Annual Groundwater Monitoring and Corrective Action Report

MERRIMACK STATION COAL ASH LANDFILL

Bow, New Hampshire

Sanborn, Head & Associates, Inc.

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1.0 INTRODUCTION

Groundwater monitoring at the Merrimack Station Coal Ash Landfill site (Site) in Bow, New Hampshire is required pursuant to 40 CFR Part 257.90. Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this 2023 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) for the Site as required by 40 CFR Part 257.90(e) to cover the reporting period from January 1, 2023, through December 31, 2023. This report and the services provided by Sanborn Head are subject to the Limitations provided in Appendix A.

2.0 GROUNDWATER MONITORING AND CORRECTIVE ACTIONS OVERVIEW

As required under 40 CFR Part 257.90(e)(6), the following summarizes the groundwater monitoring and corrective action programs for the 2023 annual reporting period.

i. The Site was operating under the detection monitoring program at the start of the annual reporting period.
ii. The Site continued to operate under the detection monitoring program at the end of the annual reporting period, i.e., there was no need to implement assessment monitoring.
iii. Statistically significant increases (SSIs) over background were detected at the Site. Pursuant to 40 CFR Part 257.94(e)(2), demonstrations that these SSIs were due to natural variation in groundwater quality have been completed and the Site continues to operate under the detection monitoring program. Alternative Source Demonstrations (ASDs), provided in Appendix B, were prepared for the following constituents and monitoring wells, and additional information regarding the statistical analyses and ASDs is provided in Section 6.
    a. June 2023 ASD for chloride at SB-4; and sulfate and total dissolved solids (TDS) at SB-1;[1] and
    b. November 2023 ASD for calcium at SB-1.[2]
iv. There were no statistically significant exceedances of groundwater protection standards.
v. There were no remedy selections required pursuant to 40 CFR Part 257.97.
vi. There were no initiated or ongoing remedial activities required pursuant to 40 CFR Part 257.98.

3.0 REPORT REQUIREMENTS

As required under 40 CFR Part 257.90(e), this Annual Report includes the following information:

1. A map and diagram showing the Site and the background (or upgradient) and downgradient monitoring wells that are part of the groundwater monitoring program for the Site;
2. Identification of monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;
3. Monitoring data obtained under 40 CFR Parts 257.90 through 257.98, including:
    a. The number of groundwater samples that were collected for analysis for each background and downgradient well;
    b. The dates the samples were collected; and

[1] The November 2022 laboratory analytical data were received on December 6, 2022. Confirmatory sampling, which may be used with the "1-of-2" retesting strategy, was completed in February 2023, and the SSI was detected in statistical analyses completed March 17, 2023.

[2] The April 2023 laboratory analytical data were received on May 12, 2023. Confirmatory sampling, which may be used with the "1-of-2" retesting strategy for detecting an SSI, was completed in August 2023, and the SSI was detected in statistical analyses completed August 30, 2023.

   c. Whether the sample was required by the detection monitoring or assessment monitoring programs;
4. A narrative discussion of transitions, if any, between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels);
5. Other information required to be included in the annual report as specified in 40 CFR Parts 257.90 through 257.98, including;
   a. Groundwater elevations measured in each well immediately prior to purging and the rate and direction of groundwater flow, as calculated by the owner or operator of the Site, each time groundwater is sampled (40 CFR Part 257.93(c)); and
   b. Written demonstrations prepared by a qualified professional engineer demonstrating that a source other than the Site caused an observed SSI over background levels for a constituent or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (40 CFR Part 257.94(e)(2));
6. As provided in the groundwater monitoring and corrective actions overview above (see Section 2.0), a section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the Site.

4.0 BACKGROUND

The Site has been operating since 1978 and was constructed in a former sand and gravel quarry on the property adjacent to the Merrimack Station electric power generation facility in Bow, New Hampshire. The landfill was constructed with a Hypalon geomembrane liner system and a leachate collection system, and it receives coal ash from the nearby Merrimack Station electric power generation facility. A portion of the landfill was filled to final grade and was capped with a final cover system. A Locus Plan for the Site is provided as Figure 1, and the locations of the monitoring wells in relation to the landfill are indicated on the Facility Plan, Figure 2.

The groundwater quality at the Site has been routinely monitored since the 1980s under New Hampshire Department of Environmental Services (NHDES) regulations. The current groundwater monitoring program, as prescribed by the NHDES Groundwater Release Detection Permit No. GWP-198400065-B-007, issued May 2, 2022, requires measuring of static groundwater levels and laboratory analyses of groundwater samples from five (5) overburden monitoring wells (i.e., SB-1, SB-4, SB-6, SB-13, and SB-14) on a semi-annual basis.

As discussed in the Groundwater Monitoring Well Network Verification[3], the five monitoring wells were certified as an appropriate groundwater monitoring system and were constructed to meet the requirements of 40 CFR Part 257.91. No monitoring wells were installed or decommissioned at the Site during the reporting period.

[3] *Groundwater Monitoring Well Network Verification* prepared by Sanborn Head, dated January 14, 2016.

5.0 SUMMARY OF GROUNDWATER MONITORING

As specified in 40 CFR Part 257.94(b), a detection monitoring program was initiated in October 2015. A Sampling and Analysis Plan[4] was prepared to address the requirements of 40 CFR part 257.93. Monitoring well SB-13 is the upgradient/background monitoring well for the Site. The other monitoring wells are considered downgradient or sidegradient to the landfill, although groundwater flow conditions at the Site vary over time. For the groundwater monitoring program, unfiltered groundwater samples were collected and analyzed by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire using low-flow sampling techniques, based on the U.S. Environmental Protection Agency (USEPA) Low Stress (Low Flow) Standard Operating Procedure, revised September 20, 2017.

As part of the detection monitoring program, eight independent samples for each background and downgradient well were collected and analyzed for the constituents listed in 40 CFR Part 257 Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and TDS) and Appendix IV (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and radium 226 and 228, combined). The initial eight, independent samples were collected in February 2016 through April 2017 for the five Site monitoring wells. The statistical analysis of the groundwater monitoring data after the eight initial samples indicated that a transition between monitoring programs (i.e., to assessment monitoring) was not required.

Semi-annual detection monitoring, as specified in 40 CFR Part 257.94, was initiated in November 2017. Detection monitoring at the Site includes sampling the five wells for analysis of the Appendix III constituents. For the current reporting period, semi-annual detection monitoring samples were collected in April 2023 and November 2023. Some confirmatory samples, which may be used with the "1-of-2" retesting strategy for detecting an SSI, were collected in February 2023 (associated with the Fall 2022 round) and in August 2023 (associated with the Spring 2023 round). As described below, the data analyses completed during the reporting period indicated that a transition between monitoring programs (i.e., to assessment monitoring) was not required.

Groundwater analytical data are summarized in Table 1, and laboratory reports are provided in Appendix C. The groundwater level measurements and inferred general groundwater flow directions are summarized in Table 2.

6.0 SUMMARY OF STATISTICAL ANALYSIS

As required under 40 CFR Part 257.90(b)(iv), Sanborn Head evaluated groundwater monitoring data for an SSI over background levels for the constituents listed in 40 CFR Part 257 Appendix III at the five Site monitoring wells. The statistical analyses completed in 2023 for the Fall 2022 and Spring 2023 data were consistent with the methods described in the Site's Statistical Analysis Plan, prepared by Sanborn Head and dated January 2024. Statistical analysis of the Fall 2023 data is ongoing.

[4] *Sampling and Analysis Plan* prepared by Sanborn Head, dated October 7, 2016.

The prediction interval procedure specified in 40 CFR Part 257.93(f)(3) was selected for evaluation of the most recent parameter values for the Site wells (i.e., SB-1, SB-4, SB-6, SB-13, and SB-14). The prediction interval procedure was performed on parameters specified in Appendix III (i.e., boron, calcium, chloride, fluoride, pH, Sulfate, and TDS) using the multiple well and multiple parameter prediction limit equation.

Based on the prediction interval procedures performed for data collected for the Fall 2022 and Spring 2023 monitoring rounds, SSIs over background levels were identified. Pursuant to 40 CFR Part 257.94(e)(2), within 90 days of detecting the SSIs, Sanborn Head prepared ASDs that demonstrated, based on a weight-of-evidence approach, that the SSIs were due to natural variation in groundwater quality. SSIs and corresponding ASDs are summarized in Exhibit 1, below. The ASDs are provided as Appendix B.

Exhibit 1: Alternative Source Demonstrations

Sampling Round	Sampling Dates	SSI Location and Parameter	ASD Date
Fall 2022	November 14, 2022 & February 13, 2023	SB-4: Chloride SB-1: Sulfate and TDS	June 13, 2023
Spring 2023	April 27, 2023 & August 17, 2023	SB-1: Calcium	November 28, 2023

Data for the November 2023 groundwater detection monitoring round are included in Table 1; however, the statistical analysis of the November 2023 data is ongoing. As stipulated in 40 CFR Part 257.93(h)(2), the Site operator has 90 days from completing the sampling and analysis to identify whether there is an SSI over background. The Fall 2023 samples were collected November 16, 2023, and the laboratory analyses were received December 8, 2023.

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Tables

TABLE 1
Groundwater Analytical Results Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Location	Date	Metals µg/L															Miscellaneous Parameters							
																					s.u	pCi/L		
		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH	Radium 226	Radium 228	Radium 226+228
Drinking Water MCL		6	5	2,000	4	NS	5	NS	100	NS	15*	NS	2	NS	50	2	NS	4,000	NS	NS	NS	NS	NS	5
CCR Alt. Standards		NA	NA	NA	NA	NA	NA	NA	NA	6	15	40	NA	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-1/(AGQS)		6 ‡	5 ‡	2,000 ‡	4 ‡	6,000 ‡	5 ‡	NS ‡	100	NS ‡	15 ‡	NS	2 ‡	NS	50 ‡	2 ‡	NS	4,000	500,000	NS	NS	NS	NS	NS
GW-2		NA	NA	NA	NA	NA	NA	NS	NA	NS	NA	NS	NA	NS	NA	NA	NS	†	†	NS	NS	NS	NS	NS
SB-1	2/24/2016	<1.0	<1.0	14	<1.0	60	<1.0	7,200	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	44,000	<100	8,000	96,000	5.21	0.2 ±0.1	0.6 ±0.6	0.8 ±0.6
	4/25/2016	<1.0	<1.0	18	<1.0	100	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	1.0	<1.0	<1.0	58,000	<100	9,000	120,000	5.72	0.5 ±0.2	0.2 ±0.4	0.7 ±0.4
	6/6/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	55,000	<100	7,000	140,000	5.52	0.6 ±0.3	0.2 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	16	<1.0	70	<1.0	8,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	9,000	120,000	5.35	0.4 ±0.3	0.0 ±0.6	0.4 ±0.6
	8/30/2016	<1.0	<1.0	17	<1.0	<50	<1.0	7,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	49,000	<100	7,000	120,000	5.23	0.4 ±0.3	0.3 ±0.4	0.7 ±0.4
	10/17/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	60,000	<100	6,000	130,000	5.63	0.6 ±0.4	0.0 ±0.4	0.6 ±0.4
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	62,000	<100	6,000	88,000	5.63	1.0 ±0.4	0.8 ±0.5	1.8 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	8,000	120,000	5.81	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					50		12,000									68,000	<100	8,000	120,000	5.70			
	1/31/2018 c							12,000																
	4/9/2018					67		12,000									55,000	<100	10,000	160,000	5.90			
	7/25/2018 c							12,000									63,000		13,000	140,000	5.94			
	11/29/2018					87		13,000									66,000	<100	10,000	100,000	6.07			
	4/26/2019					100		13,000									55,000	<100	12,000	140,000	5.78			
	11/15/2019					59		11,000									68,000	<100	10,000	140,000	5.56			
	4/23/2020					70		14,000									53,000	<100	11,000	150,000	5.94			
	11/12/2020					<50		10,000									64,000	<100	13,000	150,000	5.36			
	2/4/2021 c							11,000									78,000		11,000	150,000	5.12			
	4/28/2021					78		14,000									62,000	<100	11,000	180,000	5.42			
	9/14/2021 c					58		13,000									69,000	<100	11,000	210,000	6.21			
	11/15/2021					<50		14,000									93,000	<100	9,600	220,000	4.99			
	4/11/2022					81		16,000									92,000	<100	12,000	240,000	5.75			
	11/14/2022					79		13,000									70,000	<100	15,000	190,000	5.36			
	2/13/2023 c							12,000									79,000		16,000	180,000	5.42			
	4/27/2023					130		18,000									79,000	<100	17,000	180,000	5.53			
	8/17/2023					83		19,000									92,000		16,000	250,000	5.70			
	11/16/2023					92		17,000									100,000	<100	17,000	260,000	5.32			
SB-4	2/23/2016	<1.0	<1.0	14	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	95,000	<100	9,000	210,000	5.49	0.3 ±0.1	1.0 ±0.6	1.3 ±0.6
	4/25/2016	<1.0	<1.0	14	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	8,000	200,000	5.32	0.3 ±0.3	0.0 ±0.4	0.3 ±0.4
	6/6/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	110,000	<100	10,000	230,000	5.62	0.2 ±0.2	0.4 ±0.5	0.6 ±0.5
	7/18/2016	<1.0	<1.0	11	<1.0	<50	<1.0	7,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	11,000	220,000	5.27	0.4 ±0.3	0.4 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	10	<1.0	<50	<1.0	6,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	88,000	<100	12,000	210,000	5.72	0.2 ±0.2	0.0 ±0.4	0.2 ±0.4
	10/17/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	190,000	5.71	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/29/2016	<1.0	1.0	12	<1.0	<50	<1.0	7,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	10,000	180,000	5.79	0.7 ±0.3	0.5 ±0.5	1.2 ±0.5
	4/19/2017	<1.0	<1.0	19	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	120,000	<100	9,000	260,000	5.71	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/17/2017					<50		10,000									77,000	<100	13,000	170,000	5.80			
	4/9/2018					<50		11,000									93,000	<100	12,000	220,000	5.87			
	7/25/2018 c							9,800									95,000		11,000	210,000	5.68			
	11/28/2018					<50		12,000									86,000	<100	13,000	83,000	6.28			
	4/26/2019					<50		13,000									94,000	<100	11,000	190,000	5.83			
	11/15/2019					53		11,000									97,000	<100	11,000	230,000	5.75			
	2/14/2020 c					<50		11,000									100,000		14,000	190,000	5.85			
	4/23/2020					55		13,000									140,000	<100	11,000	260,000	5.72			
	7/8/2020 c					57		11,000									99,000		14,000	240,000	5.59			
	11/12/2020					60		9,600									120,000	<100	18,000	260,000	5.18			
	2/4/2021 c					70		8,500									100,000		20,000	240,000	5.22			
	4/28/2021					65		11,000									100,000	<100	16,000	230,000	5.71			
	11/15/2021					<50		11,000									130,000	<100	12,000	290,000	5.16			
	4/11/2022					55		13,000									110,000	<100	20,000	250,000	5.68			
	11/14/2022					<50		14,000									150,000	<100	9,700	320,000	5.46			
	2/13/2023 c							10,000									140,000		11,000	250,000	5.49			
	4/27/2023					<50		6,600									99,000	<100	12,000	190,000	5.29			
	11/16/2023					<50		7,700									91,000	<100	15,000	210,000	5.66			
SB-6	2/23/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	80,000	<100	10,000	170,000	5.55	0.1 ±0.07	0.5 ±0.5	0.6 ±0.5
	4/25/2016	<1.0	<1.0	16	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	7,000	220,000	5.55	0.4 ±0.3	0.0 ±0.4	0.4 ±0.4
	6/6/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	270,000	5.40	0.5 ±0.3	0.0 ±0.5	0.5 ±0.5
	7/18/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	260,000	5.27	0.5 ±0.3	0.3 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	9,000	280,000	5.71	0.4 ±0.2	0.0 ±0.4	0.4 ±0.4
	10/17/2016	<1.0	<1.0	18	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.78	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	9,000	230,000	5.77	0.5 ±0.2	0.8 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	13	<1.1	<51	<1.1	7,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	100,000	<100	9,000	190,000	5.68	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					<50		9,900									130,000	<100	11,000	230,000	5.60			
	4/9/2018					<50		7,900									120,000	<100	9,500	240,000	5.57			
	7/25/2018 c							11,000									180,000		12,000	310,000	5.44			
	11/28/2018					<50		11,000									150,000	<100	11,000	140,000	5.86			
	4/26/2019					84		13,000									150,000	<100	14,000	210,000	5.78			
	7/11/2019 c					80		14,000									170,000		15,000	330,000	5.84			
	11/15/2019					52		10,000									140,000	<100	13,000	280,000	5.75			
	2/14/2020 c							5,100									79,000		15,000	130,000	5.73			
	4/23/2020					<50		12,000									160,000	<100	8,100	270,000	5.56			
	11/12/2020					<50		12,000									180,000	<100	9,600	330,000	5.37			
	4/28/2021					<50		11,000									150,000	<100	6,700	290,000	5.58			
	11/15/2021					<50		12,000									200,000	<100	8,800	370,000	5.27			
	4/11/2022					<50		10,000									170,000	<100	9,400	330,000	5.80			
	11/14/2022					<50		6,800									110,000	<100	11,000	240,000	5.53			
	4/27/2023					<50		12,000									140,000	<100	7,900	250,000	5.03			
	11/16/2023					<50		6,300									110,000	<100	11,000	220,000	5.65			
SB-13	2/23/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	160,000	<100	6,000	270,000	5.34	0.6 ±0.1	0.3 ±0.6	0.9±0.6
	4/25/2016	<1.0	<1.0	17	<1.0	<50	<1.0	8,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	7,000	290,000	5.48	0.4 ±0.3	0.1 ±0.4	0.5 ±0.4
	6/6/2016	<1.0	<1.0	20	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	170,000	<100	7,000	320,000	5.50	0.8 ±0.3	0.0 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	160,000	<100	8,000	330,000	5.27	0.8 ±0.3	0.0 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	1.0	20	<1.0	<50	<1.0	8,100	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	270,000	5.35	0.8 ±0.3	0.6 ±0.4	1.4 ±0.4
	10/17/2016	<1.0	<1.0	15	<1.0	<50	<1.0	8,800	2.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	150,000	<100	8,000	260,000	5.06	0.7 ±0.4	0.6 ±0.5	1.3 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	7,400	1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	140,000	<100	8,000	240,000	5.71	0.6 ±0.3	0.7 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.1	<51	<1.1	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	130,000	<100	8,000	270,000	5.56	0.9 ±0.3	0.3 ±0.5	1.2 ±0.5
	11/17/2017					<50		7,000									110,000	<100	9,000	220,000	5.80			
	4/9/2018					<50		11,000									170,000	<100	8,000	330,000	5.81			
	7/25/2018 c							10,000									190,000		8,700	340,000	5.69			
	11/28/2018					<50		13,000									200,000	<100	7,200	260,000	5.77			
	4/26/2019					<50		14,000									200,000	<100	7,100	290,000	5.53			
	11/15/2019					<50		8,100									140,000	<100	8,100	280,000	5.82			
	4/23/2020					<50		14,000									230,000	<100	6,500	400,000	5.47			
	7/8/2020 c					<50		14,000									210,000		6,900	370,000	5.41			
	11/12/2020					<50		11,000									180,000	<100	8,000	330,000	4.96			
	2/4/2021 c					< 50		11,000									180,000		6,700	320,000	5.32			
	4/28/2021					<50		14,000									240,000	<100	5,900	410,000	5.31			
	11/15/2021					<50		11,000									200,000	<100	7,900	370,000	5.02			
	4/11/2022					<50		9,800									190,000	<100	9,700	360,000	5.47			
	11/14/2022					<50		7,700									150,000	<100	8,200	310,000	5.55			
	4/27/2023					<50		14,000									210,000	<100	6,200	430,000	5.01			
	11/16/2023					<50		3,900									94,000	<100	11,000	190,000	5.68			
SB-14	2/24/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,100	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0	<1.0	<1.0	16,000	<100	4,000	56,000	5.05	0.2 ±0.08	0.0 ±0.5	0.2 ±0.5
	4/25/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	11,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	58,000	<100	3,000	140,000	5.62	0.8 ±0.5	0.2 ±0.1	1.0 ±0.5
	6/6/2016	<1.0	<1.0	6.0	<1.0	<50	<1.0	7,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	32,000	<100	4,000	100,000	5.39	0.5 ±0.2	0.2 ±0.5	0.7 ±0.5
	7/18/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	21,000	<100	5,000	68,000	5.31	0.2 ±0.2	0.3 ±0.5	0.5 ±0.5
	8/30/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	14,000	<100	4,000	71,000	5.81	0.4 ±0.3	0.4 ±0.5	0.8 ±0.5
	10/17/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	4,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	11,000	<100	4,000	29,000	5.55	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	2,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	7,000	<100	4,000	12,000	5.19	0.2 ±0.4	0.2 ±0.5	0.4 ±0.5
	4/19/2017	<1.0	<1.0	10	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0	<1.0	<1.0	56,000	<100	5,000	120,000	5.59	0.7 ±0.3	0.1 ±0.5	0.8 ±0.5
	11/17/2017					<50		8,000									18,000	<100	5,000	59,000	5.60			
	4/9/2018					<50		4,200									14,000	<100	8,400	80,000	5.76			
	7/25/2018 c							5,100									9,800		6,100	56,000	5.61			
	11/28/2018					<50		4,500									7,800	<100	6,300	<5,000	5.96			
	4/26/2019					<50		8,700									19,000	<100	3,700	91,000	5.74			
	11/15/2019					<50		5,000									12,000	<100	7,800	69,000	5.94			
	4/23/2020					<50		5,500									9,200	<100	5,500	52,000	5.63			
	11/12/2020					<50		4,000									4,700	<100	15,000	68,000	5.10			
	2/4/2021 c							7,900									34,000		6,000	95,000	5.30			
	4/28/2021					<50		3,300									4,000	<100	7,100	42,000	5.37			
	11/15/2021					<50		3,400									9,300	<100	16,000	64,000	5.55			
	4/11/2022					<50		4,400									12,000	<100	9,600	44,000	5.76			
	11/14/2022					<50		5,600									10,000	<100	18,000	72,000	5.74			
	2/13/2023 c							6,300									22,000		11,000	53,000	5.62			
	4/27/2023					<50		5,500									6,500	<100	7,400	59,000	5.12			
	11/16/2023					<50		4,900									18,000	<100	22,000	91,000	5.65			

TABLE 1
Groundwater Analytical Results Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Notes:
1. Samples were collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire on the dates indicated and analyzed by EAI for select metals by USEPA Method 6020. Additional analysis for select wet chemistry parameters were completed by EAI. Analysis for radium 226 and 228 was completed by KNL Environmental Testing, Inc., of Tampa, Florida. Analysis for lithium was completed by SGS Accutest, of Marlborough, Massachussets (Feb. 2016) and Katahdin Analytical Services, of Scarborough, Maine (April 2016 through October 2016).

