THIRD FIVE-YEAR REVIEW REPORT FOR
GLOBAL SANITARY LANDFILL SUPERFUND SITE
OLD BRIDGE TOWNSHIP, MIDDLESEX COUNTY, NEW JERSEY

Prepared by

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

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February 20, 2025

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CEA	Classification Exception Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminants of Concern
EMP	Ecological Monitoring Plan
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GMP	Groundwater Monitoring Plan
GWQS	Groundwater Quality Standards
ICs	Institutional Controls
ITRC	Interstate Technology & Regulatory Council
LWZ	Lower Water-Bearing Zone (Old Bridge Sand Aquifer)
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethene
PRP	Potentially Responsible Party
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TBC	To Be Considered
TIC	Tentatively Identified Compound
TOC	Total Organic Carbon
UU/UE	Unlimited Use and Unrestricted Exposure
UWZ	Upper Water-Bearing Zone
VHA	Visual Habitat Assessment
VOC	Volatile Organic Compound
VISL	Vapor Intrusion Screening Levels

I. INTRODUCTION

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

The U.S. Environmental Protection Agency (EPA) is preparing this FYR 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 in consideration of EPA policy.

This is the third FYR for the Global Sanitary Landfill Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared since 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 two operable units (OUs), both of which will be addressed in this FYR. Operable Unit 1 (OU1) addresses slope stabilization, landfill capping, gas, storm water and leachate management, perimeter security fencing and implementation of a monitoring program. OU2 addresses contaminant migration from the landfill into groundwater, surface water, sediment, soil, and wetlands.

The Global Sanitary Landfill Superfund Site FYR was led by Steven J. Ferreira of EPA Region 2. Participants included Perry Katz (NJ Projects/State Coordination Section Supervisor), Abbey States (Human Health Risk Assessor), Julie McPherson (Ecological Risk Assessor), and John Mason (Hydrogeologist). The review began on 6/20/2024.

Site Background

The site is approximately 60 acres in size. The northeastern property line is also the municipal boundary between Old Bridge Township and the Borough of Sayreville. The site is bordered by wetlands to the northeast, southeast, and southwest and is in the drainage basin of Cheesequake Creek. Cheesequake Creek is located approximately 900 feet southeast. Residential areas of Old Bridge Township and the Borough of Sayreville are north and west-northwest of the site, respectively, and include several apartment complexes, as well as single-family homes, located off of Westminster Boulevard and Ernston Road (see Appendix B, Figure 1).

The site hydrogeology consists of a saturated, organic-rich meadow mat called the upper water-bearing zone (UWZ), a clayey silt semi-confining Amboy Stoneware Clay layer, and the Old Bridge Sand aquifer, referred to as the lower water-bearing zone (LWZ). In general, water quality in the UWZ is non-potable naturally due to the influence of the saline Cheesequake Creek and is classified as Class III-B (groundwater designated for any reasonable use at existing water quality, other than potable water, due to natural hydrogeologic characteristics or natural water quality) by the New Jersey Department of Environmental Protection (NJDEP). However, UWZ monitoring wells located at the northwestern/upgradient perimeter of the landfill (i.e., downgradient well MW-6S and upgradient well MW-7S) do not meet Class III-B classification criteria due to the absence of naturally occurring saline water constituents in this area. Therefore, water quality at those wells and the area in the vicinity of those wells are subject to Class II-A criteria, where groundwater at current water quality levels could be made potable with the provision of conventional treatment. Beneath the main landfill mound and a portion of the northwest extension area, the UWZ is separated by a confining layer from the Old Bridge Sand aquifer, which is the LWZ under the site. The LWZ is also designated in New Jersey as a Class II-A potable water source. The thickness of the UWZ varies from 0 to approximately 25 feet, while the LWZ is reported to extend to approximately 150 feet below mean sea level. The general direction of the groundwater flow for both the UWZ and LWZ is to the south-southeast.

The NJDEP ordered Global Landfill Reclaiming Corporation (Global) to cease operations in 1984 after a landfill side-slope failure destroyed several acres of adjacent wetlands. In 1989, the site was placed on the EPA National Priorities List (NPL) because of the presence of contaminated leachate and the discovery of buried drums containing hazardous waste in a portion of the landfill. This is a state-lead enforcement site cleanup conducted by the Potentially Responsible Parties (PRPs). NJDEP is the lead agency and EPA is the support agency.

Third Five Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Global Sanitary Landfill		
EPA ID: NJDO63160667		
Region: 2	**State:** NJ	**City/County:** Old Bridge / Middlesex
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: State		
Author name (Federal or State Project Manager): Steven J. Ferreira		
Author affiliation: U.S. EPA Region 2		
Review period: 06/20/2024 – 2/21/2025		
Date of site inspection: 10/7/2024		
Type of review: Statutory		
Review number: 3		
Triggering action date: 02/21/2020		
Due date *(five years after triggering action date)*: 02/21/2025		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Between 1991 and 1996, NJDEP conducted a remedial investigation/feasibility study (RI/FS) to evaluate the nature and extent of the contamination at the site. The RI/FS revealed that shallow groundwater at the site was contaminated with organic compounds, pesticides, and metals, and the deeper groundwater was contaminated with inorganic and organic contaminants. In accordance with CERCLA guidance on municipal landfills (Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, February 1991, OSWER Directive 9355.3-11), where established standards for one or more contaminants in a given medium are clearly exceeded, the basis for taking remedial action is warranted. The inorganic contaminants cadmium, chromium and lead, and volatile organic contaminants chlorobenzene, benzene, and vinyl chloride were all detected in excess of drinking water criteria, EPA's Maximum Contaminant Levels (MCLs). In addition, the presence of buried drums containing hazardous substances was identified. An ecological study of the wetland areas showed that the sediments near a landfill seep were adversely affecting certain native aquatic organisms. This impact was attributed to ammonia discharging from the landfill. In addition, benzene and chlorobenzene were detected in one surface water sample collected at low tide, although the remaining low and high tide samples (20 were collected in total) did not contain detectable concentrations. Since no potential human exposure pathways have been identified for groundwater, a risk assessment of groundwater was not completed at the time the Records of Decision (RODs) were issued. However, a risk assessment based on the findings of the RI/FS indicated that while soils, surface water, leachate, and airborne contaminants did not pose a threat to human health, the contaminated sediments in the immediate area of the landfill seep likely posed a threat to the environment.

Response Actions

As noted previously, the State of New Jersey issued a court order in April 1984 in response to the side-slope failure and Global's noncompliance with landfill operating procedures. The order required that a remedial plan for the slope failure be developed along with a closure plan. The PRPs performed a slope stability study which showed that the side slopes adjacent to the wetlands generally did not meet acceptable safety levels. An exploratory excavation in the 6.5-acre extension area in March 1988 uncovered drums of hazardous waste. After EPA added the site to the NPL in March 1989, NJDEP then conducted a FS for closure of the landfill. A ROD for OU1 was signed by EPA with the concurrence of NJDEP in September 1991 and included slope stabilization and capping the landfill, in addition to leachate and gas management systems. Further negotiations with the owners, operators and the Global Landfill PRP Group (PRP Group) resulted in the entry of consent decrees (CDs) in 1992 and 1993. In accordance with these decrees, the PRP Group funded and constructed the OU1 remedy. The OU2 ROD was issued in September 1997 after NJDEP's contractors completed a RI/FS for groundwater, surface water, sediment, and soil.

The remedial action objectives (RAOs) for OU1 were to:

- contain contaminants at the site; and
- limit exposure to levels protective of human health and the environment.

The major components of the remedy selected in the OU1 ROD included the following:

- Construction of a landfill cap; and
- installation of a leachate collection and treatment system.

For OU2, the RAOs are to:

- protect the potable Old Bridge Sand aquifer from contamination present in the UWZ;
- protect the wetlands from contamination present in the UWZ; and
- prevent adverse ecological impacts from contaminated wetland sediments.

The major components of the remedy selected in the OU2 ROD included the following:

- quarterly testing of new and existing on-site wells to monitor the extent of natural attenuation of contaminants in the groundwater,
- annual reviews to evaluate the effectiveness of the selected groundwater remedy,
- placement of a Classification Exception Area (CEA) which would also act as a Well Restriction Area for both the UWZ and the LWZ in areas where contaminants were detected,
- localized removal of contaminated wetland sediments from the southeastern portion of the site,
- placement of these sediments on top of the landfill before it is capped,
- annual ecological monitoring for five years after operable units one and two are implemented, and
- five-year reviews of the site pursuant to CERCLA and to determine whether any further action is needed to protect groundwater quality.

On August 15, 2006, EPA issued an Explanation of Significant Differences (ESD) that modified the materials and thickness of materials used for the landfill cover to provide for a lighter, more stable, but equally protective, landfill cap than the one selected in the OU1 ROD.

Final cleanup levels for the LWZ are the NJDEP Ground Water Quality Standards (GWQS). The following table summarizes those standards for the current contaminants of concern:

NJDEP GWQS (2019), µg/L	
1,4-dioxane	0.4
benzene	1
chlorobenzene	50
tetrachloroethene	1
1,2-dichloroethane	2
ammonia	3

Status of Implementation

OU1 Landfill Cap:

In 1993, the State of New Jersey and approximately 29 PRPs signed a CD that required the companies to implement the OU1 remedy. Work was initiated in February 1994 with the submittal of a remedial action work plan and was completed in 2012. The following actions were subsequently taken:

- Installation of geotechnical monitoring instruments to determine how placing fill on the landfill might affect settlement and slope stability,
- placement of grading fill on the top of the main landfill to crown the landfill and provide a base to support the cap,
- placement of preload fill that was left for approximately one year to allow for settling and maintain a 3% drainage grade,
- construction of a landfill gas management trench and venting system,
- placement of fill material over approximately 95% of the landfill surface to grade the top of the landfill and contour the site so that rainwater would more readily run off the cap,
- construction of leachate pump stations, conveyance piping, leachate collection tanks, and an equipment building to enable leachate disposal to a certified off-site treatment facility,
- installation of 27 deep gas wells and 27 shallow gas vents just below the grading fill to manage the landfill gas that will be trapped beneath the geomembrane cover and in conformance with NJDEP air quality discharge requirements,
- installation of 15 additional gas vents; and
- installation of the cap cover (top down): topsoil, soil cover layer, geocomposite drainage layer, geomembrane, geosynthetic clay liner or a geotextile, and a soil grading layer.

OU2 - Groundwater Monitoring, Wetland Sediments, Wetlands Mitigation:

In 2008, the PRP Group modified the existing CD to incorporate the ESD changes and include OU2 provisions. A groundwater monitoring plan (GMP) was developed pursuant to the OU2 ROD and approved as a part of the 100% Remedial Design report. The primary objectives of the monitoring plan are to track groundwater quality in the UWZ along the perimeter of the landfill following placement of the cap; and to monitor ground water quality and the natural attenuation of constituents in the LWZ. The GMP includes semi-annual monitoring of eight UWZ monitoring wells and eight LWZ monitoring wells. The effectiveness of the CEA in protecting human health and the environment has been evaluated by the PRP Group and evaluation of the monitoring results has been provided to NJDEP and EPA for approval every two years since completion of the remedy construction.

The OU2 ROD required that wetland sediments be excavated to the limits and depths necessary to replace visibly stained and distressed vegetation with new soil and wetland vegetation. In 2011, the PRP Group excavated 17,000 square feet of soil to an average depth of approximately 22 inches below ground surface, subsequently backfilled the area with imported clean topsoil, and installed native wetland vegetation. The excavated material was spread in the upland portion of the northwest extension area of the landfill and then the geosynthetic landfill cap was built above the excavated material.

From 2010 to 2011, the PRP Group worked on improvements to the selected wetlands mitigation area for the site located 1.5 miles from the landfill. This work included removal and off-site disposal of debris and impacted surficial soil and revegetation.

Final Inspection and Construction Completion:

On August 20, 2012, EPA, NJDEP, and the PRP Group representatives conducted the pre-final inspection at the site. The inspection included both the landfill and the wetland mitigation areas. On August 31, 2012, NJDEP issued to the PRP Group a letter documenting the visit and acknowledging completion of construction of the landfill cap and all its components as well as the successful growth of vegetation at the wetland mitigation area, thereby determining that the remedies have been constructed in accordance with the plans and specifications for the OU1 and OU2 RODs.

Institutional Control (IC) Summary Table:

Implemented ICs at the Site are summarized in Table 1 below.

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed?	ICs called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	OU2	To protect against groundwater use for site related contaminants	CEA 2002, revised October 10, 2019
Soil and groundwater	Yes	No	Landfill Property	To prevent damage to the cap’s impermeable layer and to prevent direct exposure to landfill contaminants	Deed notices recorded on October 23, 2015, May 27, 2016, and March 10, 2017

<u>Systems Operations/Operation & Maintenance</u>

An Operation and Maintenance (O&M) Plan for the site was developed and implemented by the PRP Group to provide inspection, maintenance, and reporting activities in connection with the following remedial components and associated activities:

- Site security to include fences, building and access roads,
- cover system and vegetation,
- storm water management system,
- leachate collection system and leachate disposal,
- landfill gas monitoring, sampling and testing,
- geotechnical instruments,
- ecological monitoring; and
- groundwater monitoring.

Currently, the landfill cap is inspected monthly. Mowing occurs once a year. Around 2013-2014, the southern drainage downchute was causing degradation to vegetation near the top of the chute. The vegetation was restored and concrete was sprayed on top of the chute to prevent further degradation. Leachate is no longer being collected and hauled since the PRP Group demonstrated that the contamination in the leachate was below federal and state standards.

Groundwater sampling is conducted semiannually across a network of eight monitoring wells within the UWZ and eight monitoring wells within the LWZ. In early 2019, the upper casing of well MW-15S was replaced after sustaining damage resulting from localized frost heave.

As a part of the biennial CEA recertification, a well inventory was conducted within the CEA and areas surrounding the landfill footprint. The current CEA for the LWZ extends approximately 4,000 feet southeast along the plume axis from the source area (see Appendix B, Figure 2). The closest municipal supply well is located approximately one mile north of the site, while two additional wells exist approximately two miles to the east. There are no known residential wells located within one mile downgradient of the landfill. A replenishing well for Hooks Creek Lake (located approximately one mile southeast of the Site) is screened in the Farrington Sand aquifer which is separated from the overlying Old Bridge Sand aquifer by as much as 130 feet of clay geologic units. The OU-2 ROD found that there is no significant current risk to the public water supply from impacted groundwater migrating from the Site in either the LWZ or the UWZ. No additional information refuting these findings has been obtained since the CEAs were established in 2014.

The wetlands mitigation area remains relatively free of *Phragmites*, though *Phragmites* is present along edges of the area. No ongoing maintenance is occurring in this area, which is currently owned by the state as part of Cheesequake State Park.

***Solar Project*:**

Since the previous FYR, the Global Landfill Community Solar Project, a 2.8-megawatt solar array, has been constructed covering 16 acres on top of the landfill cap. The solar project became operational in October 2023. The solar array provides power to about 400 New Jersey homes, over half of which are occupied by low- and moderate-income residents. In 2023, AC Power sold the solar project and its 25-year lease to New Jersey Resources Clean Energy Ventures.

Remedy Resilience Assessment:

Three tools were utilized to assess remedy resilience: *Climate Mapping for Resilience and Adaptation*, *Sea Level Rise*, and the *U.S Landslide Inventory.*

As a result of this assessment (provided in Appendix C), it has been determined that the performance of the remedy is currently not at risk due to the expected effects of severe weather in the region and near the site.

III. PROGRESS SINCE THE LAST REVIEW

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

Table 2: Protectiveness Determinations/Statements from the 2020 FYR

OU#	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy at OU1 is protective of human health and the environment
2	Protective	The remedy at OU2 is protective of human health and the environment
Sitewide	Protective	The remedies for the Global Sanitary Landfill Superfund Site are protective of human health and the environment.

There were no issues and recommendations included in the previous FYR. However, the following suggestion was provided that did not impact protectiveness:

- Since there are observed impacts to the LWZ from the UWZ, monitoring to confirm the conditions in LWZ are improving will continue.

Groundwater monitoring has continued into this FYR period twice a year. The results of the data collected are further described under Section IV.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On August 7, 2024, the EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, and Puerto Rico, including the Global Sanitary Landfill site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, the EPA Community Involvement Coordinator, or CIC for the site, Shereen Kandil, posted a public notice on the EPA site webpage (https://www.epa.gov/superfund/global-sanitary-landfill), and provided the notice to the Old Bridge Township by email on December 19, 2024 with a request that the notice be posted in municipal offices and on the village/town webpages. This notice indicated that a FYR would be conducted at the Global Sanitary Landfill site to ensure that the cleanup at the site continues to be protective of people's health and the environment. Once the FYR is completed, the results will be made available at the following repositories. In addition, the final report will be posted on the following website: https://www.epa.gov/superfund/global-sanitary-landfill.

Efforts will be made to reach out to local public officials to inform them of the results.

EPA Region 2 Public Reading Room
290 Broadway, 18th Floor
New York, NY 10007-1866
Phone: (212) 637-4308 (call to make an appointment)

Clerk's Office
1 Old Bridge Plaza
Old Bridge Township, NJ 08857
Phone: (732) 721-5600

Data Review

Groundwater Monitoring:

Groundwater monitoring is essential for assessing potential contaminant migration, limiting exposure, and determining if the potable Old Bridge Sand aquifer (the LWZ) is being protected from contamination present in the UWZ. The data under review includes information from 2019-2023.

Groundwater at the site is monitored via sixteen wells located along the perimeter of the landfill, eight wells screened in the UWZ and eight wells screened in the LWZ (see Appendix B, Figure 2). Twelve wells are sampled annually, and four wells (MW-8S, MW-8D, MW-15S, MW-15D) are sampled at a semiannual frequency. Groundwater movement at the site is to the south-southeast, although radial groundwater flow was documented onsite prior to remedy completion. UWZ well MW-7S and LWZ well MW- 7D, located along the northwest perimeter of the landfill, and LWZ MW-13S, located approximately 750 feet to the north-northwest, serve to monitor upgradient groundwater conditions. Wells MW-8 (S & D) are located on the northeast side of the landfill, wells MW-3 (SR & A), MW-14 (S & D), and MW-4 (S & A) are on the southeastern border, wells MW-5 (S & AR) and MW-15 (S & D) are on the southwest border, and well MW- 6S is located in the western corner of the landfill. Groundwater samples from both the UWZ and LWZ are analyzed for VOCs (including 1,4-dioxane), SVOCs, and target analyte list metals (TALs). Samples from the UWZ are also analyzed for ammonia.

Upper Water-bearing Zone (UWZ):

Although restoration of the UWZ is not called for in the ROD, contamination in the UWZ is monitored regularly, and observed contaminant concentrations are compared to MCLs and NJDEP GWQS in order to track progress toward achieving the RAOs outlined above. During this review period, exceedances of Class II-A GWQS in the UWZ were observed for 1,4-dioxane, benzene, chlorobenzene, tert-butyl alcohol, tetrachloroethylene (PCE), and trichloroethylene (TCE). 1,4-Dioxane was present above the 0.4 µg/L NJDEP GWQS at all wells except upgradient well MW-7S, with a maximum observed concentration of 940 µg/L at MW-8S (03/2023). Historical trends in 1,4-dioxane trends are presented for select wells (Appendix B, Figure 3). Similar to the previous review period, 1,4-dioxane was most elevated at MW-8S (Appendix B, Figure 4). Concentrations at this well have exhibited a slow decrease across the previous two review periods, and the median concentration across this review period (685 µg/L) was lower than that of the previous review period (800 µg/L).

Chlorobenzene was detected above the 50 µg/L NJDEP GWQS at MW-8S and MW-15S (Appendix B, Figure 5). Similar to the previous review period, concentrations were highest at MW-15S, and the highest concentrations of chlorobenzene and benzene (NJDEP GWQS = 1 µg/L) were observed during the last year of this review period: chlorobenzene was detected here at a concentration of 15,000 µg/L in 03/2023, and benzene was present at 140 µg/L in 09/2023 (Appendix B, Figure 6). Concentrations of contaminants of concern (COCs) at this well have increased substantially over the past several sampling events. By comparison, the maximum chlorobenzene and benzene results detected in the UWZ at the time of the ROD were 5,300 and 200 µg/L, respectively. However, during the most recent sampling event in September of 2023, chlorobenzene declined from 15,000 µg/L to 9,300 µg/L, which is more consistent with the results found during the RI. Trends at this monitoring well will continue to be evaluated.

Concentrations of the following SVOCs above NJDEP GWQS were recorded in UWZ wells MW-4S, MW-5S, MW-7S, MW-8S, MW-14S and MW-15S: 2,6-Dinitrotoluene, 2-methylnaphthalene, bis(2-

ethylhexyl)phthalate, hexachlorobenzene, naphthalene, N-nitrosodiphenylamine, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, and total detected SVOC TICs. Concentrations have generally remained stable over the reporting period, and most wells did not report consistent exceedances, although MW-15S consistently reported several SVOCs above standards, including N-nitrosodiphenylamine, benzo(a)anthracene, SVOC TICs, and combined SVOC/VOC TICs. Throughout this review period, concentrations of napthalene gradually increased to concentrations above the 300 µg/L standard at this location (310 µg/L; 09/2023).

UWZ wells reported metals concentrations above NJDEP GWQS for aluminum, arsenic, chromium, iron, lead, manganese, nickel, and sodium. The maximum observed concentrations for arsenic, chromium, and lead were 16.9 µg/L (MW-3SR, 03/2019), 121 µg/L (MW-8S, 03/2022), and 13.3µg/L (MW-8S, 03/2021), respectively.

All of the UWZ wells except for upgradient well MW-7S reported levels of ammonia that were above NJDEP GWQS (3 µg/L). The highest concentrations were observed in MW-8S, and the maximum concentration observed within this review period was 1,120 µg/L (03/2019), less than the 2,260 µg/L observed in 2016 at the same location. Concentrations remained stable across this review period (Appendix B, Figure 7)

Lower Water-bearing Zone (LWZ):

LWZ wells reported concentrations of 1,4-dioxane, benzene, chlorobenzene, and tetrachloroethene above NJDEP GWQS during this five-year review period. The maximum observed concentrations were as follows: 1,4-dioxane (35 µg/L, MW-8D, 03/2019); benzene (1.1 µg/L, MW-3A, 3/2019); chlorobenzene (180 µg/L, MW-5AR, 03/2023); and tetrachloroethene (7.8 µg/L, MW-15D, 9/2019). These maximum concentrations are less than those observed in the UWZ wells, and less than those observed during the previous review period.

1,4-Dioxane was found at levels exceeding the 0.4 µg/L NJDEP GWQS in all LWZ monitoring wells with the exception of upgradient MW-13S and MW-7D. At MW-3A, MW-4A, MW-5AR, MW-8D, and MW-14D, all samples across this review period exceeded NJDEP GWQS (Appendix B, Figure 8). Overall, benzene concentrations have decreased through time, with only one result marginally above the NJDEP GWQS across all LWZ wells (MW-3A, 1.1 µg/L; 03/2019). In the LWZ, chlorobenzene was detected above its NJDEP GWQS (50 µg/L) only in MW-5AR (Appendix B, Figure 9). The maximum observed concentration was 180 µg/L during this review period. Concentrations at this well have experienced a gradual, although unsteady, decline.

