State-Licensed Disposal Area at West Valley: 2022 Annual Report

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NEW YORK STATE | NYSERDA

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Advance clean energy innovation and investments to combat climate change, improving the health, resiliency, and prosperity of New Yorkers and delivering benefits equitably to all.

NYSERDA Record of Revision

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Revision Date	Description of Changes	Revision on Page(s)
March 2023	Original Issue	Original Issue
June 2023	Removal of mrem/hr in Acronyms and Abbreviations and Table D-1, and replacement with µrem/hr	vi, vii, D1, and D2

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State-Licensed Disposal Area at West Valley

2022 Final Report

Prepared for:

New York State Energy Research and Development Authority

West Valley, NY

June 2023

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Acronyms and Abbreviations

AMSL	above mean sea level
BGS	below ground surface
BOD	biological oxygen demand
°C	degree Celsius
cm	centimeter
COD	chemical oxygen demand
Consent Order	Administrative Order on Consent
CRDL	contract required detection limit
DEC	New York State Department of Environmental Conservation
ft.	feet
GMP	Groundwater Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley
ICM	interim control measure
LiDAR	Light Detection and Ranging
LMP	Leachate Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley
m	meter
MDC	minimum detectable concentrations
MDL	method detection limit
mg/L	milligrams per liter
mR/Qtr	milliroentgen per quarter
NAVD	North American Vertical Datum
NDA	U.S. Nuclear Regulatory Commission-Licensed Disposal Area
NTU	nephelometric turbidity unit
NYCRR	New York State Codes, Rules, and Regulations
NYSERDA	New York State Energy Research and Development Authority
pCi/L	picocurie per liter
PQL	practical quantitation limits
Q	qualifier
RCRA	Resource Conservation and Recovery Act
SDA	State-Licensed Disposal Area
SPDES	State Pollutant Discharge Elimination System
SU	standard units
TLD	thermoluminescent dosimeter

Acronyms and Abbreviations continued.

TSS	total suspended solids
µg/L	microgram per liter
µmhos/cm	micromhos per Centimeter
µrem/hr	microrem per hour
UPL	upper predictive limits
UTL	upper tolerance limits
VOC	volatile organic compound
WNYNSC	Western New York Nuclear Service Center
WP-91	Well Point-91
WVDP	West Valley Demonstration Project
WVSMP	West Valley Site Management Program
XR-5	ethylene interpolymer alloy geomembrane

S.1 Executive Summary

2022 PERFORMANCE

The New York State Energy Research and Development Authority (NYSERDA) maintains and monitors the State-Licensed Disposal Area (SDA) to protect public health, safety, and the environment. The SDA is located at the Western New York Nuclear Service Center (WNYNSC). This report summarizes the results of environmental monitoring, erosion monitoring, facility operations and maintenance, and waste management activities conducted during calendar year 2022 at the SDA.

In 2022, NYSERDA safely and successfully completed several field activities, including:

- Routine leachate and groundwater level monitoring at 63 locations on a monthly and quarterly basis.
- Additional groundwater level monitoring at 35 piezometer locations.
- Routine groundwater, surface water, and stormwater sampling at 28 locations for 86 different parameters.
- Gamma radiation measurements at 51 locations with 204 individual measurements.
- Thermoluminescent dosimeter monitoring at 11 locations with 44 individual measurements.
- Trench cap and North Slope elevations at 142 routine locations, with the North Slope elevation survey completed at least quarterly through June 2022.
- North Slope elevations at 36 focused or biased locations at least quarterly through June 2022.
- Forty separate inspections performed for the buildings, waste, geomembrane cover, erosion monitoring, and workplace safety at the SDA.

NYSERDA also continued to perform inspections of the North Slope weekly or after significant rain/snow events during 2022.

The 2022 environmental monitoring data (from groundwater, surface water, stormwater, and gamma radiation measurements) indicate radioactive and/or chemical constituents in the SDA trenches are being effectively contained.

Based on data collected during 2022, the Trench 14 Interim Control Measure (ICM) completed at the north end of Trench 14 has reduced groundwater elevations in this area and appears to be effectively reducing the flow of water into Trench 14.

For all SDA trenches, the current leachate levels are at least 10 feet (ft.) below the top of the trench indicating that NYSERDA's SDA water management activities are effective and protective of public

health and safety and the environment. In addition, inspections indicate that the SDA trench caps remain stable.

In September 2022, NYSERDA began a slope stabilization project on the north end of the SDA to address soil slumping that was identified in November 2021. The project included:

- removal of the loose surficial soils that had slumped
- armoring the slope with large stone to prevent erosion
- addition of pathways for the rain/snow and groundwater to be efficiently removed from the slope
- reduction in the steepness of the slope

The North Slope Stabilization Project was safely and successfully completed in December 2022 with minor restoration activities planned for the 2023 field season.

The erosion control measures are effective at stabilizing the stream channels and slopes surrounding the SDA, and the West Valley Site Management Program (WVSMP) operations and maintenance actions continue to keep the SDA systems functioning properly, and the grounds in good condition. The 2022 erosion monitoring reports indicate that there were no erosion concerns identified that currently threaten the integrity of the SDA.

The 2022 precipitation total at the SDA was 43.50 inches. This is 2.95 inches lower than the five-year average for the SDA. NYSERDA will continue to monitor precipitation at the SDA.

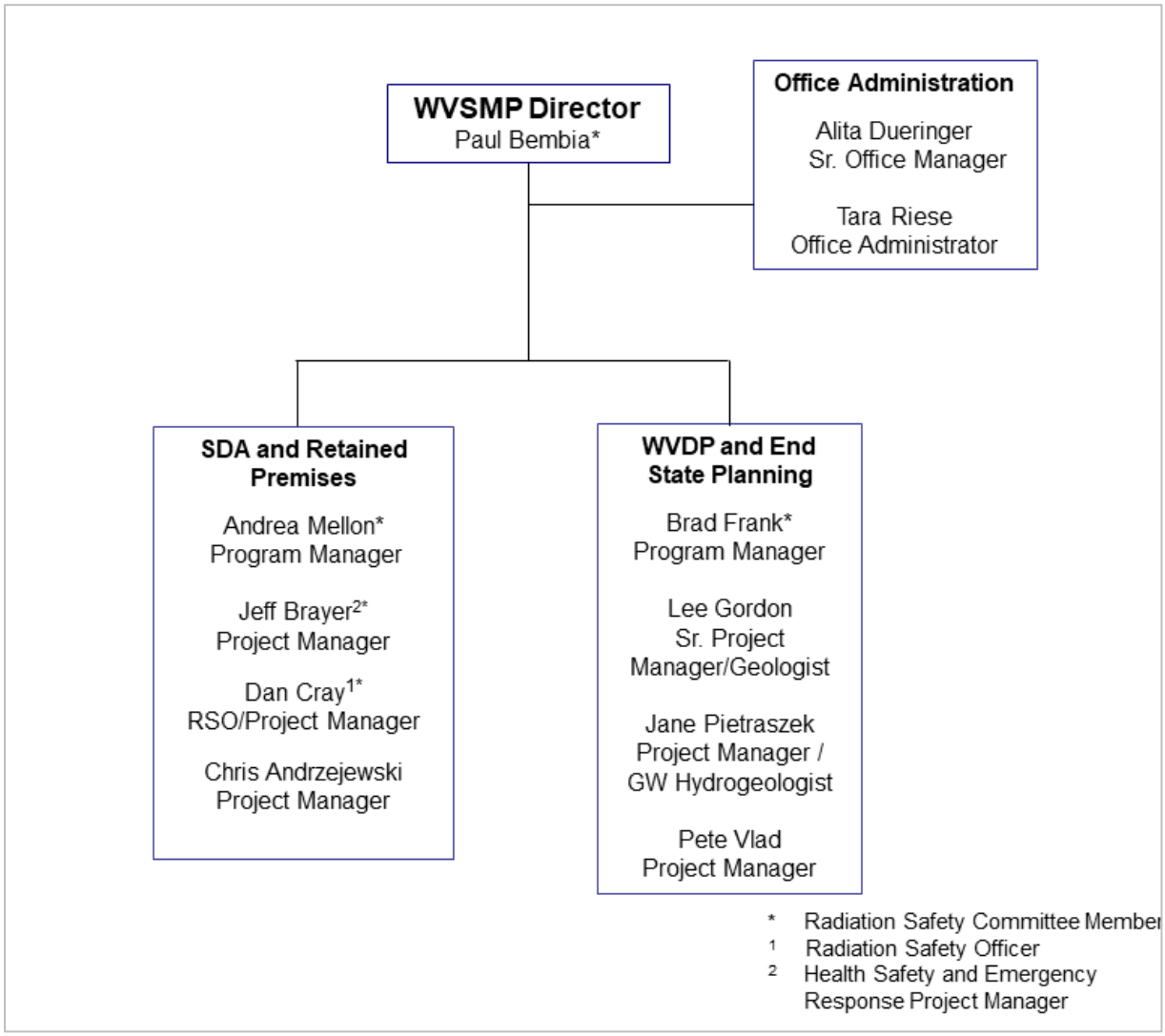
This report is prepared in accordance with the New York State Department of Environmental Conservation (DEC) radiation control regulations and the SDA radiation control program. Annual reporting requirements are specified in:

- Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (NYCRR) Part 380, Rules and Regulations for the Prevention and Control of Environmental Pollution by Radioactive Materials, February 2, 2002.
- DEC Radiation Control Permit #137-6, Permit No. 9-0422-00011/00011, December 29, 2021.

Part 380 Permit inspections were conducted on June 28-30, 2022, and on November 1-2, 2022. The inspections included records review, and a visual walkover inspection of the facility, surrounding slopes and streams, surface water, and soil sample collection. The inspector noted that NYSERDA operations at the SDA were in compliance with the Part 380 regulations and the conditions of the permit.

S.2 West Valley Site Management Program

NYSERDA's WVSMP is responsible for the protection of public health, safety, and the environment at the WNYNSC. The WVSMP is comprised of 11 professionals with diverse talents and expertise. The mission of the WVSMP is to be responsible stewards of the WNYNSC, including the SDA, by using objective analysis, and soliciting multiple perspectives to identify, assess, and implement effective, enduring approaches to protect the environment, and the well-being of our workers.



1 SDA Description

The SDA occupies approximately 15 acres of the WNYNSC (Figure 1-1) immediately adjacent to the West Valley Demonstration Project (WVDP). The SDA consists of three filled lagoons and two sets of parallel trenches that contain radioactive waste: 1 through 7 in the northern area and 8 through 14 in the southern area (see Figure 1-2). The SDA is surrounded by an eight-foot-high, chain-link fence, which includes a one-foot barbed-wire outrigger. NYSERDA controls access to the SDA by limiting the issuance of keys to the six, locked SDA gates. In addition, a contracted security service conducts routine patrols of the SDA's perimeter.

Between 1963 and 1975, Nuclear Fuel Services, Inc. (the SDA operator at that time), disposed of approximately 2.4 million cubic ft. of radioactive waste in trenches constructed in the native silty-clay soil. These trenches are 450 to 650 ft. in length and are approximately 20 ft. deep. Trench cross-sections are trapezoidal in shape, with a top width of 35 ft. and a bottom-floor width of 20 ft. During construction of the SDA trenches (except for Trenches 6 and 7) the trench floors were sloped along their length to allow water to drain to a low point where a trench sump was located. A vertical pipe, which extends from above the trench cap to each sump, provides a way to routinely monitor trench water elevations. The sump pipe also serves as a conduit through which water can be sampled or removed from the trenches. Each trench is covered with an eight- to 10-ft.-thick mounded cap of compacted clay, and a drainage swale is located between adjacent trenches to direct precipitation away from the trenches.

Differing in both physical form and construction from other trenches, Trenches 6 and 7 were built to hold high-activity wastes that required immediate shielding. Trench 6 is a series of individual holes in which waste was placed, while Trench 7 is a narrow, shallow trench where waste containers were placed and encased in concrete. A sump was not installed in either of these two trenches.

Figure 1-1. Map of the WNYNSC

Source: NYSERDA

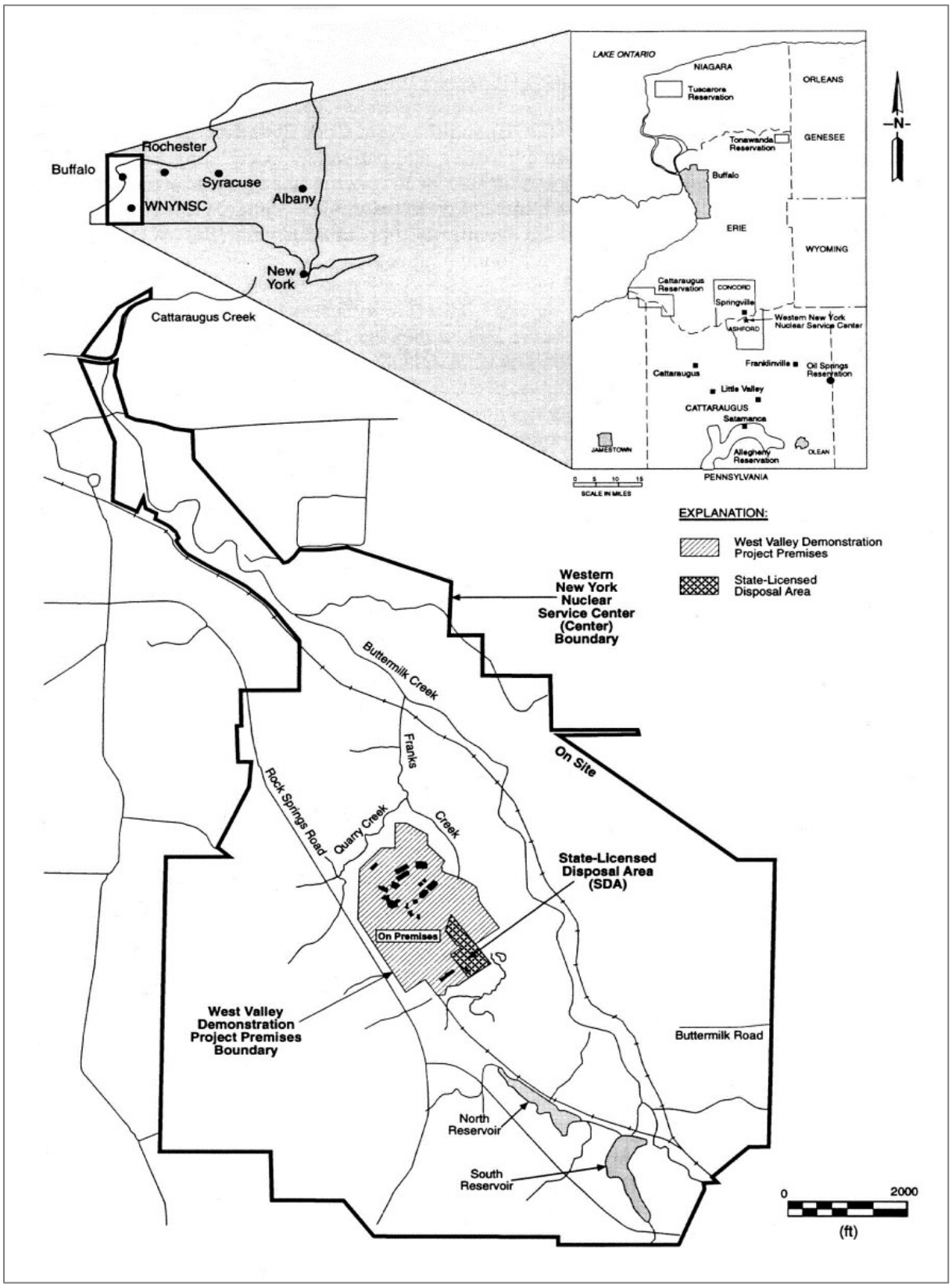


Figure 1-2. Aerial Photograph of the SDA

Source: NYSERDA

1.1 Leachate Management

Between 1990 and 1991, NYSERDA installed three tanks in two buildings at the SDA. In 1991, 8,000 gallons of leachate were pumped from Trench 14 into a 9,200-gallon fiberglass tank, located in the smaller of the two buildings. In 2009, the 8,000 gallons of leachate were removed from the fiberglass tank, placed in U.S. Department of Transportation-approved shipping containers, and shipped to a licensed and permitted treatment and disposal facility. The empty tank was removed in 2010 and shipped to a licensed facility for off-site disposal.

On December 29, 2011, NYSERDA received certification of clean closure from DEC when the portion of the Leachate Treatment Facility (SDA Solid Waste Management Unit No. 5) that stored mixed waste (i.e., leachate and Tank T-1) was removed, shipped, and treated, and the facility was sampled for confirmation that it was free of hazardous waste. On April 24, 2012, DEC approved NYSERDA's Protective Filer Certification for the unused portion of the Leachate Treatment Facility (two Frac tanks), and on April 14, 2020, NYSERDA received notification from DEC that a *Determination of No Further Action*[1] for the SDA Solid Waste Management Unit No. 5 was made.

1.2 Trench Water Infiltration Controls

NYSERDA has completed six projects as ICMs under the Resource Conservation and Recovery Act (RCRA) 3008(h) Administrative Order on Consent (Docket No. II RCRA-3008(h) 92-0202) (Consent Order). The Consent Order authorized the U.S. Environmental Protection Agency and DEC to issue orders requiring corrective action or such other responses as necessary to protect human health or the environment. Specific interim measures include:

- In September 1992, NYSERDA installed a soil-bentonite subsurface barrier wall along the western side of Trench 14 to prevent groundwater flow toward the south trenches (eight through 14). In June 1993, the project was completed with the installation of a very low-density polyethylene geomembrane cover over the surface of the trenches, extending from the centerline of Trench 12; across Trenches 13, 14, and the barrier wall, and terminating in a stormwater drainage swale excavated just beyond the barrier wall. Slit-trench monitoring wells were also installed on either side of the barrier wall to monitor for possible groundwater mounding upgradient of the wall.
- In 1995, NYSERDA expanded the use of the geomembrane covers at the SDA with the installation of a reinforced, ethylene interpolymer alloy geomembrane (XR-5) cover over Trenches 1 through 8, and 10 through 12. As part of this project, NYSERDA installed a stormwater management system consisting of five, geomembrane-lined stormwater basins to detain and release precipitation without increasing peak runoff from preproject conditions.

- In 1999, NYSERDA installed an XR-5 geomembrane cover on Trench 9, replacing the bioengineering management cover installed as a pilot project in 1993.
- In 2010, NYSERDA installed a new XR-5 geomembrane cover over the 1992 very low-density polyethylene geomembrane cover to ensure that water infiltration controls remained effective.
- In 2017, NYSERDA installed an XR-5 geomembrane cover on Trenches 1 through 12, placing the new geomembrane over the existing covers, and included reconfiguration and elimination of one stormwater detention area (W03), reconfiguration of the hardstand barrier area, regrading of select areas, removal of obsolete pipe penetrations, and installation of weighted ballasts to limit potential damage from wind.
- In 2021, NYSERDA installed a subsurface sheet-pile wall at the north end of Trench 14 and a geomembrane cover over the U.S. Nuclear Regulatory Commission-Licensed Disposal Area (NDA) hardstand area. The new geomembrane was welded to the existing SDA geomembrane perimeter and also to the existing NDA geomembrane perimeter for one continuous cover. The NDA and SDA stormwater conveyance systems were removed during construction, and the NDA system was reinstalled. With the construction of the SDA subsurface barrier wall, the SDA stormwater system was no longer needed and was not replaced.

1.3 North Slope Stabilization Controls

In 2022, NYSERDA completed a stabilization project of the SDA North Slope. This project removed the original loose soils from the slope that were deposited during construction of the trenches in the mid-1960s, and replaced them with a stone layer. Drainage features were also added to improve water movement from the slope.

1.4 Corrective Measures Study

In addition to radionuclides, the SDA trenches are known to contain materials that are classified as hazardous constituents under RCRA. Because there is a possibility that these materials could be released from the trenches, NYSERDA is required to prepare a corrective measures study under the requirements of the Consent Order. On October 6, 2010, NYSERDA submitted *the Final Focused Corrective Measures Study for the SDA at the WNYNSC West Valley, New York*.[2] NYSERDA is required to submit a Final Corrective Measures Study at the time a decision is made on the ultimate disposition of the SDA.

1.5 Hazardous Waste Management Permit Applications

In 2010, DEC requested that NYSERDA move from an interim status permit to a final status permit. In response, on January 6, 2011, NYSERDA submitted a draft 6 NYCRR Part 373 Hazardous Waste Management Permit Application (i.e., Corrective Action Permit Application). On February 10, 2011, DEC requested that the timeframe for review and processing of NYSERDA's Hazardous Waste Management Permit be suspended per 6 NYCRR Part 621 of the Uniform Procedures Act. NYSERDA

agreed to suspend the timeframes for this application on February 23, 2011. NYSERDA anticipates a Final Status RCRA Permit to be developed and finalized once the Phase 2 Supplemental Environmental Impact Statement end-state decisions for the SDA are determined.

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[1] Letter, Lynn Winterberger, DEC, to Paul Bembia, NYSERDA, "Determination of No Further Action – Solid Waste Management (SMWU) State-Licensed Disposal Area Unit No. 5 (SDA-5)," dated April 14, 2020.

[2] NYSERDA. 2010. "Final Focused Corrective Measures Study for the State-Licensed Disposal Area at the Western New York Nuclear Service Center West Valley, New York." Prepared by Ecology and Environment, Inc.

2 Environmental Monitoring

2.1 Trench Leachate Elevations

2.1.1 Leachate Elevation Monitoring

Because the SDA trenches are constructed in a highly impermeable clay, water that enters the trenches tends to accumulate. As such, routine measurements are conducted to monitor the elevation of leachate in each trench. One SDA trench sump is located in each of Trenches 1 through 5, 8, 9, and 11 through 13. Two sumps, designated 10N and 10S, are located in Trench 10; and one sump designated 14, and one well-point designated Well Point-91 (WP-91), are located in Trench 14 (see Figure 2-1).

Reference elevation surveys for each trench were completed in July 2018, with the elevations updated in February 2019. This survey data was used to calculate the leachate elevations in Table A-1.

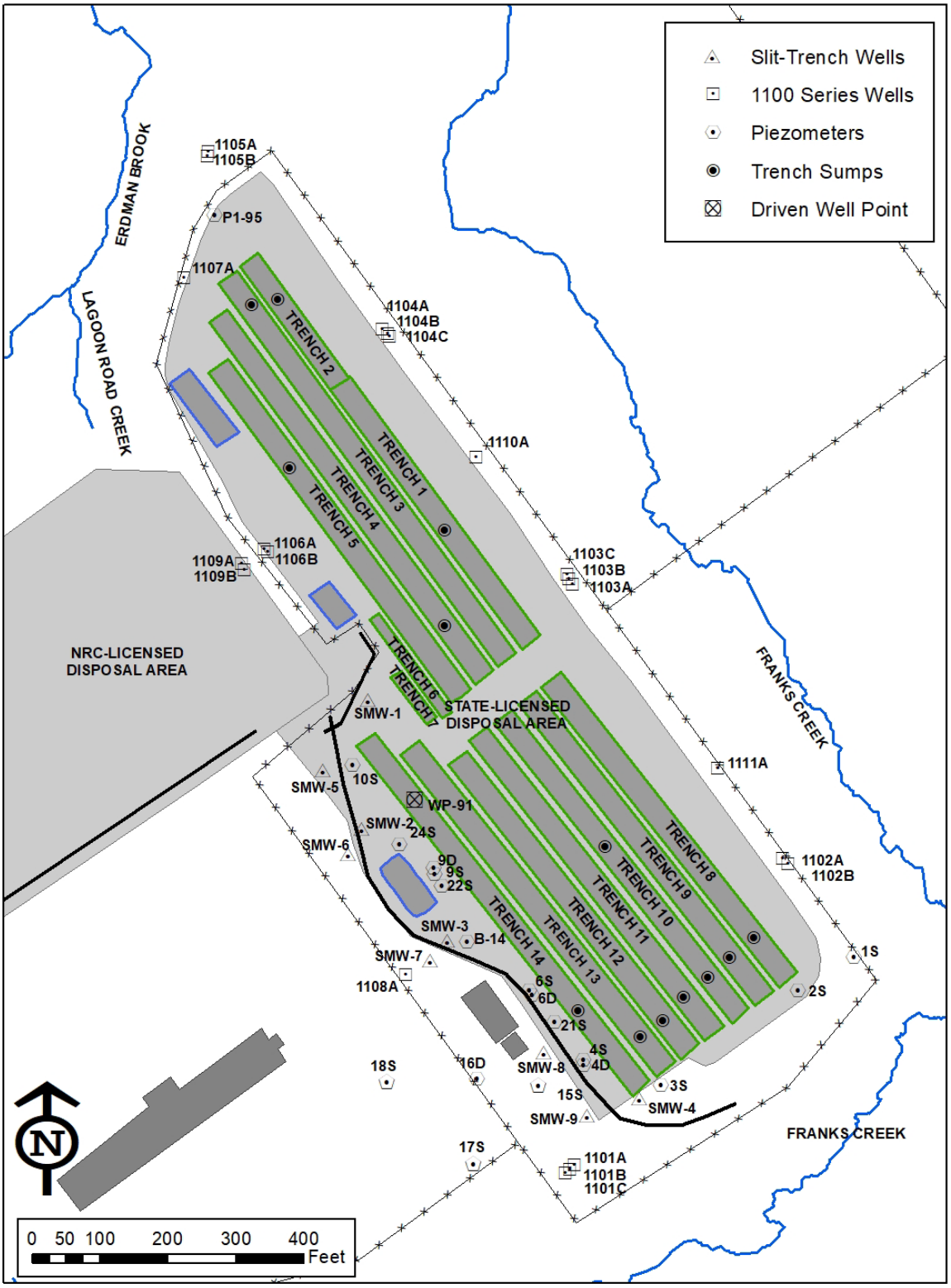
Leachate elevations are measured in accordance with the *Leachate Monitoring Plan for the State-Licensed Disposal Area (SDA)* (LMP[3]). In addition to requiring the leachate elevation measurements, the LMP specifies data assessment, notification, and reporting requirements. Table A-1 presents leachate elevation data for 2022. Graphical presentations of leachate elevations are presented using regression lines (red) and prediction lines (green) in Figures A-1 through A-16. In addition, the slope (rate of increase or decrease) and the R^2 value (coefficient of determination) are shown on these figures. The R^2 value is a statistical ratio of how the data fit the regression line and how the data points vary around their mean. In general, the closer the value of R^2 is to 1.0, the better the model fits the data.

For Trenches 1 and 3, two or more regression lines and prediction interval graphs are provided. This is due to changes in the rate of increase or decrease for these trenches.

Leachate elevation measurements for 2022 were collected quarterly in March, June, September, and December (see Table A-1). Additional monthly leachate elevation measurements were taken in Trenches 1, 13, and 14 (including WP-91) (see Section 2.1.2).

Figure 2-1. Trench Sump and Groundwater Monitoring Locations

Source: NYSERDA



2.1.2 Leachate Elevation Trend Assessment

The LMP requires an annual assessment of long-term leachate elevation trends. The long-term statistical data assessment for 2022 (*Annual Statistical Assessment of SDA Water Elevations - Data Through 2022*[4]) indicates that from 2000 through 2022, most trenches show a decreasing long-term leachate elevation trend (see Figure 2-2).

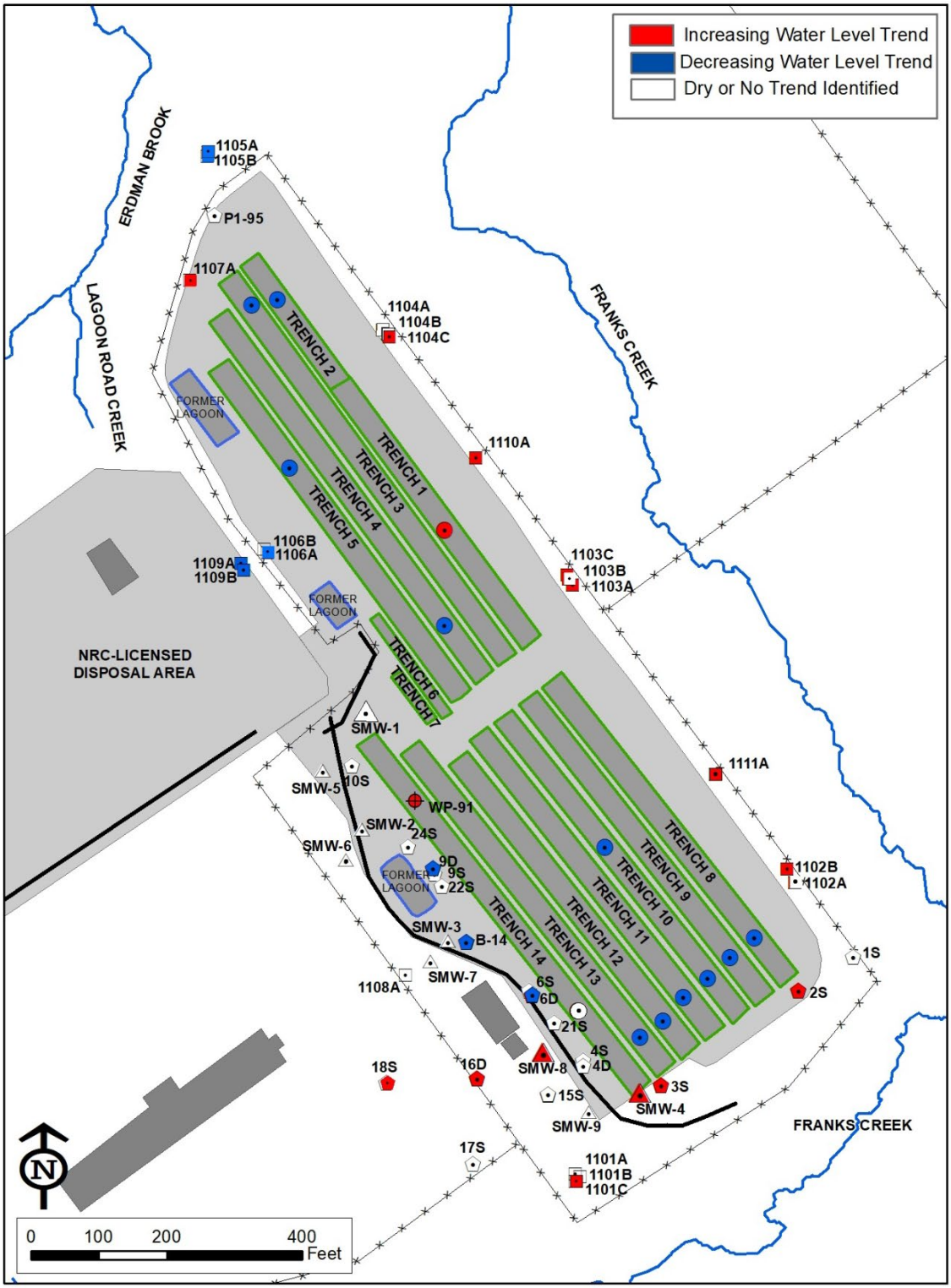
Until 2017, Trench 1 was shown to be exhibiting an increasing long-term trend (see Figure A-1). However, the Trench 1 sump was sampled in September 2017 and the leachate level in the sump decreased by approximately 0.48 ft. (approximately six inches) during sampling and did not recover through 2022 (see Figure A-2). Based on the regression analysis plotted in Figure A-2, since September 2017, Trench 1 remained stable until November 2021. In November 2021, the monthly measurement collected indicated that the leachate level had decreased by 1.51 ft., and the fourth quarter 2021 leachate elevation measurement collected in December 2021 for Trench 1 supported this change. NYSERDA began collecting weekly leachate elevations for Trench 1 in December 2021 and in February 2022, these levels returned to historical levels, where they remained for 2022. The additional weekly measurement of Trench 1 was discontinued in 2023. Measurements at Trench 1 will continue on a monthly basis.

Levels collected through 2021 have indicated there is little leachate in Trench 1, which is consistent with the results of investigations by Nuclear Fuel Services, Inc. in 1970 and 1981.[5] Statistical outlier testing of the November and December 2021 and the January 2022 measurements were completed using the Tukey and Rosner tests. The results of these tests indicate that all three of these measurements were statistical outliers or anomalies.

For the purpose of long-term trending, the three data points are removed from the Trench 1 graphs (Figures A-1 and A-2), but will not be removed from the data population until NYSERDA evaluates if there are any physical changes in the trench sump that may be creating this measurement variability. NYSERDA will continue to monitor and evaluate the leachate elevation in Trench 1.

Figure 2-2. SDA Water Elevation Trends

Source: NYSERDA



Trench 3 had been exhibiting a decrease of 1.88 inches per year through the end of 2019. Beginning in 2020, the rate of deceleration increased to 2.10 inches. In 2021, the deceleration increased to 5.8 inches, and in 2022, the rate of deceleration was 5.4 inches. The change necessitates a separate regression line for the Trench 3 graph to accurately demonstrate current leachate trending conditions at this location (see Figures A-4 and A-5). The trend in Trench 3 continues to be evaluated and an evaluation of the trench sump conditions for Trench 3 is also planned for 2023.

