

Post Mitigation Radon Sampling Report

Sampling Period: January 29-31, 2024

Mill Hill Elementary School

365 Mill Hill Terrace

Southport, Connecticut

Fairfield Public Schools

Fairfield, Connecticut

February 2024



FUSS & O'NEILL

59 Elm Street - Suite 500

New Haven, CT 06511



FUSS & O'NEILL

February 28, 2024

Mr. Angelus Papageorge
Executive Director of Operations
Fairfield Public Schools
501 Kings Highway East, Suite 210
Fairfield, CT 06824
apapageorge@fairfieldschools.org

RE: **Post Mitigation Radon Sampling**
Sampling Period: January 29-31, 2024
Mill Hill Elementary School
365 Mill Hill Terrace, Southport, Connecticut
Fuss & O'Neill Project No. 20220801.A10

Dear Mr. Papageorge:

Enclosed is the report for the post mitigation radon sampling conducted at the Mill Hill Elementary School located at 365 Mill Hill Terrace, Southport, Connecticut (the "Site"). This sampling event was performed from January 29-31, 2024. This work was performed for Fairfield Public Schools in accordance with our written agreement dated January 5, 2024.

Results of the 2022 testing season identified radon concentrations above the Environmental Protection Agency (EPA) Action Level (AL) of 4.0 picocuries per liter (pCi/L) in Rooms 124/126 – referred as Resource Rooms 1 & 2 at the Site. Following the installation of a radon mitigation system, Fuss & O'Neill, Inc. conducted post mitigation radon sampling to verify the effectiveness of the system in reducing concentrations of radon in the affected areas below the AL.

If you have any questions regarding the contents of this report, please do not hesitate to contact me at (860) 783-4751. Thank you for this opportunity to have served your environmental needs.

Sincerely,

Eduardo Miguel Marques
Senior Environmental Analyst

EMM/nw

Enclosure

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1 Introduction

Fuss & O'Neill, Inc. (Fuss & O'Neill) performed a post mitigation radon measurement event utilizing passive radon collection devices at the Mill Hill Elementary School located at 365 Mill Hill Terrace, Southport, Connecticut (the "Site"). The work was conducted for Fairfield Public Schools (the "Client") in accordance with our written agreement dated January 5, 2024, and is subject to the limitations included in *Appendix A*.

Fuss & O'Neill representative Julia Grounds performed the sampling from January 29-31, 2024. This sampling event was performed under the supervision of Mr. Jared D. Smith. Mr. Smith has completed the requirements for listing under the United States Environmental Protection Agency (EPA) sanctioned National Environmental Health Association National Radon Proficiency Program (NEHA NRPP). Mr. Smith's NEHA NRPP number is 108247RT. Mr. Robert L. May, Jr. serves as Principal-in-Charge of the radon program (NEHA NRPP number 105366 RT).

Sampling at the School was performed in response to the Connecticut General Statute Section 10-220 (d) requirement (also known as the Indoor Air Quality (IAQ) in Schools Law). This law required radon sampling prior to January 1, 2008, in at least every school building that is constructed, extended, renovated, or replaced on or after January 1, 2003.

During the five-year cycle sampling events conducted in November/December of 2022, two locations (Rooms 124/126 – referred as Resource Rooms 1 & 2) at the Site were identified to have elevated radon concentrations. Following the installation of a radon mitigation system, Fuss & O'Neill conducted post mitigation radon sampling to verify the effectiveness of the system in reducing concentrations of radon in the affected areas below the AL.

2 Radon Facts and Health Effects

Radon is a naturally-occurring radioactive gas produced by the natural breakdown (decay) of uranium which is in soil and rock throughout the United States (U.S.). Radon travels through soil and enters buildings through cracks and other penetrations in building foundations. Eventually the gas itself decays into radioactive particles (decay products) that can become trapped in the lungs during human respiration. As these particles in turn decay, they release small bursts of radiation which can damage lung tissue and lead to lung cancer over the course of a person's lifespan.

EPA studies have determined that radon concentrations in outdoor air average approximately 0.4 picoCuries per liter (pCi/L) of air. However, radon and its decay products can accumulate to a much higher concentrations inside a building. The EPA has adopted an Action Level (AL) of 4.0 pCi/L, equal to or above, which the EPA recommends action be conducted to reduce the level of airborne radon gas within a building.

Radon is a colorless, odorless, and tasteless gas; the only way to know whether or not an elevated level of radon gas is present in a building is to perform radon air sampling and analysis.

