



December 18, 2023

Mr. Chip Clunie, Director of Facilities & Grounds  
Nantucket Public Schools  
10 Surfside Road  
Nantucket, MA 02554

**Re: Limited IAQ Assessment**  
Nantucket High School  
10 Surfside Road  
Nantucket, MA 02554  
**VERTEX Project No. 92963**

Dear Mr. Clunie:

The Vertex Companies, LLC (VERTEX) is pleased to provide this letter report pertaining to the Limited Indoor Air Quality (IAQ) Assessment conducted by VERTEX within the Nantucket High School located in Nantucket, MA (herein referred to as the "Site").

Our assessment included a limited site inspection to document current conditions related to moisture intrusion and potential mold growth. VERTEX also deployed short-term radon sampling canisters to screen for indoor airborne radon concentrations within the school. The following provides a site description and background information, a limited air quality assessment and visual suspect fungal growth survey summary, and our conclusions and recommendations.

## **1.0 SITE DESCRIPTION AND BACKGROUND**

The limited assessment included an inspection of the interior areas at the school. VERTEX did not inspect the roof area as part of the assessment. Interior finish materials generally included vinyl composite flooring or carpet, painted gypsum walls and acoustical drop ceiling tiles. Heating and ventilation to the classrooms are generally provided by individual unit ventilators. Outdoor fresh air is generally adjusted through the automated building management system. MERV 10 filters were observed in several of the units inspected. According to the site contact, the filters are replaced periodically, every six (6) months by a qualified subcontractor. The last replacement of filters was reportedly conducted in September 2023. Mini-splits with heat pumps were observed in several rooms as a supplement for additional heating and/or cooling. Filters on the mini-splits are reportedly cleaned every six (6) months. Air-handler units (AHU) provide heating and ventilation for the two Gyms, Auditorium, Cafeteria and Administration offices. Limbach or Trane are reportedly contracted to provide routine maintenance for the AHUs or other mechanical services for the school.

VERTEX was retained by the Nantucket Public School District, to conduct a limited indoor air quality assessment within school and document current conditions.

## **2.0 LIMITED AIR QUALITY ASSESSMENT AND VISUAL MOLD SURVEY**

On December 6, 2023, VERTEX representative, Jason Mohre, conducted limited indoor air quality sampling and a visual assessment. Please refer to the below for a summary of our observations. Please refer to the attached Photographic Documentation page for a depiction of conditions observed at the time of our inspection:

- Water-Based Acrylic Paint and Oil-Based Paint storage in the classroom cabinets within the lower-level Art Room. No concerns were noted regarding storage of the paint. (See Photo 1 and Photo 2).
- Ejector pit area observed in Room 015 within the lower level at the school. Ejector pit was observed to be properly covered (See Photo 3).
- Water staining was observed on several ceiling tiles within the main office area. (See Photo 4). In addition, suspect mold growth was observed on one of water-stained ceiling tile(See Photo 4). Further inspection above the drop ceiling tiles did not indicate active leaks in plumbing or the roof. Uninsulated mechanical duct work was observed directly above the water-stained ceiling tiles. (See Photo 5).
- Heavy oxidation(rust) /water damage was observed on a ventilation register within Room 106A. (See Photo 6).
- Water staining was observed on two ceiling tiles within the Room 201 (See Photo 7). Further inspection above the drop ceiling tiles did not indicate active leaks in plumbing or the roof (See Photo 7). According to the site contact, there appears to be a roof leak that can not be located on the roof area and water intrusion events only are observed during heavy wind driven rain events.
- Particulate accumulation was observed on a ventilation register within Room 204 (See Photo 9).
- Heavy oxidation(rust) /water damage was observed on a ventilation register within Room 208. (See Photo 10).
- Unit-vent supply blocked with foldable table within Room 213 (See Photo 11).
- Areas of suspect visible mold growth throughout the remainder of the school was not observed at the time of assessment.
- Inspection of the filters within the wall mounted uninvents indicated a Merv-10 rating and were dated September 2023 (See Photo 12, 13 and 14).

