



13 March 2019

Mr. Joseph T. Martella II, Senior Engineer
Site Remediation Program
Office of Waste Management
RI Department of Environmental Management
235 Promenade Street
Providence, RI 02908

*RE: Quarterly O&M Status Report No. 46
Alvarez High School, 333 Adelaide Avenue, Providence, Rhode Island
Case No. 2005-029
EA Project No. 15066.06*

Dear Mr. Martella:

On behalf of the City of Providence School Department (City), EA Engineering, Science, and Technology, Inc., PBC (EA) is providing this Quarterly Operations and Maintenance (O&M) Status Report in accordance with Provision 6(f) of the Order of Approval and amendments (Amended OA) for the referenced Alvarez High School site (the Site, formerly Adelaide Avenue High School).

This O&M Report summarizes recently-completed Site activities related to compliance subslab vapor and indoor air sampling for the period from December 2018 through February 2019.

If you have any questions or require additional information, please contact me at (401) 736-3440, Ext. 1809.

Sincerely,

EA ENGINEERING, SCIENCE,
AND TECHNOLOGY, INC., PBC

Frank B. Postma, LSP, LEP, PG
Project Manager

cc: C. Maher, Prov. Dept. of Public Schools A. Bucu, Prov. Dept. of Public Property
B. Nickerson, Prov. Redevelopment Agency Knight Memorial Library Repository
R. Dorr, Neighborhood Resident Principal Hawkins, Alvarez High School
Rep. Scott Slater

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Quarterly O&M Status Report No. 46

Summarizing Subslab Depressurization and Indoor Air Monitoring and Sampling Activities

Alvarez High School Site (Formerly Adelaide Avenue High School) Providence, Rhode Island

Prepared for

City of Providence School Department
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March 2019

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1. INTRODUCTION AND BACKGROUND

On behalf of the City of Providence School Department (the City), EA Engineering, Science, and Technology, Inc., PBC (EA) has prepared this Quarterly Operations and Maintenance (O&M) Status Report No. 46 for the Parcel B area of the former Gorham Manufacturing site in Providence, Rhode Island, formerly referred to as Adelaide Avenue High School and now referred to as Alvarez High School (the Site). A Site Location Map is provided as Figure 1. This report has been prepared to satisfy provision 6(f) of the Rhode Island Department of Environmental Management (RIDEM) Order of Approval (OA) issued in June 2006, as amended in February 2007, July 2007, and July 2009. For the purposes of this report, the original and the amended OA will collectively be referred to as the Amended OA.

The Amended OA specifies the details of the approved remedy for the Site including, but not limited to, the installation of a subslab depressurization (SSD) system, installation of a continuous indoor air methane monitoring system, and implementation of an associated periodic monitoring and sampling program. In August 2007, the RIDEM-approved remedy for the Site was completed and a Remedial Action Closure Report (RACR) was submitted to RIDEM. In July 2009, the periodic indoor air and subslab vapor sampling schedule was reduced to quarterly sampling from previously required monthly sampling.

This report summarizes the O&M, monitoring, and sampling activities completed at the Site for the three-month period from December 2018 through February 2019 (Quarterly Reporting Period No. 46). Please refer to Quarterly O&M Status Reports No. 1 through No. 45 for information regarding monitoring and sampling at the Site during the previous quarters. The RACR and previously-submitted monthly correspondence contain details regarding the results of the monitoring and sampling program for the period prior to Reporting Period No. 1.

2. SUMMARY OF SSD SYSTEM AND INDOOR METHANE MONITORING SYSTEM PERFORMANCE

2.1 SSD SYSTEM AND RELATED MONITORING

The following SSD system performance parameters were inspected and/or monitored at the frequencies indicated below in accordance with the Amended OA and through discussions with RIDEM to evaluate system performance:

- Monthly sub-slab monitoring of vacuum pressure and vapor-phase constituents (20 December 2018, 16 January 2019, and 14 February 2019) at 11 monitoring locations, as illustrated on the As-Built Subslab Monitoring and Sampling Plan provided as Figure 3.
- Quarterly sampling (16 January 2019) of eight indoor air locations, one ambient outdoor air location, and six subslab points.
- Monthly inspections and monitoring (air velocity and vacuum) of the three rooftop fans to verify proper operation and effluent concentrations.
- The electronic monitoring system associated with each of three SSD system extraction fans (automatic alarm notification via audible signal and phone notification) was inspected by a certified electrician on 12 November 2018. During the inspection it was discovered that the rooftop fan alarm system was without power and the alarm was not functioning as intended. The rooftop fans were still on and operable; however, it appears the system would not notify the emergency contacts if the fans were to stop. EA is continuing to work with electricians to identify the cause of the system disconnect and repair any electrical damages which may be preventing notifications from the fan system to the autodialer.

