March 22, 2024

BCM Environmental and Land Law, PLLC
3 Maple Street
Concord, New Hampshire 03301

Attn: Amy Manzelli, Esq.

SUBJECT: Hydrogeological Opinion
Release Events at the NCES Landfill Site
Bethlehem, New Hampshire

Dear Attorney Manzelli,

Calex Environmental, LLC (Calex) was asked by North Country Alliance for Balanced Change (NCABC) for an opinion regarding whether the North Country Environmental Services (NCES) Landfill Site (Site) in Bethlehem, New Hampshire has in the past or is currently experiencing releases due to its landfilling activities. Of particular concern to NCABC is the potential source(s) of per- and polyfluoroalkyl substances (PFAS) that have been detected in groundwater monitoring wells downgradient of the operating NCES solid waste landfill and in surface water seeps entering the Ammonoosuc River. In addition, NCABC asked whether the detected PFAS at the Site is likely originating (solely) from leachate released from the historical Sanco landfill (excavated in the early 1990's and placed into Stage I, Phase I of the double lined NCES Landfill) or whether (all/some of) the PFAS could have originated from the current, active landfill operations. The consultant for the operating NCES Landfill Site, Sanborn Head and Associates (SHA) has recently opined (October 6, 2023) that the PFAS originates from the historical Sanco landfill that ceased operations in 1987.

In its evaluation of these questions, Calex reviewed the history of the NCES Landfill Site and focused on the most recent groundwater data as reported by SHA in "July 2023 Tri-Annual/2023 Annual Water Quality Monitoring Results" dated August 24, 2023, referred to as the 'Report' in this Opinion. For ease of following the discussion and referring to the appropriate Report page(s), the numbering refers to the entire 483-page PDF e.g., pg. 280/483 is page 280 of the 483-page PDF of the SHA 2023 Report.

EXECUTIVE SUMMARY

This analysis focused on historical groundwater analytical results for the NCES site, as presented in the Report. The first release evaluated occurred as a result of the excavation of the historical Sanco Landfill and placement into Stage I of the NCES landfill. This release of landfill contaminants into the groundwater is seen in the monitoring well data as spikes of typical landfill leachate parameters such as manganese, iron, sulfate etc. and in some wells, volatile organic compounds (VOCs). For VOCs, the return to background appeared to occur mostly prior to 2000, as illustrated in **Figure 1**. These trend plots clearly illustrate the slug of contaminants that were released into groundwater during Sanco landfill removal activities that dissipated over time.

The second release event evaluated was in the mid 2000's to about 2012. The extensive regulatory record shows that these landfill releases were clearly from current operations (e.g.,

leachate spills, sumps, tanks, force mains, caps, and liners) which were impacting downgradient groundwater conditions. The Leachate Management Improvement Project (LMIP) particularly addressed leachate storage and handling areas in use for those current landfill operations, leachate generated because of several phases of cells later (e.g., more recent) than leachate residuals from the former Sanco Landfill. The data from many monitoring wells show that contaminant release(s) are still migrating in groundwater from the active landfill operations and likely commingled with some leachate residuals from the former Sanco landfill. The ultimate goal of Release Detection Monitoring at a lined landfill site such as NCES is for all groundwater to maintain background quality. This environmental condition has not been attained at the NCES Site, and not just because of residual leachate from the former Sanco landfill. The detection of elevated bromide (a tracer required to be added in some NCES stages) in some of the wells (B-304UR, B-304DR, B-928U, B-928D, and B-926U) demonstrates that these wells are impacted by contaminants released from the more recent Stage II and Stage III landfill operations.

Lastly, the presence of PFAS at the NCES site was evaluated, to see if it could only have been sourced from leachate generated by the former Sanco Landfill. PFAS have been detected in groundwater at many locations on the NCES Site, both upgradient and downgradient of the former Sanco footprint. This fact indicates that not all the detected PFAS could have originated solely from leachate residuals of the former unlined Sanco landfill. When PFAS detections coincide with bromide detections, the source of the PFAS may originate from post-1996 waste leachate releases, because the tracer sodium bromide was added to waste deposited in Stages II and III of the NCES lined landfill cells.

ARE THERE DOCUMENTED RELEASES AT THE NCES SITE?

Yes, there are many releases from the Site that are documented in the regulatory record and groundwater data represented in the Report.

1) Initial releases between 1990 to 1993

It was reported by SHA and agreed to by the New Hampshire Department of Environmental Services (NHDES) (November 10, 1994) that the excavation of the historical Sanco Landfill and its placement into Stage I of the NCES Landfill resulted in a release of typical landfill contaminants due to the exposure of the Sanco wastes to precipitation during the 22 months of excavation and placement activities. This release of landfill contaminants into the groundwater is seen in the monitoring well data as spikes of typical landfill leachate parameters such as manganese, iron, sulfate etc. and in some wells, volatile organic compounds (VOCs).

Examples of groundwater contaminated by these releases can be seen in Appendix C, Time Series Plots for groundwater monitoring wells in the Report, such as B-102S (pg. 280/483), B-102D (pg.281/483), B-103S (pg. 282/483), and B-103D (pg. 283/483). **Figure 1** shows some example trend plots for B-103D which illustrate the historical jump in contamination in the post removal time of the early/mid 1990s when the Sanco landfill relocation project occurred and the relatively rapid decline of contaminants after capping of the Sanco waste and its footprint with the next landfill cell. The plots in **Figure 1** were taken from the B-103D trend plots shown on pg. 283/483 of the Report. The location of well B-103D is noted in red on the Site plan sketch, showing that it is located north of and very close to the old Sanco landfill, shown by the small rectangle. The large, angled, rectangle-like area depicts the Groundwater Management Zone assigned to define historical groundwater contamination from the former Sanco Landfill.

