



WOOD-00538

May 25, 2022

Via Email: Wbmayor@twp.Woodbridge.nj.us

John E. McCormac, Mayor
Township of Woodbridge
1 Main Street
Woodbridge, New Jersey 07095

**Re: Summary Report – Colonia High School
Woodbridge, Middlesex County, NJ**

Dear Mayor McCormac:

Attached please find the Summary Report: Radiological Investigation for Colonia High School, 180 East St, Colonia, NJ 07067 prepared by Cabrera Services, Inc. The report presents the results of the radiological field survey performed at the site April 9 thru April 30, 2022.

If you have any questions regarding the information provided, please do not hesitate to contact me at (732) 513-5665.

Very truly yours,

T&M ASSOCIATES

Jeffrey Kozic, LSRP
Supervising Environmental Scientist

G:\Projects\WOOD\00538\Correspondence\HSA\CHS Report Cover Letter.docx



Corporate Office
50 Founders Plaza, Suite 207
East Hartford, CT 06108

May 25, 2022

Jeffrey Kozic
T&M Associates
11 Tindall Road
Middletown, NJ 07748

RE: Summary Report: Radiological Investigation for Colonia High School, 180 East St, Colonia, NJ 07067

Cabrera Services Inc. (Cabrera) is providing this written summary report of survey activities conducted on the campus of Colonia High School at the request of local authorities and executed under a subcontractor agreement with your firm. The summary report includes background information, survey methodology, summary tables and figures, conclusions, and data appendices. The enclosed final report reflects *DRAFT* report review feedback from NJDEP Bureau of Environmental Radiation staff.

If you, or other stakeholders, should have any questions regarding this report, please contact me at (352) 610-2150. Note that I should be able to address any technical questions pertaining to the alpha, beta, gamma measurements conducted. If the questions are specific to the radon measurements, we will forward your inquiries to our NJ Certified Radon Measurement Business partner or the affiliated NJ Certified Radon Measurement Technician, for response, as appropriate.

Regards,

Michael S. Winters, CHP
Health Physics Group Manager / Radiation Safety Officer

Enclosure (28 pages)

SUMMARY REPORT: RADIOLOGICAL INVESTIGATION FOR COLONIA HIGH SCHOOL, 180 EAST STREET, COLONIA, NJ 07067

Cabrera Services (Cabrera) conducted a rapid-response radiological scoping investigation of the Colonia High School in Woodbridge Township New Jersey in support of T&M Associates (T&M) and on behalf of the local government. The survey was requested in response to specific radiation exposure-related cancer concerns raised by former attendees and family members.

Because the school grounds had no past history of clearing or development prior to school construction, the investigation was focused on radiological hazards near the surface on school grounds and on building surfaces in areas where direct exposure to the student population was possible.

The general approach to the radiological investigation was to assess the building for indications of elevated alpha/beta/gamma radiation levels above background levels on surfaces as well as coordinating with an affiliated NJ-certified radon measurement business to obtain representative indoor air radon concentration data. In addition, the field teams also performed gamma radiation scanning of outdoor school grounds to identify surface/near-surface radiological anomalies potentially warranting further investigation.

The field investigation was conducted from April 9-30, 2022. The certified measurement technician placed and later removed radon measurement devices and the remainder of the field team performed measurements during weekend mobilizations to avoid interfering with day-to-day school operations; weekend access coincided with the school being unoccupied and the availability of qualified Cabrera staff. Note that the school administration and janitorial staff supporting the investigation field team were very responsive and helpful during the field data collection effort.

The specific types of data collected during the scoping investigation are detailed in the following sections:

Indoor Radon Concentrations

Indoor radon levels were monitored in classrooms and other normally occupied spaces on the first and second floor of the main building between April 9, 2022, to April 24, 2022. The passive measurement devices (Rapidos® closed alpha-track detectors), applicable testing guidance for schools, measurement quality assurance/control program, out-of-state laboratory analyses, and review/reporting of results were provided by Radonova, a New Jersey-certified radon measurement business. Monitoring was performed by a New Jersey-certified radon measurement technician via a formal affiliation agreement with Radonova.

The US Environmental Protection Agency (USEPA) indoor radon action level is 4.0 picocuries per liter (pCi/L). The maximum reported result (Auditorium - Stage) was 2.4 +/- 0.6 pCi/L. All other results were <2.0 pCi/L.

At the end of the collection period 82 of 83 devices, including ten field duplicates, were recovered, and sent to Radonova for analysis along with five blank samples; one device (#798096-4; 2nd Floor - Room 238) was moved from its placement location during the monitoring interval, was deemed invalid, and was not returned to the lab for analysis when found.

The Radonova results report is included as Appendix A.

Building Interior Surface Alpha/Beta/Gamma Radiation Levels

Survey technicians walked accessible interior areas of the first and second floor performing sentinel measurements and judgmental scans of various property surfaces (e.g., walls, floors, furniture) using a Ludlum 2221 scaler/ratemeter mated to a Ludlum 44-10 (2" x 2") sodium-iodide detector reporting in units of counts per minute (cpm).

For each classroom/space surveyed with the Ludlum 44-10, the technician conducted judgmental surface scanning to identify a relative maximum location to conduct follow-up static alpha, beta, gamma measurements at various distances from the surface. These follow-up measurements included:

- A stabilized ratemeter reading with a Bicon microrem meter positioned at distances of 30 cm and 100 cm from the surface
- A one-minute static measurement with the Ludlum 44-10 positioned at distances of 10 cm and 30 cm from the surface
- A one-minute static "Surface" facing contact measurement using a Ludlum 2224 scaler/ratemeter mated to a Ludlum 43-93 100cm² alpha-beta scintillation detector followed or preceded by
- A one-minute static "Background" measurement count using a Ludlum 2224 scaler/ratemeter mated to a Ludlum 43-93 100cm² alpha-beta scintillation detector in the same location but with the detector facing *away* from the surface being surveyed.

Building interior surface survey results and specific locations were recorded manually and are presented in Radiological Survey Reports CHS-01 and CHS-02 (Appendix B). CHS-01 represents 1st Floor measurement locations; CHS-02 represents primarily 2nd Floor measurement locations. In total, 124 static measurement locations were identified during scanning yielding 992 alpha/beta/gamma data points to evaluate. Each survey report includes a diagram of specific measurement locations and makes no correction for background (i.e., all gross measurements).

Table 1 below presents the mean and standard deviation of background measurements collected during each survey, the Critical Level (L_c) and Minimum Detectable Concentration (MDC) calculated for each survey using methods prescribed in NUREG-1507, *Minimum Detectable Concentrations with Typical Radiation Survey for Instruments for Various Contaminants and Field Conditions, Revision 1*; the specific locations with detectable radioactivity above normal background ($>L_c$) and; the maximum recorded net surface activity calculated by subtracting the calculated mean background counts per minute (bcpm) from individual surface measurement results:

SURVEY	ALPHA						
	Locations	Mean	Std. Dev.	L_c	MDC	Locations	<u>Max</u> Surface
		bcpm	bcpm	cpm (s + b)	dpm/100cm ²	$>L_c$ (<u>Max</u>)	net dpm/100cm ²
CHS-01	70	2.6	2.1	7.6	51	28, <u>37</u> , 52	40
CHS-02	54	5.4	4.5	16.0	108	<u>26</u>	83
SURVEY	BETA						
	Locations	Mean	Std. Dev.	L_c	MDC	Locations	<u>Max</u> Surface
		bcpm	bcpm	cpm (s + b)	dpm/100cm ²	$>L_c$ (<u>Max</u>)	net dpm/100cm ²
CHS-01	70	197.1	43.1	297.5	1422	16, <u>17</u> , 19, 25, 28, 30	1965
CHS-02	54	161.5	17.7	202.7	715	<u>16</u> , 36, 49	533