Prolonged exposure to elevated radon concentrations causes an increased risk of lung cancer. Like other environmental pollutants, there is some uncertainty about the magnitude of radon health risks. However, scientists are more certain about radon risks than risks from most other cancer-causing environmental pollutants as estimates of radon risk are based on studies of cancer in humans (underground miners). Additional studies on more typical, non-occupationally exposed populations are underway.

The EPA estimates that radon gas may cause about 21,000 lung cancer deaths in the U.S. each year, with a range of from 7,000 to 30,000. The U.S. Surgeon General has warned that radon is the second leading cause of lung cancer deaths after smoking and is the leading cause among non-smokers.

3 Radon Sampling

On January 29, 2024, Fuss & O'Neill deployed passive radon detection canisters in two locations (Resource Rooms 1 & 2) at the Site which were identified to have elevated radon concentrations at the Site. Fuss & O'Neill retrieved the canisters at least 48 hours, but not later than 96 hours later.

The sampling followed EPA protocols in the EPA "Radon Measurement in Schools, EPA 402-R-92-014, July 1993" document, the American Association of Radon Scientists and Technologists (AARST) Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings (ANSI/AARST MALB 2014 with January 2021 revisions), and the CTDPH School Radon Testing Guidance document.

It is recommended that canisters be placed at least 20 inches from the floor and 12 inches away from exterior walls. Also, it is recommended that the canisters not be placed near drafts resulting from Heating, Ventilation and Air Conditioning (HVAC) air intakes and returns, doors, and at least 36 inches from windows. Canisters should also not be exposed to direct sunlight, be covered, or otherwise disturbed during the testing period. A closed building condition is also utilized for 12 hours prior to testing.

The canisters were supplied by, and analysis was performed by Radon Testing Corporation of America (RTCA) of Elmsford, New York. RTCA is certified by the National Radiation Safety Board (NRSB) (Certification ARLOO01) as well as the Connecticut Department of Public Health (CTDPH) (Certification PH-0327). The radon laboratory analytical report and chain of custody form are included in *Appendix B*.

4 Radon Sampling Quality Assurance Procedures

The EPA recommends and the AARST and CTDPH require that quality assurance measurements be included in radon measurement studies. Quality assurance measurements are summarized below:

Duplicate Samples are pairs of canisters deployed in the same location, side by side, for the same measurement period. Duplicate samples are placed in at least ten percent of all sampling locations. These duplicate canisters are stored, deployed, removed, and shipped to the laboratory for analysis in the same manner as the other canisters. If either or both of the analysis in a duplicate pairing is above the

EPA recommended AL of 4.0 pCi/L, the relative percent difference (RPD) between the two tests must be determined. If the allowable difference is exceeded, the test is determined to be invalid and a new duplicate test must be conducted. If both canister results are below the EPA standard, then the RPD is not calculated since both results are below the EPA standard.

Blank Samples are utilized to determine whether the manufacturing, shipping, storage, and processing of the canisters has affected the accuracy of radon sampling procedures. Blank samples are unopened, unexposed canisters that are deployed with and shipped with the exposed canisters, so the processing laboratory treats them without bias. The number of blank samples is at least five percent of the total number of canisters deployed, up to a maximum of 25 canisters.

Spike Samples are used to determine the accuracy of the normal measurement process. For each month of active radon sampling, a batch of canisters equal to three percent of the monthly sample total or a maximum of six are provided by Fuss & O'Neill to a secondary laboratory separate from the primary laboratory used for analysis of the school samples. These canisters are then exposed to a known and elevated concentration of radon (i.e., “spiked”). The spiked samples are then sent as normal school samples to the primary laboratory. The results of analysis at the primary laboratory should have an average error of no more than ten percent from the target value set by the secondary laboratory.

In the below table, we have listed the results of quality control spike samples. Spike samples were prepared at Bowser-Morner, Inc. (Bowser-Morner) of Dayton, Ohio in January 2024 and submitted to RTCA in January 2024 with samples from a school in which a radon measurement study was performed by Fuss & O'Neill that month. The target concentration as reported by Bowser-Morner (secondary laboratory) and the measured concentration as reported by RTCA (primary laboratory) are listed below in *Table 1*.

