

**HAMPDEN ENVIRONMENTAL TRUST  
COMMITTEE MEETING**

**Thursday, September 13, 2018**

**1:00 PM**

**Hampden Town Council Chambers  
Hampden, Maine**

**A G E N D A**

1. Call to Order
2. Approval of Minutes
  - a. Meeting Minutes for May 23, 2018
3. Financial Report
  - a. Account Balances
  - b. Use of Funds Policies & Practices
4. Pine Tree Landfill
  - a. Post-Closure Monitoring Review – *presented by Matt Reynolds of Drumlin Environmental, LLC*
5. Stormwater Management Projects
  - a. Schoolhouse Lane
  - b. Other Potential Locations
6. Adjourn – not later than 3:00 p.m.

**HAMPDEN ENVIRONMENTAL TRUST**  
**COMMITTEE MEETING**  
**Wednesday May 23rd, 2018**  
**2 P.M.**  
**HAMPDEN TOWN OFFICE**  
**MINUTES (DRAFT)**

**Attending:**

*Ken White, Chair*

*Kerry Woodbury, Committee Member*

*Mayor Ivan McPike, Committee Member*

*Angus Jennings, Town Manager*

*Jim Chandler, New Town Manager (Selected)*

*Sean Currier, Public Works Director*

*Doug Poulin, Hampden Resident*

*Ray Dresser, Hampden Resident (11 Schoolhouse Lane)*

*Jim Larson, Hampden Resident (26 Schoolhouse Lane)*

**1. Call to Order**

Meeting was called to order at 2 pm

**2. Approval of Meeting Minutes – May 10, 2018**

Mayor McPike moved that the Meeting Minutes be approved from the May 10, 2018 Meeting, Chair White seconded, and all in favor was yes at 2:01 pm.

**3. Continuation of May 10, 2018 discussion regarding proposed FY19 budget related to Environmental Trust, including discussion of proposed drainage and roadway improvements on Schoolhouse Lane**

Manager Jennings mentioned that during the last Environmental Trust Committee Meeting the Committee asked for more insight on the drainage issues on

Schoolhouse Lane. Public Works Director Sean Currier said that the problems on Schoolhouse Lane pre dated the work done by the Water District. He said that number 6 and 8 on Schoolhouse Lane had prior issues. There were issues on the edge of the road so Public Works would have paved the inside road edge 12-15 years ago. They paved the inside road edge and bottom but they didn't pave the back of the ditch. He said he didn't think it would have prevented water from getting into basements. Public Works Director Sean Currier then showed pictures of the ditches. Native material was used on the ditch to help prevent water from traveling down the trench. House numbers 6 and 18 were vacant during the project and the sewer lines were dug through at the road.

The Water District paid for another contractor CA Strout to replace the sewer service and also fix # 18. Public Works Director Sean Currier said that he didn't think there was any design issues, wrong doing, or contractor negligence during this project. Public Works Director Sean Currier also mentioned that there is an elevated water table there, and with the hill and slope there is already a potential for water issues on Schoolhouse Lane. Manager Jennings asked if there is any recourse with the insurer or contractor and Public Works Director Sean Currier said he didn't believe so because there wasn't design issues or contractor negligence. They used native material which would prevent water from going into the new trench. Manager Jennings said that it sounds like from what Sean has mentioned there was some worsening but it doesn't sound like it could have been avoided. Public Works Director Sean Currier said I don't see how it could have been avoided if we go back and do the new project we would put in clay dams at all services going down. There should be plenty of clay in the native soil to prevent any of that migration. Resident Doug Poulin asked if this is still going on. Public Works Director Sean Currier said yes, the hill has elevated water levels so we added a lip which is a short term fix. It would need an underdrain on both sides of the road. It will also need curb and catch basins to rectify any issues.

