SIXTH FIVE-YEAR REVIEW REPORT FOR
HOOKER (102nd STREET) LANDFILL SUPERFUND SITE
NIAGARA COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

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Pat Evangelista, Director
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Date

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LIST OF ABBREVIATIONS & ACRONYMS

AMSL	Above Mean Sea Level
APL	Aqueous phase liquid
ARAR	Applicable or Relevant and Appropriate Requirement
BHC	Beta-benzene hexachloride
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMRA	Climate Mapping for Resilience and Adaptation
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CIC	Community Involvement Coordinator
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
HA	Health Advisory
ICs	Institutional Controls
IER	Intermediate Engineering Report
LCTF	Love Canal Treatment Facility
MHHW	Mean Higher High Water
MCL	Maximum Contaminant Level
NAPL	Non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NR	NAPL Recovery
NYSDEC	New York State Department of Environmental Conservation
OCC	Occidental Chemical Corporation
Olin	Olin Corporation
OU	Operable Unit
O&M	Operation and Maintenance
PCBs	Polychlorinated biphenyls
PCMB	Bedrock Monitoring Well (PCMB Series)
PCM	Overburden Monitoring Well (PCM Series)
PCOR	Preliminary Close-Out Report
PFAS	Per- and polyfluoroalkyl substances
POTW	Publicly Owned Treatment Work
PRP	Potentially Responsible Party
PZ	Piezometer (PZ Series)
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SCO	Soil Cleanup Objective
SLR	Sea Level Rise
SLVR	NOAA Sea Level Rise Viewer

SVOC	Semi-Volatile Organic Compound
TBC	To be considered
TCE	Trichloroethylene
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
USGS	United States Geological Survey
UU/UE	Unlimited use and unrestricted exposure
VOC	Volatile Organic Compound
WQR	Water Quality Regulation

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the sixth FYR for the Hooker 102nd Street Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR, dated June 15, 2021. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU1), which will be addressed in this FYR. OU1 addresses soil, groundwater and sediment contamination as well as the on-site landfill.

The Hooker 102nd Street Superfund Site FYR was led by Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Maeve Wurtz. Participants included Julie McPherson (EPA) human-health risk assessor and ecological risk assessor, Joe Hayes (EPA) hydrogeologist, and Michael Basile (EPA) Community Involvement Coordinator (CIC). The Potentially Responsible Parties (PRPs) for the Site were notified of the initiation of the FYR. The FYR began on September 15th, 2025.

Site Background

The Site is located on Buffalo Avenue in Niagara Falls, New York (see Figure 1). The Site borders on the Niagara River and lies less than one-quarter mile directly south of the Love Canal Superfund Site, seperated by the LaSalle Expressway, as well as Buffalo and Frontier Avenues. A portion of the filled area of the Site is an extension of the original Love Canal excavation. The Site consists of approximately 22.1 acres; 15.6 acres are owned by Occidental Chemical Corporation (OCC), formerly the Hooker Chemicals & Plastics Corporation, and 6.5 acres are owned by Olin Corporation (Olin). Hereafter, OCC and Olin will collectively be referred to as the "Companies." The Site has restricted access and has not been put to reuse.

The Site is bounded to the south by a shallow embayment of the river. A stone-face bulkhead, constructed in the early 1970s to minimize soil erosion to the river, runs along the length of the shoreline at the Site. The embayment lies at the confluence of the Little Niagara River, which flows around the north shore of Cayuga Island, and the Niagara River. Directly to the west of the Site lies Griffon Park, which was formerly used as a landfill for municipal waste by the City of Niagara Falls. Griffon Park is owned by the City of Niagara Falls and is utilized for passive recreational activities and a boat ramp along the Little Niagara River. Across the Little Niagara River from Griffon Park is Cayuga Island, which is a residential community. The property to the east of the Site is zoned residential and currently has two waterfront residences but is otherwise an unimproved densely brushed field. A well-maintained perimeter fence restricts access to the Site. Locked fence gates permit authorized vehicle traffic from Buffalo Avenue.

The larger portion of the landfill operated from 1943 to 1971. During that time, approximately 23,500 tons of mixed organic solvents, organic and inorganic phosphates, and related chemicals were deposited at the landfill. Brine sludge, fly ash, electrochemical cell parts and related equipment, and 300 tons of hexachlorocyclohexane

process cake, including lindane, were also deposited at the Site. A landfill operated on the smaller portion of the Site property from 1948 to about 1970, during which time 66,000 tons of mixed organic and inorganic chemicals were disposed. In addition, about 20,000 tons of mercury brine and brine sludge, more than 1,300 tons of a mixture of hazardous chemicals, 16 tons of mixed concrete boiler ash, fly ash, and other residual materials were disposed of at the Site.

The immediate underlying geology at the Site consists of fill deposited in conjunction with the landfilling activities described above. The thickness of the fill varies in depth from 0 to 18 feet, consisting of mixtures of silt, clay, gravel, and landfill wastes. The fill is underlain by alluvium, deposited by the Niagara River, which varies in thickness up to 32 feet. A layer of clay underlies the alluvium, generally sloping toward the Niagara River. Beneath the highly impermeable clay layer, glacial till overlies the bedrock surface beneath the entire Site, ranging in thickness from less than four feet to greater than 20 feet. The uppermost bedrock formation is massive and dense dolomite, of which the majority of the porosity and permeability occurs along fracture surfaces, bedding planes, partings, and joints.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Hooker (102nd Street) Landfill		
EPA ID: NYD980506810		
Region: 2	**State:** NY	**City/County:** Niagara Falls, Niagara County
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? No	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Maeve Wurtz		
Author affiliation: EPA RPM		
Review period: 9/15/2025 – 3/26/2026		
Date of Site inspection: 12/4/2025		
Type of review: Statutory		
Review number: 6		
Triggering action date: 6/15/2021		
Due date *(five years after triggering action date)*: 6/15/2026		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Contaminants found within the survey area in on-Site media (soil, sediment, groundwater, and surface water) during the Remedial Investigation (RI) monitoring period included heavy metals (such as mercury), chlorobenzene compounds, chlorinated phenols, hexachlorocyclohexanes, polychlorinated biphenyls (PCBs), and polychlorinated dioxins and dibenzofurans. Groundwater samples taken from the bedrock aquifer beneath the Site did not contain Site contaminants. Based on these findings and considering the highly impermeable nature of the clay/till layer separating the alluvium from the bedrock, shallow (overburden) groundwater does not appear to flow vertically from the Site into the bedrock aquifer. Rather, the overburden groundwater discharges laterally into the embayment and across the Site's eastern and western boundaries. The principal pathway for migration of contaminants off-Site was via groundwater discharge from the fill and alluvium zones of the landfill into the embayment. Sediment monitoring conducted in the Niagara River showed contamination limited to an area within 300 feet from the shore. Off-Site investigations also indicated Site-specific contaminants in surface soils north of Buffalo Avenue and around the property perimeter, including dioxin above the 1 microgram per liter (µg/L) action level.

As part of the RI, a human health risk assessment was conducted. The major human exposure routes evaluated include ingestion of fish from the embayment of the Niagara River, chemical exposure while swimming in the embayment, drinking water from the Niagara River as it is withdrawn at the Niagara Falls Drinking Water Treatment Plant, and dermal contact with, ingestion of, and inhalation of dust from off-Site contaminated soils. Based on exposures to contaminants in the embayment of the Niagara River and to soil contaminants off-Site, total increased lifetime carcinogenic health risk was estimated to be 2.2×10^{-3}, with ingestion of fish from the embayment of the river driving the risk. The contaminants which contributed greatest to the Site's health risks were PCBs, hexachlorocyclohexanes, and 2,3,7,8-TCDD (dioxin). In addition, potential ecological risks were identified for sensitive species exposure to Site contaminants.

Response Actions

In December 1970, the Buffalo District of the U.S. Army Corps of Engineers inspected the Site and notified the Companies that their disposal practices were in violation of the Rivers and Harbors Act of 1899 (RHA). As a result, any further landfilling at the Site by the Companies stopped. In 1972, the Site was capped, a fence was erected on three sides, and a bulkhead along the Niagara River was installed.

On December 20, 1979, a complaint pursuant to the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), and the RHA was filed by the United States of America, on behalf of the Administrator of the EPA, against the Companies seeking injunctive relief to remediate imminent and substantial endangerment to the public health and welfare, and civil penalties. On November 18, 1980, a complaint pursuant to the New York State Conservation Law and the state's common law of public nuisance was filed by New York State (NYS) against the Companies in the U.S. District Court for the Western District of New York, seeking injunctive relief and civil penalties. The two complaints were consolidated. The Site was added to the National Priorities List (NPL) in September 1983.

On September 26, 1990, EPA issued a Record of Decision (ROD) identifying the selected remedy for the Site.

The major components of the selected remedy include the following:

Landfill Residuals

- A synthetic-lined cap, constructed in accordance with federal and state standards, will be installed over the landfill and perimeter soil.
- All "off-Site" soils above cleanup thresholds will be consolidated beneath the cap.
- A slurry wall, surrounding the Site's perimeter, will be constructed and keyed into the underlying clay/till geologic formation. The precise location of the slurry wall will be established through the use of geotechnical boring which will determine the extent of the non-aqueous phase liquid (NAPL) plume. The NAPL plume is to be contained by the slurry wall.
- Groundwater will be recovered using an interception drain installed at the seasonal low water table in the fill materials. Recovered groundwater will be treated, however, the primary function of groundwater recovery is to create and maintain an inward gradient across the slurry wall.
- NAPL beneath the Site will be recovered using dedicated extraction wells and incinerated at an off-Site facility.

Niagara River Sediments

- The two areas of river sediments which contain elevated concentrations of contaminants ("hot spots") will be dredged, and these highly contaminated sediments will be incinerated at an off-Site facility.
- The remaining sediments will be dredged out to the "clean line" with respect to Site-related contamination.
- These remaining sediments, after dewatering, will then be consolidated on the landfill.
- Any NAPL found within the remaining sediments will be extracted and incinerated at an off-Site facility.
- The primary focus of this remediation plan is to contain the NAPL plume with the slurry wall. In the event the slurry wall's initial positioning places it across the "hot spot" area(s), practicality may dictate that the wall be extended outward to enclose these "hot spots." In such case, these highly contaminated sediments, rather than being dredged and incinerated, would be left in place, that is, contained by the slurry wall, covered with fill, and finally covered with the cap. The remaining sediments beyond the slurry wall would still be dredged and consolidated beneath the cap.

Storm Sewer

- The existing storm sewer will be cleaned, and a high-density polyethylene plastic slip liner will be installed within the sewer. The annular space between the original pipe and the slip liner will then be pressure-grouted.
- Any NAPL found in the soils and/or sediments taken from the existing sewer will be extracted and incinerated at an off-Site facility.

Monitoring & Institutional Controls

- Post-remedial monitoring shall be performed to determine the effectiveness of the remedial alternatives which have been selected.
- A six-foot high chain-link fence will be installed around the perimeter of the cap in order to restrict access to the Site.
- Institutional Controls (ICs) in the form of deed and groundwater use restrictions, on future uses of the landfill, will be established.

