

LEGEND			
	EQUIPMENT TAG	SR-1 100	AIR DEVICE TAG. TOP LINE INDICATES TYPE OF DEVICE BOTTOM LINE INDICATES AIRFLOW IN CFM
	DETAIL TAG ("1" INDICATES IDENTIFICATION NUMBER; "M3" INDICATES THE SHEET NUMBER DRAWN ON)	(2)SR-1 100	AIR DEVICE TAG. TOP LINE INDICATES TYPE OF DEVICE BOTTOM LINE INDICATES AIRFLOW IN CFM (2) INDICATES TYPICAL OF TWO DEVICES
	SHEET NOTE	TYP	TYPICAL
	SUPPLY DUCT SECTION POSITIVE PRESSURE	TEMP	TEMPERATURE
	RETURN OR EXHAUST DUCT NEGATIVE PRESSURE	SA	SUPPLY AIR
	RECTANGULAR DUCT SIZE ("A" INDICATES SIDE SHOWN; "B" INDICATES SIDE NOT SHOWN)	RA	RETURN AIR
	INDICATES RISE IN ELEVATION OF DUCT.	EA	EXHAUST AIR
	EXTERNALLY INSULATED DUCTWORK	MA	MIXED AIR
	INTERNALLY INSULATED DOUBLE WALL SPIRAL DUCTWORK	OA	OUTDOOR AIR
	EXTERNALLY INSULATED ROUND FLEXIBLE DUCTWORK	TA	TRANSFER AIR
	DUCT ELBOW WITH TURNING VANES	EF	EXHAUST FAN
	RADIUSED DUCT ELBOW	CD	CEILING DIFFUSER
	FLEXIBLE DUCT CONNECTION	RG	RETURN GRILLE
	MANUAL VOLUME BALANCING DAMPER	EG	EXHAUST GRILLE
	MOTORIZED DAMPER	ER	EXHAUST REGISTER
	FIRE DAMPER WITH ACCESS DOORS	CREF	CEILING ROOF EXHAUST FAN
	SMOKE DAMPER WITH ACCESS DOORS	AHU	INDOOR AIR HANDLING UNIT
	BACKDRAFT DAMPER	TU	TERMINAL UNIT
	TEE WITH TURNING VANES	①	TEMPERATURE AND HUMIDITY SENSOR LOCATIONS
	TRANSITION	⑤	DUCT MOUNTED SMOKE DETECTOR
	FLEX DUCT TAKE-OFF WITH MVD SIZE EQUALS DIFFUSER NECK SIZE UNLESS NOTED OTHERWISE	FD	FLOOR DRAIN
	BRANCH DUCT TAKEOFF WITH MVD	UC	UNDERCUT DOOR ½"
	GATE VALVE	DG	DOOR GRILLE, REFER TO DOOR SCHEDULE
	BUTTERFLY VALVE	AFF	ABOVE FINISHED FLOOR
	BALL VALVE	FD	FIRE DAMPER AT CEILING DIFFUSER OR GRILLE.
	TWO-WAY CONTROL VALVE	XFR	TRANSFER AIR
	THREE-WAY CONTROL VALVE	HWC	HOT WATER COIL
	STRAINER WITH BLOW DOWN VALVE AND CAP	CHWC	CHILLED WATER COIL
	THERMOMETER	ESP	EXTERNAL STATIC PRESSURE
	THERMOMETER WELL OR PRESSURE TEMPERATURE PORT AS INDICATED	CH	CHILLER
	AUTOMATIC AIR VENT	GB	GAS BOILER
	PRESSURE GAUGE AND 1/4" BALL VALVE	CHP	CHILLED WATER PUMP
	AIRFLOW MEASURING STATION	BP	BOILER PUMP
	HIGH PRESSURE DUCTWORK	HWP	HEATING HOT WATER PUMP
	DOUBLE WALL HIGH PRESSURE DUCTWORK	DDC	DIRECT DIGITAL CONTROL
	FLAT OVAL DUCTWORK, A REPRESENTS THE SIDE SHOWN AND B REPRESENTS THE SIDE NOT SHOWN	CHW	CHILLED WATER
	INTERNALLY INSULATED DUCTWORK	CHS	CHILLED WATER SUPPLY
		CHR	CHILLED WATER RETURN
		HW	HOT WATER
		HWS	HOT WATER SUPPLY
		HWR	HOT WATER RETURN
		NO	NORMALLY OPEN
		NC	NORMALLY CLOSED
		VFM	VENTURI FLOW MEITER
		AI	ANALOG INPUT
		AO	ANALOG OUTPUT
		BI	BINARY INPUT
		BO	BINARY OUTPUT
		TAB	TESTING, ADJUSTING AND BALANCING
		NOM	NOMINAL
		VFD	VARIABLE FREQUENCY DRIVE
		CP	CHILLER PUMP
		EDH	ELECTRIC DUCT HEATER
		CCC	CLOSED CIRCUIT COOLER
		MHP	DUCTLESS MINI SPLIT CONDENSING UNIT
		WM	DUCTLESS MINI SPLIT WALL MOUNT INDOOR UNIT

- GENERAL NOTES
- ALL DUCT DIMENSIONS ARE NET INSIDE.
 - VERIFY COLLAR SIZES ON ALL AIR TERMINALS, EQUIPMENT OUTLETS AND INLETS, TRANSITION DUCTWORK AS NECESSARY. EXTERNALLY INSULATE TRANSITIONS AT EQUIPMENT CONNECTIONS.
 - FIELD VERIFY CLEAR SPACE AVAILABLE, ROUTING PATH, AND CONFLICTS WITH STRUCTURE AND THE WORK OF OTHER TRADES PRIOR TO FABRICATING DUCTWORK. PROVIDE OFFSETS IN DUCTWORK AS REQUIRED, WHETHER SPECIFICALLY INDICATED ON DRAWINGS OR NOT. SUBMIT SHOP DRAWINGS ON DUCTWORK LAYOUT PRIOR TO COMMENCING WORK. MAINTAIN CLEARANCE AROUND ALL LIGHT FIXTURES AS REQUIRED TO REMOVE AND SERVICE FIXTURES. COORDINATE WITH ROOF TRUSSES/STRUCTURE. PRESSURE TEST ALL DUCTWORK FOR LEAKS.
 - CONTRACTOR SHALL INSTALL ALL EQUIPMENT, PIPING, AND DUCTWORK SUCH THAT MANUFACTURERS' RECOMMENDED CLEARANCES ARE MET FOR ALL ACCESS PANELS, MOTORS, FANS, BELTS, FILTERS AND AIR INTAKES. CONDENSATE LINES SHALL BE CLEAR OF FILTER RACK ACCESS.
 - PROVIDE DUCT FLEX CONNECTIONS & VIBRATION ISOLATION FOR ALL UNITS NOT INTERNALLY ISOLATED.
 - ALL SUPPLY, RETURN, EXHAUST AND OUTSIDE AIR INTAKE DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS OTHERWISE NOTED.
 - ALL AHU FILTERS SHALL BE OF A READILY AVAILABLE SIZE, OF DISPOSABLE TYPE, AND BE ACCESSIBLE WITHOUT THE USE OF SCREWS OR OTHER MECHANICAL DEVICES REQUIRING TOOLS.
 - PROVIDE ACCESS PANELS IN CEILINGS AS REQUIRED FOR MAINTENANCE AND ADJUSTMENT OF EQUIPMENT LOCATED ABOVE CEILING.
 - CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING LOCATION OF ALL EQUIPMENT AND UTILITIES.
 - ALL WORK SHALL COMPLY WITH THE 2020 FLORIDA BUILDING CODE.
 - COORDINATE LOCATION OF ALL CEILING MOUNTED EQUIPMENT WITH ARCHITECT'S REFLECTED CEILING PLAN.

- DUCTWORK NOTES
- ALL ROUND FLEXIBLE DUCT SHALL BE FLEXMASTER TYPE 8M ACOUSTICAL FLEX OR ENGINEER APPROVED EQUAL. MAXIMUM LENGTH OF ANY FLEXIBLE DUCT RUNOUT SHALL BE 5'-0", WHERE LENGTH REQUIRED EXCEEDS 5'-0", INSTALL EXTERNALLY INSULATED ROUND SNAPLOCK DUCT FOR BALANCE OF DISTANCE TO SPIN-IN TAP AT MAIN DUCT TRUNK.
 - SEAL ALL DUCT PENETRATIONS OF WALLS AIRTIGHT, REGARDLESS OF WHETHER WALLS ARE FIRE RATED OR NOT.
 - ALL SUPPLY AIR DUCTWORK FROM AHU'S (EXCEPT TAKEOFFS TO SUPPLY AIR DIFFUSERS) SHALL BE LOW PRESSURE RECTANGULAR, SMACNA STATIC PRESSURE CLASS 2" W.G., SEAL CLASS A, EXTERNALLY INSULATED UNLESS OTHERWISE INDICATED. DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS.
 - ALL RETURN AIR DUCTWORK SHALL BE LOW PRESSURE RECTANGULAR, SMACNA STATIC PRESSURE CLASS 2" W.G., SEAL CLASS A, EXTERNALLY INSULATED UNLESS OTHERWISE INDICATED. DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS.
 - ALL OUTSIDE AIR INTAKE DUCTWORK SHALL BE LOW PRESSURE RECTANGULAR, SMACNA STATIC PRESSURE CLASS 2" W.G., SEAL CLASS A, EXTERNALLY INSULATED. DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS.
 - STANDARD EXHAUST AIR DUCTWORK SHALL BE LOW PRESSURE RECTANGULAR, SMACNA STATIC PRESSURE CLASS 1/2" W.G., SEAL CLASS A, INSULATION NOT REQUIRED.
 - WHEN ROUTING DUCTWORK OVER LIGHTS, PROVIDE A MINIMUM 6" CLEARANCE BETWEEN DUCT AND LIGHTS.

- SEQUENCE OF OPERATION
- SPLIT HEAT PUMPS:
- PROVIDE PROGRAMMABLE THERMOSTAT FOR EACH HEAT PUMP. THERMOSTAT SHALL BE CAPABLE OF PERFORMING THE SEQUENCE OUTLINED BELOW. THE THERMOSTAT SHALL BE CAPABLE 7 DAY PROGRAMMING WITH OCCUPIED AND UNOCCUPIED SCHEDULING.
- OCCUPIED MODE: THE INDOOR FAN AND COMPRESSOR SHALL CYCLE WITH A CALL FOR HEATING AND COOLING. THE SETPOINT FOR COOLING SHALL BE 74°F ADJUSTABLE. THE SETPOINT FOR HEATING SHALL BE 70°F ADJUSTABLE. THE SUPPLEMENTAL ELECTRIC HEAT SHALL OPERATE AS A SECOND STAGE OF HEATING.
- UNOCCUPIED MODE: THE INDOOR FAN AND HP SHALL CYCLE TO MAINTAIN SETPOINT TEMPERATURE. THE SETPOINT FOR COOLING SHALL BE 80°F ADJUSTABLE. THE SETPOINT FOR HEATING SHALL BE 65°F ADJUSTABLE.
- OVERRIDE MODE: THE OVERRIDE MODE SHALL PLACE THE SYSTEM IN OCCUPIED MODE FOR A MINIMUM OF 1 HR.

- PIPING GENERAL NOTES
- BUTTERFLY VALVES INDICATED FOR FLOW BALANCING AND SHUT OFF SERVICE SHALL BE PROVIDED WITH INFINITE POSITION THROTTLING HANDLE AND MEMORY STOP. AFTER HYDRONIC TEST AND BALANCE HAS BEEN COMPLETED, THE CONTRACTOR SHALL POSITION THE MEMORY STOP AT THE FINAL BALANCE POINT OF EACH VALVE. PROVIDE STAMPED ALUMINUM TAG FOR EACH VALVE INDICATING "BALANCING VALVE - DO NOT REMOVE MEMORY STOP - RETURN TO BALANCE SETTING."
 - PROVIDE AIR CHAMBER AND AUTOMATIC AIR VENTS AT ALL HIGH POINTS IN SYSTEM, PIPE TO FLOOR DRAIN WITH COPPER TUBING. SEE "TYPICAL AIR CHAMBER DETAIL."
 - BUTTERFLY VALVES FOR SHUT OFF SERVICE SHALL BE PROVIDED WITH STAMPED ALUMINUM TAG INDICATING "SERVICE VALVE."
 - ALL CONNECTIONS TO AIR VENTS AND PRESSURE GAGES SHALL BE MADE WITH BRASS PIPING.
 - INSTALL PIPE HANGERS NEXT TO AND ON BOTH SIDES OF ALL EQUIPMENT.
 - SEAL ALL PIPE PENETRATIONS OF WALLS AND FLOORS AIR TIGHT REGARDLESS OF WHETHER WALLS OR FLOORS ARE FIRE RATED OR NOT.

FAN SCHEDULE											
UNIT	TYPE	CFM	MAX. FAN RPM	ESP (IN. H2O)	MAX. MOTOR POWER	SONES/db (MAX.)	BASIS OF DESIGN	MODEL	CONTROL	ELECTRICAL	NOTES
										VOLTS/PHASE	
EF-1	INLINE	555	1387	0.4	0.24	2.3	GREENHECK	CSP-A710-VG	INTERLOCK WITH TIME CLOCK	115/1	1,2,3,4,5,6
EF-2	INLINE	555	1387	0.4	0.24	2.3	GREENHECK	CSP-A710-VG	INTERLOCK WITH TIME CLOCK	115/1	1,2,3,4,5,6

INTERIOR HEAT PUMP SCHEDULE

UNIT DESIGNATION	AHU-1	AHU-2	AHU-3	AHU-4	AHU-5	AHU-6	AHU-7	AHU-8	AHU-9	AHU-10	AHU-11	AHU-12	AHU-13	AHU-14	AHU-15	AHU-16
MANUFACTURER	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD	BARD
MODEL NUMBER	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	136H1DB06BPXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	130H1DB06ONXXXX	136H1DB06BPXXXX	130H1DB06ONXXXX	136H1DB06BPXXXX	130H1DB06ONXXXX
VOLTS/PHASE	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3
MCA (AMPS)	35	35	35	35	35	35	40	35	35	35	35	35	40	35	40	35
MOCP (AMPS)	35	35	35	35	35	35	45	35	35	35	35	35	45	35	45	35
COOLING																
ENTERING CONDITIONS °F (DB/WB)	75.3/64.6	75.3/64.6	75.3/64.6	75.3/64.6	75.3/64.6	75.3/64.6	74.4/63.3	75.3/64.6	75.3/64.6	75.3/64.6	75.3/64.6	75.3/64.6	74.4/63.3	75.3/64.6	74.4/63.3	75.3/64.6
TOTAL CAPACITY (BTUH)	26,800	26,800	26,800	26,800	26,800	26,800	33,600	26,800	26,800	26,800	26,800	26,800	33,600	26,800	33,600	26,800
SENSIBLE CAPACITY (BTUH)	20,700	20,700	20,700	20,700	20,700	20,700	27,300	20,700	20,700	20,700	20,700	20,700	27,300	20,700	27,300	20,700
EER	11.70	11.70	11.70	11.70	11.70	11.70	12	11.70	11.70	11.70	11.70	11.70	12	11.70	12	11.70
IPLV	15.4	15.4	15.4	15.4	15.4	15.4	16.5	15.4	15.4	15.4	15.4	15.4	16.5	15.4	16.5	15.4
HEATING TOTAL CAPACITY (BTUH)	26,600	26,600	26,600	26,600	26,600	26,600	32,800	26,600	26,600	26,600	26,600	26,600	32,800	26,600	32,800	26,600
COP	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.6	3.6	3.6	3.6	3.6	3.7	3.6	3.7	3.6
SUPPLEMENTARY ELECTRIC HEAT (KW)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
TOTAL AIR FLOW (CFM)	900	900	900	900	900	900	1150	900	900	900	900	900	1150	900	1300	900
OUTSIDE AIR FLOW (CFM)	105	105	105	105	105	105	120	105	105	105	105	105	105	105	120	105
EXTERNAL STATIC PRESSURE (IN W.G.)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
FAN HP	1/3	1/3	1/3	1/3	1/3	1/3	1/2	1/3	1/3	1/3	1/3	1/3	1/2	1/3	1/2	1/3
DEHUMIDIFICATION																
RATED AIRFLOW (CFM)	900	900	900	900	900	900	1150	900	900	900	900	900	1150	900	1300	900
LATENT CAPACITY (BTUH)	13,250	13,250	13,250	13,250	13,250	13,250	14,850	13,250	13,250	13,250	13,250	13,250	14,850	13,250	14,850	13,250
SENSIBLE CAPACITY (BTUH)	-100	-100	-100	-100	-100	-100	1,050	-100	-100	-100	-100	-100	1,050	-100	1,050	-100
NOTES	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11	1,2,3,4,5,6,7, 8,9,10,11

1. DOES NOT INCLUDE FILTER, FILTER LOADING, ELECTRIC HEAT, CASING, ETC.

2. PROVIDE VARIABLE SPEED DIRECT DRIVE FAN WITH ECM MOTOR.

3. ALL WHU'S SHALL BE PROVIDED WITH THERMAL EXPANSION VALVES.

4. PROVIDE CONTROL KIT TO INCLUDE BLOWER CONTRACTOR OR STARTER, TRANSFORMER, ELECTRIC HEATER INTERLOCKS AND LOCKOUTS. ELECTRICAL SERVICE SHALL BE SINGLE POINT OF CONNECTION.
5. VERTICAL DISCHARGE AND RETURN CONFIGURATION

6. PROVIDED FACTORY FURNISHED AND WIRED DISCONNECT

7. PROVIDE UNIT WITH SS IAO DRAIN PAN

8. RATED IN ACCORDANCE WITH ARI STANDARD 390.

9. REHEAT CAPACITY AT 75°F OUTDOOR, 75.0/65.5°F DB/WB INDOOR

10. PROVIDE FACTORY MOTORIZED OA/EA DAMPER.
11. HEAT PUMP CAPACITY (WITHOUT ELECTRIC HEAT) AT 47°F AMBIENT AT ARI CONDITIONS.

AIR PURIFICATION EQUIPMENT SCHEDULE

ZONE	SUPPLY CFM	OA CFM	PRESS. IN. W.C.	BASIS OF DESIGN	MODEL	QUANTITY	ELECTRICAL		NOTES
							VOLTS/PHASE	WATTS	
AHU-1	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-2	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-3	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-4	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-5	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-6	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-7	1150	120	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-8	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-9	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-10	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-11	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-12	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-13	1150	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-14	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-15	1300	120	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5
AHU-16	900	105	0.05	GPS	DM48-AC	1	24VAC	12	1,2,3,4,5

1. PROVIDE BASIS OF DESIGN OR EQUAL BY GLOBAL PLASMA OR ACTIVE AIR SOLUTIONS.
2. BI-POLAR IONIZATION SYSTEMS REQUIRING PERISHABLE GLASS TUBES ARE NOT ACCEPTABLE.
3. MANUFACTURER MUST PASS UL-867-2007 OZONE CHAMBER TESTING BY EITHER UL OR ETL.
4. ELECTRICAL INPUT SHALL BE FROM FAN CONTROL TERMINALS.
5. UNIT SHALL BE MOUNTED IN SUPPLY DUCT.

MINI SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE

UNIT	BASIS OF DESIGN	MODEL	TYPE	NOMINAL COOL CAPACITY (BTUH)	DESIGN COOLING EAT °F DB/WB	DESIGN COOLING CAPACITY (BTUH)		NOMINAL HEAT CAPACITY (BTUH)	DESIGN HEATING TOTAL CAPACITY (BTUH)	DESIGN HEATING EAT °F DB	AIRFLOW (CFM)	VOLTS/PHASE	MCA (AMPS)	MOP (AMPS)	NOTES
						COOLING TOTAL	COOLING SENSIBLE								
WM-1.1	mitsubishi	PKA-A18LA	WALL MOUNT	18000	90/72	18000	13140	NA	NA	NA	320	FED FROM HP	1.0	NA	1,2,3,4,5,6,7,8
WM-2.1	mitsubishi	PKA-A18LA	WALL MOUNT	18000	90/72	18000	13140	NA	NA	NA	320	FED FROM HP	1.0	NA	1,2,3,4,5,6,7,8
WM-3.1	mitsubishi	PKA-A18LA	WALL MOUNT	18000	90/72	18000	13140	NA	NA	NA	320	FED FROM HP	1.0	NA	1,2,3,4,5,6,7,8

1. NOMINAL COOLING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 80/67°F (DB/WB), OUTDOOR OF 95°F (DB)

2. PROVIDE COOLING ONLY UNIT.

3. DESIGN COOLING CONDITIONS ARE AT 95°F AMBIENT.
4. DESIGN CAPACITY IS NET CAPACITY FOR INSTALLATION ACCOUNTING FOR 65 FT PIPE RUN LENGTHS, ETC.

5. CALCULATE REFRIGERANT LINE SIZES BASED UPON FINAL FIELD PIPING LAYOUT.
6. EXPOSED (INDOOR OR OUTDOOR) REF PIPING SHALL BE HARD DRAWN COPPER.