Mayor Ivan McPike said we already put a dollar amount forward, correct? Manager Jennings said the Infrastructure Committee recommended the smaller project at the 5/16 Council budget meeting. Mayor Ivan McPike asked if the Trust had talked about \$80,000. Manager Jennings said yes. Public Works Director Sean Currier said he supports full construction and the current council decision was 3-3. Chair Ken White said Committee doesn't decide Council does. Public Works Director Sean Currier said yes, and provided background info. Ivan McPike asked for a cost summary. Manager Jennings said overall cost is \$310-\$330,000 of which \$150,000 would be stormwater expenses. As council recommended, would be \$80,000 out of the \$110,000 project. Councilor Stephen Wilde said when the Council recommended lesser amount it wasn't known if the Trust would reimburse. Manager Jennings said that at the Infrastructure Committee meeting it wasn't known, but it was known at the 5/16 Council meeting. Chair Ken White asked if it would be on a reimbursement basis, or up front lump sum. Manager Angus Jennings said Reimbursement; Town expense budget will need to budget full amount. Mayor Ivan McPike mentioned the Environmental Trust is drawing

from interest a finite amount of money, do we want to pace ourselves? Chair Ken White said we are trying to offset the taxpayer burden. If Council determined larger project was needed, our reimbursement could go up. Mayor Ivan McPike said if larger amount, it could sway some Councilors. Manager Angus Jennings said I think it would be helpful to the budget process to know the net cost. Councilor Stephen Wilde had to leave the meeting. Public Works Director Sean Currier said that if the Trust authorized up to \$150,000 and smaller project was done, would another vote be needed? Mayor Angus Jennings said in my opinion, no, the trust doesn't run on fiscal year. Mayor Ivan McPike made the motion to support stormwater costs up to \$150,000 if larger project, and up to \$80,000 for smaller project. Committee member Kerry Woodbury seconded the motion. Motion approved 3-0. Meeting adjourned at 2:31 pm.

#### **4. Set date for next meeting**

It was agreed to set the next meeting of the Environmental Trust at a later date.

#### **5. Adjourn**

The meeting of the Environmental Trust Committee was adjourned at 2:31 pm.

	<p><b>Drumlin Environmental, LLC</b> <i>Hydrogeologic and Engineering Consultants</i></p> <p><b>Soil Metrics, LLC</b></p>	
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## MEMORANDUM

**To:** Jim Chandler & Hampden Environmental Trust  
**From:** Matt Reynolds & Steve Rabasca  
**Date:** September 11, 2018  
**Subject:** Pine Tree Landfill –Post-Closure Monitoring Review & Update

This memorandum has been prepared to provide the Town with an overview of 2017 monitoring data and associated corrective actions and post-closure conditions at the Pine Tree Landfill (PTL). The review is based on data provided in the 2017 Annual Report, and the February 2018 memoranda prepared by Richard Heath of the Maine Department of Environmental Protection (MDEP).

This memorandum provides an update on 2017 operations and data from PTL. Additional information on historical conditions, closure, etc. was provided to the Town in a memorandum dated November 21, 2016.

Figure 1-1 from Attachment C of the 2017 Annual Report (prepared by Sevee & Maher Engineers) is attached to this memorandum for reference and shows the configuration of the landfill and location of the monitoring points and other site features. Consistent with previous update memoranda, this update does not include detailed graphs and figures, however, we would be glad to prepare these if it would assist the Town and/or address specific questions.

### **I. Landfill Closure Status**

In accordance with the October 2006 Schedule of Compliance agreed to by the Maine Department of Environmental Protection (MDEP) and the Town of Hampden, PTL completed closure of the landfill in 2010. Since that time, monitoring of water quality, gas, settlement, etc. has continued in accordance with the Environmental Monitoring Plan (EMP) for the site. In 2016 several adjustments were made to the sampling frequency and parameters as discussed in Section IV of the November 2016 memorandum and summarized in Table 1 of this memorandum.

Landfill gas containing methane is collected and used to fuel the Landfill Gas to Energy (GTE) facility constructed in 2007. Additionally, some of the leachate collected by the leachate collection system and groundwater extracted from wells at the perimeter of the landfill is being recirculated into the landfill with the approval of the MDEP.

