

Booth Free School

14 South St.

Roxbury, CT 06783



Indoor Air Quality (IAQ) Evaluation and HVAC Systems Assessment van Zelm Project # 2024005.00 September 1, 2024

VAN ZELM HEYWOOD & SHADFORD, INC.

1200 CONVERSE STREET
LONGMEADOW, MA 01106
P: 617.218.9976

10 TALCOTT NOTCH
FARMINGTON, CT 06032
P: 860.284.5064
www.vanzelm.com

862 BRAWLEY SCHOOL ROAD, SUITE 207
MOORESVILLE, NC 28117
P: 704-799-7275

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
EVALUATION.....	2
AHSRAE-62.1, (2010) Compliance	2
Outside Air Flow and Air Change Rate Findings	3
Outside Air Flow Improvements.....	3
General Recommendations to Improve Schools Performance.....	4
Typical Equipment Upgrades.....	4
General Air Handling Unit Upgrade or Replacement.....	4
Field Study Findings & General Comments	4
CONCLUSIONS.....	5

APPENDICES

APPENDIX 1 – Ventilation Data Calculations

APPENDIX 2 – TAB Airflow Survey Data

APPENDIX 3 –Room Data Take-Off Sheet

APPENDIX 4 – Floor Plans

APPENDIX 5 – Photos

Booth Free School

INDOOR AIR QUALITY (IAQ) EVALUATION AND HVAC SYSTEMS ASSESSMENTS

EXECUTIVE SUMMARY

The following Findings Report is an overview of the heating, ventilation, and air conditioning (HVAC) systems and operations that has an impact on building ventilation and indoor air quality to support a healthy learning environment in your school. The report's focus, however, relates to occupied areas indoor ventilation and the compliance or non-compliance of this school with current ASHRAE-62.1, (2010) guidelines regarding Ventilation for Acceptable Indoor Air Quality for Schools.

Building Overview

Booth Free School is a rural public school in Roxbury, Connecticut that is part of Regional School District 12. It serves approximately 85 students in K-5.

HVAC System Overview

The building HVAC systems that were evaluated for operational performance, determination of overall condition, and included in our ventilation Testing Adjusting and Balancing (TAB) services are referenced within the attached Appendices.

Additional Information Related to HVAC Systems

The available equipment data and visual inspections indicate that all of the Air Handling Heating, Cooling, Ventilation Units and distribution equipment are in poor condition due to age.

van Zelm along with Wings Testing and Balancing performed the on-site inspections during the month of April 2024. The goal of this study is primarily focused towards addressing the operational conditions and outside air and outside air change rates of the occupied spaces. Although there are code exhaust air requirements for spaces like storage rooms, electrical rooms, mechanical rooms, etc., these spaces are often not directly ventilated with outside air, nor are they required to be since they typically have no occupancy. These non-occupied spaces typically do not affect building occupied areas as they are typically provided with some form of exhaust creating a negative pressure on the surrounding area. Unoccupied space exhaust may impact outside air infiltration into occupied areas; however, this would typically be limited and is not included in occupied spaces ventilation calculations. Should the School District pursue any Phase II activities for the building including recommissioning, balancing, and controls upgrades, these spaces could then be addressed as a component of that process.

Preliminary findings from the IAQ inspections and air-side Testing Adjusting and Balancing (TAB) to date found and documented issues that could be addressed immediately to improve building environmental control, reduce energy usage, and improve building ventilation compliance with the 2010 version of the ASHRAE-62.1, (2010) guidelines. Although there are very similar guidelines and regulations put forward by publications such as the International Mechanical Code that focuses on guidelines and directives to help achieve healthy well-ventilated buildings, the State program requires that ASHRAE-62.1, (2010) ventilation guidelines be used in this study calculations. It should be noted that often suggested changes to HVAC systems to improve ventilation could increase energy costs; in some cases, this increase could be significant. Measures should be considered that offset this additional energy use with control upgrades that adjust ventilation systems based on use and measured values. The

remainder of this report will address these concerns directly and provide a path forward for Booth Free School.

