FIFTH FIVE-YEAR REVIEW REPORT FOR

OLD CITY OF YORK LANDFILL SUPERFUND SITE

YORK COUNTY, PENNSYLVANIA

Prepared by

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

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Date

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
BTAG	Biological Technical Assistance Group
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Chemical of Concern
CORE	CORE Environmental Services, Inc.
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GMUC	Groundwater Mitigation Under Control
GPRA	Groundwater Performance and Results Act
HEUC	Human Exposure Under Control
HHRA	Human Health Risk Assessment
HI	Hazard Index
ICs	Institutional Controls
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligram per Kilogram
mg/L	Milligram per Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PCE	Tetrachloroethene
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SVOC	Semi-Volatile Organic Compounds
SWRAU	Sitewide Ready for Anticipated Use
TCA	1,1,1-Trichloroethane
TCE	Trichloroethane
TQC	Top Quality Construction, Inc.
UAO	Unilateral Administrative Order
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 in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review 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 five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Old City of York Landfill Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of one operable unit (OU) that will be addressed in this FYR.

The Old City of York Landfill Superfund Site Five-Year Review was led by the EPA Remedial Project Manager (RPM). Participants included the EPA Community Involvement Coordinator (CIC), hydrogeologist, and Biological Technical Assistance Group (BTAG). Staff from the Pennsylvania Department of Environmental Protection (PADEP) also participated in the review. The potentially responsible party (PRP) group was notified of the initiation of the five-year review. The review began on August 25, 2020.

Site Background

The Old City of York Landfill Superfund Site (the Site) is located about 10 miles south of City of York, on South Road in Springfield Township, York County, Pennsylvania (Figure 1). The Site consists of approximately 56 acres of landfill areas (Figure 2) on a larger 178-acre parcel. The Site consists of a former municipal landfill and leachate collection system. Landfilling operations were conducted in three areas of the Site, designated as Areas 1, 2 and 3. Currently, an occupied residence is located on the Site and portions of the Site are used for grazing horses and for recreation by the private landowner.

Land uses near the Site are rural residential and agricultural. A substantial portion of the Site consists of rugged terrain, with heavily wooded areas, areas with thick briar and steep slopes. A tributary to the South Branch of Codorus Creek (designated herein as the Southern Unnamed Tributary) borders the Site to the southeast. A second unnamed tributary (designated as the Northern Unnamed Tributary) runs east-west through the Site.

Shallow groundwater at the Site discharges to the ground surface in the form of two leachate seeps, referred to as the east seep and the west seep. The east seep is located at the base of the landfill on the eastern side. The west seep is located at the base of the landfill near the South Branch of Codorus Creek, adjacent to the leachate collection system in the southern portion of the Site. Both the east and west leachate seeps flow overland to the Southern Unnamed Tributary. The leachate seeps have an orange coloration as a result of high iron content. In general, the leachate seeps are low flowing and, in some cases, intermittent.

The bedrock beneath the Site has been mapped as the Marburg Schist, a member of the Wissahickon complex. Extensive surficial weathering of the schist has resulted in a relatively thick sequence of clays (saprolite) overlying bedrock. Movement of groundwater in the Marburg Schist occurs mainly through

bedrock fractures, joints and bedding planes, with most water-bearing zones occuring within the upper 200 feet of formation. Groundwater from the Site is predominantly discharged to the Southern and Northern Unnamed Tributaries and Codorus Creek.

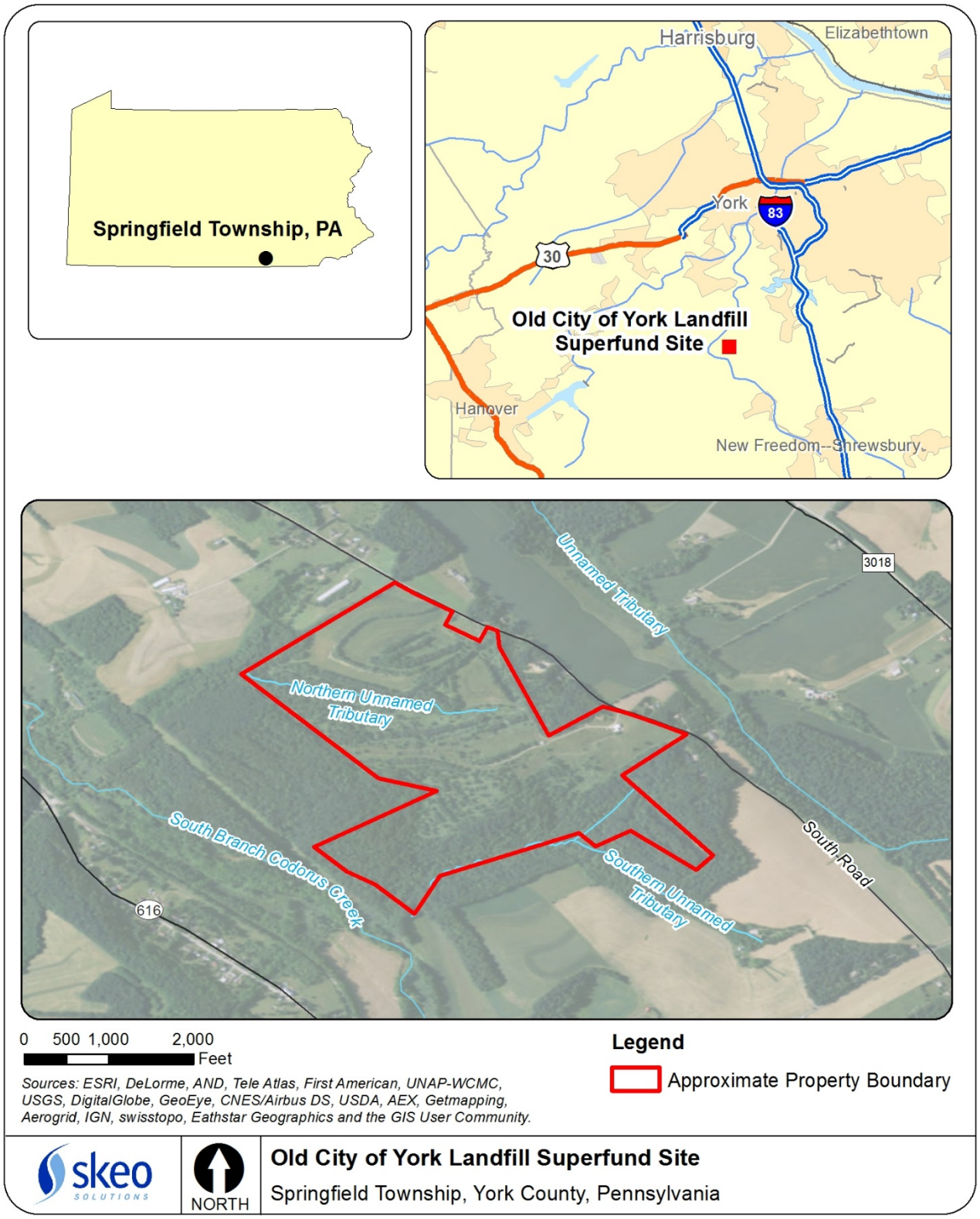
Most residences, including the residence on the Site, use the public water supply which was extended to residential properties along South Road in 1986. A few of the residences that are connected to the public water supply are able to use their wells for non-potable uses.

For more information, Appendix A provides a list of site reports and resources. Appendix B provides the Site's chronology of events.

