



MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Flower Hill Elementary School
Date of Test Report	4/26/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	52
# Rooms \geq 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	1.6 pCi/L

Project Status:
Initial testing completed; no further action needed.



April 26, 2022

Brian T. Croyle, PG, CHMM
Environmental Specialist
Montgomery County Public Schools
Gaithersburg, MD 20879

Re: **Radon Testing Services**
KCI Job # 122108316

Location: Flower Hill Elementary School
18425 Flower Hill Way
Gaithersburg, MD 20879

Dear Mr. Croyle:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to Montgomery County Public Schools (MCPS) pursuant to completing a “short-term” 3 day radon test for the Flower Hill ES, located at 18425 Flower Hill Way Gaithersburg, MD 20879 (subject site).

Scope of Services:

KCI conducted radon testing at the subject site to evaluate indoor radon levels relative to the USEPA's recommended action level of 4.0 picocuries per Liter (pCi/L) - the level at which EPA recommends that schools take action to reduce the level. KCI conducted the radon testing in accordance with American Association of Radon Scientists and Technologists (AARST) *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*. A National Radon Proficiency Program (NRPP) Radon Measurement Specialist (certification #111004 RT) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from <https://www.montgomeryschoolsmd.org> or www.epa.gov/radon.

KCI visited the site on February 28, 2022 and deployed fifty nine (59) activated charcoal (AC) radon test kits. KCI deployed radon test kits in all frequently-occupied ground contact rooms, and other areas, (if applicable) in accordance with AARST guidance.

A floor plan map of the building with the test locations is included as Attachment A of this report.

As a quality control measure, KCI also included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted test kits to Bowser-Morner, Inc. as spike samples. The spiked tests were exposed to a known radon concentration by Bowser-Morner prior to being returned to the laboratory for analysis.

KCI returned to the site on March 3, 2022 to retrieve the radon sampling test kits. KCI shipped all radon tests via overnight delivery to Airchek, Inc. for analysis by gamma-ray spectroscopy. Airchek, Inc. is a

NRSB certified analytical laboratory for radon analysis (certification # ARL1402) located at 1936 Butler Bridge Road, Mills River, North Carolina.

Evaluation of Testing Conditions:

These tests represent:

- Follow-up to initial testing.

These tests were conducted to:

- Evaluate radon concentration levels at the facility.

According to AARST, *Protocol for Conducting Measurements of Radon and Radon Decay Products in Schools and Large Buildings*, ideal testing conditions would be when the building is fully occupied and the heating system is active. For this test, the facility's HVAC system was operating in heating mode; therefore, KCI concludes that this test was conducted during ideal testing conditions.

KCI recorded observations of the following conditions in each room during the time of deployment and collection of the radon test kits:

- Indoor temperature,
- HVAC Operation,
- Dehumidifier operation,
- Humidifier operation,
- Ceiling fan operation, and
- Open windows or doors.

KCI also compiled weather data for the testing period and conducted observations of relevant field conditions. During the test period, weather records indicate low temperatures were in the 20s and high temperatures ranged from the high 50s to the low 60s Fahrenheit. Maximum sustained winds ranged from 9-17 miles per hour. Average humidity was around 40% with 0 inches of precipitation (rain) was recorded during testing period.

Results:

The sampling locations and analytical results are listed on Table 1 (Attachment B). The quality control sample locations and analytical results are listed on Table 2 (Attachment B). Sampling locations and associated test kit identification numbers and relevant field observations are listed on Table 3 (Attachment B). The laboratory analytical results are included in Attachment C. Laboratory results and exposure data for the spike samples are also included in Attachment C.

The results of the radon test analysis indicated the following:

Radon Concentration	Room	Result
≥4.0 pCi/L	None	N/A
<4.0 pCi/L	See Attachment B	

Quality Control Samples	
Results of Blank Canisters:	The office blanks, and lab transit blanks had test results of

	less than the laboratory detection limit of 0.3 pCi/L.
Adequate Laboratory Precision?	Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved.
Spike Sample Analysis:	The Spike Sample analysis results indicate the laboratory is operating within statistical control limits.

Our professional services have been performed in accordance with customary principles and practices in the field of industrial hygiene and engineering. If you have any questions or comments regarding this report, please feel free to contact me at (410) 891-1769.

Sincerely,



Tyler P. McCleaf
Radon Measurement Provider
#111004 RT
KCI Technologies, Inc.

Attachments: A- Floor Plan with Test Locations
 B- Table 1-3, Radon Test Summary Spreadsheets
 C- Laboratory Analytical Results

ATTACHMENT A

Floor Plan With Test Locations

ATTACHMENT B

Radon Test Summary Spreadsheet

Table Notes:

AC- Activated Charcoal

ACI- Air Check, Inc.

D- Duplicate

FB- Field Blank

KCI- KCI Technologies, Inc.

