THIRD FIVE-YEAR REVIEW REPORT FOR TRI-CITIES BARREL SUPERFUND SITE BROOME COUNTY, NEW YORK

Prepared by

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

Pat Evangelista Digitally signed by Pat Evangelista Date: 2026.03.10 10:43:02 -04'00'

March 10, 2026

Pat Evangelista, Director
Superfund and Emergency Management Division

Date

765914

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
CY	Cubic Yard
DCA	Dichloroethane
DCE	Dichloroethene
EPA	United States Environmental Protection Agency
ERD	Enhanced Reductive Dechlorination
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
FS	Feasibility Study
FYR	Five-Year Review
GWQS	Groundwater Quality Standard
HHRA	Human Health Risk Assessment
ICs	Institutional Controls
MNA	Monitored Natural Attenuation
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
OU	Operable Unit
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethene
PFAS	Polyfluoroalkyl Substances
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-volatile Organic Compound
TAGM	Technical and Administrative Guidance Memorandum (New York State)
TCA	Trichloroethane
TCE	Trichloroethene
TI	Technical Impracticability
TSCA	Toxic Substances Control Act
UU/UE	Unlimited Use/Unrestricted Exposure
VC	Vinyl Chloride
VI	Vapor Intrusion
VOC	Volatile Organic Compound

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 third FYR for the Tri-Cities Barrel Co., Inc. Superfund Site (Site). The triggering action for this statutory review is the completion date of the previous FYR. 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 (OU) which will be addressed in this FYR. OU1 addresses both the soil and groundwater components of the remedy.

The Site FYR was led by EPA: Thomas Mongelli, remedial project manager; Will Yeung, hydrogeologist; Jinnie Hanlee, human health risk assessor; Detbra Rosales, ecological risk assessor; and Larisa Romanowski, community involvement coordinator. The potentially responsible parties (PRPs) were notified of the initiation of the five-year review which began on 6/11/2025.

Site Background

The Site is located on a 14.9-acre parcel of land, approximately five miles northeast of the City of Binghamton in the Town of Fenton, New York. Situated adjacent to Old Route 7, the Site is bordered to the north by Osborne Creek, railroad tracks to the south, and rural residential areas, farmland, and woodlands on the other sides. The Site is bisected by Interstate Highway 88 (I-88). Two small unnamed, intermittent streams parallel the eastern and western sides of the Site. The eastern tributary is located outside of the property boundary, while the western tributary is located within the property boundary. Both streams collect surface water runoff from the southern portion of the Site, including Osbourne Hollow Road, Old Route 7, and the railroad tracks. The streams flow north, discharging to Osborne Creek. A man-made pond (a former lagoon) located north of I-88 occupies approximately 6,000 square feet (ft.). See **Appendix A, Figure 1**, for the Site location and **Appendix A, Figure 3**, for a Site plan.

The Tri-Cities Barrel Co., Inc. (Tri-Cities), a defunct corporation, owned and operated a barrel and drum (hereinafter, “drum”) reconditioning facility on the Site from about 1955 to 1992. The drum reconditioning process involved cleaning and reconditioning the interior and exterior of drums through a combination of physical, chemical, and mechanical means. The drums were brought to the Site from numerous different sources and typically contained residues of a variety of chemical compounds employed in industrial or commercial operations. Depending on the nature of the residues, Tri-Cities

Barrel Co. employed various processes and compounds to remove such residues, including water and caustic sodium hydroxide solutions, incineration, particle blasting, and scraping. Much of the available property south of I-88 was used for drum storage. As many as 1,000 drums per week were reconditioned at the facility.

From the beginning of the facility's operations to the early 1960s, liquid wastes from the reconditioning process were discharged to the ground and allowed to flow downslope toward Osborne Creek. This practice created a distinctive drainage pattern. From the early 1960s to 1980, liquid wastes were discharged to a series of unlined lagoons on the Site. These lagoons were reportedly 3 to 4 feet deep. Prior to the completion of construction of I-88 in 1968, there were five lagoons located north of the former process building, aligned along a north-south line in the same general area as their earlier discharge pattern. After the construction of I-88, the liquid wastes were directed from east to west across the Site to the lagoons which discharged to the western tributary.

In 1980, after negotiations with the New York State Department of Environmental Conservation (NYSDEC), Tri-Cities discontinued its practice of discharging liquid wastes to the lagoons. By 1981, the three lagoons south of I-88 had been backfilled with approximately 7,000 cubic yards (cy) of clean soil. Following the closure of the lagoons, the liquid wastes generated in the drum cleaning process were collected in a holding tank and hauled off-site for disposal. Upon installation of a closed-loop wastewater recirculating system, only infrequent off-site disposal of the liquid wastes was necessary.

The Site property is presently zoned residential/agricultural. The former industrial use of the property was a nonconforming use which indicated that the drum reclamation facility would be permitted to continue operating after a zoning ordinance that would have prohibited such industrial use had been established for the area. The former site, including the operations area, is currently vacant and beginning to become naturally reforested. The current land use in the immediate vicinity of the Site is residential, agricultural, and recreational. The reasonably-anticipated future use for the property is residential/agricultural.

Appendix B summarizes the documents utilized to prepare this FYR. **Appendix C** summarizes the subsite's geology/hydrogeology. For more details related to background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the Site, please refer to: https://www.epa.gov/superfund/tri-cities-barrel.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Tri-Cities Barrel Co., Inc.		
EPA ID: NYD980509285		
Region: 2	**State:** NY	**City/County:** Town of Fenton/Broome County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Thomas Mongelli		
Author affiliation: EPA		
Review period: 6/11/2025 - 10/15/2025		
Date of site inspection: 6/11/2025		
Type of review: Statutory		
Review number: 3		
Triggering action date: 1/22/2021		
Due date *(five years after triggering action date)*: 1/22/2026		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Based upon the results of an EPA-performed site investigation and a NYS-performed Phase I and Phase II site investigations, the Site was added to the National Priorities List on October 4, 1989. From 1992 to 1997, a remedial investigation (RI), conducted by the PRP Group pursuant to a 1992 Administrative Order on Consent, included the sampling of surface and subsurface soils, sediments in Osborne Creek and its tributaries, groundwater, and surface water. The results are summarized below.

Surface and Subsurface Soil

In the area north of I-88, contaminants of concern (COCs) were detected in the top two feet of the soils and sediments within the boundaries of the former lagoon and the former surficial discharge drainage pattern. See **Appendix A, Figure 2**. They primarily consisted of multiple semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and pesticides. In the area south of I-88, several

volatile organic compounds (VOCs) and metals were identified as COCs, along with many of the same contaminants identified north of I-88. In the area south of Osbourne Hollow Road, only one SVOC, bis(2-ethylhexyl)phthalate, and one pesticide, endrin, were identified as COCs.

Sediments

Sediments in the eastern and western tributaries exceeded NYSDEC's sediment criteria for SVOCs, pesticides, PCBs, and metals. With the exception of two pesticides, alpha- and gamma-chlordane, the contaminants in the eastern tributary were not believed to be attributable to the former site operations, but rather to an adjacent former junkyard. No COCs were identified in the sediments of Osborne Creek itself.

Groundwater

The affected groundwater at the Site is restricted to the area south of I-88, within the shallow, unconsolidated water bearing zone in isolated zones over an approximate 240-foot wide by 500-foot long area. Chemicals identified in this area included VOCs, SVOCs, PCBs, pesticides, and metals[1]. The bedrock aquifer was determined to not be contaminated.

Surface Water

One VOC, carbon disulfide, was detected at a maximum concentration of 13 micrograms per liter (µg/L) in two samples collected from Osborne Creek. However, this contaminant was considered to not be site-related because no carbon disulfide was detected within the Site's soil, sediment, or groundwater. The pesticides alpha- and gamma-chlordane were detected in a sample collected from the western tributary near I-88. Based on these results, it was determined that surface water in the eastern tributary and Osborne Creek were not adversely affected by the former Site operations. The western tributary may have been slightly impacted by constituents originating from the Site. However, these constituents were not detected in the surface water of Osborne Creek, the receiving stream, indicating that the concentrations are either diluted or not transported to the downstream sampling locations.

Based upon the results of the RI and feasibility study (FS), EPA concluded that a) ingestion of groundwater, b) consumption of vegetables grown in contaminated soil, c) dermal exposure to groundwater and d) inhalation of volatiles released into indoor air from the groundwater were the primary human health risks at the Site. The RI/FS identified the following VOC, SVOC and metal COCs for the groundwater: 2-butanone, 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), 1,1,1-trichloroethane (1,1,1-TCA), cis-1,2-dichloroethene (cis-1,2-DCE), methylene chloride, tetrachloroethene (PCE), toluene; trichloroethene (TCE), vinyl chloride (VC) and bis(2-ethylhexyl)phthalate. The COCs for the soil were: 2-butanone, 1,1-DCA, 1,2-DCA, methylene chloride, toluene, PCE, TCE, VC, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene; 2-methylnapthalene, phenanthrene, aldrin, alpha-chlordane, 4,4'-DDD, 4,4'-DDE, delta-BHC, dieldrin,

[1] Note that only VOCs are recognized as COCs for groundwater (reference **Appendix A Table 1**).

gamma-chlordane, heptachlor, polychlorinated biphenyls, antimony, arsenic, beryllium, cadmium, chromium (VI), iron, lead, manganese, mercury and nickel.

The 1996 ecological risk assessment identified exposure to Site soils and sediments as completed exposure pathways. Lead, PCBs, and pesticides (primarily chlordane) were the major concerns for ecological receptors.

Response Actions

Based on the results of the RI/FS, a Record of Decision (ROD) was signed in March 2000. The remedial action objectives (RAOs) established in the ROD were as follows:

- Minimize or eliminate contaminant migration to the groundwater and surface waters to levels that ensure the beneficial reuse of these resources;
- Restore groundwater quality to levels which meet state and federal drinking water standards within a reasonable timeframe;
- Reduce or eliminate the direct contact threat associated with contaminated soil, sediment, and groundwater; and
- Minimize exposure of fish and wildlife to contaminants in surface water, sediments, and soils.

The major components of the selected remedy included:

- Excavation and/or dredging of approximately 50,000 cy of unsaturated (above the water table) soil and sediment exceeding soil/sediment cleanup objectives;
- Backfilling of the excavated areas with clean fill and revegetating such areas, as appropriate. All excavated/dredged material will be characterized and transported for treatment/disposal at an off-site Resource Conservation and Recovery Act (RCRA) and/or Toxic Substances Control Act (TSCA) compliant facility, as appropriate;
- Restoration of any wetlands impacted by remedial activities. The restored wetlands will require routine inspection for several years to ensure adequate survival of the planted vegetation;
- Extraction of contaminated groundwater utilizing a network of recovery wells, and treatment of the extracted groundwater (by air-stripping, liquid phase carbon adsorption, and chemical precipitation technologies, or other appropriate treatment), followed by discharge to surface water;
- Implementation of institutional controls (ICs), *i.e.,* deed restrictions, to prohibit the installation and use of groundwater wells at the Site until groundwater cleanup standards are achieved; and
- Long-term monitoring of groundwater, surface water, and nearby residential private wells to ensure the effectiveness of the selected remedy.

A ROD amendment was signed in September 2011 that changed the groundwater component of the remedy selected in the 2000 ROD. The major components of the selected modified remedy included:

- MNA of groundwater contamination throughout the Site, except in the MW-19 Area;

- Long-term groundwater monitoring to verify that the level and extent of groundwater contaminants are declining within the time frame projected and that conditions are protective of human health and the environment; and
- Periodic monitoring of nearby residential private wells to ensure the effectiveness of the selected remedy.

Additionally, the following RAOs were established for the Site groundwater:

- Restore Site-wide groundwater quality to levels which meet state and federal drinking water standards within a reasonable time frame; and
- Reduce or eliminate any direct contact or inhalation threat associated with contaminated groundwater.