Vacuum measurements taken at each interior and perimeter subslab monitoring/sampling locations ranged from -0.01 to -0.18 in. of water column. Negative measurements confirm that a negative pressure exists beneath the building slab due to continuous fan operation. All rooftop fans were observed to be operating correctly during this reporting period; pressure and air velocity recorded at all Rooftop Fans were within normal ranges

The 8-inch eroded depression at the southeastern door was corrected by the Providence Public School Department in September 2018. A set of 6-foot(ft) long, 6-inch thick granite slabs were placed between the front sidewalk and the concrete walkway leading out from the school doors. Exposed soils on the side of the stairs were seeded with grass to promote vegetated cover.

The previously noted 6-inch hole under a roof leader downspout at the back of the building and another eroded area approximately 3-4 inches deep observed near the back door to the school remain present. Depth of landscape erosion at the back door has been slowly increasing since spring 2017. EA has met with city staff to correct the deficiencies as soon as possible. EA has been informed that the Providence Public School Department will be correcting remaining deficiencies.

On the morning of 9 January 2019, EA was contacted by Aramark Facility Services regarding persistent odors in the eastern first floor hallway and first floor women's bathroom. Aramark indicated that they were treating the sewer traps in the building; however, the odors had not subsided, and were concerned the condition may be related to the SSD system. EA responded to the site to investigate the cause. EA measured the subslab pressure at both internal and exterior monitoring points; the SSD system was under negative pressure and appeared to be operating as intended. EA also inspected the methane monitoring system and the autodialer; the monitoring system appeared operational and no methane was detected by the sensors.

Later that afternoon, EA returned to the site with a photoionization detector with part-per-billion (ppb) sensitivity to volatile organic compounds (VOCs), and a Landtec Gem 2000 Landfill Meter with percent methane, methane lower explosive limit (LEL), and hydrogen sulfide sensitivity. No hydrogen sulfide was detected in the eastern hallway or the women's bathroom where the odors were reportedly the strongest. No methane or methane LEL was detected in the eastern first-floor hallway; Methane was detected at 0.2% methane and 0% LEL in the women's bathroom. VOCs were detected in the eastern hallway at a level of 35 ppb; VOCs were detected in the women's bathroom at a level of 145 ppb. A bottle of "bioenzymatic urine digester" near the bathroom floor drain was observed, and VOC readings at the bottle were detected at 268 ppb, suggesting that the increased VOC levels in the bathroom may be associated with the drain cleaner.

VOC, methane, and hydrogen sulfide monitoring results recorded in the eastern hallway and the women's bathroom on 9 January were within normal ranges. Ambient air monitoring results, combined with the negative pressures observed at the SSD monitoring points, suggest that the odors reported on 9 January 2019 are not related to the SSD system or underlying impacted groundwater.

Copies of O&M field forms summarizing SSD System monitoring data collected during this reporting period are provided in Appendix A.

2.2 INDOOR METHANE MONITORING SYSTEM

Indoor methane concentrations were continuously monitored by an indoor methane monitoring system equipped with automatic alarm notification via audible signal and phone notification within the school at eight RIDEM-approved locations (refer to the Indoor Air Sampling and Methane Monitoring System Diagram provided as Figure 2) during this reporting period. The annual autodialer cell phone contract was renewed on 21 December 2018 for another year of service. The methane monitoring system was inspected during each monitoring event, and the filters were replaced on 14 February 2019. The next filter replacement is scheduled for May 2019.

On 12 November 2018, EA coordinated an autodialer system inspection with an electrician. No faults in the system were detected; however, the electrician suggested replacing the current autodialer battery with a new battery with larger charging capacity. Two backup batteries were

successfully installed on 26 January 2019 by D&E Electric with oversight from EA. The new battery packs have sufficient capacity to operate for multiple days (as opposed to several hours) in the event of an electrical outage or power disruption to the methane alarm notification system.

