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Northeast Academy Magnet School

HVAC Verification and Evaluation

Groton Public Schools

1300 Flanders Road Mystic, CT

April 4, 2025

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Groton Public Schools

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1 Executive Summary

The Groton Board of Education has requested a detailed assessment of the mechanical systems ventilation performance in accordance with new regulations set forth by the State of Connecticut. In 2024, the state of Connecticut codified ventilation assessment at each school building under jurisdiction of local and regional boards of education. Per substitute Senate Bill 287, "each local and regional board of education shall ensure that its heating, ventilation and air conditioning (HVAC) system is maintained and operated in accordance with the prevailing maintenance standards, such as ASHRAE Standard 62 at the time of installation or renovation of such system".

This report is an overview of findings from the HVAC systems evaluation performed at Northeast Academy Elementary School (the "school"). The focus of this report is twofold: First, to identify to what extent the school's current ventilation system components are operational. Second, to evaluate if the system components are operating in such a manner as to provide adequate ventilation to the spaces within the building in accordance with the most recent indoor ventilation standards.

It has been identified that most of the AHUs at the school are providing ventilation air below the calculated value based on ASHRAE 62.1 standards. As a result, most of the rooms within the school fail to meet the minimum outside air requirements prescribed by ASHRAE Standard 62.1, as referenced in the state's building code. In addition, many of the exhaust fans in the building were found not operable by testing and balancing personnel.

Further investigation into the HVAC equipment should be conducted to determine if the current mechanical equipment can provide adequate ventilation for the school. Based on this investigation's findings, an engineered design should be prepared to correct issues concerning the HVAC system. We also recommend that the duct system be cleaned, that outside air dampers and supply air fans be evaluated for proper operation, and that exhaust fans be repaired and placed back into service.

1.1 Building Overview

Northeast Academy Magnet School is located at 115 Oslo Street, Mystic, CT. The school is a slab on grade first floor and partial second floor with approximately 56,000 square feet of floor area. The HVAC equipment consists of ten (10) rooftop air handling units (AHUs), variable air volume boxes (VAV), unit heaters (UH) installed in various locations, and twelve (12) exhaust fans (EFs). The HVAC system is controlled by a building automation system (BAS). Exhaust fans are on a timer and run via a light switch. This building is equipped with CO_2 demand control ventilation (DCV). See Appendix C for school floor plans.

1.2 HVAC System Overview

- AHU-1 is installed on the roof. The unit is an AAON 213 MBH air handling unit and serves to condition and ventilate the gymnasium.
- AHU-2 is installed on the roof. The unit is an AAON 99.5 MBH air handling unit and serves to condition and ventilate the art and music classrooms.
- AHU-3 is installed on the roof. The unit is an AAON 115 MBH air handling unit and serves to condition and ventilate the cafeteria.
- AHU-4 is installed on the roof. The unit is an AAON 322 MBH air handling unit and serves to condition and ventilate administration areas.

- AHU-5 is installed on the roof. The unit is an AAON 211 MBH air handling unit and serves to condition and ventilate the media center.
- AHU-6 is installed on the roof. The unit is an AAON 124 MBH air handling unit and serves to condition and ventilate classrooms on the southeast corridor of the building.
- AHU-7 is installed on the roof. The unit is an AAON 317 MBH air handling unit and serves to condition and ventilate classrooms on the southwest portion of the building.
- AHU-8 is installed on the roof. The unit is an AAON 36 MBH air handling unit and serves to condition and ventilate the head end work room.
- AHU-9 is installed on the roof. The unit is an AAON 340 MBH air handling unit and serves to condition and ventilate the kitchen area.
- AHU-10 is installed on the roof. The unit is an AAON 377 MBH air handling unit and serves to condition and ventilate the third-grade classrooms on the west corridor of the building.
- UHs are installed in vestibules and on the first level of both stairwells.
- EFs are installed on the roof of the building. The fans serve as exhaust ventilation for the common restrooms and custodial closets.

2 Evaluation

2.1 Code Compliance

In 2023, substitute senate bill 1198 codified ventilation assessments at each school building under jurisdiction of local and regional boards of education. These assessments must be completed by January 1, 2025, and every five years thereafter. Per the requirements of sSB 1198, the assessment included the following inspections and evaluations:

(A) Documenting for maximum filter efficiency (MERV ratings)
(B) Physical measurements of outside air delivery rate at the minimum damper position
(C) Verification of the appropriate condition and operation of ventilation components
(D) Measurement of air distribution through all system inlets and outlets,
(E) Verification of unit operation and that required maintenance has been performed in accordance with the most recent indoor ventilation standards promulgated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers
(F) Verification of control sequences of damper operations
(G) Verification of carbon dioxide sensors does not apply.
(H) Identification of to what extent each school's current ventilation system components, including any existing central or noncentral mechanical ventilation system, are operating in such a manner as to provide appropriate ventilation to the school building in accordance with most recent indoor ventilation standards promulgated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

The required supply of outside air into interior occupied spaces is governed by the 2022 Connecticut State Building Code, which adopts the 2021 International Mechanical Code (IMC), and ASHRAE Standard 62.1, which prescribes the flow rate of outdoor air required for occupied areas based on occupancy classification. Depending on the room classification and occupant density, the outdoor airflow rates in cubic feet per minute (CFM) per person are defined. When occupancy density is unknown, these documents define occupant density for each room classification in number of occupants per space floor area. The required airflow rate in CFM for every occupied space is then calculated based on this value. It shall be noted that although the occupancy classification is education, the IMC does not distinguish between an office within an office building, a school, or any other

building classification. This applies to all rooms that are not considered traditional educational rooms such as healthcare offices, gymnasiums, theaters, and assembly halls. Table 1 below, from the 2021 IMC, indicates population density and required ventilation rates for each room classification.

Table 1
Room Type & Occupancy Summary

Room Types	Quantity[1]	Total Area[1] (SF)	Occupancy Rate[2] (People/1000 SF)	Occupancy Ventilation[2] (CFM/person)	Area Ventilation[2] (CFM/SF)	Exhaust Rate[2] (CFM)
Art Classroom	2	887	20	10	0.18	0.7
Auditorium	1	3379	150	5	0.06	-
Cafeteria	1	210	100	7.5	0.18	-
Classroom	32	20133	35	10	0.12	-
Computer Lab	0	0	25	10	0.12	-
Conference Room	2	388	50	5	0.06	-
Corridor	15	5501	-	-	0.06	-
Custodial	3	128	-	-	-	-
Gymnasium	1	2958	7	20	0.18	-
Kitchen	1	996	70	10	0.06	-
Library	0	0	10	5	0.12	-
Lobby	1	1789	10	5	0.06	-
Locker Room	5	2920	-	-	-	0.25
Multiuse Assembly	0	0	100	7.5	0.06	-
Music/Theater	1	1240	35	10	0.06	1.0
Nurse	2	239	5	5	0.06	-
Office	20	3670	5	5	0.06	-
Restroom	23	2125	-	-	-	50/70*
Stairs	3	822	-	-	-	-
Storage	15	1295	-	-	0.12	-
Stage/Studio	1	726	70	10	0.06	-
Utility	8	1108	-	-	-	-
Vestibule	2	495	10	5	0.06	-
Waiting Room	0	0	30	5	0.06	-

[1] Based on as-built drawings

[2] Based on 2021 International Mechanical Code

Some room types do not have an outside air requirement, as can be seen in Table 1 above. Alternatively, these rooms have exhaust rates that must be met and are evaluated separately in this report. Refer to the exhaust rate evaluation table in Appendix B for individual room exhaust rate evaluations.

In addition to providing mechanical ventilation to the space, an alternative method approved by the building code allows for air to enter the occupied space naturally through operable windows. The code states that the minimum openable area to the outdoors shall be 4% of the floor area being ventilated. Although this is an acceptable means of providing outdoor air by code, it is not a realistic option during cold weather or hot weather months, as windows will typically be closed. Operable windows are not considered as sources of ventilation in this analysis.

2.2 Field Study Findings and General Observations

F&O performed a walk-down of the school prior to the TAB testing activities and noted room measurements, observable maintenance concerns, and general equipment condition. Below is a summary of these observations.

2.2.1 Air Handling Units and Outside Air Dampers

The air handling units in the building are designed to operate by providing ventilation and supply air to the space. Return air is mixed with outside air and recirculated through the unit. The outside air damper on each unit adjusts according to the building automation system and environmental sensors.

Based on the testing and balancing results, most of the AHUs in the building are operating outside of their original design conditions (see Table 2). Total supply and outside airflow measurements are below original design values, which indicates that while the AHUs may be capable of supplying adequate ventilation to the space, current operating conditions are limiting equipment performance. Table 3 below compares the design outside airflow rate to the calculated cfm based on room area, room type, and expected occupancy. It can be seen from Table 3 that most AHUs were designed to provide enough outside air to satisfy current ventilation requirements.

AHU-5 supplies air to VAVs that serve the admin area of the building. It has been determined by Wing's TAB that these VAVs are providing less supply air than is required for the spaces served.

2.2.2 Exhaust Fans

Exhaust fans provide ventilation air for the restrooms throughout the building. It was discovered by the TAB contractor that some of the exhaust fans were not operational. One exhaust fan, EF-13 that serves the upper-level restrooms, has a broken fan belt. The exhaust fans in the school are not ventilating the spaces served properly. See Appendix B, Table 2 for the full list.

2.3 Outside Airflow and Air Change Rates

2.3.1 Airflow Design vs. Measurements

Tables 2 and 3 below display AHU design parameters regarding supply and outside airflows. Design information for the air handling units was obtained from the manufacturer selection cutsheets from AAON dated December 8, 2006 and as-built drawings dated January 9, 2006. Airflow measurements were performed by Wing's Testing and Balancing (TAB) and using ASHRAE 62.1 standards outside airflow rates were calculated. Note that the measured airflows are less than the design airflow and that the minimum outdoor air Appendix A contains the full report provided by Wing's TAB.

Table 2
Design vs. Measured Airflow

AHU	DESIGN AIRFLOW			MEASURED AIRFLOW		
	SUPPLY CFM	OA CFM	% OA	SUPPLY CFM	OA CFM	% OA
AHU-1	4480	1500	33%	5607	561	10%
AHU-2	3700	280	8%	3167	159	5%

AHU	DESIGN AIRFLOW			MEASURED AIRFLOW		
	SUPPLY CFM	OA CFM	% OA	SUPPLY CFM	OA CFM	% OA
AHU-3	3260	1100	34%	2609	73	3%
AHU-4	11500	2300	20%	8657	3290	38%
AHU-5	8085	2200	27%	1039	231	22%
AHU-6	4600	1070	23%	4205	673	16%
AHU-7	8400	2100	25%	7209	712	10%
AHU-8	1200	40	3%	1047	165	16%
AHU-9	8500	2550	30%	8040	806	10%
AHU-10	9600	3030	32%	7535	606	8%

Table 3
Design vs. Calculated Outside Air

AHU	DESIGN AIRFLOW		CALCULATED AIRFLOW	
	OA CFM	% OA	OA CFM	% OA
AHU-1	1500	33%	953	21%
AHU-2	280	8%	866	23%
AHU-3	1100	34%	954	29%
AHU-4	2300	20%	2933	26%
AHU-5	2200	27%	1838	23%
AHU-6	1070	23%	632	14%
AHU-7	2100	25%	3241	39%
AHU-8	40	3%	26	2%
AHU-9	2550	30%	2565	30%
AHU-10	3030	32%	3183	33%

It can be seen in Table 2 that most of the measured outside air airflow rates are less than design. As shown in Table 3, some air handlers were not designed to provide the amount of outside air recommended by current ASHRAE 62 standards. An investigation should be carried out to determine why the air handlers are not currently providing the designed airflow rate.

2.3.2 Individual Room Ventilation

Ventilation rates for each room with the outdoor air damper at minimum position are itemized in Appendix B. At this position, most rooms lack appropriate ventilation based on ASHRAE population densities described in Section 2.1. Supply fan speed and minimum damper positions should be set such that ventilation is provided to meet the ventilation requirement of the IMC for the specified space type while the space is occupied. See Section 3 for recommended adjustments.

3 Discussion and Recommendations

3.1 General Recommendations to Improve Schools Performance

It is recommended that cleaning of the entire school's duct system be performed by a qualified professional. This cleaning will help improve the quality of air circulated throughout the school and reduce pressure drop in the

system. Reduced airflow due to dirty coils and filters can increase the electrical consumption of the fan motors and affect motor performance, resulting in increased operating costs and possible motor failure.

To preserve the condition and capability of the HVAC equipment serving the building, it is recommended that a maintenance program following ASHRAE 180-2018: *Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems* be implemented. This standard provides a comprehensive guide, that when followed, can increase the HVAC system's ability to achieve acceptable thermal comfort, energy efficiency and indoor air quality within the building.

Recommissioning of the entire HVAC system should be performed to ensure all equipment and control components of the system are operating as designed. This service should be performed in 3–5-year intervals to optimize system performance, increase energy savings, and improve system efficiency.

3.1.1 Air Handling Units and Outside Air Dampers

It was determined during TAB testing that most of the outside air dampers are either inoperable or operating incorrectly. On AHU-4 and AHU-9, only half of the damper is opening. The dampers should be evaluated to ensure the actuator is operating properly. AHUs 1,2,3,5,6, and 10 all have outside air dampers that are not operating at all. Further investigation into why the outside air dampers are not operating should be performed, the controls sequence should be evaluated to ensure the building controls are operating properly, and the dampers should be adjusted by a testing and balancing contractor to satisfy the minimum outside air requirement for the spaces served. VAVs that are served by AHU-5 should be rebalanced and damper positions set to continuously provide the minimum outside air required for the space.

3.1.2 Exhaust Fans

Non-operational exhaust fans should be evaluated, repaired or replaced, and returned to service. The belt for exhaust fan 13 should be replaced, and the fan should be tested for proper operation. All exhaust fans should be properly balanced to provide the minimum ventilation requirement and replaced if found to not be capable of meeting the minimum required exhaust airflow. Groton Public Schools has performed repairs and placed back in service the exhaust fans found with deficiencies by the testing and balancing contractor.

Appendix A

Testing and Balancing Report

WING'S TESTING & BALANCING CO., INC.

Groton Public Schools

Northeast Academy

Ventilation Survey

* * * *

Fuss & O'Neill
Attn: Joshua Boudreau
One Financial Plaza
15th Floor
Hartford, CT 06103

January 2, 2025

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WING'S TESTING & BALANCING CO., INC.

January 2, 2025

Fuss & O'Neill
Attn: Joshua Boudreau
One Financial Plaza
15th Floor
Hartford, CT 06103

Re: Groton Public Schools/ Northeast Academy – Ventilation Survey

Dear Joshua,

We have completed our testing for the above-mentioned site. All supply, return, and exhaust airflow readings were taken for all applicable areas. Total air, return air, and outside airflows were taken for all AHUs. All testing for the VAV systems was done at minimum cooling positions. Some items of interest to note are as follows:

- EF-1 is not functional
- EF-7 is not functional
- EF-9 is not functional
- EF-13 has a broken belt
- AHU-4 and AHU-9 only half of the outside air damper is opening upon command
- AHUs 1, 2, 3, 5, 6 and 10 all have outside air dampers that are not functional

It is recommended that all outside air dampers for the AHUs be fixed or replaced. It is also recommended that the EFs that are not functional be replaced.

The following pages are your record of current operating conditions. If you have any questions, or if we can be of further service, please do not hesitate to call.

Very truly yours,

Wing's Testing & Balancing Co., Inc.
ICB Certified Contractor for:
TAB—Cx—Indoor Air Quality—Sound & Vibration
Fire & Smoke Damper—Smoke Control Systems

Barry Stratos
CT SM-2 License 6386
MA Sheetmetal Journeyperson License #13595
TABB Technician-BB996928T
Indoor Air Quality Technician- IAQ996928T
Indoor Air Quality Supervisor- IAQ996928S





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VELOCITY PRESSURE READINGS

PROJECT:	Northeast Academy	**DATE:**	12/31/2024
AREA SERVED:	AHUs	**TECH:**	BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENT. STAT. PRESS."	TEST		NOTES
			FPM	CFM		FPM	CFM	
AHU-1 Supply	---	---	---	4480	Grilles	---	5607	
AHU-1 Return	---	---	---	2980	Calc.	---	5046	
AHU-1 O.A.	39" x 19"	5.15	291	1500	w/ Velgrid	109	561	(1)
AHU-2 Supply	---	---	---	3700	Grilles	---	3167	
AHU-2 Return	---	---	---	3420	Calc.	---	3012	
AHU-2 O.A.	39" x 19"	5.15	54	280	w/ Velgrid	30	155	(1)
AHU-3 Supply	---	---	---	3260	Grilles	---	2606	
AHU-3 Return	---	---	---	2160	Calc.	---	2539	
AHU-3 O.A.	39" x 19"	5.15	214	1100	w/ Velgrid	13	67	(1)
AHU-4 Supply	---	---	---	11500	Grilles	---	8657	
AHU-4 Return	---	---	---	9200	Calc.	---	5379	
AHU-4 O.A.	96" x 33"	22.0	105	2300	w/ Velgrid	149	3278	(2)
AHU-5 Supply	51" x 21"	7.44	1087	8085	w/ Velgrid	211	1570	
AHU-5 Return	---	---	---	5885	Calc.	---	1221	
AHU-5 O.A.	51" x 21"	7.44	296	2200	w/ Velgrid	47	349	(1)
AHU-6 Supply	---	---	---	4600	Grilles	---	4205	
AHU-6 Return	---	---	---	3530	Calc.	---	3551	
AHU-6 O.A.	39" x 19"	5.15	208	1070	w/ Velgrid	127	654	(1)
AHU-7 Supply	51"x 21"	7.44	1129	8400	w/ Velgrid	1237	9203	
AHU-7 Return	---	---	---	6100	Calc.	---	8169	
AHU-7 O.A.	51" x 21"	7.44	282	2100	w/ Velgrid	139	1034	

REMARKS

(1) Actuator on the O.A. is not modulating
(2) One half of the damper is not opening

N/A Not Available | **N/D** No Design | **D/D** Direct Drive | **N/R** No Requirement