The ROD amendment determined that site-wide restoration of the groundwater could be achieved in 50 years, but that restoration in the MW-19 Area was technically impracticable from an engineering perspective as a result of the ineffectiveness of active remedies in the low permeable soils found at the Site, the limited mobility of the groundwater contamination, and the inability to locate a source of the contamination in that area. Therefore, a technical impracticability (TI) waiver was established in the MW-19 Area, pursuant to CERCLA§121(d)(4)(C) and NCP§300.430(f)(1)(ii)(C)(3) for the groundwater in this area. The TI zone shown in **Appendix A, Figure 3** is approximately 120 feet (ft) by 80 ft to a depth of 30 ft. The applicable or relevant and appropriate requirements that are waived for this zone include the federal maximum contaminant levels (MCLs) and NYSDEC Groundwater Quality Standards (GWQS) for PCE, 1,1,1-TCA, 1,1-DCA, cis-1,2-DCE, and VC.

In 2017, EPA issued an Explanation of Significant Differences (ESD) documenting the need for additional ICs at the Site. One IC involved recording of a survey map depicting an area of soil contamination that was not able to be addressed as part of the soil excavation portion of the remedy. This IC also included notification requirements to the local electric utility and the Fenton Town Highway Department and placement of signage at the site alerting utility workers to the presence of contaminated soil. This is discussed in further detail in the Status of Implementation section below. The 2017 ESD also called for another IC requiring a soil vapor intrusion investigation and/or mitigation, if necessary, if a structure were to be built on the Site in the future.

Status of Implementation

Following the signing of the ROD, EPA entered into a consent decree with the PRP Group to perform the remedial design and implementation of the selected remedy. Implementation of the remedy was split into two work elements. Work Element I included excavation and disposal of contaminated soils and sediments, while Work Element II consisted of extraction and treatment of the contaminated groundwater.

The remedial action for Work Element I was performed in 2003. The cleanup goals for soil are included in **Appendix A, Table 2**. The effort resulted in the following being excavated and shipped off-Site:

- 71,455 tons of nonhazardous soil to an approved landfill;

- 222 tons of RCRA/TSCA hazardous soil for incineration;[2]
- 2,550 tons of TSCA hazardous soil to an approved landfill; and
- 742 tons of RCRA hazardous soil for incineration.

Subsequent to the excavation work, backfilling, regrading, and seeding, replacement wetlands were established in the area north of I-88, as required by the remedial design. The presence of a utility pole located on-site just to the north of Osbourne Hollow Road prevented the full excavation of the contaminated soil in the area surrounding the pole. An adjacent area beginning immediately to the west of the utility poll could not be fully excavated without compromising the integrity of Osbourne Hollow Road. Therefore, a 30-mil low density polyethylene liner was placed over the contaminated soil remaining in this area before backfilling the excavation with clean fill.

EPA determined that a survey map depicting the location of the contaminated soil, liner, and backfill should be recorded in the office of the County Clerk of Broome County to supplement the restrictions against intrusive activities at these areas, pursuant to a 1996 Grant of Easement and Declaration of Restrictive Covenants previously recorded in the Broome County Clerk's office. In addition, if utility workers needed to perform any intrusive activities associated with the utility pole, *e.g.,* replace the pole, or if repairing, replacing, or expanding the road requires intrusive activities in the capped area, EPA would send letters to the local electric utility and the Fenton Town Highway Department informing them that they would need to consult with and coordinate any such work with EPA, NYSDEC, and the New York State Department of Health (NYSDOH) in order to minimize human exposure to contaminated soil. Also, EPA determined that specific signage was necessary in order to provide a further degree of protection to utility and highway department workers.[3] These changes to the remedy were documented in a January 2017 ESD.

From 2001 through 2005, a monitored natural attenuation (MNA) study was conducted and documented in the 2007 *Revised Comprehensive Monitored Natural Attenuation Evaluation Report.* The findings of this effort were also summarized in a PRP Group-prepared 2008 focused feasibility study (FFS) report where MNA was compared to other alternatives, including the ROD-selected remedy of groundwater extraction and treatment. After reviewing the FFS report, EPA concluded that while MNA may be feasible for the majority of the Site, the data did not demonstrate that MNA would address the groundwater contamination in the "MW-19 Area" where the source of the contamination in this area could not be identified (as explained below). Based upon the recommendations in the FFS report, EPA directed the PRP Group to implement an enhanced reductive dechlorination (ERD) pilot-scale treatability study in the MW-19 Area. Following the completion of four rounds of performance monitoring events, the PRP Group submitted a Pilot Study Report in January 2010. Based upon its review of the report, EPA requested that the PRP Group perform additional investigation to locate the source and, if located, perform targeted ERD treatment. Based on the results of these investigations, a ROD amendment was signed in September 2011.

[2] The RCRA hazardous soil was deemed as such due to elevated lead concentrations, while the TSCA hazardous soil was deemed as such due to elevated PCB concentrations.

[3] The noted letters were sent in January 2017. Three warning signs, marking the boundaries of contaminated soils remaining in place under a subsurface liner, were installed in June 2017.

In September 2011, MNA-related groundwater monitoring commenced under Work Element II and remains ongoing. Cleanup goals for the portion of the plume subject to MNA include the state and federal MCLs as well as the NYSDEC GWQS (**Appendix A, Table 1**).

Though the ROD and ROD Amendment included periodic monitoring of nearby residential private wells, it is important to note that all private wells are located either side-gradient or upgradient relative to the site area. No site-related contaminants were ever observed in these wells. As a result, monitoring of these wells was last conducted in 2005.

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)
Groundwater	Yes	Yes	Entire site	Restricts the withdrawal of groundwater underlying the site for drinking water purposes and prohibits the installation of drinking water wells on any part of the Site.	Environmental Protection Easement and Declaration of Restrictive Covenants: January 10, 1997
Capped area	Yes	Yes	Capped area	The presence of a utility pole and concern about the integrity of a road lead to the placement of a liner over contaminated soil. EPA required that a survey map be appended to the existing easement delineating the area where the liner was installed to establish restrictions against intrusive activities.	Environmental Protection Easement and Declaration of Restrictive Covenants: January 10, 1997.[4, 5]
Vapor intrusion	Yes	Yes	Entire Site	If, in the future, structures are proposed to be built on the Site, then a soil vapor intrusion evaluation and, potentially, vapor mitigation may be needed, or alternatively just soil vapor mitigation.	As a governmental IC, on January 16, 2014, the Office of the Town of Fenton Building Inspector acknowledged to EPA that its office will notify any party seeking to build residential structures at the site of soil vapor concerns relating to the property, and specifically of the need for a soil vapor evaluation and potentially, soil vapor mitigation systems or, alternatively just soil vapor mitigation.

[4] The easement was filed by the PRP Group several years before a remedy was selected for the Site. The restrictions delineated in the easement assumed that the contaminated soil would be capped. While capping was considered in the ROD, it was not selected. Ultimately, an approximately 120-foot by 10-foot area of the Site was capped.

[5] Letters were sent by EPA on January 20, 2017 to the local electric utility and the Fenton Town Highway Department requesting that if utility workers need to perform intrusive activities associated with the utility pole (*e.g.,* replace the pole) or if repairing, replacing, or expanding the road requires intrusive activities in the capped area, the performing party will need to consult with and coordinate this work with EPA, NYSDEC, and NYSDOH to minimize human exposure to contaminated soil. Also, three warning signs marking the boundaries of contaminated soils were installed on June 6, 2017 to provide a further degree of protection to utility and highway department workers.

Systems Operations/Operation & Maintenance

Periodic inspections of the area located along Osbourne Hollow Road where the liner was installed are performed to ensure that there are no intrusive activities in this area.

The Work Element II long-term sampling program, last revised and approved by EPA in May 2022, utilizes nine monitoring wells. Monitoring wells MW-2S, MW-2, MW-3S, MW-3, MW-7S, MW-16S, MW-18S, MW-19, and PMW-1 are sampled biannually. See **Appendix A, Figure 3**. The samples are analyzed for VOCs, field parameters[6], and MNA parameters[7] during every sampling event.

Maintenance of the monitoring wells is performed on an as-needed basis. Early in the morning of November 18, 2021, a truck driver traveling westbound on I-88 veered off the road and destroyed the MW-20 well cluster. The crash also caused an unknown volume of diesel fuel to spill from a punctured fuel tank on the truck. The diesel spill was addressed by Miller Environmental, contractor for the trucking company, under the oversight of NYSDEC's Spill Response Program (Spill ID# 2107650). EPA approved a request by the PRP group to abandon the MW-20 well cluster on November 30, 2021. Well MW-20 was abandoned in June 2022, and wells MW-20S and 20D were abandoned in July 2022.

Remedy Resilience

Potential impacts to the site area from severe weather have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of weather-related events in the region and near the Site. Please see **Appendix D** for the full evaluation.

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
1	Protective	The OU1 remedy is protective of human health and the environment.
Sitewide	Protective	The Site-wide remedy is protective of human health and the environment.

No issues or recommendations were identified in the last FYR.

[6] Field parameters include temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity.
[7] MNA parameters include ferrous iron, total iron, alkalinity, carbon dioxide, ethane, ethene, hydrogen, methane, chloride, nitrate, sulfate, sulfide, and total organic carbon.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On July 21, 2025, 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 Tri-Cities Barrel Superfund site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, Larisa Romanowski (Site CIC) posted a public notice on the EPA Site webpage (https://www.epa.gov/superfund/tri-cities-barrel) and provided the notice to the Town of Fenton by email on October 9, 2025, with a request that the notice be posted in municipal offices and on the town webpage. This notice indicated that an FYR would be conducted at the Site to ensure that the cleanup at the Site continues to be protective of human health and the environment. No responses or inquiries were received as a result of these notifications. Once the FYR is completed, the results will be made available to the following repositories: Fenton Town Hall, 44 Park Street, Port Crane, New York; Fenton Free Library, 1062 Chenango Street, Binghamton, New York; EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York. In addition, the final report will be posted on the following website: https://www.epa.gov/superfund/tri-cities-barrel. Efforts will be made to reach out to local public officials to inform them of the results.

Data Review

Shallow Groundwater

Groundwater samples collected during this review period were compared to the cleanup goals, consisting of state and federal MCLs as well as NYSDEC GWQS (**Appendix A, Table 1**). During the review period, no VOCs were detected at MW-18S, which is located upgradient of the former Tri-Cities operations area. MW-16S has historically exhibited the highest VOC concentrations at the Site and that trend has continued during this review period. This well is located in the upgradient portion of the former operations area. Four compounds (TCE, cis-1,2-DCE, methylene chloride, and 1,1-DCA) exceeded their cleanup goals at this location and exhibited increasing concentrations over the past five years. The most stringent cleanup goals included in the 2011 ROD Amendment were 5 ug/L for each compound that exceeded the cleanup goal. TCE concentrations increased from 830 to 1,200 µg/L, cis-1,2-DCE concentrations increased from 870 to 1,300 µg/L, and vinyl chloride concentrations increased from 240 to 410 µg/L between the 2021 and 2025 sampling events, respectively, during this review period. During the previous FYR period, TCE concentrations ranged from 540 to 930 µg/L, cis-1,2-DCE concentrations ranged from 600 to 970 µg/L, and vinyl chloride concentrations ranged from 150 to 380 µg/L. The TCE concentrations generally cycled between increasing and decreasing cycles across sampling rounds. This cycling of concentration trends was believed to mimic the cyclic expansion and collapse of microbial colonies (i.e., biological activity increases and the microbial colony expands, with an increasing food supply then collapses as the food source is depleted). In addition, it was believed that TCE was degrading within MW-16S due to concentrations of cis-1,2-DCE and 1,1-DCA increasing. However, during this review period, both cis-1,2-DCE and 1,1-DCA have been increasing consistently alongside TCE. Therefore, the breakdown of TCE may have stalled in this limited area despite general reductions across the plume area. Concentrations of TCE, cis-1,2-DCE, and vinyl chloride in MW-16S currently exceed concentrations observed even prior to the soil excavation portion of the remedy.