LWZ wells reported metals concentrations above NJDEP GWQS for aluminum, arsenic, beryllium, iron, manganese, nickel, and sodium. Lead and chromium, which were previously found to be in exceedance of NJDEP GWQS, were not detected above standards during this review period. The maximum observed concentrations for arsenic (GWQS = 3 µg/L) and beryllium (GWQS = 1 µg/L) between 2019-2023 were 3.6 µg/L and 4.4 µg/L, respectively.

Emerging Contaminants:

At this time, analysis of groundwater samples for select per- and polyfluoroalkyl substances (PFAS), 1,2,3-trichloropropane, and perchlorate has not yet occurred. A sampling plan designed to determine the presence or absence of these emerging contaminants onsite is currently in development.

Landfill Gas Emissions:

Landfill gas emissions, specifically for flow, VOCs, methane, and CO_2, are measured quarterly. All of the values were below the NJDEP permit limits for the period between 2014-2023.

Ecological Monitoring:

Ecological monitoring at the site consisted of a network of five primary sampling locations, referred to as ECO-1 through ECO-5, established adjacent to and within 100 feet of the landfill, on its eastern side near tributaries of the Cheesequake Creek. Location ECO-5 coincides with the Sediment Remediation Area (SRA). Two reference locations, ECO-RF1 and ECO-RF2, located approximately a half mile east-northeast of the landfill, were also established in a marsh in Cheesequake State Park to evaluate conditions unrelated to the landfill.

The Ecological Monitoring Program (EMP) entailed conducting a Visual Habitat Assessment (VHA) of the wetlands surrounding the landfill at the designated sample locations and in the area of sediment restoration, involving a qualitative monitoring of the vigor of the wetland plant community to provide a means of identifying exposure to contamination. The EMP also involved collecting sediment samples at the designated sample locations, which were analyzed for chemical constituents: TAL metals, cyanide, ammonia, and total organic carbon (TOC), macro-invertebrates, and sediment grain-size. Samples collected from ECO-5 were also subject to bioassay testing. The analyses were necessary to determine whether concentrations of COCs were bioavailable at levels that are toxic to aquatic invertebrates; the analyses are also used to evaluate the effectiveness of the remedy.

Historically, the results of the VHA noted that in general no indicators of landfill-related impacts were observed at the sample locations during the assessments from 2015 through 2018, neither were any significant changes in habitat observed in comparison to assessments completed in previous years. The results of sediment analysis noted that low levels of VOCs were detected at ECO-5 and reference sample locations in 2018 similar to previous events. Low concentrations of acetone, 2-butanone, and methylene chloride were not interpreted to be associated with the site and may be due to laboratory artifacts.

Based on the success of the wetland vegetation and benthic organism survivability, a reduction of the monitoring program was approved in 2017. Therefore, in 2017 and 2018 ecological monitoring was only conducted at location ECO-5 (and associated reference samples).

Following the continued observation of successful recovery metrics from the ECO-5 sample location over these two years (i.e. relatively lower ammonia concentrations in sample results) and the absence of adverse effects associated with discontinuing operation of the leachate management system, in 2019 a further reduction of the ecological monitoring sampling program involving the cessation of annual ecological monitoring was requested. This request was conditionally approved on August 2, 2019, provided one sediment sample from the ECO-5 SRA per FYR cycle would be collected and analyzed for chemical (VOCs and ammonia) analysis. This sampling of the SRA was performed in September 2022; the sediment analytical results are summarized as follows:

- VOCs were not detected in 2022;
- the sampled concentration of ammonia was 2.7 mg/kg (estimated), a decline from previous sediment

sample results (i.e., 6.2 mg/kg (estimated) in 2018); and

- sediment results were compared to the NJDEP Effects Range Low and Effects Range Median Ecological Screening Criteria (ESC), where available. No exceedances of ESCs were reported in 2022.

Overall, these results support historical conclusions that there have been no impacts to the surrounding marsh from the landfill since completion of the OU-1 remedy in 2012 (see Appendix D). Ammonia concentrations continue to decline, further supporting the cessation of ecological monitoring approved by NJDEP and EPA in August 2019. However, it is important to note that concentrations of chlorobenzene and benzene have increased considerably in UWZ groundwater as stated above. Although chlorobenzene and benzene were detected in only one surface water sample during the RI, the maximum chlorobenzene concentration detected in the UWZ in 2023 represented a nearly threefold increase since that time, although the concentration reduced during the most recent sampling event later that year. Benzene was also detected at the same order of magnitude as the concentrations observed during the RI. Since UWZ groundwater discharges to the wetland adjacent to the landfill, surface water sample collection should be considered if significantly elevated concentrations continue to be detected. The next sampling event is scheduled for September 2027.

Site Inspection:

The inspection of the Site was conducted on October 7, 2024. In attendance were EPA Remedial Project Manager Steven J. Ferreira, EPA Section Supervisor Perry Katz, EPA Hydrogeologist John Mason, EPA Human Health Risk Assessor Abbey States, EPA Ecological Risk Assessor Julie McPherson, WSP USA Inc Vice President, Geology, Christopher D. Hemingway, WSP USA Inc Senior Consultant, Environmental Science, Frank Malinky, and Nokia of America Remediation Manager and Global Landfill PRP Group Representative John Galasso. The purpose of the inspection was to assess the protectiveness of the remedy.

The inspection involved driving the perimeter of the site and inspecting key elements, including MW-8 and MW-15, drainage systems, the sediment remediation area, air vents, and the status of the cap. The group also visited the mitigated wetland area.

Several ongoing issues were identified and discussed. It was noted that trespassers had gained access to the site several times by cutting a section of fence and entering the property. The fence has been repaired, and physical measures implemented to prevent future access; security cameras have also been installed. Though there was evidence of tire marks in the gravel on top the landfill, no damage to the cap was found. It was also noted that animal burrowing activity in site drainage swales has repeatedly occurred and been repaired.

V. TECHNICAL ASSESSMENT

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

The remedy included the excavation of contaminated sediment from an adjacent wetland area and disposal underneath the landfill cap, as well as a wetland restoration and periodic monitoring. Ecological monitoring performed during this review period in 2022 supported historical conclusions that there have been no observable impacts to the surrounding marsh from the landfill since completion of the OU-1 remedy in 2012. The PRP Group is currently planning to sample ECO-5 in September 2027 and this task is expected to be included in a new O&M plan.

For OU2, one of the RAOs is to protect the potable Old Bridge Sand aquifer (LWZ) from contamination present in the UWZ. Concentrations of some contaminants in the UWZ remain elevated above NJDEP GWQS, however, the aquifer is mostly classified as a non-potable Class III-B aquifer. With the exception of significant increases in VOC and SVOC concentrations at MW-15S, UWZ wells generally do not indicate increasing contaminant concentrations. As noted in the sampling results from 2014-2023, elevated concentrations of 1,4-dioxane exist in all onsite wells within the UWZ, and the concentrations show no prevailing trend, with some showing decreasing concentrations, and others increasing. While it is likely that the UWZ is the source of 1,4-dioxane observed in the LWZ, it should be noted that concentrations in the LWZ monitoring wells are both much lower and have shown a trend of decreasing concentrations across all LWZ wells since 2014. While onsite UWZ monitoring wells MW-8S and MW-15S continue to show elevated and/or increasing levels of chlorobenzene and benzene, it should be noted that the LWZ wells MW-8D and MW-15D have levels far below NJDEP GWQS standards and have also been decreasing over time. However, should these trends continue to be observed, surface water sampling in the wetland adjacent to the landfill should be considered to evaluate whether it is being impacted by groundwater discharging from the UWZ.

In conclusion, the OU1 remedy has reduced the leaching of contaminants from the landfill material. No potential human exposure pathways have been identified, and a regularly updated CEA remains in place which limits exposure potential. For these reasons, the remedy appears to be functioning as intended. While concentrations of some COCs in the UWZ continue to be above NJDEP GWQS, and some are increasing, these trends are not reflected in the adjacent LWZ monitoring wells, which continue to show declining trends for most site COCs. Moving forward, groundwater monitoring will continue to track any potential contaminant migration, or changes in the contaminant flux to the LWZ. Surface water sampling is also suggested should concentrations of VOCs in the UWZ continue to increase or remain elevated. Finally, emerging contaminants analysis for select PFAS and other compounds in site groundwater is anticipated to occur early in the next five-year review period.

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

Land use considerations used in the baseline human health risk assessment are still valid. The exposure assumptions and toxicity values that were used to estimate the potential risks and hazards to human health followed the general risk assessment practice at the time the risk assessments were performed for each OU. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid.

As part of the OU1 remedy, source controls have been implemented to reduce human exposure to the landfill gas and leachate. The completed landfill cap prevents direct exposure to contaminated material and inhalation of fugitive dust. A security fence restricts access to the site, and the remaining contamination present on-site is inaccessible due to the landfill cap. Access to contaminated groundwater remains limited by a CEA. Therefore, exposure to site-related groundwater, soil, and sediment contamination during the monitored natural attenuation process is not anticipated.

One potential exposure pathway that was not evaluated at the time of remedy selection is vapor intrusion. A development of single-family homes was constructed several years after the RODs were issued 200 feet north of the landfill; however, the development is located upgradient of the UWZ plume and no elevated

VOC concentrations were found at the closest monitoring well (MW-13S). Concentrations of chlorobenzene and naphthalene during this FYR period exceeded EPA's upper-bound vapor intrusion screening levels (set at a cancer risk of 10-4 and hazard quotient of 1) at MW-15S on the south side of the landfill, and maximum concentrations of several other VOCs fell within the acceptable risk range of 10^{-6} to 10^{-4}. Since the site does not contain any buildings within 200ft of the groundwater plume at this time and future development on the cap is prohibited, the vapor intrusion pathway is considered incomplete.

The RAOs used at the time of remedy selection are still valid. The objectives of the ongoing groundwater monitoring are to track groundwater quality in the UWZ and the perimeter of the landfill and to monitor the natural attenuation of contaminants in the LWZ. Several groundwater contaminants remain in excess of state and federal MCLs both in the source area UWZ and LWZ. There is no current or future exposure via the direct pathway (ingestion as a potable water source) since there are no potable wells in the contaminated area and a CEA prevents future well installation. The aquifer's primary NJDEP IIIB classification also precludes the future use of the UWZ as a potable water source. Therefore, the remedy prohibits exposure even though groundwater exceeds drinking water standards. Groundwater monitoring will ensure that concentrations continue to decrease, and contamination is not migrating. Additional emergent contaminant sampling expected in 2025 will determine if PFAS, 1,2,3-TCP, and perchlorate are present in the groundwater plume.

Although the ecological risk assessment screening and toxicity values used to support the ROD may not necessarily reflect the current values, the excavation and capping eliminate any potential risk from surface soil contaminants to terrestrial receptors. A sediment sample was collected in 2022 to evaluate if downgradient wetlands are impacted. The sample was analyzed for VOCs and ammonia. Data was compared to NJDEP Ecological Screening Criteria. Based on the sampling results, VOCs were not detected, and ammonia concentrations continue to decline. Accordingly, based on the available data, the remedial action remains protective of ecological receptors.

While groundwater in the UWZ discharges to the wetland adjacent to the landfill, surface water is not currently collected as part of the O&M for the site. Visual observations are utilized to determine if potential impacts may exist (i.e. stressed vegetation, sheens in the surface water, etc.); no such impacts have been noted in the current FYR period. Considering that concentrations of several site-related COCs have increased in a few of groundwater monitoring wells adjacent to the wetland within the past five years to levels that would be in excess of NJDEP Surface Water Quality Criteria (https://dep.nj.gov/wp-content/uploads/rules/rules/njac7_9b.pdf), consideration should be given to collecting surface water/pore water samples in the areas adjacent to the impacted wells to determine if surface water is being impacted by site-related contaminants should these trends continue.

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

There is no other information that calls into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU1 and OU2

OTHER FINDINGS

Since concentrations of several site-related COCs have increased in a few groundwater monitoring wells adjacent to the wetland within the past five years to levels that would be in excess of NJDEP Surface Water Quality Criteria, collection of surface water and pore water samples should be considered to determine if surface water is being impacted by site-related contaminants should these trends continue.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: 01	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy at OU1 is protective of human health and the environment.	
Protectiveness Statement(s)	
Operable Unit: 02	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy at OU2 is protective of human health and the environment.	
Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	
Protectiveness Statement: The remedies for the Global Sanitary Landfill Superfund Site are protective of human health and the environment.	

VIII. NEXT REVIEW

The next FYR report for the Global Sanitary Landfill Superfund Site is required five years from the completion date of this review.

APPENDIX A: REFERENCE LIST

Second Five -Year Review for Global Landfill.

OU1 ROD, EPA, September 1991.

OU2 ROD, EPA, September 1997.

ESD for OU1 ROD, EPA, August 2006.

Remedial Action Report, PRP/Golder, September 2013

Annual Groundwater and Ecological Monitoring Report, PRP/Golder, 2014-2023

Global Landfill CEAS Groundwater Fate and Transport Description, PRP/Golder, December 2018

APPENDIX B: FIGURES

Figure 1

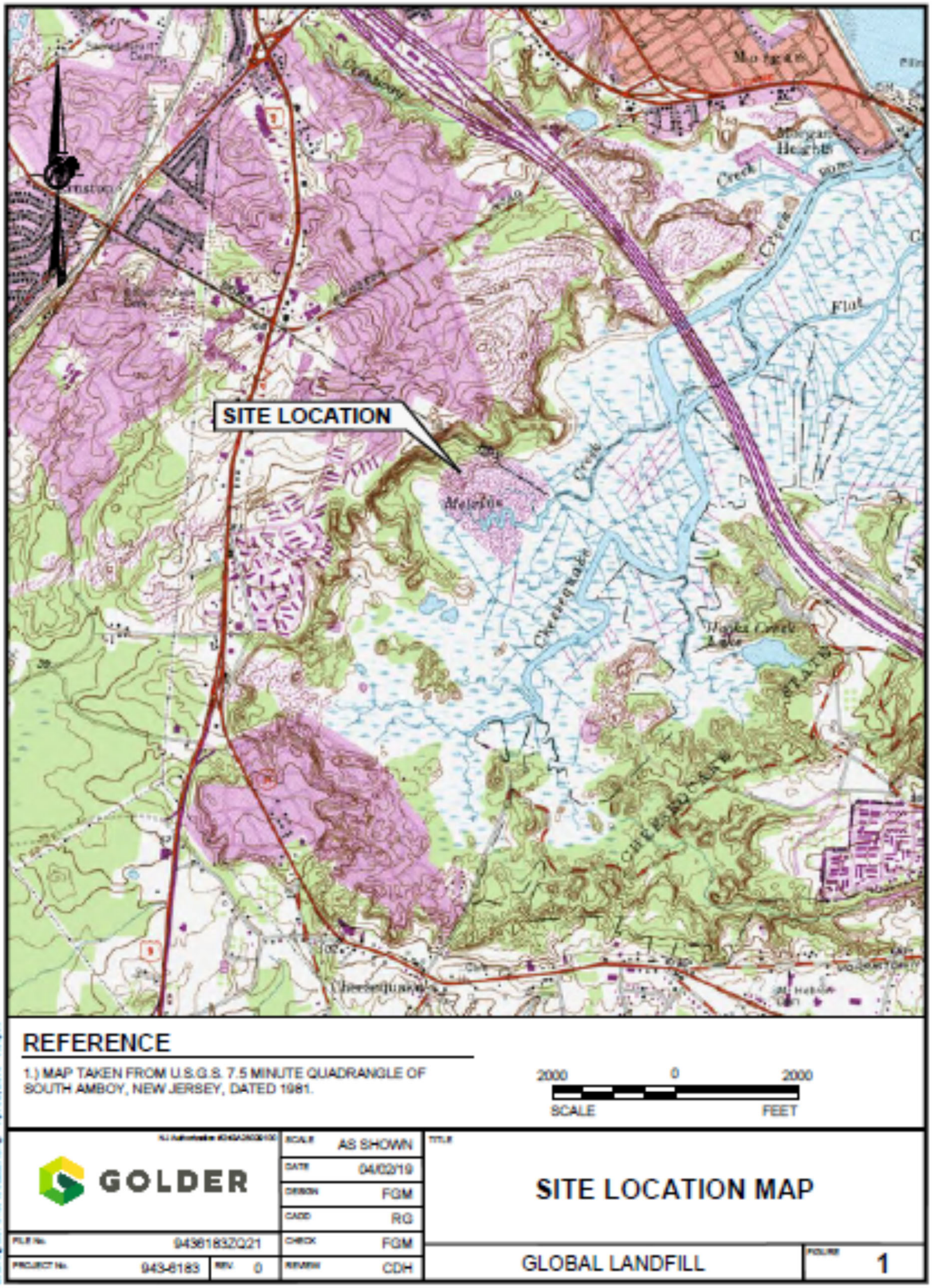
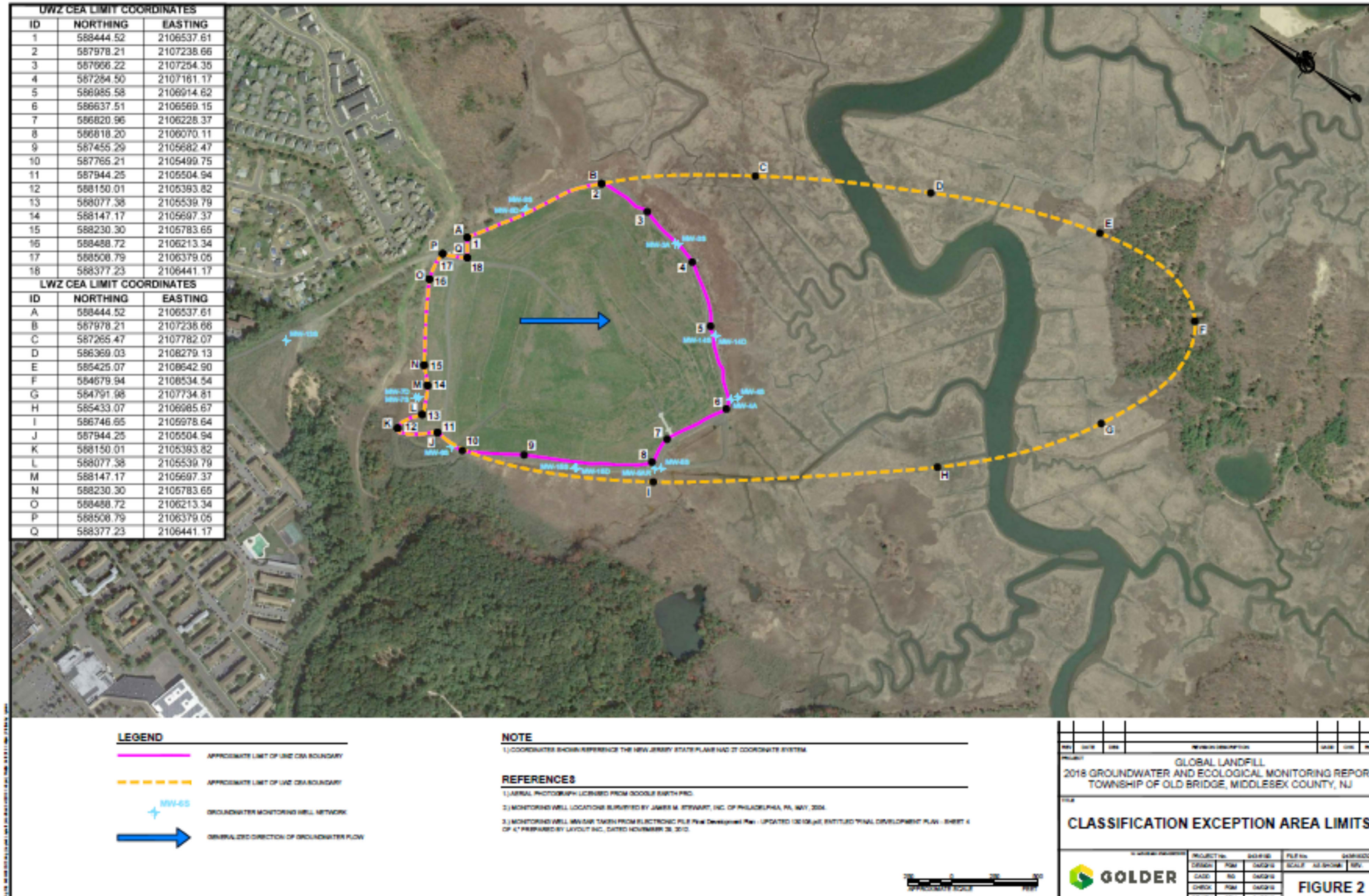

SITE LOCATION
Creek
Flat
REFERENCE
1.) MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF SOUTH AMBOY, NEW JERSEY, DATED 1981.
2000
0
2000
SCALE
FEET
GOLDER
AS SHOWN
04/02/19
FGM
RG
FGM
CDH
9436183ZQ21
943-6183
0
SITE LOCATION MAP
GLOBAL LANDFILL
1

Figure 2



UWZ CEA LIMIT COORDINATES		
ID	NORTHING	EASTING
1	588444.52	2106537.61
2	587978.21	2107238.66
3	587606.22	2107254.35
4	587284.50	2107161.17
5	586985.58	2106914.62
6	586637.51	2106569.15
7	586820.96	2106228.37
8	586818.20	2106070.11
9	587455.29	2105682.47
10	587765.21	2105499.75
11	587944.25	2105504.94
12	588150.01	2105393.82
13	588077.38	2105539.79
14	588147.17	2105697.37
15	588230.30	2105783.65
16	588488.72	2106213.34
17	588508.79	2106379.05
18	588377.23	2106441.17

LWZ CEA LIMIT COORDINATES		
ID	NORTHING	EASTING
A	588444.52	2106537.61
B	587978.21	2107238.66
C	587265.47	2107782.07
D	586369.03	2108279.13
E	585425.07	2108642.90
F	584679.94	2108534.54
G	584791.98	2107734.81
H	585433.07	2106985.67
I	586746.65	2105978.64
J	587944.25	2105504.94
K	588150.01	2105393.82
L	588077.38	2105539.79
M	588147.17	2105697.37
N	588230.30	2105783.65
O	588488.72	2106213.34
P	588508.79	2106379.05
Q	588377.23	2106441.17