Table 1: Alpha/Beta Surface Measurements from 1st and 2nd Floor

Table 2 below presents the results of gamma dose rates in microrem per hour ($\mu\text{rem/hr}$) and gamma static measurements in counts per minute (cpm):

SURVEY	Locations	GAMMA ($\mu\text{rem/hr}$ @30-100 cm)			GAMMA (cpm @ 10 cm)			GAMMA (cpm@30 cm)		
		Mean	Std. Dev.	Max.	Mean	Std. Dev.	Max.	Mean	Std. Dev.	Max.
		CHS-01	70	4.4	1.0	8	7473.1	875.9	10178	7503.6
CHS-02	54	4.1	0.8	8	6568.6	894.7	9776	2221.7	3174.4	10691

Table 2: Gamma Surface Measurements from 1st and 2nd Floor

Building Exterior Surface Alpha/Beta/Gamma Radiation Levels

At the request of the Certified Health Physicist (CHP), survey technicians collected additional surface measurements from readily accessible exterior walls and concrete courtyard surfaces, as follows:

- A stabilized ratemeter reading with a Bicon microrem meter positioned at distances of 30 cm and 100 cm from the surface
- A one-minute static "Surface" facing contact measurement using a Ludlum 2224 scaler/ratemeter mated to a Ludlum 43-93 100cm² alpha-beta scintillation detector followed or preceded by -
- A one-minute static "Background" measurement count using a Ludlum 2224 scaler/ratemeter mated to a Ludlum 43-93 100cm² alpha-beta scintillation detector in the same location but with the detector facing *away* from the surface being surveyed.

Building exterior wall and courtyard surface survey results were recorded manually and are presented in Radiological Survey Report CHS-03 (Appendix B). In total, twenty-eight locations were surveyed yielding an additional 168 alpha/beta/gamma data points to evaluate. The tables below present summary statistics for background, the Critical Level (L_c) and Minimum Detectable Concentration (MDC) calculated for Survey CHS-03 using those background statistics, the location(s) from each survey with detectable radioactivity ($>L_c$), and the maximum recorded net surface activity calculated from survey results, as follows:

SURVEY	ALPHA						
	Locations	Mean	Std. Dev.	L_c	MDC	Locations	<u>Max Surface</u>
		bcpm	bcpm	cpm (s + b)	dpm/100cm ²	$>L_c$ (<u>Max</u>)	net dpm/100cm ²
CHS-03	28	10.1	2.7	16.5	67	3, 6, 9, 12, 14, 16, <u>28</u>	59
SURVEY	BETA						
	Locations	Mean	Std. Dev.	L_c	MDC	Locations	<u>Max Surface</u>
		bcpm	bcpm	cpm (s + b)	dpm/100cm ²	$>L_c$ (<u>Max</u>)	net dpm/100cm ²
CHS-03	28	243.0	55.9	373.2	2210	1, 6, <u>7</u> , 9-23, 25-28	1773

Table 3: Alpha/Beta Static Measurements on Building Exterior

Also included in Survey Report CHS-03 are the maximum results of 30-100 cm dose rates obtained at the 28 exterior surface static alpha-beta measurement locations. Dose rate results averaged 5.4 +/- 1.0 $\mu\text{rem/hr}$ with a maximum of 8 $\mu\text{rem/hr}$.

The data presented in this section were summarized from the three interior/exterior building survey reports (CHS-01 through CHS-03) included as Appendix B.

Outdoor Gamma Walkover Surveys

Intensive Gamma Surface Scans

Survey technicians performed methodical gamma walkover surveys of ~100% of accessible school grounds looking for any indications of gamma radiation above normal background variability. The survey was conducted using a Ludlum 2221 scaler/ratemeter mated to a Ludlum 44-10 (2" x 2") sodium-iodide detector positioned approximately 10 cm above the ground surface at a walking speed of approximately 0.5 m/sec and passes spaced about one meter apart. Count rate (cpm) data was transferred in real-time by wired connection on a per second basis from the Ludlum 2221 to a GPS/GNSS a global positioning system/global navigation satellite system and data collector that paired each measurement with a geolocation and time stamp. Surveys were only constrained in the perimeter wooded areas due to overgrowth and other access limitations.

Collected GWS data was binned and initially evaluated by a Cabrera GIS Specialist and the CHP for significant statistical outliers to be investigated further during dose rate follow-up surveys including, but not limited to, every area with GWS readings in excess two times the matrix specific mean. The completed GWS (with minor matrix-specific anomalies) and associated data summary evaluation are presented as Table 4 and Figure 1 below:



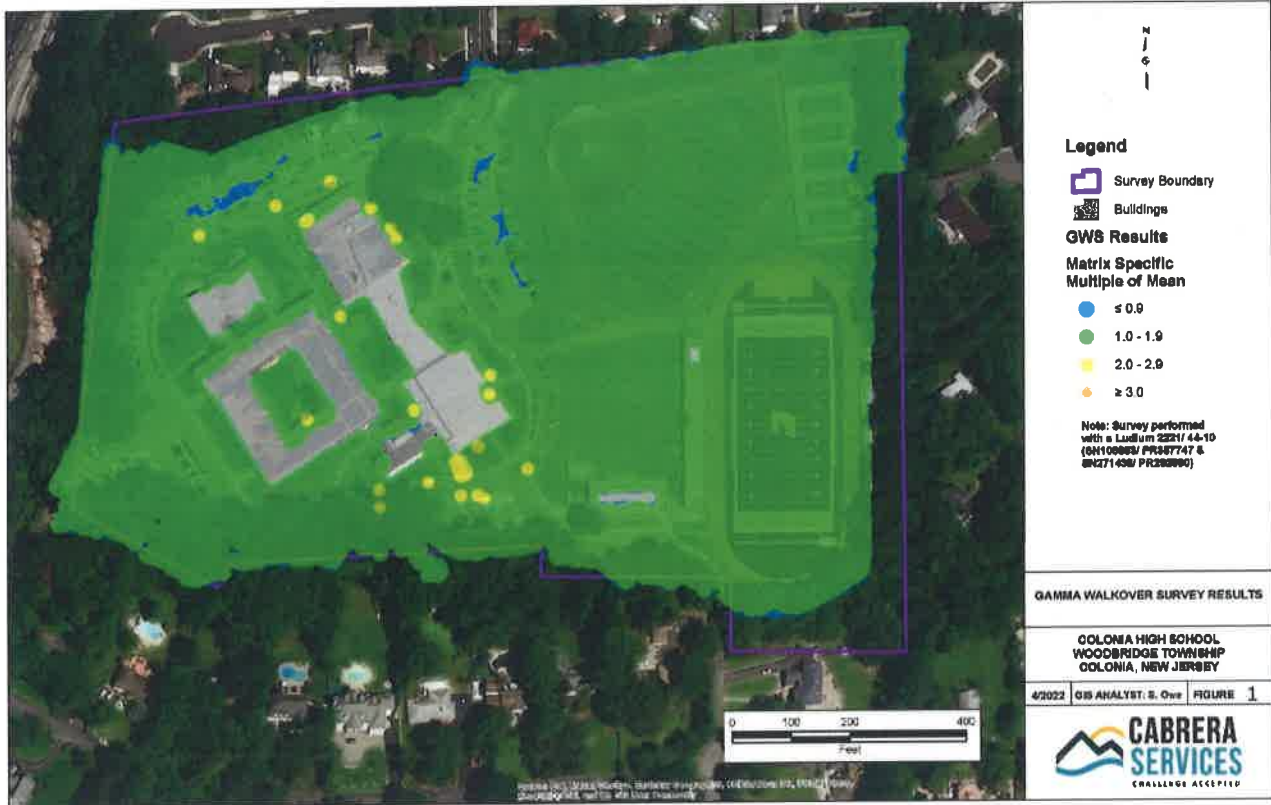
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Surface Matrix	GAMMA (cpm @ 10 cm)									
	Asphalt	Football Field Turf	Concrete	Grass/Soil	Baseball Field Turf	Aux Field Grass	Stone	Tennis Court	Track Rubber	Woods
# Data Points	38,620	22,661	7,144	79,371	14,958	7,582	1,460	3,478	6,677	11,247
Min.	3,120	2,460	3,360	2,880	2,160	3,540	2,940	3,180	3,840	4,200
Max.	17,400	8,460	18,120	17,520	8,280	11,820	9,960	11,460	13,920	12,240
Mean	7,777	4,413	6,428	8,146	4,248	7,852	5,219	6,482	8,465	7,191
Median	7,740	4,380	6,060	8,040	4,200	7,860	5,100	6,660	8,520	7,140
Std. Dev. (σ)	1,810	679	1,668	1,413	686	952	1,061	1,246	1,385	944
2x Mean (IL)	15,554	8,826	12,857	16,292	8,496	15,704	10,438	12,965	16,930	14,382
# > 2x Mean	8	0	53	7	0	0	0	0	0	0