2. Concentrations are presented in micrograms per liter (µg/L), which are equivalent to parts per billion (ppb), or they are presented in picoCuries per liter (pCi/L) or pH standard units.

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.
A blank indicates the sample was not analyzed for this parameter.

4. "GW-1" and "GW-2" Groundwater Standards are from the New Hampshire Department of Environmental Services (NHDES) Contaminated Sites Risk Characterization and Management Policy (RCMP) (January 1998, with 2000 through 2018 revisions/addenda). GW-1 Groundwater Standards are equivalent to the Ambient Groundwater Quality Standards (AGQSs) promulgated in Env-Or 600 (June 2015 with October 2016, September 2018, September 2019, May 2020, January 2021, and July 2021 amendments). The AGQS/GW-1 Groundwater Standards are intended to be protective of groundwater as a source of drinking water. The GW-2 Groundwater Standards apply to groundwater as a potential source of indoor air contamination.

5. "Drinking Water MCLs" are from the United States Environmental Protection Agency (EPA) website (accessed March 22, 2016). The Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are enforceable standards for drinking water systems.
"CCR Alt. Standards" were codified in 40 CFR Part 257.95(h)(2) for cobalt, lead, lithium, and molybdenum. These are alternative risk-based standards for the four constituents without MCLs that may require establishment of a groundwater protection standard under the coal combustion residuals (CCR) rules 40 CFR Part 257(h).

6. "*" indicates an MCL value is not currently available, and the listed value is an action level.
"†" indicates the RCMP lists the value as not currently available.
"‡" indicates the value provided is typically applied to field-filtered samples (i.e., dissolved analytes) for overburden monitoring wells.
"NA" indicates the RCMP lists the value as not applicable.
"NS" indicates the analyte is not listed in the RCMP or MCL list.
"ç" indicates sample rounds collected as part of the retesting program for identifying statistically significant increases (SSIs).

TABLE 2
Groundwater Level Measurements Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Date	Depths and elevations in feet.																
	SB-1			SB-4			SB-6			SB-13			SB-14			Inferred General Groundwater Flow Rate (feet/day)	Inferred General Groundwater Flow Direction
	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation		
Feb-16	240.85	33.82	207.03	274.26	67.36	206.90	268.77	61.84	206.93	219.86	11.83	208.03	242.70	34.88	207.82	0.5 - 2.7	Northeast
Apr-16	240.85	32.19	208.66	274.26	65.63	208.63	268.77	60.07	208.70	219.86	10.16	209.70	242.70	33.13	209.57	0.5 - 2.5	Northeast
Jun-16	240.85	31.84	209.01	274.26	66.24	208.02	268.77	60.80	207.97	219.86	11.11	208.75	242.70	33.93	208.77	0.4 - 1.9	East
Jul-16	240.85	33.88	206.97	274.26	67.30	206.96	268.77	62.07	206.70	219.86	12.41	207.45	242.70	35.10	207.60	0.4 - 1.9	Northeast
Aug-16	240.85	35.09	205.76	274.26	68.54	205.72	268.77	63.19	205.58	219.86	13.76	206.10	242.70	36.39	206.31	0.3 - 1.4	Northeast
Oct-16	240.85	36.20	204.65	274.26	69.68	204.58	268.77	64.42	204.35	219.86	13.92	205.94	242.70	37.58	205.12	0.8 - 3.9	North-Northeast
Nov-16	240.85	36.40	204.45	274.26	69.93	204.33	268.77	64.69	204.08	219.86	15.14	204.72	242.70	37.80	204.90	0.3 - 1.6	East-Northeast
Apr-17	240.85	32.27	208.58	274.26	65.82	208.44	268.77	60.04	208.73	219.86	9.58	210.28	242.70	32.99	209.71	0.8 - 3.8	North-Northeast
Nov-17	240.85	32.87	207.98	274.26	66.39	207.87	268.77	60.97	207.80	219.86	11.33	208.53	242.70	34.08	208.62	0.4 - 1.8	Northeast
Apr-18	240.85	31.13	209.72	274.26	64.58	209.68	268.77	58.93	209.84	219.86	8.74	211.12	242.70	31.94	210.76	0.6 - 3.2	North-Northeast
Jul-18	240.85	32.60	208.25	274.26	66.01	208.25	268.77	60.84	207.93	219.86	11.13	208.73	242.70	33.78	208.92	0.4 - 2.0	Northeast
Nov-18	240.85	29.99	210.86	274.26	63.59	210.67	268.77	57.92	210.85	219.86	7.66	212.20	242.70	30.82	211.88	0.7 - 3.3	Northeast
Apr-19	240.85	29.83	211.02	274.26	63.34	210.92	268.77	57.60	211.17	219.86	7.51	212.35	242.70	30.72	211.98	0.6 - 2.9	North-Northeast
Jul-19	–	–	–	–	–	–	268.77	58.71	210.06	–	–	–	–	–	–	–	–
Nov-19	240.85	34.48	206.37	274.26	67.96	206.30	268.77	62.66	206.11	219.86	13.21	206.65	242.70	35.85	206.85	0.3 - 1.3	East-Northeast
Feb-20	–	–	–	274.26	66.67	207.59	268.77	61.12	207.65	–	–	–	–	–	–	–	–
Apr-20	240.85	31.84	209.01	274.26	65.34	208.92	268.77	59.73	209.04	219.86	9.62	210.24	242.70	32.75	209.95	0.6 - 3.0	North-Northeast
Jul-20	–	–	–	274.26	66.00	208.26	–	–	–	219.86	11.00	208.86	–	–	–	–	–
Nov-20	240.85	35.72	205.13	274.26	69.23	205.03	268.77	63.92	204.85	219.86	14.48	205.38	242.70	37.09	205.61	0.3 - 1.3	East-Northeast
Feb-21	240.85	33.85	207.00	274.26	67.36	206.90	–	–	–	219.86	12.12	207.74	242.70	34.88	207.82	–	–
Apr-21	240.85	33.37	207.48	274.26	66.88	207.38	268.77	61.31	207.46	219.86	11.43	208.43	242.70	34.38	208.32	0.5 - 2.4	Northeast
Sep-21	240.85	31.11	209.74	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nov-21	240.85	31.65	209.20	274.26	65.17	209.09	268.77	59.72	209.05	219.86	10.04	209.82	242.70	32.78	209.92	0.4 - 1.9	Northeast
Apr-22	240.85	31.10	209.75	274.26	64.61	209.65	268.77	59.12	209.65	219.86	9.22	210.64	242.70	32.05	210.65	0.5 - 2.5	Northeast
Nov-22	240.85	35.06	205.79	274.26	68.62	205.64	268.77	63.27	205.50	219.86	13.80	206.06	242.70	36.46	206.24	0.3 - 1.4	East-Northeast
Feb-23	240.85	32.98	207.87	274.26	66.50	207.76	–	–	–	–	–	–	242.70	33.99	208.71	–	–
Apr-23	240.85	31.02	209.83	274.26	64.51	209.75	268.77	59.08	209.69	219.86	8.94	210.92	242.70	31.94	210.76	0.6 - 3.0	Northeast
Aug-23	240.85	30.47	210.38	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nov-23	240.85	32.37	208.48	274.26	65.80	208.46	268.77	60.44	208.33	219.86	10.85	209.01	242.70	33.51	209.19	0.4 - 1.8	Northeast

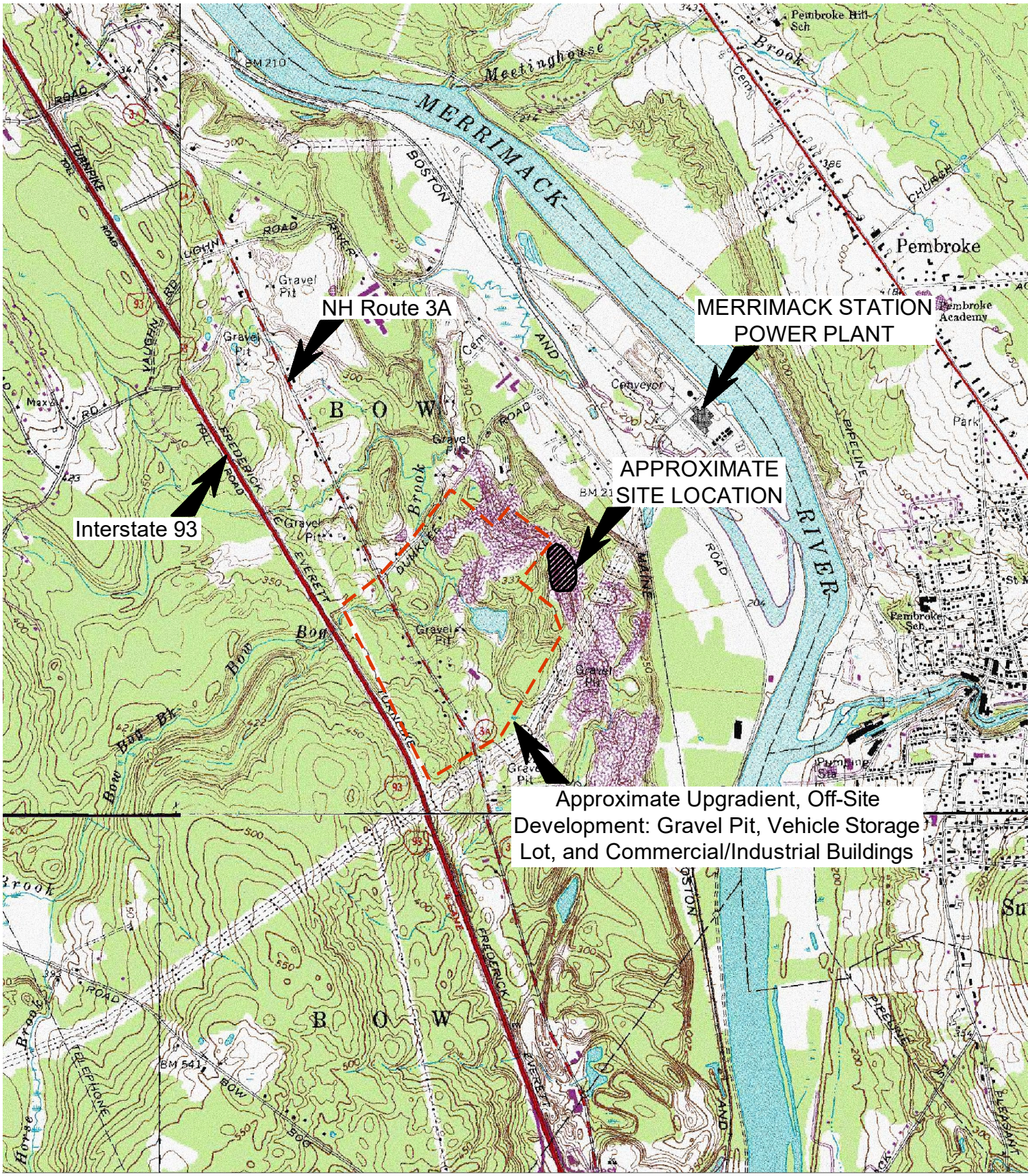
Notes:

1. Depths to water were obtained from information provided in laboratory reports and field sampling sheets prepared by Eastern Analytical, Inc.

2. Inferred general groundwater flow rates and flow directions are approximate and are based on the limited hydrogeologic and groundwater elevation data available. Other interpretations are possible and actual conditions may vary from those indicated. Note that groundwater elevations, directions, and rates may change due to seasonal or other variations in temperature, precipitation, runoff, or other factors.

3. Approximate groundwater flow rates were calculated using an assumed saturated hydraulic conductivity of 100 to 500 feet per day, and an assumed porosity of 39%. Assumptions are consistent with values typical of medium-grained, clean sand. The calculated groundwater flow rate is equivalent to the average interstitial velocity or the seepage velocity.

Figures



N
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NOTES:

BASE MAP TAKEN FROM 7.5 MINUTE
USGS QUADRANGLE MAP:
BOW, NEW HAMPSHIRE 1967
(PHOTO REVISED 1998)

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: J. Scott
Project No: 2025.14
Date: January 2024

1000 0 2000 Feet

SANBORN HEAD

Figure 1
Locus Plan

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Figure 2

Facility Plan

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: J. Scott
Project No: 2025.14
Date: January 2024

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of the landfill and the site features shown should be considered approximate.

Legend

- SB-4 — Monitoring Well
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour

SB-4
SB-6
SB-1
SB-13
SB-14

MERRIMACK STATION
LINED COAL ASH
LANDFILL

LEACHATE
COLLECTION TANKS

150' 75' 0 150' 300' Feet

SANBORN HEAD

File P:\2000s\2025.14\Graphics Files\CAD\CCR Report JAN24\CCR Facility Plan Fig.dwg Plot Date: 1-8-24

Appendix A

Limitations

APPENDIX A
LIMITATIONS

1. The conclusions and recommendations described in this report are based in part on the data obtained from a limited number of samples from widely-spaced locations. The sample results indicate conditions only at the specific location and time. They do not necessarily reflect variations that may exist between or within such locations, and the nature and extent of variations between or within these locations may not become evident until further investigation or remediation is initiated. The validity of the conclusions is based in part on assumptions Sanborn Head has made about conditions at the site. If conditions different from those described become evident, then it will be necessary to reevaluate the conclusions of this report.

2. Water level measurements were made at monitoring locations at times and under conditions stated within the report. Fluctuations in water levels may occur due to seasonal or other variations in precipitation, temperature, runoff, pumping, flooding, and other factors.

3. Quantitative laboratory analyses were performed as noted within this report. Additional compounds not searched for during the current study may be present at the site. Sanborn Head relied upon the data provided by the analytical laboratory and did not perform an independent evaluation of the reliability of these data. Moreover, variations in the types and concentrations of contaminants and variations in their distributions may occur due to the passage of time, water table fluctuations, precipitation and recharge events, and other factors.

4. The conclusions and recommendations contained in this report are based in part upon various types of chemical data as well as historical and hydrogeologic information developed during previous studies. While Sanborn Head reviewed those data and information as stated in this report, any of Sanborn Head's interpretations, conclusions, and recommendations that have relied on that information will be contingent on its validity. Should additional chemical data, historical information, hydrogeologic information, or other relevant information become available in the future, such information should be reviewed by Sanborn Head and the interpretations, conclusions, and recommendations presented herein should be modified accordingly.

5. This report was prepared for the exclusive use of GSP Merrimack LLC (GSP) for specific application for 40 CFR Part 257.90 compliance for GSP's Merrimack Station Coal Ash landfill in Bow, New Hampshire, and it was prepared in accordance with generally-accepted hydrogeologic practices. No warranty, express or implied, is made.

Appendix B

Alternative Source Demonstrations

Appendix B.1

June 2023
Alternative Source Demonstration

SANBORN HEAD

SANBORN HEAD

Allan G. Palmer
GSP Merrimack LLC
431 River Road
Bow, NH 03304

June 13, 2023
File No. 2025.14

Re: Alternative Source Demonstration
November 2022 and February 2023 Sampling
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this Alternative Source Demonstration (ASD) for the Merrimack Station Coal Ash Landfill Site (the Site) located in Bow, New Hampshire. A qualified professional engineer certification is provided in Attachment A. This ASD was prepared in accordance with the Coal Combustion Residual (CCR) Rules (40 CFR Part 257) and is subject to the Limitations provided in Attachment B. A Locus Plan for the Site is provided as Figure 1.

INTRODUCTION

Based on the prediction interval procedure performed by Sanborn Head, statistically significant increases (SSIs) compared to background groundwater concentrations were identified for chloride at SB-4, and sulfate and total dissolved solids (TDS) at monitoring well SB-1.[1] As such, pursuant to 40 CFR Part 257.94(e)(2), within 90 days of detecting the SSI, the owner or operator may provide a written demonstration from a qualified professional engineer that: (i) a source other than the CCR unit caused the SSI; or (ii) the SSI resulted from either an error in sampling, analysis, or statistical evaluation; or natural variation in groundwater chemistry.

Groundwater analytical data are provided in Table 1, and groundwater elevation data are provided in Table 2. The locations of the monitoring wells in relation to the landfill are indicated on the Facility Plan, Figure 2.

BACKGROUND

The chloride, sulfate, and TDS SSIs are based on samples collected from SB-1 and SB-4 in November 2022 and February 2023. Using a weight-of-evidence approach, we conclude that the SSIs are not sourced from the CCR unit based on the following findings:

- Chloride, sulfate, and TDS concentrations are within the range of concentrations expected to occur at the Site, given similar or higher chloride and TDS concentrations observed at the upgradient monitoring well SB-13 and similar sulfate concentrations observed at other Site monitoring wells.

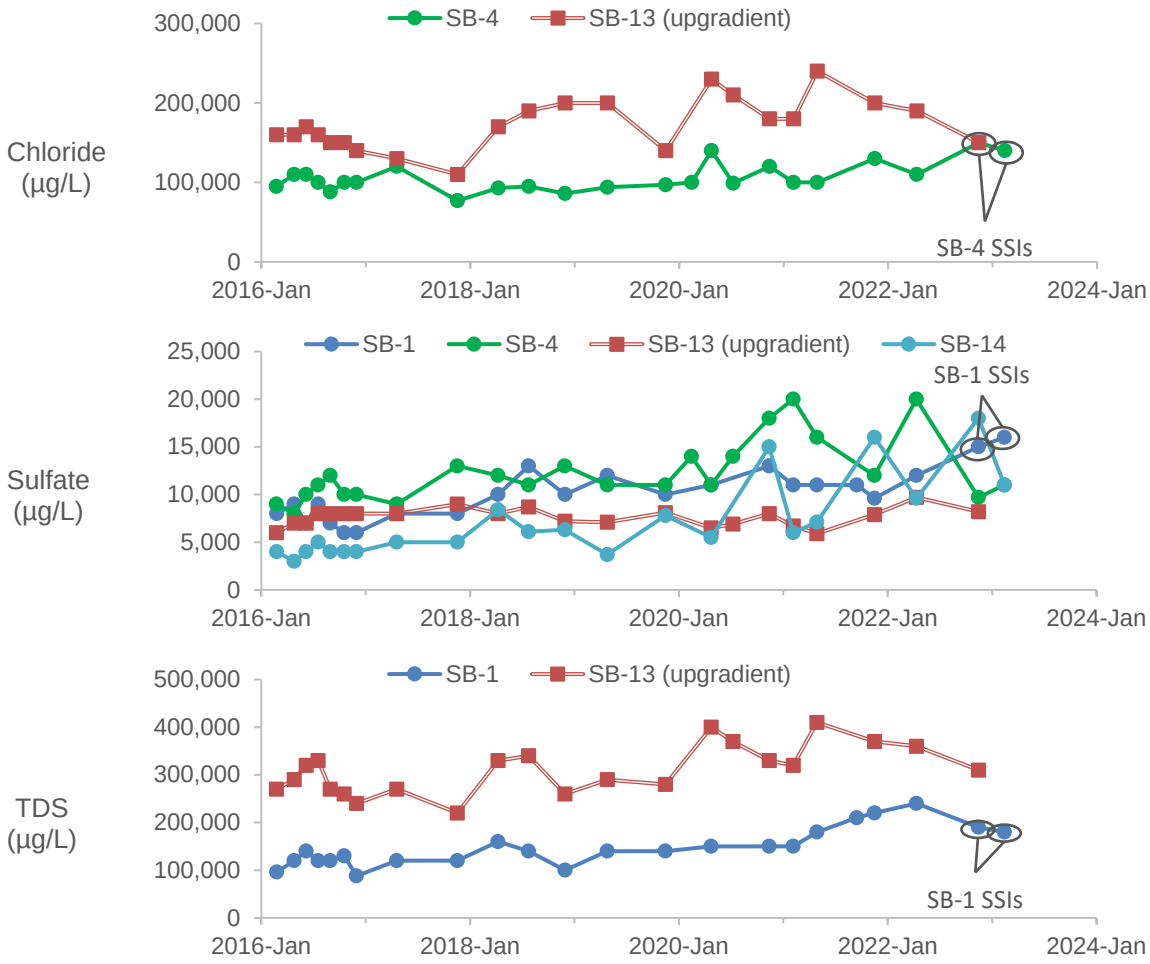
[1] The November 2022 laboratory analytical data were received on December 6, 2022. Confirmatory sampling, which may be used with the "1-of-2" retesting strategy, was completed in February 2023, and the SSI was detected in statistical analyses completed March 17, 2023.

- Chloride, sulfate, and TDS concentrations are within the range of naturally occurring concentrations.
- If the SSIs were from CCR impacts to groundwater, then increased TDS in the SSI samples should be caused by increases in other Appendix III analytes, such as calcium, chloride, sulfate, and boron. Because Appendix III analytes, except chloride, do not contribute substantially to increased TDS in SSI samples at SB-1 and SB-4, the TDS increases in the SSI samples are not consistent with CCR impacts to groundwater.
- A comparison of major ion signatures indicates the chloride, sulfate, and TDS SSIs are not sourced from CCR impacts to groundwater at SB-1 and SB-4.

SITE UPGRADIENT CONCENTRATIONS

Time series plots of well-analytes with SSIs and upgradient SB-13 are provided below as Exhibit 1. The SB-1 sulfate plot includes SB-4 and SB-14 sulfate data to provide other Site concentration context. The SB-4 chloride and SB-1 TDS SSI concentrations are similar to or less than historical chloride and TDS concentrations at the Site upgradient monitoring well SB-13. The SB-1 sulfate SSI concentrations are greater than upgradient SB-13 sulfate concentrations, but they are in the range of sulfate concentrations detected elsewhere at the Site, such as at SB-4 and SB-14.