These historical analytical data show that historical releases from the old landfill flowed downgradient with the groundwater and dissipated, such that the groundwater data returned to "background" conditions in some wells. In B-103D illustrated in **Figure 1**, the iron and manganese returned to background a bit after 2010. For VOCs, the return to background appeared to occur mostly prior to 2000, as illustrated in **Figure 1**. These trend plots clearly illustrate the slug of contaminants that were released into groundwater during Sanco landfill removal activities that dissipated over time.

Even some of the wells monitored outside the Groundwater Management Zone (GMZ) show this trend, such as monitoring wells located laterally to the old landfill, B-914U and B-914L pg. 245 and 246/483, showing relatively rapid dissipation of manganese and iron between 2000 and 2010. In addition, the Main Seep (S-1) trends shown on pg. 286/483, illustrate the significant decrease in landfill constituents with time, again likely due to the waste relocation and capping over the former old landfill footprint.

The historical landfill release interpretation prior and during its excavation and emplacement into a lined cell is not the only source of contamination detected in the onsite monitoring wells. Releases from the old landfill do not solely explain the recently detected PFAS data onsite.

Introduction of a Tracer

As the construction of the new lined NCES landfill meant disposing of waste over the former Sanco landfill footprint, the NHDES wanted to be able to verify that changes in downgradient groundwater quality could be differentiated between new NCES landfill operations versus residual Sanco landfill releases remaining in the underlying soil/aquifer. To facilitate this understanding, SHA recommended using an ionic tracer, which NHDES agreed to and added its use to NCES' operating permit. Specifically, sodium bromide was required to be added to the NCES landfilling operations beginning in 1996 for its Stage II and Stage III waste disposal cells. This requirement meant that detections of landfill contaminants coincident with bromide detections would be interpreted by the Agency to mean that current (e.g., post-1996) NCES operations were likely the source of that contamination and not residual contamination originating from under the old Sanco landfill footprint. More on this in the following Section 2.

2) Release(s) to Groundwater mid 2000's to 2012

In September 2008, the NHDES completed its technical review of documents submitted in support of an Application to expand the NCES permit for Stage IV Phase II cell construction. In their response letter NHDES denied a requested modification to the NCES' Landfill permit citing as one of their reasons, downgradient groundwater contamination from VOCs and bromide as indicative "… that the operation of the existing landfill has resulted in releases of regulated contaminants in violation of condition #9 of Groundwater Management and Releases Detection Permit …" (December 12, 2008, NHDES). In their denial of the modification request, the NHDES listed seven wells, MW-402U, MW-403L, B-913M, B-919U, B-921M, B-921U, and B-304UR as exhibiting data that supported their rationale, namely the presence of VOCs and detections of bromide in groundwater.

Calex looked for the data for these seven wells cited by the NHDES in the most recent groundwater quality Report, but the Report provided only historical data for two of the seven wells, as apparently the others have been decommissioned due to landfill expansion over time. The trend plots in Appendix C of the Report show the historical data for B-919U (pg. 274/483)

illustrating the dissipation of an apparent spike of VOCs and 1,4 dioxane in the mid 2000s to early 2012 timeframe while B-304UR (pg. 269/483) showed high VOCs and low detections of bromide in the subject timeframe. **Figure 2** illustrates some of the trend plots for B-304UR taken from the Report, pg. 269/483.

The Site plan on **Figure 2** identifies the location of B-304UR as a red dot which is located about halfway down into the GMZ. In looking at the analyte plots of **Figure 2**, one sees large spikes of VOC detections in the mid 2000s until about 2012 or 2013, while the apparent smaller detections of bromide are driven by the different plot scales (mg/l versus ug/l) of the results. The 1,4 dioxane plot shows consistent detections in the same timeframe. These data, (and the other wells listed by NHDES) showing spikes in VOCs comingled with bromide detections, indicated to NHDES that these release(s) were not from the old landfill, but had instead occurred from the operating landfill.

NHDES in its December 23, 2008, letter required that NCES propose corrective actions that include "… both soil and groundwater data needed to identify the source of each exceedance of the background concentrations for VOCs and bromide, and to confirm that the source(s) of the exceedances have been effectively remediated." The Agency issued a second denial for the landfill expansion on March 25, 2009, noting that NCES had failed to determine the source of continuing groundwater contamination at the site.

In response to NHDES' continued requests for evaluation of source(s) of releases from the current operations to the groundwater, NCES submitted a 2009 Corrective Action Plan (CAP) that was revised in response to Agency comments and resubmitted on February 19, 2010, which was subsequently approved by NHDES on May 19, 2010. Conditions that were identified as contributing to landfill releases causing the groundwater exceedances and actions undertaken to correct those conditions, were summarized on Figure 6 of the CAP for MW-402U as follows:

- March 2001, Force Main break repair.
- September through November 2002 Stage I toe repair.
- March 3, 2006, Leachate Tanker Truck Spill at Load-Out Building.
- May 12, 2006, Leachate Spill at Leachate Load-Out Building.
- April/May 2007, Stage I CAP and Detention Pond #3 Inlet Culvert drainage improvements including east portion of Stage I anchor trench.
- September 26, 2008 – January 3, 2009, and April 13, 2009 – May 15, 2009, Leachate Management Improvements Project (LMIP) and related contaminated soil removals (i.e., adjacent to Stage II and consolidation tanks; force main and swales).
- August/September 2009, Repair of Stage I Down Chute Drainage and east portion of Stage I anchor trench.
- November 19, 2009 – January 7, 2010, Stage I Landfill Gas Extraction System Improvements.

