

June 25, 2024

*Via Email*

New Hampshire Department of Environmental Services

Michael Wimsatt  
Director, Waste Management Division  
*michael.wimsatt@des.nh.gov*

Jaime Colby  
Supervisor, Engineering and Permitting Section  
*Jaime.M.Colby@des.nh.gov*

**Re: NCES Repeated Enforcement Request**

Dear Director Wimsatt and Ms. Colby,

I write in continued representation of North Country Alliance for Balanced Change (“NCABC”) concerning an opinion letter prepared by Calex Environmental Consulting (“Calex”) demonstrating that the NCES Landfill is presently allowing the continued transport of contaminants in groundwater as a result of *current* landfill operations in violation of New Hampshire law and the facility’s permits. I provided this letter to the Department on Friday, March 22, 2024, and requested that the Department take immediate enforcement action to prevent such discharges.

The Department, via Director Wimsatt, responded on Thursday, April 18, 2024, explaining that it was aware of releases from operations associated with the lined NCES Landfill, but that groundwater monitoring results suggested that the facility was not experiencing active, ongoing discharge or release from current operations. I attached my letter and your response for ease of reference.

Calex’s analysis demonstrates that historically released contaminants from both the original unlined landfill and operations of the lined landfill have resulted in groundwater contamination actively migrating downgradient in the watershed and into the Ammonoosuc River. **This operational condition of regulated contaminants leaving the property boundary violates the NCES permit and Env-Or 703.20(a), Env-Sw 1002.02(d), Env-Sw 1005.01(f), and Env-Sw 2002.01.**

As detailed below, while monitoring is a key component of the Department’s oversight, more must be done to eliminate the migrating contamination and return the site groundwater to background levels. Therefore, NCABC repeats its request that the Department take further action. Please make this letter part of your record in this matter.

### *Analysis*

As explained in detail in Calex’s opinion letter, some of the contaminants reflected in the groundwater monitoring data are from the active landfill operations, and the concentrations for several contaminants are above background—and even exceed the Ambient Groundwater Quality Standards in some cases. **This is inconsistent with the Department’s rules concerning groundwater release detection permits, including the one held by NCES, and the Department is wrong to enable NCES Landfill to maintain this status quo.**

Under Env-Or 703.01(a)(2), a lined solid waste landfill, such as the NCES Landfill, requires a groundwater release detection permit to operate. Numerous compliance criteria attach to these permits, including that a permittee must take certain steps if the concentration of any constituent is detected above background levels. Env-Or 703.17(d). Specifically, the permittee must: (1) notify the Department; and (2) conduct assessment monitoring. *Id.* If the assessment monitoring detects contaminants above background levels, the permittee must submit a corrective action plan to the Department. Env-Or 703.18(f)(2).

In turn, a corrective action plan must include:

- (1) Inspection and audit of activities and procedures at the facility to determine possible sources of contamination;
- (2) *Remediation of the source of the exceedance;*
- (3) Further groundwater investigation;
- (4) *Modification of facility operation as needed to eliminate the cause of the exceedance;*
- (5) Treatment of the waste stream as needed to eliminate the cause of the exceedance;
- (6) *Groundwater restoration;* and
- (7) If the facility operations cannot be modified to eliminate the cause of the exceedance or if the groundwater cannot be restored or remediated, a schedule of activities that will be implemented for facility closure.

Env-Or 703.19(a) (emphasis added).

The Department may approve a corrective action plan only if “the plan is reasonably designed to: (1) [a]chieve compliance *with background concentrations*; (2)

[e]liminate any future discharges of regulated contaminants to the groundwater; and (3) [p]rotect human health and the environment.” Env-Or 703.20(a) (emphasis added).

Relatedly, the Department’s solid waste rules provide that a solid waste facility, such as the NCES Landfill, “shall not contaminate surface water or groundwater in violation of federal or state law, any rules implemented by the department or any administratively-attached board, or the conditions of any permit issued by the department or any administratively-attached board.” Env-Sw 1002.02(d). If any operating problems occur at a facility, the permittee must correct, abate, and remediate such problems in a timely manner. Env-Sw 1005.01(f). Even if the Department merely *suspects* that a facility is the source of potential harm to human health or the environment, it is obligated to investigate the issue. Env-Sw 2002.01.

