KCI TECHNOLOGIES

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

936 RIDGEBROOK ROAD • SPARKS, MD 21152 • 410-316-7800 • (FAX) 410-316-7935

MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Herbert Hoover Middle 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	97
# Rooms ≥ 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	1.2 pCi/L

Project Status:
Initial testing completed; Missing or compromised samples need re-sampling.

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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: Herbert Hoover MS
8810 Postoak Rd.
Potomac, MD 20854

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 Herbert Hoover MS, located at 8810 Postoak Rd. Potomac, MD 20854 (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 one hundred and twelve (112) 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 post-mitigation biennial testing.

These tests were conducted to:

- Confirm the success of the mitigation system(s).

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 piC/L	None	N/A
<4.0 piC/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 McCleaf

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
QC- Quality Control

Table 1- Radon Testing Results		
Herbert Hoover MS		
Test Period: 02/8/2022 - 02/11/2022		
Kit Number	Room / Area	Result
11114604	1	< 0.3
11114603	7	< 0.3
11114628	7	< 0.3
11114618	8	< 0.3
11114607	9	< 0.3
11114613	11	< 0.3
11114609	12	< 0.3
11114614	13	< 0.3
11114620	16	< 0.3
11114617	18	< 0.3
11114626	18	1.2
11114627	18	0.8
11114633	24	0.5
11114637	24	0.7
11114638	24	< 0.3
11114623	25	0.7
11114608	26	0.6
11114632	27	0.7
11114622	28	0.5
11114615	29	0.5
11114636	30	0.5
11114616	31	< 0.3
11114624	33	< 0.3
11114629	34	0.7
11114601	35	< 0.3
11115296	35	< 0.3
11114605	36	< 0.3
11114619	39	< 0.3
11114621	40	< 0.3
11114625	41	0.5
11115292	100	0.7
11115278	101	0.5
11115285	102	< 0.3
11114635	103	0.8
11115273	105	< 0.3
11115268	106	< 0.3
11115267	107	< 0.3
11115276	110	< 0.3
11115291	110	< 0.3
11115284	114	0.5
11115290	115	0.7
11115289	119	0.8

Table 1- Radon Testing Results		
Herbert Hoover MS		
Test Period: 02/8/2022 - 02/11/2022		
Kit Number	Room / Area	Result
11115265	125	0.6
11114634	126	0.7
11115254	127	< 0.3
11115269	128	< 0.3
11115239	131	0.6
11115262	131	< 0.3
11115231	132	< 0.3
11114630	135	< 0.3
11115277	136	< 0.3
11115264	138	0.5
11115271	138	< 0.3
11115248	139	< 0.3
11115270	144	< 0.3
11115275	144	< 0.3
11115281	144	< 0.3
11115274	145	< 0.3
11115260	146	< 0.3
11115258	148	< 0.3
11115257	149	< 0.3
11114631	153	< 0.3
11115252	154	< 0.3
11115253	155	< 0.3
11115243	161	< 0.3
11115261	161	0.5
11115263	161	NA
11115247	162	< 0.3
11115240	163	0.6
11115266	164	< 0.3
11115255	165	1.0
11115259	166	< 0.3
11115283	167	< 0.3
11115282	168	0.6
11115244	170	< 0.3
11115249	173	< 0.3
11115251	174	< 0.3
11115246	175	< 0.3
11115250	175	< 0.3
11115245	176	< 0.3
11115223	178	< 0.3
11115238	180	< 0.3
11115207	182	< 0.3
11115295	183	< 0.3

Table 1- Radon Testing Results		
Herbert Hoover MS		
Test Period: 02/8/2022 - 02/11/2022		
Kit Number	Room / Area	Result
11115242	185	< 0.3
11115241	188	0.7
11115279	189	< 0.3
11115286	191	0.6
11115287	193	< 0.3
11115298	194	0.6
11115294	195	0.9
11115215	199	< 0.3
11114645	205	< 0.3
11114641	213	< 0.3
11114639	218	< 0.3
11114642	218	< 0.3
11114643	218	< 0.3
11114611	045A	< 0.3
11114606	046 GYM	< 0.3
11114612	046 GYM	< 0.3
11115272	138A	< 0.3
11115256	138B	< 0.3
11115216	177A	< 0.3
11115232	177B	< 0.3
11115293	192 CAFETERIA	0.6
11115300	192 CAFETERIA	< 0.3
11115288	194B	< 0.3
11115297	194B	0.8
11115299	194B	< 0.3
11115280	196B	< 0.3
11115208	199A	< 0.3
11114610	44A	0.7