VELOCITY PRESSURE READINGS

PROJECT:	Northeast Academy	**DATE:**	12/31/2024
AREA SERVED:	AHUs	**TECH:**	BS

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN		CENT. STAT. PRESS."	TEST		NOTES
			FPM	CFM		FPM	CFM	
AHU-8 Supply	---	---	---	1200	Grilles	---	1047	
AHU-8 Return	---	---	---	1160	Grilles	---	882	
AHU-8 O.A.	---	---	---	40	Calc.	---	165	
AHU-9 Supply	51" x 21"	7.44	1142	8500	w/ Velgrid	945	7031	
AHU-9 Return	---	---	---	5950	Calc.	---	6339	
AHU-9 O.A.	51" x 21"	7.44	343	2550	w/ Velgrid	93	692	(1)
AHU-10 Supply	---	---	---	9600	Grilles	---	7535	
AHU-10 Return	---	---	---	6570	Calc.	---	6925	
AHU-10 O.A.	51" x 21"	7.44	407	3030	w/ Velgrid	82	610	(2)

REMARKS

(1) Half the O.A. damper is not fully opening upon command

(2) This outside air damper is not functional

N/A Not Available | **N/D** No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN FPM	DESIGN CFM	TEST FPM	TEST CFM	FINAL FPM	FINAL CFM	NOTES
AHU-1 Supply										
1101 Gym	1	16" x 6"	0.48		280	994	497			
1101 Gym	2	16" x 6"	0.48		280	801	384			
1101 Gym	3	16" x 6"	0.48		280	722	347			
1101 Gym	4	16" x 6"	0.48		280	681	327			
1101 Gym	5	16" x 6"	0.48		280	781	375			
1101 Gym	6	16" x 6"	0.48		280	663	318			
1101 Gym	7	16" x 6"	0.48		280	698	335			
1101 Gym	8	16" x 6"	0.48		280	655	314			
1101 Gym	9	16" x 6"	0.48		280	813	390			
1101 Gym	10	16" x 6"	0.48		280	828	387			
1101 Gym	11	16" x 6"	0.48		280	669	321			
1101 Gym	12	16" x 6"	0.48		280	809	388			
1101 Gym	13	16" x 6"	0.48		280	645	310			
1101 Gym	14	16" x 6"	0.48		280	801	384			
1101 Gym	15	16" x 6"	0.48		280	521	250			
1101 Gym	16	16" x 6"	0.48		280	624	300			
					4480		5607			
AHU-1 Returns										
1101 Gym	1	24" x 16"	1.92		1125	570	1094			
1101 Gym	2	24" x 16"	1.92		1125	551	1058			
1101 Gym	3	24" x 16"	1.92		1125	624	1198			
1101 Gym	4	24" x 16"	1.92		1125	473	908			
					4500		4258			
AHU-2 Supply										
1114 Kitchen	1	2414	FH	---	735	---	603			
1114 Kitchen	2	2414	FH	---	735	---	580			
1108 Storage	3	6" x 6"	FH	---	60	---	36			
1114 Kitchen	4	2414	FH	---	735	---	634			
1114 Kitchen	5	2414	FH	---	735	---	627			
1113 Office	6	6" x 6"	FH	---	50	---	46			
1106 Staff	7	6" x 6"	FH	---	100	---	76			
1117 Corridor	8	8" x 8"	FH	---	180	---	159			
1121 Custodial	9	8" x 8"	FH	---	180	---	174			
1123 Electrical	10	8" x 8"	FH	---	120	---	116			
1102 Storage	11	6" x 6"	FH	---	70	---	116			
					3700		3167			
AHU-2 Return										
1114 Kitchen	1	48" x 24"		---	3200	---	2623			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-3 Supply										
1103 Art	1	2412	FH	---	300	---	250			
1103 Art	2	2412	FH	---	300	---	255			
1104 Corridor	3	2410	FH	---	230	---	175			
1103 Art	4	2412	FH	---	300	---	246			
1103 Art	5	2412	FH	---	300	---	195			
1129 Storage	6	6" x 6"	FH	---	40	---	36			
1128 Storage	7	6" x 6"	FH	---	40	---	28			
1126 Practice	8	8" x 8"	FH	---	140	---	115			
1132 Corridor	9	2410	FH	---	230	---	157			
1131 Music	10	2410	FH	---	230	---	175			
1131 Music	11	2410	FH	---	230	---	183			
1131 Music	12	2410	FH	---	230	---	194			
1131 Music	13	2410	FH	---	230	---	225			
1131 Music	14	2410	FH	---	230	---	187			
1131 Music	15	2410	FH	---	230	---	188			
					3300		2609			
AHU-3 Return										
1103 Art	R1	22" x 22"	FH	---	600	---	411			
1103 Art	R2	22" x 22"	FH	---	600	---	316			
1131 Music	R3	22" x 22"	FH	---	690	---	412			
1132 Corridor	R4	22" x 22"	FH	---	440	---	283			
1131 Music	R5	22" x 22"	FH	---	600	---	401			
1126 Practice	R6	22" x 22"	FH	---	140	---	103			
					3160		1926			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-4 Supply										
1133 Fac. Dining	1	2410	FH	---	250	---	185			
1135 Platform	2	2412	FH	---	350	---	300			
1135 Platform	3	2412	FH	---	350	---	265			
1135 Platform	4	2412	FH	---	350	---	295			
1134 Caf.	5	24" x 12"	1.44	472	680	141	203			
1134 Caf.	6	24" x 12"	1.44	472	680	456	657			
1134 Caf.	7	24" x 12"	1.44	472	680	412	593			
1134 Caf.	8	24" x 12"	1.44	472	680	150	216			
1134 Caf.	9	24" x 12"	1.44	472	680	395	497			
1134 Caf.	10	24" x 12"	1.44	472	680	392	564			
1134 Caf.	11	24" x 12"	1.44	472	680	176	253			
1134 Caf.	12	24" x 12"	1.44	472	680	332	478			
1134 Caf.	13	24" x 12"	1.44	472	680	412	593			
1134 Caf.	14	24" x 12"	1.44	472	680	274	395			
1134 Caf.	15	24" x 12"	1.44	472	680	404	582			
1134 Caf.	16	24" x 12"	1.44	472	680	427	615			
1134 Caf.	17	24" x 12"	1.44	472	680	404	582			
1134 Caf.	18	24" x 12"	1.44	472	680	452	651			
1134 Caf.	19	24" x 12"	1.44	472	680	510	734			
					11500		8657			
AHU-4 Return										
1133 Fac. Dining	1	2410	FH	---	250	---	147			
1134 Caf.	2	48" x 20"	6.67	---	3300	1036	6910			
1134 Caf.	3	48" x 20"	6.67	---	3300	603	4022			
1134 Caf.	4	48" x 20"	6.67	---	3300	442	2948			
					11500		14027			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE / BOX REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

AREA SERVED: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	AK	DESIGN CFM		TEST	FINAL		PRESS. DIFF.		NOTES
				MIN	MAX	CFM	MIN	MAX	MIN	MAX	
AHU-5 Supply											
VAV-C											
1203 Corr.	1	2410	FH	N/D	250		17				
1202 Boys	2	2408	FH	N/D	200		17				
1201 Girls	3	2408	FH	N/D	200		13				
				195	650		47				
VAV-D											
1200 Vest.	1	2412	FH	N/D	300		24				
1258 Lobby	2	2412	FH	N/D	300		23				
1258 Lobby	3	20" x 12"	FH	N/D	300		0				
1258 Lobby	4	20" x 12"	FH	N/D	300		0				
1258 Lobby	5	20" x 12"	FH	N/D	300		0				
				650	1500		47				
VAV-A											
1259	1	2408	FH	45	140		14				
VAV-A											
1256	1	2408	FH	N/D	N/D		35				
1255	2	2408	FH	N/D	N/D		13				
				125	350		48				
VAV-B											
1252	1	2412	FH	450	1100		18				
VAV-A											
1251	1	2410	FH	225	400		118				
VAV-A											
1249	1	2410	FH	225	450		30				
VAV-C											
1254	1	2412	FH	N/D	N/D		18				
1254	2	2412	FH	N/D	N/D		16				
				550	980		34				

REMARKS

N/A Not Available | **N/D** No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE / BOX REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

AREA SERVED: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	AK	DESIGN CFM		TEST	FINAL		PRESS. DIFF.		NOTES
				MIN	MAX	CFM	MIN	MAX	MIN	MAX	
AHU-5 Suppy Con.											
VAV-B											
1263	1	2406	FH	N/D	N/D		48				
1266	2	2406	FH	N/D	N/D		56				
1242	3	2406	FH	N/D	N/D		36				
1257	4	2406	FH	N/D	N/D		48				
1243	5	2406	FH	N/D	N/D		53				
1266	6	2406	FH	N/D	N/D		56				
1268	7	2406	FH	N/D	N/D		50				
1245	8	2406	FH	N/D	N/D		47				
				425	975		388				
VAV-B											
1316	1	2412	FH	250	450		5				
VAV-A											
1302	1	2408	FH	135	450		11				
VAV-B											
1304	1	2412	FH	200	750		11				
VAV-A											
1303	1	2408	FH	N/D	N/D		15				
1306	2	2406	FH	N/D	N/D		15				
1305	3	2406	FH	N/D	N/D		15				
				200	325		45				
VAV-C											
1322	1	2412	FH	N/D	600		10				
1324	2	2406	FH	N/D	80		0				
1323	3	2406	FH	N/D	70		6				
				125	750		16				
VAV-C											
2322	1	2410	FH	N/D	400		92				
2324	2	2406	FH	N/D	50		17				
2323	3	2406	FH	N/D	100		26				
				75	985		135				

REMARKS

N/A Not Available | **N/D** No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE / BOX REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

AREA SERVED: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	AK	DESIGN CFM		TEST	FINAL		PRESS. DIFF.		NOTES
				MIN	MAX	CFM	MIN	MAX	MIN	MAX	
VAV-C											
1253	1	2408	FH	75	700		0				
VAV-C											
2316	1	2410	FH	105	510		21				

REMARKS

N/A Not Available | **N/D** No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/26/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-5 Returns										
1241	R1	22" x 22"	FH	---	450	---	236			
1203	R2	22" x 22"	FH	---	495	---	75			
1203	R3	2412	FH	---	900	---	134			
1259	R4	2408	FH	---	175	---	29			
1256	R5	2408	FH	---	125	---	0			
1255	R6	2412	FH	---	200	---	29			
1252	R7	2414	FH	---	440	---	63			
1253	R8	2408	FH	---	160	---	68			
1254	R9	2412	FH	---	600	---	84			
1251	R10	2410	FH	---	240	---	34			
1249	R11	2410	FH	---	240	---	29			
1243	R12	2406	FH	---	90	---	0			
1301	R13	2408	FH	---	150	---	25			
1302	R14	2408	FH	---	150	---	0			
1316	R15	16" x 16"	FH	---	300	---	45			
1322	R16	12" x 12"	FH	---	540	---	71			
1323	R17	8" x 8"	FH	---	70	---	0			
1306	R18	8" x 8"	FH	---	70	---	28			
1305	R19	8" x 8"	FH	---	70	---	0			
1304	R20	22" x 22"	FH	---	540	---	69			
2322	R21	12" x 12"	FH	---	360	---	59			
2323	R22	12" x 12"	FH	---	90	---	24			
2316	R23	16" x 16"	FH	---	350	---	51			
							1153			
RTU-6 Supply										
1238	1	2406	FH	---	50	---	49			
1237	2	2406	FH	---	100	---	76			
1235	3	2414	FH	---	650	---	600			
1233	4	2408	FH	---	200	---	215			
1232	5	2412	FH	---	600	---	547			
1228	6	2408	FH	---	200	---	192			
1235	7	2414	FH	---	700	---	598			
1235	8	2414	FH	---	700	---	655			
1235	9	2414	FH	---	700	---	633			
1235	10	2414	FH	---	700	---	640			
					4600		4205			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/27/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-6 Return										
1228	1	12" x 12"	FH	---	200	---	191			
1233	2	12" x 12"	FH	---	200	---	173			
1232	3	22" x 22"	FH	---	1800	---	1403			
1232	4	22" x 22"	FH	---	1800	---	1486			
					4000		3253			
AHU-7										
1204	1	2412	FH	---	400	---	371			
1204	2	2412	FH	---	400	---	365			
1209	3	2412	FH	---	400	---	337			
1209	4	2412	FH	---	400	---	347			
1209	5	2412	FH	---	400	---	286			
1211	6	2412	FH	---	400	---	345			
1211	7	2412	FH	---	400	---	376			
1211	8	2412	FH	---	400	---	364			
1216	9	2412	FH	---	400	---	385			
1216	10	2412	FH	---	400	---	375			
1216	11	2412	FH	---	400	---	378			
1217 Class	12	2412	FH	---	400	---	369			
1217 Class	13	2412	FH	---	400	---	378			
1217 Class	14	2412	FH	---	400	---	378			
1217 Corr.	15	2412	FH	---	200	---	195			
1217 Corr.	16	2412	FH	---	200	---	162			
1223	17	2412	FH	---	400	---	355			
1223	18	2412	FH	---	400	---	372			
1223	19	2412	FH	---	400	---	364			
1224	20	2412	FH	---	400	---	344			
1224	21	2412	FH	---	400	---	355			
1224	22	2412	FH	---	400	---	365			
					8400		7566			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-7 Returns										
1204	R1	20" x 20"	FH	---	360	---	368			
1204	R2	20" x 20"	FH	---	360	---	368			
1209	R3	22" x 22"	FH	---	540	---	448			
1209	R4	22" x 22"	FH	---	540	---	542			
1211	R5	22" x 22"	FH	---	540	---	534			
1211	R6	22" x 22"	FH	---	540	---	451			
1216	R7	22" x 22"	FH	---	540	---	502			
1216	R8	22" x 22"	FH	---	540	---	514			
1217	R9	22" x 22"	FH	---	540	---	510			
1217	R10	22" x 22"	FH	---	540	---	487			
1224	R11	22" x 22"	FH	---	540	---	525			
1224	R12	22" x 22"	FH	---	540	---	513			
1223	R13	22" x 22"	FH	---	540	---	487			
1223	R14	22" x 22"	FH	---	540	---	555			
					7200		6804			
AHU-8 Supply										
1227	1	15" x 15"	FH	---	600	---	500			
1227	2	15" x 15"	FH	---	600	---	547			
					1200		1047			
AHU-8 Return										
1227	R1	22" x 22"	FH	---	1200	---	882			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-9 Supply										
2325	1	2412	FH	---	400	---	377			
2325	2	2412	FH	---	400	---	340			
2325	3	2412	FH	---	400	---	380			
2326	4	2408	FH	---	200	---	170			
2328	5	2408	FH	---	200	---	185			
2329	6	2412	FH	---	400	---	427			
2329	7	2412	FH	---	400	---	425			
2329	8	2412	FH	---	400	---	385			
2331	9	2412	FH	---	400	---	357			
2331	10	2412	FH	---	400	---	376			
2331	11	2412	FH	---	400	---	380			
1325	12	2412	FH	---	400	---	367			
1325	13	2412	FH	---	400	---	379			
1315	14	2406	FH	---	100	---	101			
1315	15	2408	FH	---	200	---	130			
1325	16	2412	FH	---	400	---	353			
1326	17	2408	FH	---	200	---	188			
1328	18	2408	FH	---	200	---	191			
1329	19	2408	FH	---	400	---	362			
1329	20	2408	FH	---	400	---	358			
1329	21	2408	FH	---	400	---	366			
1315	22	2408	FH	---	200	---	353			
1331	23	2408	FH	---	400	---	347			
1331	24	2408	FH	---	400	---	375			
1331	25	2406	FH	---	400	---	368			
					8500		8040			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-9 Return										
2325	1	22" x 22"	FH	---	540	---	521			
2325	2	22" x 22"	FH		540	---	599			
2329	3	22" x 22"	FH	---	540	---	593			
2329	4	22" x 22"	FH	---	540	---	310			
2331	5	22" x 22"	FH	---	540	---	624			
2331	6	22" x 22"	FH	---	540	---	632			
1325	7	22" x 22"	FH	---	540	---	511			
1325	8	22" x 22"	FH	---	540	---	391			
1315	9	10" x 10"	FH	---	250	---	252			
1329	10	10" x 10"	FH	---	540	---	357			
1315	11	10" x 10"	FH	---	250	---	218			
1329	12	22" x 22"	FH	---	540	---	519			
1331	13	22" x 22"	FH	---	540	---	236			
1331	14	22" x 22"	FH	---	540	---	510			
					6980		5463			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-10 Supply										
2202 Conf.	1	2408	FH	---	200	---	175			
2301 Flex	2	2412	FH	---	400	---	349			
2301 Flex	3	2412	FH	---	400	---	340			
2301 Flex	4	2412	FH	---	400	---	347			
2307 Classroom	5	2412	FH	---	400	---	347			
2307 Classroom	6	2412	FH	---	400	---	335			
2315 Corr.	7	2408	FH	---	200	---	165			
2307 Classroom	8	2412	FH	---	400	---	291			
2308 Work	9	2408	FH	---	150	---	130			
2308 Work	10	2408	FH	---	150	---	128			
2312 Class	11	2412	FH	---	400	---	246			
2315 Corr.	12	2408	FH	---	200	---	163			
2312 Class	13	2412	FH	---	400	---	360			
2312 Class	14	2412	FH	---	400	---	330			
2313 Class	15	2412	FH	---	400	---	93			
2313 Class	16	2412	FH	---	400	---	461			
2313 Class	17	2412	FH	---	400	---	625			
1307 Class	18	2412	FH	---	400	---	248			
1307 Class	19	2412	FH	---	400	---	253			
1307 Class	20	2412	FH	---	400	---	291			
1308 Work	21	2408	FH	---	150	---	83			
1308 Work	22	2408	FH	---	150	---	121			
1312 Class	23	2412	FH	---	400	---	276			
1312 Class	24	2412	FH	---	400	---	275			
1312 Class	25	2412	FH	---	400	---	291			
1313 Class	26	2412	FH	---	400	---	275			
1313 Class	27	2412	FH	---	400	---	263			
1313 Class	28	2412	FH	---	400	---	274			
					9600		7535			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: All Areas | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-10 Returns										
2301 Flex	R1	22" x 22"	FH	---	540	---	426			
2301 Flex	R2	22" x 22"	FH	---	540	---	621			
2307 Class	R3	22" x 22"	FH	---	540	---	477			
2307 Class	R4	22" x 22"	FH	---	540	---	610			
2308 Work	R5	22" x 22"	FH	---	270	---	261			
2312 Class	R6	22" x 22"	FH	---	540	---	425			
2312 Class	R7	22" x 22"	FH	---	540	---	423			
2313 Class	R8	22" x 22"	FH	---	540	---	447			
2313 Class	R9	22" x 22"	FH	---	540	---	443			
1307 C;ass	R10	22" x 22"	2.42	---	540	242	586			
1307 C;ass	R11	22" x 22"	FH	---	540	---	506			
1308 Work	R12	10" x 10"	FH	---	270	---	260			
1312 Class	R13	22" x 22"	FH	---	540	---	532			
1312 Class	R14	22" x 22"	2.42	---	540	242	586			
1313 Class	R15	22" x 22"	FH	---	540	---	526			
1313 Class	R16	22" x 22"	FH	---	540	---	549			
					8100		7678			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/23/2024