Table 1: Spike Samples Results – January 7-9, 2024

Canister Number	Target Value (pCi/Liter)	Measured Value (pCi/Liter)	Error (%)
2985410	27.2	28.7	5.23
2985378		26.4	3.03
2984857		23.7	14.77
2985605		28.5	4.56
2984942		29.1	6.53
2984876		28.6	4.90
Average Error Percentage			6.50

The average error percentage for January 2024 spike sample analysis was 6.50% and was within the +/- 10% acceptable limit.

5 Radon Analytical Results

A total of four canisters, including one duplicate sample and one blank sample, were placed in Resource Rooms 1 & 2 at the Site. The radon concentrations in the samples ranged from 0.1 pCi/L to 0.5 pCi/L. The EPA AL for radon is 4.0 pCi/L.

In *Table 2* below, the testing locations, canister numbers, and radon concentrations are listed for the radon sampling conducted from January 29, 2024, to January 31, 2024.

Table 2: Radon Sampling Results

Location	Canister Numbers	Radon Gas Concentration (pCi/Liter)
Resource Room 1	4865809	0.5
Resource Room 2	4878675	0.5

All results were below the EPA Action Level of 4.0 pCi/L and follow-up sampling is not required at this time.

Refer to *Appendix C* for a sample location diagram.

In *Table 3* below, the testing location, canister numbers, and radon concentrations of the quality control duplicate test are listed for the radon sampling conducted from January 29, 2024, to January 31, 2024.

Table 3: Duplicate Sample Result

Location	Canister Numbers	Radon Concentration (pCi/Liter)			Relative Percent Difference (RPD, %)
		Sample	Sample Duplicate	Sample Average	
Resource Room 2	4878675 4865787	0.5	0.5	0.5	Percent Difference Not Needed (No Concentrations Above 4.0 pCi/Liter)

Note: Duplicate sample result was satisfactory.

In *Table 4* below, the testing location, canister number, and radon concentration of the quality control blank test is listed for the radon sampling conducted from January 29, 2024, to January 31, 2024.

Table 4: Blank Sample Result

Location	Canister Number	Radon Concentration (pCi/Liter)
Resource Room 2	4878624	0.1

Note: Blank sample result was satisfactory.

6 Conclusions

During the course of this post-mitigation radon sampling event at the Site, a total of four canisters, including one duplicate sample and one blank sample, were placed in Rooms 124/126 – referred as Resource Rooms 1 & 2 which have active radon mitigations systems at the Site. The canisters were found in place and undisturbed when Fuss & O’Neill retrieved the canisters. The RPD was not calculated, since in each duplicate pair, both results were below the 4.0 pCi/L AL, as adjusted for the sample error rate. The ‘blank’ and ‘spike’ sample results did not exceed a concentration that would question the validity of the laboratory results.

The average outdoor radon concentration as studied by the EPA is 0.4 pCi/L and the average indoor concentration is 1.4 pCi/L. The EPA has identified an AL of 4.0 pCi/L and recommends taking further action (fixing the problem) if your results are over 4.0 pCi/L.

The laboratory results indicate the radon concentrations within the school building were below the EPA AL of 4.0 pCi/L, for the dates and times of sampling. Following the installation of a radon mitigation system, post mitigation radon sampling results verified the effectiveness of the system in reducing concentrations of radon in the affected areas below the AL.

Based on these sample results, no additional action is required at this time. Per CTDPH requirements, the facility must be continually evaluated on a two-year cycle.

The State of Connecticut Department of Public Health School Radon Mitigation Report Form for this Site is located in *Appendix D*.

Report prepared by Environmental Technician Julia Grounds.

Reviewed by:



Eduardo Miguel Marques
Senior Environmental Analyst



Kathleen C. Pane
Associate | Department Manager

Appendix A

Limitations

APPENDIX A - LIMITATIONS

**Site: Mill Hill Elementary School
365 Mill Hill Terrace, Southport, Connecticut**

1. This environmental report has been prepared for the exclusive use of Fairfield Public Schools (the “Client”), and is subject to, and is issued in connection with the terms and conditions of the agreement dated January 5, 2024, and all of its provisions. Any use or reliance upon information provided in this report, without the specific written authorization of the Client and Fuss & O’Neill, Inc. (Fuss & O’Neill) shall be at the User's individual risk.
2. Fuss & O’Neill has obtained and relied upon information from sources to form certain conclusions regarding likely environmental issues at and in the vicinity of the subject properties in conducting this inspection. Except as otherwise noted, no attempt has been made to verify the accuracy or completeness of such information, or verify compliance by any party with federal, state or local laws or regulations.
3. Fuss & O’Neill has obtained and relied upon laboratory analytical results in conducting the sampling. This information was used to form conclusions regarding radon concentrations at the subject property. Fuss & O’Neill has not performed an independent review of the reliability of this laboratory data.
4. The findings, observations and conclusions presented in this report are limited by the scope of services outlined in our agreement. Furthermore, the sampling has been conducted in accordance with generally accepted environmental practices. No other warranty, expressed or implied, is made.
5. The conclusions presented in this report are based solely upon information gathered by Fuss & O’Neill to date. Should further environmental or other relevant information be discovered at a later date, the Client should immediately bring the information to Fuss & O’Neill’s attention. Based upon an evaluation and assessment of relevant information, Fuss & O’Neill may modify the letter report and its conclusions.

Appendix B

Radon Laboratory Analytical Report and Chain of Custody Form

Site Radon Inspection Report

Date : 02/01/2024

Ms. Karron Redfield
Fuss & O'Neill Inc.
146 Hartford Road
Manchester, CT 06040-

Client: Mill Hill E.S. / 20220801.A10
Test Location: 365 Mill Hill Terrace
Fairfield, CT 06890-

Individual Canister Results

Canister ID# :	4878624	Test Start :	01/29/2024 @ 09:51
Canister Type :	Charcoal Canister 3 inch	Test Stop :	01/31/2024 @ 10:24
Location :	Room 02 BL	Received:	02/01/2024 @ 10:37
Radon Level :	0.1 pCi/L	Analyzed:	02/01/2024 @ 10:49
Error for Measurement is: ±	0.3 pCi/L		

Canister ID# :	4865787	Test Start :	01/29/2024 @ 09:51
Canister Type :	Charcoal Canister 3 inch	Test Stop :	01/31/2024 @ 10:24
Location :	Room 02 DP	Received:	02/01/2024 @ 10:37
Radon Level :	0.5 pCi/L	Analyzed:	02/01/2024 @ 10:52
Error for Measurement is: ±	0.2 pCi/L		

Canister ID# :	4878675	Test Start :	01/29/2024 @ 09:51
Canister Type :	Charcoal Canister 3 inch	Test Stop :	01/31/2024 @ 10:24
Location :	Room 02 DP	Received:	02/01/2024 @ 10:37
Radon Level :	0.5 pCi/L	Analyzed:	02/01/2024 @ 10:46

Average of Side by Side Canisters 0.5 pCi/L
Error for Measurement is: ± 0.2 pCi/L

Canister ID# :	4865809	Test Start :	01/29/2024 @ 09:56
Canister Type :	Charcoal Canister 3 inch	Test Stop :	01/31/2024 @ 10:25
Location :	Room 01	Received:	02/01/2024 @ 10:37
Radon Level :	0.5 pCi/L	Analyzed:	02/01/2024 @ 11:11
Error for Measurement is: ±	0.2 pCi/L		



Andreas C. George

Andreas C. George
Radon Measurement Specialist
NJ MES 11089

Dante Galan

Dante Galan
Laboratory Director

NRSB ARL0001
NYS ELAP ID: 10806
PADEP ID: 0346
NJDEP ID: NY933
NJ MEB 90036
FL DOH RB1609
IL RNL2000201

Site Radon Inspection Report

Date : 02/01/2024

Ms. Karron Redfield
Fuss & O'Neill Inc.
146 Hartford Road
Manchester, CT 06040-

Client: Mill Hill E.S. / 20220801.A10
Test Location: 365 Mill Hill Terrace
Fairfield, CT 06890-

Individual Canister Results

The reported results indicate that radon levels in the building tested are below the United States Environmental Protection Agency (EPA) action level of 4.0 picoCuries per liter of air (pCi/L). The EPA recommends retesting if your living patterns change and you begin occupying a lower level of the building, such as a basement or if major remodeling is done.

General radon information may be obtained by consulting the EPA booklet: A Citizen's Guide to Radon (www.epa.gov/radon/pubs/citguide.html). To request a copy or for further information, please contact your state health department. The EPA maintains a radon information website, including copies of its publications, at www.epa.gov/iaq/radon.

For New Jersey clients: Please see the attached guidance document entitled Radon Testing and Mitigation: The Basics for further information.

For New York clients: If the radon level of one or more testing devices is equal to or exceeds 20 pCi/L please contact the New York State Department of Health, Bureau of Environmental Radiation Protection, for technical advice and assistance at 518-402-7556 or toll free 1-800-458-1158.