Additional monitoring will be needed to determine if the restoration timeframe established in the ROD will be met.

In addition, methylene chloride was observed at a concentration of 78 µg/L during the 2025 sampling event after not having been detected at this well since June 2013 when it was observed at a concentration of 1.6 µg/L. Methylene chloride is often considered a lab contaminant, although it is considered a site COC. Finally, 1,1-DCA concentrations increased from 32 to 47 µg/L between the 2021 and 2025 sampling events, which exceeds its cleanup goal of 5 ug/L.

Moving farther downgradient, there were no VOC detections at MW-7S over the past five years, MW-3S had detections of cis-1,2-DCE and 1,1-DCA though all detections were below cleanup goals, and MW-2S had detections of several compounds including cis-1,2-DCE, 1,1-DCA, chloroform, chloroethane, and vinyl chloride though only detections of cis-1,2-DCE, and 1,1-DCA exceeded cleanup goals at concentrations of 9.1 µg/L and 16 µg/L, respectively, during the June 2023 sampling event. These results were anomalous and were higher than concentrations observed at this well over the past 10 years. Results from the 2025 sampling event were all below cleanup goals.

Deep Groundwater

During the review period, no VOCs were detected at MW-3. MW-2, consistent with previous results, had detections of several compounds including TCE which exceeded its cleanup goal at concentrations ranging between 33 µg/L in June 2023 to 89 µg/L in June 2025. Vinyl chloride also exceeded its cleanup goal (2 ug/L) during the June 2025 sampling event at a concentration of 3.2 µg/L. Over the past five years, MW-2 also had concentrations exceeding cleanup goals for cis-1,2-DCE ranging from 9.9 to 18 µg/L and 1,2-DCA ranging from 6.3 to 9.7 µg/L.

MW-19 Area

During the review period, PCE concentrations exhibited an increase from 180 µg/L in June 2021 to a maximum of 270 µg/L in June 2025. However, the maximum observed in 2025 remains less than the maximum concentration identified during the last FYR period (310 µg/L). TCE concentrations remained stable, ranging from 12 µg/L to 14 µg/L over the past five years. Additionally, concentrations of 1,1,1-TCA exhibited a slight decrease from a maximum of 59 µg/L in June 2021 to 48 µg/L in June 2025. These concentrations are consistent with, or have declined compared to, the previous FYR period indicating that steady state conditions are being maintained. Methylene chloride was detected in June 2025 at a concentration of 29 µg/L, despite not having previously been detected at this location, but as stated above methylene chloride is often considered a lab contaminant. Concentrations of these compounds exhibited similar trends at location PMW-1. Over the past five years, PCE concentrations increased at this well from 180 to 260 µg/L, TCE concentrations decreased slightly from 28 to 21 µg/L, and 1,1,1-TCA concentrations decreased slightly from 57 to 49 µg/L. While PCE has slightly increased compared to the last FYR, concentrations of TCE and 1,1,1-TCA have largely decreased. Methylene chloride was also detected for the first time at this location in June 2025 at a concentration of 14 µg/L.

MNA Parameters

An assessment of MNA parameters is important for an evaluation of the effectiveness of natural attenuation processes. Parameter monitoring has continued from the previous review period, but beginning in June 2023, samples for MNA analysis are collected at each biennial monitoring event. The most recent data was collected in June 2025. Analyses for dissolved gases (hydrogen, carbon dioxide, ethene, ethane, and methane) were discontinued after the December 2016 monitoring event, because background data collected from 2001 to 2016 indicated dissolved gases were present at concentrations favorable for biotic degradation.

Ferrous iron, the product of iron reduction, was detected in six monitoring wells (MW-3, MW3S, MW-7S, MW-16S, MW-19, and PMW-1) at concentrations ranging from 0.1 to 3 milligrams per liter (mg/L). Sulfate concentrations ranged from 1.8 to 53 mg/L. The lowest sulfate concentration was exhibited at monitoring well MW-3S and the highest at monitoring well MW-16S (53 mg/L). Sulfide was detected at concentrations below the reporting limit in monitoring wells MW-2, MW-2S, MW-3, MW-3S, MW-7S, MW-16S, MW-18S, and PMW-1. Nitrate was detected at concentrations below the reporting limit in monitoring wells MW-2S (0.41 mg/L), MW-3S (0.38 mg/L), and MW-7S (0.034 mg/L). Nitrate and sulfide could interfere with dechlorination.

Organic carbon, a microbial food source, was detected in all groundwater samples except PMW-1, ranging in concentration from 0.83 to 6.3 mg/L. The lowest detected organic carbon concentration was exhibited at monitoring well MW-19 (0.83 mg/L) and the highest concentrations at monitoring wells MW-16S (6.3 mg/L). Alkalinity, indicative of microbial activity, ranged from 110 to 390 mg/L and was found to be generally higher in wells monitoring the former operations area. Dissolved oxygen concentrations ranged up to 8.23 mg/L, with the highest concentrations observed in monitoring wells MW-3S (8.23 mg/L) and MW-2 (5.7 mg/L). Oxidation-reduction (redox) potential, a measure of the tendency of a chemical substance to oxidize or reduce another chemical substance, ranged from -252.5 to 206.4 millivolts, with the lowest redox potential observed in monitoring well PMW-1 and the highest in monitoring well MW-3S.

Emerging Contaminants

Supplemental sampling for emerging contaminants was conducted in 2020, as standards for 1,4-dioxane and polyfluoroalkyl substances (PFAS) were promulgated in New York. At that time, New York State established a maximum contaminant level (MCL) of 1.0 µg/L for 1,4-dioxane and 10 nanograms per liter (ηg/L) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). In 2023, NYSDEC issued ambient water quality guidance (AWQG) values for PFOA (6.7 ηg/L), PFOS (2.7 ηg/L) and 1,4-dioxane (0.35 µg/L). In 2024, EPA established MCLs for PFOA and PFOS at 4.0 ηg/L, along with six other per- and polyfluoroalkyl substances (PFAS).

Samples were collected at MW-18S (upgradient well), MW-16S (former operations area) and MW-19 (TI waiver area). 1,4-Dioxane was detected within the site monitoring wells exceeding the NYS MCLs in MW-16S (59 µg/L) and MW-19 (16 µg/L). 1,4-Dioxane was not detected in upgradient well, MW-18S. PFAS chemicals, such as perfluorobutanoic acid (PFBA), perfluorooctanesulfonic acid (PFOS), and perfluorooctanoic acid (PFOA) were also detected in levels that exceeded both state and federal MCLs in wells MW-18S (11 ηg/L of PFOS) and MW-16S (1,200 J ηg/L of PFBA; 89 ηg/L of PFOS; 71 ηg/L of

PFOA). Since the concentrations increased in the downgradient wells compared to the upgradient well relative to the site, it is recommended that PFAS and 1,4-dioxane be further evaluated at the Site, especially further downgradient of MW-16S (such as the MW-2, MW-3, and MW-7 monitoring well clusters) due to the high detections of PFAS compounds.

Groundwater Data Summary

In summary, with the exception of the MW-19 Area, which is subject to a TI waiver, the groundwater sampling results generally indicate that natural attenuation mechanisms, including biodegradation, are active at the Site, the groundwater plume is stable/decreasing, and VOC-impacted groundwater is primarily restricted to the area south of I-88. Most of the dissolved organic contaminant mass is located in the shallow portion of the unconfined water-bearing zone in the area, as defined by samples collected from monitoring well MW-16S, and is primarily comprised of TCE and its sequential reductive breakdown products. However, it is important to note that the results from this well have indicated primarily increasing trends (with some variability) in concentrations for cis-1,2-DCE, TCE, and vinyl chloride for this FYR period and the previous FYR periods. During the last sampling round in June 2025, the highest concentrations of cis-1,2-DCE, TCE, and vinyl chloride were observed since sampling began with concentrations detected at 1,300 µg/L, 1,200 µg/L, and 410 µg/L, respectively. Nevertheless, MW-2S and MW-3S further downgradient have not shown similar increases and are currently meeting all cleanup goals. Groundwater VOC data collected since the mid-1990s have consistently shown the plume to be positionally stable. VOC concentrations in samples collected from some individual wells have varied.

Site Inspection

The Site inspection was conducted on 6/11/2025. In attendance were the following EPA participants: Thomas Mongelli, remedial project manager; Will Yeung, hydrogeologist; Jinnie Hanlee, human health risk assessor; Detbra Rosales, ecological risk assessor, along with John Uruskyj of demaximis, Inc. and Erin May and Frank Alvino of WSP, consultants for the PRPs. The purpose of the inspection was to assess the protectiveness of the remedy.

The Site was observed to be in good condition. Monitoring wells were undamaged, and signs denoting the capped area near the roadway/utility pole were present, in accordance with the ICs. Land use in the area does not appear to have changed since the completion of the previous FYR. Numerous deciduous and pine trees have begun to grow on the former source area, reaching several feet high in many instances. The man-made pond located north of I-88 appeared to be in good condition with a significant number of cattails present. Signage on Osbourne Hollow Road was present to alert the public and potential utility/construction workers of the presence of contaminated soil beneath the capped area. A QR code on the sign accurately redirects to a webpage depicting a map of the capped area.

V. TECHNICAL ASSESSMENT

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

The remedial action at the Site was divided into two work elements, and both continue to function as intended by the decision documents. Work Element I was completed as envisioned by the 2000 ROD and included excavation of vadose zone contaminated soils and sediments. These actions were successfully completed in 2003. The presence of a utility pole located on-site, just to the north of Osbourne Hollow Road, prevented the full excavation of the contaminated soil in this area and an adjacent area beginning immediately to the west of the utility pole could not be fully excavated without compromising the structural integrity of Osbourne Hollow Road. Therefore, a liner and soil were placed over the contaminated soil in these areas, as documented in the 2017 ESD.

Work Element II is ongoing and includes MNA of groundwater contamination, as selected in the 2011 ROD amendment, and long-term monitoring and ICs to address the TI waiver zone. During the review period, PCE concentrations continued to rise at a very slow rate in the MW-19 Area, but TCE, TCA, and 1,1-DCA appear to have stabilized, exhibiting either a steady-state or decreasing trend. The PCE and TCA concentrations observed at monitoring wells MW-19 and PMW-1 remain elevated. The results from MW-16S have continued to exhibit increasing trends for cis-1,2-DCE, TCE, and vinyl chloride, which extend from previous FYR periods. However, MW-2S and MW-3S have not shown similar increases and are currently meeting cleanup goals. Although the plume as a whole has reduced and showed evidence of degradation, the trends at MW-16S should be further evaluated to determine the cause of the increasing concentrations and if the restoration timeframe established in the ROD can be met. Despite elevated concentrations in groundwater remaining at MW-16S and MW-19, ICs are in place and, among other things, restrict the withdrawal of groundwater underlying the Site for drinking water purposes, prohibit the installation of drinking water wells on any part of the Site, and prohibit intrusive activities in the capped area of the Site.

In addition to the Site COCs, elevated levels of 1,4-dioxane and PFAS compounds were identified at MW-16S and MW-19 in 2020, which comprise the former operations area, relative to the upgradient well sampled. Monitoring wells further downgradient were not sampled. Additional monitoring should be performed to further evaluate the nature and extent of these chemicals.

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?

Human Health

There have been no changes in the physical conditions to the Site that would impact exposures or the protectiveness of the remedy. The exposure assumptions and the toxicity values that were used to estimate the potential risks and hazards to human health followed the general risk assessment practice that was standard at the time it was performed. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice, and the need to implement a remedial action remains valid.

