RADON GAS SAMPLING AND ANALYSIS REPORT

Prepared by:

For:

Jeff Webster
Warrensburg (MO) R6 School District
201 S. Holden Street
Warrensburg, MO 64093

Project:

Radon Gas Sampling and Analysis
Martin Warren Elementary School
105 S. Maguire Street
Warrensburg, MO 64093

TES Project No.: 26086ALMR.01C

August 7, 2026

Full Service Environmental Consulting, Testing & Contracting
2418 Merriam Lane, KCK 66106 | Phone: 913-432-5500 | www.titankc.com

August 7, 2026 TES Project No.: 26086ALMR.01C

Jeff Webster
Warrensburg (MO) R6 School District
201 S. Holden Street
Warrensburg, MO 64093

RE: Report of Findings for Radon Gas Sampling and Analysis
Martin Warren Elementary School
105 S. Maguire Street
Warrensburg, MO 64093

Dear Client:

Titan Environmental Services, Inc. (TES) is pleased to provide this report of findings associated with the radon gas testing performed at 105 S. Maguire Street, Warrensburg, MO 64093 The radon gas testing was performed by Karla Granger, a National Radon Proficiency Program (NRPP) Radon Measurement Technician (Certificate #: 107404-RMP, Expiration date: January 31, 2028). Testing was conducted in accordance with HUD Guidelines and in general accordance with ANSI/AARST MA-MFLB-2023: Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily, School, Commercial and Multi-Use Buildings.

TES previously conducted a radon sampling event at the subject property from March 10-12, 2026, in accordance with HUD guidelines and in general accordance with ANSI/AARST MA-MFLB-2023. All but 12 of the results during that testing were below the ANSI/AARST MA-MFLB-2023PA Action Level of 4.0 picocuries per liter of air (4.0 pCi/L). At client request, only the basement areas that exhibited radon above the EPA standard were tested at this time. This report only references these areas.

Background Information

Radon gas comes from the natural (albeit radioactive) breakdown of uranium in soil, rock, and water, and enters the body through inhalation. Radon content within the air is ubiquitous; it can be found within any home in the United States, in both indoor and outdoor air. As such, it can be found in the air content of any building, regardless of property history or use.

Radon is the second-leading cause of lung cancer in the United States, behind tobacco use. Radon gas decays into radioactive particles which are trapped within the alveoli of the lungs when inhaled. As they break down further, these particles release small bursts of energy. This can damage lung tissues and lead to lung cancer of the course of your lifetime. Not everyone exposed to elevated levels of radon will develop lung cancer; factors that may affect your risk of lung cancer can include factors such as time exposed, other chemicals the lungs are exposed to (e.g. tobacco smoke, Volatile Organic Compounds (VOCs), etc.), and other such factors.

Radon Testing Procedure

On August 3, 2026, TES placed **seven (7)** radon gas measurement devices throughout the subject property, excluding blank samples. Duplicates are pairs of detectors or monitors deployed in the same location, side-by-side, for the same measurement period. The purpose of duplicates is to evaluate precision or agreement between detectors or monitors. Some variation between detectors of monitors. Some variation between the results of each detector is expected, but excessive variation could result from poor quality sampling media. Blanks help evaluate any detector response from sources other than radon exposure (i.e., in the manufacturing process, during shipment, storage, analysis, and handling. Ten percent (10%) duplicates and five percent (5%) field blanks were deployed for quality assurance and control (QA/QC) purposes. Each sample was set for a minimum of 48 hours in a location that was between 2.5 and 5.5 feet off the floor. This area is chosen due to it being the height at which air is typically inhaled by most human beings.

On August 5, 2026, TES Collected the Pro-Chek radon measurement devices and submitted the samples to Air-Chek Inc., in Mills River, NC (NRPP Certified Lab no.: 101138AL). The test and analysis was performed to comply with the US Environmental Protection Agency (USEPA) and State of Missouri Department of Health and Senior Services (MDHSS) short-term radon testing protocol. The test results represent the average radon concentration at the time of the sampling event, and at each specific location tested within the subject property.

There is a level of uncertainty with any measurement result, due to statistical variations and other factors. These include factors such as daily and seasonal variations in radon concentrations, weather, operation of the dwelling, or possible interference with the necessary test conditions. The average radon gas level at the time of sampling, measured in picocuries of radon per liter of air (pCi/L: +/- 0.3) has been included as well. No tampering was observed during the course of the sampling event. Closed building conditions were observed for the duration of the test.

