FUSS & O'NEILL
One Financial Plaza, 15th Floor
Hartford, CT 06103
860.646.2469
www.fando.com

Catherine Kolnaski STEAM 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 Catherine Kolnaski Steam Magnet 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 Catherine Kolnaski STEAM Magnet School are operating below their intended design airflows as indicated by the 1989 design plans. As a result, most of the rooms within the school fail to meet the minimum outside air (OA) 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. These fans should be repaired or replaced and returned to service.

Further investigation into the HVAC system should be conducted to determine if the current mechanical equipment is capable of providing 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 (SA) fans be evaluated for proper operation, and that exhaust fans be repaired and placed back into service.

1.1 Building Overview

Catherine Kolnaski STEAM Magnet School is located at 500 Poquonnock Road, Groton, CT. The school is a two-story, approximately 60,000 square foot building. The HVAC equipment consists of eleven (11) rooftop air handling units (AHU's), variable air volume boxes (VAV), unit heaters (UH) installed in various locations, and twelve (12) exhaust fans (EF's). The HVAC system is controlled by a building automation system (BAS). Exhaust fans are on a timer and run via light switch. This building is equipped with CO_2 demand control ventilation (DCV). See Appendix B for school floor plans.

1.2 HVAC System Overview

- AHU-1 is installed on the roof. The unit is an AAON 166 MBH air handling unit and serves to condition and ventilate the gymnasium.
- AHU-2 is installed on the roof. The unit is an AAON 160 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 464 MBH air handling unit and serves to condition and ventilate the cafeteria.
- AHU-4 is installed on the roof. The unit is an AAON 245 MBH air handling unit and serves to condition and ventilate administration areas.

- AHU-5 is installed on the roof. The unit is an AAON 132 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 243 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 217 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 35 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 107 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 304 MBH air handling unit and serves to condition and ventilate the third-grade classrooms on the west corridor of the building.
- AHU-11 is installed on the roof. The unit is an AAON 321 MBH air handling unit serves to condition and ventilate the second-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 287 codified ventilation assessments at each school building under jurisdiction of local and regional boards of education. HVAC inspections and assessments must be completed for 20% of school buildings starting July 1, 2025, and annually thereafter. As such, all schools must be inspected by June 30, 2030. This cycle must be repeated every five years. 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, 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 health care 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	975	20	10	0.18	0.7
Auditorium	0	0	150	5	0.06	-
Cafeteria	2	3725	100	7.5	0.18	-
Classroom	26	19157	35	10	0.12	-
Computer Lab	0	0	25	10	0.12	-
Conference Room	2	421	50	5	0.06	-
Corridor	18	7624	-	-	0.06	-
Custodial	4	141	-	-	-	-
Greenhouse	0	0	-	-	-	-
Gymnasium	1	2945	7	20	0.18	-
Kitchen	1	777	70	10	0.06	-
Library	0	0	10	5	0.12	-
Lobby	2	2259	10	5	0.06	-
Locker Room	3	2863	-	-	-	0.25
Multiuse Assembly	0	0	100	7.5	0.06	-
Music/Theater	2	1554	35	10	0.06	1.0
Nurse	3	404	5	5	0.06	-
Office	27	5225	5	5	0.06	-
Restroom	25	2349	-	-	-	50/70*
Stairs	2	568	-	-	-	-
Storage	13	1873	-	-	0.12	-
Stage/Studio	1	1132	70	10	0.06	-
Utility	7	457	-	-	-	-
Vestibule	2	453	10	5	0.06	-
Waiting Room	2	234	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 walkdown 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, VAVs and Outside Air Dampers

The air handling units in the building are designed to operate by providing conditioned supply air to the space. Return air is from the zone is mixed with outside air (OA) for ventilation. The OA damper on each unit adjusts according to the building automation system commands and environmental sensors.

Based on the TAB results, some AHU total supply and OA flowrate measurements are below original design values, which indicates that while the AHU may be capable of supplying adequate ventilation to the space, current operating conditions are limiting the performance of the equipment (see Table 2). Table 3 below compares the design OA flowrate with the calculated required OA flowrate based on the characteristics shown in Table 1 above. Note that some AHUs were not designed to provide enough outside air to satisfy current ventilation requirements.

Several outside air damper setpoints appeared to be adjusted incorrectly and are not providing adequate OA to the spaces served. Damper actuators serving all AHUs should be tested and minimum setpoints adjusted to ensure proper ventilation is provided to all spaces.

AHU-4 supplies air to multiple VAVs (See Table 4 below) that serve the Admin area of the building. Based on the TAB results, all the VAVs in the building are operating below their design conditions and out of calibration. The VAVs, tested at the maximum supply air position, were not able to provide adequate ventilation air to the spaces served.

2.2.2 Exhaust Fans

Exhaust fans provide ventilation air for the restrooms throughout the building. Exhaust fans were evaluated using ASHRAE 62.1 guidelines for fans operating continuously. Most of the fans serving the building are operating properly. Exhaust fans serving Toilet Room 404, 405, 1219 are operating just below the required exhaust air flowrates.

2.3 Outside Airflow and Air Change Rates

2.3.1 Airflow Design vs. Measurements

Table 2 and 3 below display AHU design parameters obtained from the Catherine Kolnaski Elementary School as-built mechanical drawings dated 01-09-2006. Airflow measurements were performed by Wing's TAB. Using ASHRAE 62.1 standards, required outside air flowrates were calculated (see Table 1 above). Note that the measured OA flowrates 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	4800	1500	31%	4791	457	10%
AHU-2	4800	1720	36%	3900	358	9%
AHU-3	12000	3750	31%	13522	879	7%
AHU-4	6700	2255	34%	4066	1050	26%
AHU-5	4250	1550	36%	4136	968	23%
AHU-6	6800	1680	25%	3634	916	25%
AHU-7	6400	1450	23%	5426	651	12%
AHU-8	1000	50	5%	1064	193	18%
AHU-9	3020	500	17%	3558	1665	47%
AHU-10	8200	2040	25%	7390	867	12%
AHU-11	9900	2260	23%	9524	819	9%

Table 3
Design vs. Calculated Outside Air

AHU	DESIGN AIRFLOW		CALCULATED AIRFLOW		
	SUPPLY CFM	OA CFM	% OA	OA CFM	% OA
AHU-1	4800	1500	31%	950	10%
AHU-2	4800	1720	36%	1117	9%
AHU-3	12000	3750	31%	3532	7%
AHU-4	6700	2255	34%	1721	26%
AHU-5	4250	1550	36%	483	23%
AHU-6	6800	1680	25%	2052	25%
AHU-7	6400	1450	23%	2043	12%
AHU-8	1000	50	5%	23	18%
AHU-9	3020	500	17%	658	47%
AHU-10	8200	2040	25%	3225	12%
AHU-11	9900	2260	23%	3163	9%

It can be seen in Table 2 above that most measured supply air flowrates and outside air airflow rates are less than the designed airflows. AHU-2, for example, is providing 900 CFM of supply air lower than designed and 1400 CFM less outside air. Some AHUs significantly exceed their design airflows. AHU-9, for example, is providing 500

CFM of supply air and 1150 CFM more outside air than what was designed. Some of the air handlers were not designed to provide enough outside air as prescribed by the current ASHRAE 62 standards, this can be seen in Table 3 above.

Table 4
Design vs. Measured VAV Airflow

VAV	DESIGN AIRFLOW	MEASURED AIRFLOW
	CFM	CFM
VAV-14	1400	0
VAV-15	900	240
VAV-16	300	45
VAV-17	340	261
VAV-18	840	0
VAV-19	600	140
VAV-20	650	322
VAV-21	480	365
VAV-22	200	0
VAV-23	400	371
VAV-24	1000	435
VAV-25	1200	403
VAV-26	400	0
VAV-27	500	328

Table 4 above compares the designed airflow for each VAV, and the actual airflow measured during testing. As shown in the table, all the VAVs are providing air below the designed airflow rates. Air is being provided to these VAVs by AHU-4.

2.3.2 Individual Room Ventilation

Ventilation rates for each room at the minimum outdoor air damper position are itemized in Appendix C. 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 continuous ventilation is provided. 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 from dirty coils and filters can also 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 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 (AHU) and Outside Air Dampers

It was determined that most of the AHUs serving the schools are provide less ventilation than what was designed. The outside air dampers should be evaluated to ensure proper operation. The exhaust damper on AHU-10 has been screwed closed. The exhaust damper should be placed back in service and tested for proper operation. The AHUs should be evaluated to confirm they can provide enough conditioned air to meet the design and replaced if found that they are not capable.

The majority of the VAVs served by AHU-4 are not distributing enough conditioned air to the space, with some of the boxes not distributing any air at all. This system should be evaluated further to determine the cause of this deficiency, and the units should be replaced if they cannot perform as designed.

3.1.2 Exhaust Fans

Most of the exhaust fans serving the school provide adequate ventilation to the spaces served. Exhaust fans that do not provide enough ventilation (See Appendix B) should be balanced and serviced by a qualified professional. 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

Catherine Kolnaski Elementary School

Ventilation Survey

* * * *

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

December 31, 2024

94 North Branford Road • Suite One • Branford, CT 06405
(203) 488-5634 • wings@wingstesting.com

SM-1 License #6803

www.wingstesting.com

WING'S TESTING & BALANCING CO., INC.

December 31, 2024

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

Re: Groton Public Schools/ Catherine Kolnaski Elementary – Ventilation Survey

Dear Joshua,

Testing of ventilation rates for the above-mentioned facility has been completed. The results are as follows:

- All supply, return, and exhaust air distribution for all mechanical systems have been measured.
- VAV distribution served by AHU-4 was tested with all VAVs at the maximum set point simultaneously.
- All AHUs were set for their respective minimum outside air damper position. AHU-9 was tested with KEF-1 on. This sequence sends the outside air to a minimum position of 60%.
- Graphics for AHU tested condition have been attached, as well as pictures of "actual" outside air damper positions.

During the testing, the following observations were made:

- VAVs served by AHU-4 were out of calibration.
- Outside air to most AHUs tested low.
- Exhaust damper on AHU-10 is screwed closed.
- The power exhaust fan on AHU+4 was missing a belt.

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







John Flanagan
CT SM-2 License #771
MA Sheetmetal Journeyperson #6913
TABB Supervisor- TB950107S
TABB Technician BB950107T
Indoor Air Quality Technician- IAQ950107T
TABB Sound & Vibration Supervisor- SV060109S
Fire and Smoke Damper Technician- FLS1950107T
Fume Hood Performance Testing Technician- FHP950107T



AHU-7, Min. O.A. 10%



AHU-8, Min. O.A. 5%



AHU-8, Min. O.A. 5%



AHU-10, Min. O.A. 10%



AHU-10, Exhaust screwed closed



AHU-11, Min. O.A. 10%

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-2/ Area #1 | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-2 Supply										
Kiln 1113	2-1	2408	FH	---	200	---	157			
Art 1112	2-2	2410	FH	---	300	---	289			
Art 1112	2-3	2410	FH	---	300	---	294			
Art 1112	2-4	2410	FH	---	300	---	306			
Art 1112	2-5	2410	FH	---	300	---	303			
Pract. 1109	2-6	2408	FH	---	150	---	163			
Storage 1111	2-7	2408	FH	---	200	---	146			
Music 1108	2-8	2410	FH	---	300	---	201			
Music 1108	2-9	2410	FH	---	300	---	277			
Music 1108	2-10	2410	FH	---	300	---	229			
Music 1108	2-11	2410	FH	---	300	---	304			
Music 1108	2-12	2410	FH	---	300	---	281			
Music 1108	2-13	2410	FH	---	300	---	286			
Lobby 1203	2-14	2410	FH	---	300	---	234			
					3850		3470			
Custodian 1115	2-15	2406	FH	---	100	---	100			
Corridor 1118	2-16	2408	FH	---	150	---	174			
Storage 1122	2-17	2408	FH	---	100	---	179			
Gym/Lobby 1119	2-18	2410	FH	---	300	---	311			
Corridor 1107	2-19	2408	FH	---	200	---	189			
Corridor 1107	2-20	2408	FH	---	200	---	160			
					1050		1113			
Total					4900		4583			
AHU-2 Return										
1119	R2-1	22" x 22"	FH	---	540	---	409			
Art 1112	R2-2	22" x 22"	FH	---	540	---	515			
Art 1112	R2-3	22" x 22"	FH	---	540	---	510			
Storage 1111	R2-4	12" x 12"	0.72	250	180	485	349			
Pract. 1109	R2-5	12" x 12"	FH	---	120	---	122			
Music 1108	R2-6	22" x 22"	FH	---	800	---	712			
Corridor 1107	R2-7	12" x 12"	FH	---	360	---	302			
Music 1108	R2-8	22" x 22"	FH	---	800	---	759			
Lobby 1203	R2-9	16" x 16"	FH	---	300	---	285			
					4180		3963			
Minimum O.A.							620			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-3/ Area #1 | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-3 Supply										
F. Dining 1105	3-1	2410	FH	---	300	---	692			
F. Dining 1105	3-2	2410	FH	---	300	---	607			
					600		1299			
AHU-3 Return										
F. Dining 1105	R3-1	22" x 22"	FH	---	600	---	870			