FIVE-YEAR REVIEW SUMMARY FORM

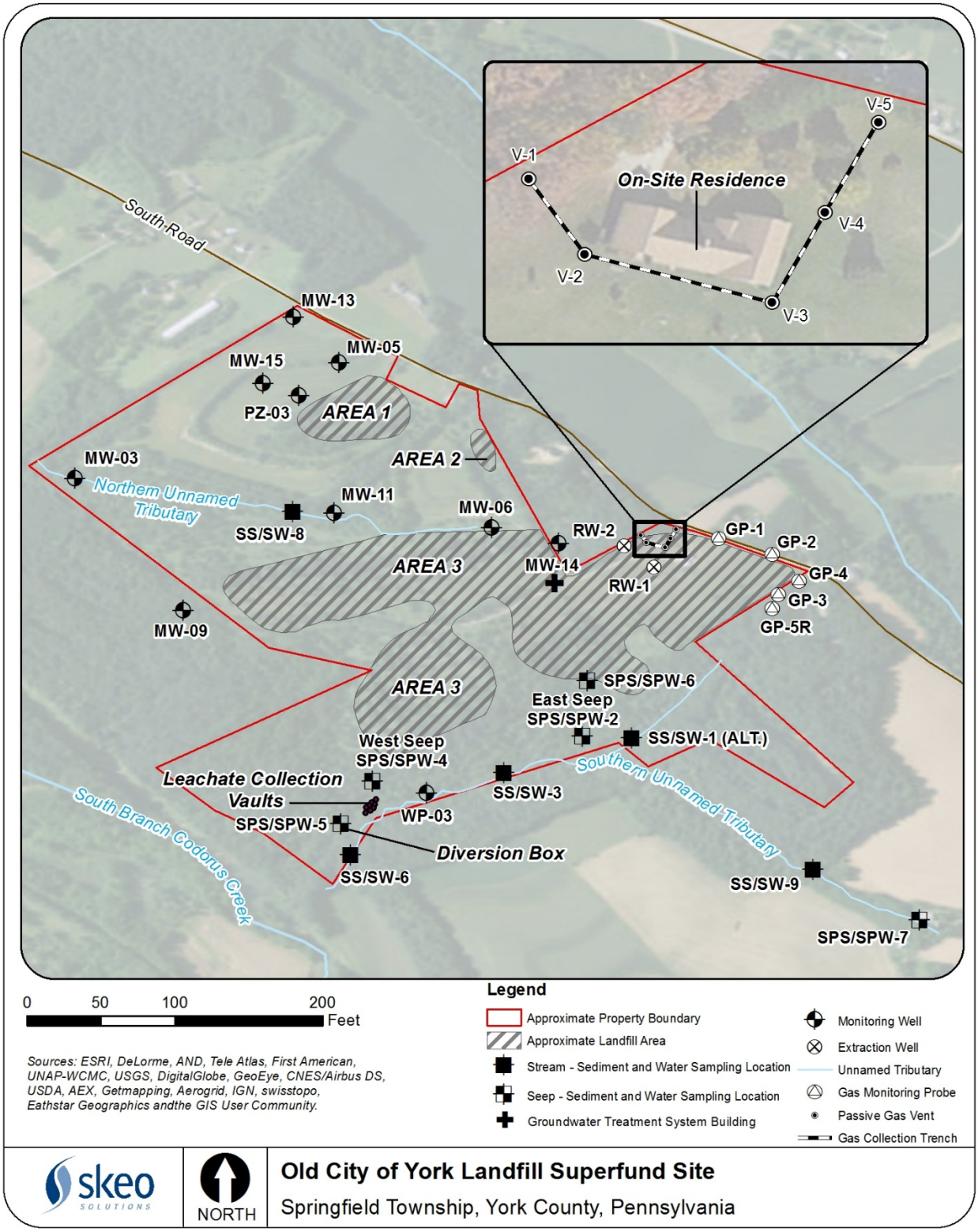
SITE IDENTIFICATION		
Site Name: Old City of York Landfill		
EPA ID: PAD980692420		
Region: 3	**State:** PA	**City/County:** Springfield Township, York County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:** N/A		
Author name (Federal or State Project Manager): Roy Schrock		
Author affiliation: EPA Region 3		
Review period: 8/25/2020 - 2/9/2021		
Date of site inspection postponed due to covid		
Type of review: Statutory		
Review number: 5		
Triggering action date: 2/26/2016		
Due date *(five years after triggering action date)*: 2/26/2021		

Figure 1: Site Location Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 2: Detailed Site Map



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The detailed site map shows monitoring locations: stream water (SW), stream sediment (SS), seep water (SPW) and seep sediment (SPS). The stream water and stream sediment samples were taken from the northern unnamed tributary and the southern unnamed tributary. The seep water and seep sediment sampling locations are located in the east seep and the west seep.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The 1991 RI identified 1,2-dichloroethane, tetrachloroethene (PCE), 1,1,2-trichloroethane, trichloroethene (TCE) and vinyl chloride as contaminants of concern (COCs) in groundwater. The COCs exceeded Maximum Contaminant Levels (MCLs) or proposed MCLs. Results of human health risk assessment (HHRA), summarized in the 1991 ROD, identified unacceptable carcinogenic risk for on- and offsite residents from exposure to contaminated groundwater (i.e., dermal contact, ingestion and inhalation of vapors). Risks associated with exposure to contaminated soil and sediment were found to be within EPA's acceptable carcinogenic risk range.

Response Actions

In the early 1980s, residents raised questions concerning water quality. Pennsylvania Department of Environmental Resources (PADER now PADEP) sampled residential wells and found volatile organic compounds (VOCs) in six residential wells along South Road adjacent to the Site. As a result, a public water main was installed along South Road from the Town of Seven Valleys, located 1.5 miles northwest of the Site. Springfield Township also implemented a construction moratorium in 1982, which required that any new residential construction along South Road in the area of the Site connect to the public water supply.

EPA proposed the Site for listing on the Superfund National Priorities List (NPL) in December 1982 and finalized the listing in September 1983. On October 27, 1987, a group of potentially responsible parties (PRPs) entered into an Administrative Order on Consent (AOC) with EPA to conduct a remedial investigation and feasibility study (RI/FS). The PRPs finalized the RI/FS in July 1991.

On April 9, 1991, the property owner placed a restrictive covenant on the deed for the entire 178-acre property. The covenant prohibits the use of groundwater and surface water, the further development or subdivision of the property, the use of additional areas for agriculture, and the disturbance of the surface soils for any purpose except as required or approved by EPA and PADEP.

Remedial Action

EPA selected the remedy for the Site in a September 31, 1991 ROD (1991 ROD) which included groundwater extraction wells (RW-1 and RW-2) and a treatment plant, restoration of the soil cover, removal of sediments from the leachate vaults, a landfill gas venting system, a perimeter fence, monitoring program for groundwater and surface water and sediment, a restrictive covenant on the landfill property and institutional controls requiring connection to public water for residential properties. EPA then modified the remedy in a September 27, 1996 Explanation of Significant Differences (1996 ESD) that revised the groundwater clean up levels to MCLs. EPA issued a March 31, 2000 ROD Amendment (2000 ROD Amendment) that modified the groundwater remedy from extraction and

treatment to monitored natural attenuation (MNA). As a result, the treatment system was disconnected. The 2000 ROD Amendment also required institutional controls on individual properties.

The final remedy as selected by the 1991 ROD, as modified by the 1996 ESD and 2000 ROD Amendment, consists of the following components:

- Restoration of the soil cover in the northeastern portion of Area 3 to a 2-foot minimum;
- Removal of sediments from the leachate collection vaults with disposal at an offsite permitted treatment, storage or disposal facility or placement below the onsite landfill soil cover;
- A landfill gas venting system to prevent landfill gas migration;
- A perimeter fence at the leachate collection vaults to prevent public access;
- Groundwater and surface water/sediment monitoring program to ensure continued protection of human health and the environment;
- Requirement that the restrictive covenant on the landfill property remains in place;
- Institutional controls on individual properties, as necessary, to prohibit the installation of new wells or the use of existing wells in the immediate Site vicinity to prevent migration of the groundwater contaminant plume;
- Monitored natural attenuation (MNA) of groundwater to meet groundwater cleanup goals (Table 1)[1];
- Groundwater extraction and treatment as a contingent remedy to MNA if EPA determines, in consultation with PADEP, that MNA is not protective of human health and the environment.

Remedial action objectives (RAOs) for the remedy are to prevent exposure to contaminated material in the landfill, restore groundwater to beneficial use, and prevent the sudden release of sediments from the leachate collection system.

Table 1: Groundwater COC Cleanup Goals

Groundwater COC	ROD Amendment Cleanup Goal (µg/L)
Benzene	5
1,4-Dichlorobenzene	75
1,2-Dichloroethane	5
1,1-Dichloroethene	7
Methylene chloride	5
PCE	5
1,1,2-Trichloroethane	5
TCE	5
Vinyl Chloride	2
Notes: Based on list of COCs and required remediation levels for groundwater included as Table 1 of the 2000 ROD Amendment. MCLs serves as the basis for each of the groundwater cleanup goals.	

[1] The 2000 ROD Amendment replaced groundwater extraction and treatment with MNA, as discussed in additional detail in the Status of Implementation section.

Status of Implementation

EPA issued an Unilateral Administrative Order (UAO) in June 1992 to the following six PRPs: Rite-Way Services, Inc. (predecessor to Waste Management of Pennsylvania, Inc.), Stewart and March Inc., York Wrecking Company Inc., Service America Corporation, Litton Industrial Automation Services, Inc. and A.B. Chance Company, Inc. to design and construct the remedy at the Site. The PRPs completed the remedial design between June 1992 and May 1995.