No Remedial Action Objectives (RAOs) were explicitly identified in the ROD. However, the main purpose of the

remedy is to contain the source area (landfill residuals) and prevent further migration of the contaminants to the extent possible. Lists of contaminants of concern (COCs) with respective regulatory levels for groundwater and sediment are located in Table 11 and Table 12 of the ROD and can be found in Appendix B of the FYR.

On September 30, 1994, EPA issued an Explanation of Significant Differences (ESD) to document a change in the remedial action for the then-existing storm sewer. The ESD documented the requirement to construct a new storm sewer that would be re-routed around the eastern perimeter of the landfill, and the then-existing storm sewer would be plugged and abandoned.

On June 9, 1995, EPA issued a ROD Amendment to document a change in the treatment of excavated sediments from the river. The remedial action, as identified in the 1990 ROD required dredging the river sediments to the "clean line" with respect to Site-related contamination. As a result of the ROD Amendment, these sediments, after dewatering, would not be incinerated, but instead would be consolidated under the landfill cap. Any NAPL found within these sediments would be extracted and incinerated at an off-Site facility, consistent with the 1990 ROD. The ROD Amendment also called for a realignment of the slurry wall so as to avoid the destruction of three acres of irreplaceable wetlands and aquatic habitat.

Status of Implementation

EPA, pursuant to Section 106(a) of CERCLA, issued a Unilateral Administrative Order (UAO) to the Companies on September 30, 1991 to conduct the Remedial Design/Remedial Action at the Site. Remedial design activities pursuant to the UAO began in October 1991. The Intermediate Engineering Report (IER), the equivalent of the Remedial Design Report, was approved by the EPA in 1993.

Landfill Residual Remediation

In April 1996, the remedial action began at the Site. Construction activities including excavation, consolidation, and isolation of perimeter and off-Site soils under the landfill cap were completed in August 1996.

Construction of the circumferential slurry wall was completed in May 1997 with a modified alignment to preserve wetland and aquatic habitat, and the shoreline was entirely dredged. The slurry wall was keyed into the underlying clay/till formation to hydraulically contain the aqueous phase liquid (APL)/NAPL plume within the Site.

An interception drain was installed within the landfill at the seasonal low water table to recover leachate and create inward gradients across the slurry wall. In March 1999, a force main system was installed to pump APL leachate from the landfill to the Love Canal Treatment Facility (LCTF). NAPL is recovered at the landfill and its presence is monitored by eight dedicated passive extraction wells (NR-01 to NR-08).

Construction of the hydraulic monitoring system included the installation of ten piezometers (PZ-01 through PZ-10) inside the slurry wall and ten overburden monitoring wells (PCM-01 through PCM-10) outside the slurry wall. Groundwater quality is monitored through sampling of the ten overburden monitoring wells and three bedrock monitoring wells (PCBM-01 through PCBM-03). A Site plan depicting the locations of the monitoring wells and piezometers can be found in Appendix C as Figure 1.

Installation of the landfill capping system began in November 1996 and was completed in November 1997. The capping system consists of a combination of geosynthetic and natural soil materials to minimize infiltration of precipitation and to isolate the landfill contents.

Access to the Site is restricted by a six-foot high chain link fence that encircles the Site along the property line and

along the bulkhead. Additionally, ICs in the form of deed restrictions were implemented to ensure that future land use at the Site is limited so as to preclude certain types of access to the landfill, prevent any construction or other activity that could interfere with the integrity of the cap or other engineering controls in place at the Site, and to restrict groundwater use at the Site.

Sediment Remediation

Beginning in July 1996, a cofferdam was built around the portion of the embayment which contained contaminated sediments. After the embayment area was dewatered, contaminated sediments above the Site-specific action levels, which can be found in Appendix B, were excavated to a maximum depth of two feet and placed on top of the landfill prior to finalization of the cap installation. Clean fill was backfilled into the excavated embayment. This work was completed in November 1996.

Storm Sewer Remedy

Abandonment and relocation of the 42-inch 100th Street storm sewer that traversed the Site was completed in September 1996.

Site Completion

A Preliminary Close-Out Report (PCOR), which summarizes remedial actions for landfill residuals, perimeter soils, shallow groundwater, NAPL, and river sediments, was signed by EPA on September 2, 1999. A settling Consent Decree was entered by the court on October 1, 1999. By means of a letter dated March 13, 2002, EPA accepted the Companies' Certification of Completion of the remedial action, and transferred the enforcement lead for oversight of the continuing operation and maintenance of the Site to the New York State Department of Environmental Conservation (NYSDEC). The Site was deleted from the NPL on August 5, 2004.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Landfill	Yes	Yes	Sitewide	Maintain integrity of landfill cap and any implemented engineering controls.	Deed restriction, Jan 25, 2000.
Groundwater	Yes	Yes	Sitewide	Restrict groundwater use, other than that necessary for remedy functions.	Deed restriction, Jan 25, 2000.

Systems Operations/Operation & Maintenance

The Operations and Maintenance (O&M) Plan has been developed and is being implemented. Pursuant to the O&M Plan, which was revised based on changes documented in the ESD, and as otherwise approved by the EPA, the necessary O&M activities currently include:

- Routine inspections of the capped area and maintenance of access restrictions.
- Regular mowing of landfill vegetation to prevent woody growth and preserve the cap.
- Quarterly groundwater level measurements.
- Quarterly NAPL presence monitoring, APL collection and discharge.
- Annual groundwater quality monitoring.

All APL leachate collected from the individual wells at the Site has been, and continues to be transferred to the nearby LCTF, where the leachate is treated and discharged. The LCTF is permitted to discharge to the Niagara Falls municipal sewerage system for final treatment at the Niagara Falls Publicly Owned Treatment Works. Wet wells are shut down when elevations in the wells reach the target level in order to maintain the inward differential (gradient) of one to two feet.

NAPL is recovered at the landfill and its presence is monitored by eight dedicated extraction wells on a quarterly basis. If more than three gallons of NAPL is present in a recovery well, NAPL is removed and stored on-Site before being transferred to GFL Environmental Services Inc. in Springwater, Ontario, Canada by Franks Vacuum Truck Service LLC for fuel blending recovery.

In accordance with the O&M Plan, groundwater level measurements are monitored within the piezometers and monitoring wells quarterly. There are ten overburden monitoring wells outside the slurry wall and three bedrock monitoring wells positioned on the southern, northern, and eastern sides of the Site. These bedrock wells are monitored in the same manner as the overburden wells for water level and water quality.

In line with regional practice, three tools were utilized to assess the Hooker 102nd Street Superfund Site for potential Site impacts from severe weather events. The performance of the remedy is currently not at risk due to these expected effects. The full remedy resiliency assessment is located in Appendix E.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** FYR as well as the recommendations from the **last** FYR and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2021 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Protective	The remedy at the Hooker 102nd Street Site currently protects human health and the environment as there is no human exposure to contaminated groundwater or landfill residuals, and engineered and institutional controls continue to be operated, monitored, and maintained.

There were no issues or recommendations identified in the previous FYR.

The previous FYR included the following suggestion: Wells PZ-06 and PZ-08 have been 'dry' consecutively for 16 and 22 quarters, respectively. The PRPs should develop a process to evaluate the inward hydraulic control in the areas of the landfill where piezometers are no longer in contact with the water table.

The difference in groundwater elevation used to demonstrate an inward gradient at these monitoring well pairs during dry events was calculated using the bottom elevation of each dry monitoring well, with the rationale that if the monitoring well was dry, the groundwater elevation would have to be at an elevation below the bottom of the monitoring well. The groundwater elevations in the monitoring wells outside the slurry wall were higher than the elevations of the bottoms of the dry monitoring wells inside the slurry wall during hydraulic monitoring events in this FYR period; therefore, regardless of the dry conditions at PZ-06 and PZ-08, an inward gradient across the slurry wall was maintained at these two monitoring well pairs in this FYR period. This approach will continue to be used when these monitoring wells are dry to evaluate the inward hydraulic control.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On July 21, 2025, the EPA Region 2 posted a notice on its website indicating that it would be reviewing Site cleanups and remedies at Superfund Sites in New York, New Jersey, and the U.S. Virgin Islands, including the Hooker 102nd Street Site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, the EPA Community Involvement Coordinator, or CIC for the Site, Michael Basile, posted a public notice on the EPA Site webpage https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0201706 and provided the notice to the City of Niagara Falls by email on 12/9/25 with a request that the notice be posted in municipal offices and on the village/town webpages. This notice indicated that a FYR would be conducted at the Hooker 102nd Street Site to ensure that the cleanup at the Site continues to be protective of human health and the environment. No inquiries were received as a result of the notice. Once the FYR is completed, the EPA will make the results available at the following repository: EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York, 10007. In addition, the EPA will post the final report on the following website: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0201706. The CIC will make efforts to reach out to local public officials to inform them of the results.

Data Review

The documents, data, and information which were reviewed in completing this FYR are summarized in Appendix A.

APL Collection and Discharge

Since the completion of the force main system and initiation of the leachate pumping operations, the system has shown integrity in that the four wet wells have been recharging properly, the leachate level within the landfill has decreased and been maintained at a reduced level. During the present operations, enough leachate has been and will be removed from the landfill so as to maintain the inward differential (gradient) of one to two feet, except in well pair 7 (discussed under *Hydraulic Monitoring* below). The force main system is pumping sufficient APL leachate from the landfill to the treatment facility as to consistently maintain an inward gradient across the slurry wall at almost all well pairs.

From 2020-2025, a total of 520,812 gallons of APL were removed and conveyed to the LCTF, a yearly average of 104,162 gallons. Both are lower than in the last FYR. This quantity of APL represents a decreased yearly average from 120,131 gallons reported for 2020 to 67,300 gallons reported for 2024. A total of approximately 10.7 million gallons of APL have been recovered from the Site since pumping was initiated in March 1999.

NAPL Presence Monitoring

NAPL is recovered at the landfill, and its presence is monitored at eight dedicated NAPL recovery (NR) wells on a quarterly basis. Performance data show that the NAPL recovery is functioning properly. For the period between 2021 and 2025, the total quantity of NAPL removed was 2,834.8 gallons. This quantity is lower than the NAPL recovered during the previous five-year period (3,416.6 gallons), which reflects decreasing availability of recoverable and mobile NAPL from the landfill subsurface. The majority of NAPL recovered was extracted from NR-02. NAPL is transported to GFL Environmental Services Inc. in Springwater, Ontario, Canada by Franks Vacuum Truck Service LLC for fuel blending recovery.

Hydraulic Monitoring

According to performance data from 2020-2024, quarterly water level monitoring at the ten well pairs along the landfill perimeter indicate that hydraulic capture has been maintained, except for well pair PCM-07R and PZ-07. During this FYR period, water level measurements for this well pair were inward in years 2021-2024, except for the April 2024 monitoring event. A similar dynamic was observed prior to well re-development activities in Spring 2018 reported during the last FYR. This well pair will be further monitored and may be evaluated for additional redevelopment events if the outward gradient trend continues.

Since well PZ-09 had historically been dry during quarterly monitoring events, it was replaced with PZ-09R in 2012. Water level monitoring confirmed an inward hydraulic gradient at this location during this FYR period.

