FIFTH FIVE-YEAR REVIEW REPORT FOR
MODERN SANITATION LANDFILL SUPERFUND SITE
YORK COUNTY, PENNSYLVANIA

FEBRUARY 2025

Prepared by

U.S. Environmental Protection Agency
Region 3
Philadelphia, Pennsylvania

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Date

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LIST OF ABBREVIATIONS AND ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
J	Estimated
MCL	Maximum Contaminant Level
MSC	Medium Specific Concentration
µg/L	Micrograms per Liter
$\mu g/m^3$	Micrograms per cubic meter
NE	Not Established
ng/L	Nanograms per Liter
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PFAS	Per- and Polyfluoroalkyl substances
PFBA	Perfluorobutanoic Acid
PFBS	Perfluorobutane Sulfonic Acid
PFDA	Perfluorodecanoic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexane Sulfonate
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PFPA	Perfluoropentanoic Acid
PRP	Potentially Responsible Party
ROD	Record of Decision
UU/UE	Unlimited Use and Unrestricted Exposure
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy 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 pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the fifth FYR for the Modern Sanitation Landfill Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

The Site consists of a single sitewide operable unit (OU) that includes the landfill cap and groundwater remedy. This FYR addresses the sitewide OU.

EPA's remedial project manager led the FYR. Additional participants from the EPA included a community involvement coordinator, human health and ecological risk assessors, a hydrogeologist and legal counsel. The Pennsylvania Department of Environmental Protection (PADEP) also participated in the review. Skeo provided EPA's contractor support for this FYR. Republic Services of Pennsylvania, LLC, the company managing the Site's cleanup, was notified of the initiation of the FYR. The review began on April 17, 2024.

Site Background

The Site is part of an active municipal waste landfill known as Modern Landfill. It is located on Mount Pisgah Road in the townships of Windsor and Lower Windsor in York County, Pennsylvania (Figure 1). The Site consists of the original 66-acre unlined landfill together with all other property that is bounded on the east and west by the respective groundwater extraction and monitoring systems. It is part of a 396-acre PADEP-permitted solid waste landfill (solid waste permit no. 10013) operated by Republic Services. The total property area owned or leased by Republic Services, which includes the permitted landfill and surrounding area, is over 700 acres.

Modern Landfill comprises four contiguous disposal areas that are partially overlain by one another and now make up a single landfill area (Figure C-1, Appendix C). These areas are:

- The inactive 66-acre unlined landfill (i.e., the Site). EPA listed this area on the Superfund program's National Priorities List in June 1986.
- An inactive, contiguous 34-acre double-lined landfill known as the Northern Expansion Area.
- An inactive contiguous 67-acre double-lined landfill known as the Southern Expansion Area.
- An active 60-acre double-lined landfill area known as the Northwest Expansion Area.

The Modern Landfill also includes:

- A PADEP-approved low permeability final cover systems over the inactive landfill areas.
- A PADEP-approved borrow areas.
- A PADEP-approved wastewater treatment plant.
- An EPA and PADEP-approved Eastern Groundwater Extraction System.
- An EPA and PADEP-approved Enhanced Western Groundwater Control System.
- A PADEP-approved landfill gas extraction system with enclosed flares.
- A PADEP-approved erosion and sedimentation control system.

Two tributaries known as the eastern and western tributaries bound Modern Landfill to the west, north and east (Figure 1). The tributaries flow north and discharge into Kreutz Creek. Groundwater at the Site occurs primarily in bedrock. Groundwater flow direction at the Site is to the north/northwest, although local variations occur as a result of operating the groundwater extraction systems.

Land uses near the landfill property are primarily agricultural and residential, with some recreational and commercial properties. There are no residences within 650 feet from the landfill boundaries.

Public water supplies are available in the northern parts of Windsor and Lower Windsor Townships along the Pennsylvania Route 124 corridor and in areas south of the landfill. However, public water is not available to residential properties closest to the Site; these properties rely on private wells for their water supply. The nearest residences with private wells are west of the Site along Riddle Road. Site contamination is not expected to affect these private wells because groundwater flow is to the north/northwest. Private wells are sampled quarterly by Republic Services and reported to PADEP as part of the solid waste permit. No large industrial plants or municipal water intakes are located near the Site.

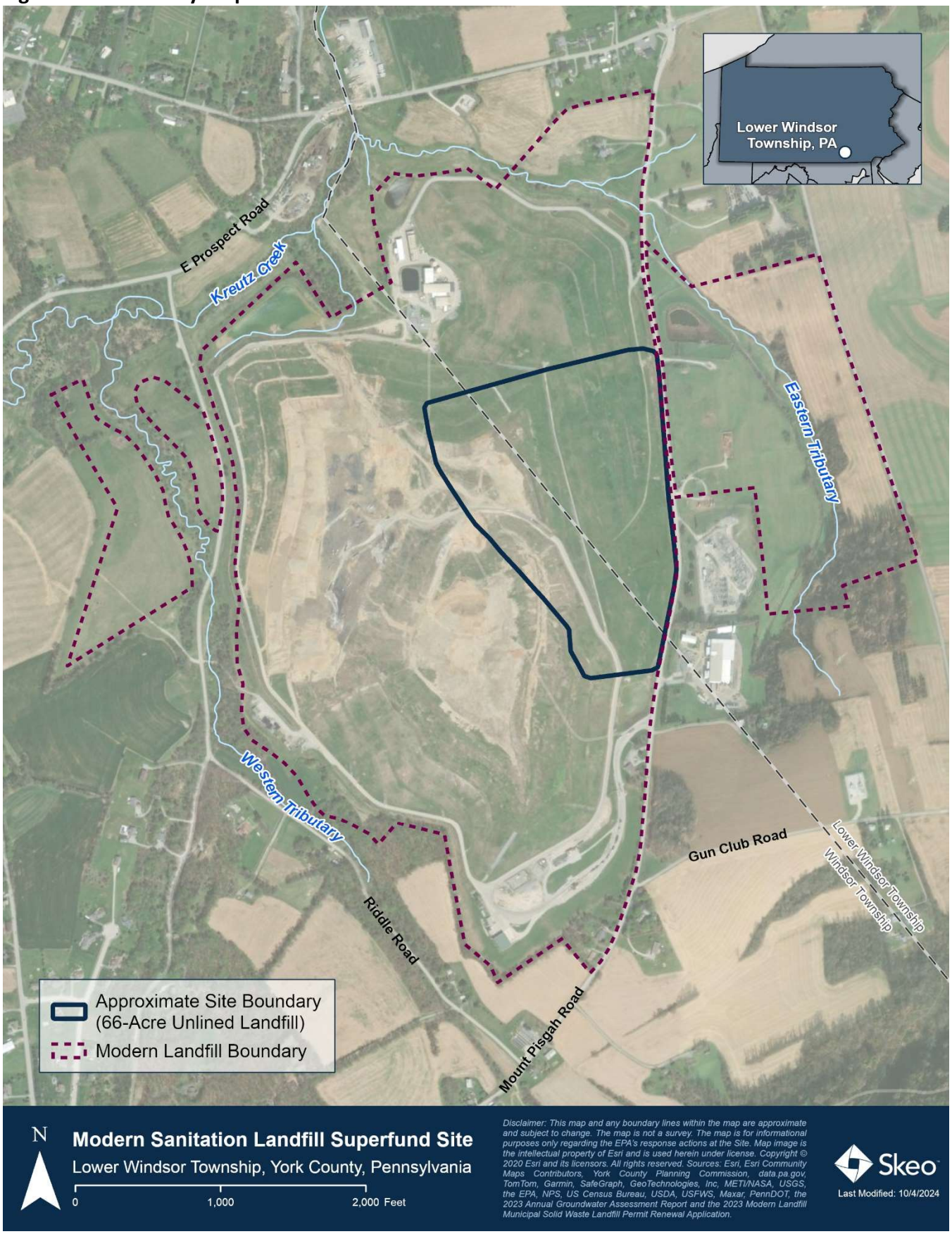
Modern Landfill has been used continuously for waste disposal since the early 1940s. Various operators accepted wastes at the landfill until 1974. In 1974, Modern Trash Removal of York, Inc. began operating the landfill. PADEP issued the first landfill permit in 1978. Republic Services has owned or leased and operated the landfill since 1999. An application for renewal of the landfill's solid waste permit was submitted to PADEP in November 2023 is currently under review.

Appendix A lists the documents reviewed during this FYR. Appendix B is a chronology of significant site events.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Modern Sanitation Landfill		
EPA ID: PAD980539068		
Region: 3	**State:** Pennsylvania	**City/County:** York County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: The EPA		
Author name: Matthew Paris, with additional support provided by Skeo		
Author affiliation: The EPA's Region 3		
Review period: 4/17/2024 – 2/24/2025		
Date of site inspection: 10/8/2024		
Type of review: Statutory		
Review number: 5		
Triggering action date: 2/24/2020		
Due date *(five years after triggering action date)*: 2/24/2025		

Figure 1: Site Vicinity Map



II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Before the Site's listing on the NPL in 1986, the PADEP was mainly responsible for directing response actions at the Site, which included, among other actions, installation of groundwater extraction systems, construction of a wastewater treatment plant, and placement of cover over the 66-acre unlined landfill. The Response Actions section of this FYR Report presents more information on the implemented early response actions.

In November 1987, Modern Trash Removal of York, Inc. (Modern) (landfill owner/operator before Republic Services) and PADEP entered into a Consent Order and Agreement to conduct a remedial investigation and feasibility study (RI/FS). Modern conducted the RI/FS from 1988 to 1991. Investigation into the disposal history at the Site indicated the on-site disposal of sodium molybdate wastes, pesticide wastes, rare earth chlorides, paper manufacturing sludge, polychlorinated biphenyls, ethylenediamine, oily wastes and paint wastes.

As part of the RI, a human health risk assessment evaluated risks associated with exposures to groundwater and surface water and sediment in the eastern and western tributaries. Exposure to contaminated soil and waste was considered an incomplete exposure pathway since the 66-acre unlined landfill had been covered and capped as an early action.

The human health risk assessment determined that risks associated with ingestion of volatile organic compounds (VOCs) in groundwater beneath the Site exceeded EPA's acceptable cancer risk limits (10^{-4} to 10^{-6}). In addition, six VOCs (benzene, carbon tetrachloride, 1,2-dichloroethene, 1,1-dichloroethene, trichloroethene, and vinyl chloride) in groundwater were detected at concentrations that exceeded federal and state drinking water standards. Table 1 in the Response Actions section of this FYR Report presents the Site's final groundwater contaminants of concern. Incidental and infrequent direct contact with sediments and surface water in the eastern and western tributaries did not result in unacceptable human health risks.

An ecological risk assessment was not conducted for the Site. The Site's 1991 Record of Decision indicates that this was based on several reasons, including the results of an aquatic biological investigation conducted in 1981 and 1982 in the western tributary by PADEP. PADEP concluded that "leachate from Modern Landfill has not resulted in any degradation to the unnamed (western) tributary to Kreutz Creek…". The assessment was conducted before the installation of the western groundwater extraction system, when groundwater recharge to the tributary was still a potentially important migration pathway. Since it began operating, the extraction systems have significantly reduced the surface water flow in both the western and eastern tributaries and thus, also minimized the potential for site-related contaminants to adversely affect the tributaries.

Response Actions

Pre-ROD Actions

PADEP has been involved with the Site since the early 1970s. After leachate seeps and the presence of leachate constituents were detected in groundwater on the west side of the 66-acre unlined landfill, landfill operators constructed the western groundwater interceptor trench and a surface impoundment treatment system in 1977.[1] Collected water was pumped to an on-site treatment system, pursuant to a PADEP water quality management permit issued in September 1976. The PADEP issued the facility a solid waste permit in August 1978, to accept municipal waste and a number of non-hazardous industrial (residual) waste streams.

In 1981, the PADEP found VOCs in groundwater samples from wells and springs near the Site. In 1982, EPA conducted a preliminary assessment and site investigation, and additional studies were conducted in 1982 and 1983.

In September 1984, Modern Trash Removal of York, Inc., entered into a Consent Order and Agreement with PADEP to correct conditions at the facility, most notably leachate from the Site contaminating groundwater and surface water. This Consent Order and Agreement was superseded by a December 1986 Consent Agreement and Order. In accordance with these orders and agreements and in response to additional landfill permitting requirements, Modern undertook several response actions between 1984 and 1990, which included the following:

- Installation of the western groundwater extraction system to include 14 extraction wells. It was designed to augment the western groundwater interceptor trench installed in 1977.
- Installation of the Eastern Groundwater Extraction System.
- Construction of an on-site wastewater treatment system to replace the surface impoundment treatment system. The facility accepts flow from the eastern and western groundwater extraction systems, the western interceptor trench, and leachate from an existing double-lined landfill and slope cap area. It includes an air stripper to remove VOCs.
- Placement of a state-approved low-permeability cap over most of the original 66-acre unlined landfill.
- Construction of the on-site landfill gas (i.e., vapor extraction) system.
- Construction of fencing around portions of the landfill to the west and east of Prospect Road.
- Development of a surface water and groundwater monitoring network.

Remedial Actions

EPA selected the Site's long-term remedy in a June 1991 Record of Decision (ROD) and updated it with a 2015 Explanation of Significant Differences (ESD). In the ROD, EPA acknowledged that Modern had previously performed substantial response actions, under the supervision of the PADEP, which included, among other actions, the installation of the groundwater extraction systems and construction of the wastewater treatment plant.

The 1991 ROD defined the following remedial action objectives for the Site's remedy, which focused on groundwater:

[1] The surface impoundments were later clean-closed in May 1987 under a PADEP-approved closure plan.

- Reduce leachate production and migration to groundwater.
- Reduce the amount of groundwater degradation on the Site.
- Decrease the potential for migration of degraded groundwater from the Modern Landfill property.
- Minimize migration of leachate constituents into surface water.
- Prevent exposure to contaminated groundwater.
- Restore contaminated groundwater to beneficial uses where practicable.
- Restore contaminated groundwater to background quality.

The 1991 ROD, as updated with the 2015 ESD, selected the following remedies for the Site:

- Continued operation and maintenance of all previous remedial actions conducted on-site, including the landfill cap, groundwater extraction systems, on-site wastewater treatment facility, gas extraction system (for removal and destruction of landfill-generated methane gas), and groundwater and surface water monitoring.
- Completion of the landfill cap system and final cover for the remainder of the 66-acre landfill.
- Maintenance of site fencing and all access restrictions.
- Installation of additional extraction wells to the eastern and western extraction systems to prevent contaminated groundwater from bypassing those systems.
- Installation of more monitoring wells or extraction wells, as needed, to ensure protectiveness and to control groundwater flow.
- Implementation of institutional controls to protect the remedial systems and to prohibit use of groundwater (added by the 2015 ESD).

The groundwater extraction systems were originally expected to operate until background levels of contaminants are reached. The attainment area for this remediation is located between the site boundary and the groundwater compliance monitoring and assessment points, all of which are located within property owned or leased by Republic Services. Figure 3 in the Institutional Controls section of this FYR Report shows the site boundary in relation to contiguous areas currently owned or leased by Republic Services.

The 2015 ESD modified the Site's groundwater remediation goals from background levels to the maximum contaminant levels (MCLs) of the Safe Drinking Water Act. For contaminants that did not have an MCL, the groundwater remedial goal was set to the medium-specific concentration established in the Pennsylvania Land Recycling and Environmental Remediation Standards Act 2 (Act 2), commonly referred to as the PADEP Act 2 standards. The ESD also set the requirement for a cumulative risk evaluation for groundwater once the groundwater remediation goals have been met. Table 1 provides the Site's revised groundwater remediation goals from the 2015 ESD.

Table 1: Groundwater COCs and Remediation Goals

Groundwater COC	2015 ESD Revised Groundwater Remediation Goal[a] (micrograms per liter)
Benzene	5
Carbon tetrachloride	5
Chloroform	80[b]
1,4-Dichlorobenzene	75
Total dichlorobenzene	75
1,1-Dichloroethane	31[b]
1,2-Dichloroethane	5
1,1-Dichloroethene	7
Trans-1,2-dichloroethene	100
1,2-Dichloroethenes (total)	70
Methylene chloride	5
Tetrachloroethene	5
Trichloroethene	5
Vinyl chloride	2

Notes:

a) From Table 1 of the Site's 2015 ESD.

b) Groundwater remediation goals are based on the PADEP Act 2 MSC.

Status of Implementation

In June 1993, EPA and Modern entered into a Consent Decree for remedial action and cost recovery. The Consent Decree acknowledged that since the date of the ROD, Modern had completed the design for the final 4 acres of the landfill cap and final cover system for the 66-acre unlined landfill and completed the installation of groundwater extraction wells.

As stated in the Consent Decree, EPA determined that the remaining work required by the ROD consisted of:

- Construction of the final 4 acres of the landfill cap and cover system for the 66-acre unlined landfill. The remaining 4 acres are commonly referred to as the highwall area.
- O&M activities for the remedial actions previously completed and those remedial actions to be completed under the Consent Decree. These activities cover the entire landfill cap and final cover system, the groundwater extraction systems, the on-site wastewater treatment facility, the landfill gas extraction system, and the surface water and groundwater monitoring network.

The following paragraphs describe the remedial actions previously completed and those remedial actions completed under the Consent Decree. The Site's 2005 FYR Report also provides a detailed description of all remediation activities at the Site and the engineering construction certifications for each component. The EPA signed the Site's Preliminary Close-Out Report in October 2000.

Capping and Cover Systems

From 1991 to 2000, Modern installed the final 4 acres of the cap and cover system for the 66-acre unlined landfill. It is now covered by cells 12A, 12B, 13A and 13B of the Northwest Expansion, and

includes a primary and secondary liner system. Overall, the cap for the 66-acre unlined landfill consists of:

- A landfill slope cap/vertical expansion area (completed in 1989). The slope cap was placed to separate the 66-acre landfill from a 30-acre vertical expansion area.
- A 20-acre plateau cap (completed in 1990).
- A 42-acre landfill side slope cap (completed in 1991).
- The 4-acre highwall area cap (completed in 2000 as part of the Northwest Expansion).