EVALUATION

For the purposes of this study, our findings address identified deficiencies or concerns related to overall school building ventilation, inherent capability of systems to achieve needed ventilation and operational performance of the site HVAC systems. Based on our findings, we offer some beneficial insight and recommendations as follows:

AHSRAE-62.1, (2010) Compliance

Our field observations indicate, most if not all of the individual occupied spaces at this school do not comply with the applicable building codes or guidelines regarding indoor air quality and outdoor ventilation.

The ideal supply of outside air to interior occupied spaces should be based upon the 2018 Connecticut Building Code, which is based on the most currently adopted 2015 International Mechanical Code and coincides with ASHRAE-62.1, (2010) guidelines. These codes and guidelines prescribe the flow rate of outside air that must be supplied mechanically to occupied areas based on occupancy classifications. Depending on the type of use of a space, outdoor air flow rates in cubic feet per minute (CFM) per person are defined when the number of occupants within a space is known. When total occupants per space are unknown, the code defines occupant density for each classification type in number of occupants per space floor area. The final flow rate in CFM for every occupied space can thus be calculated. Please note that, although this is a school, the (CFM) per person requirements for some spaces such as an office may utilize the same occupancy classification ventilation rate of a commercial office space, as the rates are the same regardless on type of building. This applies to nearly every space that is not considered a space for traditional classroom activities including, but not limited to, nurse and healthcare offices, gymnasium, assembly halls, etc.

It shall be noted that this school does not currently utilize automatic space Carbon Dioxide (CO₂) Demand Controlled Ventilation (DCV) to increase or decrease outdoor ventilation air into areas based upon CO₂ levels within the spaces. There is an absolute correlation between CO₂ levels and cubic feet per minute (CFM) of ventilation air per person that could be controlled by the Building Automation System (BAS) to meet ASHRAE 62.1 (2016) indoor ventilation requirements for schools that should be understood! The accepted formula to calculate CFM/Person utilizes: Outdoor CO₂ level in ppm, Measured Indoor CO₂ level in ppm, and CO₂ Generation Rates (CFM) for different metabolic rates by age and activity level i.e., CO₂ generation by an individual for a classroom would be lower than within an art room. Active DCV control is an acceptable alternate method to determine if ventilation requirements are met and could supersede rooms that may fail otherwise using traditional measured data collection procedures prescribed by established ASHRAE guidelines!

As an alternative to providing outside air mechanically to occupied spaces, the code and guidelines also allows for outside air to enter occupied areas naturally through operable windows. If the area of operable windows for an occupied space is at least 4% of the space's floor area, mechanical ventilation for that space is not required by code. However, although spaces with sufficient operable window area may satisfy code requirements, this is not a realistic way of providing adequate ventilation during periods of cold or hot weather, and this often adversely affects the temperature and humidity levels within the building.

The amount of outside air supplied to occupied spaces is important for occupant comfort and health because contaminants generated by people and materials in the space must be removed or they will build

up to undesirable or unhealthy levels. It should be noted that diluting interior air with outside air reduces the concentration of various airborne contaminants, including viral particles that carry the COVID-19 virus and other viral and bacterial contaminants.

Outside Air Flow and Air Change Rate Findings

By individual space area/volume measurements and ventilation air being delivered, it could then be determined if spaces conform to the requirements within codes / guidelines and the results are calculated based on individual space classification and category. Additionally, these readings should be based upon “worst case” scenario, whereby each space is considered fully occupied and the associated air handling units are operating with minimum outside air to satisfy the controlled parameters. The reason for using this method is to ensure that if a building can maintain required outside air flow in this minimum ventilation mode, it will maintain them when more outside air is introduced. It does not necessarily mean that the units will handle thermal or humidity regulation in maximum ventilation modes, which should be considered prior to any system modifications. As a caveat, it is important to understand that forcing the worst case is not necessarily typical building operation but is necessary to discover root issues behind the ventilation control of the building. It is possible that making changes regarding outside airflow may cause other issues to be revealed, which in turn may require additional analysis.