SYSTEM / AREA: EFs | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
EF-1										
1121 Custodian	1	6" x 6"	FH	---	75	---	0			
EF-2										
1107 Toilet	1	6" x 6"	FH	---	75	---	50			
1106 Toilet	2	6" x 6"	FH	---	75	---	59			
1105 Toilet	3	6" x 6"	FH	---	75	---	53			
EF-3										
Boys	1	2410	FH	---	225	---	190			
Boys	2	2410	FH	---	225	---	199			
Girls	3	2410	FH	---	225	---	205			
Girls	4	2410	FH	---	225	---	196			
					900		790			
EF-4										
1252 Toilet	1	2406	FH	---	75	---	45			
1264 Toilet	2	2406	FH	---	75	---	90			
					150		135			
EF-5										
1205 Toilet	1	8" x 8"	FH	---	75	---	107			
1206 Storage	2	8" x 8"	FH	---	50	---	58			
1207 Storage	3	8" x 8"	FH	---	50	---	62			
1208 Toilet	4	8" x 8"	FH	---	75	---	88			
					250		315			
EF-6										
1212 Toilet	1	8" x 8"	FH	---	75	---	70			
1213 Storage	2	8" x 8"	FH	---	50	---	41			
1214 Storage	3	8" x 8"	FH	---	50	---	48			
1215 Toilet	4	8" x 8"	FH	---	75	---	67			
					250		226			
EF-7										
1218 Toilet	1	8" x 8"	FH	---	75	---	0			
1219 Storage	2	8" x 8"	FH	---	50	---	0			
					125					

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

AIR DEVICE REPORT

PROJECT: Northeast Academy | **DATE:** 12/26/2024

SYSTEM / AREA: EFs | **TECH:** BS

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
EF-8										
1226 Storage	1	8"x8"	FH	---	50	---	91			
1225 Toilet	2	8"x8"	FH	---	75	---	110			
1222 Toilet	3	8"x8"	FH	---	75	---	112			
1221 Storage	4	8"x8"	FH	---	50	---	85			
					250		313			
EF-9										
1231 Electrical	1	8"x8"	0.32		75	0	0			
EF-10										
1247 Elev. Mode	1	8"x8"	FH	---	500	---	553			
EF-11										
2318 Cust.	1	8"x8"	0.32	---	75	234	75			
2324 Toilet	2	8"x8"	FH	---	75	---	79			
1317 Electrical	3	8"x8"	0.32	---	75	300	96			
1324 Toilet	4	8"x8"	FH	---	75	---	92			
					300		342			
EF-12										
1309 Toilet	1	8"x8"	FH	---	75	---	49			
1311 Toilet	2	8"x8"	FH	---	75	---	0			
1326 Boys	3	12"x12"	FH	---	300	---	210			
1328 Girls	4	12"x12"	FH	---	300	---	198			
					750		457			
EF-13										
2311 Toilet	1	8"x8"	FH	---	75	---	0			
2309 Toilet	2	8"x8"	FH	---	75	---	0			
2328 Boys	3	12"x12"	FH	---	300	---	0			
2326 Girls	4	12"x12"	FH	---	300	---	0			
					750					
KEF-1										
1114 Kitchen	1	180"x14"	21.0	---	N/D	191	4011			

REMARKS

N/A Not Available | N/D No Design | **D/D** Direct Drive | **N/R** No Requirement

General Data						TAB MEASUREMENTS						
Location	Room Number	Room Type	VAV Type	AHU	EXHAUST FAN	TAB Measured SA (cfm)	TAB MEASURED RETURN (cfm)	TAB MEASURED EXHAUST (cfm)	Calc. OA CFM @ Min. (OA cfm)	Meas. unit OA % (OA cfm)	BAS Damper Command (pos. %)	Notes
1	1101	Gymnasium	NA	AHU-1	NA	5607	4258	---	561	10%	20%	
1	1102	Storage	NA	AHU-2	NA	116	---	---	6	5%	10%	
1	1103	Art Classroom	NA	AHU-3	NA	946	727	---	28	3%	10%	
1	1104	Corridor	NA	AHU-3	NA	175	---	---	5	3%	10%	
1	1105	Restroom	NA	NA	EF-2	---	---	53	---	---	---	
1	1106	Restroom	NA	NA	EF-2	---	---	59	---	---	---	
1	1107	Restroom	NA	NA	EF-2	---	---	50	---	---	---	
1	1108	Storage	NA	AHU-2	NA	36	---	---	2	5%	10%	
1	1112	Storage	NA	AHU-2	NA	76	---	---	4	5%	10%	
1	1113	Office	NA	AHU-2	NA	46	---	---	2	5%	10%	
1	1114	Kitchen	NA	AHU-2	KEF-1	2444	2406	4011	122	5%	10%	
1	1117	Corridor	NA	AHU-2	NA	159	---	---	8	5%	10%	
1	1119	Utility	NA	AC-3	NA	---	---	---	---	---	---	No ventilation to this space
1	1121	Office	NA	AHU-2	EF-1	174	---	0	9	5%	10%	EF-1 is not functional
1	1123	Utility	NA	AHU-2	NA	116	---	---	6	5%	10%	
1	1124	Utility	NA	NA	NA	---	---	---	---	---	---	No ventilation to this space
1	1126	Classroom	NA	AHU-3	NA	115	103	---	3	3%	10%	
1	1127	Art Classroom	NA	AHU-3	NA	---	---	73	---	---	---	
1	1128	Storage	NA	AHU-3	NA	28	---	---	1	3%	10%	
1	1129	Storage	NA	AHU-3	NA	36	---	---	1	3%	10%	
1	1131	Music/Theater/Dance	NA	AHU-3	NA	1152	813	---	30	3%	10%	
1	1132	Corridor	NA	AHU-3	NA	157	283	---	5	3%	10%	
1	1133	Cafeteria	NA	AHU-4	NA	185	147	---	70	38%	10%	
1	1134	Auditorium	NA	AHU-4	NA	7612	13880	---	2893	38%	10%	
1	1135	Stage/ Studio	NA	AHU-4	NA	860	---	---	327	38%	10%	
2	1200	Vestibule	VAV-D	AHU-5	NA	24	---	---	5	22%	20%	
2	1201	Restroom	VAV-C	AHU-5	EF-3	13	---	401	3	22%	20%	
2	1202	Restroom	VAV-C	AHU-5	EF-3	17	---	389	4	22%	20%	
2	1203	Corridor	VAV-C	AHU-5	NA	17	209	---	4	22%	20%	
2	1204	Classroom	NA	AHU-7	NA	736	736	---	---	11%	15%	
2	1205	Restroom	NA	NA	EF-5	---	---	107	---	---	---	
2	1206	Storage	NA	NA	EF-5	---	---	58	---	---	---	
2	1207	Storage	NA	NA	EF-5	---	---	62	---	---	---	
2	1208	Restroom	NA	NA	EF-5	---	---	88	---	---	---	
2	1209	Classroom	NA	AHU-7	NA	970	990	---	107	11%	15%	
2	1211	Classroom	NA	AHU-7	NA	1085	985	---	119	11%	15%	
2	1212	Restroom	NA	NA	EF-6	---	---	70	---	---	---	
2	1213	Storage	NA	NA	EF-6	---	---	41	---	---	---	
2	1214	Storage	NA	NA	EF-6	---	---	48	---	---	---	
2	1215	Restroom	NA	NA	EF-6	---	---	67	---	---	---	

2	1216	Classroom	NA	AHU-7	NA	1138	1016	---	125	11%	15%	
2	1217a	Classroom	NA	AHU-7	NA	1125	997	---	124	11%	15%	
2	1217b	Classroom	NA	AHU-7	NA	---	---	---	---	---	---	Double
2	1218	Restroom	NA	NA	EF-7	---	---	0	---	---	---	EF-7 is not fuctional
2	1219	Storage	NA	NA	EF-7	---	---	0	---	---	---	EF-7 is not fuctional
2	1221	Storage	NA	NA	EF-8	---	---	85	---	---	---	
2	1222	Restroom	NA	NA	EF-8	---	---	112	---	---	---	
2	1223	Classroom	NA	AHU-7	NA	1091	1042	---	120	11%	15%	
2	1224	Classroom	NA	AHU-7	NA	1064	1038	---	117	11%	15%	
2	1225	Restroom	NA	NA	EF-8	---	---	110	---	---	---	
2	1226	Storage	NA	NA	EF-8	---	---	91	---	---	---	
2	1227	Office	NA	AHU-8	NA	1047	882	---	165	16%	10%	
2	1228	Office	NA	AHU-6	NA	192	191	---	31	16%	10%	
2	1229	Custodial	NA	NA	EF-9	---	---	0	---	---	---	EF-9 is not functional
2	1231	Utility	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
2	1232	Classroom	NA	AHU-6	NA	547	1486	---	88	16%	10%	
2	1233	Classroom	NA	AHU-6	NA	215	173	---	34	16%	10%	
2	1234	Lobby	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
2	1235	Library	NA	AHU-6	NA	3126	1403	---	500	16%	10%	
2	1236	Lobby	NA	AHU-6	NA	---	---	---	---	---	---	There is not ventilation to this space
2	1237	Office	NA	AHU-6	NA	76	---	---	12	16%	10%	
2	1238	Office	NA	AHU-6	NA	49	---	---	8	16%	10%	
2	1239	Corridor	NA	AHU-9	NA	135	---	---	14	10%	10%	
2	1241	Lobby	VAV-B	AHU-5	NA	56	236	---	12	22%	20%	
2	1242	Nurse	VAV-B	AHU-5	NA	48	---	---	11	22%	20%	
2	1243	Nurse	VAV-B	AHU-5	NA	53	0	---	12	22%	20%	
2	1245	Storage	VAV-B	AHU-5	NA	47	---	---	11	22%	20%	
2	1246	Stairs	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
2	1247	Utility	NA	NA	EF-10	---	---	553	---	---	---	
2	1248	Storage	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
2	1249	Office	VAV-A	AHU-5	NA	30	29	---	7	22%	20%	
2	1251	Office	VAV-A	AHU-5	NA	118	34	---	26	22%	20%	
2	1252	Office	VAV-B	AHU-5	NA	18	63	---	4	22%	20%	
2	1253	Corridor	VAV-C	AHU-5	NA	16	---	---	4	22%	20%	
2	1254	Office	VAV-C	AHU-5	NA	18	84	---	4	22%	20%	
2	1255	Conference Room	VAV-A	AHU-5	NA	13	29	---	3	22%	20%	
2	1256	Office	VAV-A	AHU-5	NA	35	0	---	8	22%	20%	
2	1257	Vestibule	VAV-D	AHU-5	NA	---	---	---	---	---	---	There is not ventilation to this space
2	1258	Lobby	VAV-D	AHU-5	NA	0	---	---	---	---	20%	
2	1259	Office	VAV-A	AHU-5	NA	14	29	---	3	22%	20%	
2	1261	Corridor	NA	NA	NA	---	---	---	---	---	---	
2	1262	Restroom	NA	NA	EF-4	---	---	45	---	---	---	

2	1263	Office	VAV-B	AHU-5	NA	48	---	---	11	22%	20%	
2	1264	Restroom	NA	NA	EF-4	---	---	90	---	---	---	
2	1265	Office	VAV-C	AHU-5	NA	0	68	---	0	22%	20%	
2	1266	Corridor	VAV-B	AHU-5	NA	112	---	---	25	22%	20%	
2	1267	Office	VAV-B	AHU-5	NA	48	---	---	11	22%	20%	
2	1268	Storage	VAV-B	AHU-5	NA	50	---	---	11	22%	20%	
3	1301	Lobby	VAV-A	AHU-5	NA	15	45	---	3	22%	20%	
3	1302	Office	VAV-A	AHU-5	0	11	0	---	2	22%	20%	
3	1303	Corridor	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
3	1304	Conference Room	VAV-B	AHU-5	NA	11	69	---	2	22%	20%	
3	1305	Office	VAV-A	AHU-5	NA	15	0	---	3	22%	20%	
3	1306	Office	VAV-A	AHU-5	NA	15	28	---	3	22%	20%	
3	1307	Classroom	NA	AHU-10	NA	792	1092	---	63	8%	10%	
3	1308	Office	NA	AHU-10	NA	204	260	---	16	8%	10%	
3	1309	Restroom	NA	NA	EF-12	---	---	49	---	---	---	
3	1311	Restroom	NA	NA	EF-12	---	---	0	---	---	---	
3	1312	Classroom	NA	AHU-10	NA	842	1118	---	67	8%	10%	
3	1313	Classroom	NA	AHU-10	NA	812	1075	---	65	8%	10%	
3	1314	Stairs	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
3	1315	Corridor	NA	AHU-9	NA	451	949	---	45	10%	10%	
3	1316	Classroom	VAV-B	AHU-5	NA	5	51	---	1	22%	20%	
3	1318	Custodial	NA	NA	NA	---	---	75	---	---	---	
3	1319	Custodial	NA	AC-1	NA	---	---	---	---	---	---	There is not ventilation to this space
3	1321	Utility	NA	NA	EF-11	---	---	96	---	---	---	
3	1322	Classroom	VAV-C	AHU-5	NA	10	71	---	2	22%	20%	
3	1323	Classroom	VAV-C	AHU-5	NA	6	0	---	1	22%	20%	
3	1324	Restroom	VAV-C	AHU-5	EF-11	0	24	---	0	22%	20%	
3	1325	Classroom	NA	AHU-9	NA	1099	902	---	110	10%	10%	
3	1326	Restroom	NA	NA	EF-12	---	---	210	---	---	---	
3	1327	Corridor	NA	AHU-9	NA	377	---	---	38	10%	10%	
3	1328	Restroom	NA	NA	EF-12	---	---	198	---	---	---	
3	1329	Classroom	NA	AHU-9	NA	1086	876	---	109	10%	10%	
3	1331	Classroom	NA	AHU-9	NA	1090	746	---	109	10%	10%	
3	2202	Classroom	NA	AHU-10	NA	175	---	---	18	8%	10%	
3	2301	Classroom	NA	AHU-10	NA	1036	1047	---	83	8%	10%	
3	2307	Classroom	NA	AHU-10	NA	973	108	---	78	8%	10%	
3	2308	Office	NA	AHU-10	NA	258	261	---	21	8%	10%	
3	2309	Restroom	NA	NA	EF-13	---	---	0	---	---	---	EF-13 has a broken belt
3	2311	Restroom	NA	NA	EF-13	---	---	0	---	---	---	EF-13 has a broken belt
3	2312	Classroom	NA	AHU-10	NA	936	848	---	75	8%	10%	
3	2313	Classroom	NA	AHU-10	NA	1179	890	---	94	8%	10%	
3	2314	Stairs	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space

3	2315	Corridor	NA	AHU-10	NA	328	---	---	26	8%	10%	
3	2316	Corridor	VAV-B	AHU-5	NA	21	51	---	5	22%	20%	
3	2317	Corridor	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
3	2318	Classroom	NA	NA	EF-11	---	---	75	---	---	---	
3	2319	Utility	NA	AC-2	0	---	---	---	---	---	---	
3	2321	Utility	NA	NA	NA	---	---	---	---	---	---	There is not ventilation to this space
3	2322	Classroom	VAV-C	AHU-5	NA	92	59	---	20	22%	20%	
3	2323	Classroom	VAV-C	AHU-5	NA	26	24	---	6	22%	20%	
3	2324	Restroom	VAV-C	AHU-5	EF-11	17	51	---	4	22%	20%	
3	2325	Classroom	NA	AHU-9	NA	1097	1121	---	110	10%	10%	
3	2326	Classroom	NA	NA	EF-13	---	---	0	---	---	---	EF-13 needs a new belt
3	2327	Corridor	NA	AHU-9	NA	355	---	---	36	10%	10%	
3	2328	Restroom	NA	NA	EF-13	---	---	0	---	---	---	EF-13 needs a new belt
3	2329	Classroom	NA	AHU-9	NA	1237	903	---	124	10%	10%	
3	2331	Classroom	NA	AHU-9	NA	1113	1256	---	111	10%	10%	

Appendix B

Ventilation Data Calculations

Project Name: Groton Public Schools Ventilation Study
School Name: Northeast Academy
Project Number: 20150601.A81
Scope: HVAC Verification and Evaluation
Data Collection By: TAB Data F&O Data
Date: 12/27/2024 11/20/2024
OUTSIDE AIR VERIFICATION CALCULATION