The **twelve years** the Department has already permitted NCES to monitor and attempt to manage this issue has not achieved compliance. The fact that the contaminants are coming from the NCES Landfill’s current operations and that several contaminants are above background levels shows that the source of the exceedances has not been remediated, that the facility’s operations have not been modified to eliminate the cause of the exceedances, and that the groundwater has not been restored. Therefore, all the remedial steps required by a corrective action plan have not been met. If the corrective action plan is insufficient to achieve background levels and eliminate the ongoing (and future) discharges, then it should not have been approved in the first place. By law, the Department must ensure that the NCES Landfill Release Detection Wells return to background levels, that there are no future contaminant discharges, and that human health and the environment are protected. The Department must ensure the corrective action plan is able to achieve these goals. This is especially true given the proximity of the Ammonoosuc River, which Calnex opined is likely experiencing discharges of contaminated groundwater and surface water.

While the Department may believe there are no active, ongoing discharges or releases coming from NCES Landfill’s liner system or its operations, Calnex’s opinion letter demonstrates such historical discharges are causing site conditions to be out of compliance with background AND leaving the site boundary, a clear violation of the landfill’s permit. What is more, it is indisputable that background levels have not yet been achieved, which continues to pose a danger to human health and the environment, namely the Ammonoosuc River and its watershed. The Department and NCES have a duty to achieve background levels in a timely manner, but according to Calnex’s analysis, background levels—and even Ambient Groundwater Quality Standards—are still being exceeded after twelve years.

### ***Conclusion***

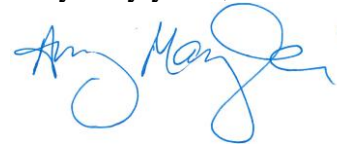
We appreciate that the Department is, and has been, monitoring the NCES Landfill’s groundwater concentrations to determine when they achieve compliance with

background. However, Calex's analysis shows sufficient residuals from the present landfill operations such that contaminants in groundwater continue to migrate downgradient within the Ammonoosuc watershed threatening and discharging into the River. The Department is responsible for ensuring NCES takes whatever steps are necessary to eliminate these discharges and restore background conditions in groundwater.

Monitoring is one part of the process, but merely monitoring the situation is not enough to achieve compliance and does not meet the standards set by the law governing the Department. The Calex opinion identified the need for a pore water investigation at the River/groundwater interface to quantify the contaminant loading to the Ammonoosuc River. For the Department to rely only upon diluted surface water tests is condoning the defunct approach of "dilution is the solution to pollution." Further action must be taken to remediate the discharges associated with the NCES site into the Ammonoosuc River and watershed. Human health and the environment will continue to be impacted if the Department permits the status quo to persist.

On behalf of my client North Country Alliance for Balanced Change, I respectfully repeat the request to the Department to immediately enforce applicable laws against NCES to achieve operational compliance at this site and reply back to me to confirm to me the Department is doing so.

Very truly yours,



Amy Manzelli, Esq.  
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Enclosure

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**Subject:** NCES Enforcement Request & Opinion Letter  
**Date:** Friday, March 22, 2024 2:57:48 PM  
**Attachments:** [image001.png](#)  
[2024-03-22 Calex NCES Opinion letter.pdf](#)

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Good Afternoon Director Wimsatt and Ms. Colby,

Please see attached the opinion letter of Calex Environmental Consulting.

As you will see, after Calex's careful and comprehensive analysis of decades of scientific records, Calex concludes NCES is currently releasing landfill contaminants into groundwater, at least in part, from NCES' current landfilling activities. In other words, Calex opines, NCES' current releases of landfill contaminants are not only from the historical Sanco landfill.

NCES releasing landfill contaminants from its current operations violates both New Hampshire laws and NCES permits. Accordingly, on behalf of my client North Country Alliance for Balanced Change, I respectfully request the Department immediately enforce applicable laws against NCES and reply back to me to confirm to me that it is doing so.