Groundwater Control Systems

General

The overall groundwater control system at Modern Landfill was designed to collect impacted groundwater from beneath the 66-acre unlined landfill area. The current groundwater control system at Modern Landfill consists of two separate groundwater extraction systems and an on-site wastewater treatment plant. The groundwater extraction systems include the original Eastern Groundwater Extraction System and the Enhanced Western Groundwater Control System that was installed in 1999 to replace the original western system. Both systems use wells to pump affected groundwater to the on-site wastewater treatment plant. A description of each system is below.

Eastern Groundwater Extraction System

The Eastern Groundwater Extraction System began operation on November 22, 1986. It currently comprises 12 extraction wells (W21, W35, W36, W37, W38, W39, W40, W41, W43, W44, W45, and W60R). The wells are designed to control affected groundwater on the eastern side of the landfill. Figure 2 shows the location of each extraction well.

Enhanced Western Groundwater Control System

As part of a permit modification for the Northwest Expansion, Modern Landfill constructed the Enhanced Western Groundwater Control System in 1999. It replaced the original western perimeter groundwater collection system. The Enhanced Western Groundwater Control System comprises a 2,825-foot-long subsurface blast trench (blast-shattered bedrock up to 100 feet deep and 30 feet wide) with four extraction wells (ESW-1, ESW-2, ESW-3 and ESW-4) placed at the downgradient end (northern end) of the trench. Extraction well ESW-4 began operating in August 1999, and extraction wells ESW-1, ESW-2 and ESW-3 began operating in March 2000. The Enhanced Western Groundwater Control System is oriented parallel to the direction of groundwater flow and passively collects groundwater due to the natural horizontal and induced upward vertical gradient. The system collects affected groundwater and provides a preferential pathway for groundwater flow. Figure 2 shows the locations of the trench and wells.

Wastewater Treatment Plant

The wastewater treatment plant has been in operation since April 1987. It is permitted under National Pollutant Discharge Elimination System (NPDES) Permit No. PA0046680 and the PADEP's Title V Permit No. 67-05047. The plant treats groundwater from the Eastern Groundwater Extraction System and the Enhanced Western Groundwater Control System. It also treats the leachate generated from the entire Modern Landfill. The treated effluent is discharged to Kreutz Creek.

In 2020, PADEP and Republic Services entered into a Consent Order and Agreement requiring upgrades to the wastewater treatment plant to achieve compliance with NPDES effluent limits for boron, osmotic pressure and other contaminants unrelated to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site compounds of concern (COCs) (there had been several permit violations related to these contaminants).

Extensive upgrades to the plant began in May 2022; the plant has been fully operational since mid-April 2023. The upgrades included the addition of a reverse osmosis treatment system, more storage tanks and the associated operative infrastructure.

In August 2023, the PADEP issued a draft NPDES permit that reflected changes in the facility's discharge permit. The NPDES Permit PA0046680 was finalized in May 2024. It became effective on July 1, 2024, and expires on June 30, 2029.

According to an NPDES Permit Fact Sheet Addendum dated May 2024, there have been no exceedances of the NPDES permit's limits since the upgrade to the treatment system. In addition, VOCs were not detected above detection limits in any effluent sample.

As required by the PADEP, Republic Services began sampling effluent for emerging contaminants known as per- and polyfluoroalkyl substances (PFAS) in addition to other required parameters before and after the treatment system upgrades. PFAS compounds have been detected in the effluent from the wastewater treatment plant. The Data Review section of this FYR Report provides recent PFAS sampling results.

Landfill Gas Extraction System

A landfill gas extraction system has been in operation at Modern Landfill since 1989 and has undergone several upgrades to accommodate the various landfill expansions. The purpose of the system is to prevent landfill gas migration. The extraction system includes a blower/flare station that pulls landfill gas from horizontal trenches and vertical wells where the gas is destroyed by an enclosed flare. All condensate from the gas extraction system is treated at the on-site wastewater treatment plant.

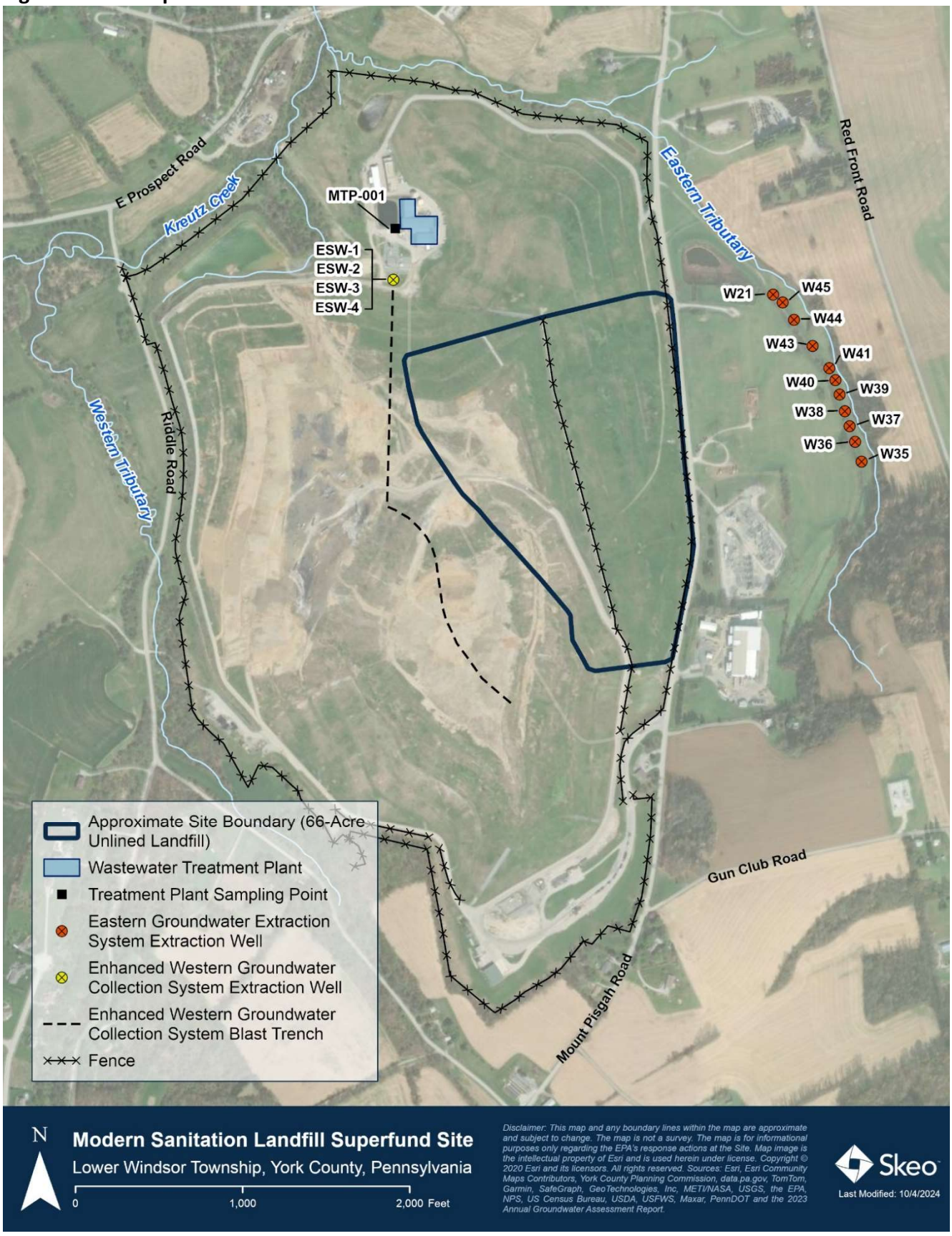
Groundwater and Surface Water Monitoring System

As a permitted solid waste landfill, and as part of the requirements identified in the 1991 ROD, Modern Landfill maintains a comprehensive groundwater and surface water monitoring system. This system is made up of 65 monitoring points including 33 groundwater monitoring wells, seven constituent assessment wells, 16 active extraction wells and nine surface water monitoring points.

The primary purpose of this monitoring system is to determine and track the groundwater chemistry in the vicinity of the landfill and provide the means to evaluate the effectiveness of the groundwater control systems. It is also implemented to satisfy the PADEP regulations regarding municipal waste landfills.

Figure C-1 in Appendix C shows the locations of the monitoring points. Generally, the groundwater monitoring wells and surface water sampling points are sampled quarterly. The groundwater extraction wells and groundwater constituent assessment wells are sampled once annually during the third quarter of each year.

Figure 2: Site Map



Institutional Control Review

In the 2015 ESD, EPA determined that institutional controls are necessary to protect the integrity of the remedial action at the Site to ensure the long-term protection of human health and the environment. The ESD also acknowledged that all required institutional controls were already in place via the mechanisms described in Table 2. The institutional controls are working effectively to protect the integrity of the remedy and to prevent exposure to contaminated groundwater.

Figure 3 shows that groundwater contamination remains within property owned or leased by Republic Services.[2]

Table 2: Summary of Planned and/or Implemented Institutional Controls

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 cap and groundwater extraction and treatment system	Yes	Yes	All of the Modern Landfill permitted area, including the Site	Prohibit activities on the Site within the existing security fencing that would disturb or interfere with the remedial systems or security measures that prevent access to the Site, unless the EPA and the PADEP provide prior written approval.	25 Pa. Code Section 273, Municipal Waste Landfills (operating requirements for landfills in Pennsylvania) 25 Pa Code Sections 273.191 and 273.192 (landfill closure provisions)
Groundwater	Yes	Yes	Areas affected by site groundwater contamination	Prohibit well drilling near the Site.	Lower Windsor Township Ordinance Section 410-35[a, b] (adopted October 2012) Windsor Township Ordinance Section 507[a, b] (adopted September 2015)

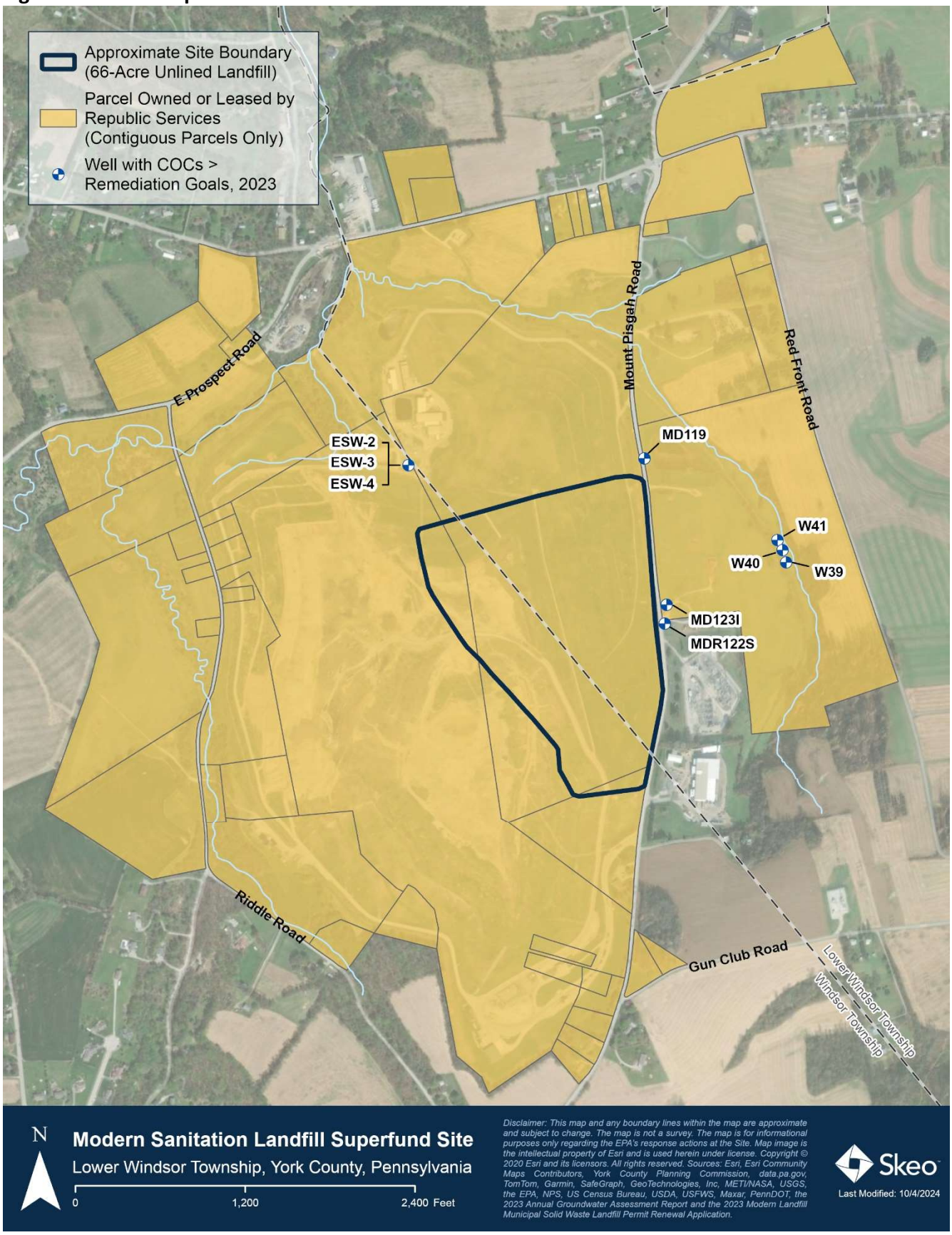
Notes:

a) The Lower Windsor Township ordinance is available online at https://ecode360.com/36204336#36204336 (accessed July 25, 2024). The Windsor Township ordinance is available online at http://www.windsortwp.com/wp-content/uploads/Subdivision-and-Land-Development-Ordinance-9212015.pdf (accessed July 25, 2024).

b) The Lower Windsor Township and Windsor Township ordinances require connection to public water where there is an existing public water supply system on or within 1,000 feet of a proposed development or subdivision. The EPA determined that the ordinances provide an effective institutional control to prohibit well drilling near the Site (2015 ESD, page 5).

[2] The source for parcels owned or leased by Republic Services is the property map provided in the November 2023 Permit Renewal Application Modern Landfill Municipal Solid Waste Landfill PADEP Solid Waste Permit No. 100113 (pdf page 27).

Figure 3: Parcel Map



Systems Operations/O&M

Republic Services operates and maintains Modern Landfill, including the groundwater extraction systems, the on-site wastewater treatment plant and the landfill gas extraction system. It also maintains the entire property, including the perimeter fence. All site work is implemented in accordance with PADEP-approved plans for the landfill under its operating permit, with activities reported to the agencies annually or as required by the permit.

Republic Services inspects the groundwater extraction systems weekly and records totalized flow volumes. Repairs to the systems are made as necessary. Recent maintenance activities for the Site's extraction wells, as reported in the 2020, 2021, 2022 and 2023 Annual Groundwater Assessment Reports, have included servicing or replacement of flow meters, pumps, probes, water lines/fittings and electrical components. Extraction well ESW-1 was offline for most of 2020 due to maintenance problems and contractor delays caused by the COVID-19 global pandemic. Maintenance of ESW-1 included jet cleaning of the well casing, full pump replacement, and servicing of all fittings and lines. It was brought back online in October 2020.

Republic Services also upgraded the wastewater treatment plant during this FYR period to include a reverse osmosis system.

Republic Services implements groundwater, surface water and wastewater treatment plant discharge monitoring based on a PADEP and EPA-approved program. Details of the monitoring systems are included in the Site Specific Monitoring Plan, dated September 2008, and PADEP Form 19. Groundwater monitoring wells and surface water locations are sampled quarterly. A comprehensive annual event in the third quarter of each year includes sampling of groundwater monitoring wells, surface water locations, groundwater extraction wells and groundwater constituent assessment wells. Table C-1 and C-2 in Appendix C include the locations included in the program, which are also shown in Figure C-1. Summaries of historical and current monitoring data are provided to the agencies in annual assessment reports. Recent analytical results are evaluated in the Data Review section of this FYR Report.

During 2022, upgradient monitoring well MU127 was permanently decommissioned due to irreparable damage to the wellhead caused by heavy equipment. Following approval by PADEP and EPA, it was permanently removed from the monitoring program. Constituent assessment well MD-128 was selected and approved by PADEP as the replacement upgradient well for MU127. Per request from PADEP, this replacement well was renamed MD128(U).

During the fourth quarter 2023 sampling event, it was discovered that shallow and deep well pair MD-563S and MD-564D had been historically mislabeled during a survey of total depths of wells during the sample event. Based on a review of well construction and survey data, it appears the wells have been labeled incorrectly (reversed) since original installation. The total depths of each well were measured in 2023 to confirm and both wells were surveyed to confirm location and elevation data.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determination and statement from the 2020 FYR Report (Table 3). The 2020 FYR did not identify any formal issues affecting the protectiveness of the remedy.

Table 3: Protectiveness Determinations/Statements from the 2020 FYR Report

OU	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy is protective of human health and the environment. The cap and cover systems installed over the 66-acre Site is functioning properly and prevents direct exposure to landfill waste. The groundwater remedy is functioning as intended by the decision documents and intercepts impacted groundwater flowing beneath the 66-acre unlined landfill. Institutional controls are in place to protect the integrity of remedial components and prevent drilling of groundwater wells within impacted areas. All exposure pathways that could result in unacceptable risks are being controlled.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was published in the *York Daily Record* and *York Dispatch* newspapers on September 3rd, 2024 (Appendix D). It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available online at the Site's Home Page at www.epa.gov/superfund/modernsanitation.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The interviews are summarized below.

The township manager for Windsor Township completed an interview form, which is included in Appendix E. She is aware of the former environmental issues at the Site and the cleanup activities that have taken place. She feels well-informed about the Site's activities and remedial progress. She is not aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedy. She is not aware of any changes in projected land use at the Site.