Well PZ-06, located inside the slurry wall, has been dry during every quarterly water level monitoring event from 2016-2024. Well PZ-08, also located inside the slurry wall, has been dry during every quarterly water level monitoring event since September 2012. Therefore, it could not be determined if inward hydraulic gradients were maintained across the northern portion of the slurry wall where these wells are located through water level measurements. The difference in groundwater elevation was used to demonstrate an inward gradient at these monitoring well pairs during dry events. The groundwater elevation difference was calculated using the bottom elevation of each dry monitoring well, with the rationale that if the monitoring well was dry, the groundwater elevation would have to be at an elevation below the bottom of the monitoring well. The groundwater elevations in the monitoring wells outside the slurry wall were higher than the elevations of the bottoms of the dry monitoring wells inside the slurry wall during hydraulic monitoring events; therefore, regardless of the dry conditions at PZ-06 and PZ-08, an inward gradient across the slurry wall was maintained at these two monitoring well pairs during the FYR period.

Piezometric contour maps of the landfill show that there is a north to south groundwater gradient towards the APL collection trench in the southern part of the landfill, indicating that groundwater flows away from the northern wall. A figure depicting the overburden groundwater contours as sampled in October 2025 can be found as Figure 2 in Appendix C. Water quality data collected from wells PCM-06 located on the outside of the slurry wall along its northern section do not show pesticide or VOC contamination. Given the low permeability of the slurry wall and the current groundwater flow direction from north to south, the potential for contaminant migration across the slurry wall is negligible.

Groundwater Quality Monitoring

The groundwater quality monitoring program calls for annual collection of groundwater samples from ten monitoring wells screened in the overburden (PCM-01 to PCM-10) and three monitoring wells screened in the bedrock (PCMB-01, PCMB-02, and PCMB-03). These wells are sampled for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and pesticides. Annual groundwater quality samples from wells screened in the overburden and wells screened in the bedrock between 2020 to 2025 indicate that there were no exceedances above their respective criteria at most perimeter wells. However, VOCs, SVOCs, and pesticides continue to exceed State water quality regulations (WQRs) in overburden screened wells PCM-03, PCM-04, PCM-05, and PCM-08, located outside of the slurry wall, from 2020-2025. A table presenting the results of the most recent overburden groundwater quality monitoring event can be found in Appendix D.

In well PCM-03, concentrations of VOCs generally fluctuated, with maximum concentrations of 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-chlorotoluene and benzene detected at 60 µg/L, 390 µg/L, 14 µg/L, and 41 µg/L, respectively. All chemical constituents are above their respective WQR (3 µg/L, 3 µg/L, 5 µg/L and 1 µg/L, respectively). Chlorobenzene continues to be detected up to three orders of magnitude above the WQR of 5 µg/L, with a maximum detection of 4,400 µg/L in 2021. During the most recent sampling event in 2025 the concentration of chlorobenzene declined to 3,600 µg/L in PCM-03. Detections of SVOCs in this well also exceeded the WQR of 1 µg/L during this same period. During the period of this FYR, 2,4-dichlorophenol, 2,5-dichlorophenol, 2-chlorophenol, and 4-chlorophenol were detected at maximum concentrations of 47 µg/L, 50 µg/L, 37 µg/L, and 73 µg/L, respectively. All are at their historical maximum for PCM-03, and generally increase from minimums in 2017. There were detections of pesticides, such as beta-benzene hexachloride (BHC) (up to 0.18 µg/L), delta-BHC (up to 1 µg/L), and gamma-BHC, also known as lindane or gamma-hexachlorocyclohexane (0.062 µg/L). The WQR for alpha-BHC is 0.01 µg/L, 0.04 µg/L for beta- and delta-BHC, and 0.05 µg/L for gamma-BHC. There were no cleanup goals set forth in the ROD for each of these chemical constituents.

Similarly, concentrations of VOCs in overburden well PCM-04 generally fluctuated, with maximum concentrations of 1,2-dichlorobenzene, 1,4-dichlorobenzene, and benzene detected at 14 µg/L, 320 µg/L, and 36 µg/L, respectively. The concentration of chlorobenzene in PCM-04 in 2017 was 6,700 µg/L, increasing to 11,000 µg/L in 2021, a maximum for the well since 2008. Concentrations have remained around 10,000 µg/L since 2021, except for an outlier concentration of 110 µg/L in October 2023. Detections of SVOCs in this well also exceeded WQR. 2,4-Dichlorophenol, 2-chlorophenol, and 4-chlorophenol were detected at maximum concentrations of 1.6 µg/L, 24 µg/L, and 47 µg/L, respectively.

Well PCM-05 exhibited a decreasing trend of chlorobenzene concentrations with a mild concentration spike, where the highest concentration was detected at 120 µg/L during 2024. Other VOCs, SVOCs, and pesticides did not exceed WQR in PCM-05.

Concentrations of two pesticides (beta-BHC and delta BHC) were detected in isolation of each other near the reporting limit for well PCM-07R in 2021 and 2022. PCM-08 has confirmed concentrations of alpha-BHC and gamma-BHC from 2022 onward. PCM-09 has not been sampled due to insufficient volume of water in the well since 2022.

The chemical constituents observed, their concentration ranges, and the locations where they were observed are consistent with the Site's historical water quality data. Overburden wells (screened less than 30 feet deep) are screened along the south/southeast side of the landfill beyond the slurry wall, near the shoreline. Since inward gradients along the southern portion of the slurry wall have been consistently maintained, it does not appear that the contamination detected in wells outside of the slurry wall is due to groundwater seeping from the landfill. Rather, the data indicate that the likely source of contaminants originate from residual contamination in the soils below the two-foot removal depth outside the slurry wall. Further, residual contamination in subsurface soil may

also persist in the soil matrix where wells are screened, affecting the saturated zone between the slurry wall and embayment. Due to various changes in concentrations of pesticides and semivolatile COCs, it should be noted that there may be some movement of contaminants within the slurry wall. According to the piezometric contour maps and the inward gradients along the southern portion of the slurry wall, it is unlikely that any dissolved phase contaminants migrate towards the river. Note that surface water and sediment sampling in 2017 confirmed Site related contamination was not migrating towards the Niagara River. This information was included in the previous FYR and the conclusion is still considered valid at the time of this FYR.

Emerging Contaminants: PFAS & 1,4-Dioxane

No emerging contaminant sampling was conducted during this FYR period. As part of a state-led sampling program, four wells screened in the overburden (PCM-03, PZ-03R, PCM-05, and PZ-05) and two wells screened in the bedrock (PCMB-01 and PCMB-02) were sampled for previously uncharacterized contaminants in December 2019, including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. These samples were collected at wells located along the southern portion of the slurry wall and were analyzed per the *Scope of Work Emerging Contaminants (EC) Sampling at OCC Remediation Sites* document.

In 2020, New York State adopted Maximum Contaminant Levels (MCLs) for PFOA and PFOS of 10 ng/L. In April of 2024, EPA finalized MCLs of 4.0 ng/L for PFOA and PFAS. PFOA and PFOS were detected at maximum concentrations of 6.3 ng/L and 5.4 ng/L in well PCM-05, respectively in 2019. Although these concentrations slightly exceed the EPA MCL, the Site is not considered a significant source of PFAS contamination.

New York State also established an MCL for 1,4-dioxane of 1 µg/L in 2020. Exceedances of the state MCL were observed in four of six overburden wells (PZ-03R, PCM-03, PZ-05, and PCM-05). The highest concentrations of 1,4-dioxane were detected in wells PZ-03R (91 µg/L) and PCM-03 (80 µg/L), which are located in close proximity to one another in the south-western section of the slurry wall. On the south-eastern section of the slurry wall, 1,4-dioxane was reported at much lower concentrations in wells PZ-05 (2.2 µg/L), PCM-05 (1.8 µg/L) and PCBM-02 (non-detect). Due to the detected concentrations of 1,4-dioxane, adding this analyte to the groundwater monitoring program is suggested.

Site Inspection

The inspection of the Site was conducted on 12/4/2025. In attendance were Maeve Wurtz of EPA, Andrew Zwack of NYSDEC, Dennis Hoyt of Geosyntec, Joseph Branch of OCC, Detbra Rosales of EPA, and William Yeung of EPA. The purpose of the inspection was to assess the protectiveness of the remedy. The Site was observed to be in excellent condition. The landfill cap is in good condition with no need of repair. There appears to be no significant subsidence or breach on the cover. The perimeter fence is intact and restricts access as intended. Site inspection photos can be found in Appendix F.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The 1990 ROD does not define specific RAOs but identifies the primary intent of the remedy as hydraulic containment of APL/NAPL within the landfill. The 1990 ROD selected remedy consisted of the following components:

- Installation of a slurry wall around the landfill perimeter;

- Recovery and treatment of APL leachate;
- Separate recovery of NAPL and off-Site incineration;
- Consolidation of contaminated soils beneath an impermeable landfill cap; and
- Installation of a perimeter fence.

The 1995 ROD Amendment eliminated the requirement to incinerate contaminated sediments excavated from the embayment area and instead required they be consolidated beneath the landfill cap. The ROD Amendment also called for long-term remedial monitoring and institutional controls to restrict land and groundwater use from the Site. Based on performance data for the past five years, the remedy is functioning according to design with respect to containment.

APL Collection and Discharge

In 1997, a slurry wall was installed around the perimeter of the landfill to hydraulically contain the APL/NAPL within the landfill. An interception drain was also installed at the seasonal low water table to recover landfill leachate, and to create inward gradients across the slurry wall. Since APL pumping and collection began in 1996, inward gradients have generally been maintained, ensuring the Site-specific contaminants are contained. From 2020 to 2025, a yearly average of 104,162 gallons were removed and conveyed to the LCTF. Based on performance data for this time period, the groundwater APL collection system appears to be functioning according to design.

NAPL Recovery

NAPL is recovered at the landfill and its presence is monitored at eight dedicated NR wells on a quarterly basis. Performance data show that the NAPL recovery system is functioning properly. From 2020 to 2025 a yearly average of 697.52 gallons of NAPL were removed, most of which was extracted from well NR-02.

Landfill Cap/Consolidated Soils and Sediment

In 1997, the consolidation of excavated sediment under the landfill cap and installation of the cap were completed. Constructed of a geosynthetic layer and natural soil material, the landfill cap appears to contain the APL/NAPL plume and eliminate exposure pathways for the Site-specific contaminants to reach the surface.

Hydraulic Monitoring

For the past five years, quarterly water level monitoring at ten well pairs along the landfill perimeter indicate that hydraulic capture has been maintained in the southern portion of the landfill but has not been consistently maintained in the north/northeastern section of the landfill. Water level measurements for the well pair PCM-07R and PZ-07 have shown that inward hydraulic gradients were not consistently maintained for one of the eight sampling events between 2020 and 2025. Additionally, wells PZ-06 and PZ-08 were dry during every water level monitoring event this FYR. In these well pairs, the difference in groundwater elevation was used to demonstrate an inward gradient during dry events. The groundwater elevation difference was calculated using the bottom elevation of each dry monitoring well, with the rationale that if the monitoring well was dry, the groundwater elevation would have to be at an elevation below the bottom of the monitoring well. The groundwater elevations in the monitoring wells outside the slurry wall were higher than the elevations of the bottoms of the dry monitoring wells inside the slurry wall during hydraulic monitoring events; therefore, regardless of the dry conditions at PZ-06 and PZ-08, an inward gradient across the slurry wall was maintained at these two monitoring well pairs during the FYR period. Additionally, piezometric contour maps of the landfill show that there is a north to south groundwater gradient toward the APL collection trench in the southern part of the landfill indicating that groundwater flows away from the northern wall.