7. PROVIDE HARD WIRED REMOTE THERMOSTAT.

8. PROVIDE DISCONNECT.

MINI SPLIT SYSTEM CONDENSING UNIT SCHEDULE

UNIT	BASIS OF DESIGN	MODEL	NOMINAL COOL CAPACITY (BTUH)	DESIGN COOLING OUTDOOR TEMP DB	SEER	NOMINAL HEAT CAPACITY (BTUH)	DESIGN HEATING OUTDOOR TEMP DB	HSPF	VOLTS/PHASE	MCA (AMPS)	MOP (AMPS)	NOTES
MHP-1	mitsubishi	PUZ-A18NKA7-BS	18000	80	19.8	NA	NA	NA	230/1	11	28	1,2,3,4
MHP-2	mitsubishi	PUZ-A18NKA7-BS	18000	80	19.8	NA	NA	NA	230/1	11	28	1,2,3,4
MHP-3	mitsubishi	PUZ-A18NKA7-BS	18000	80	19.8	NA	NA	NA	230/1	11	28	1,2,3,4

1. NOMINAL COOLING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 80/67°F (DB/WB), OUTDOOR OF 95°F (DB)

2. EFFICIENCY VALUES FOR EER, IEER, AND COP ARE BASED ON AHRI 1250 TEST METHOD FOR MIXTURE OF DUCTED AND NON-DUCTED INDOOR UNITS.
3. PROVIDE SEACOAST COATING.

4. PROVIDE UNIT WITH INVERTER COMPRESSOR.

LOUVER SCHEDULE

MARK	AIRFLOW CFM (MAX)	LOUVER SIZE (WxH) INCHES	FREE AREA FT² (MIN)	GREENHECK MODEL	NOTES
LVR-1 CFM	555	24x18	1.11	EHV-901D	1, 2

- NOTES:
1. FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD COLORS.
2. PROVIDE LOUVER WITH FLORIDA PRODUCT APPROVAL, LISTED FOR COMPLIANCE WITH AMCA 540 AND AMCA 550.

VENTILATION SCHEDULE

SPACE TYPE	VENTILATION CFM/S.F.	VENTILATION CFM/PERSON	EXHAUST CFM
CLASSROOM	0	5	-
CORRIDOR	0	5	-
STORAGE	0	5	-
RESTROOM	0	5	50/FIXTURE
MECHANICAL	0	5	-
ELECTRICAL	0	5	-
CUST.	0	5	1/SF
COMM.	0	5	-

NOTE:
VENTILATION AIR HAS BEEN CALCULATED IN COMPLIANCE WITH ASHRAE STANDARD 62.1-2016 INDOOR AIR QUALITY METHOD. THE INDOOR AIR QUALITY METHOD IS UTILIZED AS A MEANS OF REDUCTION IN OUTDOOR AIR AND IS SUBMITTED FOR APPROVAL AS AN ALTERNATE DESIGN IN ACCORDANCE WITH FBC 104.11. BI-POLAR IONIZATION IS UTILIZED TO CLEAN INDOOR AIR AND MAINTAIN ACCEPTABLE INDOOR AIR QUALITY WITH A REDUCTION IN OUTDOOR AIRFLOW.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE

	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN			12/5/22
50% PROGRESS DOCUMENTS	DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS	DRR	KAJ	03/21/23
BID DOCUMENTS	DRR	KAJ	03/05/23

JRA

ARCHITECTS

2211 THOMAS DR , STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD
ENGINEERING

4452 Clinton Street, Marietta, Florida 32048
(850) 386-3647 Project Number: 2023-007

Florida Certificate of Authorization: 27625
Keith A. Johnson, P.E. Florida License 96467

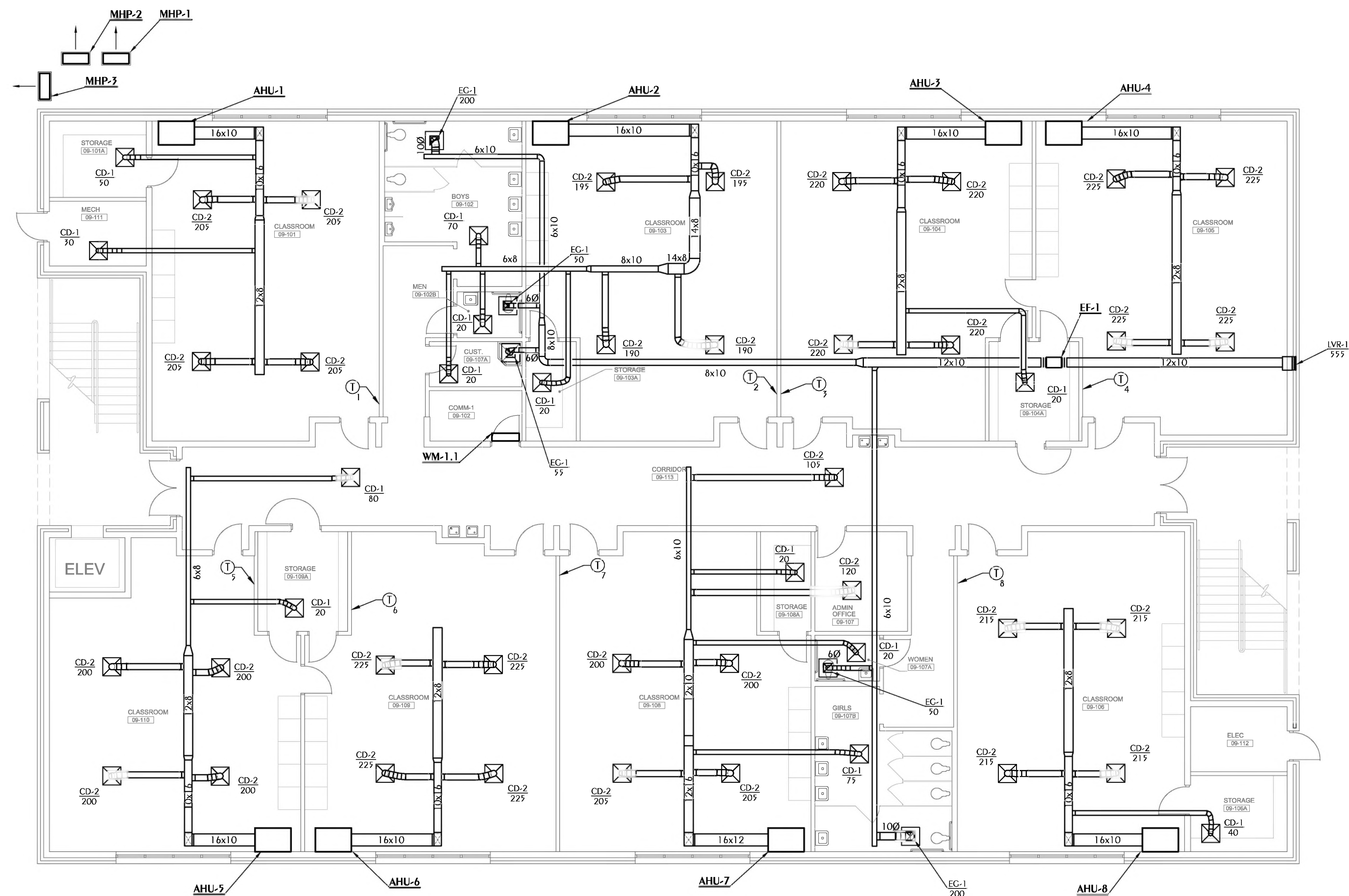
PROJECT:

BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION

PANAMA CITY, FLORIDA

SHEET TITLE:
HYAC SCHEDULES

SHEET NUMBER:
M02



HVAC FIRST FLOOR PLAN
SCALE: 1/8" = 1'-0"

REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE				

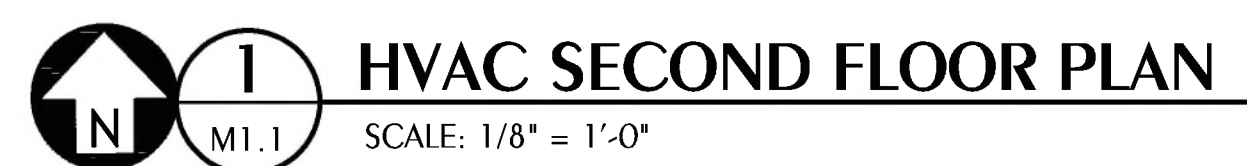
JRA ARCHITECTS 2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD ENGINEERING
4632 Clinton Street, Marianna, Florida 32446
850-336-3447 Project Number: 2023-007
Florida Certificate of Authorization: 27625
Keith A. Johnson, P.E. Florida License 95457

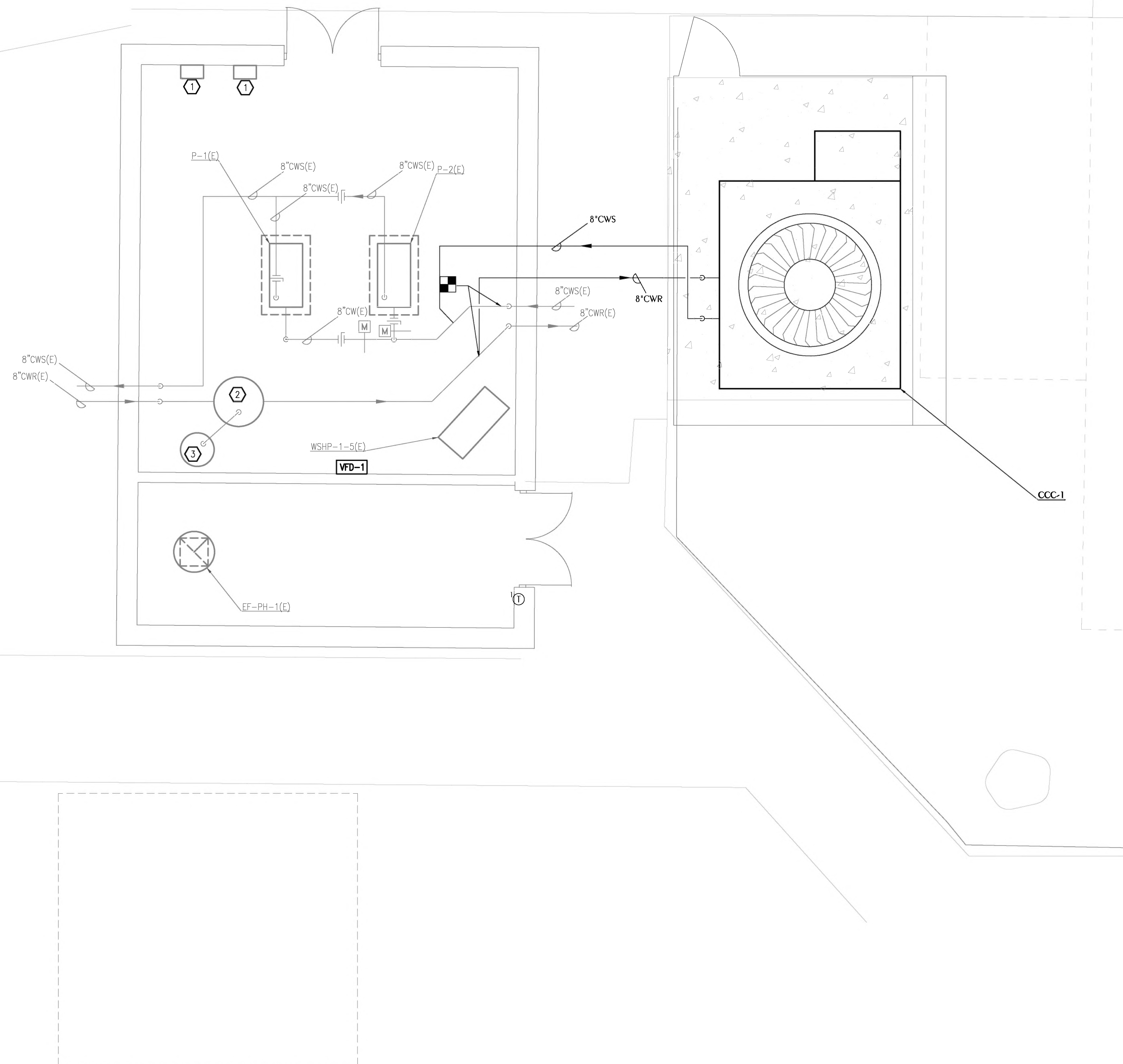
PROJECT:
BAY HAVEN CHARTER ACADEMY CLASSROOM ADDITION
PANAMA CITY, FLORIDA

SHEET TITLE:
HVAC FIRST FLOOR PLAN

SHEET NUMBER:
M1.0



SHEET NUMBER: 11



SHEET NOTES

- 1 EXISTING VFDs FOR P-1(E) AND P-2(E).
- 2 EXISTING AIR SEPARATOR.
- 3 EXISTING EXPANSION TANK.

REVISIONS

NO.	DESCRIPTION	DRAIN	CHECKED	DATE
PHASE		DRAIN	CHECKED	DATE
SCHEMATIC DESIGN				12/15/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/10/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23

JRA
ARCHITECTS

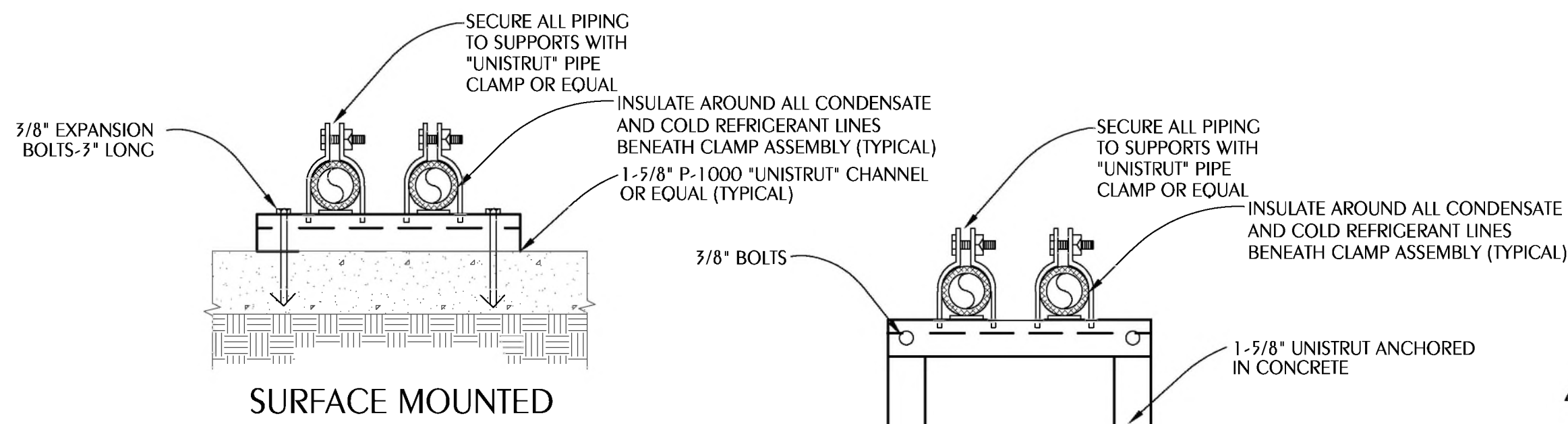


WATFORD
ENGINEERING

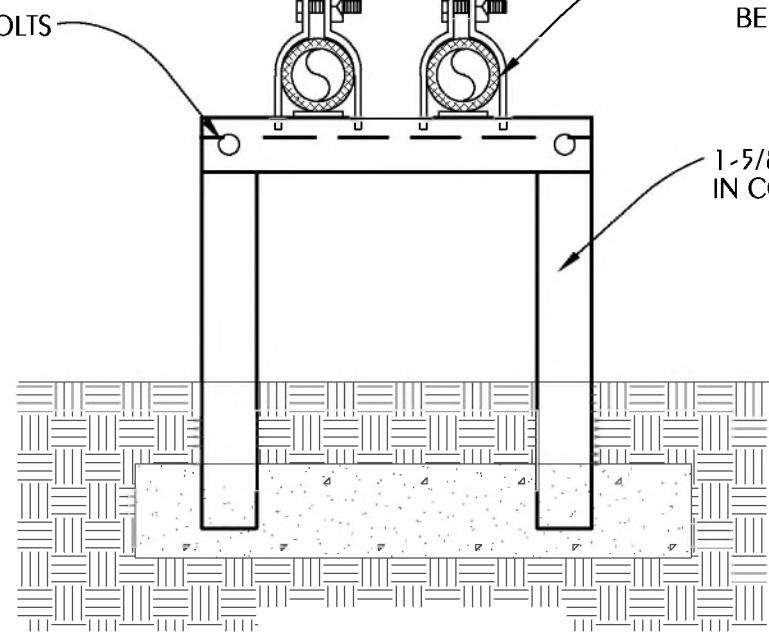
PROJECT: BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION
PANAMA CITY, FLORIDA

