

December 11, 2003

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081-12152-00

Mr. Jeffrey Crawford  
Rhode Island Department of Environmental Management  
Office of Waste Management  
235 Promenade Street  
Providence, RI 02908-5767

Subject: Quarterly Monitoring for Springfield Street School Complex, 50 Springfield Street, Providence, RI - November 2003 Monitoring Round

Dear Jeff:

Quarterly monitoring was conducted in November 2003 at the above referenced site. The monitoring was performed in accordance with the *Long-Term Operation and Maintenance Plan and Site Contingency Plan* (O&M Plan) contained in the *Remedial Action Work Plan* prepared by ATC dated April 2, 1999, revised May 3, 1999 and May 9, 1999. The *Remedial Action Work Plan* (RAWP) was approved by the Rhode Island Department of Environmental Management (RIDEM) in a letter dated June 4, 1999.

Results of monitoring are provided in the following sections and in the attachments.

## SOIL COVER MONITORING

LFR conducted a visual survey of the site for evidence of significant soil cover erosion, or for any areas where the orange snow fencing indicator barrier was visible. We did not observe any areas where the orange indicator barrier was visible during the November monitoring. However, we did observe some areas where settling and /or erosion was present. These conditions were similar to what had been observed during the previous round of monitoring, and the areas are described below and shown on the attached site plan:

- In the paved section of a courtyard on the northern end of the Middle School, the pavement has settled and broken around the catch basin in the middle of the area, and underlying soil is exposed.
- In the same courtyard area, some settling has occurred along the eastern building wall.
- On the south side of the Middle School, adjacent to the HVAC unit and a transformer, settling has occurred around the catch basin and in this general vicinity. Several holes and a depressed area were observed.

- Along the western wall of the middle school adjacent to the HVAC unit and transformer, several deep holes were observed along the building foundation.

### **SUB-SLAB VENTILATION SYSTEM**

The sub-slab ventilation system was inspected by LFR during the quarterly monitoring on November 6, 2003. Influent and effluent air from the two blowers at the elementary school and the two blowers at the middle school were sampled. Samples of influent and effluent gas were collected at each location for screening for methane, carbon dioxide, carbon monoxide, hydrogen sulfide, and volatile organic compounds (VOC).

Results are provided in Table 3. Methane was not detected in any of the system samples collected. The concentration of organic vapors detected in the effluent from the elementary school carbon vessels, and the soil vapor being drawn into the system in the front shed at the middle school exceeded the action limit for organic vapors, based on PID readings. The influent readings at the elementary school were both lower than the effluent reading. At the front shed at the middle school, the effluent reading was lower than the inlet reading.

The sub-slab ventilation system operated without interruptions or problems during the period covered by this monitoring report.

### **INDOOR AIR MONITORING**

Indoor air monitoring was conducted on November 6, 2003 using a Landtec GEM-500 landfill gas monitor and an hNu photoionization detector. Results of monitoring are provided in the Table 4. No parameters were detected at concentrations above the action levels specified in the Remedial Action Work Plan during this round of monitoring.

On the day of the inspection, the methane monitors were marked with stickers indicating that Diamond Calibration last calibrated the methane monitors at both schools on October 28, 2003. Two monitors at the elementary school were not working at the time of the inspection. Diamond Calibration personnel reported that a circuit board was found to be faulty during calibration, and the part had been ordered. Since that time, the circuit board has come in, but two sensors which were functioning at the time of the inspection have gone bad, and are on order. The sensors will be replaced by Diamond Calibration when the parts come in.

### **GROUNDWATER MONITORING**

Four of the five groundwater monitoring wells were sampled by LFR on November 5, 2003 and one monitoring well was sampled on November 7, 2003. Prior to sampling, the depth to water was gauged, and a volume of water equivalent to approximately three well volumes was removed from the well. Temperature, specific conductance, dissolved

oxygen, and pH were measured in the field prior to sampling. Depth to groundwater ranged between 9.43 to 18.33 feet below the ground surface. Groundwater sampling logs are provided as Attachment 1.

Laboratory certificates of analysis are provided in Attachment 2. Samples were analyzed for VOCs by ESS laboratory via EPA method 8260. The only compound detected during by the analysis was MTBE at 9.95 µg/L, which is well below the GB Groundwater Objective of 5,000 µg/L.

