March 22, 2023

Joe Crelier
Director of Risk Management
Portland Public Schools

Via email: jcrelier@pps.net

Regarding: Short Term Radon Testing
Terwilliger Elementary School
6318 SW Corbett Street
Portland, Oregon
PBS Project 25000.241 Phase 0019

Mr. Crelier:

From March 7 to March 10, 2023, PBS Engineering and Environmental Inc. (PBS) performed short-term radon testing at Terwilliger Elementary School, located at 6318 SW Corbett Street in Portland, Oregon. PBS understands that the District completed initial radon testing in the building in 2017 and has requested this additional sampling due to the fact that this facility has had earth- or foundation-disturbing work completed in the last five years.

METHODOLOGY

The Environmental Protection Agency (EPA) recommends, and the Oregon Health Authority (OHA) requires, that school buildings be tested for radon, and that any radon concentrations be maintained below 4.0 picocuries per liter (pCi/L) of air. PBS used Radonova, Inc., brand single-use, short-term radon test kits to measure radon levels in frequently occupied rooms that are in contact with the ground or above unoccupied basements or crawlspaces. These rooms include classrooms, offices, break rooms, conference rooms, gyms, and cafeterias. Bathrooms, hallways, stairwells, storage rooms, and closets are not tested. Testing is conducted during the winter heating season and during the school week when building uses and operations are normal.

PBS endeavored to use sample location names based on existing room numbers or common-sense descriptions, but in buildings where no room number or other designation was available, PBS assigned names or numbers to the rooms. In some circumstances, small numbers of test kits go missing during the testing period and those locations are not tested. PBS will evaluate whether or not the missing area should be retested based on the results of surrounding areas.

RESULTS

Laboratory results found concentrations below the EPA action level in all tested locations in the building. This is consistent with results from the 2017 testing.

See the attached laboratory analysis report for more details and the attached informal sample location map approximate locations of where samples were collected.

In addition to the EPA recommendation that radon concentrations not exceed 4.0 pCi/L, OHA recommends that the following steps be conducted based on the results of a room's initial short-term test:

- **If the result is less than 2.0 pCi/L,** school districts are required to test again every 10 years, per Oregon Revised Statute 332.166-167.
- **If the result is between 2.0 pCi/L and 4.0 pCi/L,** consider fixing (i.e., lowering) the radon in that room.
- **If the result is from 4.0 pCi/L to 8.0 pCi/L,** perform a follow-up measurement of that room using a long-term test. This test should be conducted over as much of a nine-month school year as possible, when the room is likely to be occupied. If that result is equal to or greater than 4.0 pCi/L, the radon in the room should be fixed (i.e., lowered).
- **If the initial short-term test result is equal to or greater than 8.0 pCi/L,** conduct a second short-term test and average its result with the initial short-term test result. If the average of the two is equal to or greater than 4.0 pCi/L, radon in the room should be fixed (i.e., lowered).

  Note: A great difference in the results of the short-term tests may indicate a flaw in the testing process. Investigate and consider retesting. For situations in which one of the test results is equal to or greater than 4.0 pCi/L, if the higher result is two or more times the lower result, repeat the test.

LIMITATIONS OF SCOPE

This study was limited to the tests and locations as previously indicated. The site as a whole may have other environmental concerns that will not be characterized by this study. The findings and conclusions of this work are not scientific certainties, but probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent conditions on the site or adjoining sites beyond those detected or observed by PBS.

Please feel free to contact me at 503.515.7489 or james.mastanduno@pbsusa.com with any questions or comments.

Sincerely,

Digitally signed by James Mastanduno
Date: 2023.03.24 11:34:21 -07'00'