As summarized in the 2000 ROD, a baseline human health risk assessment (HHRA) was conducted to evaluate potential risks to human health associated with exposure to site media, including groundwater and soil. Results of the HHRA indicated under future residential land use scenario, there were unacceptable carcinogenic risk ($6x10^{-1}$) and noncarcinogenic health effects (HI of 800) for Site visitors, on-site worker, child and adult residents [direct exposure and incidental ingestion of contaminated soil and groundwater], and from ingestion of homegrown produce. The main risk-driving contaminants were found to be arsenic, vinyl chloride, PAHs, alpha-chlordane, gamma-chlordane and PCBs. EPA conducted an updated HHRA in 2008 to estimate the current and future effects of contaminants on human health following the 2003 implementation of the remedy to remove source material. The HHRA, as documented in the 2011 ROD Amendment, concluded unacceptable cancer risk and noncancer hazards for the future child and adult resident, future on-site adult worker, and site visitor from direct contact with contaminated groundwater in the shallow wells (ingestion and inhalation). The chemicals in groundwater that contribute most significantly to the cancer risk and noncancer hazard were vinyl chloride, TCE, and cis-1,2-DCE.

The cleanup goals that were established under the ROD and ROD Amendment for the soil were the NYS Technical and Administrative Guidance Memorandums (TAGMs) values and for the groundwater were the NYS GWQS for Class GA waters along with state and federal MCLs, which remain protective of current site use (vacant). The lead cleanup goal for soil was 400 mg/kg, which remains consistent with NYSDEC Part 375 Residential Soil Cleanup Objectives. However, the current regional EPA cleanup goal for lead is based on new scientific information which indicates that a blood lead level of 10 ug/dL may no longer be health protective. The current regional EPA screening level for lead at residential sites is 200 mg/kg and is based on a target blood lead level of 5 ug/dL. Nevertheless, the portion of the site with elevated lead in soil (above what would now be considered a screening level of 200 mg/kg) was limited to the Former Operations Area, the extent of which was excavated down to the water table In addition, although future land use could include residential, no such plans currently exist and are considered unlikely.

In addition, ICs have been established to prevent future on-site workers from exposure to soil vapors and contaminated soils underlying the liner in the case of future work requiring intrusive activities in the capped area, and any work associated with the utility pole located along Osbourne Hollow Road. Since contaminated surficial soil at the site has been excavated and backfilled with clean fill, and along with ICs placed on the site, direct contact with contamination in soil is an incomplete exposure pathway. ICs prohibiting the installation and use of groundwater wells at the site have also been established; therefore, the exposure pathway is deemed incomplete.

The potential for soil vapor intrusion (VI) into indoor air is evaluated when site soils and/or groundwater are known or suspected to contain VOCs. Review of groundwater analytical data collected, during the timeframe of this FYR (2021-2025), show exceedances in several VOCs in shallow monitoring wells MW-16S, MW-19, and PMW-1, and deep monitoring well MW-2. Notably, cis-1,2-DCE, methylene chloride, PCE, TCE and VC were detected in the monitoring wells above their federal MCLs. Since the Site does not contain any buildings, the vapor intrusion pathway is currently incomplete, and additional vapor intrusion investigations are not necessary at this time. Additionally, to prevent the potential for human exposure through vapor intrusion into any of the structures or any new construction that occurs on the site, ICs have been implemented as per the 2017 ESD. Further

evaluation of the vapor intrusion pathway is recommended if development of the property were to occur. To ensure protectiveness, this pathway will continue to be accessed during future FYRs.

1,4-Dioxane and PFAS were detected in monitoring wells at elevated concentrations within the former operations area. Although additional monitoring is recommended at monitoring wells further downgradient to better evaluate nature and extent, there are no exposure pathways to groundwater currently complete. As stated above, ICs have been established which restrict the drilling of potable wells at the site. Residential wells are present nearby; however, they are all located either side-gradient or upgradient of the site with earlier sampling never indicating any site-related impacts.

Ecological

The 1996 ecological risk assessment identified various COCs in both the soil and sediment. The major concern was COCs entering the food chain via contaminated soil and sediment, leading to bioaccumulation. The current exposure assumptions remain appropriate as both the surface soil and sediment pathways are now incomplete as a result of the excavation (and capping in one small area) of the contaminated material and the placement of clean fill in these areas. Therefore, there are no complete exposure pathways to ecological receptors. Additionally, the replacement wetlands established in the area north of I-88 were monitored for five years upon completion of the remedy (2004-2008). Monitoring reports conclude that the mitigation effort identified and implemented as part of the ROD has been successful and mitigation goals were appropriately met.

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 could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 1	**Issue Category: Monitoring**			
	Issue: Elevated levels of PFAS and 1,4-dioxane were identified in monitoring wells within the former operations area (i.e., MW-16S and MW-19) relative to the upgradient monitoring well (i.e., MW-18S).			
	Recommendation: Conduct additional groundwater sampling to understand the nature and extent of these compounds at the site and in monitoring wells further downgradient.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2027

OU(s): 1	Issue Category: Monitoring			
	Issue: Concentrations of TCE, cis-1,2-DCE, vinyl chloride, and 1,1-DCA at MW-16S have been generally increasing since the start of long-term monitoring in 2011. The most recent monitoring event, conducted in June 2025, showed all four of these contaminants reaching their highest observed concentrations over that same time period.			
	Recommendation: The area around MW-16S should be further assessed to determine the cause of these increasing trends and whether this area would still be expected to meet the site's cleanup goals within the timeframe predicted in the 2011 ROD Amendment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2027

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: 01	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The OU1 remedy is protective of human health and the environment in the short term as no complete exposure pathways are present. To be protective in the long-term, additional sampling for PFAS and 1,4-dioxane is needed to understand the nature and extent of these compounds at the site and in monitoring wells further downgradient and the area around MW-16S needs to be further evaluated to determine the cause of increasing VOC concentration trends in groundwater at this well.	

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The Site-wide remedy is protective of human health and the environment in the short term as no complete exposure pathways are present. To be protective in the long-term, additional sampling for PFAS and 1,4-dioxane is needed to understand the nature and extent of these compounds at the site and in monitoring wells further downgradient and the area around MW-16S needs to be further evaluated to determine the cause of increasing VOC concentration trends in groundwater at this well.

VIII. NEXT REVIEW

The next FYR report for the Tri-Cities Barrel Co., Inc. Superfund Site is required five years from the completion date of this review.

