



Monomoy Regional Middle School Air Quality Testing Report

Reason for Testing: Concern around perceived dampness

Date: October 27, 2023

Description: Limited indoor air quality sampling and a visual assessment.

Conducted By: Vertex Companies LLC

Summary of Findings: General IAQ parameters appeared to be within acceptable human comfort range for temperature and Carbon Dioxide, and humidity was higher than recommended levels to minimize mold growth. Water damage was observed, but areas of suspected visible mold growth were not observed.

District Response: Removal and replacement of water-damaged materials (internal/external), and HVAC maintenance and repairs, increased use of dehumidifiers.



November 7, 2023

Mr. Rick Travers
Monomoy Regional School District
425 Crowell Road
Chatham, Massachusetts 02633

Re: **Limited Indoor Air Quality Assessment**
Monomoy Regional Middle School
425 Crowell Road
Chatham, Massachusetts 02633
VERTEX Project No. 92262

Dear Mr. Travers:

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 Monomoy Regional Middle School located in Chatham, MA (herein referred to as the "Site").

Our assessment included a limited site inspection to document current conditions. 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 and exterior 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, walls and acoustical drop ceiling tiles. Exterior finish materials included wood siding shingles and painted wood trim board. 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. According to the site contact, the dampers are currently adjusted to allow 35 % intake of outdoor air. MERV 8 filters were observed in several of the units inspected. According to the site contact, the filters are replaced periodically, every six (6) months. The last replacement of filters was reportedly conducted in September 2023. Mini-splits with heat pumps were observed in several classrooms as a supplement for additional heating and/or cooling. Filters on the mini-splits are reportedly cleaned in-house 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 Monomoy Regional 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 October 27, 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 staining was observed on a ceiling tile above the window area within Room E113. (See Photo 1). Further inspection below the window area revealed water damaged gypsum board adjacent to the window area (See Photograph 2). Moisture mapping of the water damaged gypsum board did not reveal elevated moisture content.
- Water staining was observed on a ceiling tile and water damage above the window area within Room E09. (See Photo 3). Further inspection below the window area revealed water damaged gypsum board adjacent to the window area (See Photograph 4). Moisture mapping of the water damaged gypsum board did not reveal elevated moisture content.
- Water staining was observed on three (3) ceiling tiles within Room E215 (See Photo 6).
- Water staining was observed on two (2) ceiling tiles within Room E212 (See Photo 7).
- Water staining was observed on two (2) ceiling tiles within Room D126 (See Photo 8).
- Water staining was observed on two (2) ceiling tiles within Room D114 (See Photo 9).
- Particulate accumulation was observed on ceiling tiles adjacent to several air supply diffusers within the Library (See Photo 10).
- Particulate accumulation was observed on ceiling tiles adjacent to air supply diffusers within the Lobby (See Photo 11).
- Water staining was observed on one (1) ceiling tile within Room B131.
- Water staining was observed on three (3) ceiling tiles within Room B137 (See Photo 12).
- Unit-vent supply blocked with book storage within Room B104 (See Photo 14).
- All classroom unit-ventilators appeared to be operable at the time of the assessment with the exception of E207 and E208 which were manually turned off by the occupants.
- Areas of suspect visible mold growth was not observed at the time of assessment.
- Inspection of the exterior revealed weathered wood siding shingles, water damaged wood trim around several window units and around the base of the perimeter of the school, as well as disconnected downspouts. (See Photos 14, 15, 16, 17, 18, 19 and 20).

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. 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 (October 28, 2023)