### **SOIL GAS MONITORING**

Soil gas monitoring was conducted at 29 locations on November 3, 4, and 5, 2003. Sampling was conducted by placing an air sampling gripper cap on each well and attaching a piece of tubing. A volume of air equivalent to approximately 3 well volumes was removed from each well using an SKC Airchek Sampling pump. Soil gas was then screened using a Landtec GEM-500 Gas Analyzer and an Hnu Photoionization Detector.

Air samples were also collected in new laboratory supplied Tedlar bags using the SKC airchek Pump from wells WB-3 and MPL-6. The Tedlar bags were submitted to Con-test Analytical Laboratory for analysis for VOC via EPA method TO-14.

#### ***Soil Gas Field Monitoring Results***

Soil gas samples were screened for methane, carbon monoxide, hydrogen sulfide, carbon dioxide, oxygen, and total VOCs. Soil gas survey results are provided in Table 1.

Methane was detected at a level of 0.1% by volume at three of the 29 locations. This is below the Remedial Action Work Plan Level of 0.5%. Methane was not detected at any of the other sampling locations during this round of monitoring.

The three wells where methane was detected were EPL-1, EPL-4, and EPL-5. EPL-1 and EPL-4 are located east of Springfield Street, adjacent to the parking lot for the elementary school. EPL-5 is located at the southern end of Springfield Street adjacent to the southern border of the site.

Carbon dioxide concentrations were generally the same as the previous monitoring event, in that some locations exceed the action limit. Carbon dioxide concentrations ranged from 0 to 9.4% during this monitoring event.

Concentrations of carbon monoxide were detected at 10 of the 29 sampling locations; however, none of the concentrations exceeded the Remedial Action Work Plan Level of 9 parts per million (PPM), during this round of monitoring.

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Hydrogen sulfide was detected at each of the 29 sampling locations during this round of monitoring; however, none of the concentrations detected exceeded the Remedial Action Work Plan Level of 10 PPM. No odors typically associated with hydrogen sulfide were detected during the soil gas monitoring.

### ***Soil Gas Laboratory Results***

In accordance with the O&M Plan, two soil gas samples were collected in Tedlar bags and submitted to Con-Test Analytical Laboratories for analysis by method TO-14. Results of the analysis are summarized in Table 3, and the laboratory report is provided in Attachment 3. The results of analysis did not reveal any unusual contaminants. Constituents detected during this round of analysis were similar to constituents detected during previous rounds of analysis.

### **CONCLUSIONS**

An exceedance of the action levels was found in the system monitoring during this monitoring period ending in November 2003. In response to this exceedance, we recommend collecting samples from the influent and effluent of the three sub-slab system for laboratory analysis for VOCs during the next round of monitoring.

If you have any questions or require any additional information, please don't hesitate to contact the undersigned at 401-738-3887.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Donna Holden Pallister'.

Donna Holden Pallister, P.E.  
Senior Engineer

A handwritten signature in cursive script, appearing to read 'Thomas L. Daley'.