## II. Corrective Action Summary

Prior to closure, corrective actions systems were implemented to control and/or mitigate impacts to groundwater and surface water include the following.

- Gas collection systems were installed in the Conventional Landfill and Secure Landfills to collect a portion of the landfill gas generated by decomposition of waste. Both gas collection systems are connected to the GTE plant.
- The Secure landfill liner system functions as a cover for the Conventional Landfill and the cover system for the Secure Landfills was completed in 2010;
- The perimeter drain (PDPS) borders the west, south and east sides of the Conventional Landfill and intercepts some shallow groundwater;
- Six groundwater extraction wells have been installed near the edge of the landfill (shown as red symbols on Figure 1-1). Wells EW-2R and EW-3R are located adjacent to the southeast corner of the landfill. Wells EW-5R, EW-6R, EW-101 and EW-102 are located adjacent to the northeast corner of the landfill. The gallons of leachate and groundwater extracted by these wells and drain during 2013 to 2017 are summarized below.

Year	Northeast (EW-5R, -6R, -101, - 102)	South (EW-2R, -3R)	PDPS	Total (gallons)
2013	2,687,000	1,121,000	3,721,000	7,529,000
2014	1,857,000	506,000	3,802,000	6,165,000
2015	3,112,039	781,344	3,356,269	7,249,652
2016	2,328,767	475,324	2,705,609	5,509,700
2017	1,429,545	155,070	3,056,334	4,640,949

Most of the decrease occurred at northeast well EW-5R (589,000 fewer gallons than in 2016) and southern well EW-3R (203,000 fewer gallons than in 2016). Overall, PTL has decreased corrective action pumping by approximately 2.6 million gallons per year since 2015.

- PTL also collects gas migrating away from the landfill in collection wells located west and south of the landfill. This external landfill gas (LFG) collection system consists of 6 gas collection wells and a passive gas collection trench. The gas extracted from the collection wells (shown as blue symbols on Figure 1-1) during 2013 to 2017 is summarized below.

Year	PTGW08-1 (MMSCF/Tons)	PTGW08-11 (MMSCF/Tons)	PTGW08-12 (MMSCF/Tons)	PTGW08-13 (MMSCF/Tons)
2013	20.8/218	2.0/17	0.5/2	0.6/4
2014	19.7/220	2.6/22	0.1/0.3	0.4/6
2015	19.2/200	2.5/19	2.1/10	1.7/8
2016	13.9/144	2.8/18	1.1/2.6	0.1/0.2
2017	8.6/101	3.5/23	1.8/12	0.2/0.1

- Notes: 1. MMSCF = Million Standard Cubic Feet. Tons = Tons of Methane Extracted  
 2. Estimate of Tons is Based on Volume Extracted and Percent Methane  
 3. No Gas Was Extracted from PTGW08-3, -9 during 2013 to 2017 Due to Low Gas & Methane

During September 2017, PTL measured higher than expected methane concentrations in monitoring well 916, east of the landfill, that may have been related to the lower flow in well PTGW-08-01. PTL investigated potential causes for the lower flow from PTGW-08-01 in 2017 and identified a structural defect in the piping from the well, which PTL plans to repair in 2018. Since 2015 PTL has increased gas extraction at PTGW08-12 south of the landfill. This has generally resulted in lower dissolved methane concentrations in downgradient monitoring wells located southwest of the landfill (e.g., MW-03-802A, -802B, -803B).

### III. Water Quality Target Criteria

The MDEP Closure Order identified 5 specific criteria for determining “successful corrective action” at PTL under the MDEP Solid Waste Regulations. These criteria incorporate the state Maximum Exposure Guideline (MEG) values and the federal Maximum Contaminant Level (MCL) and Ambient Water Quality Criteria (AWQC) values.

These criteria are as follows.

