Dutchess Sanitation (FICA) Landfill

DUTCHESS COUNTY
POUGHKEEPSIE, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 3-14-047

Prepared for:
New York State Department of Environmental Conservation
Division of Environmental Remediation
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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

APRIL 2020

CERTIFICATION STATEMENT

I Michael L. Spera certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

April 23, 2020

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CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
COC	Contaminant of Concern
CP	Commissioner Policy
DER	Division of Environmental Remediation
DOT	Department of Transportation
EC	Engineering Control
ECL	Environmental Conservation Law
EWP	Excavation Work Plan
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
IATA	International Air Transport Association
IC	Institutional Control
IRM	Interim Remedial Measure
M&M	Maintenance and Monitoring
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Law
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
POTW	Publically-Owned Treatment Works
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SCG	Standards, Criteria and Guidelines
SMP	Site Management Plan
SOP	Standard Operating Procedures
TAL	Target Analyte List
TCL	Target Compound List
USEPA	United States Environmental Protection Agency

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Dutchess Sanitation (FICA) site, as well as the inspections, monitoring, maintenance, and reporting activities required by this Site Management Plan (SMP):

Site Identification: #3-14-047: Dutchess Sanitation (FICA)

Institutional Controls:	1. The property is classified as a Class 4 inactive hazardous waste site.	
	2. An Environmental Easement will be placed on the site once site ownership is resolved. When available, this Site Management Plan will be updated. Until then, the site is governed by the 1993 Record of Decision and this SMP.	
	3. All ECs must be inspected at a frequency and in a manner defined in the SMP.	
Engineering Controls:	1. Part 360 landfill cap	
	2. Site access control (chain-link fence and locks)	
	3. Monitoring well network associated with landfill perimeter monitoring	
	4. Passive landfill gas vents	
Inspections:		Frequency
1. Landfill cap inspection, including landfill vents and site access control		Semi-annually
2. Groundwater monitoring well inspection		Semi-annually
Monitoring:		
1. Sampling landfill perimeter monitoring wells (14 wells)		Every 5th quarter
2. Field monitoring of passive landfill vents		Every 5th quarter
Maintenance:		
1. Maintenance of monitoring wells, passive landfill vents, and/or site access control		As needed
Reporting:		
1. Site Media Monitoring Report		Every 5th quarter
2. Periodic Review Report		Every three years

Further descriptions of the above requirements are provided in detail in the following sections of this Site Management Plan.

1 Introduction

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Dutchess Sanitation (FICA) Landfill located in Poughkeepsie, Dutchess County, New York (hereinafter referred to as the "site"). See Figure 1. The boundaries of the site will be more fully described in a metes and bounds site description that will be defined as part of site management activities in the future. This SMP will be updated with this information when available (Appendix A).

The site is currently in the New York State Inactive Hazardous Waste Disposal Site Remedial Program, Site No. 3-14-047, which is administered by New York State Department of Environmental Conservation (NYSDEC).

J&T Recycling, the site operator when the landfill was operational, entered into an Order on Consent in October 1989 with the New York State Department of Law (NYSDOL) requiring a Remedial Investigation/Feasibility Study (RI/FS) be conducted for the site and interim remedial measures (IRMs) be implemented. A second Order on Consent was signed by J&T Recycling in April 1991 defining the IRMs, which included fencing around the southern border of the site; stabilizing the southern slope of the landfill with construction and demolition debris, and capping the landfill.

After completion of the remedial work, some contamination was left at this site under a capped landfill, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC will be recorded with the Dutchess County Clerk when available, requiring compliance with this SMP and all ECs and ICs placed on the site. This will be added to Appendix A when available.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that failure to comply with this SMP is a violation of Environmental Conservation Law, 6NYCRR Part 375 and the Order on Consent (Site #3-14-047) for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by AECOM on behalf of NYSDEC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent, 6NYCRR Part 375 and/or Environmental Conservation Law.

- 7-day advance notice of any field activity associated with the remedial program.

- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (Appendix B).

- Notice within 48-hours of any damage or defect to the foundation, structures, or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Record of Decision (ROD), and all approved work plans and reports, including this SMP.

- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1-1 below includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information.