PLEDGE OF ASSURED QUALITY

All procedures used for generating this report are in complete accordance with the current EPA protocols for the analysis of radon in air (EPA 402-R-92-004). The analytical results relate only to the samples tested, in the condition received by the lab, and that calculations were based upon the information supplied by client. RTCA and its personnel do not assume responsibility or liability, collectively and individually, for analysis results when detectors have been improperly handled or placed by the consumer, nor does RTCA and its personnel accept responsibility for any financial or health consequences of subsequent action or lack of action, taken by the customer or its consultants based on RTCA-provided results.



Andreas C. George

Andreas C. George
Radon Measurement Specialist
NJ MES 11089

Dante Galan

Dante Galan
Laboratory Director

NRSB ARL0001
NYS ELAP ID: 10806
PADEP ID: 0346
NJDEP ID: NY933
NJ MEB 90036
FL DOH RB1609
IL RNL2000201

*RTCA: These items must be included on our results pages. Email Results and this/these sheet(s) to LabResults@fando.com.

Radon Testing Summary Sheet and Chain of Custody

Page 1 of 2

*Project Number: 20220801. A10
 *Site Name: Mill Hill Elementary
 *Building: Elementary School
 *Site Address: 365 Mill Hill Terrace
 *City/State: Southport, CT
 Project Manager: EMM

Placed by: Julia Grands
 Retrieved by: Julia Grands
 Start Date: 1/29/24
 Stop Date: 1/31/24
 Weather at Placement: 37°, mostly cloudy

Instructions: Tear off center bar coded label from canister and affix to sheet in spaces provided. Please make sure top bar coded label is left on detector. Identify test location for each detector in space provided for that detector (room #, location in room, etc.). Use additional sheets as necessary. Please mark clearly if any detector is missing or damaged at retrieval.

✓ REMOVE THIS PORTION AND AFFIX TO TEST INFORMATION FORM 4878675



Start Time: 9:51 a
 Stop Time: 10:24 a
 Identifier: resource
rm 2

Start Time: _____
 Stop Time: _____
 Identifier: _____

✓ REMOVE THIS PORTION AND AFFIX TO TEST INFORMATION FORM 4865787



D

Start Time: 9:51 a
 Stop Time: 10:24 a
 Identifier: resource
rm 2
duplicate

Start Time: _____
 Stop Time: _____
 Identifier: _____

✓ REMOVE THIS PORTION AND AFFIX TO TEST INFORMATION FORM 4878624



B

Start Time: 9:51 a
 Stop Time: 10:24 a
 Identifier: resource
rm 2
blank

Start Time: _____
 Stop Time: _____
 Identifier: _____

✓ REMOVE THIS PORTION AND AFFIX TO TEST INFORMATION FORM 4865809



Start Time: 9:56 a
 Stop Time: 10:25 a
 Identifier: resource
room 1

Start Time: _____
 Stop Time: _____
 Identifier: _____

Start Time: _____
 Stop Time: _____
 Identifier: _____

Start Time: _____
 Stop Time: _____
 Identifier: _____

Appendix C

Sample Location Diagram

District Name:	FAIRFIELD PUBLIC SCHOOLS
Building Name:	MILL HILL ELEMENTARY
Address:	635 MILL HILL TERRACE SOUTHPORT, CT 06890
Updated:	FLOOR PLANS UPDATED OCTOBER - 2022