APPENDIX A – FIGURES & TABLES

Figure 1 – Site Location

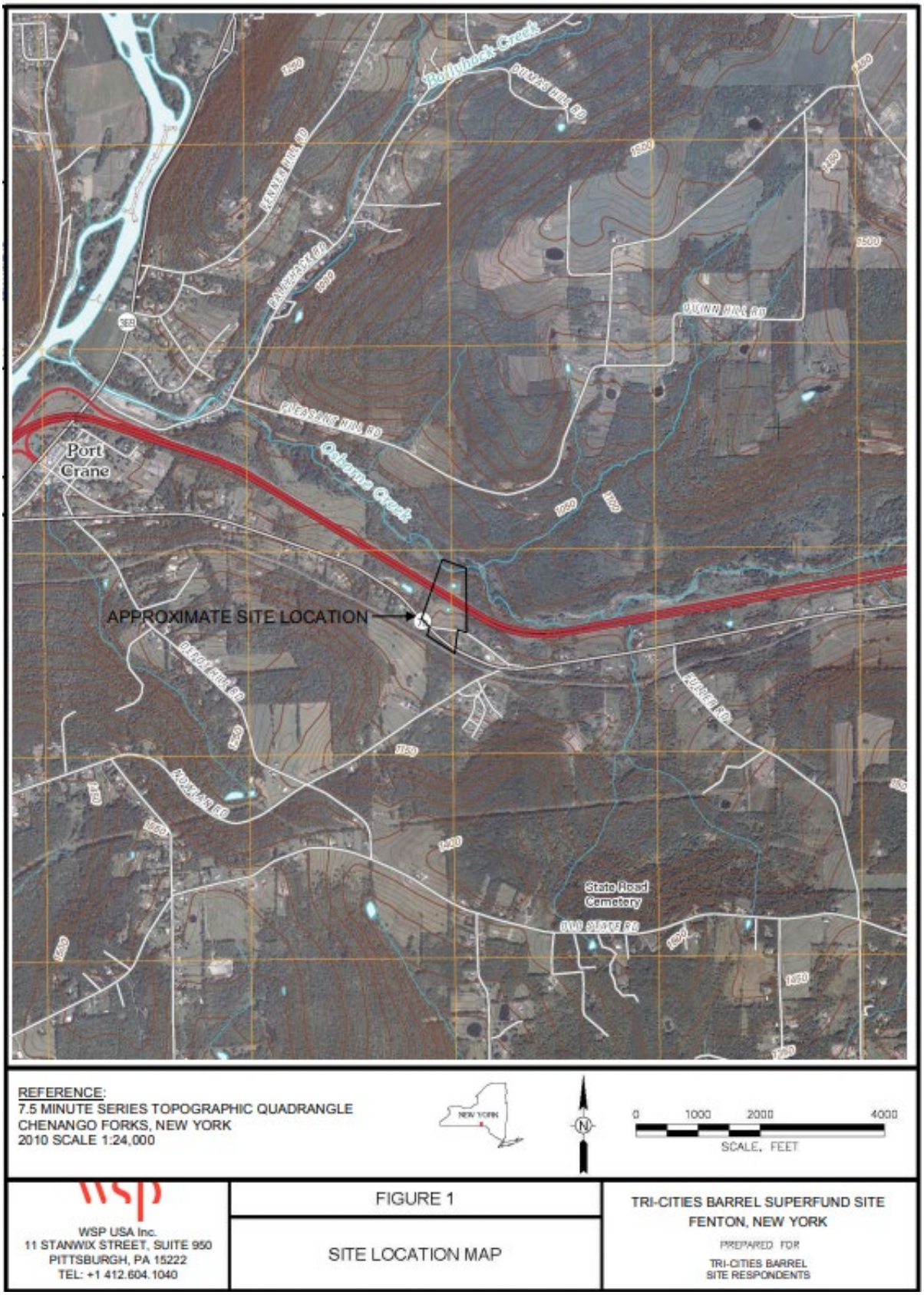


Figure 2 – Location of Former Operations Area and Lagoons

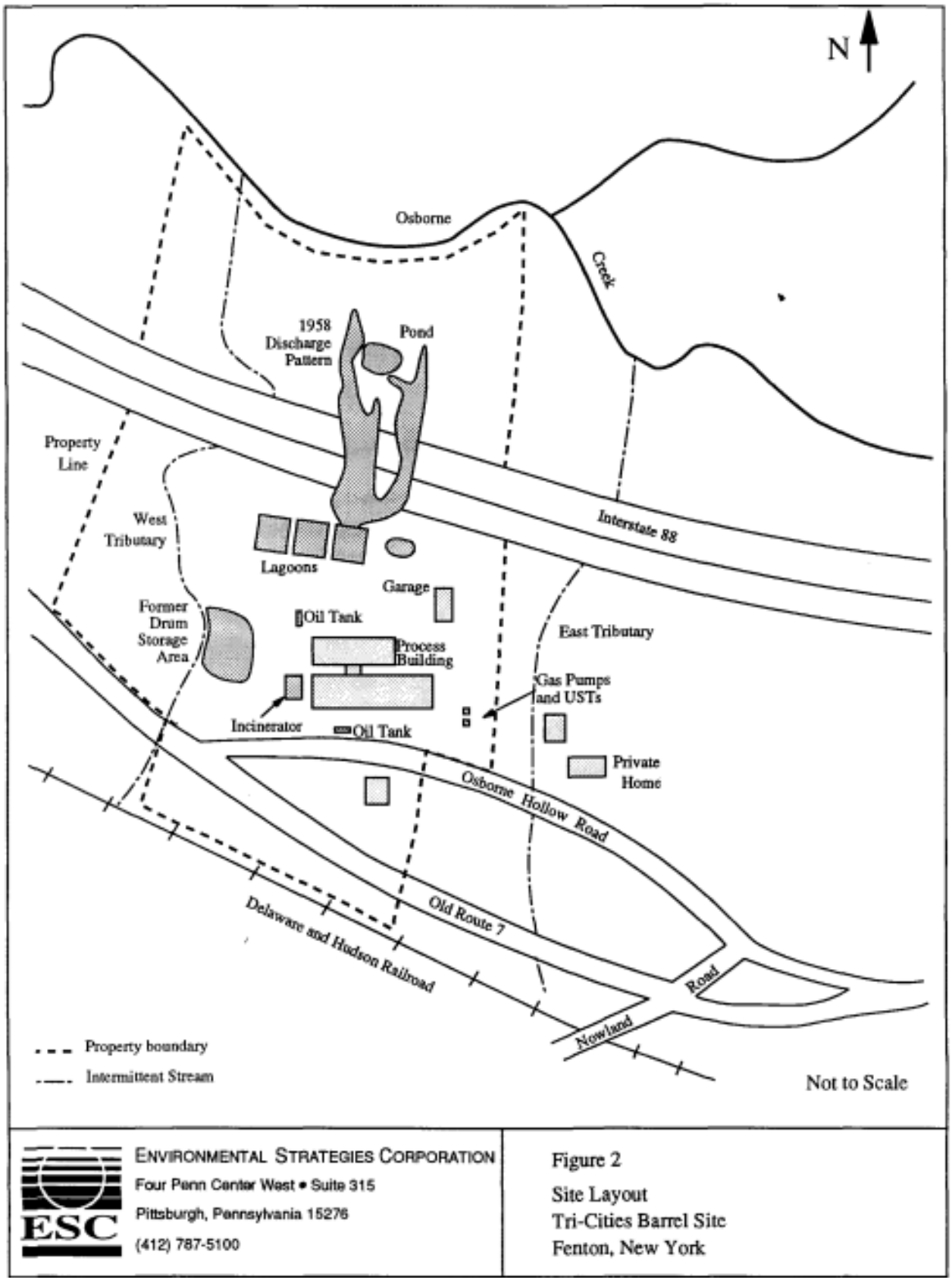


Figure 3 – Site Map

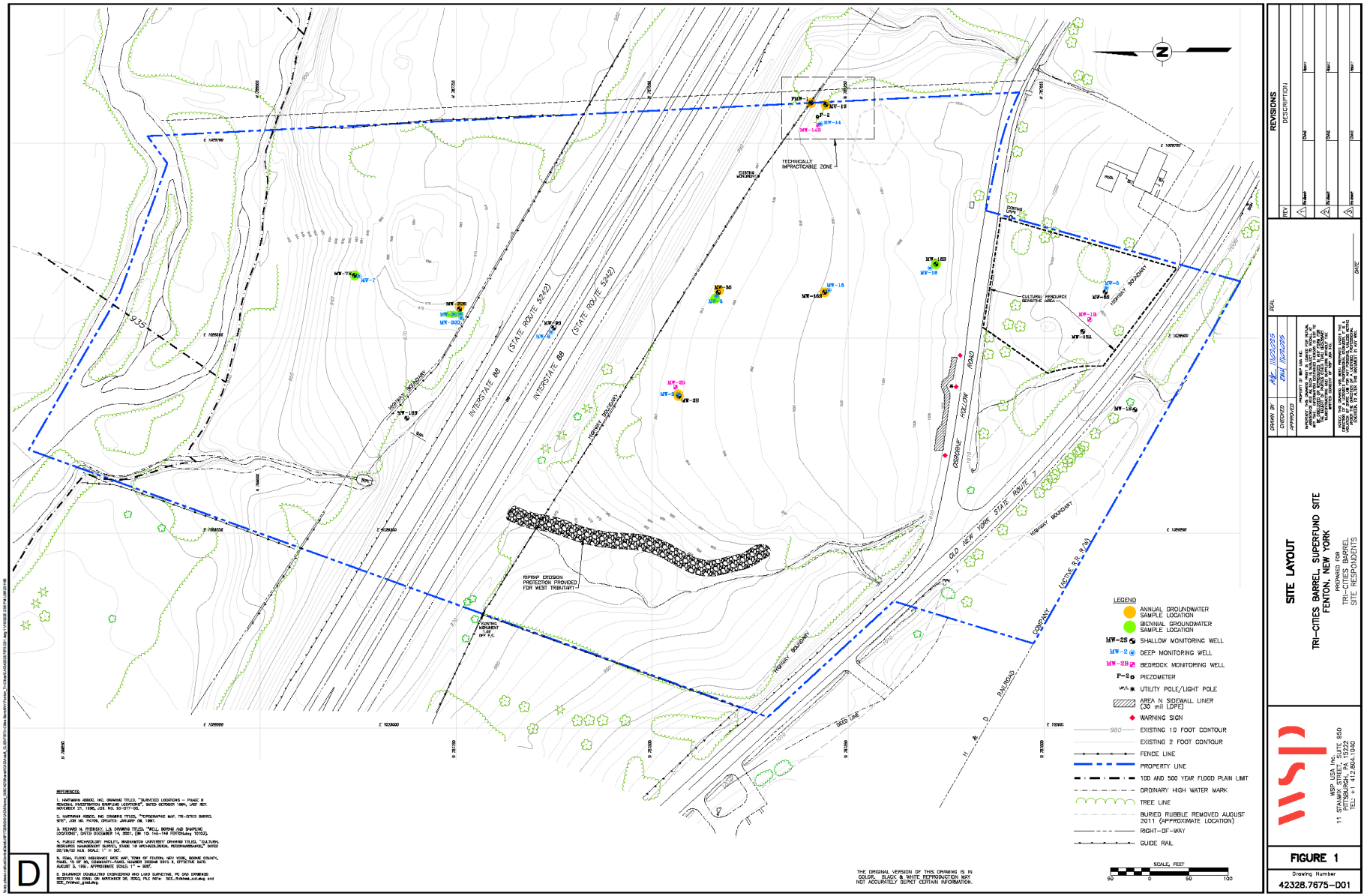


Figure 4 – Plume Centerline Trend Plots

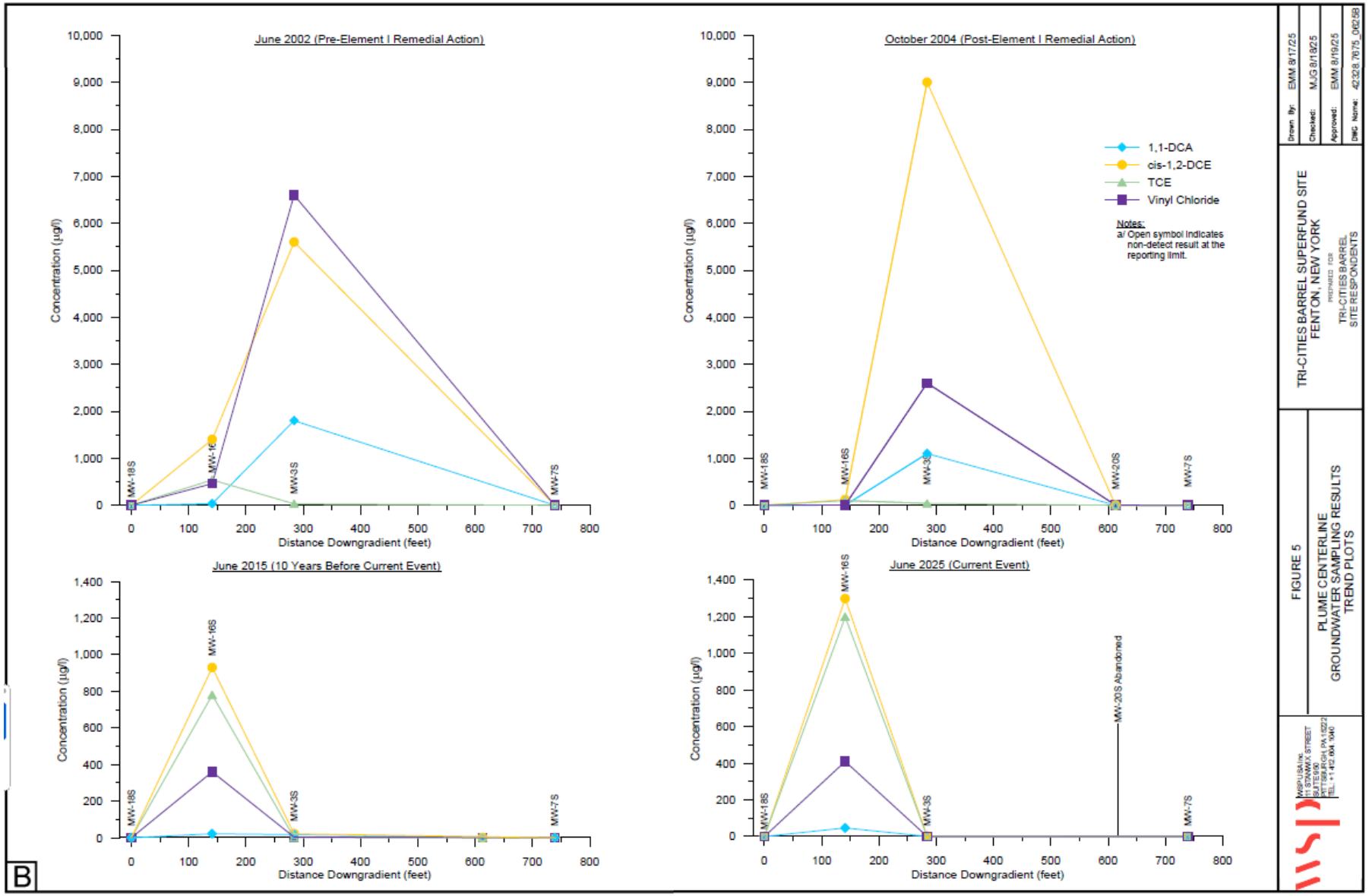


Figure 5 – MW-16S Sampling Results

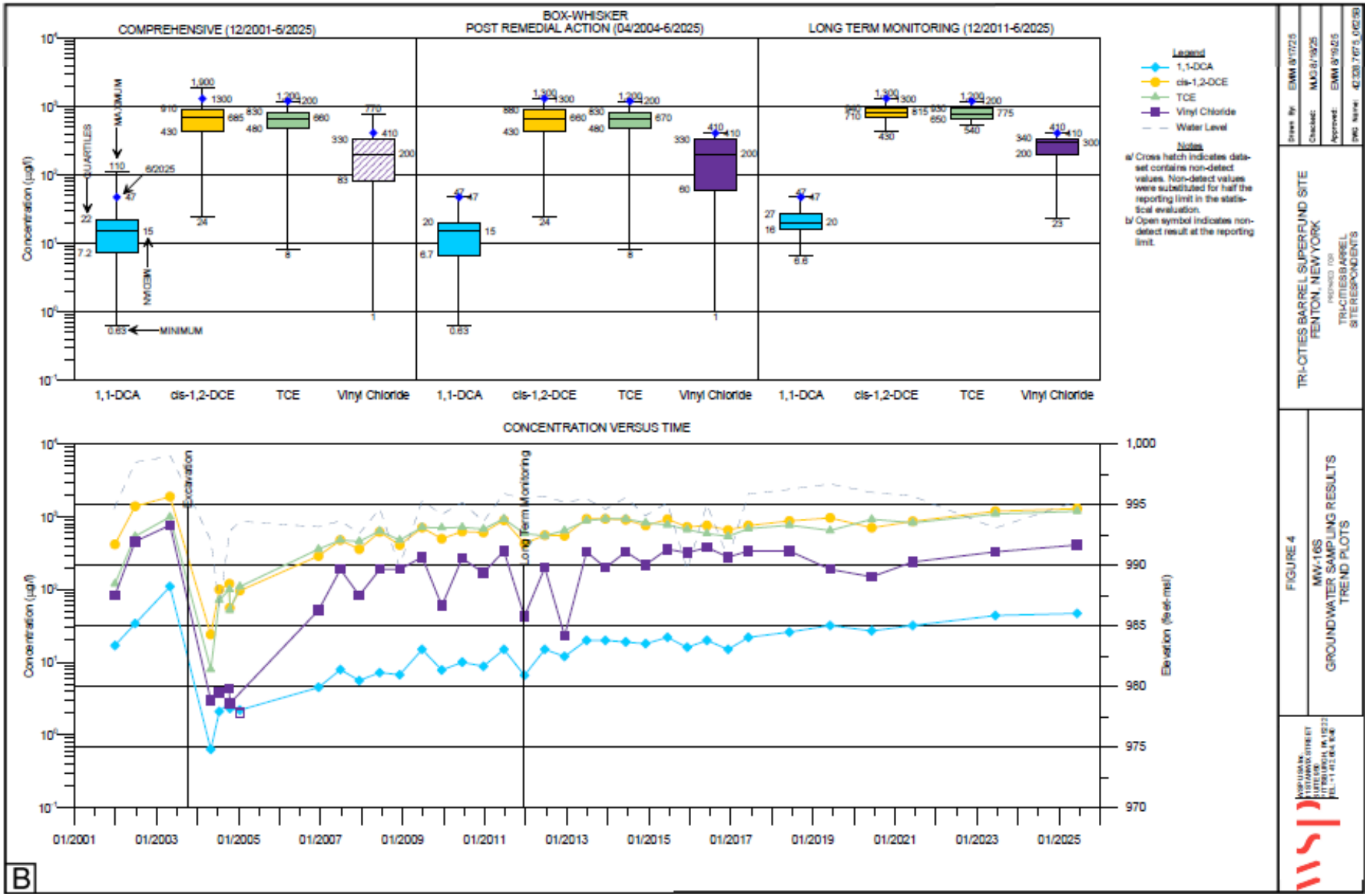


Table 1 – Groundwater COCs and Cleanup Goals (2011 ROD Amendment)

Contaminant	Federal Safe Drinking Water Act	New York State Water Quality Standards for Class GA (Groundwater)	New York Public Water Supply Regulations
	MCL (µg/L)	NYCRR, Title 6 Part 701-703 (µg/L)	NYCRR, Title 10 Part 5-1 (µg/L)
1,1-Dichloroethane	-	5	5
1,2-Dichloroethane	5	0.6	5
cis-1,2-Dichloroethene	70	5	5
Methylene chloride	5	5	5
Tetrachloroethylene	5	5	5
Trichloroethylene	5	5	5
Vinyl Chloride	2	2	2

Table 2 - Soil Cleanup Objectives

Soil Cleanup Objectives
Element I Remedial Action
Tri-Cities Barrel Superfund Site
Fenton, New York (mg/kg) (1)

Constituent	Cleanup Objective
Inorganics	
Antimony	52
Arsenic	18.45
Beryllium	518
Cadmium	21
Chromium (VI)	736
Iron	545,733
Lead	400
Manganese	2039
Mercury	10
Nickel	2212
Volatile Organics	
2-Butanone	0.3
1,1-Dichloroethane	0.2
1,1-Dichloroethene (total)	0.3
Methylene chloride	0.1
Tetrachloroethene	1.4
Toluene	1.5
Trichloroethene	0.7
Vinyl chloride	0.2
Semi Volatile Organics	
Benzo(a)anthracene	0.33
Benzo(a)pyrene	0.33
Benzo(b)fluoranthene	0.33
Benzo(g,h,i)perylene	134
Bis(2-ethyhexyl)phthalate	2
Dibenz(a,)anthracene	0.33
Indeno(1,2,3-cd)pyrene	0.33
2-Methylnaphthalene	440
Phenanthrene	521
PCB/Pesticides	
Aldrin	0.002
Alpha-chlordane	0.06
4,4'-DDD	0.08
4,4'-DDE	0.07
Delta-BHC	0.3
Dieldrin	0.0033
Gamma-chlordane	0.06
Heptachlor	0.01
Polychlorinated biphenyls, total (2 feet or less)	1
Polychlorinated biphenyls, total (greater than 2-foot depth)	10

Note:
(1) mg/kg = milligrams per kilogram.

APPENDIX B – REFERENCE LIST

- Record of Decision: Tri-Cities Barrel Superfund Site, EPA – March 2000
- Work Element I Remedial Action Report, Tri-Cities Barrel Superfund Site, ESC – December 2002
- Final Revised Comprehensive Monitored Natural Attenuation Evaluation, Tri-Cities Barrel Superfund Site, ESC – August 2007
- Amendment to the Record of Decision: Tri-Cities Barrel Superfund Site, EPA – September 2011
- Remedial Action Report – Final, Remedial Work Element II Groundwater, Tri-Cities Barrel Superfund Site, WSP – November 2012
- Explanation of Significant Differences, EPA – January 2017
- 1,4-Dioxane and Per- and Polyfluoroalkyl Substances in Groundwater Sample Results, Tri-Cities Barrel Superfund Site, WSP – September 2020
- Second Five-Year Review Report, Tri-Cities Barrel Superfund Site, EPA – January 2021
- June 2021 Groundwater Monitoring Report, Tri-Cities Barrel Superfund Site, WSP – September 2021
- Long Term Monitored Natural Attenuation Sampling Program (Version 2), Tri-Cities Barrel Superfund Site, WSP – May 2022
- June 2023 Groundwater Monitoring Report, Tri-Cities Barrel Superfund Site, WSP – September 2023
- June 2025 Groundwater Monitoring Report, Tri-Cities Barrel Superfund Site, WSP – September 2025

APPENDIX C – SITE GEOLOGY/HYDROGEOLOGY