Northeast Academy OUTSIDE AIR VERIFICATION CALCULATION											
ROOM IDENTIFICATION					AIR HAND. EQUIPMENT		CALCULATED VENTILATION REQUIREMENT				VENTILATION DELTA
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	AHU	MEASURED OA AIRFLOW	OCCUPANCY DENSITY	PEOPLE OA RATE (RP)	AREA OA CFM RATE (RA)	Vbz	
			(ft²)	(ft³)		(cfm)	(ppl/1000ft²)	(cfm/person)	(cfm/ft²)	(cfm)	MEAS. - CALC.
1101	Gymnasium	Gymnasium	2958.46	71021.0	AHU-1	561	21	420	533	953	-392
1102	Storage	Storage	174.22	2264.9	AHU-2	6	0	0	21	21	-15
1103	Art Room	Art Classroom	810.26	7299.8	AHU-3	28	16	170	146	316	-288
1104	Corridor	Corridor	395.67	5539.4	AHU-3	5	-	0	24	24	-19
1108	Storage	Storage	126.34	1144.6	AHU-2	2	0	0	21	21	-19
1112	Kitchen Staff	Storage	97.15	881.9	AHU-2	4	0	0	12	21	-17
1113	Office	Office	49.12	445.1	AHU-2	2	0	5	3	8	-6
1114	Kitchen	Kitchen	996.28	8974.0	AHU-2	122	70	700	60	760	-638
1117	Corridor	Corridor	402.63	3625.9	AHU-2	8	-	0	24	24	-16
1121	Custodian Work/ Office	Office	265.47	2128.4	AHU-2	9	1	10	16	8	1
1126	Practice	Classroom	90.89	732.5	AHU-3	3	3	40	11	51	-48
1127	Kiln Room	Art Classroom	76.63	618.4	NA	---	2	20	14	316	-
1128	Storage	Storage	114.38	920.4	AHU-3	1	0	0	21	21	-20
1129	Storage	Storage	88.63	714.4	AHU-3	1	0	0	21	21	-20
1131	Music Room	Music/Theater/Dance	1240.16	11167.4	AHU-3	30	43	440	74	514	-484
1132	Corridor	Corridor	414.29	5800.1	AHU-3	5	-	0	24	24	-19
1133	Faculty Dining	Cafeteria	209.99	2099.9	AHU-4	70	21	158	38	195	-125
1134	Cafetorium	Auditorium	3379.04	81097.0	AHU-4	2893	507	2535	203	2738	155
1135	Platform	Stage/ Studio	726.49	15982.8	AHU-4	327	-	0	0	0	327
1200	Vestibule	Vestibule	145.65	1318.4	AHU-5	5	0	10	9	19	-14
1203	Corridor	Corridor	584.07	5260.4	AHU-5	4	-	0	24	24	-20
1204	Pre-K Special Needs Classroom	Classroom	834.54	7516.9	AHU-7	---	29	300	100	51	-
1206	Storage	Storage	62.33	503.3	NA	---	0	0	21	21	-
1207	Storage	Storage	64.4	519.9	NA	---	0	0	21	21	-
1209	Pre-K Classroom	Classroom	844.94	7610.5	AHU-7	107	30	300	101	51	56
1211	Kindergarten Classroom	Classroom	844.97	7610.7	AHU-7	119	30	300	101	51	68
1213	Storage	Storage	63.72	514.4	NA	---	0	0	21	21	-
1214	Storage	Storage	62.64	505.8	NA	---	0	0	21	21	-
1216	Kindergarten Classroom	Classroom	854.56	7697.0	AHU-7	125	30	300	101	51	74
1217a	1st Grade Classroom	Classroom	855	7701.0	AHU-7	124	30	300	103	51	73
1217b	Corridor	Classroom	910	8193.8	AHU-7	---	32	320	24	51	-
1219	Storage	Storage	62.02	500.8	NA	---	0	0	21	21	-
1221	Storage	Storage	62.55	505.1	NA	---	0	0	21	21	-
1223	1st Grade Classroom	Classroom	845	7611.0	AHU-7	120	30	300	103	51	69
1224	1st Grade Classroom	Classroom	849.18	7648.6	AHU-7	117	30	300	103	51	66
1226	Storage	Storage	63.68	514.1	NA	---	0	0	21	21	-
1227	Head End Work Rm	Office	266.28	3472.5	AHU-8	165	1	10	16	8	157

Northeast Academy OUTSIDE AIR VERIFICATION CALCULATION

ROOM IDENTIFICATION					AIR HAND. EQUIPMENT		CALCULATED VENTILATION REQUIREMENT				VENTILATION DELTA
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	AHU	MEASURED OA AIRFLOW	OCCUPANCY DENSITY	PEOPLE OA RATE (RP)	AREA OA CFM RATE (RA)	Vbz	
			(ft^2)	(ft^3)		(cfm)	(ppl/1000ft^2)	(cfm/person)	(cfm/ft^2)	(cfm)	MEAS. - CALC.
1228	Literacy Workroom	Office	234.23	2115.6	AHU-6	31	1	10	14	8	23
1229	Custodian	Custodial	50.77	670.8	NA	---	-	0	0	0	-
1232	Group Area	Classroom	390.12	3516.3	AHU-6	88	14	140	47	51	37
1233	AV Production Room	Classroom	188.56	1704.5	AHU-6	34	7	70	23	51	-17
1234	Lobby	Lobby	887.96	7993.1	NA	---	62	45	53	98	-
1235	Media Center	Library	1788.73	37563.3	AHU-6	500	125	180	107	287	213
1236	Circulation	Lobby	113.83	1032.7	AHU-6	---	8	10	7	98	-
1237	Work Room	Office	160.16	1449.7	AHU-6	12	1	5	10	8	4
1238	Office	Office	80.83	735.7	AHU-6	8	0	5	3	8	0
1239	Corridor	Corridor	643.02	5789.4	AHU-9	14	-	0	24	24	-10
1241	Waiting	Lobby	108.26	976.6	AHU-5	12	8	10	6	98	-86
1242	Nurse's Office	Nurse	83.44	753.2	AHU-5	11	0	5	5	10	1
1243	Student Rest	Nurse	155.09	1398.1	AHU-5	12	1	5	9	10	2
1245	Corridor	Storage	117	1053.0	AHU-5	11	0	0	24	21	-10
1246	Stair #2	Stairs	298.71	2688.4	NA	---	-	0	0	0	-
1248	Storage	Storage	46.33	370.6	NA	0	0	0	21	21	-21
1249	Assistant Principal's Office	Office	172.2	1558.1	AHU-5	7	1	5	10	8	-1
1251	Principal's Office	Office	202.07	1826.9	AHU-5	26	1	10	12	8	18
1252	Admin	Office	306.44	2764.0	AHU-5	4	2	10	18	8	-4
1253	Corridor	Corridor	177.6	1606.7	AHU-5	4	-	0	24	24	-20
1254	Admin	Office	213.85	1930.7	AHU-5	4	1	10	18	8	-4
1256	Parent Room	Office	182.43	1645.6	AHU-5	8	1	5	11	8	0
1257	Vestibule	Vestibule	349.6	7350.4	AHU-5	0	0	20	9	19	-19
1257	Vestibule	Vestibule	349.6	7350.4	AHU-5	0	0	20	9	19	-19
1258	Lobby	Lobby	1636.83	34382.2	AHU-5	0	115	85	53	98	-98
1259	OT/PT	Office	183.8	1658.7	AHU-5	3	1	5	11	8	-5
1261	Corridor	Corridor	43.42	347.4	NA	---	-	0	24	24	-
1265	Work Room	Office	225.37	2032.1	AHU-5	0	1	10	10	8	-8
1265	Work Room	Office	225.37	2032.1	AHU-5	0	1	10	10	8	-8
1267	Exam Room	Office	92.82	843.6	AHU-5	11	0	5	6	8	3
1268	Storage	Storage	89.84	723.4	AHU-5	11	0	0	21	21	-10
1268	Storage	Storage	89.84	723.4	AHU-5	11	0	0	21	21	-10
1302	Office	Office	141.1	1275.2	AHU-5	2	1	5	3	8	-6
1303	Corridor	Corridor	90.1	816.2	NA	---	-	0	24	24	-
1303	Corridor	Corridor	90.1	816.2	NA	---	-	0	24	24	-
1305	Office	Office	123.67	1118.3	AHU-5	3	1	5	3	8	-5
1306	Office	Office	127.71	1154.6	AHU-5	3	1	5	3	8	-5
1307	3rd Grade Classroom	Classroom	868.68	7823.4	AHU-10	63	30	310	104	51	12
1308	Work Rm	Office	276.86	2497.0	AHU-10	16	1	10	17	8	8
1312	2nd Grade Classroom	Classroom	868.76	7824.1	AHU-10	67	30	310	104	51	16
1312	2nd Grade Classroom	Classroom	868.76	7824.1	AHU-10	67	30	310	104	51	16
1314	Stair #1	Stairs	265.9	5318.0	NA	---	-	0	0	0	-
1315	Corridor	Corridor	718.19	6466.0	AHU-9	45	-	0	24	24	21
1316	Resource	Classroom	281.41	2539.4	AHU-5	1	10	100	34	51	-50
1318	Cust	Custodial	27.24	223.3	NA	---	-	0	0	0	-
1319	Data	Custodial	49.98	405.2	AC-1	---	-	0	0	0	-

Northeast Academy OUTSIDE AIR VERIFICATION CALCULATION

ROOM IDENTIFICATION					AIR HAND. EQUIPMENT		CALCULATED VENTILATION REQUIREMENT				VENTILATION DELTA
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	AHU	MEASURED OA AIRFLOW	OCCUPANCY DENSITY	PEOPLE OA RATE (RP)	AREA OA CFM RATE (RA)	Vbz	
			(ft^2)	(ft^3)		(cfm)	(ppl/1000ft^2)	(cfm/person)	(cfm/ft^2)	(cfm)	MEAS. - CALC.
1322	Resource	Classroom	83.19	751.0	AHU-5	2	3	30	34	51	-49
1323	Time Out Room	Classroom	178.63	1609.9	AHU-5	1	6	70	21	51	-50
1322	Resource	Classroom	83.19	751.0	AHU-5	2	3	30	34	51	-49
1325	3rd Grade Classroom	Classroom	862.41	7766.9	AHU-9	110	30	310	104	51	59
1327	Toilet Entry	Corridor	67.83	612.0	AHU-9	38	-	0	4	24	14
1329	3rd Grade Classroom	Classroom	881.42	7938.0	AHU-9	109	31	310	104	51	58
1331	2nd Grade Classroom	Classroom	842.44	7587.2	AHU-9	109	29	300	104	51	58
2202	Corridor	Classroom	350	3155.3	AHU-10	18	12	130	24	51	-33
2301	Flex Classroom	Classroom	875.92	7888.5	AHU-10	83	31	310	105	51	32
2307	5th Grade Classroom	Classroom	875.03	7880.5	AHU-10	78	31	310	105	51	27
2308	Work Room	Office	257.74	2324.9	AHU-10	21	1	10	10	8	13
2312	5th Grade Classroom	Classroom	874.21	7873.1	AHU-10	75	31	310	105	51	24
2313	5th Grade Classroom	Classroom	852.62	7678.8	AHU-10	94	30	300	105	51	43
2314	Stair #1	Stairs	257.43	3346.6	NA	---	-	0	0	0	-
2315	Corridor	Corridor	1356.61	12210.2	AHU-10	26	-	0	24	24	2
2316	Resource	Corridor	281	2810.0	AHU-5	5	-	0	34	24	-19
2315	Corridor	Corridor	1356.61	12210.2	AHU-10	26	-	0	24	24	2
2318	Custodian	Classroom	24	267.7	NA	---	1	10	0	51	-
2318	Custodian	Classroom	24	267.7	NA	---	1	10	0	51	-
2322	Resource	Classroom	100	1000.0	AHU-5	20	4	40	34	51	-31
2323	Time Out Room	Classroom	179	1790.0	AHU-5	6	6	70	21	51	-45
2325	4th Grade Classroom	Classroom	872.2	7855.1	AHU-9	110	31	310	105	51	59
2326	Boy's	Classroom	160.34	1603.4	NA	---	6	60	0	51	-
2327	Toilet Entry	Corridor	72.98	659.1	AHU-9	36	-	0	4	24	12
2329	4th Grade Classroom	Classroom	879.41	7919.9	AHU-9	124	31	310	105	51	73
2331	4th Grade Classroom	Classroom	867.19	7810.0	AHU-9	111	30	310	105	51	60
2331	4th Grade Classroom	Classroom	867.19	7810.0	AHU-9	111	30	310	105	51	60

Project Name: Groton Public Schools Ventilation Study
Project Number: 20150601.A81
School Name Northeast Academy
Scope: HVAC Verification and Evaluation
Data Collection By: TAB Data F&O Data
Date: 12/27/2024 11/20/2024

EXHAUST FAN CALCULATION

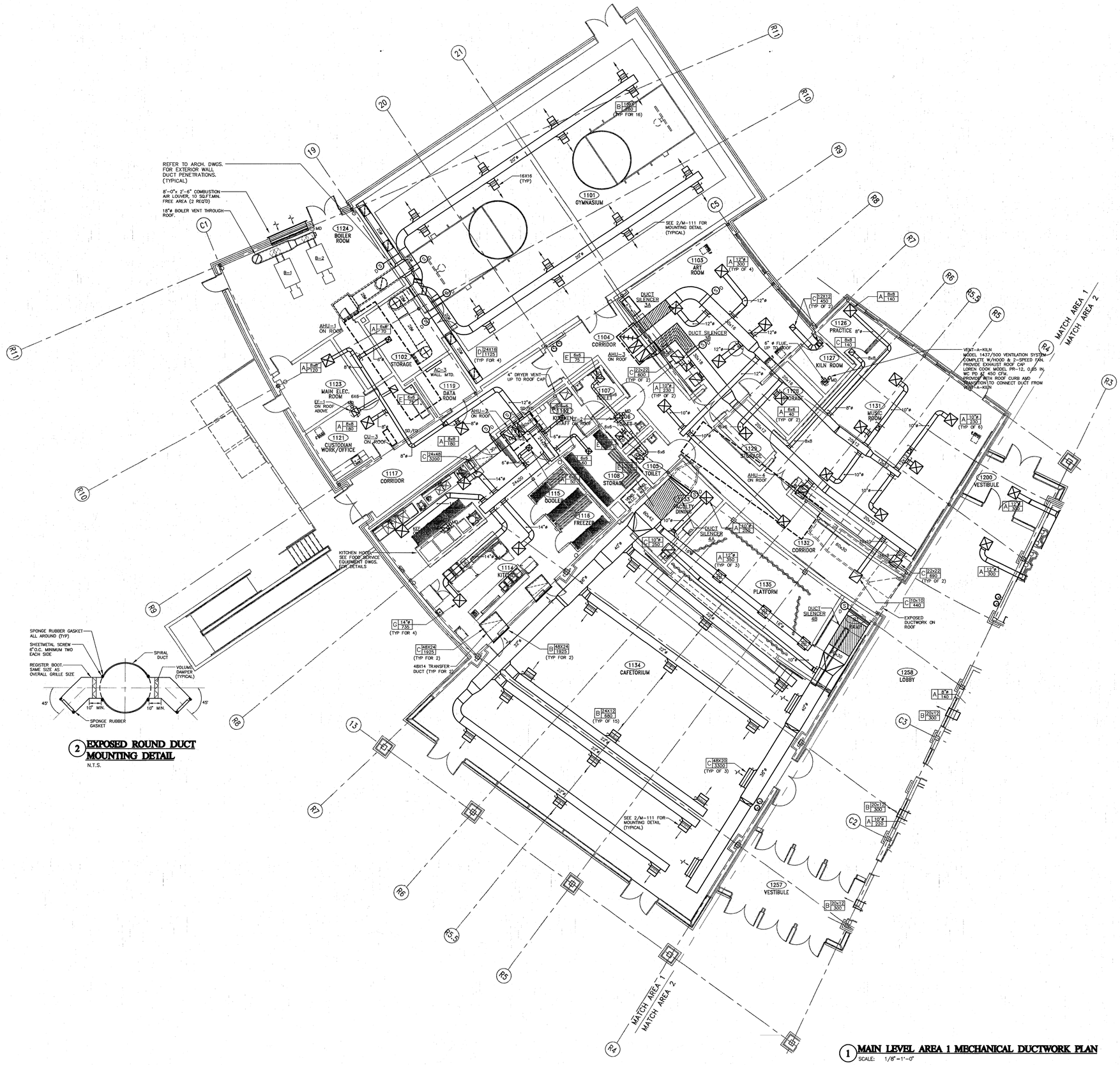
Northeast Academy EXHAUST FAN CALCULATION								
ROOM CHARACTERISTICS						TAB DATA	EXHAUST CALCULATIONS	
DRAWING ROOM NUMBER	DRAWING ROOM NAME	ROOM TYPE	AREA	VOLUME	PLUMBING FIXTURES	MEASURED EXHAUST	ASHRAE 62.1 REQUIRED EXHAUST	EXHAUST REQUIREMENT DELTA
			(ft^2)	(ft^3)	QTY.	(cfm)	(cfm)	MEAS. - CALC.
1105	Toilet	Restroom	58.48	473.2	1	53	50	3
1106	Toilet	Restroom	54.84	444.1	1	59	50	9
1107	Toilet	Restroom	57.81	467.8	1	51	50	1
1201	Girl's Toilet	Restroom	274.06	2466.5	6	401	300	101
1202	Boy's Toilet	Restroom	300.95	2708.6	6	389	300	89
1205	Toilet	Restroom	57.1	461.5	1	107	50	57
1208	Toilet	Restroom	57	460.7	1	88	50	38
1212	Toilet	Restroom	57.06	461.1	1	70	50	20
1215	Toilet	Restroom	55.18	446.1	1	67	50	17
1218	Toilet	Restroom	56.77	458.8	1	0	50	-50
1222	Toilet	Restroom	54.94	444.2	1	112	50	62
1225	Toilet	Restroom	56.05	453.1	1	110	50	60
1262	Toilet	Restroom	68.24	545.9	1	45	50	-5
1262	Toilet	Restroom	68.24	545.9	1	45	50	-5
1264	Toilet	Restroom	89.06	717.8	2	90	100	-10
1309	Toilet	Restroom	61.42	496.7	1	49	50	-1
1311	Toilet	Restroom	57.26	463.4	1	0	50	-50
1326	Boy's	Restroom	160.64	1454.0	3	210	150	60
1328	Girl's	Restroom	165.42	1497.0	3	198	150	48
2309	Toilet	Restroom	50.12	405.6	1	0	50	-50
2311	Toilet	Restroom	49.15	397.9	1	0	50	-50
2324	Toilet	Restroom	55.9	452.5	1	0	50	-50
2328	Girl's	Restroom	167.88	1678.8	3	0	150	-150

Appendix C

Floor Plans

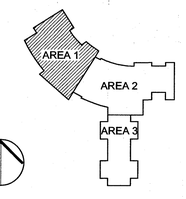
MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.



