

Town of New Hartford, Connecticut
**Air Quality & HVAC
Review for New Hartford
Schools
New Hartford Elementary
School**



TOWN OF NEW HARTFORD REPORT

Prepared for:
New Hartford, CT
New Hartford Elementary School, Pine Meadow, CT 06061



Silver Petrucelli + Associates
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FACILITY HVAC CONDITIONS ASSESSMENT

BUILDING DESCRIPTION

New Hartford Elementary School is an elementary school at 40 Wickett Street in Pine Meadow Connecticut. The school is in the 5A ASHRAE climate zone. The building consists of classrooms, offices, a kitchen and a multipurpose room.

The HVAC system consists of steam boilers, radiators, fan coil units, unit ventilators, window air conditioners, and exhaust fans.

SCOPE OF WORK

Silver Petrucelli and Associates (SP+A) completed a building walkthrough and noted all systems of heating, ventilation and cooling throughout the school. The systems were assessed based on their ages, visual conditions, capacities, controls, and energy efficiencies.

The TAB contractor measured all areas of ventilation throughout the building for their outdoor air capabilities as well as their damper controls.

Based on the information gathered, and a comparison with ASHRAE 62.1, SP+A made several recommendations for consideration to increase the indoor air quality and energy efficiency of the building.

HEATING VENTILATION AND COOLING SYSTEMS

STEAM BOILERS AND HEATING

There are two (2) fuel oil fired steam boilers that serve the schools (see Photos 1 and 2: Steam Boilers).



Photo 1: Steam Boilers



Photo 2: Steam Boilers

The Burnham boiler is in good condition and the other, SP+A was informed is well beyond its useful lifespan. With proper maintenance, the typical lifespan of a cast iron boiler is about 35 years. For current consideration, SP+A recommends testing all the steam traps in the system to ensure that there is no steam leaking by.

The existing steam and condensate insulation is in poor condition as well (see Photos 1 and 2: Steam and Condensate Insulation).



Photo 1: Condensate Insulation

SP+A also recommends insulating the entire steam and condensate recovery system with insulation in compliance with energy code.

For future consideration, SP+A recommends replacing both the boilers with propane fired condensing boilers. Changing the fuel to propane can provide savings for the building and condensing boilers are more efficient than traditional cast iron boilers because they recover heat from the flue exhausts. Installing condensing hot water boilers will require the removal of all steam piping, traps and fittings as well as the installation of hot water piping and equipment.

DOMESTIC WATER HEATER

There is one (1) propane fired domestic hot water heater (see Photo 3: Domestic Hot Water Heater)



Photo 3: Domestic Hot Water Heater

The heater was manufactured in 2015 and is in good condition. The typical lifespan of a propane fired domestic hot water heater is about 10 years. SP+A recommends replacing the domestic hot water heater with a new propane fired heater and insulating the piping with code compliant insulation. The Taco hot water recirculation pumps are in fair condition. SP+A recommends replacing the hot water recirculation pumps with new pumps with electrically commutate motors (ECM). ECMs are more efficient because they have less motor losses than traditional motors.

HVAC UNITS

See Table 1 for the HVAC units in the school.

Table 1: HVAC Units

Room No.	Volume	Area	Equipment Tag	Supply Air (SA) Sum	Return Air (RA) Sum	Outside Air (OA)	Code Required Ventilation Air (OA)
Gym/Café	63124	7014	UV-1 and UV-2	832	0	329	5681
Media Center	10224	1136	-	544	0	210	349
Second Grade 10	8009	890	-	498	0	0	274
Speech and Language	8060	896	-	673	0	0	275

SP+A considered a unit insufficient if the ventilation air supplied (OA) was +/- 10 percent of the code required ventilation. All the units, including all fan coil units and unit ventilators are insufficient.

The multiple unit ventilators in the school serve offices and Gymnasium (see Photos 5 and 6: Unit Ventilator).



Photo 5: Unit Ventilator



Photo 6: Unit Ventilator

Unit ventilators are not good solutions for air quality concerns because they pull return air through the bottoms of the units and drag dust and debris across the floor. SP+A recommends removing all unit ventilators and replacing them with the proposed hot water fin tube radiation. To provide ventilation air to those spaces, SP+A recommends installing dedicated outdoor air systems (DOAS). DOAS units serve only the code required ventilation air to the classrooms and offices which is an energy efficient option that will improve the school's overall air quality. Coordination will have to be done to determine the best location for the DOAS units.