Thomas L. Daley  
Senior Engineer

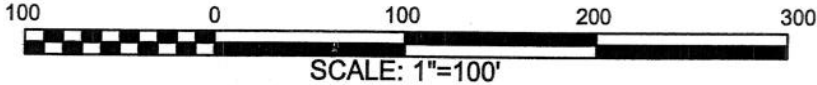
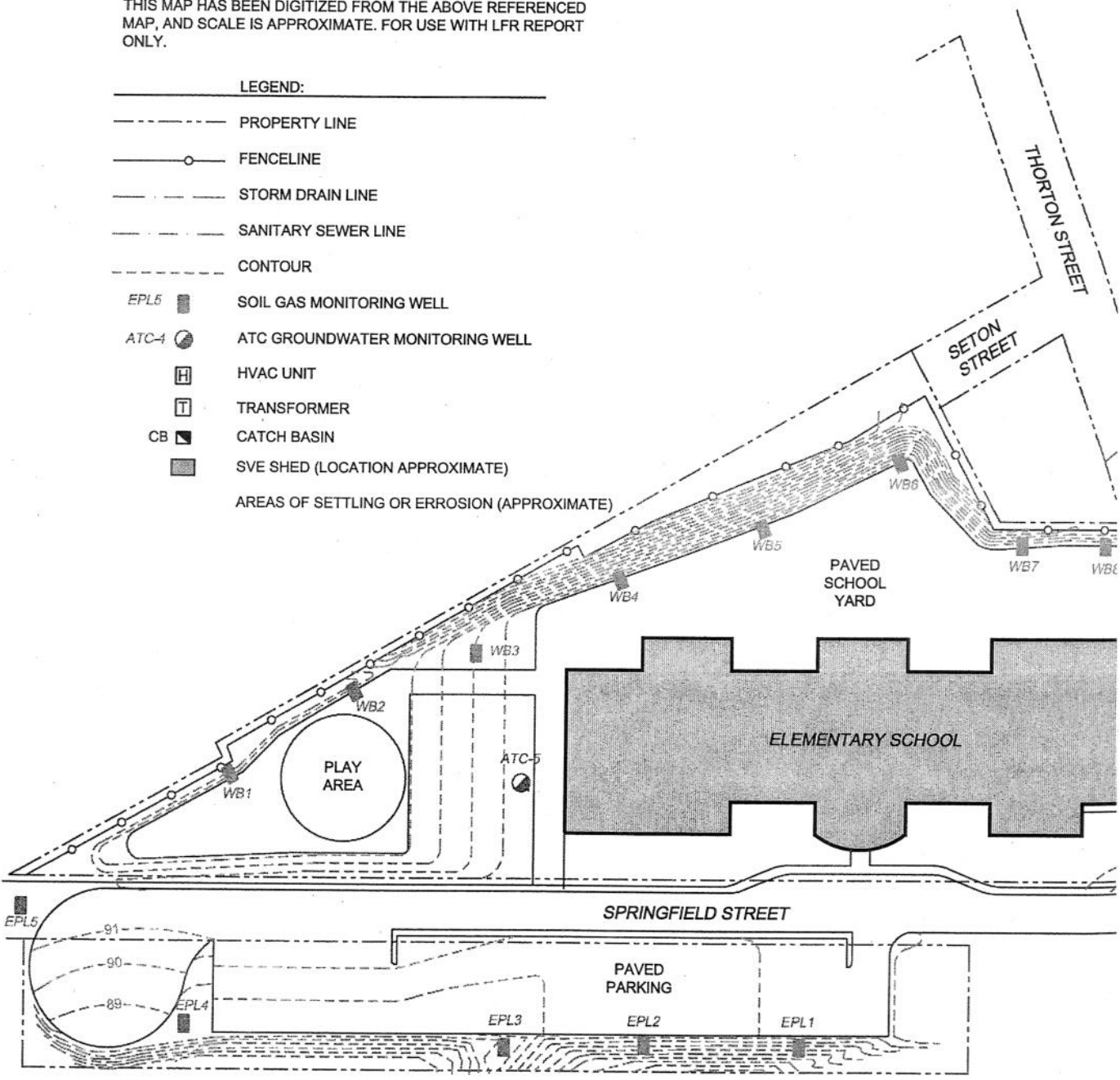
NOTES:

THE FOLLOWING MAP IS REFERENCED: ELEMENTARY & MIDDLE SCHOOLS, PROVIDENCE RHODE ISLAND, ISSUED FOR, CITY OF PROVIDENCE, GRADING AND SAMPLING LOCATION PLAN, PREPARED BY NORTHEAST ENGINEERS & CONSULTANTS, INC., DATED MAY 19, 1999, SCALE: 1"=50'.