SHEET TITLE:
HYAC PARTIAL SITE
PLAN

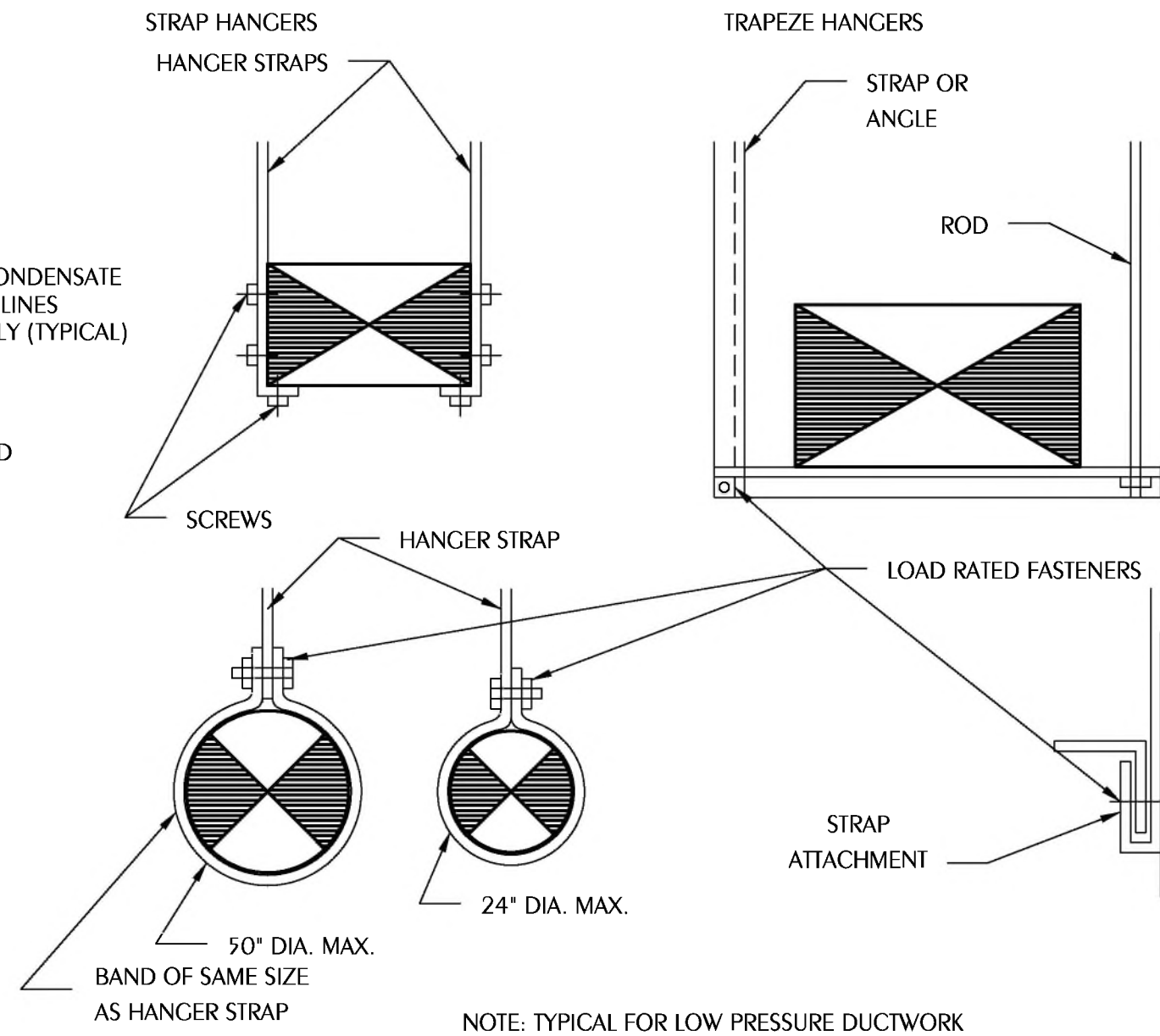
SHEET NUMBER: M1.2



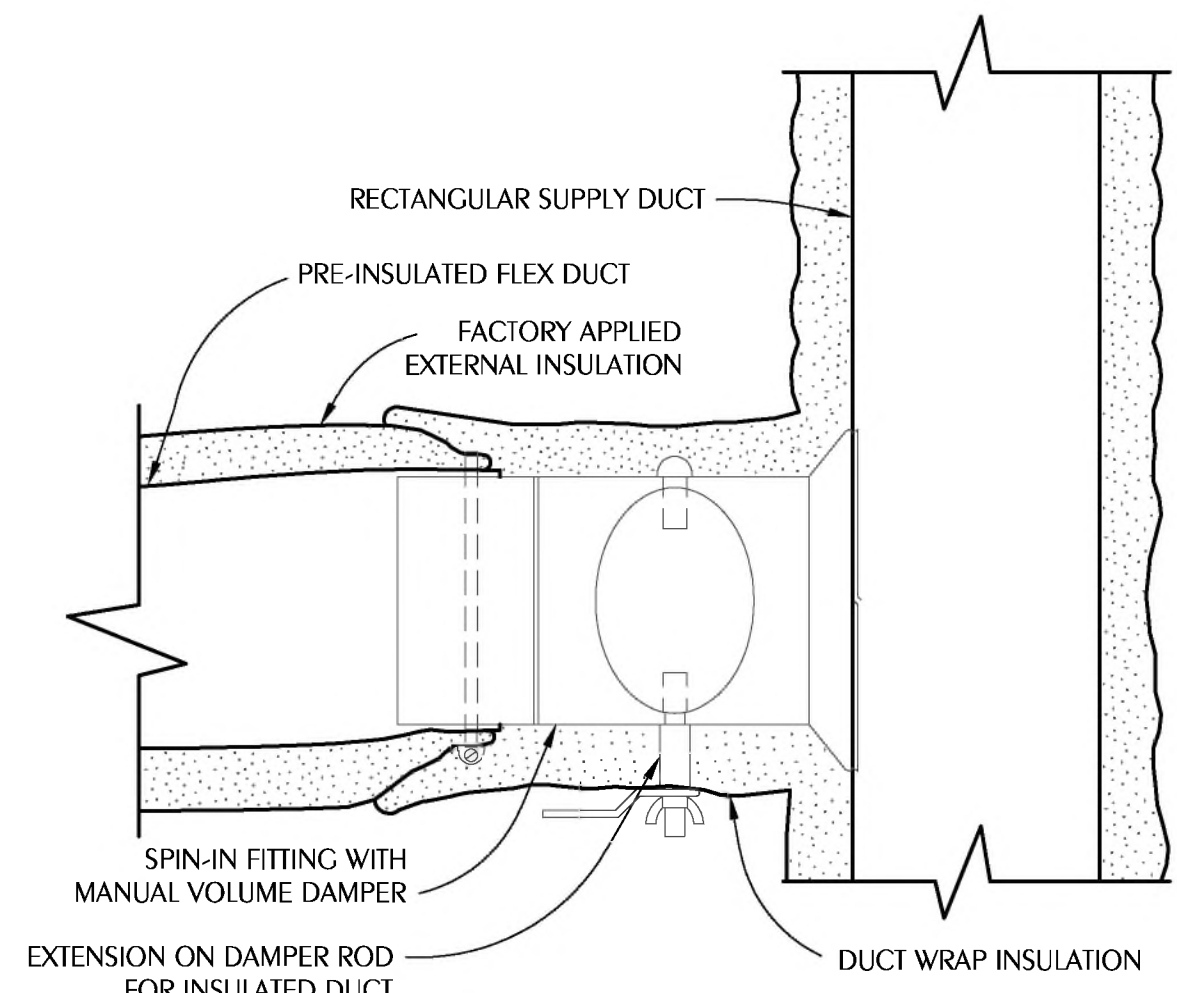
NOTE:
PROVIDE FACTORY END CAPS FOR CHANNEL.
PROVIDE ALUMINUM JACKET BETWEEN INSULATION AND PIPE CLAMP AT ALL INDOOR LOCATIONS.
PROVIDE SMOOTH 0.016\"/>



SUPPORT ABOVE GRADE



NOTE: TYPICAL FOR LOW PRESSURE DUCTWORK

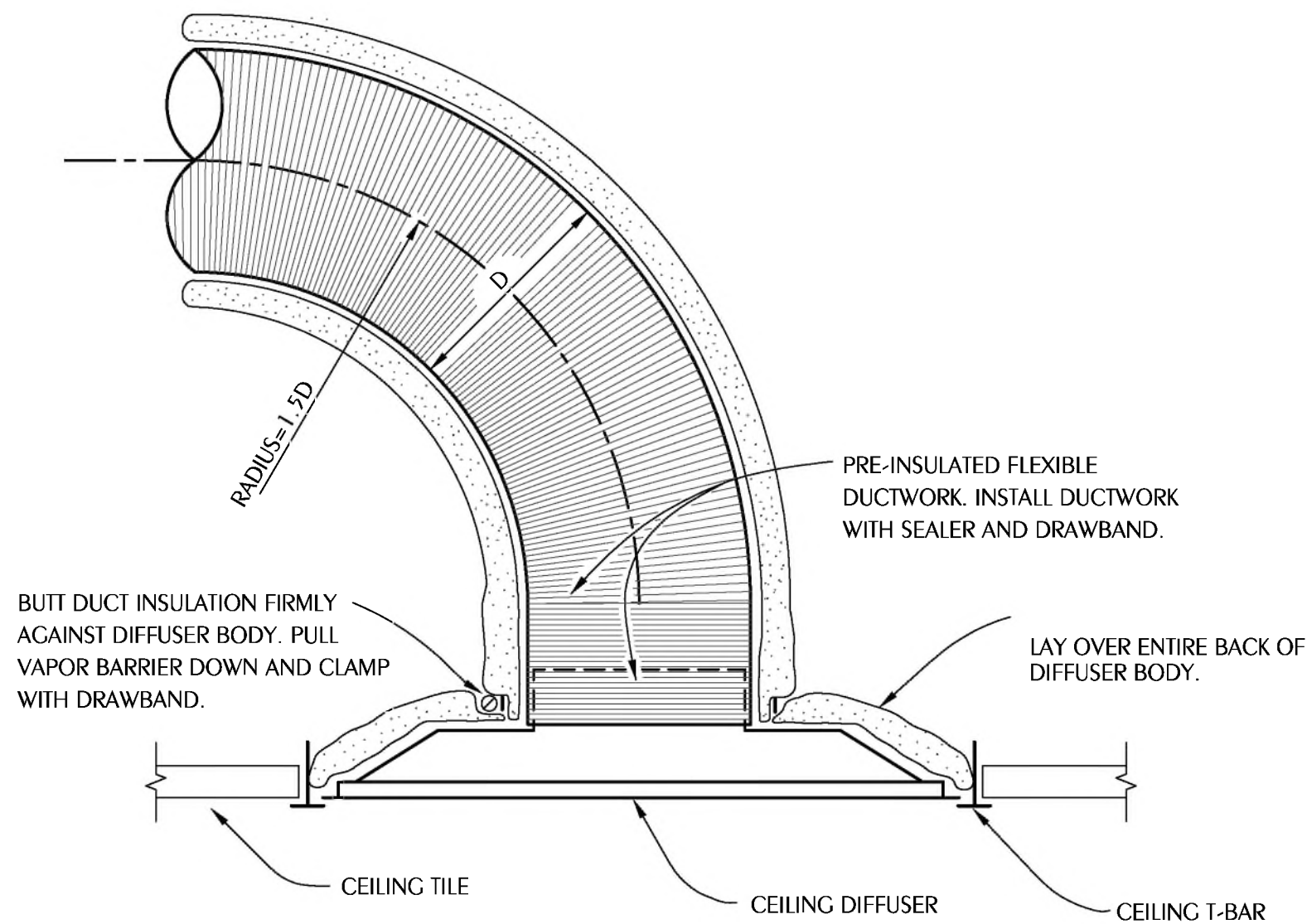


NOTES:
CONNECT FLEXIBLE DUCT TO FITTING WITH DRAWBAND AND SEALER.
ROUND HARD DUCT RUNOUTS SHOULD START WITH SPIN-IN FITTINGS SIMILAR TO THIS DETAIL.
PROVIDE REMOTE CABLE ACTUATOR FOR AIR DEVICE IN HARD CEILINGS WITHOUT ACCESS. MOUNT ACTUATOR IN FACE OF AIR DEVICE.
FLEXIBLE INSULATION SHALL BE 2\"/>

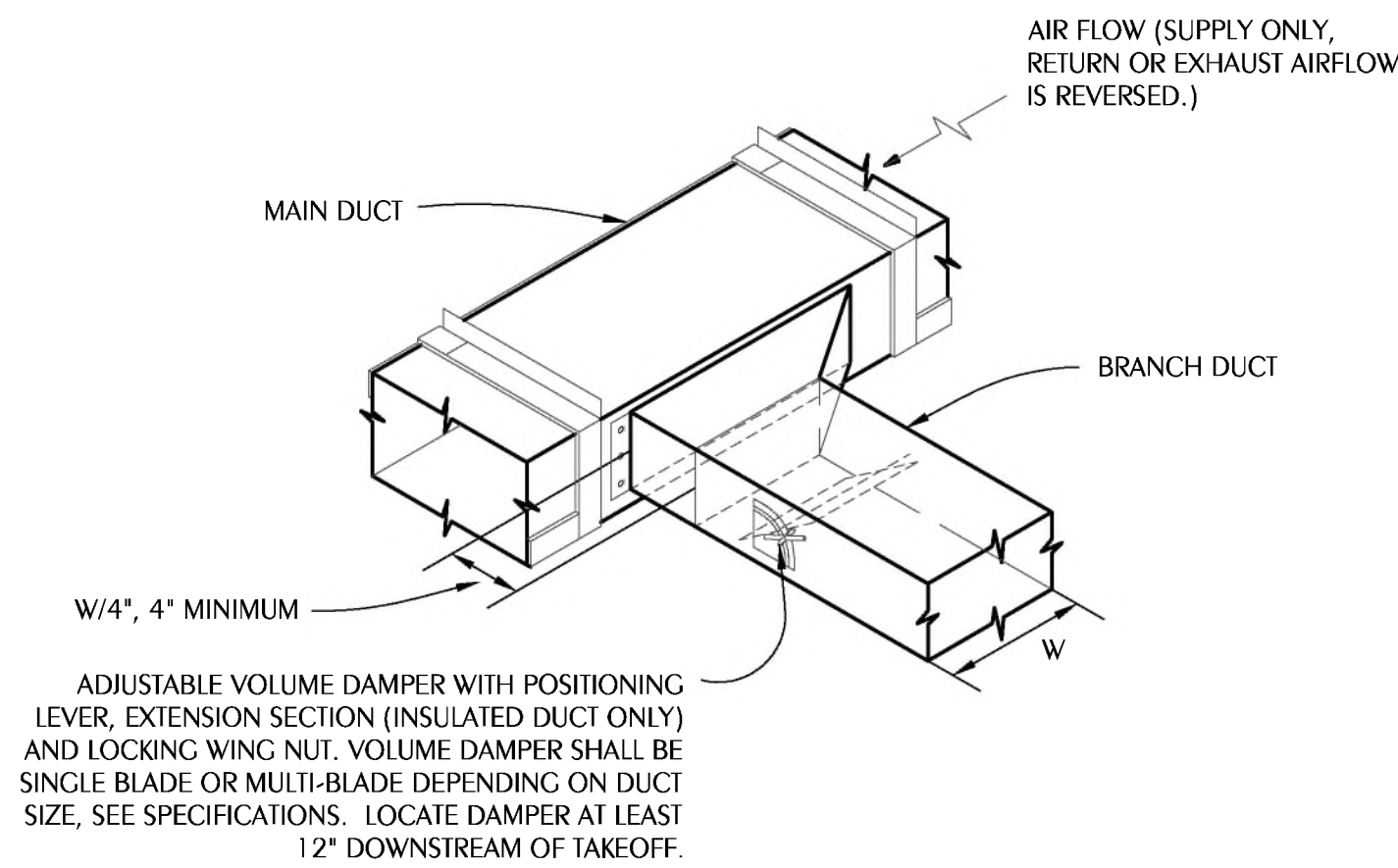
1 TYPICAL EXTERIOR PIPING SUPPORT DETAIL
M2.0 SCALE: NONE

2 DUCT HANGER DETAILS
M2.0 SCALE: NONE

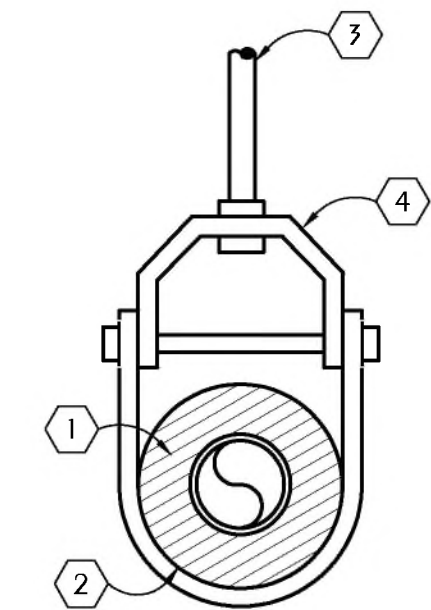
3 TYPICAL FLEX DUCT TAKEOFF DETAIL
M2.0 SCALE: NONE



NOTES:
FLEX DUCT SHALL BE NO LONGER THAN 5'-0\"/>



NOTES:
PROVIDE CABLE ACTIVATED DAMPER WITH ADJUSTMENT IN FACE OF CEILING DIFFUSER FOR INACCESSIBLE TAKEOFFS LOCATED ABOVE HARD CEILINGS.
FLEXIBLE INSULATION SHALL BE 2\"/>

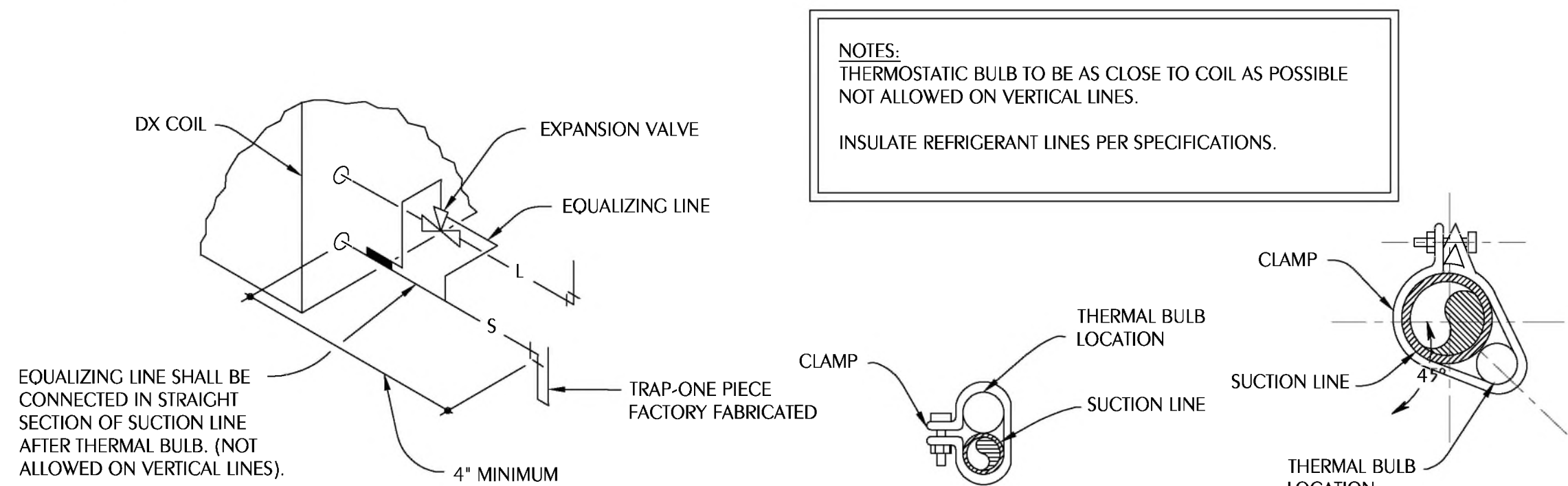


- 1 INSULATION
- 2 PIPE COVERING PROTECTION SADDLE
- 3 HANGER ROD FASTEN TO STRUCTURE PER SPECIFICATION
- 4 CLEVIS TYPE HANGER

4 TYPICAL FLEX DUCT TAKEOFF DETAIL
M2.0 SCALE: NONE

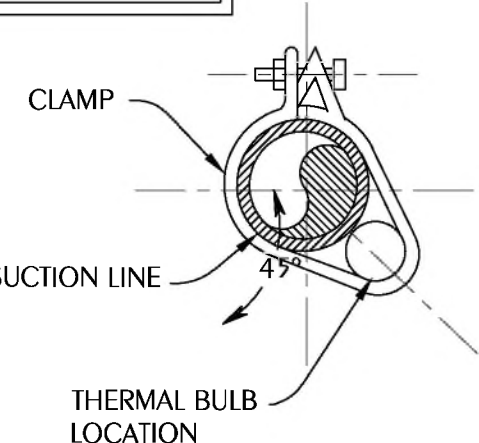
5 TYPICAL BRANCH DUCT TAKEOFF
M2.0 SCALE: NONE

6 OVERHEAD PIPE SUPPORT
M2.0 SCALE: NONE



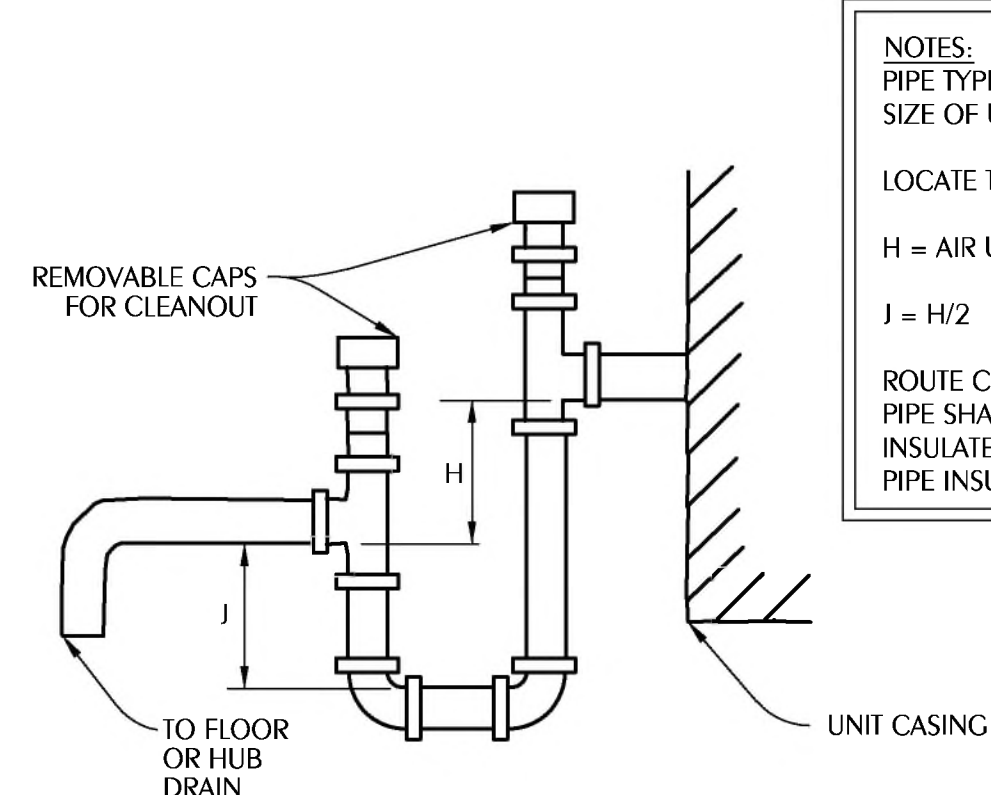
NOTES:
THERMOSTATIC BULB TO BE AS CLOSE TO COIL AS POSSIBLE NOT ALLOWED ON VERTICAL LINES.
INSULATE REFRIGERANT LINES PER SPECIFICATIONS.