Location	Time	Carbon Dioxide (CO₂) (ppm)	Temperature (Fahrenheit)	Relative Humidity (%)	Carbon Monoxide (CO) (ppm)
Exterior (Ambient)	0930	411	63.3	84.5	0.0
E114	0938	632	72.8	69.4	0.0
E112	0942	1015	69.8	72.3	0.0
E111	0945	1032	70.5	71.2	0.0
E115	0948	702	71.9	65.5	0.0
E110	0950	780	71.8	66.4	0.0
E119	0953	562	70.5	65.8	0.0
1 st Floor, E-Wing Common	0958	620	71.7	64.1	0.0
E113	1000	607	71.1	62.9	0.0
E109	1006	749	71.4	66.5	0.0
2 nd Floor Admin Lobby	1011	533	71.2	62.9	0.0
E215	1014	508	72.8	61.5	0.0
E212	1020	674	73.7	60.5	0.0
E211	1023	718	72.4	61.7	0.0
E208	1026	1028	73.8	63.9	0.0
E207 Admin	1030	615	72.6	60.9	0.0
E225-Admin	1033	430	71.5	62.5	0.0
Exterior (Ambient)	1045	378	72.2	66.5	0.0
D123	1052	827	70.4	67.3	0.0
D126	1056	484	71.5	65.9	0.0
D124-Slim Gym	1100	426	70.1	64.6	0.0
D114	1106	932	69.4	69.3	0.0
Library	1109	537	69.1	66.7	0.0
Gym	1115	513	70.5	65.9	0.0
Auditorium	1118	646	71.4	64.2	0.0
Music Room (143)	1120	715	73.5	67.1	0.0
A155	1121	909	72.8	64.2	0.0
B141	1123	892	71.9	64.3	0.0
C103	1125	442	69.4	66.5	0.0
B142	1128	665	71.5	65.1	0.0
B137	1131	831	73.4	64.5	0.0
B131	1135	486	72.1	63.2	0.0
B128	1137	602	72.1	64.1	0.0
B125	1140	486	72.7	64.3	0.0

Table 1 – Indoor Air Quality Parameters (October 28, 2023)

Location	Time	Carbon Dioxide (CO ₂) (ppm)	Temperature (Fahrenheit)	Relative Humidity (%)	Carbon Monoxide (CO) (ppm)
B136	1143	1008	73.7	62.1	0.0
B134	1147	972	72.1	63.3	0.0
B118	1150	1035	74.1	60.1	0.0
B109	1222	931	74.2	57.5	0.0
B104	1233	395	72.6	60.6	0.0
B102	1236	463	72.0	63.5	0.0
B103	1238	515	72.1	62.1	0.0
B101	1239	407	72.4	60.2	0.0
A137	1241	643	73.4	61.2	0.0
A135	1242	591	73.6	61.5	0.0
A132	1243	674	72.7	61.4	0.0
A129	1245	439	72.3	62.9	0.0
Cafeteria	1247	813	72.3	64.6	0.0
A143	1250	719	72.3	64.3	0.0
A144	1252	703	72.5	63.1	0.0
A145	1254	712	73.2	64.1	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 October 28, 2023, general IAQ parameters appeared to be within the acceptable human comfort range for temperature and Carbon Dioxide (CO₂) as per the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 55 Guidance values in most areas within the school. Relative Humidity recorded throughout the school was recorded generally above EPA recommended value (> 60 %) as well as above the ASHRAE recommended value for minimizing mold growth within several Classrooms. Measurements for Carbon Monoxide (CO) indicated that no concentrations of CO above zero were recorded.

3.0 CONCLUSIONS AND RECOMMENDATIONS

On October 27, 2023, VERTEX performed a Limited IAQ and visual assessment to document current conditions within the Monomoy Regional Middle School. Based on observations noted during the assessment, VERTEX concludes the following:

- Water damaged gypsum board adjacent to the window areas was observed in Classrooms E109 and E113. Moisture mapping of the water damaged gypsum board did not reveal elevated moisture content.
- Water staining was observed on the ceiling tiles within Rooms E212, E215 D114, D126, B131 and B137.
- Particulate accumulation was observed on ceiling tiles adjacent to several air supply diffusers within the Library and Lobby areas.
- Areas of suspect visible mold growth were not observed at the time of assessment.
- Inspection of the exterior revealed weathered wood shingles, water damaged wood trim around several window units and baseboard around the perimeter of the school, and disconnected downspouts.
- General IAQ parameters appeared to be within the acceptable human comfort range for temperature and carbon dioxide as per the ASHRAE Guidance values for areas within the school. Relative Humidity recorded throughout the school was recorded generally above EPA recommended value (> 60 %) as well as above the ASHRAE recommended value for minimizing mold growth within several Classrooms and areas within the school.

Based on the findings of the limited indoor air quality assessment at the Monomoy Regional Middle School VERTEX suggests the following:

- Retain a reputable contractor remove and replace water damaged gypsum board in E113 and E109. Ensure that the source(s) of water intrusion are investigated and repaired during this process. Potential sources of water damage may include excessive condensation around windows due to temperature differentials, damaged siding/window trim on the exterior or plumbing leaks above the false ceilings in these areas.
- Remove and inspect water source of the water-stained ceiling tiles observed within E212, E215 D114, D126, B131 and B137. Correct water source and replace ceiling tiles. When inspecting the source(s) of water intrusion in these areas, attention should be paid to:
 - Areas where roof may be leaking during storm events
 - Fire suppression line leaks or other plumbing/HVAC condensate leaks above the false ceiling
- 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.
- Maintain indoor relative humidity levels between 30% and 60% within the site building as per the EPA guidelines for precluding mold growth as well as ASHRAE guidance for thermal comfort.