To assess general indoor air quality parameters within the school, VERTEX utilized a calibrated TSI Q-Track Plus to obtain real-time temperature, relative humidity, carbon dioxide and carbon monoxide readings. In addition, VERTEX also utilized a calibrated MiniRAE Photo Ionization Detector (PID) to obtain real-time Total Volatile Organic Compounds (TVOC) readings. Such parameters can assist with identification of conditions that may be supportive of human comfort

within a building space. Additional readings were obtained from the exterior of the school (ambient) for comparison purposes. The readings are outlined in Table 1 below:

**Table 1 – Indoor Air Quality Parameters (December 6, 2023)**

<b>Location</b>	<b>Time</b>	<b>Carbon Dioxide (CO<sub>2</sub>) (ppm)</b>	<b>Temperature (Fahrenheit)</b>	<b>Relative Humidity (%)</b>	<b>Carbon Monoxide (CO) (ppm)</b>	<b>Total Volatile Organic Compounds (TVOCs) (ppm)</b>
Exterior (Ambient)	0955	381	57.9	53.4	0.1	0.0
Tech Office (LL)	1005	1050	74.1	40.5	0.0	0.0
001	1007	820	75.2	41.1	0.0	0.0
Teachers' Lounge	1007	724	75.5	39.9	0.0	0.0
002	1011	504	76.2	36.9	0.0	0.0
004	1017	497	73.7	38.2	0.0	0.0
006	1020	1120	74.1	46.5	0.0	0.0
003	1022	757	75.2	44.5	0.0	0.0
005	1024	641	76.6	38.8	0.0	0.0
008	1031	693	77.2	33.4	0.0	0.0
010	1034	1056	77.4	32.5	0.0	0.0
007	1043	696	74.8	35.3	0.0	0.0
009	1045	553	73.5	39.1	0.0	0.0
011	1047	756	74.2	41.0	0.0	0.0
013	1051	501	71.5	42.8	0.0	0.0
015	1100	625	71.3	41.2	0.0	0.0
Lower Level Corridor	1102	697	72.9	41.6	0.0	0.0
LGI	1110	330	71.7	43.2	0.0	0.0
102	1112	1508	73.9	43.4	0.0	0.0
103	1114	850	75.4	36.7	0.0	0.0
105	1117	510	73.6	33.4	0.0	0.0
104	1120	1146	77.0	41.9	0.0	0.0
104B	1122	960	75.9	40.2	0.0	0.0
107	1124	580	75.7	39.6	0.0	0.0
106	1128	1353	76.9	44.2	0.0	0.0
106A	1131	499	76.2	37.6	0.0	0.0
117B	1133	610	76.1	35.2	0.0	0.0
115	1137	636	75.6	35.7	0.0	0.0
111	1140	632	76.1	34.3	0.0	0.0
109A	1142	518	74.3	36.1	0.0	0.0
1 <sup>st</sup> Floor Tech Office	1145	719	74.5	39.1	0.0	0.0
Music Room	1150	704	74.6	39.5	0.0	0.0
ARR	1152	623	74.2	38.4	0.0	0.0

**Table 1 – Indoor Air Quality Parameters (December 6, 2023)**

Location	Time	Carbon Dioxide (CO <sub>2</sub> ) (ppm)	Temperature (Fahrenheit)	Relative Humidity (%)	Carbon Monoxide (CO) (ppm)	Total Volatile Organic Compounds (TVOCs) (ppm)
Gym	1157	625	75.3	45.7	0.0	0.0
Main Office	1200	578	76.3	38.1	0.0	0.0
Auditorium	1204	388	72.2	35.6	0.0	0.0
Cafeteria	1210	1083	75.8	42.3	0.0	0.0
Auto Shop	1215	460	73.1	38.2	1.0	1.6
Landscape Shop	1221	516	70.7	40.1	0.0	0.0
Wood Shop	1224	413	74.5	39.9	0.0	0.0
202	1228	836	75.2	38.3	0.0	0.0
201	1231	1155	75.3	39.9	0.0	0.0
203	1234	605	76.1	41.1	0.0	0.0
205	1236	710	76.6	37.5	0.0	0.0
204	1238	540	73.3	39.4	0.0	0.0
207	1244	441	73.2	36.4	0.0	0.0
206	1246	635	71.7	42.7	0.0	0.0
209	1248	501	74.2	37.3	0.0	0.0
211	1251	697	75.1	38.1	0.0	0.0
213	1253	900	76.9	40.7	0.0	0.0
215	1256	764	74.1	40.1	0.0	0.0
208	1258	528	74.6	39.1	0.0	0.0
217	1301	720	74.1	39.4	0.0	0.0