Table 2- Radon Testing Results			
Herbert Hoover MS			
Test Period: 02/8/2022 - 02/11/2022			
Kit Number	QC Type	Room / Area	Result
11115250	D	175	< 0.3
11115262	D	131	< 0.3
11115275	D	144	< 0.3
11115281	FB	144	< 0.3
11115291	D	110	< 0.3
11115297	D	194B	0.8
11115299	FB	194B	< 0.3
11114601	D	35	< 0.3
11114626	D	18	1.2
11114628	D	7	< 0.3
11114637	D	24	0.7
11114638	FB	24	< 0.3
11114639	D	218	< 0.3
11114643	FB	218	< 0.3
11113478	OB	OFFICE BLANK	< 0.3
11113477	TB	TRAVEL BLANK	< 0.3

Summary of Missed Locations		
Herbert Hoover MS		
Test Period: 02/8/22 - 02/11/22		
Kit Number	Room/Area	Result
NA	124	NA
NA	32	NA

Summary of Missing, Compromised and >/= 4 piC/L Tests		
Herbert Hoover MS		
Test Period: 02/8/22 - 02/11/22		
Kit Number	Room/Area	Result
11115263	161	Compromised

Table Note:

* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

February 15, 2022

** LABORATORY ANALYSIS REPORT **

Radon test result report for:

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11114604	001	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114603	007	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114628	007	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114618	008	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114607	009	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114613	011	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114609	012	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114614	013	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114620	016	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114626	018	2022-02-08 @ 1:00 pm	2022-02-11 @ 10:00 am	1.2 ± 0.3	2022-02-14
11114627	018	2022-02-08 @ 1:00 pm	2022-02-11 @ 10:00 am	0.8 ± 0.3	2022-02-14
11114617	018	2022-02-08 @ 1:00 pm	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11114637	024	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-14
11114638	024	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114633	024	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11114623	025	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-14
11114608	026	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-14
11114632	027	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-14
11114622	028	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11114615	029	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11114636	030	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11114616	031	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114624	033	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114629	034	2022-02-08 @ 2:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-14
11115296	035	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114601	035	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114605	036	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114619	039	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114621	040	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114625	041	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	0.5 ± 0.3	2022-02-14
11114611	045A	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114606	046 GYM	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114612	046 GYM	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11115292	100	2022-02-08 @ 11:00 am	2022-02-11 @ 9:00 am	0.7 ± 0.3	2022-02-15
11115278	101	2022-02-08 @ 11:00 am	2022-02-11 @ 9:00 am	0.5 ± 0.3	2022-02-14
11115285	102	2022-02-08 @ 11:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11114635	103	2022-02-08 @ 2:00 pm	2022-02-11 @ 9:00 am	0.8 ± 0.3	2022-02-15

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

February 15, 2022

** LABORATORY ANALYSIS REPORT **

Radon test result report for:

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11115273	105	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115268	106	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115267	107	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115276	110	2022-02-08 @ 11:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115291	110	2022-02-08 @ 11:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115284	114	2022-02-08 @ 11:00 am	2022-02-11 @ 9:00 am	0.5 ± 0.3	2022-02-15
11115290	115	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	0.7 ± 0.3	2022-02-14
11115289	119	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	0.8 ± 0.3	2022-02-14
11115265	125	2022-02-08 @ 11:00 am	2022-02-11 @ 11:00 am	0.6 ± 0.3	2022-02-14
11114634	126	2022-02-08 @ 2:00 pm	2022-02-11 @ 10:00 am	0.7 ± 0.3	2022-02-15
11115254	127	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115269	128	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115239	131	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	0.6 ± 0.3	2022-02-14
11115262	131	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115231	132	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11114630	135	2022-02-08 @ 3:00 pm	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115277	136	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115271	138	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115264	138	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	0.5 ± 0.3	2022-02-14
11115272	138A	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115256	138B	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115248	139	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115281	144	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115270	144	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115275	144	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115274	145	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115260	146	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115258	148	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115257	149	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11114631	153	2022-02-08 @ 3:00 pm	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115252	154	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115253	155	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115261	161	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	0.5 ± 0.3	2022-02-14
11115243	161	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115263	161	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	???? IF1	2022-02-15
11115247	162	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115240	163	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	0.6 ± 0.3	2022-02-14