- Retain a reputable siding contractor to remove and replace water damaged wood trim boards and weathered shingles to prevent water intrusion into the building envelope.
- Inspect and repair disconnected downspouts to manage water away from the site building.

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 Monomoy Regional 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 –

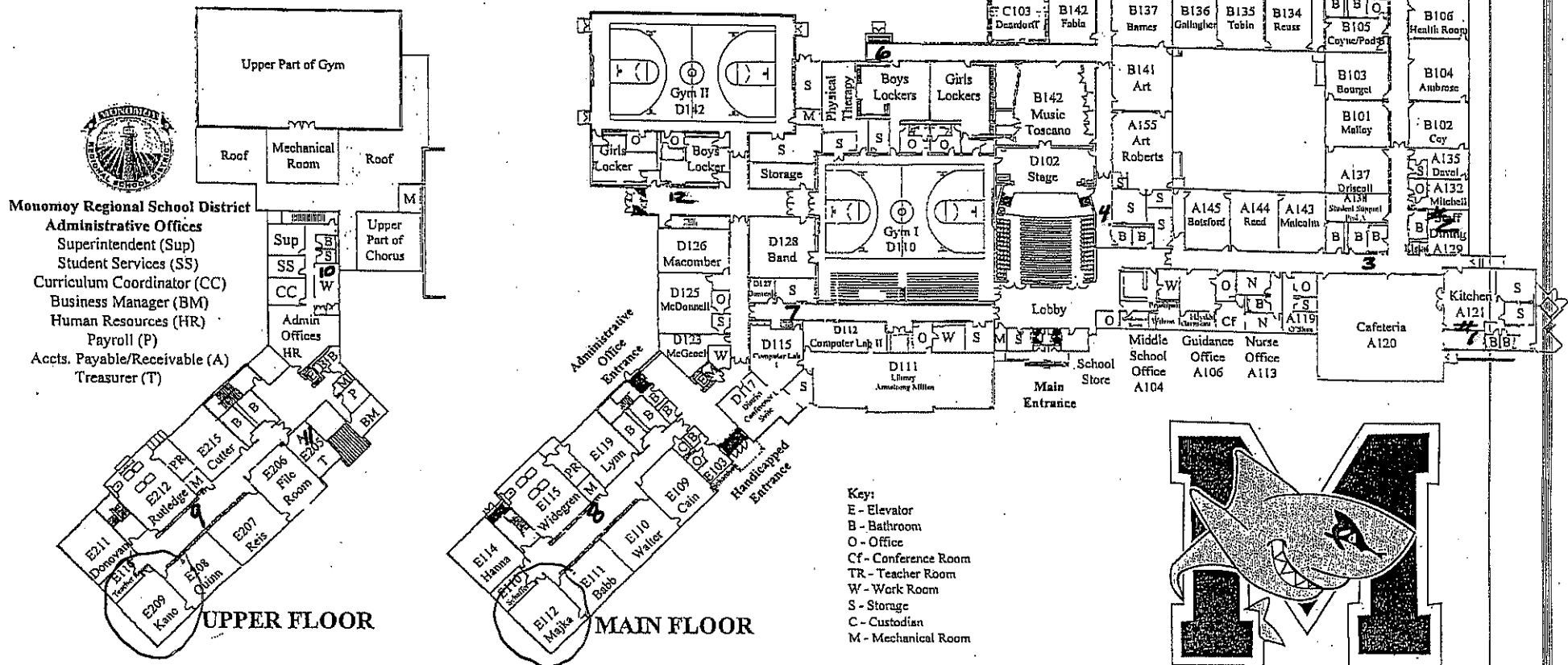
Floor Plan
Photographic Documentation Log

Floor Plan

Monomoy Regional Middle School

425 Crowell Road, Chatham, Massachusetts

Grades 5 through 7



E 112 + E 209

Photographic Documentation

ATTACHMENT A:

1

PHOTOGRAPHIC DOCUMENTATION

Photograph: 1

Description:

Photograph depicts general view of water stained ceiling tile within Room E113.



Photograph: 2

Description:

Photograph depicts general view of water damaged gypsum board within Room E113 adjacent to the window area.



ATTACHMENT A:

2

PHOTOGRAPHIC DOCUMENTATION

Photograph: 3

Description:

Photograph depicts general view of water stained ceiling tile within Room E109.