5/8\"/>



7/8\"/>

8 TYPICAL WALL PIPE PENETRATION
M2.0 SCALE: NONE



NOTES:
PIPE TYPE 'L' HARD DRAWN COPPER CONDENSATE LINE AT FULL SIZE OF UNIT CONNECTION, BUT IN NO CASE SMALLER THAN 3/4\"/>

9 NEGATIVE PRESSURE CONDENSATE DRAIN TRAP
M2.0 SCALE: NONE

REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE				
		DRAWN	CHECKED	DATE
SCHEMATIC DESIGN				12/15/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23

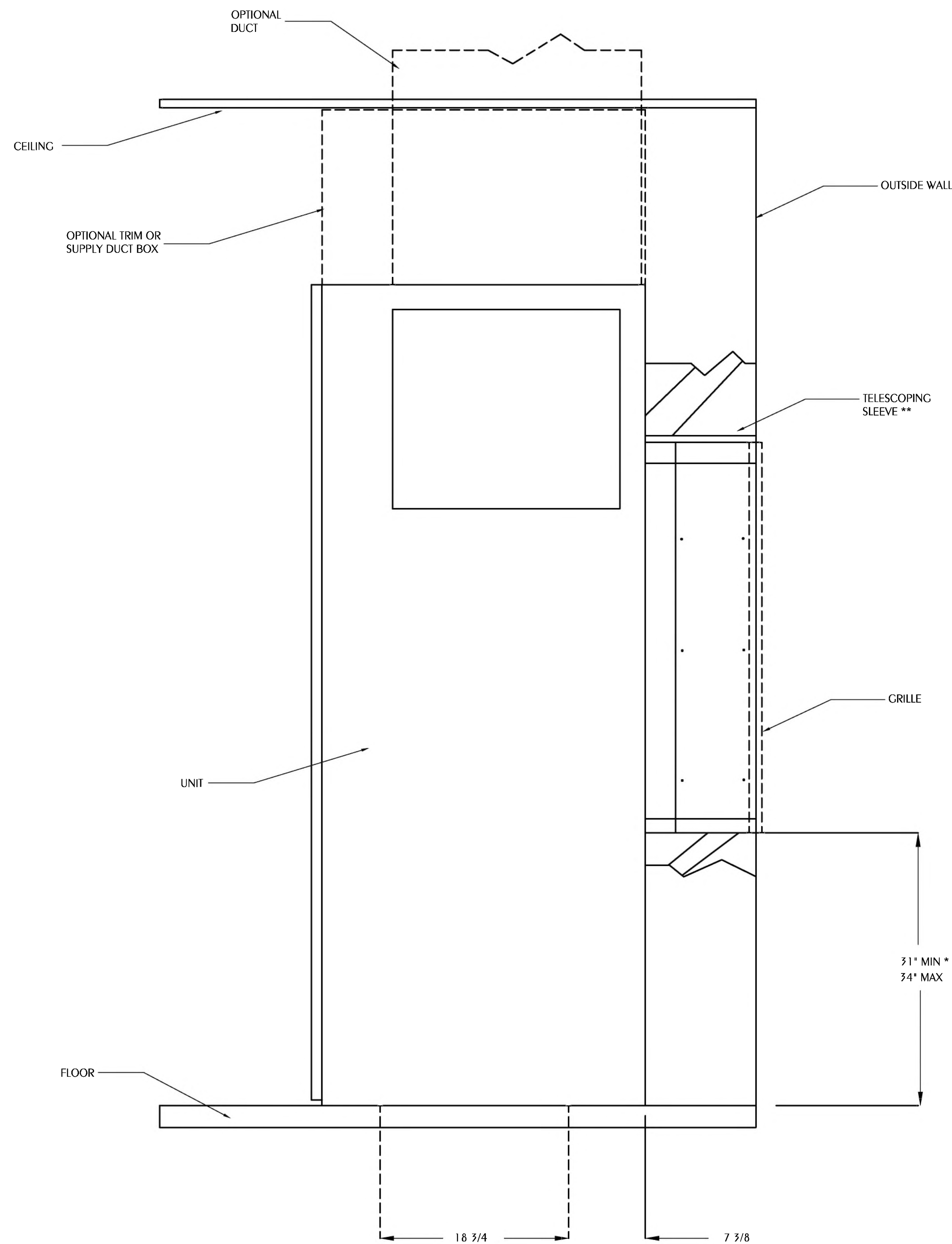
JRA ARCHITECTS 2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD ENGINEERING
4452 Clinton Street, Marianna, Florida 32446 Florida Certificate of Authorization: 27625
850-326-3447 Project Number: 2023-007 Keith A. Johnson, P.E. Florida License 95457

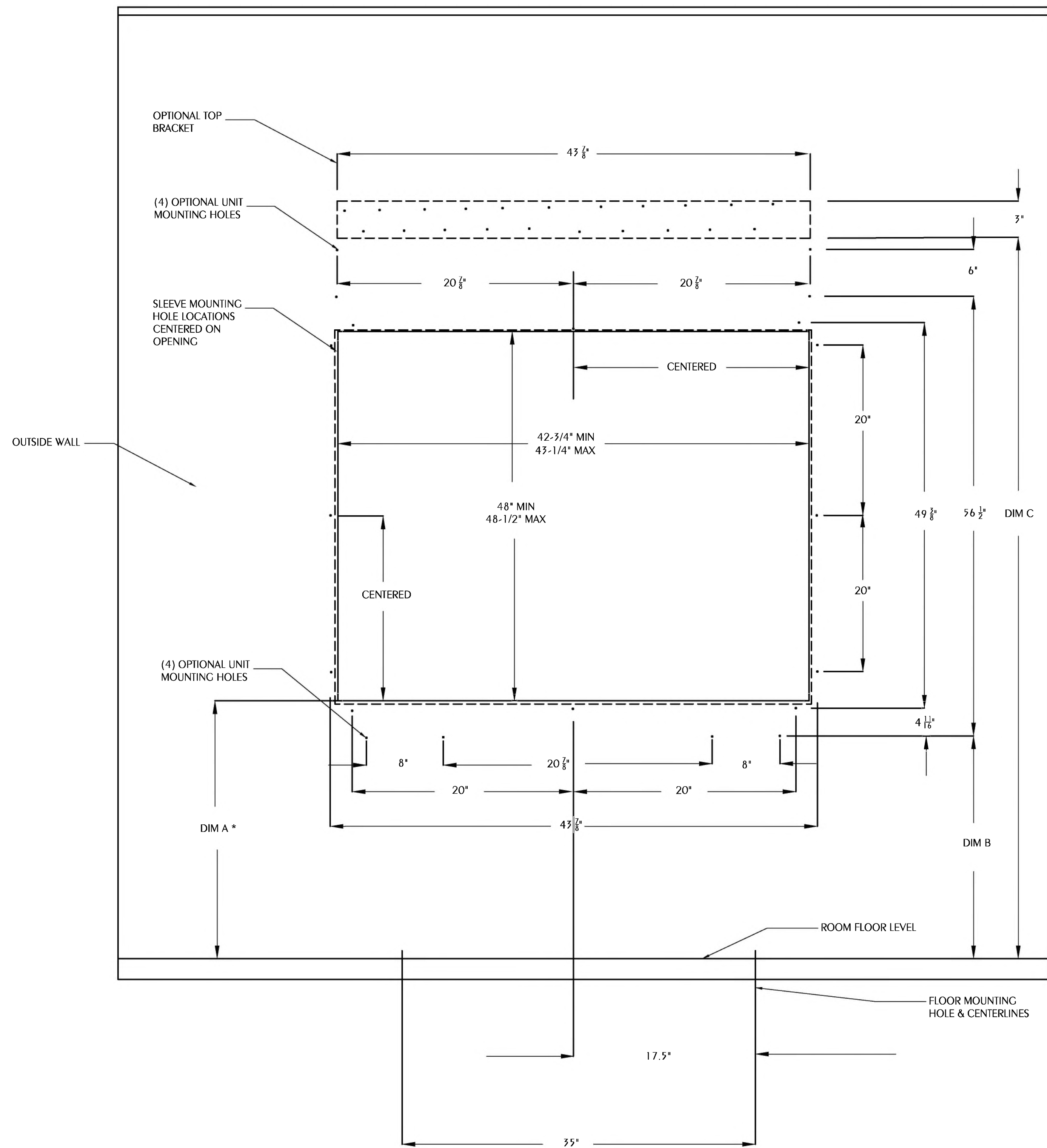
BAY HAVEN CHARTER ACADEMY CLASSROOM ADDITION
PANAMA CITY, FLORIDA

SHEET TITLE:
HVAC DETAILS

SHEET NUMBER:
M2.0



1 AHU RIGHT SIDE VIEW DETAIL
M2.1 SCALE: NONE



2 AHU FRONT WALL VIEW DETAIL
M2.1 SCALE: NONE

REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE				
		DRAWN	CHECKED	DATE
SCHEMATIC DESIGN				12/15/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23

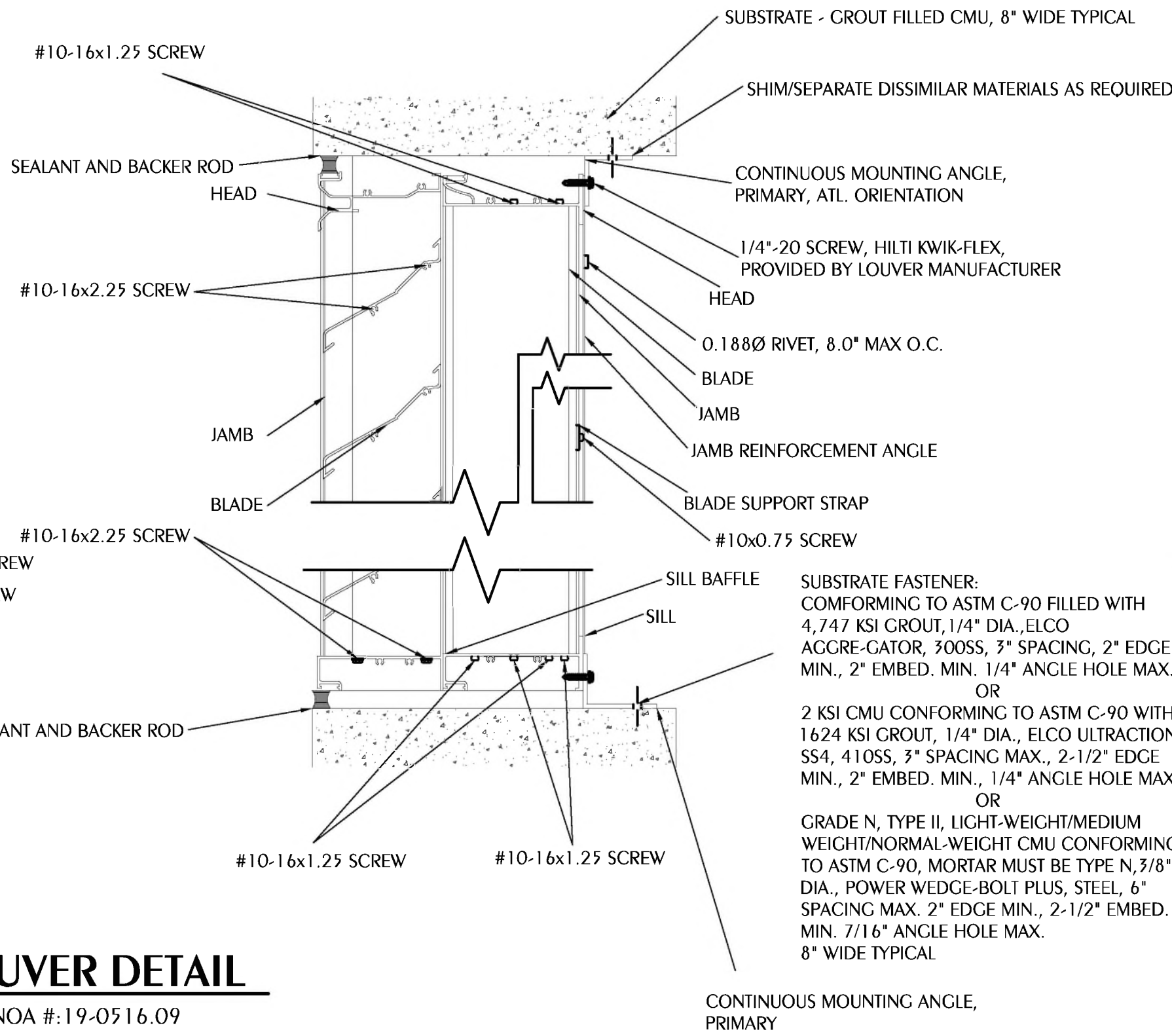
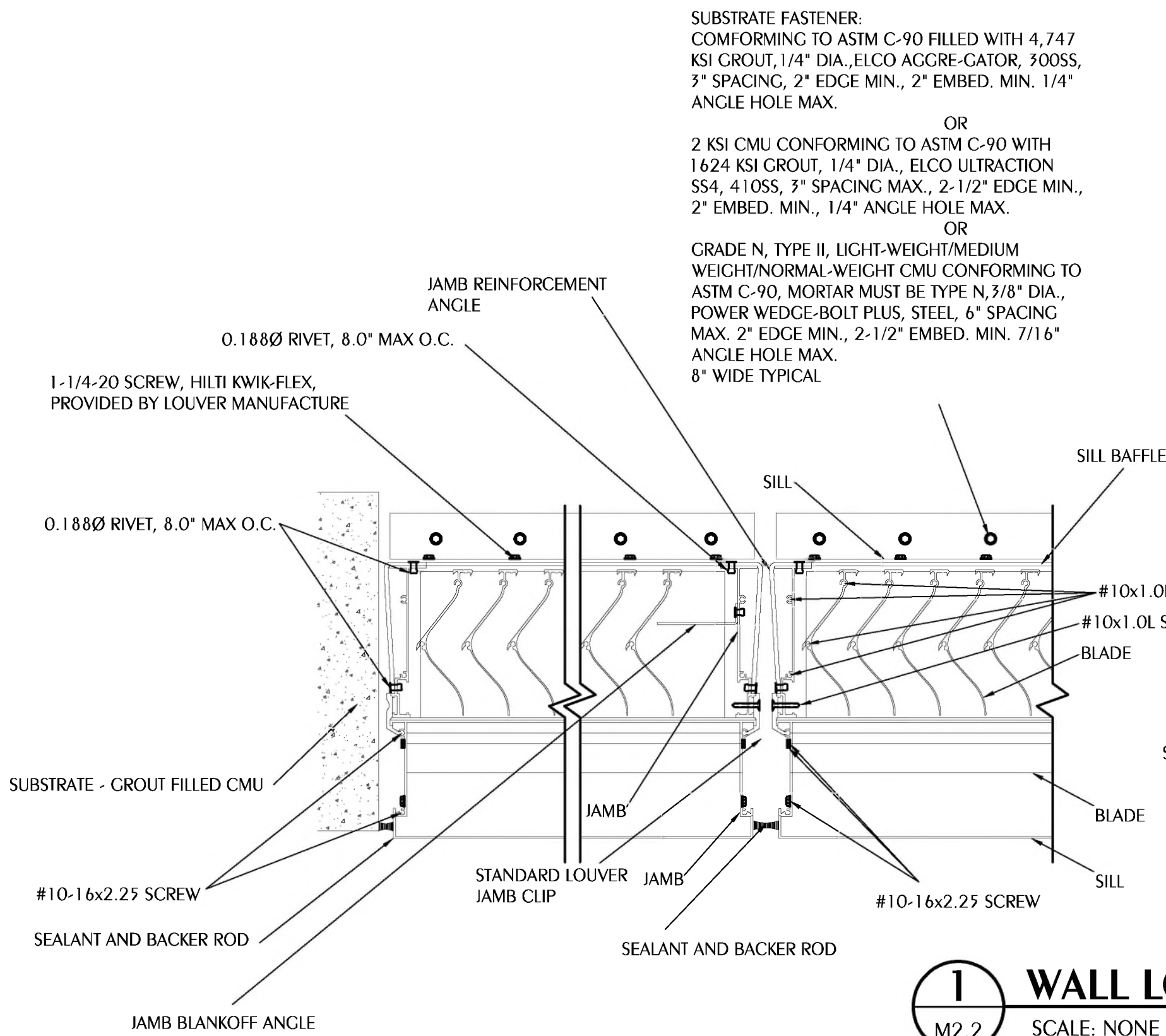
JRA ARCHITECTS 2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD ENGINEERING
4652 Clinton Street, Marianna, Florida 32446
850-326-3447 Project Number: 26524-007
Florida Certificate of Authorization: 27625
Keith A. Johnson, P.E. Florida License #6457