REMARKS

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

AIR DEVICE / BOX REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/26/2024

AREA SERVED: AHU-4/ Area #2 - Upper Level | **TECH:** JF

LOCATION	NO.	SIZE	AK	DESIGN CFM		TEST	FINAL		PRESS. DIFF.		NOTES
				MIN	MAX	CFM	MIN	MAX	MIN	MAX	
AHU-4 Supply											
VAV-14											
Lobby 1202	1	16" x 8"	FH	---	400	0					
Lobby 1202	2	16" x 8"	FH	---	400	0					
Lobby 1202	3	16" x 8"	FH	---	400	0					
Vest 1201	4	16" x 8"	FH	---	200	0					
					1400	0					
VAV-15											
1206	1	2412	FH	---	400	98					
1205	2	2412	FH	---	500	142					
					900	240					
VAV-16											
1207	1	2410	FH	---	300	45					
VAV-17											
1208	1	2410	FH	---	340	261					
VAV-18											
1213	1	2412	FH	---	500	0					
1212	2	2408	FH	---	240	0					
1211	3	2406	FH	---	100	0					
					840	0					
VAV-19											
1214	1	2410	FH	---	300	69					
1214	2	2410	FH	---	300	71					
					600	140					
VAV-20											
1224	1	2406	FH	---	100	41					
1225	2	2408	FH	---	200	106					
1217	3	2408	FH	---	180	88					
1214	4	2406	FH	---	50	33					
1218	5	2408	FH	---	120	55					
					650	322					

REMARKS

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

AIR DEVICE / BOX REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/26/2024

AREA SERVED: AHU-4/ Area #2 - Upper Level Continued | **TECH:** JF

LOCATION	NO.	SIZE	AK	DESIGN CFM		TEST	FINAL		PRESS. DIFF.		NOTES
				MIN	MAX	CFM	MIN	MAX	MIN	MAX	
VAV-21											
1221	1	2410	FH	---	360	264					
1222	2	2408	FH	---	120	101					
					480	365					
VAV-22											
1231	1	2408	FH	---	200	0					
VAV-23											
Corridor 1242	1	2406	FH	---	200	186					
Corridor 1242	2	2406	FH	---	200	185					
					400	371					
VAV-24											
1244	1	2408	FH	---	200	138					
1244	2	2408	FH	---	200	139					
1245	3	18" x 4"	0.325	923	300	215/70					
1245	4	18" x 4"	0.325	923	300	270/88					
					1000	435					
VAV-25											
1246	1	2410	FH	---	300	101					
1248	2	2410	FH	---	300	95					
1249	3	2410	FH	---	300	102					
1249	4	2410	FH	---	300	105					
					1200	403					
VAV-26											
1231	1	2408	FH	---	200	0					
1251	2	2408	FH	---	200	0					
					400	0					
VAV-27											
1401	1	2408	FH	---	200	124					
1402	2	2410	FH	---	300	204					
					500	328					

REMARKS

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

AIR DEVICE / BOX REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/26/2024

AREA SERVED: AHU-4/ Area #4 - Main Level and Lower Level | **TECH:** JF

LOCATION	NO.	SIZE	AK	DESIGN CFM		TEST	FINAL		PRESS. DIFF.		NOTES
				MIN	MAX	CFM	MIN	MAX	MIN	MAX	
AHU-4 Supply											
VAV-28											
(1)	1	2408	FH	---	300	58					
(1)	2	2410	FH	---	300	69					
					600	127					
VAV-29											
(1)	1	2406	FH	---	220	137					
(1)	2	2406	FH	---	220	181					
					440	318					
VAV-30											
1416	1	2412	FH	---	500	433					
VAV-31											
1423	1	2406	FH	---	90	32					
1422	2	2410	FH	---	400	143					
1424	3	2406	FH	---	50	45					
					540	220					
VAV-33											
0417	1	2408	FH	---	120	57					
0416	2	2408	FH	---	220	128					
0416	3	2408	FH	---	220	133					
0418	4	2406	FH	---	50	57					
					610	375					
VAV-32											
0411	1	2412	FH	---	500	319					
T.C.L.					12400	4702					

REMARKS

(1) Main Office 1403, 4, 5, 6

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/26/2024

SYSTEM / AREA: AHU-4/ Area #2 - Upper Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-4 Return										
Main Level										
1213	R4-1	16" x 16"	FH	---	400	---	265			
1217	R4-2	12" x 12"	FH	---	160	---	48			
1218	R4-3	12" x 12"	FH	---	N/L	---	41			
1221	R4-4	12" x 12"	FH	---	320	---	188			
1222	R4-5	12" x 12"	FH	---	100	---	68			
1224	R4-6	12" x 12"	FH	---	90	---	60			
1208	R4-7	16" x 16"	FH	---	300	---	236			
1207	R4-8	16" x 16"	FH	---	270	---	172			
1206	R4-9	16" x 16"	FH	---	360	---	181			
1205	R4-10	22" x 22"	FH	---	400	---	221			
1214	R4-11	16" x 16"	FH	---	540	---	202			
Corridor 1242	R4-12	22" x 22"	FH	---	600	---	228			
1249	R4-13	16" x 16"	FH	---	540	---	193			
1245	R4-14	12" x 8"	0.48	1125	540	780	374			
1244	R4-15	10" x 10"	0.50	720	360	300	150			
1401	R4-16	12" x 12"	FH	---	180	---	114			
1416	R4-17	16" x 16"	FH	---	450	---	219			
1402	R4-18	12" x 12"	FH	---	270	---	146			
1423	R4-19	12" x 12"	FH	---	90	---	30			
1422	R4-20	12" x 12"	FH	---	360	---	105			
1406	R4-21	12" x 12"	FH	---	200	---	82			
1405	R4-22	12" x 12"	FH	---	200	---	64			
1404	R4-23	16" x 16"	FH	---	540	---	171			
					7270		3558			
Lower Level										
0416	R2-24	16" x 16"	FH	---	400	---	162			
0411	R4-25	16" x 16"	FH	---	450	---	91			
0417	R4-26	10" x 10"	FH	---	100	---	253			
					950		506			
Total					8220		4064			
Minimum O.A.					4180		638			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-5/ Area #2 - Upper Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-5 Supply										
1233	5-1	2408	FH	---	200	---	174			
Media 1232	5-2	2414	FH	---	600	---	643			
1236	5-3	2414	FH	---	600	---	559			
1238	5-4	2408	FH	---	200	---	150			
1234	5-5	2408	FH	---	250	---	247			
1235	5-6	2408	FH	---	200	---	142			
Media 1232	5-7	2414	FH	---	600	---	555			
Media 1232	5-8	2414	FH	---	600	---	615			
Media 1232	5-9	2414	FH	---	600	---	553			
Media 1232	5-10	2414	FH	---	600	---	498			
					4450		4136			
AHU-5 Return										
1238	R5-1	12" x 12"	FH	---	180	---	72			
1236	R5-2	22" x 22"	FH	---	1000	---	578			
1236	R5-3	22" x 22"	FH	---	1000	---	730			
1236	R5-4	22" x 22"	FH	---	1000	---	713			
1236	R5-5	22" x 22"	FH	---	1000	---	640			
					4180		2733			
Minimum O.A.					270		1403			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-6/ Area #3 - Main Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN FPM	DESIGN CFM	TEST FPM	TEST CFM	FINAL FPM	FINAL CFM	NOTES
AHU-6 Supply										
1304	6-1	2412	FH	---	400	---	217			
1304	6-2	2412	FH	---	400	---	224			
1301	6-3	2412	FH	---	400	---	221			
1301	6-4	2412	FH	---	400	---	221			
1301	6-5	2412	FH	---	400	---	214			
1226	6-6	2412	FH	---	400	---	219			
1226	6-7	2412	FH	---	400	---	204			
1226	6-8	2412	FH	---	400	---	212			
1304	6-9	2412	FH	---	400	---	213			
1307	6-10	2412	FH	---	400	---	214			
1307	6-11	2412	FH	---	400	---	203			
1311	6-12	2412	FH	---	400	---	218			
1311	6-13	2412	FH	---	400	---	239			
1311	6-14	2412	FH	---	400	---	138			
1314	6-15	2412	FH	---	400	---	217			
1314	6-16	2412	FH	---	400	---	234			
1314	6-17	2412	FH	---	400	---	226			
					6800		3634			
AHU-6 Return										
1301	R6-1	22" x 22"	FH	---	540	---	312			
1301	R6-2	22" x 22"	FH	---	540	---	274			
1226	R6-3	22" x 22"	FH	---	540	---	314			
1226	R6-4	22" x 22"	FH	---	540	---	275			
1304	R6-5	22" x 22"	FH	---	540	---	270			
1304	R6-6	22" x 22"	FH	---	540	---	258			
1307	R6-7	22" x 22"	FH	---	540	---	289			
1311	R6-8	22" x 22"	FH	---	540	---	235			
1311	R6-9	22" x 22"	FH	---	540	---	264			
1314	R6-10	22" x 22"	FH	---	540	---	260			
1314	R6-11	22" x 22"	FH	---	540	---	229			
					5940		2980			
Minimum O.A.					860		654			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-7/ Area #3 - Main Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-7 Supply										
Toilet 1322	7-1	2408	FH	---	200	---	271			
Corridor 1317	7-2	2408	FH	---	200	---	0			
1324	7-3	2412	FH	---	400	---	442			
1324	7-4	2412	FH	---	400	---	416			
1324	7-5	2412	FH	---	400	---	442			
1325	7-6	2412	FH	---	400	---	460			
1325	7-7	2412	FH	---	400	---	455			
1325	7-8	2412	FH	---	400	---	500			
1229	7-9	2408	FH	---	200	---	226			
TLT 1321	7-10	2408	FH	---	200	---	231			
Corridor 1317	7-11	2408	FH	---	200	---	28			
1319	7-12	2412	FH	---	400	---	387			
1319	7-13	2412	FH	---	400	---	403			
1319	7-14	2412	FH	---	400	---	401			
Corridor 1317	7-15	2408	FH	---	200	---	34			
1318	7-16	2412	FH	---	400	---	397			
1318	7-17	2412	FH	---	400	---	414			
1318	7-18	2412	FH	---	400	---	421			
					6000		5928			
AHU-7 Return										
1324	R7-1	22" x 22"	FH	---	540	---	567			
Corridor 1317	R7-2	12" x 12"	FH	---	360	---	331			
1324	R7-3	22" x 22"	FH	---	540	---	484			
1325	R7-4	22" x 22"	FH	---	540	---	560			
1325	R7-5	22" x 22"	FH	---	540	---	419			
1319	R7-6	22" x 22"	FH	---	540	---	539			
Corridor 1317	R7-7	12" x 12"	FH	---	360	---	311			
1319	R7-8	22" x 22"	FH	---	540	---	555			
1318	R7-9	22" x 22"	FH	---	540	---	616			
1318	R7-10	22" x 22"	FH	---	540	---	550			
					5040		4932			
Minimum O.A.					960		996			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-8/ Area #3 - Main Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-8 Supply										
1237	8-1	15" x 15"	---	---	600	---	---			(1)
1237	8-2	15" x 15"	---	---	600	---	---			(1)
					1200					
AHU-8 Return										
1237	R8-1	22" x 22"	2.86	420	1200	302	865			

REMARKS

(1) Not accessible, see VPT sheet.