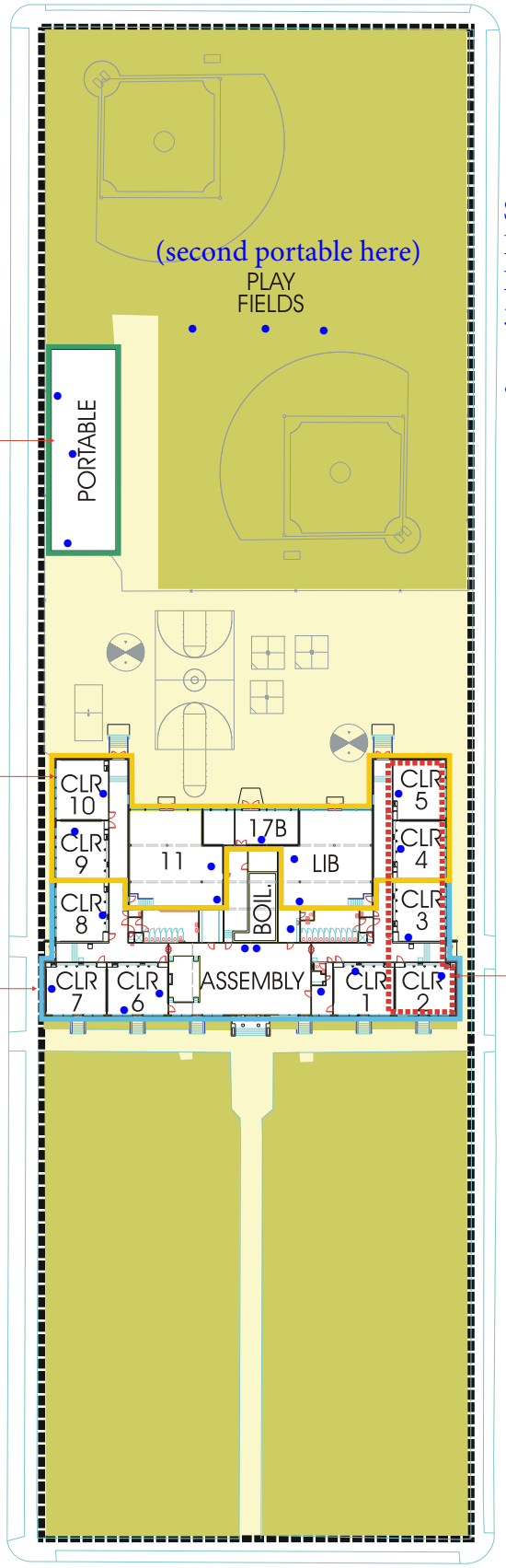
James Mastanduno
Project Manager

Attachment: Informal Sample Location Map
Radonova Laboratory Analysis Report

Portland Public Schools

FACILITIES AND ASSET MANAGEMENT

Terwilliger Elementary School
6318 SW Corbett Street
Facility Plan



Short-Term Radon Testing Locations
PBS Engineering and Environmental, Inc.
3/07-3/10/2023

• - Test Location

N

SITE / FIRST FLOOR PLAN

TOTAL SF	24,646
ACRES	3.31
1/4 SECT.	3629

radonova
The global leader in radon measurement

REPORT NUMBER
6608381:1

REPORT PAGE
1 of 5

REPORT DATE
03/15/2023

PRINT DATE
03/15/2023

OWN ID
25000.241 Phase 0019

BY
PBS Engineering & Environmental

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PBS Engingeering & Environmental
James Mastanduno

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with Activated Charcoal Adsorption by Alpha Energy Laboratories (NRPP ID: 101132 AL).

The detector(s) arrived to Alpha Energy Laboratories, Inc. **03/13/2023**.
They were measured **03/13/2023**.

Test data have been given by PBS Engingeering & Environmental

Property data and address

MEASURE SITE ADDRESS
Terwilliger Elementary School
6318 SW Corbett Ave
Portland

BUILDING ID

Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK121854 [QuickScreen]	*03/07/2023 06:40 AM – 03/10/2023 06:30 AM*	*"Floor 1, cafeteria", Standard*		< 0.7 pCi/L
RK121878 [QuickScreen]	*03/07/2023 06:41 AM – 03/10/2023 06:31 AM*	*"Floor 1, cafeteria", Standard*		< 0.8 pCi/L
RK121886 [QuickScreen]	*03/07/2023 06:42 AM – 03/10/2023 06:32 AM*	*"Floor 1, room 17B", Standard*		< 0.7 pCi/L
RK122008 [QuickScreen]	*03/07/2023 06:43 AM – 03/10/2023 06:33 AM*	*"Floor 1, room 5", Standard*		0.7 pCi/L
RK121858 [QuickScreen]	*03/07/2023 06:44 AM – 03/10/2023 06:34 AM*	*"Floor 1, room 4", Standard*		< 1.0 pCi/L
RK121852 [QuickScreen]	*03/07/2023 06:45 AM – 03/10/2023 06:35 AM*	*"Floor 1, room 4 DUP", Duplicate*		< 0.5 pCi/L
RK121883 [QuickScreen]	*03/07/2023 06:46 AM – 03/10/2023 06:36 AM*	*"Floor 1, Library", Standard*		< 0.6 pCi/L