Groundwater Quality Monitoring

From 2020-2025, annual groundwater quality samples from wells screened in the overburden and wells screened in the bedrock indicate that there were no exceedances above their respective criteria at most perimeter wells. However, concentrations of VOCs, SVOCs, and pesticides in wells PCM-03, PCM-04, and PCM-05 (screened in the overburden) remain consistent with historic trends and continue to exceed criteria. These wells are screened along the south/southeast side of the landfill, on the outside of the slurry wall near the shoreline, which had originally been targeted for removal prior to 1995 ROD amendment. Since inward hydraulic gradients along the southern section of the landfill have been consistently maintained, it does not appear that this contamination is due to contaminated water seeping from the landfill, but rather, is due to residual contamination from soils that were on the outside of the slurry wall. Each of these wells are located along the steep embankment of the Niagara River. While concentrations of pesticides in PCM-07R are below NYSDEC WQR, PCM-8 has concentrations of pesticides that are higher than alpha-BHC and gamma-BHC MCLs, a new occurrence from previous FYRs. In addition, 1,4-dioxane was identified at elevated levels at PZ-03R and PCM-03 with concentrations slightly exceeding the state MCL at PZ-05, and PCM-05. Although the extent of 1,4-dioxane is limited, adding this analyte to the groundwater quality monitoring program is suggested for further evaluation.

Institutional Controls

A six-foot-tall chain-link fence was installed around the perimeter of the cap to restrict unauthorized access to the Site. Groundwater use restrictions were implemented at the Site to preclude the extraction of groundwater other than as required for the implementation of O&M activities for the remedy. Further, deed restrictions prevent any construction or other activity that could interfere with the integrity of the landfill cap or other engineering controls in place at the Site.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure pathways and the receptor populations identified in the 1990 Baseline Human Health Risk Assessment are still valid. Although some exposure assumptions have changed and several exposure pathways were not evaluated, these changes are not expected to affect the remedy.

The toxicity values for several of the COCs have changed since the human health risk assessment was completed. In order to account for changes in toxicity values since the HHRA, the maximum detected concentrations of COCs detected at the Site monitoring wells during the 2020-2025 sampling period were compared to their respective residential groundwater Regional Screening Levels and MCLs (National Primary Drinking Water Standards) and NYSDEC WQRs. Several Site-related constituents have consistently been detected in the wells downgradient of the Site (PCM-03, PCM-04 and PCM-05) above their respective criteria. These contaminants, detected outside the slurry wall, have remained relatively stable since the implementation of the remedy. Since an inward pressure gradient has consistently been maintained in the southern portion of the landfill, the concentrations of the constituents detected in the downgradient wells does not suggest that the Site-related contamination is breaching the slurry wall, but rather residual contamination exists outside the slurry wall. Exposure to the groundwater in this area is not possible due to ICs in place at the Site.

The cleanup goals for some soil contaminants identified in the ROD are below their respective NYSDEC soil cleanup objectives (SCOs). Perimeter soils identified during the RI containing TCDD above 1 µg/kg were excavated and backfilled as part of the remedy. Although the cleanup goal for dioxin has changed, the cleanup level of 1 µg/kg for this area is still protective because the excavated areas are covered with several inches of gravel and topsoil, thereby preventing exposure to the soils beneath the excavated area. The perimeter soils maintain a vegetative cover, which is periodically inspected by the PRPs to confirm the integrity of the cover and ensure protectiveness.

Surface water and sediment sampling were conducted in 2017 during the previous FYR period to evaluate if the contamination detected in the downgradient wells (PCM-03, PCM-04 and PCM-05) are impacting the Niagara River area. Site-related constituents were not detected in the surface water samples. Several constituents were detected in the sediment samples (arsenic, mercury and gamma-BHC). The concentrations were compared to their respective NYSDEC Class A guidance values for sediment (NYSDEC 2014). The concentrations of constituents in sediment were all below the Class A guidance values. The 2017 sampling results confirmed the conclusion that Site related contamination is not migrating towards the Niagara River and concentrations detected outside of the slurry wall are residual soil contamination. This conclusion is still considered valid at the time of this FYR.

Soil vapor intrusion was not previously evaluated during the RI as a potential future exposure pathway based on the conservative (health protective) assumption that buildings are located above the maximum detected concentration of the contaminants of concern in the groundwater. This exposure pathway was qualitatively addressed in the 2011 FYR. The health-based screening criteria provided in the *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (USEPA, 2002), which has been superseded by newer guidance, was used to initially evaluate this exposure pathway. This guidance provides calculations of concentrations in groundwater associated with indoor air concentrations at acceptable levels of cancer risk and non-cancer hazard. This review compared the maximum detected concentrations of the COCs with the vapor intrusion screening criteria. Several Site-related constituents have exceeded their respective risk-based criteria ($1x10^{-6}$) and the upper bound of the risk range ($1x10^{-4}$). This does not indicate that a vapor intrusion problem would occur if a building were to be erected over the Site. This merely indicates that further investigation would be necessary, which includes Site-specific considerations such as the type of building, the location of the building respective to the maximum detected concentration, and the subsurface characteristics of the Site. Currently, there are no buildings on the Site; therefore, the exposure pathway is incomplete at this time. Additionally, ICs in place to prevent damage to the landfill cap would prevent buildings from being constructed in the future, therefore limiting the potential of future risks related to vapor intrusion.

In 1997, EPA published the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1997), followed by the more generic *Guidelines for Ecological Risk Assessment* (EPA 1998). Because the environmental endangerment assessment conducted for the ROD preceded formal EPA guidance for risk assessments, it used a two-phased approach based on available screening levels and methodologies to assess ecological risk. Aquatic organisms and fish-eating species were evaluated. Sediment Quality Criteria were developed based on ambient water quality criteria values. Chemical-specific cleanup levels for sediment included benzene at 40 µg/kg, TCE at 111 µg/kg and PCBs at 42.4 µg/kg. These values may be compared to screening criteria found in *Screening and Assessment of Contaminated Sediment* (NYSDEC 2014) which indicates values for benzene <530 µg/kg, TCE <1800 µg/kg, and PCBs <100 µg/kg. It is noted in the guidance that, "If the concentration of a contaminant in sediment is below the sediment guidance value that defines this class, the contaminant can be considered to present little or no potential for risk to aquatic life." Therefore, the values selected in the ROD remain protective of ecological receptors. Further, the landfill cap eliminates the potential terrestrial pathway to ecological receptors. Although risk assessment methodologies presented in EPA guidance have evolved since the ROD was completed, the process that was used remains valid.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that would call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU1

There are no issues or recommendations identified in this FYR. However, the following suggestions below would help with evaluation of remedy performance.

OTHER FINDINGS

The following are suggestions that were identified during the FYR and may improve performance of the remedy, but do not affect current and/or future protectiveness:

- Well pair PCM-07R and PZ-07 exhibited two events of outward hydraulic gradient across the slurry wall over the past 10 years. An evaluation of this well pair and possible well redevelopment is recommended if outward hydraulic gradient events continue.
- Due to exceedances of 1,4-dioxane in PZ-03R, PCM-03, PZ-05, and PCM-05, it is suggested that 1,4-dioxane be added to the groundwater quality monitoring program.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: 1	*Protectiveness Determination:* Protective
Protectiveness Statement: The OU1 remedy is protective of human health and the environment.	

Sitewide Protectiveness Statement
Protectiveness Determination: Protective
Protectiveness Statement: The remedy at the Hooker (102nd Street) Site is protective of human health and the environment.

VIII. NEXT REVIEW

The next FYR report for the Hooker 102nd Street Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

102nd Street Landfill Emerging Contaminants Sampling Summary, Groundwater & Environmental Services, Inc., 2020.

2021 Annual Periodic Review Report, 102nd Street Landfill Site, Niagara Falls, New York, Glenn Springs Holdings, Inc., 2021.

2022 Annual Periodic Review Report, 102nd Street Landfill Site, Niagara Falls, New York, Glenn Springs Holdings, Inc., 2022.

2023 Annual Periodic Review Report, 102nd Street Landfill Site, Niagara Falls, New York, Glenn Springs Holdings, Inc., 2023.

2024 Annual Periodic Review Report, 102nd Street Landfill Site, Niagara Falls, New York, Glenn Springs Holdings, Inc., 2024.

EPA Superfund Record of Decision: Hooker (102nd Street), USEPA, 1990. EPA Superfund Record of Decision Amendment: Hooker (102nd Street), USEPA, 1995.

Fifth Five Year Review Report Hooker (102nd Street) Superfund Site, Niagara County, New York, USEPA, September 2016.

Remedial Investigation Final Report, 102nd Street Landfill Site, Niagara Falls, New York, Occidental Chemical Corporation, 1990.

APPENDIX B – REGULATORY LEVELS OF COCS

Table 11
Evaluation of Groundwater Concentrations
at the 102nd Street Landfill

Compound	Regulatory Level (ug/L) [1]		Maximum Site Concentration (ug/L)
SSI Parameters			
benzene	ND	703.5	8200
toluene	5.00	10 NYCRR5	5700
chlorobenzene	5.00	10 NYCRR5	16000
chlorotoluene, 2-	5.00	10 NYCRR5	560
chlorotoluene, 4-	5.00	10 NYCRR5	[2]
dichlorobenzene, 1,2-	4.70	703.5	3000
dichlorobenzene, 1,4-	4.70	703.5	1200
trichlorobenzenes	5.00	10 NYCRR5	3100
tetrachlorobenzenes	5.00	10 NYCRR5	2700
hexachlorobenzene	0.35	703.5	4
hexachlorocyclohexanes	ND	703.5	1815
dichloroaniline, 2,5-	5.00	10 NYCRR5	16000
dichloroaniline, 3,4-	5.00	10 NYCRR5	[2]
phenols (total)	1.00	703.5	76
chlorobenzoic acids	50.00	10 NYCRR5	10000
mercury	2.00	703.5	68
arsenic	25.00	703.5	230
Endagerment Assessment Chemicals			
dichloroethylene, 1,1-	0.07	701.4	3
trichloroethylene	5.00	10 NYCRR5	130
benzo(a)anthracene	0.00	701.7	ND
benzo(b)fluoranthene	0.00	701.7	ND
benzo(k)fluoranthene	0.00	701.7	ND
chloronaphthalene, 2-	0.00	10 NYCRR5	10
chlorophenol, 2-	5.00	703.5 [3]	390
dichlorophenol, 2,4-	1.00	703.5 [3]	6400
dimethylphenol, 2,4-	1.00	703.5 [3]	68
trichlorophenol, 2,4,5-	1.00	703.5 [3]	2500
trichlorophenol, 2,4,6-	1.00	703.5 [3]	180
chloro-m-cresol, 4-	1.00	703.5 [3]	28
pentachlorophenol	1.00	701.4	38
mirex	0.04	703.5	ND
PCBs	0.10	703.5	140
TCDD, 2,3,7,8-	0.000035	703.5	0.5
cadmium	10.00	703.5	33

Notes:
[1] All regulations are 6 NYCRR unless stated otherwise
[2] Total of all isomers
[3] Total may not exceed 1 ug/L
ND- Not Detected