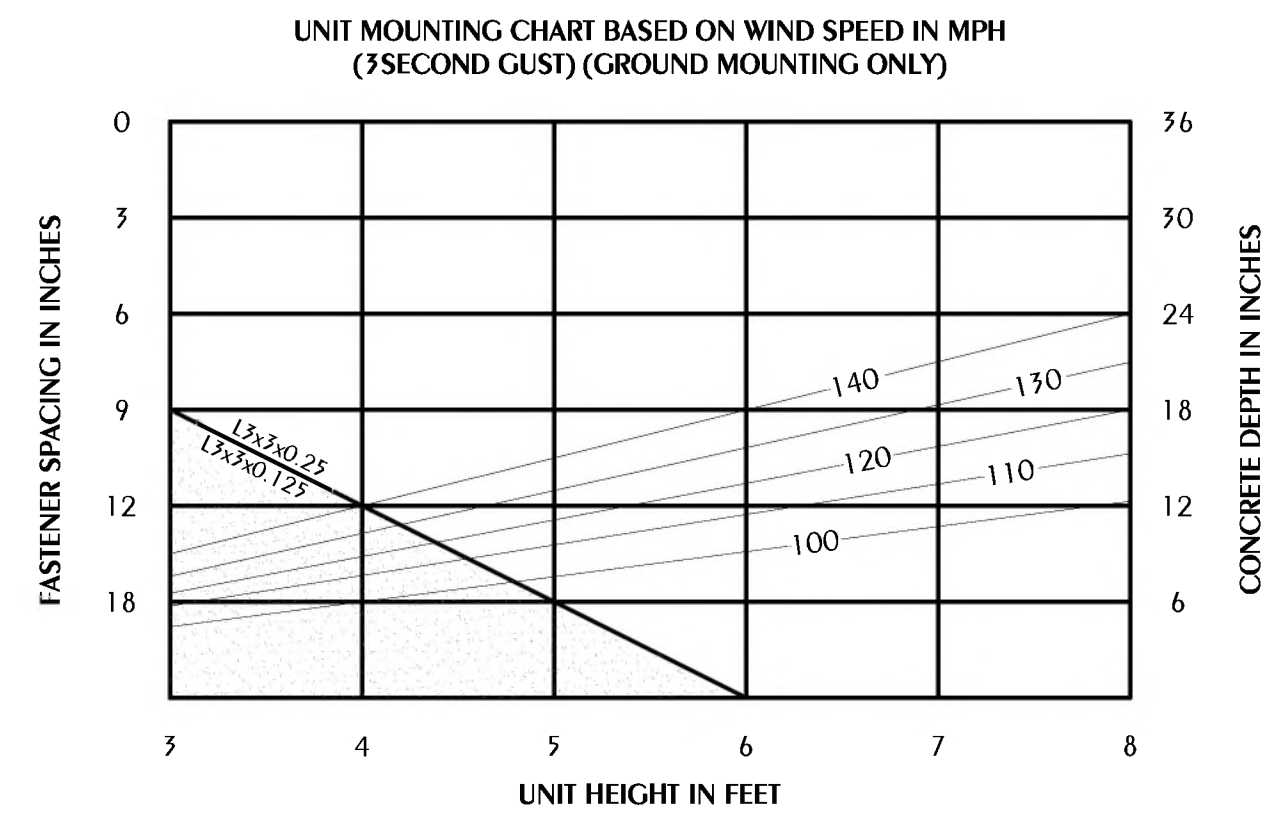
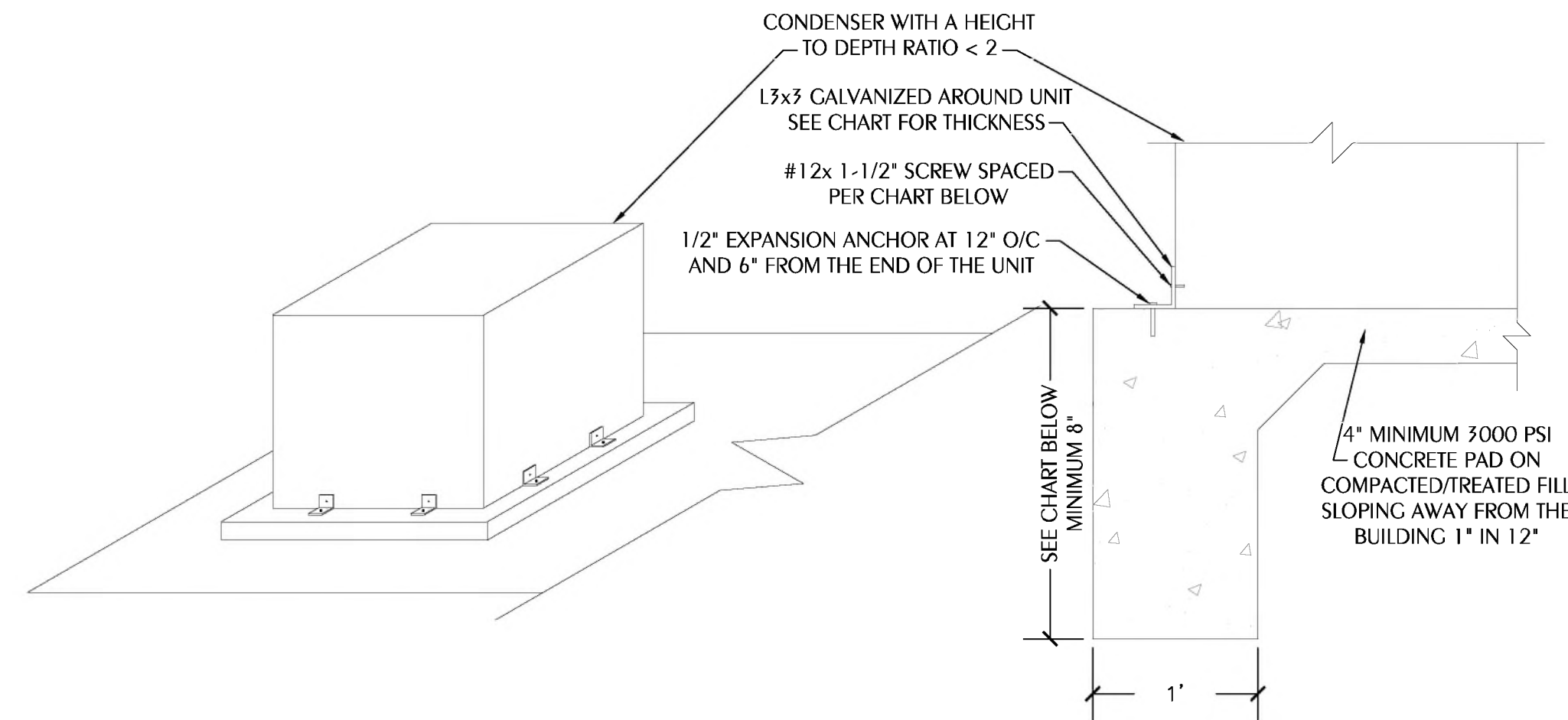
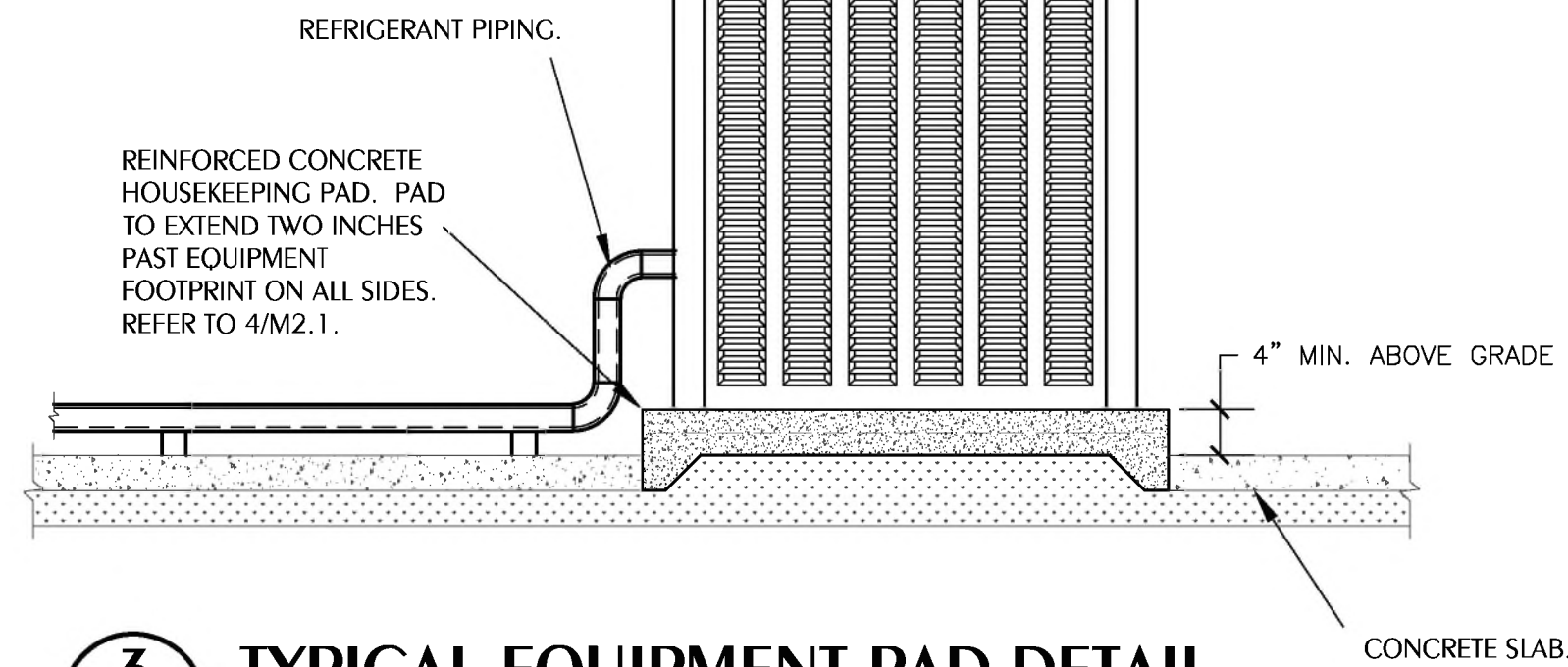
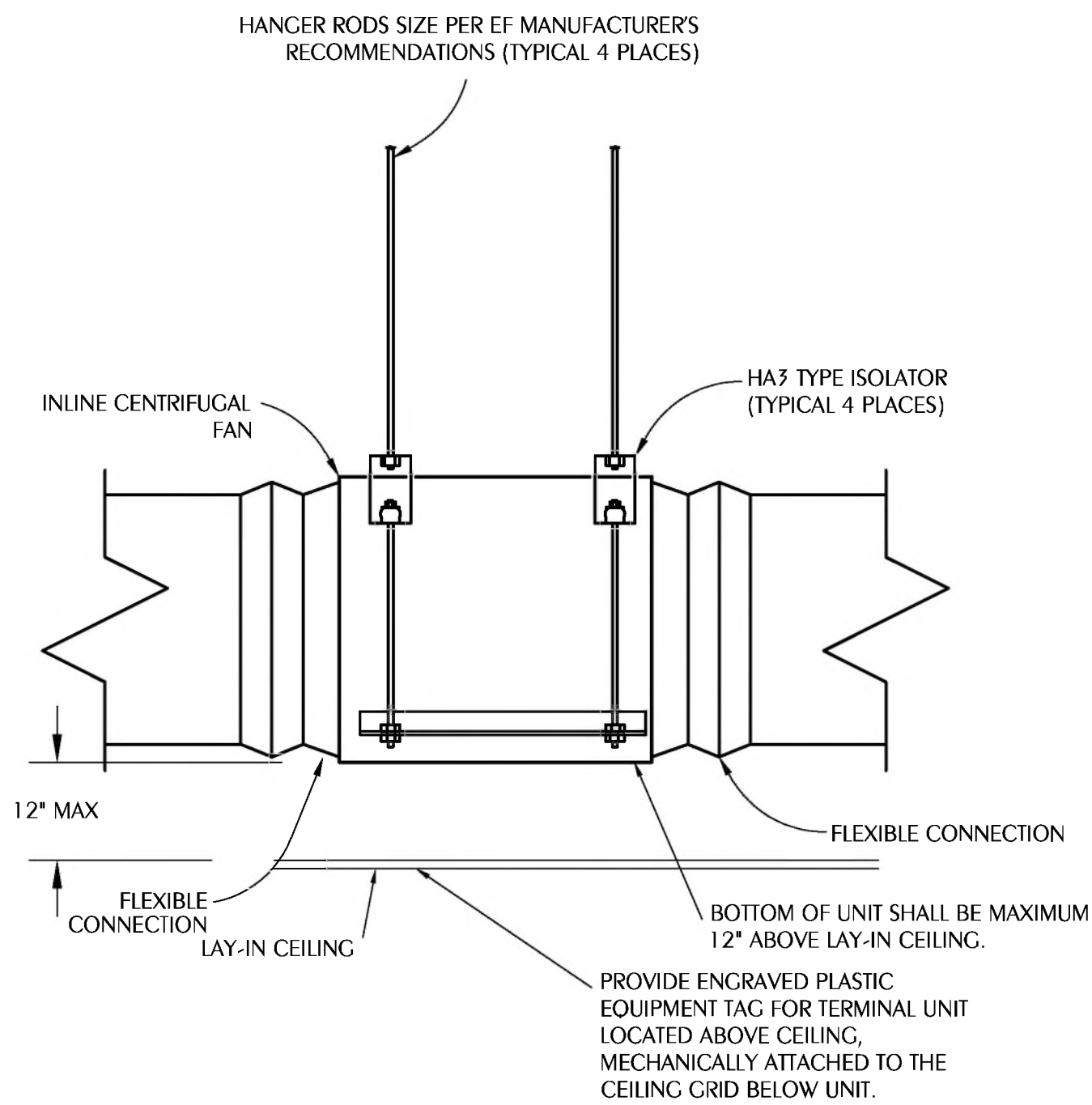
PROJECT:
**BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION**
PANAMA CITY, FLORIDA

SHEET TITLE:
HYAC DETAILS

SHEET NUMBER:
M2.1



- NOTES:**
1. THE INSTALLATION SHOWN HEREIN MUST BE FOLLOWED STRICTLY TO ENSURE COMPLIANCE WITH FLORIDA BUILDING CODE PRODUCT APPROVAL.
 2. CONTINUOUS INSTALLATION ANGLES AND FASTENERS ARE SHIPPED LOOSE AND REQUIRE INSTALLATION IN THE FIELD.
 3. SHIMS MAY BE REQUIRED TO ACHIEVE CONSISTENT CLEARANCE BETWEEN LOUVER AND OPENING ON ALL SIDES.
 4. INSTALLATION DETAIL IS BASED UPON GREENHECK MODEL 'EHV-901D'. IF AN ALTERNATE MANUFACTURER'S LOUVER IS USED, IT MUST BE INSTALLED WITH ITS FLORIDA PRODUCT APPROVAL.



REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE				
		DRAWN	CHECKED	DATE
SCHEMATIC DESIGN				12/15/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23

JRA ARCHITECTS 2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD ENGINEERING
4652 Clinton Street, Marianna, Florida 32446
850-286-3447 Project Number: 2023-007
Florida Certificate of Authorization: 27625
Keith A. Johnson, P.E. Florida License #64457