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: AHU-9/ Area #1 - Kitchen | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-9 Supply										
1124	1	2408	FH	---	120	---	130			
1125	2	2408	FH	---	180	---	206			
1123	3	2410	FH	---	360	---	464			
1123	4	2410	FH	---	360	---	464			
1123	5	2410	FH	---	360	---	455			
1123	6	2410	FH	---	360	---	409			
1123	7	2410	FH	---	360	---	384			
1123	8	2410	FH	---	360	---	434			
1127	9	2408	FH	---	160	---	197			
1126	10	2408	FH	---	200	---	191			
1131	11	2408	FH	---	200	---	224			
					3020		3558			
AHU-9 Return										
1125	R1	12" x 12"	FH	---	160	---	243			(1)
1131	R2	12" x 12"	FH	---	180	---	230			(1)
1123	R3	22" x 22"	2.86	454	1300	930	2657			(1)
					1600		3130			(1)
Minimum O.A.					1420		428			

REMARKS

(1) KEF off

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementry School | **DATE:** 12/26/2024

SYSTEM / AREA: AHU-10/ Area #4 - Main & Lower Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-10 Supply										
Lower Level										
0419	10-1	2412	FH	---	400	---	298			
0417	10-2	2412	FH	---	400	---	211			
Corridor 0409	10-3	2408	FH	---	200	---	261			
Corridor 0201	10-4	2408	FH	---	200	---	257			
0203	10-5	12" x 10"	0.60	500	300	505	303			
0205	10-6	2408	FH	---	240	---	181			
0419	10-7	2412	FH	---	400	---	327			
Entry 0422	10-8	2408	FH	---	200	---	53			
Corridor 0409	10-9	2408	FH	---	200	---	185			
Entry 0422	10-10	2408	FH	---	200	---	173			
0424	10-11	2412	FH	---	400	---	371			
0424	10-12	2412	FH	---	400	---	384			
0424	10-13	2412	FH	---	400	---	338			
Corridor 0409	10-14	2408	FH	---	200	---	173			
0425	10-15	2412	FH	---	400	---	336			
0425	10-16	2412	FH	---	400	---	347			
0425	10-17	2412	FH	---	400	---	353			
Main Level										
1425	10-18	2412	FH	---	400	---	317			
1425	10-19	2412	FH	---	400	---	373			
1425	10-20	2412	FH	---	400	---	324			
Entry 1427	10-21	2408	FH	---	200	---	261			
Entry 1427	10-22	2408	FH	---	200	---	266			
1429	10-23	2412	FH	---	400	---	186			
1429	10-24	2412	FH	---	400	---	324			
1429	10-25	2412	FH	---	400	---	325			
1431	10-26	2412	FH	---	400	---	386			
1431	10-27	2412	FH	---	400	---	399			
1431	10-28	2412	FH	---	400	---	404			
					9340		8116			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/26/2024

SYSTEM / AREA: AHU-10/ Area #4 - Main & Lower Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-10 Return										
Lower Level										
0419	R10-1	22" x 22"	FH	---	540	---	484			
Corridor 0409	R10-2	12" x 12"	FH	---	360	---	291			
0419	R10-3	22" x 22"	FH	---	540	---	443			
0424	R10-4	22" x 22"	FH	---	540	---	448			
Corridor 0409	R10-5	22" x 22"	FH	---	360	---	308			
0424	R10-6	22" x 22"	FH	---	540	---	495			
0425	R10-7	22" x 22"	FH	---	540	---	472			
0425	R10-8	22" x 22"	FH	---	540	---	447			
					3960		3388			
Main Level										
1425	R10-9	22" x 22"	FH	---	540	---	508			
1425	R10-10	22" x 22"	FH	---	540	---	515			
1429	R10-11	22" x 22"	FH	---	540	---	575			
1429	R10-12	22" x 22"	FH	---	540	---	526			
1431	R10-13	22" x 22"	FH	---	540	---	465			
1431	R10-14	22" x 22"	FH	---	540	---	493			
					3240		3082			
					7200		6470			
Minimum O.A.					2140		1646			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/24/2024

SYSTEM / AREA: AHU-11/ Area #4 - Main & Lower Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-11 Supply										
Lower Level										
0403	11-1	2410	FH	---	300	---	276			
0403	11-2	2410	FH	---	300	---	273			
0402	11-3	2412	FH	---	400	---	356			
0402	11-4	2412	FH	---	400	---	348			
0402	11-5	2412	FH	---	400	---	353			
0401	11-6	2412	FH	---	400	---	347			
0401	11-7	2412	FH	---	400	---	378			
0401	11-8	2412	FH	---	400	---	369			
0406	11-9	2412	FH	---	400	---	432			
0406	11-10	2412	FH	---	400	---	316			
0406	11-11	2412	FH	---	400	---	480			
0407	11-12	2412	FH	---	400	---	442			
0407	11-13	2412	FH	---	400	---	343			
0407	11-14	2412	FH	---	400	---	410			
Main Level										
1408	11-15	2412	FH	---	500	---	477			
Corridor 1415	11-16	2408	FH	---	200	---	219			
1407	11-17	2412	FH	---	400	---	427			
1407	11-18	2412	FH	---	400	---	491			
1407	11-19	2412	FH	---	400	---	505			
Corridor 1415	11-20	2408	FH	---	200	---	104			
1412	11-21	2412	FH	---	400	---	357			
1412	11-22	2412	FH	---	400	---	288			
1412	11-23	2412	FH	---	400	---	388			
1413	11-24	2412	FH	---	400	---	382			
1413	11-25	2412	FH	---	400	---	378			
1413	11-26	2412	FH	---	400	---	385			
Total					9900		9524			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/24/2024

SYSTEM / AREA: AHU-11/ Area - Main & Lower Level | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
AHU-11 Return										
Lower Level										
0403	R11-1	22" x 22"	FH	---	540	---	495			
0402	R11-2	22" x 22"	FH	---	540	---	472			
0402	R11-3	22" x 22"	FH	---	540	---	479			
0401	R11-4	22" x 22"	FH	---	540	---	495			
0401	R11-5	22" x 22"	FH	---	540	---	399			
0406	R11-6	22" x 22"	FH	---	540	---	499			
0406	R11-7	22" x 22"	FH	---	540	---	504			
0407	R11-8	22" x 22"	FH	---	540	---	491			
0407	R11-9	22" x 22"	FH	---	540	---	579			
					4860		4413			
Main Level										
1412	R11-10	22" x 22"	FH	---	540	---	910			
1412	R11-11	22" x 22"	FH	---	540	---	497			
1413	R11-12	22" x 22"	FH	---	540	---	420			
1413	R11-13	22" x 22"	FH	---	540	---	502			
1407	R11-14	22" x 22"	FH	---	540	---	424			
1408	R11-15	22" x 22"	FH	---	540	---	705			
1407	R11-16	22" x 22"	FH	---	540	---	460			
					3780		3918			
Total					8640		8331			
Minimum O.A.					1260		1193			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: Various | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
EF-1										
TLT1215	E1-1	8"x8"	FH	---	75	---	79			
EF-2										
TLT1219	E2-1	8"x8"	FH	---	75	---	81			
EF-3										
TLT1246	E3-1	12"x12"	FH	---	225	---	216			
TLT1246	E3-2	12"x12"	FH	---	225	---	202			
TLT1248	E3-3	12"x12"	FH	---	225	---	227			
TLT1248	E3-4	12"x12"	FH	---	225	---	187			
					900		832			
EF-4										
LL TLT0418	E4-1	8"x8"	FH	---	75	---	67			
Cust. 0413	E4-2	8"x8"	FH	---	75	---	18			
Stor. 0203	E4-3	16"x8"	0.64	469	300	265	170			
Cust. 1418	E4-4	8"x8"	0.32	234	75	700	224			
TLT1424	E4-5	8"x8"	FH	---	75	---	119			
					600		598			
EF-5										
1321	E5-1	12"x12"	FH	---	300	---	264			
1323	E5-2	12"x12"	FH	---	300	---	260			
					600		524			
EF-12										
Stor. 1302	E12-1	8"x8"	FH	---	75	---	31			
TLT1303	E12-2	8"x8"	FH	---	50	---	64			
Cust. 1214	E12-3	8"x8"	FH	---	75	---	51			
Stor. 1227	E12-4	8"x8"	FH	---	50	---	41			
TLT1228	E12-5	8"x8"	FH	---	75	---	60			
					325		247			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: Various | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
EF-6										
TLT0404	E6-1	8" x 8"	FH	---	75	---	49			
TLT0405	E6-2	8" x 8"	FH	---	75	---	46			
TLT0421	E6-3	12" x 12"	FH	---	300	---	183			
TLT0423	E6-4	12" x 12"	FH	---	300	---	194			
					750		473			
EF-7										
1409	E7-1	10" x 10"	FH	---	75	---	81			
1411	E7-2	10" x 10"	FH	---	75	---	56			
1426	E7-3	12" x 12"	FH	---	300	---	246			
1428	E7-4	12" x 12"	FH	---	300	---	220			
					750		603			
EF-8										
TLT1313	E8-1	8" x 8"	FH	---	75	---	131			
TLT1316	E8-2	8" x 8"	FH	---	75	---	97			
TLT1315	E8-3	8" x 8"	FH	---	50	---	82			
TLT1309	E8-4	8" x 8"	FH	---	75	---	62			
TLT1308	E8-5	8" x 8"	FH	---	75	---	99			
TLT1305	E8-6	8" x 8"	FH	---	50	---	78			
TLT1306	E8-7	8" x 8"	FH	---	75	---	102			
Stor. 1312	E8-8	8" x 8"	FH	---	50	---	72			
					525		723			
EF-9										
F. Dining 1105	E9-1	8" x 8"	FH	---	75		93			
EF-10										
1104	E10-1	8" x 8"	FH	---	75	---	0	---	67	
1132	E10-2	8" x 8"	FH	---	75	---	0	---	65	
1115	E10-3	8" x 8"	0.32	234	75	0	0	305	98	
					225				230	
EF-11										
Elev. Mach. 0204	11-1	12" x 12"	0.75	400	300	365	274			

REMARKS

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

AIR DEVICE REPORT

PROJECT: Catherine Kolnaski Elementary School | **DATE:** 12/23/2024

SYSTEM / AREA: KEF-1/ Area #1 - Kitchen Hood | **TECH:** JF

LOCATION	NO.	SIZE	A K	DESIGN		TEST		FINAL		NOTES
				FPM	CFM	FPM	CFM	FPM	CFM	
KEF-1										
Extractor	1	18" x 14"	1.75	---	N/D	160	280			
Extractor	2	18" x 14"	1.75	---	N/D	164	287			
Extractor	3	18" x 14"	1.75	---	N/D	227	397			
Extractor	4	18" x 14"	1.75	---	N/D	287	502			
Extractor	5	18" x 14"	1.75	---	N/D	281	492			
Extractor	6	18" x 14"	1.75	---	N/D	301	527			
Extractor	7	18" x 14"	1.75	---	N/D	228	399			
Extractor	8	18" x 14"	1.75	---	N/D	173	303			
Extractor	9	18" x 14"	1.75	---	N/D	146	256			
					3850		3443			