An increase in the Trench 14 leachate elevation has been observed since 2011 following a period of consistent decrease. Based on the regression analysis plotted in Figure A-15, between 2012 and 2022, Trench 14 had been increasing at approximately 0.46 inches per year. However, after completion of the Trench 14 ICM activities in October of 2021, leachate levels in Trench 14 have been decreasing. In 2022, the leachate in the Trench 14 sump decreased by three inches and has returned to 2015 levels.

Monitoring of location WP-91 began in 2013 to supplement data from Trench 14, as WP-91 is located on the northern end of the trench. The 2022 data show that the leachate levels are similar to the Trench 14 location (Figure A-16). Based on the regression analysis plotted in Figure A-16, between 2013 and 2022, WP-91 had been increasing at approximately 0.40 inches per year. However, after completion of the Trench 14 ICM activities in October 2021, leachate levels at WP-91 have been generally stable or decreasing. In 2022 the leachate in WP-91 decreased by approximately 3.3 inches. The current leachate levels do not represent a threat of release, or concern to health and safety for the public or the environment.

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[3] Throughout this report, LMP refers to the Leachate Monitoring Plan: NYSERDA. 2019. "Leachate Monitoring Plan for the State-Licensed Disposal Area (SDA), ENV501.06."

[4] NYSERDA. 2022. "Annual Statistical Assessment of State-Licensed Area Water Elevations – Data Through 2022." Prepared by Stantec.

[5] Letter, J. P. Duckworth to. W. H. Lewis, "Waste Burial Trench 1 Study," dated June 5, 1981.

2.2 Groundwater Monitoring

The SDA groundwater monitoring network consists of 21 groundwater monitoring wells (the 1100-series wells), 19 piezometers, and nine slit-trench wells. The location of each monitoring location is shown on Figure 2-1. The purpose of the groundwater monitoring program is twofold: (1) to provide data of sufficient quality and quantity to allow detection of the migration of radionuclides or volatile organic compounds (VOCs) from the SDA via groundwater; and (2) to provide information on hydrologic conditions near the disposal trenches. The Groundwater Monitoring Program is conducted in accordance with the *Groundwater Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley* (GMP[6]). The 1100-series wells, piezometers, and slit-trench wells are inspected and maintained as described in the GMP.

Reference elevation surveys for each groundwater location were completed in July 2018, with the elevations updated in February 2019.

2.2.1 Groundwater Elevation Monitoring

The GMP requires quarterly groundwater elevation measurements in the 1100-series wells, the piezometers, and the slit-trench wells. Well construction information for each type of well is presented in Tables B-1, B-3, and B-5. In 2022, quarterly measurements were taken in March, June, September, and December; and the results for each well are presented in Tables B-2, B-4, and B-6, respectively. In addition, monthly groundwater elevation measurements were taken at a number of locations in support of the Trench 14 leachate investigation and mitigation activities.

Groundwater elevation data are used to construct quarterly groundwater elevation contour maps for the Weathered Lavery Till and the Kent Recessional Sequence (see Figures B-1 through B-12). The 2022 groundwater contour maps show the hydraulic gradient in the Weathered Lavery Till, in the vicinity of the disposal trenches, to be inward toward the trenches. The path of the groundwater movement in the Kent Recessional Sequence is northeasterly. These trends are consistent with historical data.

2.2.2 Groundwater Elevation Trend Assessment

An assessment of increasing or decreasing trends in groundwater elevations was conducted for the data collected in 2022 (*Annual Statistical Assessment of SDA Water Elevations – Data Through 2022*[7]). The statistical assessment used groundwater elevation data from January 2000 through December 2022, and the results of the trend assessment show increasing long-term water elevation trends in: Wells 1101C,

1102B, 1103A, 1103C, 1104C, 1107A, 1110A, and 1111A; Piezometers 2S, 3S, 16D, and 18S; and Slit-Trench Wells SMW-4 and SMW-8. A long-term decreasing water elevation trend was observed in: Wells 1105A, 1105B, 1106A, 1109A, and 1109B; and Piezometers 6D, 9D, and B-14. Piezometers 4S and 9S; and Slit-Trench Wells SMW-2 and SMW-3 have been dry throughout the statistical assessment period. No upward or downward trends were found in the remaining groundwater wells at the SDA. Due to the 22-year assessment period, Well 1107A demonstrates an increasing elevation trend (see Figure 2-2). However, in the fourth quarter of 2022, 1107A shows a decreasing trend, which can be attributed to the North Slope stabilization activities (see Section 4.3.3).

As Figure 2-2 shows, the majority of the wells located within the area covered by the geomembrane and immediately downgradient of the slurry wall and subsurface sheet pile wall are dry or exhibit no trend. Four locations upgradient of the slurry wall show an increasing trend. The distribution of groundwater elevations near the west side of Trench 14, and the decreasing long-term leachate elevation trends in all but two of the SDA trenches, reflect the continued effectiveness of the water infiltration controls system (i.e., subsurface barrier walls and geomembrane cover).

2.2.3 Groundwater Parameter Monitoring

In accordance with the GMP, the 1100-series wells were sampled semiannually (May/July and November) during 2022. After the May event was conducted, NYSERDA was notified that several wells (1102A, 1102B, 1103A, 1103B, 1104A, 1104B, 1105A, 1105B, 1106A, and 1106B) had detections of toluene. A second sampling event was performed on July 7, 2022, to resample the noted wells for VOCs. One additional location was also resampled for VOCs (Well 1111A) due to the laboratory misplacing the initial VOC sample. The resampled wells did not identify any detections of toluene, and based on the information provided by the laboratory, these initial results were anomalous.

After the November event was conducted, the gross beta results at Well 1101A was found to be elevated compared to historic results. NYSERDA decided to resample this location in January 2023 to verify the gross beta result. DEC was notified of the original result and the decision to resample in an email from NYSERDA on January 6, 2023. The January 2023 resampling results were consistent with historical levels and DEC was notified on February 2, 2023.

Analytical parameters monitored semiannually included gross alpha, gross beta, and tritium, and field water quality parameters (conductivity, pH, temperature, and turbidity). Analytical parameters monitored annually in 2022 included gamma-emitting radionuclides (by gamma spectroscopy); four beta-emitting

radionuclides (carbon-14 [C-14], iodine-129 [I-129], strontium-90 [Sr-90], and technetium-99); and VOCs. Checklists of the parameters sampled at each well are presented in Tables B-7 and B-8. Groundwater analytical results for all parameters are presented in Tables B-9 and B-10.

2.2.3.1 Gross Alpha

For the May event, four wells (1101A, 1103C, 1104C, and 1106A) exceeded their respective Upper Tolerance Limits (UTL) or Upper Predictive Limits (UPL) for gross alpha. Review of the historical data for these wells indicates that the gross alpha results for Well 1101A (5.84E+00±3.05E+00 picocurie per liter [pCi/L]), Well 1103C (2.77E+01±5.78E+00 pCi/L), Well 1104C (1.11E+01±4.27E+00 pCi/L), and Well 1106A (5.75E+00±2.46E+00 pCi/L) do not indicate an increasing trend at any of these wells. With the exception of Well 1103C, no new maximum concentrations were reported for any sampled location. This result was above the 6 NYCRR 703.5 – Table 1 Water Quality Standards for Surface Water and Groundwater (6 NYCRR 703.5[8]) criteria. However, laboratory review of the groundwater sample from Well 1103C indicated that there was a high level of solids in the sample. These solids may have interfered with the sample analysis for gross alpha. For the November event, one well (1104B) exceeded its UTL. Review of the historic data from this well indicates that the gross alpha result (4.48E+00±1.07E+00 pCi/L) was above the mean of the detected results but was not a new maximum concentration, and no trends were identified.

Gross alpha results were assessed using the statistical intrawell comparison protocol described in the GMP. Results of gross alpha monitoring are consistent with historical results.

2.2.3.2 Gross Beta

For the May 2022 sampling event, the UTL/UPL was exceeded for Wells 1103C, 1105A, and 1108A. Review of the historical data for these wells indicates that the gross beta results for Well 1103C (2.86E+01±2.96E+00 pCi/L), Well 1105A (6.30E+00±1.87E+00 pCi/L), and Well 1108A (6.59E+00±1.81E+00 pCi/L) do not indicate an increasing trend at any of these wells. With the exception of Well 1103C, no new maximum concentrations were reported for any sampled location. For the November sampling event, the UTL/UPL was exceeded for Wells 1101A, 1103C, and 1104C. Review of the historical data for Wells 1103C (2.34E+01±1.25E+00 pCi/L) and 1104C (3.54E+01±3.65E+00 pCi/L) indicate that these concentrations are new maximum concentrations at these locations; however, a qualitative review of the data did not identify any trends. In addition, these results were below the 6 NYCRR 703.5 value for gross beta.

The original result for Well 1101A (2.73E+02±9.54E+00 pCi/L) was two orders of magnitude higher than historical results. NYSERDA requested that the laboratory use the remaining November sample to analyze for Sr-90. The Sr-90 result was 1.57E+00±6.20E-01 pCi/L and was "J" qualified due to high uncertainty. The Sr-90 result indicated that the elevated gross beta concentration was not due to the presence of Sr-90. In addition, the tritium result was consistent with historical values (nondetect). On January 17, 2023, NYSERDA resampled Well 1101A, and the resample result for gross beta (3.67E+00±1.51E+00 pCi/L) was consistent with historical results as are the results for all other radiological parameters. Based on the review of the data from Well 1101A and a comparison to historical results, it was determined that the gross beta result from the original sample in November was anomalous.

Gross beta results were assessed using the statistical intrawell comparison protocol described in the GMP. Results of gross beta monitoring are consistent with historical results.

2.2.3.3 Tritium

In May and November 2022, no UTLs/UPLs were exceeded for any of the sampled wells.

Tritium results were assessed using the statistical intrawell comparison protocol described in the GMP. Results of tritium monitoring are consistent with historical results.

2.2.3.4 Gamma-Emitting Radionuclides

In May 2022, gamma spectroscopy was performed for the 14 routinely reported radionuclides. The results were generally consistent with historical results. All results for beryllium-7, bismuth-214, cesium-134, cesium-137, cobalt-57, cobalt-60, lead-212, lead-214, potassium-40, radium-224, radium-226, thallium-208, thorium-234, and uranium-235 were below their minimum detectable concentrations (MDC), or 2-sigma uncertainties. There was insufficient water in Wells 1103C and 1104C for gamma spectroscopy analyses.

One result for lead-214 (Well 1110A) was above its MDC and 2-sigma uncertainty. Two results for bismuth-214 (Wells 1105B and 1108A) were above their MDC and 2-sigma uncertainty.

The May 2022 sample data did not require the development of control charts for the 14 routinely reported gamma analytes.

Sufficient groundwater was available in November 2022 to successfully sample Wells 1103C and 1104C for gamma spectroscopy. The results for all parameters were nondetect or below their MDCs and 2-sigma uncertainties, which is consistent with historical results.

The January 2023 resampling for Well 1101A indicated that all gamma spectroscopy parameters were negative or below their MDCs and 2-sigma uncertainties, which is consistent with historical results.

2.2.3.5 Beta-Emitting Radionuclides

Beta-emitting radionuclide sampling for C-14, I-129, Sr-90, and technetium-99 was performed in May 2022 and during the resampling of 1101A in January 2023. In May 2022, there was insufficient water in Well 1103C for I-129 and Sr-90 analyses.

All May 2022 and January 2023 results for C-14 were below their MDCs and consistent with historical results, which did not exceed the reporting criteria set forth in the GMP.

All May 2022 and January 2023 results for I-129 were below their MDCs and 2-sigma uncertainties. The May 2022 MDCs for the samples from Wells 1101A, 1101B, 1103A, 1103B, 1104B, 1106A, 1107A, 1109A, and 1111A exceeded the contract required detection limit (CRDL) of 1E+00 pCi/L; however, a "J" qualifier was not assigned because the results were all nondetect.

The May 2022 Sr-90 results were consistent with historical results and below the MDCs or 2-sigma uncertainties and CRDL of 1E+00 pCi/L except for Well 1107A (8.34E+00±-1.21E+00 pCi/L), which was above the CRDL, MDC, and 2-sigma uncertainty. Though above the CRDL, MDC, and 2-sigma uncertainty, the Sr-90 result for Well 1107A is consistent with the general downward trend in data observed at this location since 2013.

After the fifth positive detection for Sr-90 in Well 1107A was recorded in 2002, control charting was initiated. The current calculated mean and control limits are based upon the initial five positive detections. Based upon the control chart for Sr-90 in Well 1107A, an overall decreasing trend has been observed.

All 2022 results for technetium-99 were below their MDCs or 2-sigma uncertainties and the program detection limit of 5E+00 pCi/L, which is consistent with historical results.

2.2.3.6 Volatile Organic Compounds

For the May 2022 event, VOCs were not detected above the method detection limit (MDL) or practical quantitation limits (PQL) with the exception of toluene and methylene chloride. Toluene was detected in 14 samples, ranging from estimated concentrations below the laboratory reporting limit of 1.0 microgram per Liter (µg/L) (i.e., "J"-flagged values) to 8.56 µg/L in the field duplicate collected from Well 1104A. Toluene has not been routinely detected at these sampling locations. Methylene chloride was detected in eight of the 14 sample locations as estimated concentrations that were above the MDL and below the PQL. Although methylene chloride was not detected in any trip blanks, field blanks, or laboratory method blanks, it is generally considered a laboratory contaminant and has been detected occasionally at low concentrations in historical data. Due to the presence of toluene, the locations demonstrating the presence of toluene in May 2022 were resampled in July. The July resample toluene data was either a nondetect or "J"-qualified between the MDL and the PQL. Based on review and comparison of the May and July 2022 toluene data, the May 2022 toluene data was rejected. Methylene chloride was not detected in any of the resampled wells.

In November 2022, Well 1103C was sampled for VOCs. With the exception of acetone, which was detected between the MDL and PQL, was "J" qualified, and is a common laboratory contaminant, no volatile organic parameters were detected above their MDLs or PQLs. This is consistent with historical results.

2.2.3.7 Field Water Quality Parameters

Conductivity, temperature, turbidity, and pH are measured in the field during groundwater sampling. The 2022 water quality measurements were generally consistent with historical results and are reported in Table B-10. In May, there was insufficient groundwater at Wells 1103C and 1104C to collect water quality parameters. In November, there was insufficient groundwater at Wells 1103C, 1104C, and 1110A to collect water quality parameters. No new maximum concentrations were reported for either the May or November events.

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[6] Throughout this report, GMP refers to the Groundwater Monitoring Plan: NYSERDA. 2019. "Groundwater Monitoring Plan for the State-Licensed Disposal Area (SDA) at West Valley, ENV502.06."

[7] Stantec, pg. 11.

[8] Throughout this report, 6 NYCRR 703.5 refers to Table 1 Water Quality Standards for Surface Waters and Groundwater: DEC. 1998. "6 NYCRR 703.5 – Table 1 Water Quality Standards for Surface Waters and Groundwater."

2.3 Surface Water Monitoring

During 2022, quarterly surface water samples for gross alpha, gross beta, and tritium analyses were collected at the four SDA monitoring locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53). A background sampling location south (and upgradient) of the SDA on Buttermilk Creek (WFBCBKG) was collected quarterly and is used for data comparison. An annual sample was also collected at location WFBCANL, approximately 0.75 miles northeast (and downgradient) of the SDA on Buttermilk Creek.

As shown in Figure 2-3, WNNDADR, located in Lagoon Road Creek adjacent to both the SDA and the NDA, (and within the WVDP premises), and WNERB53, located in Erdman Brook downstream of WNNDADR, monitor surface water runoff from the SDA, NDA, and portions of the WVDP premises. WNDCELD, located in Franks Creek on the south side of the SDA, monitors surface water from areas adjacent to the WVDP Drum Cell upstream of the SDA. WNFRC67, located downstream on Franks Creek, monitors surface water on the eastern and southern portions of the SDA.

Figure 2-4 shows WFBCBKG, located upstream of the WNYNSC in Buttermilk Creek, which monitors background surface water conditions, and WFBCANL, also located in Buttermilk Creek, which monitors Buttermilk Creek just downstream of where the Kent Recessional unit groundwater is discharged to Buttermilk Creek via groundwater seeps.

Surface water monitoring data are presented in Tables C-1 through C-6. A statistical assessment of radiological constituents (gross alpha, gross beta, and tritium) for the SDA surface water was conducted using the data collected in 2022 (*Statistical Assessment of State-Licensed Radioactive Waste Disposal Area Surface Water Constituents for 2022*[9]). Results are discussed below.

2.3.1 Radiological Parameters

2.3.1.1 Gross Alpha

The 2022 gross alpha results for all four surface water sampling locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53) were statistically indistinguishable from background. The third quarter gross alpha result for WNDCELD was rejected as an outlier due to high solids in the sample; therefore, the 2022 annual dataset for that location had three data points instead of four. All 2022 gross alpha results were below the 6 NYCRR 703.5 (1.5E+01 pCi/L) criteria, which is used as a comparative value for gross alpha.

Figure 2-3. Surface Water Monitoring Locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53)

Source: NYSERDA

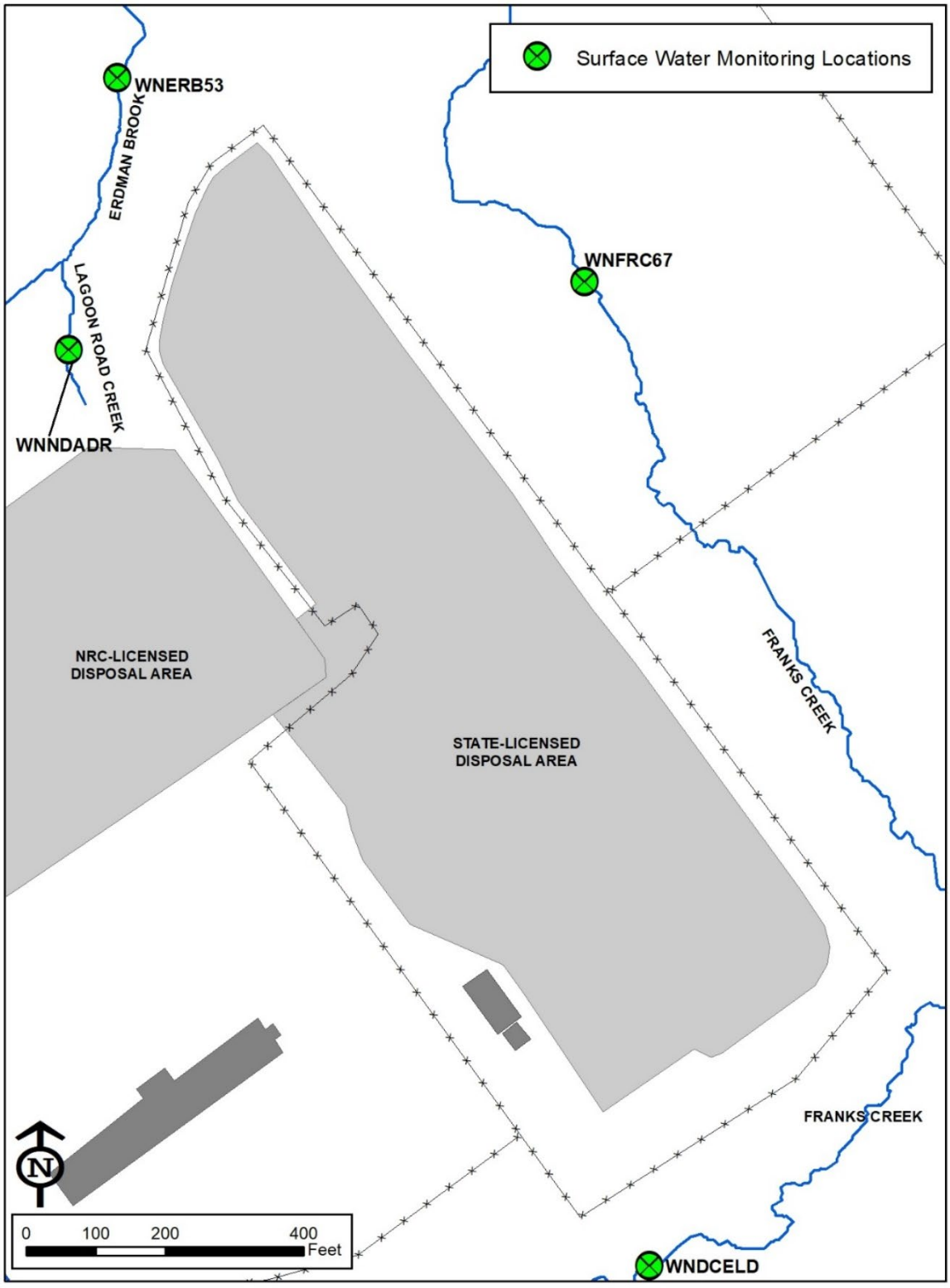
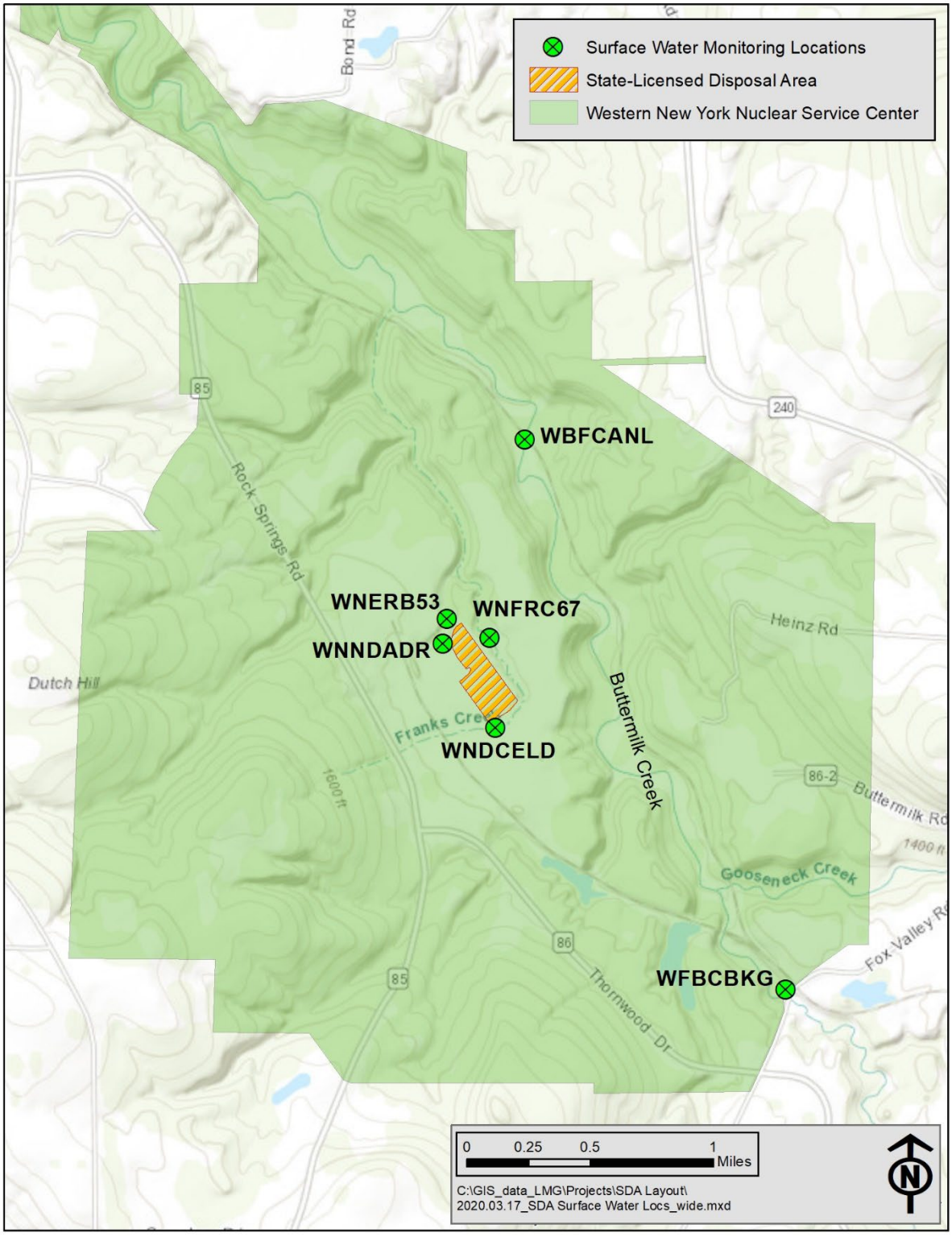


Figure 2-4. Surface Water Monitoring Locations (WFBCBKG and WFBCANL)

Source: NYSERDA



2.3.1.2 Gross Beta

The 2022 gross beta results for WNDCELD, WNFRC67, and WNERB53 were statistically indistinguishable from background. Gross beta results for WNNDADR were statistically higher than background; however, the results continue to decrease since the NDA geomembrane cover and subsurface barrier wall were installed in 2008.

Figure 2-5 shows the gross beta results for WNNDADR and the background location (WFBCBKG).

All gross beta results were below the 6 NYCRR 703.5 (1.0E+3 pCi/L) criteria, which is used as a comparative value for gross beta.

2.3.1.3 Tritium

The 2022 tritium results for all four surface water sampling locations (WNDCELD, WNFRC67, WNNDADR, and WNERB53) were statistically indistinguishable from background. The results are consistent with historical assessments, and WNNDADR continues to decrease since the NDA geomembrane cover and subsurface barrier wall were installed in 2008.

All tritium results were below the 6 NYCRR 703.5 (2.0E±4 pCi/L) criteria, which is used as a comparative value for tritium.

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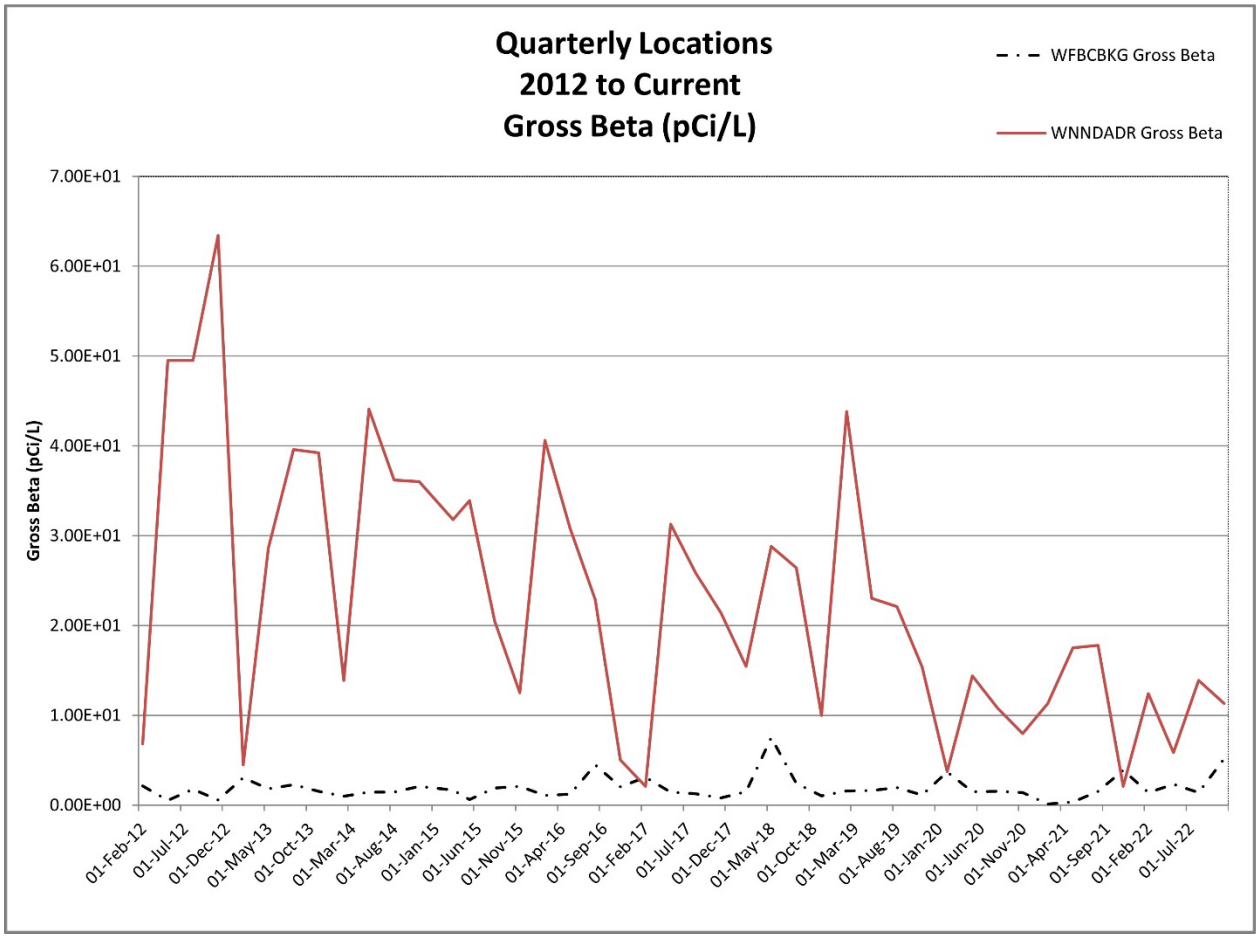
[9] NYSERDA. 2022. "Statistical Assessment of SDA Surface Water Constituents for 2022." Prepared by Stantec.

Figure 2-5. Gross Beta Results for Surface Water Monitoring Locations WNNDADR Compared to WFBCBKG

Source: NYSERDA



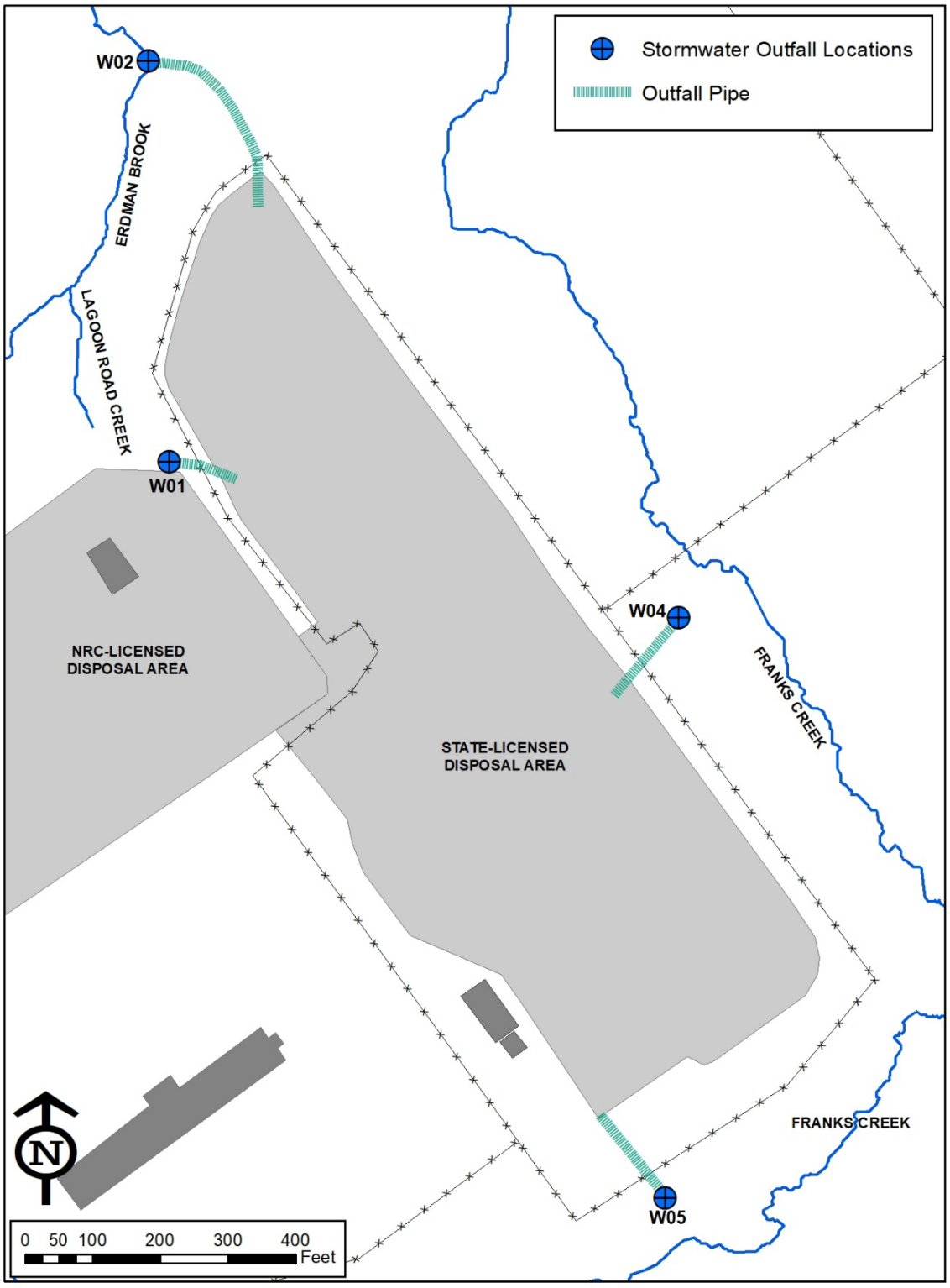
2.4 Stormwater Monitoring

As required by the SDA State Pollutant Discharge Elimination System (SPDES) Permit No. NY-026971, semiannual sampling is conducted at one of the four designated SDA stormwater outfalls (as shown in Figure 2-6). During 2022, semiannual stormwater samples were collected from Outfall W01 during a qualifying storm event on June 27, and a nonqualifying event on October 13, 2022.

