

March 4, 2022

Radon Survey Report – Schools/Commercial Buildings

640 SW Bancroft St – The Cottonwood School
Portland, OR 97239

Environmental Works is a licensed, bonded, and insured general contractor (CCB# 185781; WA# ENVIRWN906CS) and is certified by NEHA-NRPP (National Environmental Health Association- National Radon Proficiency Program #112037 RT) as a radon measurement and mitigation contractor. The following scope of work is to conduct an initial radon survey in the above referenced property and offer a mitigation technique(s), if needed, to achieve radon levels below the EPA (Environmental Protection Agency) recommended Action Level of 4.0 pCi/L. This survey does not address radon levels generated from out-gassing from well water or building materials.

Test Methods:

1. All radon testing methods presented in this agreement are based upon and in compliance with the American Association of Radon Scientists and Technologists, Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings (**ANSI/AARST MALB-2014**).
2. All testing and mitigation protocols are performed under the supervision of a Radon Professional that is certified by the American Association of Radon Scientists and Technologists (AARST) National Environmental Health Association and National Radon Proficiency Program (NRPP), License **NEHA-NRPP # 112037 RT**.
3. Analysis assumes the client/residents were provided with an **Attention Notice** prior to conducting the radon survey. This notice described the “**Closed Building Conditions**” required prior to and for the duration of the radon survey. Environmental Works posted notices at the time of test drop-offs, which were left in place or with residents for the duration of testing.*
4. Radon test kits were deployed by **Sam DeLiso** on **2/11/22** and retrieved by **Sam DeLiso** on **2/15/22**, for **95 hours** of continuous radon measurement.
5. 1 Short-Term activated charcoal test kit was deployed in each selected room, totaling **17 total test locations**.
6. **1 Duplicate Test** was set and retrieved for quality control/quality assurance.
7. **1 Field Blanks, 1 Office Blanks, & 1 Lab Blanks** were deployed to detect for batch contamination.
8. **1 Spike** was conducted to test for laboratory analysis accuracy.
9. **1 Continuous Radon Monitor (CRM)** was deployed in the main hallway near the Kiln Room – a centrally located, ground level/first floor area to track hourly variations of radon gas.
9. Charcoal test kits were provided and analyzed by AirChek Inc. RSSI Lab (NEHA Lab ID: 101138 AL)
10. Charcoal test kits were sent to the AirChek lab via UPS Next or Second Day Air service.
11. Statement of Test Limitations: There is some uncertainty with any measurement result due to statistical variations and other factors such as daily and seasonal variations in radon concentrations. Variations may be due to changes in the weather, operation of the dwelling, or possible interference with the necessary test conditions.

Table 1: Radon Test Results (Abbreviated)

COMPANY NAME	Environmental Works, LLC
TEST DATES	February 11 – 15, 2022
REPORT DATE	February 27, 2022
PROPERTY	The Cottonwood School
CLASSROOM / TEST LOCATION	
UTILITY	< 0.3
110 - COMP LAB	< 0.3
102	< 0.3
101	< 0.3
104	< 0.3
105	< 0.3
106	< 0.3
107	0.6
108	< 0.3
109	< 0.3
111	< 0.3
112	< 0.3
113	< 0.3
114	< 0.3
GREAT ROOM – NEAR HALL	< 0.3
GREAT ROOM – NEAR STAIRS	< 0.3
AMANDA'S OFFICE	< 0.3

Table 2: Extended Testing Protocol Radon Test Results (Full Report)