REMARKS

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

VELOCITY PRESSURE READINGS

PROJECT:	Catherine Kolnaski Elementary	**DATE:**	12/27/2024
AREA SERVED:	Various	**TECH:**	JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS."	TEST FPM	TEST CFM	NOTES
AHU-1								
Total								
Minimum O.A.	39 1/4" x 19"	5.18	290	1500	w/ Velgrid	86	448	(1)
AHU-2								
Minimum O.A.	39 1/4" x 19"	5.18	332	1720	w/ Velgrid	81	420	(1)
AHU-3								
Total	88 1/2" x 51"	31.34	338	10600	w/ Velgrid	457	14322	
O.A.	39 1/4" x 19"	5.18	724	3750	w/ Velgrid	179	927	(1)
AHU-4								
Total								
Minimum O.A.	51" x 21"	7.44	303	2255	w/ Velgrid	169	1257	(2)
AHU-5								
Minimum O.A.	39 1/4" x 19"	5.18	299	1550	w/ Velgrid	187	969	(3)
AHU-6								
Minimum O.A.	52" x 20"	7.22	232	1680	w/ Velgrid	127	917	(1)
AHU-7								
Minimum O.A.	51" x 21"	7.44	195	1450	w/ Velgrid	96	714	(1)
AHU-8								
Supply Total	20" x 12"	1.67	719	1200	+0.20"	637	1064	
Minimum O.A.	35" x 12"	2.92	17	50	w/ Velgrid	66	193	(4)
AHU-9								
Minimum O.A.	39 1/4" x 19"	5.18	96	500	w/ Velgrid	322	1668	(5)
AHU-10								
Total								
Minimum O.A.	52" x 20"	7.22	283	2040	w/ Velgrid	137	989	(1)

REMARKS

(1) Minimum O.A. damper command = 10%
(2) Minimum O.A. damper command = 50%
(3) Minimum O.A. damper command = 15%
(4) Minimum O.A. damper command = 5%
(5) Minimum O.A. damper command = 60% with KEF on

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

VELOCITY PRESSURE READINGS

PROJECT:	Catherine Kolnaski Elementary School	**DATE:**	12/27/2024
AREA SERVED:	Various	**TECH:**	JF

TRAVERSE LOCATIONS	DUCT SIZE "	AREA SQ.FT.	DESIGN FPM	DESIGN CFM	CENT. STAT. PRESS."	TEST FPM	TEST CFM	NOTES
AHU-11								
Total								
Minimum O.A.	52" x 20"	7.22	313	2260	w/ Velgrid	114	823	(1)
Kiln Exhaust	6"Ø	0.196	---	N/D	-0.016"	195	38	
AHU-1								
BR #1	22"Ø	2.64	1136	3000	+0.03"	919	2426	
BR #2	22"Ø	2.64		3000	+0.03"	896	2365	
				6000			4791	
AHU-3								
BR #1	18"	1.77	593	1050	+0.006"	444	786	
BR #2	44"	10.55		9600	+0.36"	1051	11088	
				10650			11874	

REMARKS

(1) Minimum O.A. damper command = 10%

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	AHU	EXHAUST FAN	TAB Measured SA	TAB MEASURED RETURN	TAB MEASURED EXHAUST	Calc. OA CFM @ Min.	Meas. unit OA %	BAS Damper Command	VAV	RTU/AHU	Notes
			# ON PLAN			(cfm)	(cfm)	(cfm)	(OA cfm)	(OA cfm)	(pos. %)			
1	1101	Cafeteria	NA	AHU-3	NA	11088	12525	---	721	7%	10%	AHU-4	AHU-3	
1	1102	Stage/ Studio	NA	AHU-3	NA	786	---	---	51	7%	10%	---	AHU-3	
1	1103	Storage	NA	NA	NA	---	---	---	---	---	---	---	---	
1	1104	Restroom	NA	NA	EF-10	---	---	67	---	---	---	---	---	
1	1105	Cafeteria	NA	AHU-3	EF-9	1299	870	93	84	7%	10%	---	AHU-3	
1	1107	Corridor	NA	AHU-3	NA	349	302	---	23	7%	10%	---	AHU-3	
1	1108	Music/Theater/Dance	NA	AHU-2	NA	1578	1471	---	145	9%	10%	---	AHU-2	
1	1109	Music/Theater/Dance	NA	AHU-2	NA	163	122	---	15	9%	10%	---	AHU-2	
1	1111	Storage	NA	AHU-2	NA	146	349	---	13	9%	10%	---	AHU-2	
1	1112	Art Classroom	NA	AHU-2	NA	1192	1025	---	110	9%	10%	---	AHU-2	
1	1113	Art Classroom	NA	AHU-2	NA	157	---	38	14	9%	10%	---	AHU-2	
1	1114	Storage	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
1	1115	Custodial	NA	NA	EF-10	---	---	98	---	---	---	---	---	
1	1116	Utility	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
1	1117	Utility	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
1	1118	Corridor	NA	AHU-2	NA	174	---	---	16	9%	10%	---	AHU-2	
1	1119	Lobby	NA	AHU-2	NA	311	409	---	29	9%	10%	---	AHU-2	
1	1121	Gymnasium	NA	AHU-1	NA	4791	4343	---	457	9%	10%	---	AHU-2	
1	1122	Office	NA	AHU-2	NA	179	---	---	16	9%	10%	---	AHU-2	
1	1123	Kitchen	NA	AHU-9	KEF-1	2610	2657	3443	1221	47%	60%	---	AHU-9	O.A. is interlocked w/ KEF-1
1	1124	Office	NA	AHU-9	NA	130	---	---	61	47%	60%	---	AHU-9	
1	1125	Storage	NA	AHU-9	NA	206	243	---	96	47%	60%	---	AHU-9	
1	1126	Corridor	NA	AHU-9	NA	388	---	---	182	47%	60%	---	AHU-9	
1	1131	Office	NA	AHU-9	NA	224	230	---	105	47%	60%	---	AHU-9	
1	1132	Restroom	NA	NA	EF-10	---	---	65	---	---	---	---	---	
2	1201	Vestibule	NA	AHU-4	NA	0	---	---	0	27	50%	14	AHU-4	
2	1203	Lobby	NA	AHU-2 & 4	NA	234	285	---	22	9.2/ 26.7	10/ 50%	14	AHU-2 & AHU-4	
2	1204	Vestibule	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
2	1205	Office	15	AHU-4	NA	142	221	---	38	27	50%	15	AHU-4	
2	1206	Office	15	AHU-4	NA	98	181	---	26	27	50%	15	AHU-4	
2	1207	Office	16	AHU-4	NA	45	172	---	12	27	50%	16	AHU-4	
2	1208	Office	17	AHU-4	NA	261	236	---	70	27	50%	17	AHU-4	
2	1209	Corridor	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
2	1211	Storage	NA	AHU-4	NA	0	---	---	0	27%	50%	18	AHU-4	
2	1212	Office	NA	AHU-4	NA	0	265	---	0	27%	50%	18	AHU-4	
2	1213	Office	NA	AHU-4	NA	0	---	---	0	27%	50%	18	AHU-4	
2	1214	Conference Room	19	AHU-4	NA	140	202	---		27%	50%	19	AHU-4	
2	1215	Restroom	NA	NA	EF-1	---	---	79	---	---	---	---	---	
2	1216	Waiting Room	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
2	1217	Nurse	20	AHU-4	NA	88	48	---	23	27%	50%	20	AHU-4	
2	1218	Nurse	20	AHU-4	NA	55	41	---	15	27%	50%	20	AHU-4	
2	1219	Restroom	20	AHU-4	EF-2	33	---	81	9	27%	50%	20	AHU-4	
2	1221	Office	21	AHU-4	NA	264	188	---	70	27%	50%	21	AHU-4	
2	1222	Office	21	AHU-4	NA	101	68	---	30	27%	50%	21	AHU-4	
2	1223	Storage	NA	NA	NA	---	---	---	---	---	---	---	---	
2	1224	Office	20	AHU-4	NA	41	60	---	11	27%	50%	20	AHU-4	

2	1225	Nurse	20	AHU-4	NA	106	---	---	28	27%	50%	20	AHU-4	
2	1226	Classroom	NA	AHU-6	NA	635	589	---	160	25%	10%	---	AHU-6	
2	1227	Storage	NA	NA	EF-12	---	---	41	---	---	---	---	---	
2	1228	Restroom	NA	NA	EF-12	---	---	60	---	---	---	---	---	
2	1229	Corridor	22	AHU-7	NA	226	---	---	27	12%	10%	---	AHU-7	
2	1231	Lobby	22	AHU-4	NA	0	---	---	0	27	50%	22	AHU-4	
2	1232	Library	NA	AHU-5	NA	2864	640	---	670	23%	15%	---	AHU-5	
2	1233	Office	NA	AHU-5	NA	174	---	---	41	23%	15%	---	AHU-5	
2	1234	Office	NA	AHU-5	NA	247	---	---	58	23%	15%	---	AHU-5	
2	1235	Office	NA	AHU-5	NA	142	---	---	33	23%	15%	---	AHU-5	
2	1236	Multiuse Assembly	NA	AHU-5	NA	559	2021	---	131	23%	15%	---	AHU-5	
2	1237	Office	NA	AHU-8	NA	1064	865	---	193	18%	5%	---	AHU-8	
2	1238	Classroom	NA	AHU-5	NA	150	72	---	35	23%	15%	---	AHU-5	
2	1239	Utility	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
2	1241	Custodial	NA	NA	EF-12	---	---	51	---	---	---	---	---	
2	1242	Corridor	23	AHU-4	NA	371	228	---	99	27%	50%	23	AHU-4	
2	1244	Office	24	AHU-4	NA	277	150	---	74	27%	50%	24	AHU-4	
2	1245	Storage	24	AHU-4	NA	158	374	---	42	27%	50%	24	AHU-4	
2	1246	Restroom	25	AHU-4	EF-3	101	---	418	27	27%	50%	25	AHU-4	
2	1247	Corridor	NA	NA	NA	---	---	---	---	---	---	---	---	
2	1248	Restroom	25	AHU-4	EF-3	95	---	414	25	27%	50%	25	AHU-4	
2	1249	Office	25	AHU-4	NA	207	193	---	55	27%	50%	25	AHU-4	
2	1251	Corridor	26	AHU-4	NA	0	---	---	0	27%	50%	26	AHU-4	
3	1301	Classroom	NA	AHU-6	NA	656	586	---	165	25%	10%	---	AHU-6	
3	1302	Storage	NA	NA	EF-12	---	---	31	---	---	---	---	---	
3	1303	Restroom	NA	NA	EF-12	---	---	64	---	---	---	---	---	
3	1304	Classroom	NA	AHU-6	NA	654	528	---	165	25%	10%	---	AHU-6	
3	1305	Storage	NA	NA	EF-8	---	---	78	---	---	---	---	---	
3	1306	Restroom	NA	NA	EF-8	---	---	102	---	---	---	---	---	
3	1307	Office	NA	AHU-6	NA	417	289	---	105	25%	10%	---	AHU-6	
3	1308	Restroom	NA	NA	EF-8	---	---	99	---	---	---	---	---	
3	1309	Restroom	NA	NA	EF-8	---	---	62	---	---	---	---	---	
3	1311	Classroom	NA	AHU-6	NA	595	499	---	150	25%	10%	---	AHU-6	
3	1312	Storage	NA	NA	EF-8	---	---	72	---	---	---	---	---	
3	1313	Restroom	NA	NA	EF-8	---	---	131	---	---	---	---	---	
3	1314	Classroom	NA	AHU-6	NA	677	489	---	171	25%	10%	---	AHU-6	
3	1315	Storage	NA	NA	EF-8	---	---	82	---	---	---	---	---	
3	1316	Restroom	NA	NA	EF-8	---	---	97	---	---	---	---	---	
3	1317	Corridor	NA	AHU-7	NA	62	642	---	7	12%	10%	---	AHU-7	
3	1318	Classroom	NA	AHU-7	NA	1232	1166	---	148	12%	10%	---	AHU-7	
3	1319	Classroom	NA	AHU-7	NA	1191	1094	---	143	12%	10%	---	AHU-7	
3	1321	Restroom	NA	AHU-7	EF-5	---	---	264	---	---	---	---	---	
3	1322	Corridor	NA	NA	NA	---	---	---	---	---	---	---	---	
3	1323	Restroom	NA	AHU-7	EF-5	---	---	260	---	---	---	---	---	
3	1324	Classroom	NA	AHU-7	NA	1300	1051	---	156	12%	10%	---	AHU-7	
3	1325	Classroom	NA	AHU-7	NA	1415	979	---	170	12%	10%	---	AHU-7	
4	1401	Waiting Room	27	AHU-4	NA	124	114	---	33	27%	50%	27	AHU-4	
4	1402	Office	27	AHU-4	NA	204	146	---	54	27%	50%	27	AHU-4	Space is open to each other
4	1403	Corridor	NA	NA	NA	---	---	---	---	---	---	---	---	Space is open to each other