Thank you,  
Amy

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March 22, 2024

BCM Environmental and Land Law, PLLC  
3 Maple Street  
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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.,

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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 Calnex'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 Calnex'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. <sup>NH</sup>  
Senior Consultant  
[muriel@calexenvironmental.com](mailto:muriel@calexenvironmental.com)

## 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.

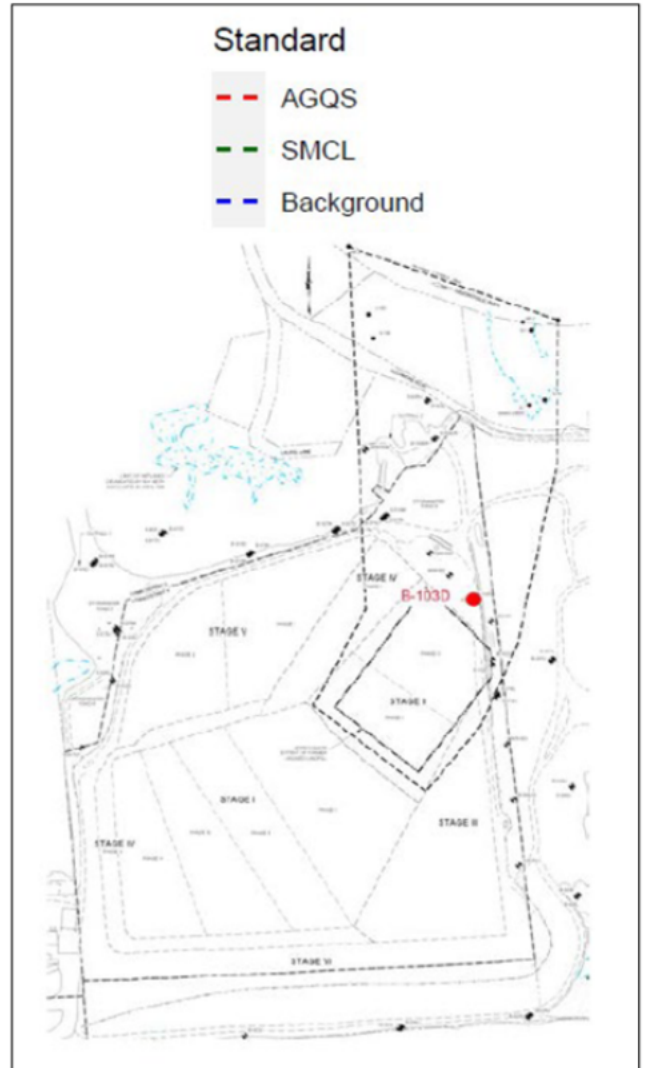
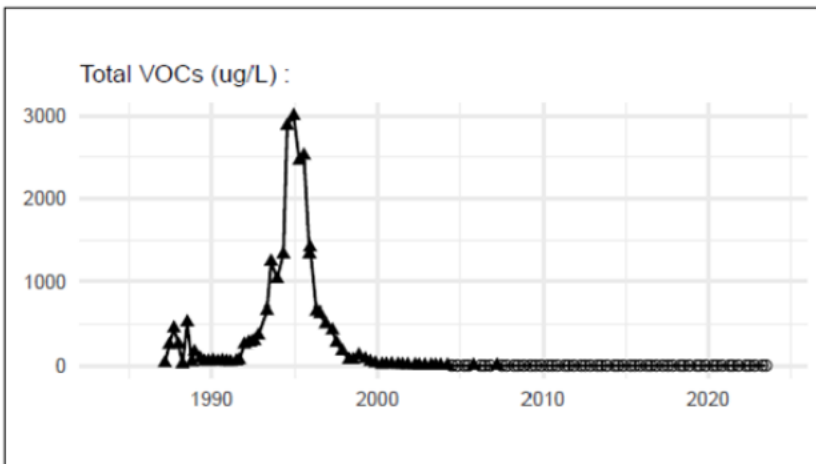
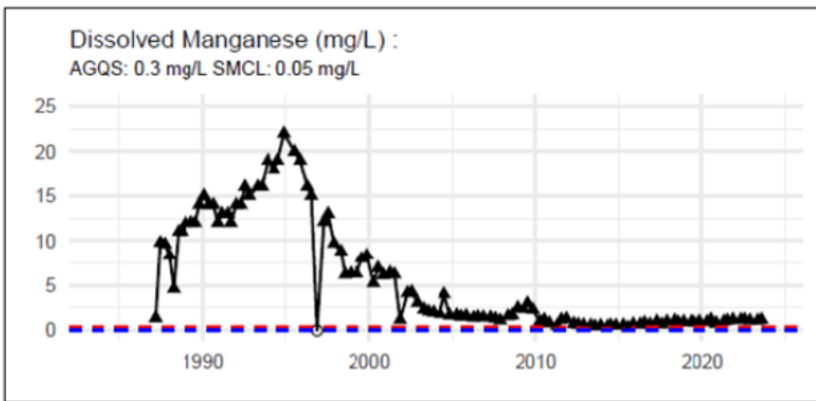
October 5, 1994, NCES Stage II Expansion, SHA.