Device Serial #	Test Location # Room or Unit	Test Location	Floor Level	Test Type (AC, AT, CRM)	QA/QC Type	Radon (pCi/L)	RPD	Radon Average	Recommend
11035682	UTILITY	Wall	0	AC		< 0.3		< 0.3	
11035683	110 - COMP LAB	Wall	0	AC		< 0.3		< 0.3	
11035684	102	Wall	0	AC		< 0.3		< 0.3	
11035685	101	Wall	0	AC		< 0.3		< 0.3	
11035686	104	Wall	0	AC		< 0.3		< 0.3	
11035687	105	Wall	0	AC		< 0.3		< 0.3	
11035688	106	Wall	0	AC		< 0.3		< 0.3	
11035689	107	Wall	0	AC		0.5		0.6	
11035696	107 DUPLICATE	Wall	0	AC	D	0.6			
11035690	108	Wall	0	AC		< 0.3		< 0.3	
11035691	109	Wall	0	AC		< 0.3		< 0.3	
11035692	111	Wall	0	AC		< 0.3		< 0.3	
11035693	112	Wall	0	AC		< 0.3		< 0.3	
11035694	113	Wall	0	AC		< 0.3		< 0.3	
11035695	114	Wall	0	AC		< 0.3		< 0.3	
11035697	GREAT ROOM NEAR HALL	Wall	0	AC		< 0.3		< 0.3	
11035698	GREAT ROOM NEAR STAIRS	Wall	0	AC		< 0.3		< 0.3	
11035699	AMANDA'S OFFICE	Wall	0	AC		< 0.3		< 0.3	
259966008	CENTRAL HALLWAY	Tripod	0	CRM	D	0.2		< 0.3	

*RPD between duplicate tests should be <36% for results over 4.0 pCi/L and <68% for results under 4.0 pCi/L

Table 3: QA / QC Blanks

Device Serial #	Room or Unit	Test Location	Floor Level	Test Type (AC, AT, CRM)	QA/QC Type	Radon (pCi/L)
11035700	OFFICE BLANK	Wall	1	AC	OB1	< 0.3
11067501	FIELD BLANK	Wall	1	AC	FB 1	< 0.3
11067502	LAB BLANK			AC	LB1	< 0.3

*Blanks should not test higher than the laboratories Lower Limit of Detection (LLD), typically < 0.3 pCi/L

Table 4: QA / QC Spikes (Bowser-Morner Radon Lab)

Device Serial #	Test Type (AC, AT, CRM)	Measured Value (pCi/L)	Chamber Value (pCi/L)	RPE
11035650	AC	13.9	16.3	14.7%

*RPE should not exceed 30% as the upper limit

Radon Inspection Report – CRM Parameters (Test Location – CENTRAL HALLWAY)

Test Checklist

- The location of the detector was selected so the detector was not to be disturbed during testing.
- The monitor was not placed in an area of high humidity such as: Kitchen, laundry room, cellar, spa room, garage, crawl space or sump area.
- The detector was not placed near areas of excessive heat, such as a fireplace or in direct sunlight.
- Portable window fans were removed or sealed in place prior to testing.
- The detector was placed within the breathing zone of at least 20 inches to 6 feet above the floor and at least 1 foot below the ceiling if suspended.
- Window air conditioners were operable in recirculation mode only.
- The detector was not placed within 1 foot of outside walls of the home or within 3 feet of any windows or doors to the exterior of the home.

Radon Inspection Report

Test Location:

The Cottonwood School
640 SW Bancroft St
Portland, OR 97239

Bldg. Type: Educational

Test For:

The Cottonwood School
640 SW Bancroft St
Portland, OR 97239

Type: Screening

Inspected By:

Environmental Works
22820 NE Sandy Blvd
Fairview, OR 97024
503-719-6715
Lic/Cert. # CCB-185781

Test Result: Pass

Overall Average:

0.2 pCi/l

Test Device Details:

Serial Number: 259966008
Model Number: 1028XP
Last Calibration: 08/11/2021
Next Calibration: 08/11/2022
Cal-Factors: 2.97
Motion Error: Yes

Test Site Condition:

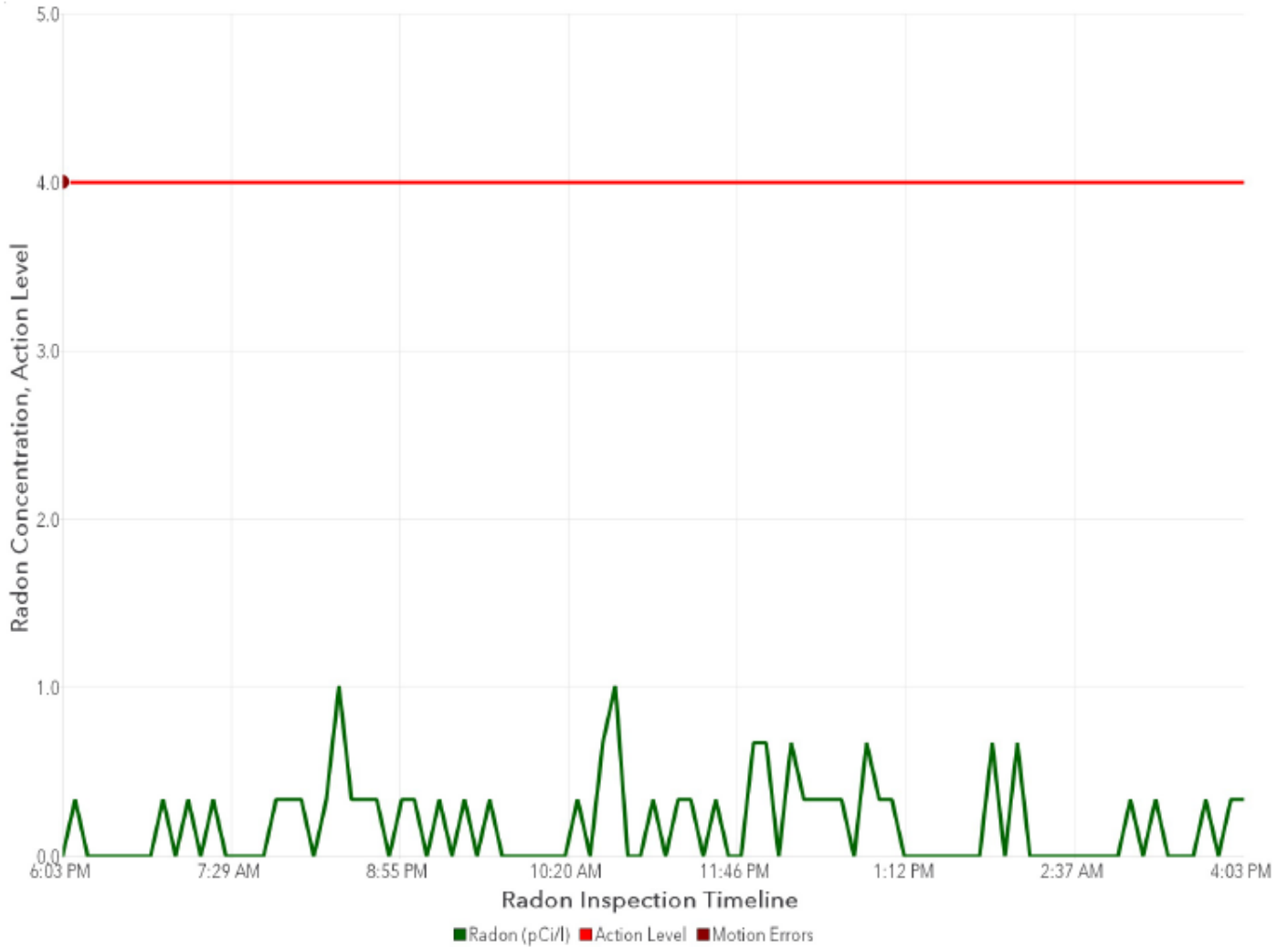
Condition: Recent Rainfall

Test Summary:

CRM Location: Central Hallway	Start: 02/11/2022 05:03 PM	Stop: 02/15/2022 04:03 PM	Interval: 1 hr	Duration: 95 hr
Radon Concentration:	Min: 0.0	Max: 1.0	Average: 0.2	Measurement Units: pCi/l



Graph 1: Radon Inspection Chart – CRM Data (Test Location – CENTRAL HALLWAY)