The data collected in this study will provide a quantitative conclusion about how well the building performs regarding ventilation if not using CO₂-based demand-controlled ventilation. For the occupied zones within this building, the total minimum required ventilation airflow will be calculated. The planned continuation TAB activity will attempt to determine the total delivered outside air for the best possible case by operating the units in 100% outside air mode to simulate the systems had the ability to function in this mode. Using this method along with room volumes and occupancy will reveal the potential amount of outside air is delivered to the spaces, and if it meets current ventilation codes. Note: In the case of this particular School, the current systems do not allow for this since the spaces only have exhaust systems and operable windows.

A common calculation used for measuring the amount of air that is exchanged through space every hour is the Air Change Rate (ACH), and for this analysis specifically we are concerned with the Outside Air Change Rate (OACH). At its core, this is a ratio of the volume of air that can theoretically completely fill the volume of each space and how many times it can do that every hour. For example, a 1000 ft² room with 10 ft ceilings will have a volume of 10,000 ft³. If 250 CFM is delivered to this space, that results in 15,000 ft³ of air. Every hour, the space will be flushed with that much air, resulting in an ACH of 1.5. This number on its own will not determine if a space satisfies code requirements and it does not mean that every molecule of the air in that space has been replaced after the hour, but it helps to give an idea into the type of performance that could be expected and there are guidelines for many spaces regarding the OACH. While general spaces like classrooms and offices are among the space categories that do not have outside air ACH requirements, these rates help to give some insight into overall performance. Current recommendations prescribe a total ACH of at least 3 throughout the building, without falling below the minimum outside air CFM.

Outside Air Flow Improvements

It is possible that based upon study findings some remedial action could be suggested to improve the HVAC systems’ operation and overall environmental control. These measures alone may help to ensure required outside ventilation air will be delivered to spaces that currently have a deficit and could improve overall building ventilation performance as a result. Due to the age of the building and changes over the years in occupancy, systems, and codes, considerations for HVAC redesign may be in order.

Aside from the above, since the emergence of the COVID-19 virus in December 2019, the specific requirements and precautions taken regarding outside air have become more stringent. For example, ASHRAE has been continuously investigating the transmission of COVID-19 through HVAC systems and has made recommendations on how to adapt existing HVAC systems to minimize transmission of COVID-19. Changes to building systems to address the virus also positively improve the performance of the ventilation systems with handling the filtration of other particulate that directly impacts building air quality. On April 14, 2020, ASHRAE released a document “ASHRAE Position Document on Infectious Aerosols”. ASHRAE also gave a presentation on June 16, 2020, regarding Recommendations and Activities for re-opening schools for the fall 2020 academic semester. These ASHRAE recommendations remain relevant as COVID and other contaminants that impact indoor air quality continue to remain a concern.

General Recommendations to Improve Schools Performance

Full Retro-commissioning of the building mechanical and control systems is usually recommended for energy savings and improved efficiency. Given the age of the equipment, this money would be better spent on HVAC upgrades.

Typical Equipment Upgrades

Generally, the more outside air that can be supplied to occupied areas, the better. Existing HVAC systems, where practical, should have outside air flow rates increased above current setpoints if determined required and have the ability. Even units that currently meet code requirements for ventilation flow rates could be increased if there is not a negative energy impact but should not be increased beyond the capacity of the unit to heat or cool the air. Total space air change rates (ACH) should also be increased to the extent possible along with increases in outside air flow to better remove contaminants from the air. If a unit at maximum fan speeds is still incapable of providing at least the minimum ventilation or ACH required, then the system should be evaluated further to determine the best solution such a total system modification, or the installation of a self-contained HEPA filtration unit in areas where increasing fresh air is limited.

Supplemental air cleaning technology, such as ultraviolet-C (UV-C) light or bi-polar ionization, is available but may not be viable for the existing HVAC system.

Note: the Booth Free School is currently ventilated with exhaust fans/operable windows only.

