LEGEND

RTU-1 — EQUIPMENT TAG

1 / M3 — DETAIL TAG ("1" INDICATES IDENTIFICATION NUMBER; "M3" INDICATES THE SHEET NUMBER DRAWN ON)

1 — SHEET NOTE

SUPPLY DUCT SECTION POSITIVE PRESSURE

RETURN OR EXHAUST DUCT NEGATIVE PRESSURE

AxB — RECTANGULAR DUCT SIZE ("A" INDICATES SIDE SHOWN; "B" INDICATES SIDE NOT SHOWN)

A/B — FLAT OVAL DUCT SIZE ("A" INDICATES SIDE SHOWN; "B" INDICATES SIDE NOT SHOWN)

AØ — ROUND DUCT SIZE

EXTERNALLY INSULATED DUCTWORK

DUCT ELBOW WITH TURNING VANES

RADIUSED DUCT ELBOW

FLEXIBLE DUCT CONNECTION

MANUAL VOLUME BALANCING DAMPER

HIGH PRESSURE DUCTWORK

DOUBLE WALL HIGH PRESSURE DUCTWORK

FABRIC DISPERSION DUCTWORK

DOUBLE WALL SPIRAL DUCTWORK

GATE VALVE

BUTTERFLY VALVE

TWO-WAY CONTROL VALVE

THREE-WAY CONTROL VALVE

STRAINER WITH BLOW DOWN VALVE AND CAP

THERMOMETER

THERMOMETER WELL OR PRESSURE TEMPERATURE PORT AS INDICATED

VFD — VARIABLE FREQUENCY DRIVE

DDC — DIGITAL CONTROLS ENCLOSURE

BUTTERFLY VALVE- VALVE HANDLE OPENS IN DIRECTION OF FLOW HANDLE

BALL VALVE- VALVE HANDLE OPENS IN DIRECTION OF FLOW

—R— REFRIGERANT PIPE

—HPS— HIGH PRESSURE STEAM

—LPS— LOW PRESSURE STEAM

—SC— STEAM CONDENSATE

—PC— PUMPED CONDENSATE

STEAM TRAP

M — MOTORIZED DAMPER

FD — FIRE DAMPER WITH ACCESS DOOR

SD — SMOKE DAMPER WITH ACCESS DOOR

FSD — FIRE/SMOKE DAMPER WITH ACCESS DOOR

BD — BACKDRAFT DAMPER

TEE WITH TURNING VANES AND BALANCING DAMPERS IN EACH LEG

FLEX DUCT TAKE OFF WITH MVD
RUNOUT SIZE EQUALS DIFFUSER NECK SIZE UNLESS OTHERWISE INDICATED

BRANCH DUCT TAKEOFF WITH MVD

AUTOMATIC AIR VENT

PRESSURE GAUGE AND 1/4" BALL VALVE

AFM — AIRFLOW MEASURING STATION

SR-1 / 100 — AIR DEVICE TAG. TOP LINE INDICATES TYPE OF DEVICE BOTTOM LINE INDICATES AIRFLOW IN CFM

(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

SR-E / 100 — EXISTING AIR DEVICE TAG. TOP LINE INDICATES TYPE OF DEVICE BOTTOM LINE INDICATES AIRFLOW IN CFM

UNION

LPS	LOW PRESSURE SUPPLY
HPS	HIGH PRESSURE SUPPLY
XFR	TRANSFER
EH	ELECTRIC HEATER
TF	TRANSFER FAN
APD	AIR PRESSURE DROP

POINT OF CONNECTION TO EXISTING

HIGH PRESSURE DUCTWORK

LOW PRESSURE SUPPLY DUCTWORK

RETURN DUCTWORK

EXHAUST DUXTWORK

OUTSIDE AIR DUCTWORK

TYP	TYPICAL
TEMP	TEMPERATURE
SA	SUPPLY AIR
RA	RETURN AIR
EA	EXHAUST AIR
OA	OUTDOOR AIR
TA	TRANSFER AIR
EF	EXHAUST FAN
CD	CEILING DIFFUSER
RG	RETURN GRILLE
EG	EXHAUST GRILLE
SWG	SIDEWALL SUPPLY GRILLE
L	LOUVER
CEF	CEILING EXHAUST FAN
AHU	INDOOR AIR HANDLING UNIT
CHWP	CHILLED WATER PUMP
HWP	HEATING HOT WATER PUMP
T1	THERMOSTAT, "1" INDICATES UNIT CONTROLLED. MOUNT WITH TOP AT 48" AFF.
S	DUCT MOUNTED SMOKE DETECTOR
UC	UNDERCUT DOOR ¾"
	16x16 DOOR GRILL
N.I.C	NOT IN CONTRACT
AFF	ABOVE FINISHED FLOOR
FD	FLOOR DRAIN
TG	TRANSFER GRILLE
SG	SOFFIT GRILLE
SWS	SIDEWALL SUPPLY GRILLE
SWR	SIDEWALL RETURN GRILLE
DDC	DIRECT DIGITAL CONTROL
CHW	CHILLED WATER
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
HW	HOT WATER
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
VFM	VENTURI FLOW METER
AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
TAB	TESTING, ADJUSTING AND BALANCING
TU	TERMINAL UNIT
NOM	NOMINAL
VFD	VARIABLE FREQUENCY DRIVE
E	EXISTING
FCU	FAN COIL UNIT
FD	HORIZONTAL FIRE DAMPER
BCU	BLOWER COIL UNIT
MVD	MANUAL VOLUME DAMPER
UH	UNIT HEATER
H	HUMIDITY SENSOR
SC	SPEED CONTROLLER
CO	CARBON MONOXIDE SENSOR
NO	NITROGEN DIOXIDE SENSOR
ZC	ZONE CONTROLLER
CREF	CEILING ROOF EXHAUST FAN

VENTILATION SCHEDULE

SPACE TYPE	VENTILATION CFM/S.F.	VENTILATION CFM/PERSON
OFFICE	0.06	5
CONFERENCE ROOM	0.06	5
RESTROOM	0	50/FIXTURE
SHOWER	0	20/FIXTURE
JANITORS CLOSETS	1	0
LOBBY	0.06	5
STORAGE	0.06	5

NOTE:
VENTILATION AIR HAS BEEN REDUCED IN COMPLIANCE WITH ASHRAE STANDARD 62.1-2019 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. BIPOLAR IONIZATION IS UTILIZED TO CLEAN INDOOR AIR AND MAINTAIN ACCEPTABLE INDOOR AIR QUALITY WITH REDUCTION IN OUTDOOR AIR FLOW.

LOUVER SCHEDULE

MARK	AIRFLOW CFM (MAX)	LOUVER SIZE (WxH) INCHES	FREE AREA FT² (MIN)
LVR-1 / CFM	470	16x24	1.07
LVR-2 / CFM	1075	44x24	3.41
LVR-3 / CFM	2590	44x44	6.94

1. PROVIDE RUSKIN MODEL 'EME3625DFL' (OR EQUAL) EXTRUDED ALUMINUM, WIND-DRIVEN RAIN RESISTANT, STATIONARY LOUVER WITH BIRDSCREEN AND FLORIDA PRODUCT APPROVAL.
2. FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD COLORS.

CARBON MONOXIDE AND NITROGEN DIOXIDE ZONE SENSOR SCHEDULE

CONTROLLER	ZONE	EXHAUST FAN	SQUARE FEET
1	1	EF-1-2	828.3

1. REFER TO SEQUENCE OF OPERATIONS.
2. PROVIDE HONEYWELL 301C 24 VOLT/1 PHASE CONTROLLER.
3. PROVIDE SENSORS WITH UL 2075 LISTING.

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	FAN (WATTS)	FAN FLA (AMPS)	NOTES
						COOLING TOTAL	COOLING SENSIBLE								
WM-2-1	MITSUBISHI	PKA-A18LA1	WALL MOUNT	18000	72.6/44.8	6900	6900	NA	NA	25.0	450	FED FROM CU-2-1	30	0.19	1,2,3,4,5,6,7,8,9

1. NOMINAL COOLING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 80/67°F (DB/WB), OUTDOOR OF 95°F (DB)
2. NOMINAL HEATING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 70°F (DB), OUTDOOR OF 43°(WB)
3. DESIGN COOLING CONDITIONS ARE AT 95°F AMBIENT; DESIGN HEATING CONDITIONS ARE AT 26°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 CONDENSATE PUMP.
9. PROVIDE DISCONNECT.

AIR PURIFICATION EQUIPMENT SCHEDULE

ZONE	SUPPLY CFM	OA CFM	PRESS. IN. W.C.	BASIS OF DESIGN	MODEL	QUANTITY	ELECTRICAL		NOTES
							VOLTS/PHASE	WATTS	
AHU-1-1	10125	1415	<0.01	GPS	GPS-IMOD	1	120/1	14.4	1,2,3,4
AHU-2-1	16850	2590	<0.01	GPS	GPS-IMOD	1	120/1	14.4	1,2,3,4

1. PROVIDE PRODUCT BY BASIS OF DESIGN, GLOBAL PLASMA SOLUTIONS OR NU-CALGON.
2. PROVIDE BASIS OF DESIGN OR EQUAL LISTED IN SPECIFICATIONS.
3. BI-POLAR IONIZATION SYSTEMS REQUIRING PERISHABLE GLASS TUBES ARE NOT ACCEPTABLE.
4. MANUFACTURER MUST PASS UL-867-2007 OZONE CHAMBER TESTING BY EITHER UL OR ETL.

GENERAL NOTES

1. ALL DUCT DIMENSIONS ARE NET INSIDE.
2. VERIFY COLLAR SIZES ON ALL AIR TERMINALS, EQUIPMENT OUTLETS AND INLETS, TRANSITION DUCTWORK AS NECESSARY. EXTERNALLY INSULATE TRANSITIONS AT EQUIPMENT CONNECTIONS.
3. 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. SEE SPECIFICATIONS.
4. 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.
5. PROVIDE DUCT FLEX CONNECTIONS & VIBRATION ISOLATION FOR ALL UNITS NOT INTERNALLY ISOLATED.
6. WASTE VENT STACKS, EXHAUST FANS, ETC. SHALL BE A MINIMUM OF 10 FT. FROM OUTSIDE AIR INTAKES.
7. ALL SUPPLY, RETURN, EXHAUST AND OUTSIDE AIR INTAKE DUCTWORK SHALL BE GALVANIZED SHEET METAL.
8. 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.
9. PROVIDE ACCESS PANELS IN HARD CEILINGS AS REQUIRED FOR MAINTENANCE AND ADJUSTMENT OF EQUIPMENT LOCATED ABOVE CEILING.
10. ALL BIRD AND INSECT SCREENS SHALL BE ANODIZED ALUMINUM.
11. BECAUSE OF THE SMALL SCALE OF CONTRACT DOCUMENTS IT IS NOT POSSIBLE TO SHOW ALL OFFSETS, TRANSITIONS, ETC. THE CONTRACT DOCUMENTS ARE ESSENTIALLY DIAGRAMATIC. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS COORDINATED WITH THE STRUCTURE AND ARCHITECTURAL WORK FOR REVIEW PRIOR TO COMMENCING WORK
12. THIS PROJECT SHALL INCLUDE COMMISSIONING OF THE HVAC, CONTROLS, AND RELATED ELECTRICAL SYSTEMS. UNDER THIS CONTRACT, THE PRIME CONTRACTOR, SUBCONTRACTORS, AND EQUIPMENT MANUFACTURERS SHALL PROVIDE LABOR AND MATERIAL AS REQUIRED TO ASSIST AND PARTICIPATE IN THE COMMISSIONING PROCESS FOR THE SCOPE OF WORK AS DESCRIBED IN SECTION 230800 OF THE PROJECT SPECIFICATIONS.
13. ALL WORK SHALL COMPLY WITH 2023 FLORIDA BUILDING CODE (8TH EDITION).

DUCTWORK AND INSULATION GENERAL NOTES

1. ALL ROUND FLEXIBLE DUCT SHALL BE FLEXMASTER TYPE 8M 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.
2. SEAL ALL DUCT PENETRATIONS OF WALLS AND FLOORS AIRTIGHT, REGARDLESS OF WHETHER WALLS AND FLOORS ARE FIRE RATED OR NOT.
3. UNLESS OTHERWISE INDICATED, ALL SUPPLY AIR DUCTWORK UPSTREAM OF TERMINAL UNITS SHALL BE OVAL OR ROUND, SMACNA STATIC PRESSURE CLASS 3" W.G., SEAL CLASS A, SPIRAL. DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS.
4. ALL SUPPLY AIR DUCTWORK DOWNSTREAM OF TERMINAL UNITS (EXCEPT TAKEOFFS TO SUPPLY AIR DIFFUSERS) SHALL BE LOW PRESSURE RECTANGULAR, SMACNA STATIC PRESSURE CLASS 2" W.G., SEAL CLASS A, EXTERNALLY INSULATED. DUCT SIZES INDICATED ARE INSIDE CLEAR DIMENSIONS.
5. ALL RETURN AIR 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. PROVIDE ACOUSTICAL DUCT LINER WHERE INDICATED.
6. 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.
7. STANDARD EXHAUST AIR DUCTWORK SHALL BE LOW PRESSURE RECTANGULAR, SMACNA STATIC PRESSURE CLASS 1/2" W.G., SEAL CLASS A, INSULATION NOT REQUIRED.
8. AVOID ROUTING DUCTWORK AND TU'S WITHIN 6" OF TOP OF LIGHT FIXTURES WHEREVER POSSIBLE. MAINTAIN CLEARANCE BETWEEN TU'S AND DUCT INSULATION TO TOP OF LIGHTS. PROVIDE CLEARANCE ALL AROUND AIR TERMINAL UNITS AS REQUIRED FOR ROUTINE MAINTENANCE.
9. PROVIDE MVD'S AT ALL TAKEOFFS FROM MAIN DUCTS.
10. TAKEOFFS TO AIR DEVICES FROM BOTTOM OF DUCT IS PROHIBITED.
11. ALL DUCTWORK AND AIR DEVICES IN EXPOSED AREAS SHALL BE PAINTED. REFER TO ARCHITECTURAL FOR COLOR.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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Commission Number: 24849

CONSULTANTS:
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850.526.3447 Project Number: 2024-027 — Keith A. Johnson, PE Florida License 86417

PROJECT:
HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC LEGEND, SCHEDULES, AND NOTES

SHEET NUMBER:
M0.1

CUSTOM AIR HANDLING UNIT SCHEDULE

UNIT DESIG-NATION	FAN DATA: TYPE	FAN TYPE	AIR VOLUME CONTROL	MAX. AIR FLOW (CFM)	MIN. AIR FLOW (CFM)	MIN. OA DAMPER (CFM)	APPROX. ESP (IN. W.G.)	TOTAL SP (IN. W.C.)	MAXIMUM FAN MOTOR HORSEPOWER	NOM MOTOR RPM	CHILLED WATER COIL DATA: MAX. FACE VELOCITY (FPM)	UNIT TOTAL CAPACITY (MBH)	UNIT SENSIBLE CAPACITY (MBH)	AIR SIDE: EAT (°F) DB	EAT (°F) WB	LAT (°F) DB	LAT (°F) WB	WATER SIDE: FLOW (GPM)	EWT (°F)	LWT (°F)	MAX. WPD (FT H2O)	CONTROL VALVE (BY DDC CONTRACTOR)	CONTROL VALVE PRESSURE DROP	FILTER SECTION: TYPE	FILTER EFF. (MERV)	THICK-NESS (IN)	WEIGHT (LBS)	NOTES
AHU-1-1	HDT	PF	VAV	10125	3045	1415	3.75	6.35	(2) 10.0	3600	500	366.6	256.0	75.6	63.5	50.4	49.4	61.1	45	57	5.0	2-WAY	11.5 FT	CARTRIDGE/PLEATED	15/8	12/2	3655	1,2,3,4,5,6,7,8,9,10,11,12
AHU-2-1	HDT	PF	VAV	16850	5055	2590	5.55	8.85	(2) 20.0	1800	515	611.1	463.6	76.0	62.1	48.9	47.8	101.9	45	57	14.2	2-WAY	11.5 FT	CARTRIDGE/PLEATED	15/8	12/2	4765	1,2,3,4,5,6,7,8,9,10,11,12