Table 1-1: Notifications*

Name	Contact Information
Robert Strang - NYSDEC Project Manager	518-402-0054; robert.strang@dec.ny.gov
Jeffrey Dyber, NYSDEC Section Chief, Remedial Section D	518-402-9621; Jeffrey.Dyber@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

2 Summary of Previous Investigations and Remedial Actions

2.1 Site Location and Description

The site is located in Poughkeepsie, Dutchess County, New York (see Figure 1). The site is an approximately 17 acre area located on a 56 acre parcel surrounded by undeveloped land to the north, east, and west. There are NYSDEC registered wetlands (PK-13) to the east of the site, Van Wagner Road is adjacent to the south side of the site, and the Schatz Federal Bearings Landfill (NYSDEC Site 3-14-003) is located along the southwestern boundary of the site. See Figure 2.

The former owner(s) of the site parcel(s) at the time of issuance of this SMP have walked away from the site, and Dutchess County has yet to take ownership.

2.2 Physical Setting

2.2.1 Land Use

The site consists of a capped landfill in conformance with 6NYCRR Part 360 regulations. The site was initially classified as Class 2 in 1986 indicating it posed a significant threat to public health and the environment. Following completion of remediation activities per the IRMs and ROD in 1994 and several years of site monitoring, the site was reclassified as a Class 4 inactive hazardous waste site in 2010, indicating it has been properly closed but requires continued site management.

At the time the ROD was issued in 1993, there were four private potable water supply wells noted to be within a half-mile radius of the site that were to be included in the groundwater monitoring; however, based on a New York State Department of Health (NYSDOH) letter dated June 29, 2010 regarding reclassification of the site, exposure to contaminated groundwater from the site is unlikely because the area is now served by public water.

2.2.2 Geology

According to the RI/FS report prepared in 1993 by Dunn Geoscience Engineering Co., P.C., bedrock was encountered at or near the ground surface across most of the site, ranging from less than 5 feet below ground surface (bgs) to 27 feet bgs. The regional geology generally consists of metamorphic and sedimentary bedrock overlain by unconsolidated glacial and alluvial sediments. The site overlies the Austin Glen Formation, consisting of greywacke and shale.

According to the RI/FS, unconsolidated deposits were encountered at all drilling locations with the exception of groundwater monitoring well DGC-11, where bedrock was encountered at the surface. The thickest area of overburden was encountered at groundwater monitoring wells DGC-3 and DGC-6, where a sand and gravel layer directly overlaid the bedrock. A dense silt and clay layer was encountered at these locations overlaying the sand and gravel. This silt and clay layer is believed to likely be associated with the wetlands along the eastern side of the site. At the remaining locations, overburden is fill comprised of weathered bedrock, clay, silt, sand, and gravel immediately overlying weathered bedrock.

2.2.3 Hydrogeology

A current groundwater flow map is not available; however, based on a November 2007 Operation, Maintenance, and Monitoring (OM&M) report prepared by Iyer Environmental Group, PLLC and submitted by O'Brien & Gere Engineers, Inc. (OB&G), the shallow site groundwater flows to the east towards the NYSDEC registered wetlands (PK-13) adjacent to the east side of the landfill. Groundwater elevation for the bedrock wells indicated the deep groundwater generally flows radially from the highest point at monitoring well DGC-9 to the east, southeast, and south. Figure C-6 from the 2007 OB&G OM&M report showing groundwater elevation contours for the shallow and deep wells in 2007 is provided in Appendix C of this SMP.

At the time the survey for the metes and bounds description is completed during future site management activities, current survey data will be collected for the monitoring wells, and updated groundwater flow maps will be created. This SMP will be updated with this information when it becomes available.

Groundwater elevation data from the August 2018 monitoring completed by AECOM are provided in Table 2-1. Available information for groundwater monitoring well construction is provided in Appendix D.

Table 2-1: Groundwater Elevations at Landfill Perimeter Monitoring Wells

Well ID	Top of Casing Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
DGC-1	159.69	8.25	151.44
DGC-2S	162.66	10.64	152.02
DGC-2D	162.66	10.42	152.24
DGC-3	164.21	Well not located	Well not located
DGC-4	160.50	5.91	154.59
DGC-5	160.63	7.21	153.42
DGC-6OB	157.70	1.93	155.77
DGC-6D	156.23	well submerged	>156.23
DGC-7	224.87	30.01	194.86
DGC-8	224.38	20.49	203.89
DGC-9	228.92	27.72	201.20
DGC-10A	219.90	40.81	179.09
DGC-11S	171.89	4.81	167.08
DGC-11D	171.90	70.99	100.91

2.3 Investigation and Remedial History

Pursuant with the ROD executed in March 1993, a RI was completed to characterize the nature and extent of contamination at the site. The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the site. Full titles for each of the reports referenced below are provided in Section 8.0 (References).