The following table details the results of the radon sampling event at the subject property:

Sample #	Location	EPA Recommended Action Guideline	Test Results (3/12/26)	Test Results (8/5/26)	Average for Both Events
12403893	Basement Room 10	4.0 pCi/L	8.3 pCi/L	0.5 pCi/L	4.4 pCi/L
12403894	Basement Room 12	4.0 pCi/L	9.1 pCi/L	<0.3 pCi/L	4.7 pCi/L
12403895	Basement Room 13	4.0 pCi/L	17.1 pCi/L	<0.3 pCi/L	8.7 pCi/L
7554097	Basement Room 13 (duplicate)	4.0 pCi/L	N/A	0.5 pCi/L	N/A
Average for Basement Room 13		4.0 pCi/L	N/A	0.4 pCi/L	N/A
12403892	Basement Room 14	4.0 pCi/L	30.8 pCi/L	<0.3 pCi/L	15.6 pCi/L
7553981	Basement Storage Room	4.0 pCi/L	10.9 pCi/L	1.8 pCi/L	6.4 pCi/L
12403883	Basement Room 11	4.0 pCi/L	9.1 pCi/L	<0.3 pCi/L	4.7 pCi/L
7553977	QC Blank	4.0 pCi/L	<0.3 pCi/L	<0.3 pCi/L	<0.3 pCi/L
Average Radon Concentration Complex-Wide		4.0 pCi/L	4.5 pCi/L	0.9 pCi/L	*2.7 pCi/L

N/A: Not Applicable

*This value only represents the average of the two sampling events. The projected overall average radon concentration for all combined readings is **7.45 pCi/L.**

Based on the results of this sampling event, the samples collected from Basement Rooms 10-14 and the Basement Storage Room reported radon gas concentrations were below the USEPA action guideline of 4.0 pCi/L at the time of this assessment. However, based on the standard short-term testing protocols established by the EPA and ANSI/AARST MAH, when two consecutive short-term tests are performed at different times of the year, **you must use the arithmetic average of those two test events to determine the need for mitigation.**

The projected overall average radon concentration for all combined readings is **7.45 pCi/L**, with individual location averages ranging from **4.7 pCi/L to 15.55 pCi/L**. Because radon levels fluctuate significantly between winter/spring (March) and summer (August), a full-year projection is typically calculated by averaging these seasonal variations.

Projected Averages by Location

- **Location 1**: **4.4 pCi/L** (8.3 March / 0.5 August)
- **Location 2**: **4.7 pCi/L** (9.1 March / 0.3 August)
- **Location 3**: **8.7 pCi/L** (17.1 March / 0.3 August)
- **Location 4**: **15.55 pCi/L** (30.8 March / 0.3 August)
- **Location 5**: **6.35 pCi/L** (10.9 March / 1.8 August)
- **Location 6**: **4.7 pCi/L** (9.1 March / 0.3 August)

Because your calculated average is **above 4.0 pCi/L**, the protocol officially requires moving forward with **radon mitigation**, regardless of the lower August snapshot. March (late winter/early spring) generally yields higher radon readings due to the "stack effect" (closed windows, heating pulling gas from the soil), while August (late summer., warm weather dynamics) often yields lower readings. Radon levels fluctuate naturally due to changing seasons, weather, and home ventilation The average acts as a more accurate representation of your true structural baseline.

Standard safety protocols explicitly forbid ignoring a previous elevated test in favor of a single lower "passing" snapshot. The protocol specifies that a building should be fixed if the integrated average exposure meets or exceeds the action level. The August results cannot be used to claim the area is "safe," as the higher March data indicates that occupants face periods of significantly elevated exposure. A single low short-term test cannot negate a previous high short-term test. The protocol dictates averaging them because short-term tests only capture a hyper-local weather snapshot. Averaging them provides a more accurate estimate of your **annual average exposure**.

The OSHA radon exposure limit is an average concentration for 40 hours in any workweek of 7 consecutive days. The still applicable 1971 radon-222 exposure limit for adult employees is $1 * 10^{-7}$ microcuries per milliliter (μ Ci/ml), or 100 pCi/L averaged over a 40-hour workweek. The average concentration in outdoor air is 0.4 p/Ci/L or 10% of the USEPA's 4 pCi/L action level. The average radon concentration in the indoor air in the first floor classrooms tested during this assessment is 0.6 pCi/L; below both the national EPA average for indoor air in homes (1.3 pCi/L); and the EPA Action Level. The average indoor radon levels of Johnson County, Missouri, as determined by Federal EPA Radon Concentration data (and confirmed by data by Air Chek, Inc.) is 2.4 pCi/L (between 2.0 pCi/L and the USEPA action level of 4.0 pCi/L).

Recommendations:

- **Do Not Re-Test**: Running a third short-term test to "break the tie" is a violation of standard protocol and unnecessarily delays fixing the hazard.
- **Install a Mitigation System**: Contact a certified professional to install an Active Soil Depressurization (ASD) system.
- **Run a Post-Mitigation Test**: Deploy a new short-term test **24 hours to 30 days** after the mitigation system is turned on to verify it has successfully brought the indoor air levels safely below 4.0 pCi/L.
- According to the U.S. Environmental Protection Agency (EPA), you should retest your radon mitigation system **at least every two years**. Even if your initial post-mitigation test was well below the 4.0 picocuries per liter (pCi/L) action level, radon levels fluctuate over time due to shifting soil conditions, seasonal changes, and structural settling. Regular testing ensures that your mitigation system continues to operate effectively.