Based on the results of an electrical resistivity survey, the top of weathered or fractured bedrock is believed to range from 48 to 52 ft. below ground surface (bgs), while the top of competent rock is between 66 and 88 ft. bgs. The bedrock is overlain by a thick till unit consisting predominantly of interbedded silt and clay with little sand and gravel. The site is on a till terrace that is mantled with a thin veneer of colluvium. Silty clay till is exposed along road cuts and in a borrow pit to the south of Old Route 7. The terrace where the site is located is underlain by approximately 60 ft. of dense silty clay till, with the thickness of the till deposits increasing toward Osborne Creek. Sand lenses are present within the till. The amount and continuity of the sand lenses increases to the north, again in the vicinity of Osborne Creek.

The site is approximately 1.3 miles from the eastern edge of the Endicott-Johnson city aquifer. The nearest municipal water well field is developed in this aquifer, approximately 2 miles from the site, on the opposite side of the Chenango River from the confluence of Osborne Creek. The till deposits under the site form an unconsolidated water bearing zone. Due to the slow recharge of the on-site wells and low hydraulic conductivity of the till, the groundwater present in the till is referred to as a water bearing zone and does not qualify as an aquifer. Groundwater in the unconsolidated water bearing zone flows to the north towards Osborne Creek.

Hydraulic conductivity for the water bearing zone at the site ranges from 1.5×10^{-7} centimeters per second (cm/s) to 3.8×10^{-3} cm/s. A review of boring logs for monitoring wells exhibiting higher hydraulic conductivity values (i.e., in the 10^{-3} cm/s range) indicate that the well screens in those locations extend across a sandy lens or till containing sand and gravel rock fragments. Because of the dense nature of the unconsolidated glacial till deposits, the hydraulic connectivity between the unconsolidated water bearing zone and the bedrock aquifer is suspected to be negligible, thereby limiting the vertical movement of groundwater.

APPENDIX D – REMEDY RESILIENCE EVALUATION

Three tools were utilized to assess the Tri-Cities Barrel site. Screenshots from each of the tools used are included below.

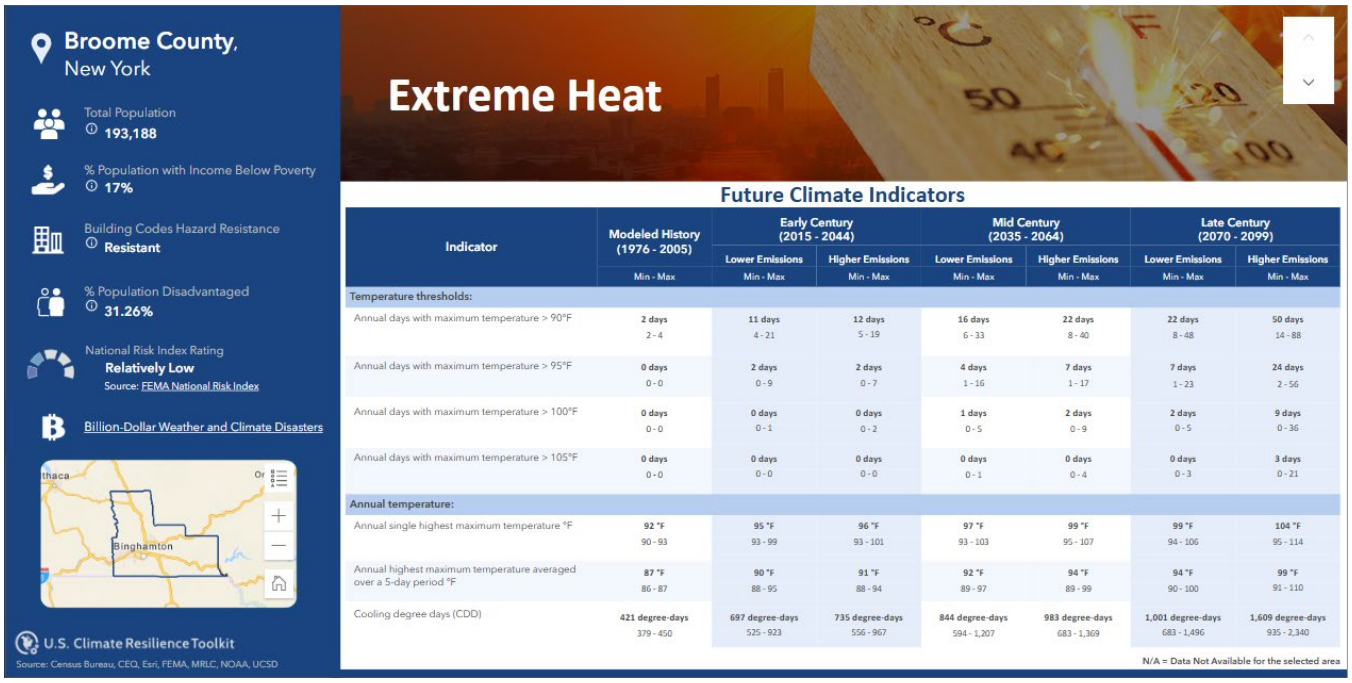
The first tool, the CMRA (see CMRA) examined five hazards (extreme heat, drought, wildfire, flooding, and costal inundation) for Broome County, the county in which the Site is located. According to the CMRA tool, the National Risk Index Ratings for extreme heat, wildfire, and flooding across the County are "Relatively Low," "Very Low," and "Relatively High," respectively (see **Figures D-1 through D-3**). However, no impacts from these hazards to the Site area or to the implementation or performance of the remedy have been observed. In addition, although the Site sits adjacent to the Osborne Creek, the remediated area is significantly elevated above the surrounding area, which makes it less vulnerable to impacts from flooding. The CMRA tool reported no rating for the risk from drought (**Figure D-4**) and the risk from coastal inundation was not applicable (**Figure D-5**).

The second tool is called the NOAA Sea Level Rise Viewer (SLRV) (see https://coast.noaa.gov/slr/). This tool assessed the potential for impacts to the site vicinity from sea level rise and coastal flooding. The site is located approximately 95 miles from the nearest coast (Lake Ontario). Therefore, coastal flooding is unlikely. **Figure D-6** from the SLRV shows that a 10-foot increase in the current mean higher high water (MHHW) level (i.e., the maximum increase viewable using the tool) would not result in any increased risk of impacts from sea level rise to the site vicinity.