General Air Handling Unit Upgrade or Replacement

Most of the major HVAC systems in the School are beyond their useful life. HVAC Systems typically have a lifespan of 20-25 years so the Facility Staff should be applauded for their diligence in keeping these units operating for all these years.

It would be an acceptable and beneficial consideration that a complete HVAC equipment evaluation be performed to consider upgrades and replacements to improve school ventilation and help ensure reliable and efficient operation for years to come.

Field Study Findings & General Comments

General Comments:

- All dampers and linkages should be cleaned and lubricated to allow free movement and reduce potential damage to actuators or linkages. Replace damper and damper seals where necessary.
- Check heating and cooling coils for cleanliness and integrity. Clean coils as required to increase heat transfer performance.

- Unit filters should be replaced with MERV 11 or higher and changed at intervals determined by area served and equipment operation.

Detailed in the attached appendix are our high-level observations of identified equipment unit information and overall operational notations.

CONCLUSIONS

The School District clearly has taken measures to maintain the aging equipment and should be commended for keeping these systems operating and maintained. Region 12 School District may want to consider unit replacement budgeting, including measures for indoor air quality (IAQ) improvements such as adding CO2 DCV.

As the accompanying compliance spreadsheet results show, this ventilation study found that the Booth Free School does not meet the current minimum ventilation requirements per ASHRAE-62.1, (2010).

U:\2024\2024005.00\Study\02 Booth Free School-c\Final Report\01 Report-c\1 Booth Free School Report Narrative Draft 09-01-24.docx

Appendix 1

Ventilation Data Calculations



Project Name:	Region 12-Booth Free Elementary School
Project Number:	2024005.00
Scope	Ventilation Calculation by Building
Date	August 21, 2024