2.3 AMBIENT OUTDOOR AND INDOOR AIR SAMPLING

One ambient outdoor air sample and the eight indoor air samples were collected at the site at RIDEM-approved sampling locations during the quarterly sampling event on 16 January 2019. The samples collected in January 2019 were submitted to Con-Test Analytical Laboratory (Con-Test) for analysis of VOCs via Method TO-15 Selective Ion Monitoring (SIM). Each summa canister used during this monitoring period was individually certified to ensure that all containers were devoid of residual contamination. The typical summa canister certification process occurs in batches. However, individual certification was requested by RIDEM for this and future sampling events after residual contamination affected the 1 August 2014 sampling results.

Sample results were compared to the State of Connecticut's Draft Proposed Indoor Residential Targeted Air Concentrations (CT RTACs) and the RIDEM approved threshold level in accordance with the Amended OA. Sampling locations for the indoor air samples are illustrated on Figure 3. The ambient outdoor air sample was collected upwind (southwest) of the school. A data summary table is provided as Appendix B and a copy of the laboratory data report associated with this sampling event is provided in Appendix E.

Two analytes were identified in indoor air above the CT RTACs and RIDEM threshold levels during the January 2019 quarterly sampling event. Chloroform was detected in the Kitchen Storage Room at a concentration of $0.99 \mu\text{g}/\text{m}^3$, which exceeds the RIDEM amended threshold value of $0.5 \mu\text{g}/\text{m}^3$. Chloroform is a common ingredient in, or can form as a byproduct of, cleaning products and some insecticides. It is also a common laboratory contaminant. Insecticides and cleaning chemicals have historically been used at the school. The detections during the 16 January 2019 sampling event are consistent with historical chloroform detections in the Kitchen Storage Room (historical values between non-detect levels and $3.8 \mu\text{g}/\text{m}^3$) and are not believed to be not attributable to soil vapor intrusion.

Acetone was detected in Room 118 at a concentration of $270 \mu\text{g}/\text{m}^3$, which exceeds the RIDEM amended threshold value of $180 \mu\text{g}/\text{m}^3$. Acetone is frequently detected at low levels in Room 118; however, the highest previously recorded concentration of acetone in Room 118 was $44 \mu\text{g}/\text{m}^3$ in 2014. Acetone is not a site-specific contaminant of concern, and is a typical ingredient in cleaning products and a known laboratory contaminant. The last time the RIDEM amended threshold level for acetone was exceeded at the school was in 2008 when acetone was detected in the Kitchen Storage Room at $570 \mu\text{g}/\text{m}^3$ and the Cafeteria at $186 \mu\text{g}/\text{m}^3$. The 2008 exceedances were determined to be the result of indoor cleaning products. The elevated acetone levels detected in Room 118 during the January 2019 sampling event are likely due to cleaning product use and not attributable to soil vapor intrusion; The highest detection of acetone in the January 2019 subsample was recorded at $33 \mu\text{g}/\text{m}^3$ at MP-1, less than the acetone levels detected in

Room 118. Acetone levels in Room 118 will be closely monitored during future sampling events to determine if corrective actions are necessary.

The laboratory method detection limits (MDLs) for several VOCs reported via TO-15 analysis were greater than the respective CT RTACs/RIDEM threshold levels even though analysis was performed using the method with the lowest available detection levels (SIM procedure). The elevated MDLs occurred primarily with analytes that are not the constituents of concern (COCs) for the project. Additionally, many of these analytes have never been detected in indoor air at concentrations greater than the applicable standards. Therefore, the slightly elevated MDLs for some analytes were not significant and do not disqualify the dataset. Refer to Appendix F for an MDL verification letter from Con-Test verifying that where MDLs are not able to be met, the detection limit was the lowest currently achievable.

2.4 SUBSLAB VAPOR SAMPLING AND EVALUATION OF POTENTIAL VOC REBOUND EFFECT

A total of 11 RIDEM-approved subslab sampling locations are installed at the Site. Six subslab samples were collected on the rotating schedule in accordance with the Amended OA and analyzed for VOCs via US EPA Method TO-15 SIM. Four exterior subslab vapor samples and two interior subslab vapor samples were collected on 16 January 2019. The subslab analytical results are presented in Appendix C and a copy of the laboratory data report associated with this sampling event is included in Appendix E. The locations for sub-slab sampling are illustrated on Figure 3.