## FIGURES





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

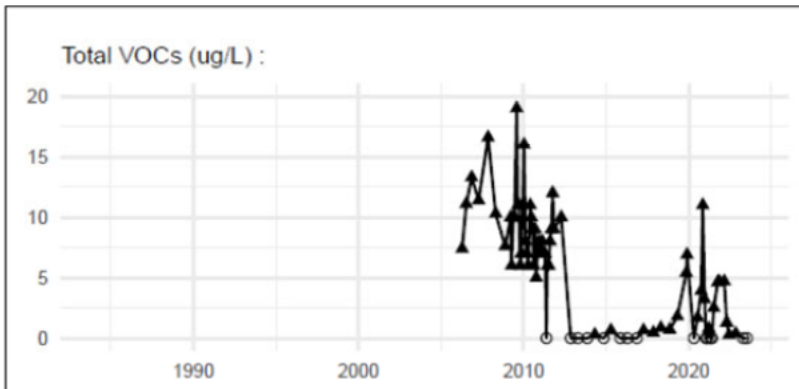
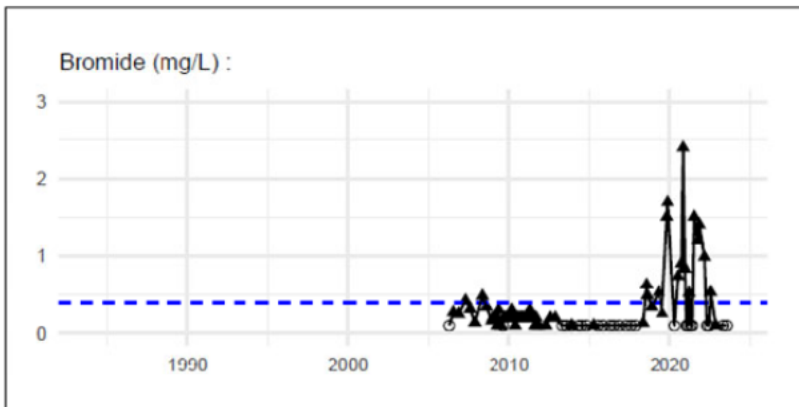
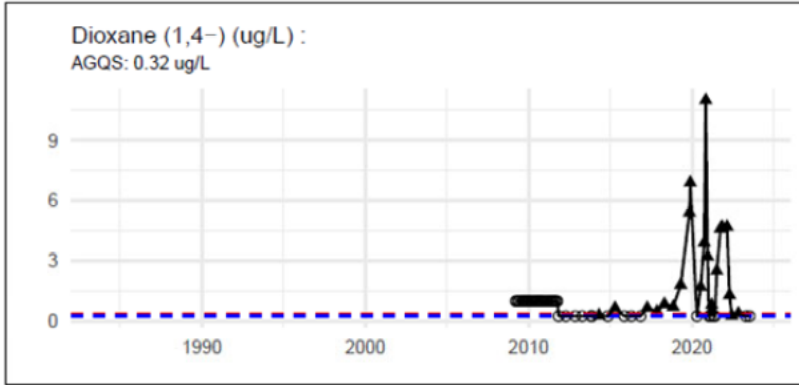