(1) ppm = Parts per Million

(2) ASHRAE 55 Guidance Value for human comfort – Temperature ranging from 67 to 82 degrees Fahrenheit

(3) ASHRAE 62.1 – Relative Humidity below 65% to preclude mold growth

(4) EPA 402-K-01-001 – Relative Humidity ranging from 30 to 60%

(5) ASHRAE– Carbon Dioxide-Ambient + 700 ppm

(6) ASHRAE– Carbon Monoxide -9 ppm

Based on the limited IAQ assessment performed by VERTEX on December 6, 2023, general IAQ parameters appeared to be within the acceptable human comfort range for temperature, Relative Humidity, Carbon Dioxide (CO<sub>2</sub>) and Carbon Monoxide (CO) as per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Guidance values in most areas within the school. CO<sub>2</sub> concentrations recorded in Rooms 006, 102, 106 and 201 were above the ASHRAE Guidance value (Ambient (381 ppm) + 700 ppm).



### **Short term Radon Screening**

The site building is located within a Zone 2 radon area, meaning that the predicted average indoor radon level is greater than 1 pCi/L and less than 4 pCi/L. The United States Environmental Protection Agency (USEPA) action level for radon is 4 pCi/L.

VERTEX collected short-term (48-72 hour) radon samples using laboratory supplied short-term canister testing devices samples within the site building. The testing devices were placed in three separate locations of the lowest level of the school building (the lowest level in contact with the ground surface).

For quality control purposes one (1) duplicate sample was collected for each location within site building and was included with the shipment of samples for analysis. Duplicate samples indicated a generally good correlation (20% or lower<sub>1</sub>) between samples were non-detect above the laboratory reporting limit. Therefore, VERTEX considers the data set to above representative measurement of short-term radon concentrations during the time period of the sample collection. Please refer to Attachment, which includes the laboratory analytical results.

Based on review of the analytical results, radon was not detected above the US EPA action level (> 4 pCi/L) within the site building.

### **3.0 CONCLUSIONS AND RECOMMENDATIONS**

On December 6, 2023, VERTEX performed a Limited IAQ and visual assessment to document current conditions within the Nantucket High School. Based on observations noted during the assessment, VERTEX concludes the following:

- Water staining was observed on several ceiling tiles within the main office area. In addition, suspect mold growth was observed on one of water-stained ceiling tile(See Photo 4). Further inspection above the drop ceiling tiles did not indicate active leaks in plumbing or the roof. Uninsulated mechanical duct work may sweat during cooling season which has resulted the water-stained ceiling tiles directly below.
- Heavy oxidation(rust) /water damage was observed on a ventilation register within Rooms 106A and 208. This may be due to wind driven rain events which may cause water intrusion into the ventilation system resulting in the observed conditions.
- Water staining was observed on two ceiling tiles within Room 201 (See Photo 7). Further inspection above the drop ceiling tiles did not indicate active leaks in plumbing or the roof (See Photo 7). According to the site contact, there appears to be a roof leak that can not be located on the roof area and water intrusion events are only observed during heavy wind driven rain events.
- Particulate accumulation was observed on a ventilation register within Room 204.
- Unit-vent supply blocked with foldable table within Room 213.

- General IAQ parameters appeared to be within the acceptable human comfort range for temperature, Relative Humidity, CO<sub>2</sub>, CO as per the ASHRAE Guidance values in most areas within the school. CO<sub>2</sub> concentrations recorded in Rooms 006, 102, 106 and 201 were above the ASHRAE Guidance value (Ambient (381 ppm) + 700 ppm).
- Based on review of the analytical results, radon was not detected above the US EPA action level (> 4 pCi/L) within the site building.