SCHEDULE LEGEND:

HDT - HORIZONTAL DRAW THRU
SDU - STACKED DEHUMIDIFICATION UNIT
FC - FORWARD CURVED
PF - PLENUM FAN
BC - BACKWARD CURVED

SZVAV - VARIABLE AIR VOLUME, SINGLE ZONE
VAV - VARIABLE AIR VOLUME, MULTIPLE ZONES
CV - CONSTANT VOLUME

SCHEDULE NOTES:

1. ESP DOES NOT INCLUDE PRESSURE DROP THROUGH AHU CASING OR COILS.
2. TOTAL SP INCLUDES PRESSURE DROP THROUGH CASING AND COILS.
3. AVERAGE ATMOSPHERIC DUST SPOT EFFICIENCY BASED ON ASHRAE 52-76.
4. BASIS OF DESIGN: TRANE PSCA.
5. 30% PRE FILTERS AND SPECIFIED FINAL FILTERS.
6. VARIABLE FREQUENCY DRIVE WITH 3 CONTACT BYPASS AND BUILT IN DISCONNECT FOR FAN MOTOR PROVIDED BY DDC CONTRACTOR
7. 208V/3 PHASE
8. MAXIMUM DIMENSIONS OF SHIPPING SECTIONS TO BE 6'-8"x7'-6".
9. PROVIDE FAN ARRAY WITH TWO TOTAL FANS
10. MAXIMUM FAN HP IS LISTED PER FAN.
11. PROVIDE UV LIGHTS FOR AIR STREAM DISINFECTION WITH 120V ELECTRICAL CONNECTION. UVDI V-MAX GRID OR APPROVED EQUAL. PROVIDE DOOR SAFETY SWITCH.
12. PROVIDE 7 ROWS OF UV LIGHTS, EACH CONSISTING OF ONE 21" LIGHT AND ONE 61" LIGHT.

PIPING GENERAL NOTES

1. 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."
2. 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."
3. BUTTERFLY VALVES FOR SHUT OFF SERVICE SHALL BE PROVIDED WITH STAMPED ALUMINUM TAG INDICATING "SERVICE VALVE."
4. ALL CONNECTIONS TO AIR VENTS AND PRESSURE GAGES SHALL BE MADE WITH BRASS PIPING.
5. INSTALL PIPE HANGERS NEXT TO AND ON BOTH SIDES OF ALL EQUIPMENT.
6. SEAL ALL PIPE PENETRATIONS OF WALLS AND FLOORS AIR TIGHT REGARDLESS OF WHETHER WALLS OR FLOORS ARE FIRE RATED OR NOT.
7. UNDERGROUND CHILLED WATER PIPING SHALL BE FACTORY FABRICATED PREINSULATED PLASTIC CARRIER PIPE WITH POLYURETHANE INSULATION AND HDPE JACKET.
8. REFER TO ARCHITECTURAL LIFE SAFETY PLANS FOR LOCATIONS OF ALL FIRE AND SMOKE WALLS. REFER TO M5.2, M5.3 AND M5.4 FOR FIRE AND SMOKE WALL PENETRATION DETAILS.
9. PROVIDE TRAINING OF PP-RCT PIPE MAINTENANCE AND INSTALL AND TOOLS TO BE TURNED OVER TO FAMU MAINTENANCE DEPARTMENT.

PUMP SCHEDULE

DESIGNATION	CHWP-1	CHWP-2
USE	CHILLED WATER DISTRIBUTION	CHILLED WATER DISTRIBUTION
MANUFACTURER - MODEL	BELL & GOSSETT - E-1510-2EB	BELL & GOSSETT - E-1510-2EB
TYPE	FRAME MOUNTED	FRAME MOUNTED
SUCTION SIZE (IN.)	3	3
DISCHARGE SIZE (IN.)	2	2
PUMP TYPE	END SUCTION	END SUCTION
CAPACITY (GPM)	163.0	163.0
TOTAL HEAD (FT. H20)	89.7	89.7
RPM	1800	1800
MINIMUM EFFICIENCY (%)	68.2	68.2
MOTOR HP (MAX)	7.5	7.5
VOLTAGE/PHASE	208/3	208/3

NOTES:
1. ALL PUMPS SHALL BE BRONZE FITTED.
2. ALL PUMPS SHALL HAVE ENERGY EFFICIENT INVERTER READY MOTORS.

FAN SCHEDULE

UNIT	TYPE	CFM	MAX. FAN RPM	ESP (IN. H20)	MAX. MOTOR POWER	SONES/db (MAX.)	BASIS OF DESIGN	MODEL	CONTROL	ELECTRICAL: VOLTS/PHASE	NOTES
EF-1-1	INLINE	1060	1847	0.87	1 HP	10.9	GREENHECK	SQ-9-M1-VG	DDC CONTROLLED	115/1	1,2,3,4,5,7
EF-1-2	WALL	625	1237	0.26	1/4 HP	6.3	GREENHECK	SE1-12-432-VG	DDC CONTROLLED	115/1	1,4,9,10,11
EF-2-1	INLINE	1075	1628	0.56	1/4 HP	10.0	GREENHECK	SQ-9-M1-VG	DDC CONTROLLED	115/1	1,2,3,4,5,7
EF-2-2	CEF	120	846	0.35	128 WATTS	1.5	GREENHECK	SP-B150	INTERLOCKED WITH LIGHTS	115/1	1,2,3,4,5,7,8
EF-2-3	CEF	120	844	0.34	128 WATTS	1.4	GREENHECK	SP-B150	INTERLOCKED WITH LIGHTS	115/1	1,2,3,4,5,7,8
EF-2-4	CEF	100	701	0.35	23 WATTS	1.5	GREENHECK	SP-A200	INTERLOCKED WITH LIGHTS	115/1	1,2,3,4,5,7,8
EF-2-5	CEF	30	807	0.33	10 WATTS	0.4	GREENHECK	SP-A70	INTERLOCKED WITH LIGHTS	115/1	1,2,3,4,5,7,8
EF-2-6	CEF	115	634	0.27	17 WATTS	1.2	GREENHECK	SP-A200	INTERLOCKED WITH LIGHTS	115/1	1,2,3,4,5,7,8

1. PROVIDE DISCONNECT
2. PROVIDE SOLID STATE SPEED CONTROLLER.
3. PROVIDE BACK DRAFT DAMPER
4. PROVIDE THERMAL OVERLOAD
5. PROVIDE DIRECT DRIVE FAN
6. PROVIDE 10 MINUTE TIME DELAY
7. PROVIDE ECM FAN MOTOR WITH EXTERNAL SIGNAL SPEED CONTROL
8. PROVIDE ALUMINUM CEILING GRILLE.
9. PROVIDE VIBRATION ISOLATION HANGERS.
10. PROVIDE WALL HOUSING WITH OSHA FAN GUARD AND MOTORIZED SHUTTER.
11. BELT DRIVEN FAN.

VARIABLE AIR VOLUME TERMINAL UNIT SCHEDULE

MARK	TOTAL CFM	COOL CFM MIN.	HEATING CFM MAX.	ELECTRIC HEATING COIL: EAT (°F)	LAT (°F)	KW	VOLTS/PHASE	MCA	MOP	MAX. UNIT APD (IN.)	SOUND POWER AT 0.5": REF. CFM	DISCHARGE NC	RADIATED NC	INLET SIZE (IN.)	MANUFACTURER	MODEL NUMBER
TU-1-1.1	860	260	385	48.0	85	4.5	208/3	15.6	20	0.3	860	23	22	9	TITUS	DESV
TU-1-1.2	1390	420	440	48.0	85	5.5	208/3	19.1	20	0.3	1390	-	24	12	TITUS	DESV
TU-1-1.3	860	260	260	48.0	85	3.0	208/3	10.4	15	0.3	860	14	22	9	TITUS	DESV
TU-1-1.4	800	240	240	48.0	85	3.0	208/3	10.4	15	0.3	800	-	20	9	TITUS	DESV
TU-1-1.5	170	50	110	48.0	85	1.5	208/3	5.2	15	0.3	170	-	16	5	TITUS	DESV
TU-1-1.6	980	295	915	48.0	85	11.0	208/3	38.2	40	0.3	980	-	23	9	TITUS	DESV
TU-1-1.7	645	195	590	48.0	85	7.0	208/3	24.3	25	0.3	645	-	23	8	TITUS	DESV
TU-1-1.8	1005	300	815	48.0	85	9.5	208/3	33.0	35	0.3	1005	-	22	12	TITUS	DESV
TU-1-1.9A	1330	400	425	48.0	85	5.0	208/3	17.3	20	0.3	1330	-	24	12	TITUS	DESV
TU-1-1.9B	875	260	425	48.0	85	5.0	208/3	17.3	20	0.3	875	-	22	9	TITUS	DESV
TU-1-1.9C	1210	365	775	48.0	85	9.5	208/3	33.0	35	0.3	1210	-	23	12	TITUS	DESV

VARIABLE AIR VOLUME TERMINAL UNIT SCHEDULE

MARK	TOTAL CFM	COOL CFM MIN.	HEATING CFM MAX.	ELECTRIC HEATING COIL: EAT (°F)	LAT (°F)	KW	VOLTS/PHASE	MCA	MOP	MAX. UNIT APD (IN.)	SOUND POWER AT 0.5": REF. CFM	DISCHARGE NC	RADIATED NC	INLET SIZE (IN.)	MANUFACTURER	MODEL NUMBER
TU-2-1.1	815	245	245	46.0	85	3.0	208/3	10.4	15	0.3	815	23	20	9	TITUS	DESV
TU-2-1.2	435	130	390	46.0	85	5.0	208/3	17.3	20	0.3	435	-	22	7	TITUS	DESV
TU-2-1.3A	1565	470	470	46.0	85	6.0	208/3	20.8	25	0.3	1565	-	25	12	TITUS	DESV
TU-2-1.3B	1565	470	470	46.0	85	6.0	208/3	20.8	25	0.3	1565	-	25	12	TITUS	DESV
TU-2-1.3C	1565	470	470	46.0	85	6.0	208/3	20.8	25	0.3	1565	-	25	12	TITUS	DESV
TU-2-1.4	885	265	360	46.0	85	4.5	208/3	15.6	20	0.3	885	14	22	9	TITUS	DESV
TU-2-1.5	1125	340	370	46.0	85	5.0	208/3	17.3	20	0.3	1125	-	22	12	TITUS	DESV
TU-2-1.6	1060	320	370	46.0	85	5.0	208/3	17.3	20	0.3	1060	10	22	12	TITUS	DESV
TU-2-1.7	1525	450	1105	46.0	85	14.0	208/3	48.6	50	0.3	1525	10	25	12	TITUS	DESV
TU-2-1.8	955	285	290	46.0	85	4.0	208/3	13.9	15	0.3	955	10	23	9	TITUS	DESV
TU-2-1.9	690	210	360	46.0	85	4.5	208/3	15.6	20	0.3	690	-	24	8	TITUS	DESV
TU-2-1.10	1445	435	470	46.0	85	6.0	208/3	20.8	25	0.3	1445	-	24	12	TITUS	DESV
TU-2-1.11	915	275	275	46.0	85	3.5	208/3	12.1	15	0.3	915	-	22	9	TITUS	DESV
TU-2-1.12	1370	410	780	46.0	85	10.0	208/3	34.7	35	0.3	1370	-	24	12	TITUS	DESV
TU-2-1.13	935	280	435	46.0	85	5.5	208/3	19.1	20	0.3	935	-	23	9	TITUS	DESV

MINI SPLIT SYSTEM CONDENSING UNIT SCHEDULE

UNIT	BASIS OF DESIGN	MODEL	NOMINAL COOL CAPACITY (BTUH)	DESIGN COOLING OUTDOOR TEMP DB	SEER2	NOMINAL HEAT CAPACITY (BTUH)	DESIGN HEATING OUTDOOR TEMP DB	HSPF2	VOLTS/PHASE	MCA (AMPS)	MOP (AMPS)	NOTES
CU-2-1	MITSUBISHI	PUY-A18NKA7	18000	95.0	20.2	NA	25	NA	208/1	11.0	28	1,2,3

1. NOMINAL COOLING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 80/67°F (DB/WB), OUTDOOR OF 95°F (DB)
2. NOMINAL HEATING CAPACITIES ARE BASED ON INDOOR COIL EAT OF 70°F (DB), OUTDOOR OF 43°(WB)
3. EFFICIENCY VALUES FOR EER, IEER, AND COP ARE BASED ON AHRI 1230 TEST METHOD FOR MIXTURE OF DUCTED AND NON-DUCTED INDOOR UNITS.

AIR DEVICE SCHEDULE

MARK	MAX AIRFLOW CFM	AIR DEVICE SIZE	DUCT CONNECTION SIZE	TITUS MODEL
CD-1 / CFM	80	9x9	6Ø	TDC
CD-2 / CFM	245	12x12	8Ø	TDC
CD-3 / CFM	350	12x12	10Ø	TDC
CD-4 / CFM	470	15x15	12Ø	TDC
SWG-1 / CFM	210	8x6	8x6	272FL
SWG-2 / CFM	400	12X8	12X8	272FL
RG,EG,SG,TG,RR,ER				
xx-1 / CFM	450	12x12	12x12	350FL
xx-2 / CFM	1705	22x22	22x22	350FL
xx-3 / CFM	450	8x6	8x6	350FL
xx-4 / CFM	350	12x8	12x8	350FL
xx-5 / CFM	930	18x14	18x14	350FL
xx-6 / CFM	2890	42x20	42x20	350FL

NOTES:
1. MAX NC=20
2. PROVIDE 2x2 LAY IN PANEL FOR AIR DEVICES IN LAY IN CEILINGS.
3. PROVIDE BEVELED MOUNTING FRAME FOR CEILING DIFFUSERS IN HARD CEILINGS.
4. PROVIDE FLAT MOUNTING FRAME FOR GRILLES LOCATED IN HARD CEILINGS.