- Groundwater Quality on the PTL Property:
  - Specific Conductance must be less than 500 umhos/cm
- Groundwater Quality off of the PTL Property:
  - Groundwater must be below the applicable MCLs and MEGs;
  - Specific Conductance must be less than 400 umhos/cm
  - Dissolved Methane must be below 700 ug/L
- Surface Water Quality:
  - Surface water quality must meet the federal AWQC and Maine water quality classification established in 38 MRSA Section 465 and 465-B.

These criteria must be met at the PTL monitoring locations before the end of the 30-year post-closure period in order for the MDEP to determine that corrective actions have been successful. The 30-year post-closure period began in 2010, so it is premature to expect that monitoring locations will meet these criteria currently. However, tracking data against these criteria allows PTL, the MDEP and the Town to judge whether the existing corrective actions will be sufficient to meet these criteria over time, or whether supplemental corrective actions may be necessary in the future.

### IV. Water Quality Overview

In accordance with the Post-Closure Environmental Monitoring Plan, water quality is currently monitored two times each year at a network of sampling locations around PTL. These monitoring points are located in different regions around the landfill and include groundwater monitoring wells, residential wells and surface water. Table 1 summarizes

the sampling regime, specific conductance range and water quality trends for the 2014 to 2017 data.

**Table 1**  
**PTL 2014 to 2017 Water Quality Monitoring Summary**

Monitoring Pt	2011-2015 Analysis <sup>1</sup> (Frequency/yr)	2016-2020 Analysis <sup>1</sup> (Frequency/yr)	Specific Cond. Range <sup>2</sup> (umhos/cm)	Predominant Trend Since 2008 <sup>3</sup>
<b>South/Southeast</b>				
<b>200*</b>	F, L (3)	F, L (2)	<b>362</b> - 691	Down
641	F, L (3), M (2)	F, L (2), M (1)	822 - 1368	Down
<b>MW-906B*</b>	F, L (3), M (2)	F, L (2)	<b>382</b> - 513	Down
MW02-801A	F, L (3), M (2)	F, L (2), M (1)	<b>2537</b> - 3530	Down
MW02-801B	F (3)	F (2)	<b>2097</b> - 3700	Down
MW03-802A	F, L (3), M (2)	F, L (2), M (1)	470 - 837	Down
MW03-802B	F (3), M (1)	F, L <sup>^</sup> (2), M (1)	1077 - 1587	Up
MW03-803A	F (3), M (1)	F, L <sup>^</sup> (2), M (1)	1264 - <b>1691</b>	Up
MW-03-803B	F, L (3), M (2)	F, L (2), M (1)	1157 - 1497	Up
<b>West &amp; North</b>				
MW03-804A	F (3)	F (2)	682 - 1070	Up Since 2014
P-914A	F, L (3)	F, L (2)	683 - <b>850</b>	Up Since 2014
P-914B	F (3)	F (2)	589 - <b>776</b>	Up Since 2014
516B-B	F, L (3)	F, L (2)	981 - 1141	Up Since 2014
<b>Northeast &amp; East</b>				
MW98-601A	F (2)	F (2)	<b>2158</b> - 2880	None
MW96-601B	F (2)	F (2)	1176 - 1730	None
<b>MW01-602B*</b>	F (2)	F (2)	259 - <b>679</b>	None Since 2012
MW97-123	F, L (3)	F, L (2)	780 - 1414	Down
509A	F (3)	F (2)	841 - 1234	None
509B	F, L (3), M (2)	F, L (2)	827 - 1249	Up
P-911B	F (3)	F (2)	768 - 959	Down
916	F, L (3), M (2)	F, L (2), M (1)	257 - 883	Down
917	F, L (3), M (2)	F, L (2), M (1)	354 - 1007	Down
<b>Residential</b>				
<b>DW04-109*</b>	F (3), L (1), M (3)	F (2), L (1), M (2)	<b>201</b> - 793	
DW-103	F (3), L (1), M (3)	F (2), L (1), M (2)	409 - <b>484</b>	
<b>Surface Water</b>				
SW-A	F, L (3)	F, L (2)	86 - 180	
SW-C	F, L (3)	F, L (2)	66 - 200	
SW-D	F, L (3)	F, L (2)	197 - 890	
SW-E	F, L (3)	F, L (2)	241 - 914	