Table 4: Gamma Walkover Survey Count-Rate Summary Statistics by Material Encountered



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Follow-up Dose Rate Surveys

To better understand the overall radiation levels relative to published values, a generalized dose rate survey was conducted at locations across school grounds using a Thermo (Bicron) microrem meter. 261 dose rate readings were taken with the instrument positioned approximately 30 cm above the ground surface with results recorded by hand. Follow-up dose rate locations included the highest 30+ statistical outliers observed from the various matrices covered by the GWS along with every area exceeding the Investigation Level (2x Mean). Follow-up dose rates across the entire exterior school grounds averaged 5.2 $\mu\text{rem/hr}$ with a standard deviation of 1.1 $\mu\text{rem/hr}$ and were unremarkable except for one discrete region along the brick wall at the northern corner of the cafeteria exterior wall where the observed dose rates were up to eleven (11) $\mu\text{rem/hr}$, slightly above the investigation level of 2x Mean. As in other instances where anomalous readings were observed, the dose rates appear to originate from the materials of construction, in this case, from a nearby section of the exterior cafeteria wall which may contain varying concentrations of background radioactivity depending on where/how/when the materials were fabricated. The measurements were not reproducible along other sections of the cafeteria wall including the adjacent north-eastern wall comprised primarily of windows (i.e., no brick to contribute to the dose rate or to attenuate a source that might have been present on the other side of the wall). Follow-up dose rates in exterior areas are presented as Figure 2.



Summary Evaluation & Recommendations

100% of indoor radon monitoring results were below the USEPA indoor radon action level of 4.0 pCi/L. The Radonova report (on page 9) provides specific guidance for interpreting results. One result exceeded 2.0 pCi/L and one device was moved from its placement location during the monitoring interval, was deemed invalid, and was not returned to the lab for analysis when found. The Radonova report provides no specific recommendation to replace the missing test or take other action(s) as a result of a single short-term test result in excess of 2.0 pCi/L.

Overall, radiation survey results from both building surfaces and campus grounds were consistent with normal background levels. No discrete radioactive sources were located. Occasional statistical anomalies were encountered above the Investigation Levels and investigated further with static measurements and/or dose rates; in each instance, the slightly elevated measurement were attributed to slightly elevated concentrations of background radioactive materials in the various building construction materials and the variety of ground covers used on campus during initial construction and subsequent improvements/repairs and/or to instrument related phenomena (e.g., source-to-detector geometry, systemic errors). Given the site history prior to school construction (i.e., a wooded undeveloped area with no known reason to suspect illegal dumping) and, the results of the alpha/beta/gamma radiation measurements collected during the investigation, no radiological *hazards* were identified that warrant further investigation.



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East Hartford, CT 06108

APPENDIX A

RADONOVA RADON MONITORING REPORT

Cabrera Services

OWN ID
N/A

BY
Cabrera Services, Inc.

REPORT RECEIVER(S)
dwhitlock@cabreraservices.com
Cabrera Services

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed alpha-track detector (Rapidos®) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Radonova Laboratories **04/26/2022**.
They were measured **05/03/2022**.

Test data have been given by Cabrera Services

Property data and address

MEASURE SITE ADDRESS

BUILDING ID

Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
507206-1 [Rapidos®]	04/09/2022 – 04/24/2022	Auditorium		< 1.0 pCi/L
384168-1 [Rapidos®]	04/09/2022 – 04/24/2022	Auditorium		< 1.0 pCi/L
431879-6 [Rapidos®]	04/09/2022 – 04/24/2022	Auditorium		1.3 ± 0.6 pCi/L
749809-0 [Rapidos®]	04/09/2022 – 04/24/2022	Stage		2.4 ± 0.6 pCi/L
307473-9 [Rapidos®]	04/09/2022 – 04/24/2022	Main office		1.2 ± 0.6 pCi/L
410675-3 [Rapidos®]	04/09/2022 – 04/24/2022	Main office		1.5 ± 0.6 pCi/L
909128-1 [Rapidos®]	04/09/2022 – 04/24/2022	Main office		< 1.0 pCi/L
970553-4 [Rapidos®]	04/09/2022 – 04/24/2022	Main office		< 1.0 pCi/L
371623-0 [Rapidos®]	04/09/2022 – 04/24/2022	Gymnasiun		< 1.0 pCi/L
116399-7 [Rapidos®]	04/09/2022 – 04/24/2022	Gymnasiun		1.1 ± 0.6 pCi/L

Comment to the results

This report replaces 6350783:2.

Trygve Rönqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

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Cabrera Services

OWN ID
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DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
803829-1 [Rapidos®]	04/09/2022 – 04/24/2022	Gymnasiun		< 1.0 pCi/L
140808-7 [Rapidos®]	04/09/2022 – 04/24/2022	Gymnasiun		1.3 ± 0.6 pCi/L
322476-3 [Rapidos®]	04/09/2022 – 04/24/2022	Gymnasiun		< 1.0 pCi/L
940892-3 [Rapidos®]	04/09/2022 – 04/24/2022	Boys locker room		< 1.0 pCi/L
810477-0 [Rapidos®]	04/09/2022 – 04/24/2022	Girls locker room		1.6 ± 0.6 pCi/L
838539-5 [Rapidos®]	04/09/2022 – 04/24/2022	Boys team room		< 1.0 pCi/L
766884-1 [Rapidos®]	04/09/2022 – 04/24/2022	Girls team room		< 1.0 pCi/L
990864-1 [Rapidos®]	04/09/2022 – 04/24/2022	Coaches office		1.1 ± 0.6 pCi/L
818243-8 [Rapidos®]	04/09/2022 – 04/24/2022	Nurse's office		< 1.0 pCi/L
830294-5 [Rapidos®]	04/09/2022 – 04/24/2022	Athletec director		1.9 ± 0.6 pCi/L
623783-8 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 100		< 1.0 pCi/L

Comment to the results

This report replaces 6350783:2.