EPA met with the Lower Windsor Township's manager and a representative from the Board of Supervisors at the township office on October 8, 2024. The township is aware of the former environmental issues at the Site and the cleanup activities conducted to date. However, they conveyed that there is significant concern from community members that previous investigations at the Site might be inadequate. There are concerns about well placement and depth. Some residents who are on private wells near the Site have expressed concern to the township that their wells maybe contaminated with PFAS. They have also received concerns the creeks maybe contaminated. The Township relayed that people in the community are frustrated and the perception is that there is a lack of oversight at the landfill. The township does not have a clear understanding of what parts PADEP and the EPA are in charge of. The township does not feel well informed regarding the Site's activities and remedial progress. They noted that mailers and community engagement sessions would be the best ways to convey site-related information to the community. The township is aware of the new regulations regarding PFAS. They want further engagement with EPA, and they want to know their concerns are heard and their community is safe. Appendix E includes the completed interview form.

EPA and PADEP will work with the community to ensure better communication on Site's activities and remedial progress through mailers.

Data Review

Data reviewed for this FYR report included groundwater level data, groundwater and surface water analytical data, and system performance data for the groundwater extraction systems. The data were presented in the 2020 through 2023 annual groundwater assessment reports prepared by Republic Service's contractor. Additional sampling data from the treatment system effluent were also reviewed.

General findings from this review include:

- Three COCs (1,4-dichlorobenzene, trichloroethene and vinyl chloride) were detected above groundwater remediation goals in a limited number of wells during this FYR period (2020 to 2023). All other COCs analyzed for were below groundwater remediation goals during this time. COC concentrations in most wells exhibit stable or declining trends.
- VOCs were not detected at any regularly monitored surface water sampling location during this review period, except for MS108. As a result of the detections in 2020, PADEP required four quarters of sampling in 2021 at an additional surface water location referred to as MS-108 Downstream. Cis-1,2-dichloroethene was detected once at this location in the fourth quarter of 2021 at a concentration of 0.93 µg/L. Based on the low-level detection, PADEP did not require further sampling at MS-108 Downstream.
- The groundwater extraction systems continue to intercept impacted groundwater (onsite capture) as designed.
    - Extraction wells and monitoring wells on the eastern side of the landfill continue to exhibit a decreasing trend in total VOC concentrations. Minor fluctuations have been noted during this FYR period.
    - The four wells of the Enhanced Western Groundwater Control System also exhibit a decreasing trend in VOCs over time. There were no VOC detections in monitoring wells located outside the extraction system's area of influence.
    - Due to the low concentrations of VOCs detected in groundwater at the Site, mass removal by the groundwater extraction systems has been consistently only a few pounds per year.
- PFAS compounds were detected in the treatment system effluent samples in 2023. No other media have been sampled for PFAS. Although discharge limits have not been established for any PFAS compound, detected concentrations were below ecological screening values for surface water. Additional sampling for PFAS compounds in groundwater is recommended to better determine if the PFAS is site related.

Further discussion on the data reviewed is presented below.

Groundwater

Groundwater Level Measurements and Flow Direction

Republic Service's contractor collects sitewide depth-to-groundwater level measurements annually, during the third quarter of each year, which are used to develop groundwater contour maps. Figure F-1 in Appendix F shows the groundwater contours from the most recent 2023 monitoring event. As

shown on Figure F-1, groundwater flow direction at the landfill property in 2023 was predominantly to the north/northwest, with local variations near the extraction wells. In general, the groundwater contours and flow directions show little change from the August 2018 groundwater contour map, included in the 2020 FYR Report.

Groundwater Quality

Republic Service's contractor collects groundwater samples on a quarterly or annual basis from the Site's network of groundwater monitoring wells, constituent assessment wells and extraction wells. Figure C-1 in Appendix C shows the monitoring locations. The purpose of the monitoring system is to determine and track the groundwater chemistry in the vicinity of the landfill, and provide the means to evaluate the effectiveness of the groundwater control systems.

The samples are analyzed for VOCs or a subset of VOCs, depending on the event, which include all site groundwater COCs except chloroform. Additional parameters are also monitored as required by PADEP Form 19 for municipal waste landfills. The following monitoring points were sampled during this FYR period:

- A total of 33 groundwater monitoring wells (sampled quarterly).
- A total of seven constituent assessment wells (sampled annually).
- A total of 16 active extraction wells (sampled annually).

Sampling results from 2020 through 2023 were reviewed for this FYR. COCs 1,4-dichlorobenzene, trichloroethene and vinyl chloride were detected at concentrations above their respective groundwater remediation goals in either the groundwater monitoring wells, constituent assessment wells or extraction wells, as follows:

- 1,4-Dichlorobenzene was detected in a single groundwater monitoring well (MD-119) at concentrations ranging from 32 µg/L (November 2023) to 86 µg/L (February 2023), compared to the 1,4-dichlorobenzene remediation goal of 75 µg/L. No other wells reported 1,4-dichlorobenzene above the remediation goal during this FYR period.
- Trichloroethene was detected above its groundwater remediation goal of 5 µg/L in two constituent assessment wells (MD-123I, MDR-122S) with a maximum concentration of 22 µg/L in MD-123I (August 2020 and August 2021). Trichloroethene was also detected above its remediation goal in extraction wells ESW-3, ESW-4, W-38, W-39, W-40, W-41, W-43 and W-44 with a maximum concentration of 42 µg/L in W-39 (August 2021). Trichloroethene was below the remediation goal in all other wells during this FYR period.
- Vinyl chloride was detected above its remediation goal of 2 µg/L in a single groundwater monitoring (MD-119) at a maximum estimated (J) concentration of 2.3 µg/L in February 2020. Vinyl chloride was also detected above its remediation goal in four extraction wells (ESW-1, ESW-2, ESW-3, ESW-4). The maximum concentration of vinyl chloride in the extraction wells was 6.5 µg/L in EWS-3 in August 2020.

Figure F-2 in Appendix F shows the locations with 1,4-dichlorobenzene, trichloroethene and vinyl chloride exceedances as of 2023.

The annual groundwater assessment reports also track overall VOC trends in the Site's wells. Appendix G shows VOCs over time in the Site's extraction wells and other select wells. Trends observed by site area are addressed below.

Groundwater Extraction System Wells

Overall, concentrations of total VOCs exhibit a declining trend in both the Eastern Groundwater Extraction System and Enhanced Western Groundwater Control System extraction wells (Appendix G). Some fluctuation in total VOC concentration has been observed during this FYR period in Enhanced Western Groundwater Control System extraction wells ESW-1, ESW-2 and ESW-4. Overall, concentrations are lower than when pumping began in 1999 and 2000.

Wells Between the Landfill and the Eastern Extraction System

There are seven wells located between the landfill and the Eastern Extraction System. They include five constituent assessment wells (W23, W34, MD120, MDR122S and MD123I) and two groundwater monitoring wells (MD125 and MD128(U)).

- VOCs have not been detected in wells W23, W34 and MD128(U) in the past 15 to 20 years.
- VOCs have been detected in MD120 and MD125 but individual COCs were consistently below remediation goals during this FYR period.
- Trichloroethene continues to exceed its remediation goal in MDR122S and MD123I. Total VOCs in MDR122S have been decreasing since 2006. Total VOCs in MD123I peaked in 2009 and decreased until 2013. Since 2013, total VOCs have been stable in MD123I.

Wells North and East of the Eastern Extraction System

There are five monitoring wells on the east side of the landfill, located either downgradient or side gradient of the landfill (MD118, MD119, MD133, MD137 and MD138).

- VOCs were mostly non-detect in wells MD118, MD133, MD137 and MD138 during this FYR period. There were no exceedances of the groundwater remediation goals in these wells between 2020 and 2023. VOCs were not detected to the east of the eastern tributary.
- Well MD119 has exhibited detections of VOCs since 2009. Most detections have been low, with only vinyl chloride and 1,4-dichlorobenzene exceeding remediation goals during this FYR period. MD119 reported 1,4-dichlorobenzene above its remediation goal three times during this FYR period (August 2020, February 2023 and May 2023). 1,4-Dichlorobenzene was below its remediation goal during the two most recent sampling events (August 2023 and November 2023). Vinyl chloride was detected once slightly above the remediation goal (2 µg/L) in February 2020 at an estimated concentration of 2.3 J µg/L, and has been below the remediation goal since that time.

Wells North of the Western Extraction System

Low concentrations of VOCs have been detected in wells near the Enhanced Western Groundwater Control System (MD112S, MD505SR, MD506DR and MD569SR). Detections of VOCs in these locations were well below remediation goals.

Residential Wells

During this FYR cycle, EPA reviewed sampling results from a private water well that a resident had installed in 2010 and was sampled in 2012. This water well was 525 feet deep and located downgradient of the site. The results showed one detection of a VOC, methylene chloride at a

concentration of 0.7 micrograms per liter (µg/L). This concentration is below the federal maximum contaminant level (MCL) of 5.0 µg/L for drinking water and any health risks. Methylene chloride is also used as a laboratory chemical, and it may not be a site-related compound of concern. This private water well did not pass water testing for total coliform and iron which resulted in the resident to abandon the well and connect to the York Water Company system.

Surface water

Republic Service's contractor collected surface water samples from nine locations during the annual sitewide monitoring events in 2020, 2021, 2022 and 2023. Samples were collected from four locations in the western tributary, four locations in the eastern tributary and one outfall (MTP-001). Figure F-2 shows the surface water sampling locations. The samples were analyzed for VOCs in addition to other parameters required by PADEP Form 19 for municipal waste landfills.

VOCs were not detected at any location except for MS108 in the western tributary (Figure F-2). Several VOCs were detected at low concentrations (typically below 2 µg/L) in 2020, 2021, 2022 and 2023, with cis-1,2-dichloroethene the most consistently detected VOC at MS108. Concentrations of cis-1,2-dichloroethene at MS108 ranged from a 0.98 J (estimated) µg/L in November 2022 to 4 J µg/L in September 2020. The ROD did not establish remediation goals for COCs in surface water. However, as a result of the detections in 2020, the PADEP required four quarters of sampling in 2021 at an additional surface water location referred to as MS-108 Downstream. Cis-1,2-dichloroethene was detected once at this location in the fourth quarter of 2021 at a concentration of 0.93 µg/L. Based on the low-level detection, the PADEP did not require further sampling at MS-108 Downstream.

Groundwater Extraction Volumes and VOC Mass Removal

Flow volumes are recorded weekly at each extraction well and the monthly and annual flow volumes are calculated from the weekly flow meter readings. Figure F-3 in Appendix F depicts the flows from the EGES system since its start-up in 1987 as well as the flows from the four new Enhanced Western Groundwater Control System wells since their startup in 1999. Figure F-4 depicts total annual flow volumes from the combined two systems and shows a decline in flow since 2004. As depicted in both figures, total system flow peaked in 2004 but has been declining since. Most of the decline in flow volume is associated with the Enhanced Western Groundwater Control System, and the reduced flow from the western system is largely attributed to the development of the lined disposal cells over top of the western groundwater collection area that has resulted in the elimination of surface recharge to groundwater in the capture area of the western system.

The VOC mass removed by the extraction systems is estimated using total annual flow volumes and the total VOC concentrations from the individual extraction wells. The mass removals calculated for 2022 and 2023 are included in Table F-1 in Appendix F. Due to the low concentrations of VOCs detected in groundwater at the Site, mass removal has been consistently only a few pounds per year. The overall VOC mass removed in 2023 was 5.57 pounds, which is a slight decrease of less than one pound from the mass removed in 2022 (6.49 pounds). Several extraction wells in the Eastern Groundwater Extraction System are no longer recovering VOC mass (Table F-1) and have consistently shown COCs below detection limits (W21, W35 and W45) for 15 or more years. Further evaluation should be conducted to determine if some of the extraction wells could be removed from the system as remediation progresses.

Treatment System Effluent

Treatment system effluent is sampled monthly or more frequently for parameters specified in the Site's NPDES permit, which includes VOCs. VOCs were not detected above laboratory method detection limits in any effluent sample collected between February 2020 and May 2024. The wastewater treatment system is effectively treating Site COCs.

Before and after the upgrades to the wastewater treatment system, the PADEP required that Republic Services sample effluent from the wastewater treatment system for PFAS, in addition to other required constituents. The samples were collected at the permitted sampling point MTP-001. At the time this five-year review report was prepared, influent sample analytical results for PFAS were not available.

According to a NPDES Permit Fact Sheet Addendum dated May 2024, average reductions in PFAS are being achieved by the upgraded treatment plant as follows:

- A 95% reduction for perfluorooctanoic acid (PFOA).
- A 97% reduction for perfluorooctanesulfonic acid (PFOS).
- A 97% average reduction for total PFAS (40 parameters).

Data from the fourth quarter 2023 and first and second quarter 2024 sampling events, collected after system upgrades, were also reviewed.

In the fourth quarter of 2023, 13 of 40 monitored PFAS compounds were above laboratory detection limits. The PFAS compounds detected at the highest concentrations included perfluorohexanoic acid (PFHxA) at 99 nanograms per liter (ng/L), PFOA at 84 ng/L, perfluoropentanoic acid (PFPA) at 83 ng/L, and perfluorobutanoic acid (PFBA) at 64 ng/L.

In the first quarter of 2024, 11 of 40 monitored PFAS compounds were above laboratory detection limits at MTP-001. The PFAS compounds detected at the highest concentrations included PFHxA (71 ng/L), PFPA (56 ng/L), PFOA (55 ng/L) and PFBA (42 ng/L).

In the second quarter of 2024, 14 of 40 monitored PFAS compounds were above laboratory detection limits. The PFAS compounds detected at the highest concentrations in the second quarter 2024 sample from MTP-001 included PFHxA (49 ng/L), PFOA (43 ng/L) and PFPA (40 ng/L).

PADEP has not established permit discharge limits for any PFAS compound, although reporting of detected concentrations is required quarterly. Surface water quality criteria for PFAS compounds have not been promulgated. The receiving body of water, Kreutz Creek, is not a source of drinking water.[3]

Ecological screening values have been developed for eight PFAS compounds and represent PFAS concentrations in surface water at or below which chronically exposed biota area not expected to be adversely affected and ecological risks or other impacts are unlikely.[4] Table 4 compares the maximum

[3] The Site's 1991 ROD, on page 3, states the Kreutz Creek does not supply water to any downstream inhabitants or municipalities.

[4] Ecological screening values can be found in *Derivation of PFAS Ecological Screening Values*. M. Grippo, J. Hayse, I. Hlohowskyj and K. Picel. Environmental Science Division, Argonne National Laboratory. September 2021.

detected concentrations from the fourth quarter 2023 and first and second quarter 2024 sampling events to the freshwater ecological screening values. Maximum detected concentrations were below the screening values.

Table 4: Comparison of PFAS Concentrations in Effluent to ESVs

PFAS Compound	Freshwater Ecological Screening Value (ng/L)[a]			4Q2023/1Q2024/ 2Q2024 Maximum Concentration at MTP-001[b] (ng/L)
	Aquatic	Mammal	Bird	
PFBA	64,600	8,370,000	No screening value	64
Perfluorobutane sulfonic acid (PFBS)	400,000	5,710,000	88,600,000	49
Perfluorodecanoic acid (PFDA)	2,940	660	No screening value	2.5
PFHxA	28,800	2,210,000	No screening value	99
Perfluorohexane Sulfonate (PFHxS)	65,300	5,500	No screening value	16
PFNA	16,400	2,080	No screening value	5.7
PFOA	307,000	1,580,000	No screening value	84
PFOS	22,600	117	2,570	13

Notes:

a. Screening values obtained from Table 3-6 of *Derivation of PFAS Ecological Screening Values*. M. Grippo, J. Hayse, I. Hlohowsky and K. Picel. Environmental Science Division, Argonne National Laboratory. September 2021. Available at https://www.denix.osd.mil/dodepa/denix-files/sites/85/2022/10/Final-PFAS-ESV-Report_Sept-2021_508.pdf.

b. Maximum concentrations fourth quarter 2023 (4Q2023), first quarter 2024 (1Q2024) and second quarter 2024 (2Q2024) are from the Effluent PFAS Sampling Report: Fourth Quarter 2023 Sample Report, dated December 19, 2023, the Effluent PFAS Sampling Report: First Quarter 2024 Sample Report, dated March 15, 2024, and the Effluent PFAS Sampling Report: Second Quarter 2024 Sample Report, dated September 12, 2024. Maximum overall concentrations reported in this table are from the 4Q2023 event.

Due to the detection of PFAS in the treatment system effluent, groundwater sampling for PFAS constituents at site monitoring wells should be considered to better determine the source of the contamination. Currently, the wastewater treatment plant accepts flow from the groundwater extraction systems as well as leachate from the existing double-lined landfills and slope cap/vertical expansion area.

Site Inspection

The site inspection took place on October 8, 2024. Participants included the EPA's remedial project manager, a representative from Skeo (EPA contractor support) and representatives from Republic Services and their contractor (ARM Group). The purpose of the inspection was to assess the protectiveness of the remedy. Appendix H includes photographs from the site inspection. Appendix I is the site inspection checklist.

Site inspection participants observed several remedial components, including the cap for the 66-acre unlined landfill, the Eastern Groundwater Extraction System extraction wells, the wastewater treatment plant, the Enhanced Western Groundwater Collection System extraction wells and site monitoring wells. Part of the 66-acre unlined landfill is inactive and has a grass cover. It is separated from the active portion of the landfill by a chain link fence. Some vegetation was observed growing on the fence. The grass cover of the landfill's cap is well established. New grass growth was observed near the southern part of the landfill, near a sedimentation basin that it outside the site boundary. Republic

Services representatives noted that work was recently conducted at the sedimentation basin that involved trucks driving over the cap to reach the sedimentation basin. Disturbed areas were reseeded. Republic Services representatives noted that some minor settlement has occurred over time; they fill in low spots when they are observed to prevent ponding.

No issues of concern related to the protectiveness of the remedy were observed at the extraction wells, monitoring wells or treatment system. All observed wells were properly labeled and secured. Fenced enclosures surround monitoring wells along Mount Pisgah Road.

