUTES (ADJ.)

EXHAUST FAN CONTROL SCHEMATIC



CONSOLE TYPE DUCTLESS HEAT PUMP (DHP) CONTROLS SCHEMATIC

NOTE: CASSETTE (CCHP) UNITS SIMILAR

DHP HEAT PUMP UNITS SEQUENCE OF OPERATION

OCCUPIED MODE:

DHP units shall operate in continuous occupied mode. Cassette units shall operate as specifed for split system heat pump units.

UNOCCUPIED MODE:

Cassette units shall be as specified for split system heat pump units.

COOLING/HEATING MODE:

The unit controller shall use space temperature and space temperature setpoint to determine when to initiate requests for cooling or heating. When the space temperature rises above the setpoint, the unit controller shall stage the DX cooling or heating as required to maintain the space temperature setpoint.

CONDENSATE DRAIN BLOCKAGE:

Provide an electronic switch in each condensate drain line and auxiliary drain pan with interface as required to shut down the unit should an obstruction occur in the condensate drain line or moisture is indicated in the auxiliary drain pan. Upon detection of an obstruction in the condensate drain line or moisture is proven in the auxiliary drain pan, the unit shall shutdown.

ZGOUVAS, EIRING & ASSOCIATES
CONSULTING ENGINEERS
800 S McDONOUGH STREET
MONTGOMERY, AL. 36104
334.263.4406
ZEA PROJECT NUMBER 25-133

Goshen High Shool Arts Center Renovation
TO
Goshen High School
FOR THE
Pike County Board of Education
Troy, ALABAMA

McKEE and ASSOCIATES
ARCHITECTURE and INTERIOR DESIGN
631 SOUTH HULL STREET MONTGOMERY, ALABAMA 36104 (334) 834-6933

SHEET TITLE :	HVAC CONTROLS
MCKEE JOB # :	20.119
DRAWN BY :	C. WARD
CHECKED BY :	T. ZGOUVAS
DATE:	10.10.2025
REVISED DATE:	
REVISED DATE:	
REVISED DATE:	

SHEET NO. : M6