Conditions that were identified as contributing to landfill releases causing the groundwater exceedances and actions undertaken to correct those conditions, were summarized on Figure 8 of the CAP for B-913M as follows:

- August 7, 2006, Leachate Spill along temporary Stage II Leachate Force Main.
- April/May 2007, Stage I CAP and Detention Pond #3 Inlet Culvert drainage improvements including east portion of Stage I anchor trench.
- August/September 2009, Repair of Stage I Phase I Capping System Down Chute Drainage System and east portion of Stage I anchor trench.

On August 27, 2010, NHDES granted the initially requested 2008 permit modification for expansion of lined cells for the NCES Landfill. This extensive regulatory record shows that landfill releases were clearly from current operations (e.g., leachate spills, sumps, tanks, force mains, caps, and liners) which were impacting downgradient groundwater conditions. The Leachate Management Improvement Project (LMIP) particularly addressed leachate storage and handling areas in use for current operations, leachate generated because of several phases of cells later (e.g., more recent) than leachate residuals from under the former Sanco Landfill.

Continued groundwater monitoring and statistical trend analyses were required by NHDES after the 2010 Corrective Action Plan to assess the success of the remedial actions and document groundwater improvements. The NCES Groundwater Release Detection permit under RSA 485-C:13 for lined landfills requires that if groundwater conditions begin to exceed background conditions, assessment monitoring is required and if groundwater quality trends do not go back to background, as some wells appeared to do after the Sanco Landfill was removed, a corrective action plan would be required to identify and remediate source(s) of releases, addressed in the next section.

3) Groundwater trends in 2018 – 2023

Calex evaluated the analytical trend plots in Appendix C for monitored wells in the Report to see if the remedial actions performed in the 2010 timeframe had caused the Release Detection Wells to return to background conditions. It did in some cases, but several wells continue to show background exceedances and/or upward trends in recent years, a timeframe starting in approximately 2018 and continuing into 2023, some of which are listed here:

- B-304UR (pg. 269/483) shows contaminated groundwater containing dioxane, volatile organic compounds (VOCs), bromide, chloride, and nitrate.
- B-304DR (pg. 270/483) shows spikes in bromide, chloride, manganese, dioxane, and total VOCs.
- MW-803 (pg. 273/483) illustrates spikes in manganese, iron, and chloride.
- B-919M (pg. 275/483) shows detections of arsenic, manganese, and iron.
- B-928 U and B-928 D (pgs. 277-278/483) both detect dioxane, and bromide.
- B-927M (pg. 262/483) illustrates exceedances of iron, an increasing trend in manganese, and VOCs.
- B-926U (pg. 259/483) has bromide and manganese above background.
- MW-701 (pg. 240/483) shows variable increases in manganese.

Figure 3 illustrates some trend plots from B-304DR, a well located within the GMZ and near B-304UR that was illustrated in **Figure 2**. The plots show spikes in bromide detections very clearly beginning prior to 2020 and falling off sharply. The manganese plot in **Figure 3** shows a broad

spike around the same period, but still remaining above standards, while the VOCs plot shows a similar discrete timeframe of detections. These data suggest impacts from releases from the operating landfill since the bromide is commingled in the groundwater. These same trend observations are also illustrated in **Figure 2** for the same 2018 to 2023 timeframe.

The data from these monitoring locations show that contaminant release(s) are still migrating in groundwater onsite from the active landfill operations and likely commingled with some residuals from the former Sanco landfill. The ultimate goal of Release Detection Monitoring at a lined landfill site such as NCES is for all groundwater to maintain background quality. This environmental condition has not been attained at the NCES Site, and not just because of residuals from the former Sanco landfill.

The detection of elevated bromide in some of the wells (B-304UR, B-304DR, B-928U, B-928D, and B-926U) demonstrates that these wells are impacted by contaminants released from the more recent Stage II and Stage III landfill operations where leachate carrying bromide would be managed. Monitoring is ongoing under the CAP to evaluate the effectiveness of remedial actions performed (i.e. the Leachate Management Improvement Project in response to multiple releases in the 2001 - 2006 timeframe).

Calex's analysis of the groundwater quality data and regulatory history of the NCES landfill site clearly shows that:

1) Contaminant releases from former Sanco landfill operations have occurred,
2) Contaminant releases from recent (post-1996) landfill operations have occurred, and
3) Groundwater is still impacted above background in the leachate management area for landfill operations (upgradient of the former Sanco landfill footprint) as well as downgradient of the former Sanco landfill footprint and current landfill operations.

These conclusions are consistent with the findings discussed in the Report.

4) Per- and polyfluoroalkyl substances (PFAS)

Within the last decade, per- and polyfluoroalkyl substances (PFAS), sometimes called "forever chemicals", have figured prominently at many contaminated sites. Due to the concerns of pervasive PFAS compounds being detected around the country and in New Hampshire, NHDES began requiring testing of various potential PFAS source areas (e.g., car washes, certain manufacturing sites, CERCLA sites, dry cleaners, landfills). In 2017, NCES first added some wells to its testing regime for PFAS and has expanded its testing and analysis since that time. As of the Report, thirty-one monitoring wells were tested for selected PFAS constituents. In addition, surface water testing for PFAS was required by NHDES in 2023, which was reported by SHA in its October 2023 SSI Report.