Figure 3

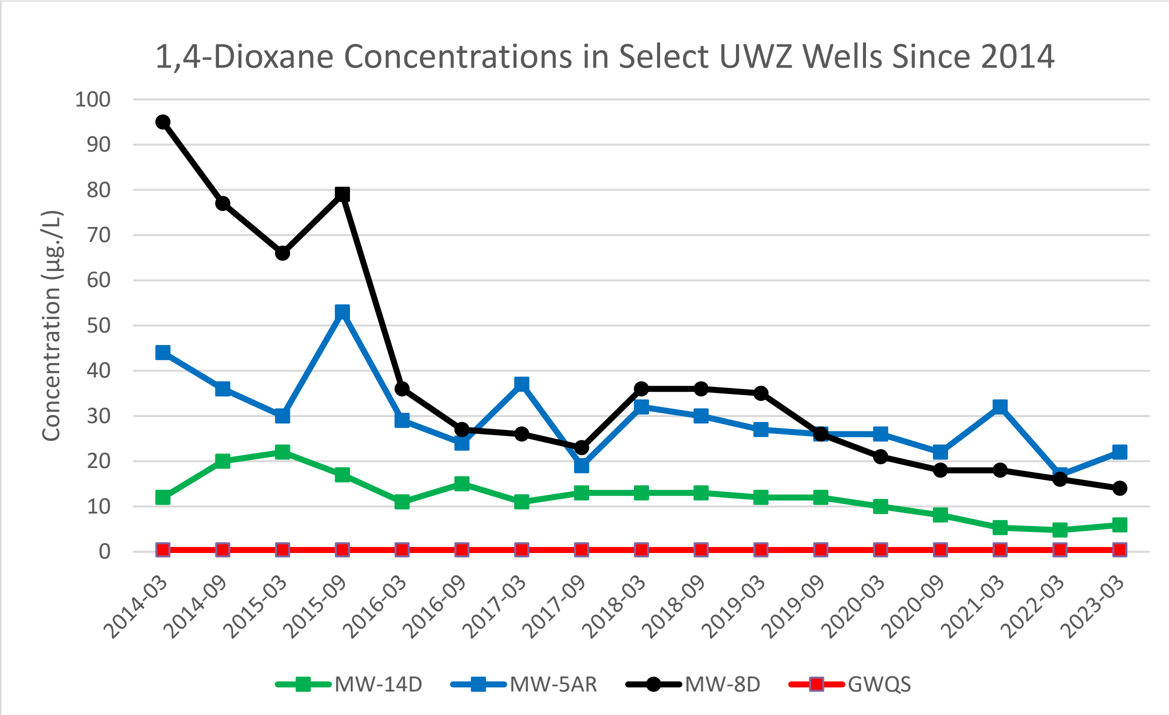


Figure 4

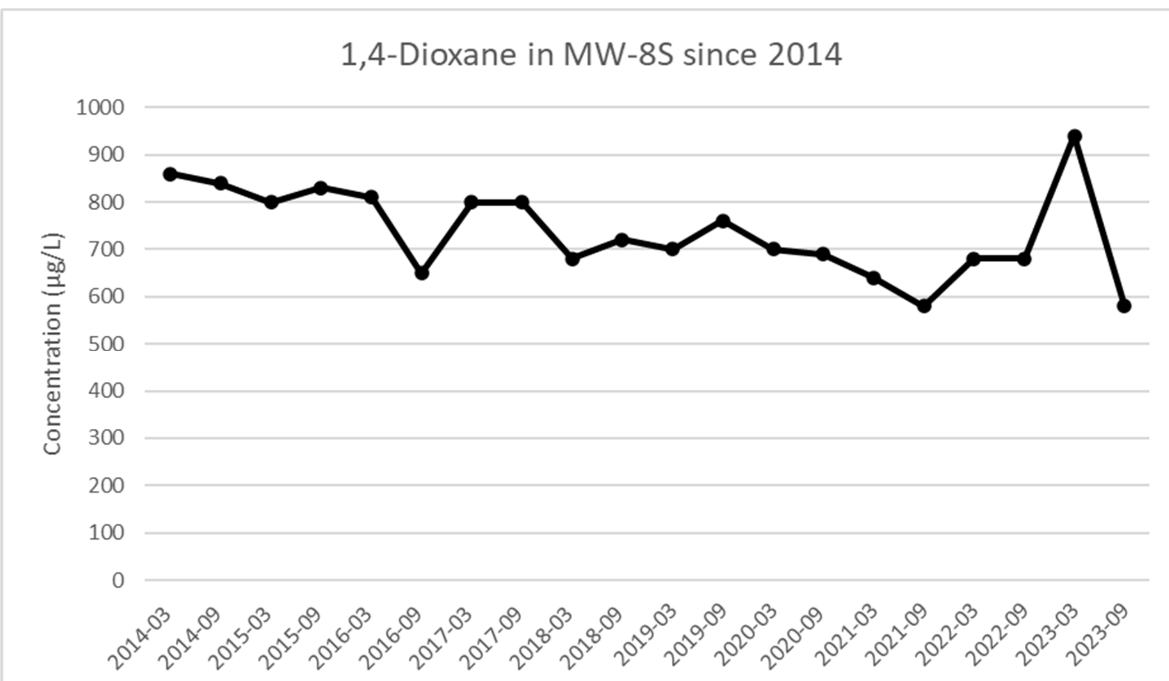


Figure 5

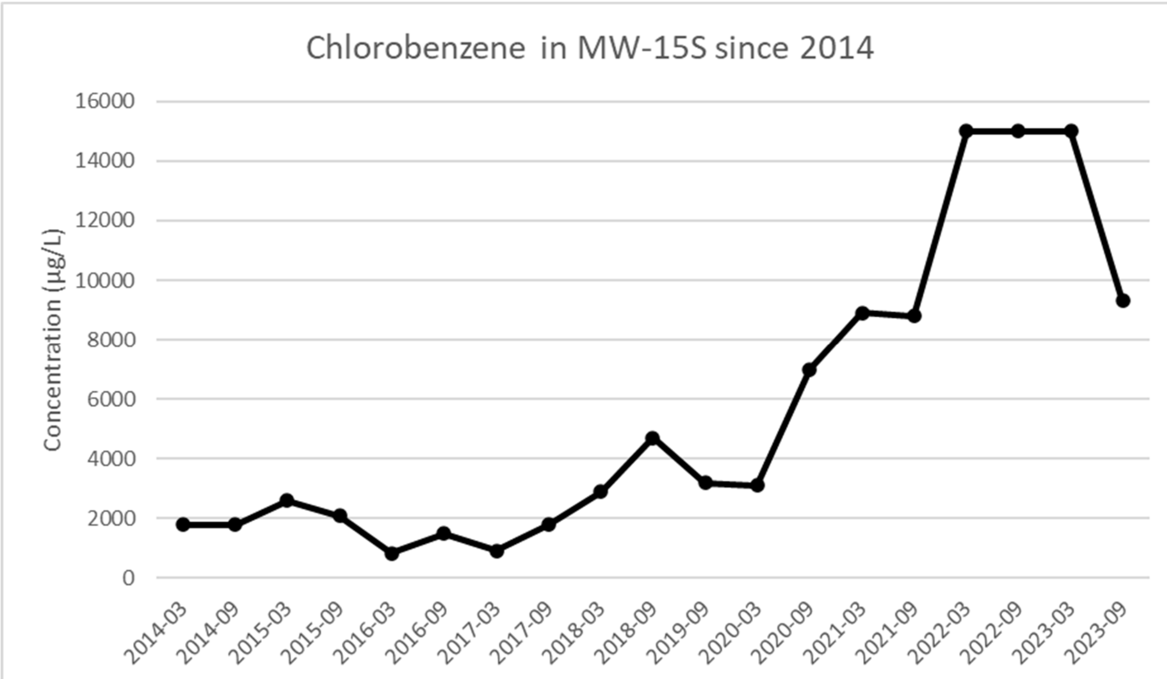


Figure 6

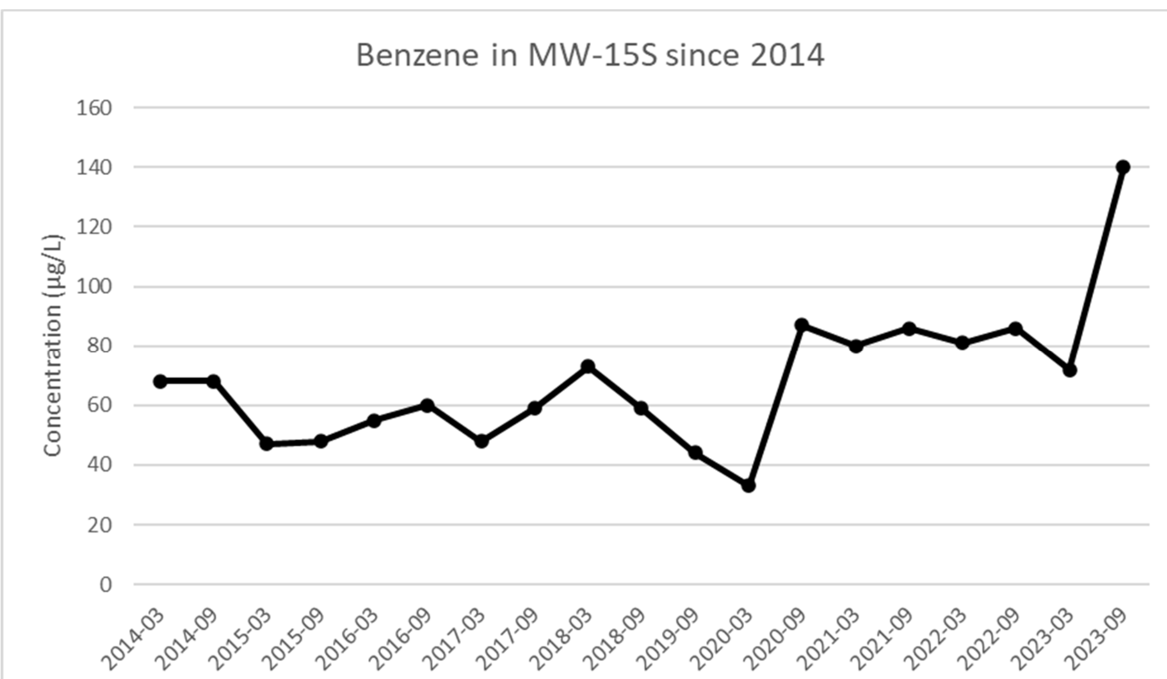


Figure 7

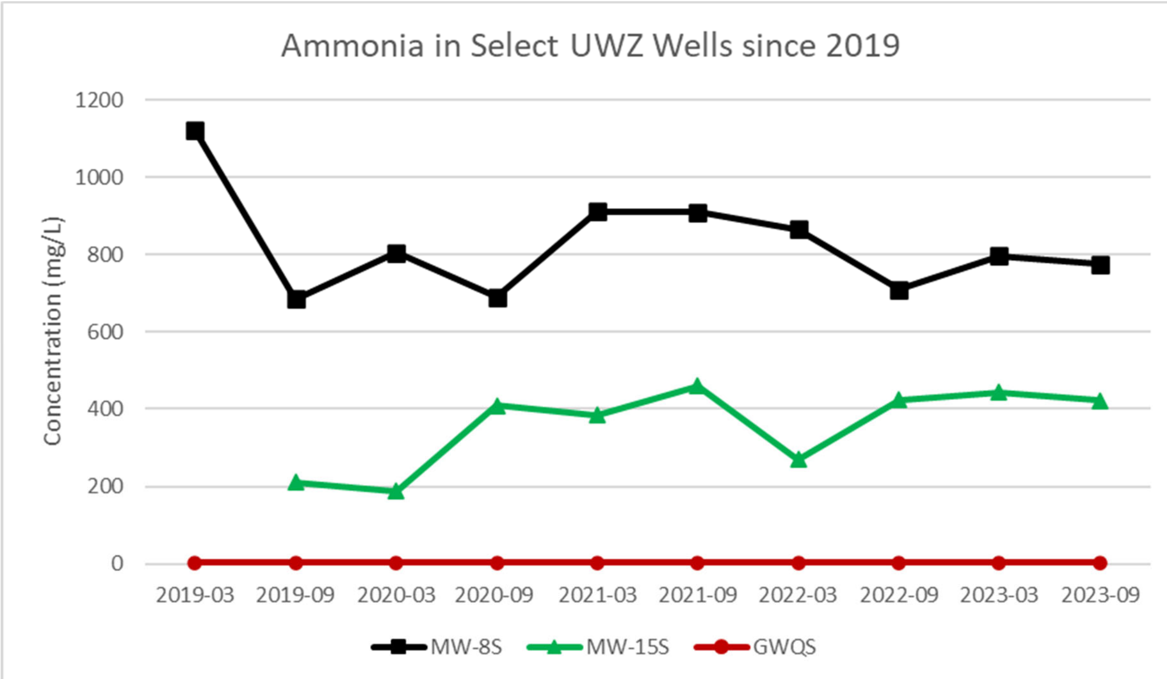


Figure 8

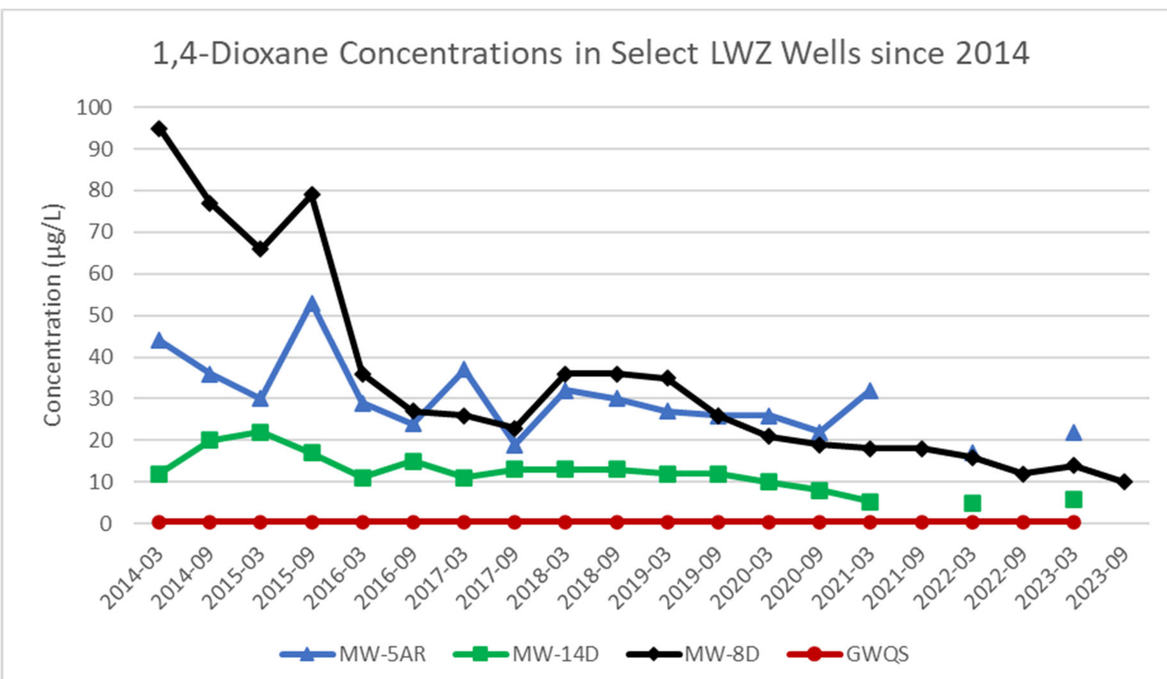
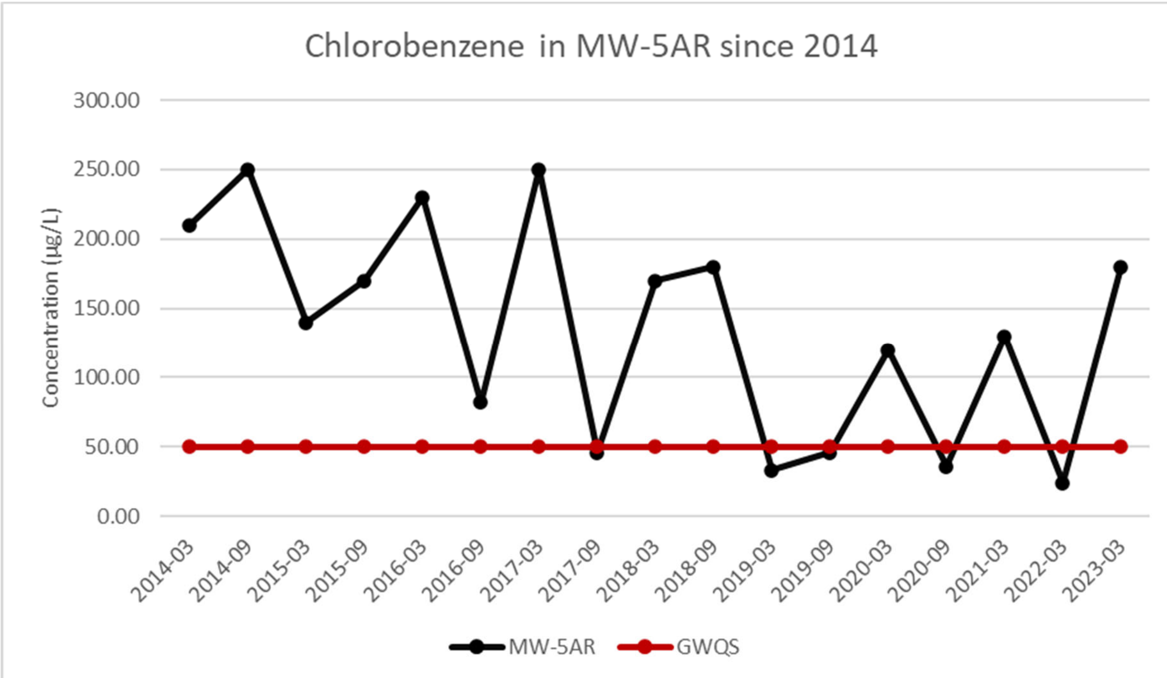


Figure 9


Chlorobenzene in MW-5AR since 2014
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Concentration (µg/L)
2014-03
2014-09
2015-03
2015-09
2016-03
2016-09
2017-03
2017-09
2018-03
2018-09
2019-03
2019-09
2020-03
2020-09
2021-03
2022-03
2023-03
MW-5AR
GWQS

APPENDIX C: REMEDY RESILIENCE ASSESSMENT

In accordance with Regional practice, three tools were utilized to assess the Global Sanitary Landfill Superfund Site, located in Middlesex County, New Jersey. Screenshots from each of the tools assessed are included herein.

The first tool used was the *Climate Mapping for Resilience and Adaptation*. Five variables were analyzed for Middlesex County, New Jersey: Extreme Heat, Drought, Wildfire, Flooding & Coastal Inundation.

- **Extreme Heat**: Middlesex County has a National Risk Index Rating (NRIR) of *Relatively High* for Extreme Heat impacts. The average number of days with temperatures over 100º Fahrenheit (F) are expected to increase from an average of 0 days per year in the Modeled History (1976-2005) time period to an average of 0-2 days annually in the Early Century (2015-2044) time period, 3-5 days in the Mid Century (2035-2064) and 5-17 days in the Late Century (2065-2099) time periods, based on lower and higher emissions scenarios respectively. The average number of days with temperatures over 95º F are expected to increase from the Modeled History of an average of 4 days per year to an average of 10-11 days in the Early Century, 14-19 days per year in the Mid Century, rising sharply to 19-44 days per year in the Late Century time periods, for low and high emissions scenarios respectively. The average number of days over 90º F is expected to rise from an average of 14 days in the Modeled History time period, to 33-35 days in the Early Century, 42-50 days per year in the Mid Century, an increase again to an average of 51-80 days in the Late Century time periods (for low emissions and high emission scenarios respectively). Figure C-1 portrays the results of this analysis.

- **Drought:** Middlesex County has an NRIR of *Relatively Low* for Drought impacts. Average Annual Precipitation is expected to increase from a Modeled History of 46 inches per year to 48 inches in the Early Century time period. It is expected to further rise to 49 inches per year in the Mid Century time period, and 51-52 inches in the Late Century time period. Days per year of precipitation are projected to decrease only from a Modeled History of 180 to 179 days in the Early Century, 178 days in the Mid Century, and to 176-178 days in the Late Century time periods. Figure C-2 portrays the results of this analysis.

- **Wildfire**: Middlesex County has an NRIR of *Relatively Low* for future wildfire impacts. Days per year with no precipitation is expected to rise only slightly from the Modeled History of 185 days, to 186 days in the Near Century, 186-188 days in the Mid Century and 187-190 days in the Late Century, under lower and higher emissions scenarios respectively. Maximum consecutive dry days is only expected to increase from 12 days in the Modeled History to 13 days under a high emissions scenario in the Late Century period. Figure C-3 portrays the results of this analysis.

- **Flooding**: Middlesex County has a NRIR of *Relatively High* for Flooding impacts. As noted previously, in the Early Century time period average Annual Precipitation is expected to increase from the Modeled History of 46 inches per year to 48 inches in the Early Century, to 49 inches per year in the Mid Century, and to 51-52 inches in the Late Century time periods, under lower and higher emissions scenarios respectively. Days per year of precipitation is expected to decrease only for a Modeled History of 180 days to 179 days in the Early Century time period, falling to 178 days in the Mid-Century time period, and 176-178 days in the Late Century time period.

Average days with 3 inches or more of precipitation is expected to remain nearly constant at 0 days per year from the Modeled History through the Mid-Century time period, only rising to an average of one day per year under a high emissions scenario in the Late Century time period. Average days where over two inches of precipitation is expected to remain constant at 1 day through the Late Century period. Average days with over one inch of precipitation is expected to rise from an average of 6 days annually to 7 days in the Early Century, and 7-8 days in the Mid Century, and from 7-9 days in the Late Century time periods, in low emission and high emission scenario respectively. Figure C-4 portrays the results of this analysis.

- **Coastal Inundation**: Middlesex County has a National Risk Index Rating (NRIR) of *Relatively High* for Coastal Inundation impacts. The percent of the county at risk from coastal inundation is expected to be 0% in the Early Century period, rising to 1% in the Mid-Century period, and 2% in the Late Century time period. Figure C-5 portrays the results of this analysis.