Based on the findings of the limited indoor air quality assessment at the Nantucket High School VERTEX suggests the following:

- Remove and replace water-stained ceiling tiles within the Main Office Area and Room 201.
- Ensure that all supply diffusers and return air grills and covers are cleaned on a regular basis such that they are free of dust, debris, or obstructions.
- Increase fresh air intake and ventilation within Rooms 006, 102, 106 and 201 when occupied.
- Inspect and repair, if needed, the roof top ventilation system that serves Rooms 106A and 208 to prevent potential future water intrusion events.

#### **4.0 LIMITATIONS**

Professional opinions presented in this report are based on information made available to VERTEX either by review of data provided by others or data obtained by VERTEX personnel.

VERTEX affirms that data gathered and presented by VERTEX in this report was collected in an appropriate manner in accordance with generally accepted methods and practices. VERTEX cannot be responsible for decisions made by our client solely on the basis of economic factors.

Real-time readings, mold conditions and observations are subject to the day and time in which they were observed and/or in which samples were obtained. Conducting a mold inspection and subsequent mold remediation do not guarantee the eradication of all airborne fungal amplifiers (which may/may not be a natural intrusion from outdoor air), surface colonies, or mold producing conditions within any given space.

Conditions described in this report are found at the time of the investigation, unless otherwise stated. Changes in conditions which affect the potential for moisture intrusion can occur over time. Should additional information become available which would affect the status of this report, we reserve the right to amend our opinions and professional judgments.

VERTEX appreciates the opportunity to provide support to Nantucket Public School District on this project. Please do not hesitate to contact the undersigned at (781) 952-6000 should you have any questions regarding this report or if we can be of further assistance. Thank you.

Sincerely,

**The Vertex Companies, LLC**



Jason Mohre  
Project Lead



Thomas D. Koch, CIH MS WELL AP  
Vice President, Industrial Hygiene and ESH Services