PROJECT:
BAY HAVEN CHARTER ACADEMY CLASSROOM ADDITION
PANAMA CITY, FLORIDA

SHEET TITLE:
HYAC DETAILS

SHEET NUMBER:
M2.2

VERTICAL INSTALLATION

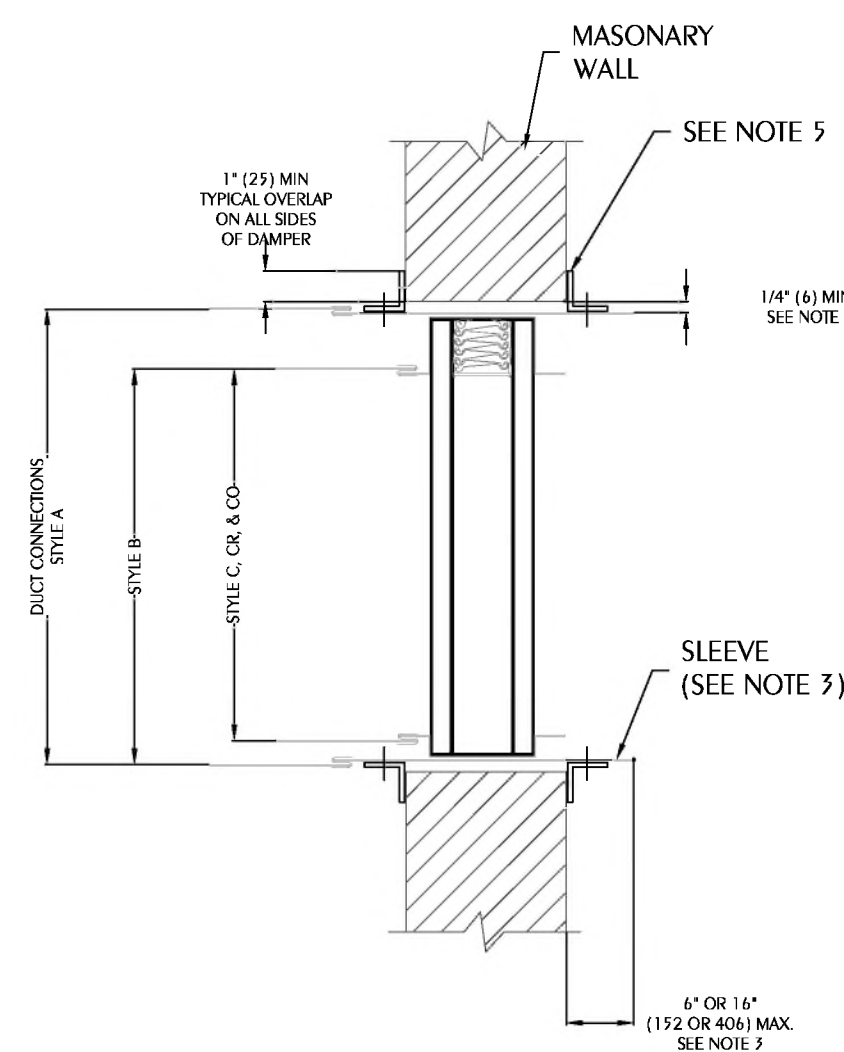


FIGURE 1

STAINLESS STEEL DAMPERS

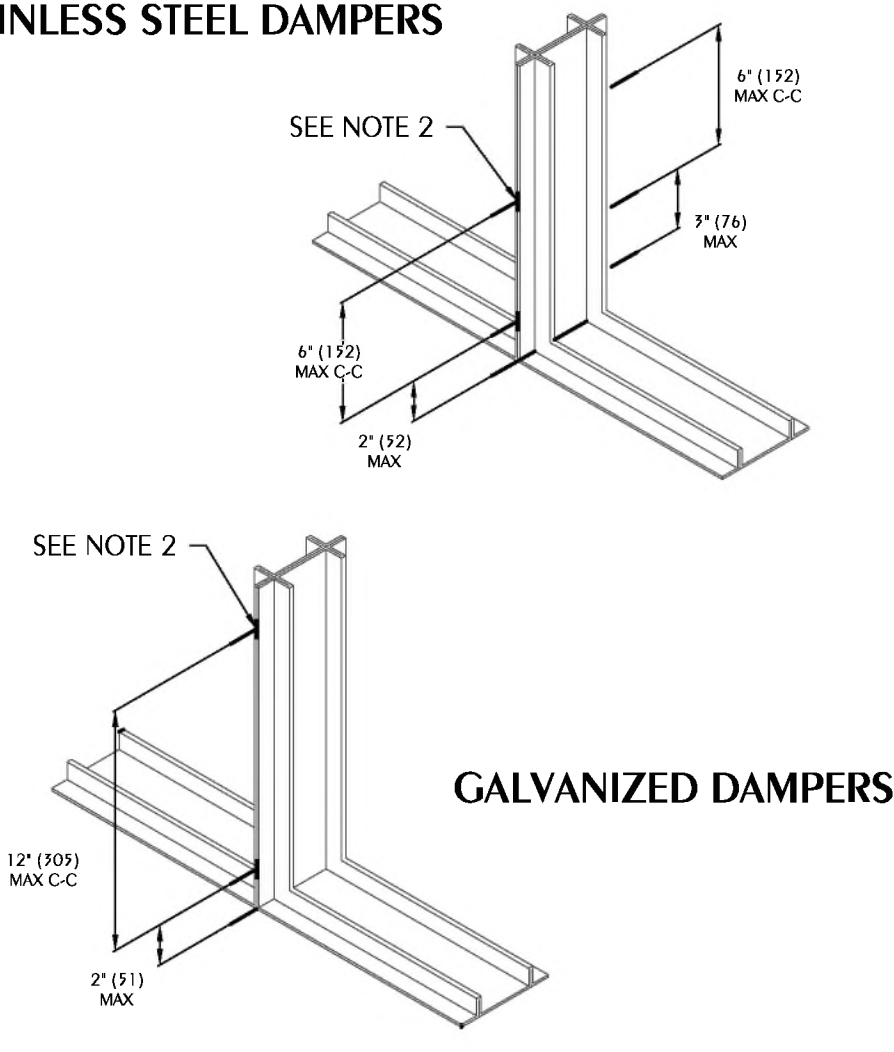


FIGURE 2
1 1/2 HOUR

HORIZONTAL INSTALLATION

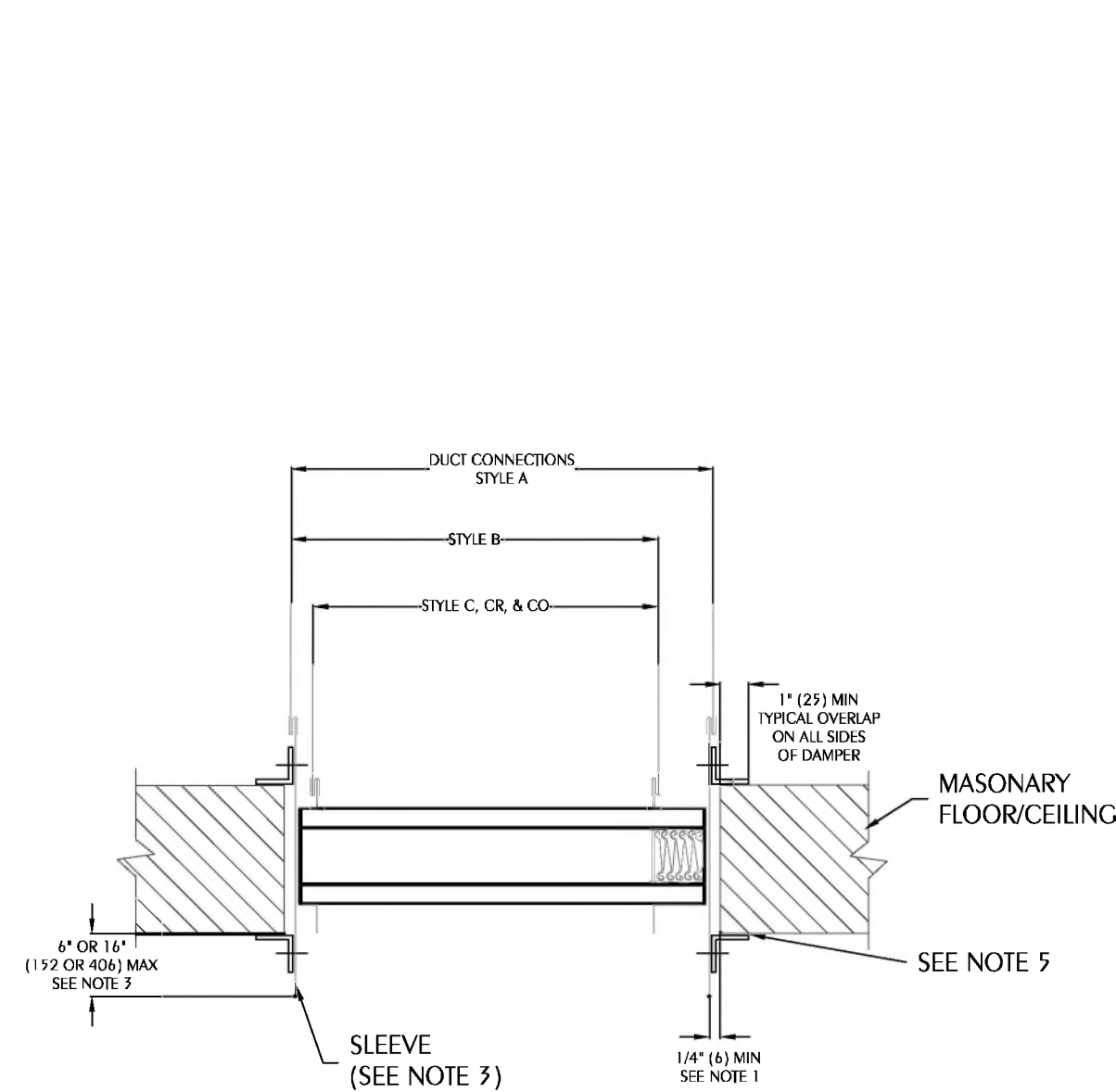


FIGURE 3

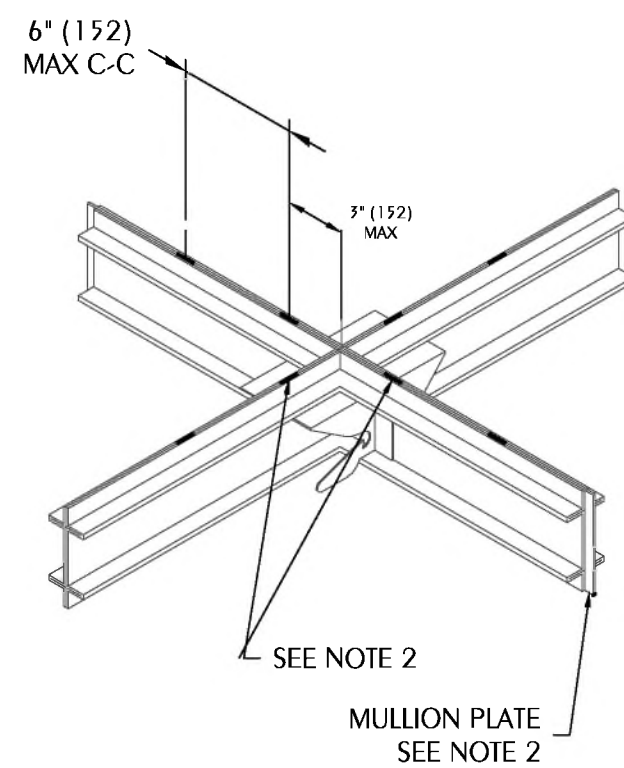


FIGURE 4
1 1/2 HOUR

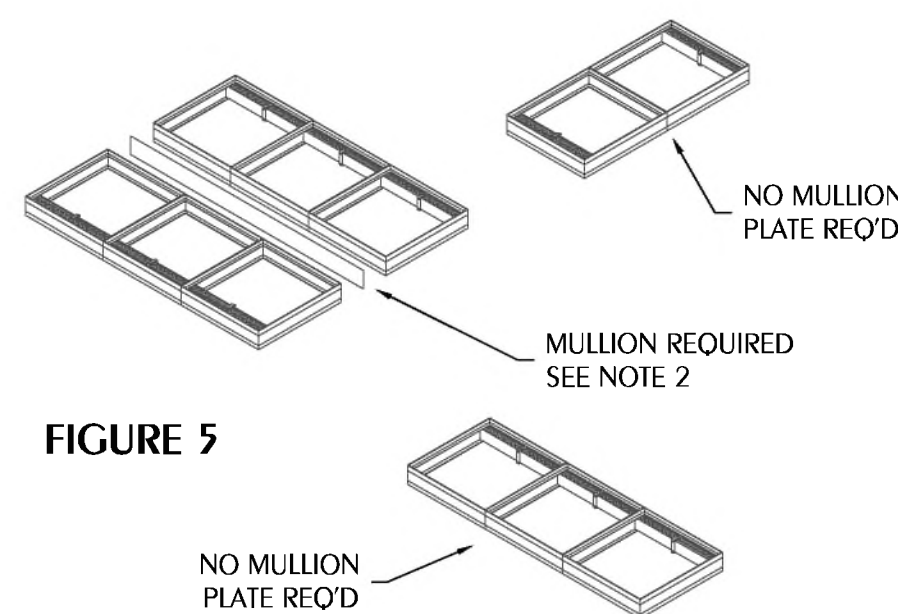


FIGURE 5

NOTE: ALL SYSTEMS DETAILED ON MECHANICAL PENETRATIONS SHEETS ARE BASED ON THE MANUFACTURERS SPECIFIED AS BASIS OF DESIGN AND APPLY TO MECHANICAL, FIRE PROTECTION, AND PLUMBING. THE CONTRACTOR SHALL SUBMIT A PENETRATIONS PACKAGE DETAILING EACH PENETRATION AND PRODUCTS TO BE USED TO THE PERMITTING AUTHORITY FOR THE ACTUAL SYSTEMS TO BE USED.

- ## OPENING CLEARANCE
- The opening in the wall or floor shall be larger than the damper/sleeve assembly to permit installation or expansion. For two angle installations the opening shall be a minimum of 1/8" per foot (3" per 305') larger than the overall size of the damper/sleeve assembly. The maximum opening size shall not exceed 1/8" per foot (3" per 305') plus 2" (51), nor shall the opening be less than 1/4" (6) larger than the damper/sleeve assembly. For one angle installations, the opening shall be a minimum of 1/4" (6) to a maximum of 1" (25) larger than the overall size of the damper/sleeve assembly. The opening may be as much as 2" (51) larger than the damper/sleeve assembly if a 16ga (1.6) mounting angles is utilized.
- ## 2. FASTENERS AND MULTIPLE SECTION ASSEMBLY
- Use No. 10 (M5) bolts or screws, 3/16" (5) rivets, tack welds or spot welds as depicted in figures 3 and 4 and spaced as follows when joining individual dampers to make multiple section damper assemblies or when fastening damper to the sleeve:
- | Vertical Mount (In wall) | |
|--------------------------|-------------------|
| Galvanized steel dampers | 12" (305) spacing |
| Stainless steel dampers | 6" (152) spacing |
- | Horizontal Mount (In floor) | |
|-----------------------------|------------------|
| All dampers | 6" (152) spacing |
- Multiple section horizontal mount dampers require a 14 gage thick x 41/2" (2 x 114) wide steel reinforcing plate sandwiched between the damper frames with 1/2" (13) long welds staggered intermittently and spaced on maximum 6" (152) centers. The reinforcing plate must be the same material as the dampers. The length must be equal to the damper width of two or more adjoining damper sections. Reinforcing plates are not required for assemblies consisting of two dampers attached end-to-end or three dampers attached side-to-side as depicted in figure 5.
- ## 3. DAMPER SLEEVE
- Sleeve thickness must be equal to or thicker than the duct connected to it. Sleeve gage requirements are listed in the SMACNA Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems and in NFPA90A. If a breakaway style duct/sleeve connection:
- 36" (914) wide: the sleeve shall be a minimum of 1/4" (6) for dampers up to 36" (914) wide by 24" (610) high and 14 gage (1.9) for dampers exceeding 36" (914) wide by 24" (610) high. Damper sleeve shall not extend more than 6" (152) beyond the fire wall or partition unless damper is equipped with a factory installed access door. Sleeve may extend up to 16" (406) beyond the fire wall or partition on sides equipped with a factory installed access door.
 - Damper sleeve terminate at both sides of wall within dimensions shown.
- ## 4. DAMPER ORIENTATION
- Use "Air Flow" and "Mount with Arrow Up" labels on Dynamic DIBD and DIBDX models for proper damper orientation. For Static IBD models use only "Mount With Arrow Up" label on damper for proper damper orientation.
- ## 5. MOUNTING ANGLES
- Mounting angles shall be a minimum of 11/2" x 11/2" x 20 gage steel (38 x 38 x 1.0). For openings in metal stud, wood stud walls or concrete/masonry walls and floors of sizes 90" x 49" or 49" x 90" (2286 x 1245 or 1245 x 2286) and less mounting angles are only required on one side of the wall or top side of the floor and must be attached to both the sleeve and the wall or floor. Mounting angles may be installed directly to the metal stud under the wall board on metal stud wall installations only. Larger openings require mounting angles on both sides of the partition and must be attached only to the sleeve. Mounting angles must overlap the partition a minimum of 1" (25). Do not weld or fasten angles together at corners of dampers. Ruskin fire dampers may be installed using Ruskin FAST angle for one angle installation or Ruskin PFMA for two angle installations.
- ## 6. DUCT/SLEEVE CONNECTIONS
- ### a. Break-Away Duct/Sleeve Connections
- Rectangular ducts must use one or more of the connections: plain "S" slip, limmed "S" slip, double "S" slip, inside slip joint, standing S, standing S (angle reinforced), standing, standing S (bar reinforced), standing S (angle reinforced, or drive slip joint).
- A maximum of two #10 sheet metal screws on each side and the bottom, located in the center of the slip pocket and penetrating both sides of the slip pocket may be used. Connections using these slip joints on the top and bottom with flat drive slips up to 20" (508) long on the sides may also be used.
- ### b. Round and Oval Break-Away Connections
- Round and oval flat break-away connections must use either a 4" (102) wide drawband or #10 sheet metal screws spaced according to the circumference of the duct as follows:
- Duct diameters 22" (559) and smaller – Maximum 7 screws.
 - Duct diameters over 22" (559) and including 36" (914) – Maximum 5 screws.
 - Duct diameters over 36" (914) and up to and including 191" (4851) total perimeter – Maximum 8 screws. For flat oval ducts, the diameter is considered the largest (major) dimension of the duct.
- Note: When optional sealing of these joints is desired, the following sealants may be applied in accordance with the sealant manufacturer's instructions:
- | | |
|--------------------------------|-------------------------------|
| Hardicat, Inc. – Iron Grip 601 | Precision – PA20P48T |
| Eco Duct Seal 44-52 | Design Polysulfides – DP 1010 |
- ### c. Flanged Break-Away Style Duct/Sleeve Connections.
- Flanged connection systems manufactured by Ductmate, Nexus or Ward are approved break-away connections when installed as shown on the Flanged System Breakaway Connections Supplement, TDC and TDF roll-formed flanged connections using 3/8" (10) steel bolts and nuts, and metal cleats, as tested by SMACNA, are approved break-away connections when installed as shown on the Flanged System Breakaway Connections Supplement.
- ### d. Non-Break-Away Duct/Sleeve Connections
- If other duct/sleeve connections are used, the sleeve shall be a minimum of 16 gage (1.6) for dampers up to 36" (914) wide x 24" (610) high and 14 gage (2.0) for dampers exceeding 36" (914) wide x 24" (610) high.
- ## 7. INSTALLATION AND MAINTENANCE
- To ensure optimum operation and performance, the damper must be installed so it is square and free from racking. Each fire damper should be maintained and tested on a regular basis and in accordance with the latest editions of NFPA 90A and local codes. Care should be exercised to ensure that such tests are performed safely and do not cause system damage.

REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE		DRAWN	CHECKED	DATE
SCHEMATIC DESIGN				12/5/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23

JRA
ARCHITECTS

2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: **22828**



WATFORD
ENGINEERING

4452 Clinton Street, Marianna, Florida 32446
850.526.3447 Project Number: 2023-007

Florida Certificate of Authorization: 27825
Keith A. Johnson, P.E. Florida License 86457

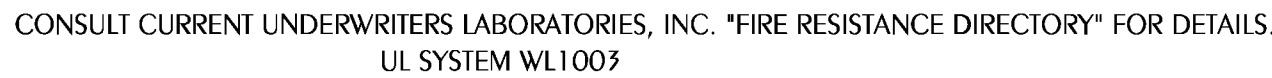
PROJECT:

BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION
PANAMA CITY, FLORIDA

SHEET TITLE:
HVAC DETAILS

SHEET NUMBER:

M2.3



- WALL ASSEMBLY—THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
- A. STUDS—WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO COMPLY WITH U300 2 BY 4 IN. LUMBER SPACED 16 IN. OC WITH MINIMUM 2 BY 4 IN. LUMBER END PLATES AND CROSS BRACES. STEEL STUDS TO BE MIN 3/4 IN. WIDE BY 1-3/8 IN. DEEP. CHANNELS SPACED MAX 24 IN. OC.
 - B. WALLBOARD, GYPSUM*—NOM 5/8 IN. THICK, 4 FT. WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 1 1/2 IN.
- THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.
2. THROUGH-PENETRANT—ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE SPACE BETWEEN PIPES, CONDUITS OR TUBING AND THE STEEL SLEEVE (ITEM 5A) SHALL BE MIN OF 0 IN. (POINT CONTACT) TO MAX 2/16 IN. (POINT CONTACT). CONDUITS ARE TO BE RIGIDLY SUPPORTED AT BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
- A. STEEL PIPE—NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
 - B. IRON PIPE—NOM 12 IN. DIAM (OR SMALLER) SERVICE WEIGHT (OR HEAVIER) CAST IRON SOIL. NOM 12 IN. DIAM (OR SMALLER) OR CLASS 50 (OR HEAVIER) DUCTILE IRON PRESSURE PIPE.
 - C. CONDUIT—NOM 4 IN. DIAM (OR SMALLER) STEEL CONDUIT OR NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.
 - D. COPPER TUBING—NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.

2. **THROUGH-PENETRANT**—ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE SPACE BETWEEN PIPES, CONDUITS OR TUBING AND THE STEEL SLEEVE (ITEM 3A) SHALL BE MIN OF 0 IN. (POINT CONTACT) TO MAX 2-5/8 IN. PIPE, CONDUIT OR TUBING TO BE RICIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:

- A. STEEL PIPE—NOM 1/2 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
- B. IRON PIPE—NOM 1/2 IN. DIAM (OR SMALLER) SERVICE WEIGHT (OR HEAVIER) CAST IRON SOIL PIPE, NOM 1/2 IN. DIAM (OR SMALLER) OR CLASS 50 (OR HEAVIER) DUCTILE IRON PRESSURE PIPE.
- C. CONDUIT—NOM 6 IN. DIAM (OR SMALLER) STEEL CONDUIT OR NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.
- D. COPPER TUBING—NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.



1. WALL ASSEMBLY: THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL/SLAB/STEEPSHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
 - A. STUDS—WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN LUMBER SPACING 16 IN. OC WITH NOM 2 BY 4 IN. LUMBER END PLATES AND CROSS BRACES. STEEL STUDS TO BE MIN 3 1/2 IN. WIDE BY 1 3/8 DEEP CHANNELS SPACED MAX 24 IN. OC.
 - B. WALLBOARD: GYPSUM BOARD 5/8 IN. THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES, THE GYPSUM WALLBOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIM OF OPENING IS 14 1/2 IN. FOR WOOD STUD WALLS AND 17 IN. FOR STEEL STUD WALLS.
- THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS 1 HR WHEN INSTALLED IN A 1 HR FIRE RATED WALL AND 2 HR WHEN INSTALLED IN A 2 HR FIRE RATED WALL.
2. THROUGH PENETRANTS—ONE METALLIC PIPE, CONDUIT OR TUBING TO BE CENTERED WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPE, CONDUIT OR TUBING MAY BE USED:
 - A. STEEL PIPE—NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE, WHEN STEEL PIPE IS USED, I RATING IS 1 HR.
 - B. CONDUIT—NOM 3 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT, WHEN STEEL CONDUIT IS USED, I RATING IS 1 1/4 HR.
 - C. COPPER TUBING—NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING, WHEN COPPER TUBING IS USED, I RATING IS 1 1/2 AND 1 HR WHEN INSTALLED IN 1 AND 2 HR RATED WALLS, RESPECTIVELY.
 - D. COPPER PIPE—NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE, WHEN COPPER PIPE IS USED, I RATING IS 1 1/2 AND 1 HR WHEN INSTALLED IN 1 AND 2 HR RATED WALLS, RESPECTIVELY.
3. PIPE CATCHER—NOM 1 OR 1 1/2 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) CLASS FIBER Joints JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY APPLIED SELF-SEALING TAPE. TRANSVERSE JOINTS SEALED WITH METAL FASTENER STRIP TAPE SUPPLIED.

SEE PIPE AND EQUIPMENT COVERINGS—MATERIALS—(BCU)
CATEGORY IN BUILDING MATERIALS DIRECTORY FOR NAMES OF
MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE
SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH
A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED
INDEX OF 50 OR LESS MAY BE USED.

4. STEEL SLEEVE—CYLINDRICAL STEEL FABRICATED FROM MIN 0.019 IN. THICK (NO. 28 GAUGE) GALV SHEET STEEL AND HAVING A MIN 2 IN. LAP ALONG THE LONGITUDINAL SEAM. LENGTH OF STEEL SLEEVE TO BE EQUAL TO THICKNESS OF WALL PLUS 1 IN. SUCH THAT, WHEN INSTALLED, THE ENDS OF THE SLEEVE WILL PROJECT APPROX 1/2 IN. BEYOND THE SURFACE OF THE WALL ON BOTH SIDES OF THE WALL ASSEMBLY. THE DIAM OF THE SLEEVE IS CUT IN THE MIDDLE OF THE LUBRICANT LAYER. THE INSIDE OF THE WALL ASSEMBLY (CONCENTRIC WITH PIPE) TO BE 2 TO 2-1/2 IN. LARGER THAN OUTSIDE DIAM OF PIPE INSULATION SUCH THAT, WHEN THE STEEL SLEEVE IS INSTALLED, A 1 TO 1-1/4 IN. ANNULAR SPACE WILL BE PRESENT BETWEEN THE STEEL SLEEVE AND THE PIPE INSULATION AROUND THE ENTIRE CIRCUMFERENCE OF THE PIPE. SLEEVE INSTALLED BY COILING THE SHEET STEEL TO A DIAM SMALLER THAN THE THROUGH OPENING, INSERTING THE COIL THROUGH THE OPENINGS AND RELEASING THE COIL TO LET IT UNCOIL AGAINST THE CIRCULAR CUTOUPS IN THE GYPSUM WALL LAYERS.
5. PACKING MATERIAL—POLYETHYLENE BACKER ROD OR MIN 1 IN. THICKNESS OF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO STEEL SLEEVE ON BOTH SIDES OF THE WALL ASSEMBLY AS PERMANENT FORMS. PACKING MATERIAL TO BE RECESSED MIN 1 IN. FROM END OF STEEL SLEEVE (RECESSED MIN 1/2 IN. INTO GYPSUM WALLBOARD SURFACE) ON BOTH SIDES OF WALL ASSEMBLY.
6. FILL VOID OR CAVITY MATERIALS—CAULK—MIN 1 IN. THICKNESS OF FILL MATERIAL APPLIED WITH ANNULUS ON BOTH SIDES OF WALL ASSEMBLY. THE FILL FOR THE VOID OR CAVITY SHALL BE MIN 1/2 IN. DIAM (OR SMALLER) STEEL PIPES OR CONDUITS MAY BE REDUCED TO A MIN 1/2 IN. A NOM 1/4 IN. DIAM CONTINUOUS BEAD OF CAULK SHALL BE APPLIED AROUND THE CIRCUMFERENCE OF THE STEEL SLEEVE AT ITS EGRESS FROM THE GYPSUM WALLBOARD LAYERS ON BOTH SIDES OF THE WALL ASSEMBLY.

*BEARING THE UL CLASSIFICATION MARKING

REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE		DRAWN	CHECKED	DATE
SCHEMATIC DESIGN				12/05/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23



4452 Clinton Street, Marianna, Florida 32448
860.526.3447 Project Number: 2023-007

PROJECT:

BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION

PANAMA CITY, FLORIDA

SHEET TITLE:

HYAC DETAILS

SHEET NUMBER:

M2.4

1 TYPICAL FIRE RATED WALL PENETRATION

M2.4

SCALE: NONE

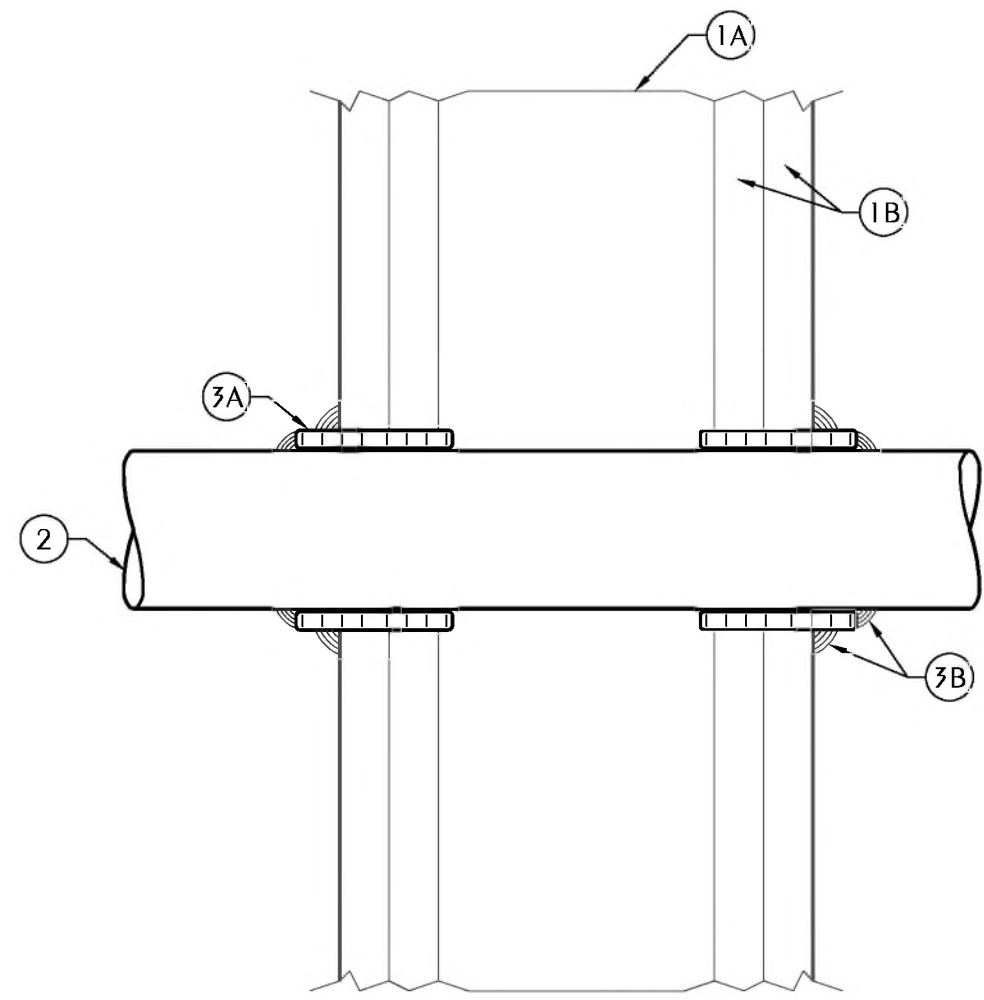
BARE METALLIC PIPE

2 TYPICAL FIRE RATED WALL PENETRATION

M2.4

SCALE: NONE

INSULATED METALLIC PIPE



CONSULT CURRENT UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY" FOR DETAILS
UL SYSTEM WL2003

- WALL ASSEMBLY—THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
 - STUDS—WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC WITH NOM 2 BY 4 IN. LUMBER END PLATES AND CROSS BRACES. STEEL STUDS TO BE MIN 3-5/8 IN. WIDE BY 1-3/8 IN. DEEP CHANNELS SPACED MAX 24 IN. OC.
 - WALLBOARD, GYPSUM*—5/8 IN. THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 3-1/8 IN.
- THROUGH PENETRANTS—ONE NONMETALLIC PIPE OR CONDUIT TO BE CENTERED IN THE THROUGH OPENING. THE ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND PERIPHERY OF OPENING SHALL BE MIN 1/4 IN. AND MAX 3/8 IN. PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR-CEILING ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF NONMETALLIC PIPES OR CONDUITS MAY BE USED:
 - POLYVINYL CHLORIDE (PVC) PIPE—NOM 2 IN. DIAM (OR SMALLER) SCHEDULE 40 SOLID CORE PVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.
 - RIGID NONMETALLIC CONDUIT++—NOM 4 IN. DIAM (OR SMALLER) SCHEDULE 40 OR 80) PVC CONDUIT INSTALLED IN ACCORDANCE WITH ARTICLE 347 OF THE NATIONAL ELECTRIC CODE (NFPA NO. 70).
 - CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE—NOM 2 IN. DIAM (OR SMALLER) SDR17 CPVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS.
 - CELLULAR CORE POLYVINYL CHLORIDE (CCPVC) PIPE—NOM 2 IN. DIAM (OR SMALLER) SCHEDULE 40 CELLULAR CORE PVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.