The PRPs began remedial action construction between November 1995 and June 1996. Construction consisted of the following activities:

- Installation of the groundwater extraction and treatment system consisting of two extraction wells, air-stripping, and off-gas treatment.
- Restoration of the soil cover to a minimum thickness of two feet in 16 acres of Area 3;
- Installation of a passive methane gas extraction system around the onsite residence consisting of a gas collection trench, five methane vents, and five perimeter monitoring probes;
- Removal of sediment from the leachate collection vaults and placement beneath the soil cover;
- Installation of a fence around the leachate collection system.

EPA issued the Prelimary Close-Out Report (PCOR) on September 27, 1996, documenting Construction Completion for the Site.

In 1998, Waste Management performed a supplemental RI/FS and submitted a request to EPA to modify the remedy by replacing the existing groundwater extraction and treatment remedy with MNA in conjunction with institutional controls. The supplemental RI/FS indicated that COC concentrations in groundwater were declining due to natural processes, that the contaminant plume was stable, and that no contaminant migration was occuring. EPA modified the groundwater remedy to MNA and institutional controls with the 2000 ROD Amendment.

The groundwater extraction and treatment system was shut down on April 20, 2000 and decommissioned between May and July 2000. The decommissioning was performed in a manner so that the system could be restarted if the MNA remedy did not satisfy the requirements of the 2000 ROD Amendment.

Institutional Control (IC) Review

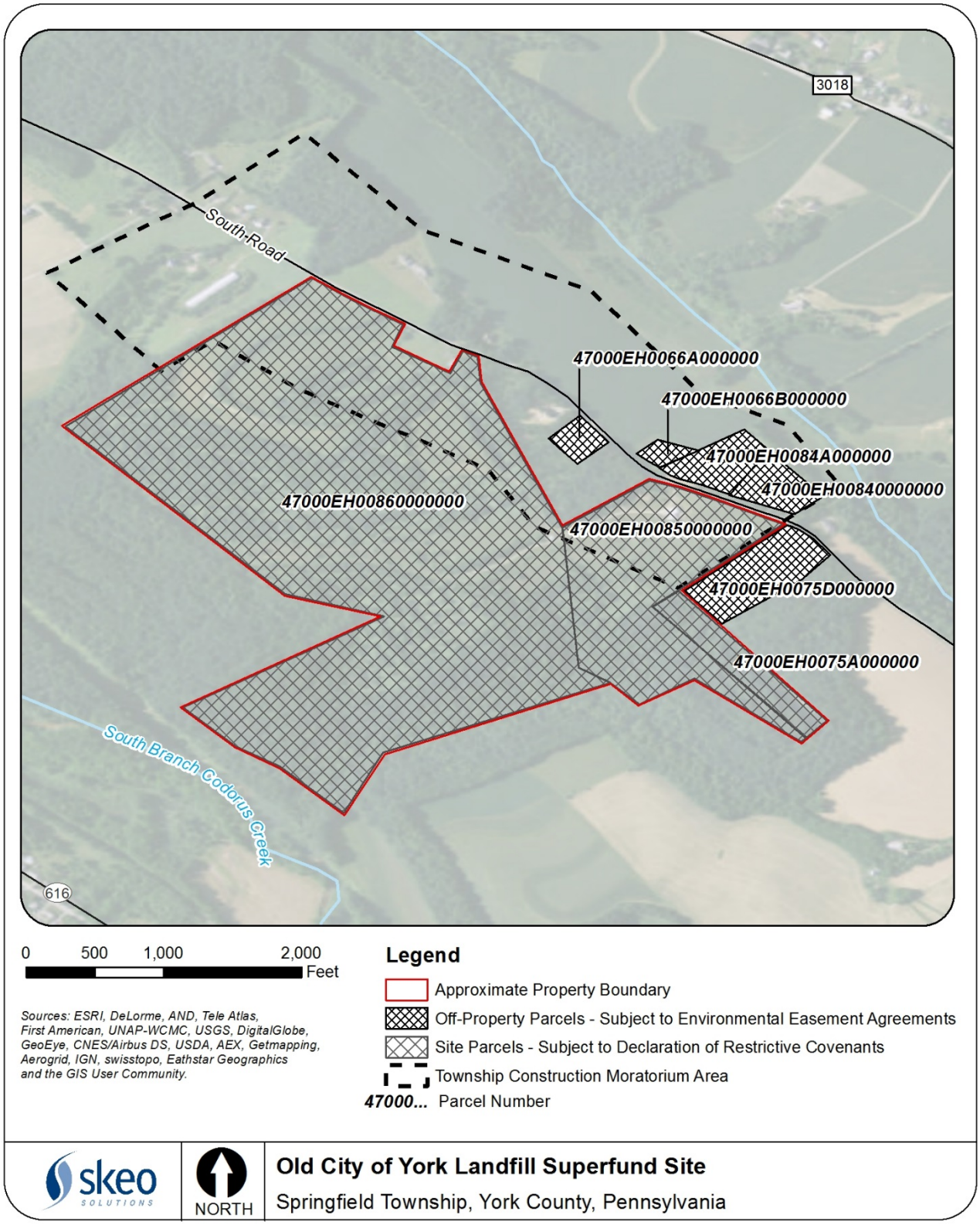
Table 2 lists the institutional controls associated with areas of interest at the Site and surrounding areas and Figure 3 shows properties included. The ICs required by the decision documents on the off-site properties are in place and are monitored annually.

Table 2: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)

Landfill property soil, groundwater and surface water	Yes	Yes	47000EH00850000000, 47000EH00860000000, 47000EH0075A000000	Restricts subdivision of the property, construction, and groundwater and surface water use, excavation that may expose solid waste, expansion of agricultural areas of the Site.	Declaration of Restrictive Covenants, recorded with the York County Recorder of Deeds.
Off-landfill property groundwater	Yes	Yes	47000EH0066A000000, 47000EH0066B000000, 47000EH0075D000000, 47000EH00840000000, 47000EH0084A000000	Restrict use of groundwater. These properties are on public water	Environmental Protection Easement Agreements recorded with the York County Recorder of Deeds.
			Includes properties along South Road closest to the Site	Require new construction to connect to the public water supply.	Springfield Township Construction Moratorium.

Figure 3: Institutional Control Base Map



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Systems Operations/Operation & Maintenance

Waste Management is responsible for O&M activities at the Site. Waste Management's contractor, CORE Environmental Services, Inc. (CORE), conducts O&M activities in accordance with an EPA-approved Operation, Maintenance and Monitoring (O&M and Monitoring Plan), dated September 2000, and revised in November 2006. Waste Management submits annual O&M and Monitoring Reports to EPA and PADEP that document Site activities conducted and data collected throughout the year.

Quarterly O&M activities include the following:

- Inspection and calibration of combustible gas monitors located in the basements of the onsite residence and two nearby residences;
- Inspection of monitoring wells, perimeter landfill gas monitoring probes, the access road to the west seep, erosion and sedimentation controls, the landfill cover, the passive landfill gas vents and the sediment collection vaults, and fencing.

Annual O&M activities include the following:

- Monitoring of the perimeter landfill gas probes;
- Measuring sediment thickness in the sediment collection vaults and removal as necessary;
- Confirmation that institutional controls are in place.

Monitoring – Groundwater, surface water, sediment, leachate seep conducted once every three years

- Sample 10 monitoring wells for VOCs every three years and perform statistical analysis.
- Sample five co-located surface water and sediment locations for metals from the northern unnamed tributary and the southern unnamed tributary.
- Sample five co-located leachate seep and sediment locations for metals from the east seep and the west.

Routine O&M Activities

The O&M activities include regular monitoring of groundwater, surface water, seeps and sediment once every three years. The PRP currently samples 10 monitoring wells for VOCs and perform statistical analysis every three years. The most recent triennial groundwater monitoring event occurred in 2019. Groundwater monitoring results are discussed in detail in the Data Review section.

The PRP samples five co-located surface water and sediment locations in the northern and southern unnamed tributary and five co-located leachate seep and sediment locations in the east and west seeps for total and dissolved cadmium, iron, lead, mercury, silver and water hardness every three years, concurrent with groundwater monitoring once every three years (see Figure 2). The most recent leachate seep, surface water and sediment sampling event occurred in 2019 and results are discussed in detail in the Data Review section.