Exhibit 1: SB-4 Chloride, SB-1/SB-4/SB-14 Sulfate, and SB-1 TDS Concentrations Compared to Site Upgradient



The well-specific data through March 2021 are considered background for the well-analytes. The SB-4 chloride, SB-1 sulfate, and SB-1 TDS SSIs were identified as SSIs because concentrations were statistically increased above the well-specific background. Although increased above well-specific background, the chloride, sulfate, and TDS SSI concentrations are within the range of concentrations expected to occur at the Site, given similar or higher chloride and TDS concentrations observed at the upgradient monitoring well SB-13 and similar sulfate concentrations observed at other Site monitoring wells.

NATURALLY OCCURRING AND AMBIENT CONCENTRATIONS

Calcium, chloride, and TDS occur naturally in groundwater in the region through rain, atmospheric deposition, and dissolution of ion-producing minerals in rock and soil. Human activities, such as road salting, agriculture, and subsurface wastewater discharge, also contribute to chloride, sulfate, and TDS concentrations in groundwater.

Sodium and chloride, the typical constituents of road salt, are the predominant ions in groundwater that comprise TDS for most wells at the Site, including SB-1, SB-4, and upgradient SB-13. Road salt may contribute to variation (seasonally and with precipitation) in chloride and TDS concentrations at the Site because two major roadways, New Hampshire Route 3A and Interstate 93, are to the west and southwest (upgradient) of the Site. There is also off-site development upgradient of the Site, including a gravel pit, vehicle storage lots, roadways, and commercial/industrial buildings, which are likely to store or use road salt. These off-site features are indicated on Figure 1.

Additionally, the use of calcium chloride for dust control on gravel roads around the Site was permitted by the New Hampshire Department of Environmental Services in 2001.[2] The period and extent of calcium chloride use at or around the Site is uncertain. Sodium chloride salt also may have been applied or may have been carried onto gravel roads via truck traffic around the Site through years of sand and gravel mining and landfill operations.

The chloride, sulfate, and TDS SSI concentrations are within the range of naturally occurring or ambient concentrations for comparable groundwaters, as reported in local aquifer, state-wide, and regional studies summarized in Exhibit 2 below.[3,4,5] The local aquifer and state-wide USGS studies are specific to stratified drift aquifers with similar geology to the Site, and the regional study is applicable to the Site because the glacial outwash overburden at the Site is eroded from the underlying crystalline rock and has similar mineralogical composition to the aquifers in the regional USGS study. The chloride, sulfate, and TDS SSI concentrations were mostly greater

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2 North American Reserve. May 11, 2001. *Notification to Apply Calcium Chloride as Dust Control Agent*; and New Hampshire Department of Environmental Services. May 14, 2001. *Bow – PSNH Pit, Manchester Sand & Gravel, Johnson Road, Nondomestic Discharge Registration (DES# 198400065)*.

3 U.S. Geological Survey. 1997. *Geohydrology and Water Quality of Stratified-Drift Aquifers in the Upper Merrimack River Basin, South-Central New Hampshire*; and U.S. Geological Survey. 1995. *Geohydrology and Water Quality of Stratified-Drift Aquifers in the Middle Merrimack River Basin, South-Central New Hampshire*.

4 U.S. Geological Survey. 1995. *Ground-Water Resources in New Hampshire: Stratified-Drift Aquifers*.

5 U.S. Department of the Interior and U.S. Geological Survey. 2012. *Quality of Water from Crystalline Rock Aquifers in New England, New Jersey, and New York, 1995-2007*.

than the values detected in the small local study, but they were well within the range of chloride, sulfate, and TDS concentrations reported in the state and regional studies.

Exhibit 2: Comparison of Site Calcium, Chloride, and TDS Concentrations and Literature Values

Study/Location	Chloride (µg/L)		Sulfate (µg/L)		TDS (µg/L)	
SSI data	SB-4 Nov. 2022: Feb. 2023:	 150,000 140,000	SB-1 Nov. 2022: Feb. 2023:	 15,000 16,000	SB-1 Nov. 2022: Feb. 2023:	 190,000 180,000
Site Upgradient SB-13 Data February 2016 through November 2023 [sample size (n)=22]	Min: Median: Max:	110,000 170,000 240,000	Min: Median: Max:	5,900 8,000 9,700	Min: Median: Max:	220,000 315,000 410,000
Local Stratified Drift Aquifers [n=16]	Minimum: Median: Maximum:	1,500 7,450 120,000	Minimum: Median: Maximum:	1,000 7,500 14,000	Minimum: Median: Maximum:	33,000 54,000 216,000
New Hampshire Stratified Drift Aquifers [n=256 chloride, n=255 for sulfate, and n=252 for TDS]	Minimum: Median: Maximum:	300 10,000 300,000	Minimum: Median: Maximum:	<100 7,800 79,000	Minimum: Median: Maximum:	17,000 77,000 612,000
Northeast Crystalline Rock Aquifers [n=1,867 for chloride, n=117 for sulfate and TDS]	Minimum: Median: 90th percentile: Maximum:	<2,500 17,000 117,000 1,800,000	Minimum: Median: 90th percentile: Maximum:	310 13,420 26,000 68,480	Minimum: Median: 90th percentile: Maximum:	29,000 126,000 323,000 876,000

See text and footnotes for references.

The SSI concentrations were lower than the U.S. Environmental Protection Agency (USEPA) Secondary Maximum Contaminant Levels (SMCLs) for chloride of 250,000 µg/L, sulfate of 250,000 µg/L, and TDS of 500,000 µg/L. The USEPA SMCLs for chloride, sulfate, and TDS are based on aesthetic and corrosion considerations for public water systems, so it is not applicable to groundwater in this situation but may be used as a reference concentration. Neither chloride nor TDS have Ambient Groundwater Quality Standard (AGQSs) in New Hampshire, but like the USEPA values, there is a New Hampshire SMCL of 250,000 µg/L for chloride and 500,000 µg/L for TDS in public water systems. The sulfate concentrations were much less than the New Hampshire AGQS for sulfate of 500,000 µg/L. The AGQSs are intended to protect groundwater as a source of drinking water.

OTHER INDICATOR ANALYTES

The CCR Rules for detection monitoring require analysis of boron, calcium, chloride, fluoride, pH, sulfate, and TDS (i.e., the Appendix III indicator analytes). If the SSIs were from CCR impacts to groundwater, then increases in TDS in SSI samples should be caused by increases in other Appendix III analytes, such as calcium, chloride, sulfate, and boron. Because other Appendix III analytes, except chloride, do not contribute substantially to increases in TDS, the TDS increases are not consistent with CCR impacts to groundwater at SB-1 and SB-4.

TDS is a relatively general, non-targeted analysis that measures the amounts of inorganic salts and small amounts of dissolved organic matter present in the sample. TDS is a collective measure that includes the dissolved Appendix III indicator analytes boron, calcium, chloride, fluoride, and sulfate, as well as other dissolved constituents, such as sodium, alkalinity, magnesium, potassium, and silica. The laboratory method for TDS includes filtering the sample and evaporating the water so that residual solids from the sample can be measured; laboratory TDS measurements do not distinguish between individual analytes or constituents.

As discussed above and with respect to naturally occurring and ambient concentrations, chloride concentrations in groundwater may be affected by a variety of human activities. Activities such as road salting and subsurface wastewater discharge may include the use of chloride-containing salts, so those impact signatures can have strong chloride signatures. In contrast, chloride concentrations in Site leachate typically contribute about 10 percent or less of TDS.[6] With such a weak chloride signature in leachate, increases in TDS associated with chloride are not an indicator of Site impacts.

An analysis of Appendix III indicator analyte contributions to the TDS in SSI samples, shown in Exhibit 3, indicates that chloride is the only Appendix III indicator contributing to more than 15 percent of the TDS increases in SSI samples. Calcium and sulfate, which are other major ion Appendix III indicator analytes, contribute a combined 20 percent or less of the TDS increases. The remaining change in TDS is from parameters not included in CCR Appendix III detection monitoring analytes, such as magnesium, sodium, and alkalinity.

Exhibit 3: Analysis of Appendix III Analyte Contributions to Increased TDS in SSI Samples

		SB-1 Nov. 2022	SB-1 Feb. 2023	SB-4 Nov. 2022	SB-4 Feb. 2023
November 2019 Background Concentrations (µg/L)	Calcium	11,000	11,000	11,000	11,000
	Sulfate	10,000	10,000	11,000	11,000
	Boron	59	59	53	53
	Fluoride	<100	<100	<100	<100
	Chloride	68,000	68,000	97,000	97,000
	TDS	140,000	140,000	230,000	230,000
SSI Sample Concentrations (µg/L)	Calcium	13,000	12,000	14,000	10,000
	Sulfate	15,000	16,000	9,700	11,000
	Boron	79	-	<50	-
	Fluoride	<100	<100	<100	<100
	Chloride	70,000	79,000	150,000	140,000
	TDS	190,000	180,000	320,000	250,000
Concentration Change (µg/L)	Calcium	+2,000	+1,000	+3,000	-1,000
	Sulfate	+5,000	+6,000	-1,300	0
	Boron	+20	-	~-3	-
	Fluoride	~0	~0	~0	~0
	Chloride	+2,000	+11,000	+53,000	+43,000
	TDS	+50,000	+40,000	+90,000	+20,000

[6] For three of four leachate samples with major ions analyzed, chloride concentrations ranged from about 35 to 76 mg/L, TDS concentrations ranged from about 3,300 to 7,900 mg/L, and chloride contributed about 0.9 to 1.1 percent of TDS. The fourth sample had 390 mg/L chloride, 3,700 mg/L TDS, and chloride as 11 percent of TDS.

		SB-1 Nov. 2022	SB-1 Feb. 2023	SB-4 Nov. 2022	SB-4 Feb. 2023
Percent of TDS Change	**Calcium**	+4%	+3%	+3%	-5%
	Sulfate	+10%	+15%	-1%	0%
	Boron	+0.04%	-	~0.00%	-
	Fluoride	**~0%**	**~0%**	**~0%**	**~0%**
	Chloride	+4%	+28%	+59%	+215%

The November 2019 sampling event was selected for background comparison because it is a recent background sampling event with TDS values lower than the corresponding SSI samples.
"Percent of TDS Change" is calculated by dividing the change in analyte by the change in TDS.
"<" indicates the analyte was not detected at the indicated reporting limit.
"-" indicates the analyte was not tested for.
"~" indicates an estimated value based on non-detect concentrations.

Because Appendix III analytes, except chloride, do not contribute substantially to the increased TDS in SSI samples at SB-1 and SB-4, the TDS increases in the SSI samples are not consistent with CCR impacts to groundwater.

COMPARISON OF MAJOR ION SIGNATURES

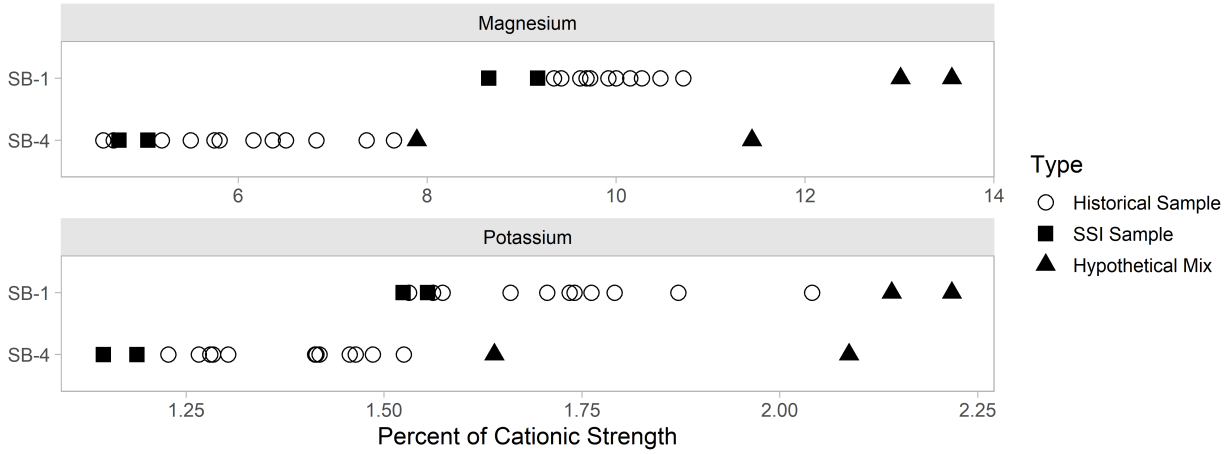
Major ion chemistry was analyzed for samples since July 2018. Leachate from the Site was also analyzed for major ion chemistry for four samples. These data for SB-1 and SB-4 are presented as plotted values in Figures 3 and 4, respectively. The major ion chemistry data show that SB-1 and SB-4 samples are consistently sodium-chloride water types, including the November 2022 and February 2023 samples that had chloride, sulfate, or TDS SSIs. The leachate is characterized as a [sodium-calcium-magnesium]–sulfate water type.

A calculated, hypothetical mixes of background (pre-SSI) samples and a leachate sample are also shown in Figures 3 and 4. The major ion chemistry for the "mix" samples is based on the November 2019 background samples, which had relatively low TDS, and the April 2022 leachate sample, which has relatively high TDS. The ratio of background sample to leachate sample was adjusted so that the TDS concentration of the "mix" sample is equal to the TDS concentration for the November 2022 and February 2023 SSI samples. The "mix" samples represent hypothetical SSI groundwater samples if the increased TDS in SSI samples was caused by leachate impacts.

Sulfate is the predominant major anion in leachate and is not a predominant major anion in Site groundwater, so the hypothetical mix sample shows increased sulfate levels over the background groundwater samples. Because sulfate levels at SB-1 and SB-4, including the SSI samples, are consistently low and are not similar to the sulfate levels in the hypothetical mix samples, these data indicate the chloride, sulfate, and TDS SSIs are not sourced from CCR leachate impacts to groundwater.

For cationic signatures, the leachate has more magnesium and potassium than Site groundwater. The magnesium and the potassium levels for historical data, the SSI data, and the hypothetical mix samples are shown in Exhibit 4. The SSI data is consistent with historical data and has overall lower magnesium and potassium levels. This pattern in the SSI data is not consistent with the mix samples, which show higher magnesium and potassium levels.

Exhibit 4: Magnesium and Potassium Signatures



Based on the contrasting ionic signatures between the hypothetical mix samples and the SSI samples, the mixing model results are not indicative of impacts from leachate.

CLOSING

Based on our understanding of the information presented herein, including the Site characteristics, natural variation of regional groundwater chemistry, and the groundwater flow and groundwater chemistry monitoring data, the November 2022 and February 2023 SB-4 chloride, SB-1 sulfate, and SB-1 TDS SSIs are not sourced from the CCR unit.

Thank you for the opportunity to be of service to GSP Merrimack LLC. We look forward to continuing to work with you on this project.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Harrison R. Roakes, PE
Senior Project Manager

Eric S. Steinhauser, PE, CPESC, CPSWQ
Senior Vice President and Principal

HRR/ESS: hrr

Enclosures:

Table 1 – Groundwater Analytical Results Summary
Table 2 – Groundwater Level Measurements Summary
Figure 1 – Locus Plan
Figure 2 – Facility Plan
Figure 3 – SB-1 Major Ion Signature
Figure 4 – SB-4 Major Ion Signature
Attachment A – Qualified Professional Engineer Certification
Attachment B – Limitations

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Tables

TABLE 1
Groundwater Analytical Results Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Location	Date	Metals (µg/L)																Miscellaneous Parameters							
																						s.u	pCi/L		
		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Silica	Selenium	Thallium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH	Radium 226	Radium 228	Radium 226+228
Drinking Water MCL		6	5	2,000	4	NS	5	NS	100	NS	15*	NS	2	NS	NS	50	2	NS	4,000	NS	NS	NS	NS	NS	5
CCR Alt. Standards		NA	NA	NA	NA	NA	NA	NA	NA	6	15	40	NA	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-1/(AGQS)		6 ‡	5 ‡	2,000 ‡	4 ‡	6,000 ‡	5 ‡	NS ‡	100	NS ‡	15 ‡	NS	2 ‡	NS	NS	50 ‡	2 ‡	NS	4,000	500,000	NS	NS	NS	NS	NS
GW-2		NA	NA	NA	NA	NA	NA	NS	NA	NS	NA	NS	NA	NS	NS	NA	NA	NS	†	†	NS	NS	NS	NS	NS
SB-1	2/24/2016	<1.0	<1.0	14	<1.0	60	<1.0	7,200	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	44,000	<100	8,000	96,000	5.21	0.2 ±0.1	0.6 ±0.6	0.8 ±0.6
	4/25/2016	<1.0	<1.0	18	<1.0	100	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	1.0		<1.0	<1.0	58,000	<100	9,000	120,000	5.72	0.5 ±0.2	0.2 ±0.4	0.7 ±0.4
	6/6/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	55,000	<100	7,000	140,000	5.52	0.6 ±0.3	0.2 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	16	<1.0	70	<1.0	8,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	60,000	<100	9,000	120,000	5.35	0.4 ±0.3	0.0 ±0.6	0.4 ±0.6
	8/30/2016	<1.0	<1.0	17	<1.0	<50	<1.0	7,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	49,000	<100	7,000	120,000	5.23	0.4 ±0.3	0.3 ±0.4	0.7 ±0.4
	10/17/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	60,000	<100	6,000	130,000	5.63	0.6 ±0.4	0.0 ±0.4	0.6 ±0.4
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	62,000	<100	6,000	88,000	5.63	1.0 ±0.4	0.8 ±0.5	1.8 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	56,000	<100	8,000	120,000	5.81	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					50		12,000										68,000	<100	8,000	120,000	5.70			
	1/31/2018 c							12,000																	
	4/9/2018					67		12,000										55,000	<100	10,000	160,000	5.90			
	7/25/2018 c							12,000										63,000		13,000	140,000	5.94			
	11/29/2018					87		13,000										66,000	<100	10,000	100,000	6.07			
	4/26/2019					100		13,000										55,000	<100	12,000	140,000	5.78			
	11/15/2019					59		11,000										68,000	<100	10,000	140,000	5.56			
	4/23/2020					70		14,000										53,000	<100	11,000	150,000	5.94			
	11/12/2020					<50		10,000										64,000	<100	13,000	150,000	5.36			
	2/4/2021 c							11,000										78,000		11,000	150,000	5.12			
	4/28/2021					78		14,000										62,000	<100	11,000	180,000	5.42			
	9/14/2021 c					58		13,000							14,000			69,000	<100	11,000	210,000	6.21			
	11/15/2021					<50		14,000							13,000			93,000	<100	9,600	220,000	4.99			
	4/11/2022					81		16,000										92,000	<100	12,000	240,000	5.75			
	11/14/2022					79		13,000										70,000	<100	15,000	190,000	5.36			
	2/13/2023 c							12,000										79,000		16,000	180,000	5.42			
SB-4	2/23/2016	<1.0	<1.0	14	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	95,000	<100	9,000	210,000	5.49	0.3 ±0.1	1.0 ±0.6	1.3 ±0.6
	4/25/2016	<1.0	<1.0	14	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	110,000	<100	8,000	200,000	5.32	0.3 ±0.3	0.0 ±0.4	0.3 ±0.4
	6/6/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	110,000	<100	10,000	230,000	5.62	0.2 ±0.2	0.4 ±0.5	0.6 ±0.5
	7/18/2016	<1.0	<1.0	11	<1.0	<50	<1.0	7,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	11,000	220,000	5.27	0.4 ±0.3	0.4 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	10	<1.0	<50	<1.0	6,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	88,000	<100	12,000	210,000	5.72	0.2 ±0.2	0.0 ±0.4	0.2 ±0.4
	10/17/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	10,000	190,000	5.71	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/29/2016	<1.0	1.0	12	<1.0	<50	<1.0	7,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	10,000	180,000	5.79	0.7 ±0.3	0.5 ±0.5	1.2 ±0.5
	4/19/2017	<1.0	<1.0	19	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	120,000	<100	9,000	260,000	5.71	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/17/2017					<50		10,000										77,000	<100	13,000	170,000	5.80			
	4/9/2018					<50		11,000										93,000	<100	12,000	220,000	5.87			
	7/25/2018 c							9,800										95,000		11,000	210,000	5.68			
	11/28/2018					<50		12,000										86,000	<100	13,000	83,000	6.28			
	4/26/2019					<50		13,000										94,000	<100	11,000	190,000	5.83			
	11/15/2019					53		11,000										97,000	<100	11,000	230,000	5.75			
	2/14/2020 c					<50		11,000										100,000		14,000	190,000	5.85			
	4/23/2020					55		13,000										140,000	<100	11,000	260,000	5.72			
	7/8/2020 c					57		11,000										99,000		14,000	240,000	5.59			
	11/12/2020					60		9,600										120,000	<100	18,000	260,000	5.18			
	2/4/2021 c					70		8,500										100,000		20,000	240,000	5.22			
	4/28/2021					65		11,000										100,000	<100	16,000	230,000	5.71			
	11/15/2021					<50		11,000							12,000			130,000	<100	12,000	290,000	5.16			
	4/11/2022					55		13,000										110,000	<100	20,000	250,000	5.68			
	11/14/2022					<50		14,000										150,000	<100	9,700	320,000	5.46			
	2/13/2023 c							10,000										140,000		11,000	250,000	5.49			
SB-6	2/23/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	80,000	<100	10,000	170,000	5.55	0.1 ±0.07	0.5 ±0.5	0.6 ±0.5
	4/25/2016	<1.0	<1.0	16	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	7,000	220,000	5.55	0.4 ±0.3	0.0 ±0.4	0.4 ±0.4
	6/6/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	8,000	270,000	5.40	0.5 ±0.3	0.0 ±0.5	0.5 ±0.5
	7/18/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	9,000	260,000	5.27	0.5 ±0.3	0.3 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	9,000	280,000	5.71	0.4 ±0.2	0.0 ±0.4	0.4 ±0.4
	10/17/2016	<1.0	<1.0	18	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	150,000	<100	8,000	260,000	5.78	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	130,000	<100	9,000	230,000	5.77	0.5 ±0.2	0.8 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	13	<1.1	<51	<1.1	7,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	9,000	190,000	5.68	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					<50		9,900										130,000	<100	11,000	230,000	5.60			
	4/9/2018					<50		7,900										120,000	<100	9,500	240,000	5.57			
	7/25/2018 c							11,000										180,000		12,000	310,000	5.44			
	11/28/2018					<50		11,000										150,000	<100	11,000	140,000	5.86			
	4/26/2019					84		13,000										150,000	<100	14,000	210,000	5.78			
	7/11/2019 c					80		14,000										170,000		15,000	330,000	5.84			
	11/15/2019					52		10,000										140,000	<100	13,000	280,000	5.75			
	2/14/2020 c					<50		5,100										79,000		15,000	130,000	5.73			
	4/23/2020					<50		12,000										160,000	<100	8,100	270,000	5.56			
	11/12/2020					<50		12,000										180,000	<100	9,600	330,000	5.37			
	4/28/2021					<50		11,000										150,000	<100	6,700	290,000	5.58			
	11/15/2021					<50		12,000							12,000			200,000	<100	8,800	370,000	5.27			
	4/11/2022					<50		10,000										170,000	<100	9,400	330,000	5.80			
	11/14/2022					<50		6,800										110,000	<100	11,000	240,000	5.53			
SB-13	2/23/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	160,000	<100	6,000	270,000	5.34	0.6 ±0.1	0.3 ±0.6	0.9±0.6
	4/25/2016	<1.0	<1.0	17	<1.0	<50	<1.0	8,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	160,000	<100	7,000	290,000	5.48	0.4 ±0.3	0.1 ±0.4	0.5 ±0.4
	6/6/2016	<1.0	<1.0	20	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	170,000	<100	7,000	320,000	5.50	0.8 ±0.3	0.0 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	160,000	<100	8,000	330,000	5.27	0.8 ±0.3	0.0 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	1.0	20	<1.0	<50	<1.0	8,100	2.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	150,000	<100	8,000	270,000	5.35	0.8 ±0.3	0.6 ±0.4	1.4 ±0.4
	10/17/2016	<1.0	<1.0	15	<1.0	<50	<1.0	8,800	2.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	150,000	<100	8,000	260,000	5.06	0.7 ±0.4	0.6 ±0.5	1.3 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	7,400	1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	8,000	240,000	5.71	0.6 ±0.3	0.7 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.1	<51	<1.1	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	130,000	<100	8,000	270,000	5.56	0.9 ±0.3	0.3 ±0.5	1.2 ±0.5
	11/17/2017					<50		7,000										110,000	<100	9,000	220,000	5.80			
	4/9/2018					<50		11,000										170,000	<100	8,000	330,000	5.81			
	7/25/2018 c							10,000										190,000		8,700	340,000	5.69			
	11/28/2018					<50		13,000										200,000	<100	7,200	260,000	5.77			
	4/26/2019					<50		14,000										200,000	<100	7,100	290,000	5.53			
	11/15/2019					<50		8,100										140,000	<100	8,100	280,000	5.82			
	4/23/2020					<50		14,000										230,000	<100	6,500	400,000	5.47			
	7/8/2020 c					<50		14,000										210,000		6,900	370,000	5.41			
	11/12/2020					<50		11,000										180,000	<100	8,000	330,000	4.96			
	2/4/2021 c					< 50		11,000										180,000		6,700	320,000	5.32			
	4/28/2021					<50		14,000										240,000	<100	5,900	410,000	5.31			
	11/15/2021					<50		11,000							12,000			200,000	<100	7,900	370,000	5.02			
	4/11/2022					<50		9,800										190,000	<100	9,700	360,000	5.47			
	11/14/2022					<50		7,700										150,000	<100	8,200	310,000	5.55			
SB-14	2/24/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,100	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	16,000	<100	4,000	56,000	5.05	0.2 ±0.08	0.0 ±0.5	0.2 ±0.5
	4/25/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	11,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	58,000	<100	3,000	140,000	5.62	0.8 ±0.5	0.2 ±0.1	1.0 ±0.5
	6/6/2016	<1.0	<1.0	6.0	<1.0	<50	<1.0	7,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	32,000	<100	4,000	100,000	5.39	0.5 ±0.2	0.2 ±0.5	0.7 ±0.5
	7/18/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	21,000	<100	5,000	68,000	5.31	0.2 ±0.2	0.3 ±0.5	0.5 ±0.5
	8/30/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	14,000	<100	4,000	71,000	5.81	0.4 ±0.3	0.4 ±0.5	0.8 ±0.5
	10/17/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	4,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	11,000	<100	4,000	29,000	5.55	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	2,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	7,000	<100	4,000	12,000	5.19	0.2 ±0.4	0.2 ±0.5	0.4 ±0.5
	4/19/2017	<1.0	<1.0	10	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	56,000	<100	5,000	120,000	5.59	0.7 ±0.3	0.1 ±0.5	0.8 ±0.5
	11/17/2017					<50		8,000										18,000	<100	5,000	59,000	5.60			
	4/9/2018					<50		4,200										14,000	<100	8,400	80,000	5.76			
	7/25/2018 c							5,100										9,800		6,100	56,000	5.61			
	11/28/2018					<50		4,500										7,800	<100	6,300	<5,000	5.96			
	4/26/2019					<50		8,700										19,000	<100	3,700	91,000	5.74			
	11/15/2019					<50		5,000										12,000	<100	7,800	69,000	5.94			
	4/23/2020					<50		5,500										9,200	<100	5,500	52,000	5.63			
	11/12/2020					<50		4,000										4,700	<100	15,000	68,000	5.10			
	2/4/2021 c							7,900										34,000		6,000	95,000	5.30			
	4/28/2021					<50		3,300										4,000	<100	7,100	42,000	5.37			
	11/15/2021					<50		3,400							11,000			9,300	<100	16,000	64,000	5.55			
	4/11/2022					<50		4,400										12,000	<100	9,600	44,000	5.76			
	11/14/2022					<50		5,600										10,000	<100	18,000	72,000	5.74			
	2/13/2023 c							6,300										22,000		11,000	53,000	5.62			