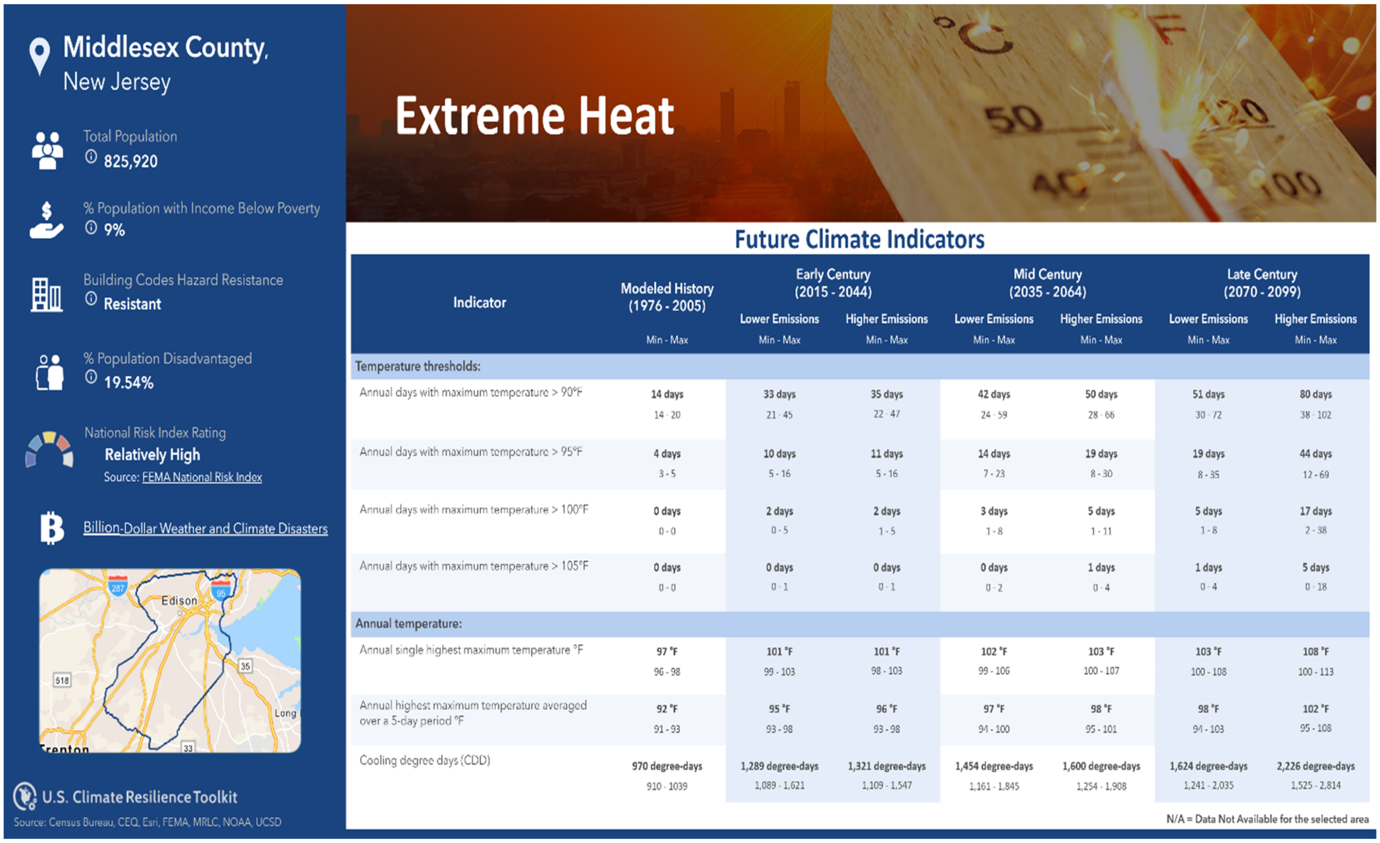
The second tool utilized is called *Sea Level Rise*. According to this assessment tool, portions of the Global Landfill Superfund Site are vulnerable to sea level rise. However, the vast majority of the impacted project area is outside of the footprint of the landfill proper. The site-related groundwater plume does extend into the adjacent marshes, which would all be inundated under a projected five foot or ten foot sea level rise. However, there are no treatment systems or other remedial infrastructure present in these locations, meaning that even in the ten foot sea level rise scenario impacts to the site remedy are not expected. Similarly, the majority of the site is noted as a Shallow Coastal Flooding Area (see Figure C-9), and a Moderate level of Sea Level Rise vulnerability (see Figure C-10).

The final tool utilized is called *U.S. Landslide Inventory*. In April 1984, after heavy rains and high tides, the southern side of the landfill collapsed, impacting adjacent wetlands. This event led to the landfill being closed and added to the NPL. As part of the site remedy the landfill was engineered to prevent future slope stability issues.

As noted in this analysis, the expected effects of weather-related events in the region and near the site include: extreme heat, flooding, coastal inundation and sea level rise. It is unlikely that extreme heat will result in negative effects to the capped landfill or impact the existing groundwater plume. Flooding, including increased frequency and intensity of storm events, coastal inundation and sea level rise may lead to inundation of portions of the project area, particularly outside the footprint of the existing landfill but within the boundary of the existing site-related groundwater plume. However, it is not anticipated that these impacts will lead to any effects to the existing groundwater plume or site remedy, since there are no treatment systems or active remediation in place in these areas. The landfill itself is not anticipated to be impacted by the projected effects of flooding, sea level rise or coastal inundation.

While the site has been included in the Landslide Inventory due to a past side slope failure at the landfill in 1984, implementation and monitoring of the landfill cap as part of the remedy will ensure that future slope failures such as the one experienced will not occur again.

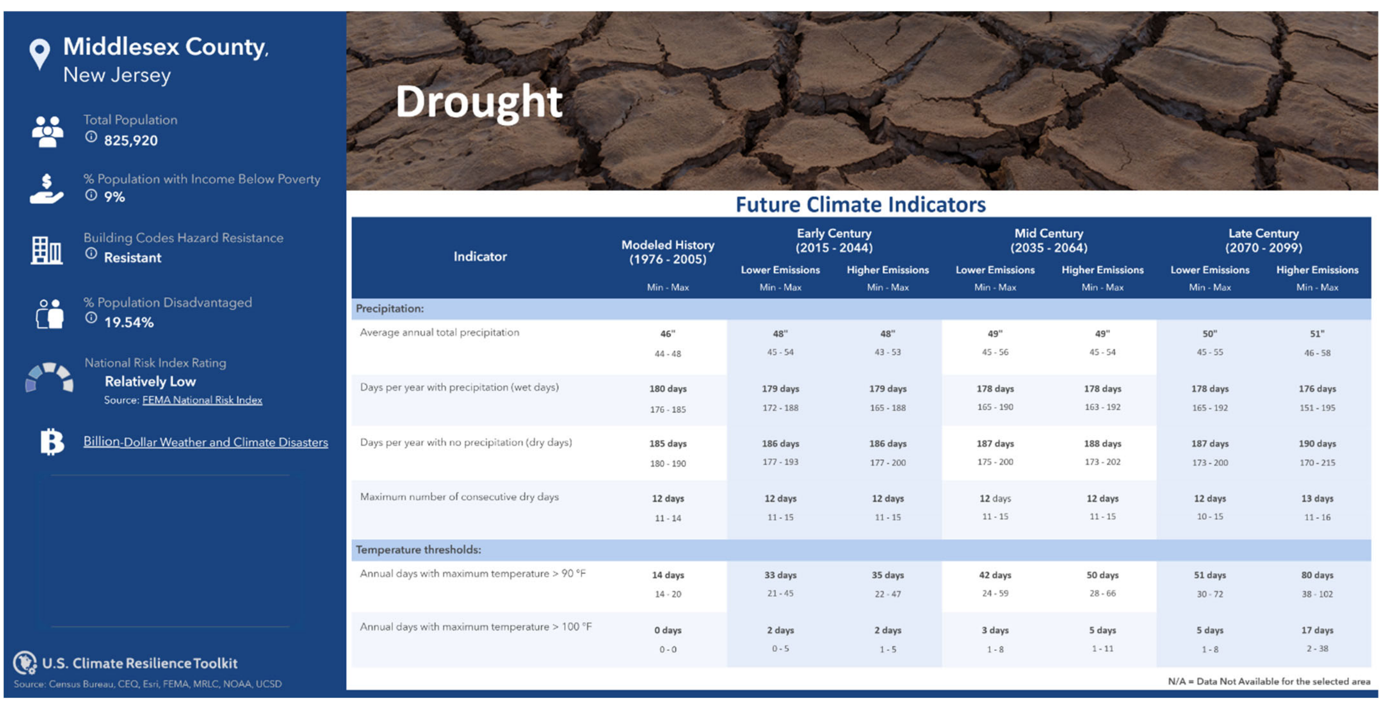
Figure C-1



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**14 days** 14 - 20	**33 days** 21 - 45	**35 days** 22 - 47	**42 days** 24 - 59	**50 days** 28 - 66	**51 days** 30 - 72	**80 days** 38 - 102
Annual days with maximum temperature > 95°F	**4 days** 3 - 5	**10 days** 5 - 16	**11 days** 5 - 16	**14 days** 7 - 23	**19 days** 8 - 30	**19 days** 8 - 35	**44 days** 12 - 69
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**2 days** 0 - 5	**2 days** 1 - 5	**3 days** 1 - 8	**5 days** 1 - 11	**5 days** 1 - 8	**17 days** 2 - 38
Annual days with maximum temperature > 105°F	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 1	**0 days** 0 - 2	**1 days** 0 - 4	**1 days** 0 - 4	**5 days** 0 - 18
Annual temperature:							
Annual single highest maximum temperature °F	**97 °F** 96 - 98	**101 °F** 99 - 103	**101 °F** 98 - 103	**102 °F** 99 - 106	**103 °F** 100 - 107	**103 °F** 100 - 108	**108 °F** 100 - 113
Annual highest maximum temperature averaged over a 5-day period °F	**92 °F** 91 - 93	**95 °F** 93 - 98	**96 °F** 93 - 98	**97 °F** 94 - 100	**98 °F** 95 - 101	**98 °F** 94 - 103	**102 °F** 95 - 108
Cooling degree days (CDD)	**970 degree-days** 910 - 1039	**1,289 degree-days** 1,089 - 1,621	**1,321 degree-days** 1,109 - 1,547	**1,454 degree-days** 1,161 - 1,845	**1,600 degree-days** 1,254 - 1,908	**1,624 degree-days** 1,241 - 2,035	**2,226 degree-days** 1,525 - 2,814

N/A = Data Not Available for the selected area

Figure C-2



Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	**46"** 44 - 48	**48"** 45 - 54	**48"** 43 - 53	**49"** 45 - 56	**49"** 45 - 54	**50"** 45 - 55	**51"** 46 - 58
Days per year with precipitation (wet days)	**180 days** 176 - 185	**179 days** 172 - 188	**179 days** 165 - 188	**178 days** 165 - 190	**178 days** 163 - 192	**178 days** 165 - 192	**176 days** 151 - 195
Days per year with no precipitation (dry days)	**185 days** 180 - 190	**186 days** 177 - 193	**186 days** 177 - 200	**187 days** 175 - 200	**188 days** 173 - 202	**187 days** 173 - 200	**190 days** 170 - 215
Maximum number of consecutive dry days	**12 days** 11 - 14	**12 days** 11 - 15	**12 days** 11 - 15	12 days 11 - 15	**12 days** 11 - 15	**12 days** 10 - 15	**13 days** 11 - 16
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	**14 days** 14 - 20	**33 days** 21 - 45	**35 days** 22 - 47	**42 days** 24 - 59	**50 days** 28 - 66	**51 days** 30 - 72	**80 days** 38 - 102
Annual days with maximum temperature > 100 °F	**0 days** 0 - 0	**2 days** 0 - 5	**2 days** 1 - 5	**3 days** 1 - 8	**5 days** 1 - 11	**5 days** 1 - 8	**17 days** 2 - 38

N/A = Data Not Available for the selected area

Figure C-3

Middlesex County, New Jersey

Total Population
825,920

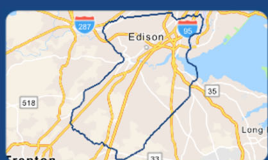
% Population with Income Below Poverty
9%

Building Codes Hazard Resistance
Resistant

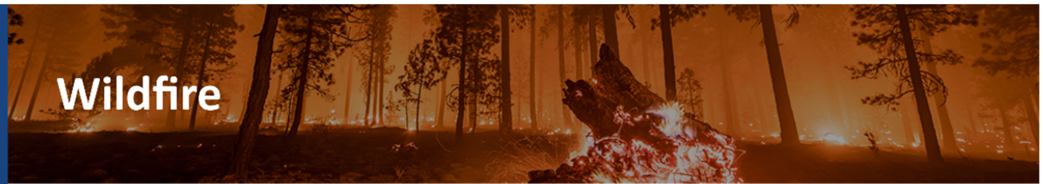
% Population Disadvantaged
19.54%

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

Billion-Dollar Weather and Climate Disasters



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



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	**185 days** 180 - 190	**186 days** 177 - 193	**186 days** 177 - 200	**187 days** 175 - 200	**188 days** 173 - 202	**187 days** 173 - 200	**190 days** 170 - 215
Maximum number of consecutive dry days	**12 days** 11 - 14	**12 days** 11 - 15	**12 days** 11 - 15	**12 days** 11 - 15	**12 days** 11 - 15	**12 days** 10 - 15	**13 days** 11 - 16
Days per year with precipitation (wet days)	**180 days** 176 - 185	**179 days** 172 - 188	**179 days** 165 - 188	**178 days** 165 - 190	**178 days** 163 - 192	**178 days** 165 - 192	**176 days** 151 - 195
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**14 days** 14 - 20	**33 days** 21 - 45	**35 days** 22 - 47	**42 days** 24 - 59	**50 days** 28 - 66	**51 days** 30 - 72	**80 days** 38 - 102
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**2 days** 0 - 5	**2 days** 1 - 5	**3 days** 1 - 8	**5 days** 1 - 11	**5 days** 1 - 8	**17 days** 2 - 38

N/A = Data Not Available for the selected area

Figure C-4

Middlesex County, New Jersey

Total Population
825,920

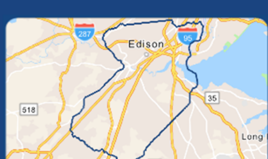
% Population with Income Below Poverty
9%

Building Codes Hazard Resistance
Resistant

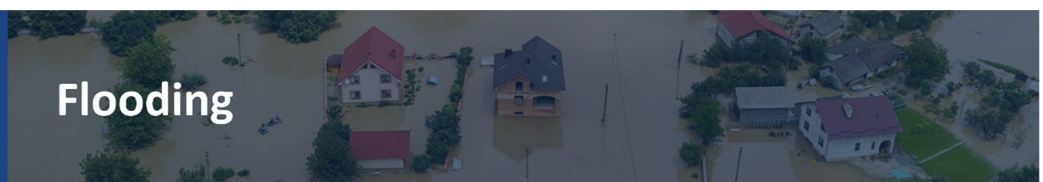
% Population Disadvantaged
19.54%

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

Billion-Dollar Weather and Climate Disasters



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

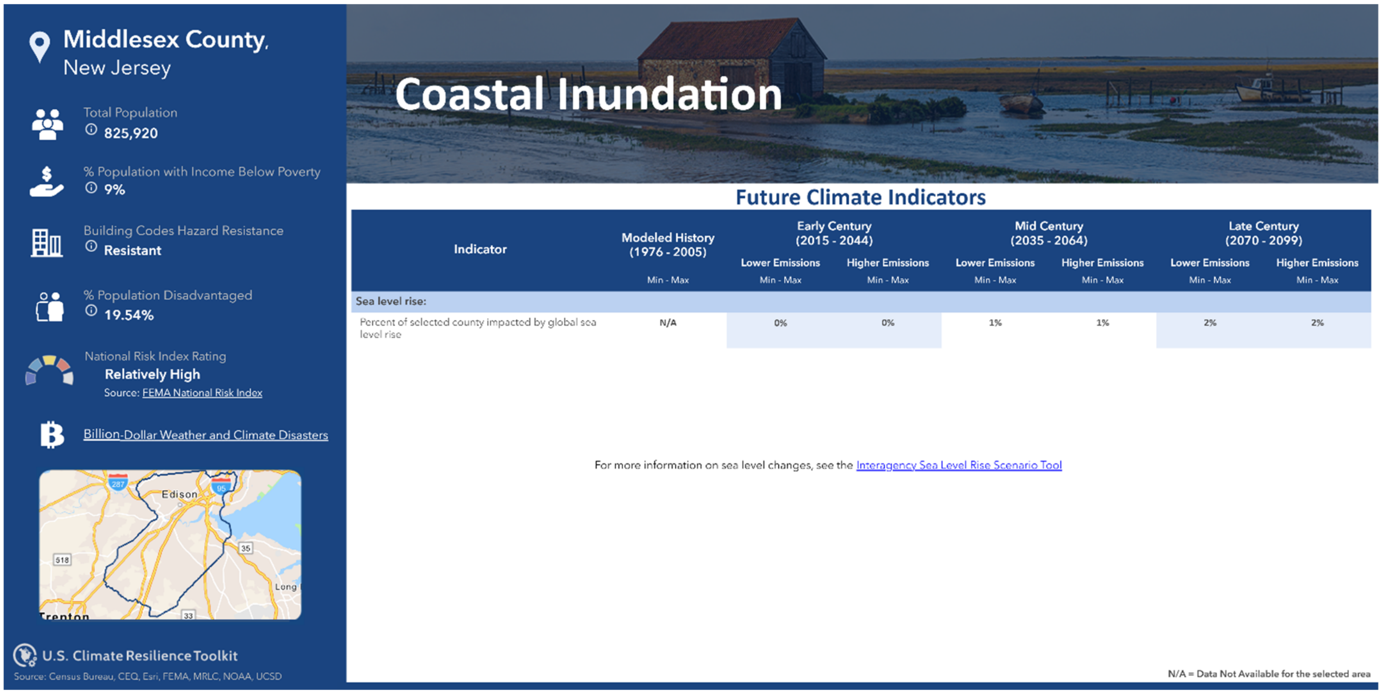


Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	**46"** 44 - 48	**48"** 45 - 54	**48"** 43 - 53	**49"** 45 - 56	**49"** 45 - 54	**50"** 45 - 55	**51"** 46 - 58
Days per year with precipitation (wet days)	**180 days** 176 - 185	**179 days** 172 - 188	**179 days** 165 - 188	**178 days** 165 - 190	**178 days** 163 - 192	**178 days** 165 - 192	**176 days** 151 - 195
Maximum period of consecutive wet days	**11 days** 10 - 12	**11 days** 10 - 13	**11 days** 10 - 13	**11 days** 9 - 13	**11 days** 9 - 13	**11 days** 9 - 13	**11 days** 8 - 15
Annual days with:							
Annual days with total precipitation > 1inch	**6 days** 6 - 7	**7 days** 5 - 9	**7 days** 6 - 9	**7 days** 6 - 9	**8 days** 6 - 9	**8 days** 7 - 9	**9 days** 6 - 11
Annual days with total precipitation > 2 inches	**1 days** 0 - 1	**1 days** 0 - 1	**1 days** 1 - 1	**1 days** 0 - 1	**1 days** 1 - 2	**1 days** 1 - 1	**1 days** 1 - 2
Annual days with total precipitation > 3 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 1
Annual days that exceed 99th percentile precipitation	**6 days** 6 - 8	**7 days** 7 - 9	**8 days** 7 - 9	**8 days** 7 - 10	**8 days** 8 - 10	**9 days** 8 - 11	**10 days** 9 - 12
Days with maximum temperature below 32 °F	**15 days** 13 - 18	**10 days** 3 - 14	**9 days** 3 - 15	**8 days** 2 - 12	**6 days** 3 - 11	**6 days** 1 - 11	**2 days** 0 - 6

N/A = Data Not Available for the selected area

Figure C-5

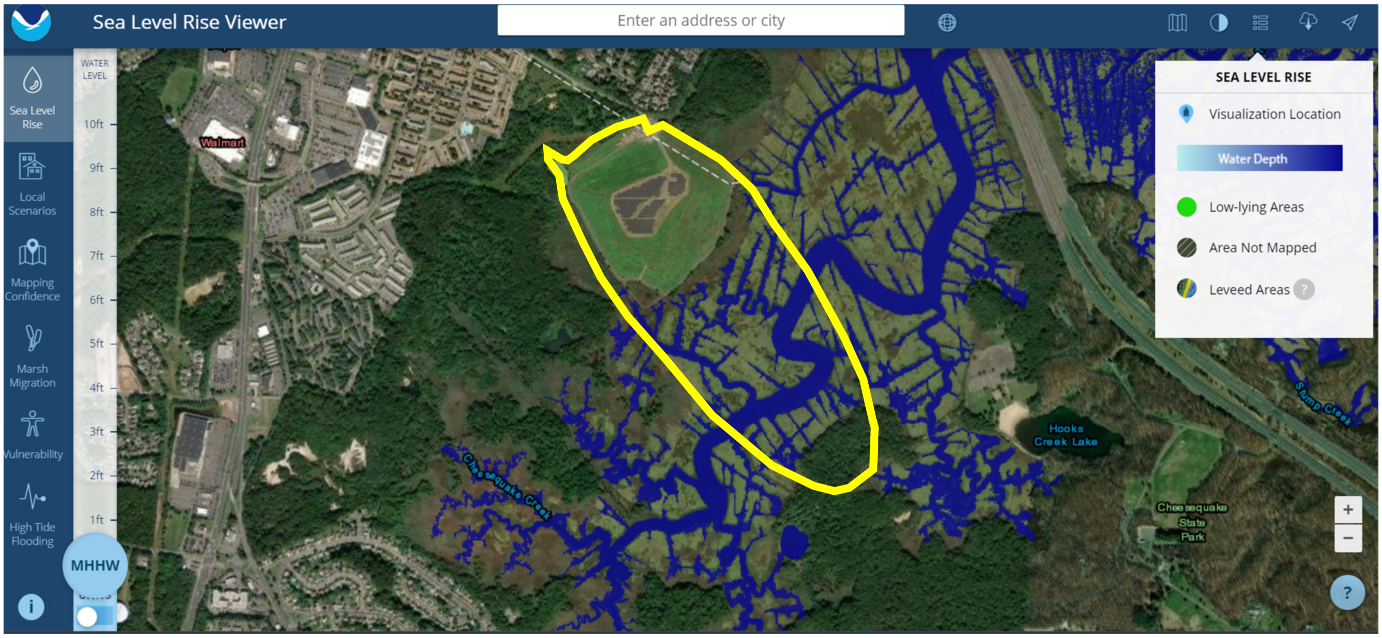


Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Sea level rise:							
Percent of selected county impacted by global sea level rise	N/A	0%	0%	1%	1%	2%	2%

For more information on sea level changes, see the Interagency Sea Level Rise Scenario Tool

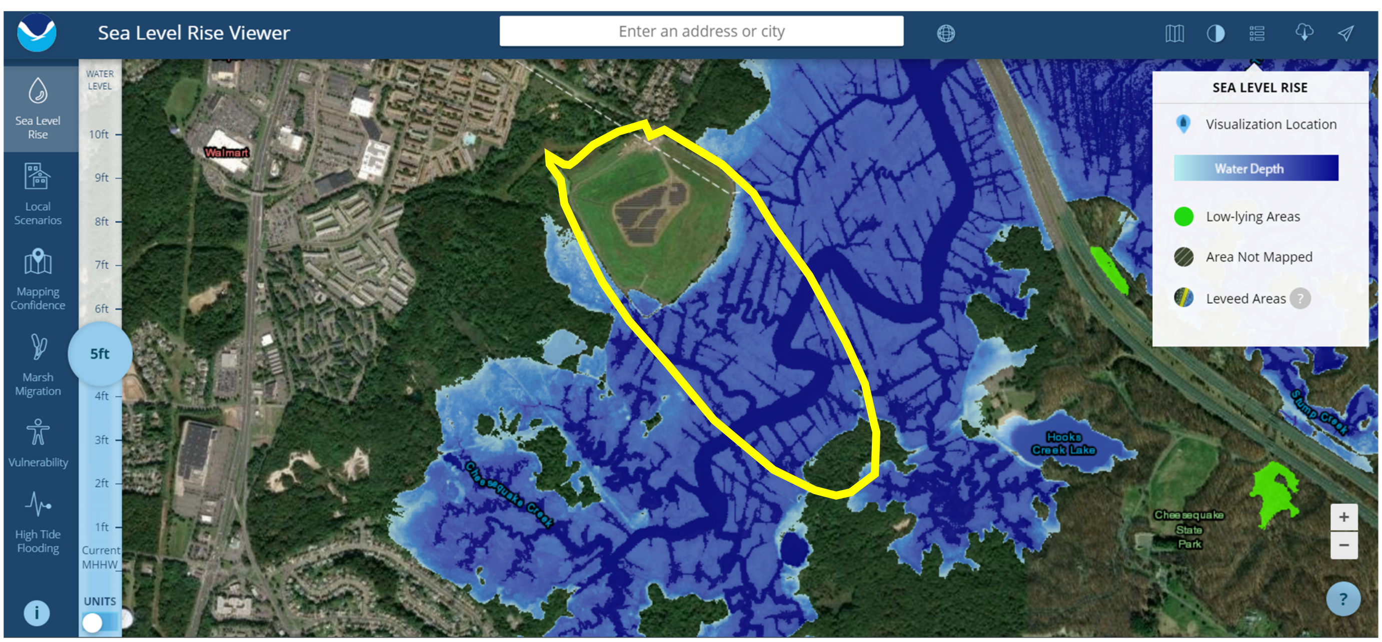
N/A = Data Not Available for the selected area