Notes: 1. Analyses: F=Field Parameters, L=Laboratory Parameters, M= Methane, L<sup>^</sup>= Supplemental

2. SC Range Reflects Data from 2014 to 2017

3. Wells in **BOLD\*** are close to or below Corrective Action Criteria for Specific Conductance.

4. Values in **RED** Represent a New Low or High Concentration measured in 2017.

### Comparison of Recent (2014 to 2017) Data to the Target Criteria

- Prior to 2013, all on-site groundwater was above the 500 umhos/cm criteria. Since 2014 several on-site wells have begun to approach or meet the 500 umhos/cm criteria.
  - MW-906B has had specific conductance below 500 since July 2014.
  - MW-200 was below the 500 umhos/cm target criteria for 6 of the 10 sampling events since April 2014.
  - MW01-602B was below 500 umhos/cm for 5 of 8 sampling events since April 2014.
- MW-916, which is an off-site well with a target criteria of 400 umhos/cm, was below this concentration for 3 of 10 events since 2014, but has been above 400 umhos/cm for the past 3 sampling events.
- Groundwater at off-site well DW04-109 was below the 400 umhos/cm target criteria during the 7 sampling rounds in since April 2015.
- At the off-site residential well DW-103, groundwater is equal to or below the MCL and/or MEG for arsenic and exceeds these criteria for sodium. At off-site monitoring well MW-916 arsenic was below the MCL and MEG in 2017. At off-site monitoring well MW-917 groundwater exceeded the arsenic MCL/MEG during the 2017 sampling events. Secondary drinking water criteria of iron and manganese are also exceeded at MW-916 and MW-917.
- Residential well DW-103 has been below the 700 ug/L methane off-site target criterion since April 2014. Well DW04-109 has been below this criterion since September of 2014. Off-site monitoring wells MW-917 and MW-917 were both below the methane criterion in October 2016.
- Surface water meets the applicable classification criteria and AWQC standards.