In addition, be certain to retest the property whenever any of the following circumstances occur:

- A new addition is constructed or alterations for building reconfiguration or rehabilitation occur.
- A ground-contact area not previously tested is occupied.
- Heating or cooling systems are altered in such a way that air distribution or pressure relationships change within the property.
- Ventilation is altered by extensive weatherization, changes to mechanical systems, or comparable procedures.
- Sizeable openings to soil occur due to any of the following:
    - Groundwater or slab surface water control systems are added or altered (e.g., sumps, perimeter drain tile, shower/tub retrofits, etc.)
    - Natural settlement occurs, causing major cracks to develop.
    - Earthquakes, construction blasting, or formation of sinkholes occur near the subject property.
    - A radon mitigation system is altered, modified, or repaired.
- If renovations or other structural changes are planned in the lower level of the subject property.

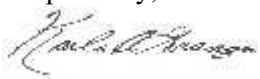
Additional information regarding radon testing and mitigation can be accessed at www.epa.gov/radon and https://health.mo.gov/living/environment/radon.

Closing Comments

TES has performed the tasks set forth above in a thorough and professional manner consistent with industry standards.
This limited scope radon sampling event and report does not and cannot address correction of the conditions that caused the contamination to occur nor does this report reflect on conditions post-cleanup that may develop that could support or encourage the redevelopment of the asbestos contamination. Furthermore, TES cannot guarantee and does not warrant that these limited testing events have revealed all asbestos contamination affecting the site. The results reported and any opinions reached by TES are for the benefit of the client. The results and opinions set forth by TES in its report will be valid as of the date of the report.

TES appreciates the opportunity to be of service to you. If you have any questions, please do not hesitate to contact us.

Respectfully,



Karla Granger
NRPP Radon Measurement Professional

Appendices: Appendix A – Radon Gas Analytical Testing Data
Appendix B – USEPA & State of Missouri Radon Zone Maps
Appendix C – Site Photographs & Drawing
Appendix D – TES Personnel Certifications

APPENDIX A – RADON GAS ANALYTICAL TESTING DATA

A Full Service Environmental Consulting and Testing Firm
Phone: 913-432-5500 Fax: 913-432-0704

RADON SAMPLE CUSTODY FORM

CLIENT: Warrensburg (MO) R6 School District **PROJECT No:** 26086ALMR.01C
JOB LOCATION: 105 S. Maguire Street, Warrensburg, MO 64093
CONTACT/PHONE: Karla Granger 913-432-5500

SAMPLE #	LOCATION	DATE STARTED	TIME STARTED	DATE COLLECTED	TIME COLLECTED
12403893	Basement Room 10	8/3/26	9:48 AM	8/5/26	10:46 AM
12403894	Basement Room 12	8/3/26	9:58 AM	8/5/26	10:55 AM
12403895	Basement Room 13	8/3/26	10:05 AM	8/5/26	10:57 AM
7554097	Basement Room 13 (duplicate)	8/3/26	10:05 AM	8/5/26	10:58 AM
12403892	Basement Room 14	8/3/26	10:10 AM	8/5/26	11:00 AM
7553981	Basement Storage Room	8/3/26	10:14 AM	8/5/26	10:48 AM
12403883	Basement Room 11	8/3/26	10:21 AM	8/5/26	10:51 AM
7553977	QC Blank	8/3/26	10:22 AM	8/5/26	11:01 AM

ADDITIONAL REMARKS:

Please email results to: paule@titankc.com,
kgranger@titankc.com

Sampled by: Karla Granger
PRINTED Name

TURNAROUND TIME: Standard

SIGNATURE

CUSTODY

Relinquished By: _____ Date/Time: 8/5/26 @1800

Received By: _____ Date/Time: _____

PLEASE RETURN ORIGINAL COPY TO TITAN ENVIRONMENTAL SERVICES, INC.

P.O. Box 410295, Kansas City, Missouri 64141 Phone (913) 432-5500 : Fax (913) 432-0704

August 6, 2026 **** LABORATORY ANALYSIS REPORT ****

Radon test result report for:
105 S. MAGUIRE ST., WARRENSBURG, MO
MAIN

Kit #	Room Id	Started	Ended	pCi/L	Analyzed
12403893	BASE. ROOM 10	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	0.5 ± 0.3	2026-08-06
12403883	BASE. ROOM 11	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	< 0.3	2026-08-06
12403894	BASE. ROOM 12	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	< 0.3	2026-08-06
12403895	BASE. ROOM 13	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	< 0.3	2026-08-06
7554097	BASE. ROOM 13 D	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	0.5 ± 0.3	2026-08-06
12403892	BASE. ROOM 14	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	< 0.3	2026-08-06
7553981	BASE. STORAGE	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	1.8 ± 0.3	2026-08-06
7553977	QC	2026-08-03 @ 10:00 am	2026-08-05 @ 11:00 am	< 0.3	2026-08-06

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

Your health risk

The primary health risk from long-term exposure to radon is lung cancer. The risk of developing a lung cancer from radon exposure depends both on how much radon is present and how long you are exposed to radon. The higher the radon level or the longer the time of exposure, even if the levels are relatively low, the greater the risk. Exposures up to 4 pCi/L may present some risk of contracting lung cancer to more sensitive occupants, especially children and those who live with smokers. The US Congress set as a goal the lowering of radon levels in buildings to equal the levels of outside air.