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

February 15, 2022

** LABORATORY ANALYSIS REPORT **

Radon test result report for:

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11115266	164	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115255	165	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	1.0 ± 0.3	2022-02-14
11115259	166	2022-02-08 @ 10:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115283	167	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115282	168	2022-02-08 @ 11:00 am	2022-02-11 @ 10:00 am	0.6 ± 0.3	2022-02-14
11115244	170	2022-02-08 @ 10:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115249	173	2022-02-08 @ 10:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115251	174	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115250	175	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115246	175	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115245	176	2022-02-08 @ 10:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115216	177A	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115232	177B	2022-02-08 @ 10:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115223	178	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115238	180	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115207	182	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115295	183	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115242	185	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115241	188	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	0.7 ± 0.3	2022-02-15
11115279	189	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115286	191	2022-02-08 @ 12:00 pm	2022-02-11 @ 10:00 am	0.6 ± 0.3	2022-02-14
11115293	192 CAFETERIA	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	0.6 ± 0.3	2022-02-14
11115300	192 CAFETERIA	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115287	193	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115298	194	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	0.6 ± 0.3	2022-02-14
11115299	194B	2022-02-08 @ 12:00 pm	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115288	194B	2022-02-08 @ 12:00 pm	2022-02-11 @ 10:00 am	< 0.3	2022-02-14
11115297	194B	2022-02-08 @ 12:00 pm	2022-02-11 @ 10:00 am	0.8 ± 0.3	2022-02-14
11115294	195	2022-02-08 @ 12:00 pm	2022-02-11 @ 10:00 am	0.9 ± 0.3	2022-02-14
11115280	196B	2022-02-08 @ 12:00 pm	2022-02-11 @ 9:00 am	< 0.3	2022-02-14
11115215	199	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11115208	199A	2022-02-08 @ 9:00 am	2022-02-11 @ 9:00 am	< 0.3	2022-02-15
11114645	205	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114641	213	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114639	218	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114643	218	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14
11114642	218	2022-02-08 @ 3:00 pm	2022-02-11 @ 11:00 am	< 0.3	2022-02-14

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February 15, 2022

** LABORATORY ANALYSIS REPORT **

Radon test result report for:

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11114610	44A	2022-02-08 @ 1:00 pm	2022-02-11 @ 11:00 am	0.7 ± 0.3	2022-02-15

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EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCI Technologies, Inc. Job Number 204186

NOMINAL Conditions: Radon Conc 25.8 pCi/L Rel. Hum 59.1 % 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, 11192998, 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 ± 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

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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	
Radon Test Kits Collected	02/11/2022	
Radon Test Kits Shipped to Lab*	02/11/2022	
Radon Test Kits Received by Lab*	02/15/2022	

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

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MCPS RADON TESTING – EXECUTIVE SUMMARY

Site Name	Herbert Hoover Middle School
Date of Test Report	05/12/2022
Round of Testing	Initial Follow-up Post Remediation 2 Year Testing 5 Year Testing HVAC Upgrade Window Replacement New Addition New Facility
# Rooms Tested	3
# Rooms ≥ 4.0 pCi/L	0
Lowest Value	<0.3 pCi/L
Highest Value	0.7 pCi/L

Project Status

Current Project Status at this time: Testing completed; no further action needed

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May 12, 2022

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

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

Location: Herbert Hoover Middle School
8810 Postoak Rd.
Potomac, MD 20854

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 Herbert Hoover Middle School, located at 8810 Postoak Rd. Potomac, MD 20854 (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 March 22, 2022 and deployed five (5) 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.

