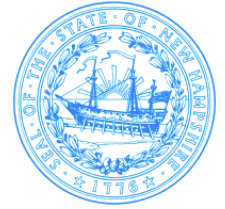




The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Robert R. Scott, Commissioner

EMAIL ONLY

November 7, 2023

John Gay
Casella Waste Management, Inc.
1855 VT Route 100
Hyde Park, VT 05655

Subject: Bethlehem - North Country Environmental Services (NCES) Landfill, 581 Trudeau Road, NHDES Site #198704033, Project #1737

2023 Summary of Water Quality Monitoring Results and Submittal of July 2023 Monitoring Results, prepared by Sanborn, Head & Associates, Inc. (SHA), dated August 24, 2023

Supplemental Site Investigation - Surface Water PFAS Sampling Data Transmittal, prepared by SHA, dated October 6, 2023

Dear John Gay:

The New Hampshire Department of Environmental Services (NHDES) has reviewed the above-referenced documents for the NCES Landfill, as submitted on your behalf by SHA. The Summary Report was prepared to comply with the ongoing monitoring and reporting requirements of the site Groundwater Management and Release Detection Permit GWP-198704033-B-008 (the Permit) and the Data Transmittal provides an update to the Supplemental Site Investigation (SSI) initiated to investigate groundwater impacts in the area of the B-304 wells as originally required in our February 17, 2021 letter.

Based on review of the most-recent Groundwater Release Detection Permit water quality data provided, we note that the monitoring results generally remain consistent with recent prior findings and indicate that the landfill liner system appears to be functioning properly. Results of Assessment Monitoring of past incidents and the ongoing SSI investigation within the Groundwater Management Zone (GMZ) for the former unlined landfill, which is monitored via the site's Groundwater Management Permit, have also been reviewed. Based on our review of the above submittals, we developed the comments that follow below. Comments requiring a response from Casella and/or SHA are summarized in ***bold/italicized font***.

As part of the ongoing SSI, additional sampling downgradient of the B-928 monitoring well couplet was required in NHDES' June 30, 2023 letter to define the downgradient extent of polyfluoroalkyl substances (PFAS) impacts and confirm the validity of the GMZ. Sampling and analysis of landfill leachate parameters, including PFAS, was required. PFAS analytical results were submitted in the October 6, 2023 SSI Data Transmittal with the remainder of the analytical data having been submitted with the August 24, 2023 Summary Report.

As discussed in the Data Transmittal, analytical results of surface water sampling conducted in August 2023 indicate detections of PFAS are limited to perfluorooctanoic acid (PFOA) at the S-101 seep and down-slope SF-1 locations, at concentrations of 3.05 nanograms per liter (ng/L) and 3.70 ng/L respectively. We note there are no surface water standards for PFOA at this time; however, for reference purposes, and as noted in the Data Transmittal, the Ambient Groundwater Quality Standard (AGQS) for PFOA is 12 ng/L. As discussed in SHA's submittal, analytical results from other surface water

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seep sampling locations did not indicate detections of PFAS above laboratory reporting limits; notably this includes the "Main Seep" S-1 location. NHDES' June 30, 2023 letter required sampling of five surface water locations S-108, S-109, S-1, S-101, and SF-1 to define the downgradient extent of PFAS impacts and confirm the validity of the GMZ; we note three additional surface water sampling locations along the Ammonoosuc River (AR-1, AR-2, and AR-3) were included in the above sampling program. The surface water samples collected up- and downstream of the facility from the Ammonoosuc River also did not indicate detectable concentrations of PFAS above laboratory reporting limits. The results of other parameters analyzed for from the river and surface water seep sample locations were generally consistent with recent monitoring results with no volatile organic compounds (VOCs) or 1,4-dioxane detected above laboratory reporting limits.

Within the GMZ for the former unlined landfill, the data presented in the Summary Report shows continued variability in PFAS concentrations at the B-304 and B-928 monitoring well couplets during the monitoring period, at times exceeding AGQS, with detected concentrations of PFOA at B-304DR increasing during the monitoring rounds. We note the available groundwater elevation data is suggestive of a downward vertical gradient, which appears to be evident in recent PFAS analytical data from the B-304 monitoring well couplet (e.g., increasing contaminant concentrations in the deeper well). We also note first time detections of perfluorooctane sulfonic acid (PFOS) and perfluorobutane sulfonic acid (PFBS) were noted at MW-604 below applicable AGQS during the July 2023 round. PFOA has been consistently detected at MW-604, at or below AGQS, since it was first analyzed for during a May 2021 sampling event. The total number and concentrations of PFAS detected at MW-604 have been generally consistent over time with a slight decrease in concentrations of total PFAS since July 2021. We note Condition #11 of the Permit requires PFAS analysis from the MW-604 monitoring well during the November sampling round.

Supplemental Site Investigation:

The surface water seeps, which have been interpreted to be an outward expression of groundwater at the site, and the river have been utilized as sampling points to monitor groundwater conditions in the downgradient regulatory extent of the GMZ for the former unlined landfill. Except for manganese, which has a long-term precedent and is analyzed as a total concentration (including dissolved and suspended solids), the surface water seeps do not indicate detected concentrations of contaminants above AGQS; and as such, the downgradient limits of the GMZ appear to be appropriately defined at this time. However, exceedances of AGQS, variability of the concentrations of detected impacts at the B-928 and B-304 monitoring well couplets and detected contaminant concentrations in samples from the monitoring well network within and adjacent to the GMZ (such as the B-927 triplet) require further investigation and evaluation. As discussed in previous correspondence, the presence of potential historical contaminant sources including the former unlined landfill, former and current leachate management infrastructure, and past landfill leachate releases contribute to the complexity of evaluating monitoring results in this portion of the site. Given the presence of the lined landfill, it is critical to continue to evaluate how potential historical sources and site infrastructure influence monitoring results to update the Conceptual Site Model that informs ongoing release detection monitoring of the lined landfill as required by Env Or-700.