The attached **Figure 4** utilizes Figure 3 from the Report as a base plan and illustrates the locations of current and former detections of PFAS around the NCES landfill site, both in groundwater and surface water. The Figure also highlights the approximate footprint of the former Sanco landfill as a red box and illustrates the approximate direction of groundwater flow (blue arrows) near the footprint of the historical landfill based on groundwater contours from July 2023. Groundwater, in general, flows northerly to northwesterly away from the former Sanco footprint and current NCES landfill. This interpretation is consistent with the Report.

WHAT ARE THE POSSIBLE SOURCES OF PFAS AT THE NCES SITE?

Figure 4 illustrates that PFAS have been detected in groundwater at many locations on the NCES Site, both upgradient and downgradient of the former Sanco footprint. This fact indicates that not all the detected PFAS could have originated solely from residuals under the former unlined Sanco landfill. The unlined historical Sanco landfill is likely a source of PFAS to the NCES Site due to the age of its waste, but other factors at the NCES Site point to additional source(s) of PFAS. Factors which indicate PFAS source(s) other than, or in addition to, the former unlined Sanco landfill are:

- Location – Whether a sampled well is located hydraulically upgradient or downgradient of the historical unlined Sanco landfill determines whether it intercepts PFAS contamination from residual releases from the historical landfill. Some PFAS detections occur at well locations that encountered PFAS sources from other than the old landfill:
    - MW-701 contained PFAS concentrations that substantially increased between April 2023 and July 2023 (pg. 306/483), while this location is outside the GMZ and is upgradient of the historical former unlined Sanco landfill **(Figure 4)**. Leachate source(s) for PFAS at this location must somehow be from the NCES landfill operations and subject to its Release Detection Permit.
    - B-915 U and B-915M located near the stormwater ponds (**Figure 4**) are upgradient of the former historical landfill footprint. PFAS detections at this location originated from current NCES landfill operations. The Report points to its source from historical leachate infrastructure operations and releases, was addressed by the Leachate Management Improvement Project (LMIP) completed in May 2009.
    - B-918U, B-918M, B-918D located cross gradient to the former historical landfill and within the historical leachate infrastructure area that experienced multiple releases of leachate in the 2001 to 2008 timeframe, addressed by the 2010 CAP remediation and the LMIP (**Figure 4**).
- Bromide – When PFAS detections coincide with bromide detections, the source of the PFAS may originate from post-1996 waste leachate releases, because the tracer sodium bromide was added to waste deposited in Stages II and III of the NCES lined landfill cells.
    - High PFAS concentrations in B-304DR and B-304UR (pgs. 269-279/483 in the Report) exceed NHDES Ambient Groundwater Quality Standards (AGQS) for selected PFAS compounds and are coincident with other parameters that show post-1996 waste leachate generation due to the detected bromide tracer and VOCs. (as illustrated in **Figures 2 and 3**). This condition suggests that a “recent” (post-1996) leachate source is contributing PFAS at this location.
    - PFAS concentrations in B-919U (pg. 315/483 of the Report) appear to be steady or possibly increasing with consistent exceedances of the AGQS for PFOA. The location of this sampling point is proximate to the NCES landfill operations and in an area that shows VOCs and bromide (B-919M) in groundwater, post-1996 generated leachate.

- PFAS concentrations in B-918M (pg. 257/483), located in the infrastructure area remediated due to releases in 2001-2006 timeframe, are also coincident with high bromide detections, suggesting PFAS contributions from post-1996 leachate.
- MW-802/803 (pgs. 272-273/483) PFAS detections, are located downgradient of the former Sanco Landfill, yet show consistent detections of bromide, with spikes in bromide that appear to correlate with significant changes in water levels. The coincidence of PFAS with consistent bromide concentrations suggests that some PFAS contributions at this location may come from releases of post-1996 leachate.
- Detections of PFAS occur in B-919M (pg. 275/483) where consistent detections of bromide are seen. The spikes in bromide appear to coincide with a significant drop in water levels in the 2014/2015 timeframe. The coincidence of PFAS with consistent bromide concentrations suggests that some PFAS contributions at this location may come from releases of post-1996 leachate.

HYDROGEOLOGICAL OPINIONS

Based on a comparison of historical groundwater quality data to the recent PFAS data, it is Calex's opinion that the PFAS constituents are sourced from both historical leachate releases originating from the former Sanco landfill and recent (post-1996) landfilling operations, based on the following lines of evidence:

- Detection of PFAS in several monitoring well locations that are hydraulically upgradient of the former unlined Sanco landfill.
- Presence of PFAS in many monitoring well locations where groundwater is comingled with detections of the bromide tracer, indicating that post-1996 leachate has impacted water quality of the well.
- The NCES landfill site exhibits many documented releases of leachate, both originating from the unlined former Sanco landfill area as well as significant releases of leachate in the infrastructure area and onsite from active (post-1996) landfill operations. These releases are documented in NCES' regulatory history and in the long-term groundwater quality data for the Site. Therefore, the NCES Site has two primary sources of PFAS contamination originating onsite. 1) Residual contamination from waste disposed of during the 1980's under the footprint of the old Sanco landfill, as well as 2) leachate from post-1996 landfilled waste in NCES cells that has documented releases onsite. To date, there has been no attempt by NCES or NHDES to differentiate these two sources of PFAS contributions, instead generically calling PFAS contamination "from the old landfill".
- The NCES landfill site is currently operating while many of the Release Detection Wells show exceedances of background conditions. In some groundwater locations, analytes even show exceedances of AGQS. As reflected in groundwater contours of **Figure 4**, contaminated groundwater is moving northerly towards the Ammonoosuc River, while contaminated surface water seeps, one within approximately 50 feet of the river, flow northerly towards the River. It is Calex's opinion that the data indicate that discharges of contaminated groundwater and surface water are likely entering the Ammonoosuc

River. Surface water sampling in the river has not detected any contamination likely due to dilution.