Site inspection participants also observed the eastern tributary, western tributary and outfall 001 on Kreutz Creek. Water was actively being discharged at the time of the site inspection.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

Yes, the remedy is functioning as intended by the Site's decision documents. The cap and cover system over the 66-acre unlined landfill (the Site) is functioning properly and prevents direct exposure to landfill waste. The groundwater extraction systems at Modern Landfill continue to intercept contaminated groundwater flowing beneath the 66-acre unlined landfill. The overall trends show that extraction wells on the eastern side of the 66-acre unlined landfill are decreasing in total VOCs. Only three COCs (1,4-dichlorobenzene, trichloroethene, and vinyl chloride) remain above the Site's groundwater remediation goals; all other COCs analyzed for were not detected or were below the groundwater remediation goals during this FYR period. Chloroform is a site groundwater COC but recent site monitoring reports do not report results for chloroform. However, chloroform was sampled for in specific wells (MD-133, MD-503SR, MD-504DR, MD-505SR, MD-506DR, MD-569SR, and MD-570DR) in the monitoring program for PADEP Form 8; all results have been non-detect. Chloroform is also sampled quarterly in the primary leachate discharge and reported to PADEP.

The Enhanced Western Groundwater Control System also exhibits a decreasing VOC trend over time with no VOC detections in monitoring wells located outside the extraction system area of influence. The overall mass of VOC capture and the non-detect results in wells located outside the influence of the extraction systems demonstrate that both the Enhanced Western Groundwater Control System and the Eastern Groundwater Extraction System continue to control and recover impacted groundwater as designed. Further evaluation should be conducted to determine if some extraction wells in the Eastern Groundwater Extraction System could be removed from the system as remediation progresses, due to consistent non-detects for total VOCs.

Republic Services and their contractors conduct O&M activities at the Site to maintain the systems in accordance with the Site's 1991 ROD and 2015 ESD. Upgrades to the wastewater treatment system took place in 2022 and 2023, and included the addition of a reverse osmosis treatment system. The upgrades were required by the PADEP to address issues unrelated to the CERCLA site. Since the upgrades, the system's effluent has met discharge requirements.

PFAS compounds have recently been detected in effluent samples from the wastewater treatment system. PADEP has not set discharge criteria for PFAS compounds and federal or state surface water standards for PFAS compounds have not been promulgated. However, due to the detections of PFAS in the system effluent, groundwater samples should be collected and analyzed for PFAS to determine if groundwater is affected above risk-based levels of concern, and if these compounds are site-related.

Interviews with local township officials expressed concern about the lack of communication from EPA and the potential for contamination from the landfill to be impacting nearby private wells and creeks. More community engagement with the Lower Windsor Township community is needed to learn more about their concerns and to answer their questions about the Site.

As required by the Site's 2015 ESD, institutional controls are in place for the Site that protect the integrity of the remedial components and restrict groundwater use in affected areas. In addition, the operating Modern Landfill is secured with a locked fence.

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

Question B Summary:

Yes, there have been many changes to risk assessment guidance and toxicity values since remedy selection. However, these changes do not call into question the protectiveness of the remedy.

The EPA updated the Site's groundwater remediation goals in a 2015 ESD. The groundwater remediation levels are based on federal MCLs, and in the absence of an MCL, the PADEP MSCs. There have been no changes in the federal MCLs or MSCs for site COCs since the 2015 ESD. The groundwater remediation levels remain valid (Table J-1 in Appendix J). The 2015 ESD also requires that once the groundwater remediation goals are met, EPA will evaluate the data and develop a trend analysis and risk assessment. The remediation of groundwater at the Site will continue until the risk-based cleanup standards ($1x10^{-4}$ and hazard index of 1) are achieved throughout the attainment area, which is the area between the Site and the groundwater compliance monitoring and assessment points.

Land use near the Modern Landfill has not changed significantly since the previous FYR, and remains a mixture of agricultural and residential uses. Although municipal solid waste disposal operations at the Site have continued throughout the Site's history, these operations do not affect the protectiveness of the remedy and the groundwater remediation systems are being fully maintained.

The vapor intrusion pathway was not evaluated in the Site's 1991 human health risk assessment. The 2015 and 2020 FYRs evaluated the potential for vapor intrusion to be a concern in the wastewater treatment plant building and found that unacceptable risks via the vapor intrusion pathways would not be expected in the building. In addition, the assessments found that vapor intrusion was not a concern for residences or businesses near the landfill. The assessment for off-site areas remains valid. The groundwater plumes are controlled by the groundwater extraction systems and there are no residences or businesses within 100 feet of the groundwater impacts.

As part of this FYR, the potential for vapor intrusion at the wastewater treatment plant building at the Modern Landfill was reevaluated (Appendix K). Data from shallow monitoring well MD112S, the closest

shallow well to the building, was evaluated using the EPA's Vapor Intrusion Screening Level calculator (see Figure F-1 for the well location). The risk results demonstrate that none of the groundwater concentrations for the VOCs detected would indicate the potential for vapor intrusion above risk-based levels of concern (Table K-1, Appendix K).

PFAS are a group of manufactured chemicals used in industry and consumer products since the 1940s because of their useful properties. PFAS are often associated with fire-fighting foams and can also be found in industrial wastes and household products, which are ultimately disposed of in landfills. Perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and other per- and poly-fluoroalkyl substances (PFAS) are emerging contaminants have recently been detected in the effluent of the wastewater treatment system's effluent which discharges into Kreutz Creek, which is not a drinking water source. It is unclear if PFAS contaminants are related to the 66-acre unlined landfill that is the Site, or if they are related to other parts of the Modern Landfill regulated by the PADEP. Groundwater sampling for PFAS is recommended to determine if they are present at the Site.

The remedies are functioning as designed. The immediate threats have been addressed and the remedies are expected to be fully protective of human health and the environment when groundwater remediation goals have been achieved throughout the attainment area. In the interim, exposure pathways that could result in unacceptable risks are being controlled.

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 FYR:
None

Issues and Recommendations Identified in the FYR:

OU(s): OU-1 (Sitewide)	Issue Category: Monitoring			
	Issue: PFAS compounds have been detected in treatment system effluent. It is unknown if they are Site related.			
	Recommendation: Sample groundwater for PFAS compounds and compare the results to the PFAS MCLs and risk-based levels. Determine if PFAS is related to the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	2/24/2026

OTHER FINDINGS

Several additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Several extraction wells in the Eastern Groundwater Extraction System are no longer recovering VOC mass and have consistently shown COCs below detection limits (W21, W35 and W45). EPA will determine if some of the extraction wells could be removed, and the system optimized as remediation progresses.
- Interviews with Lower Windsor Township officials expressed concern about the lack of communication from the EPA and the potential for contamination from the landfill to be impacting private wells and nearby creeks. More community engagement with the Lower Windsor Township community is needed to learn more about their concerns and to answer their questions about the Site.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The Site's remedy currently protects human health and the environment because the cap and cover systems installed over the 66-acre landfill are functioning properly and preventing direct exposure to landfill waste. In addition, the groundwater remedy is functioning as intended by the decision documents and intercepts impacted groundwater flowing beneath the 66-acre unlined landfill. Institutional controls are in place to protect the integrity of remedial components and prevent the drilling of groundwater wells in impacted areas. All exposure pathways that could result in unacceptable risks are being controlled. However, for

the remedy to be protective over the long term, the following action needs to be taken: sample groundwater for PFAS compounds and determine if PFAS is Site related.

VIII. NEXT REVIEW

The next FYR Report for the Modern Sanitary Landfill Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

EPA, 1991. Record of Decision, Modern Landfill, York, Pennsylvania. June 28.

EPA, 2000. Preliminary Close-Out Report, Modern Sanitary Landfill. October 20.

EPA, 2015. Explanation of Significant Differences for the Modern Sanitation Landfill Superfund Site, Windsor and Lower Windsor Townships, York County, Pennsylvania. February 25.

EPA, 2010. Five-Year Review Report, Modern Sanitation Landfill Superfund Site, Windsor and Lower Windsor Townships, York County, Pennsylvania. March 4.

EPA, 2015. Third Five-Year Review Report, Modern Sanitation Landfill Superfund Site, Windsor and Lower Windsor Townships, York County, Pennsylvania. March 4.

EPA, 2020. Fourth Five-Year Review Report for Modern Sanitation Landfill Superfund Site, Windsor and Lower Windsor Townships, York County, Pennsylvania. February 24.

Republic Services, 2023. Effluent PFAS Sampling Report: Fourth Quarter 2023 Sample, Modern Landfill Permit Number PA 0046680, Windsor and Lower Windsor Township, York County, Pennsylvania. December 19.

Republic Services, 2024. Effluent PFAS Sampling Report: First Quarter 2024 Sample, Modern Landfill Permit Number PA 0046680, Windsor and Lower Windsor Township, York County, Pennsylvania. March 15.

Republic Services, 2024. Effluent PFAS Sampling Report: Second Quarter 2024 Sample, Modern Landfill Permit Number PA 0046680, Windsor and Lower Windsor Township, York County, Pennsylvania. September 12.

Republic Services of Pennsylvania, LLC, 2023. Permit Renewal Application, Modern Landfill Municipal Solid Waste Landfill, PADEP Solid Waste Permit No. 100113. November.

PADEP, 2020. Consent Order and Agreement between PADEP and Republic Services of Pennsylvania, LLC. August 25.

PADEP, 2024. NPDES Permit Fact Sheet Addendum. Facility Name: Modern Landfill (PF#255900). May 31.

PADEP, 2024. Authorization to Discharge Under the National Pollutant Discharge Elimination System Discharge Requirements for Industrial Wastewater Facilities, NPDES Permit No: PA0046680. Effective July 1, 2024, through June 30, 2029.

Taylor GeoServices, 2021. 2020 Annual Groundwater Assessment Report, Modern Landfill. June 30.

Taylor GeoServices, 2022. 2021 Annual Groundwater Assessment Report, Modern Landfill. June 30.

Taylor GeoServices, 2023. 2022 Annual Groundwater Assessment Report, Modern Landfill. June 30.

Taylor GeoServices, 2024. 2023 Annual Groundwater Assessment Report, Modern Landfill. June 28.

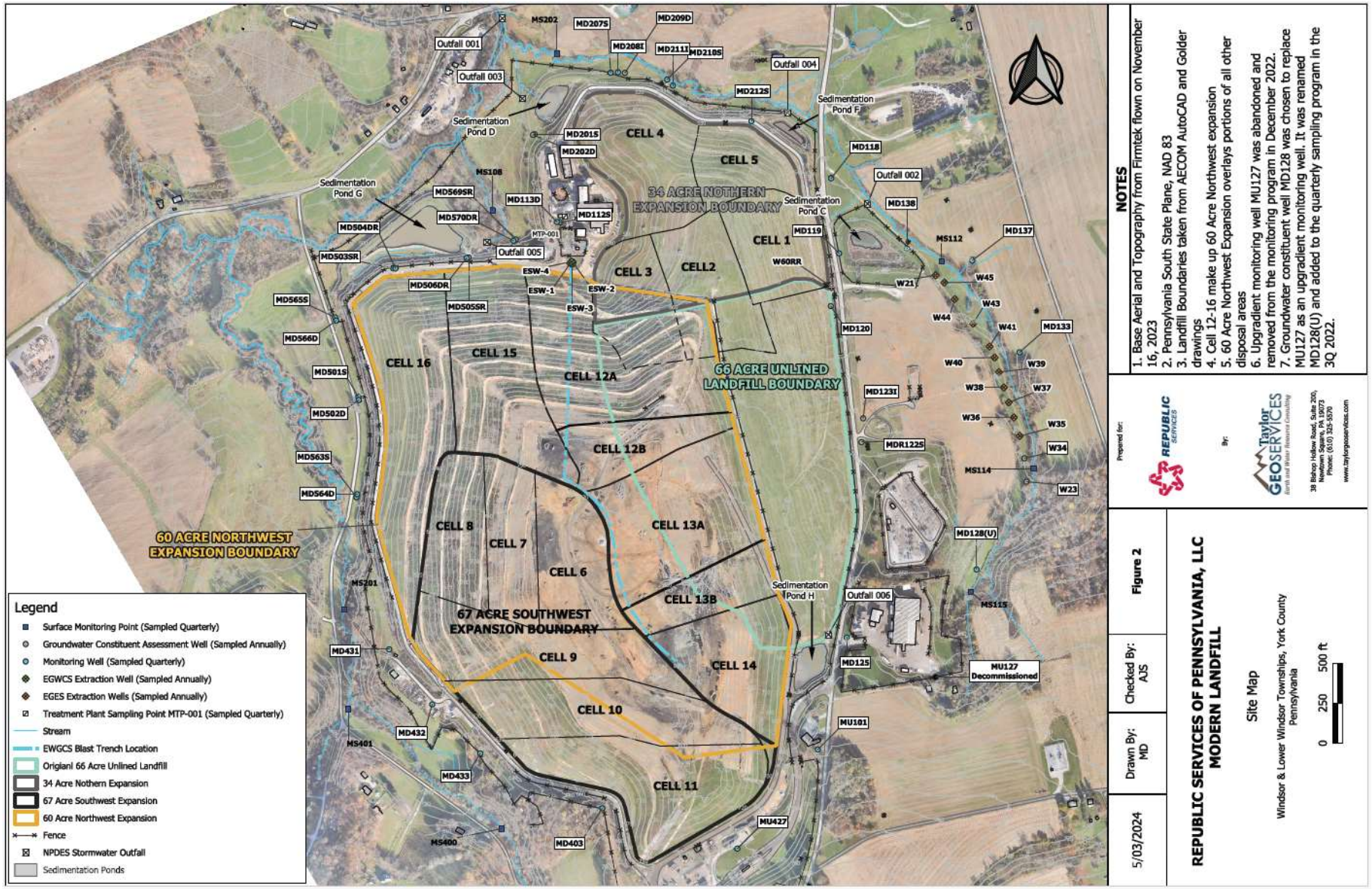
APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Waste disposal operations took place in the central area of the 66-acre unlined landfill	Early 1940s to 1952
The original landfill was extended to the south, southeast, east and west	1952 to 1971
Modern submitted a waste disposal permit application to the state	1971
The original landfill was extended to the south and northeast	1972 to 1979
Modern installed the groundwater interceptor trench and surface impoundment treatment system	1977
Capping and landfill expansion activities took place	1980s
The PADEP identified VOCs in groundwater and surface water samples	1981
The EPA conducted a preliminary assessment	1982
Quarterly groundwater sampling began	August 1983
Modern and the PADEP entered into a Consent Order and Agreement	September 1984
The western groundwater extraction system began operating	January 1985
The EPA listed the Site on the NPL	June 1986
Modern and the PADEP entered into a Consent Order and Agreement that superseded the 1984 agreement	1986
The Eastern Groundwater Extraction System began operating	November 1986
The PADEP issued NPDES permit No: PA0046680	November 1986
Modern and the PADEP entered into a Consent Order and Agreement, that superseded the 1984 agreement	December 1986
Modern finished construction of a new wastewater treatment plant	1987
Modern and the PADEP entered into a Consent Order and Agreement	November 1987
Modern constructed a cap on most of the 66-acre landfill	1988 to 1994
Modern finished construction of the landfill gas management system	1989
Modern completed the RI	1990
Modern completed the FS	1991
The EPA issued the Site's ROD	June 1991
The EPA, the PADEP and Modern signed a Consent Decree	June 1993
The Enhanced Western Groundwater Control System is constructed	1999
The remainder of the 66-acre landfill is capped as part of the Modern Landfill's Northwest Expansion	2000
The EPA issued the Site's Preliminary Close Out Report	October 2020
The EPA issued the Site's first FYR Report	March 2005
The EPA determined the Site met the Sitewide Ready for Anticipated Reuse performance measure	June 2008
The EPA issued the Site's second FYR Report	March 2010
The EPA issued an ESD	February 2015
The EPA issued the Site's third FYR Report	March 2015
The EPA issued the Site's fourth FYR Report	February 2020
Republic Services completed updates to the Site's wastewater treatment plant, to include reverse osmosis treatment	April 2023
A new state-issued NDPES permit for Modern Landfill, which includes quarterly sampling and reporting for PFAS, became effective	July 1, 2024

APPENDIX C – SITE MONITORING SYSTEM

Figure C-1: Site Monitoring System



Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

Table C-1: Monitoring System Summary

MODERN LANDFILL
2023 ANNUAL GROUNDWATER ASSESSMENT REPORT

MONITORING SYSTEM SUMMARY

Groundwater Monitoring Wells (33 Total, sampled quarterly)						
MU101	MD112S	MD133	MD208I	MD431	MD503SR	MD564D
~~MU127~~[1]	MD113D	MD137	MD210S	MD432	MD504DR	MD565S
MU427	MD118	MD138	MD211I	MD433	MD505SR	MD566D
MD128(U)[2]	MD119	MD201S	MD212S	MD501S	MD506DR	MD569SR
	MD125	MD207S	MD403	MD502D	MD563S	MD570DR

Groundwater Constituent Assessment Wells 7 Total, sampled annually)			
W23	MD120	MD123I	MD202D
W34	MDR122S	~~MD128~~[2]	MD209D

Notes:
1. MU127 was decommissioned in December 2022.
2. MD128 has been renamed to MD128(U) and is the replacement upgradient well for MU127

Key to well designation system:

Position:	Depth:
M=Modern	S=Shallow
D=Downgradient	I=Intermediate
U=Upgradient	D=Deep

Groundwater Extraction Wells (16 Active, sampled annually)			
Enhanced Western Groundwater Control System (EWGCS)	Eastern Groundwater Extraction System (EGES)		
ESW-1	W21	W38	W43
ESW-2	W35	W39	W44
ESW-3	W36	W40	W45
ESW-4	W37	W41	W60RR[3]

Notes:
3. Well W60RR was installed in December 2019 and replaced Well W60R

Surface Water Sampling Points (9 Total, sampled quarterly)				
Western Stream		Eastern Stream		Treatment Plant
MS108	MS400	MS112	MS115	MTP-001
MS201	MS401	MS114	MS202	

Key to surface water sampling point designation system
M=Modern TP=Treatment Plant (outfall) S=Stream

Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

Table C-2: Groundwater Extraction Well Construction Details

GROUNDWATER EXTRACTION WELL CONSTRUCTION DETAILS

Well Name	Northing	Easting	Well Depth (ft. bgs)	Ground Elevation (ft. MSL)	Measuring Point Elevation (ft. MSL)	Top of Screen Elevation (ft. MSL)	Base of Screen Elevation (ft. MSL)	Construction Date
Eastern Groundwater Extraction System (EGES)								
W21	231,497.31	2,325,741.37	97	537.2	538.97	519.2	440.2	02/05/85
W35	230,496.26	2,326,267.00	75	571.5	574.1	553.5	496.5	11/21/85
W36	230,611.40	2,326,230.37	75	565.3	567.38	554.3	490.3	11/21/85
W37	230,705.68	2,326,199.00	75	563.3	564.1	553.8	488.3	06/24/85
W38	230,798.28	2,326,167.76	75	559.5	560.94	541.5	484.5	11/27/85
W39	230,894.11	2,326,138.05	75	556.8	558.19	537.8	527.8	12/16/85
W40	230,984.73	2,326,110.69	75	553.8	555.61	543.8	478.8	12/18/85
W41	230,159.54	2,326,085.93	75	552.1	554.15	529.1	519.1	12/19/85
W43	231,195.70	2,325,975.87	75	550.3	552.31	532.3	475.3	01/02/86
W44	231,348.62	2,325,861.66	75	544.5	545.99	526	469.5	06/24/85
W45	231,452.27	2,325,797.13	75	539.1	540.5	521.1	464.1	12/31/85
W60RR	231,401.21	2,325,083.90	77	552.4	552.63	516.9	474.9	12/03/19
EGES Assessment Wells								
W23	230,210.94	2,326,309.59	72	581.2	583.81	566.2	509.2	01/28/85
W34	230,356.44	2,326,296.33	70	578.4	579.96	558.4	508.4	12/20/85
Enhanced Western Groundwater Control System (EWGCS)								
ESW-1	231,568.3	2,323,461.71	112	531.7	534.36	501.7	421.7	12/17-20/99 (1)
ESW-2	231,574.1	2,323,477.07	115	532.2	534.63	502.2	422.2	12/13-16/99 (1)
ESW-3	231,563.6	2,323,471.87	112	534.9	534.89	504.9	424.9	12/16-17/99 (1)
ESW-4	231,579.3	2,323,469.64	112.5	531.9	535.09	501.9	421.9	8/10/99 (2)

Notes:
Assessment Well - Wells W23 and W34 were converted from Extraction Wells to Groundwater Constituent Assessment Wells on 12/1/1991.
Well W60 was decommissioned in October 2015 and replaced by Well W60R immediately adjacent to the original location.
Well detail data from Golder, 2014 Annual Report; well data for W60R from 2015 installation report.
Well W60R well head modified and resurveyed in January 2017; well head converted to subsurface steel vault.
Well W60RR was installed as a replacement for W60R in December 2019.

Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

APPENDIX D – PRESS NOTICE

EPA PUBLIC NOTICE

EPA REVIEWS CLEANUP

MODERN SANITATION LANDFILL SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) is reviewing the cleanup that was conducted at the Modern Sanitation Landfill Superfund Site located in Windsor and Lower Windsor Townships, Pennsylvania. EPA conducts Five-Year Reviews to ensure that cleanups continue to protect public health and the environment. EPA conducted the previous Five-Year Review in 2020 and concluded that the remedy was working as designed and was currently protective. EPA will make the findings from this Five-Year Review available in February 2025.

To access site information, including the Five-Year Review, visit:
www.epa.gov/superfund/modernsanitation

For questions or to provide site-related information for the review, contact:
John Brakeall, EPA Community Involvement Coordinator
215-814-5537 or brakeall.john@epa.gov

APPENDIX E – INTERVIEW FORMS

FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Modern Sanitation Landfill	
EPA ID: PAD980539068	
Interviewer name: Matthew Paris	**Interviewer affiliation:** EPA
Subject name: Township Manager and Board of Supervisors representative	**Subject affiliation:** Lower Windsor Township
Subject contact information: https://www.lowerwindsor.com/	
Interview date: 10/8/2024	**Interview time:** 1 p.m.
Interview location: Lower Windsor Township office	
Interview format (select one): **In Person** Phone Mail Email Other:	
Interview category: Local Government	

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   Yes, but there is significant concern from community members that previous investigations at the Site might not have considered all ways that contamination could migrate from the Site. In the past, the community engaged an expert who noted there was concern that some of the wells on-site might not be deep enough or in the right places to monitor what is leaving the landfill. There is also concern that contamination left the Site long before it started to be monitored.

   Some residents who are on private wells near Gun Club Road have expressed concerns to the township that their wells are contaminated (and noted that some of these wells were privately sampled for PFAS). PFAS is a big issue of concern. The township indicated that they are listening to their community's concerns but do not have enough information from the agencies to answer them. People in the community are frustrated and the perception is that there is a lack of oversight at the landfill. They are also frustrated about the brown water in the creeks and are concerned people might be using contaminated water.

   The township also expressed concerns related to the PADEP's discharge permit and the operating landfill (including disposal of leachate from other sites at the landfill).

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?

   No. Neither the township nor its community members feel well-informed about the Site. There is considerable frustration about the lines of jurisdiction between the EPA and the PADEP. The township is frustrated by the lack of communication. A link to a site on the EPA's webpage is not sufficient. Email lists are also not sufficient because many community members do not regularly check or have access to email. The township noted that physical mailers could be used. They indicated that if EPA had a community engagement session, it would be well attended.

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

   The township was not aware of any issues with emergency response, vandalism or trespassing but their community members noted odors and spills.

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedy?

   The township is aware of the new regulations regarding PFAS, including the new drinking water standards for PFAS.

5. Are you aware of any changes in projected land use(s) at the Site?

   The township noted that Modern bought up land surrounding the landfill in the hopes of expanding. The township indicated that the landfill might be inactive within five years since it will run out of space.

6. Has the EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can the EPA best provide site-related information in the future?

   No. EPA needs more community engagement, either with mailers or community meetings. They also asked more about the process for community involvement at sites like Modern. The township sent out an online survey to engage their community members on concerns about the Site and the five-year review.

7. Do you have any comments, suggestions or recommendations regarding the project?

   The township wants answers. Residents are angry and upset and want the landfill closed. The township wants to know their community is safe. They want to know who is in charge and accountable at the Site. When they ask questions of the PADEP, the PADEP indicates that the EPA is in charge of that part, and vice versa.

   They also want to know if the active parts of the landfill could be under EPA jurisdiction if the treatment system residuals (which include residuals from the Site's groundwater treatment) are put back onto the active parts of the landfill.

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

   Provide roles.

FIVE-YEAR REVIEW INTERVIEW FORM					
Site Name: Modern Sanitation Landfill					
EPA ID: PAD980539068					
Interviewer name: Matthew Paris		**Interviewer affiliation:** EPA			
Subject name: Jennifer Gunnet		**Subject affiliation: Windsor Township**			
Subject contact information: 717-244-3512		**jgunnet@windsortwp.com**			
Interview date: October 9, 2024		**Interview time:** Not applicable			
Interview location: Not applicable					
Interview format (select one): In Person	Phone	Mail	Email	Other:	
Interview category: Local Government					

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date? **Yes**

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future? **Yes – N/A**

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing? **Not to my knowledge**

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedy? **No**

5. Are you aware of any changes in projected land use(s) at the Site? **No**

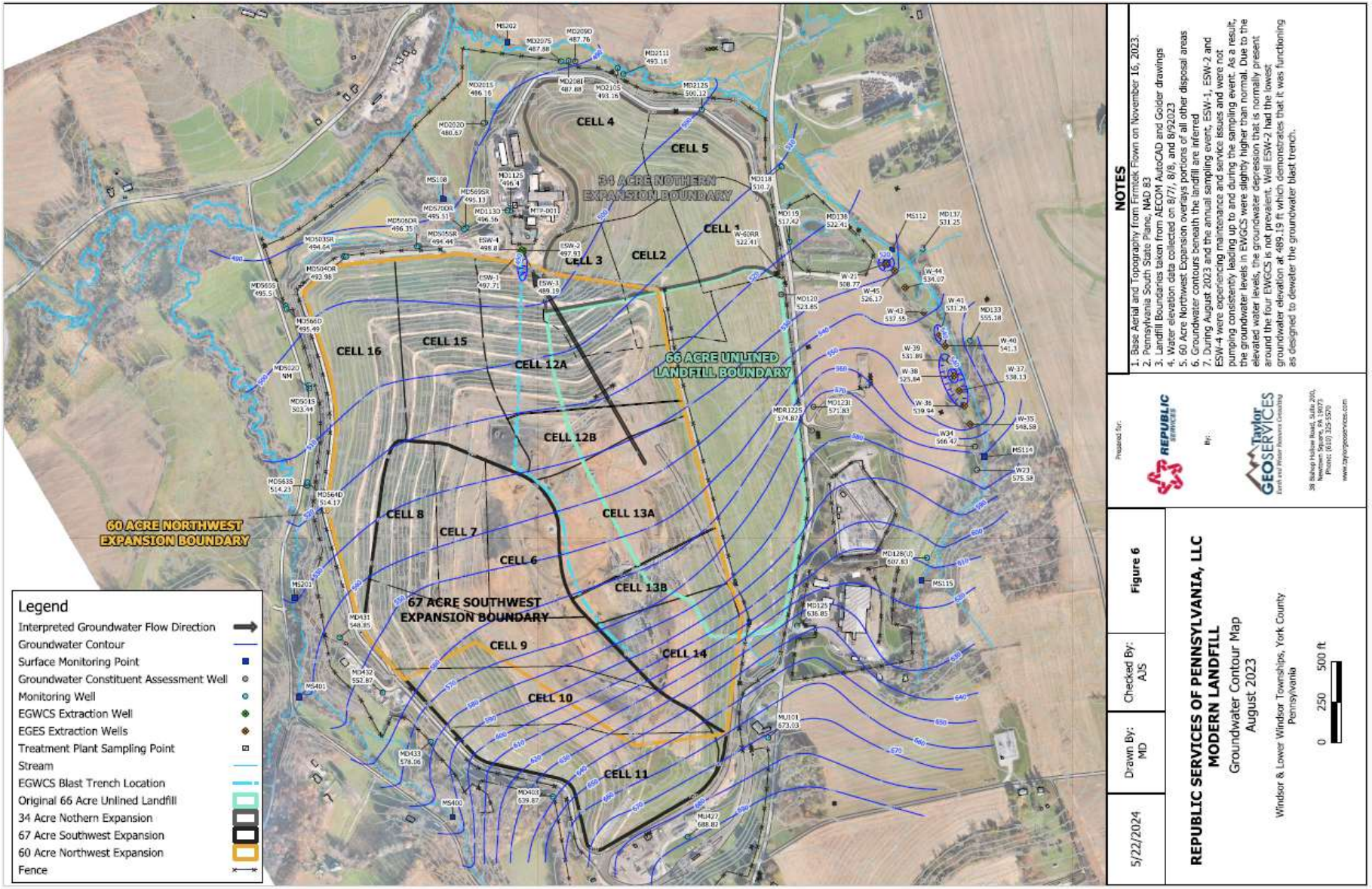
6. Has the EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can the EPA best provide site-related information in the future? **Yes – N/A**

7. Do you have any comments, suggestions or recommendations regarding the project? **No**

8. Do you consent to have your name included along with your responses to this questionnaire in the FYR report? **Yes**

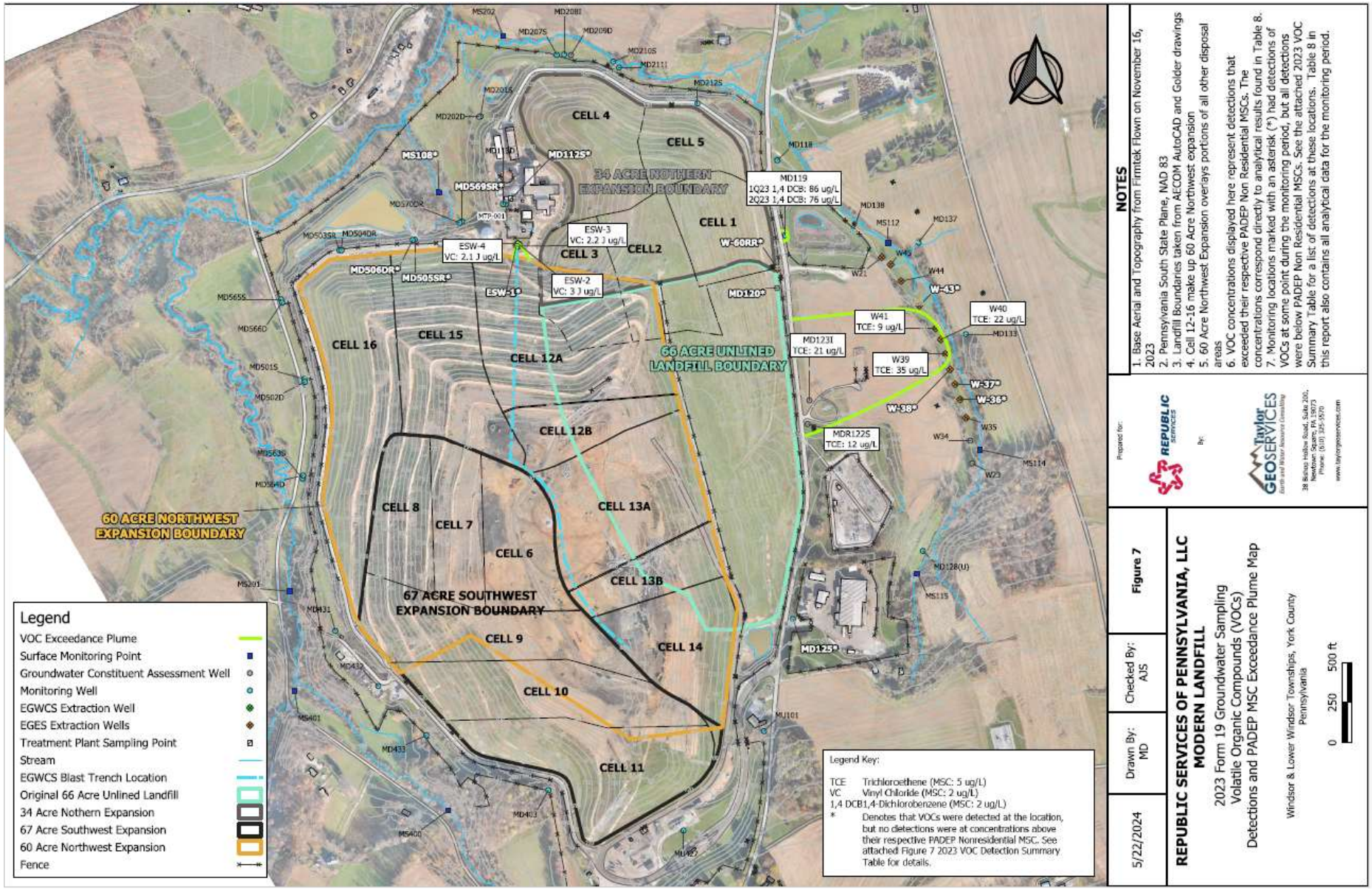
APPENDIX F – DATA REVIEW FIGURES AND TABLES

Figure F-1: Groundwater Contour Map, August 2023



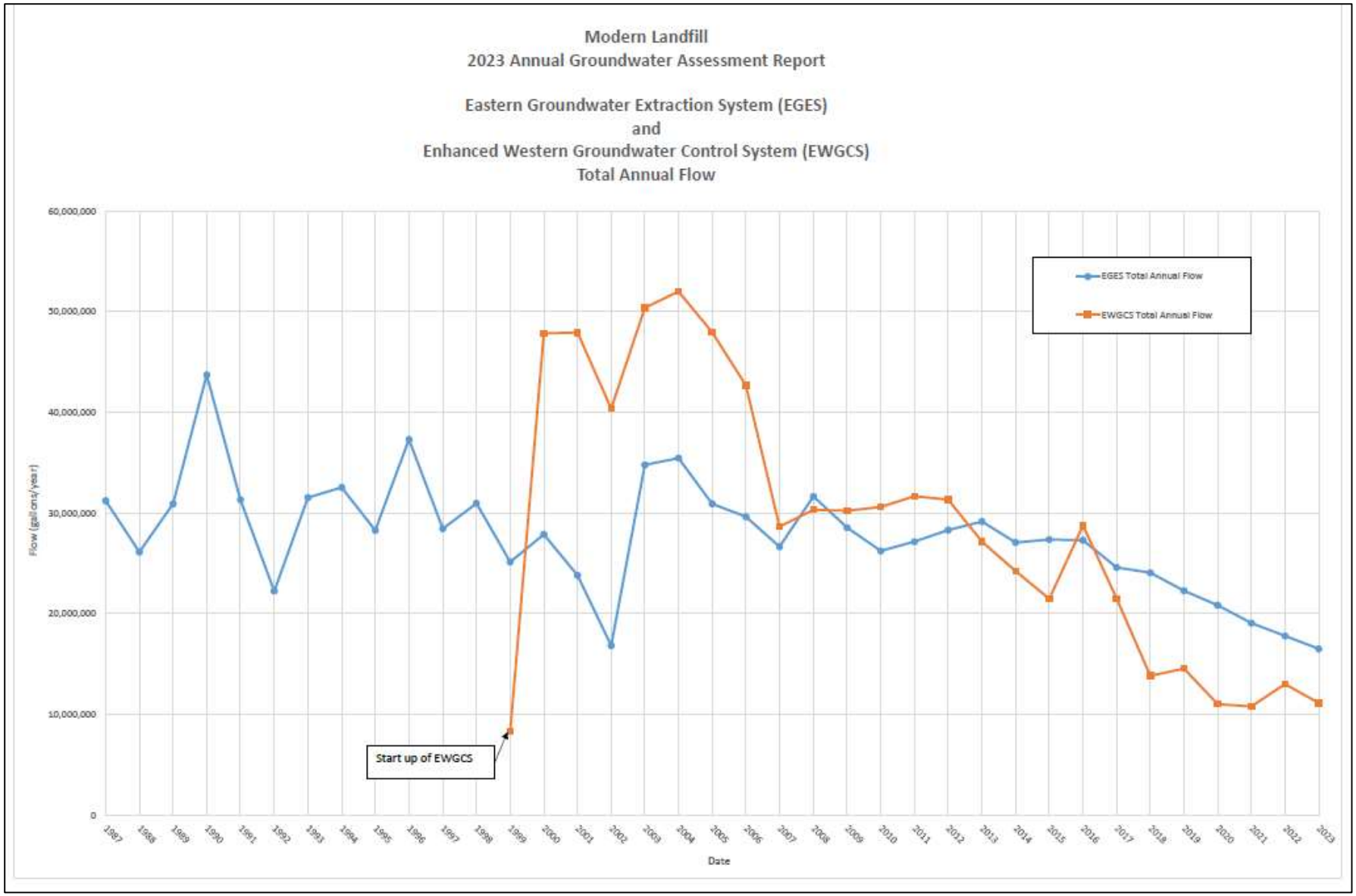
Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