OB- Office Blank

PM- Project Manager

OC- Quality Control

Table 1- Radon Testing Results		
Flower Hill ES		
Test Period: 02/28/2022 - 03/03/2022		
Kit Number	Room / Area	Result
11133057	1	< 0.3
11133065	2	< 0.3
11133058	3	0.8
11133059	4	< 0.3
11133066	5	< 0.3
11133003	6	0.6
11133071	6	< 0.3
11133067	7	0.6
11133024	8	< 0.3
11133084	8	< 0.3
11133025	9	0.7
11133100	10	< 0.3
11133060	11	0.6
11133086	12	< 0.3
11133081	13	< 0.3
11133049	14	< 0.3
11133048	15	0.6
11133080	16	0.8
11133032	17	< 0.3
11133070	17.5	< 0.3
11133033	18	< 0.3
11133052	19	< 0.3
11133082	20	0.8
11133026	21	0.7
11133030	21	< 0.3
11133031	22	< 0.3
11133068	22	< 0.3
11133064	22.5	0.6
11133073	23	0.8
11133027	24	< 0.3
11133069	24	0.7
11133074	25	< 0.3
11133004	26	1.1
11133056	27	0.8
11133055	28	0.9
11133077	29	1.6
11133078	30	1.1
11133090	ASSISTANT PRINCIPAL	< 0.3
11133097	BUILDING SERVICES	< 0.3
11133099	BUILDING SERVICES	< 0.3
11133092	CAFE	0.7
11133095	CONFERENCE	< 0.3

Table 1- Radon Testing Results		
Flower Hill ES		
Test Period: 02/28/2022 - 03/03/2022		
Kit Number	Room / Area	Result
11133079	DOWER OFFICE	1.3
11133087	GYM	0.8
11133098	GYM	1.0
11133083	GYM OFFICE	1.4
11133088	HEALTH	0.7
11133085	LANGUAGE LAB	0.6
11133051	MEDIA CENTER	< 0.3
11133076	MEDIA CENTER OFFICE	0.6
11133096	MUSIC	1.0
11133089	OFFICE	0.8
11133091	PRINCIPAL	0.8
11133093	RESOURCE	1.0
11133050	ROBERTSON OFFICE	1.6
11133072	STAFF	< 0.3
11133075	STAFF	0.9
11133094	WORKROOM	< 0.3
11133028	WORKROOM2	0.7

Table 2- Radon Testing Results			
Flower Hill ES			
Test Period: 02/28/2022 - 03/03/2022			
Kit Number	QC Type	Room / Area	Result
11133097	D	Building services	< 0.3
11133071	FB	6	< 0.3
11133084	D	8	< 0.3
11133075	D	Staff Lounge	0.9
11133031	D	22	< 0.3
11133030	FB	21	< 0.3
11133027	D	24	< 0.3
11130811	OB	OFFICE BLANK	< 0.3
11130816	TB	TRAVEL BLANK	< 0.3

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for:
FLOWER HILL ES
MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11133057	1	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133100	10	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133060	11	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.6 ± 0.3	2022-03-08
11133086	12	2022-02-28 @ 12:00 pm	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133081	13	2022-02-28 @ 12:00 pm	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133049	14	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133048	15	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.6 ± 0.3	2022-03-08
11133080	16	2022-02-28 @ 12:00 pm	2022-03-03 @ 9:00 am	0.8 ± 0.3	2022-03-08
11133032	17	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133070	17.5	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133033	18	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133052	19	2022-02-28 @ 12:00 pm	2022-03-03 @ 1:00 pm	< 0.3	2022-03-08
11133065	2	2022-02-28 @ 11:00 am	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133082	20	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.8 ± 0.3	2022-03-08
11133026	21	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.7 ± 0.3	2022-03-07
11133030	21	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133068	22	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133031	22	2022-02-28 @ 12:00 pm	2022-03-03 @ 1:00 pm	< 0.3	2022-03-08
11133064	22.5	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.6 ± 0.4	2022-03-08
11133073	23	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.8 ± 0.4	2022-03-08
11133069	24	2022-02-28 @ 12:00 pm	2022-03-03 @ 1:00 pm	0.7 ± 0.4	2022-03-08
11133027	24	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133074	25	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133004	26	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	1.1 ± 0.4	2022-03-08
11133056	27	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.8 ± 0.4	2022-03-08
11133055	28	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.9 ± 0.4	2022-03-08
11133077	29	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	1.6 ± 0.3	2022-03-07
11133058	3	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.8 ± 0.4	2022-03-08
11133078	30	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	1.1 ± 0.4	2022-03-08
11133059	4	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133066	5	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133003	6	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.6 ± 0.4	2022-03-08
11133071	6	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133067	7	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.6 ± 0.3	2022-03-08
11133084	8	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133024	8	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133025	9	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.7 ± 0.3	2022-03-08