Attachments –

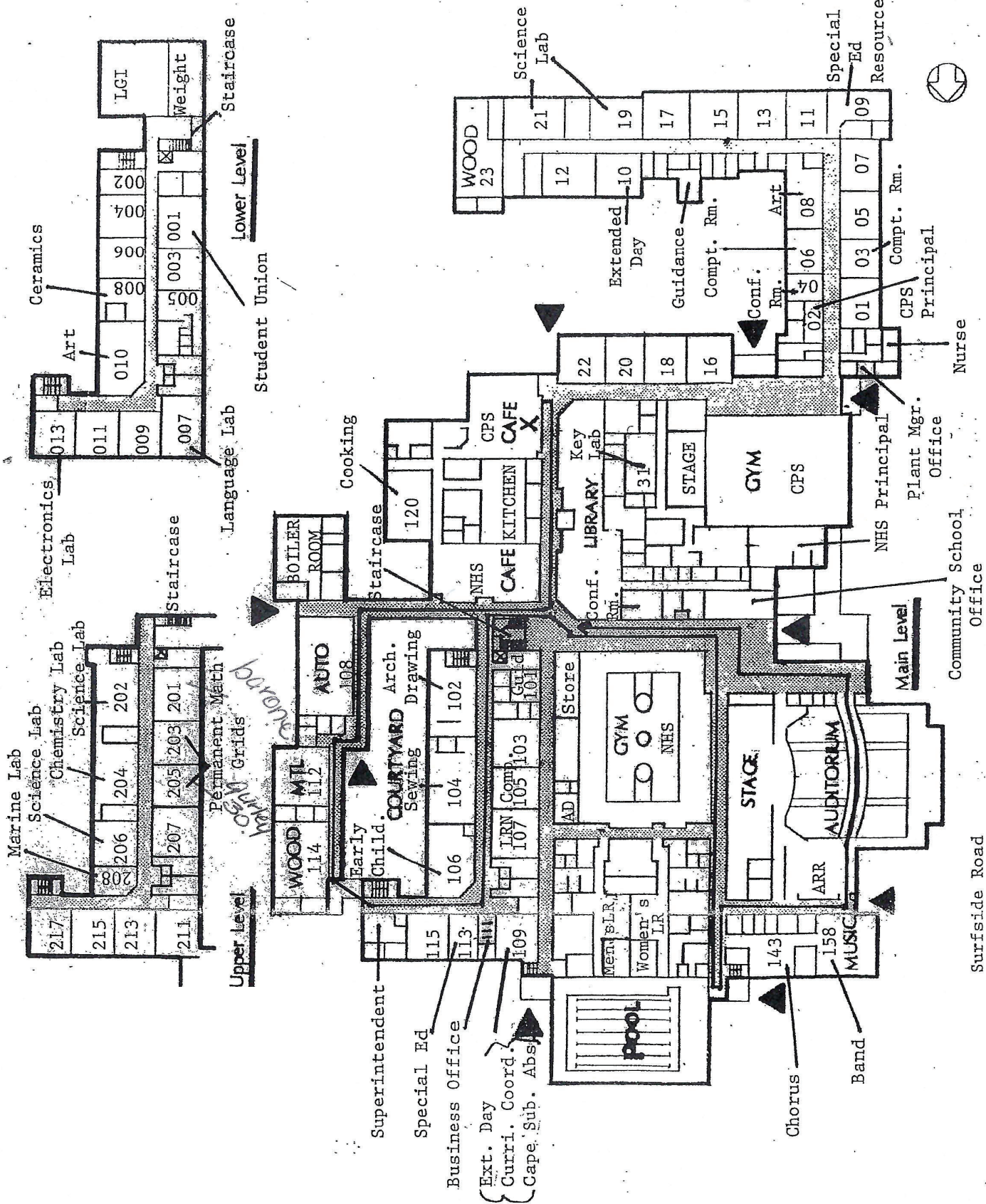
Floor Plan

Photographic Documentation Log

Short-Term Radon Laboratory Results

## Floor Plan

# CYRUS PEIRCE MIDDLE SCHOOL



# NANTUCKET HIGH SCHOOL

## Photographic Documentation



## ATTACHMENT A:

1

### PHOTOGRAPHIC DOCUMENTATION

#### Photograph: 1

##### Description:

Photograph depicts general view of Paint Storage in the lower Level Art Room.



#### Photograph: 2

##### Description:

Photograph depicts general view of Paint Storage in the lower Level Art Room.



## ATTACHMENT A:

2

### PHOTOGRAPHIC DOCUMENTATION

#### Photograph: 3

##### Description:

Photograph depicts general view of Ejector Pump within Room 015.



#### Photograph: 4

##### Description:

Photograph depicts general view of water stained ceiling tiles and suspect visible mold growth within the Main Office Area.





## PHOTOGRAPHIC DOCUMENTATION

**Photograph: 5****Description:**

Photograph depicts general view of uninsulated mechanical duct and visible suspect mold growth above the water stained ceiling tile area within the Main Office area.

**Photograph: 6****Description:**

Photograph depicts general view of the heavy oxidation on the ventilation register within Room 106A.



## PHOTOGRAPHIC DOCUMENTATION

**Photograph: 7****Description:**

Photograph depicts general view of the water-stained ceiling tiles within Room 201.

**Photograph: 8****Description:**

Photograph depicts general view of area above water-stained ceiling tile within Room 201.





## PHOTOGRAPHIC DOCUMENTATION

### Photograph: 9

#### Description:

Photograph depicts general view of particulate accumulation on ventilation register within Room 209.



### Photograph: 10

#### Description:

Photograph depicts general view of the oxidation on the ventilation register within Room 208.



## ATTACHMENT A:

6

### PHOTOGRAPHIC DOCUMENTATION

#### Photograph: 11

##### Description:

Photograph depicts general view of folding table on and restricting uninvent air supply.



#### Photograph: 12

##### Description:

Photograph depicts general view of typical classroom uninvent.