Composite samples from both events were analyzed for biological oxygen demand (BOD), chemical oxygen demand (COD), total nitrate-nitrite and total Kjeldahl nitrogen, total phosphorus, total suspended solids (TSS), gross alpha, gross beta, tritium, and gamma spectroscopy. Grab samples from both events were analyzed for BOD, COD, total nitrate-nitrite and total Kjeldahl nitrogen, oil and grease, total phosphorus, TSS, pH, and temperature. Ambient rainfall samples from both events were analyzed for pH.

Figure 2-6. Stormwater Outfall Locations

Source: NYSERDA



2.4.1 Radiological Parameters

2.4.1.1 Gross Alpha

Gross alpha results from both the June and October 2022 sampling events were nondetects as they were below their reported MDC values.

Both results were below the 6 NYCRR 703.5 (1.5E+01 pCi/L) criteria, which is used as a comparative value for gross alpha.

2.4.1.2 Gross Beta

The gross beta results for the June and October 2022 sampling events (1.51E+00±1.30E+00 pCi/L and 2.10E+00±1.60E+00 pCi/L) were respectively below and above the reported MDC values of 1.75E+00 pCi/L (for June) and 1.97E+00 pCi/L (for October). The 2022 results are consistent with historical results.

Both gross beta results were below the 6 NYCRR 703.5 (1.0E+03 pCi/L) criteria, which is used as a comparative value for gross beta.

2.4.1.3 Tritium

The tritium results for the June and October sampling events were not detected as they were below their respective reported MDC value.

Both tritium results were below the 6 NYCRR 703.5 (2.0E+04 pCi/L) criteria, which is used as a comparative value for tritium.

2.4.1.4 Gamma Spectroscopy

The results for three gamma emitters (cesium-137, cobalt-60, and potassium-40) are reported for each stormwater sampling event. In addition, gamma spectroscopy results were reviewed for an additional 145 gamma-emitting radionuclides.

All gamma spectroscopy results were reported below their respective MDC.

2.4.2 Chemical and Physical Parameters

Results for all chemical and physical parameters were below the SPDES permit limits. As required by the SPDES permit, chemical and physical results were reported to DEC's Division of Water in the Discharge Monitoring Report electronic submission after each semiannual sampling event.

2.5 Gamma Radiation Monitoring

2.5.1 Overland Gamma Radiation Surveys

Gamma radiation surveys are performed semiannually at the SDA to maintain current data on gamma exposure levels and to monitor for changing conditions at the SDA.

As shown on Figure 2-7, radiation levels are measured at 51 fixed-survey locations in and around the SDA including:

- Thirty-two monument markers located on the north and south ends of each trench (designated as T3s, T3n, etc.), and the three filled lagoons (SDA2, SDA3, and SDA4) monitor the contribution of underground radioactive materials to the area radiation levels within the SDA.
- Sixteen SDA perimeter survey points (P-1 through P-16) marked on the chain-link fence surrounding the SDA monitor external radiation from all sources, including the WVDP.
- One survey point (T-1 BLDG) inside the T-1 Building monitors external radiation. This location was previously used to track radiation levels from the stored Trench 14 leachate. Because the leachate was removed from the tank in 2009 and the tank was removed in 2010, this measurement is taken in the middle of the now-vacant concrete tank pad.
- Two survey points (DC-[G] and DC-dr) at the WVDP Drum Cell, located west of the SDA, provide information on the radiation levels near the Drum Cell. Historically, waste in the Drum Cell created elevated radiation levels at the nearby SDA monitoring points. Radiation levels have fallen since the waste was removed from the Drum Cell in 2007. The Drum Cell is currently used to house "clean" intermodals from waste disposal facilities.

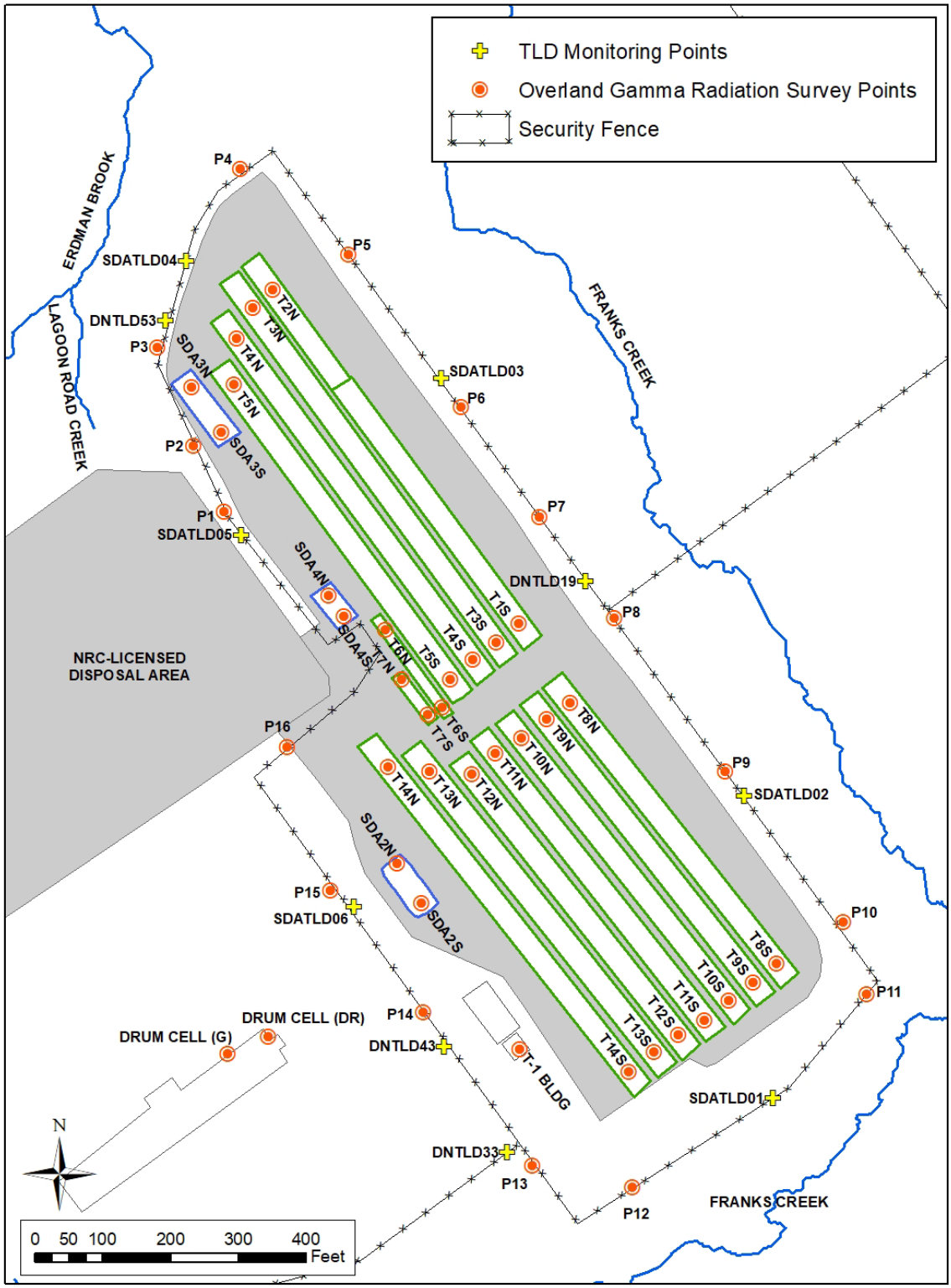
At each fixed survey point, radiation levels are measured at one meter (m) and one centimeter (cm) above the ground, floor, or building surface.

Radiation detection instruments are also monitored continuously between fixed-survey locations to identify any anomalous reading(s) exceeding three times those of the nearby fixed-survey monitoring points; no such fluctuations were identified or noted on the survey report form.

Gamma radiation levels observed during both semiannual surveys were consistent with historical data. Survey readings for the 2022 semiannual surveys (June and September) are provided in Table D-1.

Figure 2-7. Gamma Radiation Monitoring Locations

Source: NYSERDA



2.5.2 Thermoluminescent Dosimetry Monitoring

In 2022, 22 environmental thermoluminescent dosimeters (TLDs), consisting of two dosimeters at 10 designated locations around the SDA and a background location (approximately 4.5 miles southwest of the SDA outside of the Ashford Office Complex), were processed each calendar quarter to obtain the integrated environmental gamma radiation exposure from each location (see Figure 2-7). Environmental dosimeter monitoring locations are described in Table 2-1.

Table 2-1. Dosimeter Identification and Location

Source: NYSERDA

Location ID	Number of Dosimeters	Monitoring Location Description
NYTLDBK	Two	Background, on the fence along the driveway from Ashford Hollow Road to the Ashford Office Complex
DNTLD19	Two	Eastern perimeter fence north of SDA buffer area access gate between Survey Points 7 and 8
DNTLD33	Two	Outside SDA fence near corner of WVDP perimeter fence and SDA fence. South of SDA Access Gate #15
DNTLD43	Two	Western perimeter fence of SDA adjacent to the main SDA Access Gate #15
DNTLD53	Two	Northwestern corner perimeter fence of SDA
SDATLD01	Two	South fence at approximate centerline of Trench 11
SDATLD02	Two	East fence middle of southern trenches next to Survey Point 9
SDATLD03	Two	East fence middle of northern trenches next to Survey Point 6
SDATLD04	Two	North fence approximate center between Trenches 3 and 4
SDATLD05	Two	West fence middle of northern trenches next to and south of Survey Point 1
SDATLD06	Two	West fence south of Survey Point 15

In addition to the four original field locations, six new monitoring locations (SDATLD01 through SDATLD06) were added to the monitoring program beginning in 2020. DNTLD53 and SDATLD04 monitor the northwestern and northeastern corners of the SDA, respectively, and are the closest to the WVDP, which is a potential source of external radiation exposure. Site activities at the WVDP in 2022 included the demolition and removal of the Main Plant Process Building, railcar waste shipments, and off-site disposal of debris. DNTLD53 has consistently provided the highest results of the original monitoring locations and the results collected for new location SDATLD04 are similar to DNTLD53. Environmental TLD monitoring results for 2022 are included in Table D-2.

Based on the statistically similar results from a two-year statistical comparison of the historically used dosimeter (Harshaw Model 110) with a new dosimeter (Panasonic UD-814), the WVSMP has implemented the use of the Panasonic UD-814 dosimeter, which was provided by a new vendor in 2020. This change increased the number of chips contained in each dosimeter from four chips (contained in one badge) to eight chips (contained in two badges). The chips are averaged into a single result, with the Panasonic UD-814 dosimeter providing a higher level of precision and less variability within the measurements.

Also, on an annual basis, the quarterly environmental TLD results for each SDA location are compared to the background location using the Wilcoxon-Mann-Whitney test. The Wilcoxon-Mann-Whitney test is a nonparametric significance test for comparing a small number of data points (such as those available for the 2022 environmental TLD analysis).

The results of the Wilcoxon-Mann-Whitney test show that the 2022 ambient radiation exposures for all locations except DNTLD19, DNTLD33, and DNTLD43 were statistically higher than background.

Ambient radiation exposures for three of the original field locations (i.e., monitored prior to 2020) DNTLD19, DNTLD33, and DNTLD53 have ranged from indistinguishable to higher than background since 2013, while DNTLD43 has consistently been indistinguishable from background.

The six new SDA locations (SDATLD01 through SDATLD06) have been consistently higher than background since being added to the monitoring program in 2020; however, there is currently insufficient data to identify trends at the new sampling locations.

In addition, the quarterly environmental TLD results for 2022 were reviewed for completeness and accuracy, and to determine if there were any outliers in the dataset. Dixon's outlier test was performed for the 2022 results for each location. The fourth quarter 2022 results for DNTLD53 (21.21 milliroentgen per quarter [mR/Qtr]) and SDATLD02 (18.05 mR/Qtr) were flagged as potential outliers identified at a significance level of 0.05; however, the two potential outliers identified in the 2022 results were not identified as such when combined with historical results and were retained for the statistical analysis.

2.6 Meteorological Monitoring

NYSERDA operates and maintains a suite of meteorological instruments at the SDA, including instruments to measure total precipitation (e.g., rain, snow, and sleet); temperature; relative humidity; barometric pressure; wind speed; and wind direction. The instruments are equipped with a battery-powered backup system to ensure data continuity during power outages. A quarterly summary of the daily 2022 precipitation at the SDA is provided in Tables E-1, E-2, E-3, and E-4. There were no interruptions in meteorological data collection in 2022. As indicated in the Executive Summary, the 2022 precipitation total at the SDA was 43.5 inches.

3 Erosion Monitoring

In accordance with the requirements of the Part 380 Permit #9-0422-00011/00011, NYSERDA has established a comprehensive erosion monitoring program at the SDA, inclusive of the surrounding slopes and streams. The objective of the program is to monitor active erosion processes that could threaten the integrity of the SDA. The monitoring ensures that erosion features are clearly identified, inspected, quantified, and, if necessary, mitigated before erosion damage can occur at the SDA.

3.1 Visual Inspections of Surrounding Stream Channels

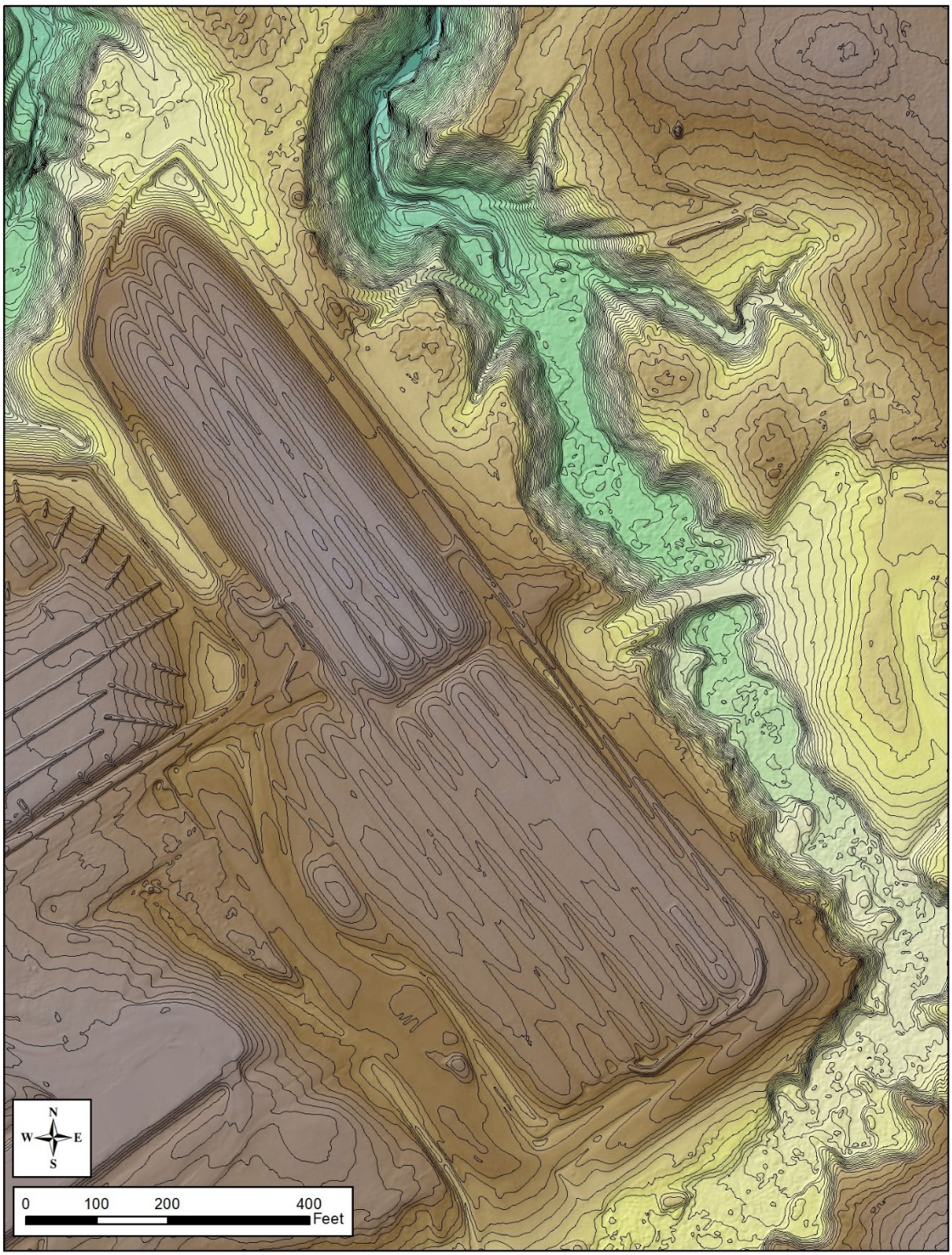
In 2022, NYSERDA conducted monthly visual inspections of the creeks that flow around three sides of the SDA (Erdman Brook, Franks Creek, and Lagoon Road Creek). Stream channel inspections included assessments of installed erosion control structures and the results are documented in NYSERDA's Erosion Monitoring Log (per NYSERDA's *Erosion Monitoring Plan*[10]). Additional unscheduled inspections are conducted after abnormally large precipitation events (>2.5 inches per 24 hours) to check for significant erosion or mass wasting. Field observations are documented and follow-up actions, if necessary, are tracked using WVSMP's Open Items database. On November 11-12, 2022, 2.68 inches of rainfall was recorded at the SDA within a 24-hour period. Accordingly, an unscheduled visual erosion inspection was performed on November 14, 2022. No erosion impacts of concern were noted during this inspection.

3.2 Light Detection and Ranging Mapping and Orthophotography

In 2020, NYSERDA conducted updated aerial Light Detection and Ranging (LiDAR) mapping and orthoimagery projects, covering both the WNYNSC and the SDA. The processed data from the 2020 survey was delivered to NYSERDA in April 2021. These surveys fulfill NYSERDA's requirement to complete comprehensive topographic mapping of the SDA and adjacent premises once every five years (per NYSERDA's *Erosion Monitoring Plan*[11]). There were no LiDAR updates completed in 2022. Detailed topographic maps of the SDA and adjacent premises are developed at a resolution of 0.5 meters utilizing the LiDAR survey data. Figure 3-1 is a high-quality topographic map of the SDA and the surrounding area that was derived from a subset of the 2020 LiDAR data. Having collected multiple LiDAR datasets at different times (i.e., 2010, 2015, 2020) allows the data to be examined for changes to the land surface due to erosion, deposition, and/or subsidence. These examinations identify active erosion of streams and gullies in the watershed, as would be expected. Streams and gullies in the vicinity of the SDA, having been largely stabilized by erosion controls, show little evidence of active erosion.

Figure 3-1. LiDAR Topographic Map of the SDA and Surrounding Areas

Source: NYSERDA



[10] NYSERDA. 2019. “Erosion Monitoring Plan, ENV509.02.”
[11] Ibid.

4 Facility Operations and Maintenance

NYSERDA is responsible for the safety, operations, and maintenance of the buildings and grounds at the SDA. Both routine and nonroutine facility inspections and maintenance activities are implemented to ensure that the facility is operating as required. In 2022, facility operations and maintenance at the SDA included:

- inspections and testing
- maintenance

4.1 Inspections and Testing

NYSERDA actively maintains the facilities at the SDA through routine inspections and testing of various physical and mechanical systems, followed by prompt corrective actions, as needed. All inspections are documented on standard forms and maintained as WVSMP records. Any deficiencies noted during these inspections and tests are tracked in the WVSMP's Open Items database, scheduled for completion, and closed out in a timely manner.

In 2022, NYSERDA completed the following inspections and tests:

- monthly SDA Building inspections per NYSERDA's *SDA Building Inspection* procedure[12]
- monthly and annual fire extinguisher inspections
- five walkover inspections of the entire SDA, and surrounding slopes and streams per NYSERDAs *Walkover Inspection of the SDA* procedure[13]
- annual geomembrane cover system inspection per NYSERDA's *Geomembrane Cover System Inspection* procedure[14]
- triennial electrical system inspection of the SDA Buildings
- nonroutine inspections of the SDA after severe weather conditions (e.g., high winds, heavy precipitation, earthquakes, etc.)

All systems and operations at the SDA are performing as designed.

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12 NYSERDA. 2023. "SDA Building Inspection, OPS016.04."
13 NYSERDA. 2019. "Walkover Inspection of the SDA, OPS003.09."
14 NYSERDA. 2023. "Geomembrane Cover System Inspection, OPS007.06."

4.2 Operations and Maintenance

In 2022, NYSERDA completed the following routine and preventative maintenance at the SDA:

- snowplowing and vegetation control at the SDA and Bulk Storage Warehouse

NYSERDA completed the following nonroutine operations and maintenance activities at the SDA in 2022:

- conducted focused topographic surveys of trench cap subsidence areas
- conducted monthly surveys and observations of the North Slope
- conducted a geotechnical investigation of the North Slope to support an engineering design for stabilization of the slope

All nonroutine maintenance actions are tracked from start to finish in the WVSMP's Open Items database.

4.2.1 Quantitative Measurements

4.2.1.1 SDA Trench Cap Survey

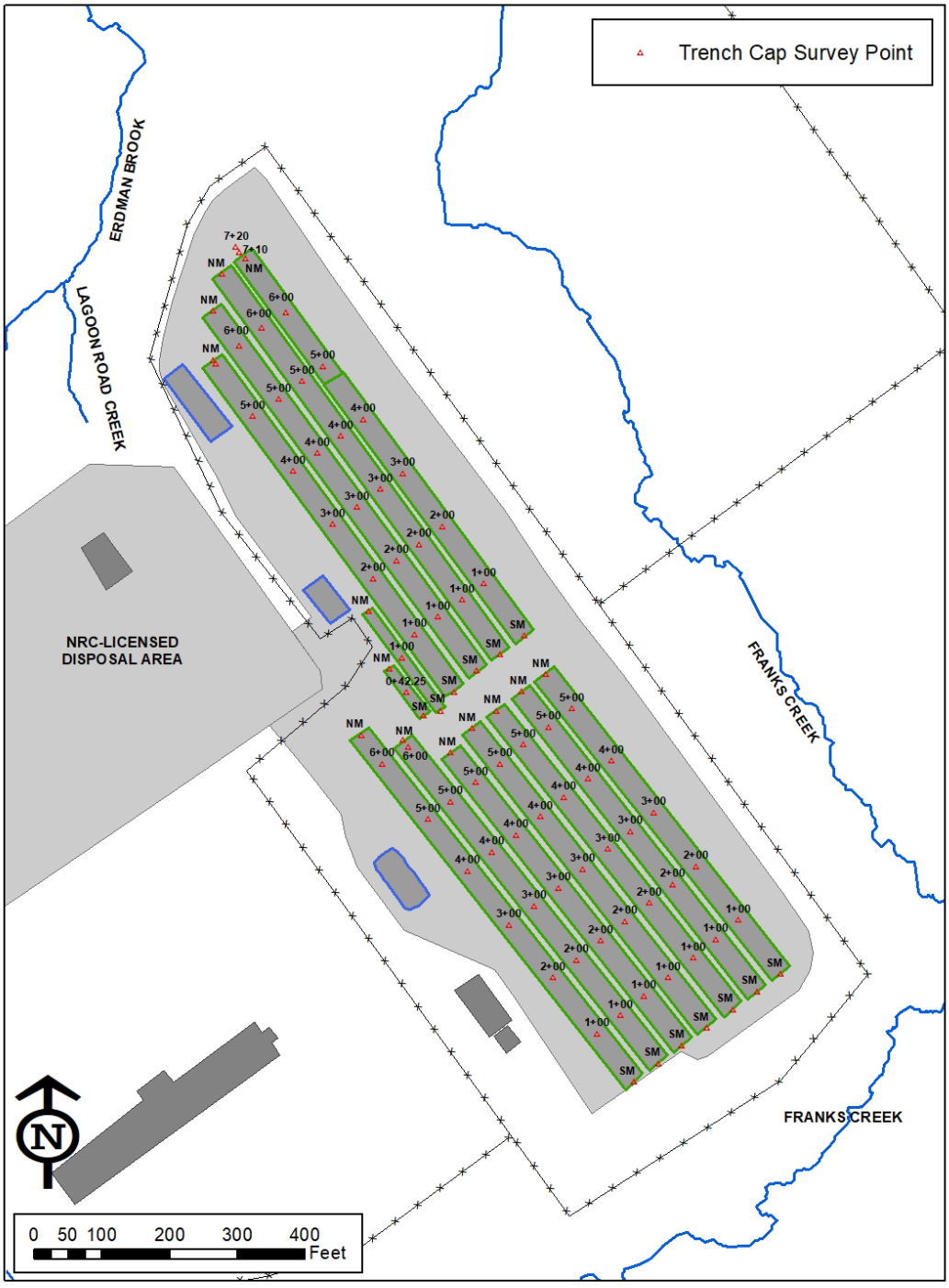
NYSERDA surveys the ground surface elevations along the SDA trench centerlines and monuments to monitor for trench cap settlement. NYSERDA has established fixed-trench cap elevation survey points that provide a consistent survey location each year. These annual results are compared to the previous year's data for indications of trench cap subsidence. A map identifying the location of the trench cap elevation survey points is shown in Figure 4-1 with the current survey data points presented in Table F-1.

Areas of settlement were observed in 2013 on the southernmost 100-foot sections of Trench 13 as well as the northern area of Trench 14. Since 2014, NYSERDA has conducted quarterly focused topographic surveys in each of the areas identified above using a 10-foot grid pattern to monitor the rate of subsidence. A very slight decreasing trend of downward movement since 2013 has been identified. The current data collected indicates that this downward movement has stabilized and the changes in elevation are within the measurement error uncertainty. NYSERDA will continue to monitor these areas annually.

In 2017, Trench 8 settlement was mitigated during the installation of the new geomembrane cover by installing lightweight geofoam blocks to raise the areas of settlement before covering with the new geomembrane cover. A settlement gauge was installed at this time to provide future monitoring

Figure 4-1. Trench Cap Ground Surface Elevations Survey Points

Source: NYSERDA



capabilities of the settled trench cap surface after the installation of the geofoam panels. The settlement gauge elevation measurements have remained very stable and within the measurement error uncertainty.

In addition to the focused topographic surveys, periodic visual inspections of the trench caps are performed to provide a more immediate identification of cap subsidence. NYSERDA will continue to monitor and report to DEC all locations where subsidence has been identified in accordance with our plans and procedures.

4.3 Engineered Construction Projects

4.3.1 North Slope Soil Slumping

Since 2017, NYSERDA has completed routine surveys, monitoring, and maintenance activities focused on soil slumping and fractured areas that were observed along the top of the North Slope. On November 4, 2021, during the routine monthly inspection, approximately 1.5 ft. of downslope movement (i.e., slumping) was identified along the fractured areas of the slope. NYSERDA immediately initiated additional environmental monitoring in and around the North Slope, and engaged our Engineering Support Services Contractor to develop a plan to investigate the source of this soil slumping and fractures. Based on the Geotechnical Investigation Plan[15] results and recommendations, NYSERDA safely and successfully implemented a path forward to stabilize the North Slope.

4.3.2 North Slope Geotechnical Investigation

In the spring of 2022, NYSERDA's contractors installed 22 soil borings to determine the source of the soil slumping along the North Slope (see Figure 4-2). The borings were monitored for movement and based on the data collected, the investigation concluded that the soil slumping was in the soil that had been placed on the North Slope during the mid-1960s construction of the SDA trenches, and the soil slumping was not occurring in the deeper soils on the slope.

Figure 4-2. Aerial view of Geotechnical Investigation

4.3.3 North Slope Stabilization Design and Implementation

In the summer of 2022, NYSERDA's Engineering Support Services Contractor submitted the Design Report for the North Slope Stabilization Project.[16]

The design focused on the removal of the approximately 4,000 cubic yards of loose soils from the North Slope down to the deeper more structurally competent soil (see Figure 4-3). The loose soils were placed in one of two soil staging areas for final characterization in 2023.

Figure 4-3. Loose soil removal from the North Slope

To create a more efficient system for groundwater movement, 12 shear keys were installed from the top of the slope to a collector trench located at the bottom of the slope, where the water is metered into a wetland area located at the bottom of the North Slope (see Figure 4-4). These rock-filled shear keys also provide a structural framework and add stability to the slope.

Finally, the steepness of the slope was reduced to a more stable geometry through the replacement of these soils with sand and bedding stone followed by layers of larger limestone. The total quantity of stone and sand placed on the slope was approximately 3,145 cubic yards.

Site restoration to fully complete this project is scheduled for the spring of 2023 (see Figure 4-5).

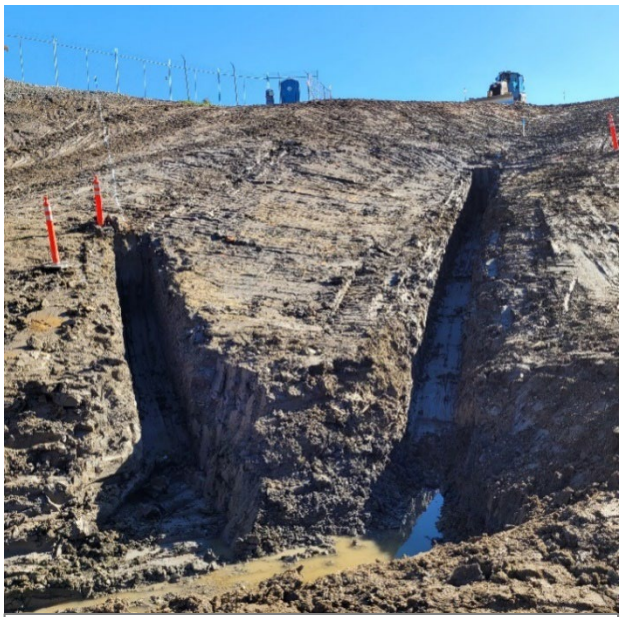


Figure 4-4. North Slope Shear Key Excavation

Figure 4-5. Aerial view of the completed North Slope Stabilization Project

[15] McMahon and Mann Consulting Engineering and Geology, P.C., 2022. "Geotechnical Engineering Report, North Slope at the State-Licensed Disposal Area, West Valley Site Management Program, West Valley, New York."

[16] McMahon and Mann Consulting Engineering and Geology, P.C., 2022. "Design Report, North Slope Stabilization at the State-Licensed Disposal Area, West Valley Site Management Program, West Valley, New York."

5 Waste Management

NYSERDA has developed and implemented both systems and procedures to manage the SDA in a manner that minimizes the generation of radioactive or hazardous waste.

In 2022, waste management activities at the SDA included:

- waste inspections
- waste storage

5.1 Inspections

In 2022, NYSERDA completed four waste inspections. No deficiencies were noted during these inspections.

5.2 Waste Removal and Disposal

NYSERDA is not a routine generator of waste. In 2022, no low-level radioactive waste was generated.

The total volume of waste currently in storage is 1.36 cubic meters. All waste currently in storage is low-level radioactive waste only.

Appendix A – Trench Leachate Elevation Data

Table A-1. 2022 Trench Leachate Elevation Data

Elevations are referenced as North American Vertical Datum (NAVD) of 1988.