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

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RK121843 [QuickScreen]	*03/07/2023 06:47 AM – 03/10/2023 06:37 AM*	*"Floor 1, Library", Standard*		< 0.6 pCi/L
RK121822 [QuickScreen]	*03/07/2023 06:48 AM – 03/10/2023 06:38 AM*	*"Floor 1, room 3", Standard*		< 0.6 pCi/L
RK121844 [QuickScreen]	*03/07/2023 06:49 AM – 03/10/2023 06:39 AM*	*"Floor 1, room 2", Standard*		< 0.9 pCi/L
RK121859 [QuickScreen]	*03/07/2023 06:50 AM – 03/10/2023 06:40 AM*	*"Floor 1, room 1", Standard*		< 0.7 pCi/L
RK121829 [QuickScreen]	*03/07/2023 06:51 AM – 03/10/2023 06:41 AM*	*"Floor 1, room 18", Standard*		< 0.9 pCi/L
RK121810 [QuickScreen]	*03/07/2023 06:52 AM – 03/10/2023 06:42 AM*	*"Floor 1, kitchen", Standard*		< 0.6 pCi/L
RK121853 [QuickScreen]	*03/07/2023 06:53 AM – 03/10/2023 06:43 AM*	*"Floor 1, room 6B", Standard*		< 0.6 pCi/L
RK121868 [QuickScreen]	*03/07/2023 06:54 AM – 03/10/2023 06:44 AM*	*"Floor 1, room 6", Standard*		< 0.5 pCi/L
RK121903 [QuickScreen]	*03/07/2023 06:55 AM – 03/10/2023 06:45 AM*	*"Floor 1, room 6A", Standard*		< 0.4 pCi/L

Comment to the results

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK122007 [QuickScreen]	*03/07/2023 06:56 AM – 03/10/2023 06:46 AM*	*"Floor 1, room 7", Standard*		< 1.1 pCi/L
RK121980 [QuickScreen]	*03/07/2023 06:57 AM – 03/10/2023 06:47 AM*	*"Floor 1, room 7 dup", Duplicate*		< 0.5 pCi/L
RK121894 [QuickScreen]	*03/07/2023 06:58 AM – 03/10/2023 06:48 AM*	*"Floor 1, room 8", Standard*		< 0.9 pCi/L
RK121947 [QuickScreen]	*03/07/2023 06:59 AM – 03/10/2023 06:49 AM*	*"Floor 1, PE", Standard*		**DNR**
RK121945 [QuickScreen]	*03/07/2023 07:00 AM – 03/10/2023 06:50 AM*	*"Floor 1, PE office", Standard*		< 0.5 pCi/L
RK121912 [QuickScreen]	*03/07/2023 07:01 AM – 03/10/2023 06:51 AM*	*"Floor 1, room 9", Standard*		< 0.4 pCi/L
RK121993 [QuickScreen]	*03/07/2023 07:02 AM – 03/10/2023 06:52 AM*	*"Floor 1, room 10", Standard*		< 0.5 pCi/L
RK121820 [QuickScreen]	*03/07/2023 07:03 AM – 03/10/2023 06:53 AM*	*"Floor 1, room 24", Standard*		< 0.7 pCi/L
RK121376 [QuickScreen]	*03/07/2023 07:04 AM – 03/10/2023 06:54 AM*	*"Floor 1, room 21", Standard*		0.8 pCi/L