Notes:
1. Samples were collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire on the dates indicated and analyzed by EAI for select metals by USEPA Method 6020. Additional analysis for select wet chemistry parameters were completed by EAI. Analysis for radium 226 and 228 was completed by KNL Environmental Testing, Inc., of Tampa, Florida. Analysis for lithium was completed by SGS Accutest, of Marlborough, Massachussets (Feb. 2016) and Katahdin Analytical Services, of Scarborough, Maine (April 2016 through October 2016).

2. Concentrations are presented in micrograms per liter (µg/L), which are equivalent to parts per billion (ppb), or they are presented in picoCuries per liter (pCi/L) or pH standard units.

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.
A blank indicates the sample was not analyzed for this parameter.

4. "GW-1" and "GW-2" Groundwater Standards are from the New Hampshire Department of Environmental Services (NHDES) Contaminated Sites Risk Characterization and Management Policy (RCMP) (January 1998, with 2000 through 2018 revisions/addenda). GW-1 Groundwater Standards are equivalent to the Ambient Groundwater Quality Standards (AGQSs) promulgated in Env-Or 600 (June 2015 with October 2016, September 2018, September 2019, May 2020, January 2021, and July 2021 amendments). The AGQS/GW-1 Groundwater Standards are intended to be protective of groundwater as a source of drinking water. The GW-2 Groundwater Standards apply to groundwater as a potential source of indoor air contamination.

5. "Drinking Water MCLs" are from the United States Environmental Protection Agency (EPA) website (accessed March 22, 2016). The Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are enforceable standards for drinking water systems.
"CCR Alt. Standards" were codified in 40 CFR Part 257.95(h)(2) for cobalt, lead, lithium, and molybdenum. These are alternative risk-based standards for the four constituents without MCLs that may require establishment of a groundwater protection standard under the coal combustion residuals (CCR) rules 40 CFR Part 257(h).

6. "*" indicates an MCL value is not currently available, and the listed value is an action level.
"†" indicates the RCMP lists the value as not currently available.
"‡" indicates the value provided is typically applied to field-filtered samples (i.e., dissolved analytes) for overburden monitoring wells.
"NA" indicates the RCMP lists the value as not applicable.
"NS" indicates the analyte is not listed in the RCMP or MCL list.
"c" indicates sample rounds collected as part of the retesting program for identifying statistically significant increases (SSIs).

TABLE 2
Groundwater Level Measurements Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Date	Depths and elevations in feet.															Inferred General Groundwater Flow Rate (feet/day)	Inferred General Groundwater Flow Direction
	SB-1			SB-4			SB-6			SB-13			SB-14				
	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation		
Feb-16	240.85	33.82	207.03	274.26	67.36	206.90	268.77	61.84	206.93	219.86	11.83	208.03	242.70	34.88	207.82	0.5 - 2.7	Northeast
Apr-16	240.85	32.19	208.66	274.26	65.63	208.63	268.77	60.07	208.70	219.86	10.16	209.70	242.70	33.13	209.57	0.5 - 2.5	Northeast
Jun-16	240.85	31.84	209.01	274.26	66.24	208.02	268.77	60.80	207.97	219.86	11.11	208.75	242.70	33.93	208.77	0.4 - 1.9	East
Jul-16	240.85	33.88	206.97	274.26	67.30	206.96	268.77	62.07	206.70	219.86	12.41	207.45	242.70	35.10	207.60	0.4 - 1.9	Northeast
Aug-16	240.85	35.09	205.76	274.26	68.54	205.72	268.77	63.19	205.58	219.86	13.76	206.10	242.70	36.39	206.31	0.3 - 1.4	Northeast
Oct-16	240.85	36.20	204.65	274.26	69.68	204.58	268.77	64.42	204.35	219.86	13.92	205.94	242.70	37.58	205.12	0.8 - 3.9	North-Northeast
Nov-16	240.85	36.40	204.45	274.26	69.93	204.33	268.77	64.69	204.08	219.86	15.14	204.72	242.70	37.80	204.90	0.3 - 1.6	East-Northeast
Apr-17	240.85	32.27	208.58	274.26	65.82	208.44	268.77	60.04	208.73	219.86	9.58	210.28	242.70	32.99	209.71	0.8 - 3.8	North-Northeast
Nov-17	240.85	32.87	207.98	274.26	66.39	207.87	268.77	60.97	207.80	219.86	11.33	208.53	242.70	34.08	208.62	0.4 - 1.8	Northeast
Apr-18	240.85	31.13	209.72	274.26	64.58	209.68	268.77	58.93	209.84	219.86	8.74	211.12	242.70	31.94	210.76	0.6 - 3.2	North-Northeast
Jul-18	240.85	32.60	208.25	274.26	66.01	208.25	268.77	60.84	207.93	219.86	11.13	208.73	242.70	33.78	208.92	0.4 - 2.0	Northeast
Nov-18	240.85	29.99	210.86	274.26	63.59	210.67	268.77	57.92	210.85	219.86	7.66	212.20	242.70	30.82	211.88	0.7 - 3.3	Northeast
Apr-19	240.85	29.83	211.02	274.26	63.34	210.92	268.77	57.60	211.17	219.86	7.51	212.35	242.70	30.72	211.98	0.6 - 2.9	North-Northeast
Jul-19	–	–	–	–	–	–	268.77	58.71	210.06	–	–	–	–	–	–	–	–
Nov-19	240.85	34.48	206.37	274.26	67.96	206.30	268.77	62.66	206.11	219.86	13.21	206.65	242.70	35.85	206.85	0.3 - 1.3	East-Northeast
Feb-20	–	–	–	274.26	66.67	207.59	268.77	61.12	207.65	–	–	–	–	–	–	–	–
Apr-20	240.85	31.84	209.01	274.26	65.34	208.92	268.77	59.73	209.04	219.86	9.62	210.24	242.70	32.75	209.95	0.6 - 3.0	North-Northeast
Jul-20	–	–	–	274.26	66.00	208.26	–	–	–	219.86	11.00	208.86	–	–	–	–	–
Nov-20	240.85	35.72	205.13	274.26	69.23	205.03	268.77	63.92	204.85	219.86	14.48	205.38	242.70	37.09	205.61	0.3 - 1.3	East-Northeast
Feb-21	240.85	33.85	207.00	274.26	67.36	206.90	–	–	–	219.86	12.12	207.74	242.70	34.88	207.82	–	–
Apr-21	240.85	33.37	207.48	274.26	66.88	207.38	268.77	61.31	207.46	219.86	11.43	208.43	242.70	34.38	208.32	0.5 - 2.4	Northeast
Sep-21	240.85	31.11	209.74	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nov-21	240.85	31.65	209.20	274.26	65.17	209.09	268.77	59.72	209.05	219.86	10.04	209.82	242.70	32.78	209.92	0.4 - 1.9	Northeast
Apr-22	240.85	31.10	209.75	274.26	64.61	209.65	268.77	59.12	209.65	219.86	9.22	210.64	242.70	32.05	210.65	0.5 - 2.5	Northeast
Nov-22	240.85	35.06	205.79	274.26	68.62	205.64	268.77	63.27	205.50	219.86	13.80	206.06	242.70	36.46	206.24	0.3 - 1.4	East-Northeast
Feb-23	240.85	32.98	207.87	274.26	66.50	207.76	–	–	–	–	–	–	242.70	33.99	208.71	–	–

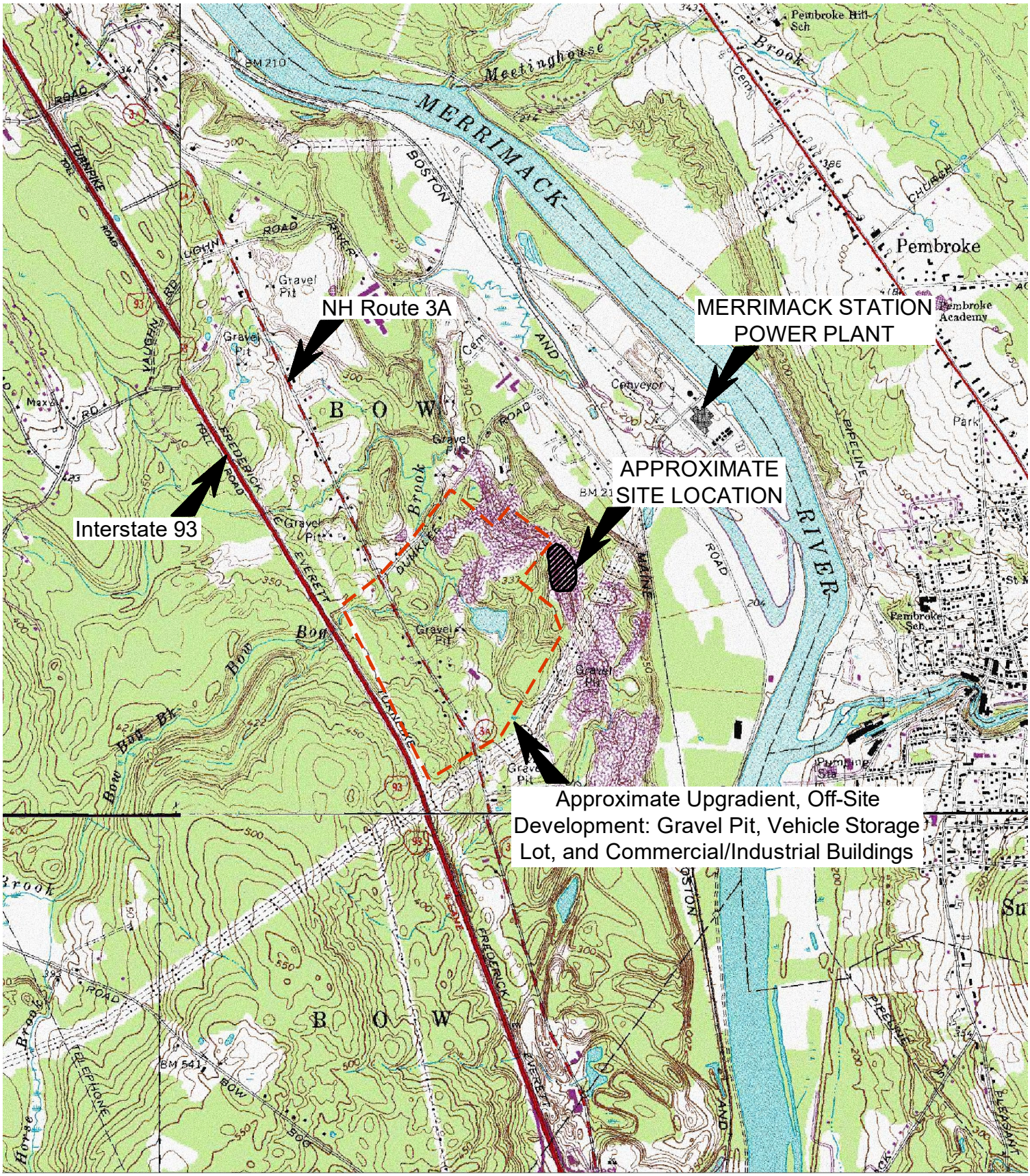
Notes:

1. Depths to water were obtained from information provided in laboratory reports and field sampling sheets prepared by Eastern Analytical, Inc.

2. Inferred general groundwater flow rates and flow directions are approximate and are based on the limited hydrogeologic and groundwater elevation data available. Other interpretations are possible and actual conditions may vary from those indicated. Note that groundwater elevations, directions, and rates may change due to seasonal or other variations in temperature, precipitation, runoff, or other factors.

3. Approximate groundwater flow rates were calculated using an assumed saturated hydraulic conductivity of 100 to 500 feet per day, and an assumed porosity of 39%. Assumptions are consistent with values typical of medium-grained, clean sand. The calculated groundwater flow rate is equivalent to the average interstitial velocity or the seepage velocity.

Figures



NOTES:

BASE MAP TAKEN FROM 7.5 MINUTE
USGS QUADRANGLE MAP:
BOW, NEW HAMPSHIRE 1967
(PHOTO REVISED 1998)

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: E. Steinhauser
Project No: 2025.13
Date: November 2022

1000 0 2000 Feet

SANBORN HEAD

Figure 1
Locus Plan

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Figure 2

Facility Plan

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: E. Steinhauser
Project No: 2025.13
Date: November 2022

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of the landfill and the site features shown should be considered approximate.

Legend

- SB-4 — Monitoring Well
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour

SB-4
SB-6
SB-1
SB-13
SB-14

MERRIMACK STATION
LINED COAL ASH
LANDFILL

LEACHATE
COLLECTION TANKS

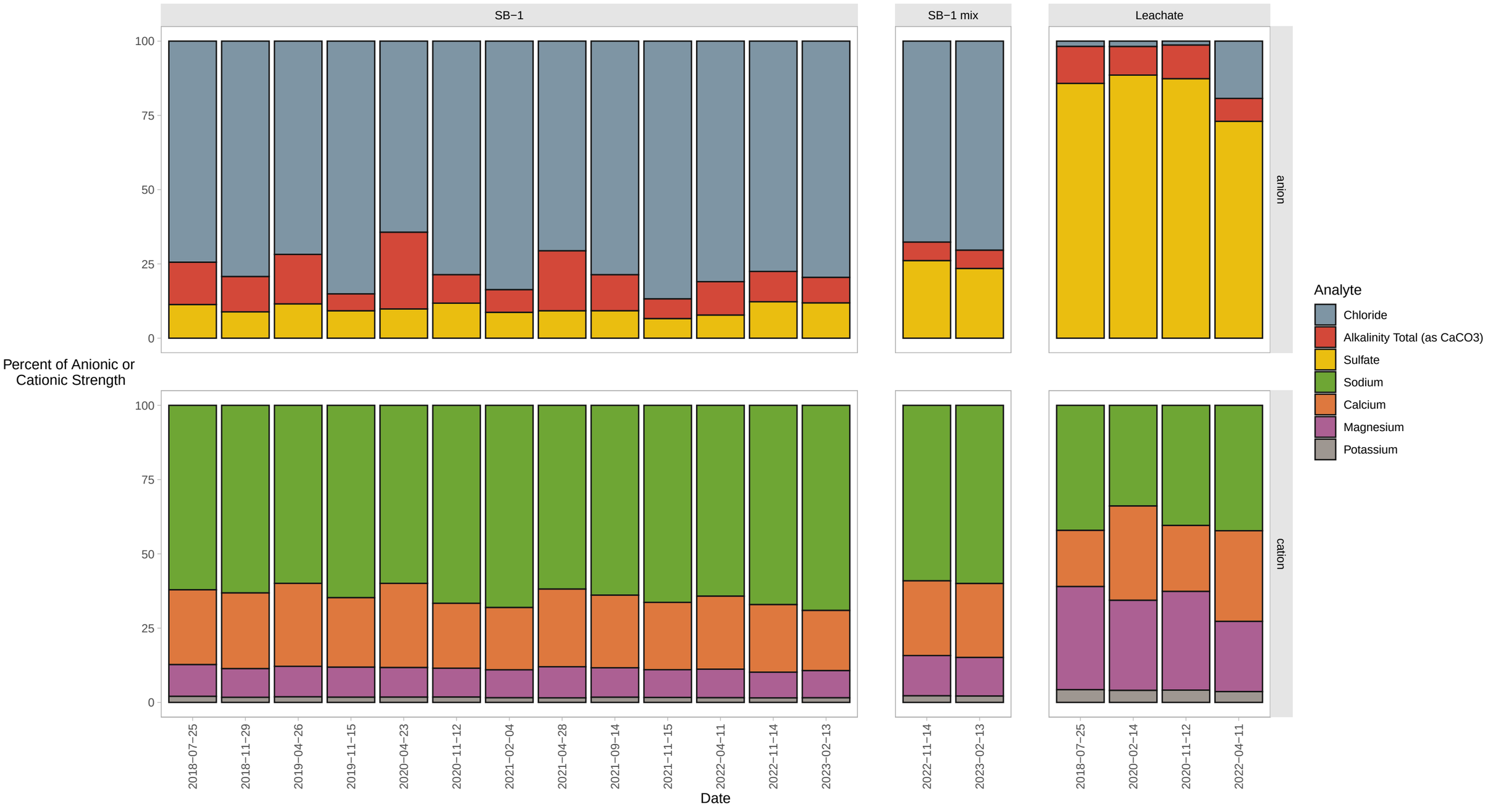
150' 75' 0 150' 300' Feet

SANBORN HEAD

File P:\2000s\2025.13\Graphics Files\CAD\2022 November Report\Nov 22 Facility Plan Fig.dwg Plot Date: 10-27-22