The March 1993 ROD summarized results of the RI/FS, prepared by Dunn Geoscience Engineering Co., P.C. (January, 1993). As summarized in the ROD, the RI was completed in the four following stages:

1. A magnetometer survey covering the entire landfill was conducted using a grid spacing of 100 feet to determine the extent of the waste mass (i.e., landfill boundary) and to locate areas where drums may exist. No such areas were identified during the survey.

2. A soil gas survey was conducted across the same grid as the magnetometer survey to determine the extent of vapor phase organic contaminants in the pore space of the soil. The primary contaminants detected in the soil gas were benzene, toluene, ethylbenzene, and xylenes (BTEX). Methyl ethyl ketone, cis-1,2-dichloroethylene, tetrachloroethylene, and chlorobenzene were also detected in the site soil gas.

3. Fourteen monitoring wells were installed as part of the RI. Locations are shown on Figure 2, and two rounds of groundwater sampling were completed in May and October 1992. The primary contaminants of concern were xylenes, with the drinking water standard being exceeded in site groundwater by over 10 times. Other COCs identified for groundwater include benzene, arsenic, barium, chromium, and lead, being detected in site groundwater at concentrations at or slightly exceeding the drinking water standards.

4. Two surface water and two sediment samples were collected in May and October 1992 from the wetland area on the east side of the site. COCs identified in the wetland area sediment and surface water included copper, lead, chromium iron, and ammonia.

Samples were also collected from the gas vents in response to odor complaints from local residents.

During the development of the RI/FS work plan, certain activities that would be required at the site were apparent including the installation of a properly designed and constructed landfill cap. Additionally, the slope of the south face of the landfill was unstable and exceeded 60 percent in some places. This factor would have made it very difficult and dangerous to complete the cap installation.

Based on the deteriorating condition of the cap as well as the need to stabilize the southern slope prior to installing the designed cap per the ROD, three IRMs were implemented prior to the execution of the ROD. These IRMs are summarized below.

1. Site security – a chain-link fence was installed to prevent restricted access to the site. The gate of this fence was to remain locked at all times except during site maintenance and management activities.

2. Stabilization of the southern face of the landfill – it was determined that the steep slope would be stabilized with the placement of certain construction and demolition (C&D) debris including: soil, stone, rock dust, concrete, brick, asphalt, wall board, masonry products, tree stumps, wood chips, clearing and grubbing materials, wood, and roofing materials. All incoming loads used for slope stabilization were inspected by a NYSDEC representative.

   Engineering controls were implemented to reduce the risk of an environmental release and another fire occurring.

   - Liners were installed at the bottom of the C&D cells mentioned above consisting of two feet of sloped compacted clay to facilitate collection of leachate.

   - Leachate collection systems were installed on top of the liners. Leachate was pumped to an on-site storage tank and hauled off-site to a publically-owned treatment works (POTW).

   - At the end of each day, two or more inches of soil were placed over the waste from that day in order to promote surface water runoff, reducing the volume of leachate produced from the landfill.

3. Part 360 Landfill cover – The cover system for the Dutchess Sanitation (FICA) landfill consisted of the following from bottom to top:

   - A gas venting system: installed in the landfill cover to allow venting of the gases produced during the decomposition of the waste. During the development of the ROD, odor complaints led to the inclusion of a flare system to treat the gas venting from the landfill. According to the 2007 M&M report and the 2011 SMP, use of this flare system was discontinued due to the relatively high cost of operation. The NYSDEC issued a letter to CH Energy group in July 2004 requesting electrical service to the system be disconnected, and in July 2014 the metal from the system was purchased for scrap metal, dismantled, and removed from the site.

   - Barrier layer: a low permeability geomembrane was installed to limit the volume of precipitation able to infiltrate the waste mass.

- Barrier protection layer: 24-inches of compacted soil was placed over the barrier layer to protect the barrier layer from temperature extremes, root penetration, and to the extent possible, burrowing animals.

- Topsoil layer: 6-inches of topsoil was placed over the surface of the landfill cover to promote grass cover, thus inhibiting erosion of the cap.

In addition to implementation of these IRMs, the ROD required four additional components designed to augment the IRM program already being implemented for the site remedy, summarized as follows:

1. Removal of pond surface water and the top 2 feet of sediment (approximately 60 cubic yards) in the northeast corner of the site that had been impacted by leachate seeps along the northeast face of the landfill. The surface water was pumped into the leachate storage tanks located on site, and the excavated sediment was placed and capped in the landfill.