2 EXPOSED ROUND DUCT MOUNTING DETAIL
N.T.S.

1 MAIN LEVEL AREA 1 MECHANICAL DUCTWORK PLAN
SCALE: 1/8"=1'-0"



05-12-06 BID SET

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Northeast Academy Elementary School

115 Oslo Street
Groton, Connecticut

State Project No. 059 0179N

Phase 1

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JCJ Architecture, Inc.
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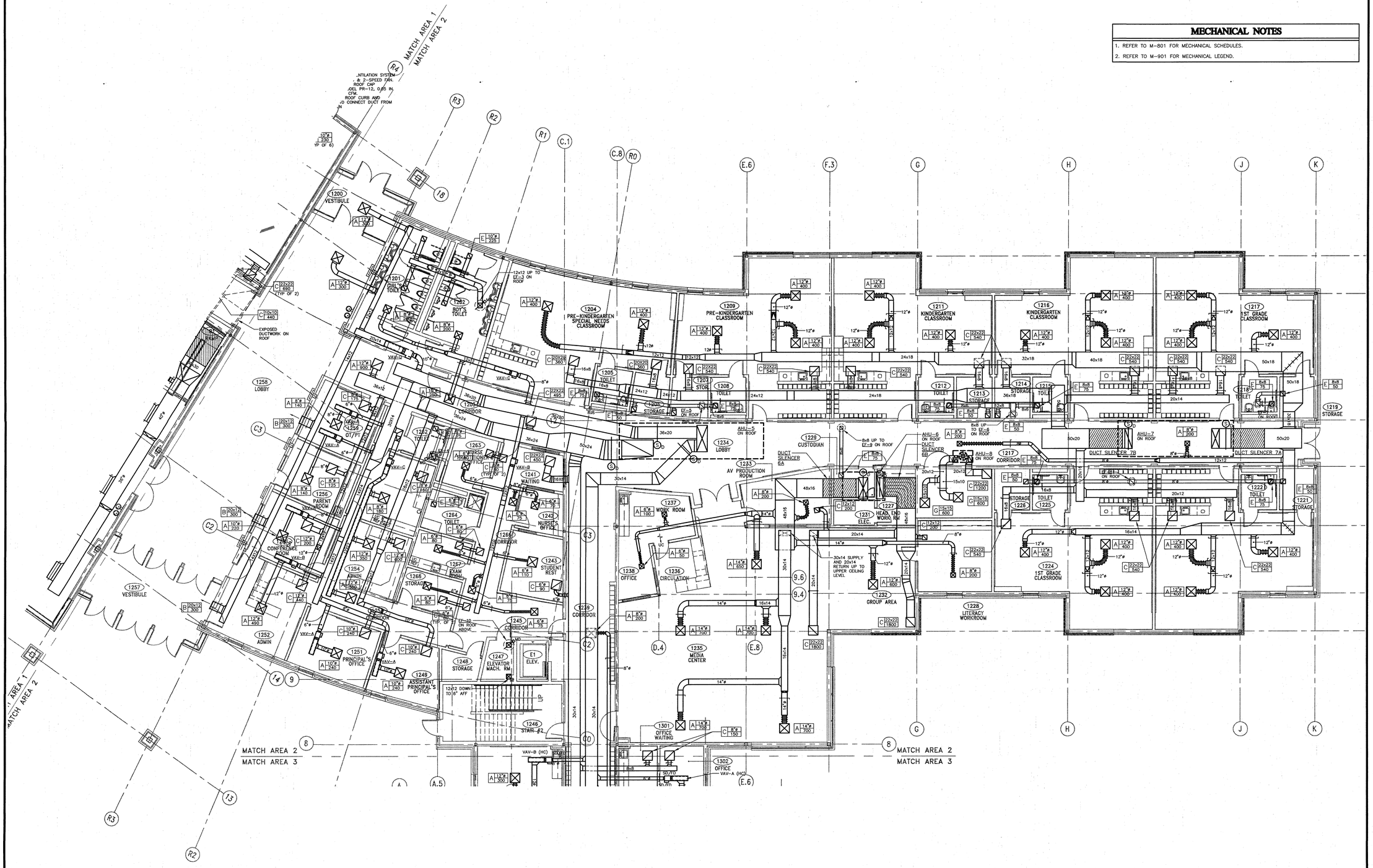
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SCALE 1/8" = 1'-0"

MAIN LEVEL
AREA 1
MECHANICAL
DUCTWORK PLAN

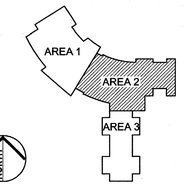
M-111

MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.



1 MAIN LEVEL AREA 2 MECHANICAL DUCTWORK PLAN
SCALE: 1/8"=1'-0"



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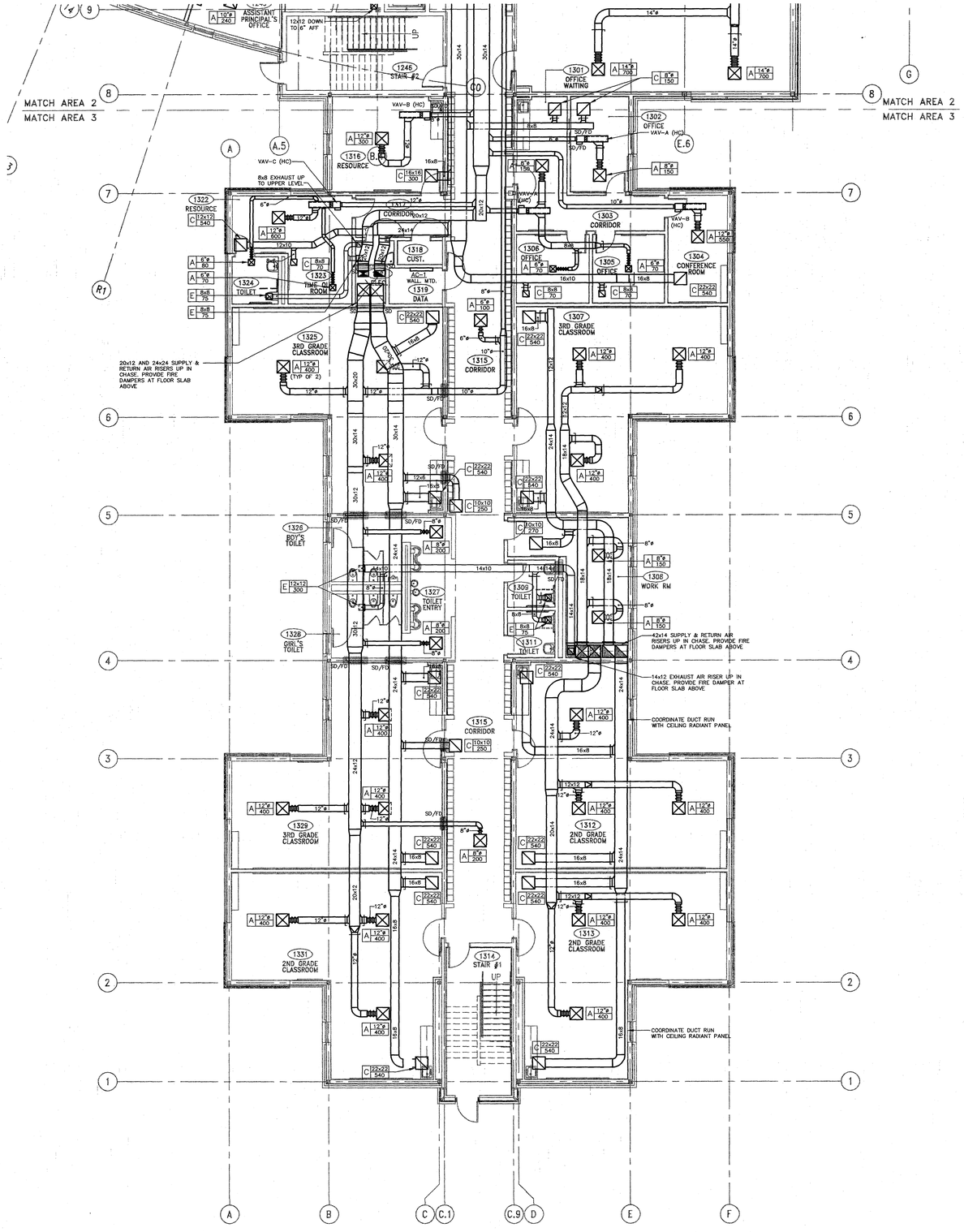
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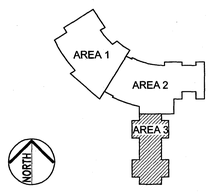
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JOB	044400
DRAWN	JJR
SCALE	1/8" = 1'-0"

MAIN LEVEL
AREA 2
MECHANICAL
DUCTWORK PLAN

M-112



1 **MAIN LEVEL AREA 3 MECHANICAL DUCTWORK PLAN**
SCALE: 1/8"=1'-0"



MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.

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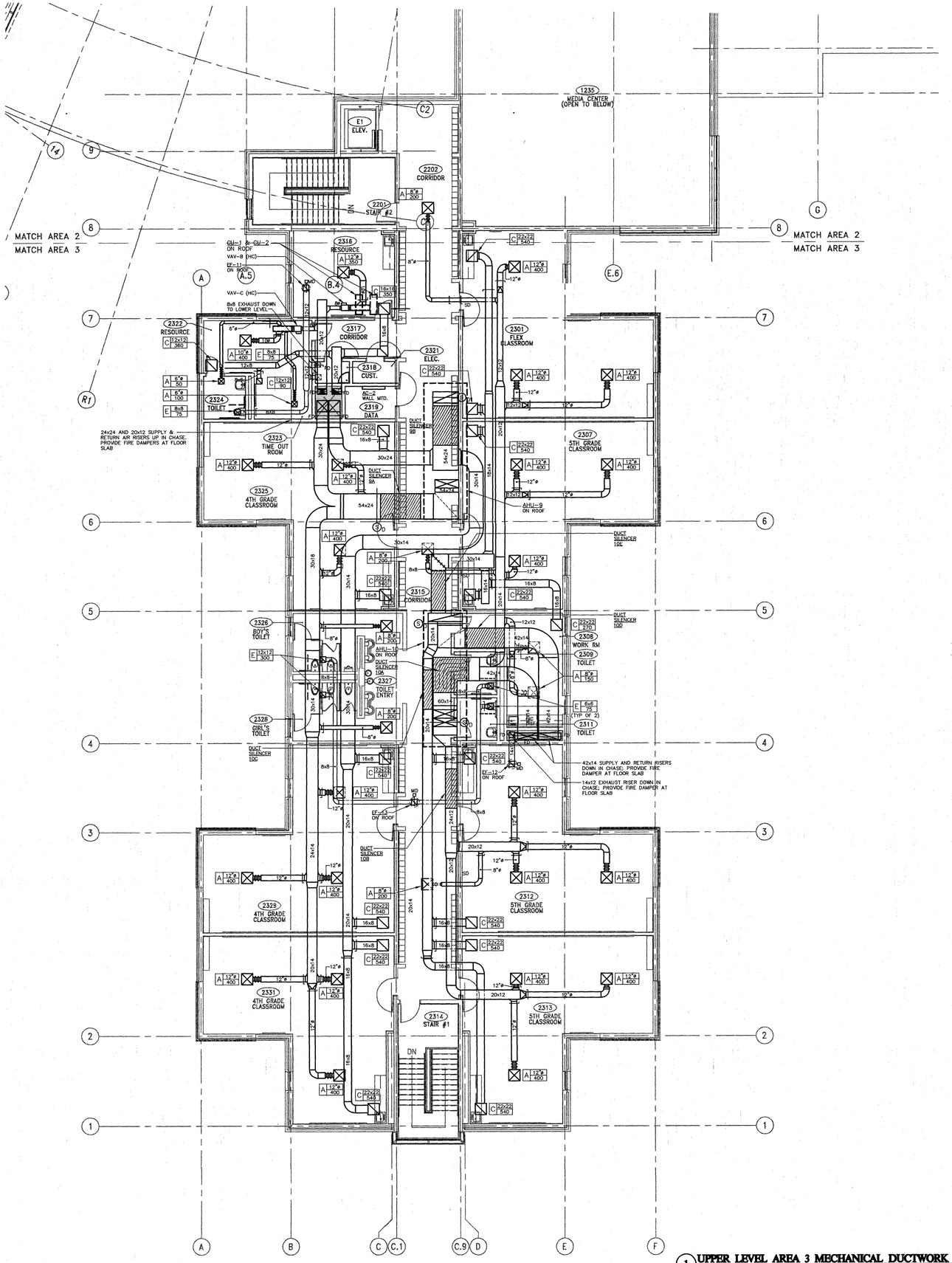
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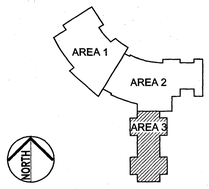
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MAIN LEVEL
AREA 3
MECHANICAL
DUCTWORK PLAN

M-113



1 **UPPER LEVEL AREA 3 MECHANICAL DUCTWORK PLAN**
SCALE: 1/8" = 1'-0"



MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.

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UPPER LEVEL
AREA3
MECHANICAL
DUCTWORK PLAN

M-123

PACKAGED ROOFTOP AIR HANDLING UNIT SCHEDULE

UNIT NO.	MANUFACTURER/MODEL NO.	LOCATION	AREA SERVED	SUPPLY FAN							RETURN/EXHAUST FAN						DX COOLING COIL DATA							HOT WATER HEATING COIL						OPERATING WEIGHT (LBS)	ELECTRICAL DATA			REMARKS
				CFM	MINIMUM O.A.	ESP (IN W.C.)	RPM	MOTOR			CFM	E.S.P.	RPM	MOTOR			CAPACITY (MBH)		STAGES OF CLG.	MIN. EER/ILPV	ENTERING AIR		LEAVING AIR		CAPACITY MBH	CFM	EWT (°F)	EAT (°F)	LAT (°F)	GPM		VOLTS	PHASE	MCA (AMPS)	
								BHP	HP	VFD				BHP	HP	VFD	TOTAL	SENS.			DB	WB	DB	WB											
AHU-1	TRANE/SLHFC20E	GYM LOBBY ROOF	GYMNASIUM	4,480	1,500	1.50	1,122	4.73	5.0	YES	4,480	1.0	749	1.66	3.0	YES	236	120	2	9.6	79.33	66.30	55.0	47.9	148	4,480	180	49.6	80.0	17.0	5,270	208	3	129.9	1,2,3
AHU-2	TRANE/TSC090	KITCHEN 1123 ROOF	KITCHEN STAFF AREA	3,700	280	1.55	1,299	3.27	5.0	–	–	–	–	–	–	–	93	84	2	10.3	75.8	63.4	55.0	54.8	60	3,700	180	65.4	80.0	4.2	1,016	208	3	55.43	1,2,3
AHU-3	TRANE/TSC120	STORAGE 1114 ROOF	ART & MUSIC CLASSROOMS	3,260	1,100	1.69	1,127	3.28	5.0	–	–	–	–	–	–	–	120	86	2	10.4	79.2	66.2	56.0	54.5	108	3,260	180	49.4	80.0	6.3	1,244	208	3	65.95	1,2,3
AHU-4	TRANE/SLHFC30E	KITCHEN 1123 ROOF	CAFETORIUM FACULTY DINING	11,500	2,300	1.0	1,087	11.44	15.0	YES	11,500	1.0	854	4.46	7.5	YES	360	272	2	9.7	77.6	64.8	56.0	54.3	277	11,500	180	57.8	80.0	20.0	6,200	208	3	221.30	1,2,3
AHU-5	TRANE/SLHFC20E	CORRIDOR ROOF	AMINISTRATION AREAS	8,085	2,200	1.5	1,304	9.46	10.0	YES	8,085	1.0	802	2.90	3.0	YES	279	206	2	10.1	77.8	65.5	56.0	54.7	233	8,085	180	53.4	80.0	20.0	5,270	208	3	144.38	1,2,3
AHU-6	TRANE/TFD151C30C	AV PRODUCTION ROOM ROOF	MEDIA CENTER & WORK ROOM	4,600	1,070	1.0	1,035	3.37	5.0	YES	4,600	1.0	1040	.75	1.0	YES	151	42	2	11.3	78.1	65.2	56.0	54.0	121	4,600	180	55.8	80.0	11.6	1,820	208	3	63.0	1,2,3
AHU-7	TRANE/SLHFC20E	CORRIDOR 1321 ROOF	CLASSROOMS AREA 2	8,400	2,100	1.0	1,170	6.80	7.5	YES	8,400	1.0	787	2.52	3.0	YES	266	185	2	10.1	78.0	65.7	56.0	54.1	230	8,400	180	54.8	80.0	20.0	5,270	208	3	136.98	1,2,3
AHU-8	TRANE/TSC036	CORRIDOR 1226 ROOF	HEAD END WORK ROOM	1,200	40	0.75	1,060	0.37	0.5	–	–	–	–	–	–	–	23	21	2	10.7	75.4	63.0	56.0	55.3	16	1,200	180	68.0	80.0	0.8	603	208	3	21.16	1,2,3
AHU-9	TRANE/SLHFC25E	CORRIDOR 1315 ROOF	CLASSROOMS AREA 3 WEST	8,500	2,550	1.5	13.87	10.85	15.0	YES	8,500	1.5	951	4.21	5.0	YES	295	208	2	9.8	78.3	65.9	56.0	54.4	261	8,500	180	51.7	80.0	25.0	5,440	208	3	193.30	1,2,3
AHU-10	TRANE/SLHFC25E	CORRIDOR 1315 ROOF	CLASSROOMS AREA 3 EAST	9,600	3,030	1.5	1,403	11.46	15.0	YES	9,600	1.5	958	4.41	5.0	YES	323	219	2	9.8	78.8	66.4	56.0	54.3	305	9,600	180	50.7	80.0	30.0	5,440	208	3	193.30	1,2,3

REMARKS:
1. PROVIDE UNIT WITH FACTORY INSTALLED DISCONNECT SWITCH.
2. PROVIDE UNIT WITH FACTORY INSTALLED VARIABLE FREQUENCY MOTOR DRIVES.
3. PROVIDE UNIT WITH MFR'S 14" Ht. ROOF CURB.