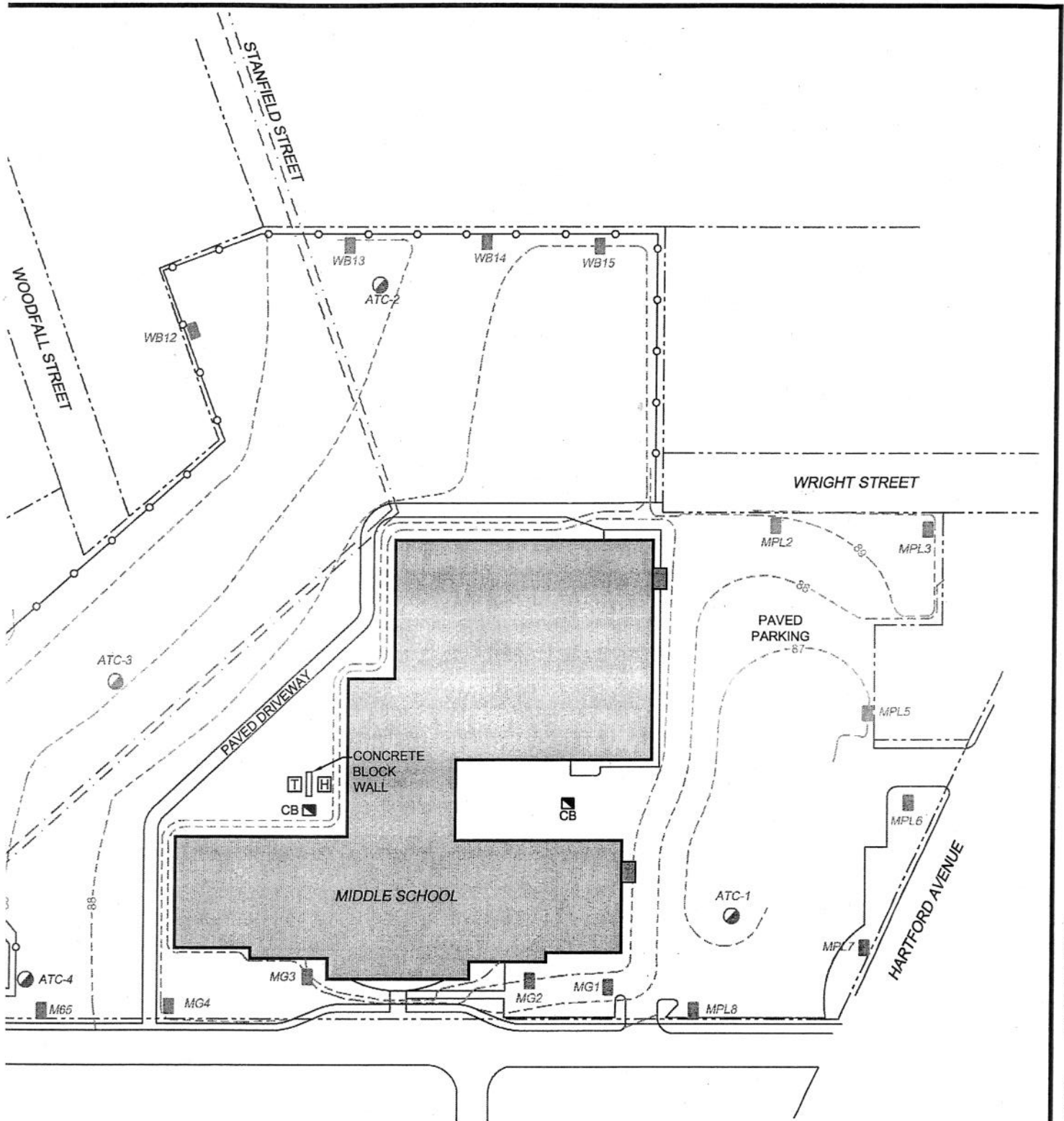
THIS MAP HAS BEEN DIGITIZED FROM THE ABOVE REFERENCED MAP, AND SCALE IS APPROXIMATE. FOR USE WITH LFR REPORT ONLY.



- LEGEND:**
- — — — — PROPERTY LINE
  - ○ — FENCELINE
  - — — — — STORM DRAIN LINE
  - — — — — SANITARY SEWER LINE
  - - - - - CONTOUR
  - EPL5 ■ SOIL GAS MONITORING WELL
  - ATC-4 ● ATC GROUNDWATER MONITORING WELL
  - HVAC UNIT
  - TRANSFORMER
  - CB ■ CATCH BASIN
  - SVE SHED (LOCATION APPROXIMATE)
  - ▨ AREAS OF SETTLING OR EROSION (APPROXIMATE)







**LFR**  
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 Building E, Suite 12  
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DATE: 4-7-03  
 DRAWN BY: PPH  
 REVIEWED BY: DP  
 APPROVED BY: DP  
 SCALE: AS NOTED  
 FILE NO: 081-12027-00  
 JOB NO: 081-12027-00