4	1404	Conference Room	28	AHU-4	NA	127	171	---	34	27%	50%	28	AHU-4	Space is open to each other
4	1405	Office	29	AHU-4	NA	181	64	---	48	27%	50%	29	AHU-4	Space is open to each other
4	1406	Office	29	AHU-4	NA	137	82	---	37	27%	50%	29	AHU-4	Space is open to each other
4	1407	Classroom	NA	AHU-11	NA	1423	884	---	122	9%	10%	---	AHU-11	
4	1408	Office	NA	AHU-11	NA	477	705	---	41	9%	10%	---	AHU-11	
4	1409	Restroom	NA	NA	EF-7	---	---	81	---	---	---	---	---	
4	1411	Restroom	NA	NA	EF-7	---	---	56	---	---	---	---	---	
4	1412	Classroom	NA	AHU-11	NA	1033	1407	---	89	9%	10%	---	AHU-11	
4	1413	Classroom	NA	AHU-11	NA	1145	922	---	98	9%	10%	---	AHU-11	
4	1415	Corridor	NA	AHU-11	NA	323	---	---	28	9%	10%	---	AHU-11	
4	1416	Office	30	AHU-4	NA	433	219	---	116	27%	50%	30	AHU-4	
4	1417	Corridor	NA	AHU-4	NA	---	---	---	---	---	---	---	---	Part of Corridor 1415
4	1418	Custodial	NA	NA	EF-4	---	---	224	---	---	---	---	---	
4	1419	Utility	NA	NA	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
4	1421	Utility	NA	NA	NA	---	---	---	---	---	---	---	---	
4	1422	Office	36	AHU-4	NA	143	105	---	38	27%	50%	31	AHU-4	
4	1423	Office	36	AHU-4	NA	32	30	---	9	27%	50%	31	AHU-4	
4	1424	Restroom	36	AHU-4	EF-4	45	---	119	12	27%	50%	31	AHU-4	
4	1425	Classroom	NA	AHU-10	NA	1014	1023	---	124	12%	10%	---	AHU-10	
4	1426	Restroom	NA	AHU-10	EF-7	---	---	246	---	---	---	---	---	
4	1427	Corridor	NA	NA	NA	527	---	---	64	12%	10%	---	AHU-10	
4	1428	Restroom	NA	AHU-10	EF-7	---	---	220	---	---	---	---	---	
4	1429	Classroom	NA	AHU-10	NA	835	1101	---	102	12%	10%	---	AHU-10	
4	1431	Classroom	NA	AHU-10	NA	1189	958	---	145	12%	10%	---	AHU-10	
Lower Level	201	Corridor	NA	AHU-10	NA	257	---	---	31	12%	10%	---	AHU-10	
Lower Level	203	Storage	NA	AHU-10	EF-4	303	---	170	37	12%	10%	---	AHU-10	
Lower Level	205	Office	NA	AHU-10	NA	181	---	---	22	12%	10%	---	AHU-10	
Lower Level	401	Classroom	NA	AHU-11	NA	1094	898	---	94	9%	10%	---	AHU-11	
Lower Level	402	Classroom	NA	AHU-11	NA	1057	951	---	91	9%	10%	---	AHU-11	
Lower Level	403	Classroom	NA	AHU-11	NA	549	495	---	47	9%	10%	---	AHU-11	
Lower Level	404	Restroom	NA	NA	EF-6	---	---	49	---	---	---	---	---	
Lower Level	405	Restroom	NA	NA	EF-6	---	---	46	---	---	---	---	---	
Lower Level	406	Classroom	NA	AHU-11	NA	1228	1003	---	106	9%	10%	---	AHU-11	
Lower Level	407	Classroom	NA	AHU-11	NA	1195	1070	---	103	9%	10%	---	AHU-11	
Lower Level	409	Corridor	NA	AHU-10	NA	619	599	---	53	9%	10%	---	AHU-11	
Lower Level	412	Corridor	NA	AHU-10	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
Lower Level	413	Custodial	NA	AHU-10	EF-4	---	---	18	---	---	---	---	---	
Lower Level	414	Utility	NA	AHU-10	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
Lower Level	415	Utility	NA	AHU-10	NA	---	---	---	---	---	---	---	---	No Ducted Ventilation
Lower Level	416	Classroom	NA	AHU-10	NA	261	162	---	22	9%	10%	---	AHU-10	
Lower Level	417	Classroom	NA	AHU-10	NA	57	---	---	5	9%	10%	---	AHU-10	
Lower Level	418	Restroom	33	AHU-4	EF-4	57	---	67	15	27%	50%	33	AHU-4	
Lower Level	421	Restroom	NA	AHU-10	EF-6	---	---	183	---	---	---	---	---	
Lower Level	422	Corridor	NA	AHU-10	NA	226	---	---	28	12%	10%	---	AHU-10	
Lower Level	423	Restroom	NA	AHU-10	EF-6	---	---	194	---	---	---	---	---	
Lower Level	424	Classroom	NA	AHU-10	NA	1093	943	---	133	12%	10%	---	AHU-10	
Lower Level	425	Classroom	NA	AHU-10	NA	1036	919	---	126	12%	10%	---	AHU-10	
Lower Level	411	Classroom	NA	AHU-10	NA	319	91	---	39	12%	10%	---	AHU-10	

Appendix B

Ventilation Data Calculations

Project Name: Groton Public Schools - 5 Year Ventilation Evaluation
School Name: Catherine Kolnaski STEAM School
Project Number: 20150601.A81
Scope: HVAC Verification and Evaluation
Data Collection By: TAB Data F&O Data
Date: 12/20/2024 11/11/2024
OUTSIDE AIR VERIFICATION CALCULATION

Catherine Kolnaski STEAM School 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.
201	Corridor	Corridor	446.07	4015	AHU-10	31	-	0	27	27	4
205	Custodian Work Office	Office	254.07	2292	AHU-10	22	1	10	15	25	(3)
401	Flex Classroom	Classroom	860.26	7746	AHU-11	94	30	310	103	413	(319)
402	4th Grade Classroom	Classroom	879.18	7919	AHU-11	91	31	310	106	416	(325)
403	Work Rm	Classroom	288.2	2600	AHU-11	47	10	110	35	145	(98)
406	4th Grade Classroom	Classroom	865.52	7795	AHU-11	106	30	310	104	414	(308)
407	4th Grade Classroom	Classroom	882.62	7950	AHU-11	103	31	310	106	416	(313)
409	Corridor	Corridor	1206.46	10864	AHU-10	53	-	0	72	72	(19)
411	Resource	Classroom	277	2497	AHU-10	39	10	100	33	133	(94)
412	Corridor	Corridor	95.19	857	AHU-10	0	-	0	6	6	(6)
412	Corridor	Corridor	95.19	857	AHU-10	0	-	0	6	6	(6)
416	Resource	Classroom	82.99	836	AHU-10	22	3	30	10	40	(18)
417	Time Out	Classroom	179.94	1799	AHU-10	5	6	70	22	92	(87)
422	Toilet Entry	Corridor	100.28	905	AHU-10	28	-	0	6	6	22
424	5th Grade Classroom	Classroom	862.72	7767	AHU-10	133	30	310	104	414	(281)
425	5th Grade Classroom	Classroom	842.43	7588	AHU-10	126	29	300	101	401	(275)
1101	Cafetorium	Cafeteria	3402.05	78262	AHU-3	721	340	2558	612	3170	(2449)
1102	Platform	Stage/ Studio	1131.77	10190	AHU-3	51	-	0	0	0	51
1105	Faculty Dining	Cafeteria	322.59	3232	AHU-3	84	32	248	58	306	(222)
1107	Corridor	Corridor	946.94	8522	AHU-3	23	-	0	57	57	(34)
1108	Music Room	Music/Theater/Dance	1460.53	13149	AHU-2	145	51	520	88	608	(463)
1109	Practice	Music/Theater/Dance	93.32	753	AHU-2	15	3	40	6	46	(31)
1112	Art Classroom	Art Classroom	886.42	7983	AHU-2	110	18	180	160	340	(230)
1113	Kiln room	Art Classroom	88.95	718	AHU-2	14	2	20	16	36	(22)
1118	Corridor	Corridor	189.11	1707	AHU-2	16	-	0	11	11	5
1119	Gym Lobby	Lobby	272.69	2185	AHU-2	29	3	15	16	31	(2)
1121	Gymnasium	Gymnasium	2945.34	79540	AHU-1	457	21	420	530	950	(493)
1122	Storage (Gym Office)	Office	194.29	1558	AHU-2	16	1	5	12	17	(1)
1123	Kitchen	Kitchen	777.11	7777	AHU-9	1221	54	550	47	597	624
1124	Office	Office	72.38	579	AHU-9	61	0	5	4	9	52
1126	Corridor	Corridor	344.8	3108	AHU-9	182	-	0	21	21	161
1131	Kitchen Staff	Office	142.61	1287	AHU-9	105	1	5	9	14	91
1201	Vestibule	Vestibule	296.57	7132	AHU-4	0	3	15	18	33	(33)
1203	Lobby	Lobby	1427.47	34273	AHU-4	22	14	75	86	161	(139)
1204	Vestibule	Vestibule	156.13	1567	NA	0	2	10	9	19	(19)
1205	Admin	Office	317.06	3176	AHU-4	38	2	10	19	29	9
1206	Work Room	Office	178.28	1426	AHU-4	26	1	5	11	16	10
1207	Assistant Principal's Office	Office	189.78	1904	AHU-4	12	1	5	11	16	(4)
1208	Principal's Office	Office	208.11	2081	AHU-4	70	1	10	12	22	48
1209	Corridor	Corridor	50.44	504	NA	0	-	0	3	3	(3)
1212	Admin	Office	115.38	1160	AHU-4	0	1	5	7	12	(12)
1209	Corridor	Corridor	50.44	504	NA	0	-	0	3	3	(3)
1214	Conference Room	Conference Room	255.28	2553	AHU-4	0	13	65	15	80	(80)