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

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913066-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 101		< 1.0 pCi/L
465699-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 102		< 1.0 pCi/L
560821-1 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 102, Duplicate		< 1.0 pCi/L
349660-1 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 102A		< 1.0 pCi/L
640959-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 103		< 1.0 pCi/L
201533-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 104		< 1.0 pCi/L
745585-0 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 105		< 1.0 pCi/L
413725-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 106		< 1.0 pCi/L
820846-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 106, Duplicate		< 1.0 pCi/L
920002-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 107		< 1.0 pCi/L
977900-0 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 108		< 1.0 pCi/L

Comment to the results

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Trygve Rönnqvist (Electronically signed)

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419849-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 108, Duplicate		< 1.0 pCi/L
972040-0 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 110		1.4 ± 0.6 pCi/L
278476-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 112		< 1.0 pCi/L
664635-0 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 114		< 1.0 pCi/L
830072-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 116		< 1.0 pCi/L
249380-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 118		< 1.0 pCi/L
448622-1 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 118, Duplicate		< 1.0 pCi/L
398367-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 120		< 1.0 pCi/L
278230-8 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 120, Duplicate		< 1.0 pCi/L
810814-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 124		< 1.0 pCi/L
802718-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 124, Duplicate		< 1.0 pCi/L

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Tryggve Rönqvist (Electronically signed)

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MEASURE SITE ADDRESS

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
808956-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 126		< 1.0 pCi/L
213397-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 127		< 1.0 pCi/L
508525-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 127, Duplicate		< 1.0 pCi/L
401339-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 128		< 1.0 pCi/L
573518-8 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 129		< 1.0 pCi/L
181199-1 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 130		< 1.0 pCi/L
719691-8 [Rapidos®]	04/09/2022 – 04/24/2022	Rm.131		< 1.0 pCi/L
707043-6 [Rapidos®]	04/09/2022 – 04/24/2022	Faculty lounge		< 1.0 pCi/L
551055-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 132		< 1.0 pCi/L
583660-6 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 132, Duplicate		< 1.0 pCi/L
295205-9 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 133		< 1.0 pCi/L

Comment to the results

This report replaces 6350783:2.

Trygve Rönqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist
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RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com

Cabrera Services

BY
Cabrera Services, Inc.

REPORT RECEIVER(S)
dwhitlock@cabreraservices.com
Cabrera Services

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed alpha-track detector (Rapidos®) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Radonova Laboratories 04/26/2022.
They were measured 05/03/2022.

Test data have been given by Cabrera Services

Property data and address

MEASURE SITE ADDRESS

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
295151-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 134		< 1.0 pCi/L
362788-2 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 136		< 1.0 pCi/L
812407-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 138		< 1.0 pCi/L
132875-6 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 140		< 1.0 pCi/L
198840-1 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 141		< 1.0 pCi/L
102412-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 142		< 1.0 pCi/L
185380-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 144		< 1.0 pCi/L
775728-9 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 146		1.1 ± 0.6 pCi/L
186341-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 148		< 1.0 pCi/L
996288-7 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 150		< 1.0 pCi/L
248760-1 [Rapidos®]	04/09/2022 – 04/24/2022	Cafeteria 1		< 1.0 pCi/L

Comment to the results

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RADON MONITORING REPORT

Description of the measurement

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They were measured **05/03/2022**.

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Property data and address

MEASURE SITE ADDRESS

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
485014-5 [Rapidos®]	04/09/2022 – 04/24/2022	Cafeteria 1		< 1.0 pCi/L
135872-0 [Rapidos®]	04/09/2022 – 04/24/2022	Cafeteria 2		< 1.0 pCi/L
811966-1 [Rapidos®]	04/09/2022 – 04/24/2022	Cafeteria 2		< 1.0 pCi/L
206723-9 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 180		1.2 ± 0.6 pCi/L
813914-9 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 181		< 1.0 pCi/L
653668-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 182		< 1.0 pCi/L
700061-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 183		< 1.0 pCi/L
398645-2 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 184		< 1.0 pCi/L
665348-9 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 201		< 1.0 pCi/L
568294-3 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 210		< 1.0 pCi/L
205085-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 216		< 1.0 pCi/L

Comment to the results

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RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed alpha-track detector (Rapidos®) following the quality guidance in EPA 402-R-95-012.

The detector(s) arrived to Radonova Laboratories **04/26/2022**.
They were measured **05/03/2022**.

Test data have been given by Cabrera Services

Property data and address

MEASURE SITE ADDRESS

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	FLOOR	RADON RESULT
537112-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 227		< 1.0 pCi/L
230513-4 [Rapidos®]	04/09/2022 – 04/24/2022	Rm.227, Duplicate		< 1.0 pCi/L
319760-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 230		< 1.0 pCi/L
798096-4 [Rapidos®]	04/09/2022 – 04/25/2022	Rm. 238, Missing		DNR
987480-1 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 244		< 1.0 pCi/L
296419-5 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 244, Duplicate		< 1.0 pCi/L
192740-9 [Rapidos®]	04/09/2022 – 04/24/2022	Rm. 255		< 1.0 pCi/L
381575-0 [Rapidos®]	04/25/2022 –	, Blanks		< 8 pCi*days/L
582633-4 [Rapidos®]	04/25/2022 –	, Blanks		< 8 pCi*days/L
110803-4 [Rapidos®]	04/25/2022 –	, Blanks		< 8 pCi*days/L
731934-6 [Rapidos®]	04/25/2022 –	, Blanks		< 8 pCi*days/L
478365-0 [Rapidos®]	04/25/2022 –	, Blanks		< 8 pCi*days/L

Comment to the results

This report replaces 6350783:2.

Trygve Rönqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

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Measurement method: Closed alpha-track detector

The radon measurement was performed with a closed alpha-track detector following the quality assurance guidance given in EPA 402-R-95-012. The detector container is manufactured from electrically conducting plastic. Through a small slit (filter), radon gas enters the detector. The track-detecting material (film) inside the detector is hit by alpha particles generated by the radon entering the container and the decay products formed from it. On the film, the alpha particles make small tracks which are enlarged through chemical etching and later counted in a microscope in order to determine the radon exposure.

Radonova Laboratories (P.O. Box 6522, SE-751 38 Uppsala, Sweden) is accredited (no. 1489) by SWEDAC to conduct radon-gas measurements using the closed alpha-track detector method. The analysis equipment is checked daily and the detectors are calibrated at regular intervals. NRPP Licenses: 107831 AL, 107830 RT

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
VTW	Not Reported – Visibly Tampered With
FBD	Not Reported – Film Broken or Damaged
LIL	Not Reported – Lost in Lab
DTO	Not Reported – Detector Too Old

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 AARST and EPA 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.
- EPA Radon Measurements in Schools, EPA 402-R-92-014, July 1993.

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 person responsible for the radon analysis at Radonova Laboratories hereby certifies that the measurement procedures follows the guidance in accordance with EPA 402-R-95-012 and that the demands from SWEDAC are fulfilled.

Measurement information displayed in italics on report has been provided by the customer.