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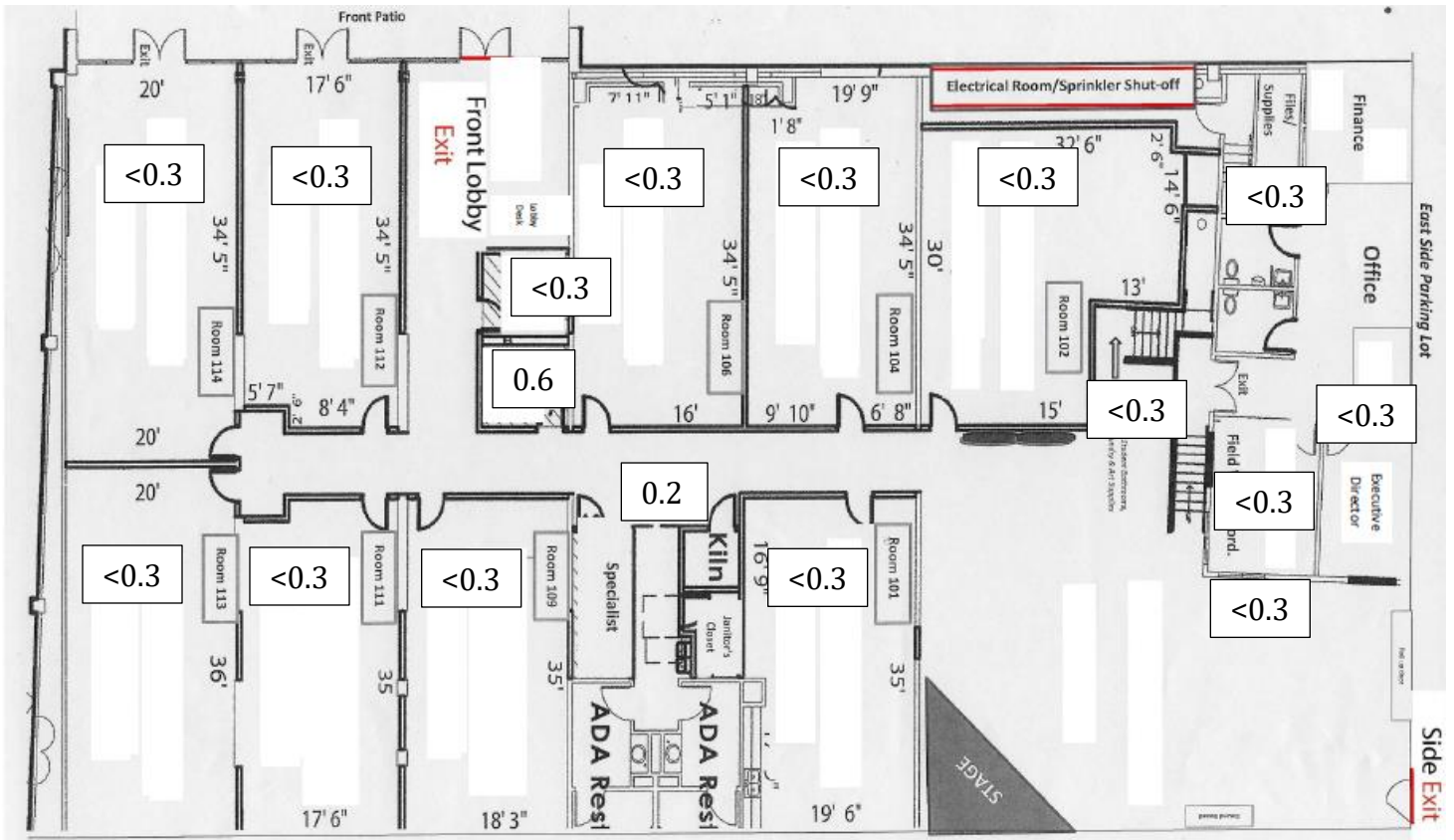
Table 5: Hourly CRM Test Data (Test Location – CENTRAL HALLWAY)