The final tool is called the USGS U.S. Landslide Inventory (see https://www.usgs.gov/tools/us-landslide-inventory-and-susceptibility-map). As shown by **Figure D-7**, there is a low to moderate vulnerability of landslides at the site, though no landslides have been observed in the site vicinity in the past.

Based on this information, potential site impacts from severe weather have been assessed, and the performance of the remedy is currently not at risk due to these effects in the region and near the site.

Figure D-1



Broome County, New York

Total Population
193,188

% Population with Income Below Poverty
17%

Building Codes Hazard Resistance
Resistant

% Population Disadvantaged
31.26%

National Risk Index Rating
Relatively Low
Source: FEMA National Risk Index

Billion-Dollar Weather and Climate Disasters

Ithaca
Binghamton

U.S. Climate Resilience Toolkit
Source: Census Bureau, CEQ, Esri, FEMA, MRLC, NOAA, UCSD

Extreme Heat

Future Climate Indicators

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	2 days 2 - 4	11 days 4 - 21	12 days 5 - 19	16 days 6 - 33	22 days 8 - 40	22 days 8 - 48	50 days 14 - 88
Annual days with maximum temperature > 95°F	0 days 0 - 0	2 days 0 - 9	2 days 0 - 7	4 days 1 - 16	7 days 1 - 17	7 days 1 - 23	24 days 2 - 56
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 1	0 days 0 - 2	1 days 0 - 5	2 days 0 - 9	2 days 0 - 5	9 days 0 - 36
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 - 3	3 days 0 - 21
Annual temperature:							
Annual single highest maximum temperature °F	92 °F 90 - 93	95 °F 93 - 99	96 °F 93 - 101	97 °F 93 - 103	99 °F 95 - 107	99 °F 94 - 106	104 °F 95 - 114
Annual highest maximum temperature averaged over a 5-day period °F	87 °F 86 - 87	90 °F 88 - 95	91 °F 88 - 94	92 °F 89 - 97	94 °F 89 - 99	94 °F 90 - 100	99 °F 91 - 110
Cooling degree days (CDD)	421 degree-days 379 - 450	697 degree-days 525 - 923	735 degree-days 556 - 967	844 degree-days 594 - 1,207	983 degree-days 683 - 1,369	1,001 degree-days 683 - 1,496	1,609 degree-days 935 - 2,340

N/A = Data Not Available for the selected area

Figure D-2

Broome County, New York

Total Population
193,188

% Population with Income Below Poverty
17%

Building Codes Hazard Resistance
Resistant

% Population Disadvantaged
31.26%

National Risk Index Rating
Very Low
Source: FEMA National Risk Index

Billion-Dollar Weather and Climate Disasters

Ithaca
Binghamton

U.S. Climate Resilience Toolkit
Source: Census Bureau, CEQ, Esri, FEMA, MRLC, NOAA, UCSD

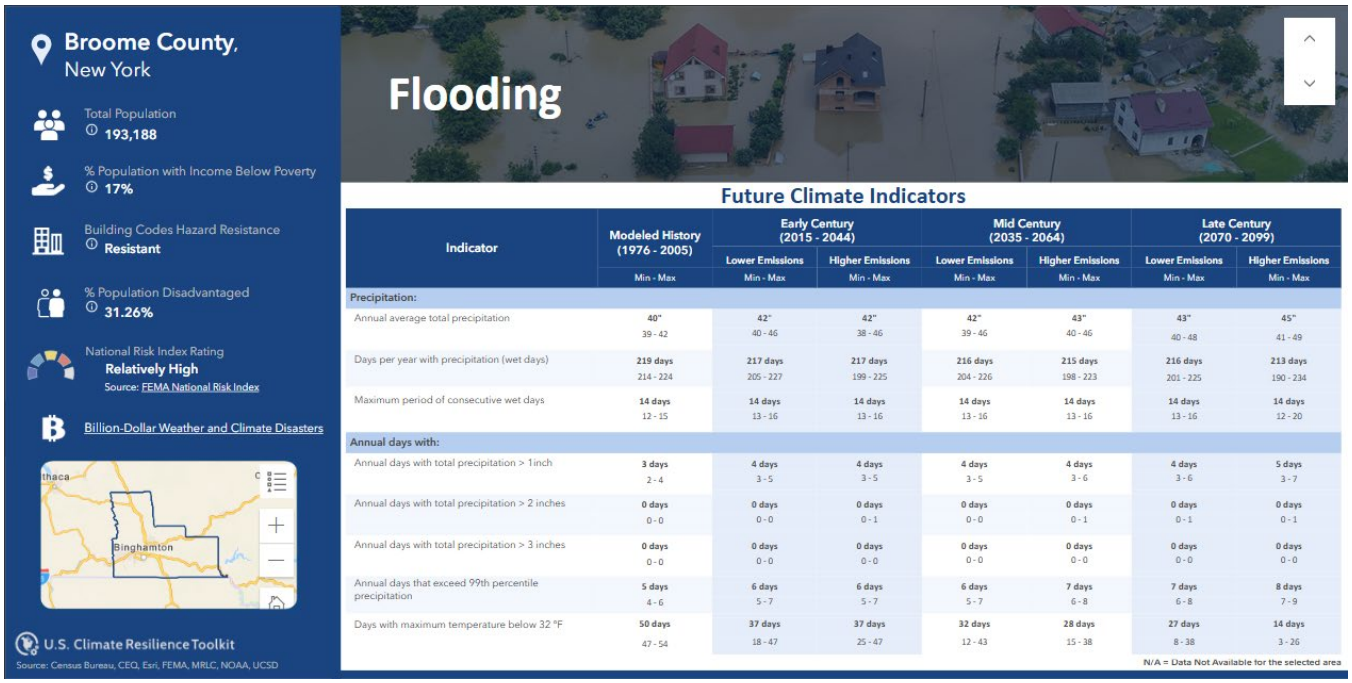
Wildfire

Future Climate Indicators

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)	146 days 142 - 151	148 days 138 - 161	148 days 140 - 166	149 days 139 - 162	150 days 142 - 168	150 days 140 - 164	152 days 131 - 175
Maximum number of consecutive dry days	9 days 8 - 10	9 days 8 - 11	9 days 8 - 12	9 days 8 - 11	9 days 8 - 13	9 days 8 - 11	10 days 8 - 12
Days per year with precipitation (wet days)	219 days 214 - 224	217 days 205 - 227	217 days 199 - 225	216 days 204 - 226	215 days 198 - 223	216 days 201 - 225	213 days 190 - 234
Temperature thresholds:							
Annual days with maximum temperature > 90°F	2 days 2 - 4	11 days 4 - 21	12 days 5 - 19	16 days 6 - 33	22 days 8 - 40	22 days 8 - 48	50 days 14 - 88
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 1	0 days 0 - 2	1 days 0 - 5	2 days 0 - 9	2 days 0 - 5	9 days 0 - 36

N/A = Data Not Available for the selected area

Figure D-3

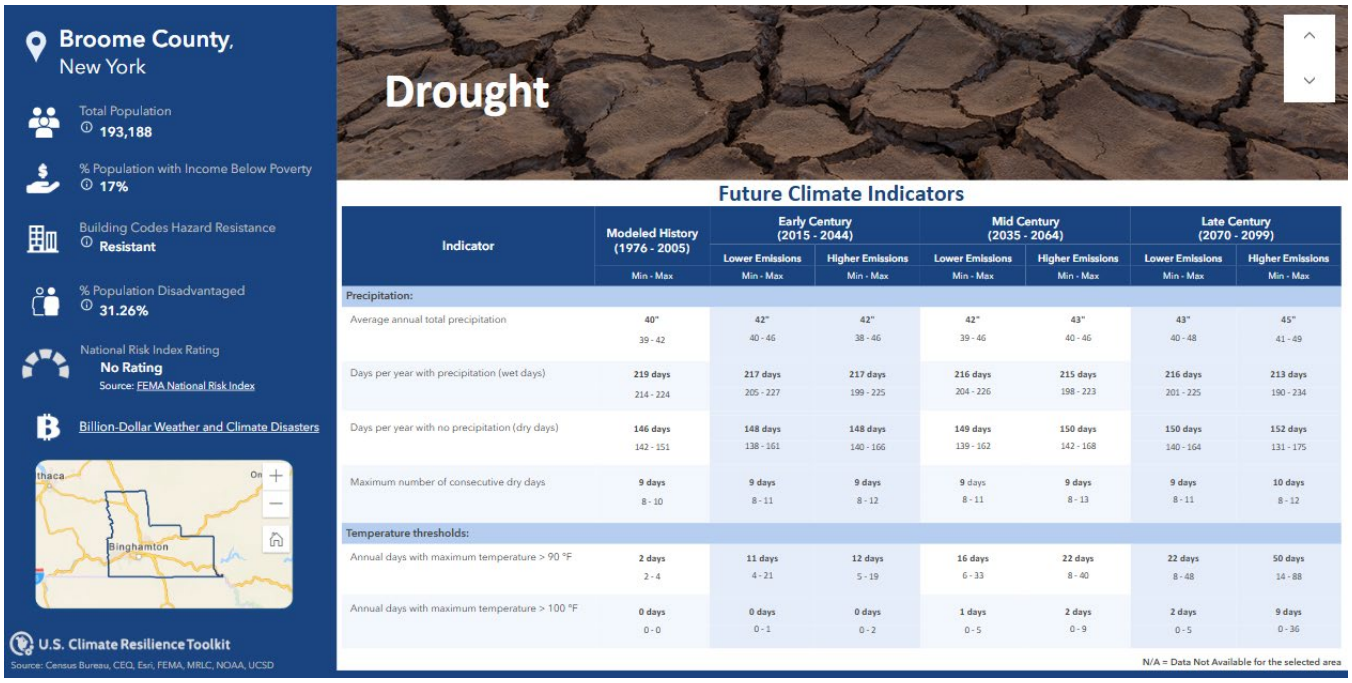


Future Climate Indicators

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	40" 39 - 42	42" 40 - 46	42" 38 - 46	42" 39 - 46	43" 40 - 46	43" 40 - 48	45" 41 - 49
Days per year with precipitation (wet days)	219 days 214 - 224	217 days 205 - 227	217 days 199 - 225	216 days 204 - 226	215 days 198 - 223	216 days 201 - 225	213 days 190 - 234
Maximum period of consecutive wet days	14 days 12 - 15	14 days 13 - 16	14 days 13 - 16	14 days 13 - 16	14 days 13 - 16	14 days 13 - 16	14 days 12 - 20
Annual days with:							
Annual days with total precipitation > 1inch	3 days 2 - 4	4 days 3 - 5	4 days 3 - 5	4 days 3 - 5	4 days 3 - 6	4 days 3 - 6	5 days 3 - 7
Annual days with total precipitation > 2 inches	0 days 0 - 0	0 days 0 - 0	0 days 0 - 1	0 days 0 - 0	0 days 0 - 1	0 days 0 - 1	0 days 0 - 1
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	5 days 4 - 6	6 days 5 - 7	6 days 5 - 7	6 days 5 - 7	7 days 6 - 8	7 days 6 - 8	8 days 7 - 9
Days with maximum temperature below 32 °F	50 days 47 - 54	37 days 18 - 47	37 days 25 - 47	32 days 12 - 43	28 days 15 - 38	27 days 8 - 38	14 days 3 - 26