Zone Identification												AHSRAE-62.1, (2010) Ventilation Calculations								
Floor	Room#	Room Name	Occupancy Classification	Category	Total Airflow	Unit Actual OA %	BAS OA Damper Cond	Served By	Zone Area, Az, per space	Ceiling Height	Volume, per space	Zone Population, Pz, per space	People OA Rate in Breathing Zone, Rp	Area OA Rate in Breathing Zone, Ra	Default Occupant Density	Min. Required Ventilation Airflow	ACTUAL MEASURED VENTILATION AIR FLOW	Meets Current required airflow?	Ventilation ACH	DCV?
					(cfm)	(%)	(%)		(sq.ft)	(ft)	(cu.ft)	Adult	(cfm/ person)	(cfm/sf)	(#/1000sf)	(cfm)	(cfm)	Yes/No/N/A	(AC/hr)	Yes/No
2	103	HEALTH	Offices	Office spaces	---	---	---	---	162	12	1944	3	5.0	0.06	5	25	0	No	0.000	No
2	UL-14	PRINCIPLE	Offices	Office spaces	417 Exhaust	---	---	EF-1	207	12	2484	6	5.0	0.06	5	42	0	No	0.000	No
2	UL-15	CONFERENCE	Offices	Conference rooms	---	---	---	---	130	12	1560	4	5.0	0.06	50	28	0	No	0.000	No
2	101	OFFICE MANAGER	Offices	Office spaces	90 Exhaust	---	---	EF-3	526	9	4734	3	5.0	0.06	5	47	0	No	0.000	No
2	UL-12	STORAGE	Storage	Warehouses	---	---	---	---	82	9	738	1	0.0	0.06	0	5	0	No	0.000	No
2	111	SPEECH	Education	Classroom (ages 5-8)	---	Pneumatic Pot.	---	---	134	12	1608	1	10.0	0.12	25	26	0	No	0.000	No
2	104	GRADE 4	Education	Classroom (ages 5-8)	120 Exhaust	Pneumatic Pot.	---	EF-3	626	12	7512	14	10.0	0.12	25	215	0	No	0.000	No
2		COUNCILING	Offices	Office spaces	40 Exhaust	Pneumatic Pot.	---	EF-3	131	12	1572	2	5.0	0.06	5	18	0	No	0.000	No
2	105	GRADE 5	Education	Classroom (ages 5-8)	183 Exhaust	---	---	EF-3	639	12	7668	24	10.0	0.12	25	317	0	No	0.000	No
2	110	LIBRARY	Public Spaces	Libraries	149 Exhaust	---	---	EF-3	786	12	9432	16	5.0	0.12	10	174	0	No	0.000	No
2	109	SPANISH/MATH	Education	Classroom (ages 5-8)	38 Exhaust	Pneumatic Pot.	---	EF-3	153	9	1377	4	10.0	0.12	25	58	0	No	0.000	No
2	108	SMALL GROUP 2	Education	Classroom (ages 5-8)	44 Exhaust	Pneumatic Pot.	---	EF-3	250	9.8	2450	5	10.0	0.12	25	80	0	No	0.000	No
2	107	COMPUTER TECH LAB	Education	Computer lab	146 Exhaust	---	---	EF-3	477	12	5724	8	10.0	0.12	25	137	0	No	0.000	No
2	106	TEACHERS LOUNGE	Education	Multiuse assembly	152 Exhaust	Pneumatic Pot.	---	EF-3	340	12	4080	8	7.5	0.06	100	80	0	No	0.000	No
2	UL-10	CUSTODIAN	Storage	Warehouses	80 Exhaust	Pneumatic Pot.	---	EF-2	40	12	480	1	0.0	0.06	0	2	0	No	0.000	No
	SPARE	N/A	None	None	216 Exhaust	N/A	---	EF-2	---	---	0	---	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A
1	LL	CORRIDOR WORK AREA	Public Spaces	Corridors	---	---	---	---	158	8	1264	2	0.0	0.06	0	9	0	No	0.000	No
1	204	GRADE 1	Education	Classroom (ages 5-8)	191 Exhaust	---	---	Classroom EF	784	8.8	6899.2	26	10.0	0.12	25	354	0	No	0.000	No
1	205	GRADE 2	Education	Classroom (ages 5-8)	248 Exhaust	---	---	Classroom EF	724	8.8	6371.2	19	10.0	0.12	25	277	0	No	0.000	No
1	206	GRADE 3	Education	Classroom (ages 5-8)	226 Exhaust	---	---	Classroom EF	804	8.8	7075.2	23	10.0	0.12	25	326	0	No	0.000	No
1	203	ART/MUSIC	Education	Art Classroom	201 Exhaust	---	---	Classroom EF	790	8.8	6952	16	10.0	0.18	20	302	0	No	0.000	No
1	202	KINDERGARTEN	Education	Classroom (ages 5-8)	268 Exhaust	---	---	Classroom EF	725	8.8	6380	23	10.0	0.12	25	317	0	No	0.000	No
1	201	LLI READING	Education	Classroom (ages 5-8)	18 Exhaust	---	---	Classroom EF	168	8.8	1478.4	7	10.0	0.12	25	90	0	No	0.000	No
1	LL-20	STAGE	Education	Music/theater/dance	0 Exhaust	---	---	---	810	15	12150	10	10.0	0.06	35	149	0	No	0.000	No
1	207	GYMNASIUM	Education	Music/theater/dance	---	---	---	---	2383	20	47660	32	10.0	0.06	35	463	0	No	0.000	No
1	208	KITCHEN	Food and beverage service	Kitchens (cooking)	0 Supply/ 0 Exhaust	---	---	MAU-1 Hood EF	341	8	2728	2	0.0	0.00	0	0	0	N/A	0.000	No
1	209	COPIER	Workrooms	Copy, printing rooms	---	---	---	---	94	8	752	2	5.0	0.06	4	16	0	No	0.000	No
1		PORTABLE 1	Education	Classroom (ages 5-8)	1245 Supply	---	0.085	Portable 1 AHU	862	8	6896	9	10.0	0.12	25	193	107	No	0.931	No
1		PORTABLE 2	Education	Classroom (ages 5-8)	1158 Supply	---	0.067	Portable 2 AHU	862	8	6896	6	10.0	0.12	25	163	78	No	0.679	No
1	SPARE		None	None		---	---	---	---	---	0	---	0.0	0.00	0	N/A	N/A	N/A	N/A	No

Appendix 2

TAB Airflow Survey Data





WING'S TESTING & BALANCING CO., INC.