Certification no:

107831-AL, 107830-RT, NRSB ARL1904, NY ELAP ID: 12042,



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APPENDIX B
CABRERA RADIOLOGICAL SURVEY REPORTS
(CHS-01 to CHS-03)

Survey Number	CHS-01
Survey Date	4/9/2022 and 4/24/22
Survey Location	Colonia H.S. (i/s 1st Floor)
Surveyor(s)	J. Elmazi / C. Hill
Reviewer(s)	D. Whitlock / M. Winters
Survey Type	Scoping Investigation
Total Pages	3
Project #	R6-0056.01



**RADIOLOGICAL
SURVEY
REPORT**

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Survey Remarks		Meter/Survey Parameters	Gamma			Alpha		Beta		Alpha		Beta	
A	Max. observed ratemeter reading within noted distance range												
B	1-minute static at noted distance and 100cm ² detector orientation	Model	microrem ^A	2221/44-10 ^B		2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B	
		Serial	1715	108853/PR357747		168594/PR401494		168594/PR401494		168594/PR401494		168594/PR401494	
	µrem = microrentgen equivalent man	Cal. Due Date	7/26/2022	3/23/2023		3/1/2023		3/1/2023		3/1/2023		3/1/2023	
	cpm = counts per minute	Efficiency (4π)	N/A	N/A		0.2060		0.1430		0.2060		0.143	
	dpm = disintegrations per minute	Distance (cm)	30-100	10	30	Background (Detector Face UP)				Surface (Detector Face DOWN)			
#	Measurement Location	Units of Measure	µrem/hr	cpm	cpm	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm
1	Main Office		3	5701	5841	5	24	195	1364	2	10	186	1301
2	Main Office		3	7583	7773	1	5	188	1315	1	5	190	1329
3	Main Office		3	6438	6594	0	0	208	1455	0	0	176	1231
4	Main Office		3	8046	8180	2	10	170	1189	2	10	166	1161
5	Main Office		3	5911	6032	2	10	181	1266	3	15	185	1294
6	Auditorium		5	7538	7580	0	0	203	1420	1	5	207	1448
7	Auditorium		7	7726	7767	0	0	157	1098	2	10	226	1580
8	Auditorium		8	7855	7919	2	10	179	1252	3	15	155	1084
9	Auditorium		5	7846	8019	0	0	203	1420	3	15	266	1860
10	Room 144		4	7173	6913	0	0	191	1336	3	15	197	1378
11	Room 144		4	7196	7229	0	0	182	1273	0	0	209	1462
12	Room 146		4	7923	7848	1	5	211	1476	0	0	208	1455
13	Room 146		3	9678	9468	0	0	190	1329	1	5	186	1301
14	Room 148		4	8412	8236	0	0	214	1497	1	5	201	1406
15	Room 150		3	8021	8071	0	0	216	1510	0	0	202	1413
16	Main Lobby Wall		4	5224	5424	1	5	279	1951	3	15	308	2152
17	Main Lobby Wall		5	6652	6667	0	0	315	2203	4	19	478	3343
18	Main Lobby Wall		3	5733	5744	1	5	161	1126	1	5	236	1650
19	Main Lobby Wall		3	10178	10264	2	10	379	2650	5	24	460	3217
20	Field House		6	5896	5990	0	0	176	1231	1	5	183	1280
21	Field House		5	6125	6086	0	0	168	1175	2	10	185	1294
22	Main Lobby		5	6315	6394	2	10	172	1203	2	10	199	1392
23	Main Lobby		5	7062	6923	1	5	240	1678	2	10	252	1762
24	Boy's Locker Room		5	7200	7698	1	5	223	1559	4	19	195	1364
25	Boy's Locker Room		4	8345	8389	2	10	374	2615	1	5	423	2958
26	Boy's Team Room		5	7881	7885	5	24	205	1434	3	15	214	1497
27	Gymnasium		5	7579	7271	5	24	184	1287	4	19	197	1378
28	Gymnasium		6	7450	7606	3	15	273	1909	9	44	405	2832
29	Girl's Team Room		5	7068	7244	4	19	188	1315	3	15	184	1287
30	Girl's Locker Room		6	8369	8301	1	5	182	1273	4	19	319	2231
31	Room 110		6	8276	8207	6	29	218	1524	4	19	238	1664
32	Room 112		4	7915	8147	6	29	207	1448	3	15	194	1357
33	Room 114		5	7693	7641	4	19	213	1490	2	10	185	1294
34	Room 116		3	7233	7284	6	29	203	1420	4	19	179	1252
35	Room 118		3	7126	6891	7	34	213	1490	2	10	199	1392
36	Room 120		6	7244	7341	6	29	189	1322	4	19	176	1231
37	Room 124		4	7857	8000	4	19	205	1434	11	53	216	1510
38	Room 127		4	7613	7469	3	15	227	1587	1	5	193	1350
39	Room 126		4	7929	7717	2	10	171	1196	3	15	171	1196
40	Room 129		5	7133	7401	4	19	166	1161	5	24	198	1385

Survey Number	CHS-01
Survey Date	4/9/2022 and 4/24/22
Survey Location	Colonia H.S. (i/s 1st Floor)
Surveyor(s)	J. Elmazi / C. Hill
Reviewer(s)	D. Whitlock / M. Winters
Survey Type	Scoping Investigation
Total Pages	3
Project #	R6-0056.01



**RADIOLOGICAL
SURVEY
REPORT**

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P: 860.569.0095
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Survey Remarks		Meter/Survey Parameters	Gamma			Alpha		Beta		Alpha		Beta	
A	Max. observed ratemeter reading within noted distance range	Model	microrem ^A	2221/44-10 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B
B	1-minute static at noted distance and 100cm ² detector orientation	Serial	1715	108853/PR357747	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494
	µrem = microrentgen equivalent man	Cal. Due Date	7/26/2022	3/23/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023
	cpm = counts per minute	Efficiency (4π)	N/A	N/A	0.2060	0.1430	0.2060	0.1430	0.2060	0.1430	0.2060	0.1430	0.1430
	dpm = disintegrations per minute	Distance (cm)	30-100	10	30	Background (Detector Face UP)				Surface (Detector Face DOWN)			
#	Measurement Location	Units of Measure	µrem/hr	cpm	cpm	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm
41	Room 128		4	6688	6931	4	19	160	1119	2	10	174	1217
42	Room 131		5	7295	7410	2	10	174	1217	2	10	150	1049
43	Room 130		3	7475	7551	1	5	188	1315	2	10	167	1168
44	Room 133		4	7696	7534	6	29	202	1413	4	19	199	1392
45	Teachers Lounge		5	6703	7009	3	15	170	1189	2	10	202	1413
46	Room 132		4	7802	7895	1	5	166	1161	3	15	159	1112
47	Room 134		5	8529	8992	0	0	193	1350	2	10	185	1294
48	Cafeteria (2)		4	6723	6698	5	24	169	1182	7	34	179	1252
49	Room 136		5	7650	7776	4	19	200	1399	7	34	214	1497
50	Room 138		5	7542	7916	3	15	209	1462	4	19	203	1420
51	Cafeteria (1)		5	6184	6255	2	10	205	1434	4	19	209	1462
52	Room 140		4	8420	8256	3	15	203	1420	9	44	197	1378
53	Room 142		4	8316	8139	7	34	206	1441	6	29	164	1147
54	Room 100		3	7230	7211	3	15	206	1441	3	15	211	1476
55	Room 101		3	7778	7615	2	10	177	1238	6	29	187	1308
56	Room 102		5	7223	7297	2	10	205	1434	5	24	204	1427
57	Room 103		3	6583	6658	5	24	163	1140	3	15	167	1168
58	Room 104		4	7288	7297	3	15	179	1252	2	10	188	1315
59	Room 105		4	7575	7740	0	0	210	1469	5	24	226	1580
60	Room 106		4	7164	6918	6	29	172	1203	4	19	172	1203
61	Room 107		5	7479	7257	5	24	190	1329	7	34	222	1552
62	Room 108		5	7086	7127	4	19	163	1140	4	19	148	1035
63	Kitchen		5	8420	7632	5	24	169	1182	3	15	203	1420
64	Gymnasium		5	7068	7253	1	5	156	1091	0	0	128	895
65	Gymnasium		5	7070	7228	1	5	138	965	2	10	141	986
66	Room 180		5	8740	8627	3	15	160	1112	1	5	152	1063
67	Room 181 Wall		4	8214	8304	2	10	129	902	0	0	116	811
68	Room 183 (184)		4	8029	8166	2	10	178	1245	0	0	168	1175
69	Room 183 (184)		5	8178	8231	0	0	167	1168	3	15	203	1420
70	Room 182		5	8827	8876	7	34	168	1175	6	29	176	1231