Catherine Kolnaski STEAM School 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.
1216	Waiting	Waiting Room	106.28	962	NA	0	3	40	6	46	(46)
1217	Nurse's Office	Nurse	95.72	869	AHU-4	23	0	5	6	11	12
1221	NP Office	Office	184.63	1852	AHU-4	70	1	5	11	16	54
1222	Exam Room	Office	86.58	779	AHU-4	30	0	5	5	10	20
1224	Exam Room	Office	79.44	720	AHU-4	11	0	5	5	10	1
1225	Nurse	Nurse	159.79	1442	AHU-4	28	1	5	10	15	13
1226	Pre-K Special Needs	Classroom	851.94	7675	AHU-6	160	30	300	102	402	(242)
1226	Pre-K Special Needs	Classroom	851.94	7675	AHU-6	160	30	300	102	402	(242)
1232	Media Center	Library	1846	36932	AHU-5	670	18	190	111	301	369
1233	AV Prod. Room	Office	186.29	1683	AHU-5	41	1	5	11	16	25
1235	Office	Office	79.32	1039	AHU-5	33	0	5	5	10	23
1236	Media Center	Library	412.74	3720	AHU-5	131	4	50	25	75	56
1233	AV Prod. Room	Office	186.29	1683	AHU-5	41	1	5	11	16	25
1238	Literacy Workroom	Classroom	140.82	1273	AHU-5	35	5	50	17	67	(32)
1236	Media Center	Library	412.74	3720	AHU-5	131	4	50	25	75	56
1242	Corridor	Corridor	701.36	6317	AHU-4	99	-	0	42	42	57
1244	OT/PT	Office	403.1	3632	AHU-4	74	2	15	24	39	35
1247	Toilet Entry	Corridor	64.93	649	NA	0	-	0	4	4	(4)
1244	OT/PT	Office	403.1	3632	AHU-4	74	2	15	24	39	35
1249	Parent Room	Office	287.97	2592	AHU-4	55	1	10	17	27	28
1251	Corridor	Corridor	231.93	2094	AHU-4	0	-	0	14	14	(14)
1301	Pre-K Classroom	Classroom	852.77	7679	AHU-6	165	30	300	102	402	(237)
1304	Kindergarten Classroom	Classroom	856.16	7711	AHU-6	165	30	300	103	403	(238)
1307	Work Rm	Office	431.87	3460	AHU-6	105	2	15	26	41	64
1314	Kindergarten Classroom	Classroom	853.3	7685	AHU-6	171	30	300	102	402	(231)
1317	Corridor	Corridor	946.05	12306	AHU-7	7	-	0	57	57	(50)
1318	1st Grade Classroom	Classroom	871.25	7845	AHU-7	148	30	310	105	415	(267)
1319	1st Grade Classroom	Classroom	871.13	7848	AHU-7	143	30	310	105	415	(272)
1322	Toilet Entry	Corridor	155.61	1403	NA	0	-	0	9	9	(9)
1324	1st Grade Classroom	Classroom	867.36	7811	AHU-7	156	30	310	104	414	(258)
1325	Flex Classroom	Classroom	873.04	8739	AHU-7	170	31	310	105	415	(245)
1401	Office Waiting	Waiting Room	127.74	1156	AHU-4	33	4	45	8	53	(20)
1402	Office	Office	139.35	1262	AHU-4	54	1	5	8	13	41
1403	Corridor	Corridor	145.1	1311	NA	0	-	0	9	9	(9)
1404	Conference Room	Conference Room	165.25	1491	AHU-4	34	8	45	10	55	(21)
1405	Office	Office	126.14	1135	AHU-4	48	1	5	8	13	35
1406	Office	Office	128.23	1159	AHU-4	37	1	5	8	13	24
1407	2nd Grade Classroom	Classroom	868.79	7824	AHU-11	122	30	310	104	414	(292)
1408	Work Rm	Office	262.9	2374	AHU-11	41	1	10	16	26	15
1412	2nd Grade Classroom	Classroom	898.09	8088	AHU-11	89	31	320	108	428	(339)
1413	2nd Grade Classroom	Classroom	880.65	7933	AHU-11	98	31	310	106	416	(318)
1415	Corridor	Corridor	1280.4	11531	AHU-11	28	-	0	77	77	(49)
1416	Resource	Office	275.78	2486	AHU-4	116	1	10	17	27	89
1417	Corridor	Corridor	106.82	961	AHU-4	0	-	0	6	6	(6)
1422	Resource	Office	84.8	768	AHU-4	38	0	5	5	10	28
1423	Time Out Room	Office	180.99	1629	AHU-4	9	1	5	11	16	(7)
1425	3rd Grade Classroom	Classroom	869.39	7830	AHU-10	124	30	310	104	414	(290)
1427	Toilet Entry	Corridor	144.45	1302	NA	64	-	0	9	9	55
1429	3rd Grade Classroom	Classroom	867.93	7814	AHU-10	102	30	310	104	414	(312)
1431	3rd Grade Classroom	Classroom	870.78	7845	AHU-10	145	30	310	104	414	(269)

Project Name: Groton Public Schools - 5 Year Ventilation Evaluation
Project Number: 20150601.A81
School Name Catherine Kolnaski STEAM School
Scope: HVAC Verification and Evaluation
Data Collection By: TAB Data F&O Data
Date: 12/20/2024 11/11/2024
EXHAUST FAN CALCULATION

Catherine Kolnaski STEAM School 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.
404	Toilet	Restroom	59.2	476.7	1	49	50	(1)
405	Toilet	Restroom	57.3	462.7	1	46	50	(4)
418	Toilet	Restroom	56.1	448.7	1	67	50	17
421	Boy's Toilet	Restroom	151.3	1366.7	3	183	150	33
423	Girl's Toilet	Restroom	153.5	1385.4	3	194	150	44
1104	Toilet	Restroom	64.2	518.4	1	67	50	17
1132	Toilet Room	Restroom	64.4	521.9	1	65	50	15
1215	Toilet	Restroom	61.6	493.0	1	79	50	29
1215	Toilet	Restroom	61.6	493.0	1	79	50	29
1219	Toilet	Restroom	109.9	886.2	2	81	100	(19)
1228	Storage	Restroom	57.5	535.0	1	60	50	10
1246	OT/PT	Restroom	264.4	2649.4	6	418	300	118
1303	Toilet	Restroom	56.7	457.9	1	64	50	14
1308	Toilet	Restroom	55.8	449.8	1	99	50	49
1309	Toilet	Restroom	56.7	442.2	1	62	50	12
1306	Storage	Restroom	54.7	538.7	1	102	50	52
1313	Toilet	Restroom	54.7	442.2	1	131	50	81
1316	Toilet	Restroom	54.4	440.0	1	97	50	47
1321	Girl's Toilet	Restroom	116.5	1056.4	3	264	150	114
1323	Boy's	Restroom	121.8	1099.8	3	260	150	110
1409	Toilet	Restroom	61.5	7824.4	1	81	50	31
1411	Toilet	Restroom	59.2	7824.4	1	56	50	6
1424	Toilet	Restroom	55.3	7824.4	1	119	50	69
1426	Boy's Toilet	Restroom	118.4	7824.4	3	246	150	96
1428	Girl's Toilet	Restroom	117.0	7824.4	3	220	150	70

Appendix C

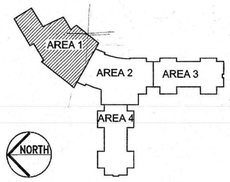
Floor Plans

MECHANICAL GENERAL NOTES

1. REFER TO DWG. M-901 FOR MECHANICAL SYMBOL LIST & LEGEND
2. PLACEMENT OF ALL ROOF MOUNTED SHALL BE COORDINATED WITH STRUCTURAL STEEL; REFER TO STRUCTURAL DRAWINGS.
3. FOR T-STAT LOCATIONS, REFER TO MP DRAWINGS.



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



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CONSULTANTS

CIVIL ENGINEER
PARE ENGINEERING CORPORATION
8 BLACKSTONE VALLEY PLACE
LINCOLN, RHODE ISLAND 02865
401.334.4100

LANDSCAPE ARCHITECT
FERRERO HIXON ASSOCIATES, LLC
738 HOPMEADOW STREET PO BOX 425
SIMSBURY, CONNECTICUT
06070-0425
860.658.0456

STRUCTURAL ENGINEER
MACCHI ENGINEERS, LLC
44 GILLETT STREET
HARTFORD, CONNECTICUT
06105-2694
860-549-6190

MECHANICAL/ELECTRICAL/ PLUMBING/FIRE PROTECTION ENGINEER
CONSULTING ENGINEERING SERVICES INC.
811 MIDDLE STREET
MIDDLETOWN, CONNECTICUT 06457
860-632-1682
CES PROJECT #24168.00

TECHNOLOGY CONSULTANT
CCR PYRAMID, INC.
110 CEDAR STREET
WELLESLEY, MASSACHUSETTS
02481
781.943.4400

FOOD SERVICE CONSULTANT
CRABTREE McGRATH ASSOCIATES, INC.
153 ANDOVER STREET, SUITE 209
DANVERS, MASSACHUSETTS 01923
978.762.6464

Catherine Kolnaski Elementary School

500 Poquonnock Road
Groton, Connecticut

State Project No. 059-0168N

Phase 1

JCJARCHITECTURE
JCJ Architecture, Inc.
38 Prospect Street
Hartford, CT 06103

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SCALE	1/8" = 1'-0"

MAIN LEVEL
AREA 1
MECHANICAL
PIPING PLAN

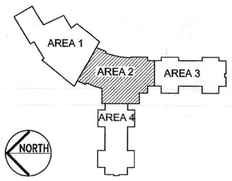
MP-111

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1 MAIN LEVEL AREA 2 MECHANICAL PIPING PLAN
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8 BLACKSTONE VALLEY PLACE
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FERRERO HIXON ASSOCIATES, LLC
738 HOPMEADOW STREET PO BOX 425
SIMSBURY, CONNECTICUT
06070-0425
860.658.0456

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MACCHI ENGINEERS, LLC
44 GILLETT STREET
HARTFORD, CONNECTICUT
06105-2694
860-549-6190

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CONSULTING ENGINEERING SERVICES INC.
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MIDDLETOWN, CONNECTICUT 06457
860-632-1682
CES PROJECT #24168.00

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CCR PYRAMID, INC.
110 CEDAR STREET
WELLESLEY, MASSACHUSETTS 02481
781.943.4400

FOOD SERVICE CONSULTANT
CRABTREE McGRATH ASSOCIATES, INC.
153 ANDOVER STREET, SUITE 209
DANVERS, MASSACHUSETTS 01923
978.762.6464

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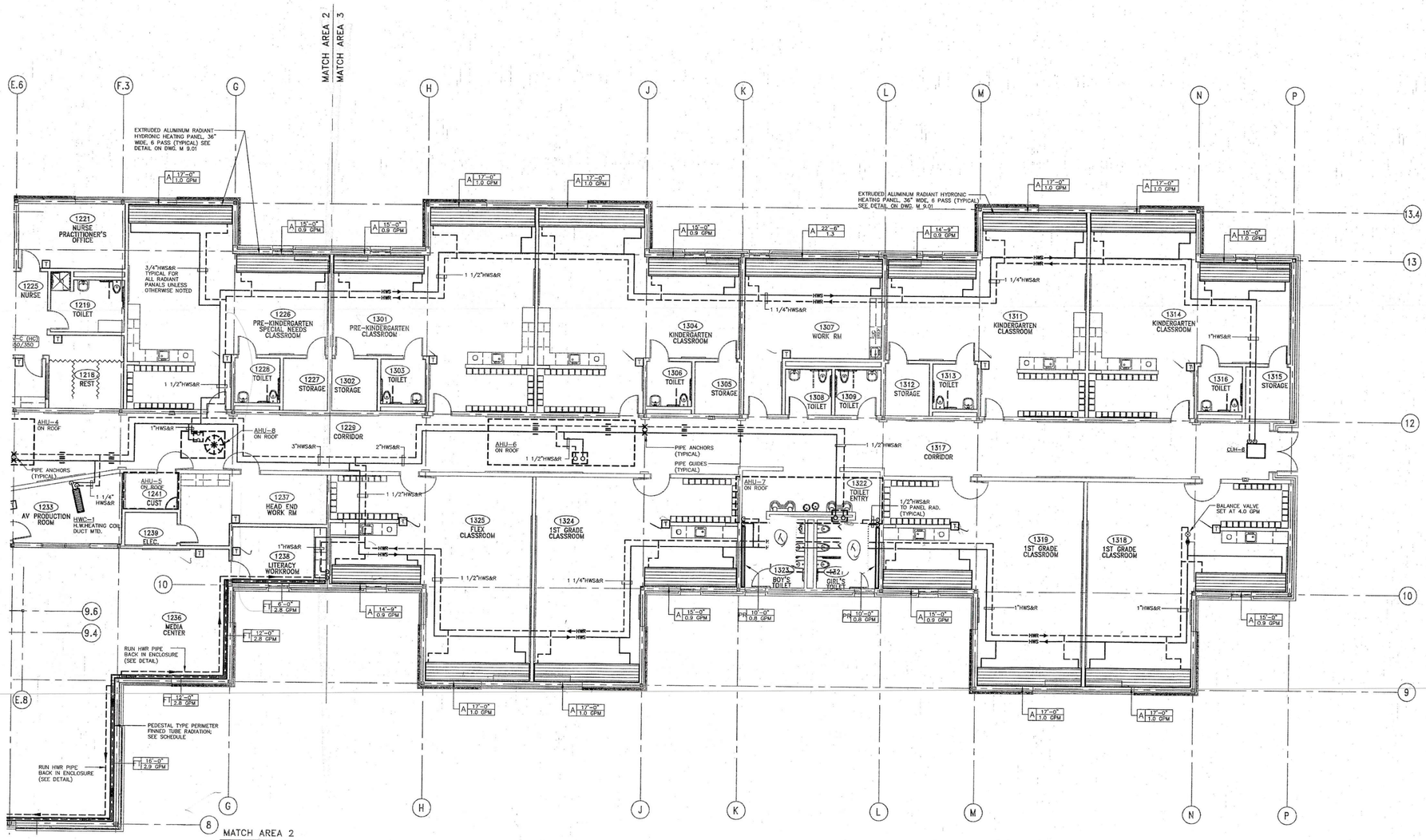
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MAIN LEVEL
AREA 2
MECHANICAL
PIPING PLAN