Figure C-6: Sea Level Rise
Current Conditions



Approximate Site Boundary

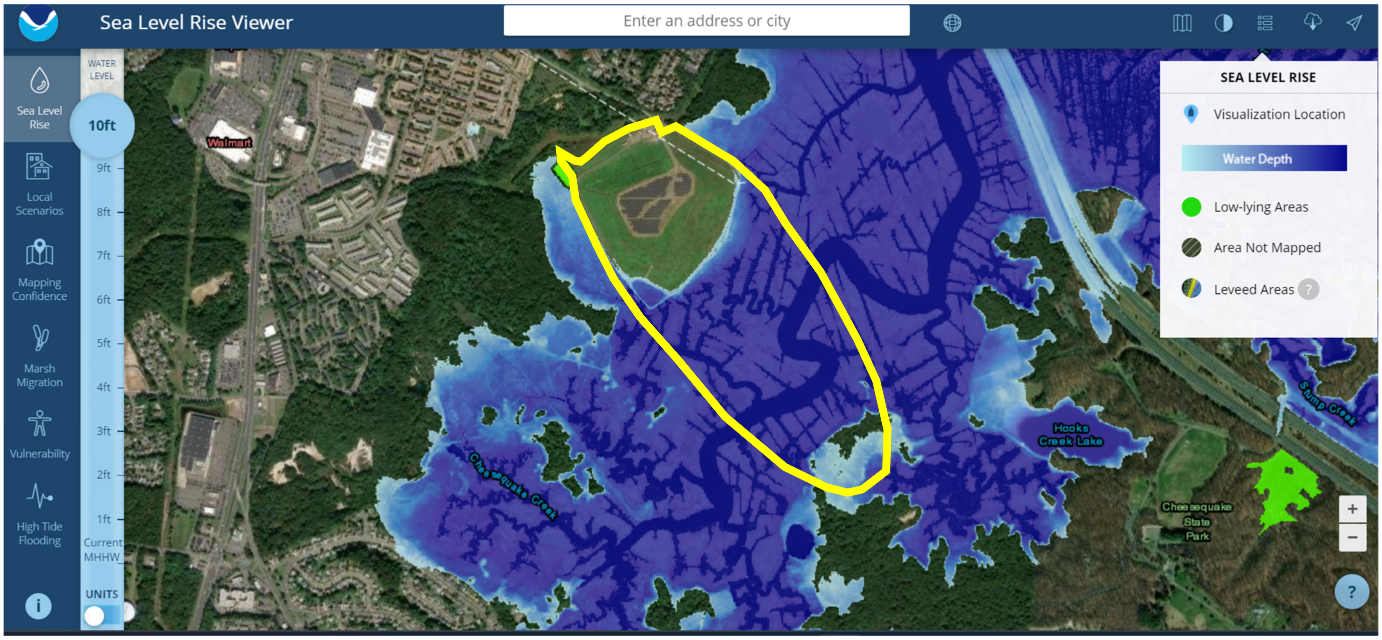
Figure C-7: Current Mean Higher Water Level
With a 5 Foot Sea Level Rise



Approximate Site Boundary

Figure C-8: Current Mean Higher Water Level

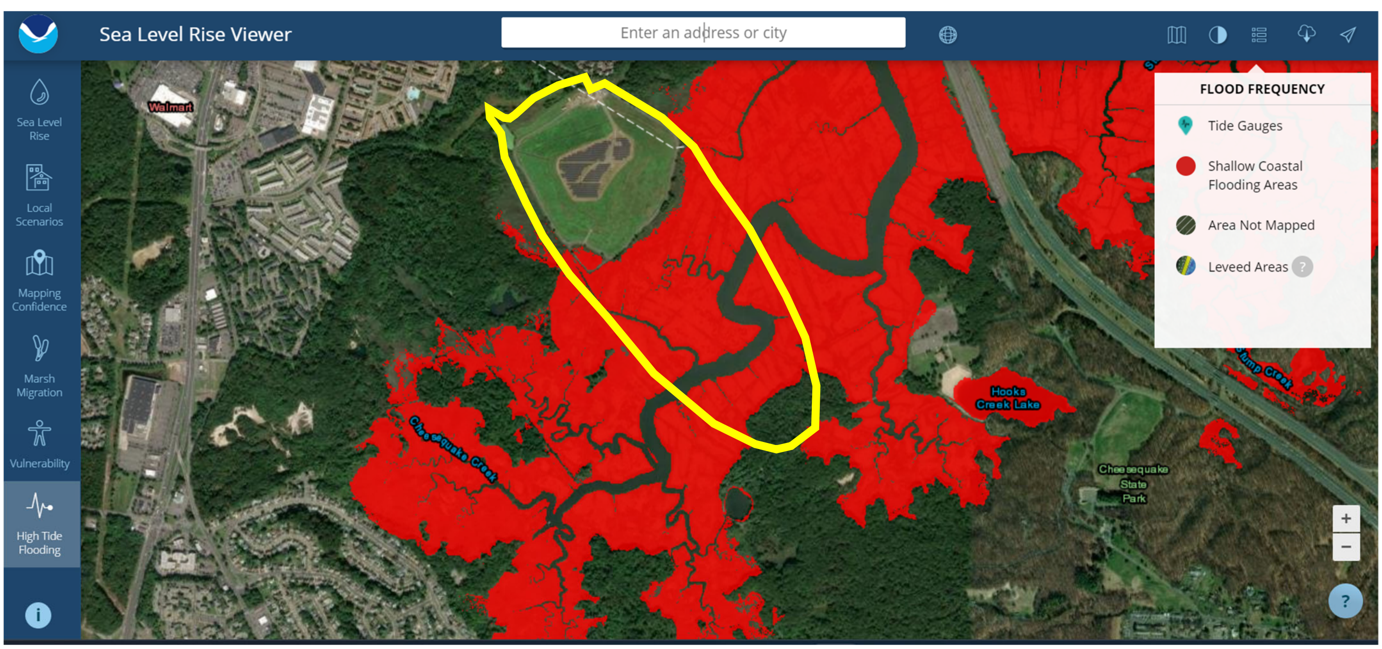
With a 10 Foot Sea Level Rise



Approximate Site Boundary

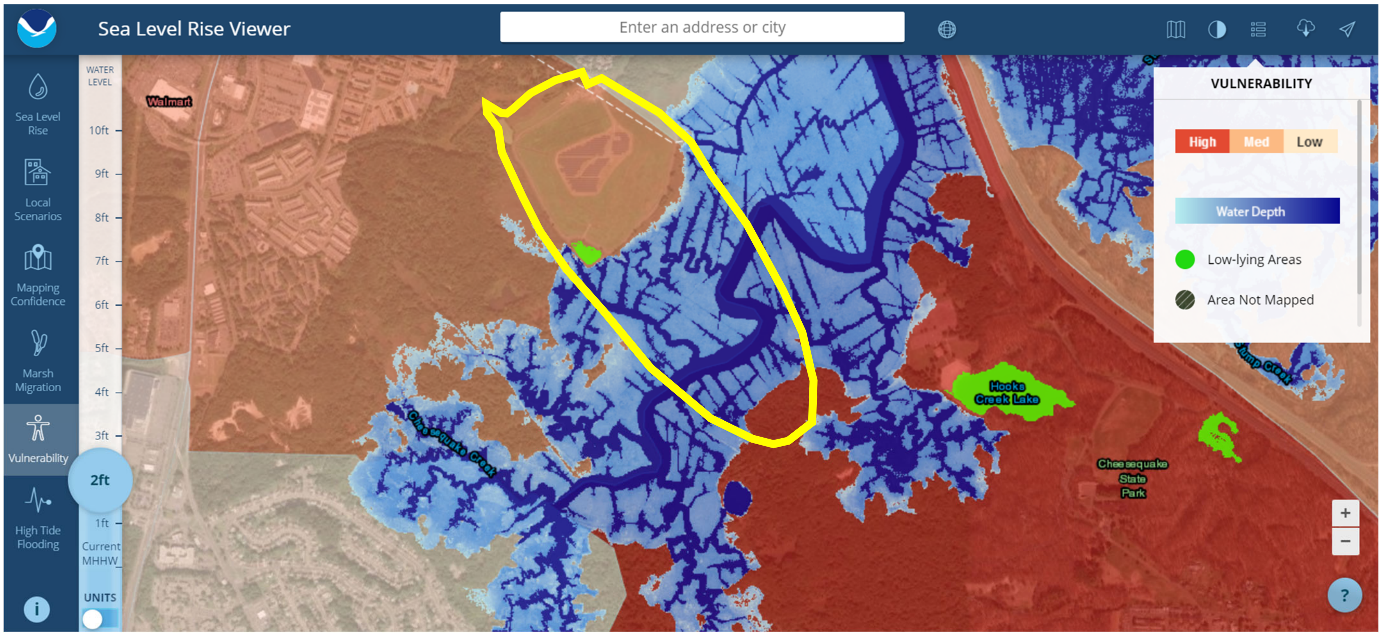
Figure C-9: Current Mean Higher Water Level

Flood Frequency



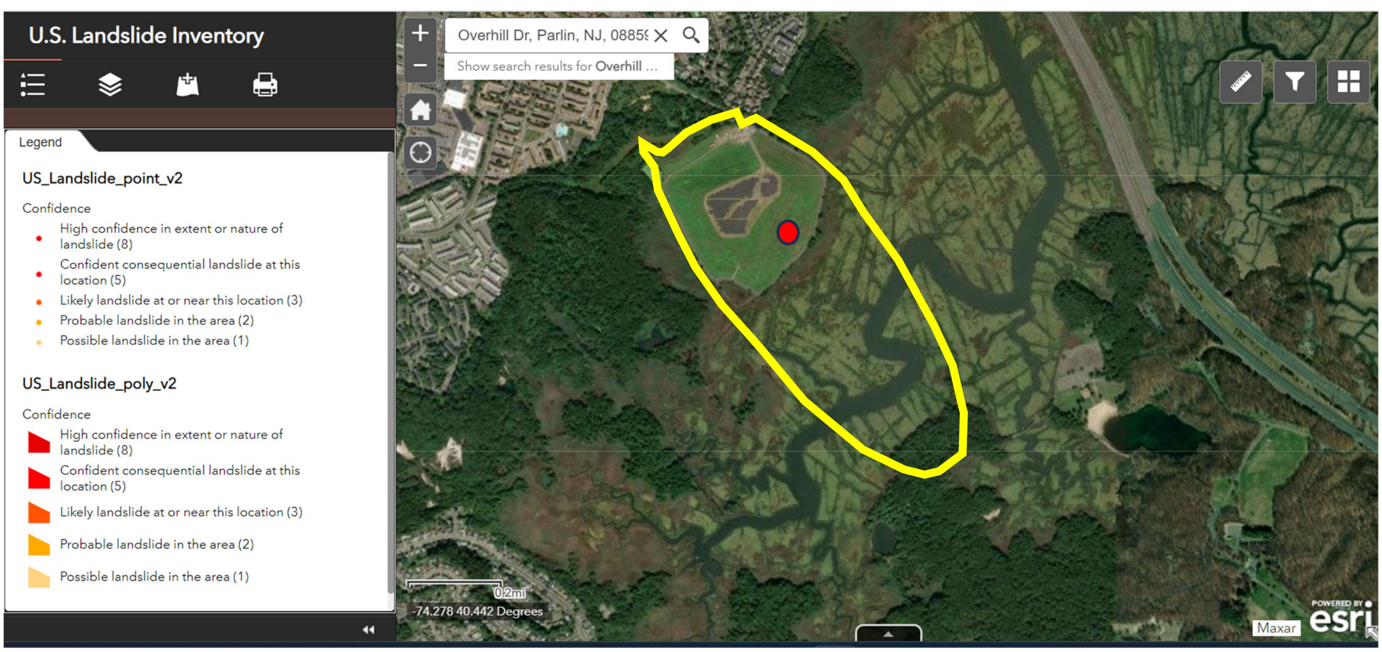
Approximate Site Boundary

Figure C-10: Current Mean Higher Water Level
Vulnerability



Approximate Site Boundary

Figure C-11: US Landslide Inventory



Approximate Site Boundary

APPENDIX D: TABLES

Table 1

LWZ Upgradient Wells and Contaminants that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)

Well ID	Date	1,4-Dioxane	Tetrachloroethene	Aluminum	Chromium	Iron
GWQS		**0.4**	**1**	**200**	**70**	**300**
MW-13S	2014-03	NA	NA	743	19	**2990**
MW-13S	2014-10	NA	NA	**420**	12.7	**724**
MW-13S	2015-03	NA	NA	**317**	1.9	**2080**
MW-13S	2015-09	NA	NA	**206**	NA	137
MW-13S	2016-03	NA	NA	**257**	1.6	**2180**
MW-13S	2016-09	NA	NA	**275**	NA	**378**
MW-13S	2017-03	NA	NA	**488**	NA	206
MW-13S	2017-09	NA	0.7	**421**	NA	256
MW-13S	2018-03	NA	NA	**245**	NA	**385**
MW-13S	2018-09	NA	NA	**260**	NA	135
MW-13S	2019-03	NA	NA	**637**	NA	**574**
MW-13S	2019-09	NA	NA	**2030**	3.1	**56000**
MW-13S	2020-03	NA	0.31	**1490**	NA	90
MW-13S	2020-09	NA	NA	**1070**	1.5	204
MW-13S	2021-03	NA	NA	**885**	NA	**596**
MW-13S	2022-03	NA	NA	**1390**	NA	150
MW-13S	2023-03	NA	NA	**530**	NA	223
MW-7D	2014-03	NA	**1.6**	NA	65	224
MW-7D	2014-09	NA	**1.7**	72.2	**163**	**548**
MW-7D	2015-03	NA	**1.3**	51.5	**199**	**774**
MW-7D	2015-09	NA	**1.8**	18.6	69.2	219
MW-7D	2016-03	NA	**1.3**	15.8	43.8	133
MW-7D	2016-09	NA	0.98	NA	39.3	113
MW-7D	2017-03	NA	0.78	NA	38.4	81
MW-7D	2017-09	**0.43**	**13**	NA	50.1	119
MW-7D	2018-03	NA	**2.3**	NA	44.7	115
MW-7D	2018-09	NA	NA	61.5	46.2	79
MW-7D	2019-03	NA	**1.6**	NA	33.2	59.2
MW-7D	2019-09	NA	NA	20.7	14.4	NA
MW-7D	2020-03	NA	**2.1**	19.6	13.7	NA
MW-7D	2020-09	NA	**2**	58.2	20.9	54.3
MW-7D	2021-03	NA	**1.9**	164	7	122
MW-7D	2022-03	NA	**1.7**	36.4	8.9	NA
MW-7D	2023-03	NA	**2.6**	24.3	44.7	249

Table 2
LWZ Downgradient Wells and VOCs that are Above Groundwater Quality Standards (GWQS) (µg/L)
(highlight indicates above GWQS)

Well ID	Date	1,2-Dichloroethane	1,4-Dioxane	Benzene	Chlorobenzene	Tetrachloroethene
GWQS		**2**	**0.4**	**1**	**50**	**1**
MW-14D	2014-03	0.38	**12**	**1**	18	**1**
MW-14D	2014-09	0.23	**20**	**1.1**	17	0.56
MW-14D	2015-03	NA	**22**	**1.1**	16	NA
MW-14D	2015-09	0.39	**17**	**1.1**	17	0.36
MW-14D	2016-03	0.52	**11**	0.92	16	0.53
MW-14D	2016-09	0.44	**15**	0.7	14	NA
MW-14D	2017-03	0.59	**11**	0.65	15	0.38
MW-14D	2017-09	0.59	**13**	0.67	14	**13**
MW-14D	2018-03	0.74	**13**	0.73	14	0.65
MW-14D	2018-09	0.73	**13**	0.73	12	0.29
MW-14D	2019-03	0.81	**12**	0.56	12	0.41
MW-14D	2019-09	0.79	**12**	0.43	9.6	0.39
MW-14D	2020-03	0.94	**10**	0.41	8.6	0.28
MW-14D	2020-09	0.90	**8.1**	NA	8.2	NA
MW-14D	2021-03	1.1	**5.3**	NA	7.0	0.48
MW-14D	2022-03	1.2	**4.8**	NA	7.2	0.32
MW-14D	2023-03	1.4	**5.9**	NA	7.7	NA
MW-15D	2014-03	0.2	NA	NA	NA	**6.2**
MW-15D	2014-09	NA	NA	NA	NA	**5.7**
MW-15D	2015-03	NA	NA	NA	NA	**6.1**
MW-15D	2015-09	NA	NA	NA	NA	**5.8**
MW-15D	2016-03	NA	NA	NA	NA	**6.1**
MW-15D	2016-09	NA	NA	NA	NA	**5.4**
MW-15D	2017-03	NA	NA	NA	0.37	**5.4**
MW-15D	2017-09	NA	0.27	NA	NA	**6.1**
MW-15D	2018-03	NA	0.27	NA	NA	**7.5**
MW-15D	2018-09	NA	NA	NA	NA	**6**
MW-15D	2019-03	NA	NA	NA	NA	**7.2**
MW-15D	2019-09	NA	NA	NA	NA	**7.8**
MW-15D	2020-03	NA	NA	NA	NA	**7.2**
MW-15D	2020-09	NA	0.33	NA	NA	**5.6**
MW-15D	2021-03	NA	NA	NA	NA	**3.0**
MW-15D	2021-09	NA	NA	NA	NA	**4.2**
MW-15D	2022-03	NA	NA	NA	NA	**3.3**
MW-15D	2022-09	NA	NA	NA	NA	**4.2**
MW-15D	2023-03	NA	0.82	NA	NA	**4.2**
MW-15D	2023-09	NA	NA	NA	NA	**5.9**
MW-3A	2014-03	NA	**4.6**	**1.3**	12	NA
MW-3A	2014-09	NA	**8.4**	**1.3**	9.7	NA
MW-3A	2015-03	NA	**7.7**	**1.4**	11	NA
MW-3A	2015-09	NA	**7**	**1.2**	10	NA
MW-3A	2016-03	NA	**5.6**	**1.1**	7.7	NA
MW-3A	2016-09	NA	**6**	**1.2**	9.1	NA
MW-3A	2017-03	NA	**8**	**1.1**	8.8	NA
MW-3A	2017-09	NA	**8**	**1.2**	10	NA
MW-3A	2018-03	NA	**8.4**	**1.2**	8.6	NA
MW-3A	2018-09	NA	**10**	**1.3**	9.2	0.27
MW-3A	2019-03	NA	**9.8**	**1.1**	9.2	NA
MW-3A	2019-09	NA	**9**	0.96	8.8	0.46
MW-3A	2020-03	NA	**6.9**	0.84	7.6	0.27
MW-3A	2020-09	NA	**8.3**	0.89	7.4	NA
MW-3A	2021-03	NA	**8.2**	0.54	5.5	NA
MW-3A	2022-03	NA	**6.8**	0.62	5.9	0.28
MW-3A	2023-03	NA	**6.9**	0.47	5.5	**3.8**

Table 2 (continued)
LWZ Downgradient Wells and VOCs that are Above Groundwater Quality Standards (GWQS) (µg/L)
(highlight indicates above GWQS)

	Date	1,2-Dichloroethane	1,4-Dioxane	Benzene	Chlorobenzene	Tetrachloroethene
GWQS		2	0.4	1	50	1
MW-4A	2014-03	1.7	**1.2**	NA	NA	0.33
MW-4A	2014-09	**3.1**	**1.1**	NA	NA	0.26
MW-4A	2015-03	**3.1**	**2.3**	NA	NA	NA
MW-4A	2015-09	1.8	**0.52**	NA	NA	0.28
MW-4A	2016-03	**3.7**	**2.2**	NA	0.39	NA
MW-4A	2016-09	1.6	**2**	NA	NA	0.47
MW-4A	2017-03	0.82	**0.61**	NA	NA	0.19
MW-4A	2017-09	1.7	**0.79**	NA	NA	0.64
MW-4A	2018-03	1.9	**1.1**	NA	NA	0.63
MW-4A	2018-09	1.3	**1.3**	NA	NA	0.86
MW-4A	2019-03	0.83	**0.94**	NA	NA	0.82
MW-4A	2019-09	0.77	**1.9**	NA	NA	0.98
MW-4A	2020-03	0.83	**1.2**	NA	NA	0.7
MW-4A	2020-09	NA	**0.51**	NA	NA	0.89
MW-4A	2021-03	1.1	**1.3**	NA	NA	0.34
MW-4A	2022-03	NA	**0.97**	NA	NA	0.35
MW-4A	2023-03	NA	**0.95**	NA	NA	NA
MW-5AR	2014-03	NA	**44**	**1.5**	**210**	**1.6**
MW-5AR	2014-09	NA	**36**	**1.5**	**250**	**1.6**
MW-5AR	2015-03	NA	**30**	**1**	**140**	0.79
MW-5AR	2015-09	NA	**53**	**1.1**	**170**	0.74
MW-5AR	2016-03	NA	**29**	**1.5**	**230**	**1.1**
MW-5AR	2016-09	NA	**24**	0.7	**82**	0.8
MW-5AR	2017-03	NA	**37**	**1.3**	**250**	**1.1**
MW-5AR	2017-09	0.27	**19**	0.4	46	0.83
MW-5AR	2018-03	NA	**32**	**1.2**	**170**	**1.2**
MW-5AR	2018-09	NA	**30**	0.74	**180**	0.92
MW-5AR	2019-03	NA	**27**	NA	33	NA
MW-5AR	2019-09	NA	**26**	NA	46	0.5
MW-5AR	2020-03	NA	**26**	0.53	**120**	0.73
MW-5AR	2020-09	NA	**22**	NA	36	0.42
MW-5AR	2021-03	NA	**32**	NA	**130**	4.3
MW-5AR	2022-03	NA	**17**	NA	24	0.46
MW-5AR	2023-03	NA	**22**	0.27	**180**	**1.2**
MW-8D	2014-03	NA	**95**	**2.2**	45	0.14
MW-8D	2014-09	NA	**77**	**1.8**	43	NA
MW-8D	2015-03	NA	**66**	**1.5**	38	NA
MW-8D	2015-09	NA	**79**	**1.7**	41	NA
MW-8D	2016-03	NA	**36**	**1.3**	32	NA
MW-8D	2016-09	NA	**27**	0.9	13	0.14
MW-8D	2017-03	NA	**26**	0.78	21	NA
MW-8D	2017-09	NA	**23**	0.97	30	0.53
MW-8D	2018-03	NA	**36**	0.2	4.7	NA
MW-8D	2018-09	NA	**36**	NA	4.3	NA
MW-8D	2019-03	NA	**35**	NA	NA	NA
MW-8D	2019-09	NA	**26**	NA	3.8	NA
MW-8D	2020-03	NA	**21**	NA	NA	NA
MW-8D	2020-09	NA	**19**	NA	3.8	**2.4**
MW-8D	2021-03	NA	**18**	0.62	13	NA
MW-8D	2021-09	NA	**18**	NA	2.9	0.48
MW-8D	2022-03	NA	**16**	0.63	13	NA
MW-8D	2022-09	NA	**12**	0.53	16	NA
MW-8D	2023-03	NA	**14**	0.45	11	NA
MW-8D	2023-09	NA	**10**	0.56	18	**1.5**
MW-8D	2023-09 (FD)	NA	**10**	0.58	18	**1.6**