CONCLUSIONS

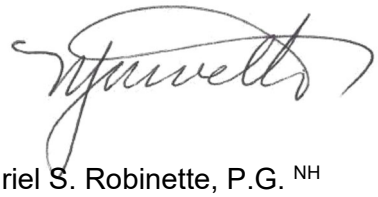
Regardless of the precise hydrogeological source(s) to the PFAS contamination, the data show that PFAS, as well as other regulated compounds, have migrated beyond the historical and current landfill footprints and are migrating downgradient in groundwater onsite. Some of the groundwater manifests as discharges to seeps, one of which is very close to the compliance boundary and the Ammonoosuc River. The current landfill owner/operator is responsible for keeping any and all landfill-derived contaminants controlled onsite whether the contaminants originate from the old unlined landfill residuals or current operations.

The NCES Site is required by law to operate in compliance with its Permits. Any regulated contaminant should not be allowed to leave the Site and enter the Ammonoosuc River. With a seep (SF-1) (**Figure 4**) that shows contamination located less than 50 feet from the edge of the River, it is important for the NHDES to require a multi-level pore water investigation of the groundwater/river interface to determine, and quantify, the contaminant loading to the River so that effective groundwater/surface water mitigation measures can be implemented to keep regulated contaminants from leaving the Site and entering the River.

Please do not hesitate to call if you have any questions. Thank you.

Sincerely,

CALEX ENVIRONMENTAL, LLC



Muriel S. Robinette, P.G. NH
Senior Consultant
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REFERENCED DOCUMENTS

November 7, 2023, NHDES Comments on 2023 Water Quality Submittal and SSI-Surface Water PFAS Sampling.

October 6, 2023, SSI Surface Water PFS Sampling Data Transmittal, NCES Landfill, SHA.

August 24, 2023, July 2023 Tri-Annual/2023 Annual Water Quality Monitoring Results, SHA.

August 28, 2010, NHDES Permit Modification for NCES Stage IV landfill.

February 19, 2010, Corrective Action Plan, SHA.

February 8, 2010, NHDES Comments on November 24, 2009 Corrective Action Plan.

March 25, 2009, NHDES Denial of NCES Application Permit Modification for Stage IV Phase II.

September 10, 2008, NHDES letter to NCES noting issues of concern.

November 10,1994, NHDES Memorandum, North Country Environmental Services Landfill Water Quality Evaluation and Release Detection Permit Modification.

October 5, 1994, NCES Stage II Expansion, SHA.

FIGURES

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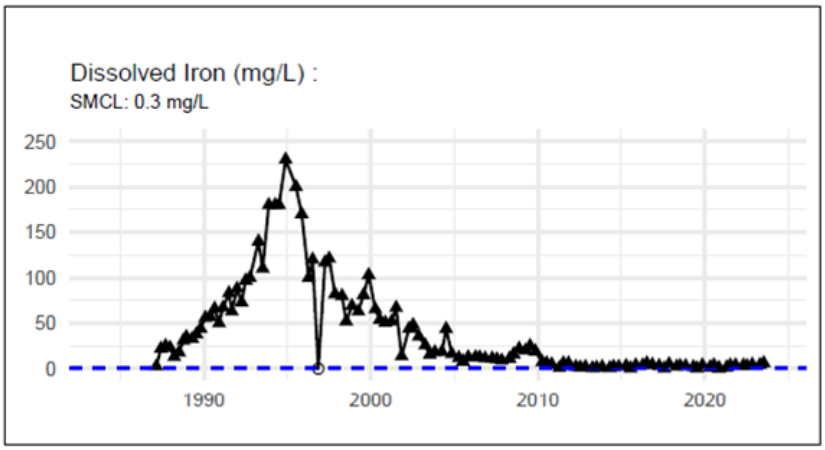