PO Box 236  
Colebrook, NH 03576

DES Site:

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

SIZE	CALEX PROJECT	DWG NO	REV
		<b>Figure 1</b>	
Drawn By:	March 2024	SHEET	



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

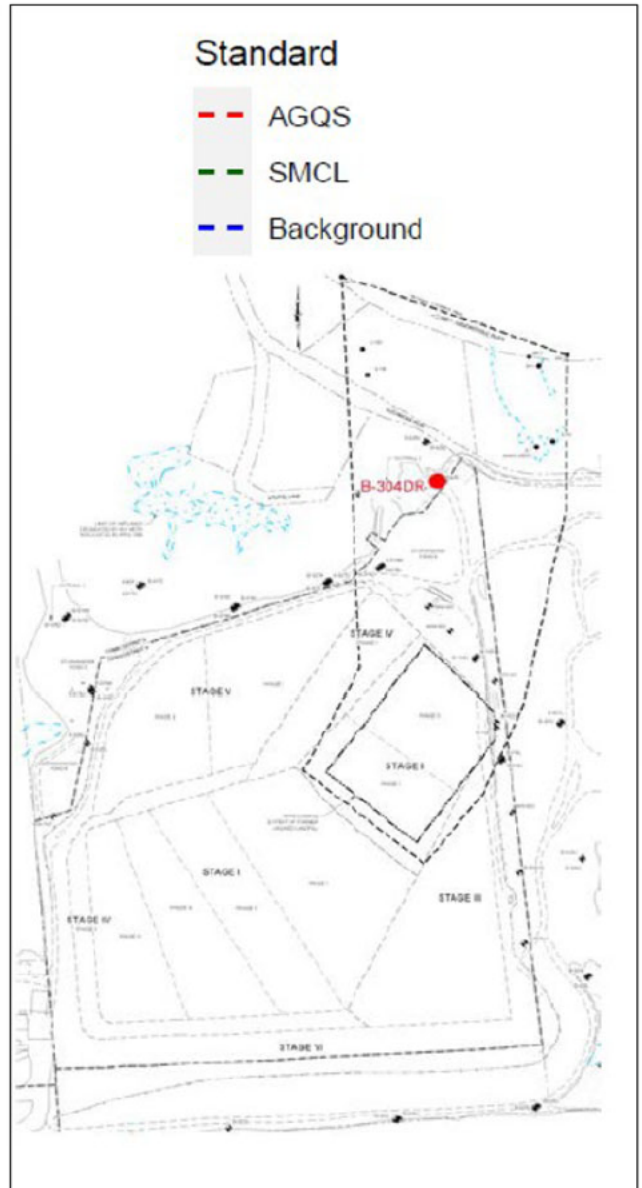
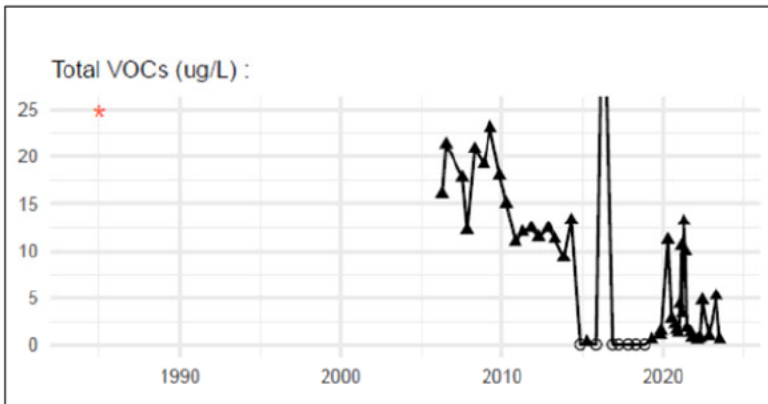
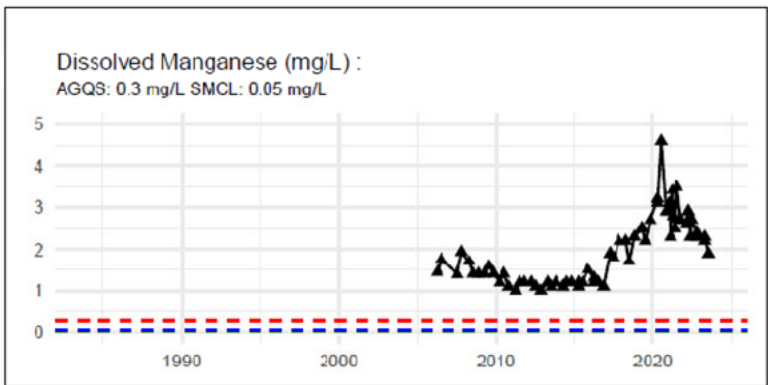
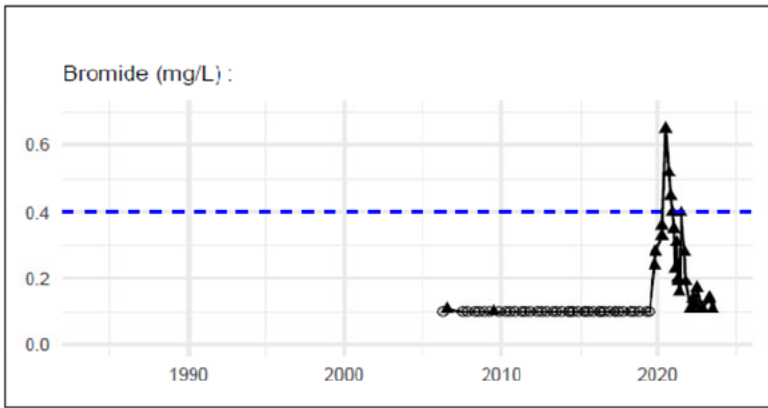