PERFORMING RADON TESTS FOR A REAL ESTATE TRANSACTION

US EPA protocols state that when using passive devices, such as activated charcoal tests, two short-term tests should be conducted, either together or sequentially, at the same location in the building. The tests should be averaged together and if the average is 4.0 pCi/L or higher, radon mitigation is recommended. Even if the average is below 4.0 pCi/L, the buyers should consider testing in a different season or deploy a long-term test device to assess their long-term risks. It is **highly recommended** that any property transaction tests be conducted by a non-interested third party. To locate a listed or certified radon tester, contact your state radon office or visit our website at http://www.neha-nrpp.org to download a list of NEHA-NRPP certified testers. You should also visit the EPA website to download a copy of EPA's Home Buyer's and Seller's Guide to Radon.

Radon Test Device Placement

The US EPA recommends that testing device(s) be placed in the lowest level of the home that could be used regularly, whether it is finished or unfinished. Conduct the test in any space that could be used by the buyer as a bedroom, play area, family room, den, exercise room, or workshop. Based on their client's intended use of the space, the qualified testing professional should identify the appropriate test location and inform their client (buyer). Do not test in a closet, stairway, hallway, crawl space or in an enclosed area of high humidity or high air velocity. An enclosed area may include a kitchen, bathroom, laundry room or furnace room.

Variations in Radon Levels

When tests are performed in different seasons or under different weather conditions, the initial screening and follow-up tests may vary considerably. Radon levels can vary significantly between seasons, so different values **are to be expected**. Even during normal weather, indoor radon levels may rise and fall by a factor of two on a daily cycle; for example, from 5 pCi/L to 10 pCi/L in 24 hours. During rapidly changing or stormy weather, the levels may change more dramatically. Because continual changes in radon levels are considered normal, expose the testing device for as long as is practical, while following the manufacturer's recommendations. This, of course, provides a better overall average of the measurement.

If you are comparing tests, or are averaging a series of tests, bear in mind that any radon test returns only the average of the levels present during a **specific period of time** at the **precise location** of the test. Conditions during a different test period or at a different location in the building are **expected to be different.**

Test results can also vary if the radon test instructions were not carefully followed. A laboratory measuring radon in samples taken outside the lab **must rely on the person conducting the test**. For example, the wrong starting or ending date of a test will significantly affect the calculated result. The location of each radon test can also influence the result. For example, a test placed in the blowing air stream of a fan is likely to collect more radon than it would under normal conditions. Also, three tests conducted in one home, but in three different rooms, **would be expected to have at least slightly different test results.**

Test results from a properly used activated charcoal test will more closely reflect the average radon concentrations over the last three to four days of the test period. This happens because the radon collected by the activated charcoal has a radioactive half-life of only four days. Thus, much of the radon collected early in a seven day test has already begun to decay prior to the conclusion of the test.

Retesting

It is important to understand that radon levels can change at some point in the future. Therefore, it is important to retest when there is occupancy by a new owner, before and after a new addition to the house, alterations that could alter ventilation patterns, if major cracks are noticed in foundation walls or the slab, you begin using a ground contact area of the home not previously tested, or even recent nearby construction blasting or earthquakes. EPA recommends that homes be retested every 2-3 years. If the home has been previously mitigated or alterations are made to the mitigation system, retesting should be done.