HOT WATER CABINET & UNIT HEATER SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	TYPE	LOCATION	CAPACITY (MBH)	COIL FLOW (GPM)	COIL PD (FT HD)	EWT (°F)	LWT (°F)	AIR FLOW (CFM)	FAN SPEED (RPM)	ELECTRICAL			WEIGHT (LBS)	REMARKS
											HP	VOLTS	PHASE		
CUH-1	RITTLING RF-04	HORZ. FLR	CORRIDOR 1117	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2
CUH-2	RITTLING RFRW-04	WALL MTD.	VESTIBULE 1257	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2
CUH-3	RITTLING RFRC-04	CLG. MTD.	VESTIBULE 1200	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2
CUH-4	RITTLING RFRC-04	CLG. MTD.	VESTIBULE 1200	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2
CUH-5	RITTLING RF-04	HORZ. FLR	STAIR #2 1246	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2
CUH-6	RITTLING RFRC-04	CLG. MTD.	CORRIDOR 1217	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2
CUH-7	RITTLING RF-06	HORZ. FLR	STAIR #1 1314	21.6	2.5	0.5	180	160	335	650	1/25	120	1ø	130	2,3
UH-1	RITTLING RH-33	HORZ.	BOILER ROOM 1124	20.4	2.5	.12	180	160	630	1550	1/15	120	1ø	43	1
UH-2	RITTLING RH-33	HORZ.	BOILER ROOM 1124	20.4	2.5	.12	180	160	630	1550	1/15	120	1ø	43	1
UH-3	RITTLING RH-33	HORZ.	MAIN ELEC. RM. 1123	20.4	2.5	.12	180	160	630	1550	1/15	120	1ø	43	1

REMARKS:
1. PROVIDE WITH WALL BRACKET, ADJUSTABLE HORIZONTAL AND VERTICAL BLADES AND LINE VOLTAGE THERMOSTAT.
2. PROVIDE WITH INTEGRAL THERMOSTAT, LEVELING LEGS, TAMPER RESISTANT ACCESS FASTENERS AND TWO SPEED FAN.
3. FLOOR MOUNTED SEMI-RECESSED UNIT; PROVIDE ALL REQUIRED TRIM.

SOUND ATTENUATOR SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	AIR FLOW (CFM)	AIR PD (IN WG)	FACE VELOCITY (FPM)	DYNAMIC INSERTION LOSS (DB) OCTAVE BAND (HZ)								UNIT DIMENSIONS (INCHES)	OPERATING WEIGHT	REMARKS
					63	125	250	500	1K	2K	4K	8K			
3A	VIBRO-ACOUSTICS RMB-MV-F1	3,260	0.21	978	8	15	27	30	36	25	19	16	30x16x84L	300	1
3B	VIBRO-ACOUSTICS REMB-MHV-F1	3,260	0.22	978	9	14	21	33	30	28	22	19	30x16x84L	185	1,2
4A	VIBRO-ACOUSTICS RMB-MLV-F1	11,500	0.26	920	9	16	30	34	41	29	21	17	60x30x84L	385	1
4B	VIBRO-ACOUSTICS RMB-MLV-F1	11,500	0.26	920	11	18	32	36	42	30	20	17	60x30x84L	200	1
6A	VIBRO-ACOUSTICS RMB-MLV-F4	4,600	0.19	863	11	15	27	44	48	39	21	14	48x16x84L	185	1
6B	VIBRO-ACOUSTICS REMB-MV-F4	4,600	0.25	863	8	17	27	36	39	37	28	23	48x16x84L	185	1,2
7A	VIBRO-ACOUSTICS RMB-MV-F3	8,400	0.26	1210	9	13	24	37	40	29	19	14	50x20x84L	185	1
7B	VIBRO-ACOUSTICS RMB-MV-F3	8,400	0.26	1210	11	17	27	40	40	27	17	13	50x20x84L	185	1
9A	VIBRO-ACOUSTICS RMB-MLV-F2	8,500	0.26	944	10	16	29	37	44	32	21	16	54x24x84L	200	1
9B	VIBRO-ACOUSTICS RMB-MLV-F2	8,500	0.26	944	12	17	31	39	44	32	20	16	54x24x84L	185	1
10A	VIBRO-ACOUSTICS REMB-HV-F1	7,000	0.15	1200	9	12	17	29	29	29	22	19	60x14x84L	185	1,2
10B	VIBRO-ACOUSTICS RMB-MHV-F4	2,600	0.18	1300	8	12	21	37	36	26	16	11	24x12x84L	200	1
10C	VIBRO-ACOUSTICS RMB-MHV-F6	2,400	0.20	1234	9	15	22	39	44	33	21	14	20x14x84L	185	1
10D	VIBRO-ACOUSTICS RMB-MLV-F5	3,510	0.21	860	12	17	29	45	50	39	24	16	42x14x84L	185	1
10E	VIBRO-ACOUSTICS RMB-MV-F1	2,700	0.19	926	10	16	29	32	36	26	19	16	30x14x84L	185	1

REMARKS:
1. PROVIDE WITH ALL REQUIRED INLET & OUTLET TRANSITIONS.
2. PROVIDE 90° ELBOW TYPE DUCT SILENCER.

EXPANSION TANK SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	TYPE	LOCATION	CONFIGURATION	MIN. ACCEPTANCE VOLUME (GAL)	SIZE (DIA x H)
ET-2	BELL & GOSSETT B-500	D	BOILER 1124	VERTICAL	110	30x78

TYPES:
C = COMPRESSION
D = DIAPHRAGM

CONFIGURATION:
H = HORIZONTAL
V = VERTICAL

SPLIT SYSTEM AIR CONDITIONER UNIT SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	LOCATION	AREA SERVED	TOTAL CAPACITY MBH	SENSIBLE CAPACITY MBH	CFM	AMBIENT AIR TEMP (°F)	MOTOR DATA VOLT/PH/Hz	REMARKS
CU-1	SANYO KS1852	OUTDOOR UNIT	DATA ROOM 1319	17.0	N/A	–	95	8.4 AMPS 208/1ø/60HZ	1,2
CU-2	SANYO KS1852	OUTDOOR UNIT	DATA ROOM 2319	17.0	N/A	–	95	8.4 AMPS 208/1ø/60HZ	1,2
CU-3	SANYO KS1852	OUTDOOR UNIT	DATA ROOM 1119	17.0	N/A	–	95	8.4 AMPS 208/1ø/60HZ	1,2
AC-1	SANYO CL1852	DATA ROOM 1319	DATA ROOM 1319	17.0	N/A	390	80		1
AC-2	SANYO CL1852	DATA ROOM 2319	DATA ROOM 2319	17.0	N/A	390	80		1
AC-3	SANYO CL1852	DATA ROOM 1119	DATA ROOM 1119	17.0	N/A	390	80		1

REMARKS:
1. MINIMUM SEER RATING 10.6.
2. UNIT SHALL BE RATED FOR LOW AMBIENT OPERATION DOWN TO 0 DEGREE F.

FIN TUBE RADIATION SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	CAPACITY BTUH/LF	EWT (°F)	LWT (°F)	ENCLOSURE HEIGHT	MOUNTING HEIGHT TO BOTTOM	NO. OF TIERS	PIPE SIZE	FIN SIZE	REMARKS
FT	RITTLING/ PIBO 1S	920	180	160	10"	6"	1	1"	4 1/4"x4 1/4"x 40	1,2,3,4

INDICATES TYPE — FT | 10'-0" | 2.5 GPM — INDICATES LENGTH OF RADIANT PANEL; INDICATES WATER FLOW THRU RADIANT PANEL

REMARKS:
1. PROVIDE SUPPORT SADDLE FOR RETURN PIPE WHERE SHOWN ON THE DRAWINGS.
2. PEDESTAL TYPE ENCLOSURE SHALL COMPLETELY COVER ALL PIPING, FITTINGS AND VALVES.
3. MEDIA SHALL BE 30% PROPYLENE GLYCOL WATER SOLUTION.
4. REMOVABLE COVER SECTION OR DOORS SHALL BE PROVIDED FOR ACCESS TO ISOLATION VALVES, CONTROL VALVES, DRAIN VALVES, BALANCING VALVES AND AIR VENTS.

DIFFUSER AND REGISTER SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	DUTY	TYPE	BORDER TYPE	CONSTRUCTION			REMARKS
					OBD	FRAME	BLADES	
A	PRICE SCD	SUPPLY	ROUND NK. CEILING DIFFUSER	T-BAR MTD.	NONE	STEEL	STEEL	1,3
B	PRICE 520	SUPPLY	SIDEWALL DIRFFUSER	FLANGE MTD.	NONE	STEEL	STEEL	4
C	PRICE SERIES 80	RETURN	RETURN GRILLE	T-BAR MTD.	NONE	ALUMINUM	ALUMINUM	1,3
D	PRICE SERIES 90	RETURN	RETURN GRILLE HEAVY DUTY	FLANGE MTD.	NONE	ALUMINUM	ALUMINUM	4
E	PRICE 635	EXHAUST	EXHAUST GRILLE	FLANGE MTD.	NONE	ALUMINUM	ALUMINUM	3
G	PRICE ASPD	SUPPLY	ROUND NK. PLAQUE DIFFUSER	T-BAR MTD.	NONE	ALUMINUM	ALUMINUM	1,3
H	PRICE SCD SERIES	SUPPLY	SQUARE CONE DIFFUSER	FLANGE MTD.	NONE	STEEL	STEEL	2

REMARKS:
1. DIFFUSER SHALL FIT RECESSED INTO ACOUSTICAL HUNG CEILING.
2. PROVIDE SQUARE TO ROUND TRANSITION.
3. PROVIDE LAY-IN PANEL.
4. SURFACE TYPE INSTALLATION.

INDICATES UNIT TYPE — A | 10"ø | 350 — INDICATES NECK SIZE; INDICATES UNIT CFM CAPACITY

RADIANT CEILING PANEL SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	CAPACITY BTUH/LF	EWT (°F)	PANEL WIDTH	MOUNTING	PANEL MATERIAL	BRANCH PIPE SIZE	REMARKS
A	AIRTEX HEF-Z	530	180	36"	T-BAR	ALUMINUM/ COPPER TUBE	3/4"	1,2

INDICATES TYPE — A | 17'-0" | 1.0 GPM — INDICATES LENGTH OF RADIANT PANEL; INDICATES WATER FLOW THRU RADIANT PANEL

REMARKS:
1. PROVIDE 2" BATT INSULATION OVER ENTIRE PANEL.
2. MEDIA SHALL BE 30% PROPYLENE GLYCOL WATER SOLUTION.

PANEL RADIATION SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	CAPACITY BTUH/LF	EWT (°F)	LWT (°F)	HEIGHT	MOUNTING HEIGHT TO BOTTOM	NO. OF TUBES	PIPE SIZE	REMARKS
PR	PANEL RADIATOR PRF-3	706	180	160	8.5"	7'-6"	3	1/2"	1,2,3

INDICATES TYPE — PR | 10'-0" | 0.7 — INDICATES LENGTH OF RADIANT PANEL; INDICATES WATER FLOW THRU RADIANT PANEL

REMARKS:
1. PROVIDE 12' LENGTH END CAPS TRIM TO COMPLETELY CONCEAL PIPING, FITTING & VALVES
2. PROVIDE ALL REQUIRED WALL MOUNTING ACCESSORIES.
3. LOCATE CONTROL VALVE IN ACCESSIBLE CEILING

PUMP SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	TYPE	LOCATION	SYSTEM SERVING	MEDIA	FLOW RATE (GPM)	TDH (FT)	FLUID TEMP (°F)	PUMP EFF (%)	BHP	MOTOR DATA				REMARKS
											HP	RPM	VOLTS	PHASE	
HWP-1 HWP-2	BELL & GOSSETT 1510 2-1/2AB	ES	BOILER 1124	HEATING SYSTEM	HEATING WATER	311	110	180	76.9	11.62	15.0	3500	208	3	1,2
PP-1	BELL & GOSSETT 80 3x3x7B	IL	BOILER 1124	HEATING SYSTEM	HEATING WATER	216	20	180	60.7	1.77	2.0	1750	208	3	1,2
PP-2	BELL & GOSSETT 80 3x3x7B	IL	BOILER 1124	HEATING SYSTEM	HEATING WATER	216	20	180	60.7	1.77	2.0	1750	208	3	1,2
DP-1	BELL & GOSSETT 60 1 1/4x1 1/4x 5 1/4	IL	BOILER 1124	DOMESTIC WATER HEATER	HEATING WATER	29	25	180	56.8	0.34	.75	1750	208	3	1

TYPE:
ES = END SUCTION
CC = CLOSE COUPLED
HSC = HORIZONTAL SPLIT CASE
IL = IN-LINE
VSC = VERTICAL SPLIT CASE

REMARKS:
1. HEATING WATER SHALL BE 30% PROPYLENE GLYCOL/WATER SOLUTION
2. PROVIDE PUMP WITH AC VARIABLE FREQUENCY DRIVE.

EXHAUST FAN SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	TYPE	LOCATION	SERVING	AIR FLOW (CFM)	SP (IN WG)	FAN SPEED (RPM)	DRIVE	BHP	MOTOR DATA			WEIGHT (LBS)	SONES	REMARKS
										HP	VOLTS	PH			
KEF-1	LOREN COOK 195VCR	ROOF MOUNTED UP-BLAST	KITCHEN 1123	KITCHEN HOOD	3,850	0.85	1050	BELT	1.07	1 1/2	208	3	238	15.7	3,4
EF-1	LOREN COOK 70ACEB	ROOF MOUNTED	CUSTODIAN 1121	CUSTODIAN 1121	75	0.375	1389	DIRECT	0.05	1/20	115	1	53	3.9	1,2,5
EF-2	LOREN COOK 120ACEB	ROOF MOUNTED	TOILET 1106	TOILET 1105-1107	225	0.375	1476	BELT	0.12	1/4	115	1	78	9.0	1,2
EF-3	LOREN COOK 120ACEB	ROOF MOUNTED	BOY'S 1202	TOILET 1101 & 1102	900	0.375	1108	BELT	0.12	1/4	115	1	106	6.4	1,2
EF-4	LOREN COOK 70ACEB	ROOF MOUNTED	TOILET 1264	TOILET 1262 & 1264	150	0.375	1236	BELT	0.07	1/4	115	1	78	6.5	1,2
EF-5	LOREN COOK 70ACEB	ROOF MOUNTED	STORAGE 1206	TOILET 1205 & 1208	250	0.375	1236	BELT	0.07	1/4	115	1	78	6.5	1,2
EF-6	LOREN COOK 70ACEB	ROOF MOUNTED	STORAGE 1214	TOILET 1212 & 1214	250	0.375	1236	BELT	0.07	1/4	115	1	78	6.5	1,2
EF-7	LOREN COOK 70ACED	ROOF MOUNTED	TOILET 1218	TOILET 1218	75	0.375	1389	DIRECT	0.05	1/20	115	1	53	3.9	1,2,5
EF-8	LOREN COOK 70ACEB	ROOF MOUNTED	CLASSROOM 1224	TOILET 1222 & 1225	250	0.375	1236	BELT	0.07	1/4	115	1	78	6.5	1,2
EF-9	LOREN COOK 70ACED	ROOF MOUNTED	CUSTODIAN 1229	CUSTODIAN 1229	75	0.375	1389	DIRECT	0.05	1/20	115	1	53	3.9	1,2,5
EF-10	LOREN COOK 100ACEB	ROOF MOUNTED	EMR 1247	EMR 1247	500	0.5	1405	BELT	0.1	1/4	115	1	78	7.6	1,2
EF-11	LOREN COOK 100ACEB	ROOF MOUNTED	TIME OUT 2323	TOILET 1324, 1318, 2324 & 2318	300	0.5	1378	BELT	0.06	1/4	115	1	78	6.6	1,2
EF-12	LOREN COOK 100ACEB	ROOF MOUNTED	CLASSROOM 2312	TOILET 1309, 1311, 1326 & 1328	750	0.5	1683	BELT	0.16	1/4	115	1	78	10.1	1,2
EF-13	LOREN COOK 100ACEB	ROOF MOUNTED	CORRIDOR 2315	TOILET 2309, 2311, 2326 & 2328	750	0.375	1601	BELT	0.14	1/4	115	1	78	9.5	1,2

REMARKS:
1. PROVIDE WITH MOTORIZED BACKDRAFT DAMPER INTERLOCK WITH FAN OPERATION.
2. PROVIDE WITH MANUFACTURER'S ROOF CURB.
3. PROVIDE FAN WITH 42"Ht. VENTILATED ROOF CURB
4. PROVIDE FANS WITH GREASE TRAP & HINGED ACCESS.
5. PROVIDE WITH SPEED CONTROLLER MOUNTED IN ACCESSIBLE CEILING SPACE ADJACENT TO FAN.