Radon test result report for:
FLOWER HILL ES
MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11133090	ASSISTANT PRINCIPAL	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133097	BUILDING SERVICES	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133099	BUILDING SERVICES	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133092	CAFE	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.7 ± 0.4	2022-03-08
11133095	CONFERENCE	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133079	DOWER OFFICE	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	1.3 ± 0.4	2022-03-08
11133087	GYM	2022-02-28 @ 11:00 am	2022-03-03 @ 10:00 am	0.8 ± 0.3	2022-03-08
11133098	GYM	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	1.0 ± 0.4	2022-03-08
11133083	GYM OFFICE	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	1.4 ± 0.4	2022-03-08
11133088	HEALTH	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.7 ± 0.4	2022-03-08
11133085	LANGUAGE LAB	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.6 ± 0.4	2022-03-08
11133051	MEDIA CENTER	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133076	MEDIA CENTER OFFICE	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.6 ± 0.4	2022-03-08
11133096	MUSIC	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	1.0 ± 0.4	2022-03-08
11133089	OFFICE	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.8 ± 0.4	2022-03-08
11133091	PRINCIPAL	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	0.8 ± 0.4	2022-03-08
11133093	RESOURCE	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	1.0 ± 0.4	2022-03-08
11133050	ROBERTSON OFFICE	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	1.6 ± 0.4	2022-03-08
11133072	STAFF	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	< 0.3	2022-03-08
11133075	STAFF	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.9 ± 0.3	2022-03-08
11133094	WORKROOM	2022-02-28 @ 11:00 am	2022-03-03 @ 9:00 am	< 0.3	2022-03-08
11133028	WORKROOM2	2022-02-28 @ 12:00 pm	2022-03-03 @ 10:00 am	0.7 ± 0.4	2022-03-08

EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 204620

NOMINAL Conditions: Radon Conc 27.0 pCi/L Rel. Hum 50.1 % Temp. 70.0 F

Date Start: 3/18/22 Date Stop: 3/21/22 Date Start: _____ Date Stop: _____

Time Start: 0705 Time Stop: 0705 Time Start: _____ Time Stop: _____

Device No.'s: (5) Char Bags - Device No.'s: _____

11139367, 11139368, 11139371, _____

11139710, 11139717 _____

E3 Right

Date Start: _____ Date Stop: _____ Date Start: _____ Date Stop: _____

Time Start: _____ Time Stop: _____ Time Start: _____ Time Stop: _____

Device No.'s: _____ Device No.'s: _____

Date Start: _____ Date Stop: _____ Date Start: _____ Date Stop: _____

Time Start: _____ Time Stop: _____ Time Start: _____ Time Stop: _____

Device No.'s: _____ Device No.'s: _____

Note: All times are in 24-hour (military) notation, Eastern Standard Time (EST)
Background = 7 μ R/h Elevation = 820 ft

March 30, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within $\pm 25\%$ of the chamber's reference value (25.7 pCi/L).

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11139367	SK1	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.9 \pm 2.1	2022-03-30
11139368	SK2	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	23.9 \pm 2.0	2022-03-30
11139371	SK3	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.7 \pm 2.1	2022-03-30
11139710	SK4	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	26.4 \pm 2.1	2022-03-30
11139717	SK5	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	24.6 \pm 2.0	2022-03-30

Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498

March 30, 2022

**** LABORATORY ANALYSIS REPORT ****

Radon test result report for:

**RSH
MAIN**

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11139726	BASEMENT	2022-03-20 @ 8:00 am	2022-03-23 @ 7:00 am	0.9 ± 0.5	2022-03-30
11139725	DINING	2022-03-20 @ 8:00 am	2022-03-23 @ 7:00 am	< 0.3	2022-03-30

Air Chek 1936 Butler Bridge Rd, Mills River, NC 28759-3892 Phone: (828) 684-0893 Fax: (828) 684-8498



Radon Test Kit Chain of Custody

Project Name: MCPS Radon – March 2022 Schools

Name of Schools:

1. Marshall, Thurgood ES
2. Ridgeview MS
3. Travilah ES
4. Flower Hill ES
5. Resnik, Judith A. ES
6. Strawberry Knolls ES
7. Whetstone ES
8. Laytonsville ES
9. Stedwick ES
10. Watkins Mill ES
11. Watkins Mill HS
12. Einstein, Albert E. HS

	Date	Initials
Radon Test Kits Deployed	02/28/2022	PM
Radon Test Kits Collected	03/03/2022	PM
Radon Test Kits Shipped to Lab*	03/3/2022	PM
Radon Test Kits Received by Lab*	03/5/2022	PM

*All samples sent to Air Check, Inc., 1936 Butler Bridge Rd, Mills River, NC 28759