Mitigation

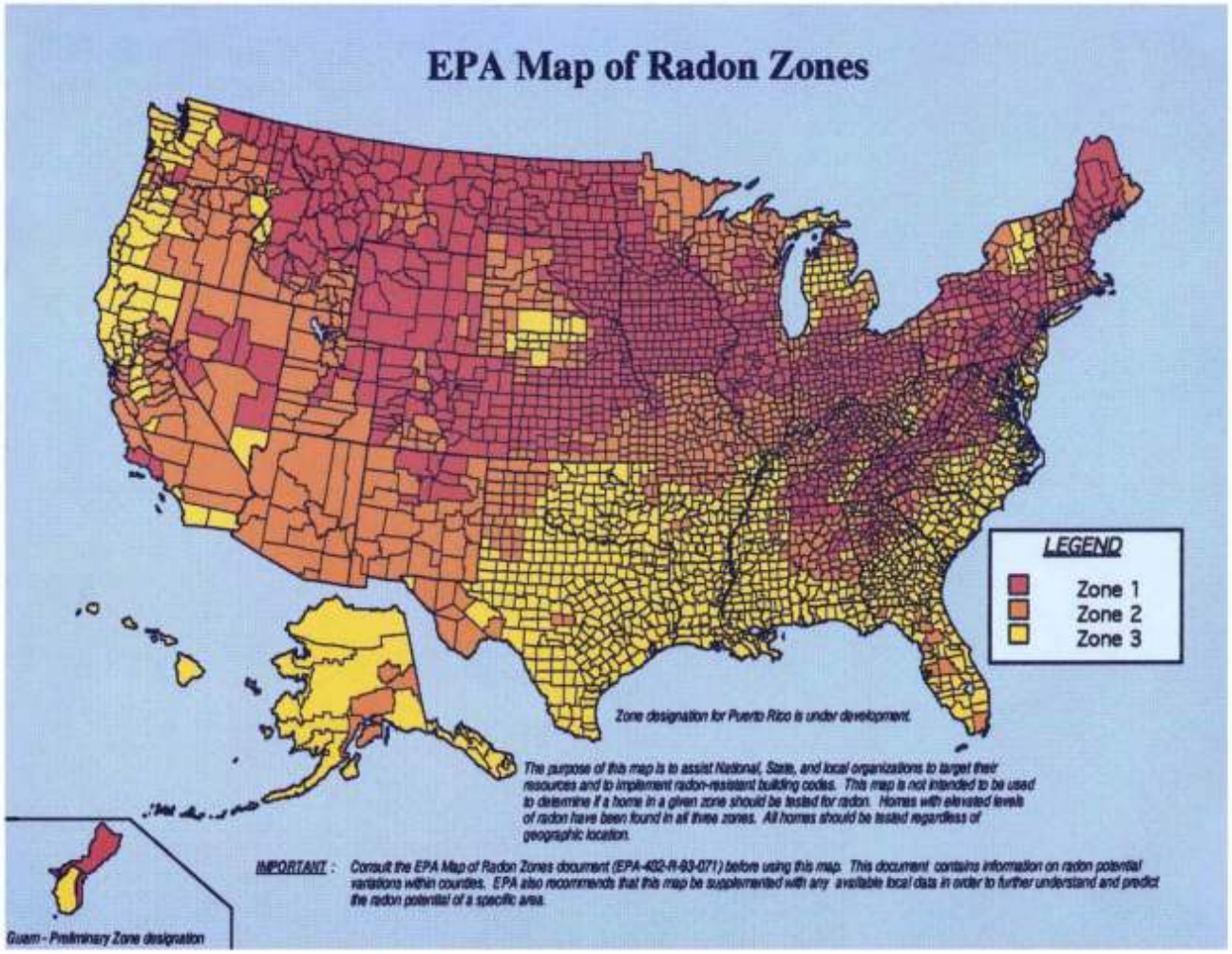
When radon mitigation is necessary, it is advisable that a state-licensed or nationally- certified contractor be used to design and install the mitigation system. For easy to read mitigation information, go to the US EPA website and download a copy of the Consumer's Guide to Radon Reduction.

For technical information, call (828) 684-0893. Office hours are Mon-Fri 8:30 to 5:30 EASTERN
You can reach us by Fax at (828) 684-8498 or write to Air Chek, Inc., Box 2000, Naples, NC 28760
Web Site: http://www.radon.com **Email to:** info@radon.com

APPENDIX B – USEPA & STATE OF MISSOURI RADON ZONE MAPS

Radon Zones Map

The U.S. Environmental Protection Agency (EPA) created this map to identify areas with the potential for elevated indoor radon levels. The EPA Map of Radon Zones helps national, state, and local organizations implement radon-resistant building codes. The map should not be used to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones. All homes should be tested for radon.



What do the colors mean?

	Zone 1 (red zones)	Highest potential; average indoor radon levels may be greater than 4 pCi/L (picocuries per liter)
	Zone 2 (orange zones)	Moderate potential; average indoor radon levels may be between 2 and 4 pCi/L
	Zone 3 (yellow zones)	Low potential; average indoor radon levels may be less than 2 pCi/L