Booth Free Elementary Ventilation Verification Survey

* * * *

**Van Zelm Heywood & Shadford, Inc.
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032-1800**

April 17, 2024



WING'S TESTING & BALANCING CO., INC.

April 17, 2024

Van Zelm Heywood & Shadford, Inc.
Attn: Bill Donald
10 Talcott Notch Road
Farmington, CT 06032-1800

RE: Booth Free Elementary School

Dear Bill,

The ventilation verification survey of the above referenced location has been completed.

The addition to this school was built in 1959; heating is supplied by radiant heat for the entire school except the two portable classrooms. Most spaces are ventilated by exhaust fans and operable windows only. Several spaces, including the corridors, have no ventilation. A highlighted drawing has been included with this report.

The following pages are your record of current operating conditions. If you have any questions, or 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



Project Name:	Region 12 School District	Booth Free Elementary
Project Number:	2024005.00	
Scope	TAB Data	
Date	April 4, 2024	

Zone Identification							
Floor	Room#	Room Name	MEASURED CFM	Measured Min OA Flow (cfm)	BAS Min OA Flow (cfm) / Pos. (%)	Associated VAV & RTU/AHU Unit	Notes
2	103	HEALTH	---	0	---	---	No Ventilation
2	UL-14	PRINCIPLE	417 Exhaust	0	---	EF-1	Space only has exhaust air
2	UL-15	CONFERENCE	---	0	---	---	No Ventilation
2	101	OFFICE MANAGER	90 Exhaust	0	---	EF-3	Space only has exhaust air
2	UL-12	STORAGE	---	0	---	---	No Ventilation
2	111	SPEECH	---	0	---	---	No Ventilation
2	104	GRADE 4	120 Exhaust	0	---	EF-3	Space only has exhaust air
2		COUNCILING	40 Exhaust	0	---	EF-3	Space only has exhaust air
2	105	GRADE 5	183 Exhaust	0	---	EF-3	Space only has exhaust air
2	110	LIBRARY	149 Exhaust	0	---	EF-3	Space only has exhaust air
2	109	SPANISH/MATH	38 Exhaust	0	---	EF-3	Space only has exhaust air
2	108	SMALL GROUP 2	44 Exhaust	0	---	EF-3	Space only has exhaust air
2	107	COMPUTER TECH LAB	146 Exhaust	0	---	EF-3	Space only has exhaust air
2	106	TEACHERS LOUNGE	152 Exhaust	0	---	EF-3	Space only has exhaust air
2	UL-10	CUSTODIAN	80 Exhaust	0	---	EF-2	Space only has exhaust air
	SPARE		216 Exhaust	0	---	EF-2	Space only has exhaust air
1	LL	CORRIDOR WORK AREA	---	0	---	---	No Ventilation
1	204	GRADE 1	191 Exhaust	0	---	Classroom EF	Space only has exhaust air
1	205	GRADE 2	248 Exhaust	0	---	Classroom EF	Space only has exhaust air
1	206	GRADE 3	226 Exhaust	0	---	Classroom EF	Space only has exhaust air
1	203	ART/MUSIC	201 Exhaust	0	---	Classroom EF	Space only has exhaust air
1	202	KINDERGARTEN	268 Exhaust	0	---	Classroom EF	Space only has exhaust air
1	201	LLI READING	18 Exhaust	0	---	Classroom EF	Space only has exhaust air
1	LL-20	STAGE	0 Exhaust	0	---	---	The exhaust fan serving this space is not operational
1	207	GYMNASIUM	---	0	---	---	No Ventilation
1	208	KITCHEN	0 Supply/ 0 Exhaust	0	---	MAU-1 Hood EF	The MAU and kitchen hood are no longer in use and have been capped