Figure 3 − SB−1 Major Ion Signature

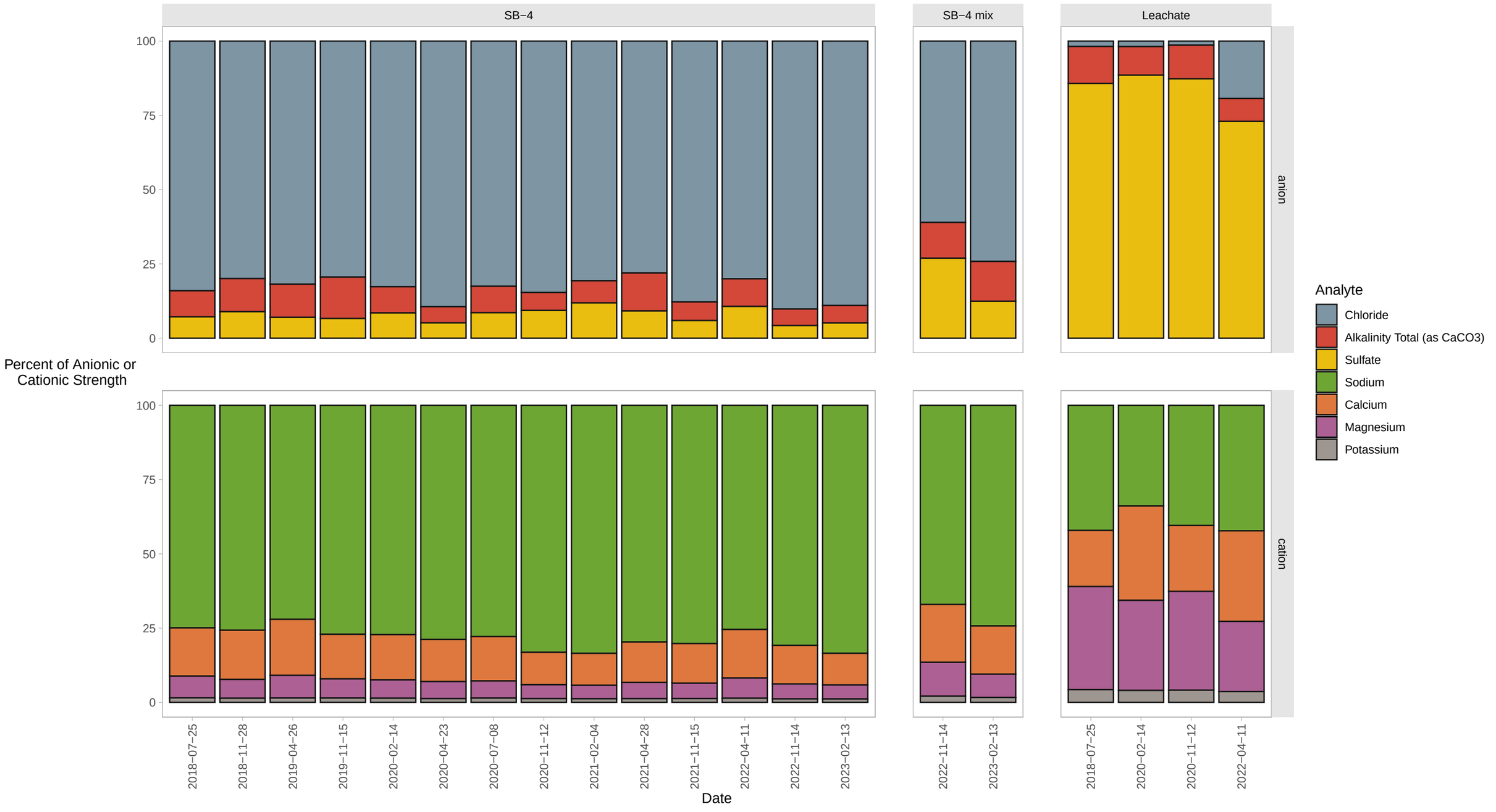
Samples With Project−Specific Major Ion List Analyzed



Notes:
Only samples with analysis of project−specific major ions are plotted.
The hypothetical mix sample is based on the SSI sample, the selected background sample, and the April 11, 2022, leachate sample.
See text for additional assumptions and details.

Figure 4 − SB−4 Major Ion Signature

Samples With Project−Specific Major Ion List Analyzed



Notes:

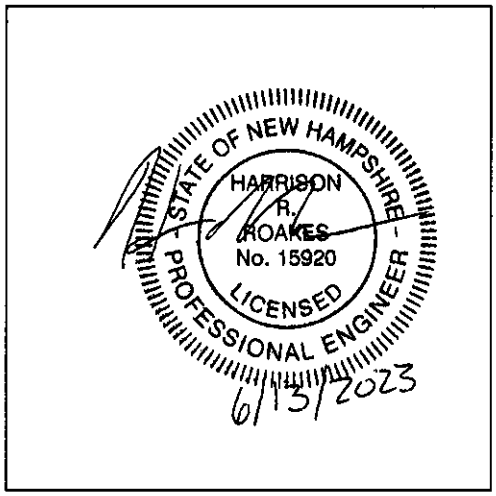
Only samples with analysis of project−specific major ions are plotted.
The hypothetical mix sample is based on the SSI sample, the selected background sample, and the April 11, 2022, leachate sample.
See text for additional assumptions and details.

Attachment A

Qualified Professional Engineer Certification

ATTACHMENT A
QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I certify that the information in this alternative source demonstration (ASD) report, dated June 13, 2023 (the "Report"), is accurate, subject to the assumptions and limitations contained within the Report. The ASD report was prepared by Sanborn, Head & Associates, Inc. for the Merrimack Station Coal Ash Landfill site located in Bow, New Hampshire.



Harrison R. Roakes
Printed Name of Licensed Professional Engineer

Signature

15920	New Hampshire	6/13/2023
License Number	Licensing State	Date

Appendix B

Limitations

ATTACHMENT B
LIMITATIONS

1. The conclusions and recommendations described in this report are based in part on the data obtained from a limited number of groundwater samples from widely-spaced monitoring locations. The monitoring locations indicate conditions only at the specific locations and times, and only to the depths sampled. They do not necessarily reflect variations that may exist between such locations, and the nature and extent of variations between these monitoring locations may not become evident until further study or remediation is initiated. The validity of the conclusions is based in part on assumptions Sanborn Head has made about conditions at the site. If conditions different from those described become evident, it will be necessary to re-evaluate the conclusions of this report.
2. Water level measurements were made in the monitoring well locations at times and under conditions stated within the report. Fluctuations in the levels of the groundwater may occur due to variations in precipitation and other factors not evident at the time measurements were made.
3. Quantitative laboratory analyses were performed as noted within the report. Additional analytes not searched for during the current study may be present in groundwater at the site. Sanborn Head has relied upon the data provided by the analytical laboratory and did not conduct an independent evaluation of the reliability of these data. Additionally, variations in the types and concentrations of analytes and variations in their distributions within the groundwater may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.
4. Quantitative laboratory analyses were performed as noted within the report. Additional analytes not searched for during the current study may be present in groundwater at the site. Sanborn Head has relied upon the data provided by the analytical laboratory and did not conduct an independent evaluation of the reliability of these data. Additionally, variations in the types and concentrations of analytes and variations in their distributions within the groundwater may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.
5. This report was prepared for the exclusive use of GSP Merrimack LLC (GSP) for specific application for 40 CFR Part 257.90 compliance for GSP's Merrimack Station Coal Ash landfill in Bow, New Hampshire, and was prepared in accordance with generally-accepted hydrogeologic practices. No warranty, express or implied, is made.

Appendix B.2

November 2023
Alternative Source Demonstration

SANBORN HEAD

SANBORN HEAD

Allan G. Palmer
GSP Merrimack LLC
431 River Road
Bow, NH 03304

November 28, 2023
File No. 2025.14

Re: Alternative Source Demonstration
April 2023 and August 2023 Sampling
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this Alternative Source Demonstration (ASD) for the Merrimack Station Coal Ash Landfill Site (the Site) located in Bow, New Hampshire. A qualified professional engineer certification is provided in Attachment A. This ASD was prepared in accordance with the Coal Combustion Residual (CCR) Rules (40 CFR Part 257) and is subject to the Limitations provided in Attachment B. A Locus Plan for the Site is provided as Figure 1.

INTRODUCTION

Based on the prediction interval procedure performed by Sanborn Head, a statistically significant increase (SSI) compared to background groundwater concentrations was identified for calcium at SB-1.[1] As such, pursuant to 40 CFR Part 257.94(e)(2), within 90 days of detecting the SSI, the owner or operator may provide a written demonstration from a qualified professional engineer that: (i) a source other than the CCR unit caused the SSI; or (ii) the SSI resulted from either an error in sampling, analysis, or statistical evaluation; or natural variation in groundwater chemistry.

Groundwater analytical data are provided in Table 1, and groundwater elevation data are provided in Table 2. The locations of the monitoring wells in relation to the landfill are indicated on the Facility Plan provided as Figure 2.

BACKGROUND

The calcium SSI is based on samples collected from SB-1 in April 2023 and August 2023. Using a weight-of-evidence approach, we conclude that the SSI is not sourced from the CCR unit based on the following findings:

- The variability in calcium data that resulted in the SB-1 SSI is also observed in calcium variability at upgradient monitoring well SB-13.
- Calcium concentrations are within the range of naturally occurring concentrations.

[1] The April 2023 laboratory analytical data were received on May 12, 2023. Confirmatory sampling, which may be used with the "1-of-2" retesting strategy for detecting an SSI, was completed in August 2023, and the August 2023 data were received on August 30, 2023.

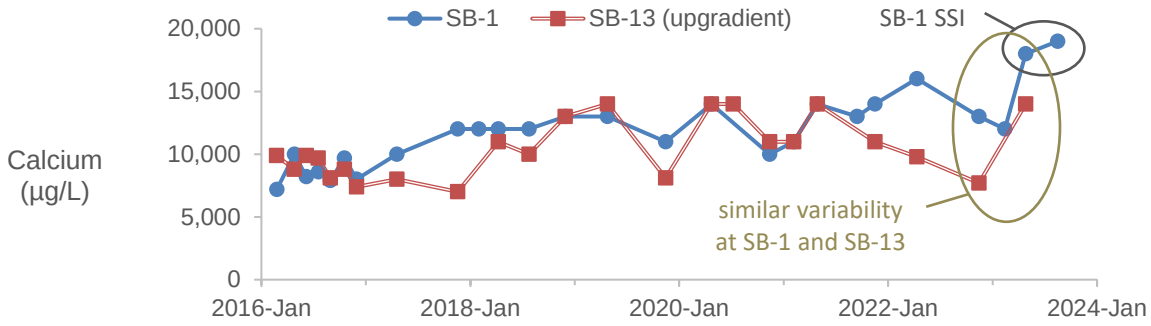
- If the SSI was from CCR impacts to groundwater, then increased total dissolved solids (TDS) in the SSI samples should be caused by increases in Appendix III analytes, such as calcium, chloride, sulfate, and boron. Because Appendix III analytes, except chloride and to a lesser extent calcium, are not contributing substantially to increased TDS in the SSI samples, the TDS increases observed in the SSI samples are not consistent with CCR impacts to groundwater.
- A comparison of major ion signatures indicates the calcium SSI is not sourced from CCR impacts to groundwater at SB-1.

Further details supporting each of these findings are provided below.

SITE UPGRADIENT CONCENTRATIONS

Monitoring well SB-13 is upgradient of the landfill, and SB-1 is downgradient of the landfill. Time series plots of SB-1 calcium, including the SSI data, and upgradient SB-13 calcium is provided below as Exhibit 1. The SB-1 calcium SSI concentrations are greater than upgradient SB-13 calcium concentrations, but there is similar variability in the SB-13 data as there is for the SB-1 data that resulted in the SSI. For example, there was a 5,000 microgram per liter (µg/L) increase of calcium from the SB-1 November 2022 sample (not an SSI) to the SB-1 April 2023 sample (SSI). There was an even greater 6,300 µg/L increase of calcium at upgradient SB-13 for the same November 2022 to April 2023 timeframe. This similar variability in the upgradient groundwater indicates the SSI may be sourced from natural variation in groundwater chemistry.

Exhibit 1: SB-1 Calcium Concentrations Compared to Site Upgradient



NATURALLY OCCURRING AND AMBIENT CONCENTRATIONS

Calcium occurs naturally in groundwater in the region through rain, atmospheric deposition, and dissolution of ion-producing minerals in rock and soil. Human activities, such as agriculture and subsurface wastewater discharge, may also contribute to calcium concentrations in groundwater. There is off-site development upgradient of the Site, including a gravel pit, vehicle storage lots, roadways, and commercial/industrial buildings. These off-site features are indicated on Figure 1.

Additionally, the use of calcium chloride for dust control on gravel roads around the Site was permitted by the New Hampshire Department of Environmental Services in 2001.[2] The period and extent of calcium chloride use at or around the Site is uncertain.

The calcium SSI concentrations are within the range of naturally occurring or ambient concentrations for comparable groundwaters, as reported in local aquifer, state-wide, and regional studies summarized in Exhibit 2 below.[3,4,5] The local aquifer and state-wide USGS studies are specific to stratified drift aquifers with similar geology to the Site, and the regional study is applicable to the Site because the glacial outwash overburden at the Site is eroded from the underlying crystalline rock and has similar mineralogical composition to the aquifers in the regional USGS study. The calcium SSI concentrations were greater than the values detected in the small local study, but they were well within the range of calcium concentrations reported in the state and regional studies.

Exhibit 2: Comparison of Site Calcium Concentrations and Literature Values

Study/Location	Calcium (µg/L)	
SSI data	SB-1 April 2023: August 2023:	 18,000 19,000
Site Upgradient SB-13 Data February 2016 through April 2023 [sample size (n)=23]	Min: Median: Max:	7,000 9,900 14,000
Local Stratified Drift Aquifers [n=16]	Minimum: Median: Maximum:	3,400 4,650 8,600
New Hampshire Stratified Drift Aquifers [n=256]	Minimum: Median: Maximum:	40 7,600 87,000
Northeast Crystalline Rock Aquifers [n=117]	Minimum: Median: 90th percentile: Maximum:	2,700 19,800 53,400 98,500

See text and footnotes for references.

Calcium does not have a U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL) or New Hampshire Ambient Groundwater Quality Standard (AGQS), which are standards intended to be protective of human health for drinking water. Calcium also does not have a USEPA Secondary Maximum Contaminant Level (SMCL) or New Hampshire SMCL, which are standards based on aesthetic and corrosion considerations for public water systems. Calcium concentrations can contribute to TDS levels, although it is not a large portion of TDS at

[2] North American Reserve. May 11, 2001. *Notification to Apply Calcium Chloride as Dust Control Agent*; and New Hampshire Department of Environmental Services. May 14, 2001. *Bow – PSNH Pit, Manchester Sand & Gravel, Johnson Road, Nondomestic Discharge Registration (DES# 198400065)*.

[3] U.S. Geological Survey. 1997. *Geohydrology and Water Quality of Stratified-Drift Aquifers in the Upper Merrimack River Basin, South-Central New Hampshire*; and U.S. Geological Survey. 1995. *Geohydrology and Water Quality of Stratified-Drift Aquifers in the Middle Merrimack River Basin, South-Central New Hampshire*.

[4] U.S. Geological Survey. 1995. *Ground-Water Resources in New Hampshire: Stratified-Drift Aquifers*.

[5] U.S. Department of the Interior and U.S. Geological Survey. 2012. *Quality of Water from Crystalline Rock Aquifers in New England, New Jersey, and New York, 1995-2007*.

SB-1. There are USEPA and New Hampshire SMCLs of 500,000 µg/L for TDS. The TDS levels at SB-1, which range up to 250,000 µg/L, are well below the TDS SMCL of 500,000 µg/L.

OTHER INDICATOR ANALYTES

The CCR Rules for detection monitoring require analysis of boron, calcium, chloride, fluoride, pH, sulfate, and TDS (i.e., the Appendix III indicator analytes). If the SSIs were from CCR impacts to groundwater, then increases in TDS in SSI samples should be caused by increases in Appendix III analytes. Because Appendix III analytes, except chloride and to a lesser extent calcium, do not contribute substantially to the observed increases in TDS, the TDS increases are not consistent with CCR impacts to groundwater at SB-1.

TDS is a relatively general, non-targeted analysis that measures the amounts of inorganic salts and small amounts of dissolved organic matter present in the sample. TDS is a collective measure that includes the dissolved Appendix III indicator analytes boron, calcium, chloride, fluoride, and sulfate, as well as other dissolved constituents, such as sodium, alkalinity, magnesium, potassium, and silica. The laboratory method for TDS includes filtering the sample and evaporating the water so that residual solids from the sample can be measured; laboratory TDS measurements do not distinguish between individual analytes or constituents.

An analysis of Appendix III indicator analyte contributions to the TDS in SSI samples, shown in Exhibit 3, indicates that calcium and chloride are the only Appendix III indicators contributing to more than 15 percent of the TDS increases in SSI samples. Sulfate, which is the other major ion Appendix III indicator analyte, contributed 13 percent or less of the TDS increases. The remaining change in TDS is from parameters not included in CCR Appendix III detection monitoring analytes, such as magnesium, sodium, and alkalinity.

Exhibit 3: Analysis of Appendix III Analyte Contributions to Increased TDS in SSI Samples

		SB-1 April 2023	SB-1 August 2023
November 2019 Background Concentrations (µg/L)	Calcium	10,000	10,000
	Sulfate	13,000	13,000
	Boron	<50	<50
	Fluoride	<100	<100
	Chloride	64,000	64,000
	TDS	150,000	150,000
SSI Sample Concentrations (µg/L)	Calcium	18,000	19,000
	Sulfate	17,000	16,000
	Boron	130	83
	Fluoride	<100	<100
	Chloride	79,000	92,000
	TDS	180,000	250,000
Concentration Change (µg/L)	Calcium	+8,000	+9,000
	Sulfate	+4,000	+3,000
	Boron	~+80	~+33
	Fluoride	~0	~0
	Chloride	+15,000	+28,000

		SB-1 April 2023	SB-1 August 2023
	TDS	+30,000	+100,000
Percent of TDS Change	**Calcium**	+27%	+9.0%
	Sulfate	+13%	+3.0%
	Boron	~+0.27%	~+0.033%
	Fluoride	~0%	~0%
	Chloride	+50%	+28%

The November 2020 sampling event was selected for background comparison because it is a recent background sampling event with TDS values lower than the corresponding SSI samples.
"Percent of TDS Change" is calculated by dividing the change in analyte by the change in TDS.
"<" indicates the analyte was not detected at the indicated reporting limit.
"-" indicates the analyte was not tested for.
"~" indicates an estimated value based on non-detect concentrations. Where a non-detect is compared to a detect, the non-detect reporting limit is used for calculating concentration change.
Values are displayed to two significant figures.

Although chloride is included as an Appendix III indicator analyte, chloride is not a strong indicator for potential leachate impacts to groundwater for the Site. Chloride concentrations in groundwater may be affected by a variety of human activities. Off-site development upgradient of the Site, indicated on Figure 1, includes a gravel pit, vehicle storage lots, roadways, and commercial/industrial buildings. Road salting and subsurface wastewater discharge at these developed areas may result in the introduction of chloride-containing salts to groundwater. Sodium chloride and calcium chloride salt also may have been applied or may have been carried onto gravel roads via truck traffic around the Site through years of sand and gravel mining and landfill operations. In contrast to potentially strong chloride signatures for off-site and non-landfill activities, chloride concentrations in leachate collected at the Site typically contribute about 10 percent or less of leachate TDS. With such a weak chloride signature in leachate, increases in groundwater TDS associated with chloride are not an indicator of Site impacts.

Because Appendix III analytes, except chloride and to a lesser extent calcium, are not contributing substantially to the increased TDS in the SSI samples at SB-1, the TDS increases in the SSI samples are not consistent with CCR impacts to groundwater.

COMPARISON OF MAJOR ION SIGNATURES

Major ion chemistry was analyzed for in groundwater samples since July 2018. Leachate from the Site was also analyzed for major ion chemistry for four samples. These data for SB-1 are presented as plotted values in Figure 3. The major ion chemistry data show that SB-1 samples are consistently sodium-chloride water types, including the April 2023 and August 2023 samples that had calcium SSIs. The leachate is characterized as a [sodium calcium magnesium]–sulfate water type.

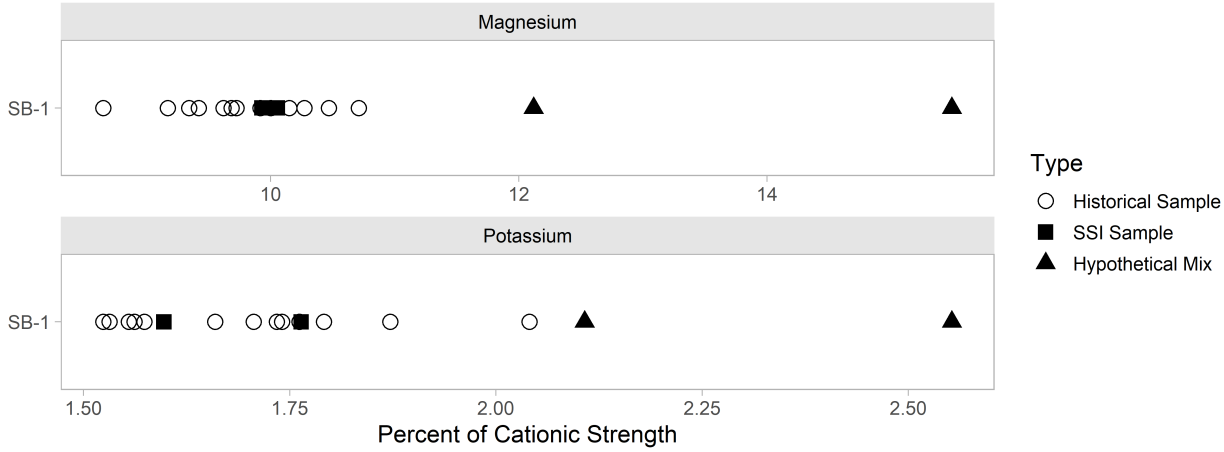
A calculated, hypothetical mixes of background (pre-SSI) samples and a leachate sample are also shown in Figure 3. The major ion chemistry for the "mix" samples are based on the SB-1 November 2020 background sample, which had relatively low TDS, and the April 2022 leachate sample, which has relatively high TDS. The ratio of background sample to leachate sample was adjusted so that the TDS concentration of the "mix" sample is equal to the TDS concentration

for the SB-1 April 2023 and August 2023 SSI samples. The "mix" samples represent hypothetical SSI groundwater samples if the increased TDS in SSI samples was caused by leachate impacts.