Access Controlled
Doors are displayed
in **ORANGE**

SIDE C

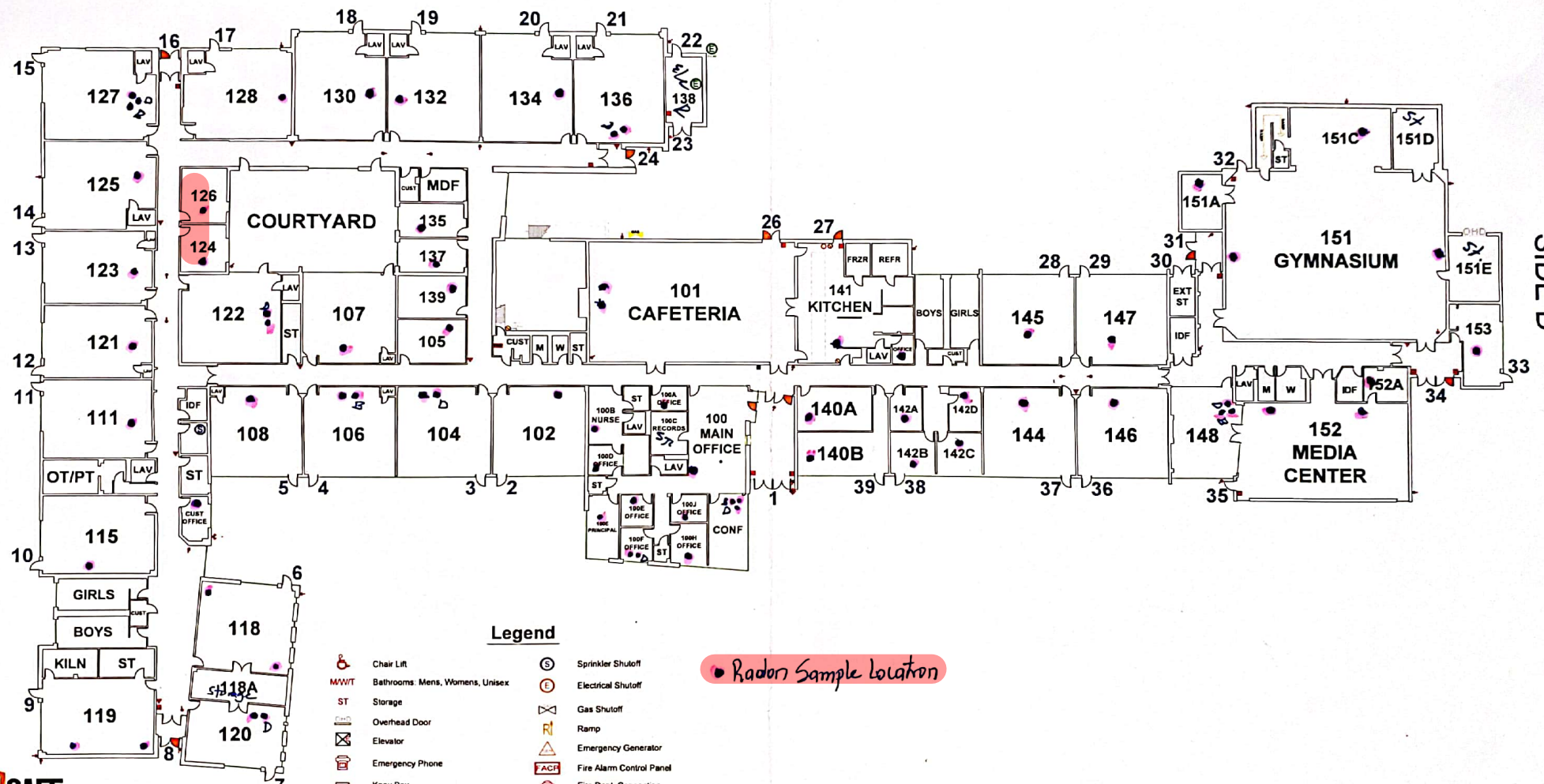
For Official Use Only

1ST FLOOR

1ST FLOOR

SIDE B

SIDE D



SIDE A

1ST FLOOR

Appendix D

State of Connecticut Department of Public Health Radon Mitigation Report Form



STATE OF CONNECTICUT
 DEPARTMENT OF PUBLIC HEALTH
 RADON PROGRAM
SCHOOL RADON MITIGATION REPORT FORM



The radon mitigation contractor must complete the following form for the school representative within two weeks of completing radon mitigation activities in a school. The school shall submit the signed form by **email** to the Radon Program at: DPH.RadonReports@ct.gov

Name of School: _____

Address: _____
 (Street, town/city, state, zip code)

Date Mitigation Completed: _____

Mitigation Contractor: _____

NRPP/NRSB Certification #: _____

CT DCP HIC Registration #: _____

Test Location	Pre-Mitigation Rn Level	Post-Mitigation Rn Level

Number of Sub-Slab Depressurization suction points needed: 1

Matthew A. Bednarz
 Signature of Radon Mitigation Contractor

A. Papageorge
 Signature of Designated School Representative

 Date

2/21/2024
 Date



Phone: (860) 509-7300
 Telephone Device for the Deaf (860) 509-7191
 410 Capitol Avenue - MS # 12-RAD
 P.O. Box 340308, Hartford, CT 06134
 An Equal Opportunity Employer