TITLE:  
**SITE PLAN**

LOCATION:  
**SPRINGFIELD STREET SCHOOL COMPLEX  
 SPRINGFIELD STREET  
 PROVIDENCE, RHODE ISLAND**

FIGURE:  
**1**

**Table 1**  
**Soil Gas Survey Results**  
**Springfield Street School Complex**  
**Providence, RI**  
**November 2003**

| Monitoring Well | Methane % by volume | Carbon Dioxide % by volume | Oxygen % by volume | Carbon Monoxide PPM | Hydrogen Sulfide PPM | Organic Vapors PPM |
|-----------------|---------------------|----------------------------|--------------------|---------------------|----------------------|--------------------|
| WB-1            | 0                   | 2.3                        | 17.8               | 0                   | 0.3                  | 0                  |
| WB-2            | 0                   | 1.9                        | 18.1               | 1                   | 0.2                  | 0                  |
| WB-3            | 0                   | 0                          | 20.4               | 0                   | 0.3                  | 0                  |
| WB-4            | 0                   | 0                          | 20.4               | 1                   | 0.2                  | 0                  |
| WB-5            | 0                   | 0                          | 20.2               | 0                   | 0.3                  | 0                  |
| WB-6            | 0                   | 0                          | 20.5               | 0                   | 0.3                  | 0                  |
| WB-7            | 0                   | 0                          | 20.2               | 0                   | 0.2                  | 0                  |
| WB-8            | 0                   | 0                          | 20.4               | 0                   | 0.2                  | 0                  |
| WB-12           | 0                   | 0.9                        | 19.5               | 0                   | 0.3                  | 0                  |
| WB-13           | 0                   | 0.2                        | 20.4               | 1                   | 0.2                  | 0                  |
| WB-14           | 0                   | 2.9                        | 16.8               | 0                   | 0.5                  | 0                  |

**Table 1 (continued)**  
**Soil Gas Survey Results**  
**Springfield Street School Complex**  
**Providence, RI**  
**November 2003**

| Monitoring Well | Methane<br>% by volume | Carbon Dioxide<br>% by volume | Oxygen<br>% by volume | Carbon Monoxide<br>PPM | Hydrogen Sulfide<br>PPM | Organic Vapors<br>PPM |
|-----------------|------------------------|-------------------------------|-----------------------|------------------------|-------------------------|-----------------------|
| WB-15           | 0                      | 4.8                           | 14.4                  | 1                      | 0.1                     | 0                     |
| EPL-1           | 0.1                    | 0.8                           | 19.4                  | 0                      | 0.2                     | 0                     |
| EPL-2           | 0                      | 1.9                           | 16.3                  | 1                      | 0.4                     | 0                     |
| EPL-3           | 0                      | 1.8                           | 17.6                  | 0                      | 0.2                     | 0                     |
| EPL-4           | 0.1                    | 5.2                           | 10.4                  | 0                      | 0.5                     | 0                     |
| EPL-5           | 00.1                   | 3.2                           | 15.3                  | 0                      | 0.1                     | 0                     |
| ENE-1           | 0                      | 0.8                           | 18.7                  | 0                      | 0.4                     | 0                     |
| MG1             | 0                      | 2.4                           | 16.5                  | 0                      | 0.4                     | 0                     |
| MG2             | 0                      | 4.2                           | 15.4                  | 3                      | 0.2                     | 0                     |
| MG3             | 0                      | 1.8                           | 17.8                  | 2                      | 0.2                     | 0                     |
| MG4             | 0                      | 3.4                           | 15.5                  | 0                      | 0.4                     | 0                     |
| MG5             | 0                      | 0.3                           | 19.9                  | 0                      | 0.2                     | 0                     |
| MPL2            | 0                      | 0                             | 20.4                  | 4                      | 0.5                     | 0                     |



**Table I (continued)**  
**Soil Gas Survey Results**  
**Springfield Street School Complex**  
**Providence, RI**  
**November 2003**

| Monitoring Well                         | Methane % by volume | Carbon Dioxide % by volume | Oxygen % by volume | Carbon Monoxide PPM | Hydrogen Sulfide PPM | Organic Vapors PPM |
|---|---------------------|----------------------------|--------------------|---------------------|----------------------|--------------------|
| MPL3                                    | 0                   | 2.8                        | 17.3               | 1                   | 0.2                  | 0                  |
| MPL5                                    | 0                   | 1.1                        | 18.9               | 0                   | 0.2                  | 0                  |
| MPL6                                    | 0                   | 0                          | 20.4               | 1                   | 0.2                  | 1                  |
| MPL7                                    | 0                   | 9.4                        | 9.9                | 0                   | 0.3                  | 0                  |
| MPL8                                    | 0                   | 7.6                        | 11.4               | 0                   | 0.2                  | 0                  |
| Remedial Action Work Plan Action Levels | 0.5%                | 1,000 PPM                  | NA                 | 9 PPM               | 10 PPM               | 5 PPM              |