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DES Site:

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

SIZE	CALEX PROJECT	DWG NO	REV
		<b>Figure 2</b>	
Drawn By:	March 2024	SHEET	



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



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Colebrook, NH 03576

DES Site:

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

SIZE	CALEX PROJECT	DWG NO	REV
		<b>Figure 3</b>	
Drawn By:	March 2024	SHEET	

**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

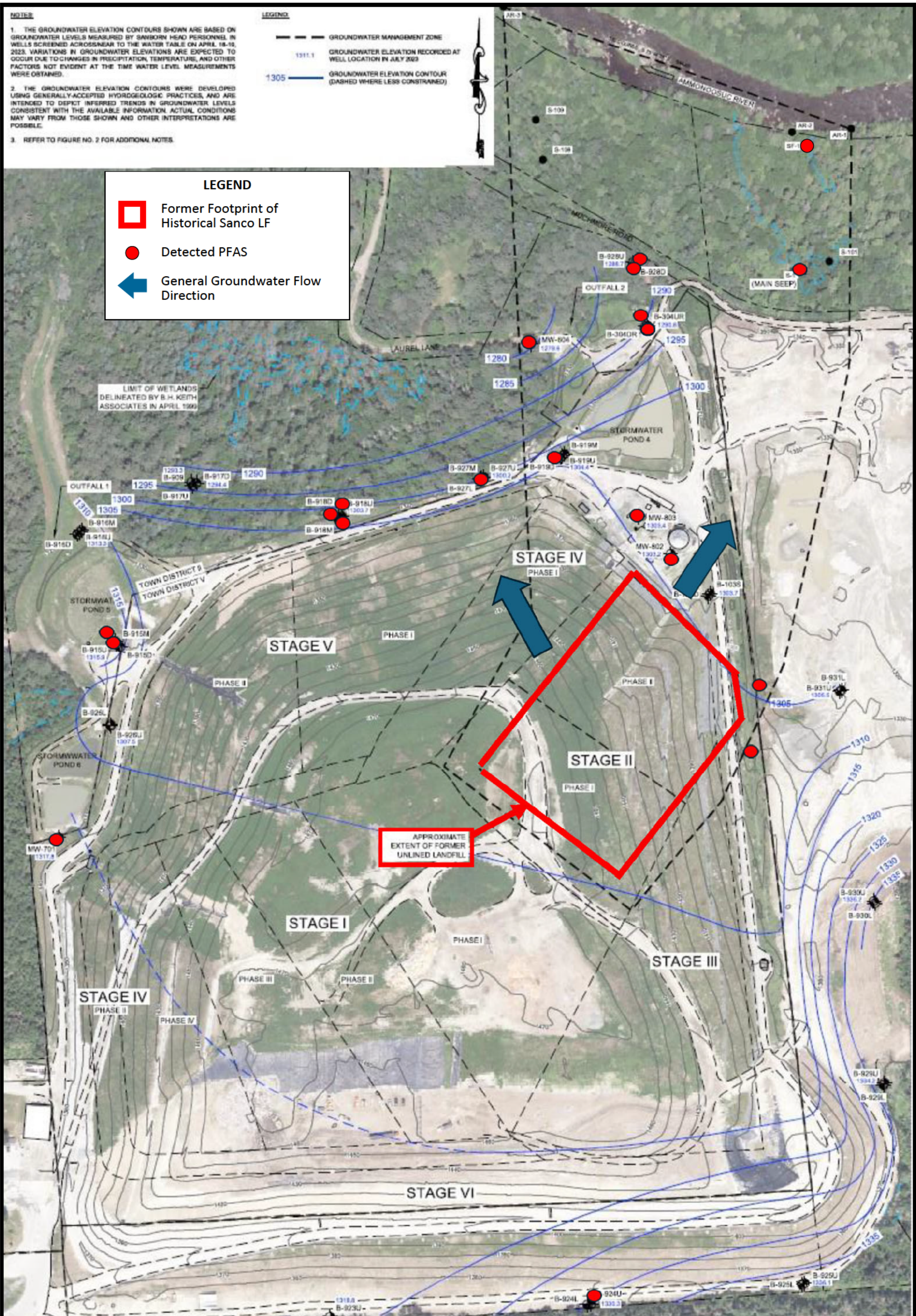


Figure taken from Sanborn Head & Associates (SHA), July 2023 Groundwater Elevation Contour Plan.  
 PFAS data from SHA, July 2023 Tri-Annual/2023 Annual Water Quality Monitoring Results.  
 SHA October 2023 SSI Surface Water PFAS Sampling Data Transmittal.



**PFAS DETECTIONS AT NCS LANDFILL SITE**

PO Box 236 Colebrook, NH 03576	SIZE	CALEX PROJECT	DWG NO	REV
DES Site:	Drawn By:	March 2024	<b>Figure 4</b>	SHEET

**From:** [Wimsatt, Mike](#)  
**To:** [Amy Manzelli](#)  
**Subject:** RE: NCES Enforcement Request & Opinion Letter  
**Date:** Thursday, April 18, 2024 1:16:11 PM  
**Attachments:** [image001.png](#)

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Dear Attorney Manzelli,

Thank you for your email and for providing a copy of Calex Environmental Consulting's opinion letter. The New Hampshire Department of Environmental Services is aware that releases have occurred from operations associated with the lined landfill at North Country Environmental Services (NCES) over the years. Our site remediation project files contain documentation of these releases and NHDES' responses to them. When a release occurs, NH's Contaminated Site and Groundwater Release Detection Rules, Env-Or 600 and 700, require assessment monitoring, initial response action, and corrective actions in accordance with a NHDES-approved corrective action plan. NHDES is, and has been, evaluating compliance of the solid waste facility's operations with applicable rules and statutes, and we have, and will continue to, follow up on compliance issues in accordance with our Compliance Assurance Response Policy. Our evaluation of groundwater monitoring results submitted under the combined Groundwater Management and Groundwater Release Detection Permit for this facility do not indicate an active, ongoing discharge or release from the current operations or the landfill liner system.