2. Further examination of the odor issue was to be conducted. Ultimately, a flare system was designed, constructed, and operated for a number of years following installation. However, the system was discontinued and removed due to high cost operation, and it was determined to no longer be necessary for odor control. Currently, the landfill is vented by passive vents.

3. Leachate was to be collected and treated. Very little leachate generation was expected to occur after the landfill cap was installed.

4. Groundwater samples were to be collected on a regular basis and analyzed for the site specific COCs, including the ionic forms of heavy metals and VOCs. Surface water and sediment samples were also to be collected from the wetland area.

   At the time the ROD was issued in 1993, there were four private potable water supply wells noted to be within a half-mile radius of the site that were to be included in the groundwater monitoring; however, based on a NYSDOH letter dated June 29, 2010 regarding reclassification of the site, exposure to contaminated groundwater from the site is unlikely because the area is now served by public water.

2.4 Remedial Action Objectives

Although not explicitly listed in the ROD, the Remedial Action Objectives (RAOs) for the site are as follows:

Groundwater

RAOs for Environmental Protection

- Prevent the discharge of contaminants to surface water.
- Prevent the migration of contaminated groundwater off-site.

Surface Water

RAOs for Public Health Protection

- Prevent ingestion of water impacted by contaminants.
- Prevent contact or inhalation of contaminants from impacted water bodies.

RAOs for Environmental Protection

- Prevent impacts to biota from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the marine or aquatic food chain.

Sediment/Soil

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediment/soil.
- Prevent surface water contamination.

RAOs for Environmental Protection

- Prevent releases of contaminant(s) from sediment/soil that would result in surface water levels in excess of ambient water quality criteria.
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.

2.5 Remaining Contamination

Based on the remedial actions implemented as IRMs as required by the ROD, no remaining contamination would be expected outside of the footprint of the landfill if the remedy continues to perform as designed. However, as noted in the ROD, it is conceivable that a small quantity of waste may have been left uncovered. It was determined that covering this area of the wetlands would likely have caused more damage than leaving the waste uncapped, therefore the toe of the landfill cap was not extended into the wetlands on the eastern boundary of the landfill. According to the 2011 SMP and the 2015 PRR prepared by Aztech, there was no contamination left outside of the footprint of the landfill. Available post-remediation surface water and sediment monitoring data are provided in Appendix E of this SMP, and surface water and sediment data from the RI are provided in Appendix F.

2.5.1 Groundwater

Results of post-remediation groundwater monitoring samples from the landfill perimeter collected between 2000 and 2018 from the landfill perimeter wells are provided in Appendix E of this SMP. The ROD for the site required long-term monitoring of the groundwater perimeter wells for metals and VOCs. The analytes included in the 2018 monitoring event were based on the 2011 SMP and recommendations in the 2015 PRR prepared by Aztech and include parameters that were not required in the ROD and that have not been detected during the previous site monitoring events (e.g., polychlorinated biphenyls [PCBs] and semivolatile organic compounds [SVOCs]). Additionally, as an initial screening measure, eight of the site wells were also sampled in 2018/2019 for emerging contaminants perfluorooctanoic acid (PFOA) and other per- and polyfluorakyl substances (PFAS) (modified Method 537) and 1,4-dioxane (modified EPA Method 8270 SIM). Samples were collected in accordance with Revision 1.2 of the NYSDEC Sample Protocol for PFC Groundwater Samples dated June 29, 2016. The wells were chosen to be representative of the full site, to the extent possible, including both deep and shallow wells. It should be noted that the laboratory also provided results for 1,4-dioxane from the Method 8260 scan, but this method is typically considered unreliable for 1,4-dioxane, therefore these results have not been discussed herein or provided in the summary tables. However, there was a detection of 53 µg/L reported for Monitoring Well DGC-5 from the less reliable scan, which is consistent with the elevated levels in the nearby wells from the modified 8270 SIM analysis.

The results of the 2018 groundwater sampling are generally consistent with previous sample results. Table 2 in Appendix E reports the groundwater data collected for VOCs and metals since 1992, prior to completion of the remedy. These sample results are compared to NYSDEC Ambient Water Quality Standards and Guidance Values (AWQS) in Table 2 and in the text below. As noted above, SVOCs and PCBs were also analyzed in groundwater; however, they were not required per the ROD, nor have they been detected, including the August 2018 event. Based on this, the data are not discussed herein. Table 3 in Appendix E reports the data for the emerging contaminants.