## ATTACHMENT A:

7

### PHOTOGRAPHIC DOCUMENTATION

#### Photograph: 13

##### Description:

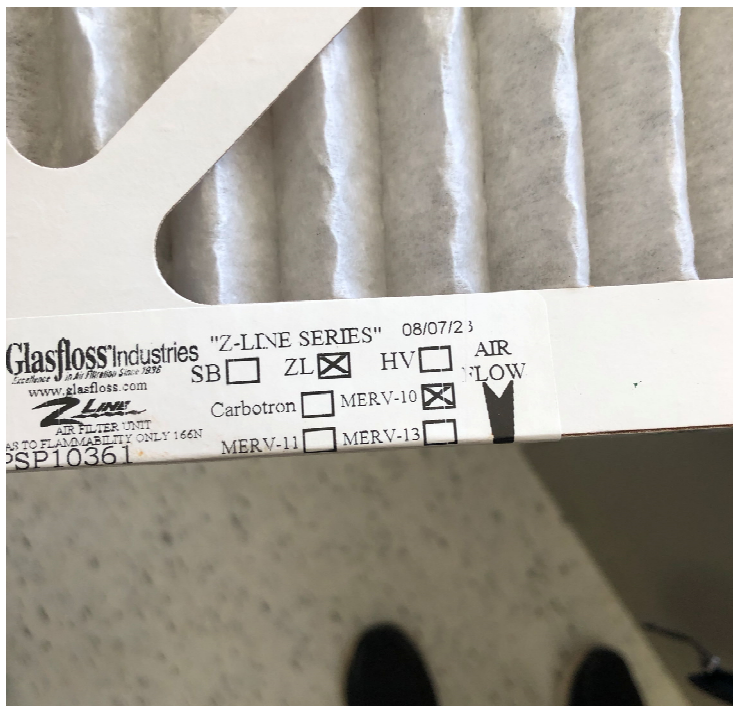
Photograph depicts general view of the condition of the typical filter for the unit-ventilator.



#### Photograph: 14

##### Description:

Photograph depicts general view of typical filter specifications.



## **Short-Term Radon Screening Laboratory Results**

NELAC NY 11769  
NRPP 103216 AL  
NRSB ARL0017EPA Method #402-R-92-004  
Liquid Scintillation  
NRPP Device Code 8088  
NRSB Device Code 12193

## Laboratory Report for:

## Property Tested:

VERTEX  
400 Libbey Parkway  
Weymouth MA 02189Nantucket High School (NHS)  
10 Surfside Rd.  
Nantucket MA 02554

Log Number	Device Number	Test Exposure Duration:				Area Tested	Result pCi/L
8460277	4926496	12/04/2023	10:05 am	12/07/2023	7:25 am	Bldg. NHS Lower Level Tech Office	< 0.4
8460278	4926497	12/04/2023	10:05 am	12/07/2023	7:25 am	Bldg. NHS Lower Level Tech Office	< 0.4
8460279	4926494	12/04/2023	10:29 am	12/07/2023	7:29 am	Bldg. NHS Lower Level Room 003	< 0.4
8460280	4926495	12/04/2023	10:29 am	12/07/2023	7:29 am	Bldg. NHS Lower Level Room 005	< 0.4
8460281	4926505	12/04/2023	10:53 am	12/07/2023	7:32 am	Bldg. NHS Lower Level Room 015	0.5
8460282	4926506	12/04/2023	10:53 am	12/07/2023	7:32 am	Bldg. NHS Lower Level Room 015	0.7

**Comment:** A copy of this report was emailed to jmohre@vertexeng.com.

Test Performed By: Placed: J Mohre

Distributed by: VERTEX

Date Received: 12/08/2023 Date Logged: 12/08/2023 Date Analyzed: 12/09/2023 Date Reported: 12/11/2023

Report Reviewed By: Report Approved By: **Disclaimer:**

The counting uncertainty of this radon measurement is +/- 10 %. Factors contributing to uncertainty include statistical variations, daily and seasonal variations in radon concentrations, sample collection techniques and operation of the dwelling. Interference with test conditions may influence the test results.

This report may only be transferred to a third party in its entirety. Laboratory personnel were not involved in the placement or retrieval of the samples. Analytical results relate to the samples as received by the laboratory. Results shown on this report represent levels of radon gas measured between the dates shown in the room or area of the site identified above as "Property Tested". Incorrect information will affect results. The results may not be construed as either predictive or supportive of measurements conducted in any area of this structure at any other time. AccuStar Labs, its employees and agents are not responsible for the consequences of any action taken or not taken based upon the results reported or any verbal or written interpretation of the results.