TERMINAL UNIT SCHEDULE NOTES:

1. ALL VAV TERMINAL UNITS SHALL BE PRESSURE INDEPENDENT.
2. PROVIDE ALL VAV TERMINAL UNITS WITH ACCESS PANEL TO ALLOW SERVICING OF AIR VALVE WITHOUT DISCONNECTING DUCT WORK.
3. PROVIDE ALL VAV TERMINAL UNITS WITH FOIL FACED INSULATION.
4. SOUND DATA FOR DISCHARGE NC BASED ON 10 dB ROOM ABSORPTION, 15' UNLINED DUCT (12"x12") WITH 1 ELBOW, 5' LINED FLEX DUCT (8") TO DIFFUSER, 8" END REFLECTION, 5000 CUBIC FOOT ROOM VOLUME, DISTANCE OF 8', AND MAX 300 CFM PER DIFFUSER.
5. SOUND DATA FOR RADIATED NC BASED ON 10 dB ROOM ABSORPTION, 3' DEEP CEILING CAVITY, AND 5/8" THICK, 20 LB/CU. FT. FIBER CEILING TILE.
6. PROVIDE VAV TERMINAL UNITS WITH FACTORY MULTIPOINT FLOW SENSOR.
7. PROVIDE FACTORY MOUNTED CONTROLS TRANSFORMER AT VOLTAGE SHOWN IN SCHEDULE TO SUPPLY 24 VOLT POWER TO DAMPER ACTUATOR AND CONTROLS.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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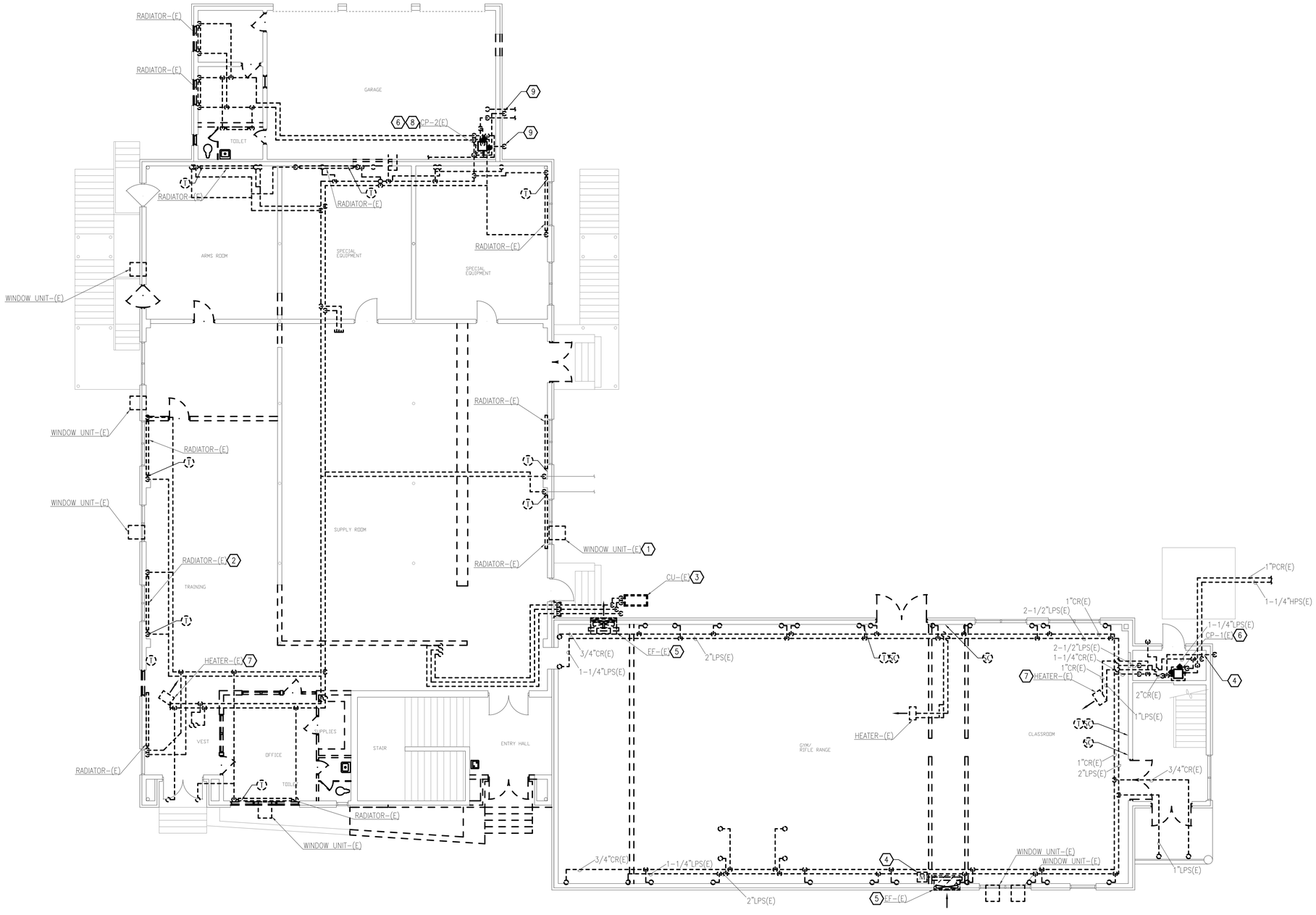
PROJECT:
HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC SCHEDULES

SHEET NUMBER:
M0.2



N 1 M1.1 **HVAC FIRST FLOOR DEMOLITION PLAN**

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

SHEET NOTES

1. REMOVE EXISTING WINDOW UNITS AND ASSOCIATED CONTROLS. TYPICAL.
2. REMOVE EXISTING RADIATOR, STEAM PIPE, AND ASSOCIATED CONTROLS. TYPICAL.
3. REMOVE EXISTING CONDENSER, REFRIGERANT LINES, CONDENSATE LINE, AND ASSOCIATED CONTROLS. PATCH AND SEAL EXISTING OPENING TO MATCH EXISTING EXTERIOR SURROUNDING CONDITIONS.
4. REMOVE EXISTING MOTORIZED LOUVER AND ASSOCIATED CONTROLS. PREPARE AREA FOR NEW LOUVER. REFER TO NEW WORK.
5. REMOVE EXISTING FAN AND ASSOCIATED CONTROLS. REFER TO ARCHITECTURAL PLANS FOR PATCHING AND SEALING OF OPENING.
6. REMOVE EXISTING STEAM PUMP AND ASSOCIATED CONTROLS.
7. REMOVE EXISTING HEATER AND ASSOCIATED CONTROLS.
8. CAP EXISTING STEAM PIPE BELOW SLAB.PATCH AND SEAL EXISTING OPENING TO MATCH EXISTING SURROUNDING CONDITIONS.
9. PATCH EXISTING OPENING TO MATCH EXISTING SURROUNDING CONDITIONS AFTER REMOVAL OF PIPE.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

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70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
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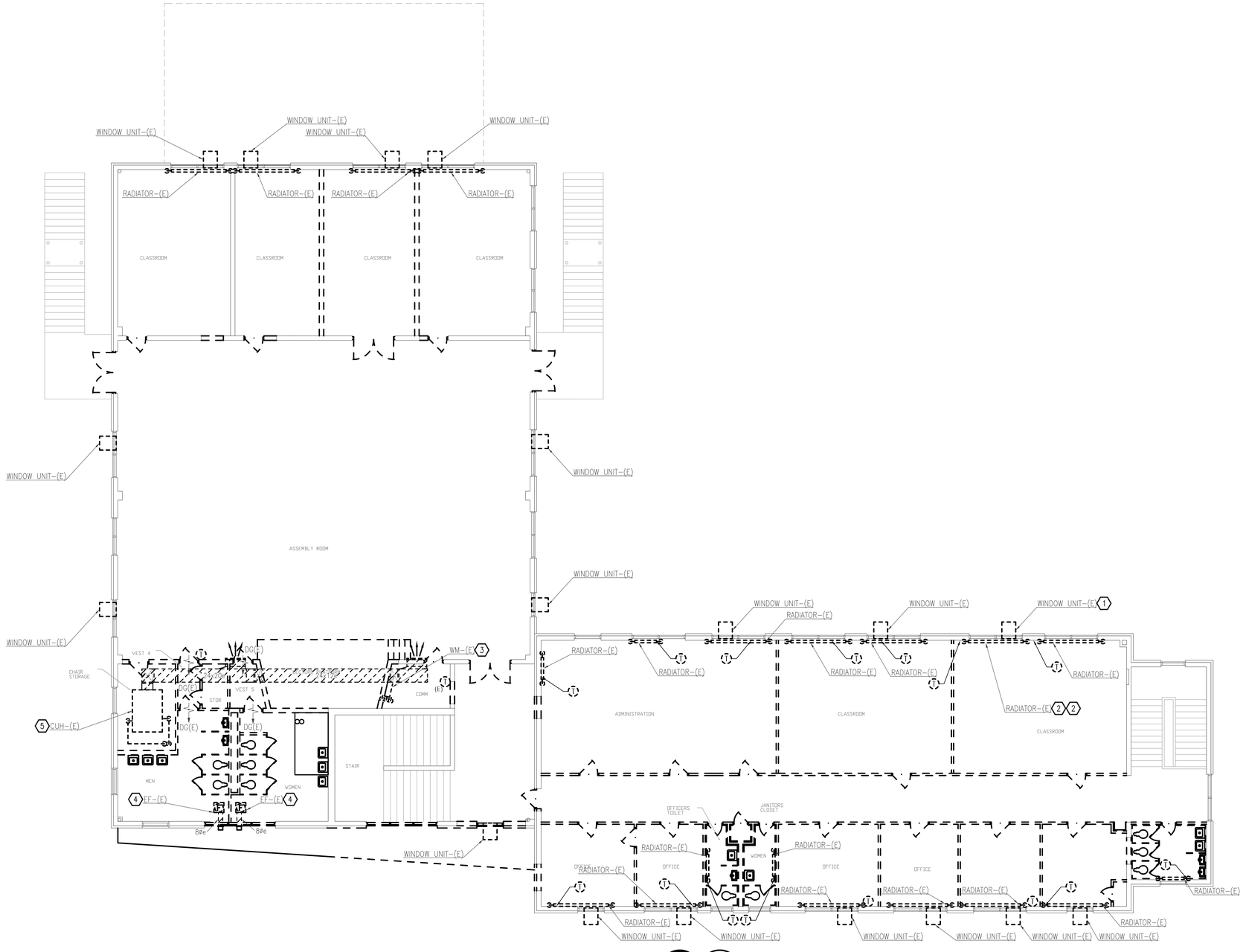
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC FIRST FLOOR
DEMOLITION PLAN

SHEET NUMBER:
M1.1



HVAC SECOND FLOOR DEMOLITION PLAN

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

SHEET NOTES

1. REMOVE EXISTING WINDOW UNITS AND ASSOCIATED CONTROLS. TYPICAL.
2. REMOVE EXISTING RADIATOR, STEAM PIPE, AND ASSOCIATED CONTROLS. TYPICAL.
3. REMOVE EXISTING DUCTLESS SPLIT, REFRIGERANT LINES, CONDENSATE LINE, AND ASSOCIATED CONTROLS. PATCH AND SEAL EXISTING FLOOR OPENING. REFER TO ARCHITECTURAL.
4. REMOVE EXISTING FAN, ASSOCIATED CONTROLS, AND EXISTING WALL CAP. REFER TO ARCHITECTURAL PLANS FOR PATCHING AND SEALING OF OPENING.
5. REMOVE EXISTING HEATER, DUCTWORK, GRILLES, AND ASSOCIATED CONTROLS.
6. PATCH AND SEAL EXISTING OPENING OF REMOVED PIPE. TYPICAL.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

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SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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PROJECT:

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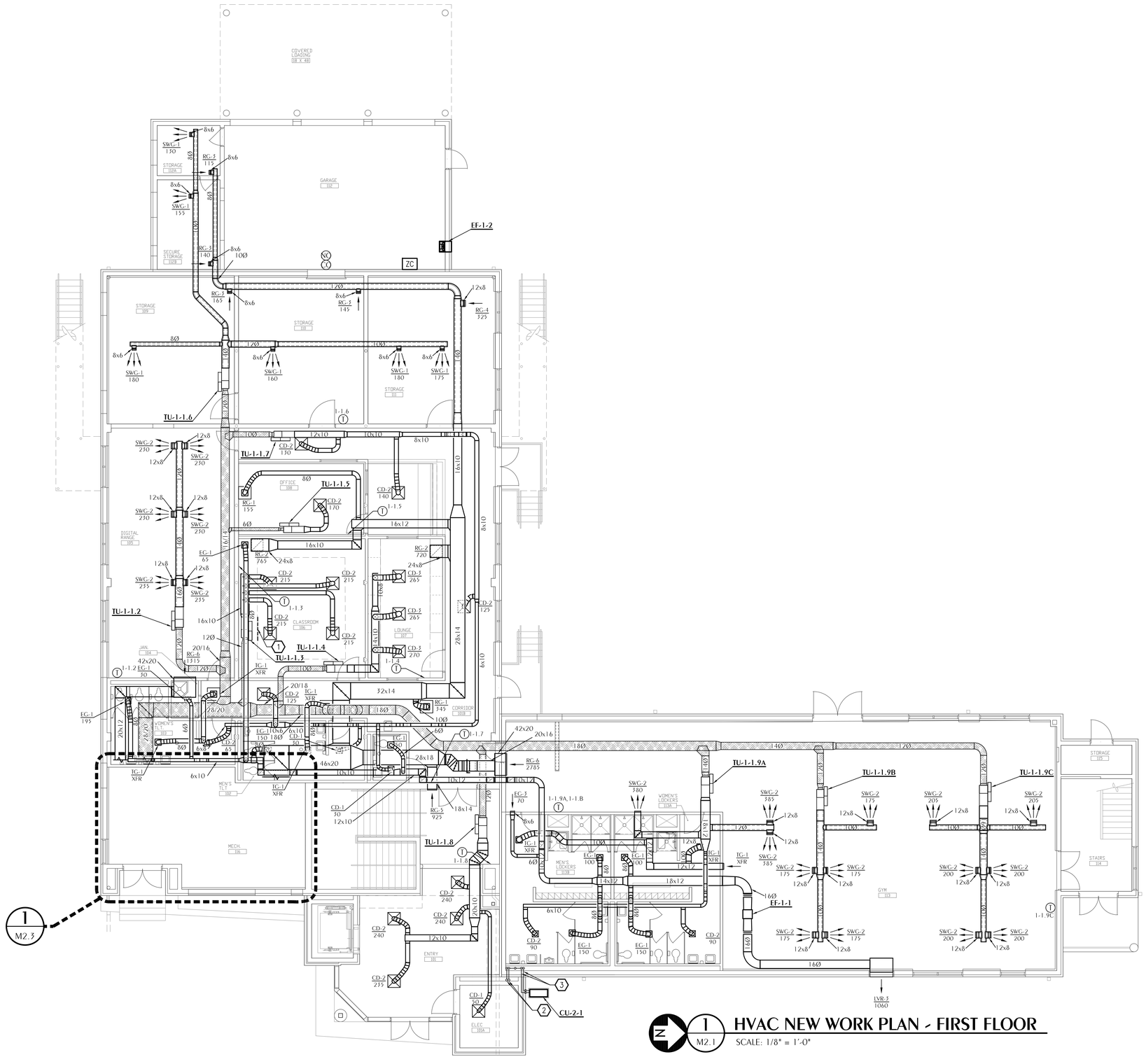
TALLAHASSEE, FLORIDA

SHEET TITLE:

HVAC SECOND FLOOR
DEMOLITION PLAN

SHEET NUMBER:

M1.2



1 M2.1 HVAC NEW WORK PLAN - FIRST FLOOR

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

SHEET NOTES

1. PROVIDE 18"X44" WALL ACCESS DOOR. COORDINATE WITH ARCHITECT COLOR OF DOOR.
2. REFER TO 1/M2.2 FOR CONTINUATION OF REFRIGERANT TO FLOOR ABOVE.
3. OFFSET REFRIGERANT UP ABOVE CEILING OF ELEC 101A.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

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SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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PROJECT:

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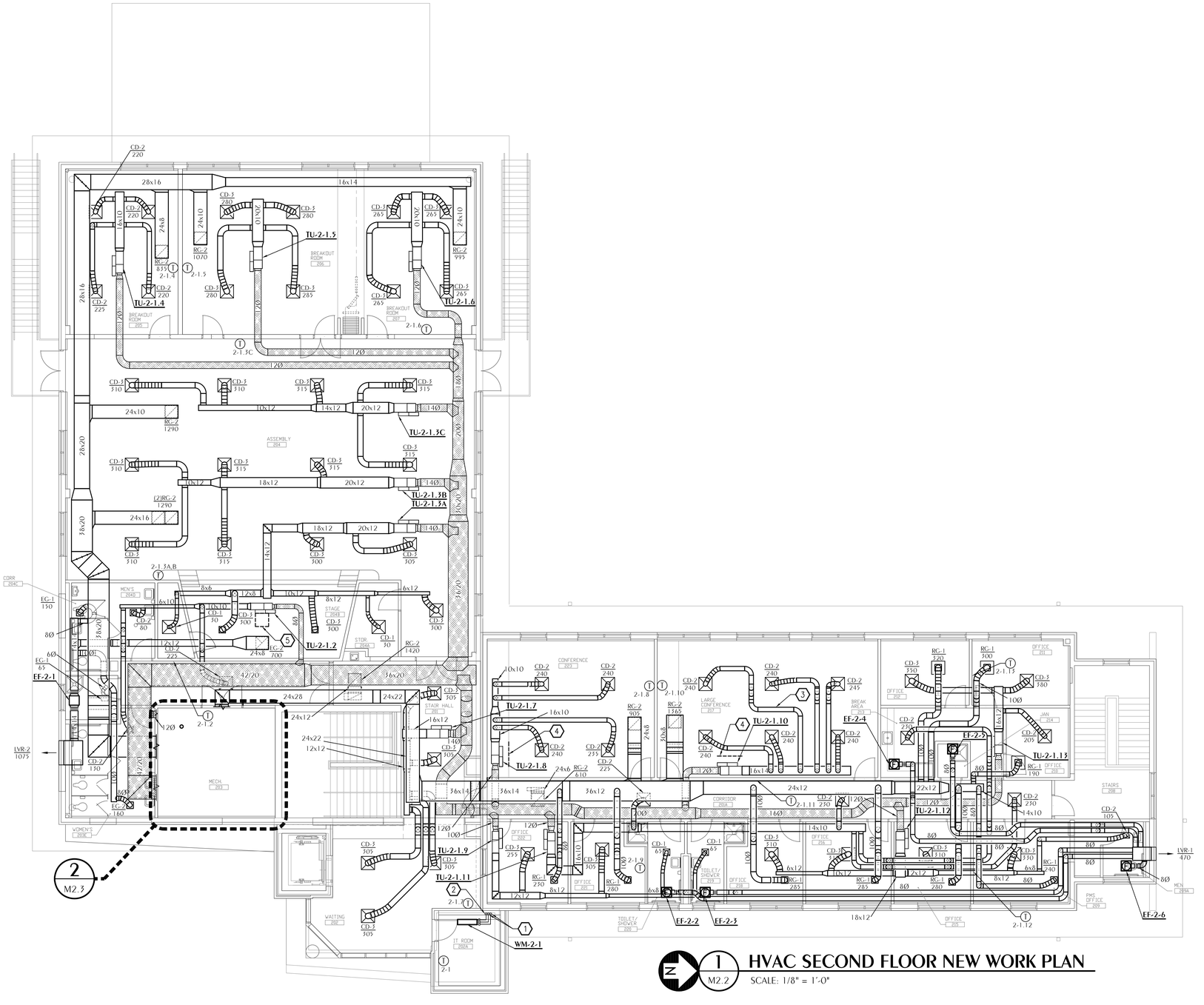
SHEET TITLE:

HVAC FIRST FLOOR
NEW WORK PLAN

SHEET NUMBER:

M2.1



1 M2.2 HVAC SECOND FLOOR NEW WORK PLAN

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

SHEET NOTES

1. CONTINUE ROUTING REFRIGERANT FROM FLOOR BELOW. REFER TO 1/M2.1 FOR CONTINUATION.
2. ROUTE CONDENSATE TO ADJACENT UTILITY BOX. REFER TO PLUMBING DRAWINGS FOR CONTINUATION.
3. ROUTE DUCTWORK THROUGH STRUCTURE TO AIR DEVICE. TYPICAL.
4. PROVIDE 18"X44" WALL ACCESS DOOR. COORDINATE WITH ARCHITECT COLOR OF DOOR.
5. PROVIDE 24"X 24" ACCESS DOOR. COORDINATE COLOR OF DOOR WITH ARCHITECT.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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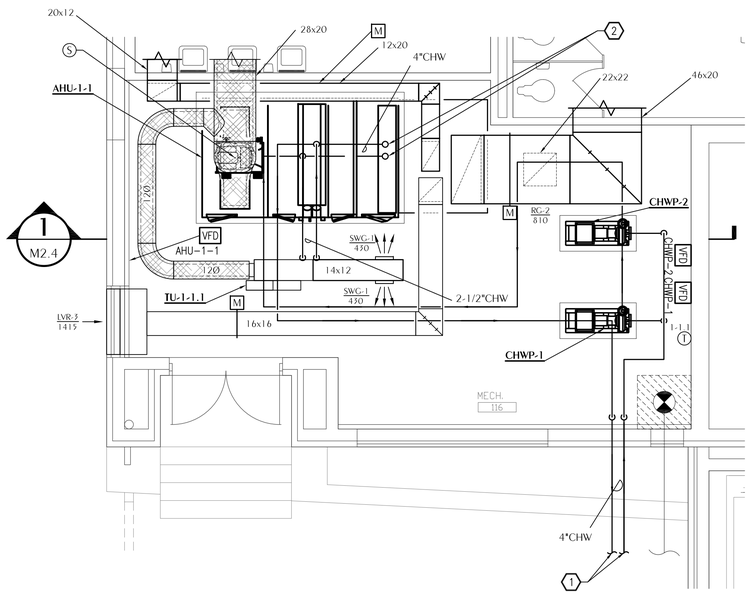
SHEET TITLE:

HVAC SECOND FLOOR
NEW WORK PLAN

SHEET NUMBER:

M2.2



1 M2.4 HVAC ENLARGED MECH 116 ROOM

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

2 M2.4 HVAC ENLARGED MECH 203 ROOM

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

SHEET NOTES

1. CONNECT 4"Ø CHILLED WATER SUPPLY AND RETURN TO CAMPUS MAIN. REFER TO CIVIL.
2. 3"Ø CHILLED WATER SUPPLY AND RETURN UP TO SECOND FLOOR. REFER TO 2/M2.3 FOR CONTINUATION.
3. 3"Ø CHILLED WATER SUPPLY AND RETURN DOWN TO FIRST FLOOR. REFER TO 1/M2.3 FOR CONTINUATION.
4. SEAL AND FLASH AROUND AHU-2.1.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

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SCHEMATIC DESIGN SUBMITTAL			05/31/24
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70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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TALLAHASSEE, FLORIDA

SHEET TITLE:

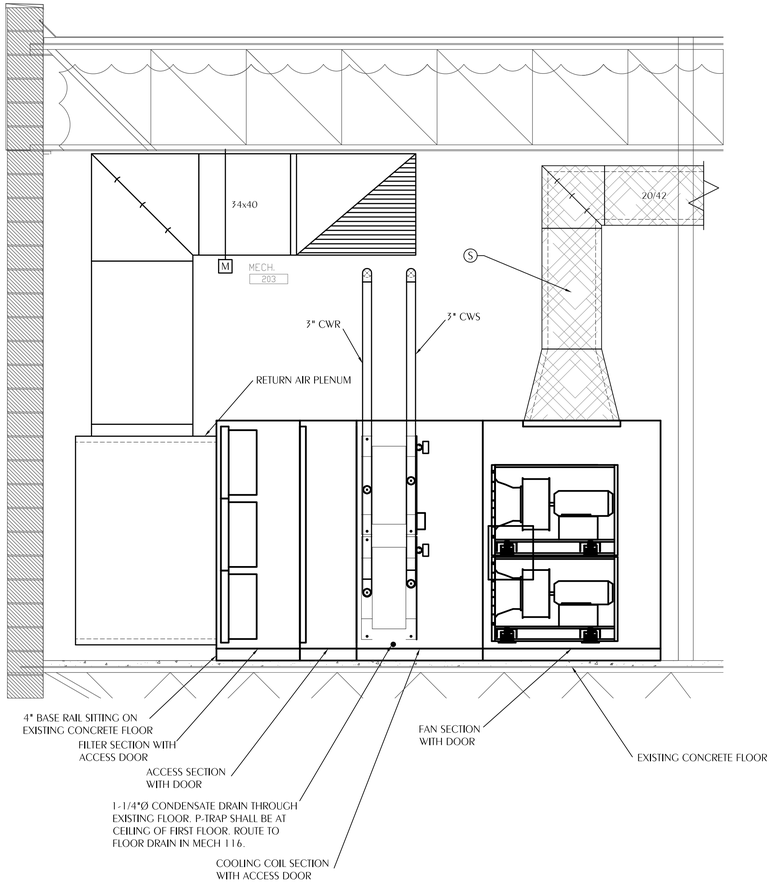
HVAC ENLARGED PLANS

SHEET NUMBER:

M2.3

1 M2.4 **MECH 116 ROOM SECTION**

SCALE: 1/2" = 1'-0"



2 M2.4 **MECH 203 ROOM SECTION**

SCALE: 1/2" = 1'-0"

SHEET NOTES

1. NONE.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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FLORIDA A&M UNIVERSITY

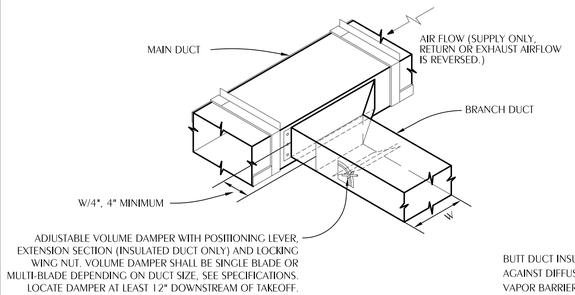
TALLAHASSEE, FLORIDA

SHEET TITLE:

HVAC SECTIONS

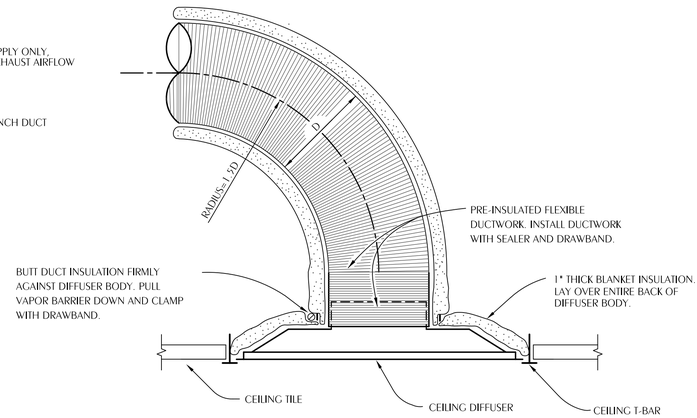
SHEET NUMBER:

M2.4



1 M3.1 TYPICAL BRANCH DUCT TAKEOFF

SCALE: NONE



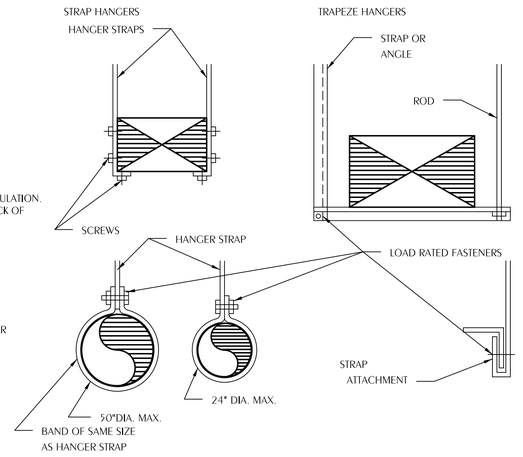
NOTES:
NEW FLEX DUCT SHALL BE NO LONGER THAN 5'-0".

PROVIDE 24x24 LAY IN PANEL FOR DIFFUSERS IN LAY IN CEILINGS.

PROVIDE BEVELED MOUNTING FRAME FOR DIFFUSERS IN HARD CEILINGS.

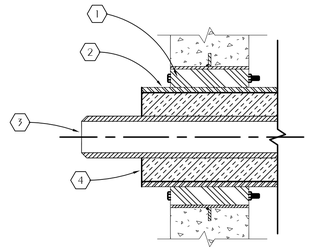
2 M3.1 TYPICAL CEILING DIFFUSER DETAILS

SCALE: NONE



3 M3.1 TYPICAL DUCT HANGER DETAILS

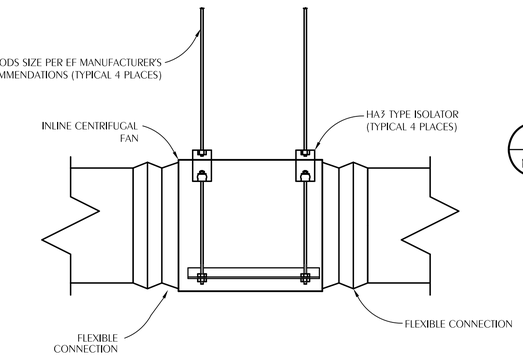
SCALE: NONE



1. WALL SEAL APPURTENANCES PER SPECIFICATIONS
2. PIPE SLEEVE PER SPECIFICATIONS
3. CHILLED OR HOT WATER PIPING
4. INSULATION

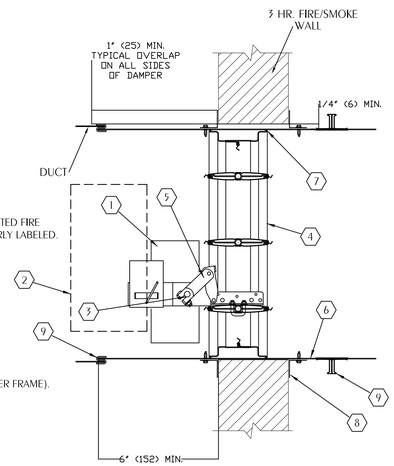
4 M3.1 TYPICAL WALL PIPE PENETRATION

SCALE: NONE



5 M3.1 INLINE FAN DETAIL

SCALE: NONE

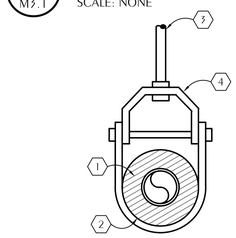


ITEM. DESCRIPTION

1. 24V ACTUATOR (MOUNT OUTSIDE DUCT). RUSKIN'S UL LISTED FIRE DAMPER ACTUATORS MAY BE FIELD INSTALLED IF PROPERLY LABELED.
2. DUCT ACCESS DOOR.
3. AUXILLARY OPERATING JACK SHIFT
4. DAMPER
5. OVER CENTER LOCK
6. SLEEVE
7. CAULKING MATERIAL (MAY BE ON EITHER SIDE OF DAMPER FRAME).
8. PFMA OR CONVENTIONAL MOUNTING ANGLES
9. S-JOINT/DUCT MATE, SLEEVE TO DUCT.

7 M3.1 TYPICAL FIRE AND SMOKE DAMPER DETAIL

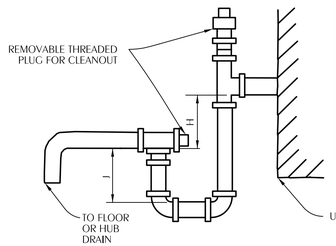
SCALE: NONE



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

8 M3.1 OVERHEAD PIPE SUPPORT

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".