N/A = Data Not Available for the selected area

Figure D-4



Future Climate Indicators

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	40" 39 - 42	42" 40 - 46	42" 38 - 46	42" 39 - 46	43" 40 - 46	43" 40 - 48	45" 41 - 49
Days per year with precipitation (wet days)	219 days 214 - 224	217 days 205 - 227	217 days 199 - 225	216 days 204 - 226	215 days 198 - 223	216 days 201 - 225	213 days 190 - 234
Days per year with no precipitation (dry days)	146 days 142 - 151	148 days 138 - 161	148 days 140 - 166	149 days 139 - 162	150 days 142 - 168	150 days 140 - 164	152 days 131 - 175
Maximum number of consecutive dry days	9 days 8 - 10	9 days 8 - 11	9 days 8 - 12	9 days 8 - 11	9 days 8 - 13	9 days 8 - 11	10 days 8 - 12
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	2 days 2 - 4	11 days 4 - 21	12 days 5 - 19	16 days 6 - 33	22 days 8 - 40	22 days 8 - 48	50 days 14 - 88
Annual days with maximum temperature > 100 °F	0 days 0 - 0	0 days 0 - 1	0 days 0 - 2	1 days 0 - 5	2 days 0 - 9	2 days 0 - 5	9 days 0 - 36

N/A = Data Not Available for the selected area

Figure D-5

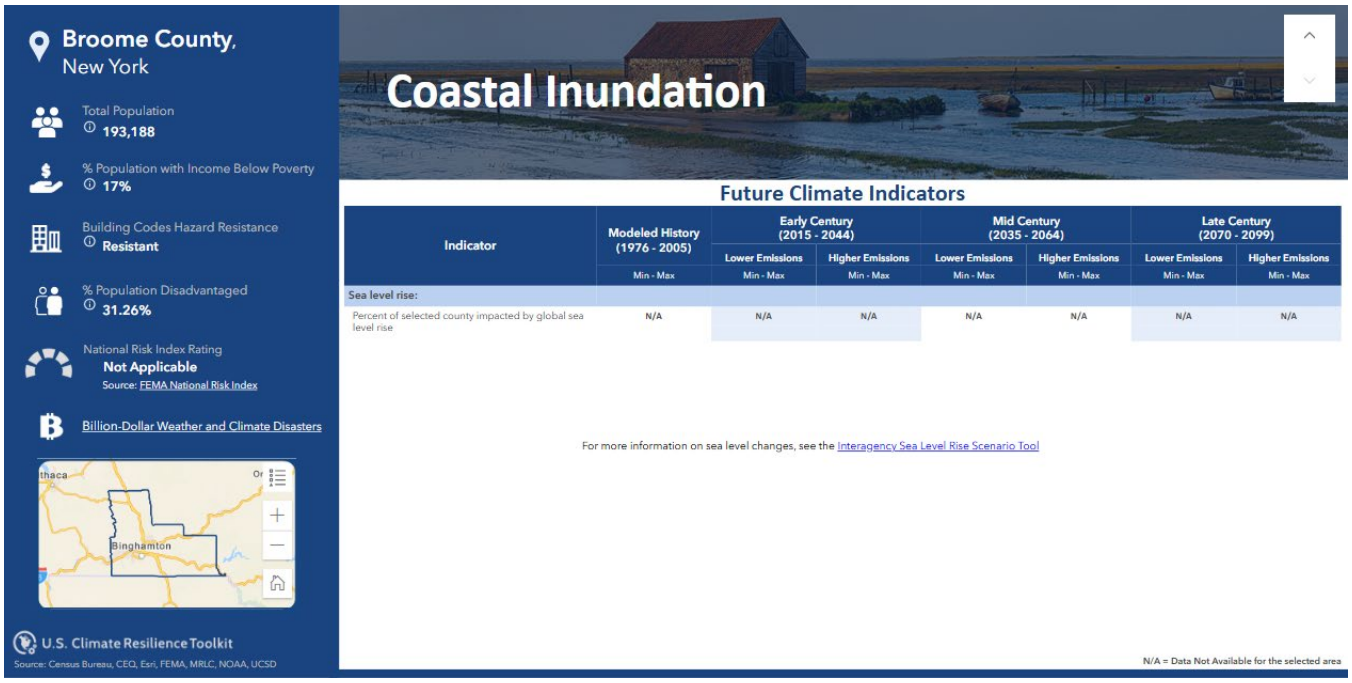


Figure D-6

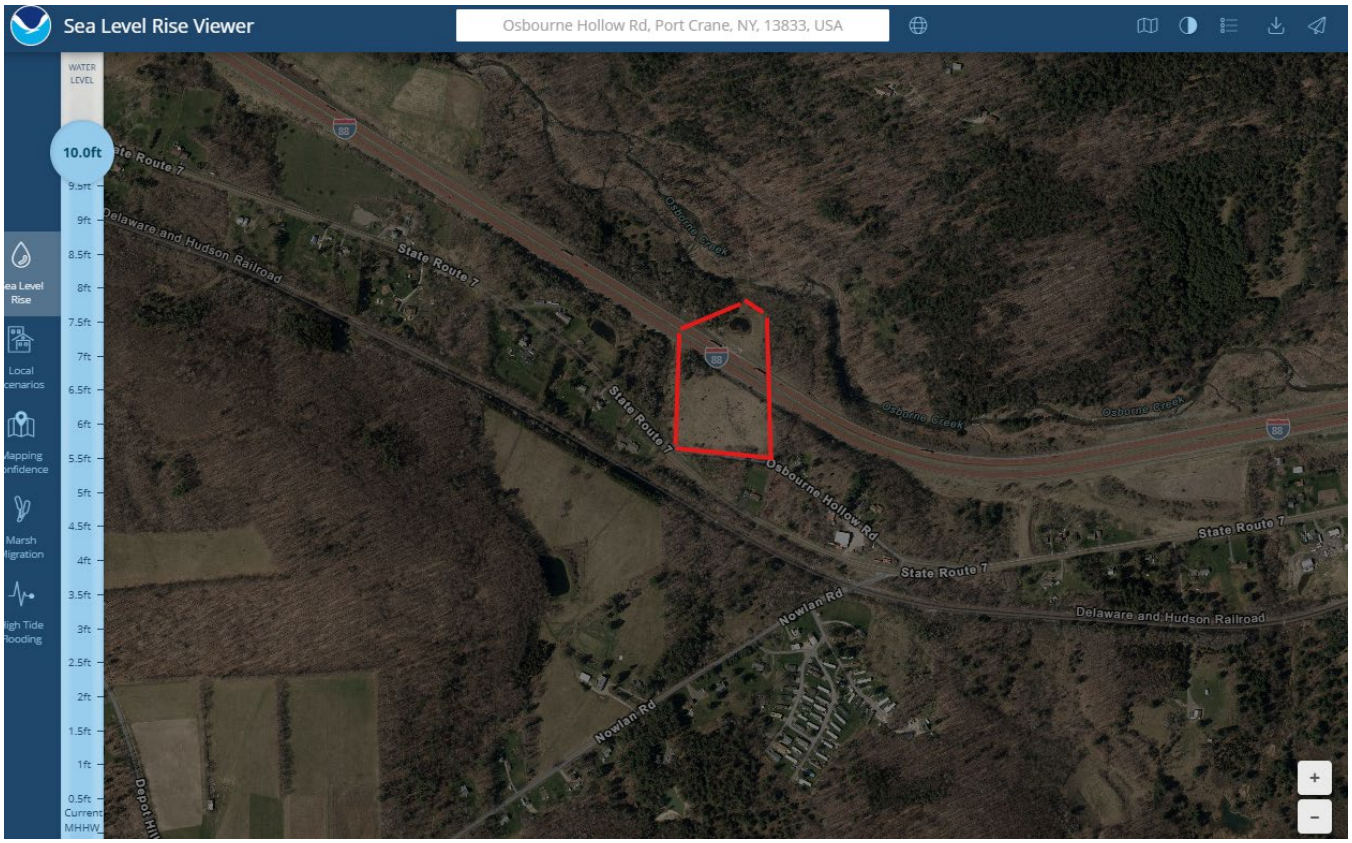
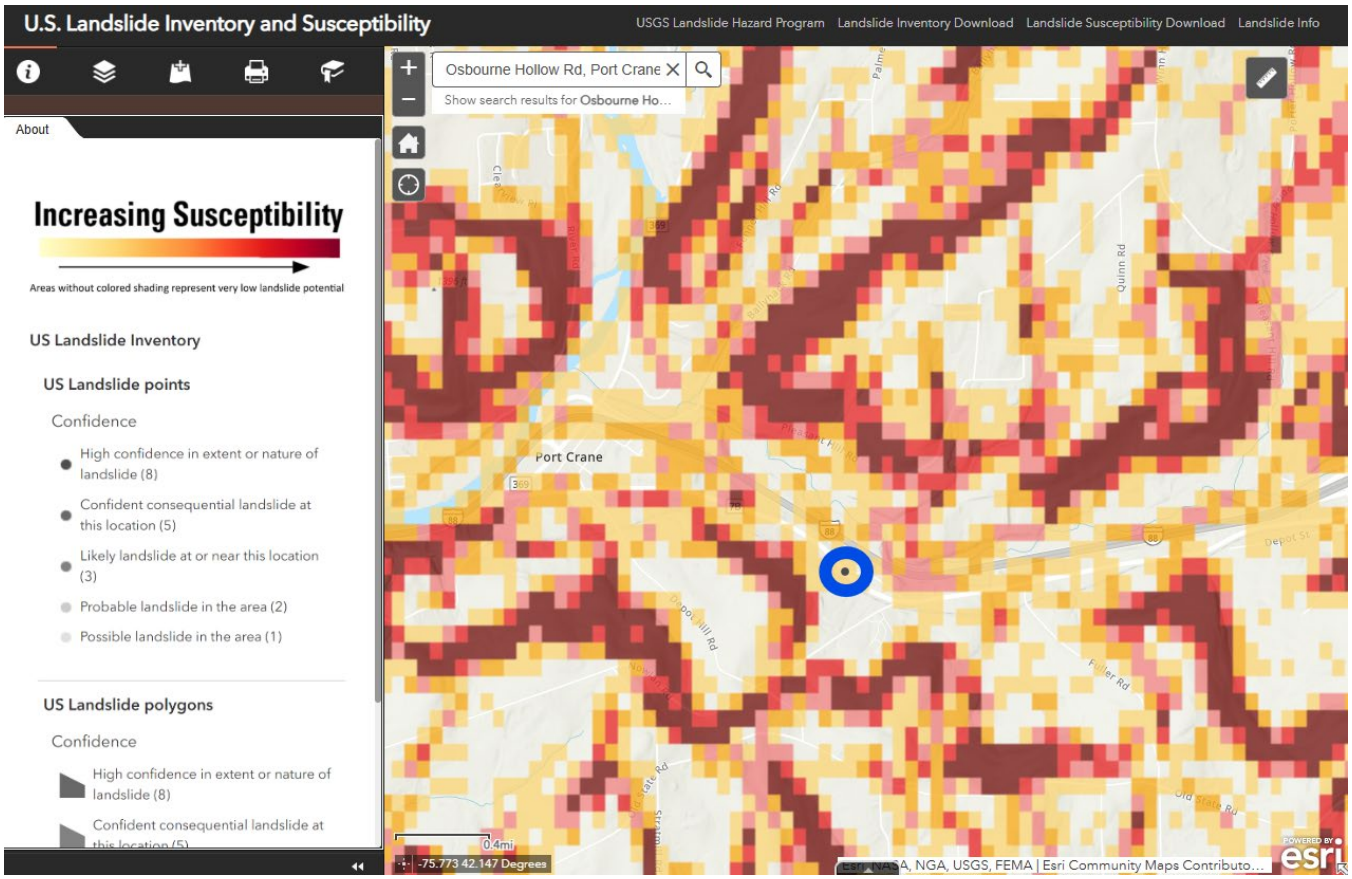


Figure D-7


U.S. Landslide Inventory and Susceptibility
USGS Landslide Hazard Program
Landslide Inventory Download
Landslide Susceptibility Download
Landslide Info
About
Increasing Susceptibility
Areas without colored shading represent very low landslide potential
US Landslide Inventory
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)
Osbourne Hollow Rd, Port Crane
Show search results for Osbourne Ho...
Port Crane
Quinn Rd
Fuller Rd
Depot St
0.4mi
-75.773 42.147 Degrees
esri