- ACRYLONITRILE BUTADIENE STYRENE (ABS) PIPE—NOM 2 IN. DIAM (OR SMALLER) SCHEDULE 40 SOLID CORE ABS PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS.
 - CELLULAR CORE ACRYLONITRILE BUTADIENE STYRENE (CCABS) PIPE—NOM 2 IN. DIAM (OR SMALLER) SCHEDULE 40 CELLULAR CORE ABS PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS.
- FIRESTOP SYSTEM—INSTALLED SYMMETRICALLY ON BOTH SIDES OF WALL ASSEMBLY. THE HOURLY F AND T RATINGS FOR THE FIRESTOP SYSTEM ARE EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED. THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:
 - FILL, VOID OR CAVITY MATERIALS*—WRAP STRIP—NOM 1/4 IN. THICK INTUMESCENT ELASTOMERIC MATERIAL FACED ON ONE SIDE WITH ALUMINUM FOIL, SUPPLIED IN 2 IN. WIDE STRIPS. NOM 2 IN. WIDE STRIP TIGHTLY WRAPPED AROUND NONMETALLIC PIPE (FOIL SIDE OUT) WITH SEAM BUTTED. WRAP STRIP LAYER SECURELY BOUND WITH STEEL WIRE OR ALUMINUM FOIL TAPE AND SLID INTO ANNULAR SPACE APPROX 1-1/4 IN. SUCH THAT APPROX 3/4 IN. OF THE WRAP STRIP PROTRUDES FROM THE WALL SURFACE.
MINNESOTA MINING & MFG. CO.—FS-195+
 - FILL, VOID OR CAVITY MATERIALS*—CAULK OR PUTTY—MIN 5/8 IN. THICKNESS OF CAULK OR PUTTY APPLIED INTO ANNULAR SPACE BETWEEN WRAP STRIP AND PERIPHERY OF OPENING. A NOM 1/4 IN. DIAM BEAD OF CAULK OR PUTTY TO BE APPLIED TO THE WRAP STRIP/WALL INTERFACE AND TO THE EXPOSED EDGE OF THE WRAP STRIP LAYERS APPROX 3/4 IN. FROM THE WALL SURFACE. MINNESOTA MINING & MFG CO.—CP 25WB+ CAULK OR MPS-2+ PUTTY. (NOTE: I RATINGS APPLY ONLY WHEN TYPE CP-25 WB+ CAULK IS USED.)
 - FOIL TAPE—(NOT SHOWN)—NOM 4 IN. WIDE, 3 MIL THICK ALUMINUM TAPE WRAPPED AROUND PIPE PRIOR TO THE INSTALLATION OF THE WRAP STRIP (ITEM 3A). MIN OF ONE WRAP, FLUSH WITH BOTH SIDES OF WALL AND PROCEEDING OUTWARD. TAPE IS NOT REQUIRED FOR PIPES SHOWN IN ITEMS 2A, 2B AND 2C.

*BEARING THE UL CLASSIFICATION MARKING

1 TYPICAL FIRE RATED WALL PENETRATION

SCALE: NONE

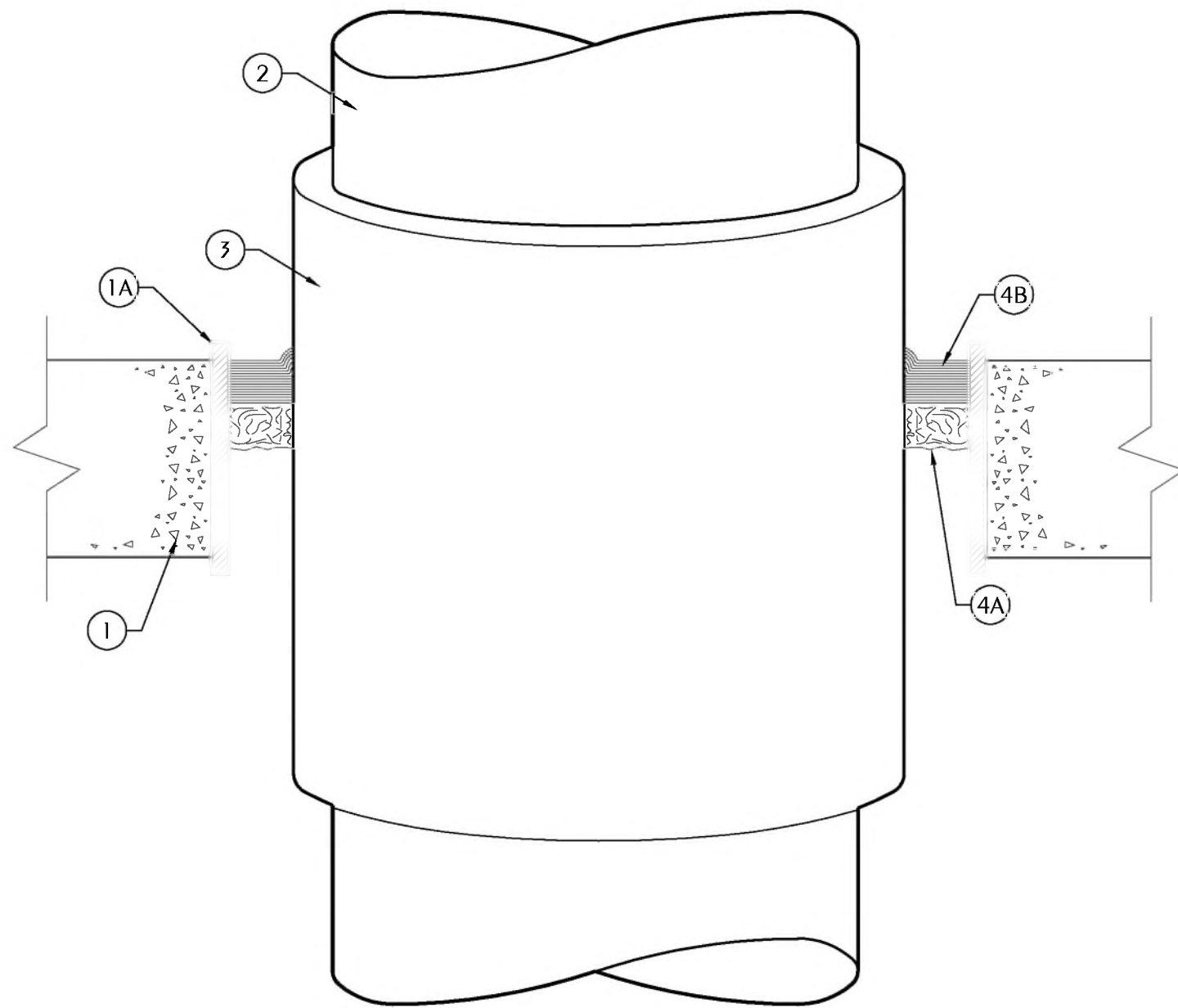
BARE PLASTIC PIPE 2" DIAMETER OR SMALLER

- FLOOR OR WALL ASSEMBLY—MIN 2-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150) PCF CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 18 IN. SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
- STEEL SLEEVE—NOM 10 IN. (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY. SLEEVE MAY EXTEND A MAX OF 2 IN. ABOVE TOP OF FLOOR OR BEYOND EITHER SURFACE OF WALL. T RATING IS 0 HR WHEN SLEEVE IS USED.
- THROUGH PENETRANT—NOM 4 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER PIPE, NOM 12 IN. DIAM (OR SMALLER) SERVICE WEIGHT (OR HEAVIER) CAST IRON SOIL PIPE, NOM 12 IN. DIAM (OR SMALLER) CLASS 50 (OR HEAVIER) DUCTILE IRON PRESSURE PIPE OR NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE CENTERED IN THE OPENING AND RIGIDLY SUPPORTED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY.
- PIPE COVERING*—NOM 1/2 TO 2 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN. 3.5 PCF) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY-APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT STRIP TAPE SUPPLIED WITH THE PRODUCT. SEE PIPE AND EQUIPMENT COVERING—MATERIALS*(BRCL) CATEGORY IN BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.
- FIRESTOP SYSTEM—THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:
 - PACKING MATERIAL—MIN 1 IN. THICKNESS OF FIRMLY PACKED MINERAL WOOL BATT INSULATION USED AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR SLEEVE OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF CAULK FILL MATERIAL (ITEM B).
 - FILL, VOID OR CAVITY MATERIAL*—CAULK—APPLIED TO FILL THE ANNULAR SPACE FLUSH WITH THE TOP SURFACE OF THE FLOOR OR SLEEVE OR FLUSH WITH BOTH SURFACES OF WALL. WHEN NOM PIPE COVERING THICKNESS IS 2 IN., MIN THICKNESS OF CAULK FILL MATERIAL IS 2 IN. WHEN NOM PIPE COVERING THICKNESS IS 1-1/2 IN. OR LESS, MIN THICKNESS OF CAULK FILL MATERIAL IS 1 IN. THE HOURLY F AND T RATINGS OF THE FIRESTOP SYSTEM ARE DEPENDENT UPON THE THICKNESS OF THE FLOOR OR WALL, THE SIZE OF PIPE, THE THICKNESS OF PIPE COVERING MATERIAL AND THE SIZE OF THE ANNULAR SPACE (BETWEEN THE PIPE COVERING MATERIAL AND THE EDGE OF THE CIRCULAR THROUGH OPENING), AS SHOWN IN THE FOLLOWING TABLE:

MIN FLOOR OR WALL THKNS		MAX PIPE DIAM	NOM PIPE COVERING THKNS		ANNULAR SPACE	F RATING	T
RATING	IN.	IN.	IN.	IN.	IN.	HR	
HR	2-1/2	4	1 OR 1-1/2	1/2 TO 2-3/8	2		1
	4-1/2	4	2	1/4 TO 3-5/8	2		1-1/2
	2-1/2	12	1	1/2 TO 1-1/2	2		1/2
	4-1/2	12	1	1/2 TO 2-3/8	3		1
	2-1/2	12	1/2	1/2 TO 2-3/8	2		0

MINNESOTA MINING & MFG. CO.—CP 25WB+.

*BEARING THE UL CLASSIFICATION MARKING



CONSULT CURRENT UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY" FOR DETAILS

UL SYSTEM CAJ5001

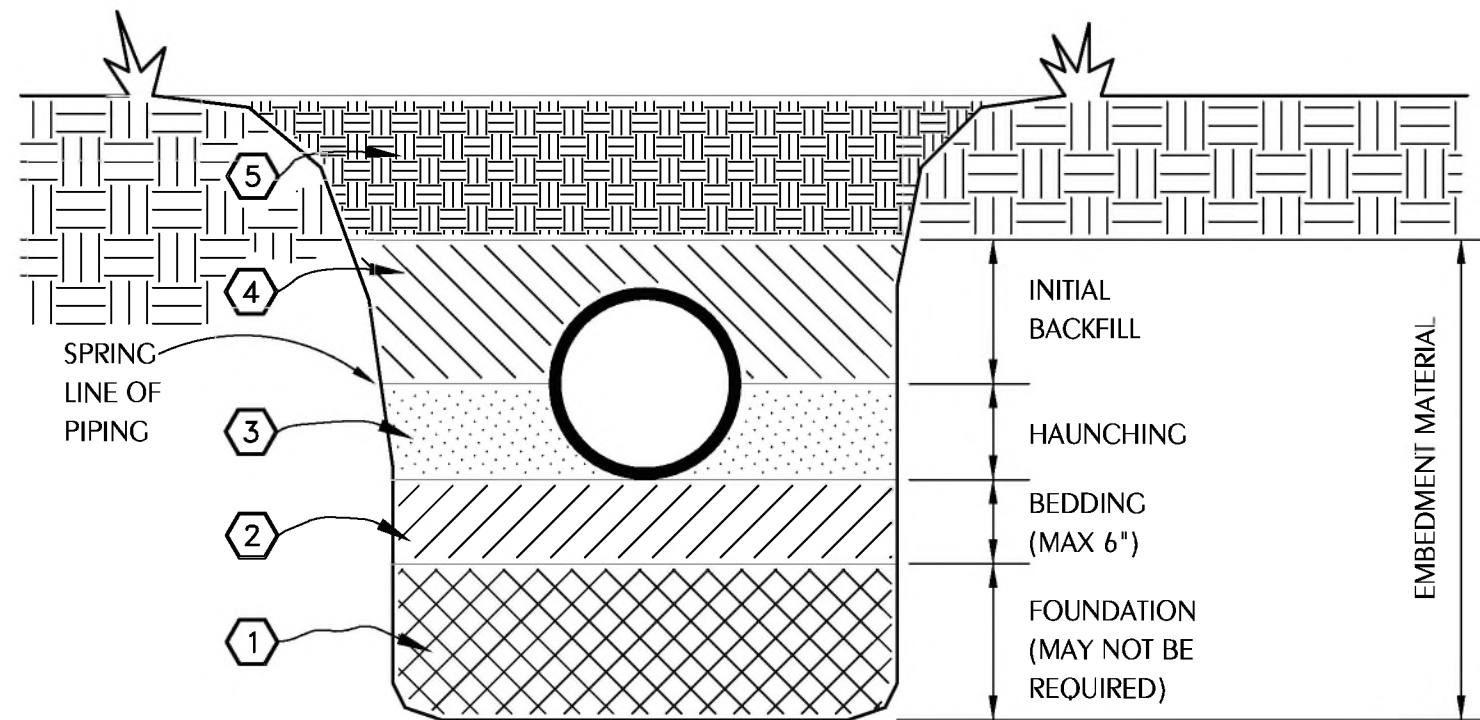
2 TYPICAL FIRE RATED WALL/FLOOR PENETRATION

SCALE: NONE

FIBERGLASS INSULATED METALLIC PIPE

- A FOUNDATION MAY BE REQUIRED IN VERY POOR SOIL CONDITIONS.
- BEDDING IS REQUIRED PRIMARILY TO BRING THE TRENCH BOTTOM UP TO GRADE. BEDDING MATERIALS SHALL PROVIDE A UNIFORM AND ADEQUATE LONGITUDINAL SUPPORT UNDER THE PIPE. IN DRY SOIL CONDITIONS, CLASS II OR III MATERIAL SHALL BE HAND PLACED IN 4-6", LIGHTLY COMPACTED UNIFORM AND NOT FINER THAN THE FOUNDATION MATERIAL. IN WET CONDITIONS, CLASS I, II OR III MATERIAL SHALL BE HAND PLACED IN 4-6", UNIFORM AND NOT FINER THAN THE FOUNDATION MATERIAL. WHEN UTILIZING CLASS I MATERIAL, SUFFICIENT AMOUNTS OF CLASS II OR III MATERIAL SHALL BE ADDED TO FILL ALL VOIDS CREATED BY THE USE OF CLASS I MATERIAL.
- HAUNCHING MATERIAL SHALL BE HAND PLACED TO THE SPRINGLINE OF THE PIPE. CLASS II OR III MATERIAL SHALL BE CONSOLIDATED UNDER THE PIPE AND HAND TAMPED TO PROVIDE ADEQUATE SIDE SUPPORT.
- INITIAL BACKFILL MATERIAL SHALL BE CLASS II OR III. IT SHALL BE PLACED WITHIN 24-30" ABOVE THE TOP OF THE PIPE AND TAMPED BY A PORTABLE VIBRATOR. FINAL BACKFILL MATERIAL MAY BE MACHINE PLACED. THE MATERIAL SHALL BE CLASS II OR III MATERIAL. CLASS IV MATERIAL MAY BE INSTALLED OUTSIDE OF ROADWAY.
- FINAL BACKFILL UNDER ROADWAYS MAY REQUIRE SPECIAL COMPACTION AND DENSITY TESTS. A MINIMUM OF 30" OF COVER OVER THE TOP OF THE PIPE SHALL BE PROVIDED BEFORE THE TRENCH IS WHEEL-LOADED.

NOTE:
ALL EMBEDMENT MATERIALS SHALL BE NO LESS THAN 95% OF MAXIMUM DENSITY. LABORATORY TESTING OF THE SOIL WILL BE REQUIRED. THIS PROCEDURE SHALL BE REQUIRED ON ALL INSTALLATIONS. ALL TRENCHING, EXCAVATION, AND BACKFILLING SHALL BE IN ACCORDANCE WITH 2020 FLORIDA BUILDING CODE SECTION 306.