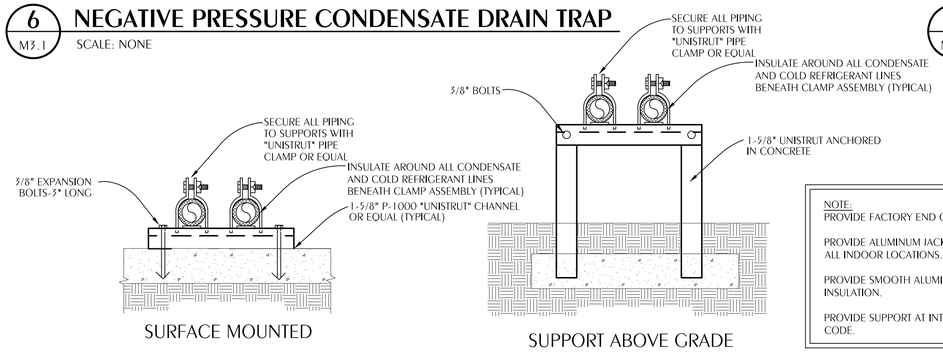
LOCATE TRAPS SO AS TO BE ACCESSIBLE FOR CLEANING.

H = AIR UNIT TOTAL STATIC PRESSURE + 1"

I = H/2

6 M3.1 NEGATIVE PRESSURE CONDENSATE DRAIN TRAP

SCALE: NONE



NOTE:
PROVIDE FACTORY END CAPS FOR CHANNEL.

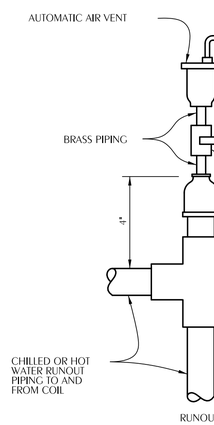
PROVIDE ALUMINUM JACKET BETWEEN INSULATION AND PIPE CLAMP AT ALL INDOOR LOCATIONS.

PROVIDE SMOOTH ALUMINUM JACKET OVER ALL EXPOSED OUTDOOR INSULATION.

PROVIDE SUPPORT AT INTERVALS REQUIRED BY THE FLORIDA BUILDING CODE.

9 M3.1 TYPICAL EXTERIOR PIPING SUPPORT DETAIL

SCALE: NONE



10 M3.1 TYPICAL AUTOMATIC AIR VENT DETAILS

SCALE: NONE

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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Florida Certificate of Authorization: 27825
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PROJECT:
HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC DETAILS

SHEET NUMBER:
M3.1

VERTICAL INSTALLATION

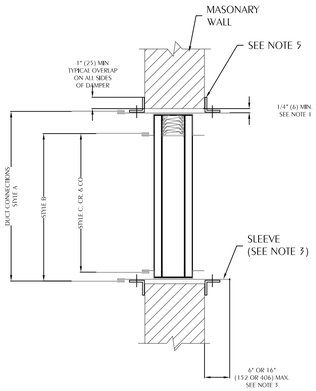
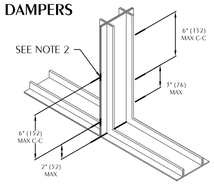


FIGURE 1

STAINLESS STEEL DAMPERS



GALVANIZED DAMPERS

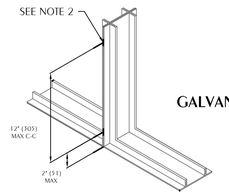


FIGURE 2
1 1/2 HOUR

HORIZONTAL INSTALLATION

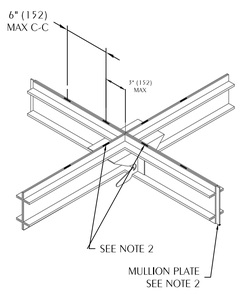


FIGURE 4
1 1/2 HOUR

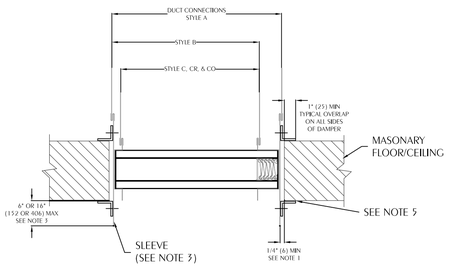


FIGURE 3

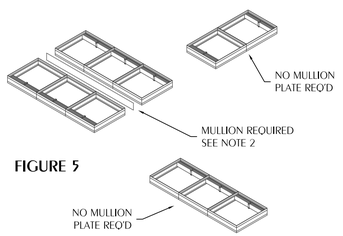
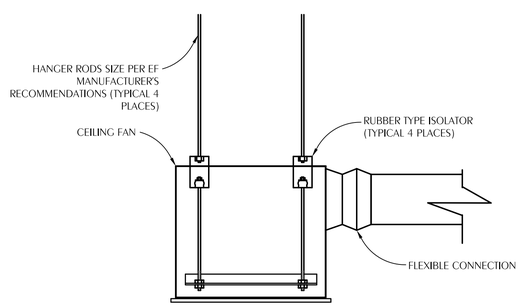


FIGURE 5

1. **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 is not used, the sleeve shall be a minimum of 16 gage (1.6) 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. Sleeve shall 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.
   a. **Mounting Angle Fasteners**
      Sleeve: #10 bolts or screws, 3/16" (5) steel rivets or 1/2" (13) long welds.
      Masonry/Wall or Floor: #10 self-tapping concrete screws.
      Wood/Steel Stud Wall: #10 screws
   b. **Mounting Angle Fastener Spacing**
      For one angle installations the sleeve fasteners shall be spaced at 6" (152) o.c. and the wall or floor fasteners shall be spaced at 12" (305) o.c. with a minimum of 2 fasteners on each side, top and bottom. Screw fasteners used in metal stud must engage the metal stud a minimum of 1/2" (13). Screw fasteners used in wood stud must engage the wood stud a minimum of 3/4" (19). Screw fasteners used in masonry walls or floors must engage the wall a minimum of 11/2" (38). For two angle installations the fasteners shall be spaced at 8" (203) o.c.
6. **Duct/Sleeve Connections**
   a. **Break-away Duct/Sleeve Connections**
      Rectangular ducts must use one or more of the connections: plain "S" slip, hemmed "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 flat oval break-away connections must use either a 4" (102) wide drawband or #10 sheet metal screws spaced equally around the circumference of the duct as follows:
      - Duct diameters 22" (559) and smaller — Maximum 3 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:
      - Hardcast, Inc. — Iron Grip 601
      - Precision —PA2084T
      - Eco Duct Seal 44-52
      - Design Polymerics — 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.



2 / M3.2 **CEILING FAN DETAIL**
SCALE: NONE

1 / M3.2 **TYPICAL HORIZONTAL AND VERTICAL FIRE DAMPER DETAIL**
SCALE: NONE

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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Commission Number: 24849

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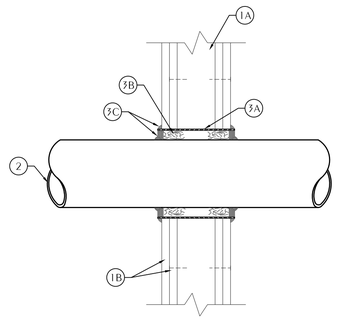
850.526.3447 Project Number 2024-037 — Keith A. Johnson, PE Florida License 86407

PROJECT:
HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC DETAILS

SHEET NUMBER:
M3.2



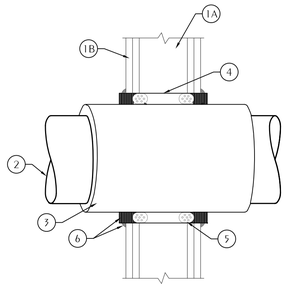
CONSULT CURRENT UNDERWRITERS LABORATORIES, INC. "FIRE RESISTANCE DIRECTORY" FOR DETAILS.
UL SYSTEM WL1003

1. 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 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 3-1/2 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 15 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 3A) SHALL BE MIN OF 0 IN. (POINT CONTACT) TO MAX 2-3/8 IN. PIPE, CONDUIT OR TUBING TO BE RIGIDLY 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 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 PIPE, NOM 12 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.
   E. COPPER PIPE—NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
3. FIRESTOP SYSTEM—INSTALLED SYMMETRICALLY ON BOTH SIDES OF WALL ASSEMBLY. THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS.
   A. STEEL SLEEVE—CYLINDRICAL SLEEVE 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 TO 4 IN. SUCH THAT, WHEN INSTALLED, THE ENDS OF THE SLEEVE WILL PROJECT APPROXIMATELY 1/2 TO 2 IN. BEYOND THE SURFACE OF THE WALL ON BOTH SIDES OF THE WALL ASSEMBLY.
      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 CUTOUTS IN THE GYPSUM
      WALLBOARD LAYERS.
   B. PACKING MATERIAL—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 1/2 IN. FROM END OF STEEL SLEEVE (FLUSH WITH OR RECESSED INTO GYPSUM WALLBOARD SURFACE) ON BOTH SIDES OF WALL ASSEMBLY.
   B1. PACKING MATERIAL—(NOT SHOWN)—AS AN ALTERNATE TO ITEM B, NOM 1 IN. THICK POLYETHYLENE BACKER ROD MAY BE USED. THE BACKER ROD IS TO BE RECESSED WITHIN THE STEEL SLEEVE A MIN OF 1 IN. FROM EACH SURFACE OF WALL.
   C. FILL, VOID OR CAVITY MATERIALS*—CAULK—WHEN MINERAL WOOL BATT INSULATION IS USED, APPLIED TO FILL THE STEEL SLEEVE TO A MIN DEPTH OF 1/2 IN. ON BOTH SIDES OF WALL ASSEMBLY. WHEN BACKER ROD IS USED, A MIN THICKNESS OF 1 IN. OF CP-25WB+ CAULK IS REQUIRED FLUSH WITH SURFACE OF WALL. 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. MINNESOTA MINING & MFG. CO.—CP 25WB+

*BEARING THE UL CLASSIFICATION MARKING

1 TYPICAL FIRE RATED WALL PENETRATION
M3.3 SCALE: NONE BARE METALLIC PIPE



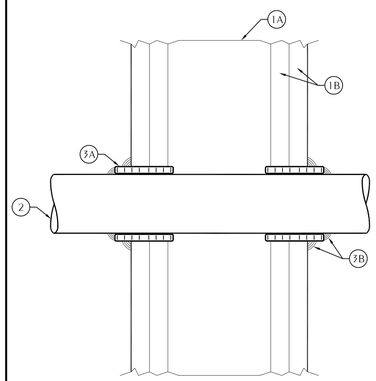
CONSULT CURRENT UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY" FOR DETAILS
UL SYSTEM WL5011

1. WALL ASSEMBLY—THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALLASSEMBLY SHALL 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 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 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 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 PIPES, CONDUITS 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, T RATING IS 1 HR.
   B. CONDUIT—NOM 3 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT. WHEN STEEL CONDUIT IS USED, T RATING IS 1/4 HR.
   C. COPPER TUBING—NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. WHEN COPPER TUBING IS USED, T RATING IS 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, T RATING IS 1/2 AND 1 HR WHEN INSTALLED IN 1 AND 2 HR RATED WALLS, RESPECTIVELY.
3. PIPE COVERING*—NOM 1 OR 1-1/2 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 FACTORYAPPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SEALED WITH METAL FASTENER STRIP TAPE SUPPLIED WITH THE PRODUCT.
   SEE PIPE AND EQUIPMENT COVERINGS—MATERIALS—(BRCU) 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 SLEEVE 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 OPENINGS CUT IN THE GYPSUM WALLBOARD LAYERS ON EACH SIDE 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 CUTOUTS IN THE GYPSUM WALLBOARD 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 WITHIN ANNULUS ON BOTH SIDES OF WALL ASSEMBLY. THICKNESS FOR FILL MATERIAL FOR NOM 3 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.
   MINNESOTA MINING & MFG. CO.—CP 25WB+

*BEARING THE UL CLASSIFICATION MARKING

2 TYPICAL FIRE RATED WALL PENETRATION
M3.3 SCALE: NONE INSULATED METALLIC PIPE

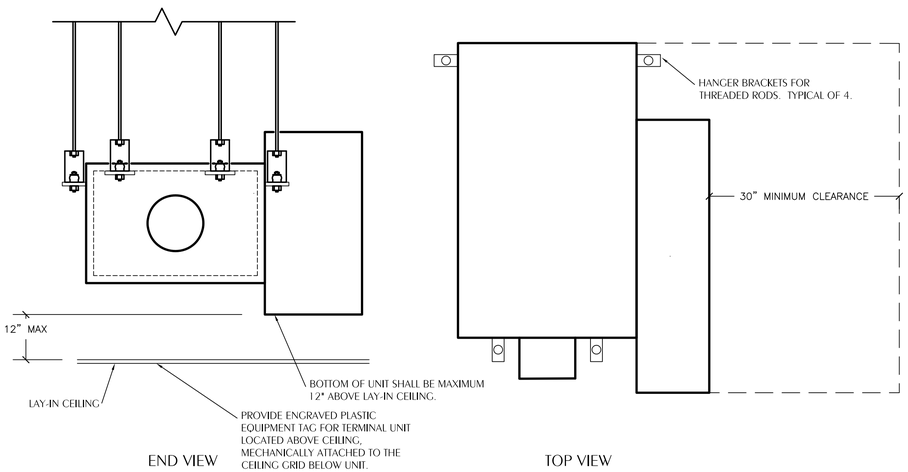


CONSULT CURRENT UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY" FOR DETAILS
UL SYSTEM WL2003

1. 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 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.
   B. 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.
2. THROUGH PENETRANTS—ONE NONMETALLIC PIPE OR CONDUIT TO BE CENTERED INTHE 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:
   A. 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.
   B. 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).
   C. 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.
   D. 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.
   E. 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.
   F. 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.
3. 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.
   A. 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+
   B. 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: L RATINGS APPLY ONLY WHEN TYPE CP-25 WB+ CAULK IS USED.)
   C. 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

3 TYPICAL FIRE RATED WALL PENETRATION
M3.3 SCALE: NONE BARE PLASTIC PIPE 2" DIAMETER OR SMALLER



END VIEW TOP VIEW

4 TERMINAL UNIT MOUNTING DETAIL
M3.3 SCALE: NONE

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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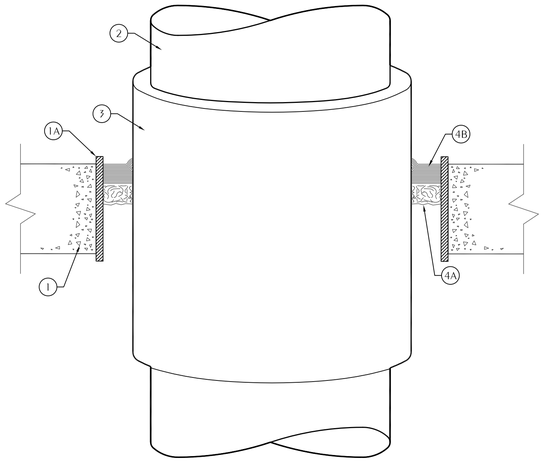
4452 Clinton Street, Marianna, Florida 32446 Florida Certificate of Authorization: 27825
850.526.3447 Project Number: 2024-037 Keith A. Johnson, PE Florida License 85457

PROJECT:
HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC DETAILS

SHEET NUMBER:
M3.3



CONSULT CURRENT UNDERWRITERS LABORATORIES *FIRE RESISTANCE DIRECTORY* FOR DETAILS

UL SYSTEM CAJ5001

1. 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.