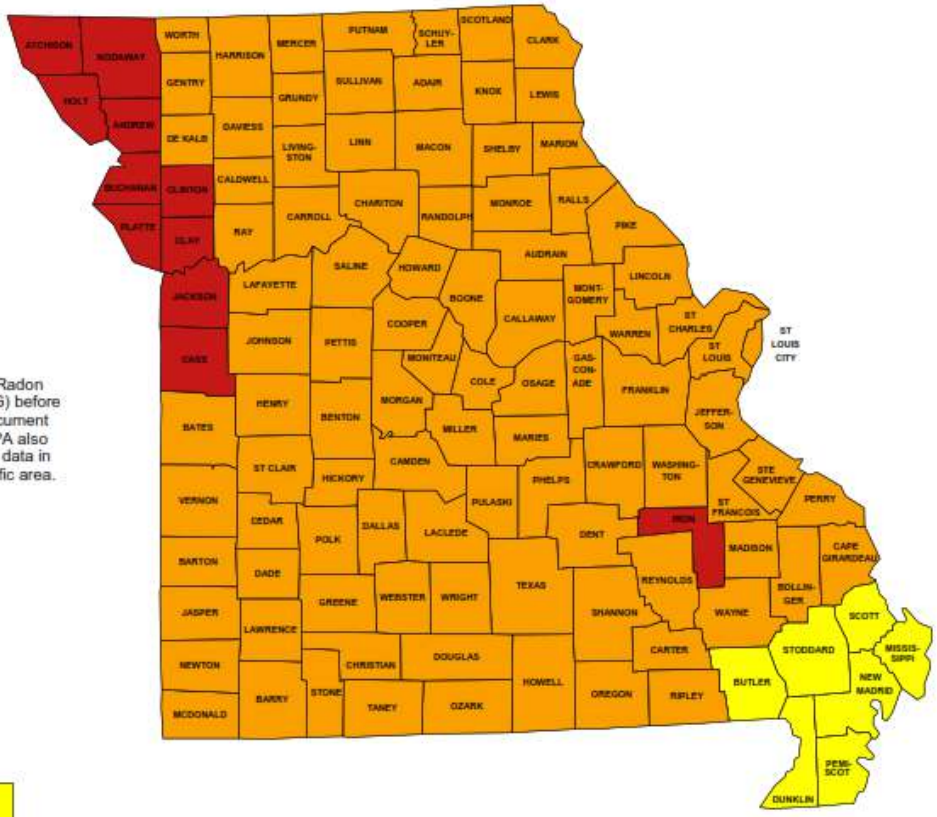
MISSOURI - EPA Map of Radon Zones

http://www.epa.gov/radon/zonemap.html

The purpose of this map is to assist National, State and local organizations to target their resources and to implement radon-resistant building codes.

This map is not intended to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones.

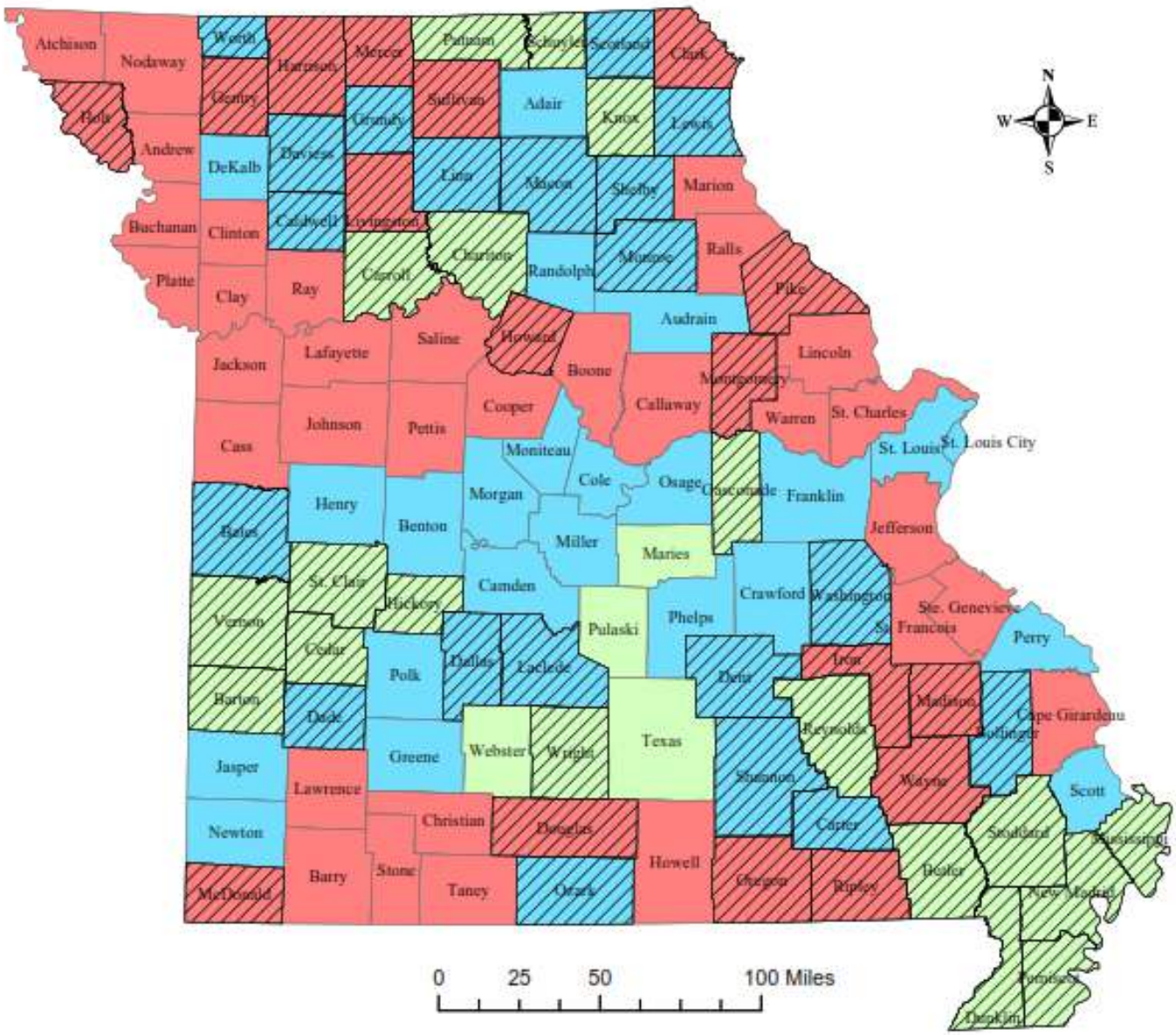
All homes should be tested, regardless of zone designation.