Table 12
Estimated Sediment Quality Criteria
at the 102nd Street Landfill

Compound	NYSDEC AWQS [1] (ug/L)	Sediment Remed. Level (ug/kg) [4]
TCDD, 2,3,7,8-	0.000001	0.26
trichloroethylene	11 [2]	111
benzene	6 [2]	40
chlorobenzene	5	132
dichlorobenzene, 1,2-	5	680
dichlorobenzene, 1,4-	5	680
trichlorobenzene, 1,2,3-	5	3680
trichlorobenzene, 1,2,4-	5	3680
tetrachlorobenzene, 1,2,3,4-	5 [3]	640
hexachlorobenzene	UA	
chlorobenzoic acid, 2-	UA	
chlorophenol, 4-	1	NC
trichlorophenol, 2,4,6-	1	160
dichloroaniline, 2,5-	UA	
hexachlorocyclohexane, a-	0.01	3.04
hexachlorocyclohexane, b-	0.01	3.04
hexachlorocyclohexane, g-	0.01	0.86
PCBs	0.001	42.4
arsenic	190	ND
cadmium	2.77	ND
mercury	0.2	ND

Notes:
UA - Unavailable
NC - Cannot be calculated without Koc
ND - No algorithm available for metals

[1] NYSDEC Division of Water TOGS 1.1.1 Ambient Water Quality Standards (1987)
[2] NYSDEC TOGS 1.1.1 Guidance Value
[3] NIH IRIS Chronic AWQC for 1,2,4,5-tetrachlorobenzene (1989)
[4] Based on the sediment concentration necessary to potentially exceed AWQS

Organic Carbon (fraction): 0.08

APPENDIX C – FIGURES

Figure 1 – Site Plan

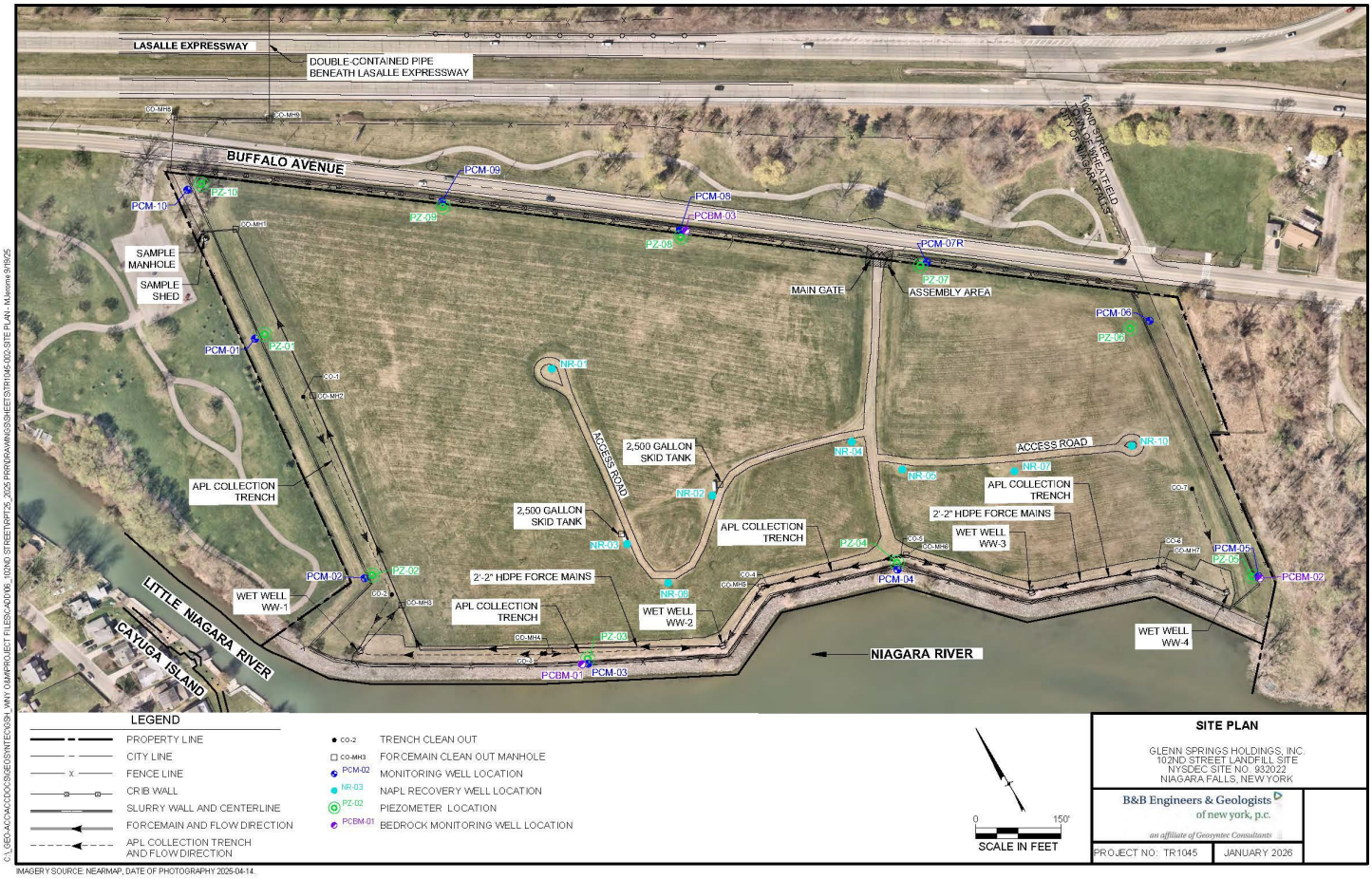
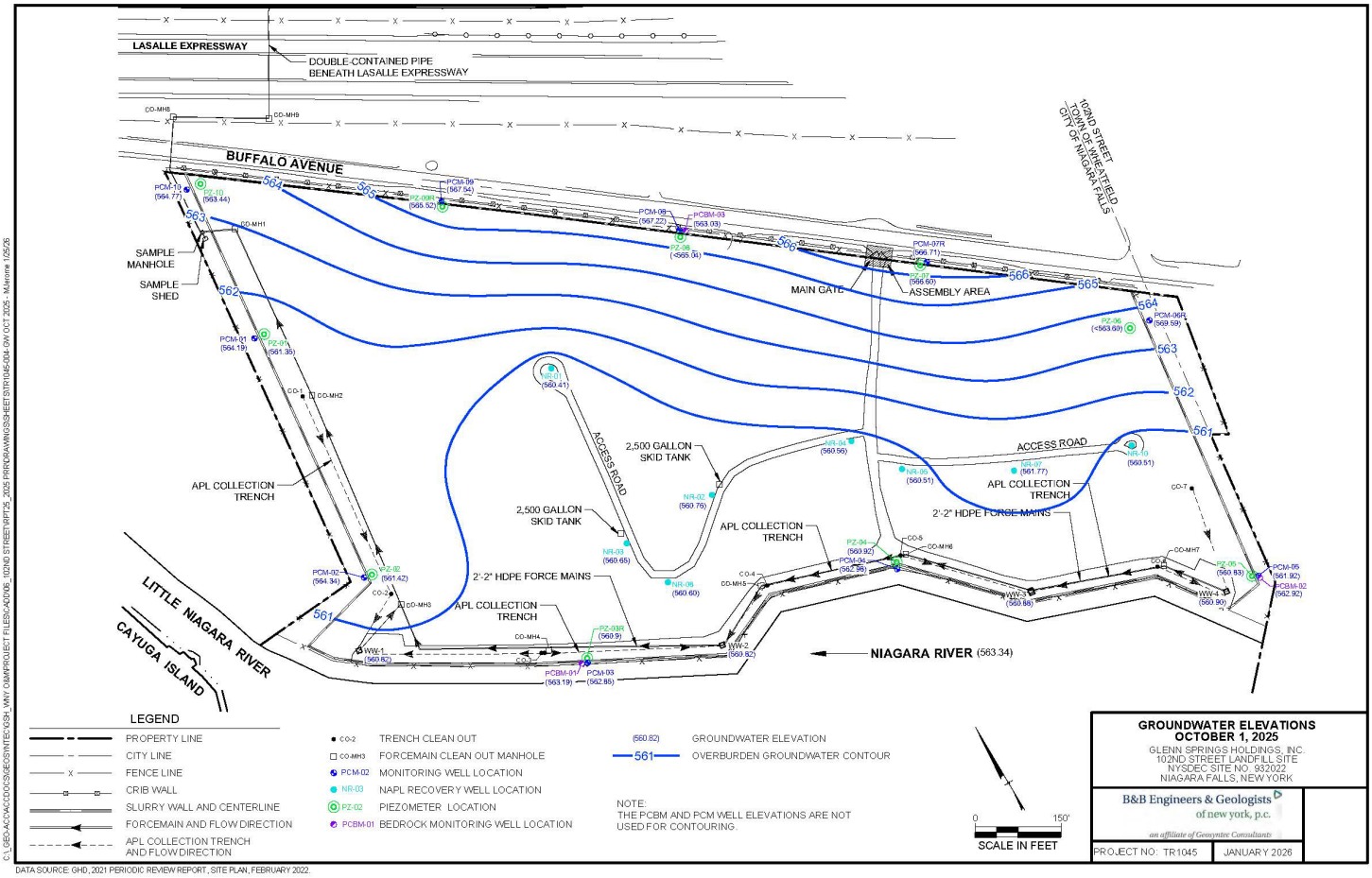


Figure 2 – Site Groundwater Contours



APPENDIX D – OVERBURDEN GROUNDWATER QUALITY MONITORING RESULTS

Table 2.4

Analytical Results Summary
Glenn Springs Holdings, Inc.
102nd Street Landfill Site
Niagara Falls, New York

			Overburden Wells									
		Sample Location:	PCM-01	PCM-02	PCM-02	PCM-03	PCM-04	PCM-05	PCM-06R	PCM-07R	PCM-08	PCM-10
		Sample ID:	PCM-01-1025	PCM-02-1025	PCM-02-1025	PCM-03-1025	PCM-04-1025	PCM-05-1025	PCM-06-1025	PCM-07R-1025	PCM-08-1025	PCM-10-1025
		Sample Date:	10/06/2025	10/06/2025	10/06/2025	10/06/2025	10/08/2025	10/08/2025	10/08/2025	10/08/2025	10/06/2025	10/06/2025
					Duplicate							
Parameters	**NYSDEC Class GA GW Standard**	**Units**										
Volatile Organic Compounds												
1,2,3-Trichlorobenzene	5	µg/L	1.0 U	1.0 U	1.0 U	25 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	5	µg/L	1.0 U	1.0 U	1.0 U	25 U	100 U	1.0 U	1.0 U	1.0 U	0.61 J	1.0 U
1,2-Dichlorobenzene	3	µg/L	1.0 U	1.0 U	1.0 U	**27**	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	3	µg/L	1.0 U	1.0 U	1.0 U	**310**	**320**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chlorotoluene	5	µg/L	1.0 U	1.0 U	1.0 U	**12 J**	100 U	1.0 U	1.0 U	1.0 U	0.33 J	1.0 U
Benzene	1	µg/L	1.0 U	1.0 U	1.0 U	**28**	**36 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	5	µg/L	1.0 U	1.0 U	1.0 U	**3600**	**12000**	**90**	1.0 U	1.0 U	1.0 U	1.0 U
Semi-volatile Organic Compounds												
1,2,4,5-Tetrachlorobenzene	5	µg/L	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U
2,4,5-Trichlorophenol	1	µg/L	9.6 U	9.6 U	9.6 U	9.6 U	9.6 UJ	9.6 UJ	9.6 UJ	9.6 UJ	9.6 U	9.6 U
2,4-Dichlorophenol	5	µg/L	9.6 U	9.6 U	9.6 U	**29**	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U
2,5-Dichlorophenol	1	µg/L	4.8 U	4.8 U	4.8 U	**8.3**	1.0 J	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U
2-Chlorophenol	1	µg/L	9.6 U	9.6 U	9.6 U	**26**	**26**	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U
3/4-Chlorophenol	1	µg/L	9.6 U	9.6 U	9.6 U	**29**	**31 J-**	9.6 UJ	9.6 UJ	9.6 UJ	9.6 U	9.6 U
Phenol	1	µg/L	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U	9.6 U
Pesticides												
alpha-BHC	0.01	µg/L	0.048 U	0.048 U	0.048 U	**0.078**	0.048 U	0.048 U	0.048 U	**0.030 J**	**0.090**	0.048 U
beta-BHC	0.04	µg/L	0.048 U	0.048 U	0.048 U	0.048 U	**0.13**	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U
delta-BHC	0.04	µg/L	0.048 U	0.048 U	0.048 U	**0.56**	**1.7**	0.048 U	0.048 U	0.021 J	0.027 J	0.048 U
gamma-BHC (lindane)	0.05	µg/L	0.048 U	0.048 U	0.048 U	0.048	0.048 U	0.048 U	0.048 U	0.036 J	**0.062**	0.048 U