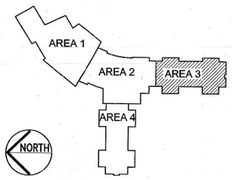
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1 MAIN LEVEL AREA 3 MECHANICAL PIPING PLAN
SCALE: 1/8"=1'-0"



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8 BLACKSTONE VALLEY PLACE
LINCOLN, RHODE ISLAND 02865
401.334.4100

LANDSCAPE ARCHITECT
FERRERO HIXON ASSOCIATES, LLC
738 HOPMEADOW STREET PO BOX 425
SIMSBURY, CONNECTICUT
06070-0425
860.658.0456

STRUCTURAL ENGINEER
MACCHI ENGINEERS, LLC
44 GILLETT STREET
HARTFORD, CONNECTICUT
06105-2694
860-549-6190

MECHANICAL/ELECTRICAL/ PLUMBING/FIRE PROTECTION ENGINEER
CONSULTING ENGINEERING SERVICES INC.
811 MIDDLE STREET
MIDDLETOWN, CONNECTICUT 06457
860-632-1622
CES PROJECT #24168.00

TECHNOLOGY CONSULTANT
CCR PYRAMID, INC.
110 CEDAR STREET
WELLESLEY, MASSACHUSETTS 02481
781.943.4400

FOOD SERVICE CONSULTANT
CRABTREE McGRATH ASSOCIATES, INC.
153 ANDOVER STREET, SUITE 209
DANVERS, MASSACHUSETTS 01923
978.762.6464

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Groton, Connecticut

State Project No. 059-0168N

Phase 1

JCJARCHITECTURE
JCJ Architecture, Inc.
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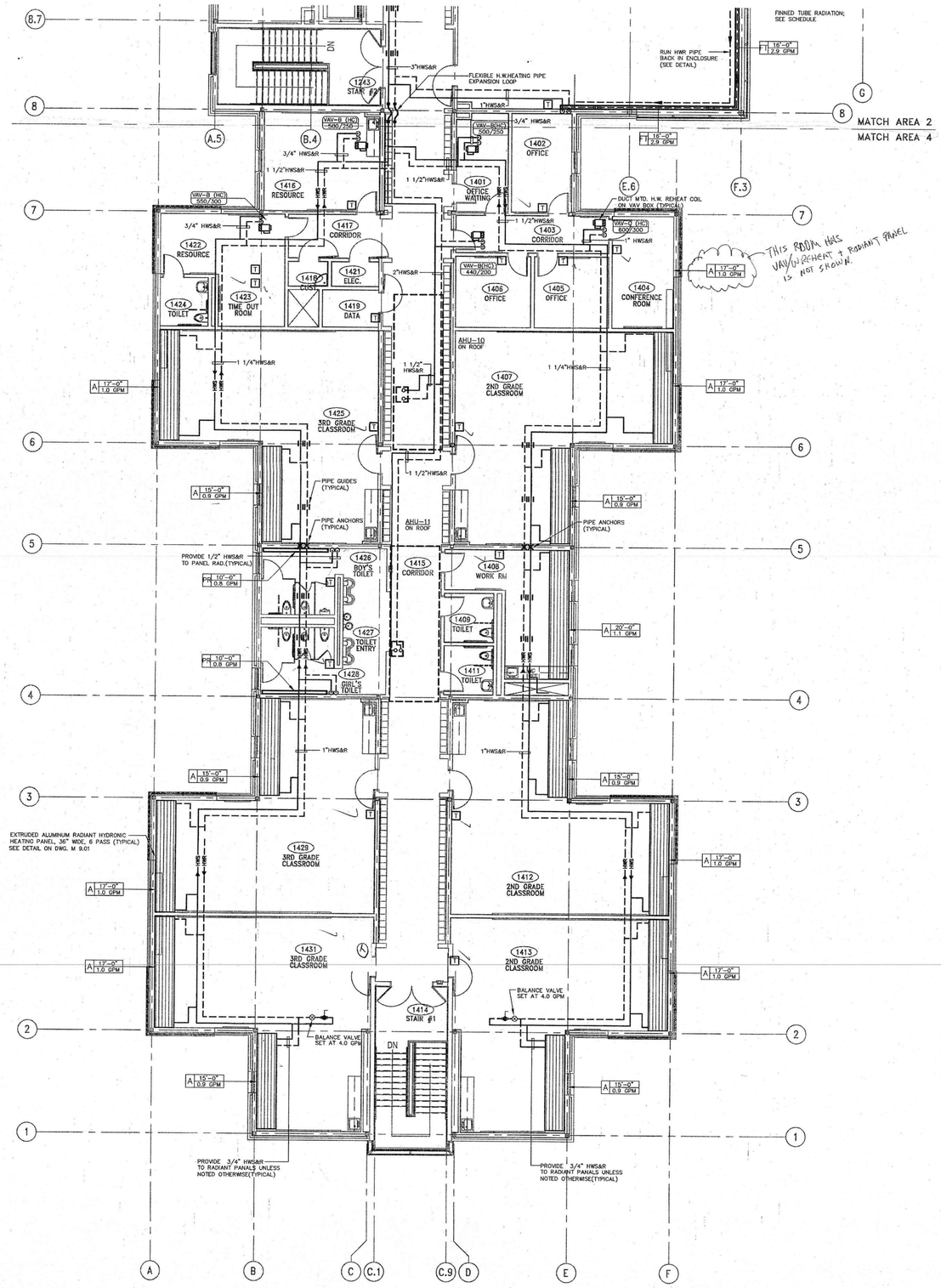
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MAIN LEVEL
AREA 3
MECHANICAL
PIPING PLAN

MP-113

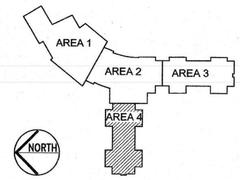
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17 = RAD WALL
11 = T

1 MAIN LEVEL AREA 4 MECHANICAL PIPING PLAN
SCALE: 1/8"=1'-0"



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8 BLACKSTONE VALLEY PLACE
LINCOLN, RHODE ISLAND 02865
401.334.4100

LANDSCAPE ARCHITECT
FERRERO HIXON ASSOCIATES, LLC
738 HOPMEADOW STREET PO BOX 425
SIMSBURY, CONNECTICUT 06070-0425
860.658.0456

STRUCTURAL ENGINEER
MACCHI ENGINEERS, LLC
44 GILLETT STREET
HARTFORD, CONNECTICUT 06105-2694
860-549-6190

MECHANICAL/ELECTRICAL/ PLUMBING/FIRE PROTECTION ENGINEER
CONSULTING ENGINEERING SERVICES INC.
811 MIDDLE STREET
MIDDLETOWN, CONNECTICUT 06457
860-632-1682
CES PROJECT #24168.00

TECHNOLOGY CONSULTANT
CCR PYRAMID, INC.
110 CEDAR STREET
WELLESLEY, MASSACHUSETTS 02481
781.943.4400

FOOD SERVICE CONSULTANT
CRABTREE McGRATH ASSOCIATES, INC.
153 ANDOVER STREET, SUITE 209
DANVERS, MASSACHUSETTS 01923
978.762.6464

Catherine Kolnaski Elementary School

500 Poquonnock Road
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JCJ Architecture, Inc.
38 Prospect Street
Hartford, CT 06103

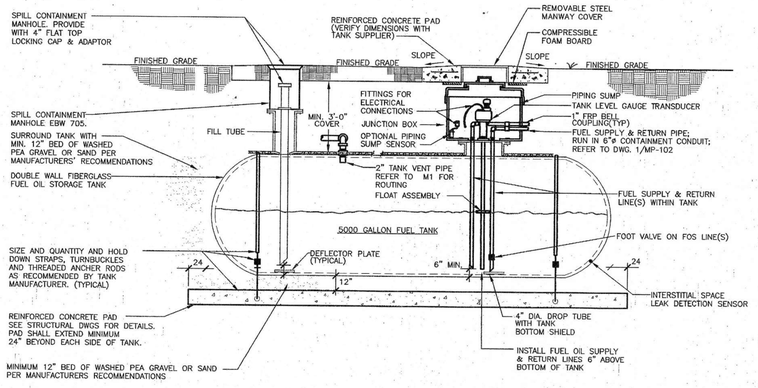
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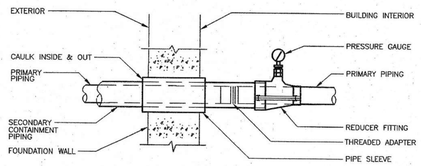
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MAIN LEVEL
AREA 4
MECHANICAL
PIPING PLAN

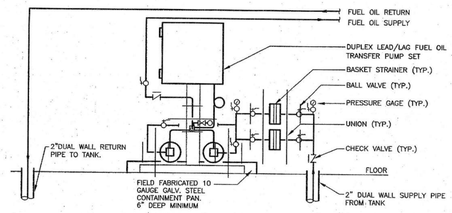
MP-114



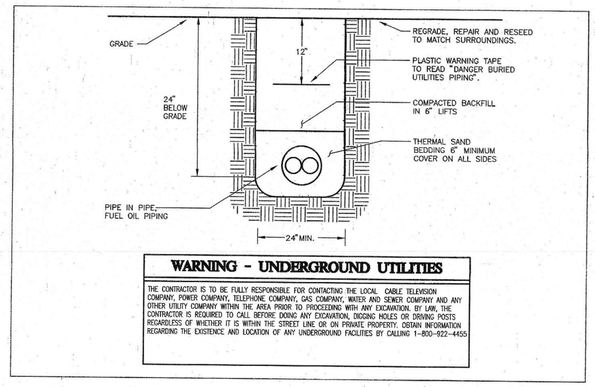
2 DOUBLE WALL FIBERGLASS 5000 GALLON CAP. FUEL OIL STORAGE TANK PIPING DETAIL
N.T.S.