According to the O&M and Monitoring Plan, the sediments will be removed and properly disposed when the vaults have 25% remaining capacity (i.e., 75% full) based on the results of an annual inspection. The PRP cleaned out the vaults in 2016 and repaired the lids to the vaults in 2019

O&M tasks for institutional controls include annual inspections of properties for which restrictive covenants have been secured to confirm that no new water supply wells have been installed on the

properties. During the inspection, the landowner is interviewed to confirm that groundwater withdrawal rates have not increased, and that any groundwater usage remains solely for non-potable purposes. From 2016 to 2019, no new groundwater wells were identified on any of the five properties for which restrictive deed covenants exist, groundwater usage rates remained approximately the same level as before the restrictive deed covenants were put in place and none of the property owners are using groundwater for potable purposes. Institutional control monitoring also includes an annual records review (e.g., at York County Courthouse and Springfield Township Building) on certain properties near but outside of the institutional control area to determine if any subdivision and/or development has taken place. Springfield Township staff are kept apprised of activities related to the maintenance of the institutional controls and according to the 2019 Annual Report, there haven't been any changes since the 2012 municipal and county files were reviewed.

O&M of the Leachate Collection System

Waste Management evaluated the leachate collection system, sediment vaults and diversion box during the June 2016 sampling event. Waste Management removed liquids and sediment from the eight collection vaults and then pressure washed and cleaned the vaults, the diversion box and the manhole on June 15, 2016. The manhole/vaults were determined to be structurally intact and in fair condition, with no obvious holes or cracks present. During the June 2019 Site inspection, three concrete lids for the leachate vaults and the one cover for the diversion box were replaced. Since then, no new staining or seeps have been observed

Response to Flood Damage

The Site was subject to several flooding events during the summer months of 2018 that resulted in damage to the access road and the leachate collection system. Due to the flood the vault that collects leachate overflowed and discharged leachate into both the east and west seep channels that eventually discharge to the creek. The PRP's contractor repaired the damage due to the flood. A drainage channel was widened and reinforced with rip rap to stabilize it. To prevent damage from future floods, approximately 150 feet of the surface drainage area leading to the manhole collection vault that had previously overflowed was graded and stabilized with riprap.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last five-year review as well as the recommendations from the last five-year review and the current status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2016 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The remedy for the Site is protective of human health and the environment in the short-term because the landfill soil cover prevents exposure to landfill materials and institutional controls restrict use of groundwater. O&M activities, consisting of maintenance of the soil cover and leachate collection vaults and long-term monitoring of leachate seeps, groundwater, surface water, sediment, and landfill gas vents, continue a

		regular basis. A statistical analysis will continue to be performed periodically for groundwater data to evaluate the effectiveness of MNA. However, the following actions need to be taken to ensure long-term protectiveness: • Evaluate mitigation measures to address the iron concentrations in leachate seep water, surface water, and sediment from the west seep area. • Sample Codorus Creek surface water and sediment as part of long-term monitoring. • Sample groundwater for 1,4-dioxane during the next sampling event. • Evaluate the effectiveness of the leachate collection vaults to determine if repairs or upgrades are warranted to ensure effective, long-term collection of leachate and sediment.

Table 4: Status of Recommendations from the 2016 FYR

OU 1	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
	Iron in leachate seep water, surface water, and sediment continue to exceed BTAG screening and benchmarks and Pennsylvania Water Quality Standards. Orange staining indicative of high iron content was observed throughout the length of the drainage channel between the diversion box (downgradient of the collection vaults) and Codorus Creek	Evaluate additional mitigation measures for leachate seep water, surface water and sediment at the diversion box and water leading to Codorus Creek. Any proposed mitigation measures will require the submission of a work plan to EPA and PADEP for review and approval.	Ongoing	PRP continues to sample the leachate, surface water and sediment for metals including iron. Iron concentrations in Codorus Creek do not exceed PA WQS and orange staining are not present in the creek. PRP cleaned out the vaults in 2016 and replaced the lids to the vaults in 2019.	2016 and 2019
	Visible iron impacts were observed extending into Codorus Creek.	Sample Codorus Creek surface water and sediment as part of long-term monitoring.	Completed	Sampling was implemented during the June 2016 and June 2019 sampling events and	6/25/2019

	Current long-term monitoring does not include sampling of Codorus Creek			addressed in the Annual Reports. Seeps still exceed PA water quality criteria and BTAG screening benchmark levels.	
	Groundwater samples have not been analyzed for 1,4-dioxane	Sample groundwater for 1,4-dioxane during the next sampling event.	Completed	Groundwater sampling for 1,4 dioxane was performed during the June 2016 sampling event for all monitoring well. The 1,4-dioxane levels in MW-05 and PZ-03 were 88 and 120 ug/L, respectively	6/25/19
	The concrete leachate collection system vaults are in deteriorating condition and their integrity is unknown.	Evaluate the integrity of the leachate collection vaults to determine if additional actions are warranted to maintain their long-term effectiveness. Any proposed actions to address the leachate collection system will require the submission of a work plan to EPA and PADEP for review and approval.	Completed	The vault integrity was evaluated during the June 2016 site visit and was documented in the August 2016 Status Report. Three concrete lids for the leachate vaults and one cover for the diversion box were replaced during the June 2019 site inspection.	June 15, 2016 and June 25, 2019

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

EPA published a public notice in the York Daily Record newspaper, on October 15, 2020. It stated that the FYR was underway and invited the public to submit comments to the EPA. The results of the review and the report will be made available online and at the Site information repository at Springfield Area Village Library located at 35-C North Main Street in Jacobus, Pennsylvania when the library is open.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy. EPA did not receive any phone calls or emails from the community in response to the EPA public notice. On September 30, 2020, the RPM contacted the Springfield Township Secretary to

conduct an interview via email. The Township Secretary stated she had not received any calls about the Site. The Secretary did state that there are two residential construction sites near the Site but that both are connected to public water.

Data Review

The data review evaluates triennial groundwater, surface water, leachate seep, sediment monitoring data and annual landfill gas and leachate collection system monitoring data, as presented in the 2016 through 2019 O&M and Monitoring Reports, prepared by the PRP's contractor. Figure 2 represents sampling locations. Key points from the review are provided below:

- Groundwater monitoring data indicate that COC concentrations were below MCLs during the 2019 groundwater sampling event at all monitoring wells and there is no evidence of plume expansion.
- Iron concentrations in select surface water, leachate seep water, and sediment locations exceed comparison values (BTAG values, PAWQS); however, iron levels in both Codorus Creek and both tributary surface water are in compliance with water quality standards.
- From 2016 to 2019, methane was not detected in any of the gas probes.
- In June 2016, accumulated sediment and leachate were removed from the eight leachate collection vaults and transported offsite for disposal.

Groundwater Monitoring Data

A total of ten groundwater monitoring wells are sampled on a triennial basis (MW-05, MW-06, MW-07, MW-09, MW-13, MW-14, MW-15, PZ-03, RW-02 and WP-03). The monitoring wells are designed to monitor both shallow and deep groundwater and range in depth from 25 feet to 153 feet below ground surface (bgs). Groundwater data collected during the most recent triennial sampling event in 2019 indicated that COC concentrations have continued to decline and are below MCLs in all wells. Additionally, there is no evidence of plume expansion. Concentrations reported for the most recent monitoring event (June 2019) indicated no wells with vinyl chloride concentrations above the MCL. Concentrations of vinyl chloride have decreased substantially from the peak concentrations. The concentration of vinyl chloride at piezometer well PZ-3 has decreased from a peak concentration of 17µg/L (December 2001) to <1.0 µg/L (June 2019). Vinyl chloride in monitoring well MW-14 has decreased from a peak concentration of 11 µg/L (December 2001) to <1.0 µg/L (June 201) and vinyl chloride in monitoring well MW-5 has decreased from a peak concentration of 13 µg/L (June 2002) to <1.0 µg/L (June 2019). The 2013, 2016 and 2019 concentrations are the lowest observed in these three wells in the last nineteen years.

In accordance with the 2000 ROD Amendment, a statistical analysis is performed for groundwater monitoring data during each triennial sampling event to evaluate MNA progress. The statistical analysis results (using simple linear regression and analysis of variance) report decreasing trends at most wells since groundwater extraction was discontinued in 2000[2]. The only exception was a marginally increasing trend for TCE at well MW-06; however, all detected TCE concentrations in this well remained below the MCL of 5 µg/L. The groundwater concentrations and statistical analysis indicate

[2] Summary of statistical evaluation of groundwater monitoring results is presented in Table 9 of the 2019 Annual Report.

that MNA is occuring and progressing as intended. Additionally, all the sampling results during the monitoring period were below the MCL of 70 µg/L for cis-1,2-DCE.