Notes:

J - Estimated Concentration
J- - Estimated Concentration; implied low bias
U - Not detected at the associated reporting limit
UJ - Not detected; associated reporting limit is estimated
µg/L - Micrograms per liter
3400 - Concentration exceeds the NYSDEC Class GA GW Standard
3400 - Concentration detected less than the NYSDEC Class GA GW Standard

APPENDIX E – REMEDY RESILENCY

The first tool used to assess the remedy resiliency of the Site was the *CMRA*. The tool examined five hazards for Niagara County, NY. According to this tool, the National Risk Index Rating for extreme heat and flooding is "Relatively Low." There is no projected increase of days per year with maximum temperatures >100°F, and there is a projected increase of 3 days per year with maximum temperatures >90°F as shown in Figure E-1. Figure E-2 shows an increase in average annual total precipitation and a decrease in days per year with precipitation.

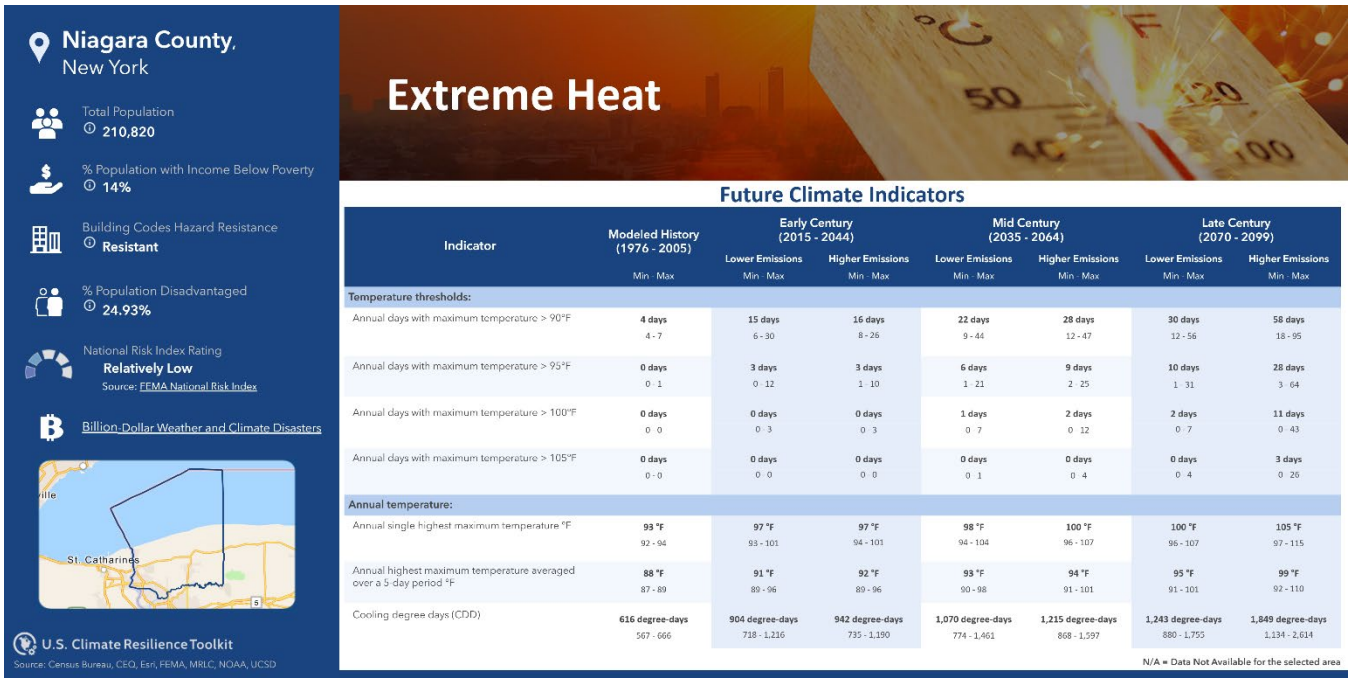
The three other hazards evaluated by this tool – drought, wildfire, and coastal flooding – each have a National Risk Index Rating of "Very Low". Figures E-3 and E-4 show an increase in days per year with no precipitation. As shown in Figure 5, the county is not impacted by global sea level rise.

The second tool is called the *NOAA Sea Level Rise Viewer* (SLVR). This tool assessed the potential for impacts to the Site from sea level rise and coastal flooding. The Site is located relatively far inland, therefore coastal flooding is unlikely to occur. The nearest water body to the Site is the Niagara River. Flooding attributable to flooding from the river is possible given extreme circumstance, such as a period of extreme precipitation. Figure E-6, a screenshot from the SLRV, shows that a 10-foot increase in the mean higher water (MHHW) level would not result in any increased risk of impacts from sea level rise to the Site.

The final tool utilized is called the *USGS U.S. Landslide Inventory & Susceptibility Map*. As shown by Figures E-7 and E-8, there have been no landslides recorded in the vicinity of the Site, and the Site is likely not susceptible to landslide activity in the future.

Potential Site impacts from severe weather events have been assessed, and the performance of the remedy is currently not at risk due to these expected effects.

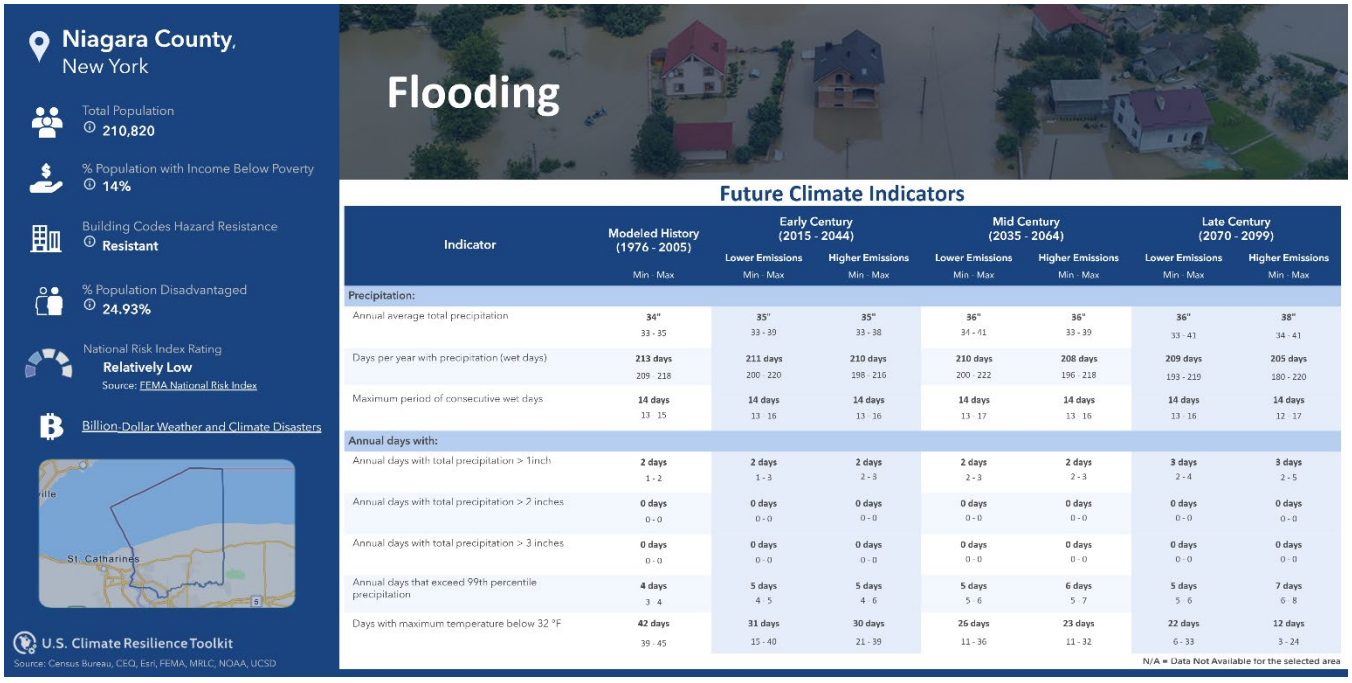
Figure E-1



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	4 days 4 - 7	15 days 6 - 30	16 days 8 - 26	22 days 9 - 44	28 days 12 - 47	30 days 12 - 56	58 days 18 - 95
Annual days with maximum temperature > 95°F	0 days 0 - 1	3 days 0 - 12	3 days 1 - 10	6 days 1 - 21	9 days 2 - 25	10 days 1 - 31	28 days 3 - 64
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 3	0 days 0 - 3	1 days 0 - 7	2 days 0 - 12	2 days 0 - 7	11 days 0 - 43
Annual days with maximum temperature > 105°F	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 1	0 days 0 - 4	0 days 0 - 4	3 days 0 - 26
Annual temperature:							
Annual single highest maximum temperature °F	93 °F 92 - 94	97 °F 93 - 101	97 °F 94 - 101	98 °F 94 - 104	100 °F 96 - 107	100 °F 96 - 107	105 °F 97 - 115
Annual highest maximum temperature averaged over a 5-day period °F	88 °F 87 - 89	91 °F 89 - 96	92 °F 89 - 96	93 °F 90 - 98	94 °F 91 - 101	95 °F 91 - 101	99 °F 92 - 110
Cooling degree days (CDD)	616 degree-days 567 - 666	904 degree-days 718 - 1,216	942 degree-days 735 - 1,190	1,070 degree-days 774 - 1,461	1,215 degree-days 868 - 1,597	1,243 degree-days 880 - 1,755	1,849 degree-days 1,134 - 2,614