VARIABLE AIR VOLUME BOX SCHEDULE LIST

SYMBOL	MANUFACTURER/ MODEL NUMBER	TYPE	AIR CFM		INLET (INCHES) (DIAMETER)	MAXIMUM N.C. RATING	HOT WATER COIL DATA					REMARKS
			MIN. CFM	MAX CFM			CFM	CAPACITY MBH	EAT/LAT (°F)	EWT (°F)	GPM (°F)	PRESSURE DROP FT HD	
VAV-A VAV-A (HC)	TRANE VCCF/VCWF	SINGLE DUCT	130	350	5	25	325	10.5	65/95	180	1.0	2.8	1,2,3,4,5,6,7
VAV-B VAV-B (HC)	TRANE VCCF/VCWF	SINGLE DUCT	165	550	6	25	550	17.8	65/95	180	1.7	3.2	1,2,3,4,5,6,7
VAV-C VAV-C (HC)	TRANE VCCF/VCWF	SINGLE DUCT	300	1000	8	25	1000	32.4	65/95	180	3.2	4.1	1,2,3,4,5,6,7
VAV-D VAV-D (HC)	TRANE VCCF/VCWF	SINGLE DUCT	480	1600	10	25	1600	51.8	65/95	180	5.2	4.6	1,2,3,4,5,6,7

REMARKS:
1. PROVIDE CONTROL DISCONNECT
2. PROVIDE CONTROL LINE FUSE
3. PROVIDE OUTLET CONNECTION AND SIZE AS REQUIRED
4. PROVIDE INLET CONNECTION TRANSITION AS REQUIRED
5. PROVIDE UNIT MOUNTED FUSED DISCONNECT SWITCH
6. PROVIDE AIR FLOW SWITCH
7. ALL VAV BOXES SHALL BE ARI RATED

NOTE:
1. ALL VAV TERMINALS MARKED (HC) SHALL BE PROVIDED WITH HOT WATER REHEAT COIL; REFER TO FLOOR PLANS FOR VAV BOX LOCATIONS

FUEL OIL PUMP SET SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	TYPE	LOCATION	SERVING	MEDIA	FLOW RATE (GPH)	DISCHARGE PRESSURE	BHP	MOTOR DATA				REMARKS
									HP(EA.)	RPM	VOLTS	PHASE	
FOP-1	PREFERRED ATPS-103-208-100	DUPLEX	BOILER 195	B-1, B-2	OIL	80	100	–	1/3	1725	208	1	1,2,3,4,5,6,7,8, 9,10,11,12,13,14,15

REMARKS:
1. TWO LIGHT OIL PUMP & MOTOR ASSEMBLIES
2. ONE CONTROL CENTER CABINET
3. TWO RELIEF VALVES
4. TWO CHECK VALVES
5. FOUR BALL VALVES
6. ONE FLOW SWITCH
7. ONE DUPLEX STRAINER
8. ONE 4" STRAINER COMPOUND PRESSURE GAUGE
9. ONE STRAINER DP SWITCH / GAUGE
10. TWO 4" PUMP OUTLET PRESSURE GAUGES
11. FIVE SWITCH AND GAUGE ISOLATION VALVES
12. ONE BASE ASSEMBLY WITH LEAK DETECTOR SWITCH
13. CONTROL PANEL
14. PUMP SET LEAK DETECTION SWITCH
15. BAS DISCRETE OUTPUT CONTACTS

BOILER SCHEDULE

SYMBOL	MANUFACTURER/ MODEL NUMBER	MEDIA	I=B=R GROSS OUTPUT (MBH)	NET I=B=R RATINGS (MBH)	EWT/LWT (°F)	FUEL DATA		WATER CONTENT (GALS)	OPERATING WEIGHT (LBS)	BURNER DATA				REMARKS
						TYPE	RATE (GPH)			MANUFACTURER/ MODEL NUMBER	HP	VOLTS	PHASE	
B-1	SMITH 28A-7	HW	1699	2163	160/180	OIL	15.0	204	12,000	POWER FLAME C2-OA	3/4	208	3	1,2
B-2	SMITH 28A-7	HW	1699	2163	160/180	OIL	15.0	204	12,000	POWER FLAME C2-OA	3/4	208	3	1,2

REMARKS:
1. BURNER FIRING SHALL BE [OFF-LOW-HIGH] (MODULATING).
2. PROVIDE WITH ELECTRONIC SPARK IGNITION.

MEDIA:
HW = HOT WATER
LPS = LOW PRESSURE STEAM
PPG = 30% PROPYLENE GLYCOL/WATER SOLUTION.

05-12-06 BID SET

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State Project No. 059 0179N

Phase 1

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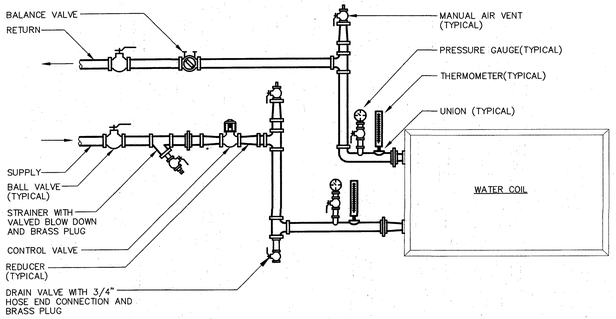
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J.C. ____

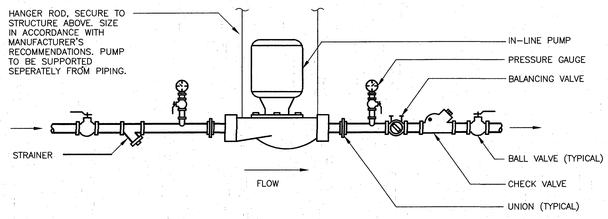
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SCALE N.T.S.

MECHANICAL SCHEDULES

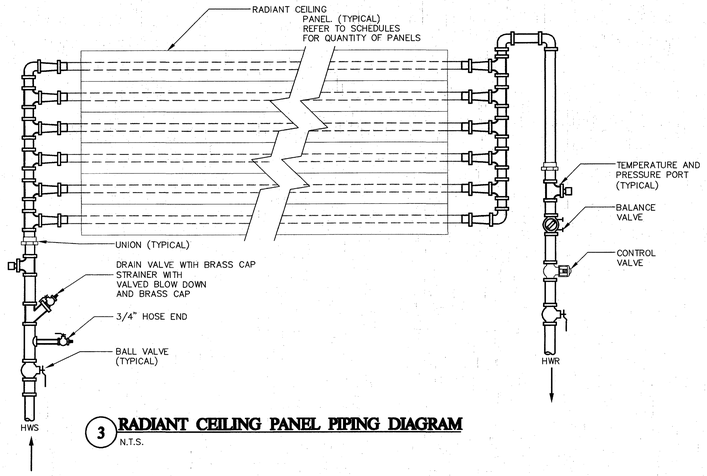
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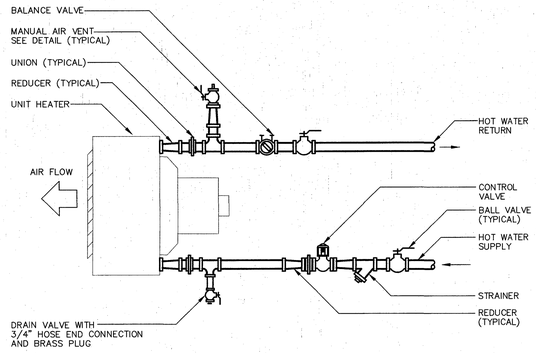
1 HOT WATER COIL PIPING DIAGRAM
N.T.S.



2 IN-LINE PUMP DETAIL
N.T.S.



3 RADIANT CEILING PANEL PIPING DIAGRAM
N.T.S.

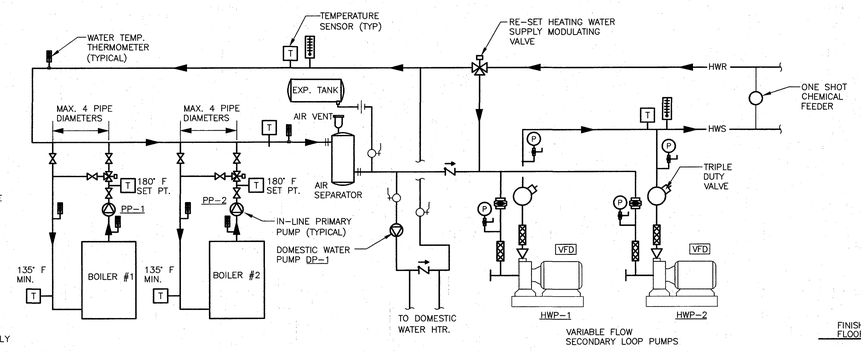


4 HORIZONTAL HOT WATER UNIT HEATER PIPING DIAGRAM
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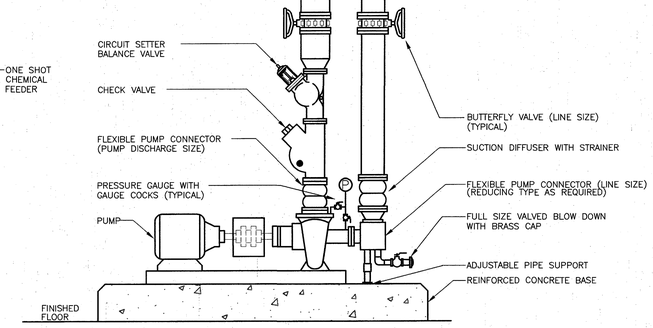
MECHANICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	ACOUSTICAL LINED DUCTWORK (DOUBLE LINED)	FOS	FUEL OIL SUPPLY
	FLEXIBLE DUCTWORK	FOR	FUEL OIL RETURN
	NEW DUCTWORK (DOUBLE LINE)	FOV	FUEL OIL VENT
	RETURN DUCT DROP (DOUBLE LINE)		GATE VALVE
	RETURN DUCT RISE (DOUBLE LINE)		BALL VALVE
	SUPPLY DUCT DROP (DOUBLE LINE)		GLOBE VALVE
	SUPPLY DUCT RISE (DOUBLE LINE)		BUTTERFLY VALVE
	VOLUME DAMPER		CHECK VALVE
FD	FIRE DAMPER		UNION
BD	BACKDRAFT DAMPER		STRAINER WITH VALVED BLOWDOWN
MD	MOTORIZED DAMPER	PA	PIPE ANCHOR
SD	SMOKE DAMPER		PIPE DROP
F/SD	COMBINATION FIRE AND SMOKE DAMPER		PIPE RISE
SD	DUCT MOUNTED SMOKE DETECTOR	HWS	HOT WATER SUPPLY
	RETURN/EXHAUST/OUTSIDE AIR ARROW	HWR	HOT WATER RETURN
	SUPPLY ARROW	RL	REFRIGERANT LIQUID
UD	UNDERCUT DOOR	RG	REFRIGERANT HOT GAS BYPASS
	ROOF MOUNTED EQUIPMENT	RS	REFRIGERANT SUCTION
	SUPPLY DIFFUSER (ARROWS DESIGNATE PATTERN REQUIREMENTS)	A	AQUASTAT
	RETURN/EXHAUST REGISTER	T	TEMPERATURE SENSOR
		T	THERMOSTAT
		VFD	VARIABLE FREQUENCY DRIVE

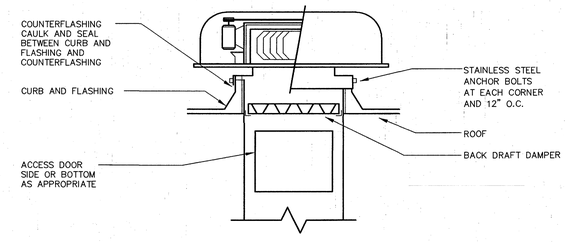
5 HOT WATER CABINET UNIT HEATER PIPING DIAGRAM
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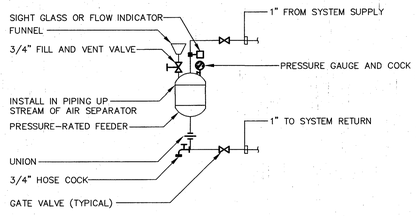
6 BOILER PIPING DIAGRAM
N.T.S.



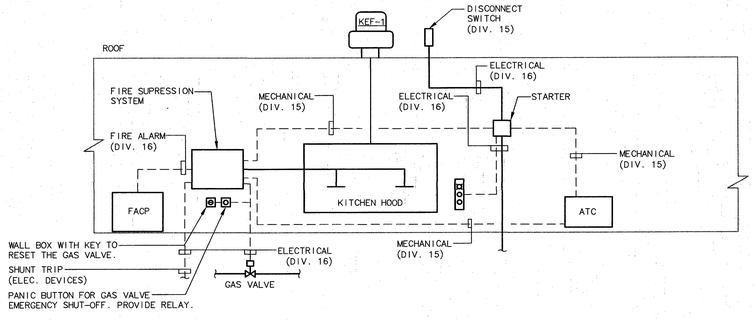
7 BASE MOUNTED END-SUCTION PUMP DETAIL
N.T.S.



9 BOTTOM DISCHARGE ROOF MOUNTED EXHAUST FAN DETAIL
N.T.S.



8 ONE SHOT CHEMICAL FEEDER DETAIL
N.T.S.



9 KITCHEN EQUIPMENT CONTROL DIAGRAM
N.T.S.

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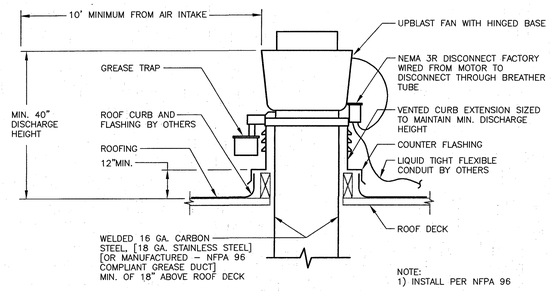
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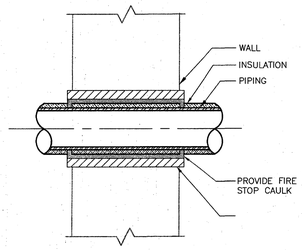
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SCALE N.T.S.

MECHANICAL DETAILS AND LEGEND

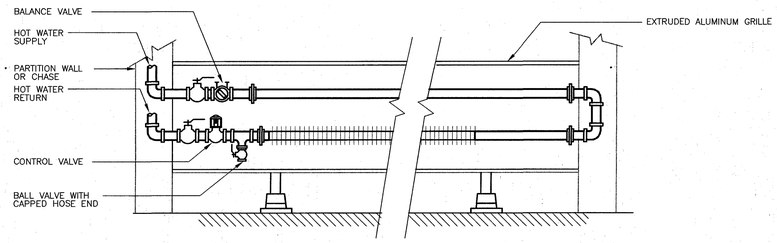
M-901



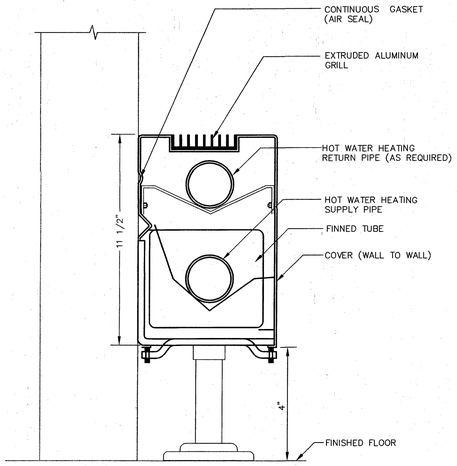
1 KITCHEN HOOD BLAST EXHAUST FAN DETAIL
N.T.S.



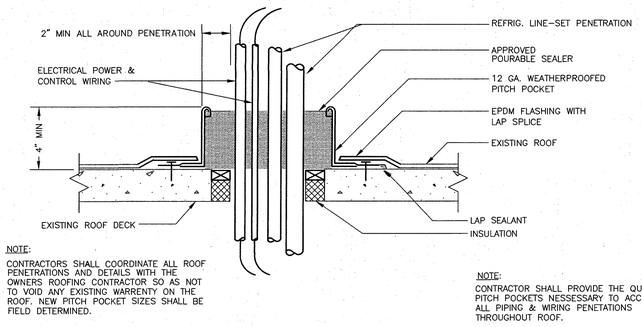
2 WALL PENETRATION DETAIL
N.T.S.



3 HOT WATER FIN TUBE RADIATION PIPING DIAGRAM
N.T.S.



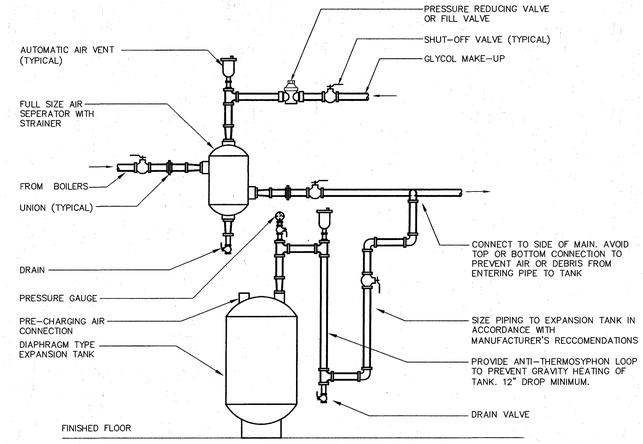
4 PEDESTAL TYPE RADIATION ENCLOSURE DETAIL
N.T.S.



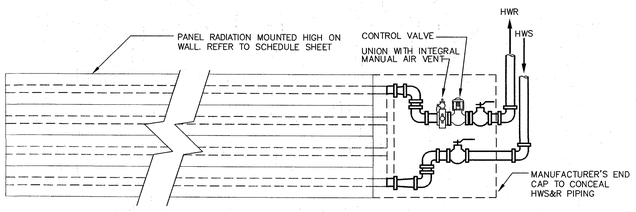
NOTE:
CONTRACTORS SHALL COORDINATE ALL ROOF PENETRATIONS AND DETAILS WITH THE OWNERS ROOFING CONTRACTOR SO AS NOT TO VOID ANY EXISTING WARRENTY ON THE ROOF. NEW PITCH POCKET SIZES SHALL BE FIELD DETERMINED.

NOTE:
CONTRACTOR SHALL PROVIDE THE QUANTITY OF PITCH POCKETS NESSESSARY TO ACCOMMODATE ALL PIPING & WIRING PENETATIONS THROUGHOUT ROOF.

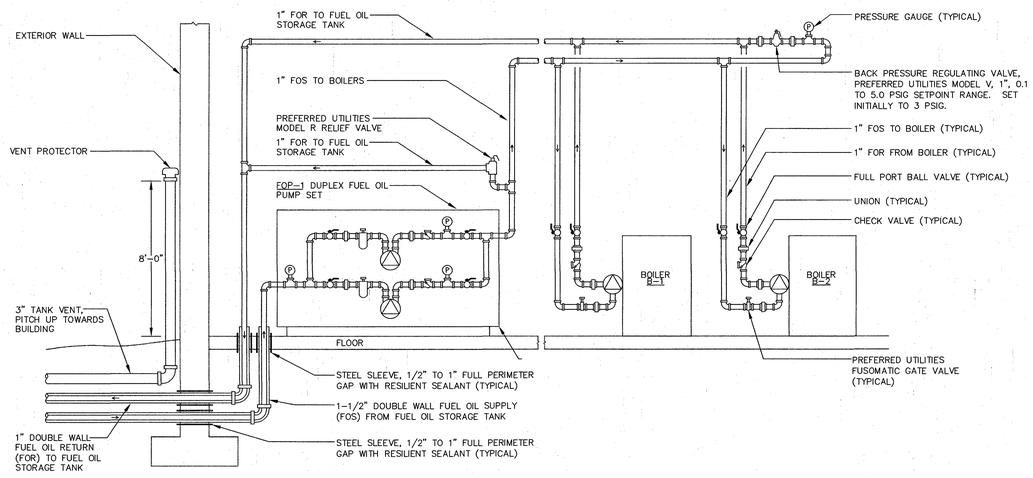
5 PITCH POCKET DETAIL
N.T.S.