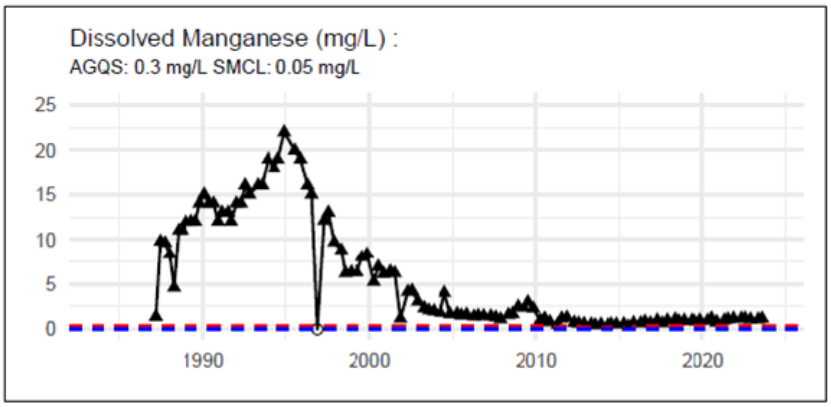

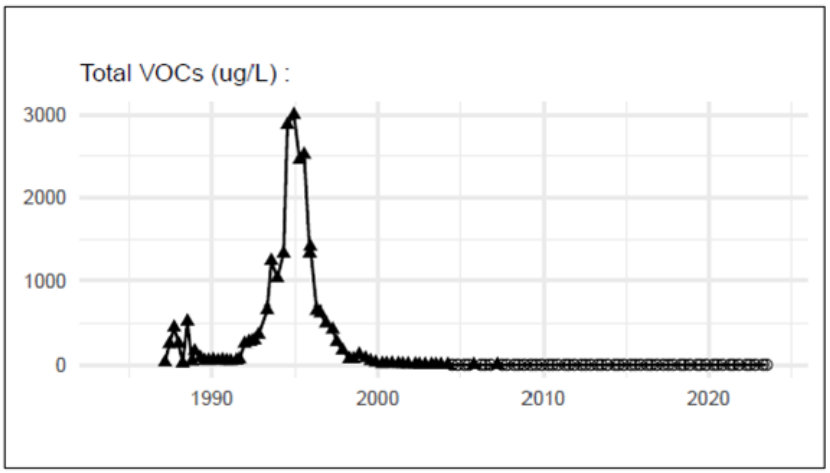

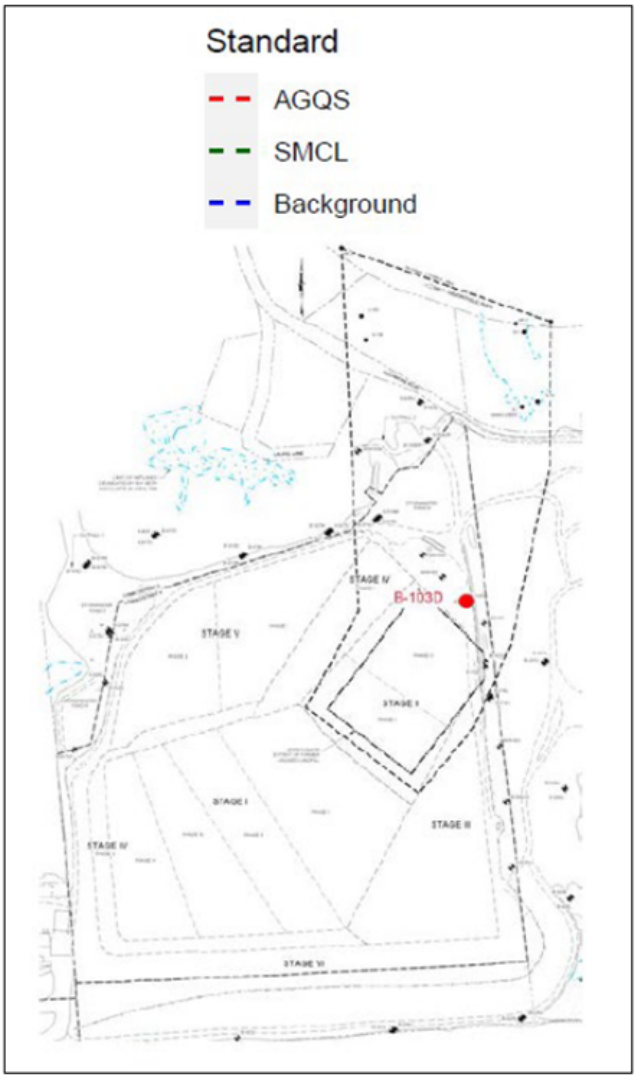

Notes: Plots taken from Page 283/483 of July "2023 Tri-Annnual/2023 Annual Water Quality Monitoring Results", August 2023, SHA.

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DES Site:

Example Trend Plots from B-103D for Releases from Sanco Landfill Excavation

SIZE	CALEX PROJECT	DWG NO	REV
		Figure 1	

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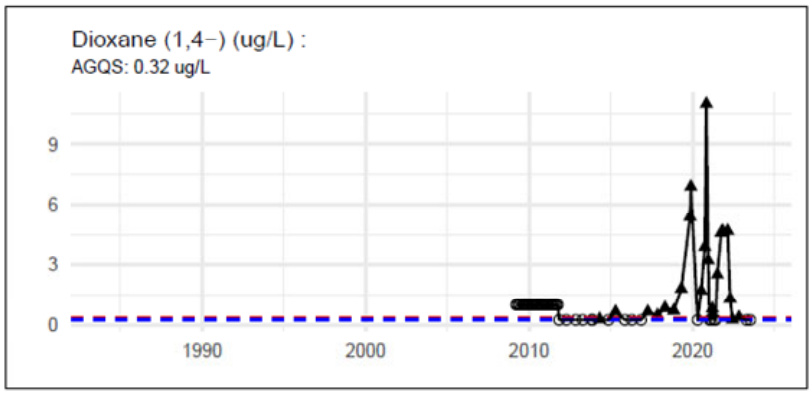