1A. 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.

2. 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.

3. 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*(BRGU) 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. FIRESTOP SYSTEM—THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS.
   A. 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).
   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:

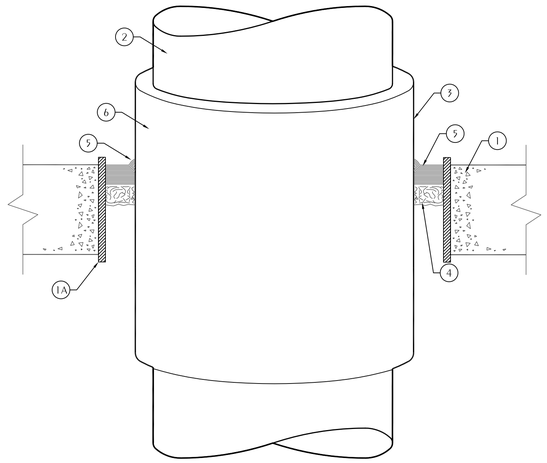
MIN FLOOR OR WALL THKNS IN.	MAX PIPE DIAM IN.	NOM PIPE COVERING THKNS IN.	ANNULAR SPACE IN.	F RATING HR	T RATING HR
2-1/2	4	1 OR 1-1/2	1/2 TO 2-3/8	2	1
4-1/2	4	2	1/4 TO 3-5/8	2	1-1/2
2-1/2	12	1	1/2 TO 1-1/2	2	1/2
4-1/2	12	1	1/2 TO 2-3/8	3	1
2-1/2	12	1/2	1/2 TO 2-3/8	2	0

MINNESOTA MINING & MFG. CO.—CP 25WB+.

*BEARING THE UL CLASSIFICATION MARKING

1 TYPICAL FIRE RATED WALL/FLOOR PENETRATION

M3.4 SCALE: NONE — FIBERGLASS INSULATED METALLIC PIPE



CONSULT CURRENT UNDERWRITERS LABORATORIES *FIRE RESISTANCE DIRECTORY* FOR DETAILS

UL SYSTEM CAJ5060

1. FLOOR OR WALL ASSEMBLY—MIN 2-1/2 IN. THICK LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. F RATINGS AND T RATINGS ARE DEPENDENT ON THE MIN THICKNESS OF FLOOR OR WALL, AS WELL AS THE MAX SIZE OF THE PIPE AND THE NOM THICKNESS OF THE CELLULAR GLASS INSULATION, AS NOTED IN ITEM 3. MAX DIAM OF THROUGH OPENING IS 28-1/2 IN.
   SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

1A. STEEL SLEEVE—MAX 15 IN. ID (OR SMALLER), MIN 0.25 IN. WALL THICKNESS (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.

2. THROUGH PENETRANTS—ONE METALLIC PIPE OR TUBING TO BE POSITIONED WITHIN THE FIRESTOP SYSTEM. PIPE OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR TUBING MAY BE USED:
   A. STEEL PIPE—NOM 20 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. COPPER TUBING—NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   C. COPPER PIPE—NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. PIPE COVERING MATERIALS*—CELLULAR GLASS INSULATION—NOM 1-1/2 TO 3 IN. THICK CELLULAR GLASS UNITS SIZED TO THE OUTSIDE DIAM OF THE STEEL PIPE AND SUPPLIED IN NOM 24 IN. LONG HALF SECTIONS OR NOM 18 IN. LONG SEGMENTS. PIPE INSULATION INSTALLED ON PIPE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. F RATINGS AND T RATINGS ARE DEPENDENT ON THE ITEMS NOTED IN THE FOLLOWING TABLE:

MIN FLOOR OR WALL THKNS IN.	MAX PIPE DIAM IN.	NOM GLASS INSUL THKNS IN.	F RATING HR	T RATING HR
2-1/2	6	1-1/2 AND 3	2	3/4
4-1/2	6	1-1/2	3	1
4-1/2	6	3	3	1-1/2
4-1/2	20	1-1/2	2	1/2
4-1/2	20	3	2	1

PITTSBURGH CORNING CORP.—FOAMGLAS

4. PACKING MATERIAL—MIN 1 IN. THICKNESS OF TIGHTLY-PACKED MINERAL WOOL BATT INSULATION MATERIAL USED AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED MIN 1 IN. FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL TO ACCOMMODATE THE CAULK FILL MATERIAL (ITEM 5).

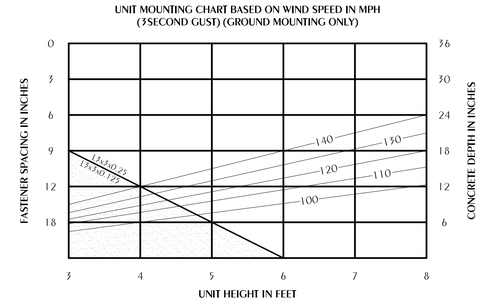
5. FILL, VOID OR CAVITY MATERIALS*—CAULK—INSTALLED TO FILL ANNULAR SPACE TO A MIN DEPTH OF 1 IN., FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL. A MIN 1/2 IN. DIAM BEAD OF CAULK SHALL BE APPLIED TO THE PIPE INSULATION/CONCRETE INTERFACE AT THE POINT CONTACT LOCATION ON THE TOP SURFACE OF THE FLOOR AND ON BOTH SIDES OF WALLS.
   MINNESOTA MINING & MFG. CO.—CP 25WB+.

6. METAL JACKET—MIN 12 IN. LONG JACKET FORMED OF MIN 0.010 IN. THICK STEEL OR ALUMINUM SHEET CUT TO WRAP TIGHTLY AROUND THE PIPE INSULATION WITH A MIN 2 IN. LAP AND SECURED USING BANDS AND SEALS OF SIMILAR MATERIAL. BANDS TO BE LOCATED WITHIN 2 IN. OF EACH END OF THE JACKET AND SPACED MAX 10 IN. OC. JACKET TO BE INSTALLED WITH EDGE ABUTTING SURFACE OF CAULK FILL MATERIAL (ITEM 5) ON TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL. METAL JACKET TO BE USED IN ADDITION TO ANY OTHER JACKETING MATERIAL WHICH MAY BE REQUIRED OR DESIRED ON THE PIPE INSULATION.

*BEARING THE UL CLASSIFICATION MARKING

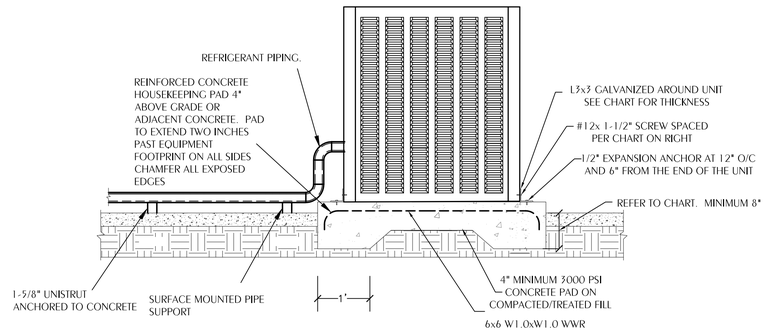
2 TYPICAL FIRE RATED WALL/FLOOR PENETRATION

M3.4 SCALE: NONE — CELLULAR GLASS INSULATED METALLIC PIPE



DESIGN CRITERIA:

CODE:	ASCE 7-05
VELOCITY:	SEE BELOW
Kz:	0.70
Kzt:	1.00
Kd:	0.85
IMPORTANCE:	1.15
EXPOSURE:	B
Cf:	1.3
Gf:	0.85
qz:	
100 mph	17.52 psf
110 mph	21.20 psf
120 mph	25.22 psf
130 mph	29.60 psf
140 mph	34.33 psf
Pdesign:	
100 mph	19.36 psf
110 mph	23.42 psf
120 mph	27.87 psf
130 mph	32.71 psf
140 mph	37.94 psf



3 TYPICAL OUTDOOR MECHANICAL UNIT MOUNTING DETAIL

M3.4 SCALE: NONE

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.

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/10/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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850.526.3447 Project Number: 2024-037 — Keith A. Johnson, PE Florida License 86437

PROJECT:

HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY

TALLAHASSEE, FLORIDA

SHEET TITLE:

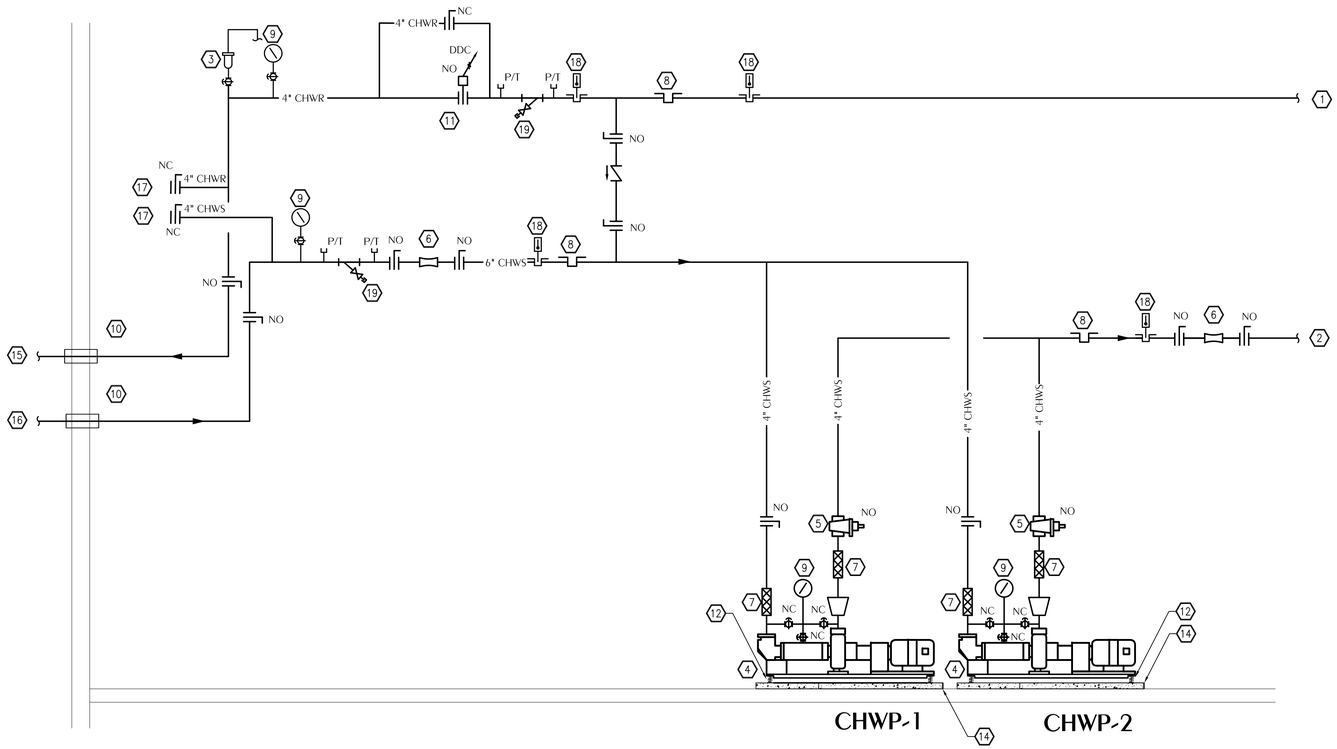
HVAC DETAILS

SHEET NUMBER:

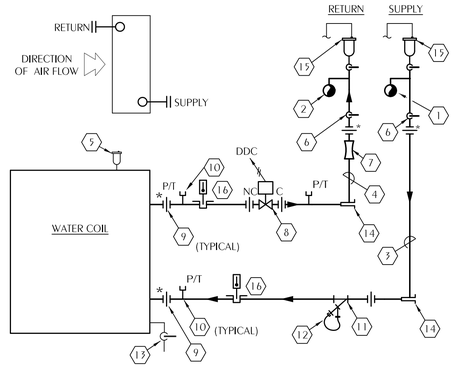
M3.4

CHILLED WATER PLANT PIPING DIAGRAM NOTES

1. CHWR FROM BLDG.
2. CHWS TO BLDG.
3. AUTOMATIC AIR VENT AT ALL HIGH POINTS, PIPE TO FLOOR DRAIN WITH 1/4" COPPER TUBING.
4. SUCTION DIFFUSER
5. PUMP DISCHARGE VALVE-DO NOT USE FOR BALANCING.
6. VENTURI FLOW METER
7. TYPE PF1 FLEXIBLE CONNECTOR PER PROJECT SPECIFICATIONS.
8. STAINLESS STEEL WELL FOR EMCS SENSOR
9. PRESSURE GAUGE
10. PIPE SLEEVE THROUGH WALL PER SPECIFICATIONS
11. MOTORIZED CONTROL VALVE
12. TYPE BF2 VIBRATION ISOLATION PER SPECIFICATIONS.
13. THERMOMETER WELL AND PRESSURE TAP AND VALVE WITH SNUBBER.
14. CONCRETE HOUSEKEEPING PAD.
15. CHWR TO CENTRAL PLANT.
16. CHWS FROM CENTRAL PLANT.
17. PROVIDE BUTTERFLY VALVE AND BLIND FLANGE.
18. THERMOMETER.
19. Y STRAINER WITH HOSE END AND CAP.



1 CHILLED WATER PIPING DIAGRAM
M5.2 SCALE: NONE



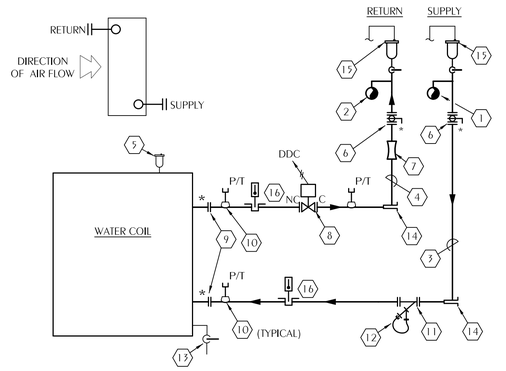
KEY NOTES:

1. SUPPLY MAIN
2. RETURN MAIN
3. SUPPLY RUNOUT
4. RETURN RUNOUT
5. 1/4" AUTOMATIC AIR VENT IN COIL HEADER, FLOW DESIGN MODEL AA025.
6. BALL SERVICE VALVE, SCREWED
7. VENTURI FLOW METER
8. 2-WAY PRESSURE INDEPENDENT CONTROL VALVE, BRASS CONSTRUCTION
9. SERVICE UNION
10. PRESSURE/TEMPERATURE PORT WITH EXTENDED NECK
11. BRONZE STRAINER, SCREWED.
12. STRAINER BLOWDOWN/HOSE END DRAIN VALVE WITH BRASS CAP AND CHAIN FLOW DESIGN MODEL HE.
13. 3/8" COPPER DRAIN W/BALL VALVE
14. STAINLESS STEEL WELL FOR DDC TEMPERATURE TRANSMITTER IN TEE, COORDINATE WITH DDC CONTRACTOR. (OMIT ON TERMINAL UNITS AND DUCT MOUNTED REHEAT COILS).
15. 1/2" AUTOMATIC AIR VENT, SEE MOUNTING DETAIL 10/M3.1.
16. THERMOMETER (OMIT ON TERMINAL UNITS AND DUCT MOUNTED REHEAT COILS).