Appendix D includes the results from the sampling program performed in June 2016 for 1,4-dioxane as presented in the Annual and Triennial 2016 Routine Monitoring and Statistical Evaluation Report, prepared by the PRP's contractor, dated September 2016. The 2016 Annual Report reported that MW-05 and PZ-03 detected 88 and 120 ug/L of 1,4-dioxane. Sampling for 1,4-Dioxane was only conducted one time in 2016. Groundwater well samples should be analyzed for 1,4-dioxane in all sampling events to verify the 2016 results and evaluate the trends of 1,4-dioxane.

Appendix D also includes a summary of the 2019 groundwater sampling results as presented in the Annual and Triennial 2019 Routine Monitoring and Statistical Evaluation Report, prepared by the PRP's contractor, dated October 2019. Appendix D also includes a potentiometric surface map from the 2019 sampling event (Appendix D, Figure D-1).

Surface Water, Leachate Seep and Sediment Monitoring Data

For purposes of this Five-Year Review the metals data will be compared to BTAG screening values and as appropriate water quality criteria. Surface water, leachate seep, and stream and seep sediment sampling are performed on a triennial basis. Co-located surface water and sediment samples are collected at five locations and co-located leachate seep and sediment samples are collected at five locations, as shown on Figure 2. Samples are taken from the northern unnamed tributary, the southern unnamed tributary, the east seep area and the west seep area.

Surface water sampling results were compared to the BTAG freshwater screening benchmarks and water quality criteria. Because the leachate seeps discharge to the Unnamed Southern Tributary to Codorus Creek, the leachate seep sampling results were also compared to the BTAG freshwater screening benchmarks and water quality criteria. All sediment sampling results were compared to the BTAG freshwater sediment screening benchmarks (Appendix D, Table D-2).

Three seep water sampling locations (SPW-4, SPW-5 and SPW-6) exceeded the iron specific BTAG screening benchmark (300 µg/L based on an average hardness of 100 mg/L) and the water quality criteria for iron of 1,500 µg/L. Leachate seep samples SPW-4 (30,800 µg/L) and SPW-5 (8,820 µg/L) were both collected from the west seep area and SPW-6 (4,340 µg/L) from the east seep area. The results at these locations are within historical concentration ranges for total/dissolved iron.

Sampling results indicate that the Codorus Creek and unnamed tributary stream water samples had concentrations that were below the water quality criteria for metals.

Sampling results from the 2019 stream and seep sediment monitoring show that all the stream and seep sediment sample concentrations exceeded the BTAG screening benchmark for iron of 20,000 mg/kg. Stream sediment sampling location SS-6 and seep sediment sampling location SPS-2 exceeded the BTAG screening levels for lead of 35.8 mg/kg. The maximum iron concentration of 410,000 mg/kg was detected in the leachate seep sediment sample (SPS-5) that is located adjacent to the diversion box, which receives the leachate seep and sediment overflow from the leachate collection vaults.

Codorus Creek Sampling Data

The Codorus Creek Sampling Work Scope was utilized during the 2019 sampling event and consisted of surface water sampling for total and dissolved metals. Samples were obtained from three upstream locations and three downstream locations at least 100 feet apart from the entrance of the west seep into the stream. Dissolved results of the upstream and downstream water samples are summarized in Appendix D, Table D-4. Iron concentrations at upstream sample location CCWU-1 (0.2 µg/L and 1,050 µg/L, respectively) and an iron concentration at downstream sample location CCWD-3 (57 µg/L) were below the corresponding water quality criteria of 1,500 µg/L. Upstream and downstream water sample results also show all constituent concentrations were below the BTAG screening benchmark levels with the exception of upstream sample location CCWU-1.

Codorus Creek sediment sample results from the upstream and downstream sampling locations are summarized in Appendix D, Table D-5. All sediment sample location results exceeded the BTAG screening benchmark level for iron. Trend analysis should be conducted to determine if iron concentrations change over time. Risk evaluation should be performed if iron concentrations are increasing.

Landfill Gas

Landfill gas monitoring is performed on an annual basis for methane at five locations. The methane action level specified in the Site O&M and Monitoring Plan is 1.25%. From 2016 to 2019, methane was not detected in any of the gas probes. In addition, combustible gas monitors located in the basements of two residences north of South Road and at the residence on the landfill property did not signal an alarm in the last five years.

Leachate

The leachate collection system consists of eight concrete vaults that collect leachate primarily from the west seep area. The O&M and Monitoring Plan requires sediment in the leachate collection vaults to be removed and disposed offsite when the vaults become 75% full. The vaults are considered 75% full when the thickness of the sediment in the vaults averages 4.5 feet. In June 2016, Kline's Services, Inc. was retained to remove accumulated sediment from the eight west seep collection vaults. Sediment and standing water in the vaults were agitated to suspend the sediment, and the mixture was transported to a tank truck for off-site transport. Approximately 5,500 gallons of waste was taken to Derry Township Treatment Facility for processing. As of June 2019, the average thickness for the eight vaults was 1.5 feet (25% full).

Site Inspection

Due to the COVID-19 pandemic, EPA did not conduct a site inspection for this FYR. EPA will conduct a site inspection as soon as possible following the completion of the FYR when COVID 19 conditions allow. The routine inspection of the Site was conducted by the PRP contractor on November 9, 2020. The PRP reported that site conditions and seep areas were unchanged. Sediment in the vaults remained low and repairs were intact. There were no rainfall washouts. EPA and DEP personnel did not participate in the inspection.

V. TECHNICAL ASSESSMENT

TECHNICAL ASSESSMENT

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

Yes. The remedy is functioning as intended by the decision documents. The soil cover prevents direct exposure to waste materials. The PRPs perform routine O&M activities to ensure that the integrity of the soil cover, drainage structures, leachate collection system and passive landfill gas venting system is maintained. Annual landfill gas monitoring has not identified methane above the permissible limit, which indicates that there is no significant risk posed by landfill gas to nearby residents.

Concentrations of all COCs in groundwater were below MCLs in all wells during the most recent triennial sampling event in 2019. Additionally, statistical analysis of sampling results required by the 2000 ROD Amendment indicates that contaminant concentrations are decreasing in all wells except MW-06. Therefore, MNA appears to be occuring and is progressing as intended. However, there were detections of 1,4-dioxane in 2 monitoring wells and routine sampling for 1,4-dioxane should be incorporated into future groundwater sampling events. Residential properties are on public water and there are restrictions in place to prevent use of groundwater for drinking water purposes.

To address the iron concentrations, the PRP replaced three concrete lids for the leachate vaults and the cover for the diversion box during the June 2019 site inspection. The PRP will continue to evaluate the results of these mitigation measures for leachate, surface water and sediment.

Institutional controls are in place. The restrictive covenant and environmental protection easement agreements on individually owned parcels continue to prevent exposure to potential contaminated groundwater that was present when the ICs were implemented. The restrictive covenant for the landfill property prohibits groundwater and surface water usage, development or subdivision of the property, the use of additional areas for agriculture, and disturbance of the soil cover are prohibited. The restrictive covenants transfer to future landowners if the properties are sold. The institutional control monitoring program, performed by the PRP, ensures that the institutional controls are being implemented properly and that the effectiveness of the institutional controls is maintained. Although not required as a component of the remedy, the construction moratorium of Springfield Township requires that new construction on South Road must connect to the public water supply which further enhances the protectiveness of the remedy.

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

No. Although the RAOs and cleanup levels from the time of remedy selection remain valid; the exposure assumptions, risk methodology and toxicity factors used at the time of the remedy selection have changed. However, these changes do not affect the protectiveness of the remedy.

Vapor Intrusion was evaluated by EPA as part of the 2011 FYR, the 2016 FYR and agan in this FYR. Based on the data and review EPA has still determined that vapor intrusion is not a concern because of the low level of VOCs detected in groundwater and the depth of groundwater. The online VI calculator was used to model VI risks based on groundwater concentrations. At this time VI risk is not expected; however, if groundwater concentrations increase it is recommended that VI modeling be repeated.

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

Question C Summary:

No. No other information has been identified that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
Issues and Recommendations Identified in the Five-Year Review:

Issues/Recommendations	
Issues and Recommendations Identified in the Five-Year Review:	
OU(s): 1	**There are no issues identified for OU1**

OTHER FINDINGS

- Due to the COVID-19 pandemic, EPA did not conduct a site inspection for this FYR. EPA will conduct a site inspection as soon as possible following the completion of the FYR when COVID 19 conditions allow.
- PRP will continue to monitor the leachate collection system and will identify mitigation measures when needed. Trend analysis should be conducted to determine if iron concentrations change over time. Risk evaluation should be performed if iron concentrations are increasing.
- PRP will submit plans to EPA and DEP outlining future mitigation measures to address the iron concentrations.
- PRP will incorporate routine sampling for 1,4-Dioxane in the future groundwater monitoring events and monitor concentrations over time. Site Sampling plans will be updated accordingly.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* N/A
Protectiveness Statement: The remedy for this Site is protective of human health and the environment because the landfill cover prevents exposure to landfill materials and institutional controls restrict the use of groundwater. O&M activities, consisting of maintenance of the soil cover and the leachate collection vaults; and monitoring of the leachate seeps, groundwater, surface water, sediment, and landfill gas vents, will continue on a regular basis.	