IMPORTANT: Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of Missouri" (USGS Open-file Report 93-292-G) before using this map. http://energy.cr.usgs.gov/radon/grpinfo.html This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.

Zone 1 Zone 2 Zone 3

Average Radon Level in Tested Homes



Average by County

- < 2.0 pCi/L
- 2.0 - 3.9 pCi/L
- >= 4.0 pCi/L
- < 30 homes tested

*Source: Bureau of Environmental Epidemiology
Indoor Air Quality Database 2005 - 2015

APPENDIX C – SITE PHOTOGRAPHS & DRAWINGS



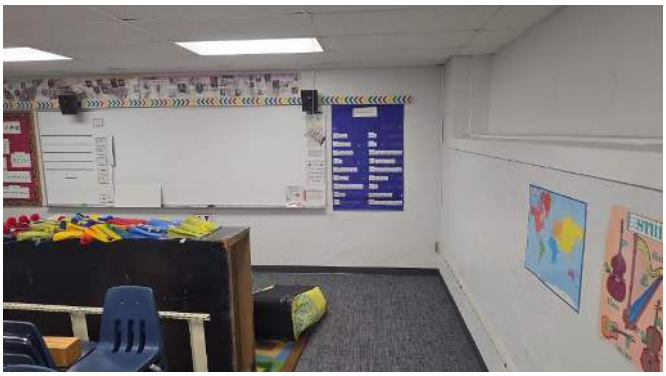
Exterior Front Overview



Basement Room 10 Entrance



Basement Room 10 Overview



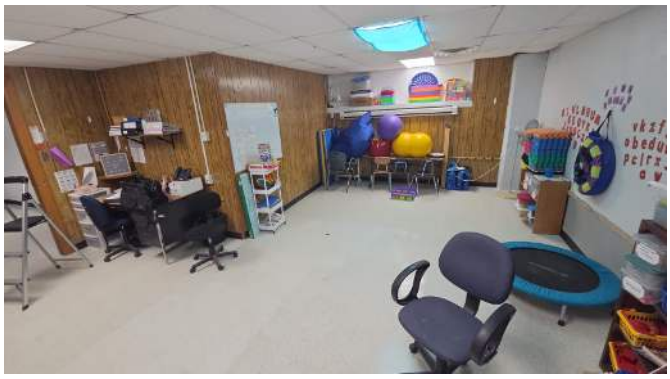
Basement Room 10 Sample Location



Basement Room 10 Sample



Basement Room 12 Entrance



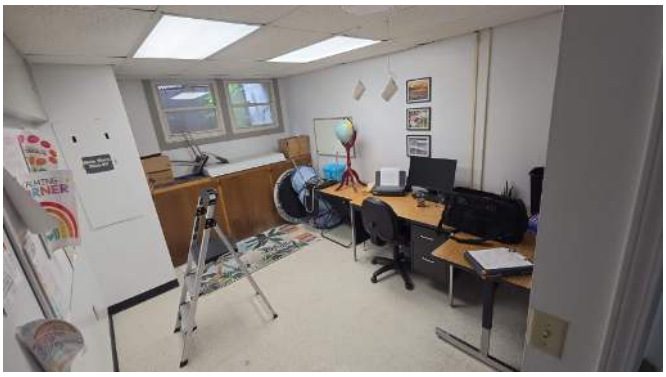
Basement Room 12 Overview



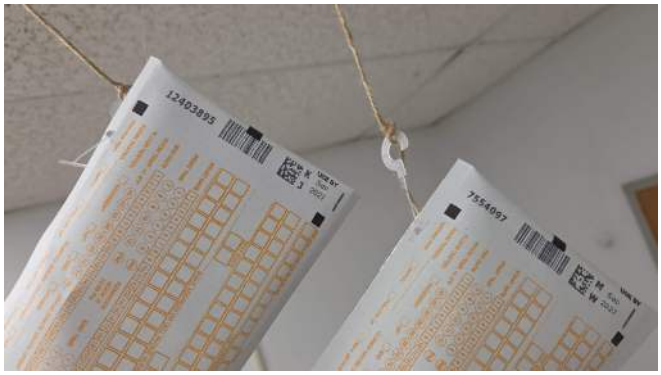
Basement Room 12 Sample



Basement Room 13 Entrance



Basement Room 13 Sample Location



Basement Room 13 Duplicate Samples



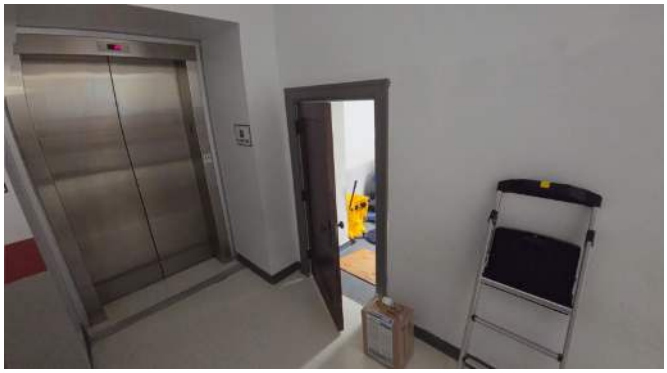