Photograph: 4

Description:

Photograph depicts general view of water damaged gypsum board within Room E109 adjacent to the window area.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 5**Description:**

Photograph depicts general view of the filter for the unit-ventilator within Room E215.

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

Photograph depicts general view of the water-stained ceiling tiles in Room E215.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 7

Description:

Photograph depicts general view of the water-stained ceiling tiles in Room E215.



Photograph: 8

Description:

Photograph depicts general view of the water-stained ceiling tiles in Room D126.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 9

Description:

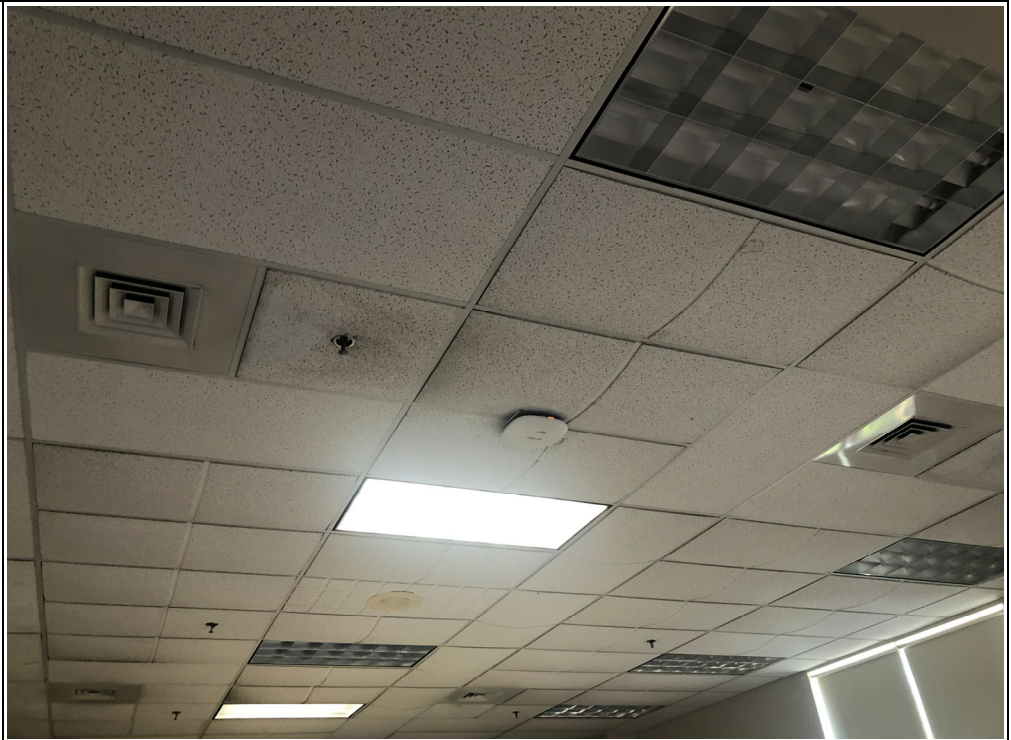
Photograph depicts general view of the water-stained ceiling tiles in Room D114.



Photograph: 10

Description:

Photograph depicts general view of particulate accumulation on the ceiling tile adjacent to the air supply diffuser within the library.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 11

Description:

Photograph depicts general view of particulate accumulation on the ceiling tile adjacent to the air supply diffuser within the lobby.



Photograph: 12

Description:

Photograph depicts general view of the water-stained ceiling tiles in Room B137.



ATTACHMENT A:

7

PHOTOGRAPHIC DOCUMENTATION

Photograph: 13

Description:

Photograph depicts general view of the filter for the unit-ventilator within Room B136.



Photograph: 14

Description:

Photograph depicts general view of book storage on unit-ventilator air supply within Room B104.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 15**Description:**

Photograph depicts general view of the weathered wood shingles and water damaged wood trim board outside Room E119.

**Photograph: 16****Description:**

Photograph depicts general view of the weathered wood shingles and water damaged wood trim board outside Room E109.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 17**Description:**

Photograph depicts general view of the weathered wood shingles and water damaged wood trim board as well as disconnected down spout.

**Photograph: 18****Description:**

Photograph depicts general view of the cleared courtyard area within A and B block.



PHOTOGRAPHIC DOCUMENTATION

Photograph: 19**Description:**

Photograph depicts general view of the weathered wood shingles and disconnected down spouts.

**Photograph: 20****Description:**

Photograph depicts general view of the weathered wood shingles and water damaged wood trim board at the base of the building.