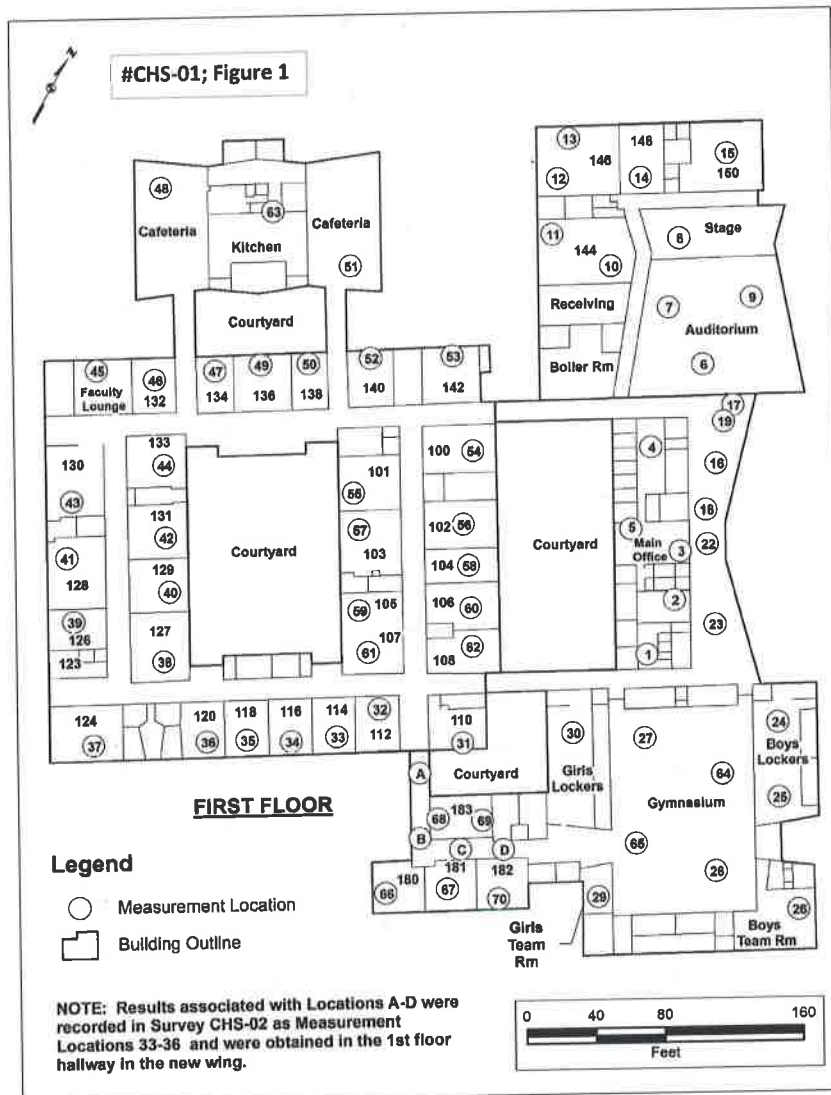
Survey Number	CHS-01
Survey Date	4/9/2022 and 4/24/22
Survey Location	Colonia H.S. (1/3 1st Floor)
Surveyor(s)	J. Elmazi / C. Hill
Reviewer(s)	D. Whitlock / M. Winters
Survey Type	Scoping Investigation
Total Pages	3
Project #	R6-0056.01



**RADIOLOGICAL
SURVEY
REPORT**

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Survey Remarks	Meter/Survey Parameters	Gamma			Alpha		Beta		Alpha		Beta		
A Max. observed ratemeter reading within noted distance range	Model	microrem ^A	2221/44-10 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	
B 1-minute static at noted distance and 100cm ² detector orientation	Serial	1715	108853/PR357747	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	168594/PR401494	
µrem = microrentgen equivalent man	Cal. Due Date	7/26/2022	3/23/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	3/1/2023	
cpm = counts per minute	Efficiency (4π)	N/A	N/A	0.2060	0.1430	0.2060	0.1430	0.2060	0.1430	0.2060	0.1430	0.1430	
dpm = disintegrations per minute	Distance (cm)	30-100	10	30	Background (Detector Face UP)				Surface (Detector Face DOWN)				
#	Measurement Location	Units of Measure	µrem/hr	cpm	cpm	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm



Survey Number	CHS-02
Survey Date	4/9/2022 and 4/24/22
Survey Location	Colonia H.S. (i/s 2nd Floor)
Surveyor(s)	D. Whitlock / C. Hill
Reviewer(s)	M. Winters
Survey Type	Scoping Investigation
Total Pages	3
Project #	R6-0056.01



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Survey Remarks		Meter/Survey Parameters	Gamma			Alpha		Beta		Alpha		Beta		
A Max. observed ratemeter reading within noted distance range			2221/44-10 ^B			2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B		
B 1-minute static at noted distance and 100 cm ² detector orientation		Model	1715	108853/PR357747			227244/PR401610		227244/PR401610		227244/PR401610		227244/PR401610	
Serial		Cal. Due Date	7/26/2022	3/17/2023			3/9/2023		3/9/2023		3/9/2023		3/9/2023	
µrem = microrentgen equivalent man		Efficiency (4π)	N/A	N/A			0.200		0.119		0.200		0.119	
cpm = counts per minute		Distance (cm)	30-100	10	30	Background (Detector Face UP)				Surface (Detector Face DOWN)				
dpm = disintegrations per minute		Units of Measure	µrem/hr	cpm	cpm	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm	
1	Hallway Floor	4	5936	6120	0	0	119	1000	2	10	179	1504		
2	Room 225	5	6091	6011	15	75	163	1370	11	55	144	1210		
3	Hallway Floor	4	5471	5398	7	35	152	1277	8	40	198	1664		
4	Room 224 Wall	4	6282	6342	6	30	167	1403	5	25	179	1504		
5	Room 227	4	6267	6053	2	10	172	1445	3	15	138	1160		
6	Room 226	4	6292	6317	1	5	145	1218	5	25	143	1202		
7	Room 229	5	5780	5709	4	20	150	1261	7	35	160	1345		
8	Hallway Floor	4	5647	5701	3	15	165	1387	3	15	167	1403		
9	Room 228	5	6167	6482	9	45	169	1420	6	30	151	1269		
10	Room 231	4	5529	6042	5	25	177	1487	5	25	134	1126		
11	Room 230	4	6149	6165	5	25	187	1571	5	25	154	1294		
12	Room 233 (wall)	4	6106	5884	5	25	164	1378	6	30	134	1126		
13	Room 232	4	6903	6176	3	15	176	1479	5	25	169	1420		
14	Room 234	3	6392	7144	8	40	168	1412	6	30	155	1303		
15	Room 235	4	7215	7329	10	50	175	1471	1	5	158	1328		
16	Stairwell Floor	4	9776	10691	5	25	171	1437	5	25	225	1891		
17	Room 237	5	6860	7194	8	40	186	1563	8	40	182	1529		
18	Room 236	4	5968	6236	16	80	174	1462	5	25	161	1353		
19	Room 238	8	6405	6474	10	50	166	1395	5	25	152	1277		
20	Hallway Floor	5	5310	5651	4	20	150	1261	5	25	162	1361		
21	Room 240	5	5926	5808	9	45	149	1252	7	35	158	1328		
22	Room 242	4	5558	6173	10	50	177	1487	5	25	178	1496		
23	Hallway Floor	4	5721	5862	4	20	161	1353	5	25	171	1437		
24	Room 201	5	6204	6493	9	45	170	1429	5	25	142	1193		
25	Room 255	5	7234	7287	10	50	148	1244	6	30	142	1193		
26	Room 207	3	6080	6267	18	90	167	1403	22	110	189	1588		
27	Hallway Floor	4	6341	6418	14	70	135	1134	9	45	171	1437		
28	Hallway Floor	4	6981	6899	9	45	172	1445	9	45	172	1445		
29	Room 210	4	5781	5522	12	60	180	1513	7	35	152	1277		
30	Hallway Floor	3	7134	7100	8	40	162	1361	12	60	181	1521		
31	Room 214	4	6326	6137	9	45	171	1437	6	30	169	1420		
32	Hallway Wall	3	6402	6583	9	45	158	1328	12	60	159	1336		
33	Hallway Floor - 1st Floor (See CHS-01)	3	8163	8115	7	35	168	1412	6	30	176	1479		
34	Hallway Wall - 1st Floor (See CHS-01)	3	8108	8077	7	35	154	1294	6	30	180	1513		
35	Hallway Floor - 1st Floor (See CHS-01)	4	8310	8251	5	25	185	1555	8	40	167	1403		
36	Hallway Wall - 1st Floor (See CHS-01)	4	8214	8210	5	25	157	1319	3	15	208	1748		
37	Room 203	4	5465	5765	2	10	149	1252	3	15	141	1185		
38	Room 205	3	5682	5783	0	0	132	1109	4	20	124	1042		
39	Room 204	4	6026	5921	1	5	124	1042	4	20	137	1151		
40	Room 211	5	6777	7051	0	0	139	1168	3	15	137	1151		