GENERAL NOTES:

1) SUPPLY AND RETURN RUNOUT PIPING FROM TEE AT AUTO AIR VENT TO COIL SHALL BE SCHEDULE 40 GALVANIZED STEEL WITH GALVANIZED MALLEABLE IRON FITTINGS. TYPE L HARD DRAWN COPPER IS ACCEPTABLE AT THE CONTRACTOR'S OPTION.
2) VENTURI FLOW METERS SHALL NOT REQUIRE MORE THAN 5 STRAIGHT PIPE DIAMETERS UPSTREAM NOR 2 PIPE DIAMETERS DOWNSTREAM TO ACHIEVE RATED ACCURACY (2%). VENTURI FLOW METERS TO BE BY FLOW DESIGN INC, AEROQUIP CORPORATION, GERAND ENGINEERING COMPANY, PRESCO, OR APPROVED EQUAL.
3) INSTALL COIL COMPONENTS IN THE PHYSICAL RELATIONSHIP INDICATED WITH RESPECT TO THE COIL, AND TO EACH OTHER.
4) INSTALL 2-WAY CONTROL VALVE WITH ACTUATOR IN VERTICAL POSITION.
5) INSTALL P/T PORTS IN REDUCING TEE. HALF COUPLINGS ARE NOT ALLOWABLE.
6) ARRANGE PIPING SUCH THAT THE ENTIRE COIL CONNECTION ASSEMBLY CAN BE REMOVED BY DISCONNECTING AT POINTS MARKED WITH AN ASTERISK (*) FOR COIL SERVICING. PIPING SHALL NOT INTERFERE WITH ACCESS TO ANY COMPONENT OF THE AIR HANDLING UNIT THAT REQUIRES SERVICE.

2 TYPICAL COIL CONNECTION SCHEMATIC
M4.1 SCALE: NONE — PIPE SIZE 2" AND SMALLER



KEY NOTES:

1. SUPPLY MAIN
2. RETURN MAIN
3. SUPPLY RUNOUT
4. RETURN RUNOUT
5. 1/4" AUTOMATIC AIR VENT IN COIL HEADER, FLOW DESIGN MODEL AA025.
6. BUTTERFLY SERVICE VALVE, FLANGED
7. VENTURI FLOW METER
8. 2-WAY PRESSURE INDEPENDENT CONTROL VALVE, BRASS CONSTRUCTION.
9. SERVICE FLANGE
10. PRESSURE/TEMPERATURE PORT WITH EXTENDED NECK
11. CAST IRON STRAINER, FLANGED.
12. STRAINER BLOWDOWN/HOSE END DRAIN VALVE WITH BRASS CAP AND CHAIN, FLOW DESIGN MODEL HE.
13. 3/8" COPPER DRAIN W/BALL VALVE
14. STAINLESS STEEL WELL FOR DDC TEMPERATURE TRANSMITTER IN TEE, COORDINATE WITH DDC CONTRACTOR.
15. 3/4" AUTOMATIC AIR VENT, SEE MOUNTING DETAIL 10/M3.1.
16. THERMOMETER

GENERAL NOTES:

1) VENTURI FLOW METERS SHALL NOT REQUIRE MORE THAN 5 STRAIGHT PIPE DIAMETERS UPSTREAM NOR 2 PIPE DIAMETERS DOWNSTREAM TO ACHIEVE RATED ACCURACY (2%). VENTURI FLOW METERS TO BE BY FLOW DESIGN INC, AEROQUIP CORPORATION, GERAND ENGINEERING COMPANY, PRESCO, OR APPROVED EQUAL.
2) INSTALL P/T PORTS IN FORGED STEEL THREDOLETS OR REDUCING TEE. HALF COUPLINGS ARE NOT ALLOWABLE.
3) ARRANGE PIPING SUCH THAT THE ENTIRE COIL CONNECTION ASSEMBLY CAN BE REMOVED BY DISCONNECTING AT POINTS MARKED WITH AN ASTERISK (*) FOR COIL SERVICING. PIPING SHALL NOT INTERFERE WITH ACCESS TO ANY COMPONENT OF THE AIR HANDLING UNIT THAT REQUIRES SERVICE.

3 TYPICAL COIL CONNECTION SCHEMATIC
M4.1 SCALE: NONE — PIPE SIZE LARGER THAN 2"

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

PHASE	DRAWN	CHECKED	DATE
SCHEMATIC DESIGN SUBMITTAL			05/31/24
DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
CONSTRUCTION DOCUMENTS	ISL	KAJ	03/07/25

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850.526.3447 Project Number: 2024-037 Keith A. Johnson, PE Florida License 86457

PROJECT:
HOWARD HALL RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC CHILLED WATER PIPING DIAGRAM

SHEET NUMBER:
M4.1

DIRECT DIGITAL CONTROLS GENERAL NOTES

1. THE CONTRACTOR SHALL CONNECT TO EXISTING CAMPUS DDC SYSTEM TO PERFORM THE INDICATED SEQUENCES, ALL OTHER FUNCTIONS REQUIRED BY THE CONTRACT DOCUMENTS, AND ALL OTHER FUNCTIONS REQUIRED FOR A COMPLETE AND FUNCTIONAL SYSTEM.
2. ALL SEQUENCES ARE SUBJECT TO SAFETIES. DDC CONTRACTOR SHALL PROVIDE ALL NECESSARY AND CUSTOMARY SAFETIES.
3. ALL WIRING SHALL BE IN CONDUIT. ALL CONDUIT SHALL BE IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS, REQUIREMENTS FOR 120 VAC CIRCUITS.
4. ALL CONTROL TUBING SHALL BE RUN IN CONDUIT. ALL CONDUIT SHALL BE IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS, REQUIREMENTS FOR 120 VAC CIRCUITS.
5. ALL WELLS SHALL BE 316 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.
6. 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.
7. THE DDC CONTRACTOR AND THE TAB CONTRACTOR SHALL UTILIZE P/T'S TO CALIBRATE INSTRUMENTS TO CERTIFIED PRESSURE GAGES, PRESSURE METERS AND THERMOMETERS.
8. CONDUIT SHALL BE RUN PERPENDICULAR AND PARALLEL TO BUILDING LINES IN A FIRST CLASS WORKMANSHIP LIKE MANNER.
9. PROVIDE A COMPLETE NEW DDC SYSTEM.
10. THE NEW DDC SYSTEM SHALL BE A COMPLETE NEW BACNET COMPATIBLE SYSTEM. ALL DEVICE CONTROLLERS SHALL BE BACNET COMPATIBLE DEVICES WITHOUT THE USE OF EXTERNAL TRANSLATION DEVICES.

SEQUENCE OF OPERATION
BUILDING CHILLED WATER SYSTEM

STARTING AND STOPPING OF EQUIPMENT SHALL BE ACCOMPLISHED THRU A "HAND-OFF-AUTO" SWITCH LOCATED ON FACE OF THE CHILLED WATER SYSTEM CONTROL PANEL. WITH THE CHW SYSTEM HOA SWITCH IN THE "AUTO" POSITION, THE CHILLED WATER SYSTEM SHALL BE ENABLED BY THE DDC SYSTEM AND STARTED UNDER ITS OWN SEQUENCE SUBJECT TO SAFETIES AND OVERLOADS.

THE CHILLED WATER SYSTEM SHALL BE STARTED AUTOMATICALLY WHENEVER ANY OF THE FOLLOWING CONDITIONS OCCUR:

A) ANY SPACE TEMPERATURE IS ABOVE SET POINT THROTTLING RANGE.

B) ANY SPACE REQUIRES HUMIDITY CONTROL.

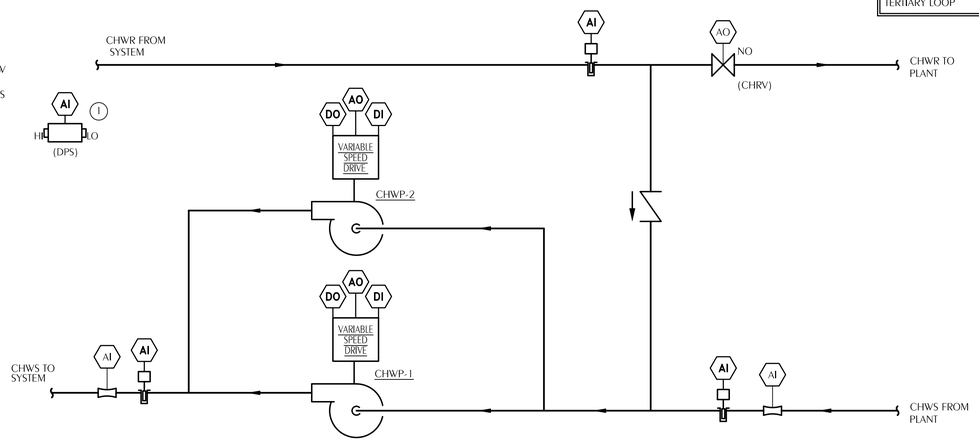
CHILLED WATER SYSTEM PUMP CONTROL: UPON CHILLED WATER SYSTEM STARTUP, THE DDC SYSTEM SHALL START CHWP-1 OR CHWP-2 AS REQUIRED. THE DDC SHALL ALTERNATE CHWP'S WEEKLY BASED ON RUNTIME. WHENEVER THE CHW SYSTEM IS IN OPERATION THE DDC SHALL MODULATE PUMP SPEED WITH THE VFD TO MAINTAIN DIFFERENTIAL PRESSURE SET POINT INSIDE THE BUILDING. IF A PUMP FAILS TO OPERATE WHEN ENABLED, THE DDC SYSTEM SHALL START THE ALTERNATE PUMP AND POST AN ALARM. THE DDC SHALL MONITOR TOTAL BUILDING FLOW.

CHILLED WATER SYSTEM PRESSURE SETPOINT OPTIMIZATION:

THE DDC SHALL CONTINUALLY MONITOR THE CHILLED WATER VALVE (CHWV) POSITION OF ALL AHU'S AND FAN COIL UNITS CONNECTED TO THE CHILLED WATER SYSTEM. AT STARTUP, THE PUMP DIFFERENTIAL PRESSURE CONTROL SETPOINT SHALL BE THE REQUIRED VALUE MEASURE BY THE TEST AND BALANCE CONTRACTOR TO INSURE DESIGN FLOW AT ALL DEVICES AT FULL LOAD CONDITIONS. WHEN ALL CHWVs ARE LESS THAN 85% OPEN, THE DDC SHALL LOWER THE SETPOINT BY 0.1 PSI EVERY FIVE MINUTES UNTIL AT LEAST ONE VALVE IS MORE THAN 85% OPEN OR THE PUMP HAS REACHED MINIMUM SPEED. WHEN ANY CHWV IS MORE THAN 95% OPEN, THE DDC SHALL INCREASE THE DIFFERENTIAL PRESSURE CONTROL SETPOINT BY 0.1 PSI EVERY FIVE MINUTES UNTIL NO VALVE IS MORE THAN 95% OPEN OR THE SETPOINT HAS REACHED IS TEST AND BALANCE DETERMINED MAXIMUM VALUE.

CHILLED WATER SUPPLY CONTROL:

THE DDC SHALL MODULATE THE CHILLED WATER RETURN VALVE (CHRV) TO MAINTAIN BUILDING CHILLED WATER SUPPLY AT SETPOINT, 45° (ADJUSTABLE).



1 / M5.1 BUILDING CHILLED WATER SYSTEM CONTROL DIAGRAM

SCALE: NONE

BACnet MONITORED SYSTEMS

DIVISION 22 AND 26 SYSTEMS

THE DDC SHALL MONITOR SYSTEM CONTROLLERS PROVIDED BY OTHERS THROUGH A FACTORY BACnet INTERFACE. THE DDC SHALL READ AND IDENTIFY ALL POINTS TRANSMITTED BY THE FACTORY CONTROLLER. THE DDC SHALL INCLUDE A SYSTEM GRAPHIC FOR EACH CONTROLLED DEVICE WITH BACnet ADJUSTABLE SET POINTS IDENTIFIED AND ADJUSTABLE FROM THE GRAPHIC. THE FOLLOWING SYSTEMS ARE TO BE INCLUDED:

LIGHTING CONTROL PANEL

FLOOD ALARM DEVICES

COORDINATE WITH THE EQUIPMENT AND CONTROLLERS PROVIDED BY OTHERS. MONITOR KW DEMAND AND KWH FROM MAIN ELECTRICAL PANEL.

DIVISION 23 SYSTEMS

IN ADDITION TO SYSTEMS NOTED IN SPECIFIC CONTROL DIAGRAMS ON THESE DRAWINGS, THE DDC SHALL MONITOR DUCTLESS SPLIT AND MULTIZONE DUCTLESS SPLIT SYSTEM CONTROLLERS SERVING SWITCHGEAR, ELECTRICAL, COMM ROOMS, AND STAIRS. THE DDC SHALL READ AND IDENTIFY ALL POINTS TRANSMITTED BY THE FACTORY CONTROLLER. THE DDC SHALL INCLUDE A SYSTEM GRAPHIC FOR EACH CONTROLLED DEVICE WITH SPACE SET POINTS IDENTIFIED AND ADJUSTABLE FROM THE GRAPHIC.

BUILDING CHILLED WATER SYSTEM POINTS LIST

SYSTEM POINT DESCRIPTION		ANALOG							DIGITAL								SYSTEMS FEATURES											
		INPUT				OUTPUT			INPUT				OUTPUT				ALARMS								PROGRAMS			
CHILLER	GRAPHIC	TEMPERATURE	PERCENT	DIFFERENTIAL PRESSURE	FLOW RATE	DDC			SETPOINT ADJ	VFD SPEED	OPEN/CLOSE		HOA STATUS	STATUS ON/OFF	STATUS	STATUS OPEN/CLSD	STARTS/OP	OPEN/CLOSE	LOCK OUT	ENABLE/DISABLE	HIGH/LOW	HIGH ANALOG	LOW ANALOG	SENSOR FAIL	FLOW FAIL	DIAGNOSTICS	COMM. FAIL	DIAGNOSTICS	TIME SCHEDULING	RUN TIME	TIMED OVERRIDE	MODE CONTROL	ALTERNATE
CHILLER PLANT	X																											
CHWP-1										X			X											X			X	X	X		X
CHWP-2										X			X											X			X	X	X		X
TERTIARY LOOP				X	X																	X	X								

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PROJECT:
HOWARD HALL
RENOVATIONS
FLORIDA A&M UNIVERSITY
TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC CONTROLS

SHEET NUMBER:
M5.1

SEQUENCE OF OPERATION
SINGLE DUCT TERMINAL UNIT

EACH TERMINAL UNIT SHALL BE PROVIDED WITH A UNIT CONTROL MODULE (UCM). THE UCM SHALL BE FACTORY MOUNTED. THE ELECTRICAL CONTRACTOR SHALL PROVIDE POWER TO EACH TERMINAL UNIT. 24V CONTROLS TRANSFORMER FOR EACH TU FURNISHED WITH EACH TU. THE ZONE TEMPERATURE SENSOR WITH SET POINT ADJUSTMENT SHALL BE PROVIDED WITH NIGHT SETBACK OVERRIDE, AND A COMMUNICATIONS JACK. UPPER AND LOWER ZONE TEMPERATURE SET POINTS SHALL BE SET BY THE DDC.

UNIT AIRFLOW SHALL BE MONITORED BY AN INTEGRAL, MULTIPLE POINT, AVERAGING FLOW SENSING DEVICE AND A TRANSDUCER TO MAINTAIN AIRFLOW WITHIN 5% OF RATED CFM DOWN TO A MINIMUM CFM AS SCHEDULED, INDEPENDENT OF CHANGES IN SYSTEM STATIC PRESSURE.