Comment to the results

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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
RK121670 [QuickScreen]	*03/07/2023 07:05 AM – 03/10/2023 06:55 AM*	*"Floor 1, room 26", Standard*		0.7 pCi/L
RK121920 [QuickScreen]	*03/07/2023 07:06 AM – 03/10/2023 06:56 AM*	*"Floor 1, room 27", Standard*		< 0.3 pCi/L
RK121910 [QuickScreen]	*03/07/2023 07:07 AM – 03/10/2023 06:57 AM*	*"Floor 1, room 27 DUP", Duplicate*		< 0.5 pCi/L
RK121856 [QuickScreen]	*03/07/2023 07:08 AM – 03/10/2023 06:58 AM*	*"Floor 1, room 28", Standard*		< 0.6 pCi/L
RK121934 [QuickScreen]	*03/07/2023 07:09 AM – 03/10/2023 06:59 AM*	*"Floor 1, room 29", Standard*		< 0.5 pCi/L
RK121668 [QuickScreen]	*03/07/2023 07:09 AM – 03/10/2023 06:59 AM*	*Blank, Blank*		< 1.0 pCi/L

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Measurement method: Activated Charcoal Adsorption

For this method using the QuickScreen detector, the airtight container with activated charcoal is opened in the area to be sampled and radon in the air adsorbs onto the charcoal granules. At the end of the sampling period, the container is sealed and may be sent to a laboratory for analysis. The gamma decay from the radon adsorbed to the charcoal is counted on a scintillation detector and a calculation based on calibration information is used to calculate the radon concentration at the sample site.

Measured radon concentrations

For each detector, the measured value of the radon concentration is provided. For each value an uncertainty associated with the measurement to a 95% confidence level is also provided. For example a measurement result of 4.0 ± 0.5 pCi/L means that the radon concentration is most likely contained in the range 3.5 - 4.5 pCi/L. If the start or end date of the measurement has not been provided, the radon concentration cannot be calculated. In such cases, the total exposure in pCi*days/L will be reported. The reported measured values are related to the detectors as received by Radonova Laboratories. Detector deployment is not performed by Radonova Laboratories. Measurement information such as monitoring period (dates) and placement location is provided to Radonova Laboratories by the end user.

Codes on non-reportable detectors

DNR Not Reported – Detector Not Returned
ERR Not Reported – See comment

Measurement method versions used when the report was created

ANSI/AARST MAH-2019, Protocol for Conducting Measurements of Radon and Radon Decay Products in Homes
ANSI/AARST MAMF-2017, rev. 1/2021, Protocol for Conducting Measurements of Radon and Radon Decay Products in Multifamily Buildings
ANSI/AARST MALB-2014, rev. 1/2021, Prot. for Conducting Measurements of Radon and Radon Decay Products In Schools and Large Buildings

Radon measurements in Multifamily Buildings, Schools and Large Buildings

The United States Environmental Protection Agency (EPA) recommends remediation if the results of one long-term test or the average of two short-term tests conducted in an occupied room are 4.0 pCi/L or higher. The average yearly residential indoor radon level in the US is estimated to be around 1.3 pCi/L. Long-term tests are conducted for more than 90 days. Short-term tests are conducted between 2 and 90 days and should be performed under closed building conditions.
If an initial short-term test result is less than 4 pCi/L, a follow-up measurement is probably not needed.
If an initial short-term test result is between 4 pCi/L and 8 pCi/L, a long-term or a short-term follow-up measurement is recommended.
If an initial short-term test result is greater than 8 pCi/L, a short term follow-up measurement is recommended in order to get a fast result.

More information about radon measurements and mitigation can be found in the ANSI/AARST publications:

- ANSI/AARST Protocol for Conducting Measurements of Radon and Radon-Decay Products in Schools and Large Buildings.
- ANSI/AARST Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings.
- ANSI/AARST Radon Mitigation Standards for Schools and Large Buildings.
- ANSI/AARST Radon Mitigation Standards for Multifamily Buildings.

For more information about the interpretation of your test results or about other radon related issues we suggest contacting your state radon office.

Signature on the report

With the signature on the report, the Measurement specialist at Radonova Laboratories certifies that the quality control procedures follows the guidance in accordance with the AARST/ANSI Measurement Protocols. Measurement information displayed in italics on report has been provided by the customer.

Certification no:

101132-AL, 107830-RT, NY ELAP ID: 11430

APPEND_US_EN_002_REPORT_v230306:1.ppcd

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