Figure F-2: VOC Detections in Groundwater, 2023



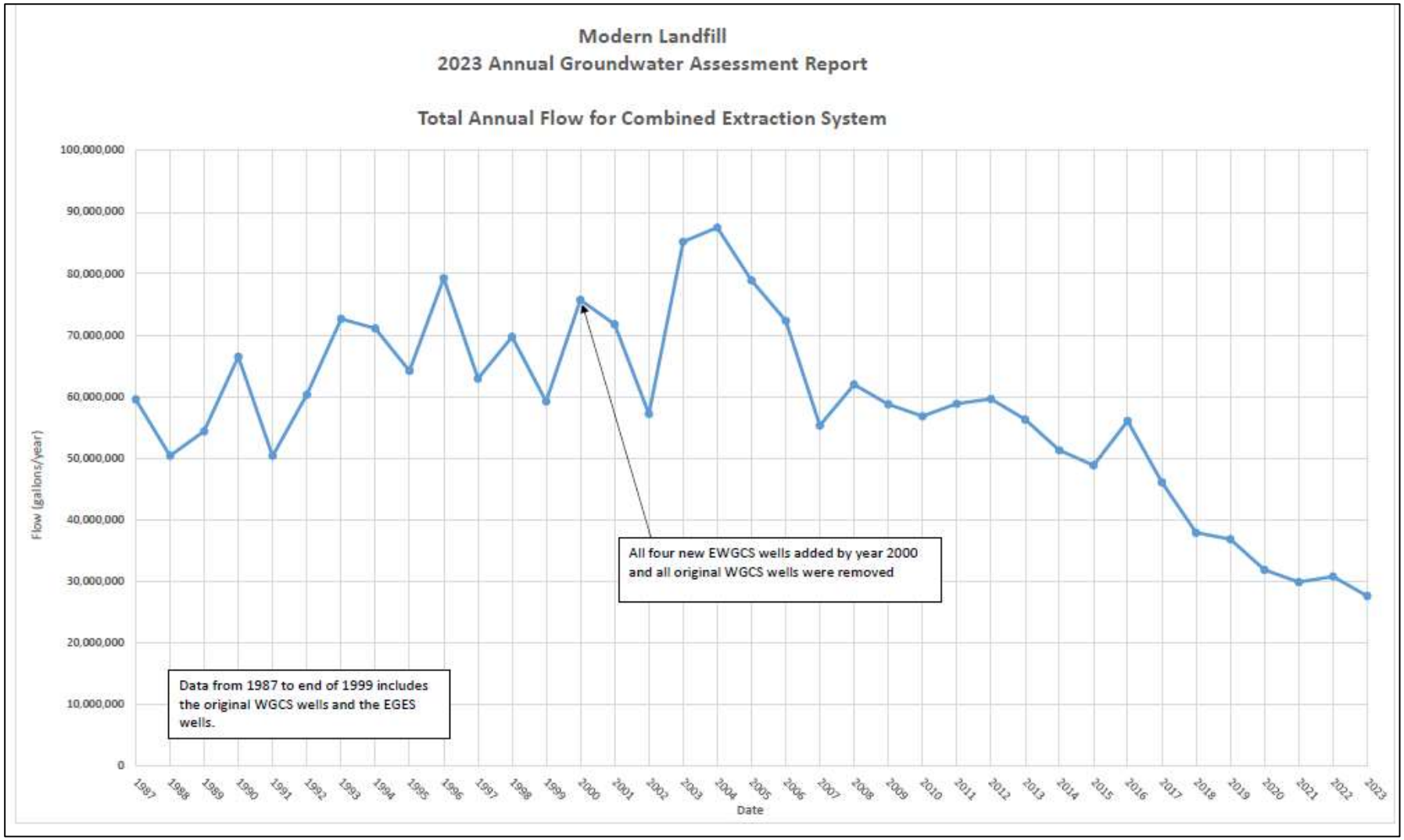
Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

Figure F-3: Eastern Groundwater Extraction System and Enhanced Western Groundwater Control System Total Annual Flow



Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

Figure F-4: Combined Extraction System Total Annual Flow



Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

Table F-1: Mass Removal Estimates, 2023-2023 Comparative Summary

MODERN LANDFILL
2023 ANNUAL GROUNDWATER ASSESSMENT REPORT

MASS REMOVAL ESTIMATES
2022-2023 COMPARATIVE SUMMARY

	2022							2023							COMPARISON 2022-2023		
Well	Total Annual Flow (gallons)	Percent of System Flow (%)	Percent of Combined Systems Flow (%)	Total Conc. Of VOCs (µg/l)	Total Mass of VOCs (mg/yr)	Total Mass of VOCs (lbs./yr)	Percent of Combined VOC Mass Removed (%)	Total Annual Flow (gallons)	Percent of System Flow (%)	Percent of Combined Systems Flow (%)	Total Conc. Of VOCs (µg/l)	Total Mass of VOCs (mg/yr)	Total Mass of VOCs (lbs./yr)	Percent of Combined VOC Mass Removed (%)	Percent Change in Flow 2022-2023	Percent Change in Conc. of VOCs 2022-2023	Percent Change in Mass Removed 2022-2023
Eastern Groundwater Extraction System (EGES)																	
W21	28,827	0.16%	0.09%	0	0	0	0.00%	120,164	0.73%	0.43%	0	0	0	0.00%	316.84%	NC	NA
W35	3,012,707	16.93%	9.77%	0	0	0	0.00%	2,014,885	12.19%	7.28%	0	0	0	0.00%	-33.12%	NC	NA
W36	2,248,975	12.64%	7.29%	4.6	38,821	0.086	1.32%	2,213,092	13.39%	8.00%	4.6	38,201	0.084	1.51%	-1.60%	0.00%	-1.60%
W37	1,494,658	8.40%	4.85%	7.2	40,567	0.089	1.38%	1,391,759	8.42%	5.03%	6.9	36,352	0.080	1.44%	-6.88%	-3.77%	-10.39%
W38	326,862	1.84%	1.06%	16.6	20,539	0.045	0.70%	353,285	2.14%	1.28%	2.5	3,343	0.007	0.13%	8.08%	-84.94%	-83.72%
W39	948,161	5.33%	3.08%	88.49	317,606	0.700	10.78%	933,477	5.65%	3.37%	82.9	292,935	0.645	11.59%	-1.55%	-6.32%	-7.77%
W40	415,155	2.33%	1.35%	59.5	93,459	0.206	3.17%	461,437	2.79%	1.67%	54.4	94,952	0.209	3.76%	11.15%	-8.59%	1.60%
W41	1,304,646	7.33%	4.23%	28.1	138,578	0.305	4.70%	1,247,589	7.55%	4.51%	22.2	104,984	0.231	4.15%	-4.37%	-20.78%	-24.24%
W43	2,737,820	15.38%	8.88%	17.9	185,511	0.409	6.30%	3,028,232	18.32%	10.95%	11.9	135,952	0.300	5.38%	10.61%	-33.74%	-26.71%
W44	1,948,006	10.95%	6.32%	0	0	0	0.00%	1,775,832	10.75%	6.42%	0	0	0.0	0.00%	-8.84%	NC	NA
W45	1,043,516	5.86%	3.38%	0	0	0	0.00%	1,047,891	6.34%	3.79%	0	0	0.0	0.00%	0.42%	NC	NA
W60RR	2,288,075	12.86%	7.42%	27.9	241,997	0.533	8.22%	1,938,932	11.73%	7.01%	32.4	237,805	0.524	9.41%	-15.26%	15.96%	-1.73%
Total:	17,797,408	100.00%	57.72%	250.2	1,077,078	2.37	36.56%	16,526,575	100%	59.74%	217.7	944,525	2.08	37.36%	-7.14%	-12.98%	-12.31%
Enhanced Western Groundwater Control System (EWGCS)																	
ESW-1	811,526	6.23%	6.23%	22.1	68,013	0.150	3.64%	515,718	4.63%	1.86%	29.6	57,746	0.127	2.28%	-36.45%	33.60%	-15.10%
ESW-2	621,368	4.77%	4.77%	17.6	41,374	0.091	2.21%	1,254,713	11.26%	4.54%	44.2	209,837	0.462	8.30%	101.93%	151.17%	407.17%
ESW-3	8,390,809	64.36%	64.36%	46.9	1,490,304	3.283	79.75%	6,605,814	59.30%	23.88%	38.0	948,967	2.091	37.53%	-21.27%	-19.12%	-36.32%
ESW-4	3,212,682	24.64%	24.64%	22.1	269,008	0.593	14.40%	2,762,547	24.80%	9.99%	35.1	367,368	0.809	14.53%	-14.01%	58.82%	36.56%
Total:	13,036,386	100.00%	42.28%	108.8	1,868,699	4.12	63.44%	11,138,792	100%	40.26%	146.8	1,583,918	3.49	62.64%	-14.56%	35.00%	-15.24%
Totals for the Combined East and West Extraction Systems																	
Total:	30,833,794	N/A	100.00%	358.96	2,945,778	6.49	100.00%	27,665,367	N/A	100.00%	365	2,528,443	5.57	100.00%	-10.28%	1.56%	-14.17%

Notes:
NA = Not Applicable
µg/l - micrograms pre liter (ppb)
mg/yr = milligrams per year
Conc. = Concentration
-- Starting value can not be 0 therefore calculation can not be completed
NC = No Change

TABLE 9

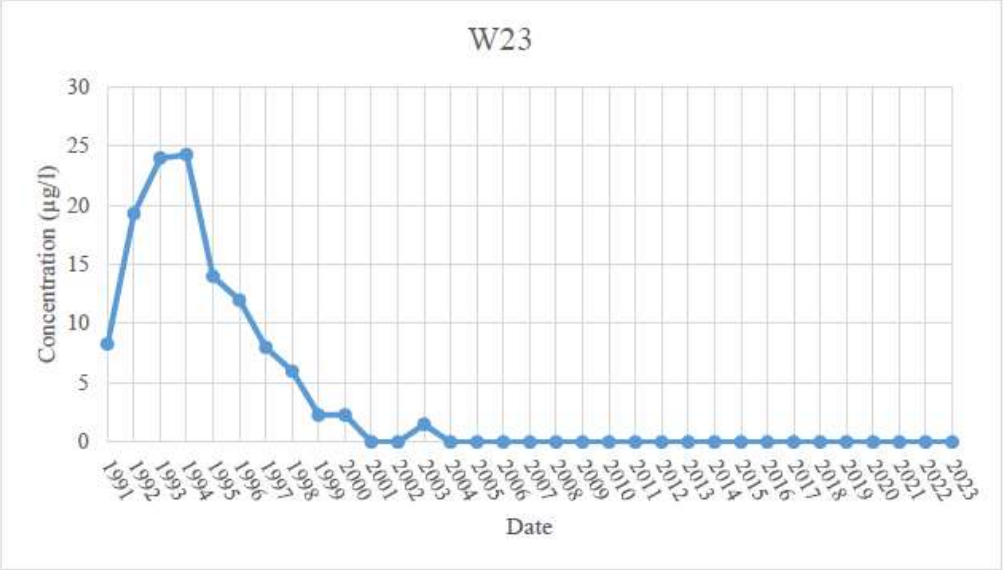
Page 1 of 1

Source: The Site's 2023 Annual Groundwater Assessment Report, dated June 2024.

APPENDIX G – TOTAL VOC CONCENTRATION TREND GRAPHS

All graphs below are from the 2023 Annual Groundwater Assessment Report, dated June 2024.

EXTRACTION WELLS
Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA



NOTE: No graph has been generated for well W21 as no VOCs have been detected in it since 1988.

EXTRACTION WELLS

Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA

EXTRACTION WELLS

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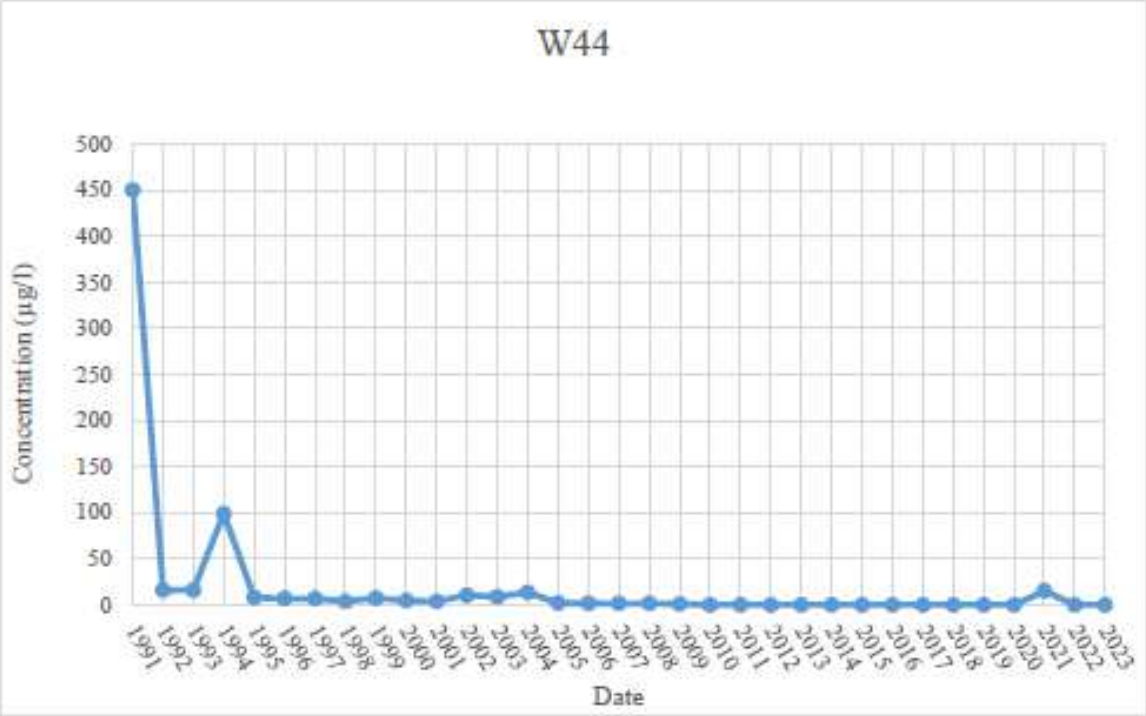
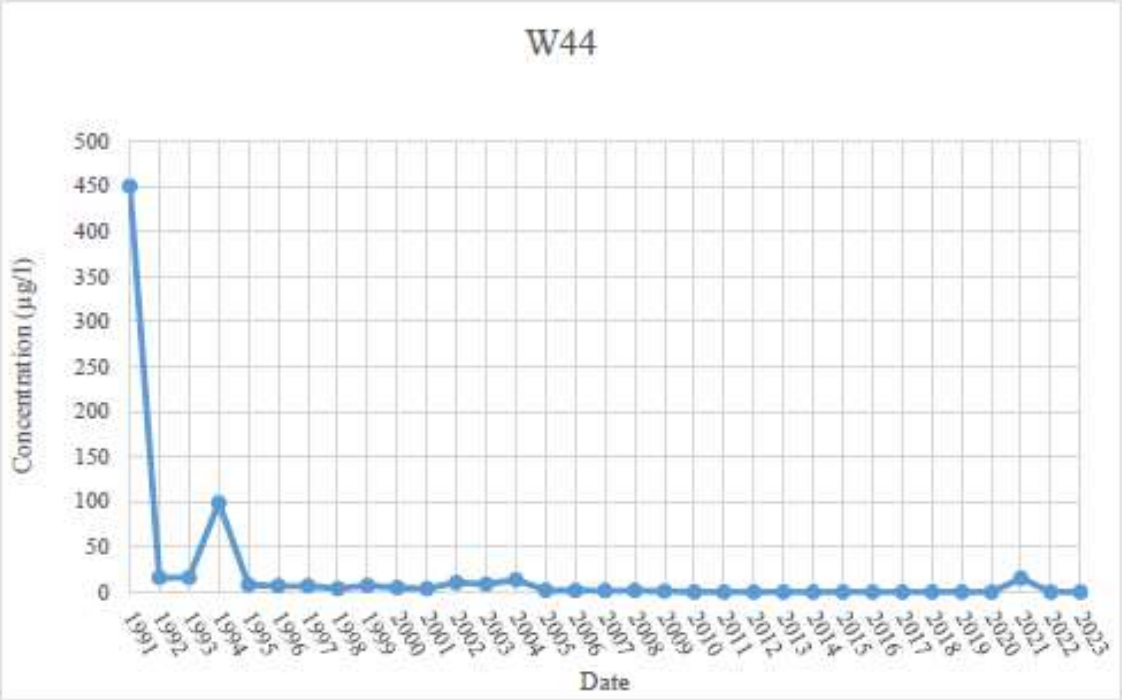