In consideration of the above, please provide a work plan that includes the following:

1. An updated hydrogeologic evaluation of the northeastern portion of the site incorporating recent and historical data. The purpose would be to provide an updated understanding of the

hydrogeology of the area and better inform evaluation of the influence of past, present, and potential future impacts to groundwater in this portion of the site. The focus area should include the GMZ and areas adjacent to it, including monitoring wells such as the B-927 triplet and former B-914 couplet. The evaluation is to include updated geologic cross-sections incorporating data from newly installed or relocated monitoring wells with historic data and a compilation of current and former boring and monitoring well installation logs.

2. As noted earlier in the letter, an apparent downward gradient and increasing contaminant concentrations with depth have been noted at the B-304 couplet that raise the question of impacts potentially being transported downgradient in deep overburden groundwater that is not monitored nor has not been historically investigated at the site. As part of the work plan, please propose locations for deep monitoring wells to improve understanding of deep geologic strata, evaluate potential historical impacts, and to and improve the ability to monitor groundwater for release detection purposes from the lined landfill across the northeastern portion of the site. Pairing of deep monitoring wells with shallower existing well locations may be favorable for data collection but is not intended to be a requirement.
3. Provide a detailed evaluation on the influence of Pond #4 on groundwater, both hydrologically and chemically over the short-term and long-term. The following potential influences should be considered: 1) Groundwater mounding beneath the pond and the effects this may have on localized hydraulic head and contaminant fate and transport downgradient of the pond; 2) The potential for stormwater in the pond to contain contaminants and therefore contribute to the groundwater contaminant plume via discharge from the pond to the subsurface; and 3) The potential for stormwater in the pond to not contain contaminants and therefore dilute the groundwater contaminant plume via discharge from the pond to the subsurface.
4. The investigation should provide discussion and evaluation of former leachate and stormwater management infrastructure, operations and operational incidents, and past construction activities as potential source and/or influences on groundwater in the northeastern portion of the site. A timeline of construction activities and identified incidents should be compiled, mapped, and included with the submittal.

The above items have been identified by NHDES as required to inform the Conceptual Site Model but are not intended to limit the potential updates to it. If additional lines of investigation or data are identified by SHA that could also improve the Conceptual Site Model they should be proposed as part of the work plan. ***Please provide a work plan to inform/update the Conceptual Site Model within 90 days of the date of this letter.***

Assessment Monitoring:

Detected concentrations of PFAS and other landfill leachate indicator parameters at MW-701 and B-918M indicate generally stable or decreasing concentrations and trends over time. Based on the monitoring well locations and analytical results, the groundwater impacts are generally consistent with residual impacts from previously identified and corrected leachate management issues and do not appear indicative of a new release from the landfill. NHDES notes manganese was detected at MW-701 at concentrations above AGQS throughout the reporting period, although concentrations decreased during the July 2023 round. We also note 1,4-dioxane was detected, for the first time since April 2019, at a concentration equal to the laboratory reporting limit of 0.25 micrograms per liter (ug/L) during the July 2023 round. Assessment monitoring at MW-701 and B-918M is required to continue on a quarterly basis

to continue to track detected impacts and confirm the current trends. Sampling and analysis of PFAS, NHDES Waste Management Division Full List of Analytes for volatile organics, 1,4-dioxane (using a 0.25 ug/L reporting limit), specific conductance @25°C, pH, temperature, and turbidity, nitrate, sulfate, Total Kjeldahl Nitrogen (TKN), chloride, iron, and manganese is required. NHDES notes if increasing trends of landfill leachate indicator parameters are noted, additional investigation and/or expanded monitoring may be required.

Other Reporting Comments:

Analytical results from the river and surface water seep monitoring locations have historically been compared to AGQS to evaluate the extent of upgradient groundwater impacts. However, surface water standards should also be evaluated and presented on the surface water analytical tables for applicable analytes. ***Please include surface water standards on surface water analytical result tables as part of future report submittals.***

As discussed above, manganese has been detected above the current AGQS at some surface water seep locations historically. Although appropriate for surface water sampling per the Permit, we note manganese has been analyzed as a total concentration. To allow for more direct comparison of seep samples to upgradient groundwater results, which are analyzed and reported as dissolved concentrations, metals analysis of the seep monitoring locations for both total and dissolved concentrations should be considered with an evaluation of the potential long-term inclusion of both analyses in the Permit monitoring schedule. ***Please provide recommendations for a round or rounds of dissolved metals analysis at the surface water seep monitoring locations with the next Permit submittal.***

We note surface water seeps have been included on some geologic cross-sections as the surficial expression of groundwater along the river slope. The seeps do not appear to have been included in calculating groundwater contours historically. ***Please evaluate incorporating surface water seep elevations into the generation of groundwater contour plans for future reporting.***

Should you have any questions, please contact me at NHDES' Waste Management Division.

Sincerely,



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