RADON SCREENING SURVEY – FOLLOW-UP WHITTIER WOODS CENTER

7100 Whittier Boulevard, Bethesda, Maryland 20817

Date of Test Report:	5/12/16
Round of Testing:	Initial
	Follow-up
	Post Remediation
# Rooms Tested	3
# Rooms <u>≥</u> 4.0 pCi/L:	0
Low Value:	1.9
High Value:	3.3
Confirmed Rooms ≥ 4.0 pCi/L US EPA	0
Action Level	

EXECUTIVE SUMMARY

Summary of Sampling Events ≥ 4.0 pCi/L

Room	Result (pCi/L) 3/24/16	Result (pCi/L) 5/12/16	Average Result (pCi/L)
5	4.1	1.9	3.0
4	3.6	3.3	3.5
KITCHEN	3.9	2.9	3.4



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MCPS RADON TESTING

Executive Summary: Whittier Woods Center

Date of Test Report:	5/12/2016
Round of Testing:	Initial
C	Follow-up
	Post Remediation
# Rooms Tested:	3
# Rooms \geq 4.0 pCi/L:	0
Low Value:	1.9
High Value:	3.3

Project Status:

Retesting completed; use the average of the initial and re-test results in a room to determine if remediation is necessary.



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May 12, 2016

Mr. Richard Cox Indoor Air Quality Team Leader Montgomery County Public Schools 850 Hungerford Drive Rockville, MD 20850

Re:	Radon Testing Services
	KCI Job # 12146341.36
Location:	Whittier Woods Center
	7100 Whittier Boulevard
	Bethesda, MD 20817

Dear Mr. Cox:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to the Montgomery County Public Schools (MCPS) pursuant to completing a "short-term" 3 day radon test for the Whittier Woods Center, located at 7100 Whittier Boulevard in Bethesda, Maryland 20817 (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 Safety Board (NRSB) Radon Measurement Specialist (certification #14SS056) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from www.montgomerycountymd.gov/dep/air/radon or www.epa.gov/radon.

KCI visited the site on April 11, 2016 and deployed three (3) activated charcoal (AC) radon test kits. KCI deployed radon test kits in 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 included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted six (6) 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 April 14, 2016 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:

The operating condition that represents the greatest amount of significantly occupied time for this building is; heating active, with outdoor temperature averages $\leq 65^{\circ}$ F.

KCI concludes that the test period reasonably represents normal conditions when the building is significantly occupied. Clear characterization of the radon hazard is most likely to be observed under this normal operating condition. Based on the evaluation of test conditions, this test should reasonably characterize radon hazards.

KCI also conducted observations of field conditions which could affect the results of the test and compiled weather data for the testing period. KCI recorded observations of the following conditions in each room at 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.

School personnel informed KCI during the sample collection that numerous windows were opened for extended periods during the testing due to a problem with the facility's HVAC system.

Results:

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 Attachn	nent B

Notes:

D- Duplicate sample

The office blank and lab transit blank had test results of less than the laboratory detection limit of 0.3 pCi/L. Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved. The Spike sample analysis results indicate the laboratory is operating within statistical control limits.

The sampling locations, field observations, and analytical results are listed on Table 1 (Attachment B). The laboratory analytical results are also attached (Attachment C). Laboratory results and exposure data for the spike samples are also included in Attachment C.

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) 316-7800.

Mr. Richard Cox May 12, 2016 Page 4

Sincerely,

James Makler

James M. Moulsdale Radon Measurement Specialist KCI Technologies, Inc.

Attachments:

- A- Floor Plan with Test Locations B- Table 1-Radon Test Summary Spreadsheet
- C- Laboratory Analytical Results

ATTACHMENT A

Floor Plan With Test Locations

ATTACHMENT B

Radon Test Summary Spreadsheet

Table Notes:

- AC- Activated Charcoal
- ACI- Air Chek, Inc.
- **D-** Duplicate
- FB- Field Blank
- KCI- KCI Technologies, Inc.
- **OB- Office Blank***
- PM- Project Manager
- QC- Quality Control

*Office blanks were submitted at a rate of 1% for all samples deployed in Phase 14 testing. Office blanks were not submitted under each school individually.