KCI sampled the following locations during this follow-up test:

1. Rooms with missing test kits from the Radon 2022 testing period (i.e. test kit was deployed but not recovered),
2. Rooms with invalidated test kits from the Radon 2022 testing period (e.g. an open window in the room or disturbed test kit),
3. Rooms which were locked/inaccessible during the Radon 2022 testing period,
4. Rooms with elevated radon results (i.e. ≥3.5 piC/L),
5. Rooms previously tested for radon but not tested in Radon 2022, and
6. Additional rooms that require testing (if applicable.)

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 25, 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 low 40°Fs and high temperatures ranged from the low 50°Fs to the low 70°Fs. Maximum sustained winds ranged from 0-29 miles per hour. Average humidity was around 56% with 0.51 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 piC/L	None	N/A
<4.0 piC/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 McCleaf

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
QC- Quality Control

Table 1- Radon Testing Results		
Herbert Hoover MS RT		
Test Period: 03/22/2022 - 03/25/2022		
Kit Number	Room / Area	Result
11139069	32	0.6
11139090	124	< 0.3
11138954	161	< 0.3
11138960	161	0.7
11139089	161	< 0.3

Table 2- Radon Testing Results			
Herbert Hoover MS RT			
Test Period: 03/22/2022 - 03/25/2022			
Kit Number	QC Type	Room / Area	Result
11138960	D	161	< 0.3
11139089	FB	161	< 0.3
11139902	OB	OFFICE BLANK	< 0.3
11139928	TB	TRAVEL BLANK	< 0.3

Summary of Missed Locations		
Herbert Hoover MS RT		
Test Period: 03/22/22 - 03/25/22		
Kit Number	Room/Area	Result
	NA	

Summary of Missing, Compromised and >/= 4 piC/L Tests		
Herbert Hoover MS RT		
Test Period: 03/22/22 - 03/25/22		
Kit Number	Room/Area	Result
	NA	

Table Note:

* Missing or Compromised Sample

ATTACHMENT C

Laboratory Analytical Results

March 28, 2022

** LABORATORY ANALYSIS REPORT **

Radon test result report for:

HERBERT HOOVER MS RT
MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
11139090	124	2022-03-22 @ 10:00 am	2022-03-25 @ 9:00 am	< 0.3	2022-03-28
11138954	161	2022-03-22 @ 10:00 am	2022-03-25 @ 9:00 am	< 0.3	2022-03-28
11138960	161	2022-03-22 @ 10:00 am	2022-03-25 @ 10:00 am	0.7 ± 0.3	2022-03-28
11139089	161	2022-03-22 @ 10:00 am	2022-03-25 @ 9:00 am	< 0.3	2022-03-28
11139069	32	2022-03-22 @ 10:00 am	2022-03-25 @ 9:00 am	0.6 ± 0.3	2022-03-28

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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 Eight	_____
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

March 30, 2022

** LABORATORY ANALYSIS REPORT **

Radon test result report for:

MCPS - Spike Sample Lab Results. Measured values are satisfactory, i.e., within ± 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 ± 2.1	2022-03-30
11139368	SK2	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	23.9 ± 2.0	2022-03-30
11139371	SK3	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	25.7 ± 2.1	2022-03-30
11139710	SK4	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	26.4 ± 2.1	2022-03-30
11139717	SK5	2022-03-18 @ 7:00 am	2022-03-21 @ 7:00 am	24.6 ± 2.0	2022-03-30

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Radon Test Kit Chain of Custody

Project Name: MCPS Radon – March 2022 Schools – Retesting

Name of Schools:

1. Herbert Hoover MS
2. Parkland MS
3. Redland MS
4. Rock Creek Valley ES
5. Tilden MS
6. Rockville HS
7. Wootton HS
8. Capt. James E. Daly ES
9. Clarksburg HS
10. Clearspring ES
11. Hallie Wells MS
12. Northwest HS
13. Paint Branch HS
14. Rocky Hills MS
15. Seneca Valley HS
16. Sherwood HS
17. Wilson Wims ES

	Date	Initials
Radon Test Kits Deployed	03/22/2022	BMM
Radon Test Kits Collected	03/25/2022	BMM
Radon Test Kits Shipped to Lab*	03/25/2022	BMM
Radon Test Kits Received by Lab*	03/28/2022	BMM

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