Project Name:	Region 12 School District	Booth Free Elementary
Project Number:	2024005.00	
Scope	TAB Data	
Date	April 4, 2024	

Zone Identification							
Floor	Room#	Room Name	MEASURED CFM	Measured Min OA Flow (cfm)	BAS Min OA Flow (cfm) / Pos. (%)	Associated VAV & RTU/AHU Unit	Notes
1	209	COPIER	---	0	---	---	No Ventilation
1		PORTABLE 1	1245 Supply	107	8.50%	Portable 1 AHU	OA measured directly
1		PORTABLE 2	1158 Supply	78	6.70%	Portable 2 AHU	OA measured directly
2	UL-08	GRILS ROOM	121 Exhaust	0	---	EF-2	Space only has exhaust air
2	LAV	TEACHERS RESTROOM	55 Exhaust	0	---	EF-2	Space only has exhaust air
2	RR	OFFICE RESTROOM	72 Exhaust	0	---	EF-2	Space only has exhaust air
1	LAV	BOYS ROOM	0 Exhaust	0	---	Bathroom EF	Space only has exhaust air
1	LAV	GIRLS ROOM	0 Exhaust	0	---	Bathroom EF	Space only has exhaust air
1	S6	HOUSEKEEPING	0 Exhaust	0	---	Bathroom EF	Space only has exhaust air
1	LAV	TEACHERS BATHROOM	0 Exhaust	0	---	Bathroom EF	Space only has exhaust air

Appendix 3

Room Data Take-Off Sheet



Project Name:	Region 12		
Project Number:	2024005.00	<i>Auditor : RCM</i>	
Scope	Room Data Take-Off		
Date	April 4, 2024		

Booth Free Elementary School

Zone Identification									
Floor	Room#	Room Name	Area (SF)	Ceiling Height (FT)	Volume	People	Notes	Identified Deficiencies	Pictures
									Y /N
2	103	HEALTH	162	12	1944	3			
2	UL-14	PRINCIPLE	207	12	2484	6			
2	UL-15	CONFERENCE	130	12	1560	4			
2	101	OFFICE MANAGER	526	9	4734	3			
2	UL-12	STORAGE	82	9	738	1			
2	111	SPEECH	134	12	1608	1			
2	104	GRADE 4	626	12	7512	14			
2		COUNCILING	131	12	1572	2			
2	105	GRADE 5	639	12	7668	24			
2	110	LIBRARY	786	12	9432	16			
2	109	SPANISH/MATH	153	9	1377	4			
2	108	SMALL GROUP 2	250	9.8	2450	5			
2	107	COMPUTER TECH LAB	477	12	5724	8			
2	106	TEACHERS LOUNGE	340	12	4080	8			
2	UL-10	CUSTODIAN	40	12	480	1			
	SPARE				0				
1	LL	CORRIDOR WORK AREA	158	8	1264	2			
1	204	GRADE 1	784	8.8	6899.2	26			
1	205	GRADE 2	724	8.8	6371.2	19			
1	206	GRADE 3	804	8.8	7075.2	23			
1	203	ART/MUSIC	790	8.8	6952	16			

Appendix 4

Floor Plans





CLOHESSY
HARRIS &
KAISER, LLC

GREYSTONE COURT WEST
573 HOPMEADOW STREET
PO BOX 95
SIMSBURY, CT 06070-0095
860-651-3777
Fax 860-651-7316
chk@chkarch.com