	Radon Testing Results	
	Whittier Woods Center	
	Test Period: 04/11/16-04/14/16	
Kit Number	Room / Area	Result
7752161	4	3.3
7752164	5	1.9
7752165	KITCHEN	2.9

ATTACHMENT C

Laboratory Analytical Results

Radon test result report for: WHITTIER CENTER MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7752161	4	2016-04-11 @ 3:00 pm	2016-04-14 @ 9:00 am	3.3 ± 0.4	2016-04-18
7752164	5	2016-04-11 @ 3:00 pm	2016-04-14 @ 9:00 am	1.9 ± 0.3	2016-04-18
7752165	KITCHEN	2016-04-11 @ 3:00 pm	2016-04-14 @ 9:00 am	2.9 ± 0.4	2016-04-18

Radon test result report for: OFFICE BLANK Phase 14

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7752157	0	2016-04-11 @ 4:00 pm	2016-04-14 @ 4:00 pm	< 0.3	2016-04-18
7752157	0	2016-04-11 @ 4:00 pm	2016-04-14 @ 4:00 pm	< 0.3	2016-04-

Radon test result report for: TRANSIT BLANK Phase 14

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7752162	1	2016-04-11 @ 4:00 pm	2016-04-14 @ 4:00 pm	< 0.3	2016-04-18

Radon test result report for: MCPS Spike Sample Results

7735295 1 7735289 2	2016-03-18	@ 1:00 pm	2016-03-21 @ 1:0	00 nm 30	10 ± 20	016 02 24
7735289 2	0016 00 10			00 pm - 50	$J.0 \pm 2.0$ 2	2016-03-24
	2016-03-18	@ 1:00 pm	2016-03-21 @ 1:0	00 pm 29	9.9 ± 2.0	2016-03-24
7735274 3	2016-03-18	@ 1:00 pm	2016-03-21 @ 1:0	00 pm 25	5.6 ± 1.7 2	2016-03-24
7735278 4	2016-03-18	@ 1:00 pm	2016-03-21 @ 1:0	00 pm 26	5.2 ± 1.8 2	2016-03-24
7735299 5	2016-03-18	@ 1:00 pm	2016-03-21 @ 1:0	00 pm 28	3.3 ± 1.9 2	2016-03-24
7735293 6	2016-03-18	@ 1:00 pm	2016-03-21 @ 1:0	00 pm 31	1.0 ± 2.0	2016-03-24

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

Note: Spike samples are test canisters that are deliberately exposed to a controlled high level of radon in a laboratory. They provide a quality control measure in the testing process and do NOT reflect radon levels in the building being tested.

EXPOSURE IN BOWSER-	MORNER RA	DON CHAMBER
CLIENT KCI Technolog:	es The.	Job Number 174430
NOMINAL Conditions: Radon Conc 26. (_pCi/L Rel. Hum	-18.8 % Temp. 70.1
Date Start: 3/18/16 Date Stop: 3/21/16	• Date Start:	Date Stop:
Time Start: 1250 Time Stop: 1350	Time Start:	Time Stop:
Device No.'s: (6) Chan. Cana	- Device No.'s:_	
3029154 thru 3029157		
3029083, 3029086		· .
FS Right		
Date Start: 3/18/16 Date Stop: 3/21/16	Date Start:	Date Stop:
Time Start: 1250 Time Stop: 1250	Time Start:	Time Stop:
Device No.'s: (6) Chan. Bags.	Device No.'s:_	
7735299,7735293,7735295,		
7735274, 7735278, 7735289		
-s Right		
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



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Radon Test Kit Chain of Custody

Project Name: MCPS Radon Phase 14

Name of Schools:

- 1. Westland MS
- 2. Whittier Woods Center

	Date	Initials
Radon Test Kits Deployed	4/11/16	JM
Radon Test Kits Collected	4/14/16	JM
Radon Test Kits Shipped to Lab*	4/14/16	JM
Radon Test Kits Received by Lab*	4/18/16	M

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



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MCPS RADON TESTING

Executive Summary: Whittier Woods Center

Date of Test Report:	3/24/2016
Round of Testing:	Initial
	Follow-up
	Post Remediation
# Rooms Tested:	12
# Rooms \geq 4.0 pCi/L:	1
Low Value:	1.8
High Value:	4.1

Rooms with results \geq 4.0 pCi/L: 5 (4.1 pCi/L)

 $\label{eq:project Status:} Initial testing completed; re-test needed for results \geq 4.0 \ pCi/L.$



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March 24, 2016

Mr. Richard Cox Indoor Air Quality Team Leader Montgomery County Public Schools 850 Hungerford Drive Rockville, MD 20850

Re:	Radon Testing Services
	KCI Job # 12146341.30
Location:	Whittier Woods Center
	7100 Whittier Boulevard
	Bethesda, MD 20817

Dear Mr. Cox:

KCI Technologies, Inc. (KCI) is pleased to submit the following report to the Montgomery County Public Schools (MCPS) pursuant to completing a "short-term" 3 day radon test for the Whittier Woods Center, located at 7100 Whittier Boulevard in Bethesda, Maryland 20817 (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 Safety Board (NRSB) Radon Measurement Specialist (certification #14SS056) supervised the testing. Additional information on radon management and the health effects of radon exposure is available from www.montgomerycountymd.gov/dep/air/radon or www.epa.gov/radon.