N/A = Data Not Available for the selected area

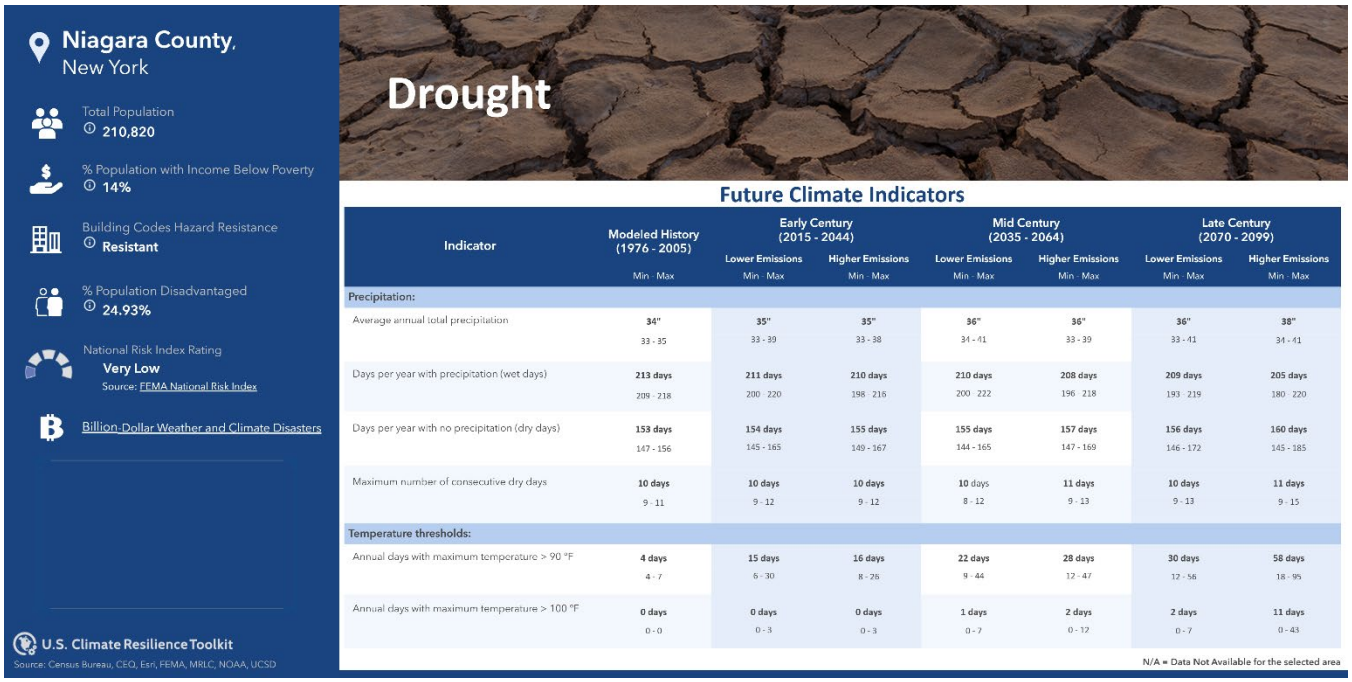
Figure E-2



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	34" 33 - 35	35" 33 - 39	35" 33 - 38	36" 34 - 41	36" 33 - 39	36" 33 - 41	38" 34 - 41
Days per year with precipitation (wet days)	213 days 209 - 218	211 days 200 - 220	210 days 198 - 216	210 days 200 - 222	208 days 196 - 218	209 days 193 - 219	205 days 180 - 220
Maximum period of consecutive wet days	14 days 13 - 15	14 days 13 - 16	14 days 13 - 16	14 days 13 - 17	14 days 13 - 16	14 days 13 - 16	14 days 12 - 17
Annual days with:							
Annual days with total precipitation > 1inch	2 days 1 - 2	2 days 1 - 3	2 days 2 - 3	2 days 2 - 3	2 days 2 - 3	3 days 2 - 4	3 days 2 - 5
Annual days with total precipitation > 2 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0
Annual days with total precipitation > 3 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0	0 days 0 - 0
Annual days that exceed 99th percentile precipitation	4 days 3 - 4	5 days 4 - 5	5 days 4 - 6	5 days 5 - 6	6 days 5 - 7	5 days 5 - 6	7 days 6 - 8
Days with maximum temperature below 32 °F	42 days 39 - 45	31 days 15 - 40	30 days 21 - 39	26 days 11 - 36	23 days 11 - 32	22 days 6 - 33	12 days 3 - 24

N/A = Data Not Available for the selected area

Figure E-3



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	34" 33 - 35	35" 33 - 39	35" 33 - 38	36" 34 - 41	36" 33 - 39	36" 33 - 41	38" 34 - 41
Days per year with precipitation (wet days)	213 days 209 - 218	211 days 200 - 220	210 days 198 - 216	210 days 200 - 222	208 days 196 - 218	209 days 193 - 219	205 days 180 - 220
Days per year with no precipitation (dry days)	153 days 147 - 156	154 days 145 - 165	155 days 149 - 167	155 days 144 - 165	157 days 147 - 169	156 days 146 - 172	160 days 145 - 185
Maximum number of consecutive dry days	10 days 9 - 11	10 days 9 - 12	10 days 9 - 12	10 days 8 - 12	11 days 9 - 13	10 days 9 - 13	11 days 9 - 15
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	4 days 4 - 7	15 days 6 - 30	16 days 8 - 26	22 days 9 - 44	28 days 12 - 47	30 days 12 - 56	58 days 18 - 95
Annual days with maximum temperature > 100 °F	0 days 0 - 0	0 days 0 - 3	0 days 0 - 3	1 days 0 - 7	2 days 0 - 12	2 days 0 - 7	11 days 0 - 43

N/A = Data Not Available for the selected area

Figure E-4

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	153 days 147 - 156	154 days 145 - 165	155 days 149 - 167	155 days 144 - 165	157 days 147 - 169	156 days 146 - 172	160 days 145 - 185
Maximum number of consecutive dry days	10 days 9 - 11	10 days 9 - 12	10 days 9 - 12	10 days 8 - 12	11 days 9 - 13	10 days 9 - 13	11 days 9 - 15
Days per year with precipitation (wet days)	213 days 209 - 218	211 days 200 - 220	210 days 198 - 216	210 days 200 - 222	208 days 196 - 218	209 days 193 - 219	205 days 180 - 220
Temperature thresholds:							
Annual days with maximum temperature > 90°F	4 days 4 - 7	15 days 6 - 30	16 days 8 - 26	22 days 9 - 44	28 days 12 - 47	30 days 12 - 56	58 days 18 - 95
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 3	0 days 0 - 3	1 days 0 - 7	2 days 0 - 12	2 days 0 - 7	11 days 0 - 43