Basement Room 14 Entrance



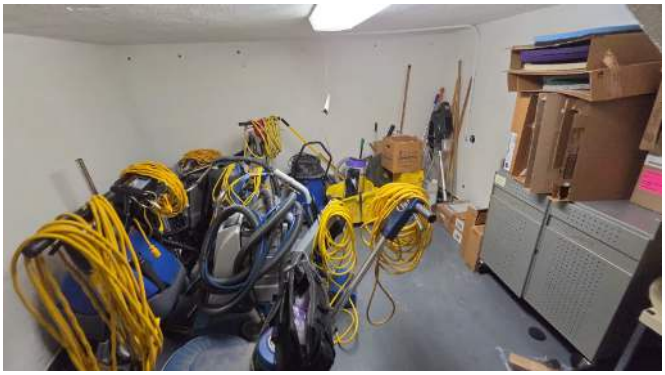
Basement Room 14 Sample Location



Basement Room 14 Sample



Entrance to Basement Storage Room



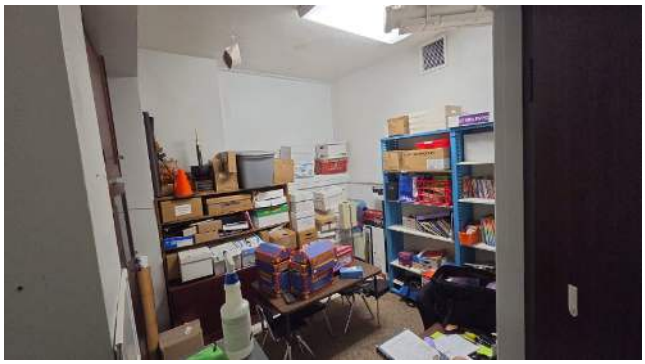
Basement Storage Room Overview



Basement Storage Room Sample



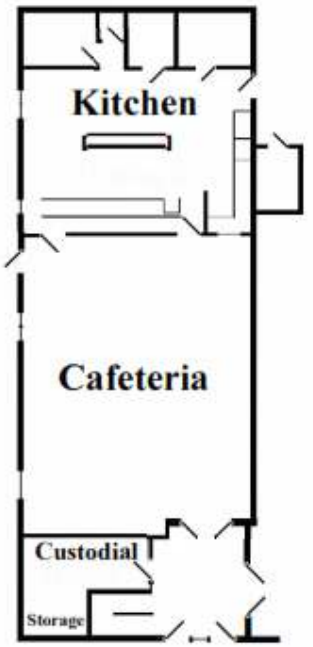
Basement Room 11 Entrance



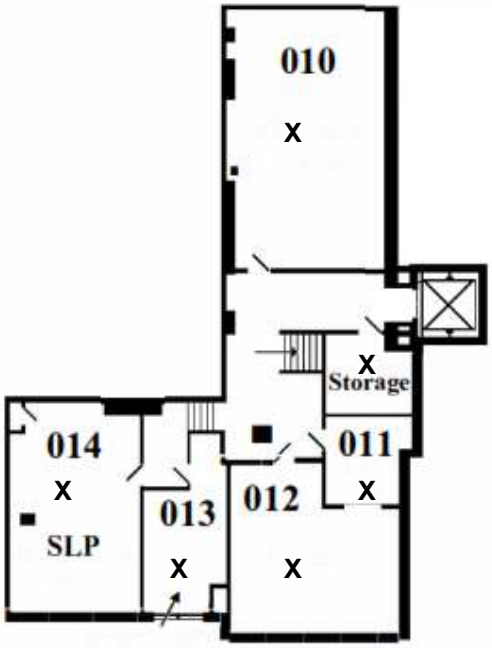
Basement Room 11 Sample Location



Basement Room 11 Sample



X=Basement Testing Locations





Martin Warren Elementary

APPENDIX D – TES PERSONNEL CERTIFICATIONS

Karla Granger

Has satisfactorily fulfilled the requirements set forth by the
National Radon Proficiency Program and is therefore certified as a:

Radon Measurement Professional

with Standard Services

NRPP ID 107404-RMP
Issued On: 2026-01-12 Expires: 2028-01-31

Valid for specific activities or measurement devices, which can be verified with NRPP. State and local agencies may have additional requirements.

In witness Whereof,
I have subscribed my name as a
Representative of NRPP

Ashley Falco
Chair, Certification Council