KCI visited the site on February 29, 2016 and deployed fifteen (15) activated charcoal (AC) radon test kits. KCI deployed radon test kits in 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 included duplicate samples, field blanks, lab transit blanks, and office blanks in accordance with AARST recommendations. In addition, KCI submitted six (6) 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, 2016 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:

The operating condition that represents the greatest amount of significantly occupied time for this building is; heating active, with outdoor temperature averages $\leq 65^{\circ}$ F.

KCI concludes that the test period reasonably represents normal conditions when the building is significantly occupied. Clear characterization of the radon hazard is most likely to be observed under this normal operating condition. Based on the evaluation of test conditions, this test should reasonably characterize radon hazards.

KCI also conducted observations of field conditions which could affect the results of the test and compiled weather data for the testing period. KCI recorded observations of the following conditions in each room at 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.

Results:

The results of the radon test analysis indicated the following:

Radon Concentration	Room Result			
≥4.0 piC/L	5 4.1			
<4.0 piC/L	See Attachment B			

Notes:

D- Duplicate sample

The field blank, office blanks, and lab transit blanks had test results of less than the laboratory detection limit of 0.3 pCi/L. Review of the duplicate sample analysis indicates that adequate laboratory measurement precision was achieved. The Spike sample analysis results indicate the laboratory is operating within statistical control limits.

The sampling locations, field observations, and analytical results are listed on Table 1 (Attachment B). The laboratory analytical results are also attached (Attachment C). Laboratory results and exposure data for the spike samples are also included in Attachment C.

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) 316-7800.

Mr. Richard Cox March 24, 2016 Page 4

Sincerely,

James Makler

James M. Moulsdale Radon Measurement Specialist KCI Technologies, Inc.

Attachments:

- A- Floor Plan with Test Locations B- Table 1-Radon Test Summary Spreadsheet
- C- Laboratory Analytical Results

ATTACHMENT A

Floor Plan With Test Locations

ATTACHMENT B

Radon Test Summary Spreadsheet

Table Notes:

- AC- Activated Charcoal
- ACI- Air Chek, Inc.
- **D-** Duplicate
- FB- Field Blank
- KCI- KCI Technologies, Inc.
- **OB- Office Blank***
- PM- Project Manager
- QC- Quality Control

*Office blanks were submitted at a rate of 1% for all samples deployed in Phase 10 testing. Office blanks were not submitted under each school individually.

Radon Testing Results Whitter Woods Test Period: 02/29/16-03/03/16			
Kit Number	Room / Area	Result	
7732472	4	3.6	
7732500	5	4.1	
7730091	6	3.0	
7730097	8	2.0	
7726820	9	2.0	
7732479	10	2.2	
7718585	11	2.1	
7735200	E	2.5	
7735187	KITCHEN	3.9	
7732473	OFFICE	2.6	
7732483	OFFICE 2	2.5	
7732486	S	2.3	

	Radon Testing Results			
	Whitter Woods			
	Test Period: 02/29/16-03/03/16			
Kit Number	QC Type	Result		
7735189	D (10)	1.8		
7729756	D (4)	3.1		
7718587	FB (11)	< 0.3		

ATTACHMENT C

Laboratory Analytical Results

March** LABORATORY ANALYSIS 16, REPORT **

Radon test result report for: WHITTIER WOODS MAIN

	NUOIII IU	Started	Ended	pCi/L	Analyzed
7732479	10	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.2 ± 0.4	2016-03-07
7735189	10	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	1.8 ± 0.4	2016-03-07
7718585	11	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.1 ± 0.4	2016-03-07
7718587	11	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	< 0.3	2016-03-07
7729756	4	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	3.1 ± 0.4	2016-03-07
7732472	4	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	3.6 ± 0.5	2016-03-07
7732500	5	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	4.1 ± 0.5	2016-03-07
7730091	6	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	3.0 ± 0.5	2016-03-07
7730097	8	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.0 ± 0.4	2016-03-07
7726820	9	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.0 ± 0.4	2016-03-07
7735200	Е	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.5 ± 0.4	2016-03-07
7735187 K	ITCHEN	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	3.9 ± 0.5	2016-03-07
7732473	OFFICE	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.6 ± 0.5	2016-03-07
7732483 C	OFFICE 2	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.5 ± 0.4	2016-03-07
7732486	S	2016-02-29 @ 12:00 pm	2016-03-03 @ 9:00 am	2.3 ± 0.4	2016-03-07