ARCHITECTURE • INTERIOR DESIGN • FACILITIES PLANNING

Consultants

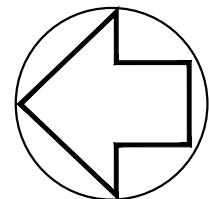
RSD 12 Booth Free School Door Survey

14 South Street
Roxbury, Connecticut

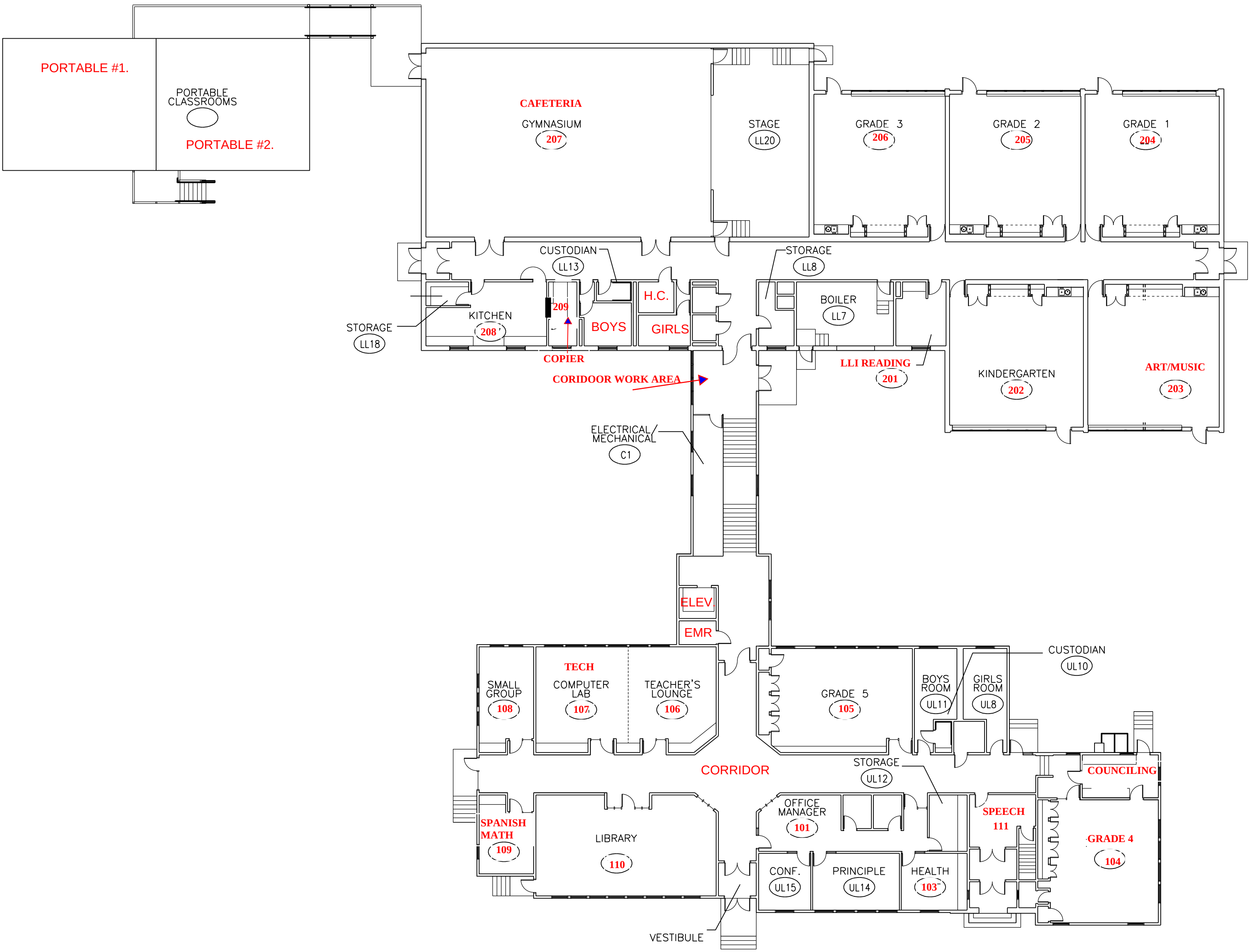
Revisions

Date 1/11/2013
Scale 1/16"=1'-0"
Project Number 13005
Drawn By DTP

DOOR SURVEY



A101a



BOOTH FREE SCHOOL KEY PLAN
SCALE: 1/16"=1'-0"

Appendix 5

Photos