VIII. NEXT REVIEW

The next five-year review report for the Old City of York Landfill Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2016 Annual and Triennial Routine Monitoring and Statistical Evaluation Report, Old City of York Landfill Superfund Site. Prepared by Core Environmental Services, Inc. September 2016.

2017 Annual Routine Monitoring Report, Old City of York Landfill Superfund Site. Prepared by Core Environmental Services, Inc. September 2017.

2018 Annual Routine Monitoring Report, Old City of York Landfill Superfund Site. Prepared by Core Environmental Services, Inc. September 2018.

2019 Annual and Triennial Routine Monitoring and Statistical Evaluation Report, Old City of York Landfill Superfund Site. Prepared by Core Environmental Services, Inc. October 2019.

Declaration of Restrictive Covenants, York County, Pennsylvania Recorder of Deeds Office. Deed Book 182, Page 629. Recorded June 7, 1991.

Explanation of Significant Differences, Old City of York Landfill Site, Springfield Township, York County, Pennsylvania. Prepared by USEPA Region III. September 27, 1996.

Final Revised Remedial Investigation and Risk Assessment Report (RI/RA) for the Old City of York Landfill, Springfield Township, Pennsylvania. Prepared by Groundwater Technology. July 8, 1991.

Five-Year Review Report, Old City of York Landfill Superfund Site, Springfield Township, Pennsylvania. Prepared by USEPA Region III. December 29, 2000.

Record of Decision Amendment, Old City of York Landfill Superfund Site, York County, Pennsylvania. Prepared by USEPA Region III. March 31, 2000.

Record of Decision, Old City of York Landfill Site, Springfield Township, York County, Pennsylvania. Prepared by USEPA Region III. September 30, 1991.

Second Five-Year Review Report for Old City of York Landfill Site, Springfield Township, York County, Pennsylvania. Prepared by USEPA Region III. February 2006.

Third Five-Year Review Report for Old City of York Landfill Site, Springfield Township, York County, Pennsylvania. Prepared by USEPA Region III. February 2011.

Fourth Five-Year Review Report for Old City f York Landfill Site, Springfield Township, York County, Pennsylvania. Prepared by USEPA Region III. February 2016.

APPENDIX B – SITE CHRNOLOGY

Event	Date
Landfill activities occurred	1961-1975
Local residents raised concerns about water quality near the Site The Pennsylvania Department of Environmental Resources (PADER, now PADEP) sampled residential wells and identified volatile organic compounds (VOCs) in six residential wells	July 1, 1981
PADER completed its preliminary assessment	June 1, 1982
EPA proposed the Site for listing on the Superfund program's National Priorities List (NPL)	December 30, 1982
Site listed on the NPL by EPA	September 8, 1983
EPA completed a site inspection	December 1, 1983
EPA and PRPs entered into an Administrative Order on Consent (AOC) to conduct a remedial investigation and feasibility study (RI/FS)	October 27, 1987
Site property owner recorded a restrictive covenant on the 178-acre landfill property	April 9, 1991
PRPs completed the RI/FS	July 19, 1991
EPA issued the Record of Decision (ROD), which included extraction and treatment of groundwater	September 30, 1991
EPA issued Unilateral Administrative Order to several PRPs to conduct the remedial design and remedial action	June 30, 1992
PRPs finished the remedial design and began the remedial action	May 8, 1995
PRPs began construction for the remedial action	November 6, 1995
EPA issued Explanation of Significant Differences (ESD) to allow on-site disposal of leachate vault sediments below the landfill soil cover and to modify groundwater cleanup standards from background to federal maximum contaminant levels (MCLs)	September 27, 1996
EPA prepared the Preliminary Close-out Report	September 27, 1996
PRPs submitted formal request and proposed scope of work to EPA to modify groundwater remedy from extraction and treatment to monitored natural attenuation (MNA) and institutional controls PRPs conducted fieldwork for focused RI/FS in third quarter of 1998	September 1, 1998
PRPs presented results of the focused RI/FS in Alternative Groundwater Remedy Evaluation Report	November 9, 1998
EPA issued ROD Amendment to change groundwater remedy from extraction and treatment to MNA and institutional controls	March 31, 2000
EPA prepared the First Amendment to the Administrative Order to shut down the groundwater extraction and treatment system	April 18, 2000
EPA issued the first FYR	December 29, 2000
PRPs completed the remedial action	September 27, 2001
EPA issued the second FYR	February 27, 2006
Site achieved EPA's Sitewide Ready for Anticipated Use (SWRAU) measure	June 27, 2008
EPA issued the third FYR	February 28, 2011
PRPs conducted seep remediation project to address areas identified in third FYR as requiring maintenance	July 2014
EPA issued the fourth FYR	February 21, 2016

APPENDIX C – PRESS RELEASE

The following notice ran in the October 15, 2020 edition of the York Daily Record

EPA PUBLIC NOTICE

EPA REVIEWS CLEANUP
OLD CITY OF YORK LANDFILL

The U.S. Environmental Protection Agency (EPA) is reviewing the cleanup that was conducted at the Old City of York Landfill Superfund Site located in Seven Valleys, 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 2016 and concluded that the remedy was working as designed and is protective in the short-term. Findings from the current review will be available in February, 2021.

To access site information, including the five-year review report once finalized, visit: www.epa.gov/superfund/oldcityofyork

For questions or to provide site-related information for the review, contact:
Gina Soscia, EPA Community Involvement Coordinator
215-814-5538 or soscia.gina@epa.gov

APPENDIX D – DATA REVIEW SUPPORTING DOCUMENTATION

Table D-1
Groundwater VOC and SVOC Analytical – June 2016
Old City of York Landfill
York, Pennsylvania

Period: From 6/15/2016 thru 06/16/2016 – Inclusive
Sample Type: Water

Site	Date	1,4-Dioxane (µg/L)
MW-05	6/16/2016	88
MW-06	6/15/2016	<10.0
MW-07	6/15/2016	<10.0
MW-09	6/15/2016	<10.0
MW-13	6/16/2016	<10.0
MW-14	6/15/2016	<10.0
MW-15	6/16/2016	<10.0
PZ-03	6/16/2016	120
RW-02	6/15/2016	<10.0
WP-03	6/15/2016	<11.0

Table D-2
Groundwater VOC and SVOC Analytical – June 2019
Old City of York Landfill
York, Pennsylvania

Period: From 6/25/2019 thru 06/25/2019 – Inclusive
Sample Type: Water

SITE	DATE	1,1,1-Trichloro ethane (ug/l)	1,1,2,2-Tetra chloroethane (ug/l)	1,1,2-Trichloro ethane (ug/l)	1,1-Dichloro ethane (ug/l)	1,1-Dichloro ethylene (ug/l)	1,2-Dichloro ethane (ug/l)	1,2-Dichloro propane (ug/l)
EPA - Maximum Contaminant Levels		200		5		7	5	5
MW-05	06/25/2019	<1.0	<1.0	<1.0	11.1	<1.0	<1.0	<1.0
MW-06	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-07	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-09	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-13	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-14	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-15	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PZ-03	06/25/2019	<1.0	<1.0	3.3	6.9	<1.0	<1.0	<1.0
RW-02	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WP-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

EPA-MSL - EPA Maximum Contaminant Level

[x]=Greater than Action Level --=Not analyzed

Table D-2
Groundwater VOC and SVOC Analytical – June 2019
Old City of York Landfill
York, Pennsylvania

Period: From 6/25/2019 thru 06/25/2019 – Inclusive
Sample Type: Water

SITE	DATE	Benzene (ug/l)	Bromodichloromethane (ug/l)	Bromoform (ug/l)	Carbon tetrachloride (ug/l)	Chlorobenzene (ug/l)	Chloroethane (ug/l)	Chloroform (ug/l)
EPA - Maximum Contaminant Levels		5			5	100		
MW-05	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-06	06/25/2019	<1.0	<1.0	<1.0	<1.0	7.0	<1.0	<1.0
MW-07	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-09	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-13	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-14	06/25/2019	<1.0	<1.0	<1.0	<1.0	7.2	<1.0	<1.0
MW-15	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PZ-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
RW-02	06/25/2019	<1.0	<1.0	<1.0	<1.0	2.4	<1.0	<1.0
WP-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