Source: NYSERDA

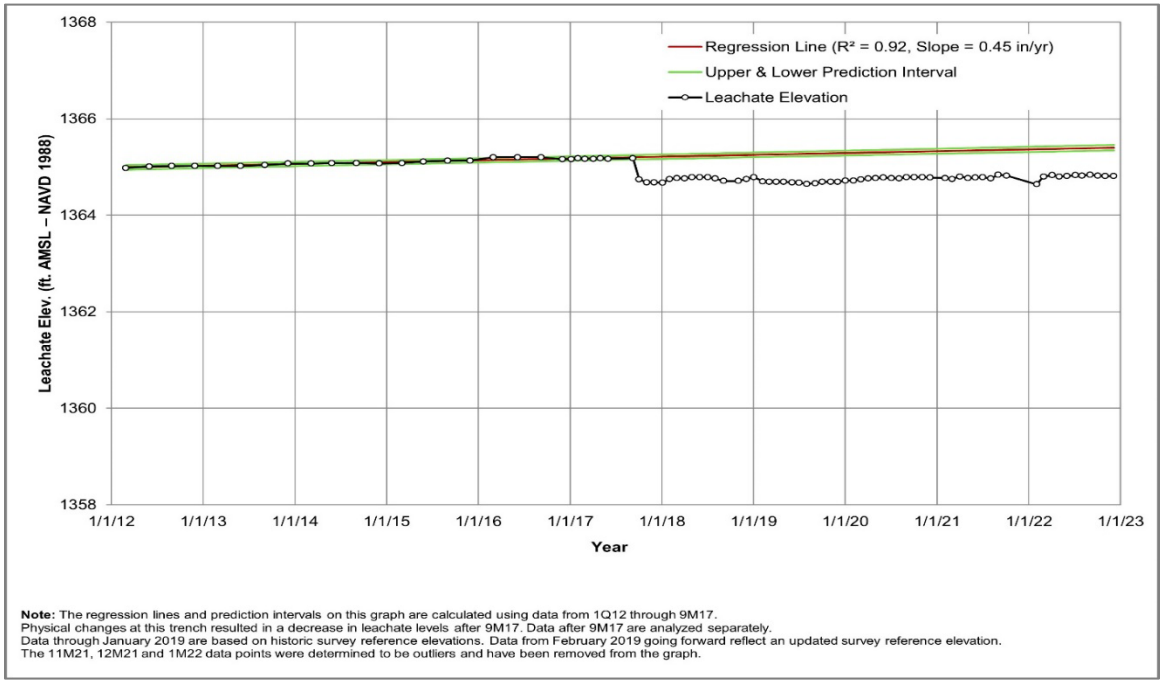
Trench	Jan 12	Feb 1	Mar 1	Apr 4	May 2 and May 3		June 1
Trench 1	1363.33	1364.64	1364.80	1364.83	1364.80		1364.81
Trench 2			1360.13				1360.06
Trench 3			1357.34				1357.14
Trench 4			1361.37				1361.34
Trench 5			1361.67				1361.62
Trench 8			1360.12				1360.06
Trench 9			1358.92				1358.87
Trench 10n			1360.30				1360.13
Trench 10s			1359.26				1359.25
Trench 11			1358.95				1358.91
Trench 12			1360.00				1359.72
Trench 13	1362.36	1362.15	1362.14	1362.07	1362.09		1362.10
Trench 14	1365.63	1365.66	1365.61	1365.50		1365.47	1365.44
WP-91	1365.61	1365.61	1365.51	1365.46	1365.40		1365.39

Table A-1 continued.

Trench	Jul 5	Aug 1	Sep 1	Oct 3	Nov 1	Dec 5
Trench 1	1364.83	1364.82	1364.84	1364.82	1364.81	1364.81
Trench 2			1359.98			1359.99
Trench 3			1356.97			1356.89
Trench 4			1361.33			1361.32
Trench 5			1361.63			1361.62
Trench 8			1360.01			1360.01
Trench 9			1358.83			1358.79
Trench 10n			1359.97			1359.99
Trench 10s			1359.18			1359.25
Trench 11			1358.86			1358.85
Trench 12			1359.70			1359.62
Trench 13	1362.08	1362.04	1362.07	1362.06	1362.07	1362.07
Trench 14	1365.42	1365.40	1365.40	1365.39	1365.39	1365.38
WP-91	1365.39	1365.38	1365.33	1365.33	1365.33	1365.33

Figure A-1. January 2012 - September 2017 Leachate Elevations, Trench 1

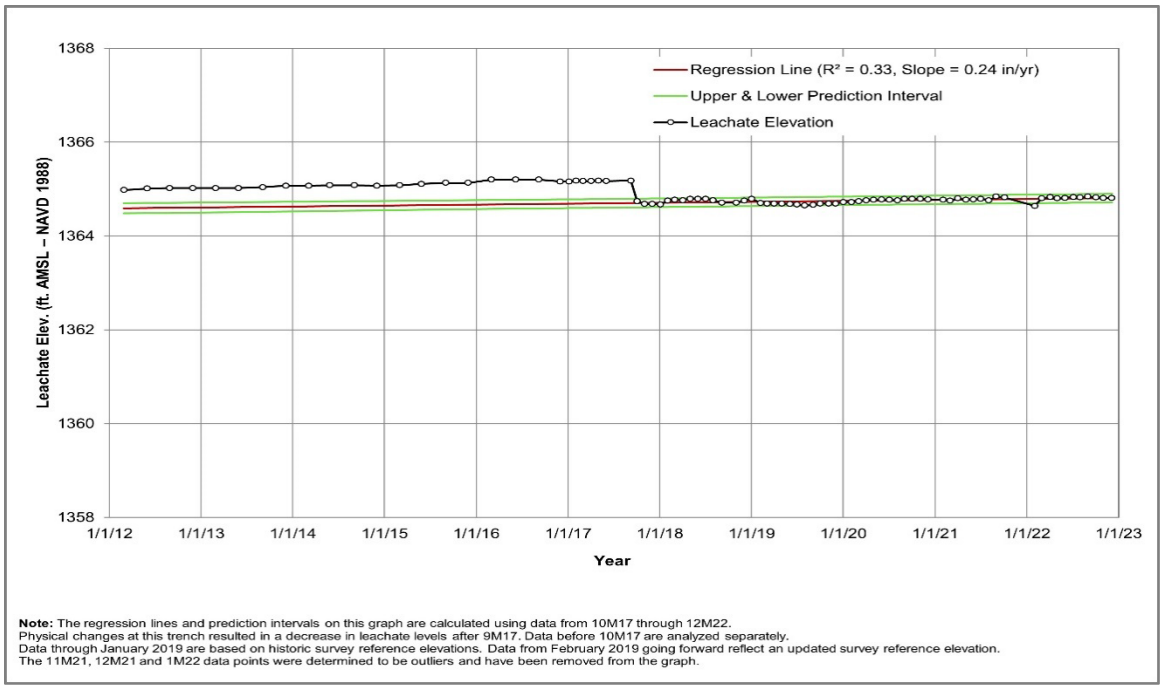
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 9M17.
Physical changes at this trench resulted in a decrease in leachate levels after 9M17. Data after 9M17 are analyzed separately.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.
The 11M21, 12M21 and 1M22 data points were determined to be outliers and have been removed from the graph.

Figure A-2. October 2017 – December 2022 Leachate Elevations, Trench 1

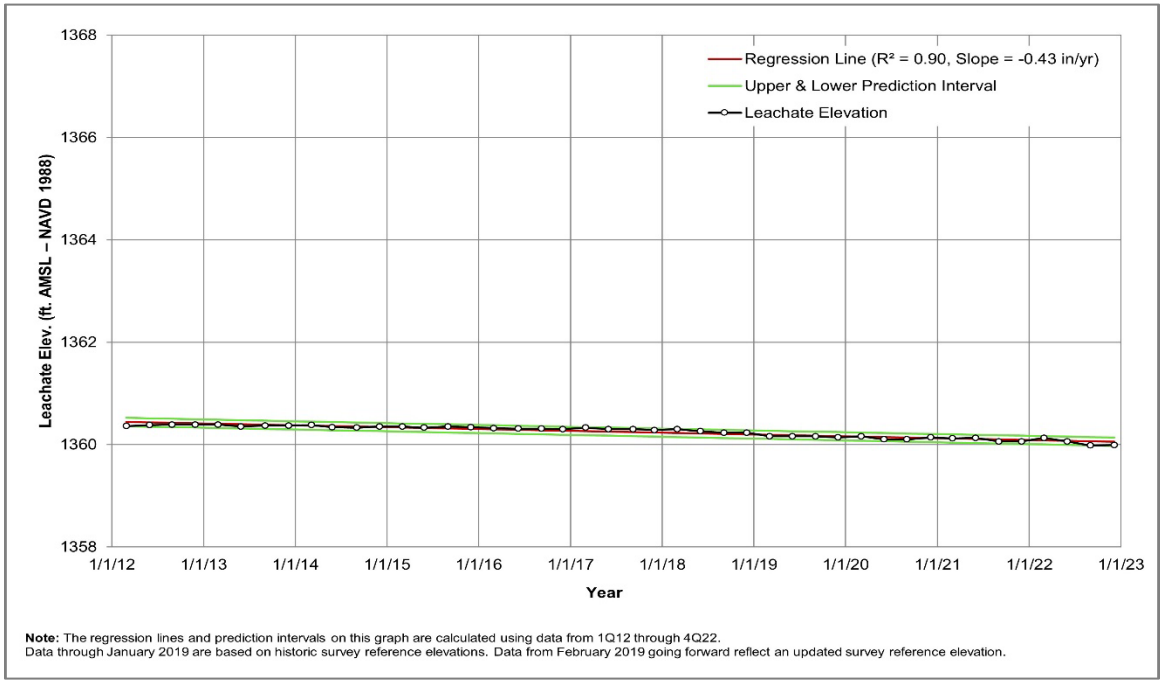
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 10M17 through 12M22.
Physical changes at this trench resulted in a decrease in leachate levels after 9M17. Data before 10M17 are analyzed separately.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.
The 11M21, 12M21 and 1M22 data points were determined to be outliers and have been removed from the graph.

Figure A-3. 2012 – 2022 Leachate Elevations, Trench 2

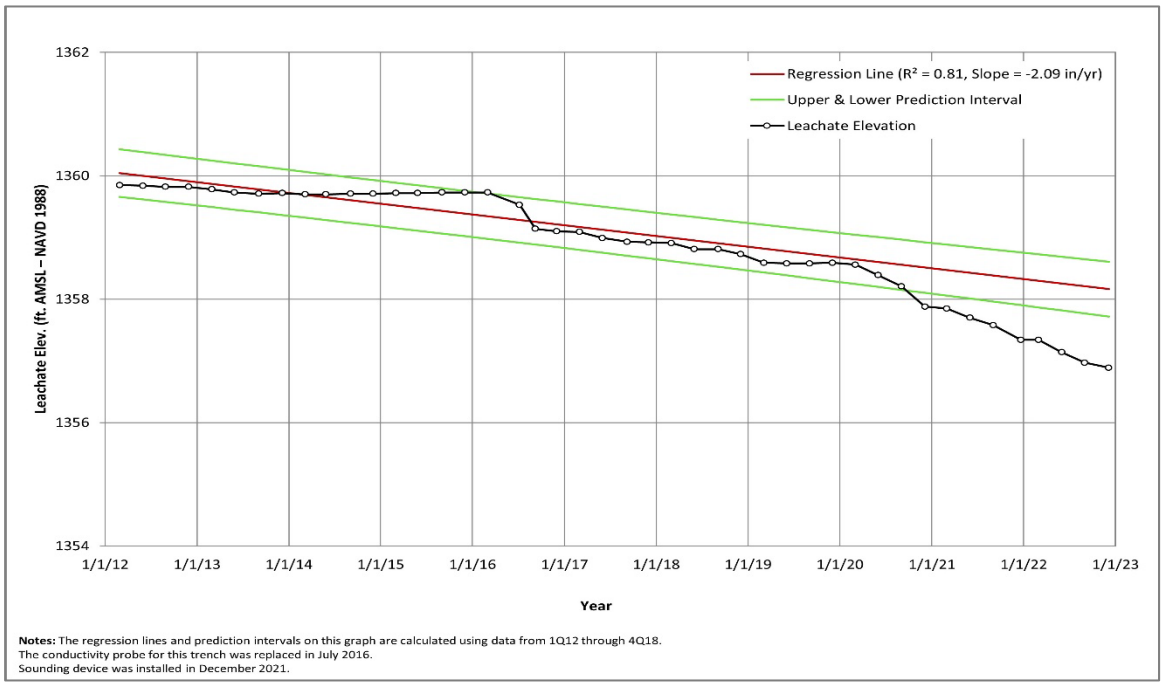
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 4Q22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-4. 2012 – 2018 Leachate Elevations, Trench 3

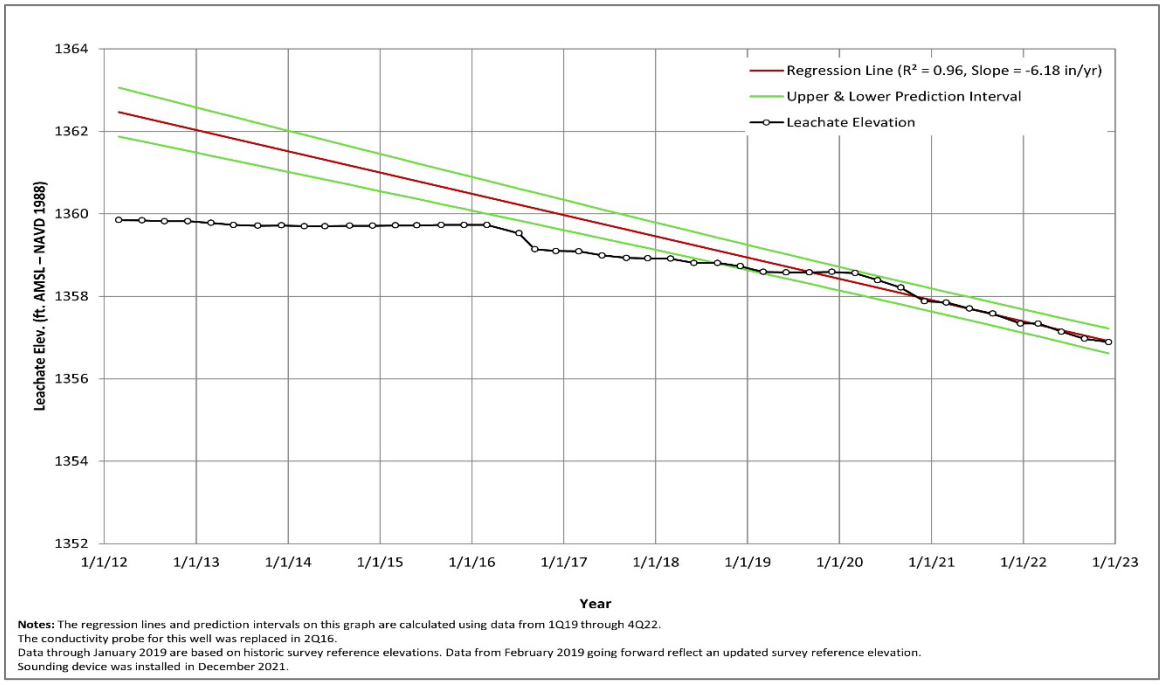
Source: Stantec



Notes: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 4Q18.
The conductivity probe for this trench was replaced in July 2016.
Sounding device was installed in December 2021.

Figure A-5. 2019 – 2022 Decreasing Leachate Elevations, Trench 3

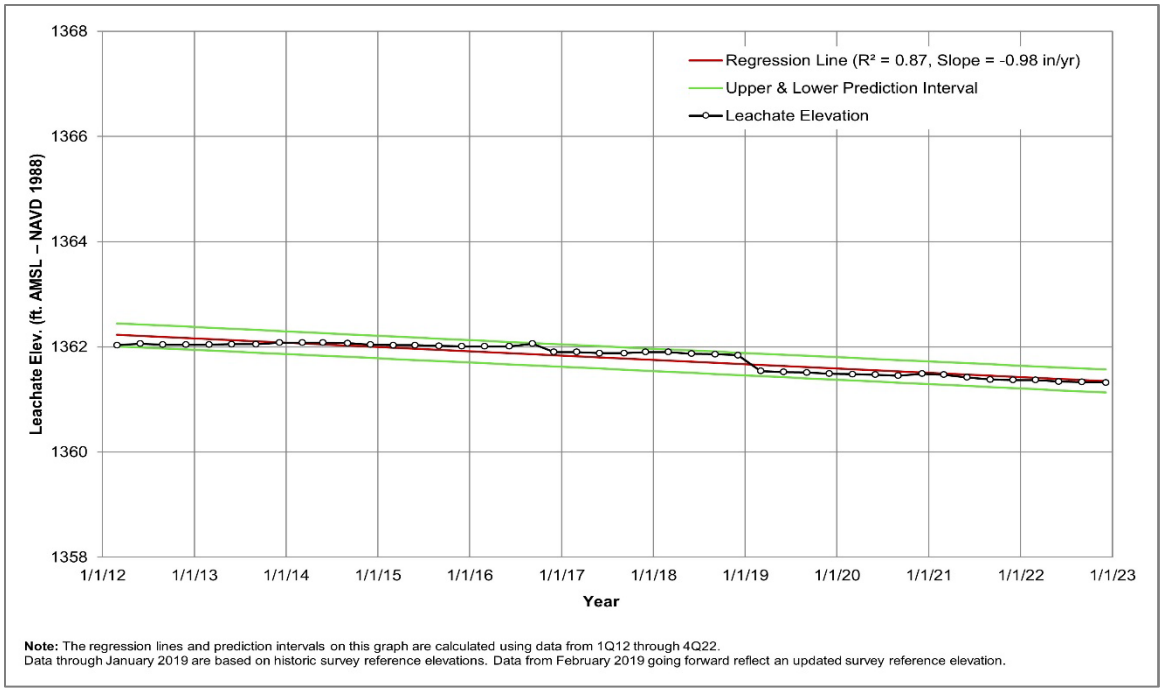
Source: Stantec



Notes: The regression lines and prediction intervals on this graph are calculated using data from 1Q19 through 4Q22.
The conductivity probe for this well was replaced in 2Q16.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.
Sounding device was installed in December 2021.

Figure A-6. 2012 – 2022 Leachate Elevations, Trench 4

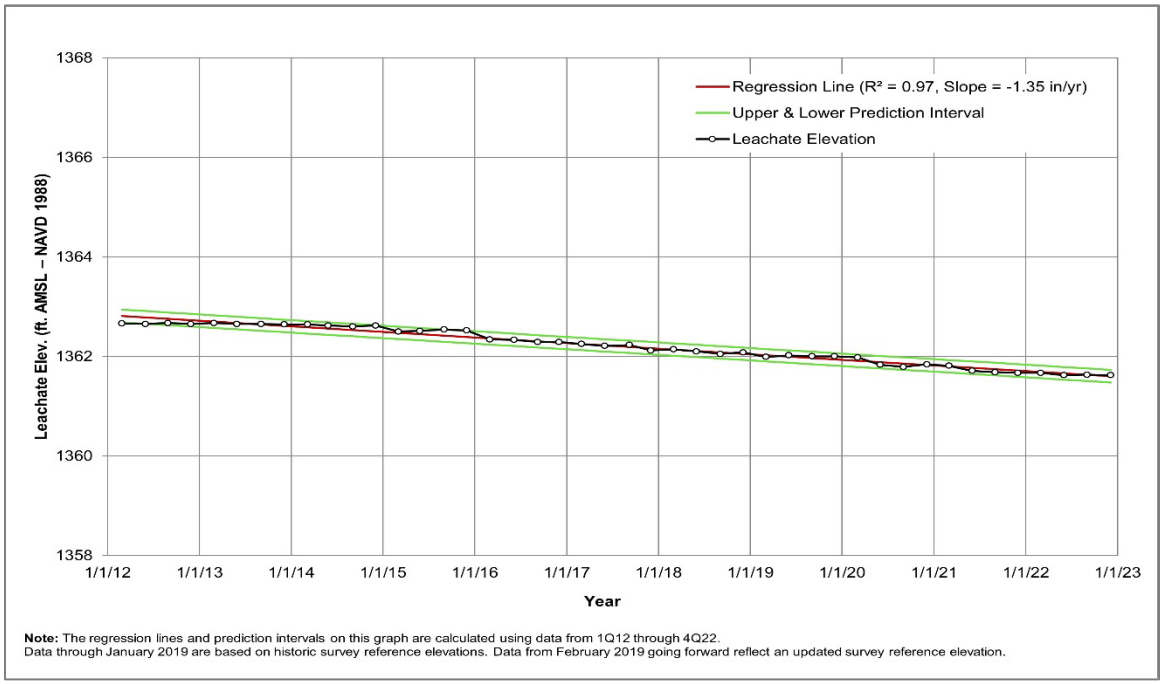
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 4Q22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-7. 2012 – 2022 Leachate Elevations, Trench 5

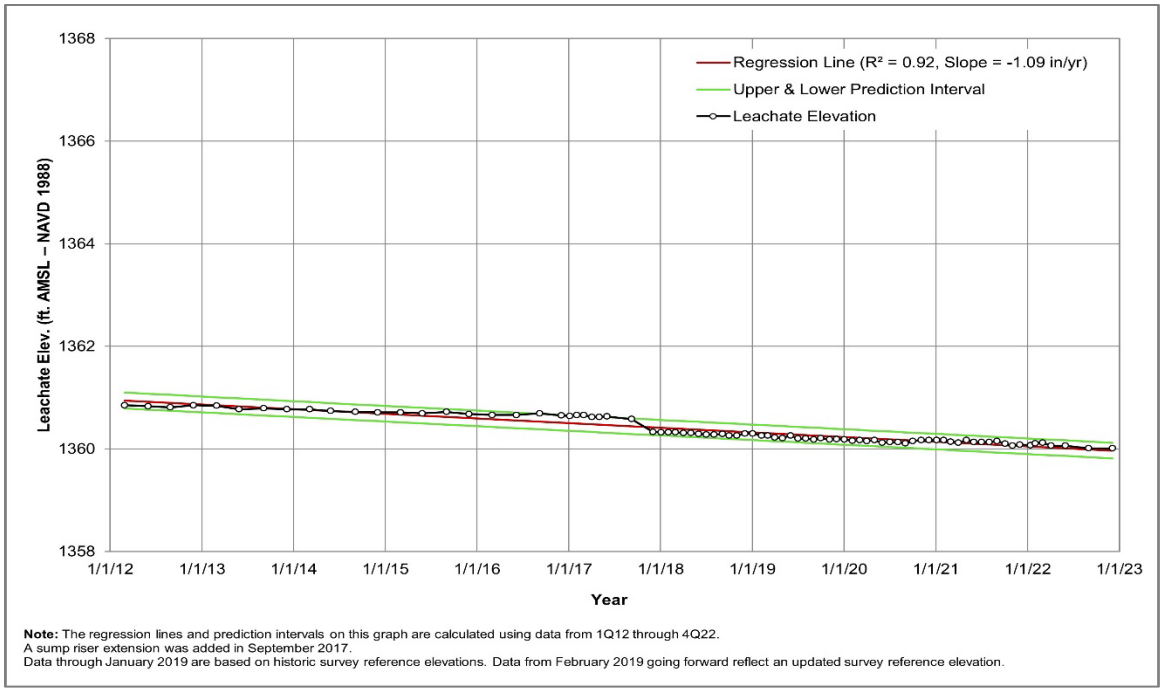
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 4Q22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-8. 2012 – 2022 Leachate Elevations, Trench 8

Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 4Q22.
A sump riser extension was added in September 2017.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-9. 2012 – 2022 Leachate Elevations, Trench 9

Source: Stantec

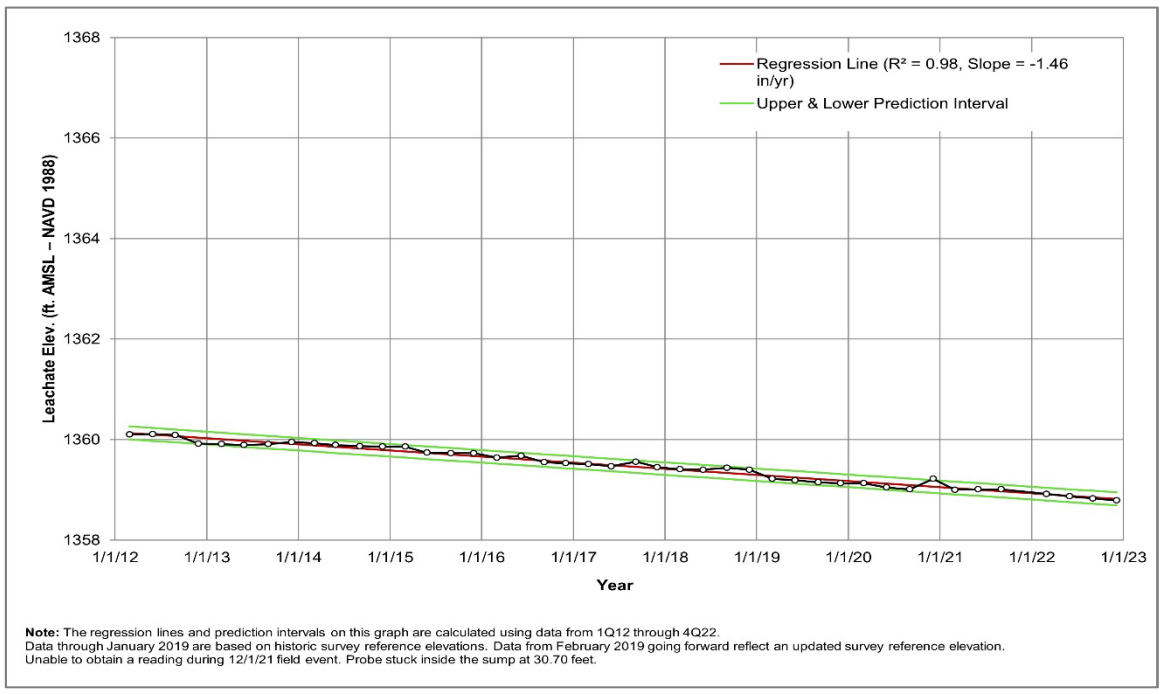


Figure A-10. 2012 – 2022 Leachate Elevations, Trench 10N

Source: Stantec

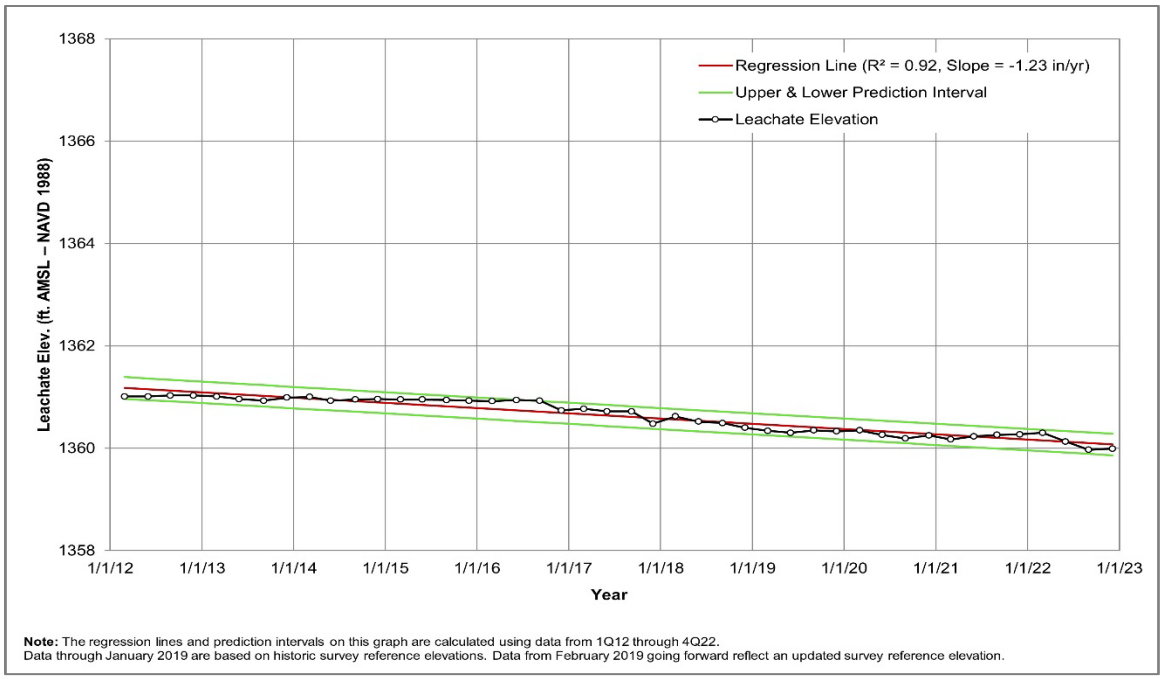


Figure A-11. 2012 – 2022 Leachate Elevations, Trench 10S

Source: Stantec

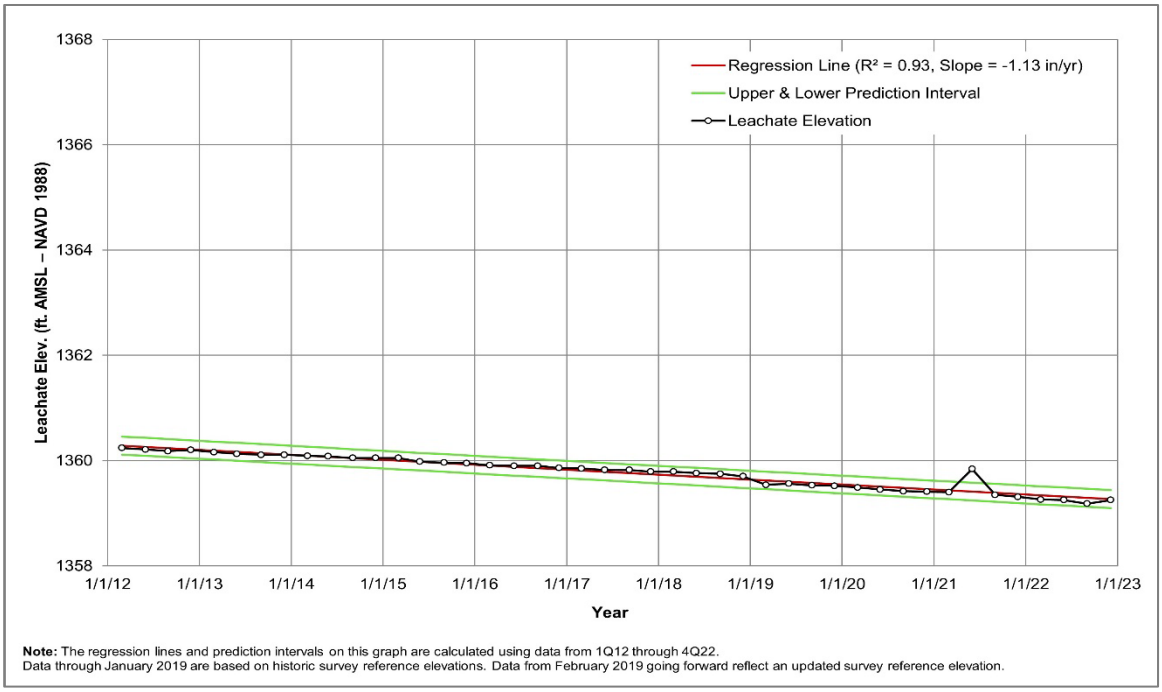


Figure A-12. 2012 – 2022 Leachate Elevations, Trench 11

Source: Stantec

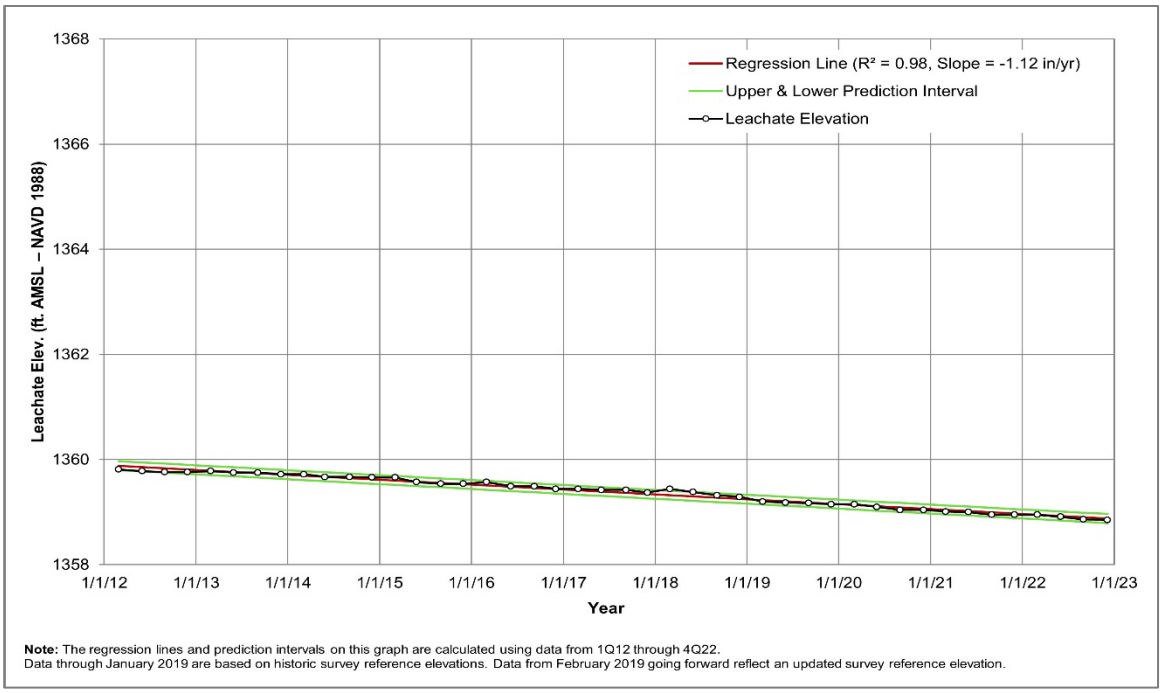
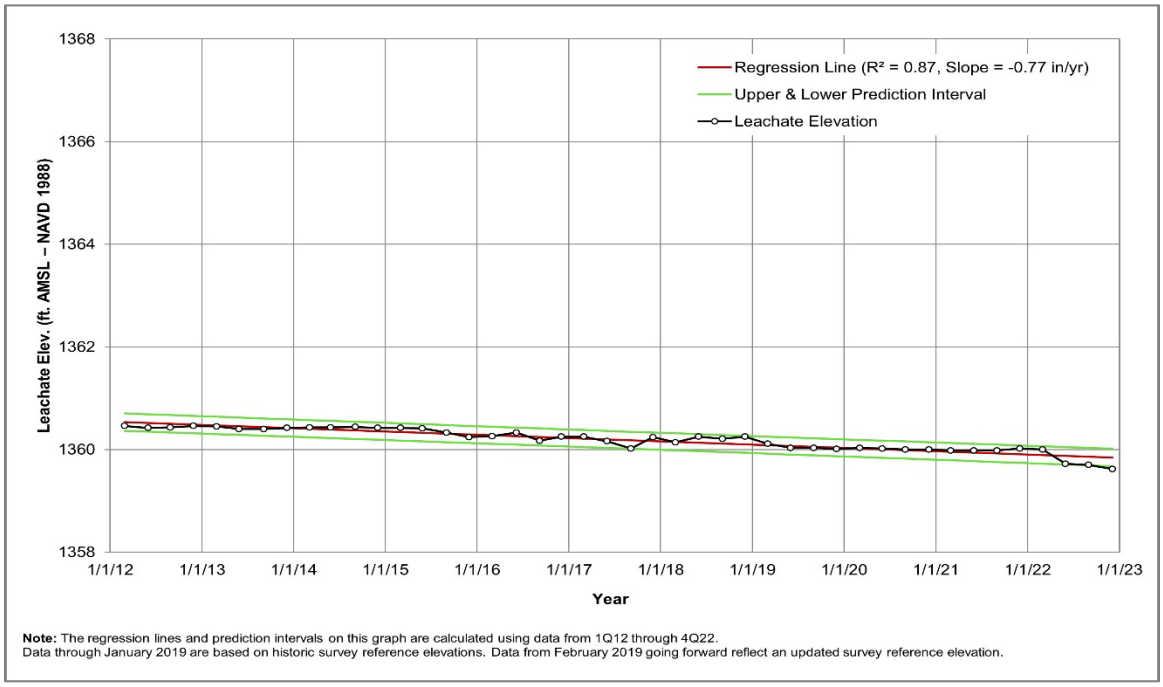