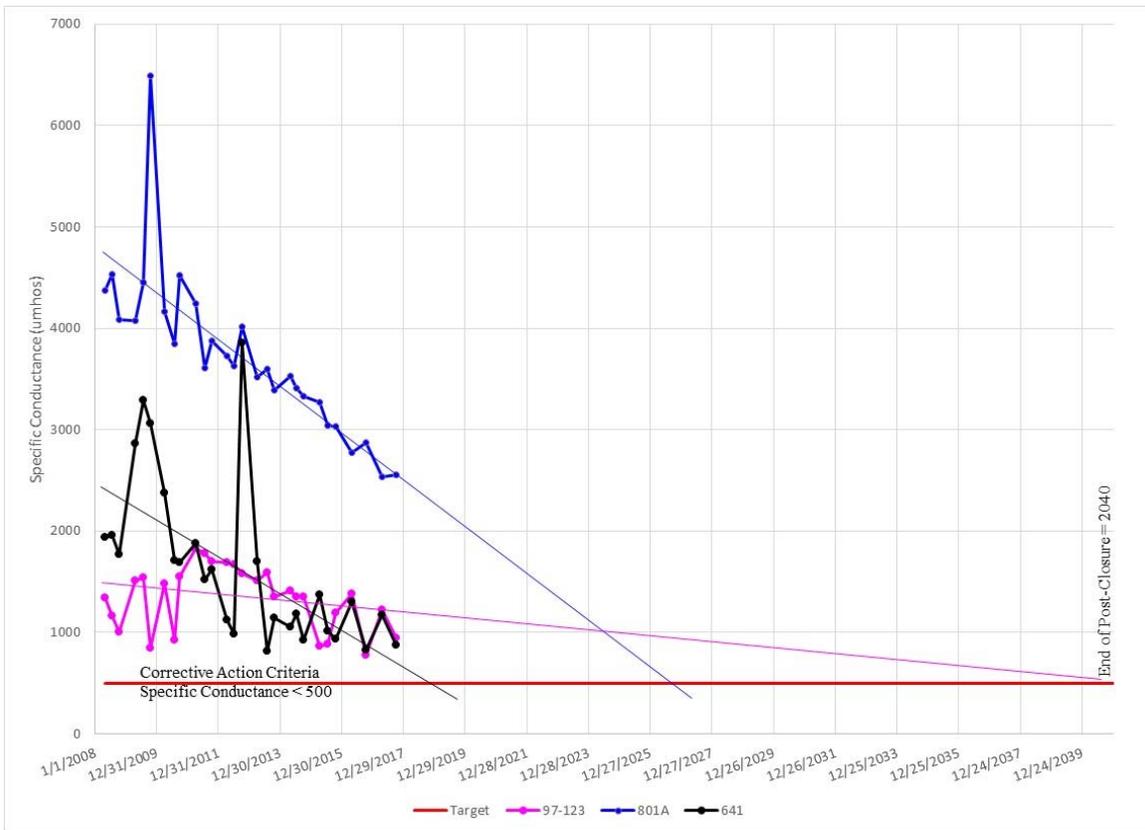
### Discussion of Data Trends

As reflected in Table 1, there has been an improving trend in specific conductance and related cations and anions in many of the locations included in the monitoring network at the PTL site. This improving trend has generally been gradual and at many locations, the specific conductance remains significantly above the target criteria of 500 umhos/cm.

The area where there has been the most pronounced upward trend has been to the southwest of landfill in wells MW03-802B and MW03-803A & B. During 2012, PTL began operation of 2 gas extraction wells PTGW08-12 and -13 in the vicinity of the 802 and 803 wells. In response to the gas extraction, the methane concentrations in these wells have decreased, particularly since 2015, when an effort was made to extract landfill gas on a more consistent basis. However the decrease in methane concentration in these wells has not resulted in a significant decrease in specific conductance. In June 2016, PTL discovered leachate leaking from a cover defect onto soils in this area. This

condition was repaired promptly and PTL has suggested that this leachate leakage may have contributed to the rising trend observed in the MW03-802 and -803 wells. As shown in Table 1, a new high conductivity value was measured in MW03-03A in 2017, after the repairs were complete. It may be too soon to observe improvements in 2017 and future sampling data from 2018 and 2019 should provide better insight in the possible role of the leachate leak in this area.

The 2017 Annual Report notes that 2017 was the 7<sup>th</sup> year of the 30-year post-closure monitoring period and there has been discussion regarding whether the current correction action systems are adequate to reach the corrective action criteria by the end of the 30-year post-closure period. Figure 2 shows the specific conductivity data and 2008 to 2017 trend for three example monitoring wells at the PTL site. MW-02-801A and well 641 are south of the landfill and have exhibited moderate to strong decreasing trends that suggest the potential to reach the Corrective Action Criteria well before the end of the Post-Closure period in 2040. Review of Figure 2 also shows that data from well 641 from 2013 to 2017 has been more variable with a weaker downward trend. Well 97-123 from northeast of the landfill shows a more gradual downward trend that suggests the potential to remain above the Corrective Action Criteria after 30 years.



**Figure 2 – Water Quality Trends**

These examples suggest that with continued diligent operation of the Corrective Action systems, many wells at the PTL site have the potential to reach the criteria within the 30-

year post-closure period. However as shown in Table 1, there are wells in the southwest and west of the landfill where there are increasing trends that may require additional corrective actions in the future.

#### Discussion of Arsenic in Groundwater.

Following closure in 2010, data from the PTL monitoring program showed increasing arsenic concentrations at on-site monitoring locations. Based on this the MDEP requested and PTL conducted supplemental off-site sampling of residential wells during 2014. The June 2014 arsenic concentrations were below the detection limit at all off-site wells except DW-103, where the concentration was 0.012 mg/L, slightly above the MCL and MEG concentrations for arsenic of 0.010 mg/L. Arsenic was detected at concentrations below the MCL & MEG at the PTL office well and the well at the Gas to Energy plant. After reviewing the data, the MDEP concluded that the arsenic sampling program “did not suggest widespread impact of the closed landfill on water quality of the surrounding residential wells included in the investigation”.