Table 3
UWZ Upgradient Well and Contaminants that are Above Groundwater Quality Standards (GWQS), (µg/L);
(highlight indicates above GWQS)

Well ID	Date	Hexachlorobenzene	Iron	Manganese	Sodium
GWQS		**0.02**	**300**	**50**	**50000**
MW-7S	2014-03	NA	288	21.6	13300
MW-7S	2014-09	NA	**510**	37.6	13400
MW-7S	2015-03	**0.031**	**574**	13.2	13100
MW-7S	2015-09	NA	NA	17.2	16200
MW-7S	2016-03	NA	360	20.4	21100
MW-7S	2016-09	NA	NA	17.3	22800
MW-7S	2017-03	NA	NA	18.2	24100
MW-7S	2017-09	NA	NA	23.6	24000
MW-7S	2018-03	NA	92.1	32.4	43600
MW-7S	2018-09	NA	NA	45.2	**72900**
MW-7S	2019-03	NA	106	**59.4**	**90100**
MW-7S	2019-09	NA	NA	47.6	**98700**
MW-7S	2020-03	NA	NA	**78.7**	**89300**
MW-7S	2020-09	NA	21.1	17.6	**53700**
MW-7S	2021-03	NA	84.1	26.3	**115000**
MW-7S	2022-03	NA	NA	44.8	**160000**
MW-7S	2023-03	NA	665	**52.5**	**174000**

Table 4 UWZ Downgradient Wells and VOCs that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)								
Well ID	**Date**	**1,4-Dioxane**	**Benzene**	**Chlorobenzene**	**Methylene Chloride**	**tert-Butyl Alcohol**	**Tetra-chloroethene**	**Total Det. VOC TICs**
GWQS		**0.4**	**1**	**50**	**3**	**100**	**1**	**500**
MW-14S	2014-03	**93**	**4.4**	44	NA	NA	NA	61
MW-14S	2014-09	**97**	**5.9**	**53**	NA	NA	NA	16.4
MW-14S	2015-03	**100**	**6.2**	**54**	NA	94	NA	12.9
MW-14S	2015-09	**100**	**4.5**	41	NA	71	NA	NA
MW-14S	2016-03	**37**	**1.5**	13	NA	31	NA	NA
MW-14S	2016-09	**84**	**1.3**	12	NA	62	0.35	46
MW-14S	2017-03	**72**	**1.7**	17	**4**	54	NA	NA
MW-14S	2017-09	**110**	**2.4**	20	NA	57	NA	NA
MW-14S	2018-03	**32**	**1.6**	13	NA	25	0.87	NA
MW-14S	2018-09	**51**	0.65	8.8	NA	28	NA	NA
MW-14S	2019-03	**12**	NA	8.5	NA	20	NA	NA
MW-14S	2019-09	**50**	**1.1**	11	NA	45	0.68	NA
MW-14S	2020-03	**11**	NA	7.2	NA	16	NA	NA
MW-14S	2020-09	**50**	**1.2**	10	NA	46	NA	NA
MW-14S	2021-03	**9.3**	0.5	5.8	NA	21	NA	25.7*
MW-14S	2022-03	**25**	0.9	5.1	NA	24	NA	171.5*
MW-14S	2023-03	**53**	0.75	4.3	NA	31	NA	**2139.2***
MW-15S	2014-03	**180**	**68**	**1800**	NA	NA	NA	NA
MW-15S	2014-09	**190**	**68**	**1800**	NA	NA	NA	NA
MW-15S	2015-03	**120**	**47**	**2600**	0.36	**120**	NA	NA
MW-15S	2015-09	**190**	**48**	**2100**	NA	98	NA	NA
MW-15S	2016-03	**71**	**55**	**830**	NA	55	NA	NA
MW-15S	2016-09	**130**	**60**	**1500**	NA	70	NA	80
MW-15S	2017-03	**110**	**48**	**930**	**3.8**	66	NA	NA
MW-15S	2017-09	**130**	**59**	**1800**	NA	61	NA	36.6
MW-15S	2018-03	**130**	**73**	**2900**	NA	75	NA	171.2
MW-15S	2018-09	**170**	**59**	**4700**	NA	95	NA	201
MW-15S	2019-09	**210**	**44**	**3200**	NA	89	NA	85
MW-15S	2020-03	**140**	**33**	**3100**	NA	67	NA	139
MW-15S	2020-09	**280**	**87**	**7000**	NA	**100**	NA	451
MW-15S	2021-03	**220**	**80**	**8900**	NA	**190**	NA	**4540***
MW-15S	2021-09	**200**	**86**	**8800**	NA	**190**	NA	**1422***
MW-15S	2021-09(FD)	**210**	**86**	**8200**	NA	**170**	NA	**3597***
MW-15S	2022-03	**190**	**81**	**15000**	NA	NA	NA	**4551***
MW-15S	2022-09	**190**	**86**	**14000**	NA	NA	NA	**4431***
MW-15S	2022-09(FD)	**200**	**85**	**15000**	NA	NA	NA	**5315***
MW-15S	2023-03	**290**	**65**	**15000**	NA	NA	NA	**6204***
MW-15S	2023-03(FD)	**270**	**72**	**13000**	NA	NA	NA	**4676***
MW-15S	2023-09	**240**	**140**	**9300**	NA	**230**	NA	**3544***
MW-3SR	2014-03	**3.9**	0.21	NA	NA	NA	NA	13
MW-3SR	2014-09	**5.8**	0.22	NA	NA	NA	NA	590
MW-3SR	2015-03	**3.3**	NA	NA	NA	NA	NA	NA
MW-3SR	2015-09	**3.4**	0.18	NA	NA	NA	NA	NA
MW-3SR	2016-03	**1.7**	0.11	NA	NA	NA	NA	NA
MW-3SR	2016-09	**3.2**	0.19	NA	NA	NA	NA	NA
MW-3SR	2017-03	**1.3**	NA	0.34	NA	NA	NA	NA
MW-3SR	2017-09	**1.2**	0.1	NA	NA	NA	NA	NA
MW-3SR	2018-03	**1.6**	0.22	NA	NA	6.9	0.26	NA
MW-3SR	2018-09	**0.81**	NA	NA	NA	NA	NA	NA
MW-3SR	2019-03	**1.1**	NA	NA	NA	NA	NA	NA
MW-3SR	2019-09	**1.3**	NA	NA	NA	NA	NA	NA
MW-3SR	2020-03	**0.66**	NA	NA	NA	NA	NA	NA
MW-3SR	2020-09	**0.93**	NA	NA	NA	NA	**2**	NA
MW-3SR	2021-03	**0.62**	NA	NA	NA	NA	NA	NA*
MW-3SR	2022-03	**0.63**	NA	NA	NA	NA	NA	NA*
MW-3SR	2023-03	**0.43**	NA	NA	NA	NA	NA	NA*

Table 4 (continued)
UWZ Downgradient Wells and VOCs that are above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)

Well ID	Date	1,4-Dioxane	Benzene	Chloro-benzene	Methylene Chloride	tert-Butyl Alcohol	Tetra-chloroethene	Total Det. VOC TICs
GWQS		0.4	1	50	3	100	1	500
MW-4S	2014-03	23	NA	NA	NA	NA	0.19	5.3
MW-4S	2014-09	41	0.23	NA	NA	NA	NA	NA
MW-4S	2015-03	35	NA	NA	NA	36	NA	NA
MW-4S	2015-09	34	0.14	NA	NA	22	NA	NA
MW-4S	2016-03	28	0.09	NA	NA	18	NA	NA
MW-4S	2016-09	26	0.11	NA	NA	20	NA	NA
MW-4S	2017-03	34	NA	NA	NA	21	NA	NA
MW-4S	2017-09	31	0.1	NA	0.47	18	NA	NA
MW-4S	2018-03	32	0.11	NA	NA	20	NA	NA
MW-4S	2018-09	31	NA	NA	NA	15	NA	NA
MW-4S	2019-03	38	NA	NA	NA	19	NA	NA
MW-4S	2019-09	32	NA	NA	NA	19	NA	NA
MW-4S	2020-03	29	NA	NA	NA	17	NA	NA
MW-4S	2020-09	28	NA	NA	NA	15	1.1	8.5
MW-4S	2021-03	16	NA	NA	NA	17	NA	53*
MW-4S	2022-03	23	NA	NA	NA	14	NA	13.8*
MW-4S	2023-03	25	NA	NA	NA	NA	NA	388.8*
MW-5S	2014-03	91	22	110	NA	NA	NA	3202
MW-5S	2014-09	86	18	81	NA	NA	NA	1679.7
MW-5S	2015-03	79	7.1	23	NA	34	NA	153.2
MW-5S	2015-09	73	10	33	NA	42	NA	126.6
MW-5S	2016-03	70	7.3	25	NA	45	NA	86
MW-5S	2016-09	65	6.6	17	NA	34	NA	43.3
MW-5S	2017-03	83	5.7	16	NA	59	NA	46
MW-5S	2017-09	81	8.8	28	NA	55	NA	57
MW-5S	2018-03	100	9.1	24	NA	74	0.41	448.7
MW-5S	2018-09	110	9.1	30	NA	77	NA	685.3
MW-5S	2019-03	110	7.6	19	NA	78	NA	210
MW-5S	2019-03 (FD)	110	7.2	17	NA	80	NA	170.3
MW-5S	2019-09	110	6.7	16	NA	NA	NA	170
MW-5S	2019-09 (FD)	120	5.6	15	NA	NA	NA	250
MW-5S	2020-03	110	6.2	17	NA	77	NA	165
MW-5S	2020-03 (FD)	100	6	16	NA	78	NA	165
MW-5S	2020-09	97	4.6	13	NA	54	NA	168.9
MW-5S	2020-09 (FD)	93	4	13	NA	71	NA	119
MW-5S	2021-03	86	5.9	17	NA	82	NA	211*
MW-5S	2021-03 (FD)	96	5.8	16	NA	93	NA	94.1*
MW-5S	2022-03	73	3.1	7	0.75	70	NA	475.9*
MW-5S	2022-03 (FD)	76	4	9.5	NA	71	NA	325.9*
MW-5S	2023-03	110	3.2	7.7	NA	62	NA	1481.6*
MW-6S	2014-03	NA	0.18	8.3	NA	NA	NA	NA
MW-6S	2014-09	1.8	0.11	5	NA	NA	NA	NA
MW-6S	2015-03	1.5	NA	0.89	1.1	NA	NA	NA
MW-6S	2015-09	1.8	NA	NA	NA	NA	NA	NA
MW-6S	2016-03	1.4	NA	0.62	NA	NA	NA	NA
MW-6S	2016-09	1.2	NA	1.1	NA	NA	NA	NA
MW-6S	2017-03	0.95	NA	0.61	NA	NA	NA	NA
MW-6S	2017-09	0.73	0.093	2.9	0.35	NA	NA	NA
MW-6S	2018-03	0.94	NA	0.58	NA	NA	NA	NA
MW-6S	2018-09	0.94	NA	0.97	NA	NA	6.7	NA
MW-6S	2019-03	0.76	NA	0.69	NA	NA	NA	NA
MW-6S	2019-09	1.2	NA	0.62	NA	NA	0.28	NA
MW-6S	2020-03	1.4	NA	NA	NA	NA	NA	NA
MW-6S	2020-09	0.77	NA	NA	NA	NA	NA	NA
MW-6S	2021-03	0.73	NA	NA	NA	NA	NA	42*
MW-6S	2022-03	0.65	NA	NA	NA	NA	NA	NA*
MW-6S	2023-03	NA	NA	0.43	NA	NA	NA	NA*

Table 4 (continued)
UWZ Downgradient Wells and VOCs that are Above Groundwater Quality Standards (GWQS) (µg/L);
(highlight indicates above GWQS)

Well ID	Date	1,4-Dioxane	Benzene	Chloro-benzene	Methylene Chloride	tert-Butyl Alcohol	Tetra-chloroethene	Total Det. VOC TICs
GWQS		0.4	1	50	3	100	1	500
MW-8S	2014-03	**860**	**100**	**130**	NA	NA	NA	**964**
MW-8S	2014-09	**840**	**73**	**100**	NA	NA	NA	**661.3**
MW-8S	2015-03	**800**	**81**	**110**	0.23	**410**	NA	218
MW-8S	2015-09	**830**	**62**	**93**	NA	**350**	NA	**849.1**
MW-8S	2016-03	**810**	**58**	**84**	NA	**300**	NA	145.8
MW-8S	2016-09	**650**	**42**	**61**	NA	**290**	NA	175.8
MW-8S	2017-03	**800**	**56**	**73**	NA	**290**	NA	209
MW-8S	2017-09	**800**	**36**	**62**	NA	**300**	NA	197.5
MW-8S	2018-03	**680**	**50**	**70**	NA	**290**	0.52	95.1
MW-8S	2018-09	**720**	**37**	**55**	NA	**310**	0.45	135.8
MW-8S	2019-03	**700**	**46**	**70**	NA	**300**	NA	169.4
MW-8S	2019-09	**760**	**29**	**55**	NA	**380**	0.56	156.7
MW-8S	2020-03	**700**	**41**	**56**	NA	**330**	NA	157.1
MW-8S	2020-09	**690**	**34**	**51**	NA	**350**	NA	130.7
MW-8S	2021-03	**640**	**60**	**93**	NA	**260**	NA	**1386.9***
MW-8S	2021-09	**580**	**42**	**69**	NA	**350**	NA	**971.1***
MW-8S	2022-03	**680**	**40**	**69**	NA	**320**	0.4	**1363.1***
MW-8S	2022-09	**680**	**28**	**57**	NA	**430**	NA	**1516.2***
MW-8S	2023-03	**940**	**47**	**78**	NA	**480**	NA	**1108***
MW-8S	2023-09	**580**	**41**	**64**	NA	**340**	NA	**1270.1***

***2021, 2022, 2023 values are for combined VOC & SVOC TICs**

Table 5

UWZ downgradient wells and semi- VOCs that are above Groundwater Quality Standards (GWQS (μg/L); (highlight indicates above GWQS)

Well ID	Date	2,6-Dinitro-toluene	2-Methyl-naphthalene	Bis(2-ethylhexyl) Phthalate	Naphthalene	N-Nitroso-diphenylamine	Benzo [a] anthracene	Benzo[a] -pyrene	Benzo[b]-fluoranthene	Total Det SVOC TICs
GWQS		10	30	3	300	10	0.1	0.1	0.2	500
MW-14S	2014-03	NA	4	NA	11	NA	NA	NA	NA	**512.3**
MW-14S	2014-09	NA	6.4	NA	11	NA	NA	NA	NA	**637.8**
MW-14S	2015-03	NA	2.3	NA	3.8	NA	NA	NA	NA	347
MW-14S	2015-09	3.1	2.2	NA	NA	1.6	NA	NA	NA	**666.9**
MW-14S	2016-03	NA	0.98	1	NA	0.97	NA	NA	NA	258.1
MW-14S	2016-09	NA	1.7	NA	0.87	NA	NA	NA	NA	**1406**
MW-14S	2017-03	NA	NA	NA	NA	NA	NA	NA	NA	342.8
MW-14S	2017-09	3.3	1.7	NA	NA	NA	NA	NA	NA	**2637**
MW-14S	2018-03	NA	NA	NA	NA	NA	0.024	NA	NA	**1003.2**
MW-14S	2018-09	NA	NA	NA	NA	NA	NA	NA	NA	**1668.7**
MW-14S	2019-03	NA	NA	NA	NA	NA	NA	NA	NA	36
MW-14S	2019-09	NA	NA	NA	NA	NA	0.029	NA	NA	**1607**
MW-14S	2020-03	NA	NA	NA	NA	NA	NA	NA	NA	31
MW-14S	2020-09	1.5	NA	NA	NA	NA	0.03	NA	NA	**1596**
MW-14S	2021-03	NA	NA	NA	NA	NA	0.02	NA	NA	25.7*
MW-14S	2022-03	NA	NA	NA	NA	NA	0.017	NA	NA	**171.5***
MW-14S	2023-03	NA	NA	NA	NA	NA	0.02	NA	NA	**2139.2***
MW-15S	2014-03	NA	6.4	1.4	66	**19**	NA	NA	NA	**1731**
MW-15S	2014-09	NA	2.7	**6.8**	33	**17**	**0.19**	0.056	0.092	**1016**
MW-15S	2015-03	NA	5.2	2.8	56	**15**	**0.42**	0.075	0.09	**978**
MW-15S	2015-09	**12**	5.6	2.2	65	**17**	**0.21**	0.042	0.076	**1116**
MW-15S	2016-03	NA	2.4	NA	28	**12**	NA	NA	NA	**710.3**
MW-15S	2016-09	NA	5.2	1.5	57	**17**	**0.17**	NA	0.07	**824**
MW-15S	2017-03	NA	3.2	NA	39	**11**	NA	NA	NA	**515.8**
MW-15S	2017-09	**10**	5	2.4	62	**15**	NA	0.043	0.08	**836**
MW-15S	2018-03	6.7	9	1.7	110	**16**	**0.5**	0.079	0.11	**2163**
MW-15S	2018-09	8.2	8.7	NA	110	**15**	**0.26**	0.046	0.076	**2302**
MW-15S	2019-09	NA	6.1	NA	68	**14**	NA	NA	NA	**1833**
MW-15S	2020-03	NA	6.7	NA	96	**15**	0.094	NA	0.028	**878**
MW-15S	2020-09	NA	19	NA	230	**20**	**0.43**	NA	0.086	**1622**
MW-15S	2021-03	NA	15	1.4	190	**15**	**0.31**	0.057	0.083	**4540***
MW-15S	2021-09	NA	8	1.1	140	**11**	**0.45**	0.092	0.11	**1422***
MW-15S	2021-09 (FD)	NA	9.5	1.3	170	**13**	**0.33**	0.062	0.1	**3597***
MW-15S	2022-03	NA	16	NA	190	9.4	**0.26**	0.042	0.057	**4551***
MW-15S	2022-09	NA	21	1	280	**15**	**0.29**	NA	0.092	**4431***
MW-15S	2022-09(FD)	NA	19	1	**330**	**12**	**0.34**	0.078	0.097	**5315***
MW-15S	2023-03	NA	20	2.1	280	**11**	**1**	**0.24**	**0.29**	**6204***
MW-15S	2023-03(FD)	NA	17	1.9	210	**12**	**0.85**	**0.21**	**0.22**	**4676***
MW-15S	2023-09	NA	23	NA	**310**	**18**	**0.37**	0.074	0.12	**3544***
MW-3SR	2014-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2014-09	NA	NA	NA	NA	NA	NA	NA	NA	183.2
MW-3SR	2015-03	NA	NA	NA	NA	NA	NA	NA	0.032	NA
MW-3SR	2015-09	NA	NA	NA	NA	NA	NA	NA	NA	19.3
MW-3SR	2016-03	NA	NA	NA	NA	NA	NA	NA	NA	23.2
MW-3SR	2016-09	NA	NA	NA	1.2	NA	NA	NA	NA	14.5
MW-3SR	2017-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2017-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2018-03	NA	NA	NA	NA	NA	0.022	NA	NA	NA
MW-3SR	2018-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2019-03	NA	NA	NA	NA	NA	NA	NA	NA	13
MW-3SR	2019-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2020-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2020-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3SR	2021-03	NA	NA	NA	NA	NA	NA	NA	NA	NA*
MW-3SR	2022-03	NA	NA	NA	NA	NA	NA	NA	NA	NA*
MW-3SR	2023-03	NA	NA	NA	NA	NA	0.023	NA	NA	NA*

Table 5 (continued)
UWZ downgradient wells and semi- VOCs that are above Groundwater Quality Standards (GWQS) (µg/L);
(highlight indicates above GWQS)

Well ID	Date	2,6-Dinitro-toluene	2-Methyl-naphthalene	Bis(2-ethylhexyl) Phthalate	Naphthalene	N-Nitroso-diphenylamine	Benzo [a] anthracene	Benzo[a] -pyrene	Benzo[b]-fluoranthene	Total Det SVOC TICs
GWQS		10	30	3	300	10	0.1	0.1	0.2	500
MW-4S	2014-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4S	2014-09	NA	NA	NA	NA	NA	NA	NA	NA	49
MW-4S	2015-03	NA	NA	NA	NA	NA	NA	NA	NA	123.8
MW-4S	2015-09	NA	NA	NA	NA	NA	NA	NA	NA	51.6
MW-4S	2016-03	NA	NA	NA	NA	NA	NA	NA	NA	198.1
MW-4S	2016-09	NA	NA	NA	NA	NA	NA	NA	NA	114.8
MW-4S	2017-03	NA	NA	NA	NA	NA	NA	NA	NA	32.2
MW-4S	2017-09	NA	NA	NA	NA	NA	NA	NA	NA	50
MW-4S	2018-03	NA	NA	NA	NA	NA	0.034	NA	0.021	20
MW-4S	2018-09	NA	NA	NA	NA	NA	NA	NA	NA	**794**
MW-4S	2019-03	NA	NA	NA	NA	NA	NA	NA	NA	56.8
MW-4S	2019-09	NA	NA	NA	NA	NA	NA	NA	NA	7.6
MW-4S	2020-03	NA	NA	NA	NA	NA	**0.13**	0.082	0.1	187.6
MW-4S	2020-09	NA	NA	NA	NA	NA	NA	NA	NA	8.5
MW-4S	2021-03	NA	NA	NA	NA	NA	NA	NA	NA	53*
MW-4S	2022-03	NA	NA	NA	NA	NA	0.02	NA	0.11	13.8*
MW-4S	2023-03	NA	NA	NA	NA	NA	NA	NA	NA	388.8*
MW-5S	2014-03	NA	**47**	NA	**1300**	NA	**0.84**	NA	**0.62**	245.5
MW-5S	2014-09	NA	**34**	NA	**1400**	NA	NA	NA	NA	254
MW-5S	2015-03	NA	3.7	NA	290	NA	NA	NA	0.054	**575**
MW-5S	2015-09	NA	8.5	NA	**370**	NA	NA	NA	NA	**749**
MW-5S	2016-03	NA	8.8	NA	**430**	NA	NA	NA	NA	305
MW-5S	2016-09	NA	5	NA	180	NA	**0.13**	NA	0.052	442.5
MW-5S	2017-03	NA	NA	NA	150	NA	NA	NA	NA	290.4
MW-5S	2017-09	NA	1.8	2.4	180	NA	NA	NA	0.024	**2218**
MW-5S	2018-03	NA	NA	NA	54	NA	0.078	NA	NA	**2052**
MW-5S	2018-09	NA	6.6	NA	**320**	NA	0.081	NA	0.03	**754**
MW-5S	2019-03	NA	2.6	NA	93	NA	0.045	NA	NA	305.8
MW-5S	2019-03 (FD)	1.6	2.1	NA	83	1.4	0.058	NA	NA	1197
MW-5S	2019-09	NA	5.9	NA	160	1.1	**0.12**	0.029	0.035	1021
MW-5S	2019-09 (FD)	NA	5.2	NA	160	1.4	**0.13**	0.038	0.048	1438
MW-5S	2020-03	NA	2.5	NA	77	NA	**0.17**	0.099	0.17	622.6
MW-5S	2020-03 (FD)	NA	4.6	NA	120	NA	**0.23**	**0.18**	**0.3**	700.7
MW-5S	2020-09	NA	1.5	NA	39	NA	0.041	NA	NA	272.9
MW-5S	2020-09 (FD)	NA	1.6	0.043	46	NA	0.043	NA	NA	238.4
MW-5S	2021-03	NA	2	NA	75	NA	NA	NA	NA	211.1*
MW-5S	2021-03 (FD)	NA	NA	NA	NA	NA	NA	NA	NA	94.1*
MW-5S	2022-03	NA	0.7	NA	27	NA	0.034	NA	NA	475.9*
MW-6S	2014-03	NA	NA	NA	NA	2	NA	NA	NA	NA
MW-6S	2014-09	NA	NA	NA	NA	2	NA	NA	NA	NA
MW-6S	2015-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2015-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2016-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2016-09	NA	NA	NA	NA	NA	NA	NA	NA	7.8
MW-6S	2017-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2017-09	NA	NA	NA	NA	NA	NA	NA	0.014	NA
MW-6S	2018-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2018-09	NA	NA	NA	NA	2	NA	NA	NA	NA
MW-6S	2019-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2019-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2020-03	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2020-09	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6S	2021-03	NA	NA	NA	NA	NA	NA	NA	0.044	42*
MW-6S	2022-03	NA	NA	NA	NA	NA	NA	NA	NA	3.6*
MW-6S	2023-03	NA	NA	NA	NA	NA	NA	NA	NA	NA*