Sulfate is the predominant major anion in leachate and is not a predominant major anion in Site groundwater, so the hypothetical mix sample shows increased sulfate levels over the background groundwater samples. Because sulfate levels at SB-1, including the SSI samples, are consistently low and are not similar to the sulfate levels in the hypothetical mix samples, these data indicate the calcium SSI is not sourced from CCR leachate impacts to groundwater.

For cationic signatures, the leachate has more magnesium and potassium than Site groundwater. The magnesium and the potassium levels for historical data, the SSI data, and the hypothetical mix samples are shown in Exhibit 4. The SSI data is consistent with historical data and has overall lower magnesium and potassium levels. This pattern in the SSI data is not consistent with the mix samples, which show higher magnesium and potassium levels.

Exhibit 4: Magnesium and Potassium Signatures



Based on the contrasting ionic signatures between the hypothetical mix samples and the SSI samples, the mixing model results are not indicative of impacts from leachate.

CLOSING

Based on our understanding of the information presented herein, including the Site characteristics, natural variation of regional groundwater chemistry, and the groundwater flow and groundwater chemistry monitoring data, the April 2023 and August 2023 SB-1 calcium SSI is not sourced from the CCR unit.

Thank you for the opportunity to be of service to GSP Merrimack LLC. We look forward to continuing to work with you on this project.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Harrison R. Roakes, PE
Senior Project Manager

Julie S. Scott, TURP
Senior Vice President

HRR/JSS: hrr

Encl. Table 1 – Groundwater Analytical Results Summary
Table 2 – Groundwater Level Measurements Summary
Figure 1 – Locus Plan
Figure 2 – Facility Plan
Figure 3 – SB-1 Major Ion Signature
Attachment A – Qualified Professional Engineer Certification
Attachment B – Limitations

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Tables

TABLE 1
Groundwater Analytical Results Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Location	Date	Metals µg/L																Miscellaneous Parameters							
																						s.u	pCi/L		
		Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Silica	Selenium	Thallium	Chloride	Fluoride	Sulfate	Total Dissolved Solids	pH	Radium 226	Radium 228	Radium 226+228
Drinking Water MCL		6	5	2,000	4	NS	5	NS	100	NS	15*	NS	2	NS	NS	50	2	NS	4,000	NS	NS	NS	NS	NS	5
CCR Alt. Standards		NA	NA	NA	NA	NA	NA	NA	NA	6	15	40	NA	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW-1/(AGQS)		6 ‡	5 ‡	2,000 ‡	4 ‡	6,000 ‡	5 ‡	NS ‡	100	NS ‡	15 ‡	NS	2 ‡	NS	NS	50 ‡	2 ‡	NS	4,000	500,000	NS	NS	NS	NS	NS
GW-2		NA	NA	NA	NA	NA	NA	NS	NA	NS	NA	NS	NA	NS	NS	NA	NA	NS	†	†	NS	NS	NS	NS	NS
SB-1	2/24/2016	<1.0	<1.0	14	<1.0	60	<1.0	7,200	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	44,000	<100	8,000	96,000	5.21	0.2 ±0.1	0.6 ±0.6	0.8 ±0.6
	4/25/2016	<1.0	<1.0	18	<1.0	100	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	1.0		<1.0	<1.0	58,000	<100	9,000	120,000	5.72	0.5 ±0.2	0.2 ±0.4	0.7 ±0.4
	6/6/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	55,000	<100	7,000	140,000	5.52	0.6 ±0.3	0.2 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	16	<1.0	70	<1.0	8,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	60,000	<100	9,000	120,000	5.35	0.4 ±0.3	0.0 ±0.6	0.4 ±0.6
	8/30/2016	<1.0	<1.0	17	<1.0	<50	<1.0	7,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	49,000	<100	7,000	120,000	5.23	0.4 ±0.3	0.3 ±0.4	0.7 ±0.4
	10/17/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	60,000	<100	6,000	130,000	5.63	0.6 ±0.4	0.0 ±0.4	0.6 ±0.4
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	62,000	<100	6,000	88,000	5.63	1.0 ±0.4	0.8 ±0.5	1.8 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	56,000	<100	8,000	120,000	5.81	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					50		12,000										68,000	<100	8,000	120,000	5.70			
	1/31/2018 c							12,000																	
	4/9/2018					67		12,000										55,000	<100	10,000	160,000	5.90			
	7/25/2018 c							12,000										63,000		13,000	140,000	5.94			
	11/29/2018					87		13,000										66,000	<100	10,000	100,000	6.07			
	4/26/2019					100		13,000										55,000	<100	12,000	140,000	5.78			
	11/15/2019					59		11,000										68,000	<100	10,000	140,000	5.56			
	4/23/2020					70		14,000										53,000	<100	11,000	150,000	5.94			
	11/12/2020					<50		10,000										64,000	<100	13,000	150,000	5.36			
	2/4/2021 c							11,000										78,000		11,000	150,000	5.12			
	4/28/2021					78		14,000										62,000	<100	11,000	180,000	5.42			
	9/14/2021 c					58		13,000							14,000			69,000	<100	11,000	210,000	6.21			
	11/15/2021					<50		14,000							13,000			93,000	<100	9,600	220,000	4.99			
	4/11/2022					81		16,000										92,000	<100	12,000	240,000	5.75			
	11/14/2022					79		13,000										70,000	<100	15,000	190,000	5.36			
	2/13/2023 c							12,000										79,000		16,000	180,000	5.42			
	4/27/2023					130		18,000										79,000	<100	17,000	180,000	5.53			
	8/17/2023					83		19,000										92,000		16,000	250,000	5.70			
SB-4	2/23/2016	<1.0	<1.0	14	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	95,000	<100	9,000	210,000	5.49	0.3 ±0.1	1.0 ±0.6	1.3 ±0.6
	4/25/2016	<1.0	<1.0	14	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	110,000	<100	8,000	200,000	5.32	0.3 ±0.3	0.0 ±0.4	0.3 ±0.4
	6/6/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	110,000	<100	10,000	230,000	5.62	0.2 ±0.2	0.4 ±0.5	0.6 ±0.5
	7/18/2016	<1.0	<1.0	11	<1.0	<50	<1.0	7,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	11,000	220,000	5.27	0.4 ±0.3	0.4 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	10	<1.0	<50	<1.0	6,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	88,000	<100	12,000	210,000	5.72	0.2 ±0.2	0.0 ±0.4	0.2 ±0.4
	10/17/2016	<1.0	<1.0	12	<1.0	<50	<1.0	8,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	10,000	190,000	5.71	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/29/2016	<1.0	1.0	12	<1.0	<50	<1.0	7,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	10,000	180,000	5.79	0.7 ±0.3	0.5 ±0.5	1.2 ±0.5
	4/19/2017	<1.0	<1.0	19	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	120,000	<100	9,000	260,000	5.71	0.3 ±0.3	0.0 ±0.5	0.3 ±0.5
	11/17/2017					<50		10,000										77,000	<100	13,000	170,000	5.80			
	4/9/2018					<50		11,000										93,000	<100	12,000	220,000	5.87			
	7/25/2018 c							9,800										95,000		11,000	210,000	5.68			
	11/28/2018					<50		12,000										86,000	<100	13,000	83,000	6.28			
	4/26/2019					<50		13,000										94,000	<100	11,000	190,000	5.83			
	11/15/2019					53		11,000										97,000	<100	11,000	230,000	5.75			
	2/14/2020 c					<50		11,000										100,000		14,000	190,000	5.85			
	4/23/2020					55		13,000										140,000	<100	11,000	260,000	5.72			
	7/8/2020 c					57		11,000										99,000		14,000	240,000	5.59			
	11/12/2020					60		9,600										120,000	<100	18,000	260,000	5.18			
	2/4/2021 c					70		8,500										100,000		20,000	240,000	5.22			
	4/28/2021					65		11,000										100,000	<100	16,000	230,000	5.71			
	11/15/2021					<50		11,000							12,000			130,000	<100	12,000	290,000	5.16			
	4/11/2022					55		13,000										110,000	<100	20,000	250,000	5.68			
	11/14/2022					<50		14,000										150,000	<100	9,700	320,000	5.46			
	2/13/2023 c							10,000										140,000		11,000	250,000	5.49			
	4/27/2023					<50		6,600										99,000	<100	12,000	190,000	5.29			
SB-6	2/23/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	80,000	<100	10,000	170,000	5.55	0.1 ±0.07	0.5 ±0.5	0.6 ±0.5
	4/25/2016	<1.0	<1.0	16	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	7,000	220,000	5.55	0.4 ±0.3	0.0 ±0.4	0.4 ±0.4
	6/6/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	8,000	270,000	5.40	0.5 ±0.3	0.0 ±0.5	0.5 ±0.5
	7/18/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,200	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	9,000	260,000	5.27	0.5 ±0.3	0.3 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	9,000	280,000	5.71	0.4 ±0.2	0.0 ±0.4	0.4 ±0.4
	10/17/2016	<1.0	<1.0	18	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	150,000	<100	8,000	260,000	5.78	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	8,100	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	130,000	<100	9,000	230,000	5.77	0.5 ±0.2	0.8 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	13	<1.1	<51	<1.1	7,400	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	100,000	<100	9,000	190,000	5.68	0.4 ±0.3	0.2 ±0.5	0.6 ±0.5
	11/17/2017					<50		9,900										130,000	<100	11,000	230,000	5.60			
	4/9/2018					<50		7,900										120,000	<100	9,500	240,000	5.57			
	7/25/2018 c							11,000										180,000		12,000	310,000	5.44			
	11/28/2018					<50		11,000										150,000	<100	11,000	140,000	5.86			
	4/26/2019					84		13,000										150,000	<100	14,000	210,000	5.78			
	7/11/2019 c					80		14,000										170,000		15,000	330,000	5.84			
	11/15/2019					52		10,000										140,000	<100	13,000	280,000	5.75			
	2/14/2020 c					<50		5,100										79,000		15,000	130,000	5.73			
	4/23/2020					<50		12,000										160,000	<100	8,100	270,000	5.56			
	11/12/2020					<50		12,000										180,000	<100	9,600	330,000	5.37			
	4/28/2021					<50		11,000										150,000	<100	6,700	290,000	5.58			
	11/15/2021					<50		12,000							12,000			200,000	<100	8,800	370,000	5.27			
	4/11/2022					<50		10,000										170,000	<100	9,400	330,000	5.80			
	11/14/2022					<50		6,800										110,000	<100	11,000	240,000	5.53			
	4/27/2023					<50		12,000										140,000	<100	7,900	250,000	5.03			
SB-13	2/23/2016	<1.0	<1.0	17	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	160,000	<100	6,000	270,000	5.34	0.6 ±0.1	0.3 ±0.6	0.9±0.6
	4/25/2016	<1.0	<1.0	17	<1.0	<50	<1.0	8,800	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	160,000	<100	7,000	290,000	5.48	0.4 ±0.3	0.1 ±0.4	0.5 ±0.4
	6/6/2016	<1.0	<1.0	20	<1.0	<50	<1.0	9,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	170,000	<100	7,000	320,000	5.50	0.8 ±0.3	0.0 ±0.5	0.8 ±0.5
	7/18/2016	<1.0	<1.0	18	<1.0	<50	<1.0	9,700	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	160,000	<100	8,000	330,000	5.27	0.8 ±0.3	0.0 ±0.6	0.8 ±0.6
	8/30/2016	<1.0	1.0	20	<1.0	<50	<1.0	8,100	2.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	150,000	<100	8,000	270,000	5.35	0.8 ±0.3	0.6 ±0.4	1.4 ±0.4
	10/17/2016	<1.0	<1.0	15	<1.0	<50	<1.0	8,800	2.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	150,000	<100	8,000	260,000	5.06	0.7 ±0.4	0.6 ±0.5	1.3 ±0.5
	11/29/2016	<1.0	<1.0	16	<1.0	<50	<1.0	7,400	1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	140,000	<100	8,000	240,000	5.71	0.6 ±0.3	0.7 ±0.5	1.3 ±0.5
	4/19/2017	<1.0	<1.0	16	<1.1	<51	<1.1	8,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	130,000	<100	8,000	270,000	5.56	0.9 ±0.3	0.3 ±0.5	1.2 ±0.5
	11/17/2017					<50		7,000										110,000	<100	9,000	220,000	5.80			
	4/9/2018					<50		11,000										170,000	<100	8,000	330,000	5.81			
	7/25/2018 c							10,000										190,000		8,700	340,000	5.69			
	11/28/2018					<50		13,000										200,000	<100	7,200	260,000	5.77			
	4/26/2019					<50		14,000										200,000	<100	7,100	290,000	5.53			
	11/15/2019					<50		8,100										140,000	<100	8,100	280,000	5.82			
	4/23/2020					<50		14,000										230,000	<100	6,500	400,000	5.47			
	7/8/2020 c					<50		14,000										210,000		6,900	370,000	5.41			
	11/12/2020					<50		11,000										180,000	<100	8,000	330,000	4.96			
	2/4/2021 c					< 50		11,000										180,000		6,700	320,000	5.32			
	4/28/2021					<50		14,000										240,000	<100	5,900	410,000	5.31			
	11/15/2021					<50		11,000							12,000			200,000	<100	7,900	370,000	5.02			
	4/11/2022					<50		9,800										190,000	<100	9,700	360,000	5.47			
	11/14/2022					<50		7,700										150,000	<100	8,200	310,000	5.55			
	4/27/2023					<50		14,000										210,000	<100	6,200	430,000	5.01			
SB-14	2/24/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,100	<1.0	<1.0	<1.0	<1,000	<0.10	<1.0		<1.0	<1.0	16,000	<100	4,000	56,000	5.05	0.2 ±0.08	0.0 ±0.5	0.2 ±0.5
	4/25/2016	<1.0	<1.0	9.0	<1.0	<50	<1.0	11,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	58,000	<100	3,000	140,000	5.62	0.8 ±0.5	0.2 ±0.1	1.0 ±0.5
	6/6/2016	<1.0	<1.0	6.0	<1.0	<50	<1.0	7,600	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	32,000	<100	4,000	100,000	5.39	0.5 ±0.2	0.2 ±0.5	0.7 ±0.5
	7/18/2016	<1.0	<1.0	3.0	<1.0	<50	<1.0	6,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	21,000	<100	5,000	68,000	5.31	0.2 ±0.2	0.3 ±0.5	0.5 ±0.5
	8/30/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	5,300	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	14,000	<100	4,000	71,000	5.81	0.4 ±0.3	0.4 ±0.5	0.8 ±0.5
	10/17/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	4,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	11,000	<100	4,000	29,000	5.55	0.2 ±0.3	0.0 ±0.5	0.2 ±0.5
	11/29/2016	<1.0	<1.0	2.0	<1.0	<50	<1.0	2,900	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	7,000	<100	4,000	12,000	5.19	0.2 ±0.4	0.2 ±0.5	0.4 ±0.5
	4/19/2017	<1.0	<1.0	10	<1.0	<50	<1.0	10,000	<1.0	<1.0	<1.0	<100	<0.10	<1.0		<1.0	<1.0	56,000	<100	5,000	120,000	5.59	0.7 ±0.3	0.1 ±0.5	0.8 ±0.5
	11/17/2017					<50		8,000										18,000	<100	5,000	59,000	5.60			
	4/9/2018					<50		4,200										14,000	<100	8,400	80,000	5.76			
	7/25/2018 c							5,100										9,800		6,100	56,000	5.61			
	11/28/2018					<50		4,500										7,800	<100	6,300	<5,000	5.96			
	4/26/2019					<50		8,700										19,000	<100	3,700	91,000	5.74			
	11/15/2019					<50		5,000										12,000	<100	7,800	69,000	5.94			
	4/23/2020					<50		5,500										9,200	<100	5,500	52,000	5.63			
	11/12/2020					<50		4,000										4,700	<100	15,000	68,000	5.10			
	2/4/2021 c							7,900										34,000		6,000	95,000	5.30			
	4/28/2021					<50		3,300										4,000	<100	7,100	42,000	5.37			
	11/15/2021					<50		3,400							11,000			9,300	<100	16,000	64,000	5.55			
	4/11/2022					<50		4,400										12,000	<100	9,600	44,000	5.76			
	11/14/2022					<50		5,600										10,000	<100	18,000	72,000	5.74			
	2/13/2023 c							6,300										22,000		11,000	53,000	5.62			
	4/27/2023					<50		5,500										6,500	<100	7,400	59,000	5.12			

TABLE 1
Groundwater Analytical Results Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Notes:
1. Samples were collected by Eastern Analytical, Inc. (EAI) of Concord, New Hampshire on the dates indicated and analyzed by EAI for select metals by USEPA Method 6020. Additional analysis for select wet chemistry parameters were completed by EAI. Analysis for radium 226 and 228 was completed by KNL Environmental Testing, Inc., of Tampa, Florida. Analysis for lithium was completed by SGS Accutest, of Marlborough, Massachussets (Feb. 2016) and Katahdin Analytical Services, of Scarborough, Maine (April 2016 through October 2016).

2. Concentrations are presented in micrograms per liter (µg/L), which are equivalent to parts per billion (ppb), or they are presented in picoCuries per liter (pCi/L) or pH standard units.

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.
A blank indicates the sample was not analyzed for this parameter.

4. "GW-1" and "GW-2" Groundwater Standards are from the New Hampshire Department of Environmental Services (NHDES) Contaminated Sites Risk Characterization and Management Policy (RCMP) (January 1998, with 2000 through 2018 revisions/addenda). GW-1 Groundwater Standards are equivalent to the Ambient Groundwater Quality Standards (AGQSs) promulgated in Env-Or 600 (June 2015 with October 2016, September 2018, September 2019, May 2020, January 2021, and July 2021 amendments). The AGQS/GW-1 Groundwater Standards are intended to be protective of groundwater as a source of drinking water. The GW-2 Groundwater Standards apply to groundwater as a potential source of indoor air contamination.

5. "Drinking Water MCLs" are from the United States Environmental Protection Agency (EPA) website (accessed March 22, 2016). The Maximum Contaminant Level (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are enforceable standards for drinking water systems.
"CCR Alt. Standards" were codified in 40 CFR Part 257.95(h)(2) for cobalt, lead, lithium, and molybdenum. These are alternative risk-based standards for the four constituents without MCLs that may require establishment of a groundwater protection standard under the coal combustion residuals (CCR) rules 40 CFR Part 257(h).

6. "*" indicates an MCL value is not currently available, and the listed value is an action level.
"†" indicates the RCMP lists the value as not currently available.
"‡" indicates the value provided is typically applied to field-filtered samples (i.e., dissolved analytes) for overburden monitoring wells.
"NA" indicates the RCMP lists the value as not applicable.
"NS" indicates the analyte is not listed in the RCMP or MCL list.
"c" indicates sample rounds collected as part of the retesting program for identifying statistically significant increases (SSIs).

TABLE 2
Groundwater Level Measurements Summary
Merrimack Station Coal Ash Landfill
Bow, New Hampshire

Date	Depths and elevations in feet.																
	SB-1			SB-4			SB-6			SB-13			SB-14			Inferred General Groundwater Flow Rate (feet/day)	Inferred General Groundwater Flow Direction
	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation	Reference Elevation	Depth to Water	Water Elevation		
Feb-16	240.85	33.82	207.03	274.26	67.36	206.90	268.77	61.84	206.93	219.86	11.83	208.03	242.70	34.88	207.82	0.5 - 2.7	Northeast
Apr-16	240.85	32.19	208.66	274.26	65.63	208.63	268.77	60.07	208.70	219.86	10.16	209.70	242.70	33.13	209.57	0.5 - 2.5	Northeast
Jun-16	240.85	31.84	209.01	274.26	66.24	208.02	268.77	60.80	207.97	219.86	11.11	208.75	242.70	33.93	208.77	0.4 - 1.9	East
Jul-16	240.85	33.88	206.97	274.26	67.30	206.96	268.77	62.07	206.70	219.86	12.41	207.45	242.70	35.10	207.60	0.4 - 1.9	Northeast
Aug-16	240.85	35.09	205.76	274.26	68.54	205.72	268.77	63.19	205.58	219.86	13.76	206.10	242.70	36.39	206.31	0.3 - 1.4	Northeast
Oct-16	240.85	36.20	204.65	274.26	69.68	204.58	268.77	64.42	204.35	219.86	13.92	205.94	242.70	37.58	205.12	0.8 - 3.9	North-Northeast
Nov-16	240.85	36.40	204.45	274.26	69.93	204.33	268.77	64.69	204.08	219.86	15.14	204.72	242.70	37.80	204.90	0.3 - 1.6	East-Northeast
Apr-17	240.85	32.27	208.58	274.26	65.82	208.44	268.77	60.04	208.73	219.86	9.58	210.28	242.70	32.99	209.71	0.8 - 3.8	North-Northeast
Nov-17	240.85	32.87	207.98	274.26	66.39	207.87	268.77	60.97	207.80	219.86	11.33	208.53	242.70	34.08	208.62	0.4 - 1.8	Northeast
Apr-18	240.85	31.13	209.72	274.26	64.58	209.68	268.77	58.93	209.84	219.86	8.74	211.12	242.70	31.94	210.76	0.6 - 3.2	North-Northeast
Jul-18	240.85	32.60	208.25	274.26	66.01	208.25	268.77	60.84	207.93	219.86	11.13	208.73	242.70	33.78	208.92	0.4 - 2.0	Northeast
Nov-18	240.85	29.99	210.86	274.26	63.59	210.67	268.77	57.92	210.85	219.86	7.66	212.20	242.70	30.82	211.88	0.7 - 3.3	Northeast
Apr-19	240.85	29.83	211.02	274.26	63.34	210.92	268.77	57.60	211.17	219.86	7.51	212.35	242.70	30.72	211.98	0.6 - 2.9	North-Northeast
Jul-19	–	–	–	–	–	–	268.77	58.71	210.06	–	–	–	–	–	–	–	–
Nov-19	240.85	34.48	206.37	274.26	67.96	206.30	268.77	62.66	206.11	219.86	13.21	206.65	242.70	35.85	206.85	0.3 - 1.3	East-Northeast
Feb-20	–	–	–	274.26	66.67	207.59	268.77	61.12	207.65	–	–	–	–	–	–	–	–
Apr-20	240.85	31.84	209.01	274.26	65.34	208.92	268.77	59.73	209.04	219.86	9.62	210.24	242.70	32.75	209.95	0.6 - 3.0	North-Northeast
Jul-20	–	–	–	274.26	66.00	208.26	–	–	–	219.86	11.00	208.86	–	–	–	–	–
Nov-20	240.85	35.72	205.13	274.26	69.23	205.03	268.77	63.92	204.85	219.86	14.48	205.38	242.70	37.09	205.61	0.3 - 1.3	East-Northeast
Feb-21	240.85	33.85	207.00	274.26	67.36	206.90	–	–	–	219.86	12.12	207.74	242.70	34.88	207.82	–	–
Apr-21	240.85	33.37	207.48	274.26	66.88	207.38	268.77	61.31	207.46	219.86	11.43	208.43	242.70	34.38	208.32	0.5 - 2.4	Northeast
Sep-21	240.85	31.11	209.74	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nov-21	240.85	31.65	209.20	274.26	65.17	209.09	268.77	59.72	209.05	219.86	10.04	209.82	242.70	32.78	209.92	0.4 - 1.9	Northeast
Apr-22	240.85	31.10	209.75	274.26	64.61	209.65	268.77	59.12	209.65	219.86	9.22	210.64	242.70	32.05	210.65	0.5 - 2.5	Northeast
Nov-22	240.85	35.06	205.79	274.26	68.62	205.64	268.77	63.27	205.50	219.86	13.80	206.06	242.70	36.46	206.24	0.3 - 1.4	East-Northeast
Feb-23	240.85	32.98	207.87	274.26	66.50	207.76	–	–	–	–	–	–	242.70	33.99	208.71	–	–
Apr-23	240.85	31.02	209.83	274.26	64.51	209.75	268.77	59.08	209.69	219.86	8.94	210.92	242.70	31.94	210.76	0.6 - 3.0	Northeast
Aug-23	240.85	30.47	210.38	–	–	–	–	–	–	–	–	–	–	–	–	–	–