**Date:** 11/3/03, 11/4/03 and 11/5/03      **Sampled by:** Andrea J. Lang and Christina L. Taggart (11/3 only)  
**Weather Conditions:** 11/3 – sunny 75 degrees F, 11/4 – rainy 50 degrees F and 11/5 – rainy 50 degrees F  
**Sampling Equipment:** Landtec GEM-500, SKC Pump and hNU PID Meter

**Table 2**  
**Soil Gas Laboratory Analysis Results**  
**Springfield Street School Complex**  
**November 11, 2003**

| Parameter               | Results of Analysis in parts per billion by volume (PPBv) |      |
|-------------------------|---|------|
|                         | MPL-6   | WB-3 |
| Benzene                 | ND  | 0.9  |
| Ethylbenzene            | 1.6   | ND   |
| Dichlorodifluoromethane | ND  | 0.9  |
| 1,2,4-Trimethylbenzene  | 2.2   | ND   |
| 1,3,5-Trimethylbenzene  | 1.3   | ND   |
| Methylene Chloride*     | ND  | 4.0  |
| Toluene                 | ND  | 3.3  |
| Tetrachloroethylene     | ND  | 0.7  |
| Trichloroethylene       | ND  | 0.9  |
| O-Xylene                | 3.3   | 0.6  |
| M/p-Xylene*             | 15.8  | 1.7  |

Table lists only detected compounds. See laboratory report for full list of analytes.

\* The laboratory reported that m/p-xylene and methylene chloride were detected in the method blank.

**Table 3**  
**System Monitoring Notes**  
**Springfield Street School Complex**  
**Providence, RI**  
**081-12152-00**

| <b>Monitoring Location</b>                            | <b>Methane % by volume</b> | <b>Carbon Dioxide % by volume</b> | <b>Oxygen % by volume</b> | <b>Carbon Monoxide PPM</b> | <b>Hydrogen Sulfide PPM</b> | <b>Organic Vapors PPM</b> |
|---|----------------------------|-----------------------------------|---------------------------|----------------------------|-----------------------------|---------------------------|
| Elementary School inlet 1                             | 0                          | 0.4                               | 19.7                      | 0                          | 0.2                         | 1.2                       |
| Elementary School inlet 2                             | 0                          | 0.4                               | 19.7                      | 0                          | 0.2                         | 2.0                       |
| Elementary School Outlet                              | 0                          | 0.4                               | 19.6                      | 0                          | 0.1                         | 11.0                      |
| Middle school front shed inlet                        | 0                          | 0                                 | 20.2                      | 0                          | 0.2                         | 11.0                      |
| Middle school front shed after 2 <sup>nd</sup> carbon | 0                          | 0                                 | 20.3                      | 0                          | 0.1                         | 0                         |
| Middle school back shed inlet                         | 0                          | 0.3                               | 19.9                      | 0                          | 0.3                         | 1.4                       |
| Middle school back shed after 2 <sup>nd</sup> carbon  | 0                          | 0                                 | 20.4                      | 0                          | 0                           | 0                         |

Measurements made with: Landtec GEM 500, hNu photoionizer detector  
 Sampling date: 11/6/03

**Table 4**  
**Indoor Air Monitoring Notes**  
**Springfield Street School Complex**  
**Providence, RI**  
**November 6, 2003**