In 2015 the MDEP requested and PTL agreed to include the historically sampled residential wells in the three rounds of sampling. Arsenic concentrations were below the MCL/MEG in these wells in 2015 except at DW-103 where the concentration was in the 0.014 to 0.019 mg/L range.

In 2016 and 2017 arsenic was sampled at DW04-109 in October and was below the MCL/MEG. During these sampling events DW-103 was equal to or below the MCL/MEG for arsenic.

Arsenic was also analyzed in 14 on-site monitoring wells in April and October 2017. These samples generally had a lower arsenic concentration compared to 2016. While most of the on-site monitoring wells had arsenic concentrations above the MCL/MEG in 2017, the data no longer suggest an increasing trend in arsenic concentration.

## **V. Geotechnical Monitoring**

The geotechnical monitoring program for the landfill continued in 2017 and was summarized in a report prepared by Dr. Richard Wardwell, PE, who has been involved with the geotechnical monitoring at that site for many years. The primary purposes of the geotechnical monitoring are to assess if the internal waste mass and foundation soils are stable, and to assess if the cover system is performing as-designed.

The deformation monitoring indicates that the landfill waste mass is continuing to settle and since closure in 2010, the rate of settlement is diminishing, which is consistent with expectations. The strain on the cover system is calculated based on several monuments, and these calculations indicate that the measured strains are less than the originally predicted and is well within tolerable limits. There are no observations, from the survey monitoring or periodic visual observations that the indicate liner instabilities or foundation instabilities.

Additionally, the overall slopes of the cover are gradually flattening. This flattening of the cover system improves the overall factor of safety for the liners, which were designed for the steeper slopes created when the landfill was closed.

#### Leachate Recirculation in 2017:

PTL continued the leachate recirculation program in 2017. Approximately 1.3 million gallons of leachate were recycled in two of the four leachate recirculation trenches, one gas collection trench and one gas well. Use of the two other trenches was discontinued from further recirculation after short circuiting of leachate was discovered in 2016. There were no operational issues reported during 2017 with the system.

This total leachate recirculated in 2017 was considerably less than the total recirculated in 2016 (2.6 million gallons) or originally planned for 2017. According to the 2017 Annual Report, the reason for the reduction in the volume of leachate recirculated was limited PTL staffing during the year.