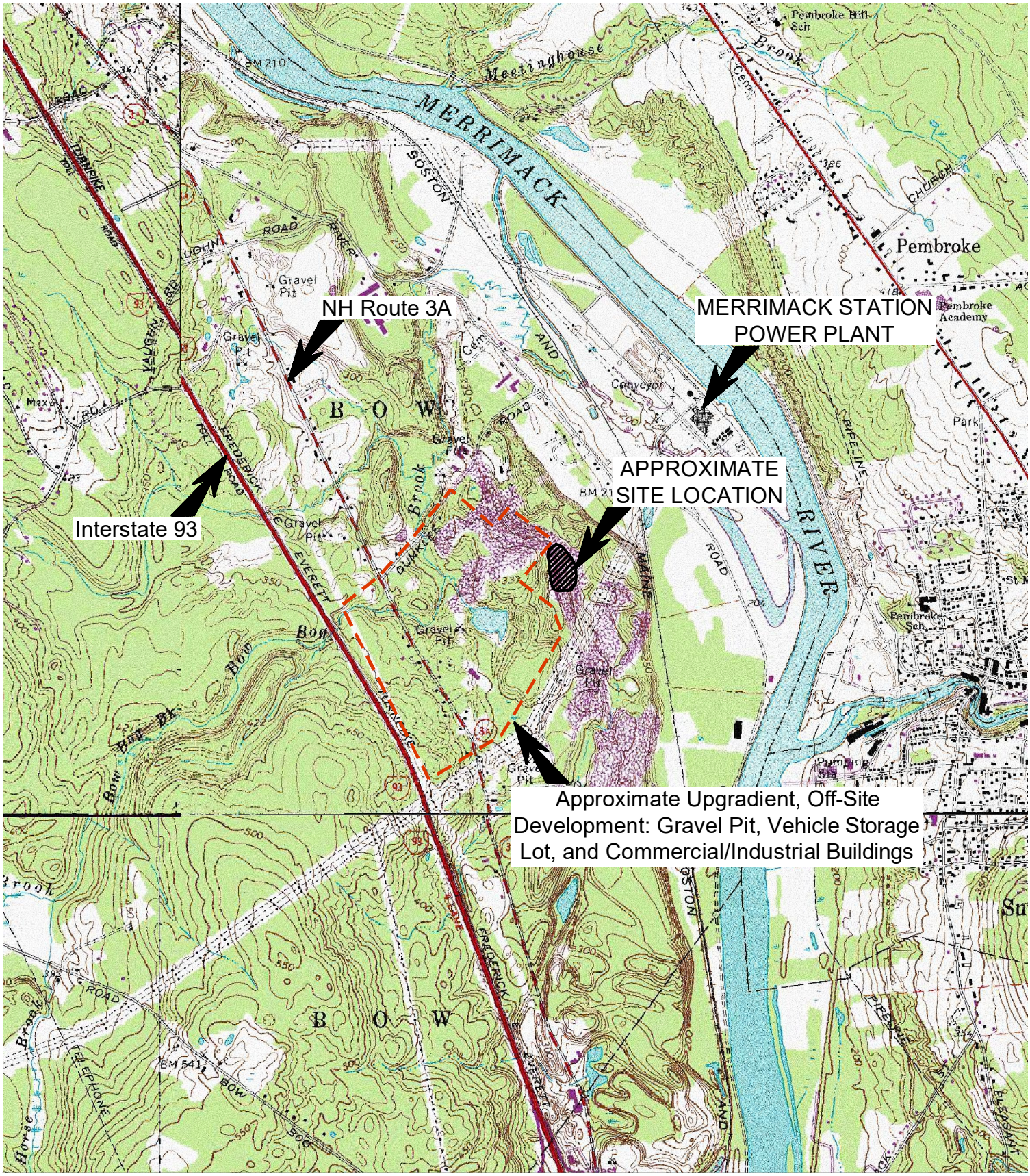
Notes:

1. Depths to water were obtained from information provided in laboratory reports and field sampling sheets prepared by Eastern Analytical, Inc.

2. Inferred general groundwater flow rates and flow directions are approximate and are based on the limited hydrogeologic and groundwater elevation data available. Other interpretations are possible and actual conditions may vary from those indicated. Note that groundwater elevations, directions, and rates may change due to seasonal or other variations in temperature, precipitation, runoff, or other factors.

3. Approximate groundwater flow rates were calculated using an assumed saturated hydraulic conductivity of 100 to 500 feet per day, and an assumed porosity of 39%. Assumptions are consistent with values typical of medium-grained, clean sand. The calculated groundwater flow rate is equivalent to the average interstitial velocity or the seepage velocity.

Figures



NOTES:

BASE MAP TAKEN FROM 7.5 MINUTE
USGS QUADRANGLE MAP:
BOW, NEW HAMPSHIRE 1967
(PHOTO REVISED 1998)

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: E. Steinhauser
Project No: 2025.13
Date: November 2022

1000 0 2000 Feet

SANBORN HEAD

Figure 1
Locus Plan

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Figure 2

Facility Plan

Merrimack Station
Coal Ash Landfill
Bow, New Hampshire

Drawn By: D. Dombrowsky
Designed By: H. Roakes
Reviewed By: E. Steinhauser
Project No: 2025.13
Date: November 2022

Notes

1. The base map was developed from a drawing prepared by Public Service Company of New Hampshire's Engineering Division entitled, "Area Plan, Merrimack Station, Bow, N.H." The drawing was dated 5/1/90 and was last revised on 6/28/95.

2. The location of the landfill and the site features shown should be considered approximate.

Legend

- SB-4 — Monitoring Well
- Right-Of-Way
- Fence
- OU — Overhead Utilities
- 250 — Elevation Contour

SB-4
SB-6
SB-1
SB-13
SB-14

MERRIMACK STATION
LINED COAL ASH
LANDFILL

LEACHATE
COLLECTION TANKS

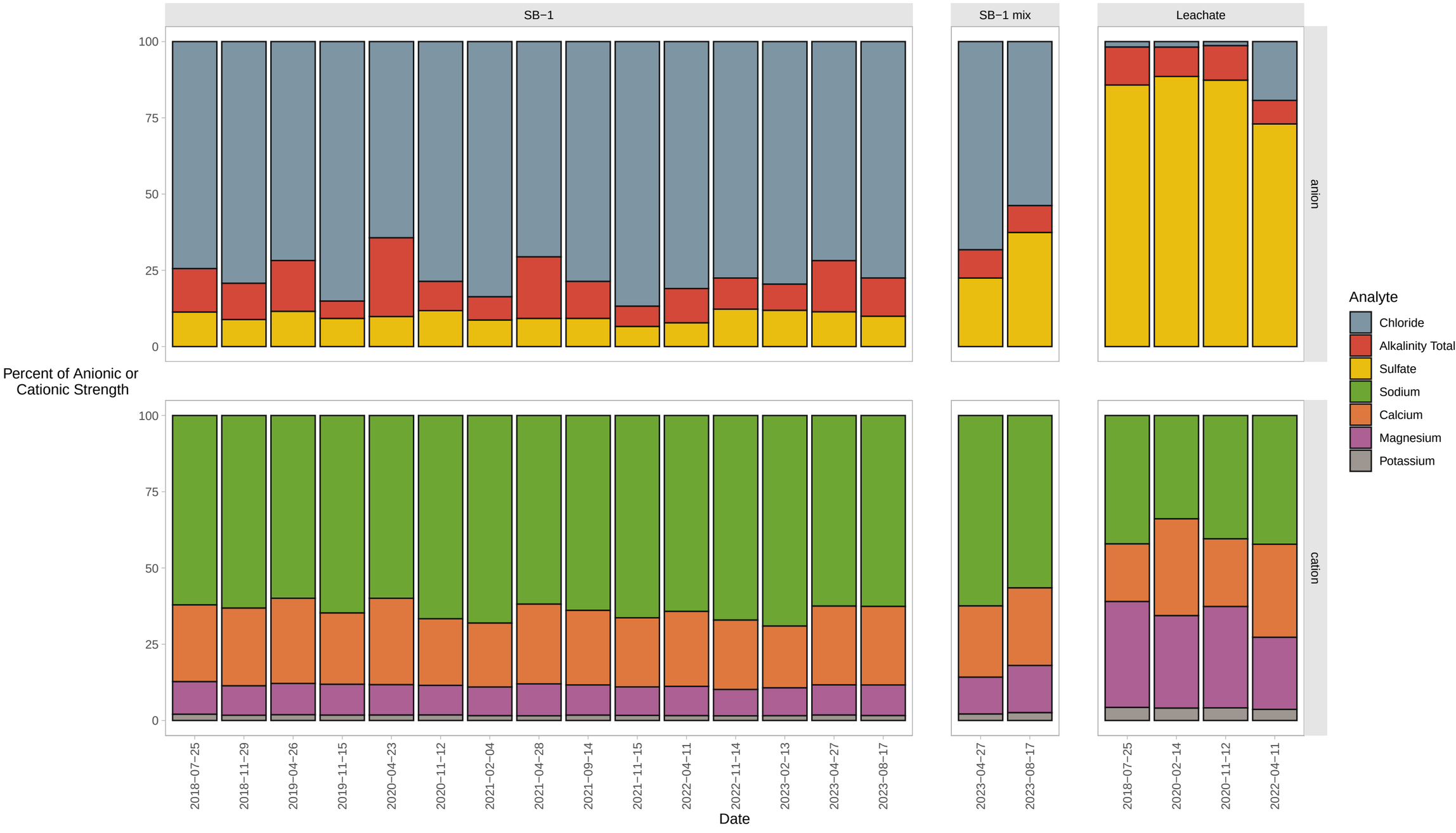
150' 75' 0 150' 300' Feet

SANBORN HEAD

File P:\2000s\2025.13\Graphics Files\CAD\2022 November Report\Nov 22 Facility Plan Fig.dwg Plot Date: 10-27-22

Figure 3 − SB−1 Major Ion Signature

Samples With Project−Specific Major Ion List Analyzed



Notes:

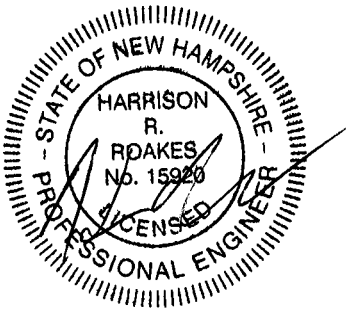
Only samples with analysis of project−specific major ions are plotted.
The hypothetical mix sample is based on the SSI sample, the selected background sample, and the April 11, 2022, leachate sample.
See text for additional assumptions and details.

Attachment A

Qualified Professional Engineer Certification

ATTACHMENT A
QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I certify that the information in this alternative source demonstration (ASD) report, dated November 28, 2023 (the "Report"), is accurate, subject to the assumptions and limitations contained within the Report. The ASD report was prepared by Sanborn, Head & Associates, Inc. for the Merrimack Station Coal Ash Landfill site located in Bow, New Hampshire.



Harrison R. Roakes
Printed Name of Licensed Professional Engineer

Signature

15920	New Hampshire	11/28/2023
License Number	Licensing State	Date

Attachment B

Limitations

ATTACHMENT B
LIMITATIONS

1. The conclusions and recommendations described in this report are based in part on the data obtained from a limited number of groundwater samples from widely-spaced monitoring locations. The monitoring locations indicate conditions only at the specific locations and times, and only to the depths sampled. They do not necessarily reflect variations that may exist between such locations, and the nature and extent of variations between these monitoring locations may not become evident until further study or remediation is initiated. The validity of the conclusions is based in part on assumptions Sanborn Head has made about conditions at the site. If conditions different from those described become evident, it will be necessary to re-evaluate the conclusions of this report.
2. Water level measurements were made in the monitoring well locations at times and under conditions stated within the report. Fluctuations in the levels of the groundwater may occur due to variations in precipitation and other factors not evident at the time measurements were made.
3. Quantitative laboratory analyses were performed as noted within the report. Additional analytes not searched for during the current study may be present in groundwater at the site. Sanborn Head has relied upon the data provided by the analytical laboratory and did not conduct an independent evaluation of the reliability of these data. Additionally, variations in the types and concentrations of analytes and variations in their distributions within the groundwater may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.
4. Quantitative laboratory analyses were performed as noted within the report. Additional analytes not searched for during the current study may be present in groundwater at the site. Sanborn Head has relied upon the data provided by the analytical laboratory and did not conduct an independent evaluation of the reliability of these data. Additionally, variations in the types and concentrations of analytes and variations in their distributions within the groundwater may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.
5. This report was prepared for the exclusive use of GSP Merrimack LLC (GSP) for specific application for 40 CFR Part 257.90 compliance for GSP's Merrimack Station Coal Ash landfill in Bow, New Hampshire, and was prepared in accordance with generally-accepted hydrogeologic practices. No warranty, express or implied, is made.

Appendix C

Laboratory Reports

Eastern Analytical, Inc.
professional laboratory and drilling services

Allan Palmer
Granite Shore Power
431 River Road
Bow , NH 03304

Laboratory Report for:

Eastern Analytical, Inc. ID:	256015
Client Identification:	Merrimack Station - Coal Ash
Date Received:	2/13/2023
Report revision/reissue:	Revision, replaces report dated 2/27/2023.
Revision information:	This report has been amended to include updated wet chemistry results.

Enclosed are the analytical results per the Chain of Custody for sample(s) in the referenced project. All analyses were performed in accordance with our QA/QC Program, NELAP and other applicable state requirements. All quality control criteria was within acceptance criteria unless noted on the report pages. Results are for the exclusive use of the client named on this report and will not be released to a third party without consent.

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the written approval of the laboratory.

The following standard abbreviations and conventions apply to all EAI reports:
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Certifications:
Eastern Analytical, Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269), Vermont (VT1012), New York (12072) and West Virginia (9910C). Please refer to our website at www.easternanalytical.com for a copy of our certificates and accredited parameters.

References:
- EPA 600/4-79-020, 1983
- Standard Methods for Examination of Water and Wastewater, 20th, 21st, 22nd & 23rd edition or noted revision year.
- Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
- Hach Water Analysis Handbook, 4th edition, 1992

If you have any questions regarding the results contained within, please feel free to contact customer service. Unless otherwise requested, we will dispose of the sample(s) 6 weeks from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director — Date: 2.28.23

SAMPLE CONDITIONS PAGE

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Temperature upon receipt (°C): 2.1 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date/Time Sampled		Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
256015.01	SB-1	2/13/23	2/13/23	12:40	aqueous		Adheres to Sample Acceptance Policy
256015.02	SB-4	2/13/23	2/13/23	10:25	aqueous		Adheres to Sample Acceptance Policy
256015.03	SB-14	2/13/23	2/13/23	11:39	aqueous		Adheres to Sample Acceptance Policy

All results contained in this report relate only to the above listed samples.

Unless otherwise noted:

- *Hold times, preservation, container types, and sample conditions adhered to EPA Protocol.*
- *Solid samples are reported on a dry weight basis, unless otherwise noted. pH/Corrosivity, Flashpoint, Ignitability, Paint Filter, Conductivity and Specific Gravity are always reported on an "as received" basis.*
- *Analysis of pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite were performed at the laboratory outside of the recommended 15 minute hold time.*
- *Samples collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures.*

LABORATORY REPORT

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-1

Lab Sample ID: 256015.01

Matrix: aqueous

Date Sampled: 2/13/23

Date Received: 2/13/23

			Analysis			
	RL	Units	Date	Time	Method	Analyst
Solids Dissolved **180**	10	mg/L	2/14/23	15:25	2540C-11	APH
Sulfate **16**	1	mg/L	2/13/23	15:31	300.0	ALM
Chloride **79**	1	mg/L	2/13/23	15:31	300.0	ALM
Alkalinity Total (CaCO3) **12**	1	mg/L	2/14/23	9:27	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-4

Lab Sample ID:	256015.02
Matrix:	aqueous
Date Sampled:	2/13/23
Date Received:	2/13/23

		Analytical Matrix	Units	Date of Analysis	Method	Analyst
Solids Dissolved	**250**	AqTot	mg/L	2/14/23	2540C-11	APH
Sulfate	**11**	AqTot	mg/L	2/13/23	300.0	ALM
Chloride	**140**	AqTot	mg/L	2/13/23	300.0	ALM
Alkalinity Total (CaCO3)	**13**	AqTot	mg/L	2/14/23	2320B-11	BAF

Sample ID: SB-14

Lab Sample ID:	256015.03
Matrix:	aqueous
Date Sampled:	2/13/23
Date Received:	2/13/23

		Analytical Matrix	Units	Date of Analysis	Method	Analyst
Solids Dissolved	**53**	AqTot	mg/L	2/14/23	2540C-11	APH
Sulfate	**11**	AqTot	mg/L	2/13/23	300.0	ALM
Chloride	**22**	AqTot	mg/L	2/13/23	300.0	ALM
Alkalinity Total (CaCO3)	**10**	AqTot	mg/L	2/14/23	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-1

Lab Sample ID: 256015.01
Matrix: aqueous
Date Sampled: 2/13/23
Date Received: 2/13/23

		RL	Analytical Matrix	Units	Analysis Date	Method	Analyst
Calcium	**12**	0.05	AqTot	mg/L	2/14/23	200.8	DS
Magnesium	**3.3**	0.05	AqTot	mg/L	2/14/23	200.8	DS
Potassium	**1.8**	0.05	AqTot	mg/L	2/14/23	200.8	DS
Sodium	**47**	0.5	AqTot	mg/L	2/14/23	200.8	DS

LABORATORY REPORT

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-4	SB-14							
Lab Sample ID:	256015.02	256015.03							
Matrix:	aqueous	aqueous							
Date Sampled:	2/13/23	2/13/23							
Date Received:	2/13/23	2/13/23							
			RL	**Analytical Matrix**	**Units**	**Analysis Date**	**Method**	**Analyst**	
Calcium	**10**	**6.3**	0.05	AqTot	mg/L	2/14/23	200.8	DS	
Magnesium	**2.7**	**1.8**	0.05	AqTot	mg/L	2/14/23	200.8	DS	
Potassium	**2.1**	**0.89**	0.05	AqTot	mg/L	2/14/23	200.8	DS	
Sodium	**90**	**15**	0.5	AqTot	mg/L	2/14/23	200.8	DS	

LABORATORY REPORT

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-1

Lab Sample ID: 256015.01

Matrix: aqueous

Date Sampled: 2/13/23

		Units	Date of Analysis	Method	Analyst
Static Water Level	**32.98**	ft	2/13/23	FieldStati	TNC
Field pH	**5.42**	SU	2/13/23	SM4500	TNC

LABORATORY REPORT

EAI ID#: **256015**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-4	SB-14				
Lab Sample ID:	256015.02	256015.03				
Matrix:	aqueous	aqueous				
Date Sampled:	2/13/23	2/13/23				
			Units	**Date of Analysis**	**Method**	**Analyst**
Static Water Level	**66.50**	**33.99**	ft	2/13/23	FieldStati	TNC
Field pH	**5.49**	**5.62**	SU	2/13/23	SM4500	TNC

CHAIN-OF-CUSTODY RECORD

eastern analytical
professional laboratory services

256015

aSampleID	Date/Time	aMatrix	Parameters	Sample Notes	# of containers
SB-1	2/13/2023 12:40	GW	Total Calcium, Magnesium, Potassium, Sodium, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity, SWL		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-4	2/13/2023 10:25	GW	Total Calcium, Magnesium, Potassium, Sodium, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity, SWL		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-14	2/13/2023 11:39	GW	Total Calcium, Magnesium, Potassium, Sodium, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity, SWL		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					

aClientID Merrimack Station - Coal Ash
nProjectID 3949 **nYearMonth** 2023.02
Client (Pro Mgr) Allan Palmer
Customer Granite Shore Power
Address 431 River Road
City Bow **NH** 03304
Phone 230-7997
Fax

Results Needed by: Preferred date _____
Notes about project

ReportingOptions
☒ HC ☐ NO FAX ☐ EDD Disk
☐ Fax ☐ No partial FAX ☒ EDD emai

PO# 9918
Quote# _____

Ice: Y☒ N☐ **Temperature** 2.1 °C

Samples Collected by: EAI F.S.-JL,AG

2-13-23/14:00
Relinquished by **Date/Time** **Received by**

Relinquished by **Date/Time** **Received by**

Eastern Analytical, Inc.

professional laboratory and drilling services

Allan Palmer
Granite Shore Power
431 River Road
Bow , NH 03304

Laboratory Report for:

Eastern Analytical, Inc. ID: 259356
Client Identification: Merrimack Station - Coal Ash
Date Received: 4/27/2023

Enclosed are the analytical results per the Chain of Custody for sample(s) in the referenced project. All analyses were performed in accordance with our QA/QC Program, NELAP and other applicable state requirements. All quality control criteria was within acceptance criteria unless noted on the report pages. Results are for the exclusive use of the client named on this report and will not be released to a third party without consent.