*First 4 hours of data excluded from test result overall average

<u>Date/Time</u>	<u>Radon(pCi/l)</u>	<u>Flags</u>	<u>Date/Time</u>	<u>Radon(pCi/l)</u>	<u>Flags</u>
02/11/22 06:03 PM	0.0	M	02/13/22 02:03 PM	1.0	-
02/11/22 07:03 PM	0.3	-	02/13/22 03:03 PM	0.0	-
02/11/22 08:03 PM	0.0	-	02/13/22 04:03 PM	0.0	-
02/11/22 09:03 PM	0.0	-	02/13/22 05:03 PM	0.3	-
02/11/22 10:03 PM	0.0	-	02/13/22 06:03 PM	0.0	-
02/11/22 11:03 PM	0.0	-	02/13/22 07:03 PM	0.3	-
02/12/22 12:03 AM	0.0	-	02/13/22 08:03 PM	0.3	-
02/12/22 01:03 AM	0.0	-	02/13/22 09:03 PM	0.0	-
02/12/22 02:03 AM	0.3	-	02/13/22 10:03 PM	0.3	-
02/12/22 03:03 AM	0.0	-	02/13/22 11:03 PM	0.0	-
02/12/22 04:03 AM	0.3	-	02/14/22 12:03 AM	0.0	-
02/12/22 05:03 AM	0.0	-	02/14/22 01:03 AM	0.7	-
02/12/22 06:03 AM	0.3	-	02/14/22 02:03 AM	0.7	-
02/12/22 07:03 AM	0.0	-	02/14/22 03:03 AM	0.0	-
02/12/22 08:03 AM	0.0	-	02/14/22 04:03 AM	0.7	-
02/12/22 09:03 AM	0.0	-	02/14/22 05:03 AM	0.3	-
02/12/22 10:03 AM	0.0	-	02/14/22 06:03 AM	0.3	-
02/12/22 11:03 AM	0.3	-	02/14/22 07:03 AM	0.3	-
02/12/22 12:03 PM	0.3	-	02/14/22 08:03 AM	0.3	-
02/12/22 01:03 PM	0.3	-	02/14/22 09:03 AM	0.0	-
02/12/22 02:03 PM	0.0	-	02/14/22 10:03 AM	0.7	-
02/12/22 03:03 PM	0.3	-	02/14/22 11:03 AM	0.3	-
02/12/22 04:03 PM	1.0	-	02/14/22 12:03 PM	0.3	-
02/12/22 05:03 PM	0.3	-	02/14/22 01:03 PM	0.0	-
02/12/22 06:03 PM	0.3	-	02/14/22 02:03 PM	0.0	-
02/12/22 07:03 PM	0.3	-	02/14/22 03:03 PM	0.0	-
02/12/22 08:03 PM	0.0	-	02/14/22 04:03 PM	0.0	-
02/12/22 09:03 PM	0.3	-	02/14/22 05:03 PM	0.0	-
02/12/22 10:03 PM	0.3	-	02/14/22 06:03 PM	0.0	-
02/12/22 11:03 PM	0.0	-	02/14/22 07:03 PM	0.0	-
02/13/22 12:03 AM	0.3	-	02/14/22 08:03 PM	0.7	-
02/13/22 01:03 AM	0.0	-	02/14/22 09:03 PM	0.0	-
02/13/22 02:03 AM	0.3	-	02/14/22 10:03 PM	0.7	-
02/13/22 03:03 AM	0.0	-	02/14/22 11:03 PM	0.0	-
02/13/22 04:03 AM	0.3	-	02/15/22 12:03 AM	0.0	-
02/13/22 05:03 AM	0.0	-	02/15/22 01:03 AM	0.0	-
02/13/22 06:03 AM	0.0	-	02/15/22 02:03 AM	0.0	-
02/13/22 07:03 AM	0.0	-	02/15/22 03:03 AM	0.0	-
02/13/22 08:03 AM	0.0	-	02/15/22 04:03 AM	0.0	-
02/13/22 09:03 AM	0.0	-	02/15/22 05:03 AM	0.0	-
02/13/22 10:03 AM	0.0	-	02/15/22 06:03 AM	0.0	-
02/13/22 11:03 AM	0.3	-	02/15/22 07:03 AM	0.3	-
02/13/22 12:03 PM	0.0	-	02/15/22 08:03 AM	0.0	-
02/13/22 01:03 PM	0.7	-	02/15/22 09:03 AM	0.3	-
			02/15/22 10:03 AM	0.0	-
			02/15/22 11:03 AM	0.0	-
			02/15/22 12:03 PM	0.0	-
			02/15/22 01:03 PM	0.3	-
			02/15/22 02:03 PM	0.0	-
			02/15/22 03:03 PM	0.3	-
			02/15/22 04:03 PM	0.3	-



Figure 1: Site Map of Radon Survey Results (Figures in pCi/L)
The Cottonwood School Layout



Summary:

1. **QUALITY CONTROL** measures indicate no error in laboratory analysis or batch contamination.
2. **BUILDING AIR PURIFICATION SYSTEMS IN OPERATION DURING TESTING** likely to be contributing to increased air circulation and potentially reduced radon concentrations.
3. **MITIGATION NOT RECOMMENDED** as all test results came back below the EPA Recommended Action Level of 4.0 pCi/L. Re-testing every 2 to 5 years is suggested and following any major structural, mechanical, or other changes to the building systems.