N/A = Data Not Available for the selected area

Figure E-5

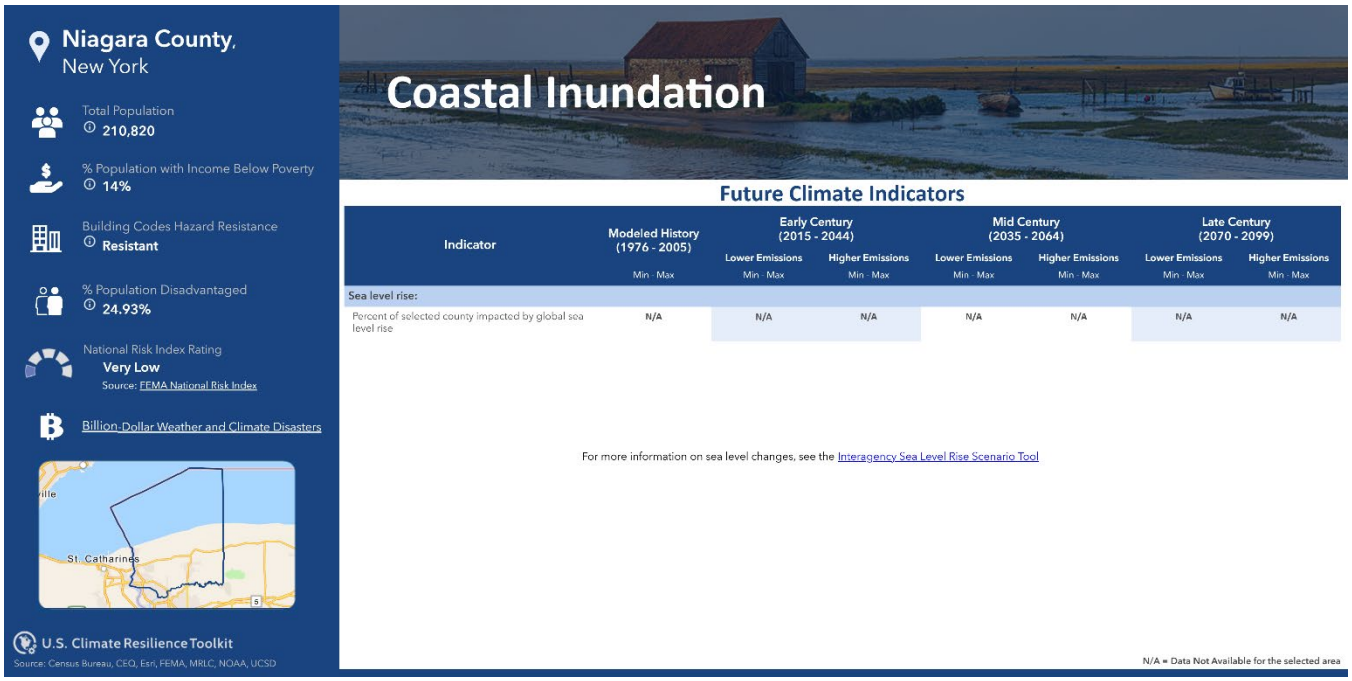


Figure E-6

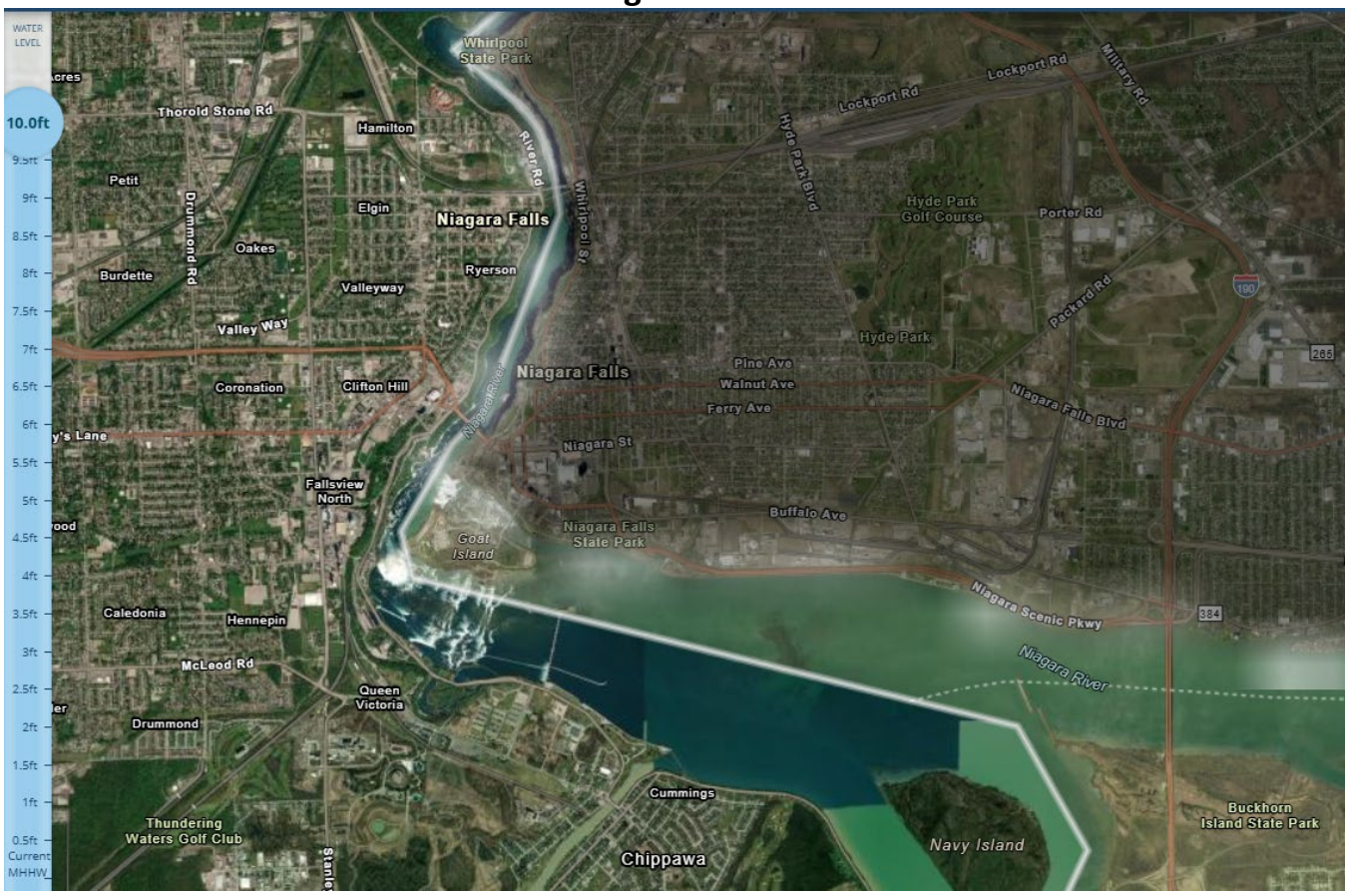


Figure E-7

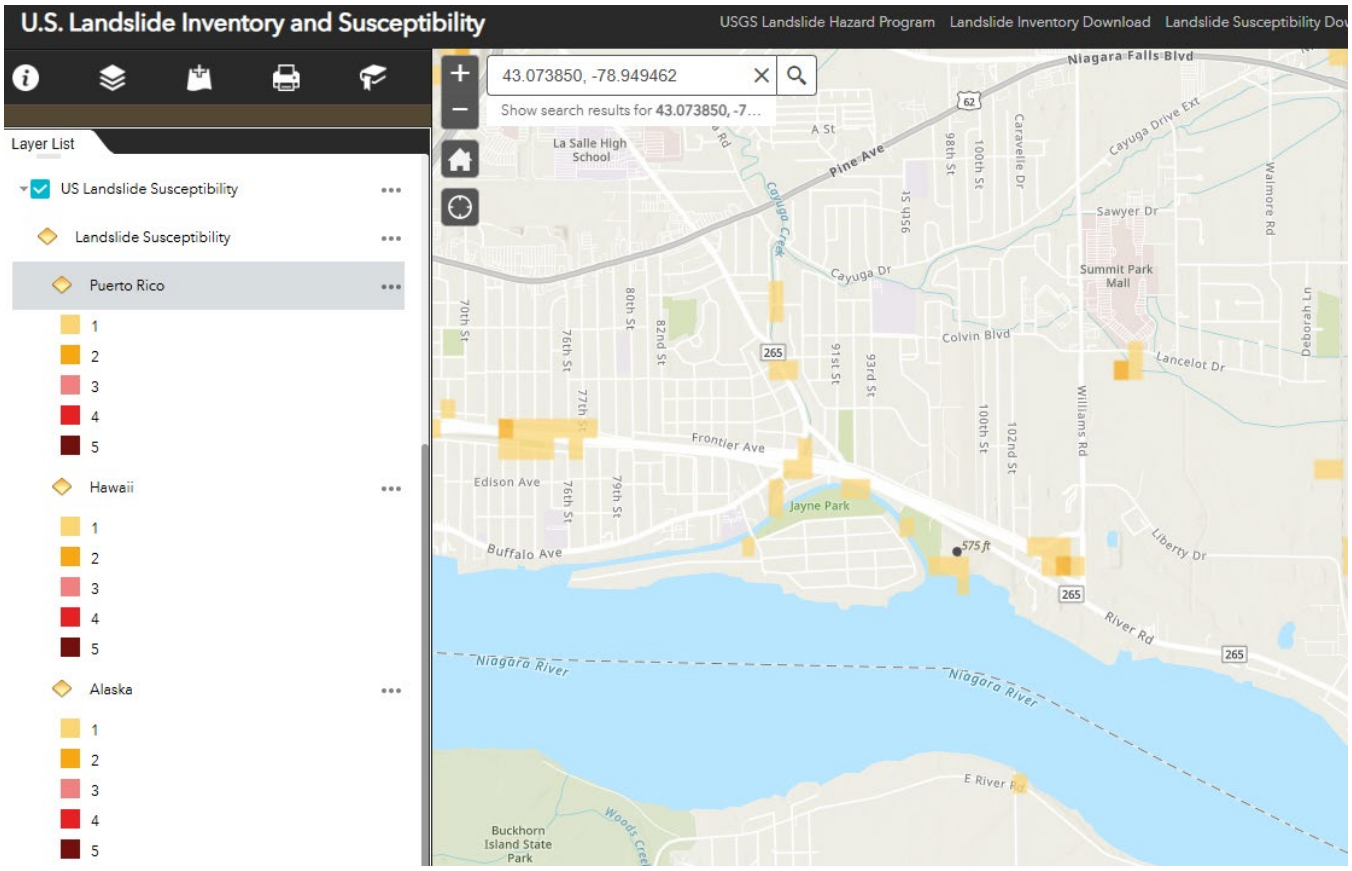
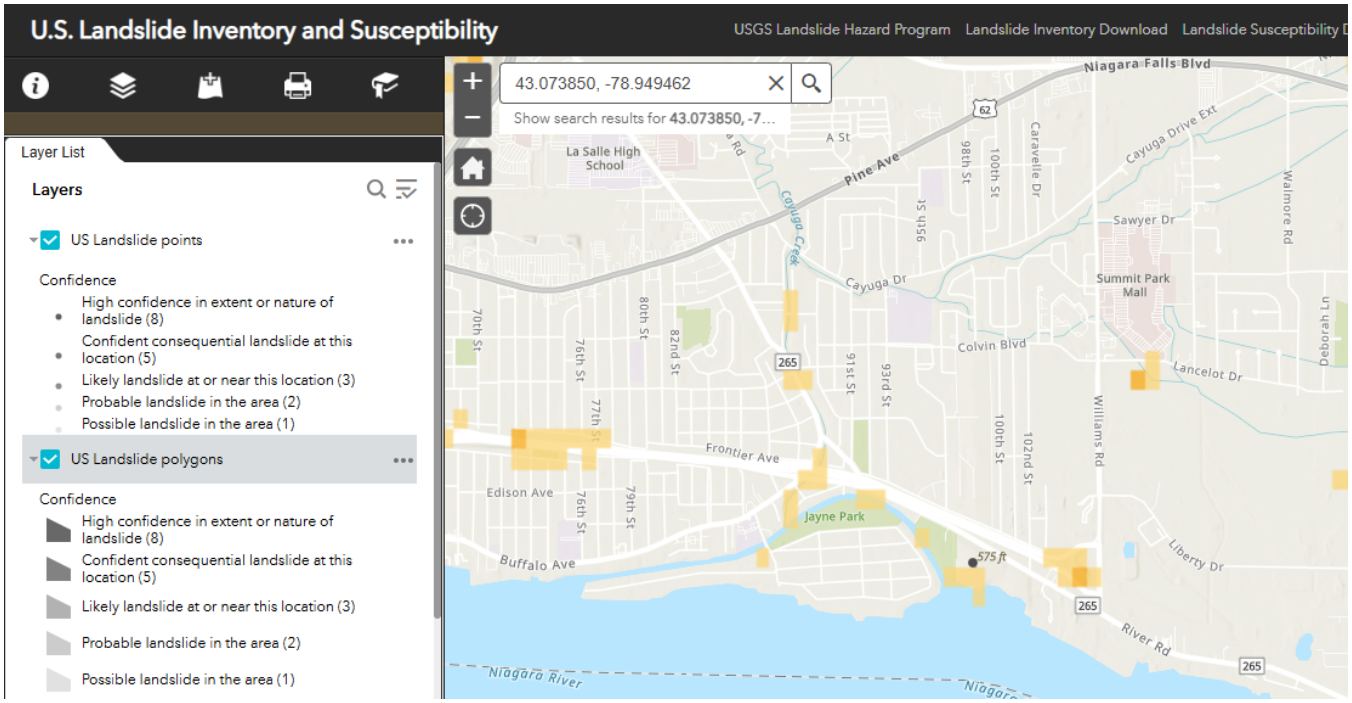

U.S. Landslide Inventory and Susceptibility
USGS Landslide Hazard Program
Landslide Inventory Download
Landslide Susceptibility Do
Layer List
US Landslide Susceptibility
Landslide Susceptibility
Puerto Rico
1
2
3
4
5
Hawaii
1
2
3
4
5
Alaska
1
2
3
4
5
43.073850, -78.949462
Show search results for 43.073850, -7...
Niagara Falls Blvd
Pine Ave
Cayuga Drive Ext
Sawyer Dr
Summit Park Mall
Colvin Blvd
Lancelot Dr
Walmore Rd
Deborah Ln
Cayuga Dr
Frontier Ave
Edison Ave
Jayne Park
Buffalo Ave
Liberty Dr
River Rd
Niagara River
E River Rd
Buckhorn Island State Park
La Salle High School
Caravelle Dr
Williams Rd
575 ft

Figure E-8


U.S. Landslide Inventory and Susceptibility
USGS Landslide Hazard Program
Landslide Inventory Download
Layer List
Layers
US Landslide points
Confidence
High confidence in extent or nature of landslide (8)
Confident consequential landslide at this location (5)
Likely landslide at or near this location (3)
Probable landslide in the area (2)
Possible landslide in the area (1)
US Landslide polygons
Confidence
High confidence in extent or nature of landslide (8)
Confident consequential landslide at this location (5)
Likely landslide at or near this location (3)
Probable landslide in the area (2)
Possible landslide in the area (1)
43.073850, -78.949462
Show search results for 43.073850, -7...
Niagara Falls Blvd
Pine Ave
Cayuga Drive Ext
Sawyer Dr
Summit Park Mall
Colvin Blvd
Lancelot Dr
Walmore Rd
Deborah Ln
Cayuga Dr
Frontier Ave
Edison Ave
Jayne Park
Buffalo Ave
Liberty Dr
River Rd
Niagara River
La Salle High School
Caravelle Dr
Williams Rd
575 ft

APPENDIX F – SITE PHOTOS

Photo 1 – Cap Surface

Photo 2 – Cap Surface

Photo 3 – Monitoring Wells

Photo 4 – Wet Well A