



MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Flower Valley Elementary School
Date of Test Report	4/6/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	58
# Rooms \geq 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	1.2 pCi/L

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



April 6, 2022

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

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

Location: Flower Valley ES
4615 Sunflower Dr.
Rockville, MD 20853

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 Valley ES, located at 4615 Sunflower Dr. Rockville, MD 20853 (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 8, 2022 and deployed sixty seven (67) 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 February 11, 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 30s and high temperatures ranged from the mid 30s to the mid 50s Fahrenheit. Maximum sustained winds ranged from 3-12 miles per hour. Average humidity was around 23% with 0.1 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 Valley ES		
Test Period: 02/8/2022 - 02/11/2022		
Kit Number	Room / Area	Result
11115379	100	0.7
11115398	100	0.5
11115390	101	< 0.3
11115394	101	< 0.3
11115383	102	< 0.3
11115384	102	< 0.3
11115370	106	< 0.3
11115376	109	< 0.3
11115371	110	< 0.3
11115375	111	< 0.3
11115388	112	< 0.3
11115395	112	0.7
11115369	113	1.1
11115377	114	< 0.3
11115368	115	< 0.3
11115386	121	< 0.3
11115385	122	< 0.3
11115387	122	< 0.3
11113620	123	< 0.3
11115391	127	< 0.3
11113619	128	< 0.3
11113628	128	< 0.3
11113631	129	0.6
11113627	135	< 0.3
11113635	136	0.5
11113636	137	0.6
11113626	138	< 0.3
11113624	139	< 0.3
11113633	139	< 0.3
11113642	140	< 0.3
11113630	142	< 0.3
11113641	143	< 0.3
11113638	144	< 0.3
11113610	145	< 0.3
11113644	148	< 0.3
11113613	149	< 0.3
11113612	150	< 0.3
11113609	151	< 0.3
11113611	152	< 0.3
11113614	153	< 0.3
11113616	153	0.9
11113604	154	< 0.3

Table 1- Radon Testing Results		
Flower Valley ES		
Test Period: 02/8/2022 - 02/11/2022		
Kit Number	Room / Area	Result
11113607	154	< 0.3
11113623	157	0.7
11113603	158	1.2
11113634	159	0.5
11113625	160	0.5
11113617	165	1.1
11115372	166	1.2
11115393	166	0.9
11115397	100A	0.5
11115396	115A	0.9
11115381	120 C	0.7
11115380	120 MAIN	0.5
11115399	120D	0.9
11115382	120E	0.5
11115378	120F	0.6
11115389	128A	< 0.3
11113615	128D	< 0.3
11113632	134A	0.6
11113621	134B	< 0.3
11113622	134B	0.5
11113629	134C	< 0.3
11113637	134C	< 0.3
11113618	134D	< 0.3
11115400	166A	0.6
11115392	166B	0.8

Table 2- Radon Testing Results			
Flower Valley ES			
Test Period: 02/8/2022 - 02/11/2022			
Kit Number	QC Type	Room / Area	Result
11115395	D	112	0.7
11115384	D	102	< 0.3
11115394	FB	101	< 0.3
11115385	D	122	< 0.3
11113621	D	134B	< 0.3
11113637	FB	134C	< 0.3
11113624	D	139	< 0.3
11113604	D	154	< 0.3
11113614	FB	153	< 0.3
11113478	OB	OFFICE BLANK	< 0.3
11113477	TB	TRAVEL BLANK	< 0.3

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for:
FLOWER VALLEY ES
MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11115398	100	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	0.5 ± 0.3	2022-02-14
11115379	100	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	0.7 ± 0.3	2022-02-15
11115397	100A	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	0.5 ± 0.3	2022-02-14
11115390	101	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115394	101	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115383	102	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115384	102	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115370	106	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115376	109	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115371	110	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11115375	111	2022-02-08 @ 2:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-15
11115388	112	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11115395	112	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-15
11115369	113	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	1.1 ± 0.3	2022-02-14
11115377	114	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11115368	115	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11115396	115A	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.9 ± 0.3	2022-02-14
11115381	120 C	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-15
11115380	120 MAIN	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-15
11115399	120D	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.9 ± 0.3	2022-02-15
11115382	120E	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-15
11115378	120F	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-15
11115386	121	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11115387	122	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11115385	122	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113620	123	2022-02-08 @ 3:00 pm	2022-02-11 @ 12:00 pm	< 0.3	2022-02-14
11115391	127	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113628	128	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113619	128	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11115389	128A	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113615	128D	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113631	129	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-14
11113632	134A	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-14
11113622	134B	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-15
11113621	134B	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113629	134C	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113637	134C	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15

Radon test result report for:
FLOWER VALLEY ES
MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11113618	134D	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113627	135	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113635	136	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11113636	137	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-15
11113626	138	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113624	139	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113633	139	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113642	140	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113630	142	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113641	143	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113638	144	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113610	145	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113644	148	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113613	149	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113612	150	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113609	151	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113611	152	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-15
11113614	153	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113616	153	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	0.9 ± 0.3	2022-02-15
11113604	154	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113607	154	2022-02-08 @ 4:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11113623	157	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-14
11113603	158	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	1.2 ± 0.3	2022-02-14
11113634	159	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11113625	160	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11113617	165	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	1.1 ± 0.3	2022-02-15
11115372	166	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	1.2 ± 0.3	2022-02-14
11115393	166	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.9 ± 0.3	2022-02-14
11115400	166A	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-14
11115392	166B	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.8 ± 0.3	2022-02-14

EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 204186

NOMINAL Conditions: Radon Conc 25.8 pCi/L Rel. Hum 50.1 % Temp. 70.9 F

Date Start: 2/18/22 Date Stop: 2/21/22 Date Start: _____ Date Stop: _____

Time Start: 0911 Time Stop: 0911 Time Start: _____ Time Stop: _____

Device No.'s: (3) Char Bags -
11113484, 1112998, 20107126 Device No.'s: _____

23 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 µR/h Elevation = 820 ft**

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 Number	Start Date	Start Time	End Date	End Time	Temp.	Facility	Building	Room	Project ID	Floor	Result
11113484	2022-02-18	9:00 am	2022-02-21	9:00 am	71	OFFICE	MAIN	SK1		1	27.9
11122998	2022-02-18	9:00 am	2022-02-21	9:00 am	71	OFFICE	MAIN	SK2		1	26.0
20107126	2022-02-18	9:00 am	2022-02-21	9:00 am	71	OFFICE	MAIN	SK3		1	27.6



Radon Test Kit Chain of Custody

Project Name: MCPS Radon – February 2022 Schools

Name of Schools:

- 1. Earle. B Wood MS
- 2. Flower Valley ES
- 3. Parkland MS
- 4. Herbert Hoover MS
- 5. Ritchie Park ES
- 6. Wayside ES
- 7. Potomac ES
- 8. Redland MS
- 9. Sequoyah ES
- 10. Sherwood ES
- 11. Rock Terrace School

	Date	Initials
Radon Test Kits Deployed	02/08/2022	PM
Radon Test Kits Collected	02/11/2022	PM
Radon Test Kits Shipped to Lab*	02/11/2022	PM
Radon Test Kits Received by Lab*	02/15/2022	PM

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