Figure A-13. 2012 – 2022 Leachate Elevations, Trench 12

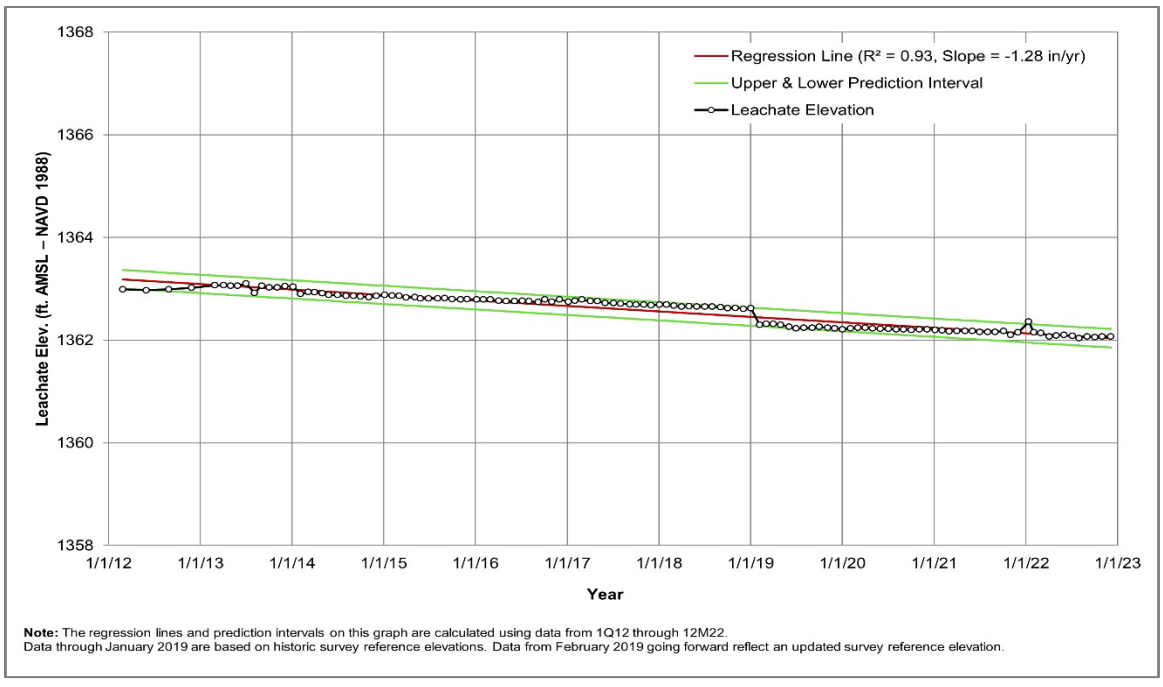
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 4Q22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-14. 2012 – 2022 Leachate Elevations, Trench 13

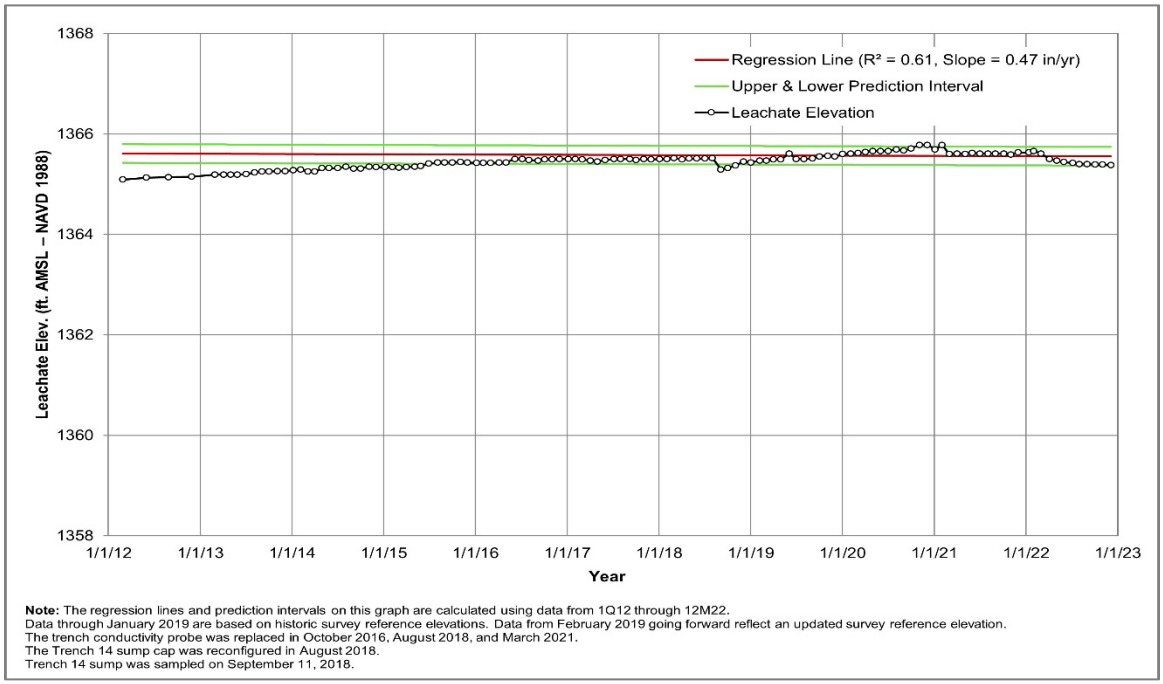
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 12M22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Figure A-15. 2012 – 2022 Leachate Elevations, Trench 14

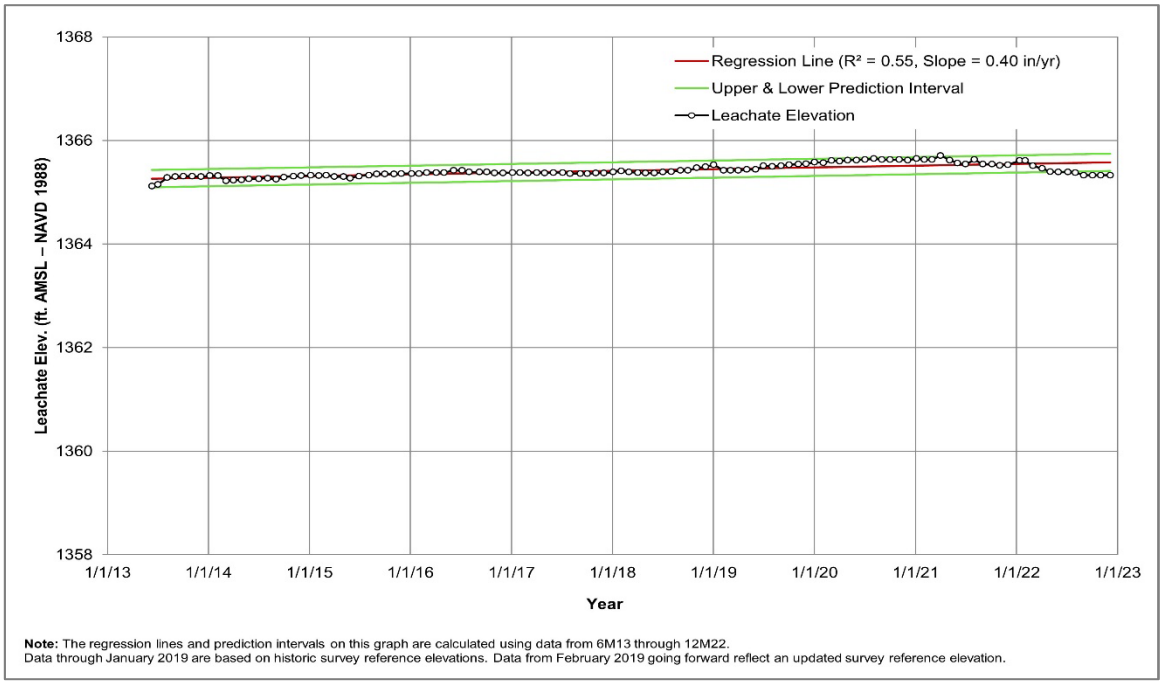
Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 1Q12 through 12M22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.
The trench conductivity probe was replaced in October 2016, August 2018, and March 2021.
The Trench 14 sump cap was reconfigured in August 2018.
Trench 14 sump was sampled on September 11, 2018.

Figure A-16. 2013 – 2022 Leachate Elevations, WP-91

Source: Stantec



Note: The regression lines and prediction intervals on this graph are calculated using data from 6M13 through 12M22.
Data through January 2019 are based on historic survey reference elevations. Data from February 2019 going forward reflect an updated survey reference elevation.

Appendix B – Groundwater Monitoring

Table B-1. Groundwater Monitoring Well Summary – SDA 1100 Series Wells

Elevations are referenced to the NAVD of 1988 and based on well construction details.

Source: NYSERDA

Well	Well Depth (ft. BGS)	Well Bottom Elevation (ft. AMSL)	Screened Interval Elevations (ft. AMSL)	Geologic Unit Screened
1101A	16.4	1362.78	1373.20 - 1363.20	W/U
1101B	30.4	1348.83	1359.25 - 1349.25	U
1101C	109.4	1269.54	1284.96 - 1269.96	L
1102A	17.4	1365.12	1375.54 - 1365.54	W/U
1102B	31.4	1351.00	1361.42 - 1351.42	U
1103A	16.4	1363.31	1373.73 - 1363.73	W/U
1103B	36.4	1343.24	1358.66 - 1343.66	U
1103C	121.4	1257.92	1273.34 - 1258.34	L/O
1104A	19.4	1356.53	1371.95 - 1356.95	W/U
1104B	36.4	1339.51	1354.93 - 1339.93	U
1104C	124.4	1251.37	1261.79 - 1251.79	L/O
1105A	21.4	1344.22	1354.64 - 1344.64	U
1105B	36.4	1329.43	1344.85 - 1330.27	U
1106A	16.4	1357.77	1368.19 - 1358.19	W/U
1106B	31.1	1343.03	1353.45 - 1343.45	U
1107A	19.4	1357.58	1373.00 - 1358.00	W/U
1108A	16.4	1364.34	1374.76- 1364.76	W/U
1109A	16.4	1358.27	1368.69 - 1358.69	W/U
1109B	31.4	1342.43	1357.85 - 1342.85	U
1110A	20.4	1356.46	1366.88 - 1356.88	W/U
1111A	21.4	1358.63	1369.05 - 1359.05	U

Key:

L	Lacustrine Unit (Kent recessional sequence)
L/O	Lacustrine/Outwash - Kame Sand and Gravel (Kent recessional sequence)
U	Unweathered Till
W/U	Weathered/Unweathered Till

Table B-2. 2022 Groundwater Elevations – SDA 1100-Series Wells – (ft. AMSL)

Elevations are referenced to the NAVD of 1988.

Source: NYSERDA

Well	Jan 12	Feb 1	Mar 1	Apr 4	May 2	June 1
1101A	1377.27	1376.47	1377.28	1377.50	1377.53	1371.17
1101B	1362.87	1363.68	1363.72	1363.54	1363.47	1356.23
1101C	1281.54	1281.40	1281.67	1281.58	1281.68	1281.69
1102A			1379.33			1374.12
1102B			1366.96			1366.45
1103A			1379.08			1377.84
1103B			1365.75			1364.14
1103C			1259.52			1259.33
1104A			1372.66			1367.61
1104B			1360.94			1352.64
1104C			1253.95			1253.76
1105A			1354.22			1350.19
1105B			1340.56			1335.06
1106A	1370.92	1369.70	1371.01	1371.51	1371.37	1366.42
1106B	1357.67	1357.38	1356.75	1356.41	1356.44	1353.64
1107A			1368.99			1369.55
1108A	1373.20	1373.66	1375.51	1375.86	1375.50	1370.87
1109A	1361.75	1361.43	1361.34	1361.12	1361.15	1359.65
1109B	1361.52	1360.50	1360.36	1360.06	1360.05	1357.92
1110A			1360.12			1359.33
1111A			1377.83			1377.55

Table B-2 continued.

Well	Jul 5	Aug 1	Sep 1	Oct 3	Nov 1	Dec 5
1101A	1375.31	1374.95	1374.72	1375.77	1376.45	1372.63
1101B	1359.36	1361.74	1362.52	1362.65	1363.47	1357.53
1101C	1280.28	1281.57	1281.68	1281.33	1281.67	1281.58
1102A			1374.42			1374.74
1102B			1364.90			1366.45
1103A			1376.37			1378.93
1103B			1364.54			1364.78
1103C			N.M.[a]			1260.55
1104A			1370.41			1368.66
1104B			1360.19			1352.23
1104C			1253.59			1253.70
1105A			1353.13			1350.32
1105B			1338.54			1335.49
1106A	1369.66	1369.98	1370.38	1371.06	1370.39	1368.22
1106B	1356.44	1357.19	1357.86	1358.33	1358.46	1356.11
1107A			1369.24			1366.99
1108A	1373.11	1373.84	1373.63	1373.23	1374.14	1371.82
1109A	1361.26	1361.95	1362.87	1362.35	1362.41	1361.38
1109B	1360.19	1362.54	1362.85	1363.14	1363.12	1361.77
1110A			N.M.[a]			1360.23
1111A			1373.80			1374.49

[a] Not measured due to wasp activity.

Table B-3. Groundwater Monitoring Well Summary – SDA Piezometers

Elevations are referenced to the NAVD of 1988 and based on well construction details.

Source: NYSERDA

Piezometer	Well Depth (ft. BGS)	Well Bottom Elevation (ft. AMSL)	Screened Interval Elevations (ft. AMSL)	Geologic Unit Screened
1S-91	14	1368.88	1376.38- 1368.88	W/U
2S-91	16	1368.87	1378.87- 1368.87	W/U
3S-91	13.5	1365.10	1372.60- 1365.10	W/U
4S-91	11	1369.48	1374.48- 1369.48	W/U
4D-91	29	1351.48	1366.48- 1351.48	U
6S-91	11	1370.52	1375.52- 1370.52	W/U
6D-91	25	1356.52	1366.52- 1356.52	U
9S-91	9	1372.03	1377.03- 1372.03	W/U
9D-91	25	1356.03	1366.03- 1356.03	U
10S-91	12.4	1367.07	1374.57- 1367.07	W/U
15S-91	13	1365.91	1373.41- 1365.91	W/U
16D-91	25	1354.31	1364.31- 1354.31	U
17S-91	11	1372.55	1377.55- 1372.55	W/U
18S-91	14	1366.52	1374.02- 1366.52	U
21S-91	16	1365.52	1370.52- 1365.52	U
22S-91	21	1361.74	1366.74- 1361.74	U
24S-91	18	1362.32	1372.32- 1362.32	W/U
B-14	24	1355.89	1365.89- 1355.89	U
P1-95[b]	7.7	1360.21	1365.21- 1360.21	W

[b] P1-95 was installed using the direct push method.

Key:

U	Unweathered Till
W	Weathered Till
W/U	Weathered/Unweathered Till

Table B-4. 2022 Groundwater Elevations – SDA Piezometers – (ft. AMSL)

Elevations are referenced to the NAVD of 1988.

Source: NYSERDA

Well/ Piezometer	Jan 12	Feb 1	Mar 1	Apr 4	May 2	June 1
1S			1380.49			1380.95
2S			1380.03			1381.32
3S	1372.95	1372.86	1373.90	1374.44	1374.79	1375.04
4S	dry	dry	dry	dry	dry	dry
4D	1357.12	1356.52	1356.20	1355.42	1355.33	1355.39
6S	dry	dry	dry	dry	dry	dry
6D	1361.79	1361.55	1360.90	1360.52	1360.30	1360.31
9S	dry	dry	dry	dry	dry	dry
9D	1357.25	1357.12	1356.91	1356.52	1356.28	1356.27
10S	1372.01	1371.76	1371.29	1371.08	1371.31	1372.13
15S	1378.77	1377.75	1378.71	1379.43	1379.17	1378.90
16D	1363.85	1363.51	1363.21	1362.81	1362.56	1362.48
17S	1382.42	1381.67	1382.55	1382.61	1382.41	1382.23
18S	1377.71	1377.31	1378.00	1378.14	1378.09	1378.05
21S	dry	dry	dry	dry	dry	dry
22S	dry	dry	dry	dry	dry	dry
24S	dry	dry	dry	dry	dry	dry
B-14	1358.56	1358.23	1357.85	1357.38	1357.18	1357.13
P1			1364.54			1363.80

Table B-4 continued.

Well/ Piezometer	Jul 5	Aug 1	Sep 1	Oct 3	Nov 1	Dec 5
1S			1378.33			1380.08
2S			1379.38			1377.74
3S	1375.17	1374.76	1373.92	1372.99	1372.57	1373.36
4S	dry	dry	dry	dry	dry	dry
4D	1355.69	1356.17	1356.62	1357.15	1357.54	1357.49
6S	dry	dry	dry	dry	dry	dry
6D	1360.82	1361.63	1362.15	1362.75	1362.84	1362.24
9S	dry	dry	dry	dry	dry	dry
9D	1356.14	1356.42	1356.19	1356.06	1357.09	1357.17
10S	1373.77	1374.82	1375.04	1374.60	1373.41	1372.59
15S	1378.22	1378.21	1378.31	1378.79	1378.47	1379.49
16D	1362.54	1362.74	1362.98	1363.10	1363.36	1363.37
17S	1380.28	1378.67	1378.03	1379.35	1380.60	1381.77
18S	1377.48	1376.35	1375.51	1374.80	1374.80	1376.69
21S	dry	dry	dry	dry	dry	dry
22S	dry	dry	dry	dry	dry	dry
24S	dry	dry	dry	dry	dry	dry
B-14	1357.30	1357.80	1358.34	1358.68	1359.15	1358.88
P1			1363.14			1364.54

Table B-5. Groundwater Monitoring Well Summary – SDA Slit-Trench Wells

Elevations are referenced in the NAVD of 1988 and based on well construction details.

Source: NYSERDA

Slit Trench Well	Well Depth (ft. BGS)	Well Bottom Elevation (ft. AMSL)	Screened Interval Elevations (ft. AMSL)	Geologic Unit Screened
SMW-1	7	1372.91	1375.33 - 1373.08	W
SMW-2	6	1373.91	1376.33 - 1374.08	W
SMW-3	6	1373.80	1376.22 - 1373.97	W
SMW-4	11	1366.77	1369.19 – 1366.94	W/U
SMW-5	7.2	1369.93	1372.35 – 1370.10	W
SMW-6	7	1372.59	1375.01 – 1372.76	W
SMW-7	6.5	1371.59	1374.01 – 1371.76	W
SMW-8	7	1371.78	1375.03 – 1372.78	W
SMW-9	6	1369.93	1372.35 - 1370.10	W

Key:

W Weathered Till

W/U Weathered/Unweathered Till

Table B-6. 2022 Groundwater Elevations – SDA Slit-Trench Wells – (ft. AMSL)

Elevations are referenced to the NAVD of 1988.

Source: NYSERDA

Well	Jan 12	Feb 1	Mar 1	Apr 4	May 2	June 1
SMW-1	1375.15	1374.90	1374.52	1374.32	1374.31	1374.73
SMW-2	dry	dry	dry	dry	dry	dry
SMW-3	dry	dry	dry	dry	dry	dry
SMW-4	1371.79	1371.86	1373.23	1374.22	1374.75	1375.21
SMW-5	1375.94	1375.74	1377.16	1376.15	1376.67	1376.93
SMW-6	1378.63	1377.68	1378.93	1379.26	1379.96	1379.12
SMW-7	1375.02	1374.62	1374.47	1374.96	1375.17	1375.49
SMW-8	1373.62	1373.24	1373.60	1373.81	1374.47	1375.81
SMW-9	1376.52	1375.61	1376.61	1376.51	1375.35	1376.60

Well	Jul 5	Aug 1	Sep 1	Oct 3	Nov 1	Dec 5
SMW-1	1375.32	1375.71	1375.76	1375.47	1374.87	1374.28
SMW-2	dry	dry	dry	dry	dry	dry
SMW-3	dry	dry	dry	dry	dry	dry
SMW-4	1375.29	1374.88	1373.51	1371.51	1371.43	1371.47
SMW-5	1376.44	1376.32	1375.99	1375.57	1375.71	1375.85
SMW-6	1378.38	1377.39	1376.77	1376.92	1377.04	1378.78
SMW-7	1375.48	1375.20	1374.81	1374.50	1373.92	dry
SMW-8	1376.14	1376.75	1376.24	1375.74	1374.86	1373.90
SMW-9	1375.81	1374.76	1373.95	1373.78	1374.26	1376.26

Figure B-1. First Quarter 2022 Weathered Lavery Till Groundwater Contour Map

Source: Stantec

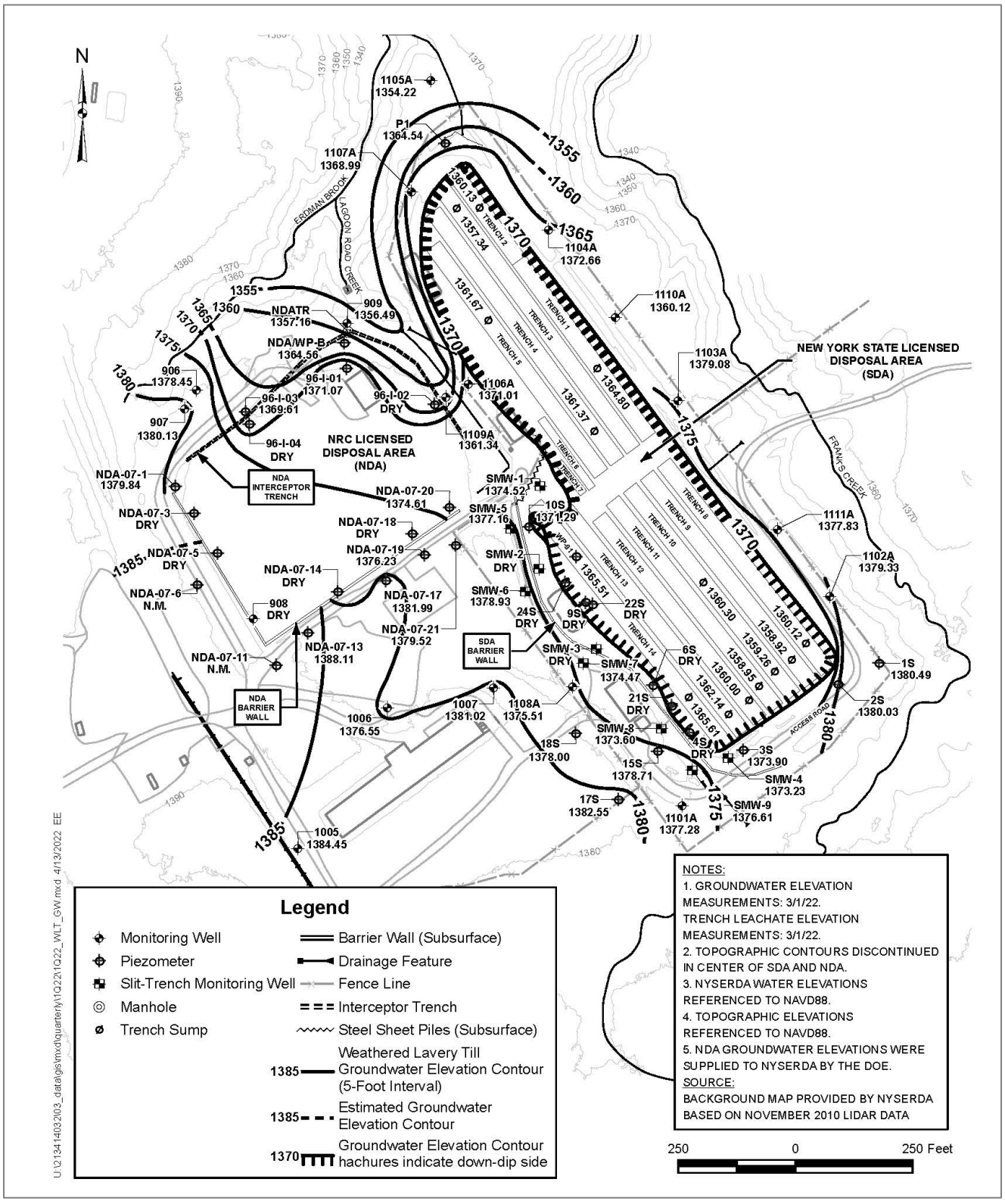


Figure B-2. First Quarter 2022 Kent Recessional Groundwater Contour Map

Source: Stantec

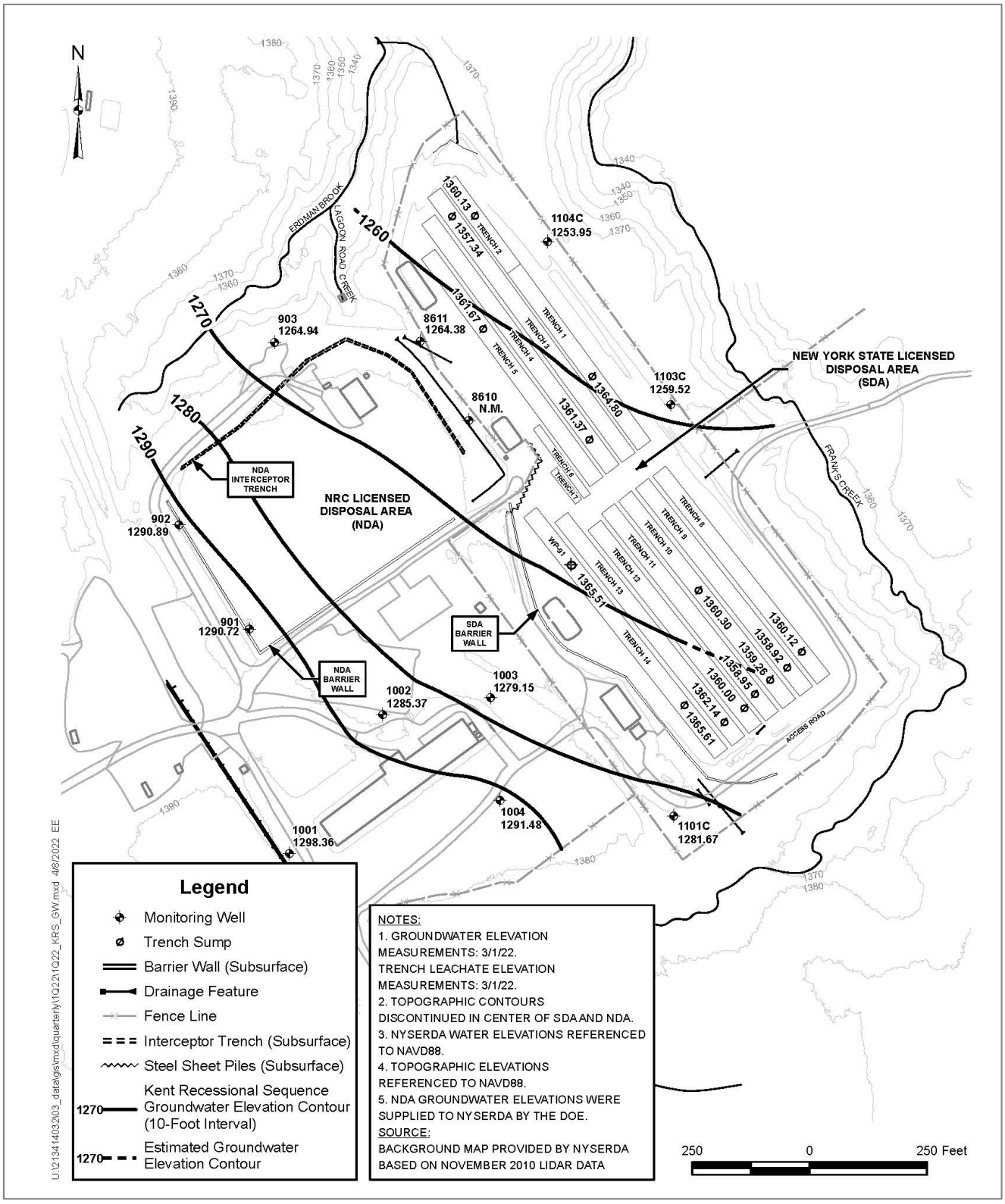


Figure B-3. First Quarter 2022 North End Trench 14 Enhanced Groundwater Contour Map