There are also various rooms that require ventilation, but they are not currently mechanically ventilated. See Table 2: Non Mechanically Ventilated Spaces.

Table 2: Non Mechanically Ventilated Spaces

Room No.	Area	Equipment Tag	Code Required Ventilation Air (OA) or Exhaust Air (EA)
Main Office	188	No Mechanical	16
Side Office	119	No Mechanical	10
Workroom	305	No Mechanical	94
Faculty Lounge	22	No Mechanical	2

Nurse	148	No Mechanical	13
Principal	134	No Mechanical	11
Speech X	134	No Mechanical	50
Special Ed X	99	No Mechanical	8
Joint Room (Est 20)	24	No Mechanical	2
School Psychologist	278	No Mechanical	24
Bridges 1	934	No Mechanical	287
Grade 2	917	No Mechanical	282
Pre-K	926	No Mechanical	285
Kindergarten	1109	No Mechanical	341
Kindergarten	1109	No Mechanical	341
First Grade	911	No Mechanical	280
Room 11 Office	144	No Mechanical	9
Hallway South Wing	1282	No Mechanical	77
Hallway East Wing	846	No Mechanical	51
Hallway North Wing	759	No Mechanical	46
Hallway West Wing	576	No Mechanical	35
Rear Exit Doorway	68	No Mechanical	4
Front Entrance Doorway	51	No Mechanical	3
Music/Art	964	No Mechanical	296
Resource Room	964	No Mechanical	296
Reading Room	947	No Mechanical	291

Since the spaces in Table 2 are not mechanically ventilated, the actual amount of outdoor air they receive cannot be definitively known. SP+A recommends mechanically ventilating all the spaces in the school with the recommended DOAS. For the Gymnasium and Kitchen, SP+A recommends installing packaged air handling units with humidity controls to ensure occupant comfort and moisture control in those spaces.

WINDOW AIR CONDITIONERS

Many of the classrooms install window air conditioners in warmer weather (see Photo 7: Window Air Conditioner).



Photo 7: Window Air Conditioner

To provide heating and introduce cooling to the building, SP+A recommends installing variable refrigerant flow (VRF) heat pumps. Heat pumps provide heating or cooling by removing or adding heat to the space depending on the system. VRF changes the flow of the refrigerant to modulate the heat transfer capability of the system depending on the heating and cooling load. Overall, VRF is an energy efficient system that will provide supplemental heating to the fin tube radiation as well as introduce cooling to the building. Provisions will have to be made for the heat pump outdoor units and their locations.

EXHAUST FANS

See Table 3 for all the rooms requiring exhaust such as restrooms and custodial closets.

Table 3: Rooms Requiring Exhaust

Room No.	Equipment Tag	Exhaust Air (EA)	Code Required Exhaust Air (EA) (per fixture for restrooms)
Handicap S RR	No Mechanical	0	50
Nurse RR	No Mechanical	83	50
Boys S	Exhaust Fan	357	50
Girls S	Exhaust Fan	307	50
Staff E	No Mechanical	0	50
Room S RR	No Mechanical	0	50
Custodian Closet E	No Mechanical	0	-
Pre-K RR	No Mechanical	0	50
Pre- K Closet	No Mechanical	0	-
Kindergarten 2 RR	No Mechanical	0	50
Pre-K Closet	No Mechanical	0	-
Kindergarten RR	No Mechanical	0	50
Custodian N	No Mechanical	0	-
RR W	No Mechanical	0	50
Custodian	No Mechanical	0	-

Many of the rooms that require exhaust have no mechanical ventilation, which is a code violation as they are to be negative pressure spaces to contain odors and gases.

Many of the existing exhaust fans are in only fair condition as well (see Photos 8 and 9 Rooftop Exhausts).



Photo 8: Rooftop Exhausts



Photo 9: Rooftop Exhausts

SP+A recommends replacing all the exhaust fans in the school to ensure that the proper spaces are negative pressure according to CT mechanical code. For all applicable exhaust fans, SP+A recommends variable speed fans that change their exhaust capacities based on what is required.

MISCELLANEOUS MEASURES

- There is some ceiling discoloration which could be a sign of a humidity issue or a leak (see Photos 10 and 11: Ceiling Discoloration).



Photo 10: Ceiling Discoloration



Photo 11: Ceiling Discoloration

SP+A recommends investigating all ceiling and wall discoloration as well as the wall peeling to determine what the source of the moisture is. Any form of moisture or humidity build up can promote the growth of microorganisms and decrease the overall quality of the air.