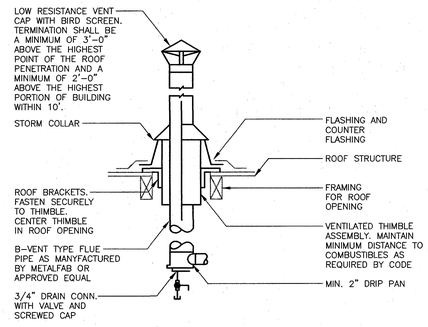
6 DIAPHRAGM EXPANSION TANK PIPING DIAGRAM
N.T.S.



7 PANEL RADIATION PIPING DIAGRAM
SCALE: N.T.S.



8 MECHANICAL ROOM FUEL OIL PIPING DIAGRAM
N.T.S.



9 FLUE ROOF PENETRATION DETAIL
N.T.S.

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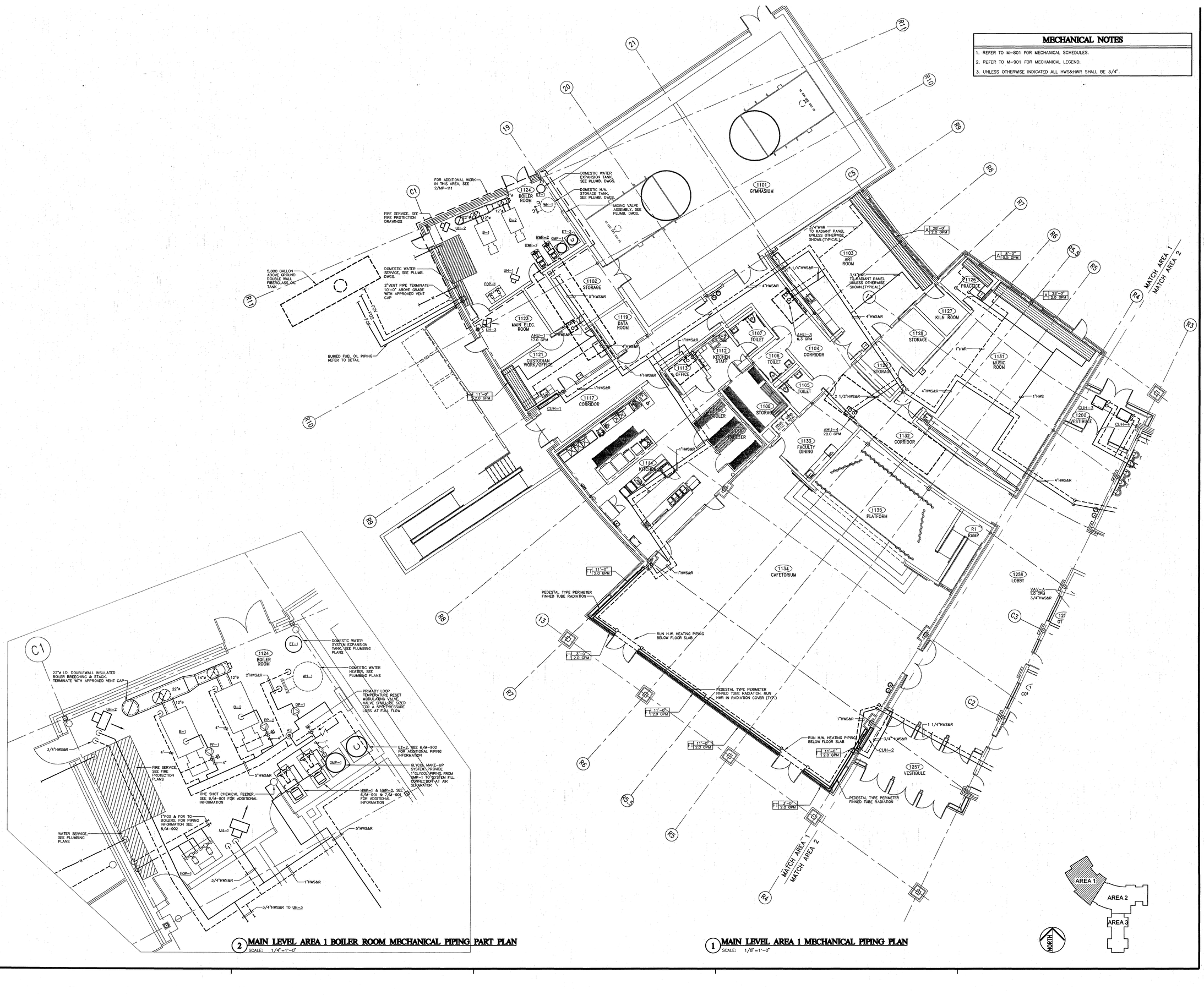
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MECHANICAL DETAILS

M-902

MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.
3. UNLESS OTHERWISE INDICATED ALL HWS&HWR SHALL BE 3/4".



2 **MAIN LEVEL AREA 1 BOILER ROOM MECHANICAL PIPING PART PLAN**
SCALE: 1/4"=1'-0"

1 **MAIN LEVEL AREA 1 MECHANICAL PIPING PLAN**
SCALE: 1/8"=1'-0"

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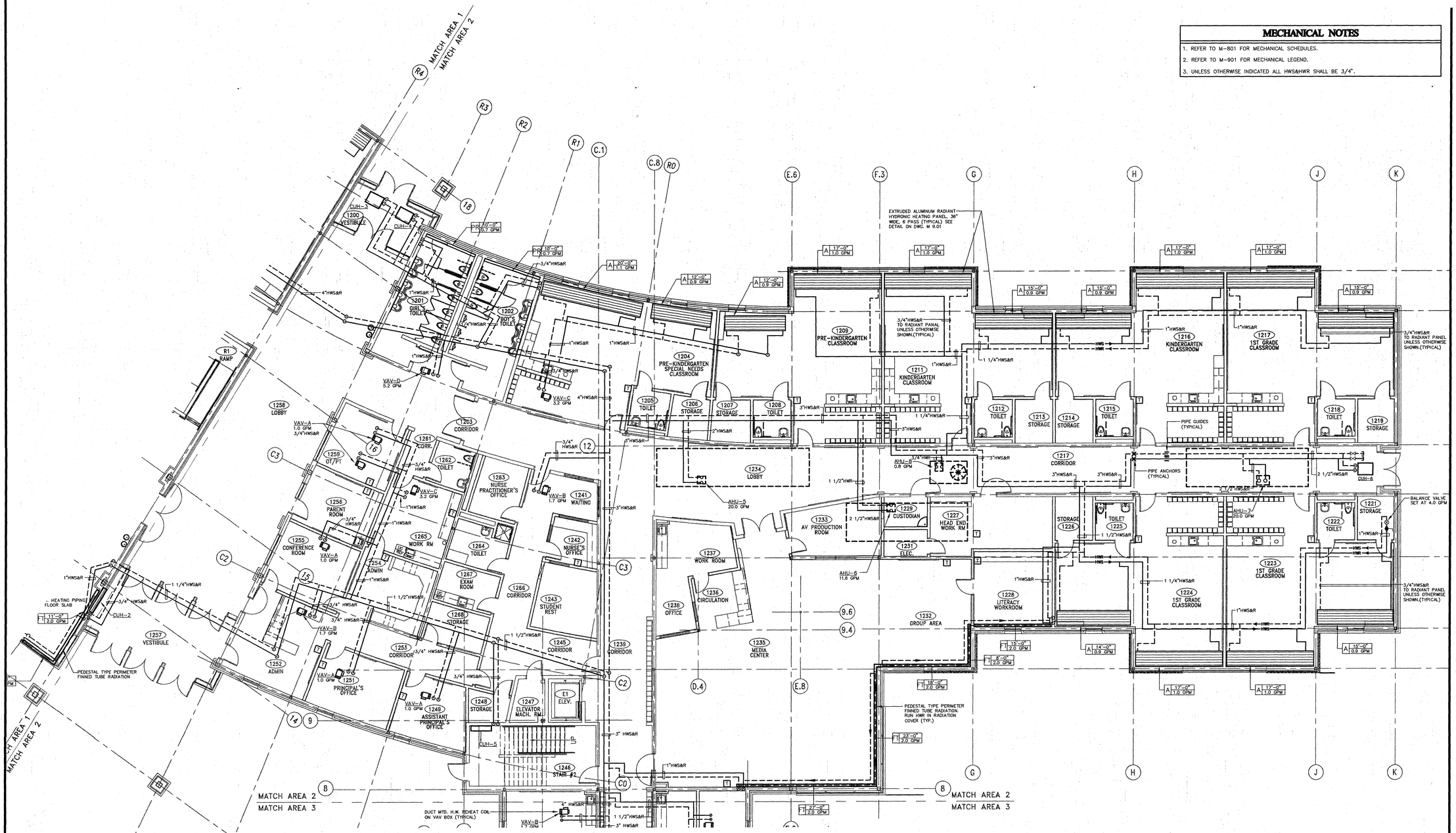
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JOB	044400
DRAWN	JJR
SCALE	1/8" = 1'-0"

MAIN LEVEL
AREA 1
MECHANICAL
PIPING PLAN

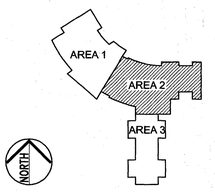
MP-111

MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.
3. UNLESS OTHERWISE INDICATED ALL HWS&HWR SHALL BE 3/4".



1 **MAIN LEVEL AREA 2 MECHANICAL PIPING PLAN**
SCALE: 1/8"=1'-0"



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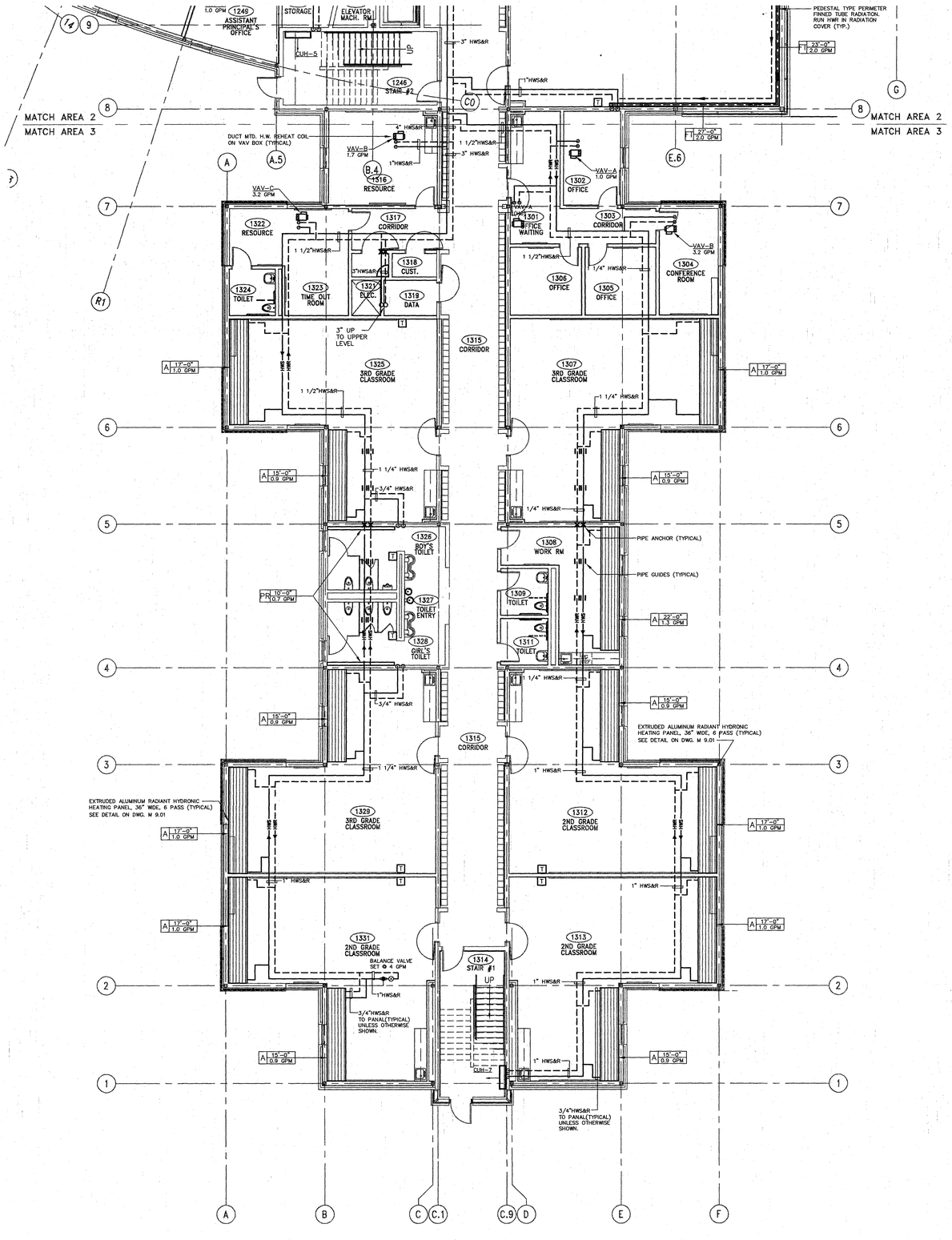
ISSUE	01-09-06
JOB	044400
DRAWN	JJR
SCALE	1/8" = 1'-0"

MAIN LEVEL
AREA 2
MECHANICAL
PIPING PLAN

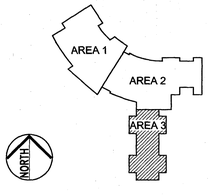
MP-112

MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.
3. UNLESS OTHERWISE INDICATED ALL HWS&HWR SHALL BE 3/4".



1 MAIN LEVEL AREA 3 MECHANICAL PIPING PLAN
SCALE: 1/8"=1'-0"



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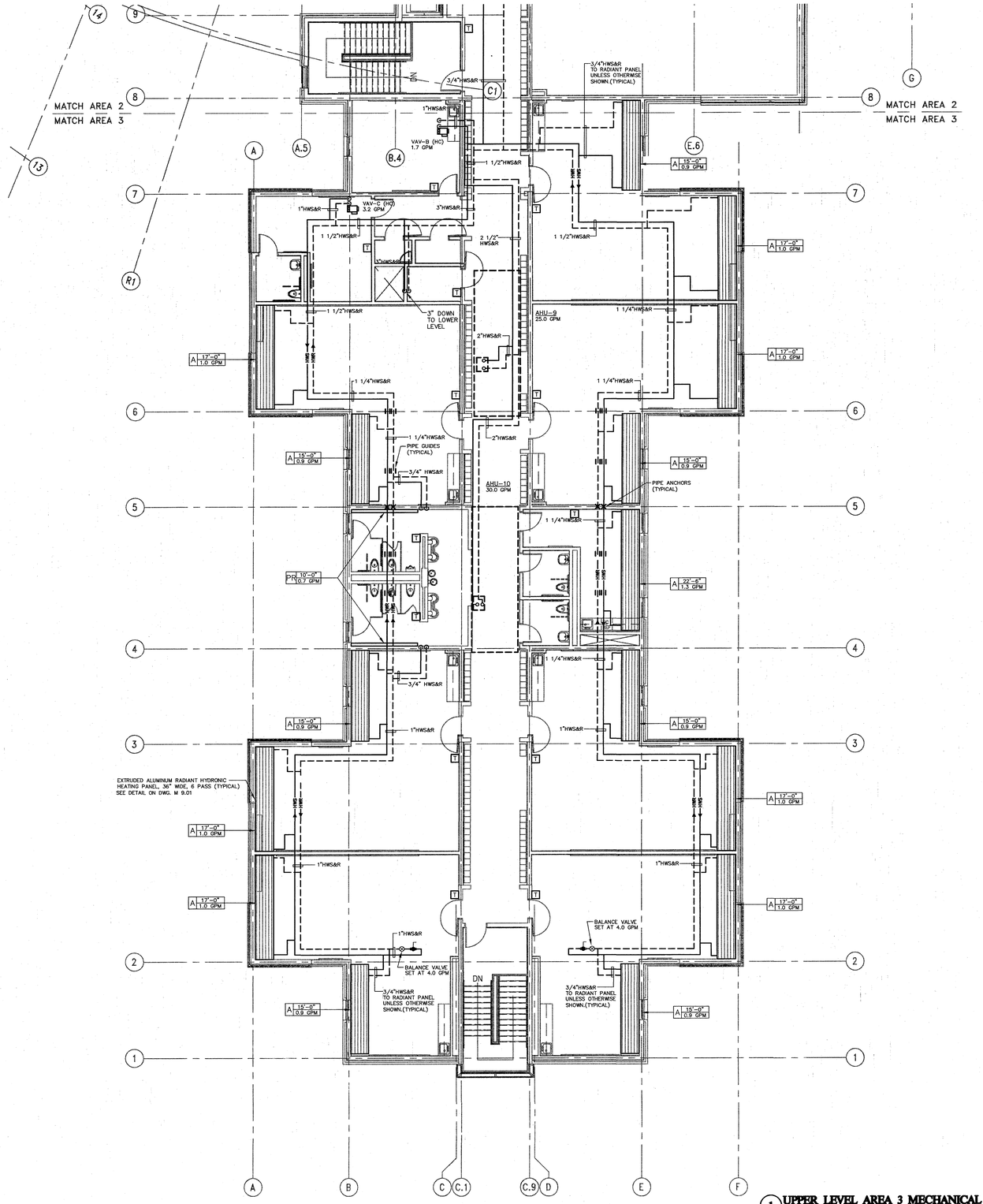
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DRAWN JJR
SCALE 1/8" = 1'-0"

MAIN LEVEL
AREA 3
MECHANICAL
PIPING PLAN

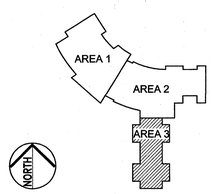
MP-113

MECHANICAL NOTES

1. REFER TO M-801 FOR MECHANICAL SCHEDULES.
2. REFER TO M-901 FOR MECHANICAL LEGEND.
3. UNLESS OTHERWISE INDICATED ALL HWS&HWR SHALL BE 3/4".



1 UPPER LEVEL AREA 3 MECHANICAL PIPING PLAN
SCALE: 1/8"=1'-0"



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UPPER LEVEL AREA3 MECHANICAL PIPING PLAN

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