Source: Stantec

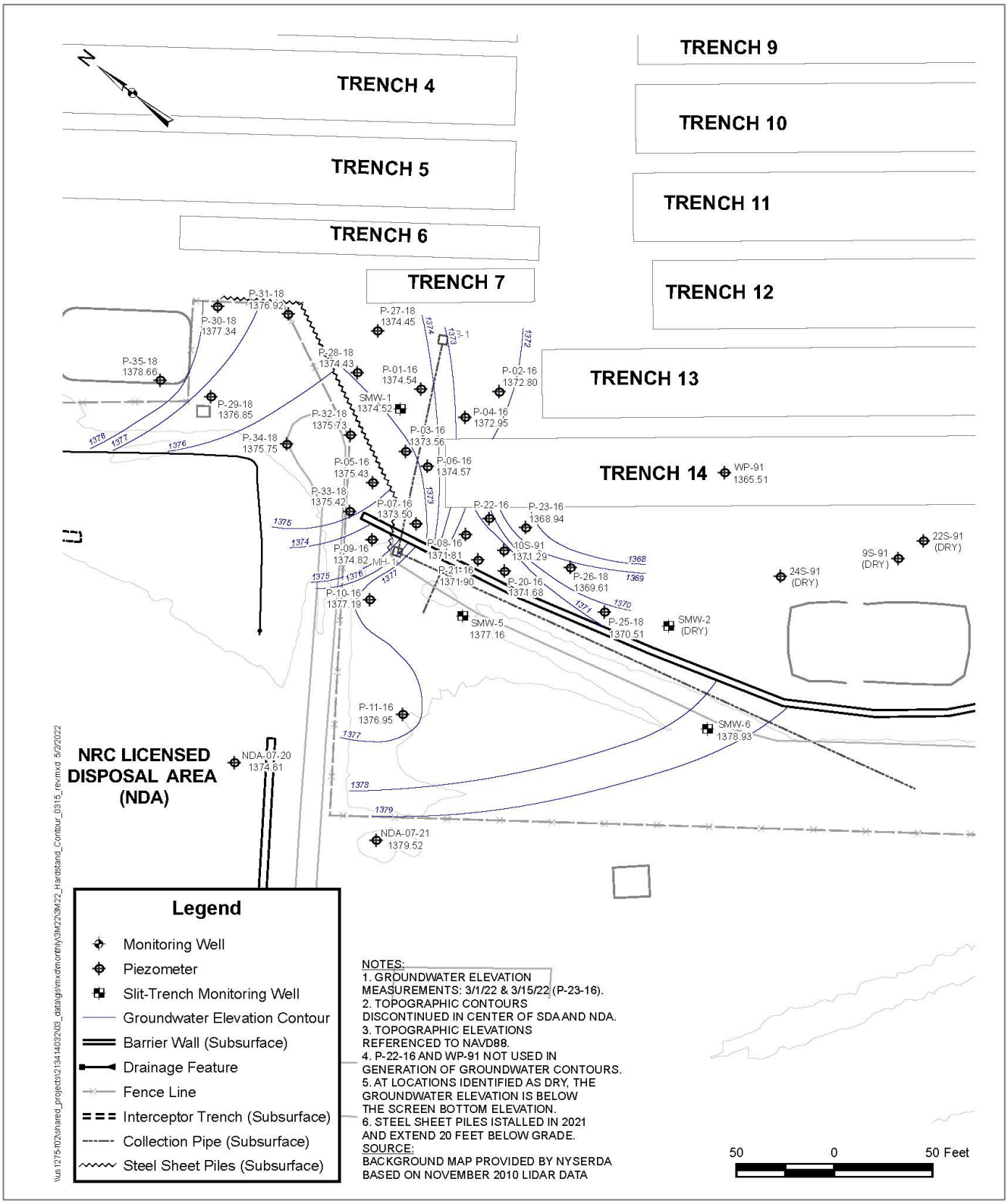


Figure B-4. Second Quarter 2022 Weathered Lavery Till Groundwater Contour Map

Source: Stantec

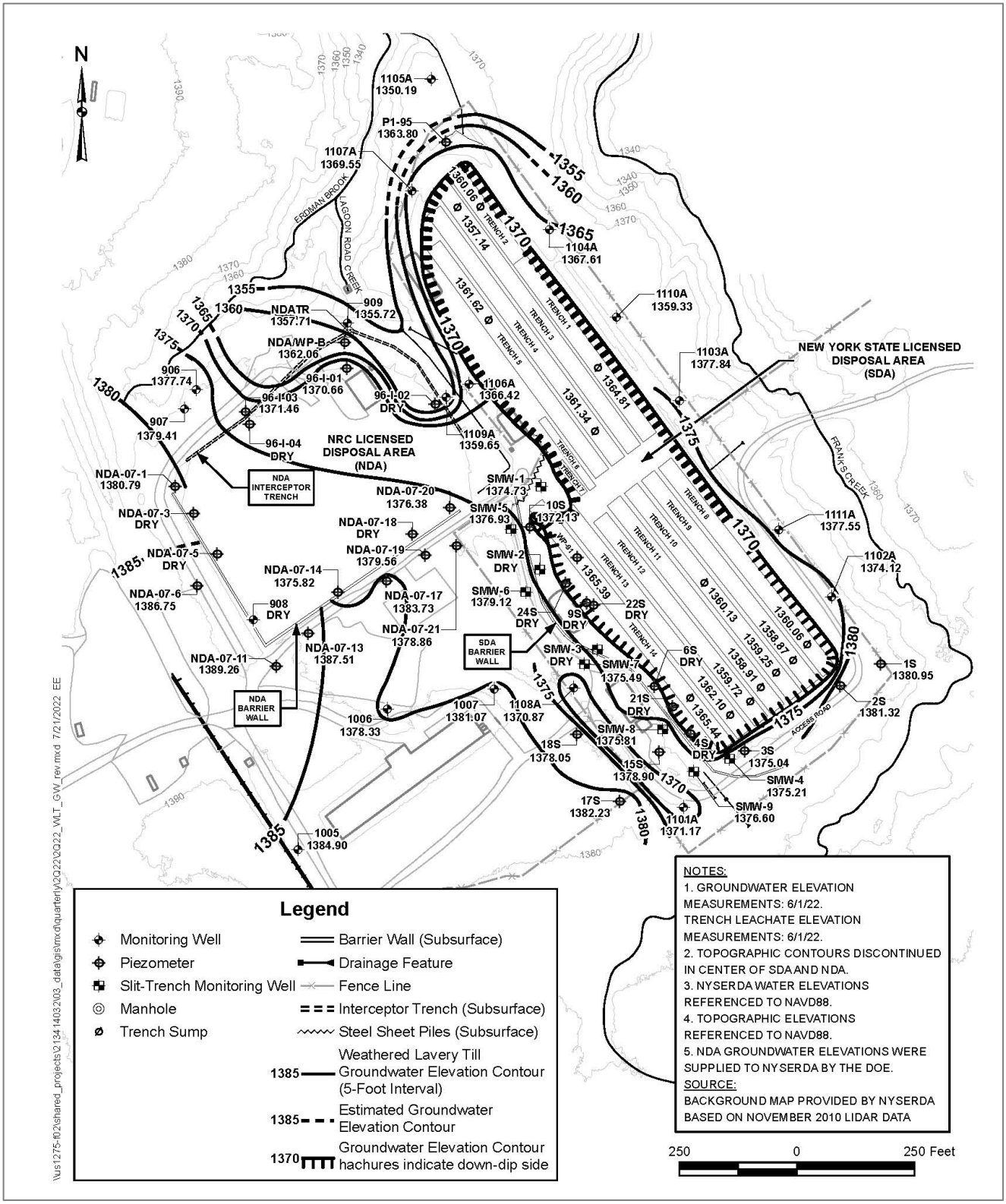


Figure B-5. Second Quarter 2022 Kent Recessional Groundwater Contour Map

Source: Stantec

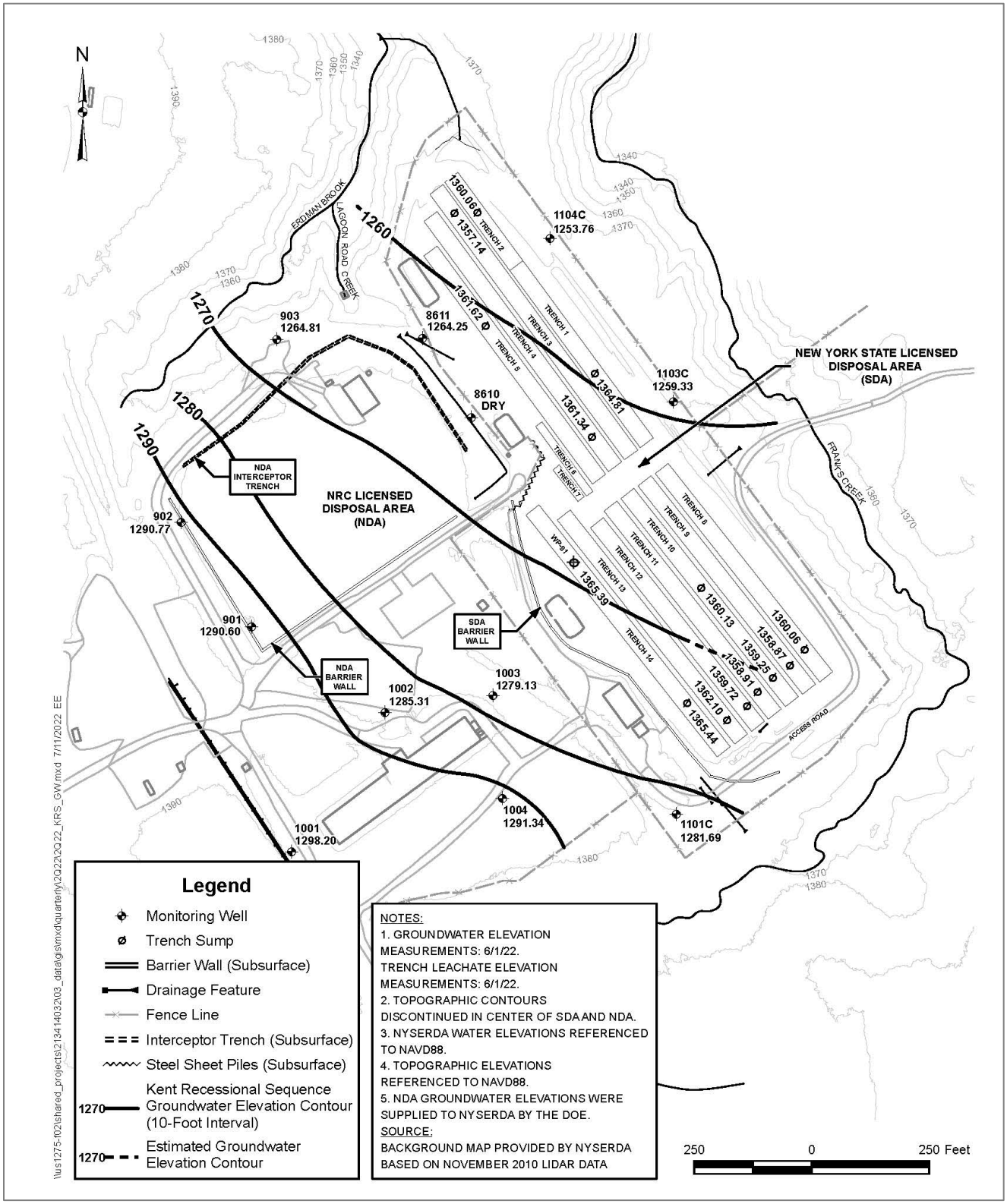


Figure B-6. Second Quarter 2022 North End Trench 14 Enhanced Groundwater Contour Map

Source: Stantec

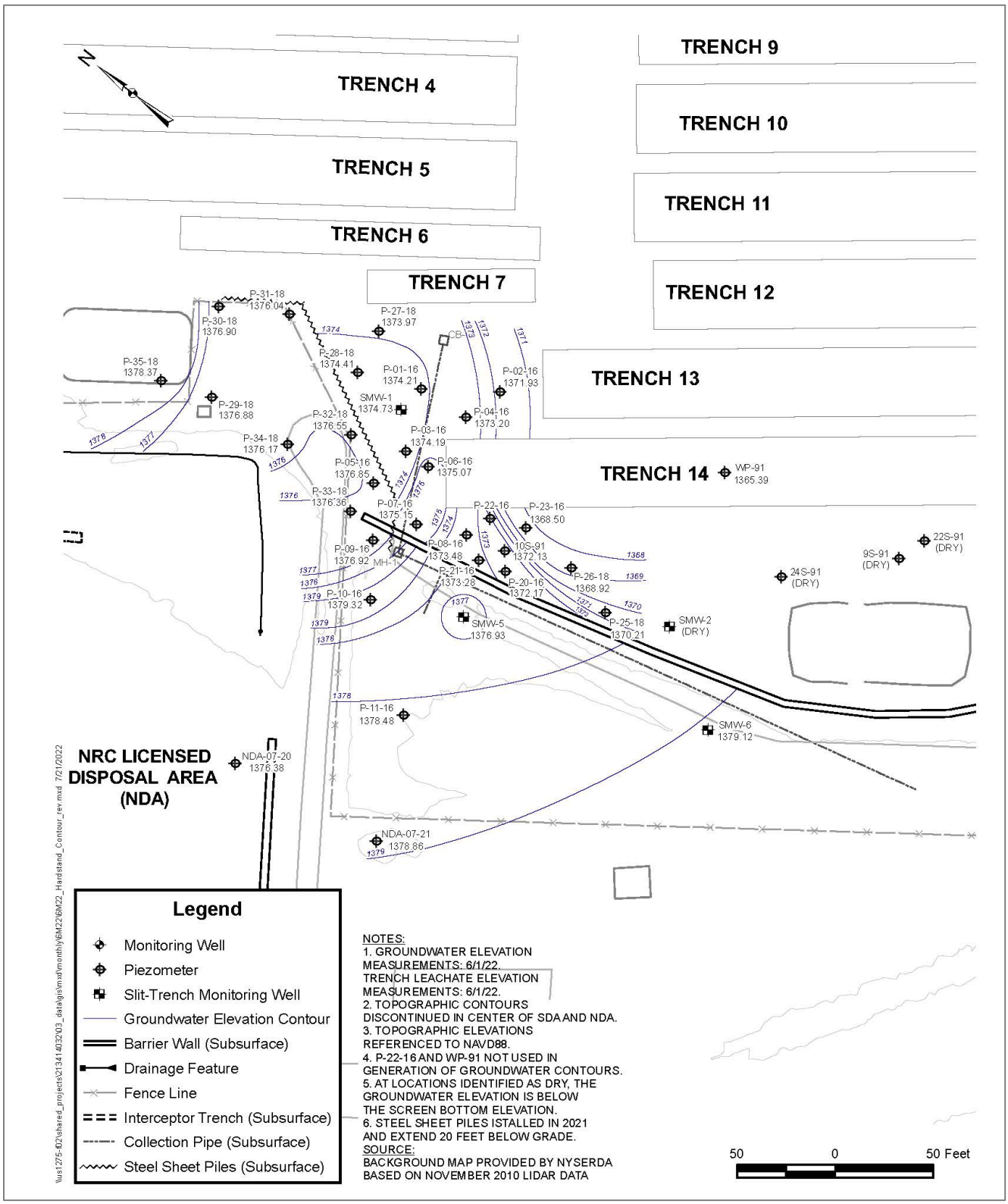


Figure B-7. Third Quarter 2022 Weathered Lavery Till Groundwater Contour Map

Source: Stantec

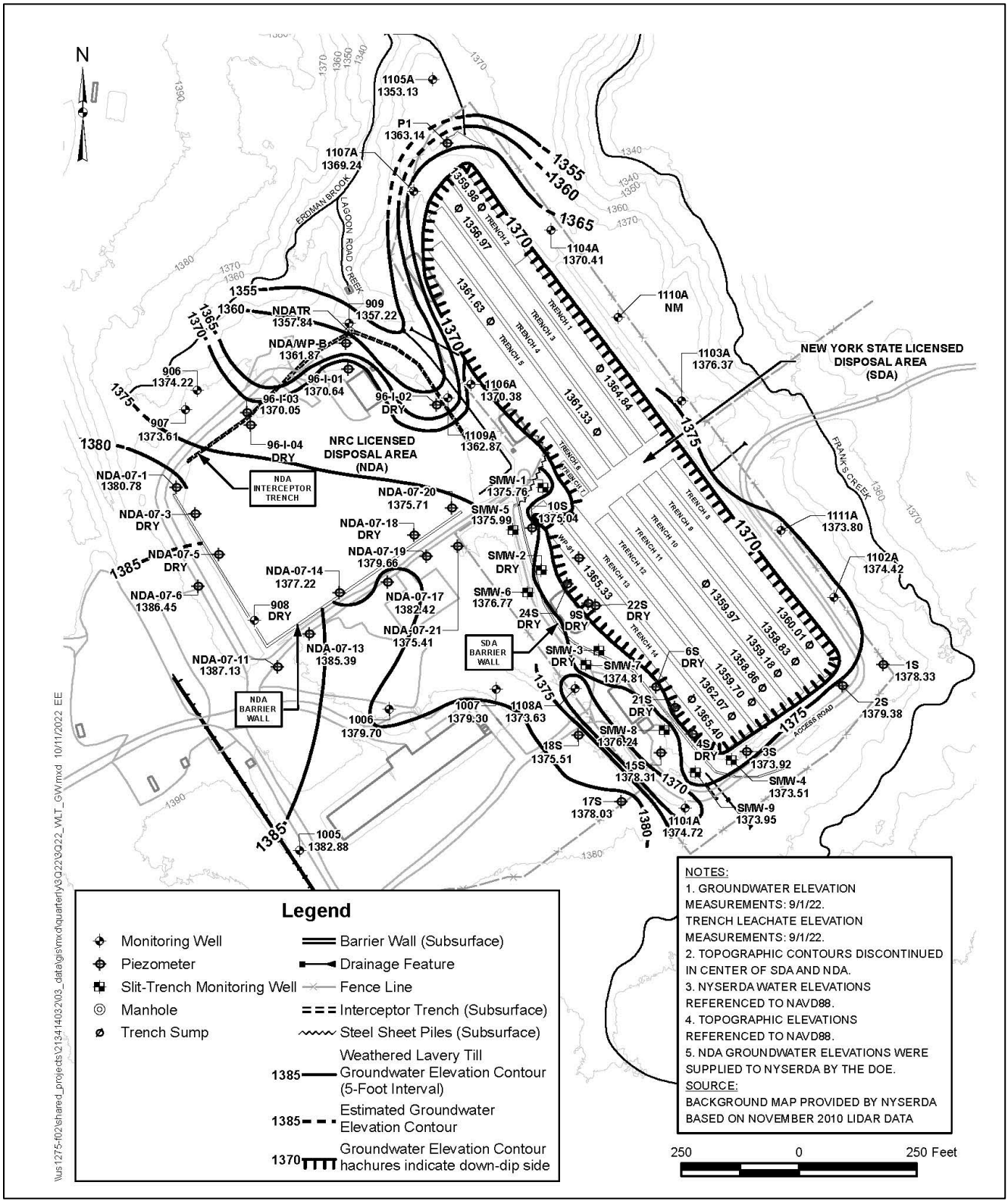


Figure B-8. Third Quarter 2022 Kent Recessional Groundwater Contour Map

Source: Stantec

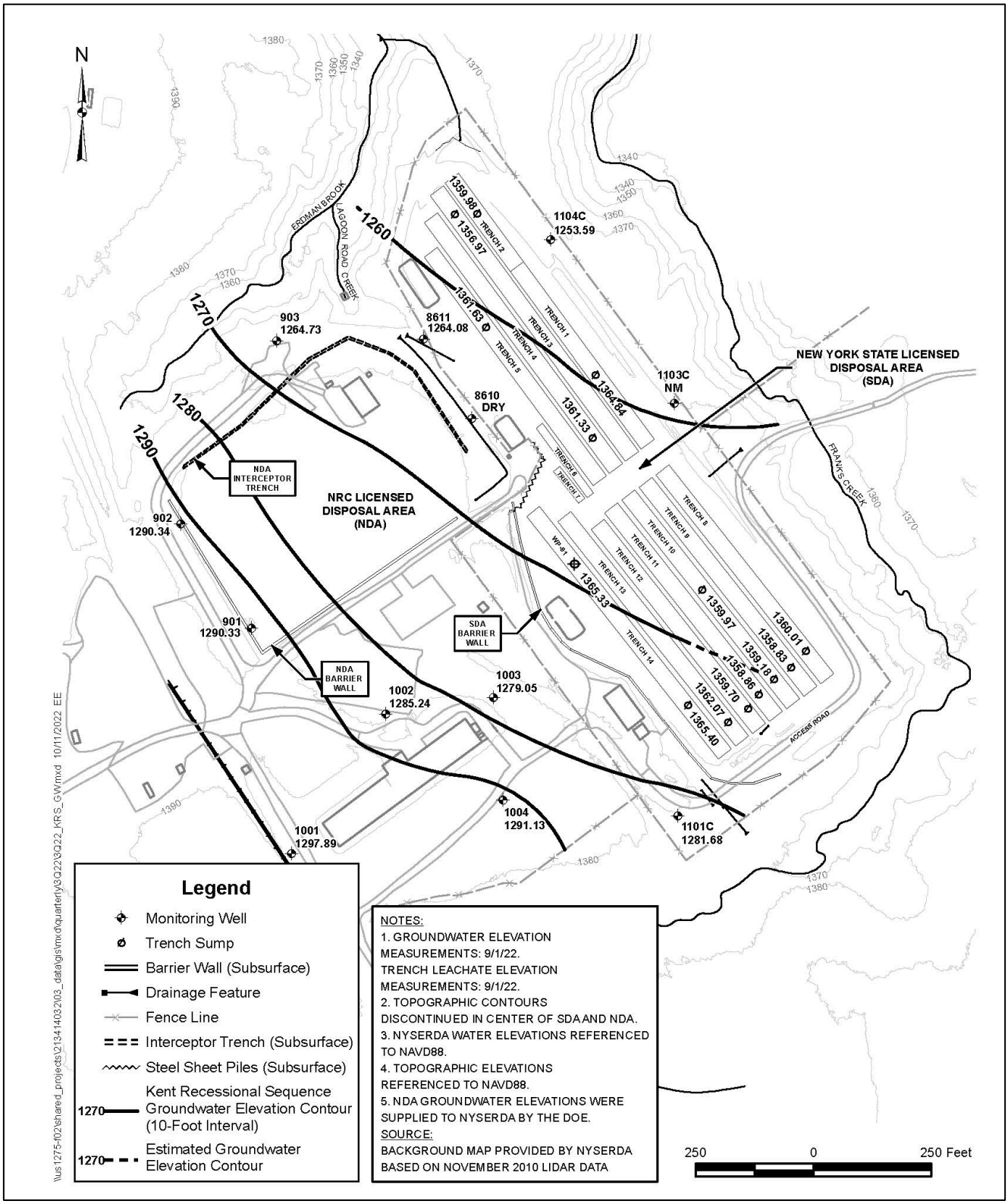


Figure B-9. Third Quarter 2022 North End Trench 14 Enhanced Groundwater Contour Map

Source: Stantec

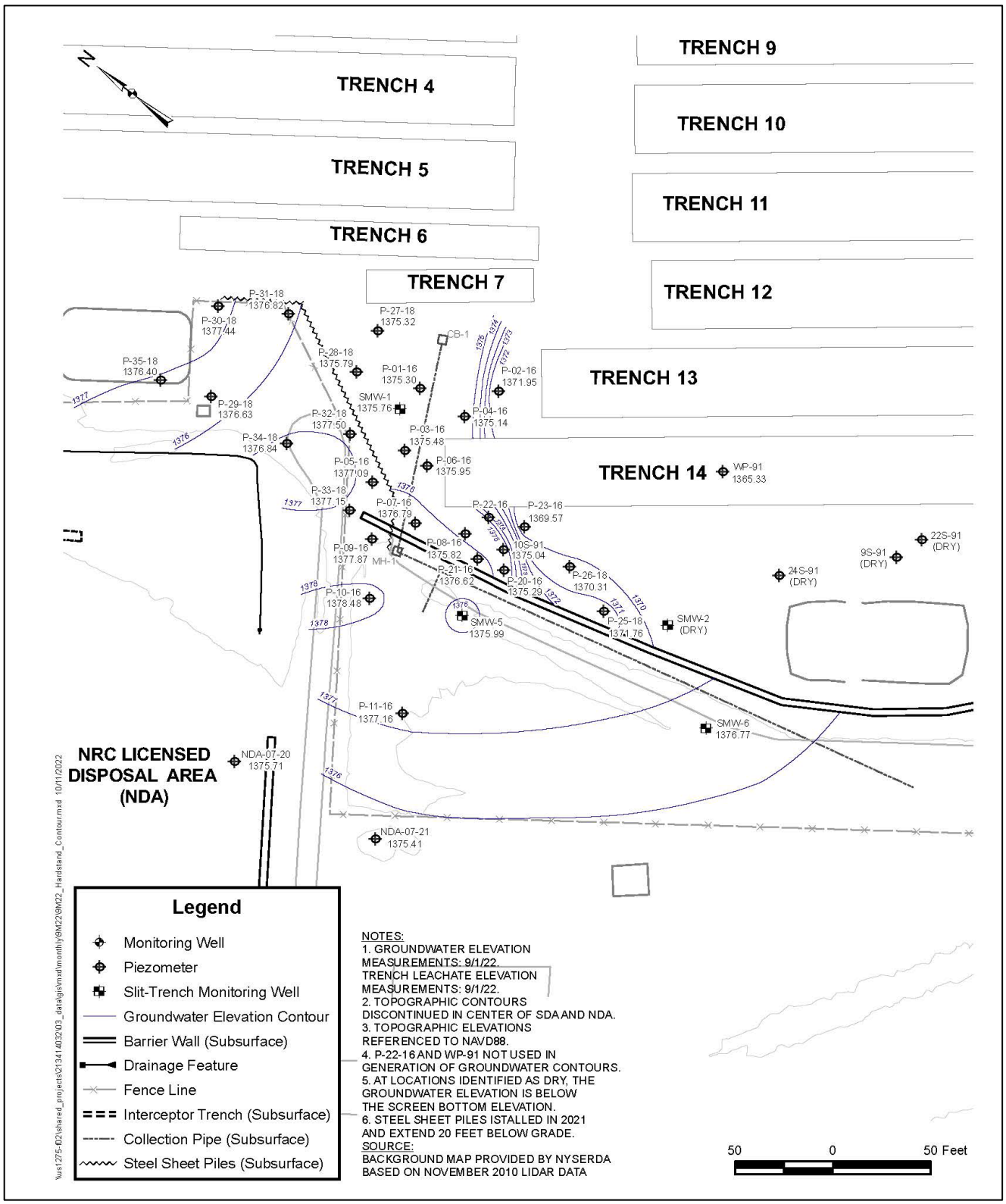


Figure B-10. Fourth Quarter 2022 Weathered Lavery Till Groundwater Contour Map

Source: Stantec

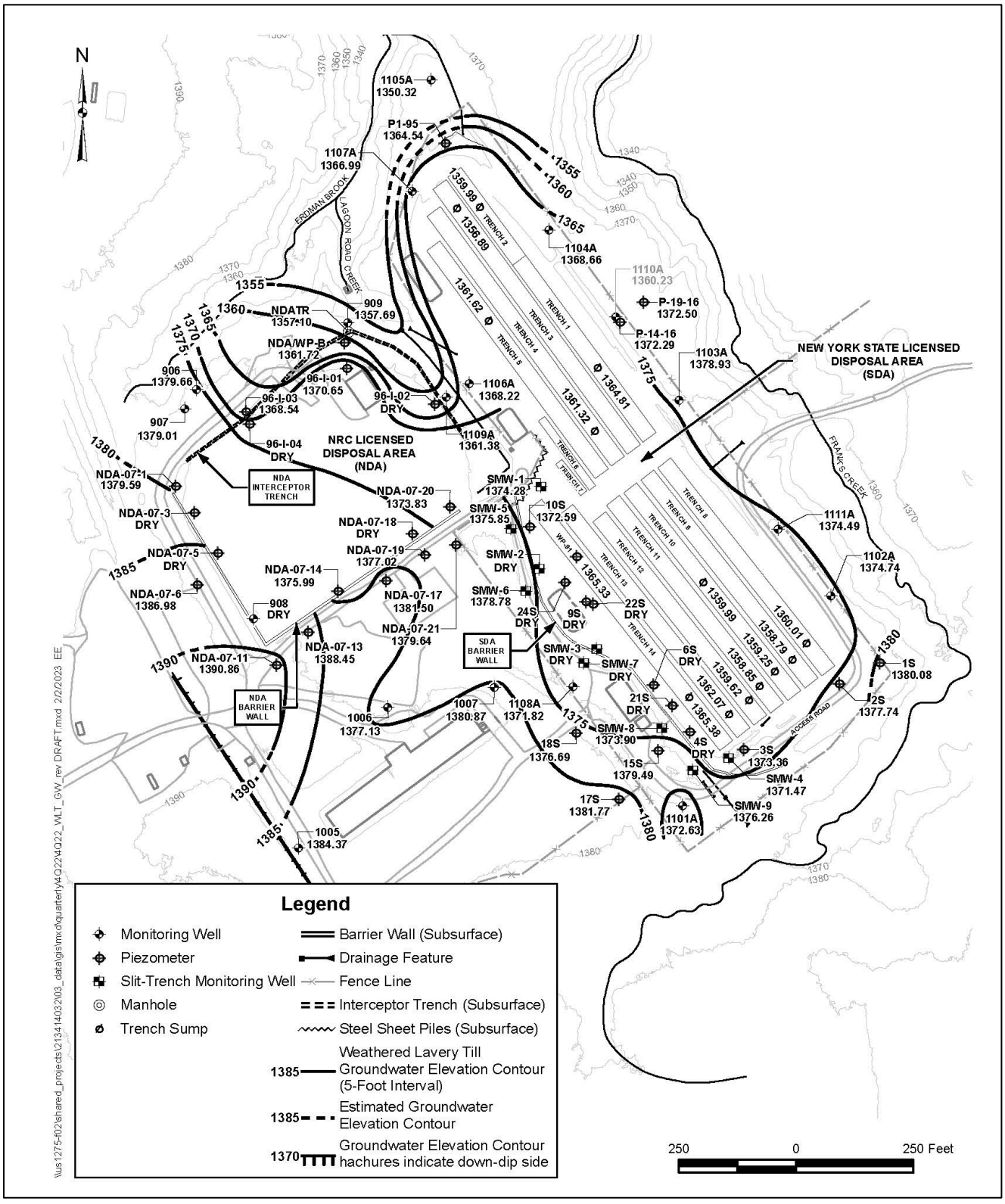


Figure B-11. Fourth Quarter 2022 Kent Recessional Groundwater Contour Map

Source: Stantec

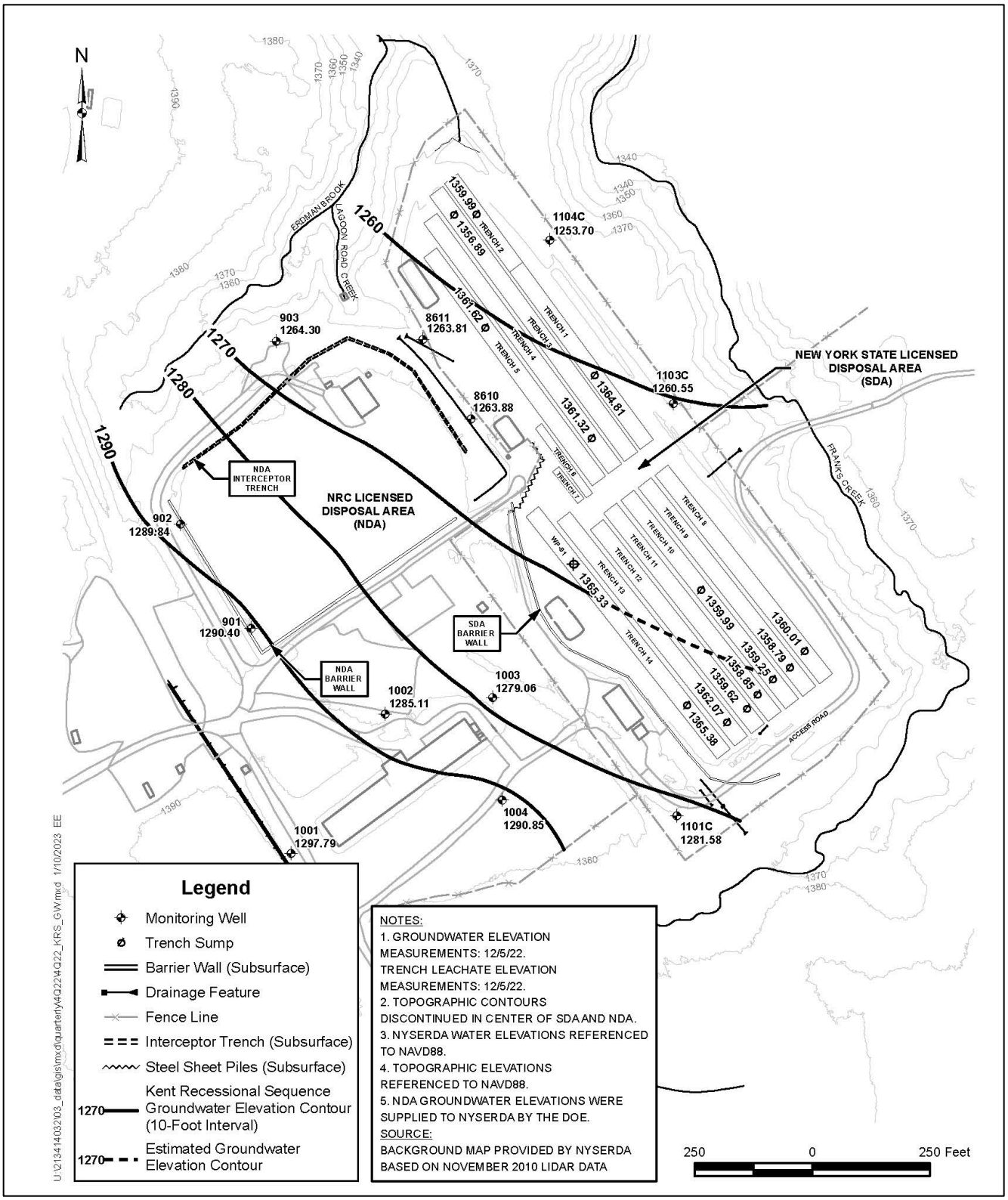


Figure B-12. Fourth Quarter 2022 North End Trench 14 Enhanced Groundwater Contour Map

Source: Stantec

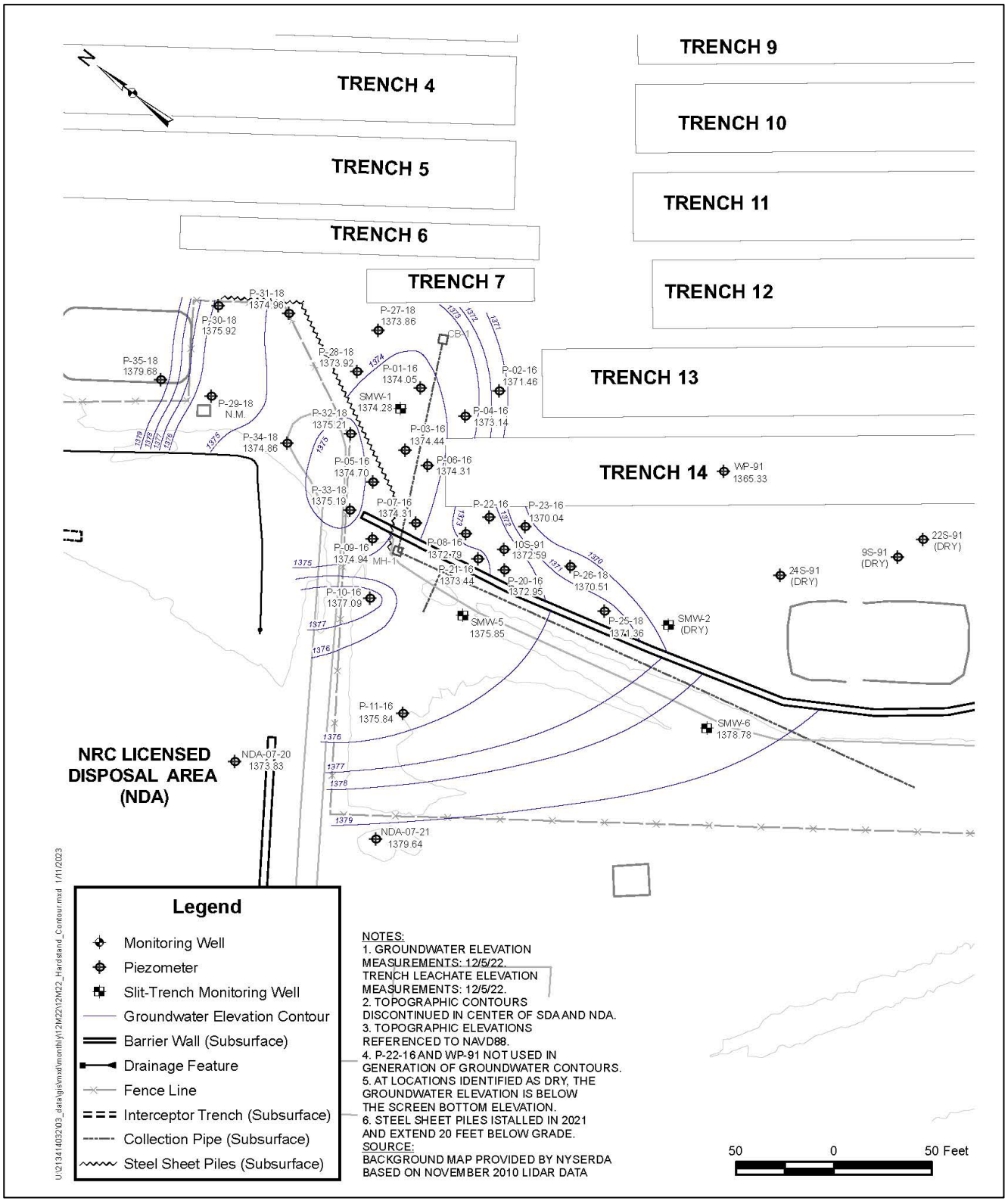


Table B-7. Semiannual Groundwater Sampling Performed in 2022

Source: NYSERDA

Well	Gross Alpha (May)	Gross Alpha (Nov)	Gross Beta (May)	Gross Beta (Nov)	Tritium	Tritium	Field Water Quality Parameters (May)	Field Water Quality Parameters (Nov)
1101A	✓	✓[c]	✓	✓[c]	✓	✓[c]	✓	✓
1101B	✓	✓	✓	✓	✓	✓	✓	✓
1101C	✓	✓	✓	✓	✓	✓	✓	✓
1102A	✓	✓	✓	✓	✓	✓	✓	✓
1102B	✓	✓	✓	✓	✓	✓	✓	✓
1103A	✓	✓	✓	✓	✓	✓	✓	✓
1103B	✓	✓	✓	✓	✓	✓	✓	✓
1103C	✓	✓	✓	✓	✓	✓	ISV	ISV
1104A	✓	✓	✓	✓	✓	✓	✓	✓
1104B	✓	✓	✓	✓	✓	✓	✓	✓
1104C	✓	✓	✓	✓	✓	✓	ISV	ISV
1105A	✓	✓	✓	✓	✓	✓	✓	✓
1105B	✓	✓	✓	✓	✓	✓	✓	✓
1106A	✓	✓	✓	✓	✓	✓	✓	✓
1106B	✓	✓	✓	✓	✓	✓	✓	✓
1107A	✓	✓	✓	✓	✓	✓	✓	✓
1108A	✓	✓	✓	✓	✓	✓	✓	✓
1109A	✓	✓	✓	✓	✓	✓	✓	✓
1109B	✓	✓	✓	✓	✓	✓	✓	✓
1110A	✓	✓	✓	✓	✓	✓	✓	ISV
1111A	✓	✓	✓	✓	✓	✓	✓	✓

[c] Resampled in January 2023.