Table 5 (continued) UWZ Downgradient Wells and Semi-VOCs that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)										
Well ID	**Date**	**2,6-Dinitro-toluene**	**2-Methyl-naphthalene**	**Bis(2-ethylhexyl) Phthalate**	**Naphthalene**	**N-Nitroso-diphenylamine**	**Benzo [a] anthracene**	**Benzo[a] - pyrene**	**Benzo[b]-fluoranthene**	**Total Det SVOC TICs**
GWQS		**10**	**30**	**3**	**300**	**10**	**0.1**	**0.1**	**0.2**	**500**
MW-8S	2014-03	NA	NA	**7.3**	12	NA	NA	NA	NA	MW-8S
MW-8S	2014-09	NA	NA	**4.4**	11	NA	NA	NA	NA	MW-8S
MW-8S	2015-03	NA	NA	2.4	5	NA	NA	NA	NA	MW-8S
MW-8S	2015-09	**25**	NA	**4**	8.5	1.8	NA	NA	NA	MW-8S
MW-8S	2016-03	NA	NA	**4**	8.8	1.6	NA	NA	NA	MW-8S
MW-8S	2016-09	NA	1.8	NA	7.3	NA	NA	NA	NA	MW-8S
MW-8S	2017-03	NA	NA	NA	7.1	NA	NA	NA	NA	MW-8S
MW-8S	2017-09	**30**	1.2	2.2	5.8	1.3	NA	NA	NA	MW-8S
MW-8S	2018-03	NA	NA	NA	5.5	NA	NA	**0.17**	0.16	MW-8S
MW-8S	2018-09	NA	NA	2.2	5.3	1.1	NA	NA	NA	MW-8S
MW-8S	2019-03	**23**	NA	NA	NA	1.1	NA	NA	NA	MW-8S
MW-8S	2019-09	**12**	NA	NA	2.6	1.4	**0.2**	0.09	0.13	MW-8S
MW-8S	2020-03	NA	NA	1.7	3.8	NA	NA	NA	NA	MW-8S
MW-8S	2020-09	**31**	NA	NA	4.9	NA	NA	NA	NA	MW-8S
MW-8S	2021-03	NA	1.4	2.7	7	1.2	NA	0.077	0.12	MW-8S
MW-8S	2021-09	NA	0.57	`1.7	4.9	NA	NA	NA	NA	MW-8S
MW-8S	2022-03	NA	NA	NA	5.1	NA	NA	NA	NA	MW-8S
MW-8S	2022-09	**22**	0.83	NA	.4.7	NA	NA	0.076	NA	MW-8S
MW-8S	2023-03	NA	0.65	2	NA	NA	**0.13**	0.093	0.1	MW-8S
MW-8S	2023-09	NA	1	**4.3**	5.9	0.89	NA	NA	NA	MW-8S

***2021, 2022, 2023 values are for combined VOC & SVOC TICs**

Table 6

LWZ Downgradient Wells and Metals that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)

Well ID	Date	Aluminum	Arsenic	Beryllium	Iron	Lead	Manganese	Nickel	Sodium
GWQS		200	3	1	300	5	50	100	50000
MW-14D	2014-03	NA	**4.7**	NA	**66700**	NA	**116**	NA	**60500**
MW-14D	2014-09	NA	**7.5**	NA	**76200**	NA	**123**	NA	**62800**
MW-14D	2015-03	38.7	**3.8**	NA	**67900**	NA	**185**	3	**59400**
MW-14D	2015-09	94.6	**4.6**	NA	**71500**	NA	**130**	NA	**62900**
MW-14D	2016-03	**249**	**5.9**	NA	**73000**	0.53	**130**	3.8	**58400**
MW-14D	2016-09	43.2	**3.9**	NA	**66800**	NA	**112**	2.5	**63300**
MW-14D	2017-03	NA	**3.5**	NA	**56800**	NA	**95.7**	2.1	**50800**
MW-14D	2017-09	NA	**3.7**	NA	**51500**	NA	**93.8**	1.9	**53500**
MW-14D	2018-03	NA	**3.7**	NA	**48000**	NA	**85.5**	1.6	49200
MW-14D	2018-09	NA	NA	NA	**2190**	NA	3.6	NA	2310
MW-14D	2019-03	NA	**3**	NA	**56000**	NA	**97.8**	NA	**50800**
MW-14D	2019-09	42.1	2.9	NA	**50600**	NA	**90.2**	NA	48600
MW-14D	2020-03	NA	2.4	NA	**50900**	NA	**93**	10.7	49400
MW-14D	2020-09	NA	**3.6**	NA	**49900**	NA	**88.8**	2.1	48200
MW-14D	2021-03	NA	**3.3**	NA	**45900**	NA	**89.1**	1.8	44000
MW-14D	2022-03	NA	**3.1**	NA	**45400**	NA	**83.6**	1.7	39200
MW-14D	2023-03	NA	**3.1**	NA	**45000**	NA	**85.3**	1.8	37700
MW-15D	2014-03	**440**	NA	**1.5**	NA	1.9	**79.1**	13.9	14500
MW-15D	2014-09	**419**	NA	**1.4**	NA	NA	**73.9**	11.8	14500
MW-15D	2015-03	**469**	NA	**1.6**	199	0.99	**59.9**	8.8	12900
MW-15D	2015-09	**492**	NA	**1.9**	**385**	1.1	**64.4**	8.8	12700
MW-15D	2016-03	**641**	NA	**1.7**	**822**	1.3	**70**	10	13400
MW-15D	2016-09	**463**	NA	**1.9**	68.6	1	**65.8**	10.1	16400
MW-15D	2017-03	**493**	NA	**1.5**	96.3	1.1	**64.7**	11	15500
MW-15D	2017-09	**484**	NA	**1.6**	66.8	1.1	**62.1**	10.6	16400
MW-15D	2018-03	**468**	NA	**1.7**	49	0.95	**53.9**	10.6	15900
MW-15D	2018-09	**453**	NA	**1.7**	NA	1.1	**62.9**	11.1	16800
MW-15D	2019-03	**467**	NA	**1,8**	NA	0.84	**62.4**	10.9	17100
MW-15D	2019-09	**493**	NA	**1.9**	125	0.93	**67.2**	11.2	38200
MW-15D	2020-03	**522**	NA	**1.5**	NA	1.8	**62.2**	12.5	20100
MW-15D	2020-09	**690**	NA	**1.8**	NA	1.4	**52.2**	12.3	20200
MW-15D	2021-03	**678**	NA	**1.9**	NA	1.4	**59.4**	13.7	18900
MW-15D	2021-09	**633**	NA	**1.8**	NA	1.3	**55**	13.8	18900
MW-15D	2022-03	**656**	NA	**1.6**	NA	1.4	**54.5**	13.8	20100
MW-15D	2022-09	**767**	NA	**1.8**	NA	1.5	**62.1**	15	20800
MW-15D	2023-03	**803**	NA	**1.8**	NA	1.2	**63.8**	14.3	20900
MW-15D	2023-09	**894**	NA	**2.1**	130	1.6	**71.7**	15.9	24500
MW-3A	2014-03	90.7	NA	NA	**31700**	NA	**183**	4.9	40200
MW-3A	2014-09	93.6	NA	NA	**40900**	NA	**210**	NA	44000
MW-3A	2015-03	**1160**	1.4	NA	**32200**	1.1	**200**	6.7	39300
MW-3A	2015-09	**347**	NA	NA	**40100**	NA	**206**	NA	40900
MW-3A	2016-03	**895**	1.1	NA	**34200**	0.9	**221**	6.1	48300
MW-3A	2016-09	73.7	NA	NA	**36900**	NA	**216**	2.6	44600
MW-3A	2017-03	**383**	NA	NA	**32500**	0.81	**242**	4.2	**50000**
MW-3A	2017-09	131	NA	NA	**38300**	NA	**243**	2.9	**50300**
MW-3A	2018-03	190	NA	NA	**25500**	NA	**222**	2.6	49600
MW-3A	2018-09	NA	NA	NA	**36800**	NA	**221**	2.5	**50300**
MW-3A	2019-03	31.6	NA	NA	**39000**	NA	**229**	2.7	**51400**
MW-3A	2019-09	59.7	NA	NA	**35400**	NA	**190**	3.4	47000
MW-3A	2020-03	59.5	NA	NA	**31900**	NA	**163**	3.5	40500
MW-3A	2020-09	56.2	NA	NA	**37400**	NA	**208**	2,8	49500
MW-3A	2021-03	31	NA	NA	**33800**	NA	**212**	2.8	46000
MW-3A	2022-03	NA	NA	NA	**31800**	NA	**238**	2	44200
MW-3A	2023-03	78.3	1.2	0.26	**49700**	NA	**220**	2	41800

Table 6 (continued)

LWZ Downgradient Wells and Metals that are Above Groundwater Quality Standards (GWQS (µg/L);
(highlight indicates above GWQS)

Well ID	Date	Aluminum	Arsenic	Beryllium	Iron	Lead	Manganese	Nickel	Sodium
GWQS		200	3	1	300	5	50	100	50000
MW-3A	2014-03	90.7	NA	NA	**31700**	NA	**183**	4.9	40200
MW-3A	2014-09	93.6	NA	NA	**40900**	NA	**210**	NA	44000
MW-3A	2015-03	**1160**	1.4	NA	**32200**	1.1	**200**	6.7	39300
MW-3A	2015-09	**347**	NA	NA	**40100**	NA	**206**	NA	40900
MW-3A	2016-03	**895**	1.1	NA	**34200**	0.9	**221**	6.1	48300
MW-3A	2016-09	73.7	NA	NA	**36900**	NA	**216**	2.6	44600
MW-3A	2017-03	**383**	NA	NA	**32500**	0.81	**242**	4.2	**50000**
MW-3A	2017-09	131	NA	NA	**38300**	NA	**243**	2.9	**50300**
MW-3A	2018-03	190	NA	NA	**25500**	NA	**222**	2.6	49600
MW-3A	2018-09	NA	NA	NA	**36800**	NA	**221**	2.5	**50300**
MW-3A	2019-03	31.6	NA	NA	**39000**	NA	**229**	2.7	**51400**
MW-3A	2019-09	59.7	NA	NA	**35400**	NA	**190**	3.4	47000
MW-3A	2020-03	59.5	NA	NA	**31900**	NA	**163**	3.5	40500
MW-3A	2020-09	56.2	NA	NA	**37400**	NA	**208**	2,8	49500
MW-3A	2021-03	31	NA	NA	**33800**	NA	**212**	2.8	46000
MW-3A	2022-03	NA	NA	NA	**31800**	NA	**238**	2	44200
MW-3A	2023-03	78.3	1.2	0.26	**49700**	NA	**220**	2	41800
MW-4A	2014-03	**246**	NA	NA	**15800**	NA	**139**	6.3	14700
MW-4A	2014-09	69.2	NA	NA	**4890**	NA	**104**	7	12400
MW-4A	2015-03	109	NA	0.69	**6130**	NA	**123**	7	12300
MW-4A	2015-09	111	NA	0.76	**3880**	NA	**108**	8	10300
MW-4A	2016-03	137	NA	0.85	**6330**	0.45	**134**	7.5	13300
MW-4A	2016-09	104	NA	0.71	**2230**	NA	**173**	10.4	13100
MW-4A	2017-03	**242**	NA	0.95	**6670**	1.2	**80.1**	9.5	10500
MW-4A	2017-09	121	NA	0.81	**2130**	NA	**192**	11.2	13900
MW-4A	2018-03	140	NA	**1.1**	**1980**	NA	**209**	12.5	14300
MW-4A	2018-09	108	NA	0.8	**5170**	NA	**228**	12.9	14800
MW-4A	2019-03	167	NA	0.84	**9560**	NA	**206**	12.3	16100
MW-4A	2019-09	154	NA	0.78	**9960**	NA	**200**	11.6	15900
MW-4A	2020-03	179	NA	0.84	**8850**	0.9	**190**	11.3	14600
MW-4A	2020-09	**267**	NA	0.9	**4260**	NA	**60.1**	11.9	11100
MW-4A	2021-03	**343**	NA	**1.3**	**5760**	NA	**192**	18.7	17100
MW-4A	2022-03	133	NA	0.96	**7300**	NA	**193**	18.9	15400
MW-4A	2023-03	**317**	NA	0.87	**5130**	NA	**76.6**	11.3	11400
MW-5AR	2014-03	**450**	NA	**1.1**	**5130**	NA	**190**	26.7	**51300**
MW-5AR	2014-09	**870**	NA	**1.3**	**6870**	NA	**200**	26.5	**56900**
MW-5AR	2015-03	**4730**	2.5	**3.6**	**9090**	**8.3**	**165**	54	40100
MW-5AR	2015-09	**1320**	0.92	**1.7**	**5090**	1.5	**158**	35.3	42000
MW-5AR	2016-03	**5400**	2.9	**4**	**11700**	**8.3**	**206**	61.4	**52100**
MW-5AR	2016-09	**271**	NA	**2.2**	**4280**	NA	**167**	54.5	37800
MW-5AR	2017-03	**203**	0.66	**1.8**	**5780**	NA	**201**	40.2	**52600**
MW-5AR	2017-09	**350**	NA	**3.2**	**3040**	NA	**169**	58.1	34500
MW-5AR	2018-03	188	NA	**2.2**	**4760**	NA	**168**	49.8	43800
MW-5AR	2018-09	156	NA	**1.5**	**5610**	NA	**201**	38.3	46200
MW-5AR	2019-03	**280**	NA	**4.4**	**2990**	NA	**157**	61.1	33000
MW-5AR	2019-09	**307**	1	**3.1**	**3240**	NA	**152**	56	39600
MW-5AR	2020-03	**287**	NA	**2.5**	**5170**	NA	**177**	51.1	38300
MW-5AR	2020-09	**419**	NA	**3.9**	**2620**	NA	**149**	51	35100
MW-5AR	2021-03	**401**	NA	**2.2**	**7380**	NA	**249**	50.2	44500
MW-5AR	2022-03	**479**	NA	**3.3**	**2140**	NA	**143**	51.4	36500
MW-5AR	2023-03	**184**	NA	**1**	**11120**	NA	**259**	25.6	40500

Table 6 (continued)
LWZ Downgradient Wells and Metals that are above Groundwater Quality Standards (GWQS) (µg/L);
(highlight indicates above GWQS)

Well ID	Date	Aluminum	Arsenic	Beryllium	Iron	Lead	Manganese	Nickel	Sodium
GWQS		**200**	**3**	**1**	**300**	**5**	**50**	**100**	**50000**
MW-8D	2014-03	54.8	NA	NA	**45400**	NA	**97.9**	9.3	**65800**
MW-8D	2014-09	75.7	NA	NA	**37400**	NA	**77.4**	19.3	**60800**
MW-8D	2015-03	**280**	1.1	NA	**40500**	1.3	**102**	11.6	**58100**
MW-8D	2015-09	68.3	NA	NA	**46000**	NA	**100**	15.8	**63300**
MW-8D	2016-03	33.5	NA	NA	**36900**	NA	**89.5**	35.3	**64500**
MW-8D	2016-09	NA	NA	NA	**2710**	NA	**89.8**	113	**83000**
MW-8D	2017-03	25.4	NA	NA	**14700**	0.78	40.2	53.9	**68200**
MW-8D	2017-09	55.4	NA	NA	**20400**	NA	45.5	13.6	**62300**
MW-8D	2018-03	NA	1.5	NA	**701**	NA	3.2	78.1	**77000**
MW-8D	2018-09	NA	NA	NA	**531**	NA	**76.7**	99.6	**76900**
MW-8D	2019-03	NA	NA	NA	**491**	NA	4.7	**102**	**81000**
MW-8D	2019-09	52	NA	NA	**560**	NA	**62.1**	96.2	**78700**
MW-8D	2020-03	NA	NA	NA	186	NA	**50.5**	96.4	**78100**
MW-8D	2020-09	NA	NA	NA	**376**	NA	**78.6**	86.6	**80000**
MW-8D	2021-03	NA	NA	**NA**	**486**	NA	**60.6**	54.5	**75200**
MW-8D	2021-09	NA	NA	NA	260	NA	34	57.2	**71100**
MW-8D	2022-03	NA	NA	NA	**397**	NA	41.8	41.4	**68500**
MW-8D	2022-09	20.2	NA	NA	**6910**	NA	22.5	21	**66300**
MW-8D	2023-03	NA	NA	NA	**388**	NA	25.9	32	**68500**
MW-8D	2023-09	29.6	NA	NA	**11170**	NA	29	14.1	**62200**

Table 7

UWZ Downgradient Wells and Metals that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)

Well ID	Date	Aluminum	Arsenic	Chromium	Iron	Lead	Manganese	Nickel	Sodium
GWQS		200	3	70	300	5	50	100	50000
MW-14S	2014-03	126	3.6	24.9	9290	3	323	17.4	1580000
MW-14S	2014-09	173	4.1	27.2	8960	7.6	299	21	1360000
MW-14S	2015-03	55.7	2.9	19.4	10800	2.8	347	16.3	558000
MW-14S	2015-09	117	3.8	25.5	4390	9.2	282	19.6	1630000
MW-14S	2016-03	59	2.6	14.4	1860	NA	205	8.2	2240000
MW-14S	2016-09	95.4	2.2	23	1150	2.5	222	15.8	2270000
MW-14S	2017-03	58.8	2.4	18	570	0.83	315	13.3	1630000
MW-14S	2017-09	83.8	2.8	23.5	1760	3	211	17	2200000
MW-14S	2018-03	35.6	1.1	6.8	12400	1.2	275	4.4	874000
MW-14S	2018-09	94.8	0.77	11.5	1420	1.4	163	5.6	1610000
MW-14S	2019-03	26.6	NA	NA	32600	NA	197	NA	188000
MW-14S	2019-09	96.7	1.3	14	1590	2	209	8.5	2000000
MW-14S	2020-03	NA	NA	NA	35600	0.57	164	NA	120000
MW-14S	2020-09	70.1	1.7	14.6	1080	NA	200	10.1	2150000
MW-14S	2021-03	70.4	NA	7.1	6750	NA	94.5	4.6	1440000
MW-14S	2022-03	101	0.98	8.8	1400	NA	154	4.7	2430000
MW-14S	2023-03	96.6	1.5	10.4	1090	1.1	115	5.8	2360000
MW-15S	2014-03	51.7	4	25.2	38600	3	464	43.1	705000
MW-15S	2014-09	53.4	4.3	29.3	39700	3.2	427	46.6	745000
MW-15S	2015-03	79.2	4.4	30.4	35900	5.2	348	53.8	759000
MW-15S	2015-09	56.7	3.4	24	38100	2.7	418	37.3	643000
MW-15S	2016-03	44.6	2.3	14.6	42000	1.8	523	23.1	416000
MW-15S	2016-09	60.7	3.1	25.9	44000	2.3	503	39.9	702000
MW-15S	2017-03	36.2	1.8	14.9	35400	1.1	500	21.3	422000
MW-15S	2017-09	46.5	2.8	18.4	32200	1.5	455	28.3	511000
MW-15S	2018-03	44.1	2.7	21.5	30800	2.2	378	37.9	565000
MW-15S	2018-09	78.6	3.4	26.3	37600	2.3	419	46.5	753000
MW-15S	2019-09	102	2.5	20.4	36900	2.1	417	36.9	580000
MW-15S	2020-03	77.4	2.5	22.6	38100	3.3	461	48.7	614000
MW-15S	2020-09	68.8	6.2	40.2	46600	3.8	244	88.8	1180000
MW-15s	2021-03	84.4	5.3	35.9	49800	3.9	256	79.8	106000
MW-15S	2021-09	59.8	5.8	44.2	40800	4.6	225	102	1230000
MW-155	2021-09 (FD)	24.7	1.1	8	8430	0.86	46	21.5	251000
MW-15S	2022-03	49.3	5.6	29.1	74400	3.6	264	66	789000
MW-15S	2022-09	75.3	5.8	44.3	64300	4.7	259	94.8	1270000
MW-15S	2022-09 (FD)	69.3	6.2	41.4	68700	4.5	273	88.2	1170000
MW-15S	2023-03	143	5	31.4	84700	5.6	311	67.5	854000
MW-15S	2023-03 (FD)	168	5.2	30.5	83000	5.6	293	64.8	826000
MW-15S	2023-09	72.1	5.7	42.2	51500	4.9	240	88	1170000
MW-3SR	2014-03	NA	5.8	NA	76300	NA	1100	5.2	1070000
MW-3SR	2014-09	NA	17.3	NA	94500	NA	1220	5.4	1100000
MW-3SR	2015-03	36.2	19.4	2.5	86200	0.6	936	5.2	758000
MW-3SR	2015-09	34.6	33.7	NA	95800	NA	1110	NA	775000
MW-3SR	2016-03	19	22.6	2.1	59800	NA	659	2.9	419000
MW-3SR	2016-09	21.3	10.1	3	45500	NA	729	3.2	1.00E+06
MW-3SR	2017-03	NA	13.8	1.6	40300	0.66	614	1.6	408000
MW-3SR	2017-09	NA	33.8	2.1	34900	NA	468	1.9	438000
MW-3SR	2018-03	NA	6.4	1.4	29600	NA	422	1.3	526000
MW-3SR	2018-09	NA	16.6	NA	33500	NA	485	NA	453000
MW-3SR	2019-03	NA	16.9	NA	26900	NA	532	NA	253000
MW-3SR	2019-09	102	9.3	2.4	28200	NA	544	NA	357000
MW-3SR	2020-03	NA	8.8	NA	26700	NA	584	NA	318000
MW-3SR	2020-09	NA	11.1	1.6	19200	NA	505	1.3	254000
MW-3SR	2021-03	NA	12.1	NA	25900	0.91	554	1.4	281000
MW-3SR	2022-03	NA	11.8	NA	22600	NA	498	1	254000
MW-3SR	2023-03	NA	11.7	NA	15900	NA	253	NA	286000