The subslab data has been evaluated for potential rebound. No evidence of increasing VOCs (i.e., VOC rebound) beneath the school has been observed. Slight fluctuations in concentrations were noted during this reporting period though these variations were within historical ranges and do not constitute an increasing trend.

2.5 SUMMARY OF ROOFTOP VOC EMISSIONS

The Amended OA requires that rooftop VOC sampling be completed on an annual basis. Rooftop sampling was conducted on 27 July 2018 (Rooftop Fans #1 and #3), and on 7 August 2018 (Rooftop Fan #2). Rooftop Fan #2 was originally sampled on 27 July 2018 however the summa canister tubing became dislodged during sample collection, introducing ambient air to the sample. For data quality purposes, Rooftop Fan #2 was resampled on 7 August 2018. The analytical results of rooftop fan sampling are summarized in Appendix D. No exceedances of the RIDEM Air Pollution Control Permit Applicability Thresholds for hourly, daily, or annual emissions were observed. The next annual rooftop effluent VOC sampling event is scheduled for July 2019.

Previous rooftop effluent sampling rounds conducted in March 2007 (immediately after SSD system startup), June 2007, June 2008, September 2009, July 2010, July 2011, July 2012, July 2013, October 2014, July 2015, July 2016 and July 2017 indicated compliance with all Air Pollution Control Permit Applicability Thresholds. Concentrations of VOCs in rooftop fan vents

continue to be evaluated based on the regulatory thresholds and their effect to background air at the school and the nearby residential neighborhood. RIDEM conducted roofline and downwind outdoor air sampling during the 22 October 2014 monitoring event to determine if rooftop fan exhaust was possibly infiltrating the building or impacting downwind air. The roofline and downwind sample concentrations were approximately the same as the upwind sample concentration and significantly lower than those concentrations observed in the rooftop fan exhaust. This data indicated that exhausted vapors from the rooftop fans were well dispersed and are not causing significant impacts downwind or inside the building.

2.6 CONCLUSIONS

The following conclusions are made based upon the completed inspections, monitoring, and sampling performed during this reporting period:

- The consistent negative pressure maintained below the floor slab indicates that soil vapor intrusion into Alvarez High School is not occurring.
- The continuous operation of the SSD System and confirmation of continuous sub-slab vacuum beneath the school illustrates ongoing, effective operation of the SSD System.
- Deficiencies noted in the engineered cap near the back (northern) entrance to the school and the roof leader downspout at the northwestern corner of the school need to be corrected, though the largest cap deficiency located in front of the school was corrected during this reporting period.
- The subslab data was evaluated for potential rebound in accordance with the Amended OA. No evidence of increasing VOCs (i.e., VOC rebound) beneath the school has been observed. Fluctuations in concentrations were noted during this reporting period; these variations do not constitute an increasing trend.
- The use of certified clean summa canisters, as requested by RIDEM, yielded confidence in the samples collected in January 2019. EA will continue to use certified clean canisters in the upcoming sampling events.
- During the 12 November 2018 alarm system inspection, it was discovered that the rooftop fan alarm system was without power and not functioning as intended. Rooftop fans remain on and operable. EA is working with electricians to identify the alarm power source and repair any electrical damages which may be affecting the emergency notifications.

3. FUTURE ACTIVITIES AND NEXT QUARTERLY SUMMARY REPORT

The following activities will be completed in accordance with the Amended OA during the next quarterly status reporting period from March 2019 to May 2019:

- Continuous monitoring of the operational status of the three rooftop fans;
- Monthly site inspections and monitoring using a photoionization detector with part-per-billion sensitivity;
- Collection of air samples from eight indoor locations, one ambient location, and six subslab monitoring points in April 2019;
- Initiate repairs to the engineered cap;
- Coordination with electricians to investigate the fan alarm system wiring, reconnect the alarm system to a reliable power source, and complete upgrades to the autodialer system as necessary.

These activities will be summarized in the next status report (Quarterly Status Report No. 47), expected to be submitted by the end of June 2019.

FIGURES

APPENDIX A

O&M Field Forms

APPENDIX B

Indoor and Ambient Outdoor Air Analytical Summary

APPENDIX C

Subslab Vapor Analytical Summary

APPENDIX D

Rooftop Emission Analytical Summary

APPENDIX E

Laboratory Analytical Reports

APPENDIX F

Laboratory MRL Correspondence