Notes:

ISV Insufficient sample volume.

Table B-8. Annual Groundwater Sampling Performed in 2022

Source: NYSERDA

Well	Gamma Emitters	Beta Emitters				Volatile Organic Compounds
		C-14	I-129	Sr-90	Tc-99	
1101A	✓[d]	✓[d]	✓[d]	✓[d]	✓[d]	✓
1101B	✓	✓	✓	✓	✓	✓
1101C	✓	✓	✓	✓	✓	✓
1102A	✓	✓	✓	✓	✓	✓
1102B	✓	✓	✓	✓	✓	✓
1103A	✓	✓	✓	✓	✓	✓
1103B	✓	✓	✓	✓	✓	✓
1103C	✓	✓	ISV	ISV	✓	✓
1104A	✓	✓	✓	✓	✓	✓
1104B	✓	✓	✓	✓	✓	✓
1104C	✓	✓	✓	✓	✓	✓
1105A	✓	✓	✓	✓	✓	✓
1105B	✓	✓	✓	✓	✓	✓
1106A	✓	✓	✓	✓	✓	✓
1106B	✓	✓	✓	✓	✓	✓
1107A	✓	✓	✓	✓	✓	✓
1108A	✓	✓	✓	✓	✓	✓
1109A	✓	✓	✓	✓	✓	✓
1109B	✓	✓	✓	✓	✓	✓
1110A	✓	✓	✓	✓	✓	✓
1111A	✓	✓	✓	✓	✓	✓

[d] Resampled in January 2023.

Notes:

ISV Insufficient sample volume.

Table B-9. 2022 Groundwater Radiological Data – SDA 1100-Series Wells

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table B-9, the 6 NYCRR Part 703.5, Table 1, *Water Quality Standards Surface Waters and Groundwater* concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Location	Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards		1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
1101A	05/09/22	5.84E+00±3.05E+00	J	4.72E+00±2.25E+00		1.07E+01±6.38E+01	U
1101A	11/07/22	2.32E+00±2.82E+00	U	2.73E+02±9.54E+00		9.43E+01±7.95E+01	U
1101A	01/17/23	3.45E+00±2.10E+00	J	3.67E+00±1.51E+00		1.21E+01±7.69E+01	UJ
1101A	01/17/23	3.64E+00±2.14E+00	J	2.16E+00±1.14E+00	J	4.33E+01±6.64E+01	UJ
1101B	05/09/22	3.60E+00±2.44E+00	J	2.36E+00±1.78E+00	U	1.04E+01±6.32E+01	U
1101B	11/07/22	4.47E+00±2.63E+00	J	5.03E+00±1.98E+00		3.84E+01±7.27E+01	U
1101C	05/09/22	2.55E+00±2.05E+00	U	2.25E+00±1.38E+00		-1.01E+01±6.26E+01	U
1101C	11/07/22	8.24E-01±1.53E+00	U	2.30E+00±1.38E+00		7.87E+00±7.21E+01	U
1102A	05/05/22	3.70E+00±2.26E+00	J	1.91E+00±1.66E+00	U	5.88E+01±6.71E+01	U
1102A	11/07/22	3.58E+00±1.00E+00		2.59E+00±8.25E-01		6.20E+01±7.57E+01	U
1102B	05/05/22	-2.37E-01±1.51E+00	U	3.57E-01±1.02E+00	U	5.99E+01±7.13E+01	U
1102B	11/07/22	1.04E+00±1.72E+00	U	2.22E+00±1.67E+00	U	9.42E+01±7.95E+01	U
1103A	05/05/22	8.02E+00±3.20E+00		4.72E+00±1.99E+00		5.99E+01±6.64E+01	U
1103A	11/07/22	6.20E+00±1.38E+00		9.89E+00±9.87E-01		1.10E+02±7.22E+01	U
1103B	05/05/22	9.79E-01±1.63E+00	U	1.97E+00±1.50E+00	U	-9.74E+00±6.42E+01	U
1103B	11/07/22	4.62E+00±1.17E+00		3.59E+00±9.62E-01		6.08E+01±7.05E+01	U
1103C	05/03/22	2.77E+01±5.78E+00		2.86E+01±2.96E+00		3.53E+01±6.75E+01	U
1103C	11/01/22	6.28E-01±1.19E+00	U	2.34E+01±1.25E+00		-1.27E+01±6.81E+01	U
1104A	05/05/22	4.30E+00±2.47E+00	J	1.42E+00±1.63E+00	U	3.24E+01±6.43E+01	U
1104A	05/05/22	3.48E+00±2.26E+00	J	1.75E+00±1.34E+00	U	3.80E+01±6.58E+01	U
1104A	11/07/22	2.82E+00±8.31E-01		3.79E+00±7.85E-01		5.90E+01±7.06E+01	U
1104B	05/05/22	2.94E+00±2.12E+00	J	2.90E+00±1.26E+00		6.10E+00±6.36E+01	U
1104B	11/07/22	4.48E+00±1.07E+00		3.87E+00±9.12E-01		-6.49E+01±6.46E+01	UJ
1104C	05/03/22	1.11E+01±4.27E+00		1.24E+01±2.45E+00		7.10E-01±6.05E+01	U
1104C	11/01/22	1.02E+01±4.37E+00	J	3.54E+01±3.65E+00	J	-2.25E+01±6.73E+01	U

Table B-9 continued.

Sample Location	Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards		1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
1105A	05/05/22	6.89E+00±2.69E+00		6.30E+00±1.87E+00		4.55E+01±6.40E+01	U
1105A	11/07/22	2.35E+00±7.49E-01		1.73E+00±7.55E-01		8.78E+01±7.09E+01	U
1105A	11/07/22	2.82E+00±2.15E+00	U	1.49E+00±1.52E+00	U	6.26E+01±7.66E+01	U
1105B	05/05/22	4.59E+00±2.35E+00	J	3.73E+00±1.35E+00		1.45E+01±6.78E+01	U
1105B	11/07/22	2.93E+00±8.70E-01		2.41E+00±5.91E-01		9.67E+00±6.83E+01	U
1106A	05/05/22	5.75E+00±2.46E+00		1.68E+00±1.07E+00	J	1.47E+02±7.20E+01	J
1106A	11/07/22	3.30E+00±1.13E+00		3.06E+00±7.68E-01		1.00E+02±8.15E+01	U
1106B	05/05/22	1.13E+00±1.75E+00	U	2.59E+00±1.34E+00	J	3.97E+01±6.79E+01	U
1106B	11/07/22	1.74E+00±8.80E-01		1.10E+00±5.22E-01		6.07E+01±7.95E+01	U
1107A	05/05/22	5.12E+00±2.77E+00		1.17E+01±2.06E+00		2.31E+03±1.59E+02	J
1107A	11/07/22	6.29E+00±3.03E+00	J	2.58E+01±2.45E+00		1.96E+03±1.20E+02	
1108A	05/04/22	1.13E+01±3.61E+00		6.59E+00±1.81E+00		2.73E+01±6.53E+01	U
1108A	11/07/22	5.16E+00±1.38E+00		3.60E+00±6.97E-01		6.38E+01±7.02E+01	U
1109A	05/04/22	3.69E+00±2.25E+00	J	5.25E+00±1.83E+00		4.23E+02±8.72E+01	J
1109A	11/03/22	4.72E+00±1.44E+00		3.01E+00±6.70E-01		3.98E+02±8.21E+01	
1109B	05/09/22	1.45E+00±1.75E+00	U	2.93E+00±1.22E+00		2.77E+02±8.33E+01	J
1109B	11/03/22	1.96E+00±6.58E-01		2.45E+00±5.33E-01		2.33E+02±7.68E+01	
1110A	05/03/22	1.00E+01±3.80E+00		9.56E+00±2.19E+00		6.76E+01±6.67E+01	U
1110A	11/02/22	1.09E+01±2.07E+00		5.60E+00±8.98E-01		4.66E+01±6.95E+01	U
1111A	05/09/22	6.22E+00±2.88E+00		4.30E+00±1.70E+00		-8.43E-01±1.13E+02	UJ
1111A	11/07/22	4.28E+00±1.12E+00		3.25E+00±6.45E-01		6.66E+01±6.99E+01	U

Table B-9 continued.

Sample Location	Sample Date	Actinium-228 (pCi/L)	Q	Beryllium-7 (pCi/L)	Q	Bismuth-214 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/09/22	1.44E+01±3.10E+01	U	4.30E+01±5.09E+01	U	7.81E+00±2.16E+01	U
1101A	01/17/23	4.57E+00±2.76E+01	U	7.90E+00±4.24E+01	U	9.98E+00±2.30E+01	U
1101A	01/17/23	-2.34E+00 ±2.27E+01	U	5.71E+00±3.57E+01	U	1.74E+01±1.82E+01	U
1101B	05/09/22	-3.01E+01±2.66E+01	UJ	3.60E+01±5.92E+01	U	8.45E+00±2.18E+01	U
1101C	05/09/22	-1.84E+01±1.64E+01	UJ	2.88E+01±3.42E+01	U	0.00E+00±1.66E+01	UI
1102A	05/05/22	-6.43E+00±2.47E+01	U	-1.96E+01±7.14E+01	U	7.98E+00±1.37E+01	U
1102B	05/05/22	3.78E+00±2.26E+01	U	-6.70E+00±4.02E+01	U	4.38E+00±1.01E+01	U
1103A	05/05/22	-2.12E+01±1.84E+01	UJ	9.34E+00±3.41E+01	U	2.26E+00±8.93E+00	U
1103B	05/05/22	-1.29E+01±2.15E+01	U	7.69E+00±4.67E+01	U	1.25E+00±9.72E+00	U
1103C	11/01/22	-1.58E+00±4.52E+01	U	2.39E+01±8.52E+01	U	4.06E+01±3.35E+01	U
1104A	05/05/22	2.42E+01±2.77E+01	U	3.15E+01±4.59E+01	U	1.10E+01±1.72E+01	U
1104A	05/05/22	1.31E+00±2.22E+01	U	-3.81E+01±3.65E+01	UJ	-3.06E+00±9.97E+00	U
1104B	05/05/22	-5.35E+00±2.02E+01	U	-9.42E+00±4.28E+01	U	-1.18E-01±1.21E+01	U
1104C	11/01/22	-1.18E+01±2.07E+01	U	8.29E-01±3.89E+01	U	0.00E+00±1.78E+01	UJ
1105A	05/05/22	-7.90E-01±2.22E+01	U	-2.19E+01±4.45E+01	U	2.67E+00±1.67E+01	U
1105B	05/05/22	-6.75E+00±1.78E+01	U	-2.23E+01±3.81E+01	U	3.05E+01±1.31E+01	
1106A	05/05/22	2.18E+01±2.25E+01	U	1.00E+01±3.33E+01	U	9.91E+00±1.12E+01	U
1106B	05/05/22	-5.87E+00±1.67E+01	U	4.81E+01±3.44E+01	U	1.02E+01±1.25E+01	U
1107A	05/05/22	-1.94E+01±2.20E+01	U	-1.46E+01±3.99E+01	U	-3.51E+00±1.06E+01	U
1108A	05/04/22	-1.29E+01±2.03E+01	U	-2.40E+01±4.12E+01	U	2.46E+01±1.72E+01	J
1109A	05/04/22	-1.67E+01±1.98E+01	U	1.18E+01±3.53E+01	U	8.95E+00±2.04E+01	U
1109B	05/09/22	-4.35E+00±2.47E+01	U	7.49E+01±6.13E+01	U	5.21E+00±9.73E+00	U
1110A	05/03/22	-1.75E+01±3.04E+01	U	-1.86E+01±6.20E+01	U	3.15E+01±2.45E+01	U
1111A	05/09/22	1.09E+01±2.35E+01	U	1.04E+01±3.88E+01	U	4.26E+00±1.82E+01	U

Table B-9 continued.

Sample Location	Sample Date	Carbon-14 (pCi/L)	Q	Cesium-134 (pCi/L)	Q	Cesium-137 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/09/22	-4.48E+00±1.59E+01	U	1.34E+00±3.92E+00	U	-2.27E-02±5.11E+00	U
1101A	01/17/23	1.31E+01±2.34E+01	U	-2.52E+00±7.52E+00	U	0.00E+00±9.97E+00	UI
1101A	01/17/23	2.34E+00±2.35E+01	U	4.34E+00±5.11E+00	U	-4.68E+00±4.23E+00	UJ
1101B	05/09/22	-3.68E+00±1.60E+01	U	2.87E+00±6.86E+00	U	-3.86E+00±7.95E+00	U
1101C	05/09/22	-4.40E+00±1.61E+01	U	6.12E-02±4.27E+00	U	-2.79E-01±3.69E+00	U
1102A	05/05/22	-1.59E+01±1.58E+01	UJ	-4.16E+00±6.11E+00	U	3.81E+00±5.53E+00	U
1102B	05/05/22	-2.34E+00±1.64E+01	U	-4.78E-02±4.52E+00	U	-2.16E+00±5.07E+00	U
1103A	05/05/22	-1.90E+00±1.64E+01	U	2.91E-02±4.07E+00	U	7.59E-01±3.45E+00	U
1103B	05/05/22	1.04E+01±1.66E+01	U	2.95E+00±4.95E+00	U	-7.94E+00±5.75E+00	UJ
1103C	05/03/22	-6.57E+00±2.62E+01	U	ISV		ISV	
1103C	11/01/22	—		-1.17E+01±1.20E+01	U	-5.53E+00±1.23E+01	U
1104A	05/05/22	1.36E+01±1.55E+01	U	-1.78E-01±4.98E+00	U	-1.78E+00±4.72E+00	U
1104A	05/05/22	2.13E+01±1.70E+01	U	6.98E-01±3.71E+00	U	-9.86E-01±4.71E+00	U
1104B	05/05/22	-7.36E+00±1.43E+01	U	6.04E-02±4.66E+00	U	7.65E-01±4.36E+00	U
1104C	05/03/22	-2.22E+01±7.35E+01	UJ	ISV		ISV	
1104C	11/01/22	—		-1.34E-01±5.40E+00	U	1.76E+00±4.33E+00	U
1105A	05/05/22	4.57E+00±1.50E+01	U	1.32E+00±5.48E+00	U	-2.49E+00±5.42E+00	U
1105B	05/05/22	-4.55E+00±1.44E+01	U	-2.54E+00±4.96E+00	U	-1.03E+00±4.08E+00	U
1106A	05/05/22	2.13E-01±1.47E+01	U	2.10E+00±3.80E+00	U	-2.93E+00±4.88E+00	U
1106B	05/05/22	2.15E+01±1.60E+01	U	-1.21E+00±3.84E+00	U	7.23E-01±3.74E+00	U
1107A	05/05/22	5.06E+00±1.49E+01	U	4.60E+00±3.54E+00	U	-4.38E-01±4.12E+00	U
1108A	05/04/22	-6.00E+00±1.43E+01	U	7.91E+00±5.47E+00	U	-1.98E+00±5.80E+00	U
1109A	05/04/22	2.21E+01±1.59E+01	U	-2.09E+00±4.72E+00	U	3.67E-01±5.82E+00	U
1109B	05/09/22	-6.19E+00±1.59E+01	U	2.28E+00±6.71E+00	U	-1.06E+00±4.51E+00	U
1110A	05/03/22	-2.43E+01±2.74E+01	U	1.20E+01±8.32E+00	U	8.35E+00±9.17E+00	U
1111A	05/09/22	-3.17E+00±1.61E+01	U	-5.63E-01±3.83E+00	U	-1.78E+00±5.02E+00	U

Table B-9 continued.

Sample Location	Sample Date	Cobalt-57 (pCi/L)	Q	Cobalt-60 (pCi/L)	Q	Iodine-129 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/09/22	-2.15E-01±3.97E+00	U	5.38E-01±6.26E+00	U	1.22E-01±5.58E-01	U
1101A	01/17/23	-8.74E-01±3.59E+00	U	5.54E-01±5.76E+00	U	7.90E-02±5.20E-01	UJ
1101A	01/17/23	-2.91E-01±3.13E+00	U	-1.31E+00±4.13E+00	U	-5.99E-02±1.43E-01	UJ
1101B	05/09/22	-3.38E-01±2.83E+00	U	4.47E+00±6.47E+00	U	-3.85E-01±7.72E-01	U
1101C	05/09/22	-9.35E-01±2.93E+00	U	1.95E+00±4.15E+00	U	6.22E-02±3.32E-01	U
1102A	05/05/22	-4.14E-01±2.84E+00	U	2.45E+00±5.60E+00	U	2.46E-01±4.90E-01	U
1102B	05/05/22	4.48E-01±2.82E+00	U	-2.14E+00±3.45E+00	U	-4.86E-02±2.67E-01	U
1103A	05/05/22	-7.75E-01±2.87E+00	U	-1.41E+00±3.78E+00	U	2.91E-01±6.60E-01	U
1103B	05/05/22	7.67E-01±3.03E+00	U	2.86E+00±3.78E+00	U	1.54E-01±4.63E-01	U
1103C	11/01/22	1.10E+00±6.76E+00	U	3.61E+00±8.73E+00	U	ISV	
1104A	05/05/22	8.15E-01±3.44E+00	U	-2.67E-01±4.25E+00	U	-6.09E-02±3.02E-01	U
1104A	05/05/22	2.49E-01±2.90E+00	U	3.30E+00±4.08E+00	U	4.72E-02±3.69E-01	U
1104B	05/05/22	-4.73E-01±3.85E+00	U	6.25E-01±6.48E+00	U	-4.72E-01±6.99E-01	U
1104C	05/03/22	ISV		ISV		-1.66E-01±4.93E-01	U
1104C	11/01/22	1.41E-01±3.62E+00	U	4.01E-01±4.44E+00	U	—	
1105A	05/05/22	4.29E+00±4.81E+00	U	-1.04E-01±7.67E+00	U	-2.32E-01±4.86E-01	U
1105B	05/05/22	-1.81E+00±2.96E+00	U	9.56E-01±3.28E+00	U	-2.73E-01±5.59E-01	U
1106A	05/05/22	-4.72E-01±3.04E+00	U	4.27E-02±3.46E+00	U	-7.17E-01±6.64E-01	UJ
1106B	05/05/22	-2.11E-01±2.93E+00	U	5.57E+00±3.45E+00	U	-1.84E-02±4.43E-01	U
1107A	05/05/22	-1.10E+00±3.41E+00	U	4.47E-01±2.71E+00	U	2.55E-01±4.52E-01	U
1108A	05/04/22	-1.47E+00±3.42E+00	U	5.33E-01±4.07E+00	U	-1.86E-02±3.93E-01	U
1109A	05/04/22	1.00E+00±3.01E+00	U	4.96E+00±9.09E+00	U	3.53E-01±5.74E-01	U
1109B	05/09/22	2.69E-01±3.51E+00	U	6.76E-01±5.90E+00	U	-2.01E-01±5.03E-01	U
1110A	05/03/22	1.39E+00±3.06E+00	U	-3.70E+00±7.70E+00	U	3.05E-01±3.89E-01	U
1111A	05/09/22	5.38E-01±2.49E+00	U	-5.15E-01±4.11E+00	U	2.41E-01±4.46E-01	U

Table B-9 continued.

Sample Location	Sample Date	Lead-212 (pCi/L)	Q	Lead-214 (pCi/L)	Q	Potassium-40 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/09/22	8.50E+00±1.44E+01	U	0.00E+00±3.00E+01	UI	-4.98E+01±8.26E+01	U
1101A	01/17/23	1.36E+00±1.49E+01	U	1.35E+01±2.11E+01	U	-2.00E+01±7.32E+01	U
1101A	01/17/23	1.15E+01±1.13E+01	U	0.00E+00±1.67E+01	UI	3.17E+01±7.16E+01	U
1101B	05/09/22	1.24E-02±1.39E+01	U	1.38E+01±2.46E+01	U	-1.34E+01±8.34E+01	U
1101C	05/09/22	4.08E+00±1.20E+01	U	6.74E-01±1.26E+01	U	1.21E+01±5.92E+01	U
1102A	05/05/22	-5.02E+00±8.72E+00	U	3.06E+00±1.12E+01	U	-8.80E+01±8.28E+01	UJ
1102B	05/05/22	1.34E+01±1.06E+01	U	4.21E+00±8.18E+00	U	-7.93E+01±6.06E+01	UJ
1103A	05/05/22	2.92E+00±1.17E+01	U	2.55E+00±8.03E+00	U	-3.21E+01±5.67E+01	U
1103B	05/05/22	1.83E+00±1.26E+01	U	-2.96E+00±1.29E+01	U	-3.01E+01±5.43E+01	U
1103C	11/01/22	3.76E+00±2.51E+01	U	2.03E+01±2.45E+01	U	-4.73E+00±1.44E+02	U
1104A	05/05/22	3.89E+00±1.56E+01	U	7.50E+00±1.48E+01	U	6.88E+01±6.45E+01	U
1104A	05/05/22	7.50E+00±1.23E+01	U	0.00E+00±1.86E+01	UI	-5.94E+01±5.52E+01	UJ
1104B	05/05/22	6.08E+00±1.50E+01	U	5.15E+00±1.29E+01	U	-3.08E+01±7.09E+01	U
1104C	11/01/22	1.99E+00±9.90E+00	U	5.41E+00±1.98E+01	U	-1.45E+01±6.12E+01	U
1105A	05/05/22	1.41E+00±1.01E+01	U	9.12E+00±2.03E+01	U	-1.90E+01±7.33E+01	U
1105B	05/05/22	8.88E-01±8.71E+00	U	4.62E+00±1.45E+01	U	-2.20E+01±6.08E+01	U
1106A	05/05/22	-1.08E+00±8.54E+00	U	5.77E+00±7.82E+00	U	-7.36E+01±5.70E+01	UJ
1106B	05/05/22	8.45E+00±1.37E+01	U	9.19E+00±1.67E+01	U	-1.94E+01±6.13E+01	U
1107A	05/05/22	-5.48E-01±9.63E+00	U	1.78E+00±1.09E+01	U	3.76E+01±5.67E+01	U
1108A	05/04/22	2.19E+00±1.33E+01	U	1.38E+01±1.31E+01	U	1.40E+01±5.64E+01	U
1109A	05/04/22	1.48E+01±1.28E+01	U	1.81E+00±1.24E+01	U	-6.04E+01±7.28E+01	U
1109B	05/09/22	3.11E+00±1.54E+01	U	1.85E+00±1.37E+01	U	2.00E+00±7.31E+01	U
1110A	05/03/22	0.00E+00±2.20E+01	UI	3.64E+01±2.28E+01	J	1.41E+02±1.19E+02	U
1111A	05/09/22	4.94E+00±1.17E+01	U	-5.19E+00±1.16E+01	U	2.19E+01±7.57E+01	U

Table B-9 continued.

Sample Location	Sample Date	Radium-224 (pCi/L)	Q	Radium-226 (pCi/L)	Q	Strontium-90 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/09/22	2.77E+01±1.18E+02	U	0.00E+00±2.53E+02	UI	-1.51E-01±4.07E-01	U
1101A	11/07/22	—		—		1.57E+00±6.20E-01	
1101A	01/17/23	1.06E+02±1.48E+02	U	-7.44E+01±1.18E+02	U	1.58E-01±4.79E-01	U
1101A	01/17/23	0.00E+00±1.24E+02	UI	-5.07E+01±1.03E+02	U	4.47E-01±4.89E-01	U
1101B	05/09/22	2.70E+01±9.77E+01	U	-1.04E+02±1.16E+02	U	-9.64E-02±4.07E-01	U
1101C	05/09/22	1.73E+01±6.99E+01	U	1.41E+01±1.20E+02	U	1.77E-01±4.25E-01	U
1102A	05/05/22	-1.70E+00±7.77E+01	U	1.10E+02±1.30E+02	U	3.95E-03±4.61E-01	U
1102B	05/05/22	2.40E+01±6.87E+01	U	9.58E+01±9.94E+01	U	2.67E-01±5.61E-01	U
1103A	05/05/22	1.80E+01±7.57E+01	U	1.36E+01±1.19E+02	U	5.04E-01±5.65E-01	U
1103B	05/05/22	-4.77E+01±9.18E+01	U	-3.65E+01±1.11E+02	U	-2.90E-01±4.38E-01	U
1103C	11/01/22	1.89E+01±1.80E+02	U	-1.96E+02±2.19E+02	U	ISV	
1104A	05/05/22	6.12E+01±9.06E+01	U	0.00E+00±1.91E+02	UI	1.52E-01±4.41E-01	U
1104A	05/05/22	4.53E+00±7.29E+01	U	1.49E+01±1.45E+02	U	5.70E-01±5.83E-01	U
1104B	05/05/22	1.65E+01±9.80E+01	U	1.09E+02±1.69E+02	U	1.08E-01±4.65E-01	U
1104C	05/03/22	ISV		ISV		-2.52E-01±3.60E-01	U
1104C	11/01/22	-7.03E+01±8.81E+01	U	2.48E+01±1.92E+02	U	—	
1105A	05/05/22	6.07E+00±1.01E+02	U	6.95E+01±1.46E+02	U	5.35E-02±4.45E-01	U
1105B	05/05/22	5.62E+01±5.95E+01	U	3.59E+01±1.15E+02	U	8.72E-01±5.64E-01	U
1106A	05/05/22	-4.57E+00±7.33E+01	U	-6.29E+01±1.09E+02	U	7.52E-01±5.26E-01	U
1106B	05/05/22	1.46E+01±7.42E+01	U	4.81E+01±1.23E+02	U	3.09E-01±4.74E-01	U
1107A	05/05/22	-1.43E+02±9.17E+01	UJ	9.50E+01±1.76E+02	U	8.34E+00±1.21E+00	
1108A	05/04/22	-5.18E+00±9.38E+01	U	-5.68E+01±1.03E+02	U	9.22E-01±6.22E-01	U
1109A	05/04/22	4.47E+01±7.90E+01	U	9.71E+01±1.68E+02	U	-1.77E-01±3.97E-01	U
1109B	05/09/22	3.28E+01±1.01E+02	U	1.18E+02±2.16E+02	U	3.19E-01±4.17E-01	U
1110A	05/03/22	0.00E+00±2.34E+02	UI	-1.14E+02±1.11E+02	UJ	1.28E-01±4.68E-01	U
1111A	05/09/22	9.35E+01±1.15E+02	U	1.74E+01±1.42E+02	U	1.99E-02±3.85E-01	U

Table B-9 continued.

Sample Location	Sample Date	Technetium-99 (pCi/L)	Q	Thallium 208 (pCi/L)	Q	Thorium-234 (pCi/L)	Q
703.5 Water Quality Standards							
1101A	05/09/22	5.25E-01±1.90E+00	U	2.84E+00±1.07E+01	U	-1.23E+02±4.05E+02	U
1101A	01/17/23	-3.44E-01±2.69E+00	U	-2.56E+00±6.31E+00	U	-7.84E+01±2.45E+02	U
1101A	01/17/23	-3.93E-01±2.69E+00	U	9.22E-01±8.97E+00	U	-1.32E+02±1.81E+02	U
1101B	05/09/22	-1.10E-01±1.93E+00	U	-5.89E-01±7.93E+00	U	1.75E+02±1.71E+02	U
1101C	05/09/22	1.54E+00±1.95E+00	U	-1.65E+00±5.15E+00	U	9.89E+01±2.23E+02	U
1102A	05/05/22	1.29E+00±2.08E+00	U	2.59E+00±9.90E+00	U	0.00E+00±1.77E+02	UI
1102B	05/05/22	5.66E-02±1.99E+00	U	1.85E+00±4.99E+00	U	7.30E+01±2.76E+02	U
1103A	05/05/22	1.32E-01±1.97E+00	U	-1.63E+00±5.14E+00	U	-1.81E+02±1.55E+02	UJ
1103B	05/05/22	-1.00E+00±1.84E+00	U	1.36E+00±7.93E+00	U	1.21E+02±2.19E+02	U
1103C	05/03/22	1.69E+00±2.38E+00	U	ISV		ISV	
1103C	11/01/22	—		3.13E+00±1.97E+01	U	2.11E+02±5.85E+02	U
1104A	05/05/22	-1.22E-02±1.85E+00	U	-5.03E-01±5.59E+00	U	-1.17E+01±3.46E+02	U
1104A	05/05/22	7.68E-01±2.03E+00	U	3.41E+00±5.41E+00	U	6.15E+01±3.37E+02	U
1104B	05/05/22	-3.00E-01±1.88E+00	U	-1.95E-01±6.69E+00	U	-4.40E+01±3.78E+02	U
1104C	05/03/22	-1.33E+00±1.79E+00	U	ISV		ISV	
1104C	11/01/22	—		3.25E+00±8.42E+00	U	-2.43E+02±3.37E+02	U
1105A	05/05/22	-7.86E-02±1.93E+00	U	-1.16E+00±6.08E+00	U	-3.19E+02±3.66E+02	U
1105B	05/05/22	1.07E+00±2.03E+00	U	-3.64E+00±5.58E+00	U	1.54E+02±3.04E+02	U
1106A	05/05/22	1.15E+00±1.94E+00	U	1.29E-01±4.50E+00	U	1.11E+02±3.26E+02	U
1106B	05/05/22	3.78E+00±2.36E+00	U	1.01E-01±6.69E+00	U	0.00E+00±3.32E+02	UI
1107A	05/05/22	-8.36E-02±2.33E+00	U	8.38E-01±9.37E+00	U	2.33E+02±4.65E+02	U
1108A	05/04/22	1.01E+00±2.11E+00	U	4.59E+00±1.04E+01	U	9.80E+01±2.73E+02	U
1109A	05/04/22	1.43E+00±1.98E+00	U	-5.30E-01±5.53E+00	U	7.18E+01±2.47E+02	U
1109B	05/09/22	5.51E-01±2.09E+00	U	3.72E+00±7.71E+00	U	1.24E+02±3.46E+02	U
1110A	05/03/22	-8.24E-02±2.16E+00	U	1.14E+00±7.87E+00	U	3.40E+01±1.61E+02	U
1111A	05/09/22	1.05E+00±2.25E+00	U	-8.28E-01±4.83E+00	U	7.89E+01±2.25E+02	U

Table B-9 continued.