EMBEDMENT MATERIALS

- | | |
|------------|---|
| CLASS I: | ANGULAR, 1/4"-1-1/2", GRADED STONE, INCLUDING A NUMBER OF FILL MATERIALS THAT HAVE REGIONAL SIGNIFICANCE SUCH AS CORAL, SLAC, CINDERS, CRUSHED STONE AND CRUSHED SHELLS. |
| CLASS II: | COARSE SANDS AND GRAVELS WITH MAXIMUM PARTICLE SIZE OF 1-1/2" INCLUDING VARIOUS GRADED SANDS AND GRAVELS CONTAINING SMALL PERCENTAGES OF FINES, GENERALLY GRANULAR AND NON-COHESIVE, EITHER WET OR DRY. SOIL TYPES GW, GP, SW, AND SP ARE INCLUDED IN THIS CLASS. |
| CLASS III: | FINE SAND AND CLAY GRAVELS, INCLUDING FINE SANDS, SAND-CLAY MIXTURES AND GRAVEL-CLAY MIXTURES. SOIL TYPES GM, GC, SM, AND SC ARE INCLUDED IN THIS CLASS. |
| CLASS IV: | SILT, SILTY CLAYS, AND CLAYS, INCLUDING INORGANIC CLAYS AND SILT OF MEDIUM TO HIGH PLASTICITY AND LIQUID LIMITS. SOIL TYPES MH, ML, CH, AND CL ARE INCLUDED IN THIS CLASS. THESE MATERIALS ARE <u>NOT</u> TO BE USED FOR BEDDING, HAUNCHING, OR INITIAL BACKFILL. |
| CLASS V: | THIS CLASS INCLUDES THE ORGANIC SOILS, AS WELL AS SOILS CONTAINING FROZEN EARTH, DEBRIS, ROCKS LARGER THAN 1-1/2" IN DIAMETER AND OTHER FOREIGN MATERIALS. THESE MATERIALS ARE <u>NOT</u> TO BE USED FOR BEDDING, HAUNCHING, OR INITIAL BACKFILL. |

3 EXCAVATION AND BACKFILL DETAIL

SCALE: NONE

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE

	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN			12/15/22
50% PROGRESS DOCUMENTS	DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS	DRR	KAJ	03/21/23
BID DOCUMENTS	DRR	KAJ	03/05/23

JRA ARCHITECTS
2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD ENGINEERING
4452 Clinton Street, Marietta, Florida 32048
850-326-3447 Project Number: 2023-007
Florida Certificate of Authorization: 27625
Keith A. Johnson, PE Florida License 94947

PROJECT:

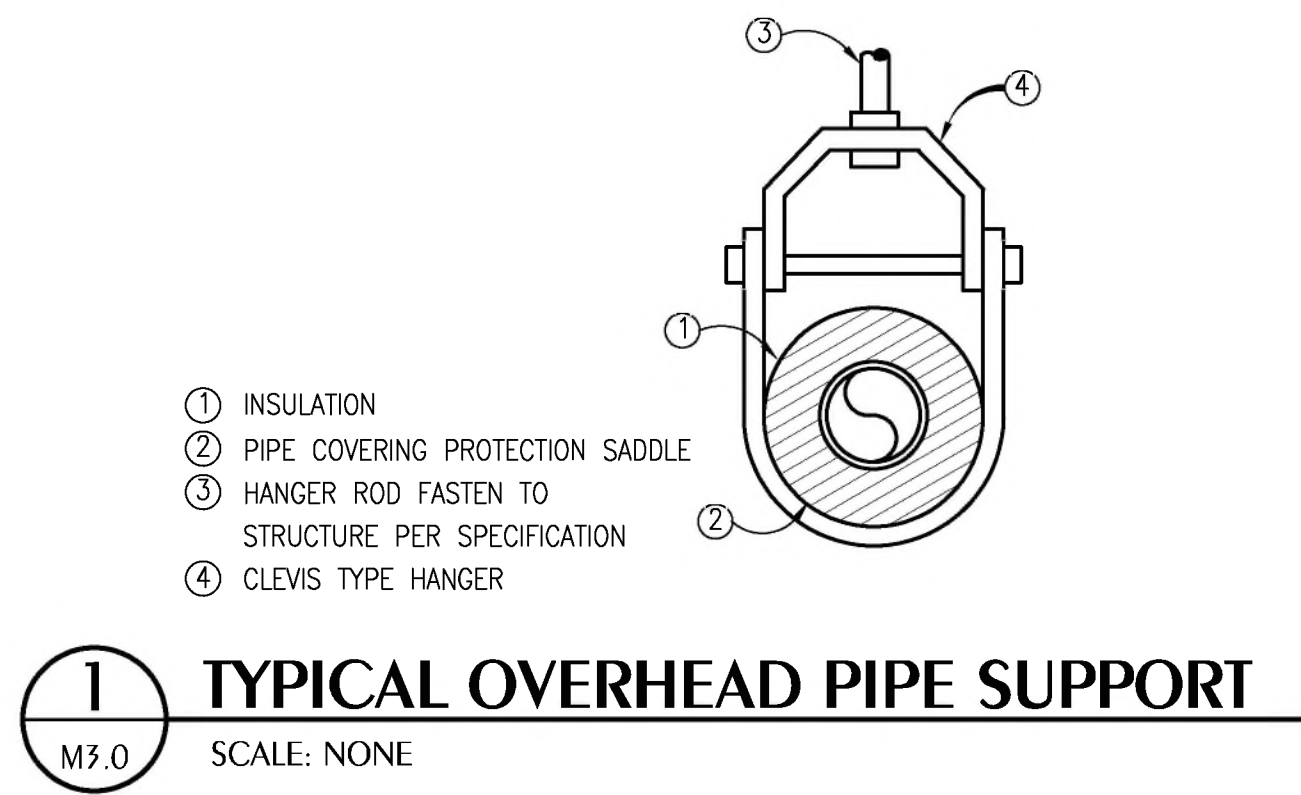
**BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION**
PANAMA CITY, FLORIDA

SHEET TITLE:

HYAC DETAILS

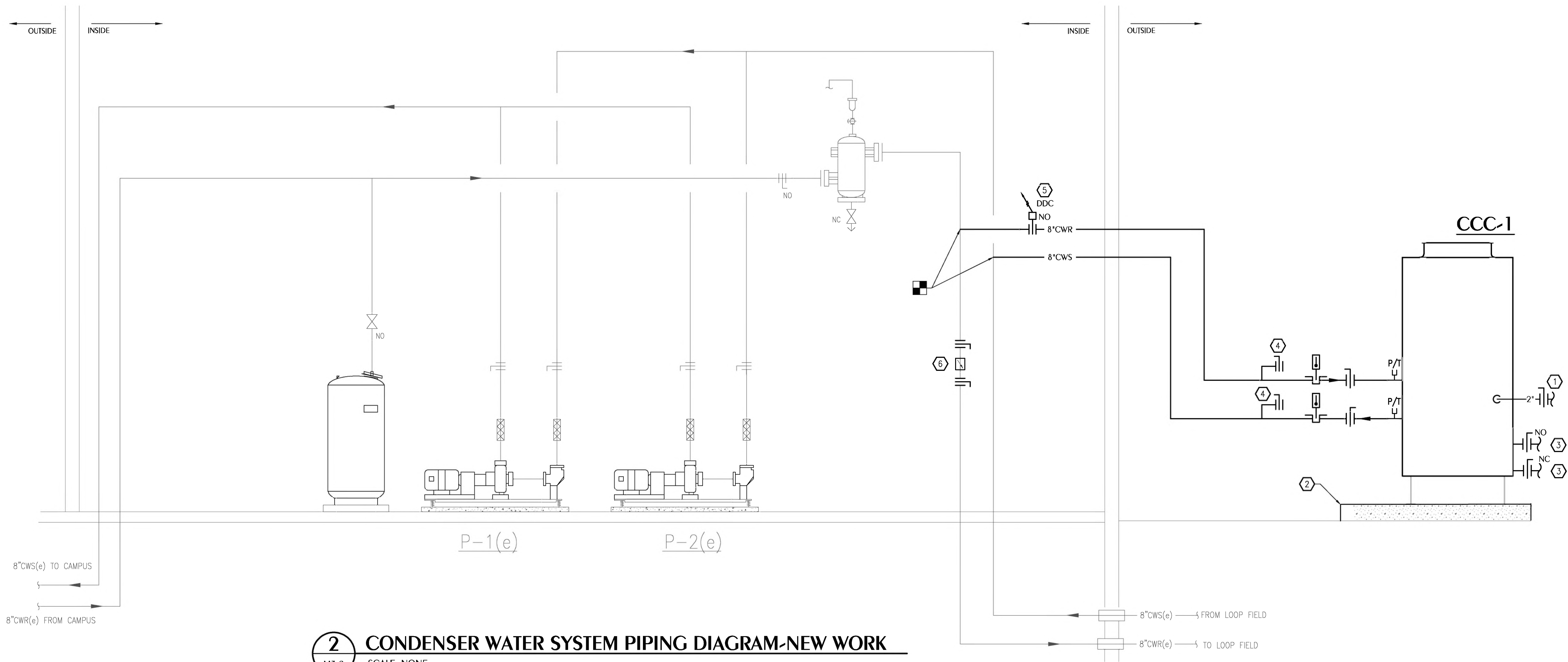
SHEET NUMBER:

M2.5



CONDENSER WATER PLANT PIPING DIAGRAM NOTES

- ① MAKE UP CONNECTION. CONNECT TO MAKEUP WATER.
- ② CONCRETE HOUSEKEEPING PAD BY STRUCTURAL.
- ③ BASIN DRAIN AND OVERFLOW.
- ④ BUTTERFLY VALVE AND BLIND FLANGE AT FULL SIZE OF CW PIPING.
- ⑤ MOTORIZED CONTROL VALVE
- ⑥ AUTOMATIC FLOW CONTROL VALVE. PROVIDE BUTTERFLY VALVES ON EACH SIDE FOR FUTURE ACCESS.



2 CONDENSER WATER SYSTEM PIPING DIAGRAM-NEW WORK
M3.0 SCALE: NONE

REVISIONS				
NO.	DESCRIPTION	DRAWN	CHECKED	DATE
PHASE				
		DRAWN	CHECKED	DATE
SCHEMATIC DESIGN				12/15/22
50% PROGRESS DOCUMENTS		DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS		DRR	KAJ	03/21/23
BID DOCUMENTS		DRR	KAJ	03/05/23



2211 THOMAS DR , STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

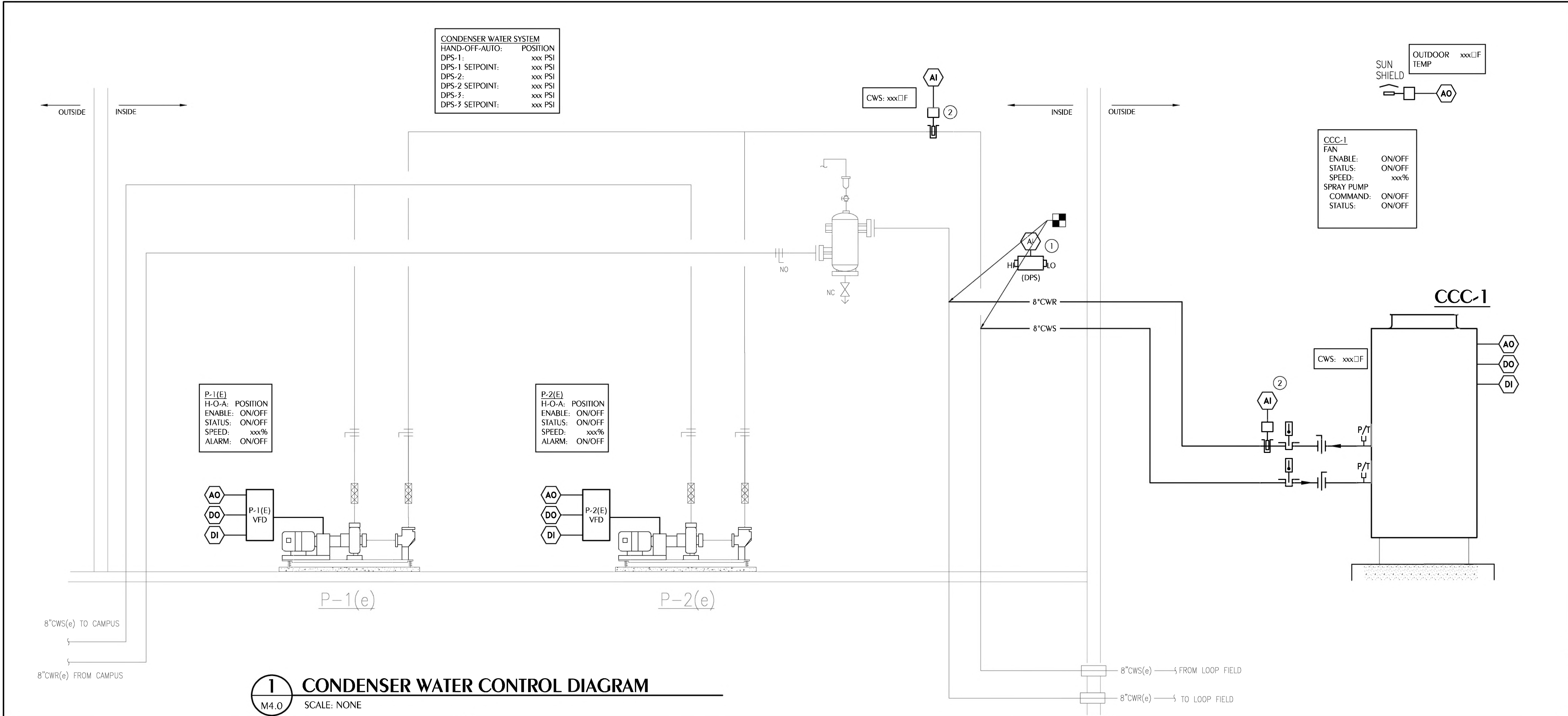


4452 Clinton Street, Marianna, Florida 32446
850-326-3447 Project Number: 2023-007
Florida Certificate of Authorization: 27625
Keith A. Johnson, P.E. Florida License 96457

PROJECT:
**BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION**
PANAMA CITY, FLORIDA

SHEET TITLE:
HYAC PIPING SCHEMATIC

SHEET NUMBER:
M3.0



DDC SYSTEM GENERAL NOTES

- THE CONTRACTOR SHALL MODIFY THE EXISTING DDC SYSTEM AS REQUIRED TO PERFORM THE INDICATED SEQUENCES, ALL OTHER FUNCTIONS REQUIRED BY THE CONTRACT DOCUMENTS, AND ALL OTHER FUNCTIONS REQUIRED FOR A COMPLETE AND FUNCTIONAL SYSTEM. REFER TO GENERAL SCOPE OF WORK AND GENERAL NOTES ON SHEET M001 FOR ADDITIONAL CONTROLS REQUIREMENTS.
- ALL SEQUENCES ARE SUBJECT TO SAFETIES. DDC CONTRACTOR SHALL PROVIDE ALL NECESSARY AND CUSTOMARY SAFETIES.
- EQUIPMENT OR SYSTEM GRAPHIC FOR EACH UNIT SHALL INCLUDE ALL ITEMS INDICATED IN EACH CONTROL DIAGRAM.
- ALL WIRING SHALL BE IN CONDUIT. ALL CONDUIT SHALL BE IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS, REQUIREMENTS FOR 120 VAC CIRCUITS.
- ALL CONTROL TUBING SHALL BE RUN IN CONDUIT. ALL CONDUIT SHALL BE IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS, REQUIREMENTS FOR 120 VAC CIRCUITS.
- ALL WELLS SHALL BE 3/16 STAINLESS STEEL AND SHALL BE INSTALLED IN NEW THREDOLETS WHETHER INSTALLED IN NEW OR EXISTING PIPING. IN CHILLED WATER PIPING PROVIDE NEW WELLS WITH EXTENDED NECK TO SUIT INSULATION THICKNESS.
- WHERE EXISTING PIPE INSULATION IS DISTURBED WHILE INSTALLING NEW SYSTEM COMPONENTS, INCLUDING WELLS, PRESSURE TAPS, AND P/T TAPS, THE INSULATION CONTRACTOR SHALL REPAIR INSULATION, VAPOR BARRIER AND JACKET TO MATCH EXISTING. PAINT JACKET TO MATCH EXISTING.
- THE DDC CONTRACTOR IS CO-RESPONSIBLE, ALONG WITH THE TAB CONTRACTOR FOR COORDINATING THE PROPER INSTALLATION OF WELLS, PRESSURE TAPS, AND P/T TAPS IN ALL LOCATIONS INDICATED AND OTHERWISE AS REQUIRED FOR A COMPLETE AND FULLY FUNCTIONAL SYSTEM.
- THE DDC CONTRACTOR AND THE TAB CONTRACTOR SHALL UTILIZE P/T'S TO CALIBRATE INSTRUMENTS TO CERTIFIED PRESSURE GAGES, PRESSURE METERS AND THERMOMETERS.
- CONDUIT SHALL BE RUN PERPENDICULAR AND PARALLEL TO BUILDING LINES IN A FIRST CLASS WORKMANSHIP LIKE MANNER.
- ALL DEVICES SHOWN ON THE CONSTRUCTION DOCUMENTS SHALL BE NEW UNLESS SPECIFICALLY NOTED AS EXISTING TO REMAIN.
- PROVIDE ALL SENSORS, WIRING, AND DEVICES NECESSARY TO PERFORM THE SEQUENCE OF OPERATIONS DESCRIBED HEREIN, WHETHER SPECIFICALLY NOTED ON THE CONSTRUCTION DOCUMENTS OR NOT. THE NEW CONTROLS SHALL BE A TURN KEY INSTALLATION.

SEQUENCE OF OPERATION CONDENSER WATER PLANT

THE CONTROLS CONTRACTOR SHALL PROVIDE EQUIPMENT AND PROGRAMMING AS REQUIRED TO PERFORM THE FOLLOWING SEQUENCE. CONTROL PANEL CAPABLE OF ALL INPUT/OUTPUT SHALL BE LOCATED IN MAIN MECHANICAL ROOM WITH PUMPS.

STARTING AND STOPPING OF EQUIPMENT SHALL BE ACCOMPLISHED THRU A "HAND-OFF-AUTO" SWITCH LOCATED ON THE FACE OF DDC CONTROL PANEL. AN ALARM SHALL BE POSTED TO THE DDC SYSTEM ANYTIME THE CONDENSER SYSTEM SWITCH IS INDEXED TO THE "OFF" OR "HAND" POSITION. WITH THE SYSTEM SWITCH IN THE "AUTO" POSITION, THE SYSTEM SHALL BE STARTED AUTOMATICALLY BY THE DDC SYSTEM AND ALL CONTROLS ACTIVATED SUBJECT TO SAFETIES AND OVERLOADS.

PUMP CONTROL: UPON SYSTEM STARTUP, THE DDC SYSTEM SHALL START EITHER PUMP P-1(E) OR P-2(E). THE DDC SYSTEM SHALL ALTERNATE PUMP OPERATION DAILY STARTING THE PUMP WITH THE LEAST RUN TIME. THE EXISTING ADJUSTABLE VARIABLE FREQUENCY DRIVE SHALL MODULATE PUMP SPEED AS REQUIRED TO MAINTAIN A CONSTANT DIFFERENTIAL PRESSURE AT THE DIFFERENTIAL PRESSURE SENSOR(S). THE CONTROLS CONTRACTOR SHALL PROVIDE DIFFERENTIAL PRESSURE SENSORS INSIDE THE PLANT AND REMOTE SENSORS AT WHP-XX AND XX. THE DDC SHALL CONTROL PUMP SPEED BASED ON THE DIFFERENTIAL PRESSURE INSIDE THE PLANT AND RESET THIS SETPOINT UP OR DOWN TO MAINTAIN THE REMOTE SENSORS AT A MINIMUM OF 3 PSI. THE DDC SYSTEM SHALL POST AN ALARM IF EITHER PUMP IS ENABLED AND NOT OPERATING.

TOWER CONTROL: THE DDC SYSTEM SHALL CONTROL ALL TOWER FUNCTIONS. THE TOWER SHALL ONLY OPERATE WHEN THE BUILDING IS IN A COOLING MODE (RETURN CONDENSER WATER TEMPERATURE IS HIGHER THAN THE SUPPLY CONDENSER WATER TEMPERATURE). THE TOWER STAGES SHALL MODULATE AS REQUIRED TO MAINTAIN THE TEMPERATURE AT THE DISCHARGE OF THE CCC AT 87°F. THE STAGES OF COOLING SHALL BE AS FOLLOWS:

- COOLING TOWER PUMP
- FAN ON-MODULATING BY VFD

LIMIT THE RATE OF FAN SPEED INCREASE TO AVOID OVERSHOOT OF THE SETPOINT.

TOWER FREEZE PROTECTION: WHEN THE BUILDING IS IN A HEATING MODE (CWR TEMPERATURE IS LOWER THAN CWS TEMPERATURE) AND THE AMBIENT AIR TEMPERATURE IS BELOW 40°F THE DDC SHALL START THE CONDENSER WATER SYSTEM AND CIRCULATE WATER THROUGH THE HEAT EXCHANGER. UNDER THESE CONDITIONS THE TOWER FAN AND PUMP SHALL BE OFF. THE BASIN HEATERS SHALL CYCLE AS REQUIRED TO MAINTAIN BASIN WATER TEMPERATURE ABOVE 40°F AT ALL TIMES.

CONDENSER WATER SYSTEM POINTS LIST

SYSTEM POINT DESCRIPTION	ANALOG								DIGITAL								SYSTEMS FEATURES												
	INPUT				OUTPUT				INPUT				OUTPUT				ALARMS				PROGRAMS								
	GRAPHIC	TEMPERATURE	DIFFERENTIAL PRESSURE	CARBON DIOXIDE	DDC	SPEED	SET POINT ADJ.	OPEN/CLOSE	FAULT	STATUS	FLOW SWITCH	HIGH/LOW	START/STOP	OPEN/CLOSE	LOCK OUT	ENABLE/DISABLE	HIGH/LOW	HIGH	LOW	SENSOR FAIL	COMM. FAIL	DIAGNOSTICS	LATCHING	TIME SCHEDULING	RUN TIME	TIME OVERRIDE	MODE CONTROL	MODBUS INTERFACE	
CONTROL PANEL	X																			X	X	X		X	X	X			
DISTRIBUTION PUMP (P-1,2)										X			X							X									
CCC FAN									X	X			X			X													
CCC SPRAY PUMP														X															
CCC CWS							X																						
CWS		X																		X	X	X							
CWR		X																		X	X	X							
CW LOOP			X																	X	X	X							
OUTDOOR AIR		X																		X									

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN			12/15/22
50% PROGRESS DOCUMENTS	DRR	KAJ	02/07/23
CONSTRUCTION DOCUMENTS	DRR	KAJ	03/21/23
BID DOCUMENTS	DRR	KAJ	03/05/23

JRA ARCHITECTS
2211 THOMAS DR., STE 100
PANAMA CITY BEACH, FL
PHONE: (850) 236-9832
Commission Number: 22828

WATFORD ENGINEERING
4652 Clinton Street, Marietta, Florida 32048
850-336-3447 Project Number: 2023-007
Florida Certificate of Authorization: 27625
Keith A. Johnson, P.E. Florida License 96457

PROJECT:
**BAY HAVEN CHARTER ACADEMY
CLASSROOM ADDITION**
PANAMA CITY, FLORIDA

SHEET TITLE:
HYVAC CONTROLS

SHEET NUMBER:
M4.0