Table 7 (continued)

UWZ Downgradient Wells and Metals that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)

Well ID	Date	Aluminum	Arsenic	Chromium	Iron	Lead	Manganese	Nickel	Sodium
GWQS		200	3	70	300	5	50	100	50000
MW-4S	2014-03	52.9	NA	11.3	255	NA	**81**	8	**3450000**
MW-4S	2014-09	NA	NA	11.6	163	NA	**81.6**	9.9	**3370000**
MW-4S	2015-03	42.7	1.5	10.3	**355**	0.77	**73**	9.7	**2970000**
MW-4S	2015-09	32.4	1	8.1	67.5	NA	32.2	6.2	**2820000**
MW-4S	2016-03	15.8	1.4	10.1	88	NA	**65.7**	9.2	**3860000**
MW-4S	2016-09	24.3	0.98	11.1	60.3	NA	47.3	8.7	**4010000**
MW-4S	2017-03	25.1	1.2	9.6	77.7	NA	44.6	7.6	**3570000**
MW-4S	2017-09	18.6	1.1	10.7	89.8	NA	35.5	7.2	**3900000**
MW-4S	2018-03	21.4	1.6	9.7	NA	NA	29.9	6.5	**3600000**
MW-4S	2018-09	NA	NA	10.2	56.9	NA	34.7	6.5	**3910000**
MW-4S	2019-03	23.6	1	10.7	NA	NA	24.6	6.7	**4000000**
MW-4S	2019-09	34.5	NA	10.8	102	NA	24.7	6	**4000000**
MW-4S	2020-03	NA	NA	9.8	NA	NA	19.2	4.9	**3700000**
MW-4S	2020-09	NA	NA	10.4	NA	NA	22.4	4.4	**3880000**
MW-4S	2021-03	31.4	0.93	9.9	67.1	NA	23.2	4.8	**3460000**
MW-4S	2022-03	23	NA	10.0	71.2	NA	28.2	3.6	**4310000**
MW-4S	2023-03	22.7	0.91	8.4	NA	NA	26.9	3.7	**3420000**
MW-5S	2014-03	**2770**	**3**	18.3	**9000**	**19.9**	**277**	17.2	**788000**
MW-5S	2014-09	**657**	NA	9.4	**7480**	4.4	**327**	16.7	**871000**
MW-5S	2015-03	**245**	1.7	9.3	**680**	1.4	**201**	7.3	**1280000**
MW-5S	2015-09	**292**	1.5	6.2	**747**	2.2	**213**	6.6	**1230000**
MW-5S	2016-03	**250**	2	8	**1000**	1.9	**271**	10.4	**1450000**
MW-5S	2016-09	**353**	1.6	8.5	**1350**	2.7	**287**	9.4	**1730000**
MW-5S	2017-03	196	1.4	8.9	**425**	0.83	**275**	10	**1840000**
MW-5S	2017-09	188	1.5	9.1	**669**	0.85	**343**	11.9	**1650000**
MW-5S	2018-03	153	1.9	10.1	**540**	0.86	**282**	14.8	**1770000**
MW-5S	2018-09	**277**	1.7	11.3	**1380**	2.6	**353**	19.3	**1660000**
MW-5S	2019-03	**246**	1.5	10.9	**1080**	1.7	**362**	18.1	**2000000**
MW-5S	2019-03 (FD)	**201**	1.5	10.9	**1030**	1.2	**359**	17.9	**2000000**
MW-5S	2019-09	**341**	1.6	12	**1390**	1.9	**391**	17.8	**2000000**
MW-5S	2019-09 (FD)	**337**	1.9	12	**1430**	2	**396**	18.1	**2000000**
MW-5S	2020-03	156	1.7	11.5	**1300**	0.9	**385**	21.1	**1730000**
MW-5S	2020-03 (FD)	159	2	11.9	**1220**	0.96	**387**	20.8	**1770000**
MW-5S	2020-09	136	1.7	11.9	**429**	NA	**349**	19.6	**2020000**
MW-5S	2020-09 (FD)	235	1.9	11.7	**484**	0.8	**353**	20	**1940000**
MW-5S	2021-03	192	1.9	11.8	**584**	NA	**332**	20.2	**2190000**
MW-5S	2021-03 (FD)	183	1.5	11.7	**780**	0.78	**332**	20.6	**2250000**
MW-5S	2022-03	112	1.4	9.6	132	NA	**274**	14.7	**1830000**
MW-5S	2022-03 (FD)	116	1.6	10.3	199	NA	**271**	15.7	**1930000**
MW-5S	2023-03	184	1.6	9.8	213	0.89	**269**	13.8	**1750000**
MW-6S	2014-03	87	NA	NA	**24100**	NA	**199**	NA	39500
MW-6S	2014-09	89.6	NA	NA	**22700**	NA	**187**	NA	35300
MW-6S	2015-03	41.8	1.2	NA	**19200**	0.59	**172**	NA	31600
MW-6S	2015-09	49.4	1.5	NA	**19300**	NA	**171**	NA	30900
MW-6S	2016-03	29.7	1.4	NA	**20900**	NA	**185**	NA	32800
MW-6S	2016-09	37.3	1.5	1.6	**21800**	NA	**198**	NA	34000
MW-6S	2017-03	35.9	1.1	NA	**21300**	NA	**202**	NA	31400
MW-6S	2017-09	38.3	1.5	NA	**22800**	NA	**205**	NA	33000
MW-6S	2018-03	23.5	1	1.6	**20600**	NA	**201**	NA	30100
MW-6S	2018-09	NA	1.1	NA	**20100**	NA	**193**	NA	30600
MW-6S	2019-03	30.1	1.2	NA	**22900**	NA	**203**	NA	29000
MW-6S	2019-09	32.9	0.78	NA	**18900**	NA	**191**	NA	28300
MW-6S	2020-03	30.2	1.5	NA	**23300**	NA	**204**	NA	28700
MW-6S	2020-09	42.5	1.7	1.2	**22500**	NA	**202**	0.64	27900
MW-6S	2021-03	32.9	1.1	NA	**24600**	NA	**213**	0.97	27700
MW-6S	2022-03	33.1	1.4	NA	**23900**	NA	**217**	NA	28100
MW-6S	2023-03	26.4	1.3	NA	**22700**	NA	**209**	NA	25900

Table 7 (continued)									
UWZ Downgradient Wells and Metals that are Above Groundwater Quality Standards (GWQS) (µg/L); (highlight indicates above GWQS)									
Well ID	**Date**	**Aluminum**	**Arsenic**	**Chromium**	**Iron**	**Lead**	**Manganese**	**Nickel**	**Sodium**
GWQS		**200**	**3**	**70**	**300**	**5**	**50**	**100**	**50000**
MW-5S	2014-03	**2770**	**3**	18.3	**9000**	**19.9**	**277**	17.2	**788000**
MW-5S	2014-09	**657**	NA	9.4	**7480**	4.4	**327**	16.7	**871000**
MW-5S	2015-03	**245**	1.7	9.3	**680**	1.4	**201**	7.3	**1280000**
MW-5S	2015-09	**292**	1.5	6.2	**747**	2.2	**213**	6.6	**1230000**
MW-5S	2016-03	**250**	2	8	**1000**	1.9	**271**	10.4	**1450000**
MW-5S	2016-09	**353**	1.6	8.5	**1350**	2.7	**287**	9.4	**1730000**
MW-5S	2017-03	196	1.4	8.9	**425**	0.83	**275**	10	**1840000**
MW-5S	2017-09	188	1.5	9.1	**669**	0.85	**343**	11.9	**1650000**
MW-5S	2018-03	153	1.9	10.1	**540**	0.86	**282**	14.8	**1770000**
MW-5S	2018-09	**277**	1.7	11.3	**1380**	2.6	**353**	19.3	**1660000**
MW-5S	2019-03	**246**	1.5	10.9	**1080**	1.7	**362**	18.1	**2000000**
MW-5S	2019-03 (FD)	**201**	1.5	10.9	**1030**	1.2	**359**	17.9	**2000000**
MW-5S	2019-09	**341**	1.6	12	**1390**	1.9	**391**	17.8	**2000000**
MW-5S	2019-09 (FD)	**337**	1.9	12	**1430**	2	**396**	18.1	**2000000**
MW-5S	2020-03	156	1.7	11.5	**1300**	0.9	**385**	21.1	**1730000**
MW-5S	2020-03 (FD)	159	2	11.9	**1220**	0.96	**387**	20.8	**1770000**
MW-5S	2020-09	136	1.7	11.9	**429**	NA	**349**	19.6	**2020000**
MW-5S	2020-09 (FD)	235	1.9	11.7	**484**	0.8	**353**	20	**1940000**
MW-5S	2021-03	192	1.9	11.8	**584**	NA	**332**	20.2	**2190000**
MW-5S	2021-03 (FD)	183	1.5	11.7	**780**	0.78	**332**	20.6	**2250000**
MW-5S	2022-03	112	1.4	9.6	132	NA	**274**	14.7	**1830000**
MW-5S	2022-03 (FD)	116	1.6	10.3	199	NA	**271**	15.7	**1930000**
MW-5S	2023-03	184	1.6	9.8	213	0.89	**269**	13.8	**1750000**
MW-6S	2014-03	87	NA	NA	**24100**	NA	**199**	NA	39500
MW-6S	2014-09	89.6	NA	NA	**22700**	NA	**187**	NA	35300
MW-6S	2015-03	41.8	1.2	NA	**19200**	0.59	**172**	NA	31600
MW-6S	2015-09	49.4	1.5	NA	**19300**	NA	**171**	NA	30900
MW-6S	2016-03	29.7	1.4	NA	**20900**	NA	**185**	NA	32800
MW-6S	2016-09	37.3	1.5	1.6	**21800**	NA	**198**	NA	34000
MW-6S	2017-03	35.9	1.1	NA	**21300**	NA	**202**	NA	31400
MW-6S	2017-09	38.3	1.5	NA	**22800**	NA	**205**	NA	33000
MW-6S	2018-03	23.5	1	1.6	**20600**	NA	**201**	NA	30100
MW-6S	2018-09	NA	1.1	NA	**20100**	NA	**193**	NA	30600
MW-6S	2019-03	30.1	1.2	NA	**22900**	NA	**203**	NA	29000
MW-6S	2019-09	32.9	0.78	NA	**18900**	NA	**191**	NA	28300
MW-6S	2020-03	30.2	1.5	NA	**23300**	NA	**204**	NA	28700
MW-6S	2020-09	42.5	1.7	1.2	**22500**	NA	**202**	0.64	27900
MW-6S	2021-03	32.9	1.1	NA	**24600**	NA	**213**	0.97	27700
MW-6S	2022-03	33.1	1.4	NA	**23900**	NA	**217**	NA	28100
MW-8S	2014-03	194	**9.5**	**106**	**3260**	**17.1**	**68.1**	**156**	**2370000**
MW-8S	2014-09	174	**9.6**	**93.8**	**3240**	**11.2**	**74.8**	**156**	**2160000**
MW-8S	2015-03	160	**8.2**	**83.9**	**3660**	**14.8**	**59.9**	**141**	**964000**
MW-8S	2015-09	179	**8.9**	**86.3**	**3350**	**8.4**	**69.6**	**145**	**1970000**
MW-8S	2016-03	160	**9.7**	**93.8**	**4400**	**11**	**73.6**	**147**	**2350000**
MW-8S	2016-09	153	**9**	**90.7**	**3110**	**6.1**	**76.3**	**140**	**2320000**
MW-8S	2017-03	159	**11.1**	**117**	**4460**	**8.1**	**81.5**	**167**	**2480000**
MW-8S	2017-09	126	**10.2**	**109**	**3890**	4.9	**82.9**	**157**	**2220000**
MW-8S	2018-03	171	**9.8**	**108**	**4080**	**6.7**	**77.9**	**157**	**2080000**
MW-8S	2018-09	135	**8**	**95**	**2540**	4.8	**72.7**	**135**	**2060000**
MW-8S	2019-03	142	**10.3**	**114**	**4010**	**6.4**	**80.4**	**152**	**2000000**
MW-8S	2019-09	194	**11**	**119**	**3110**	NA	**88.2**	**168**	**2000000**
MW-8S	2020-03	153	**7.8**	**113**	**4010**	**10.4**	**81.2**	**153**	**2370000**
MW-8S	2020-09	124	**8.8**	**85**	**2860**	**6.4**	**69.5**	**135**	**2060000**
MW-8S	2021-03	198	**11.1**	**116**	**5700**	**13.3**	**82.4**	**194**	**3150000**
MW-8S	2021-09	167	**7.6**	**98.8**	**4590**	**8.1**	**76.6**	**189**	**2340000**
MW-8S	2022-03	160	**10.3**	**121**	**5430**	**7**	**83.7**	**189**	**3230000**
MW-8S	2023-03	159	**9.9**	**109**	**4470**	**5.4**	**76.2**	**175**	**2330000**
MW-8S	2023-09	161	**10.9**	**98.9**	**3030**	**6.7**	**75.3**	**160**	**2270000**

Table 8

UWZ Downgradient Wells and Ammonia that are Above Groundwater Quality Standards (GWQS); (µg/L); (highlight indicates above GWQS)

Date	GWQS	MW-14S	MW-15S	MW-3SR	MW-4S	MW-5S	MW-6S	MW-7S	MW-8S
2014-03	3	**327**	**533**	**51.3**	**206**	**154**	**4.4**	NA	**1630**
2014-09	3	**339**	**375**	**45.9**	**121**	**117**	**6.4**	NA	**807**
2015-03	3	**443**	**507**	**21.3**	**144**	**184**	**3.5**	0.065	**353**
2015-09	3	**294**	**582**	**24.5**	**167**	**234**	2.8	NA	**1310**
2016-03	3	**47**	0.89	**12.1**	**83.5**	**71.1**	2.3	0.089	**2260**
2016-09	3	**285**	**633**	**24.2**	**204**	**220**	**3.8**	NA	**794**
2017-03	3	**439**	**312**	**15.3**	**223**	**280**	**4.1**	NA	**1660**
2017-09	3	**345**	**170**	**13.3**	**113**	**102**	**3.6**	NA	**1110**
2018-03	3	**63.1**	**179**	**12.3**	**63.3**	**108**	**3**	0.061	**132**
2018-09	3	**14.4**	**202**	**26.2**	**193**	**120**	**32.5**	NA	**1670**
2019-03	3	**23.4**		**9.3**	**158**	**85**	**3.1**	NA	**1120**
2019-09	3	**131**	**211**	**9.8**	**68.7**	**131**	**3.6**	NA	**685**
2020-03	3	**14.7**	**188**	**7**	**68.9**	**140**	**3.5**	NA	**805**
2020-09	3	**134**	**409**	**7.2**	**71.5**	**129**	**3.8**	NA	**690**
2021-03	3	**42.3**	**384**	**6**	**67**	**134**	**3.5**	NA	**911**
2021-09	3		**458**						**910**
2022-03	3	**76.3**	**270**	**6.5**	**62**	**131**	**3.6**	NA	**865**
2022-09	3		**423**						
2023-03	3	**92.4**	**443**	**5.5**	**68.4**	**145**	**3.4**	NA	**796**
2023-09	3		**422**						**775**

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Table 9

Validated 2022 Results - Sediment
Global Landfill
Old Bridge, New Jersey

Sample Location				ECO-5				ECO-5			
Sample Date				9/22/2022				9/22/2022			
N=Normal, FD=Field Duplicate				N				FD			
Parameter	NJDEP ESC (ER-L)	NJDEP ESC (ER-M)	Unit	Result	Qual	MDL	RL	Result	Qual	MDL	RL
Volatile Organic Compounds											
1,1,1-Trichloroethane	NS	NS	ug/kg	< 6.6	U	2.2	6.6	< 7.1	U	2.4	7.1
1,1,2,2-Tetrachloroethane	NS	NS	ug/kg	< 6.6	U	2	6.6	< 7.1	U	2.2	7.1
1,1,2-Trichloroethane	NS	NS	ug/kg	< 6.6	U	1.3	6.6	< 7.1	U	1.4	7.1
1,1-Dichloroethane	NS	NS	ug/kg	< 6.6	U	2.1	6.6	< 7.1	U	2.3	7.1
1,1-Dichloroethene	NS	NS	ug/kg	< 6.6	U	3	6.6	< 7.1	U	3.2	7.1
1,2,4-Trichlorobenzene	NS	4.8	ug/kg	< 8	U	3.4	8	< 8.5	U	3.6	8.5
1,2-Dibromo-3-chloropropane	NS	NS	ug/kg	< 6.6	U	4.3	6.6	< 7.1	U	4.6	7.1
1,2-Dibromoethane	NS	NS	ug/kg	< 6.6	U	1.8	6.6	< 7.1	U	1.9	7.1
1,2-Dichlorobenzene	NS	13	ug/kg	< 6.6	U	2.2	6.6	< 7.1	U	2.4	7.1
1,2-Dichloroethane	NS	NS	ug/kg	< 6.6	U	1.9	6.6	< 7.1	U	2	7.1
1,2-Dichloropropane	NS	NS	ug/kg	< 6.6	U	1.8	6.6	< 7.1	U	1.9	7.1
1,3-Dichlorobenzene	NS	NS	ug/kg	< 6.6	U	4.1	6.6	< 7.1	U	4.4	7.1
1,4-Dichlorobenzene	NS	110	ug/kg	< 6.6	U	2	6.6	< 7.1	U	2.1	7.1
2-Butanone	NS	NS	ug/kg	< 6.6	U	3.4	6.6	< 7.1	U	3.6	7.1
2-Hexanone	NS	NS	ug/kg	< 6.6	U	2.1	6.6	< 7.1	U	2.2	7.1
4-Methyl-2-pentanone	NS	NS	ug/kg	< 6.6	U	2.4	6.6	< 7.1	U	2.6	7.1
Acetone	NS	NS	ug/kg	< 27	U	5.2	27	< 28	U	5.5	28
Benzene	340	NS	ug/kg	< 6.6	U	1.9	6.6	< 7.1	U	2	7.1
Bromodichloromethane	NS	NS	ug/kg	< 6.6	U	3.1	6.6	< 7.1	U	3.3	7.1
Bromoform	NS	NS	ug/kg	< 6.6	U	3.3	6.6	< 7.1	U	3.6	7.1
Bromomethane	NS	NS	ug/kg	< 6.6	U	3	6.6	< 7.1	U	3.2	7.1
Carbon Disulfide	NS	NS	ug/kg	< 6.6	U	5.3	6.6	< 7.1	U	5.7	7.1
Carbon Tetrachloride	NS	NS	ug/kg	< 6.6	U	2.7	6.6	< 7.1	U	2.9	7.1
Chlorobenzene	NS	NS	ug/kg	< 6.6	U	1.7	6.6	< 7.1	U	1.8	7.1
Chloroethane	NS	NS	ug/kg	< 6.6	U	3.9	6.6	< 7.1	U	4.1	7.1
Chloroform	NS	NS	ug/kg	< 6.6	U	2.1	6.6	< 7.1	U	2.3	7.1
Chloromethane	NS	NS	ug/kg	< 6.6	U	2.6	6.6	< 7.1	U	2.8	7.1
cis-1,2-Dichloroethene	NS	NS	ug/kg	< 6.6	U	2	6.6	< 7.1	U	2.1	7.1
cis-1,3-Dichloropropene	NS	NS	ug/kg	< 6.6	U	2.9	6.6	< 7.1	U	3.1	7.1
Cyclohexane	NS	NS	ug/kg	< 6.6	U	3.2	6.6	< 7.1	U	3.4	7.1
Dibromochloromethane	NS	NS	ug/kg	< 6.6	U	3.3	6.6	< 7.1	U	3.5	7.1
Dichlorodifluoromethane	NS	NS	ug/kg	< 6.6	U	3.3	6.6	< 7.1	U	3.5	7.1
Ethylbenzene	1400	NS	ug/kg	< 6.6	U	2.5	6.6	< 7.1	U	2.6	7.1
Freon 113	NS	NS	ug/kg	< 6.6	U	2.7	6.6	< 7.1	U	2.8	7.1
Isopropylbenzene	NS	NS	ug/kg	< 6.6	U	3.5	6.6	< 7.1	U	3.7	7.1
m,p-Xylenes	NS	NS	ug/kg	< 6.6	U	2.4	6.6	< 7.1	U	2.5	7.1
Methyl Acetate	NS	NS	ug/kg	< 33	U	9.8	33	< 35	U	10	35
Methyl Cyclohexane	NS	NS	ug/kg	< 6.6	U	3.2	6.6	< 7.1	U	3.4	7.1
Methyl tert-Butyl Ether	NS	NS	ug/kg	< 6.6	U	2	6.6	< 7.1	U	2.1	7.1
Methylene Chloride	NS	NS	ug/kg	< 6.6	U	6	6.6	< 7.1	U	6.4	7.1
o-Xylene	NS	NS	ug/kg	< 6.6	U	2.7	6.6	< 7.1	U	2.8	7.1
Styrene	NS	NS	ug/kg	< 6.6	U	2	6.6	< 7.1	U	2.1	7.1
Tetrachloroethene	450	NS	ug/kg	< 6.6	U	2.7	6.6	< 7.1	U	2.8	7.1
Toluene	2500	NS	ug/kg	< 6.6	U	1.9	6.6	< 7.1	U	2	7.1
trans-1,2-Dichloroethene	NS	NS	ug/kg	< 6.6	U	2.3	6.6	< 7.1	U	2.5	7.1
trans-1,3-Dichloropropene	NS	NS	ug/kg	< 6.6	U	3	6.6	< 7.1	U	3.2	7.1
Trichloroethene	1600	NS	ug/kg	< 6.6	U	2.1	6.6	< 7.1	U	2.2	7.1
Trichlorofluoromethane	NS	NS	ug/kg	< 6.6	U	5.5	6.6	< 7.1	U	5.9	7.1
Vinyl Chloride	NS	NS	ug/kg	< 6.6	U	4.8	6.6	< 7.1	U	5.1	7.1
Xylenes, Total	120	NS	ug/kg	< 13	U	9.6	13	< 14	U	10	14
General Chemistry											
Ammonia	NS	NS	mg/kg	2.7	J	0.19	0.43	3.3		0.19	0.43

Notes:
NJDEP ESC - New Jersey Department of Environmental Protection Ecological Screening Criteria
ER-L -ESC Saline Water Effects Range - Low
ER-M - ESC Saline Water Effects Range - Median

Abbreviations:
MDL: Method Detection Limit
mg/kg: Milligram Per Kilogram
NS: No Standard
Qual: Qualifier
RL: Reporting Limit
ug/kg: Microgram Per Kilogram

Qualifiers:
J: Estimated Result
U: Non-Detect Result

Checked By:
JKC 12/14/2022