COOLING MODE: THE UCM SHALL MONITOR THE ZONE TEMPERATURE AGAINST ITS SET POINT (74°F ADJUSTABLE) AND MODULATE THE DAMPER TO MEET THE ZONE SETPOINT. IF THE TU CALLS FOR FULL COOLING AND CANNOT REACH MAXIMUM AIRFLOW FOR FIVE MINUTES, THE DDC SHALL RESET THE RTU STATIC PRESSURE UP 0.15". AS THE COOLING SET POINT IS REACHED, THE UCM SHALL MODULATE THE ZONE DAMPER TO THE MINIMUM SCHEDULED COOLING CAPACITY.

HEATING MODE: IF THE ZONE REACHES MINIMUM COOLING AIRFLOW AND THERE IS A CALL FOR HEAT (COOLING SET POINT MINUS 3°F), THE UCM SHALL MODULATE THE UNIT MOUNTED ELECTRIC REHEAT SCR CONTROLLER TO INCREASE SUPPLY AIR TEMPERATURE AS REQUIRED TO MAINTAIN ROOM TEMPERATURE AT SETPOINT UP TO THE MAXIMUM SUPPLY AIR TEMPERATURE INDICATED IN THE TERMINAL UNIT SCHEDULE. IF THERE IS A CONTINUED CALL FOR HEAT UPON REACHING THE MAXIMUM HEATING SUPPLY AIR TEMPERATURE, THE UCM SHALL MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT AND MODULATE AIRFLOW UNTIL THE MAXIMUM HEATING AIRFLOW IS REACHED.

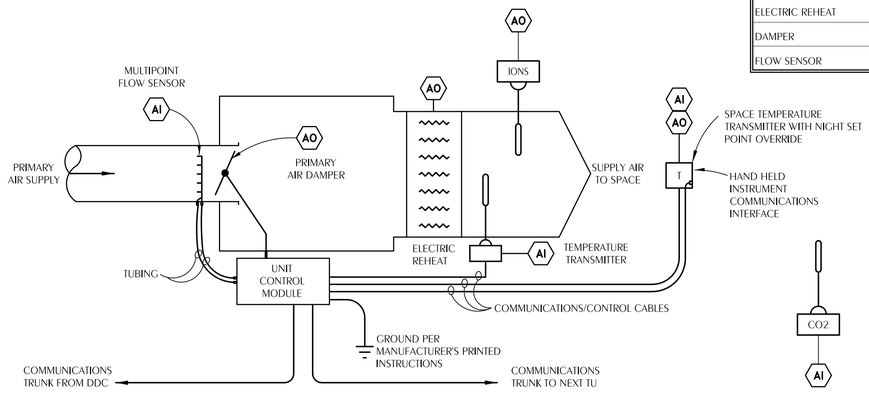
OCCUPIED/UNOCCUPIED MODE: CONTROLS CONTRACTOR SHALL CONSULT WITH OWNER FOR SPACE TEMPERATURE SETPOINTS.

UNOCCUPIED TIMES DURING SCHEDULED OCCUPANCY (CLASSROOMS ONLY): THE UCM SHALL MONITOR THE ISOLATED OCCUPANCY RELAY FROM THE LOW VOLTAGE ROOM OCCUPANCY SENSORS FOR THE LIGHTING SYSTEM PROVIDED BY DIVISION 21. WHEN THE OCCUPANCY SENSOR(S) FOR A TERMINAL UNIT INDICATE THE ROOM IS UNOCCUPIED, THE UCM SHALL RESET THE MINIMUM SUPPLY AIR SETPOINT FOR THE TERMINAL UNIT TO 0 CFM. IF THE AHU SERVING THE TERMINAL UNIT REACHES MINIMUM SPEED AND THE SUPPLY AIR STATIC PRESSURE RISES ABOVE SETPOINT FOR LONGER THAN 5 MINUTES, THE DDC SHALL RESET THE MINIMUM AIRFLOW BACK TO OCCUPIED VALUES.

OVERRIDE MODE: THE OVERRIDE TIMER SHALL PLACE THE TU AND RTU IN OCCUPIED MODE FOR ONE HOUR (ADJUSTABLE).

MINIMUM AIRFLOW RESET (TU-2-1.3A, TU-2-1.3B, TU-2-1.3C ONLY): PROVIDE CO2 SENSOR IN RM. 204 ASSEMBLY AREA FOR TERMINAL UNIT MINIMUM AIRFLOW RESET. UPON A RISE IN SPACE CO2 CONCENTRATION ABOVE 1540 PPM FOR FIVE MINUTES, THE DDC SHALL RESET THE TU MINIMUM AIRFLOW TO 100% UNTIL CO2 CONCENTRATION FALLS BELOW 1300 PPM FOR FIVE MINUTES.

ION SENSOR: TU-1-1.9C AND TU-2-1.4 SHALL BE EQUIPPED WITH A SUPPLY AIR MOUNTED ION SENSOR WITH ADJUSTABLE SETPOINT AND ANALOG INPUT. THE DDC SHALL POST AN ALARM WHEN THE ION COUNT FALLS BELOW THE SETPOINT. INITIAL SETPOINT MINIMUM SHALL BE 5000 IONS/CC/SEC. DUCT SETPOINT SHALL BE CONFIRMED BY SPACE ION MEASUREMENTS AT A MINIMUM OF 2000 IONS/CC/SEC IN THE SPACE SERVED.



1 M5.2 **SINGLE DUCT TU CONTROL DIAGRAM**
SCALE: NONE

SINGLE DUCT TU POINTS LIST

SYSTEM POINT DESCRIPTION	ANALOG INPUT: GRAPHIC	TEMPERATURE	CO2	CFM	HUMIDITY	IONS	ANALOG OUTPUT: % OPEN/ON	VARIABLE FREQ. DRIVE	SET POINT ADJ.	DIGITAL INPUT: PNEU. TRANSDUCER	STATUS ON/OFF	FILTER STATUS	SMOKE	IONS	DIGITAL OUTPUT: START/STOP	OPEN/CLOSE	LOCK OUT	ENABLE/DISABLE	SYSTEMS FEATURES ALARMS: HIGH ANALOG	LOW ANALOG	SENSOR FAIL	COMM. FAIL	DIAGNOSTICS	LATCHING	PROGRAMS: TIME SCHEDULING	RUN TIME	TIMED OVERRIDE	MODE CONTROL
CONTROL PANEL																							X	X	X			
SUPPLY AIR TO SPACE		X																	X	X	X						
ZONE SENSOR		X	X			X		X											X	X	X						
ELECTRIC REHEAT							X																					
DAMPER							X																					
FLOW SENSOR			X																		X							

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DESIGN DEVELOPMENT	ISL	KAJ	08/06/24
70% CONSTRUCTION DOCUMENTS	ISL	KAJ	12/20/24
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TALLAHASSEE, FLORIDA

SHEET TITLE:
HVAC CONTROLS

SHEET NUMBER:
M5.2

SEQUENCE OF OPERATION
VARIABLE VOLUME AHU

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

OCCUPIED MODE:

OPEN OUTSIDE AIR DAMPER AND START EXHAUST FANS INDICATED WHENEVER THE BUILDING IS IN OCCUPIED MODE.

COOLING COIL FREEZE PROTECTION: THE DDC SYSTEM SHALL CLOSE THE OUTSIDE AIR DAMPER ANYTIME THE COOLING COIL ENTERING AIR TEMPERATURE FALLS BELOW 40°F LONGER THAN 5 MINUTES. THE LOW LIMIT FREEZE STAT SHALL STOP THE AHU FAN MOTOR ANYTIME THE COOLING COIL ENTERING AIR TEMPERATURE FALLS BELOW 35°F.

DISCHARGE TEMPERATURE CONTROL: THE DDC SYSTEM SHALL MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SET POINT (REFER TO AHU SCHEDULE). WHEN MINIMUM SPEED IS REACHED AND THERE IS A CALL FOR HEATING FROM ANY ZONE, THE DDC SHALL RESET SUPPLY AIR TEMPERATURE UP IN 2°F INCREMENTS EVERY FIVE MINUTES TO A MAXIMUM OF 65°F. THE DDC SHALL REVERSE SUPPLY AIR RESET UPON A CALL FOR COOLING OR WHEN RETURN AIR RH RISES ABOVE 60%.

FAN SPEED CONTROL: SUBJECT TO THE DUCT MOUNTED HIGH LIMIT STATIC PRESSURE SENSORS, THE ADJUSTABLE VARIABLE FREQUENCY DRIVE SHALL MODULATE FAN SPEED AS REQUIRED TO MAINTAIN A CONSTANT STATIC PRESSURE AT THE DUCT MOUNTED STATIC PRESSURE SENSOR. THE DUCT STATIC PRESSURE SET POINT SHALL BE SET AT THE MINIMUM REQUIRED FOR TEST AND BALANCE. WHEN NONE OF THE TU'S ASSOCIATED WITH THE AHU HAVE BEEN IN FULL COOLING MODE FOR FIVE MINUTES, THE DDC SHALL RESET THE DUCT STATIC PRESSURE DOWN 0.15". AHU AIRFLOW SHALL BE LIMITED TO SCHEDULED MAXIMUM AND MINIMUM VALUES. AHU FAN SHALL RUN CONTINUOUSLY.

OUTSIDE AIR CONTROL: THE DDC SYSTEM, WITH OA DUCT MOUNTED FLOW MEASURING STATION, SHALL MODULATE RA DAMPER AS REQUIRED TO MAINTAIN OUTSIDE AIR QUANTITY AT SET POINT REGARDLESS OF THE TOTAL AIR FLOW OF THE AIR HANDLING UNIT AT ANYTIME. READOUT OF OUTSIDE AIR QUANTITY SHALL BE IN CFM. OUTSIDE AIR DAMPER SHALL BE OPENED TO ITS BALANCED POSITION DURING OCCUPIED CYCLES. UPON FAILURE THE OA DAMPER SHALL BE NORMALLY CLOSED. WHENEVER THE AHU OPERATES DURING UNOCCUPIED MODE, THE OA DAMPER SHALL REMAIN CLOSED.

UNOCCUPIED MODE: THE OA DAMPER SHALL SHUT AND THE FAN SHALL CYCLE UPON A CALL FOR COOLING OR HEATNG FROM ANY SPACE.

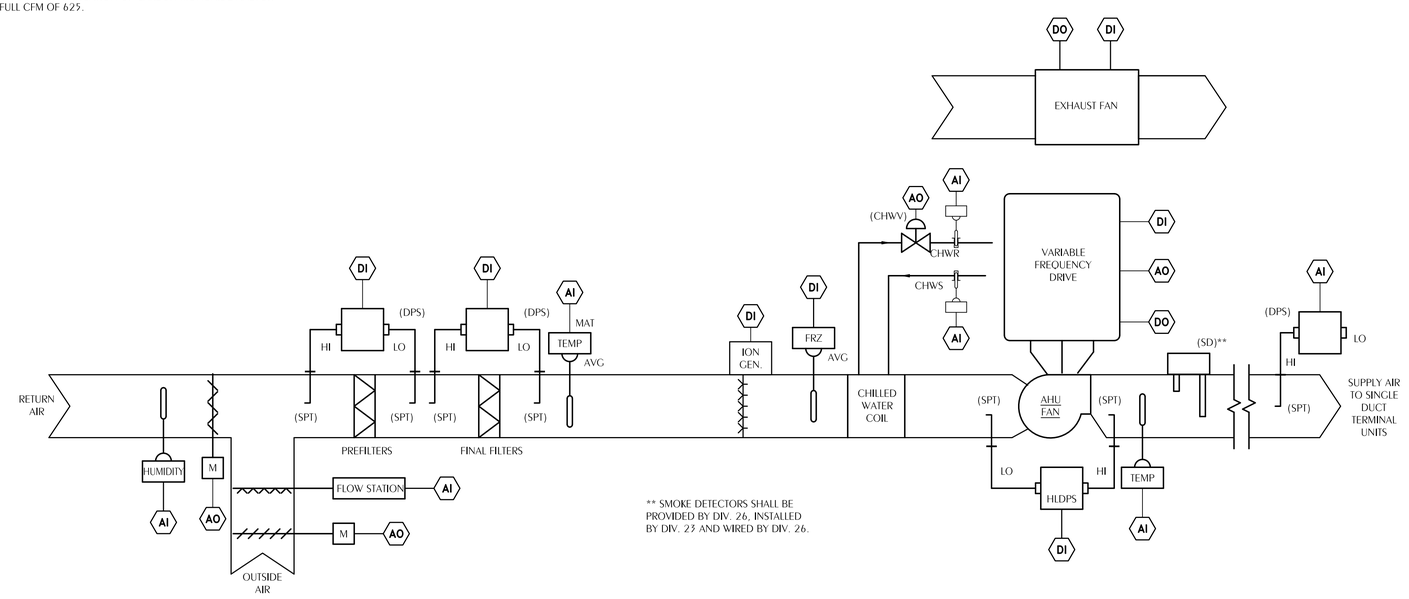
THE DDC SYSTEM SHALL MODULATE THE CHILLED WATER VALVE AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SET POINT (REFER TO AHU SCHEDULE).

INTERLOCKED EXHAUST FANS: INTERLOCKED EXHAUST FANS SHALL OPERATE ONLY DURING OCCUPIED TIMES AND MONITOR STATUS VIA CURRENT SENSOR.

EF-1-2: FAN SHALL OPERATE AT LOW CFM EXHAUST OF 50 . UPON INDICATION OF CARBON MONOXIDE AND/OR NITROGEN DIOXIDE DETECTION, FAN SHALL EXHAUST FULL CFM OF 625.

VARIABLE VOLUME AHU POINTS LIST

SYSTEM POINT DESCRIPTION	ANALOG INPUT: GRAPHIC	TEMPERATURE	CFM	STATIC PRESSURE	HUMIDITY	ANALOG OUTPUT: OPEN	VARIABLE FREQ. DRIVE	SET POINT ADJ.	DIGITAL INPUT: FAULT	STATUS	FILTER STATUS	SMOKE	DIGITAL OUTPUT: START/STOP	OPEN/CLOSE	LOCK OUT	ENABLE/DISABLE	HIGH/LOW	SYSTEMS FEATURES ALARMS: HIGH ANALOG	LOW ANALOG	SENSOR FAIL	COMM. FAIL	DIAGNOSTICS	LATCHING	PROGRAMS: TIME SCHEDULING	RUN TIME	TIMED OVERRIDE	MODE CONTROL
CONTROL PANEL	X																			X	X	X			X	X	
FAN CONTROL							X		X	X			X							X							
RETURN AIR					X													X	X	X							
MIXED AIR		X																X	X	X							
CHWC DISCHARGE AIR		X																X	X	X							
COOLING VALVE (CHWV)						X																					
CHWS		X																X	X	X							
CHWR		X																X	X	X							
FILTERS											X							X		X							
OUTSIDE AIR			X															X	X	X							
RETURN AIR DAMPER						X																					
DUCT STATIC PRESSURE				X														X	X	X							
OUTSIDE AIR DAMPER						X																					
HLDPS																	X	X									
EXHAUST FAN									X				X							X							
BI-POLAR IONIZATION									X											X							



** SMOKE DETECTORS SHALL BE PROVIDED BY DIV. 26, INSTALLED BY DIV. 23 AND WIRED BY DIV. 26.

1 M5.3 **VARIABLE VOLUME AHU CONTROL DIAGRAM**

SCALE: NONE

TYPICAL FOR AHU1-1, 2-1

REVISIONS

NO.	DESCRIPTION	DRAWN	CHECKED	DATE

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SCHEMATIC DESIGN SUBMITTAL			05/31/24
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