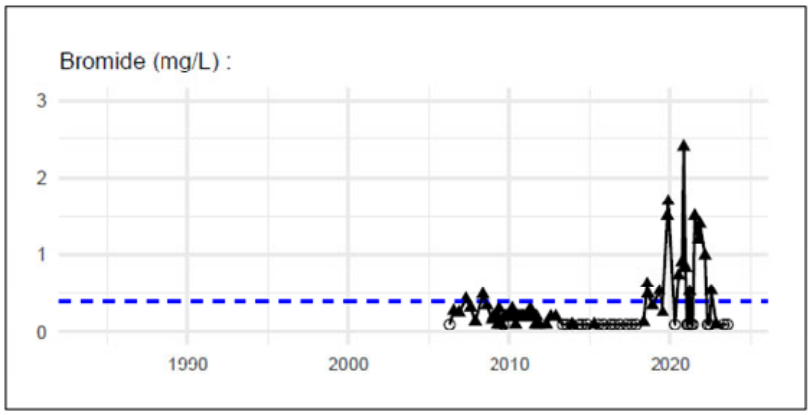

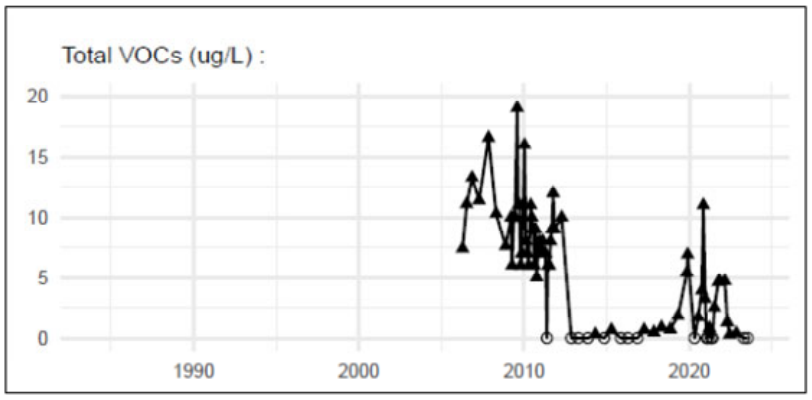

Notes: Plots taken from Page 269/483 of July "2023 Tri-Annnual/2023 Annual Water Quality Monitoring Results", August 2023, SHA.

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DES Site:

Example Trend Plots from B-304UR for Releases from Post – 1996 Waste Disposal Operations

SIZE	CALEX PROJECT	DWG NO	REV
		Figure 2	

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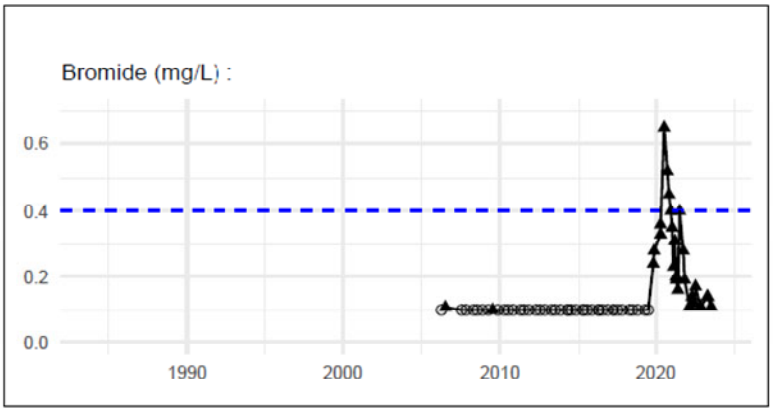