## **VI. Summary**

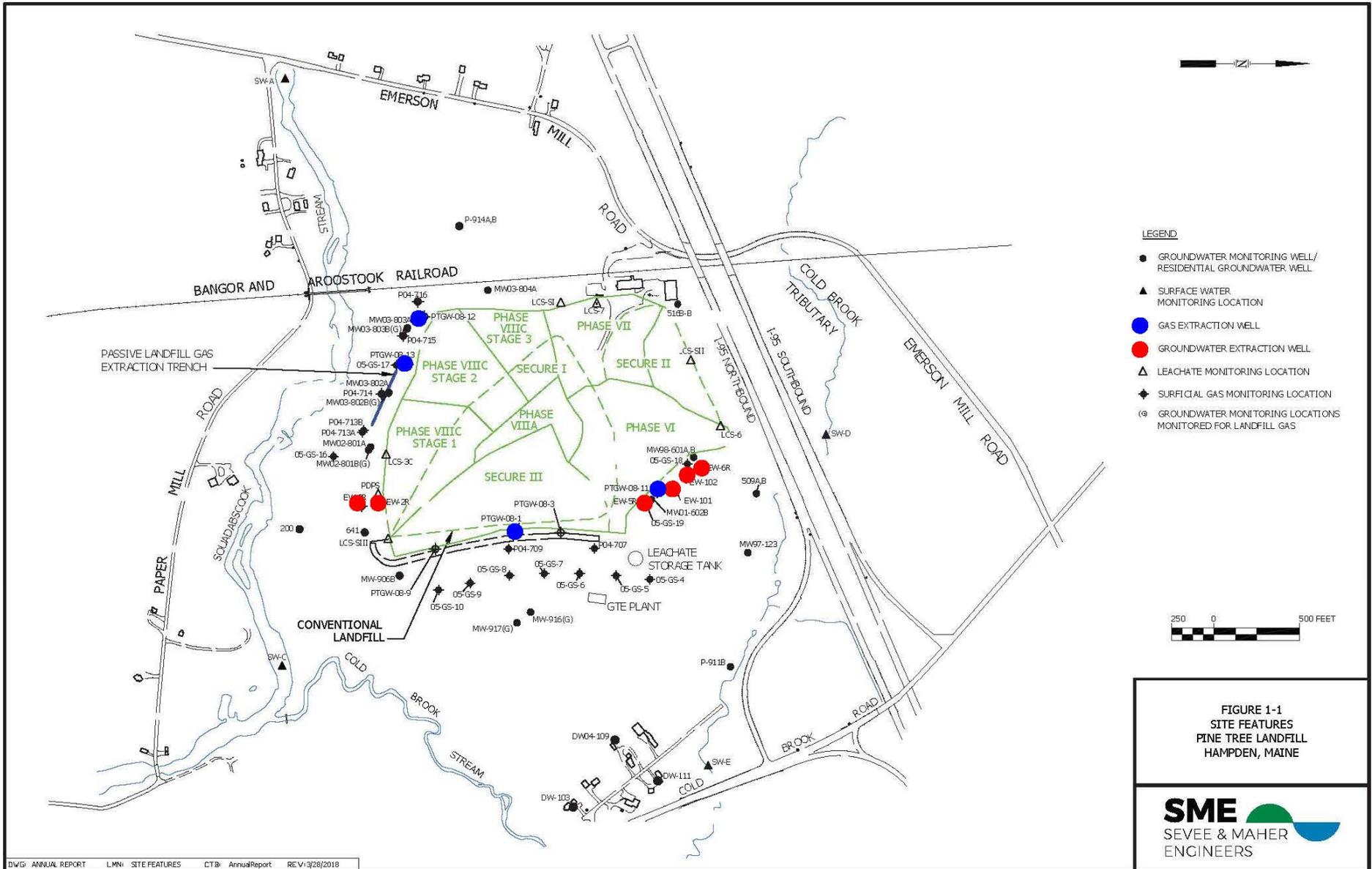
Overall, the water quality monitoring data from PTL reflected in the 2017 Annual Report indicate that there continues to be gradual improvement at many monitoring locations. Data from 2017 represented the 7<sup>th</sup> year of the 30-year post-closure monitoring period and is not required to meet the target criteria. Nevertheless, there are several on-site locations that are close to or meet the corrective action criteria. Importantly, data from 2017 also show that the trend of increasing arsenic concentrations has reversed and lower concentrations were measured in most wells.

Despite the overall improving trend, there are a number of monitoring wells that continue to have significantly elevated concentrations of landfill-related compounds. Additionally, groundwater in several wells southwest of the landfill continue to exhibit increasing concentration trends. Repair of the cover in this area and modification of the leachate recirculation system in 2016 did not result in improved water quality in this area through 2017, but improvement may be observed in 2018 and 2019.

Continued diligent operation of the corrective action systems (groundwater extraction and external gas extraction) will be necessary to maintain and extend the improvement observed to date. However, there has been less groundwater extraction over the past three years and there was less gas extraction from PTGW08-01 east of the landfill in 2017.

If the trend of increasing conductivity in the MW03-802 and MW03-803 wells on the south side of the landfill continues, it may also be appropriate for PTL to consider additional corrective actions in this area in the future.

We hope that the information summarized in this memorandum is helpful to the Town. I look forward to discussing any questions or comments at the upcoming Hampden Environmental Trust meeting.



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