Survey Number	CHS-02
Survey Date	4/9/2022 and 4/24/22
Survey Location	Colonia H.S. (i/s 2nd Floor)
Surveyor(s)	D. Whitlock / C. Hill
Reviewer(s)	M. Winters
Survey Type	Scoping Investigation
Total Pages	3
Project #	R6-0056.01



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Survey Remarks		Meter/Survey Parameters	Gamma			Alpha		Beta		Alpha		Beta	
A	Max. observed ratemeter reading within noted distance range	Model	microrem ^A	2221/44-10 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B
B	1-minute static at noted distance and 100 cm ² detector orientation	Serial	1715	108853/PR357747	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610
	µrem = microrentgen equivalent man	Cal. Due Date	7/26/2022	3/17/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023	3/9/2023
	cpm = counts per minute	Efficiency (4π)	N/A	N/A	0.200	0.119	0.200	0.119	0.200	0.119	0.200	0.119	0.119
	dpm = disintegrations per minute	Distance (cm)	30-100	10	30	Background (Detector Face UP)				Surface (Detector Face DOWN)			
#	Measurement Location	Units of Measure	µrem/hr	cpm	cpm	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm
41	Room 206		4	6557	6314	4	20	215	1807	1	5	194	1630
42	Room 283		4	6363	6361	0	0	157	1319	0	0	147	1235
43	Room 280		4	6344	6406	0	0	143	1202	1	5	115	966
44	Room 281		5	6202	6062	0	0	169	1420	3	15	155	1303
45	Room 282		3	6275	6370	1	5	161	1353	3	15	183	1538
46	Room 208		4	6451	6334	1	5	163	1370	0	0	152	1277
47	Room 212		4	6192	6347	1	5	171	1437	0	0	197	1655
48	Room 216		3	6642	6781	1	5	129	1084	2	10	149	1252
49	Room 218		5	7539	7486	0	0	172	1445	1	5	215	1807
50	Room 222		4	8045	8127	3	15	156	1311	4	20	171	1437
51	Room 255 Wall		4	6421	6319	1	5	174	1462	0	0	184	1546
52	Room 246 Wall		4	8129	8062	3	15	169	1420	2	10	183	1538
53	Room 244		4	7124	7063	2	10	125	1050	0	0	150	1261
54	Room 248		5	7444	7291	2	10	165	1387	4	20	139	1168

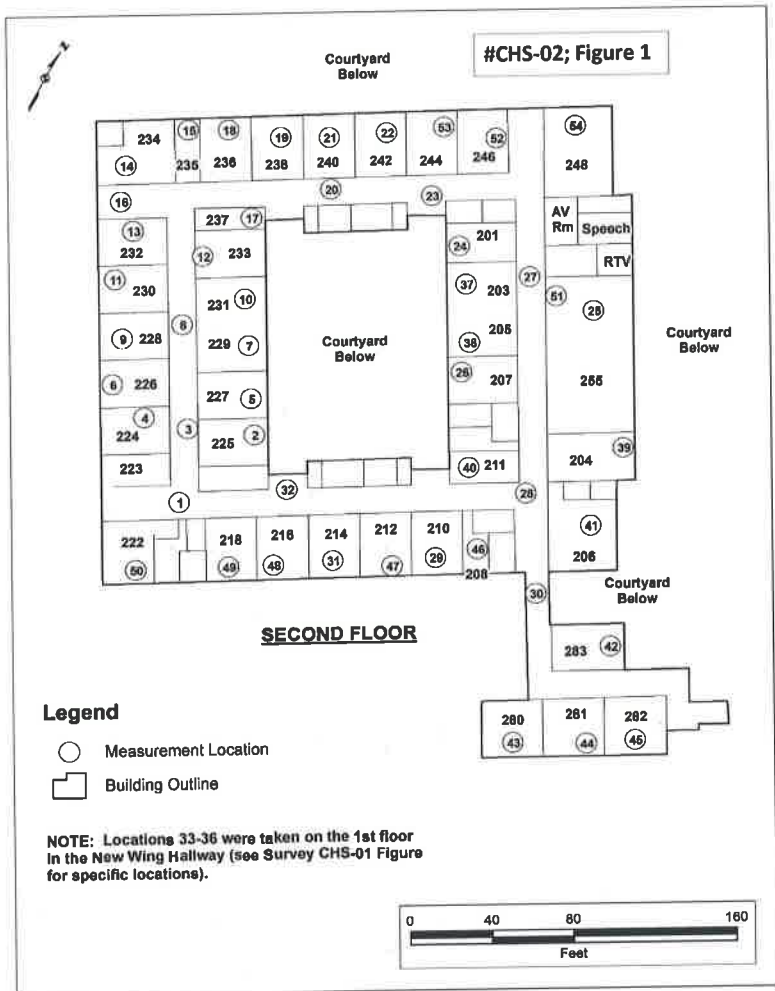
Survey Number	CHS-02
Survey Date	4/9/2022 and 4/24/22
Survey Location	Colonia H.S. (i/s 2nd Floor)
Surveyor(s)	D. Whitlock / C. Hill
Reviewer(s)	M. Winters
Survey Type	Scoping Investigation
Total Pages	3
Project #	R6-0056.01



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Survey Remarks	Meter/Survey Parameters	Gamma			Alpha		Beta		Alpha		Beta		
^A Max. observed ratemeter reading within noted distance range	Model	micromem ^A	2221/44-10 ^B			2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B	
^B 1-minute static at noted distance and 100 cm ² detector orientation	Serial	1715	108853/PR357747			227244/PR401610		227244/PR401610		227244/PR401610		227244/PR401610	
μrem = microroentgen equivalent man	Cal. Due Date	7/26/2022	3/17/2023			3/9/2023		3/9/2023		3/9/2023		3/9/2023	
cpm = counts per minute	Efficiency (4π)	N/A	N/A			0.200		0.119		0.200		0.119	
dpm = disintegrations per minute	Distance (cm)	30-100	10	30	Background (Detector Face UP)				Surface (Detector Face DOWN)				
#	Measurement Location	Units of Measure	$\mu\text{rem/hr}$	cpm	cpm	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm



END OF REPORT

Survey Number	CHS-03
Survey Date	4/9/2022
Survey Location	Colonia H.S. (exterior static)
Surveyor(s)	D. Whitlock
Reviewer(s)	M. Winters
Survey Type	Scoping Investigation
Total Pages	2
Project #	R6-0056.01



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Survey Remarks		Meter/Survey Parameters	Gamma	Alpha		Beta		Alpha		Beta	
A	Max. observed ratemeter reading within noted distance range										
B	1-minute static at noted distance and 100 cm ² detector orientation	Model	microm ^A	2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B		2224/43-93 ^B	
		Serial	1715	227244/PR401610		227244/PR401610		227244/PR401610		227244/PR401610	
	µrem = microroentgen equivalent man	Cal. Due Date	7/26/2022	3/9/2023		3/9/2023		3/9/2023		3/9/2023	
	cpm = counts per minute	Efficiency (4π)	N/A	0.200		0.119		0.200		0.119	
	dpm = disintegrations per minute	Distance (cm)	30-100	Background (Detector Face UP)				Surface (Detector Face DOWN)			
#	Measurement Location	Units of Measure	µrem/hr	cpm	dpm	cpm	dpm	cpm	dpm	cpm	dpm
1	Courtyard Wall		5	14	70	277	2328	10	50	444	3731
2	Courtyard Wall		6	8	40	265	2227	16	80	272	2286
3	Courtyard Sidewalk		5	15	75	234	1966	20	100	245	2059
4	Courtyard Patio		5	8	40	199	1672	11	55	217	1824
5	Courtyard Sidewalk		5	10	50	176	1479	13	65	217	1824
6	Courtyard Wall		6	5	25	222	1866	18	90	451	3790
7	Courtyard Wall		7	11	55	244	2050	16	80	454	3815
8	Outside Wall		5	12	60	171	1437	14	70	237	1992
9	Outside Wall		6	14	70	280	2353	20	100	421	3538
10	Outside Wall		8	7	35	260	2185	16	80	428	3597
11	Outside Wall		5	10	50	380	3193	14	70	410	3445
12	Outside Wall		4	12	60	241	2025	18	90	389	3269
13	Outside Wall		4	8	40	192	1613	12	60	441	3706
14	Outside Wall		6	12	60	214	1798	18	90	418	3513
15	Outside Wall		6	7	35	244	2050	14	70	407	3420
16	Outside Wall		5	9	45	198	1664	17	85	451	3790
17	Outside Wall		4	11	55	177	1487	12	60	432	3630
18	Outside Wall		4	14	70	234	1966	15	75	438	3681
19	Outside Wall		5	12	60	282	2370	16	80	399	3353
20	Outside Wall		6	10	50	231	1941	7	35	404	3395
21	Outside Wall		6	14	70	290	2437	10	50	425	3571
22	Outside Wall		5	12	60	254	2134	7	35	390	3277
23	Outside Wall		6	11	55	240	2017	10	50	444	3731
24	Outside Wall		4	6	30	139	1168	8	40	150	1261
25	Outside Wall		6	8	40	218	1832	7	35	451	3790
26	Outside Wall		5	9	45	240	2017	14	70	410	3445
27	Outside Wall		5	7	35	321	2697	12	60	421	3538
28	Outside Wall		6	8	40	380	3193	22	110	440	3697

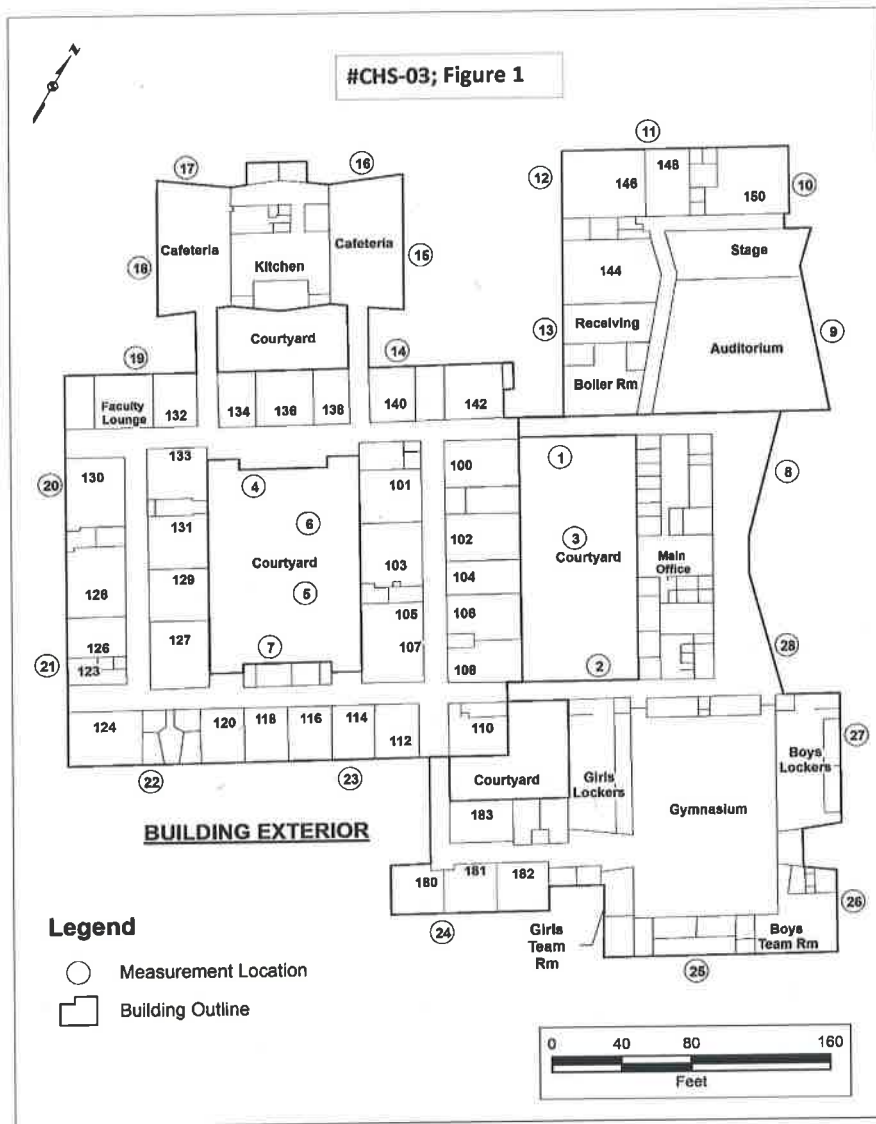
Survey Number	CHS-03
Survey Date	4/9/2022
Survey Location	Colonia H.S. (exterior static)
Surveyor(s)	D. Whitlock
Reviewer(s)	M. Winters
Survey Type	Scoping Investigation
Total Pages	2
Project #	R6-0056.01



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Survey Remarks	Meter/Survey Parameters	Gamma	Alpha	Beta	Alpha	Beta
A Max. observed ratemeter reading within noted distance range	Model	microm ^A	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B	2224/43-93 ^B
B 1-minute static at noted distance and 100 cm ² detector orientation	Serial	1715	227244/PR401610	227244/PR401610	227244/PR401610	227244/PR401610
µrem = microroentgen equivalent man	Cal. Due Date	7/26/2022	3/9/2023	3/9/2023	3/9/2023	3/9/2023
cpm = counts per minute	Efficiency (4π)	N/A	0.200	0.119	0.200	0.119
dpm = disintegrations per minute	Distance (cm)	30-100	Background (Detector Face UP)		Surface (Detector Face DOWN)	
# Measurement Location	Units of Measure	µrem/hr	cpm	dpm	cpm	dpm



END OF REPORT