EPA-MSL - EPA Maximum Contaminant Level

--=Not analyzed

Table D-2
Groundwater VOC and SVOC Analytical – June 2019
Old City of York Landfill
York, Pennsylvania

Period: From 6/25/2019 thru 06/25/2019 – Inclusive
Sample Type: Water

SITE	DATE	cis-1,2-Dichloro ethylene (ug/l)	cis-1,3-Dichloropropene (ug/l)	Dibromochloro methane (ug/l)	Dichloro difluoromethane (ug/l)	trans-1,2-Dichloroethene (ug/l)	Ethylbenzene (ug/l)	1,3-Dichloro benzene (ug/l)
EPA - Maximum Contaminant Levels		70				100	700	
MW-05	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-06	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-07	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-09	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-13	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-14	06/25/2019	2.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-15	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PZ-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
RW-02	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WP-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

EPA-MSL - EPA Maximum Contaminant Level

--=Not analyzed

Table D-2
Groundwater VOC and SVOC Analytical – June 2019
Old City of York Landfill
York, Pennsylvania

Period: From 6/25/2019 thru 06/25/2019 – Inclusive
Sample Type: Water

SITE	DATE	Methyl bromide (ug/l)	Methyl chloride (ug/l)	Methylene chloride (ug/l)	1,2-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	Tetrachloro ethylene (ug/l)	Toluene (ug/l)
EPA - Maximum Contaminant Levels				5	600	75	5	1000
MW-05	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-06	06/25/2019	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	<1.0
MW-07	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-09	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-13	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-14	06/25/2019	<1.0	<1.0	<1.0	<1.0	9.7	<1.0	<1.0
MW-15	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PZ-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
RW-02	06/25/2019	<1.0	<1.0	<1.0	<1.0	7.5	<1.0	<1.0
WP-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

EPA-MSL - EPA Maximum Contaminant Level

--=Not analyzed

Table D-2
Groundwater VOC and SVOC Analytical – June 2019
Old City of York Landfill
York, Pennsylvania

Period: From 6/25/2019 thru 06/25/2019 – Inclusive
Sample Type: Water

SITE	DATE	Trans-1,3-Dichloropropene (ug/l)	Trichloro ethylene (ug/l)	Trichloro fluoromethane (ug/l)	Vinyl chloride (ug/l)	Xylene (total) (ug/l)
EPA - Maximum Contaminant Levels			5		2	10000
MW-05	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
MW-06	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
MW-07	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
MW-09	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
MW-13	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
MW-14	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
MW-15	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
PZ-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
RW-02	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0
WP-03	06/25/2019	<1.0	<1.0	<1.0	<1.0	<2.0

EPA-MSL - EPA Maximum Contaminant Level

--=Not analyzed

Table D-3
Stream and Seep Water Analytical Results – Dissolved Metals – June 2019
Old City of York Landfill
York, Pennsylvania

STREAM WATER

Sample ID	Silver (ug/l)		WQC (1)	Iron (ug/l)		WQC (1, 3)	Cadmium (ug/l)		WQC (2)	Mercury (ng/l)		WQC (3, 4)	Lead (ug/l)		WQC (1)	Hardness (mg/l)
Stream Water 1 (Alt.)	<0.2	U	NA/ 20.0	<50	U	1,500	<0.2	U	0.5/ 5.6	<5.0	U	770/ 1,400	<1.0	U	7.8/ 201	289
Stream Water 3	<0.2	U	NA/ 1.8	<50	U	1,500	<0.2	U	0.2/ 1.4	<5.0	U	770/ 1,400	<1.0	U	1.7/ 44	70.5
Stream Water 6	<0.2	U	NA/ 1.9	<50	U	1,500	<0.2	U	0.2/ 1.5	<5.0	U	770/ 1,400	<1.0	U	1.8/ 47	74.1
Stream Water 8	<0.2	U	NA/ 5.4	<50	U	1,500	<0.2	U	0.3/ 2.7	<5.0	U	770/ 1,400	<1.0	U	3.5/ 89	135
Stream Water 9	<0.2	U	NA/ 1.3	<50	U	1,500	<0.2	U	0.2/ 1.2	<5.0	U	770/ 1,400	<1.0	U	1.4/ 36	59.1
BTAG Limit			3.2			300			0.25			26			2.5	

Limit based on hardness of 100 mg/L with exception of iron and mercury

SEEP WATER

Sample ID	Silver (ug/l)		WQC (1)	Iron (ug/l)		WQC (1, 3)	Cadmium (ug/l)		WQC (2)	Mercury (ng/l)		WQC (3, 4)	Lead (ug/l)		WQC (1)	Hardness (mg/l)
Seep Water 2	<0.2	U	NA/ 17.8	<50	U	1,500	<0.2	U	0.5/ 5.3	<5.0	U	770/ 1,400	<1.0	U	7.3/ 187	270
Seep Water 4	<0.2	U	NA/ 9.5	**30,800**		1,500	<0.2	U	0.4/ 3.7	<5.0	U	770/ 1,400	<1.0	U	5.0/ 127	188
Seep Water 5	<0.2	U	NA/ 10.9	**8,820**		1,500	<0.2	U	0.4/ 4.0	<5.0	U	770/ 1,400	<1.0	U	5.4/ 138	203
Seep Water 6	<0.2	U	NA/ 17.6	**4,340**		1,500	<0.2	U	0.5/ 5.3	<5.0	U	770/ 1,400	<1.0	U	7.3/ 186	269
Seep Water 7	<0.2	U	NA/ 1.1	<50	U	1,500	<0.2	U	0.2/ 1.9	<5.0	U	770/ 1,400	<1.0	U	1.3/ 32	53.2
BTAG Limit			3.2			300			0.25			26			2.5	

U= Constituent not detected above laboratory detection limit

(1)=Water Quality Criteria calculated using guidelines for development of criteria for toxic substances and water quality criteria for toxic substances (Pa. Code Ch. 93.8b, Table 5) (chronic/acute) (2)=Specific Water Quality Criteria (Pa. Code Ch. 93.7)

(3)=WQC for hardness not applicable

(4) = Limits in ng/L

BTAG: Biological Technical Assistance Group

All laboratory concentrations are reported on a dissolved basis.

BOLD = Exceeds WQC

Table D-4
Stream and Seep Sediment Analytical Results – Dissolved Metals – June 2019
Old City of York Landfill
York, Pennsylvania

STREAM SEDIMENT

Sample ID	Silver (mg/kg)		Iron (mg/kg)	Cadmium (mg/kg)		Mercury (mg/kg)	Lead (mg/kg)
Stream Sediment 1 (Alt.)	<0.5	U	47,300	<50.0	U	0.04	17.1
Stream Sediment 3	<0.2	U	42,400	<0.2	U	0.022	20.5
Stream Sediment 6	<0.5	U	172,000	<100	U	0.11	[46.6]
Stream Sediment 8	<0.5	U	33,100	<50.0	U	0.07	13.3
Stream Sediment 9	<0.5	U	48,800	<50.0	U	0.04	15.4
ER-M	4		N/A	9.6		0.71	218
BTAG Limit	1		20,000	0.99		0.18	35.8

SEEP SEDIMENT

Sample ID	Silver (mg/kg)		Iron (mg/kg)	Cadmium (mg/kg)		Mercury (mg/kg)	Lead (mg/kg)
Seep Sediment 2	<0.5	U	111,000	<100	U	0.14	[39.7]
Seep Sediment 4	<0.2	U	48,900	<0.2	U	0.022	15.3
Seep Sediment 5	<0.2	U	410,000	[1.1]		0.075	20.7
Seep Sediment 6	<0.2	U	43,800	<0.2	U	0.042	25.5
Seep Sediment 7	<0.5	U	33,700	<50.0	U	0.02	14.9
ER-M	4		N/A	9.6		0.71	218
BTAG Limit	1		20,000	0.99		0.18	35.8

ER-M: Effects Range-Medium Values (See Long and MacDonald, 1993). BTAG: Biological Technical Assistance Group
Data reported on a dry weight basis
N/A = Not applicable
U= Constituent not detected above laboratory detection limit [x]= Exceeds BTAG Limit
BOLD = Exceeds ER-M Value

Table D-5
Codorus Creek Water Analytical Results – Total Metals – June 2019
Old City of York Landfill
York, Pennsylvania