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%R : % Recovery

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References:

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- Standard Methods for Examination of Water and Wastewater, 20th, 21st, 22nd & 23rd edition or noted revision year.
- Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
- Hach Water Analysis Handbook, 4th edition, 1992
- ASTM International

If you have any questions regarding the results contained within, please feel free to contact customer service. Unless otherwise requested, we will dispose of the sample(s) 6 weeks from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director — 5.12.23 Date

SAMPLE CONDITIONS PAGE

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Temperature upon receipt (°C): 1.3 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date/Time Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
259356.01	SB-1	4/27/23	4/27/23 10:35	aqueous		Adheres to Sample Acceptance Policy
259356.02	SB-4	4/27/23	4/27/23 10:10	aqueous		Adheres to Sample Acceptance Policy
259356.03	SB-6	4/27/23	4/27/23 12:42	aqueous		Adheres to Sample Acceptance Policy
259356.04	SB-13	4/27/23	4/27/23 14:08	aqueous		Adheres to Sample Acceptance Policy
259356.05	SB-14	4/27/23	4/27/23 15:07	aqueous		Adheres to Sample Acceptance Policy

All results contained in this report relate only to the above listed samples.

Unless otherwise noted:

- *Hold times, preservation, container types, and sample conditions adhered to EPA Protocol.*
- *Solid samples are reported on a dry weight basis, unless otherwise noted. pH/Corrosivity, Flashpoint, Ignitability, Paint Filter, Conductivity and Specific Gravity are always reported on an "as received" basis.*
- *Analysis of pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite were performed at the laboratory outside of the recommended 15 minute hold time.*
- *Samples collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures.*

LABORATORY REPORT

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-1

Lab Sample ID: 259356.01
Matrix: aqueous
Date Sampled: 4/27/23
Date Received: 4/27/23

				Analysis			
		RL	Units	Date	Time	Method	Analyst
Solids Dissolved	**180**	10	mg/L	5/02/23	8:59	2540C-11	HEH
Fluoride	< 0.1	0.1	mg/L	5/01/23	20:19	300.0	ALM
Sulfate	**17**	1	mg/L	5/01/23	12:30	300.0	ALM
Chloride	**79**	1	mg/L	5/01/23	20:19	300.0	ALM
Alkalinity Total (CaCO3)	**26**	1	mg/L	5/04/23	8:51	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-4	SB-6	SB-13						
Lab Sample ID:	259356.02	259356.03	259356.04						
Matrix:	aqueous	aqueous	aqueous						
Date Sampled:	4/27/23	4/27/23	4/27/23						
Date Received:	4/27/23	4/27/23	4/27/23			Analysis			
				RL	**Units**	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**190**	**250**	**430**	10	mg/L	5/02/23	8:59	2540C-11	HEH
Fluoride	< 0.1	< 0.1	< 0.1	0.1	mg/L	5/01/23	20:34	300.0	ALM
Sulfate	**12**	**7.9**	**6.2**	1	mg/L	5/01/23	12:30	300.0	ALM
Chloride	**99**	**140**	**210**	5	mg/L	5/02/23	12:42	300.0	ALM
Alkalinity Total (CaCO3)	**17**	**11**	**8.2**	1	mg/L	5/04/23	8:51	2320B-11	BAF

Sample ID:	SB-14							
Lab Sample ID:	259356.05							
Matrix:	aqueous							
Date Sampled:	4/27/23							
Date Received:	4/27/23			Analysis				
		RL	**Units**	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**59**	10	mg/L	5/02/23	8:59	2540C-11	HEH
Fluoride	< 0.1	0.1	mg/L	5/01/23	22:29	300.0	ALM
Sulfate	**7.4**	1	mg/L	5/01/23	12:30	300.0	ALM
Chloride	**6.5**	1	mg/L	5/01/23	22:29	300.0	ALM
Alkalinity Total (CaCO3)	**16**	1	mg/L	5/04/23	8:51	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-1

Lab Sample ID: 259356.01
Matrix: aqueous
Date Sampled: 4/27/23
Date Received: 4/27/23

		RL	Analytical Matrix	Units	Analysis Date	Method	Analyst
Boron	**0.13**	0.05	AqTot	mg/L	5/04/23	200.8	DS
Calcium	**18**	0.05	AqTot	mg/L	5/04/23	200.8	DS
Magnesium	**4.2**	0.05	AqTot	mg/L	5/04/23	200.8	DS
Potassium	**2.4**	0.05	AqTot	mg/L	5/04/23	200.8	DS
Sodium	**50**	0.5	AqTot	mg/L	5/04/23	200.8	DS

LABORATORY REPORT

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID:	SB-4	SB-6	SB-13							
Lab Sample ID:	259356.02	259356.03	259356.04							
Matrix:	aqueous	aqueous	aqueous							
Date Sampled:	4/27/23	4/27/23	4/27/23							
Date Received:	4/27/23	4/27/23	4/27/23	**RL**	**Analytical Matrix**	**Units**	**Analysis Date**	**Method**	**Analyst**	
Boron	< 0.05	< 0.05	< 0.05	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Calcium	**6.6**	**12**	**14**	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Magnesium	**1.7**	**3.0**	**3.1**	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Potassium	**1.8**	**2.0**	**2.3**	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Sodium	**80**	**97**	**140**	0.5	AqTot	mg/L	5/04/23	200.8	DS	

Sample ID:	SB-14							
Lab Sample ID:	259356.05							
Matrix:	aqueous							
Date Sampled:	4/27/23							
Date Received:	4/27/23	**RL**	**Analytical Matrix**	**Units**	**Analysis Date**	**Method**	**Analyst**	
Boron	< 0.05	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Calcium	**5.5**	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Magnesium	**1.6**	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Potassium	**0.85**	0.05	AqTot	mg/L	5/04/23	200.8	DS	
Sodium	**7.3**	0.5	AqTot	mg/L	5/04/23	200.8	DS	

LABORATORY REPORT

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash**

Sample ID: SB-1

Lab Sample ID: 259356.01

Matrix: aqueous

Date Sampled: 4/27/23

		Units	Date of Analysis	Method	Analyst
Field pH	**5.53**	SU	4/27/23	SM4500	TNC

LABORATORY REPORT

EAI ID#: **259356**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash259356.059**

Sample ID:	SB-14					
Lab Sample ID:	259356.05					
Matrix:	aqueous					
Date Sampled:	4/27/23					
				Units	**Date of Analysis**	**Method**	**Analyst**
Field pH	**5.12**			SU	4/27/23	SM4500H	TNC

Sample ID:	SB-4	SB-6	SB-13				
Lab Sample ID:	259356.02	259356.03	259356.04				
Matrix:	aqueous	aqueous	aqueous				
Date Sampled:	4/27/23	4/27/23	4/27/23				
				Units	**Date of Analysis**	**Method**	**Analyst**
Field pH	**5.29**	**5.03**	**5.01**	SU	4/27/23	SM4500H	AJG

CHAIN-OF-CUSTODY RECORD

eastern analytical
professional laboratory services

259356

aSampleID	Date/Time	aMatrix	Parameters	Sample Notes	# of containers
SB-1	4/27/23 10:35	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL ~~HNO_3~~ H_2SO_4 NaOH MEOH $Na_2S_2O_3$ ICE					
SB-4	4/27/23 10:10	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL HNO_3 H_2SO_4 NaOH MEOH $Na_2S_2O_3$ ICE					
SB-6	4/27/23 12:42	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL HNO_3 H_2SO_4 NaOH MEOH $Na_2S_2O_3$ ICE					
SB-13	4/27/23 14:08	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL HNO_3 H_2SO_4 NaOH MEOH $Na_2S_2O_3$ ICE					
SB-14	4/27/23 15:07	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL HNO_3 H_2SO_4 NaOH MEOH $Na_2S_2O_3$ ICE					

aClientID Merrimack Station - Coal Ash
nProjectID 3949 **nYearMonth** 2023.04
Client (Pro Mgr) Allan Palmer
Customer Granite Shore Power
Address 431 River Road
City Bow **NH** 03304
Phone 230-7997
Fax

Results Needed by: Preferred date _____
Notes about project

ReportingOptions
☒ HC ☐ NO FAX ☐ EDD Disk
☐ Fax ☐ No partial FAX ☒ EDD emai

PO# _____
Quote# _____

Ice: Y☒ N☐ **Temperature** 1.3 °C

Samples Collected by: EAJ F.S.-JC, AG

Relinquished by	Date/Time	Received by
[signature]	4-27-23/16:00	BAF

Eastern Analytical, Inc.
professional laboratory and drilling services

Allan Palmer
Granite Shore Power
431 River Road
Bow , NH 03304

Laboratory Report for:

Eastern Analytical, Inc. ID: 265328
Client Identification: Merrimack Station - Coal Ash LF
Date Received: 8/17/2023

Enclosed are the analytical results per the Chain of Custody for sample(s) in the referenced project. All analyses were performed in accordance with our QA/QC Program, NELAP and other applicable state requirements. All quality control criteria was within acceptance criteria unless noted on the report pages. Results are for the exclusive use of the client named on this report and will not be released to a third party without consent.

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the written approval of the laboratory.

The following standard abbreviations and conventions apply to all EAI reports:
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Certifications:
Eastern Analytical, Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269), Vermont (VT1012), New York (12072) and West Virginia (9910C). Please refer to our website at www.easternanalytical.com for a copy of our certificates and accredited parameters.

References:
- EPA 600/4-79-020, 1983
- Standard Methods for Examination of Water and Wastewater, 20th, 21st, 22nd & 23rd edition or noted revision year.
- Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
- Hach Water Analysis Handbook, 4th edition, 1992
- ASTM International

If you have any questions regarding the results contained within, please feel free to contact customer service. Unless otherwise requested, we will dispose of the sample(s) 6 weeks from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director — 8.30.23 Date

SAMPLE CONDITIONS PAGE

EAI ID#: **265328**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Temperature upon receipt (°C): 2.4 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date/Time Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
265328.01	SB-1	8/17/23	8/17/23 10:13	aqueous		Adheres to Sample Acceptance Policy

All results contained in this report relate only to the above listed samples.

Unless otherwise noted:

- *Hold times, preservation, container types, and sample conditions adhered to EPA Protocol.*
- *Solid samples are reported on a dry weight basis, unless otherwise noted. pH/Corrosivity, Flashpoint, Ignitability, Paint Filter, Conductivity and Specific Gravity are always reported on an "as received" basis.*
- *Analysis of pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite were performed at the laboratory outside of the recommended 15 minute hold time.*
- *Samples collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures.*

LABORATORY REPORT

EAI ID#: **265328**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID: SB-1

Lab Sample ID: 265328.01
Matrix: aqueous
Date Sampled: 8/17/23
Date Received: 8/17/23

				Analysis			
		RL	Units	Date	Time	Method	Analyst
Solids Dissolved	**250**	10	mg/L	8/18/23	11:30	2540C-11	ABL
Sulfate	**16**	1	mg/L	8/23/23	13:12	300.0	MNT
Chloride	**92**	1	mg/L	8/18/23	9:45	4500ClE-11	ALM
Alkalinity Total (CaCO3)	**21**	1	mg/L	8/21/23	9:34	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **265328**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID: SB-1

Lab Sample ID: 265328.01
Matrix: aqueous
Date Sampled: 8/17/23
Date Received: 8/17/23

		RL	Analytical Matrix	Units	Analysis Date	Method	Analyst
Boron	**0.083**	0.05	AqTot	mg/L	8/18/23	200.8	DS
Calcium	**19**	0.05	AqTot	mg/L	8/18/23	200.8	DS
Magnesium	**4.5**	0.05	AqTot	mg/L	8/18/23	200.8	DS
Potassium	**2.3**	0.05	AqTot	mg/L	8/18/23	200.8	DS
Sodium	**53**	0.5	AqTot	mg/L	8/18/23	200.8	DS

LABORATORY REPORT

EAI ID#: **265328**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID:	SB-1
Lab Sample ID:	265328.01
Matrix:	aqueous
Date Sampled:	8/17/23

		Units	Date of Analysis	Method	Analyst
Field pH	**5.70**	SU	8/17/23	SM4500	TNC

CHAIN-OF-CUSTODY RECORD

eastern analytical
professional laboratory services

265328

aSampleID	Date/Time	aMatrix	Parameters	Sample Notes	# of containers
SB-1	8/17/23 1013	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4

preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)

aClientID Merrimack Station - Coal Ash
nProjectID 3949 nYearMonth 2023.08
Client (Pro Mgr) Allan Palmer
Customer Granite Shore Power
Address 431 River Road
City Bow NH 03304
Phone 230-7997
Fax

Results Needed by: Preferred date _____
Notes about project

ReportingOptions
☒ HC ☐ NO FAX ☐ EDD Disk
☐ Fax ☐ No partial FAX ☒ EDD emai

PO#_____
Quote# —
Ice: Y☐ N☐
Temperature 2.4 °C

Samples Collected by: EAI FS-TC

Relinquished by	Date/Time	Received by
[signature]	8/17/23 1130	BAF

Relinquished by	Date/Time	Received by

Eastern Analytical, Inc.
professional laboratory and drilling services

Allan Palmer
Granite Shore Power
431 River Road
Bow , NH 03304

Laboratory Report for:

Eastern Analytical, Inc. ID: 270232
Client Identification: Merrimack Station - Coal Ash LF
Date Received: 11/16/2023

Enclosed are the analytical results per the Chain of Custody for sample(s) in the referenced project. All analyses were performed in accordance with our QA/QC Program, NELAP and other applicable state requirements. All quality control criteria was within acceptance criteria unless noted on the report pages. Results are for the exclusive use of the client named on this report and will not be released to a third party without consent.

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the written approval of the laboratory.

The following standard abbreviations and conventions apply to all EAI reports:
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Certifications:
Eastern Analytical, Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269), Vermont (VT1012), New York (12072) and West Virginia (9910C). Please refer to our website at www.easternanalytical.com for a copy of our certificates and accredited parameters.

References:
- EPA 600/4-79-020, 1983
- Standard Methods for Examination of Water and Wastewater, 20th, 21st, 22nd & 23rd edition or noted revision year.
- Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
- Hach Water Analysis Handbook, 4th edition, 1992
- ASTM International

If you have any questions regarding the results contained within, please feel free to contact customer service. Unless otherwise requested, we will dispose of the sample(s) 6 weeks from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Jamie L. Smith for
Lorraine Olashaw, Lab Director

12.8.23
Date

SAMPLE CONDITIONS PAGE

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Temperature upon receipt (°C): 3.5 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date/Time Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
270232.01	SB-1	11/16/23	11/16/23 16:10	aqueous		Adheres to Sample Acceptance Policy
270232.02	SB-4	11/16/23	11/16/23 11:08	aqueous		Adheres to Sample Acceptance Policy
270232.03	SB-6	11/16/23	11/16/23 12:56	aqueous		Adheres to Sample Acceptance Policy
270232.04	SB-13	11/16/23	11/16/23 09:35	aqueous		Adheres to Sample Acceptance Policy
270232.05	SB-14	11/16/23	11/16/23 14:46	aqueous		Adheres to Sample Acceptance Policy

All results contained in this report relate only to the above listed samples.

Unless otherwise noted:

- *Hold times, preservation, container types, and sample conditions adhered to EPA Protocol.*
- *Solid samples are reported on a dry weight basis, unless otherwise noted. pH/Corrosivity, Flashpoint, Ignitability, Paint Filter, Conductivity and Specific Gravity are always reported on an "as received" basis.*
- *Analysis of pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite were performed at the laboratory outside of the recommended 15 minute hold time.*
- *Samples collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures.*

LABORATORY REPORT

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID: SB-1

Lab Sample ID: 270232.01
Matrix: aqueous
Date Sampled: 11/16/23
Date Received: 11/16/23

				Analysis			
		RL	Units	Date	Time	Method	Analyst
Solids Dissolved	**260**	10	mg/L	11/21/23	11:30	2540C-11	ABL
Fluoride	< 0.1	0.1	mg/L	11/21/23	4:22	300.0	MNT
Sulfate	**17**	1	mg/L	11/21/23	4:22	300.0	MNT
Chloride	**100**	10	mg/L	11/21/23	17:08	300.0	MNT
Alkalinity Total (CaCO3)	**12**	1	mg/L	11/21/23	9:27	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID:	SB-4	SB-6	SB-13			Analysis			
Lab Sample ID:	270232.02	270232.03	270232.04						
Matrix:	aqueous	aqueous	aqueous						
Date Sampled:	11/16/23	11/16/23	11/16/23						
Date Received:	11/16/23	11/16/23	11/16/23	**RL**	**Units**	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**210**	**220**	**190**	10	mg/L	11/21/23	11:30	2540C-11	ABL
Fluoride	< 0.1	< 0.1	< 0.1	0.1	mg/L	11/21/23	4:36	300.0	MNT
Sulfate	**15**	**11**	**11**	1	mg/L	11/21/23	4:51	300.0	MNT
Chloride	**91**	**110**	**94**	1	mg/L	11/21/23	4:36	300.0	MNT
Alkalinity Total (CaCO3)	**22**	**15**	**14**	1	mg/L	11/21/23	9:27	2320B-11	BAF

Sample ID:	SB-14				Analysis			
Lab Sample ID:	270232.05							
Matrix:	aqueous							
Date Sampled:	11/16/23							
Date Received:	11/16/23	**RL**	**Units**	**Date**	**Time**	**Method**	**Analyst**
Solids Dissolved	**91**	10	mg/L	11/21/23	11:30	2540C-11	ABL
Fluoride	< 0.1	0.1	mg/L	11/21/23	6:03	300.0	MNT
Sulfate	**22**	1	mg/L	11/21/23	6:03	300.0	MNT
Chloride	**18**	1	mg/L	11/21/23	6:03	300.0	MNT
Alkalinity Total (CaCO3)	**10**	1	mg/L	11/21/23	9:27	2320B-11	BAF

LABORATORY REPORT

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID: SB-1

Lab Sample ID: 270232.01
Matrix: aqueous
Date Sampled: 11/16/23
Date Received: 11/16/23

		RL	Analytical Matrix	Units	Analysis Date	Method	Analyst
Boron	**0.092**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Calcium	**17**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Magnesium	**3.9**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Potassium	**2.3**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Sodium	**55**	0.5	AqTot	mg/L	11/22/23	200.8	DS

LABORATORY REPORT

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID:	SB-4	SB-6	SB-13						
Lab Sample ID:	270232.02	270232.03	270232.04						
Matrix:	aqueous	aqueous	aqueous						
Date Sampled:	11/16/23	11/16/23	11/16/23						
Date Received:	11/16/23	11/16/23	11/16/23	**RL**	**Analytical Matrix**	**Units**	**Analysis Date**	**Method**	**Analyst**
Boron	< 0.05	< 0.05	< 0.05	0.05	AqTot	mg/L	11/22/23	200.8	DS
Calcium	**7.7**	**6.3**	**3.9**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Magnesium	**1.8**	**1.5**	**0.86**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Potassium	**1.7**	**1.6**	**1.3**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Sodium	**64**	**76**	**70**	0.5	AqTot	mg/L	11/22/23	200.8	DS

Sample ID:	SB-14							
Lab Sample ID:	270232.05							
Matrix:	aqueous							
Date Sampled:	11/16/23							
Date Received:	11/16/23	**RL**	**Analytical Matrix**	**Units**	**Analysis Date**	**Method**	**Analyst**
Boron	< 0.05	0.05	AqTot	mg/L	11/22/23	200.8	DS
Calcium	**4.9**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Magnesium	**1.3**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Potassium	**0.92**	0.05	AqTot	mg/L	11/22/23	200.8	DS
Sodium	**21**	0.5	AqTot	mg/L	11/22/23	200.8	DS

LABORATORY REPORT

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID: SB-1

Lab Sample ID: 270232.01

Matrix: aqueous

Date Sampled: 11/16/23

		Units	Date of Analysis	Method	Analyst
Field pH	**5.32**	SU	11/16/23	SM4500	AJG

LABORATORY REPORT

EAI ID#: **270232**

Client: **Granite Shore Power**

Client Designation: **Merrimack Station - Coal Ash LF**

Sample ID:	SB-4	SB-6	SB-13	SB-14				
Lab Sample ID:	270232.02	270232.03	270232.04	270232.05				
Matrix:	aqueous	aqueous	aqueous	aqueous				
Date Sampled:	11/16/23	11/16/23	11/16/23	11/16/23				
					Units	**Date of Analysis**	**Method**	**Analyst**
Field pH	**5.66**	**5.65**	**5.68**	**5.65**	SU	11/16/23	SM4500	AJG

CHAIN-OF-CUSTODY RECORD

eastern analytical
professional laboratory services

270232

1/1

aSampleID	Date/Time	aMatrix	Parameters	Sample Notes	# of containers
SB-1	11/16/23 16:10	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-4	11/16/23 11:08	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-6	11/16/23 12:56	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-13	11/16/23 09:35	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					
SB-14	11/16/23 14:46	GW	Total Boron, Calcium, Magnesium, Potassium, Sodium, Fluoride, Chloride, Sulfate, Field pH, Total Dissolved Solids, Total Alkalinity		4
preservative: HCL (HNO3) H_2SO_4 NaOH MEOH $Na_2S_2O_3$ (ICE)					

aClientID Merrimack Station - Coal Ash
nProjectID 3949 **nYearMonth** 2023.11
Client (Pro Mgr) Allan Palmer
Customer Granite Shore Power
Address 431 River Road
City Bow **NH** 03304
Phone 230-7997
Fax

Results Needed by: Preferred date _____

Notes about project

ReportingOptions
☒ HC ☐ NO FAX ☐ EDD Disk
☐ Fax ☐ No partial FAX ☒ EDD emai

PO# _____
Quote# _____

Ice: Y☐ N☐ **Temperature** 3.5 °C

Samples Collected by: EAI F.S. - AG

Relinquished by	Date/Time	Received by
[signature]	11-16-23/17:25	BAF
Relinquished by	**Date/Time**	**Received by**