- The Gymnasium is missing various sections of the ceiling (see Photo 12: Gymnasium Ceiling)



Photo 12: Gymnasium Ceiling

When sections of a ceiling are missing, the particulates above the ceiling are more likely to fall into the occupied space and affect the air quality. SP+A recommends replacing all ceilings that are past their useful lifespans and ensuring the above ceiling spaces are adequately sealed.

- SP+A recommends replacing all cleaning equipment such as brooms, mops and dusters that are past their useful lifespans or are in poor condition. If the cleaning equipment does not adequately clean the rooms and furniture, it could have a negative impact on the overall indoor air quality of the building due to bacteria growth and dust accumulation.
- SP+A recommends installing hand sanitation stations throughout the school to promote a healthy environment

- SP+A recommends investigation into installing high efficiency sinks and hand dryers (see Photo 13: High Efficiency Sink and Hand Dryer).



Photo 13: High Efficiency Sink and Hand Dryer

High efficiency hand dryers (and others like it) can aid in promoting healthy indoor air quality because they filter the air for the dryer as opposed to traditional hand dryers which recirculate dirty bathroom air. They save energy because they are water efficient and dry hands faster.

- SP+A recommends the abatement of any asbestos in the school in accordance with CT standards.
- There are several radon exhausts on the roof. Per the CT Dept of Public Health, buildings should be tested for radon, and retested every 5 years if the initial measurements are less than 4.0 pCi/L. If the measurements are above the state's acceptable level then radon mitigation is required to reduce levels, and re-evaluation is performed every 2.5 years. Test for radon and take corrective action as needed.
- SP+A recommends investigating if there is adequate sealing for windows and door sweeps for exterior doors to help control the amount of moisture and bugs that get into the building.

APPENDICES

The following documents attached in order are:

- HVAC data
- Ventilation Survey
- EPA Checklists



Environmental Testing & Balancing, Inc.
154 State Street Suite 204
North Haven Connecticut 06473
(203) 234-2089 Fax (203) 234-2147

CERTIFIED TESTING and BALANCING REPORT

Date: November 6, 2024

Project: New Hartford Elementary School
HVAC Survey

Address: 40 Wickett Street
Pine Meadow
Connecticut

HVAC Contractor: Enviro-Med Services, Inc.

The data presented in this report is a record of system measurements and final adjustment that have been obtained in accordance with the current edition of the NEBB *Procedure Standard for Testing, Adjusting and Balancing of Environmental Systems*. The measurements shown, and the information presented in this report, are certified to be accurate and complete, at the time and date information was gathered. Any variances from design quantities, which exceed NEBB tolerances, are noted in the TAB report project summary.

Submitted and Certified by:
NEBB Professional Michael R. DeZinno



Environmental Testing & Balancing, Inc.
Registration No.: 2968



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Glossary

Abbreviation	Meaning	Abbreviation	Meaning
" W.G.	(measured in) Inches Water Gauge	MBH	Thousand BTUs per Hour
A/C	Air Changes per Hour	MIN	Minimum
AF	Air Foil	MVD	Manual Volume Damper
AFMS	Air Flow Monitoring (Measuring) Station	N/A	Not Applicable, Not Available
AHU	Air Handling Unit	N/ACC	No Reasonable Access
AMP(S)	Amperage(s)	NDI	No Damper Installed
BD	Balancing Damper	NF	No Flow
BHP	Brake Horsepower	NG	Not Given
BLNC	Balance	No.	Number
BTU	British Thermal Unit	NPSH	Net Positive Suction Head
BTUh	BTU per Hour	NPSHA	Net Positive Suction Head Available
BV	Balancing Valve	NPSHR	Net Positive Suction Head Required
CD	Ceiling Diffuser	OA	Outside Air
CEF	Ceiling Exhaust Fan	OBD	Opposed Blade Damper
CF	Correction Factor	OD	Outside Diameter
CF for DDC	BMS Correction Factor	OED	Open End Duct
CFLA	Corrected Full Load Amperage	P	Pump
CFM	Cubic Feet per Minute	PD	Pressure Drop
CH	Chiller	PH	Phase
CHWC, CC	Chilled Water Coil, Cooling Coil	PP	Pressure Port
CONFIG	Configuration	PSI	Pounds per Square Inch
CS	Circuit Setter	PSIA	Pounds per Square Inch Absolute
CT	Cooling Tower	PSIG	Pounds per Square Inch Gauge
CV	Constant Volume	QTY	Quantity
dB	Decibel	RA	Return Air
DB	Dry Bulb	RAF	Return Air Fan
DFC	Damper Fully Closed	RCP	Radiant Ceiling Panel
Dia	Diameter	RECT	Rectangular
dP, DP	Differential Pressure	Req'd	Required
DWO	Damper Wide Open	RG	Return Grille
EA	Exhaust Air	RGD(s)	Register(s), Grille(s), Diffuser(s)
EADB	Entering Air Dry Bulb	RHC	Reheat Coil
EAT	Entering Air Temperature	Rm Press	Room Pressure
EAWB	Entering Air Wet Bulb	RND	Round
EF	Exhaust Fan	RP	Radiant Panel
EG	Exhaust Grille	RPM	Revolutions per Minute
ER	Exhaust Register	RR	Return Register
ESP	External Static Pressure	RTU	Roof Top Unit
EWT	Entering Water Temperature	RVA, RV	Rotating Vane Anemometer
EX / EXH	Exhaust	SA	Supply Air
F	Fahrenheit	SD	Supply Diffuser