UPSTREAM

Sample ID	Silver (ug/l)		WQC (1)	Iron (ug/l)		WQC (1, 3)	Cadmium (ug/l)		WQC (2)	Mercury (ng/l)		WQC (3, 4)	Lead (ug/l)		WQC (1)	Hardness (mg/l)
CCWU-1	0.2		NA/ 1.8	1,050		1,500	<0.2	U	0.2/ 1.4	<5.0	U	770/ 1,400	<1.0	U	1.7/ 44	70.5
CCWU-2	<0.2	U	NA/ 2.4	<50	U	1,500	<0.2	U	0.2/ 1.7	<5.0	U	770/ 1,400	<1.0	U	2.1/ 54	84.2
CCWU-3	<0.2	U	NA/ 2.2	<50	U	1,500	<0.2	U	0.2/ 1.6	<5.0	U	770/ 1,400	<1.0	U	2.0/ 51	80.0
BTAG Limit			3.2			300			0.25			26			2.5	

Limit based on hardness of 100 mg/L with exception of iron and mercury

DOWNSTREAM

Sample ID	Silver (ug/l)		WQC (1)	Iron (ug/l)		WQC (1, 3)	Cadmium (ug/l)		WQC (2)	Mercury (ng/l)		WQC (3, 4)	Lead (ug/l)		WQC (1)	Hardness (mg/l)
CCWD-1	<0.2	U	NA/ 2.4	<50	U	1,500	<0.2	U	0.2/ 1.7	<5.0	U	770/ 1,400	<1.0	U	2.1/ 54	84.8
CCWD-2	<0.2	U	NA/ 2.5	<50	U	1,500	<0.2	U	0.2/ 1.7	<5.0	U	770/ 1,400	<1.0	U	2.1/ 54	85.4
CCWD-3	<0.2	U	NA/ 2.5	57		1,500	<0.2	U	0.2/ 1.8	<5.0	U	770/ 1,400	<1.0	U	2.2/ 56	87.3
BTAG Limit			3.2			300			0.25			26			2.5	

U= Constituent not detected above laboratory detection limit

(1)=Water Quality Criteria calcuated using guidelines for development of criteria for toxic substances and water quality criteria for toxic substances (Pa. Code Ch. 93.8b, Table 5 (chronic/acute)

(2)=Specific Water Quality Criteria (Pa. Code Ch. 93.7)

(3)=WQC for hardness not applicable

(4) = Limits in ng/L

All laboratory concentrations are reported on a dissolved basis.

BOLD = Exceeds WQC

Table D-6
Codorus Creek Sediment Analytical Results – Total Metals – June 2019
Old City of York Landfill
York, Pennsylvania

UPSTREAM SEDIMENT

Sample ID	Silver (mg/kg)		Iron (mg/kg)	Cadmium (mg/kg)		Mercury (mg/kg)	Lead (mg/kg)
CCSU-1	<0.2	U	39,300	<0.2	U	0.032	12.3
CCSU-2	<0.2	U	29,600	<0.2	U	0.016	6.3
CCSU-3	<0.2	U	36,100	<0.2	U	0.021	9.2
ER-M	4		N/A	9.6		0.71	218
BTAG Limit	1		20,000	0.99		0.18	35.8

DOWNSTREAM SEDIMENT

Sample ID	Silver (mg/kg)		Iron (mg/kg)	Cadmium (mg/kg)		Mercury (mg/kg)	Lead (mg/kg)
CCSD-1	<0.2	U	27,100	<0.2	U	0.045	24.6
CCSD-2	<0.2	U	28,000	<0.2	U	0.055	27.8
CCSD-3	<0.2	U	29,400	<0.2	U	0.070	[36.7]
ER-M	4		N/A	9.6		0.71	218
BTAG Limit	1		20,000	0.99		0.18	35.8

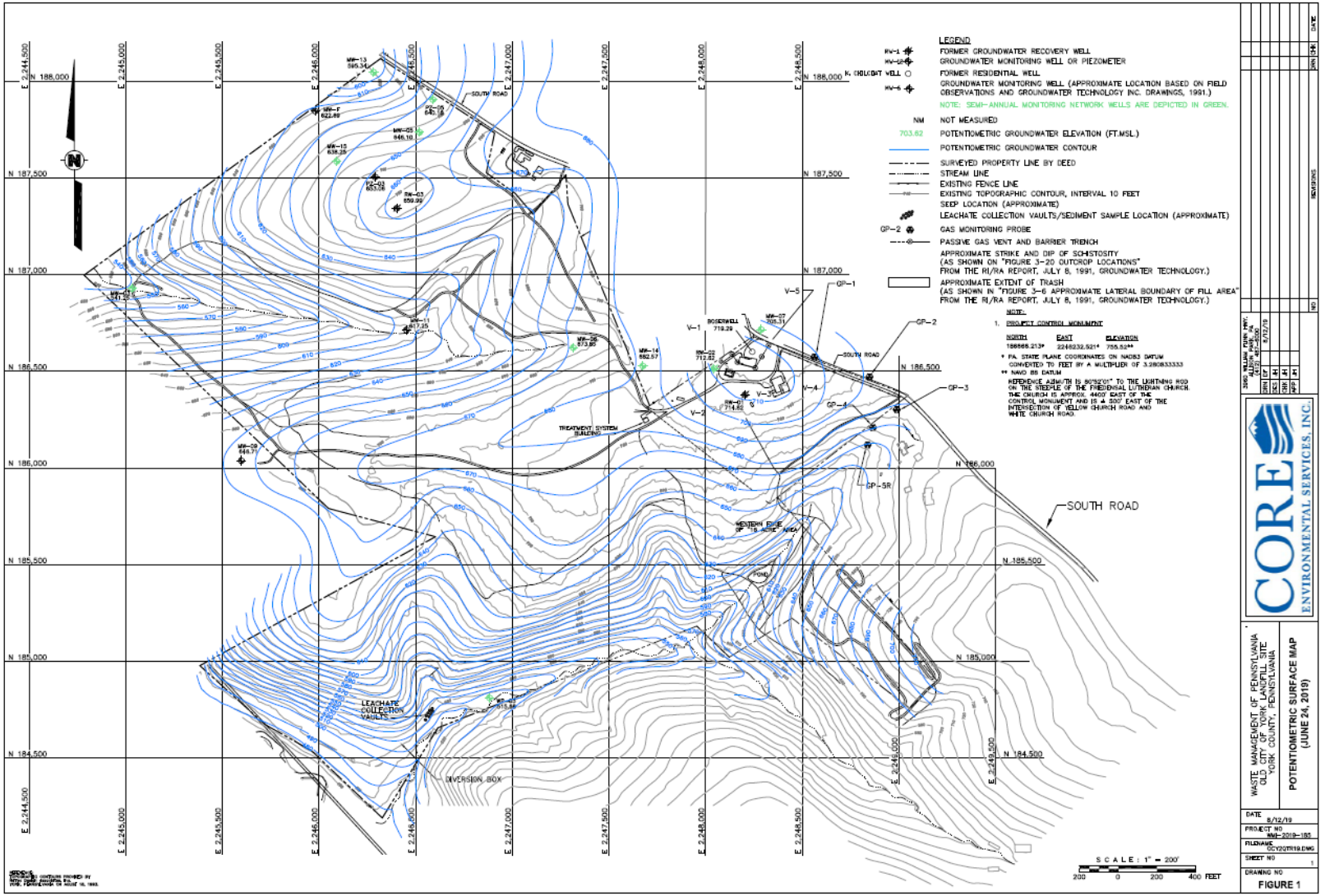
ER-M: Effects Range-Medium Values (See Long and MacDonald, 1993). Data reported on a dry weight basis

N/A = Not applicable

U= Constituent not detected above laboratory detection limit [x]= Exceeds BTAG Limit

BOLD = Exceeds ER-M Va

Figure D-1
Potentiometric Surface Map – June 2019
Old City of York Landfill
York, Pennsylvania



APPENDIX E – ARARS REVIEW

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate.

Groundwater
The 2000 ROD Amendment specified the MCLs promulgated under the Safe Drinking Water Act as chemical specific ARARs for groundwater at the Site. No changes to the MCLs have occurred.

Surface Water
The 1991 ROD identified the Pennsylvania Water Quality Standards (PA Code Title 25, Chapter 93.1 through 93.9 and 16) and Pennsylvania Wastewater Treatment Requirements (PA Code Title 25, Chapter 95 et. seq.) as chemical-specific ARARs for surface water. Specific values for the surface water criteria were not included in the ROD. During routine monitoring, surface water data are compared to the most recent state surface water quality criteria.

Air
The 1991 ROD identified several ARARs for air emissions from the air stripper as part of the treatment process. The air stripper is no longer in operation so the chemical specific ARARs for air do not require evaluation at this time.

Sediment/Soil
The 1991 ROD did not identify ARARs for sediment or soil.