| Monitoring Location       | Methane % by volume | Carbon Dioxide % by volume | Oxygen % by volume | Carbon Monoxide PPM | Hydrogen Sulfide PPM | Organic Vapors PPM |
|---------------------------|---------------------|----------------------------|--------------------|---------------------|----------------------|--------------------|
| <b>Elementary School</b>  |                     |                            |                    |                     |                      |                    |
| Front office              | 0                   | 0                          | 20.3               | 0                   | 0.5                  | 0                  |
| Elevator Room             | 0                   | 0                          | 20.2               | 0                   | 0.5                  | 0                  |
| Elevator Shaft            | 0                   | 0                          | 20.1               | 0                   | 0.5                  | 0                  |
| Electrical closet         | 0                   | 0                          | 20.0               | 0                   | 0.3                  | 0.2                |
| Gym storage closet        | 0                   | 0                          | 20.1               | 0                   | 0.6                  | 0.2                |
| Boiler Rm. Elec. Closet   | 0                   | 0                          | 20.1               | 1                   | 0.4                  | 0                  |
| Library                   | 0                   | 0                          | 19.9               | 0                   | 0.3                  | 3                  |
| Second Floor, West closet | 0                   | 0                          | 20.1               | 0                   | 0                    | 2                  |
| Stairway                  | 0                   | 0                          | 20.2               | 1                   | 0                    | 3                  |
| Room 110                  | 0                   | 0                          | 19.8               | 0                   | 0.1                  | 0.5                |
| Room 205                  | 0                   | 0                          | 19.9               | 0                   | 0.2                  | 0.3                |
| Room 215                  | 0                   | 0                          | 20.0               | 0                   | 0                    | 0.3                |

**Indoor Air Monitoring Notes**  
**Springfield Street School Complex**  
**November 6, 2003**

| <b>Monitoring Location</b>          | <b>Methane % by volume</b> | <b>Carbon Dioxide % by volume</b> | <b>Oxygen % by volume</b> | <b>Carbon Monoxide PPM</b> | <b>Hydrogen Sulfide PPM</b> | <b>Organic Vapors PPM</b> |
|-------------------------------------|----------------------------|-----------------------------------|---------------------------|----------------------------|-----------------------------|---------------------------|
| Room 214                            | 0                          | 0                                 | 20.0                      | 0                          | 0.1                         | 0.2                       |
| Room 218                            | 0                          | 0                                 | 20.0                      | 0                          | 0                           | 0.2                       |
| Room 201                            | 0                          | 0                                 | 20.2                      | 0                          | 0                           | 0.2                       |
| Cafeteria                           | 0                          | 0                                 | 20.2                      | 0                          | 0.4                         | 0.3                       |
| Heating vent in cafeteria           | 0                          | 0                                 | 20.3                      | 0                          | 0.4                         | 0.3                       |
| <b>Middle School</b>                |                            |                                   |                           |                            |                             |                           |
| Front office                        | 0                          | 0                                 | 20.4                      | 0                          | 0.1                         | 1                         |
| Elev. closet                        | 0                          | 0                                 | 20.5                      | 1                          | 0.1                         | 1.4                       |
| Elev. shaft                         | 0                          | 0                                 | 20.5                      | 0                          | 0.3                         | 1.2                       |
| Crack near door to outside near gym | 0                          | 0                                 | 20.4                      | 0                          | 0.2                         | 1.2                       |
| Music Room                          | 0                          | 0                                 | 20.4                      | 0                          | 0.2                         | 1.1                       |
| Closet 1 <sup>st</sup> Floor        | 0                          | 0                                 | 20.5                      | 0                          | 0.2                         | 2                         |
| Closet 2 <sup>nd</sup> Floor        | 0                          | 0                                 | 20.5                      | 0                          | 0.3                         | 1.1                       |
| Room 205                            | 0                          | 0                                 | 20.4                      | 0                          | 0.2                         | 1.2                       |
| Library                             | 0                          | 0                                 | 20.4                      | 0                          | 0.2                         | 1.2                       |
| Janitor office                      | 0                          | 0                                 | 20.5                      | 0                          | 0.1                         | 1.2                       |

**Indoor Air Monitoring Notes**  
**Springfield Street School Complex**  
**November 6, 2003**

| <b>Monitoring Location</b>                     | <b>Methane % by volume</b> | <b>Carbon Dioxide % by volume</b> | <b>Oxygen % by volume</b> | <b>Carbon Monoxide PPM</b> | <b>Hydrogen Sulfide PPM</b> | <b>Organic Vapors PPM</b> |
|--|----------------------------|-----------------------------------|---------------------------|----------------------------|-----------------------------|---------------------------|
| Stairwell north end front                      | 0                          | 0                                 | 20.3                      | 0                          | 0.3                         | 1.4                       |
| <b>Remedial Action Work Plan Action Levels</b> | <b>0.5</b>                 | <b>1,000 ppm</b>                  | <b>NA</b>                 | <b>9 ppm</b>               | <b>10 ppm</b>               | <b>5 ppm</b>              |

Landtec GA90/hNu photoionization detector