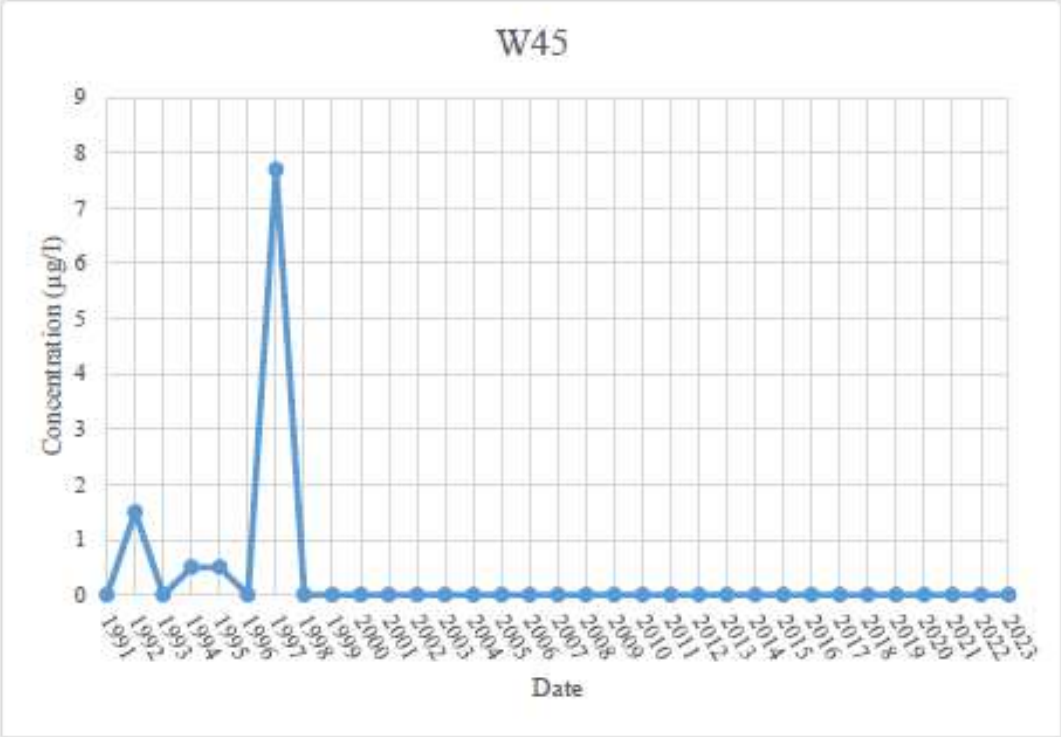
EXTRACTION WELLS

Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA



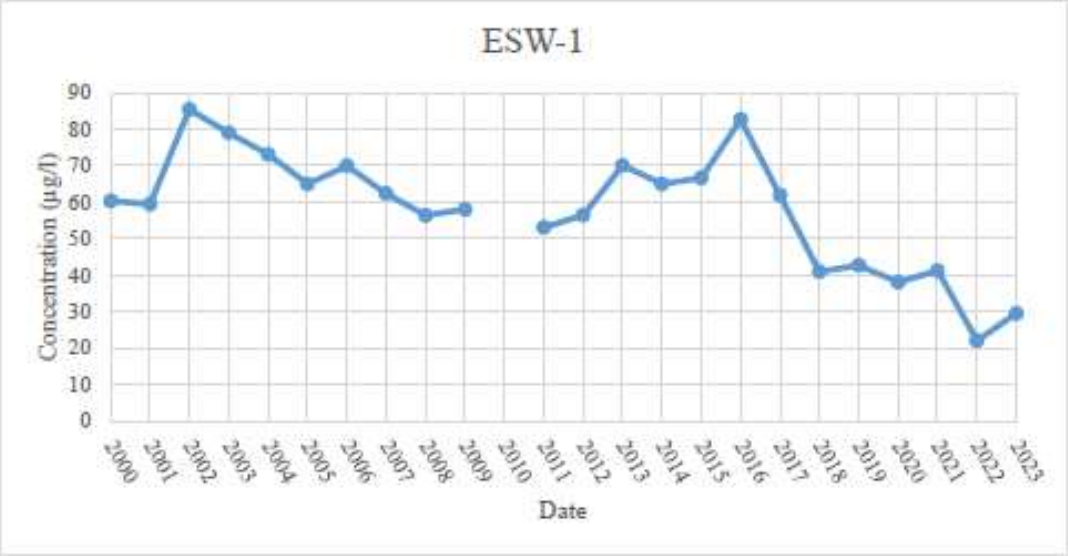
EXTRACTION WELLS

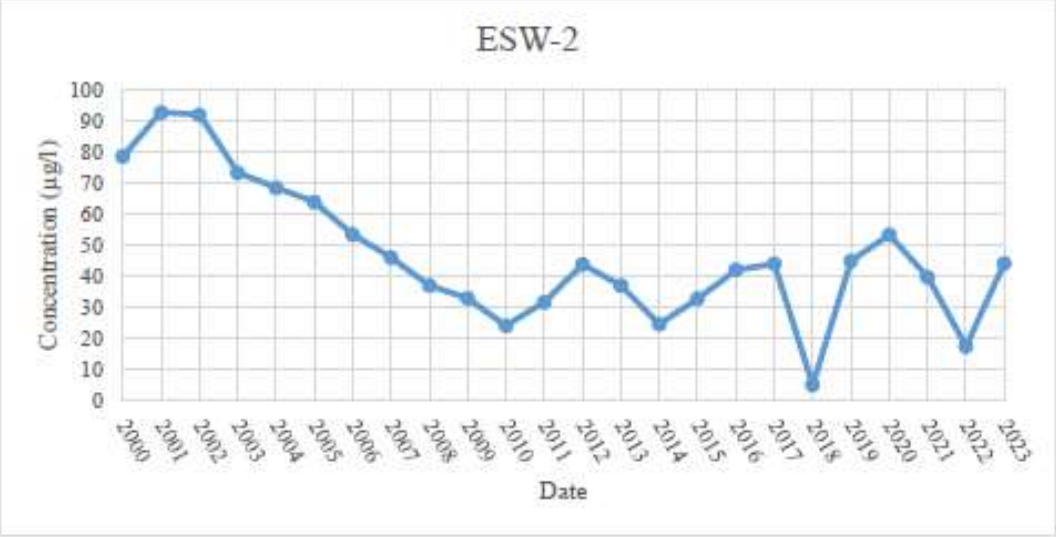
Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA



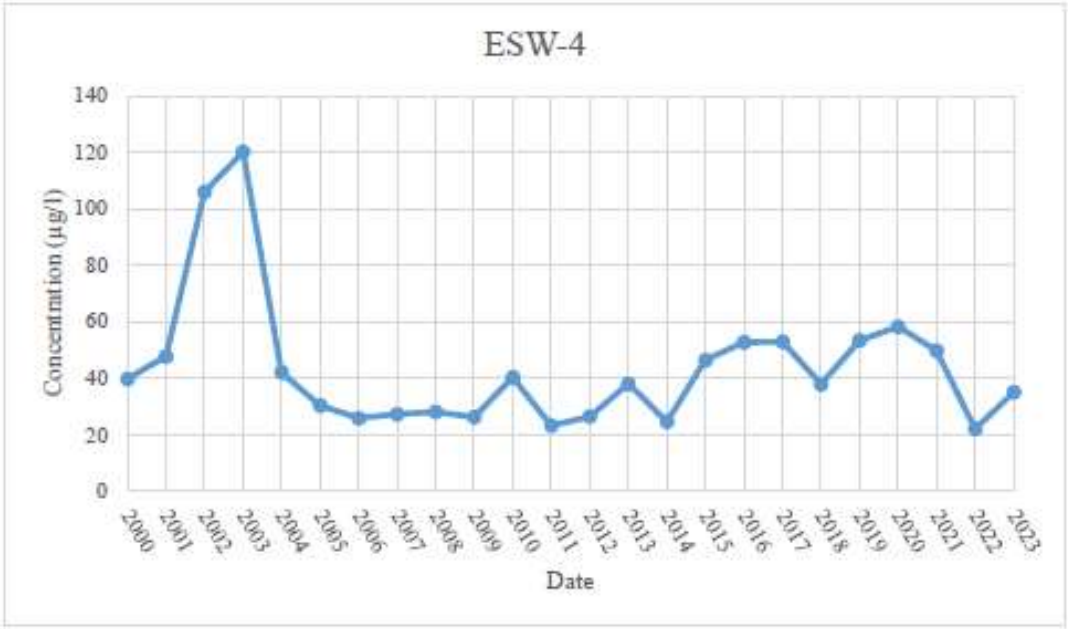
EXTRACTION WELLS

Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA

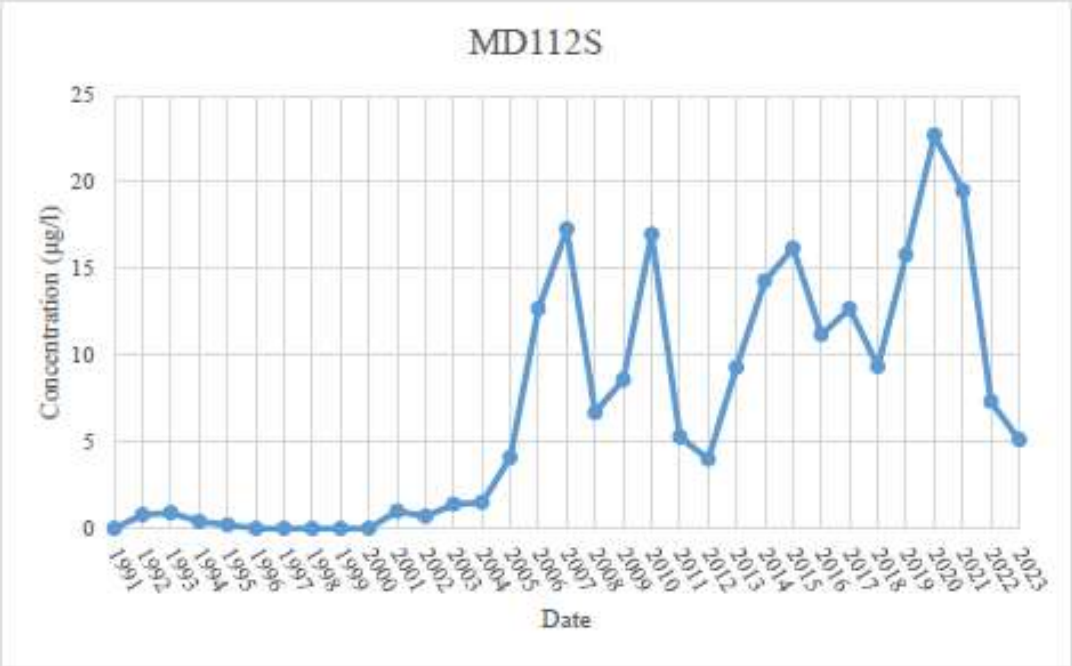


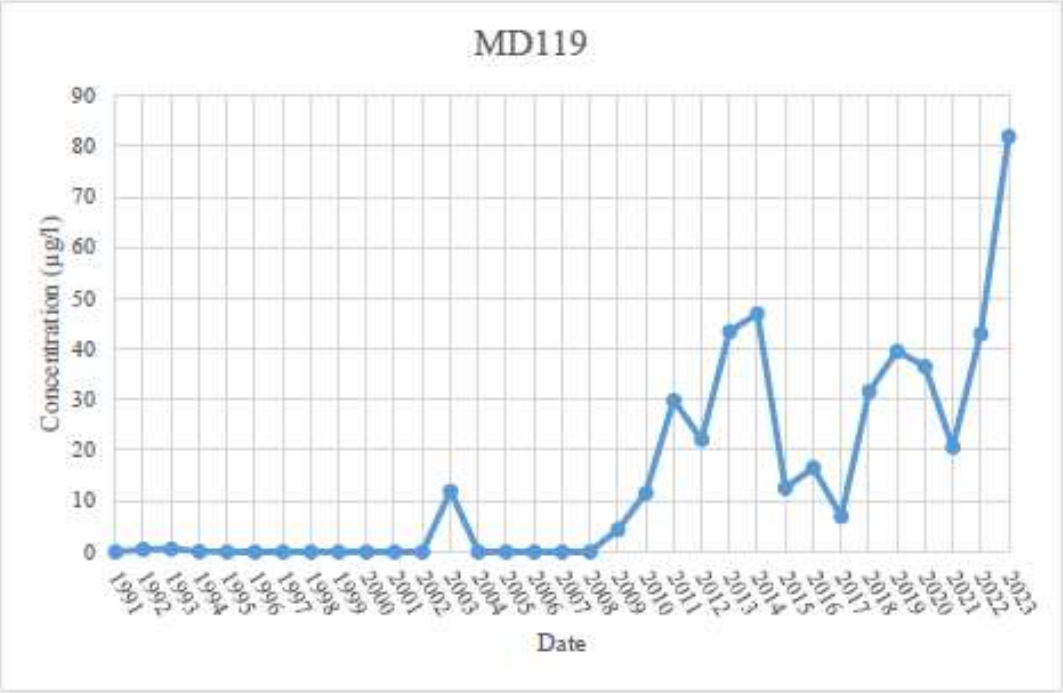


EXTRACTION WELLS
Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA



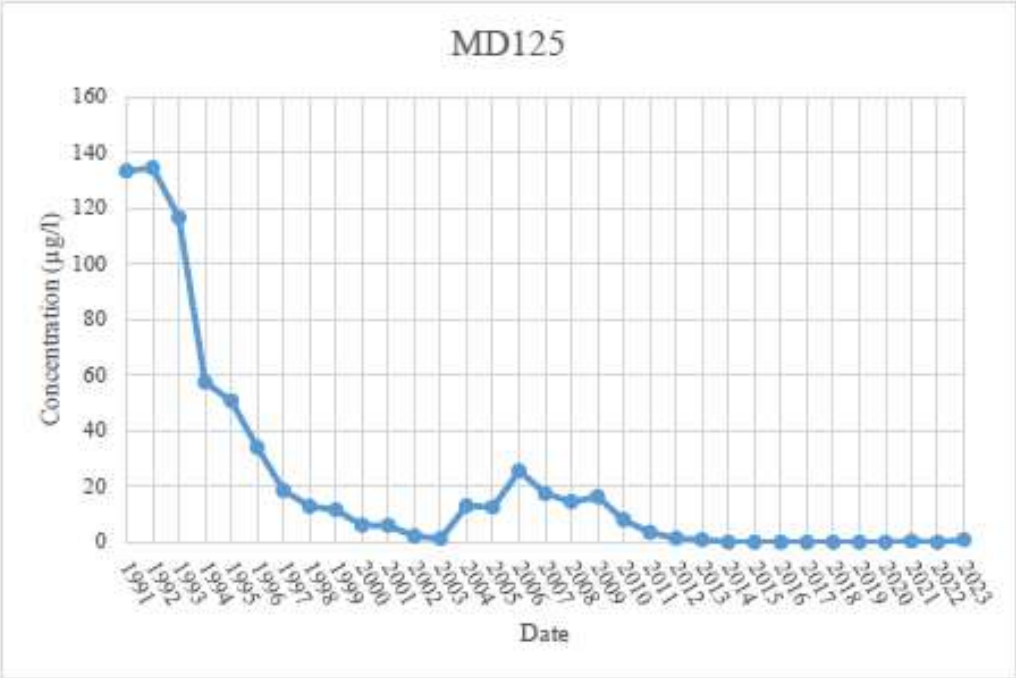
LANDFILL MONITORING WELLS
Groundwater Chemistry Time Trend Graphs
Averaged Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA





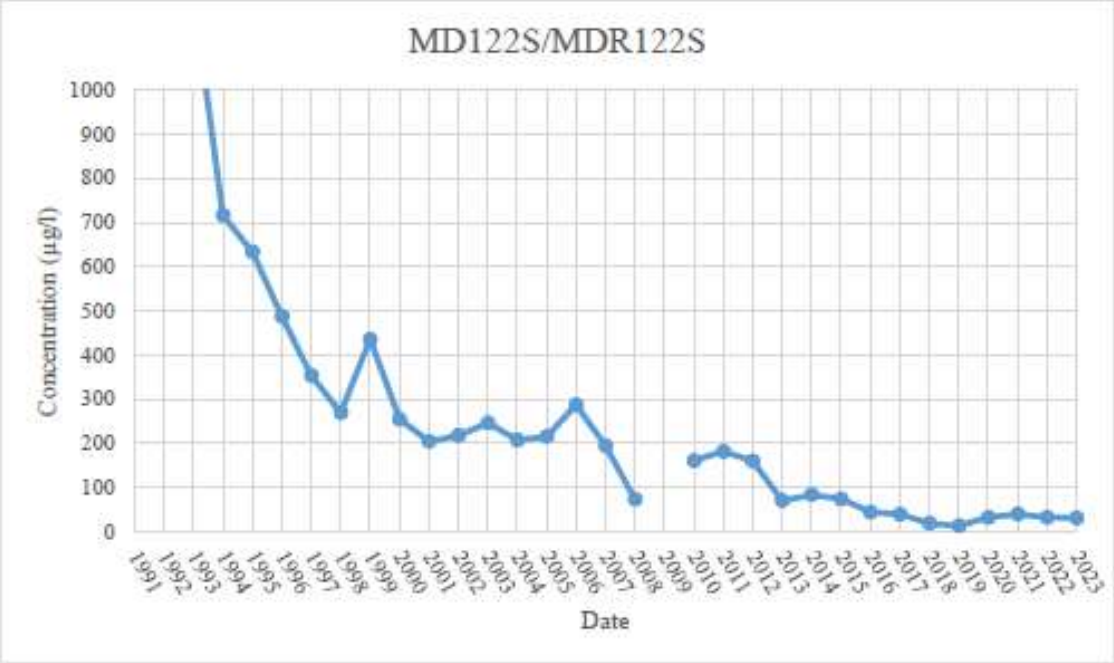
Note: Total VOC counts are elevated in 2023 due to the quarterly reporting of chlorobenzene and 1,4-dichlorobenzene

LANDFILL MONITORING WELLS
Groundwater Chemistry Time Trend Graphs
Averaged Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA

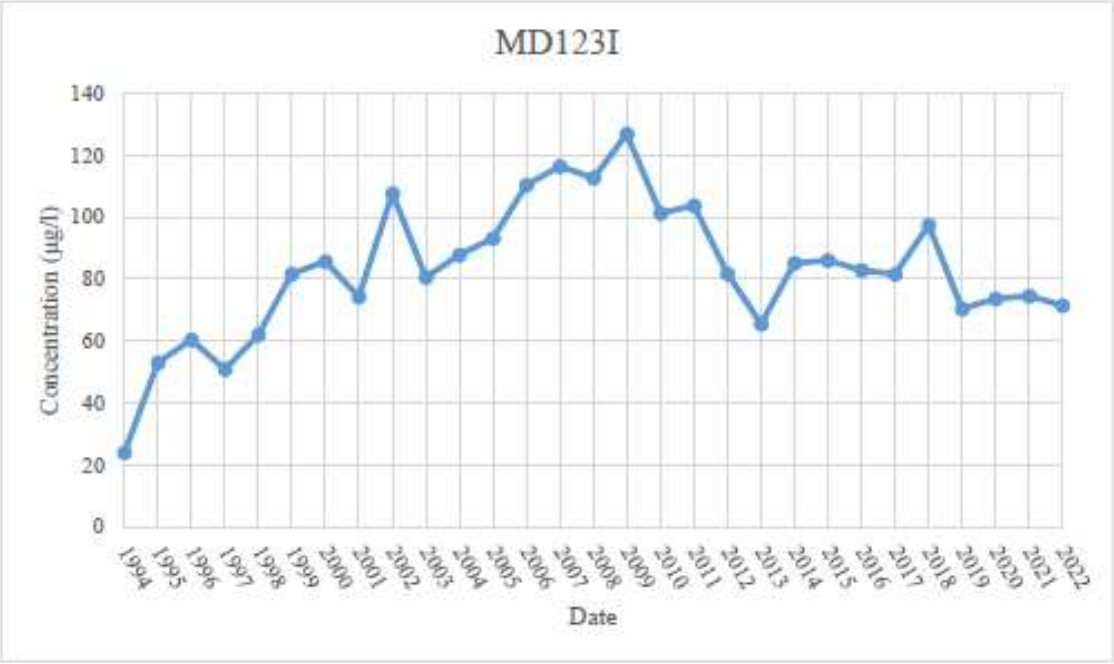


Note: Only wells with historical detections of VOCs have been graphed.