FCU	Fan Coil Unit	SL	Slot
FD	Fire Damper	SNRKL	Snorkel
FH	Flow Hood	SP	Static Pressure
FLA	Full Load Amperage	TADBF	Total Air Delivered by Fan
FPM	Feet per Minute	TB	Terminal Box
GPM	Gallons per Minute	TD	Temperature Differential
HP	Horsepower	TDH	Total Dynamic Head
HWC, HC	Hot Water Coil, Heating Coil	TEMP	Temperature
HX	Heat Exchanger	TF	Thermafuser
HZ	Hertz	TP	Thermally Protected
kW	Kilowatt	TRAV/TRV	Traverse
LADB	Leaving Air Dry Bulb	TSP	Total Static Pressure
LAT	Leaving Air Temperature	V	Volt(s) / Voltage
LAWB	Leaving Air Wet Bulb	VAV	Variable Air Volume
LD	Linear Diffuser	VD	Volume Damper
LS	Linear Slot	VEL	Velocity
LWT	Leaving Water Temperature	VFD	Variable Frequency Drive
MA	Mixed Air	VG	Velgrid
MAU, MUA	Make-Up Air Unit	WB	Wet Bulb
MAX	Maximum		

Notes

Measuring with Flow Hood (referencing Air Outlet Test Sheets and Grille, Register & Diffuser Test Sheets):

Registers, diffusers and grilles are read directly in CFM. (Report program indicates 1.00 in Ak Factor column.)

Measuring in Velocity (referencing Air Outlet Test Sheets and Grille, Register & Diffuser Test Sheets):

Ak Factor indicates actual area of registers, following multiplying the Ak by the area equals the actual free area; therefore CFM is calculated and based on this factor (FPM x Ak).

Codes (referencing Air Outlet Test Sheets and Grille, Register & Diffuser Test Sheets):

If codes are not listed here, please reference design drawings.

ENVIRONMENTAL TESTING & BALANCING, INC.

New Hartford Elementary School HVAC Survey

Remarks

November 6, 2024

Room 21, Room 21 Ext

FCUs serving these rooms were not operating at the time of testing.

General Note

Rooms identified as "No Mech" on the Room Air Change Report have no mechanical ventilation.

FCU Rooms 9 and 10

Outside air has been blocked off due to control issues.

GRILLE, REGISTER & DIFFUSER TEST SHEET

Job Name: New Hartford Elementary School HVAC Survey

Tested by: Mike DeZinno November 6, 2024 (24082N)

Outlet Number	Room Number	Code	Size	"Ak" Factor	Required		First Test	New Req'd	fpm/cfm Reading	Final cfm
					fpm	cfm				
Exhaust										
1	Boys S	EG	7"x7"	1.00	0	N/A	209		209	209
2	Boys S	EG	7"x7"	1.00	0	N/A	148		148	148
										357
Exhaust										
1	Girls S	EG	7"x7"	1.00	0	N/A	179		179	179
2	Girls S	EG	7"x7"	1.00	0	N/A	128		128	128
										307
Exhaust										
1	Nurse RR	EG	7"x7"	1.00	0	N/A	83		83	83
Exhaust										
1	Staff E	EG	7"x7"	1.00	0	N/A	0		0	0
Exhaust										
1	Bridges 1	EG	7"x7"	1.00	0	N/A	0		0	0
Exhaust										
1	Pre-K 3 RR	EG	7"x7"	1.00	0	N/A	0		0	0
Exhaust										
1	Kndrgrtn 2 RR	EG	7"x7"	1.00	0	N/A	0		0	0
Exhaust										
1	RR W	EG	7"x7"	1.00	0	N/A	0		0	0
Exhaust										
1	Handicap S RR	EG	7"x7"	1.00	0	N/A	78		78	78