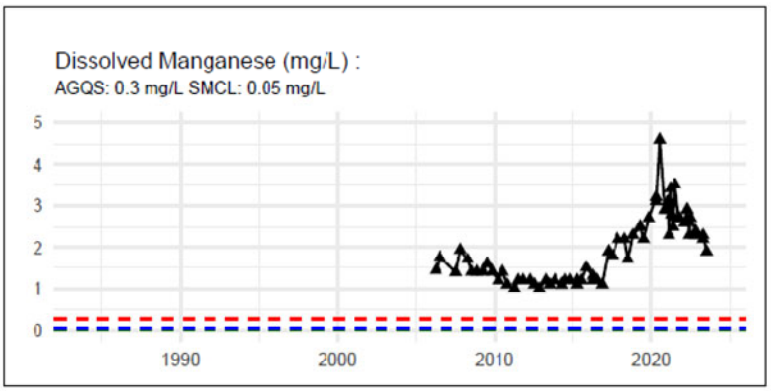

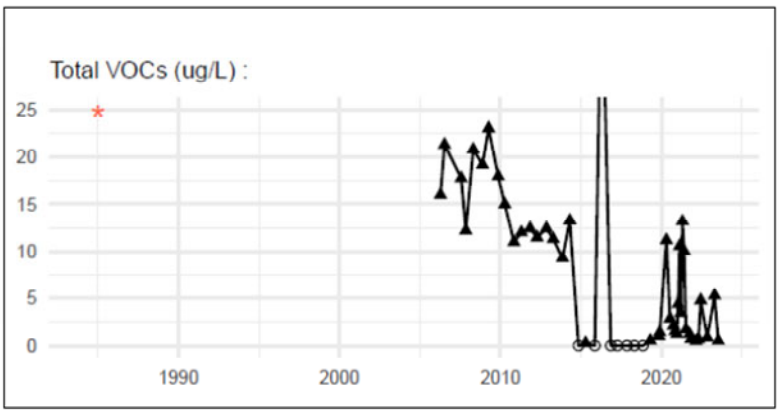

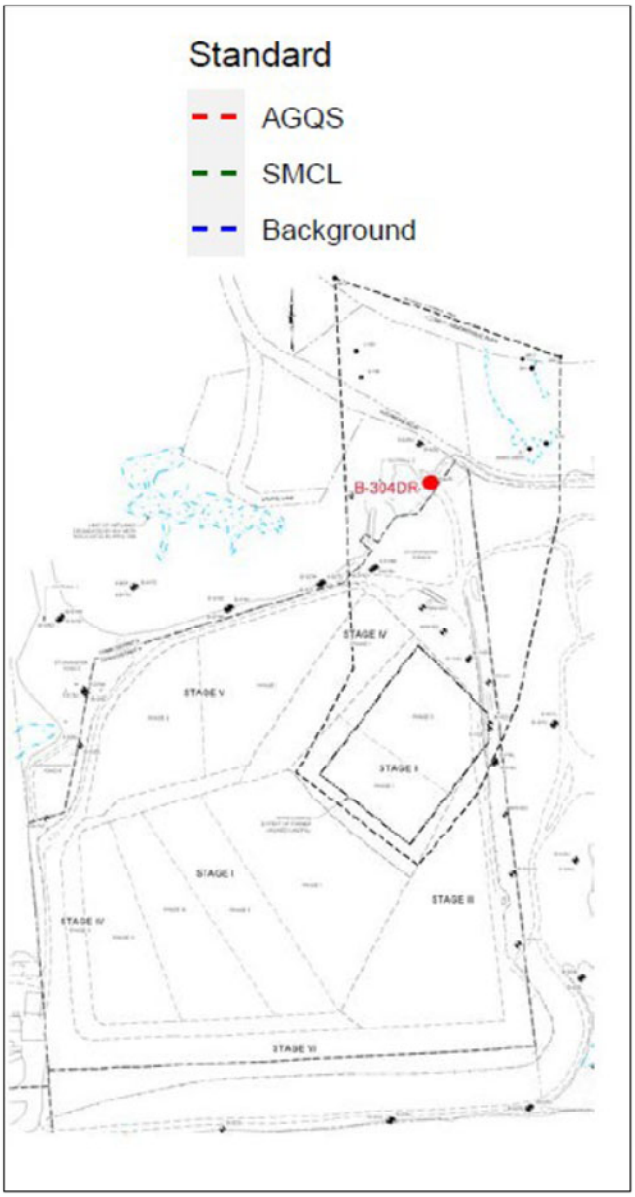

Notes: Plots taken from Page 270/483 of July "2023 Tri-Annnual/2023 Annual Water Quality Monitoring Results", August 2023, SHA.

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DES Site:

Example Trend Plots from B-304DR Showing Comingled Releases from Post – 1996 Operations

SIZE	CALEX PROJECT	DWG NO	REV
		Figure 3	

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NOTES:

1. THE GROUNDWATER ELEVATION CONTOURS SHOWN ARE BASED ON GROUNDWATER LEVELS MEASURED BY SANBORN HEAD PERSONNEL IN WELLS SCREENED ACROSS/NEAR TO THE WATER TABLE ON APRIL 18-19, 2023. VARIATIONS IN GROUNDWATER ELEVATIONS ARE EXPECTED TO OCCUR DUE TO CHANGES IN PRECIPITATION, TEMPERATURE, AND OTHER FACTORS NOT EVIDENT AT THE TIME WATER LEVEL MEASUREMENTS WERE OBTAINED.

2. THE GROUNDWATER ELEVATION CONTOURS WERE DEVELOPED USING GENERALLY-ACCEPTED HYDROGEOLOGIC PRACTICES, AND ARE INTENDED TO DEPICT INFERRED TRENDS IN GROUNDWATER LEVELS CONSISTENT WITH THE AVAILABLE INFORMATION. ACTUAL CONDITIONS MAY VARY FROM THOSE SHOWN AND OTHER INTERPRETATIONS ARE POSSIBLE.

3. REFER TO FIGURE NO. 2 FOR ADDITIONAL NOTES.

LEGEND:

GROUNDWATER MANAGEMENT ZONE

1311.1 GROUNDWATER ELEVATION RECORDED AT WELL LOCATION IN JULY 2023

1305 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE LESS CONSTRAINED)

LEGEND

Former Footprint of Historical Sanco LF

Detected PFAS

General Groundwater Flow Direction

AMMONOOSUC RIVER

MECHANIC ROAD

LAUREL LANE

OUTFALL 2

OUTFALL 1

LIMIT OF WETLANDS DELINEATED BY B.H. KEITH ASSOCIATES IN APRIL 1990

STORMWATER POND 4

STORMWATER POND 5

STORMWATER POND 6

TOWN DISTRICT 5

TOWN DISTRICT V

STAGE I

STAGE II

STAGE III

STAGE IV

STAGE V

STAGE VI

PHASE I

PHASE II

PHASE III

PHASE IV

APPROXIMATE EXTENT OF FORMER UNLINED LANDFILL

Figure taken from Sanborn Head & Associates (SHA), July 2023 Groundwater Elevation Contour Plan.
PFAS data from SHA, July 2023 Tri-Annual/2023 Annual Water Quality Monitoring Results.
SHA October 2023 SSI Surface Water PFAS Sampling Data Transmittal.

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DES Site:

PFAS DETECTIONS AT NCES LANDFILL SITE

SIZE	CALEX PROJECT	DWG NO	REV
		Figure 4	

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