Sample Location	Sample Date	Uranium-235 (pCi/L)	Q
703.5 Water Quality Standards			
1101A	05/09/22	1.74E+01±3.37E+01	U
1101A	01/17/23	-1.58E+01±3.42E+01	U
1101A	01/17/23	-1.63E+01±2.82E+01	U
1101B	05/09/22	1.53E+01±3.15E+01	U
1101C	05/09/22	4.27E+00±2.50E+01	U
1102A	05/05/22	-2.52E+01±2.83E+01	U
1102B	05/05/22	-1.92E+01±2.77E+01	U
1103A	05/05/22	0.00E+00±3.41E+01	UI
1103B	05/05/22	-1.22E+01±2.66E+01	U
1103C	11/01/22	-1.16E+01±5.53E+01	U
1104A	05/05/22	-2.63E+01±3.25E+01	U
1104A	05/05/22	-5.29E-01±2.52E+01	U
1104B	05/05/22	-1.92E+01±3.73E+01	U
1104C	11/01/22	-1.80E+00±3.09E+01	U
1105A	05/05/22	3.98E+01±4.38E+01	U
1105B	05/05/22	8.87E+00±3.35E+01	U
1106A	05/05/22	2.77E+01±4.14E+01	U
1106B	05/05/22	-1.05E+01±2.50E+01	U
1107A	05/05/22	-2.46E+01±3.14E+01	U
1108A	05/04/22	1.87E+01±2.87E+01	U
1109A	05/04/22	-8.88E+00±2.64E+01	U
1109B	05/09/22	-6.19E+00±3.43E+01	U
1110A	05/03/22	-5.88E+00±2.98E+01	U
1111A	05/09/22	-1.52E+01±2.49E+01	U

Key for Qualifier Codes (Q):

J = Analyte identified. Associated result is considered estimated or uncertain.
U = Not detected above MDC and/or 2-sigma uncertainty.
UI = Gamma spectroscopy--uncertain identification.
UJ = Not detected above MDC and/or 2-sigma uncertainty, which may be considered estimated or uncertain.

Notes:

ISV = Insufficient sample volume.
— = No sample required.

Table B-10. 2022 Groundwater Field Parameter Data – SDA 1100-Series Wells

Source: NYSERDA

Sample Location	Sample Date	Conductivity (µmhos/cm)	pH	Temperature (°C)	Turbidity (NTU)
1101A	05/09/22	750	7.40	10.22	11.39
1101A	11/07/22	164	7.52	13.17	1.97
1101B	05/09/22	552	7.66	11.80	3.29
1101B	11/07/22	117	7.87	11.74	2.59
1101C	05/09/22	185	7.89	11.29	94.8
1101C	11/07/22	69	7.50	10.87	7.50
1102A	05/05/22	742	7.50	10.81	11.9
1102A	11/07/22	161	7.54	13.51	12.05
1102B	05/05/22	530	7.62	13.07	6.86
1102B	11/07/22	113	7.70	12.47	3.96
1103A	05/05/22	1199	7.28	10.65	19.1
1103A	11/07/22	259	7.27	13.36	20.7
1103B	05/05/22	567	7.65	12.77	4.46
1103B	11/07/22	132	7.59	12.15	4.39
1103C	05/03/22	ISV	ISV	ISV	ISV
1103C	11/01/22	ISV	ISV	ISV	ISV
1104A	05/05/22	685	7.73	12.56	9.04
1104A	11/07/22	138	7.52	13.48	2.05
1104B	05/05/22	546	7.75	13.34	3.19
1104B	11/07/22	112	7.74	12.00	0.84
1104C	05/03/22	ISV	ISV	ISV	ISV
1104C	11/01/22	ISV	ISV	ISV	ISV
1105A	05/05/22	690	7.86	11.22	4.38
1105A	11/07/22	131	7.81	11.62	28.2
1105B	05/05/22	600	7.81	11.91	47.7
1105B	11/07/22	127	7.64	10.27	9.05
1106A	05/05/22	681	7.57	12.14	6.44
1106A	11/07/22	136	7.65	14.44	3.76
1106B	05/05/22	688	7.54	15.10	88.4

Table B-10 continued.

Sample Location	Sample Date	Conductivity (µmhos/cm)	pH	Temperature (°C)	Turbidity (NTU)
1106B	11/07/22	141	7.68	12.76	25.1
1107A	05/05/22	1936	6.69	12.47	6.91
1107A	11/07/22	420	6.56	13.54	1.72
1108A	05/04/22	820	7.44	9.58	80
1108A	11/07/22	164	7.56	13.42	106
1109A	05/04/22	643	7.53	11.19	2.13
1109A	11/03/22	140	7.46	14.49	3.27
1109B	05/09/22	492	7.68	14.90	41.3
1109B	11/03/22	186	7.86	13.91	50.2
1110A	05/03/22	1532	7.31	12.07	73.5
1110A	11/02/22	ISV	ISV	ISV	ISV
1111A	05/09/22	902	7.38	11.67	4.77
1111A	11/07/22	193	7.31	13.16	4.55

Notes:

ISV = Insufficient sample volume.

Appendix C – Surface and Stormwater Data

Table C-1. 2022 SDA Surface Water Data – Lagoon Road Creek (WNNDADR)

As a comparison for the data in Table C-1, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/16/22	5.61E-01±1.11E+00	U	1.24E+01±1.43E+00		2.14E+02±9.82E+01	
05/19/22	2.69E+00±1.65E+00	J	5.84E+00±1.51E+00		2.43E+01±8.86E+01	U
08/04/22	1.00E+00±6.70E-01	U	1.39E+01±8.74E-01		1.17E+02±8.53E+01	U
11/10/22	1.21E+00±1.24E+00	U	1.13E+01±1.82E+00		1.23E+02±1.06E+02	U

Table C-2. 2022 SDA Surface Water Data – Erdman Brook (WNERB53)

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-2, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/16/22	4.25E-01±9.30E-01	U	6.32E-01±1.13E+00	U	9.65E+01±8.81E+01	U
05/19/22	3.52E-01±9.05E-01	U	2.66E+00±1.02E+00		6.87E+01±9.37E+01	U
08/04/22	5.68E-01±1.35E+00	UJ	4.17E+00±1.12E+00		3.94E+01±7.79E+01	U
08/04/22	-2.09E-01±8.15E-01	U	5.04E+00±7.17E-01		3.66E+01±7.87E+01	U
11/10/22	1.05E-01±9.88E-01	U	2.76E+00±9.76E-01		9.93E+01±1.04E+02	U

Table C-3. 2022 SDA Surface Water Data – Franks Creek (WNFRC67)

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-3, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/16/22	7.51E-01±1.06E+00	U	4.69E-01±8.84E-01	U	2.29E+01±8.04E+01	U
02/16/22	-3.73E-02±8.20E-01	U	1.01E+00±1.17E+00	U	7.21E+01±8.54E+01	U
05/19/22	5.02E-01±1.00E+00	U	1.81E+00±1.17E+00	U	6.56E+01±9.29E+01	U
08/04/22	-1.48E-01±4.09E-01	U	1.13E+00±4.93E-01		1.65E+01±7.60E+01	U
11/10/22	8.56E-01±1.14E+00	U	2.46E+00±1.21E+00		1.14E+02±1.04E+02	U

Table C-4. 2022 SDA Surface Water Data – Franks Creek (WNDCELD)

As a comparison for the data in Table C-4, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/16/22	-3.88E-01±4.51E-01	U	1.25E-01±8.44E-01	U	4.65E+01±8.09E+01	U
05/19/22	1.65E-01±9.33E-01	U	8.42E-01±1.01E+00	U	2.00E+01±8.90E+01	U
08/04/22	8.37E+01±1.44E+01	R	1.01E+02±7.86E+00	R	1.02E+02±1.06E+02	U
11/10/22	4.86E-01±9.45E-01	U	2.93E+00±1.29E+00		9.60E+01±1.04E+02	U

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Table C-5. 2022 SDA Surface Water Data – Buttermilk Creek: Upgradient of the SDA (WFBCBKG)

As a comparison for the data in Table C-5, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
02/16/22	1.79E-02±7.96E-01	U	1.41E+00±1.13E+00	U	1.64E+01±8.20E+01	U
05/19/22	4.40E-01±1.00E+00	U	2.33E+00±1.25E+00	J	5.14E+00±8.82E+01	U
08/04/22	7.60E-01±6.59E-01	U	1.42E+00±5.03E-01		9.24E+01±8.43E+01	U
11/10/22	2.32E+00±1.45E+00	J	5.15E+00±1.43E+00		8.09E+01±1.03E+02	U

Table C-6. 2022 SDA Surface Water Data – Buttermilk Creek: Downgradient of the SDA (WFBCNL)

As a comparison for the data in Table C-6, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
05/19/22	1.20E+00±1.22E+00	U	1.81E+00±1.27E+00	U	6.50E+01±8.95E+01	U

Key for Qualifier Codes (Q):

J = Analyte identified. Associated result is considered estimated or uncertain.

U = Not detected above MDC and/or 2-sigma uncertainty.

UJ = Not detected above MDC and/or 2-sigma uncertainty, which may be considered estimated or uncertain.

R = Rejected.

Table C-7. 2022 SDA Stormwater Radiological Data – Outfall Location W01

Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

As a comparison for the data in Table C-7, the 6 NYCRR Part 703.5 concentrations are provided as a reference. This table lists the concentrations that are applicable for waters that are designated as Health (Water Source) locations. NYSERDA does not have a location that meets this definition.

Source: NYSERDA

Sample Date	Gross Alpha (pCi/L)	Q	Gross Beta (pCi/L)	Q	Tritium (pCi/L)	Q
703.5 Water Quality Standards	1.50E+01 pCi/L		1.00E+03 pCi/L		2.00E+04 pCi/L	
06/07/22	6.63E-01±9.10E-01	U	1.51E+00±1.14E+00	U	2.95E+01±9.06E+01	U
10/13/22	-2.50E-01±5.73E-01	U	2.72E+00±1.31E+00		-1.66E+01±1.12E+02	U
10/13/22	6.53E-01±9.30E-01	U	1.48E+00±1.22E+00	U	-3.47E+00±1.15E+02	U

Sample Date	Cesium-137 (pCi/L)	Q	Cobalt-60 (pCi/L)	Q	Potassium-40 (pCi/L)	Q
703.5 Water Quality Standards						
06/07/22	-3.52E+00±6.42E+00	U	1.19E+00±4.41E+00	U	-3.86E+01±6.36E+01	U
10/13/22	-2.22E+00±4.41E+00	U	1.01E-01±3.37E+00	U	1.24E+01±7.08E+01	U

Key for Qualifier Codes (Q):

U = Not detected above MDC and/or 2-sigma uncertainty.

Table C-8. 2022 SDA Stormwater Chemical Physical Data – Outfall Location W01

Data is shown as reported on the Discharge Monitoring Reports. Blank entries indicate a result was not obtained, typically because it was not required. Duplicate samples on the same date indicate a field duplicate was collected and analyzed.

Source: NYSERDA

Sample Date	Sample Type	BOD (mg/L)	Q	COD (mg/L)	Q	Nitrogen Total (mg/L)	Q	Oil & Grease (mg/L)	Q
06/07/22	Grab	20	J	106	BJ+	2.7	J	1.5	J
06/07/22	Composite	4.5	JB	<9.0	UJB	0.52			
06/07/22	Grab	15	JB	69	B	2.5		<1.4	UJ
10/13/22	Grab	<1.0	UJ	<9.0	U	0.20		2.6	J
10/13/22	Composite	<1.0	UJ	<9.0	U	0.19	J		
10/13/22	Composite	<1.0	UJ	<9.0	U	0.10	J		

Sample Date	Sample Type	Total Phosphorus (mg/L)	Q	TSS (mg/L)	Q	pH (SU)	Q	Temp (°C)	Q
06/07/22	Grab	0.17	J	8.7		5.88		18.76	
06/07/22	Composite	0.030	J	3.9	J				
06/07/22	Ambient Rain					6.24		16.75	
06/07/22	Grab	0.11		10					
10/13/22	Grab	<0.02	UB	<0.57	U	4.84		15.09	
10/13/22	Composite	0.036	JB	<0.59	U				
10/13/22	Ambient Rain					5.71		13.47	
10/13/22	Composite	0.040	JB	<0.60	U				

Key for Qualifier Codes (Q):

J =	Analyte identified. Associated result is considered estimated or uncertain.
BJ+ =	High-biased estimated with blank contamination.
JB =	Analyte identified. Associated numerical value is considered estimate or uncertain, and Blank contamination was present.
U =	Not detected above associated value.
UJ =	Not detected above associated value, which may be considered estimated or uncertain.
UJB =	Not detected at the estimated MDL due to blank contamination.
B =	Blank contamination was present.

Appendix D – Overland Gamma Radiation Survey & Thermoluminescent Dosimeter Data

Table D-1. 2022 Overland Gamma Radiation Survey Results

Source: NYSERDA

	June (µrem/hr)		September (µrem/hr)	
Location[e]	1m	1cm	1m	1cm
P-1	4	4	5	4
P-2	4	5	5	6
P-3	8	8	5	5
P-4	5	5	5	6
P-5	4	5	4	5
P-6	6	5	5	5
P-7	7	7	5	5
P-8	7	7	4	4
P-9	6	6	5	5
P-10	5	5	4	5
P-11	6	6	3	5
P-12	7	7	4	4
P-13	8	8	5	5
P-14	4	5	5	4
P-15	5	5	5	4
P-16	6	6	5	4
SDA2n	7	7	4	5
SDA2s	8	8	4	4
SDA3n	5	5	5	4
SDA3s	8	6	5	6
SDA4n	5	5	5	6
SDA4s	6	6	5	5
T1s	5	6	4	4
T2n	7	7	5	6
T3n	8	8	3	4
T3s	6	5	4	5

Table D-1 continued.

	June (µrem/hr)		September (µrem/hr)	
Location[e]	1m	1cm	1m	1cm
T4n	5	5	5	5
T4s	4	4	3	4
T5n	7	7	5	6
T5s	7	6	4	5
T6n	7	7	3	3
T6s	7	8	5	6
T7n	7	7	5	5
T7s	6	7	4	4
T8n	7	7	3	4
T8s	7	7	3	4
T9n	6	6	4	5
T9s	7	7	4	4
T10n	8	8	5	5
T10s	8	7	5	6
T11n	7	6	4	4
T11s	5	5	5	5
T12n	8	7	5	6
T12s	5	5	4	4
T13n	8	8	5	6
T13s	7	6	3	3
T14n	7	6	4	4
T14s	5	5	4	4
Tank T-1	3	4	4	4
DC-(G)[f]	8	8	3	4
DC-dr[f]	7	8	3	3

[e] SDA perimeter locations (P-1 through P-16) are identified on Figure 2-11. Measurements were made at one meter (1 m) and one centimeter (1 cm) from the ground, tank, or building surface.

[f] DC-(G) and DC-dr are located (at the Drum Cell) on the WVDP premises adjacent to the SDA. The Drum Cell was previously used to store low-level radioactive waste drums; however, the waste was removed and shipped for off-site disposal in 2007. The Drum cell is currently used to house “clean” intermodals from waste disposal facilities. The DC-(G) and DC-dr measurements were made at locations on the north side and west roll-up door, respectively.

Table D-2. 2022 Thermoluminescent Dosimeter Data

Source: NYSERDA

Location	1st Qtr (mR/Qtr)	Q	2nd Qtr (mR/Qtr)	Q	3rd Qtr (mR/Qtr)	Q	4th Qtr (mR/Qtr)	Q
NYTLDBK (Background Location)	13.90±1.72		14.82±0.97		14.16±1.13		16.04±2.04	
DNTLD19 (SDA E. Fence)	15.30±1.64		15.36±1.19		15.97±0.95		16.81±1.72	
DNTLD33 (SDA SW Corner)	15.75±2.00		15.79±1.13		16.57±1.05		17.39±1.88	
DNTLD43 (SDA West Gate)	13.65±1.92		12.71±0.81		12.64±1.09		14.23±1.48	
DNTLD53 (SDA N. Fence)	18.85±2.24		18.26±1.29		18.33±1.09		21.21±1.74	
SDATLD01 (SDA S. Fence)	15.77±1.82		16.70±1.23		16.75±0.99		18.25±2.10	
SDATLD02 (SDA SE Fence)	16.30±1.52		16.49±1.38		16.13±2.14		18.05±1.88	
SDATLD03 (SDA NE Fence)	17.45±1.66		18.25±1.27		17.26±1.03		19.56±2.32	
SDATLD04 (SDA N. Fence)	19.35±1.92		19.55±1.40		18.55±1.70		21.04±1.76	
SDATLD05 (SDA NW Fence)	16.59±1.84		17.79±1.38		16.22±1.01		18.67±1.78	
SDATLD06 (SDA W. Fence)	16.90±1.56		17.92±1.66		17.35±1.03		18.34±1.58	

Appendix E – Precipitation

Table E-1. First Quarter 2022 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

January 2022	Precipitation (inches)	February 2022	Precipitation (inches)	March 2022	Precipitation (inches)
1/1/2022	0.44	2/1/2022	0.01	3/1/2022	0.00
1/2/2022	0.10	2/2/2022	0.16	3/2/2022	0.22
1/3/2022	0.01	2/3/2022	0.64	3/3/2022	0.01
1/4/2022	0.00	2/4/2022	0.15	3/4/2022	0.00
1/5/2022	0.01	2/5/2022	0.00	3/5/2022	0.00
1/6/2022	0.02	2/6/2022	0.00	3/6/2022	0.17
1/7/2022	0.16	2/7/2022	0.00	3/7/2022	0.52
1/8/2022	0.00	2/8/2022	0.11	3/8/2022	0.00
1/9/2022	0.31	2/9/2022	0.00	3/9/2022	0.03
1/10/2022	0.02	2/10/2022	0.11	3/10/2022	0.00
1/11/2022	0.00	2/11/2022	0.18	3/11/2022	0.14
1/12/2022	0.01	2/12/2022	0.05	3/12/2022	0.16
1/13/2022	0.08	2/13/2022	0.00	3/13/2022	0.01
1/14/2022	0.00	2/14/2022	0.00	3/14/2022	0.00
1/15/2022	0.00	2/15/2022	0.00	3/15/2022	0.00
1/16/2022	0.22	2/16/2022	0.01	3/16/2022	0.00
1/17/2022	0.78	2/17/2022	1.14	3/17/2022	0.00
1/18/2022	0.03	2/18/2022	0.28	3/18/2022	0.00
1/19/2022	0.01	2/19/2022	0.07	3/19/2022	0.39
1/20/2022	0.00	2/20/2022	0.00	3/20/2022	0.05
1/21/2022	0.02	2/21/2022	0.00	3/21/2022	0.07
1/22/2022	0.00	2/22/2022	0.53	3/22/2022	0.02
1/23/2022	0.13	2/23/2022	0.02	3/23/2022	0.29
1/24/2022	0.08	2/24/2022	0.00	3/24/2022	0.05
1/25/2022	0.08	2/25/2022	0.40	3/25/2022	0.06
1/26/2022	0.02	2/26/2022	0.00	3/26/2022	0.14
1/27/2022	0.00	2/27/2022	0.01	3/27/2022	0.09
1/28/2022	0.02	2/28/2022	0.00	3/28/2022	0.01
1/29/2022	0.00			3/29/2022	0.00
1/30/2022	0.00			3/30/2022	0.02
1/31/2022	0.01			3/31/2022	0.07
Total	**2.56**	**Total**	**3.87**	**Total**	**2.52**

Table E-2. Second Quarter 2022 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

April 2022	Precipitation (inches)	May 2022	Precipitation (inches)	June 2022	Precipitation (inches)
4/1/2022	0.03	5/1/2022	0.37	6/1/2022	0.11
4/2/2022	0.00	5/2/2022	0.19	6/2/2022	0.00
4/3/2022	0.02	5/3/2022	0.12	6/3/2022	0.00
4/4/2022	0.00	5/4/2022	0.43	6/4/2022	0.00
4/5/2022	0.00	5/5/2022	0.00	6/5/2022	0.00
4/6/2022	0.15	5/6/2022	0.00	6/6/2022	0.00
4/7/2022	0.91	5/7/2022	0.00	6/7/2022	0.27
4/8/2022	0.06	5/8/2022	0.00	6/8/2022	0.04
4/9/2022	0.02	5/9/2022	0.00	6/9/2022	0.81
4/10/2022	0.05	5/10/2022	0.00	6/10/2022	0.00
4/11/2022	0.35	5/11/2022	0.00	6/11/2022	0.04
4/12/2022	0.37	5/12/2022	0.00	6/12/2022	0.07
4/13/2022	0.20	5/13/2022	0.00	6/13/2022	0.00
4/14/2022	0.03	5/14/2022	0.63	6/14/2022	0.01
4/15/2022	0.02	5/15/2022	0.22	6/15/2022	0.00
4/16/2022	0.27	5/16/2022	0.54	6/16/2022	0.22
4/17/2022	0.01	5/17/2022	0.02	6/17/2022	0.01
4/18/2022	0.08	5/18/2022	0.18	6/18/2022	0.01
4/19/2022	0.25	5/19/2022	0.15	6/19/2022	0.00
4/20/2022	0.00	5/20/2022	0.10	6/20/2022	0.00
4/21/2022	0.03	5/21/2022	0.63	6/21/2022	0.24
4/22/2022	0.00	5/22/2022	0.08	6/22/2022	0.22
4/23/2022	0.00	5/23/2022	0.00	6/23/2022	0.00
4/24/2022	0.00	5/24/2022	0.00	6/24/2022	0.00
4/25/2022	0.51	5/25/2022	0.00	6/25/2022	0.00
4/26/2022	0.09	5/26/2022	0.06	6/26/2022	0.62
4/27/2022	0.14	5/27/2022	0.71	6/27/2022	0.12
4/28/2022	0.00	5/28/2022	0.12	6/28/2022	0.00
4/29/2022	0.00	5/29/2022	0.00	6/29/2022	0.00
4/30/2022	0.00	5/30/2022	0.00	6/30/2022	0.00
		5/31/2022	0.00		
Total	**3.59**	**Total**	**4.55**	**Total**	**2.79**

Table E-3. Third Quarter 2022 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

July 2022	Precipitation (inches)	August 2022	Precipitation (inches)	September 2022	Precipitation (inches)
7/1/2022	0.55	8/1/2022	0.00	9/1/2022	0.13
7/2/2022	0.35	8/2/2022	0.01	9/2/2022	0.00
7/3/2022	0.00	8/3/2022	0.00	9/3/2022	0.00
7/4/2022	0.00	8/4/2022	0.02	9/4/2022	0.28
7/5/2022	0.06	8/5/2022	0.98	9/5/2022	0.32
7/6/2022	0.00	8/6/2022	0.03	9/6/2022	0.00
7/7/2022	0.00	8/7/2022	0.22	9/7/2022	0.02
7/8/2022	0.00	8/8/2022	0.04	9/8/2022	0.00
7/9/2022	0.00	8/9/2022	0.16	9/9/2022	0.00
7/10/2022	0.00	8/10/2022	0.00	9/10/2022	0.00
7/11/2022	0.00	8/11/2022	0.00	9/11/2022	0.15
7/12/2022	0.07	8/12/2022	0.00	9/12/2022	0.15
7/13/2022	0.00	8/13/2022	0.00	9/13/2022	0.29
7/14/2022	0.00	8/14/2022	0.00	9/14/2022	0.00
7/15/2022	0.00	8/15/2022	0.07	9/15/2022	0.00
7/16/2022	0.00	8/16/2022	0.01	9/16/2022	0.00
7/17/2022	0.34	8/17/2022	0.23	9/17/2022	0.00
7/18/2022	0.55	8/18/2022	0.00	9/18/2022	0.06
7/19/2022	0.00	8/19/2022	0.00	9/19/2022	0.44
7/20/2022	0.00	8/20/2022	0.00	9/20/2022	0.00
7/21/2022	0.29	8/21/2022	0.52	9/21/2022	0.00
7/22/2022	0.00	8/22/2022	0.04	9/22/2022	0.24
7/23/2022	0.00	8/23/2022	0.16	9/23/2022	0.00
7/24/2022	0.54	8/24/2022	0.00	9/24/2022	0.00
7/25/2022	0.66	8/25/2022	0.04	9/25/2022	0.80
7/26/2022	0.00	8/26/2022	0.03	9/26/2022	0.89
7/27/2022	0.03	8/27/2022	0.00	9/27/2022	0.99
7/28/2022	0.58	8/28/2022	0.00	9/28/2022	0.29
7/29/2022	0.00	8/29/2022	0.02	9/29/2022	0.00
7/30/2022	0.00	8/30/2022	1.19	9/30/2022	0.00
7/31/2022	0.00	8/31/2022	0.00		
Total	**4.02**	**Total**	**3.77**	**Total**	**5.05**

Table E-4. Fourth Quarter 2022 SDA Precipitation Data (Liquid Rainfall Equivalent)

Source: NYSERDA

October 2022	Precipitation (inches)	November 2022	Precipitation (inches)	December 2022	Precipitation (inches)
10/1/2022	0.00	11/1/2022	0.16	12/1/2022	0.13
10/2/2022	0.00	11/2/2022	0.00	12/2/2022	0.00
10/3/2022	0.00	11/3/2022	0.00	12/3/2022	0.29
10/4/2022	0.00	11/4/2022	0.00	12/4/2022	0.00
10/5/2022	0.00	11/5/2022	0.01	12/5/2022	0.00
10/6/2022	0.00	11/6/2022	0.52	12/6/2022	0.01
10/7/2022	0.01	11/7/2022	0.00	12/7/2022	0.03
10/8/2022	0.00	11/8/2022	0.00	12/8/2022	0.01
10/9/2022	0.00	11/9/2022	0.00	12/9/2022	0.00
10/10/2022	0.02	11/10/2022	0.00	12/10/2022	0.00
10/11/2022	0.00	11/11/2022	2.56	12/11/2022	0.09
10/12/2022	0.00	11/12/2022	0.12	12/12/2022	0.00
10/13/2022	1.67	11/13/2022	0.28	12/13/2022	0.00
10/14/2022	0.00	11/14/2022	0.00	12/14/2022	0.00
10/15/2022	0.03	11/15/2022	0.05	12/15/2022	0.25
10/16/2022	0.00	11/16/2022	0.07	12/16/2022	0.13
10/17/2022	0.02	11/17/2022	0.41	12/17/2022	0.00
10/18/2022	0.17	11/18/2022	0.07	12/18/2022	0.29
10/19/2022	0.45	11/19/2022	0.00	12/19/2022	0.07
10/20/2022	0.01	11/20/2022	0.31	12/20/2022	0.00
10/21/2022	0.00	11/21/2022	0.00	12/21/2022	0.00
10/22/2022	0.00	11/22/2022	0.00	12/22/2022	0.22
10/23/2022	0.00	11/23/2022	0.00	12/23/2022	0.41
10/24/2022	0.00	11/24/2022	0.00	12/24/2022	0.08
10/25/2022	0.00	11/25/2022	0.13	12/25/2022	0.01
10/26/2022	0.23	11/26/2022	0.00	12/26/2022	0.00
10/27/2022	0.00	11/27/2022	0.25	12/27/2022	0.00
10/28/2022	0.00	11/28/2022	0.01	12/28/2022	0.00
10/29/2022	0.00	11/29/2022	0.00	12/29/2022	0.00
10/30/2022	0.00	11/30/2022	0.98	12/30/2022	0.00
10/31/2022	0.00			12/31/2022	0.22
Total	**2.61**	**Total**	**5.93**	**Total**	**2.24**

Appendix F – Ground Surface Elevation Data

Table F-1. 2022 SDA Trench Cap Ground Surface Elevation Data

Source: NYSERDA

Trench	Location[g]	Elevation[h]	Trench	Location[g]	Elevation[h]	Trench	Location[g]	Elevation[h]
1&2	S-M	1392.76	6	S-M	1385.83	11	S-M	1385.37
1&2	1+0	1391.86	6	1+0	1388.46	11	1+0	1384.43
1&2	2+0	1390.88	6	N-M	1390.65	11	2+0	1385.60
1&2	3+0	1390.53				11	3+0	1386.51
1&2	4+0	1389.99	7	S-M	1385.89	11	4+0	1386.93
1&2	5+0	1388.90	7	0+42.25	1384.99	11	5+0	1387.16
1&2	6+0	1386.11	7	N-M	1384.76	11	N-M	1388.66
1&2	N-M	1383.72						
1&2	7+10	1379.63	8	S-M	1390.25	12	S-M	1385.35
1&2	7+20	1377.40	8	1+0	1388.64	12	1+0	1383.71
			8	2+0	1387.87	12	2+0	1384.93
3	S-M	1392.87	8	3+0	1387.53	12	3+0	1386.02
3	1+0	1392.39	8	4+0	1387.42	12	4+0	1386.71
3	2+0	1392.29	8	5+0	1387.52	12	5+0	1386.63
3	3+0	1391.01	8	N-M	1389.06	12	N-M	1389.50
3	4+0	1390.59						
3	5+0	1389.08	9	S-M	1388.45	13	S-M	1385.20
3	6+0	1386.38	9	1+0	1386.34	13	1+0	1382.18
3	N-M	1384.21	9	2+0	1387.09	13	2+0	1384.54
			9	3+0	1387.49	13	3+0	1385.50
4	S-M	1393.28	9	4+0	1388.08	13	4+0	1386.15
4	1+0	1391.21	9	5+0	1388.46	13	5+0	1386.42
4	2+0	1392.13	9	N-M	1389.81	13	6+0	1385.20
4	3+0	1391.51				13	N-M	1387.93
4	4+0	1391.36	10	S-M	1386.58			
4	5+0	1389.45	10	1+0	1385.28	14	S-M	1385.30
4	6+0	1387.22	10	2+0	1386.48	14	1+0	1383.09
4	N-M	1387.17	10	3+0	1387.03	14	2+0	1383.77
			10	4+0	1387.62	14	3+0	1384.88
5	S-M	1393.81	10	5+0	1387.76	14	4+0	1385.33
5	1+0	1391.64	10	N-M	1389.46	14	5+0	1384.80
5	2+0	1390.92				14	6+0	1384.30
5	3+0	1390.15				14	N-M	1384.56
5	4+0	1389.51						
5	5+0	1389.61						
5	6+0	1386.69						
5	N-M	1388.36						

Table notes are on the next page.

Table F-1 continued

[g] Location is given as X+Y where X is trench length in 100-foot increments plus Y in ft. (e.g., 7+10 = 710 ft.). N-M is located on the centerline mark of the north monument plaque at each trench. S-M is located on the centerline mark of the south monument plaque at each trench.

[h] Coordinate System: Horizontal datum is North American Datum of 83, NY West Zone. Vertical datum is NAVD of 1988. Elevations were measured on November 8, 2022, by Clear Creek Land Surveying, LLC.

Location[i]	2021			2022		
	Northing	Easting	Elevation	Northing	Easting	Elevation
1003	891333.32	1131254.81	1384.46	891333.32	1131254.81	1384.46
1004	891032.88	1130825.12	1379.24	891032.88	1130825.12	1379.24
1005	891619.21	1130390.13	1380.72	891619.21	1130390.13	1380.72

[i] Control for the SDA Trench Cap Survey was provided by the above Control Points.

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