Sincerely,  
Mike Wimsatt

Michael J. Wimsatt, P.G., Director  
Waste Management Division  
NH Department of Environmental Services  
PO Box 95, 29 Hazen Drive  
Concord, New Hampshire 03302-0095  
Tel 603-271-1997 Fax 603-271-2456  
[michael.j.wimsatt@des.nh.gov](mailto:michael.j.wimsatt@des.nh.gov)  
[www.des.nh.gov](http://www.des.nh.gov)

---

**From:** Amy Manzelli <[manzelli@nhlandlaw.com](mailto:manzelli@nhlandlaw.com)>  
**Sent:** Friday, March 22, 2024 2:58 PM  
**To:** Wimsatt, Mike <[michael.j.wimsatt@des.nh.gov](mailto:michael.j.wimsatt@des.nh.gov)>; Colby, Jaime <[Jaime.M.Colby@des.nh.gov](mailto:Jaime.M.Colby@des.nh.gov)>  
**Cc:** [town.clerk@townofdaltont.com](mailto:town.clerk@townofdaltont.com); [adminassistant@townofdaltont.com](mailto:adminassistant@townofdaltont.com); [selectmen@townofdaltont.com](mailto:selectmen@townofdaltont.com); [planningboard@townofdaltont.com](mailto:planningboard@townofdaltont.com); [selectmen@townoflittleton.org](mailto:selectmen@townoflittleton.org); [vpotter@townoflittleton.org](mailto:vpotter@townoflittleton.org); [abrousseau@townoflittleton.org](mailto:abrousseau@townoflittleton.org); [admin@bethlehemnh.org](mailto:admin@bethlehemnh.org); [townclerk@bethlehemnh.org](mailto:townclerk@bethlehemnh.org); [selectmen@townofcarroll.org](mailto:selectmen@townofcarroll.org); [administrativeassistant@whitefieldnh.org](mailto:administrativeassistant@whitefieldnh.org); [townclerk@whitefieldnh.org](mailto:townclerk@whitefieldnh.org); [mmoren@nccouncil.org](mailto:mmoren@nccouncil.org); [nccinc@nccouncil.org](mailto:nccinc@nccouncil.org); [onthefarm21@gmail.com](mailto:onthefarm21@gmail.com); Sales, Tracie <[tracie.j.sales@des.nh.gov](mailto:tracie.j.sales@des.nh.gov)>; Sales, Tracie <[riversprogram@des.nh.gov](mailto:riversprogram@des.nh.gov)>; Marchand, Michael <[michael.marchand@wildlife.nh.gov](mailto:michael.marchand@wildlife.nh.gov)>; Stanwood, Sabrina <[sabrina.stanwood@dncr.nh.gov](mailto:sabrina.stanwood@dncr.nh.gov)>; Lamb, Amy <[amy.lamb@dncr.nh.gov](mailto:amy.lamb@dncr.nh.gov)>

Sanders, Nicholas <Nicholas.Sanders@dot.nh.gov>; Kelvin.A.Brooks@doh.nh.gov; O'Rourke, James <James.W.Orourke@des.nh.gov>

**Subject:** NCES Enforcement Request & Opinion Letter

**EXTERNAL:** Do not open attachments or click on links unless you recognize and trust the sender.

---

Good Afternoon Director Wimsatt and Ms. Colby,

Please see attached the opinion letter of Calex Environmental Consulting.

As you will see, after Calex's careful and comprehensive analysis of decades of scientific records, Calex concludes NCES is currently releasing landfill contaminants into groundwater, at least in part, from NCES' current landfilling activities. In other words, Calex opines, NCES' current releases of landfill contaminants are not only from the historical Sanco landfill.

NCES releasing landfill contaminants from its current operations violates both New Hampshire laws and NCES permits. Accordingly, on behalf of my client North Country Alliance for Balanced Change, I respectfully request the Department immediately enforce applicable laws against NCES and reply back to me to confirm to me that it is doing so.

Thank you,

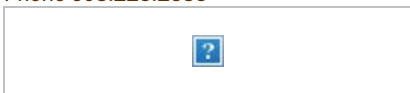
Amy

**Amy Manzelli, Esq. she/her**

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[manzelli@nhlandlaw.com](mailto:manzelli@nhlandlaw.com)

Phone 603.225.2585



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