3 DOUBLE WALL OIL PIPE SLEEVE DETAIL
N.T.S.

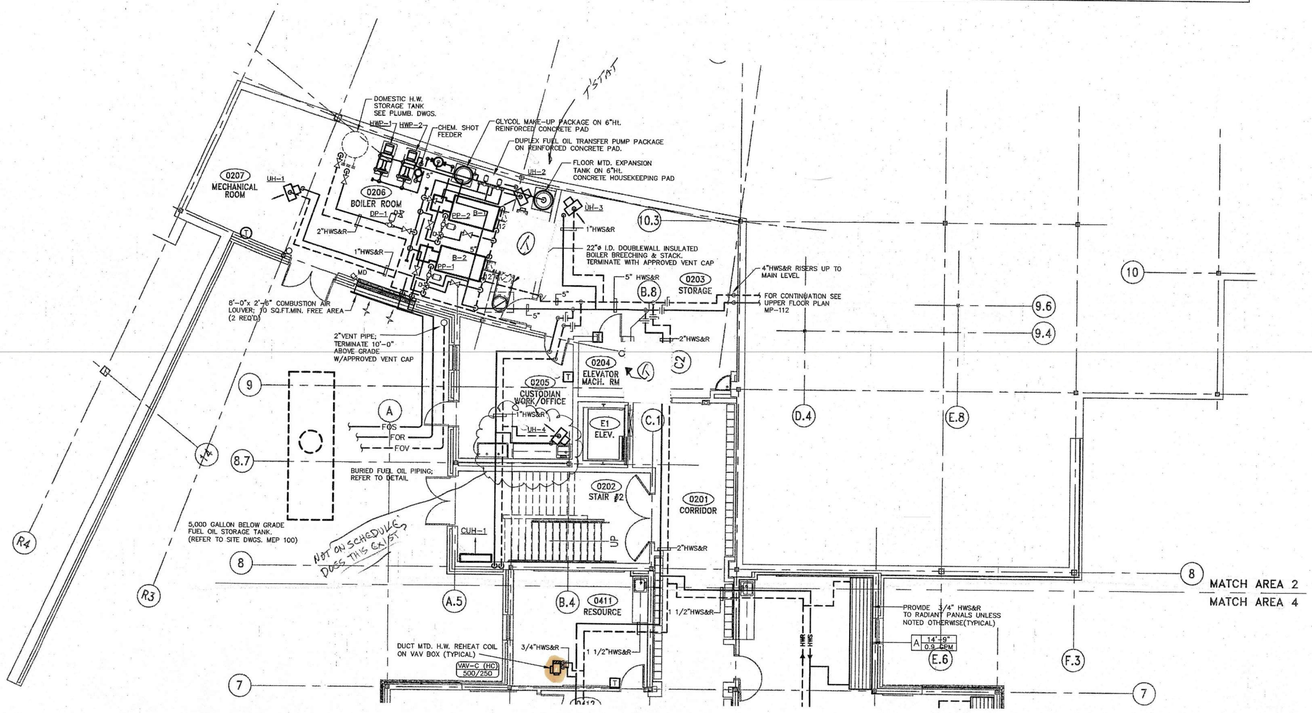


4 FUEL OIL TRANSFER PUMP DETAIL
N.T.S.

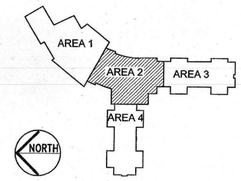


WARNING - UNDERGROUND UTILITIES

THE CONTRACTOR IS TO BE FULLY RESPONSIBLE FOR CONTACTING THE LOCAL CABLE TELEVISION COMPANY, POWER COMPANY, TELEPHONE COMPANY, GAS COMPANY, WATER AND SEWER COMPANY AND ANY OTHER UTILITY COMPANY WITHIN THE AREA PRIOR TO PROCEEDING WITH ANY EXCAVATION. BY LAW, THE CONTRACTOR IS REQUIRED TO CALL BEFORE DOING ANY EXCAVATION, DIGGING HOLES OR DRIVING POSTS REGARDLESS OF WHETHER IT IS WITHIN THE STREET LINE, OR ON PRIVATE PROPERTY. OBTAIN INFORMATION REGARDING THE EXISTENCE AND LOCATION OF ANY UNDERGROUND FACILITIES BY CALLING 1-800-922-4455



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



MECHANICAL GENERAL NOTES

1. REFER TO DWG. M-901 FOR MECHANICAL SYMBOL LIST & LEGEND
2. PLACEMENT OF ALL ROOF MOUNTED SHALL BE COORDINATED WITH STRUCTURAL STEEL; REFER TO STRUCTURAL DRAWINGS.
3. FOR T-STAT LOCATIONS, REFER TO MP DRAWINGS.

REVISIONS
05-12-06 BID SET

CONSULTANTS

CIVIL ENGINEER
PARE ENGINEERING CORPORATION
8 BLACKSTONE VALLEY PLACE
LINCOLN, RHODE ISLAND 02865
401.334.4100

LANDSCAPE ARCHITECT
FERRERO HIXON ASSOCIATES, LLC
738 HOPMEADOW STREET PO BOX 425
SIMSBURY, CONNECTICUT
06070-0425
860.658.0456

STRUCTURAL ENGINEER
MACCHI ENGINEERS, LLC
44 GILLETT STREET
HARTFORD, CONNECTICUT
06105-2694
860-549-6190

MECHANICAL/ELECTRICAL/ PLUMBING/FIRE PROTECTION ENGINEER
CONSULTING ENGINEERING SERVICES INC.
811 MIDDLE STREET
MIDDLETOWN, CONNECTICUT 06457
860-632-1822
CES PROJECT #24168.00

TECHNOLOGY CONSULTANT
CCR PYRAMID, INC.
110 CEDAR STREET
WELLESLEY, MASSACHUSETTS 02481
781.943.4400

FOOD SERVICE CONSULTANT
CRABTREE McGRATH ASSOCIATES, INC.
153 ANDOVER STREET, SUITE 209
DANVERS, MASSACHUSETTS 01923
978.762.6464

Catherine Kolnaski Elementary School

500 Poquonnock Road
Groton, Connecticut

State Project No. 059-0168N

Phase 1

JCJARCHITECTURE
JCJ Architecture, Inc.
38 Prospect Street
Hartford, CT 06103

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P.C.
P.M.
D.P.
J.C.

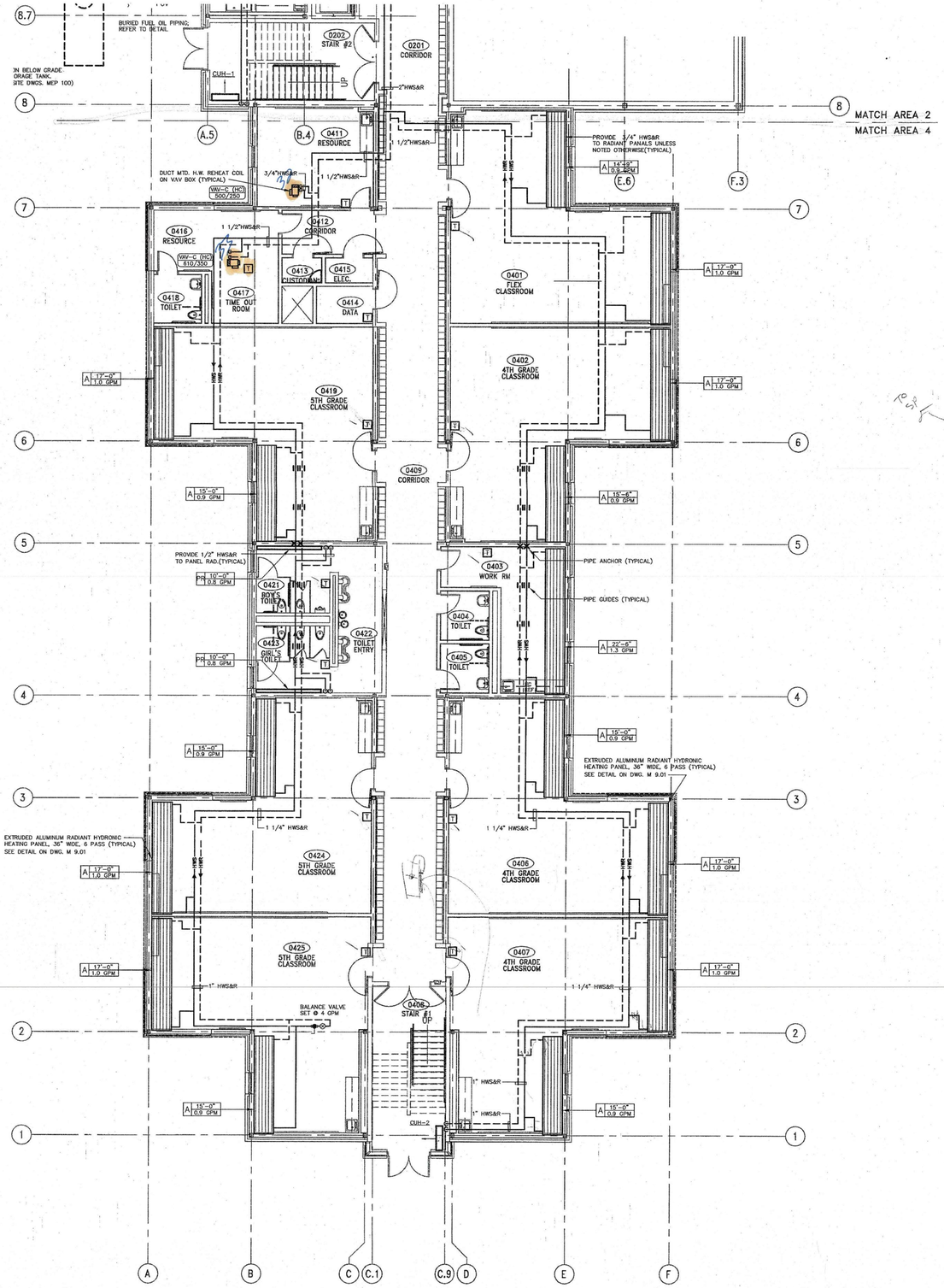
ISSUE 01-09-06
JOB 044300
DRAWN AC
SCALE 1/8" = 1'-0"

LOWER LEVEL AREA 2 MECHANICAL PIPING PLAN

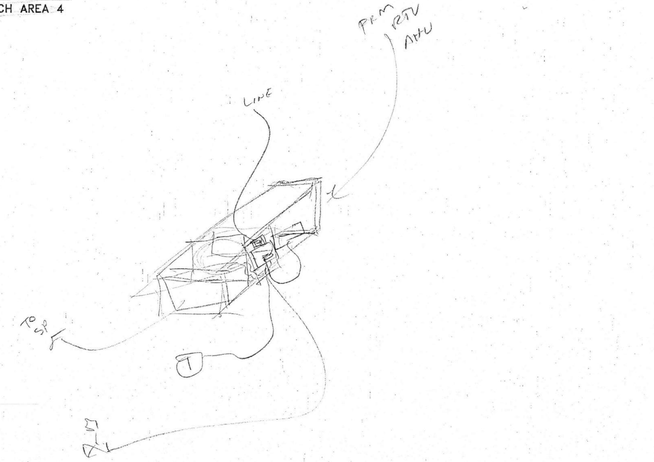
MP-102

MECHANICAL GENERAL NOTES

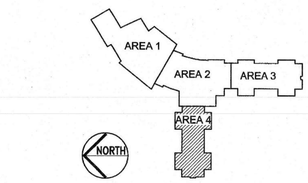
1. REFER TO DWG. M-901 FOR MECHANICAL SYM LIST & LEGEND
2. PLACEMENT OF ALL ROOF MOUNTED SHALL BE COORDINATED WITH STRUCTURAL STEEL; REF TO STRUCTURAL DRAWINGS.
3. FOR T-STAT LOCATIONS, REFER TO MP DRAWIN



1 LOWER LEVEL AREA 4 MECHANICAL PIPING PLAN
SCALE: 1/8"=1'-0"







L.
FEB.
738 h.
425
SIMSBU.
06070-042.
860.658.0456

STRUCTURAL
MACCHI ENGINEE.
44 GILLETT STREET
HARTFORD, CONNEC.
06105-2694
860-549-6190

MECHANICAL/ELECTRICA. PLUMBING/FIRE PROTECTI. ENGINEER
CONSULTING ENGINEERING SERVICES INC.
811 MIDDLE STREET
MIDDLETOWN, CONNECTICUT 06457
860-632-1992
CES PROJECT #24168.00

TECHNOLOGY CONSULTANT
CCR PYRAMID, INC.
110 CEDAR STREET
WELLESLEY, MASSACHUSETTS 02481
781.943.4400

FOOD SERVICE CONSULTANT
CRABTREE McGRATH ASSOCIATES, INC.
153 ANDOVER STREET, SUITE 209
DANVERS, MASSACHUSETTS 01923
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Phase 1

JCJARCHITECTURE
JCJ Architecture, Inc.
38 Prospect Street
Hartford, CT 06103

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D.P.
J.C.

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LOWER LEVEL
AREA 4
MECHANICAL
PIPING PLAN

MP-104