GRILLE, REGISTER & DIFFUSER TEST SHEET

Job Name: New Hartford Elementary School HVAC Survey
Tested by: Mike DeZinno November 6, 2024 (24082N)

[illegible]

New Hartford Elementary School HVAC Survey

Mike DeZinno November 6, 2024 (24082N)

Pro-Calibration, LLC
440 North St. Suite 204
North Haven, CT 06467
Calibration Certificate

Manufacturer: MOHARCH INSTRUMENTS CUSTOMER: Environmental Testing & Bearing
Model: 182100 154 State St. Suite 204
Serial Number: 182100 North Haven, CT 06467
Asset Number: 182100

Pro-Calibration, LLC certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced instrument's performance manual. It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted reference standards, or derived by the use of type of self-calibrating techniques. This calibration complies with ANSI Z39.1-2006 and/or ISO/IEC 17025:2005. (This report may be reproduced, except in full, without permission for the publication of an approved abstract is obtained in writing from the calibration organization.)

Calibration Information			
Cal Date	4 Apr 2024	Temperature	21.0°C
Next Cal Due	4 Apr 2025	Humidity	45%
Cal Procedure	Manufacturer Specifications	Test Result	✓

Remarks:

Calibration used for calibration:

Asset Number	Description	Cal Date	Due Date
010001	PRO CAL-100 LIGHT SOURCE	08 Nov 2024	08 Nov 2025
010002	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025

Signature: *[Signature]*

PRINTED ON: 4 Apr 2024 Certificate Number: ETB-076171228088 Page 1 of 1

Pro-Calibration, LLC
440 North St. Suite 204
North Haven, CT 06467
Calibration Certificate

Manufacturer: FLUKE CUSTOMER: Environmental Testing & Bearing
Model: 5171 154 State St. Suite 204
Serial Number: 3816333 North Haven, CT 06467
Asset Number: 1708-016

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Calibration Information			
Cal Date	17 Oct 2023	Temperature	17.0°C
Next Cal Due	17 Oct 2024	Humidity	45%
Cal Procedure	Manufacturer Specifications	Test Result	✓

Remarks:

Calibration used for calibration:

Asset Number	Description	Cal Date	Due Date
010001	PRO CAL-100 LIGHT SOURCE	08 Nov 2024	08 Nov 2025
010002	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025

Signature: *[Signature]*

PRINTED ON: 17 Oct 2023 Certificate Number: ETB-076171228088 Page 1 of 1

Pro-Calibration, LLC
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North Haven, CT 06467
Calibration Certificate

Manufacturer: DCCOMM CUSTOMER: Environmental Testing & Bearing
Model: 182100 154 State St. Suite 204
Serial Number: 182100 North Haven, CT 06467
Asset Number: 182100

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Calibration Information			
Cal Date	11 Oct 2023	Temperature	21.0°C
Next Cal Due	11 Oct 2024	Humidity	45%
Cal Procedure	Manufacturer Specifications	Test Result	✓

Remarks:

Calibration used for calibration:

Asset Number	Description	Cal Date	Due Date
010001	PRO CAL-100 LIGHT SOURCE	08 Nov 2024	08 Nov 2025
010002	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025
010003	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025
010004	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025
010005	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025

Signature: *[Signature]*

PRINTED ON: 11 Oct 2023 Certificate Number: ETB-076171228088 Page 1 of 1

PRO-CALIBRATION, LLC
440 North St. Suite 204
North Haven, CT 06467
Calibration Certificate

Manufacturer: DCCOMM CUSTOMER: Environmental Testing & Bearing
Model: 182100 154 State St. Suite 204
Serial Number: 182100 North Haven, CT 06467
Asset Number: 182100

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Calibration Information			
Cal Date	11 Oct 2023	Temperature	21.0°C
Next Cal Due	11 Oct 2024	Humidity	45%
Cal Procedure	Manufacturer Specifications	Test Result	✓

Remarks:

Calibration used for calibration:

Asset Number	Description	Cal Date	Due Date
010001	PRO CAL-100 LIGHT SOURCE	08 Nov 2024	08 Nov 2025
010002	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025
010003	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025
010004	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025
010005	HEWLETT PACKARD 105A GENERATOR	11 Jan 2024	11 Jan 2025

Signature: *[Signature]*

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