CONSTITUENT ASSESSMENT WELLS
Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA



CONSTITUENT ASSESSMENT WELLS
Groundwater Chemistry Time Trend Graphs
Total Annual VOC Concentrations
2023 Annual Groundwater Assessment Report
Modern Landfill, York, PA



NOTE: No graphs have been generated for Constituent Assessment Wells W23, W34, MD128, MD202D, or MD209D as no VOCs have either been detected in them or have not been detected in the last 20 years.

APPENDIX H – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Modern Sanitation Landfill	**Date of Inspection:** 10/08/2024
Location and Region: York County, Pennsylvania, Region 3	**EPA ID:** PAD980539068
Agency, Office or Company Leading the Five-Year Review: The EPA's Region 3	**Weather/Temperature:** sunny; approx. 60 degrees F

Remedy Includes: (check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Maintenance of existing systems, including the groundwater extraction systems and landfill caps

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency Lower Windsor Township
   Contact _____ (Name) Township Manager and representative from the Board of Supervisors (Title) 10/08/2024 (Date) _____ (Phone)
   Problems/suggestions ☒ Report attached: See Appendix E.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ _____ _____ _____

Name	Title	Date	Phone	
Problems/suggestions ☐ Report attached: _____				
Agency _____				
Contact _____	_____	_____	_____	
Name	Title	Date	Phone	
Problems/suggestions ☐ Report attached: _____				
Agency _____				
Contact _____	_____	_____	_____	
Name	Title	Date	Phone	
Problems/suggestions ☐ Report attached: _____				

4. **Other Interviews** (optional) ☒ Report attached: Windsor Township manager - See Appendix E.

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☐ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☐ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

3.	**O&M and OSHA Training Records**	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: Modern maintains an operating permit for a municipal waste landfill (PADEP solid waste permit no. 100113), and an NPDES permit for discharge of water treated at the landfill's wastewater treatment plant (inputs include groundwater and leachate from the larger landfill). They are not specific to the Site's remedy.

5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: Landfill gas generation records are not specific to the Site's remedy.

6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: Leachate extraction records are not specific to the Site's remedy.

9. **Discharge Compliance Records**

☐ Air ☐ Readily available ☐ Up to date ☐ N/A

☒ Water (effluent) ☒ Readily available ☒ Up to date ☐ N/A

Remarks: The facility's discharge permit was recently renewed in July 2024; it is not specific to the Site's remedy.

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: Modern is an operating landfill with its own access/security protocols.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☒ PRP in-house ☒ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☒ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

From: _____ To: _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: Some vegetation was observed on the perimeter fence that surrounds a part of the 66-acre

unlined landfill.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☒ N/A

   Remarks: _____

C. Institutional Controls

1. **Implementation and Enforcement**

   Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

   Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

   Type of monitoring (e.g., self-reporting, drive by): self-reporting

   Frequency: daily

   Responsible party/agency: PRP

   Contact _____ _____ _____ _____

   Name Title Date Phone

   Reporting is up to date ☐ Yes ☐ No ☒ N/A

   Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

   Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

   Violations have been reported ☐ Yes ☒ No ☐ N/A

   Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

   Remarks: _____

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

   Remarks: _____

2. **Land Use Changes On-Site** ☐ N/A

   Remarks: None; a portion of the Site is on an active landfill.

3. **Land Use Changes Off-Site** ☐ N/A

   Remarks: None.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

   Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1.	**Settlement** (low spots)	☐ Location shown on site map	☐ Settlement not evident
	Area extent: _____		Depth: _____
	Remarks: Minor settlement was noted; Republic Services staff indicated that they fill in low spots when they are observed.		
2.	**Cracks**	☐ Location shown on site map	☒ Cracking not evident
	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☒ Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☒ Grass	☒ Cover properly established
	☒ No signs of stress	☐ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: An area of new grass growth was observed on the southern part of the landfill's cap. Republic Services staff indicated that work had recently been completed at the sediment basin south of the landfill; they needed to reseed the disturbed area after that work was completed.		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☒ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☒ Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☒ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Area extent: _____
	☐ Ponding	☐ Location shown on site map	Area extent: _____
	☐ Seeps	☐ Location shown on site map	Area extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☒ No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		

B. Benches ☒ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☒ Active ☐ Passive

   ☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☐ Good condition

   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

   Remarks: _____

2. **Gas Monitoring Probes**

   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

   Remarks: _____

4. **Extraction Wells Leachate**

   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

   Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A

   Remarks: _____

E. Gas Collection and Treatment ☒ Applicable ☐ N/A

1. **Gas Treatment Facilities**

   ☒ Flaring ☐ Thermal destruction ☐ Collection for reuse

   ☐ Good condition ☐ Needs maintenance

   Remarks: Not specific to the Site's remedy. It is for the entire landfill.

2. **Gas Collection Wells, Manifolds and Piping**

   ☐ Good condition ☐ Needs maintenance

   Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

   ☐ Good condition ☐ Needs maintenance ☐ N/A

   Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

   Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

   Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

   ☐ Siltation not evident

   Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

   ☐ Erosion not evident

   Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

   Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

   Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

   Horizontal displacement: _____ Vertical displacement: _____

   Rotational displacement: _____

   Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

   Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

   Area extent: _____ Depth: _____

   Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

   ☐ Vegetation does not impede flow

   Area extent: _____ Type: _____

   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

   Area extent: _____ Depth: _____

   Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☒ Air stripping ☐ Carbon adsorbers

☒ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☒ Others: reverse osmosis

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☒ Quantity of groundwater treated annually: 27,665,367 gallons (2023); combined flow from both extraction systems

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☒ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS	
A.	**Implementation of the Remedy**
	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). The remedy for the Site is to reduce infiltration of precipitation into the landfill and thereby reduce the quantity of leachate generated at the landfill and restore groundwater to the revised groundwater remediation goals (2015 ESD). The attainment area for this remediation is located between the CERCLA site and the groundwater compliance monitoring and assessment points, all of which are located within the property boundary owned or leased by Modern. The remedy was considered complete when the EPA signed the Preliminary Close-Out Report in October 2000. The remedy is functioning as designed and continues to intercept groundwater containing COCs flowing from beneath the 66-acre unlined landfill. Overall trends continue to show that monitoring wells located near the eastern side of the 66-acre landfill have shown significant decreases in VOC concentrations.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. No issues with O&M were identified.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Consider whether some extraction wells could be taken offline due to consistent nondetects for VOCs.

APPENDIX I – SITE INSPECTION PHOTOS

View of the grassed portion of the 66-acre unlined landfill, looking northwest

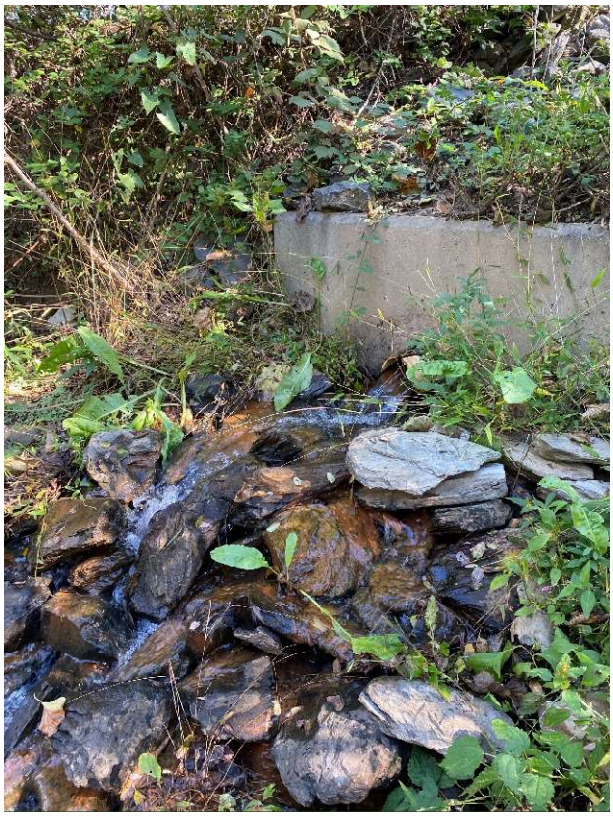
Fence that separates the grassed portion of the landfill from active landfill operations; new grass seen near the gated entrance is to the left

View of the grassed portion of the 66-acre unlined landfill, looking northeast toward the electrical substation property

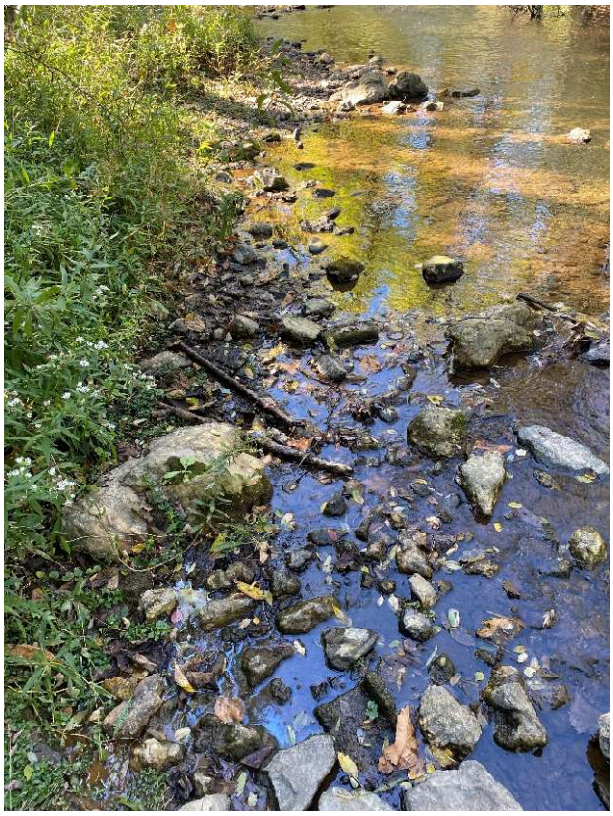
Eastern tributary near the Eastern Groundwater Extraction System

Extraction well W35

Sign near the outfall for treated water



Outfall 001 along Kreutz Creek north of Modern Landfill



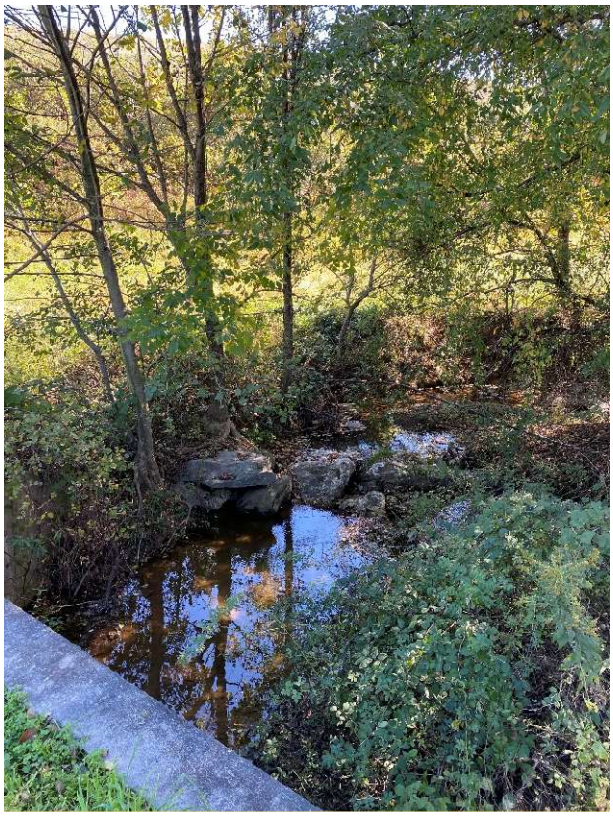
Sheen on the water of Kreutz Creek, just upstream of Outfall 001; no odor was observed

Wastewater treatment system building

Enhanced Western Groundwater Collection System extraction wells (ESW-1 through ESW-4) with the enclosed flares for landfill gas in the background

Monitoring well MD122SR east of the landfill, surrounded by a fenced enclosure

Monitoring well MD122SR, locked and labeled



Western tributary

Republic Services sign with the 66-acre unlined landfill in the background (behind the flagpole)

APPENDIX J – CLEANUP LEVEL REVIEW

Table J-1: Comparison of Site Groundwater Remediation Goals to Current MCLs and MSCs

Groundwater COC	2015 ESD Revised Groundwater Remediation Goal (µg/L)	Current MCL[b] (µg/L)	Current PADEP Act 2 MSC[c] (µg/L)
Benzene	5	5	5
Carbon tetrachloride	5	5	5
Chloroform	80[a]	80[d]	80
1,4-Dichlorobenzene	75	75	75
Total dichlorobenzene	75	75[f]	75[f]
1,1-Dichloroethane	31[a]	NE	31
1,2-Dichloroethane	5	5	5
1,1-Dichloroethene	7	7	7
Trans-1,2-dichloroethene	100	100	100
1,2-Dichloroethenes (total)	70	70[e]	70[e]
Methylene chloride	5	5	5
Tetrachloroethene	5	5	5
Trichloroethene	5	5	5
Vinyl chloride	2	2	2

Notes:

a) Groundwater remediation goals are based on the PADEP Act 2 MSCs; all others are based on the MCLs.

b) Safe Drinking Water Act MCLs from https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations (accessed 8/21/24).

c) The PADEP Act 2 MSCs for Used Aquifer, Residential, Total Dissolved Solids (TDS) ≤ 2500 available from https://www.dep.pa.gov/Business/Land/LandRecycling/Standards-Guidance-Procedures/Pages/Statewide-Health-Standards.aspx (accessed 8/21/24).

d) MCL is for total trihalomethanes.

e) Value is for cis-1,2-dichloroethene.

f) Value is for the more stringent of the o- and p-dichlorobenzene values.

NE = not established

APPENDIX K – VAPOR INTRUSION EVALUATION

This FYR evaluated the vapor intrusion exposure pathway using current groundwater data and the EPA's Vapor Intrusion Screening Level calculator to assess the potential for vapor intrusion concerns at the facility's wastewater treatment plant. It is the only potentially occupied building on the landfill property near the VOC plume. There are no other buildings or residences within 100 feet of the Site's VOC plume. Previous FYRs for the Site determined that there is no complete exposure pathway for off-site buildings. This assessment remains valid for off-site areas.

The August 2023 data from shallow monitoring well MD-112S, the closest shallow well to the wastewater treatment building, were used for the evaluation. The August 2023 data were selected since they included the full suite of VOCs analyzed. As shown in Table K-1, the VISL calculator results demonstrate that none of the VOCs detected in MD-112S results in risks that exceed the EPA's cancer risk range ($1x10^{-6}$ to $1x10^{-4}$) or a noncancer hazard quotient of 1. Vapor intrusion is not a concern at this time but should continue to be evaluated in future FYRs should site conditions or land use change.

Table K-1: VISL Calculator Results – Commercial Use Scenario

VOC	Groundwater Concentrations in Well MD-112S (August 2023) (µg/L)[a]	Modeled Indoor Air Concentration (µg/m³)	VISL Calculator Results for Commercial Use Scenario[b]	
			Cancer Risk	Noncancer HQ
Chlorobenzene	1.2	1.53×10^{-1}	-	0.0007
Dichlorobenzene, 1,4-	3.8	3.74×10^{-1}	3×10^{-7}	0.0001
Dichloroethane, 1,1-	0.5	1.15×10^{-1}	2×10^{-8}	-
Dichloroethane, 1,2-	0.21	1.01×10^{-2}	2×10^{-8}	0.0003
Dichloroethene, cis-1,2-	2.3	3.84×10^{-1}	-	0.002
Methylene chloride	0.57	7.57×10^{-2}	6×10^{-11}	0.00003
		Totals:	4×10^{-7}	0.003

Notes:

a. Data are from the August 2023 comprehensive annual sampling event at MD-112S, found in Appendix B of the 2023 Annual Groundwater Assessment Report.

b. VISL calculator accessed 8/22/2024 at epa-visl.ornl.gov/cgi-bin/visl_search.

µg/m³ = micrograms per cubic meter

- = value not available.