Radon test result report for: MCPS Radon Phase 10 Office Blanks

7726881 0 2016-02-29 @ 12:00 pm 2016-03-03 @ 12:00 pm < 0.3 2016-03- 7735107 0 2016 02 29 @ 12:00 pm 2016 03 03 @ 12:00 pm < 0.3 2016 03	Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7735107 0 2016 02 20 @ 12:00 pm 2016 03 03 @ 12:00 pm < 0.3 2016 03	7726881	0	2016-02-29 @ 12:00 pm	2016-03-03 @ 12:00 pm	< 0.3	2016-03-07
7753137 0 2010-02-27 @ 12.00 pm 2010-05-05 @ 12.00 pm < 0.5 2010-05-	7735197	0	2016-02-29 @ 12:00 pm	2016-03-03 @ 12:00 pm	< 0.3	2016-03-07

March** LABORATORY ANALYSIS 22, REPORT **

Radon test result report for: TRANSIT - PHASE 10 & 11 MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7735300	1	2016-03-18 @ 4:00 pm	2016-03-21 @ 4:00 pm	< 0.3	2016-03-22
7735296	2	2016-03-18 @ 4:00 pm	2016-03-21 @ 4:00 pm	< 0.3	2016-03-22
7735294	3	2016-03-18 @ 4:00 pm	2016-03-21 @ 4:00 pm	< 0.3	2016-03-22

February LABORATORY ANALYSIS 15, REPORT **

Spike Sample Laboratory Results

Radon test result report for: MCPS

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
7718273	101A	2016-01-30 @ 9:00 am	2016-02-01 @ 9:00 am	6.5 ± 0.6	2016-02-04
7718281	102B	2016-01-30 @ 9:00 am	2016-02-01 @ 9:00 am	6.4 ± 0.6	2016-02-04
7718282	103C	2016-01-30 @ 9:00 am	2016-02-01 @ 9:00 am	6.3 ± 0.6	2016-02-04
7718288	104D	2016-01-30 @ 9:00 am	2016-02-01 @ 9:00 am	6.7 ± 0.6	2016-02-04
7718289	105E	2016-01-30 @ 9:00 am	2016-02-01 @ 9:00 am	6.6 ± 0.6	2016-02-04
7718291	106F	2016-01-30 @ 9:00 am	2016-02-01 @ 9:00 am	6.5 ± 0.6	2016-02-04

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

Note: Spike samples are test canisters that are deliberately exposed to a controlled high level of radon in a laboratory. They provide a quality control measure in the testing process and do NOT reflect radon levels in the building being tested.

EXPOSURE IN BOWSER-MORNER RADON CHAMBER

CLIENT KCF Technologie	5 Inc. Job Number 173704
NOMINAL Conditions: Radon Conc 5.9	pCi/L Rel. Hum <u>45.9</u> % Temp. <u>79.0</u>
Date Start: 1/30/16 Date Stop: 2/1/16	Date Start: Date Stop:
Time Start: <u>9926</u> Time Stop: <u>996</u>	Time Start: Time Stop:
Device No.'s: (6) Char. Bago-	Device No.'s:
, ופבצורר, בוצבצורר אוצבצורר	
7718288, 7718289, 7718273	
E3 Left	
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



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Radon Test Kit Chain of Custody

Project Name: MCPS Radon Phase 10

Name of Schools:

- 1. Clarksburg Annex
- 2. Gaithersburg HS
- 3. Garrett Park Annex
- 4. Fields Road ES
- 5. Whitman HS
- 6. Rockview ES
- 7. Whittier Woods
- 8. Roscoe Nix ES
- 9. Clearspring ES
- 10. Key MS

	Date	Initials
Radon Test Kits Deployed	2/29/16	M
Radon Test Kits Collected	3/3/16	JM
Radon Test Kits Shipped to Lab*	3/3/16	JM
Radon Test Kits Received by Lab*	3/7/16	M

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