VOCs

From the wells along the northern and western perimeter of the landfill (DGC-7, DGC-8, DGC-9, and DGC-10A), VOCs were only detected at concentrations above the reporting limits at DCG-7; however, there were no exceedances of the groundwater AWQS.

From the wells along the eastern perimeter of the landfill (DGC-4, DGC-5, and DGC-6OB), there were several lower level detections of VOCs; however, benzene was the only VOC detected above its AWQS of 1 µg/L, with detections of 1.6 µg/L and 1.2 µg/L at DGC-5 and DGC-6OB, respectively. These benzene concentrations are consistent with the 2015 sampling results as well as some of the earlier monitoring results.

Few VOCs were detected above reporting limits in the groundwater from the three perimeter wells adjacent to the southern border of the landfill and a portion of the wetlands (DGC-1, DGC-2S, and DGC-2D). Vinyl chloride was the only parameter to exceed the groundwater AWQS (2 µg/L) in these samples, with a detection of 5.3 µg/L at DGC-2S. This is consistent with the results since at least the 2000 sampling event, from which time detections have ranged from 3 to 7 µg/L. Vinyl chloride was not identified as a site COC in the ROD.

No VOCs were detected from the monitoring well at the south western corner of the site (DGC-11S).

Total detected VOCs for each of the sampled wells are shown on Figure 3.

Metals

Several metals were detected from the wells along the northern and western perimeter of the landfill (DGC-7, DGC-8, DGC-9, and DGC-10A), with iron, manganese, and sodium exceeding their respective AWQS of 300 µg/L, 300 µg/L, and 20,000 µg/L with maximum concentrations of 2,800 µg/L, 5,700 µg/L, and 21,000 µg/L, respectively. No metals exceeded AWQS in the sample from DGC-8.

From the wells along the eastern perimeter of the landfill (DGC-4, DGC-5, and DGC-6OB), several metals were detected, with iron, magnesium, and sodium exceeding their respective AWQS of 300 µg/L, 300 µg/L, and 20,000 µg/L with maximum concentrations of 1,200 µg/L, 780 µg/L, and 110,000 µg/L, respectively.

Several metals were detected in groundwater samples adjacent to the southern border of the landfill and a portion of the wetlands, from DGC-1, DGC-2S, and DGC-2D, many being detected at levels below the respective AWQS. Iron and sodium were detected in all three of these wells at concentrations exceeding their respective AWQS of 300 µg/L and 20,000 µg/L, ranging from 910 to 24,000 µg/L for iron and 90,000 to 230,000 µg/L for sodium (Table 2). In addition to iron and sodium, manganese was detected at levels exceeding the AWQS (300 µg/L) at 1,500 µg/L (DGC-1) and 9,100 µg/L (DGC-2S). At monitoring well DGC-2S, arsenic and magnesium were also detected at elevated levels, with arsenic detected at 100 µg/L, exceeding the AWQS of 25 µg/L; and magnesium detected at 80,000 µg/L, exceeding the AWQS of 35,000 µg/L.

No metals were detected at levels exceeding the AWQS at the well along the south western corner of the site (DGC-11S).

Metals identified as groundwater COCs in the ROD, including arsenic, barium, chromium, and lead, are shown on Figure 3 for each of the sampled wells.

Emerging Contaminants

Emerging contaminants PFAS and 1,4-dioxane were sampled in perimeter monitoring wells DGC-1, DGC-2S, DGC-2D, DGC-4, DGC-6OB, DGC-6D, DGC-7, and DGC-11S and were compared against the screening levels of 10 ng/L for PFOA and PFOS individually, 100 ng/L for all other PFAS individually, and 500 ng/L for total PFAS, based on the January 2020 NYSDEC Guidelines for Sampling and Analysis of PFAS. A screening value of 1 µg/L was used for 1,4 Dioxane, based on 2018 recommendation by NY Drinking Water Quality Council. These data are summarized in Table 3 in Appendix E and shown on Figure 4 and indicate emerging contaminants are present at levels exceeding the screening values in wells across the site. Monitoring Wells DGC-2D, DGC-6D, and DGC-11S were the only site wells screened for emerging contaminants with no exceedances for these parameters.

2.5.2 Surface Water and Sediment Sampling

Four sediment and surface water samples were collected from the wetlands during the August 2018 monitoring event to assess the performance of the remedy. Approximate sample locations are provided on Figure 2 and have remained consistent since site monitoring activities began. As noted above, SVOCs and PCBs were also analyzed in these samples; however, they were not required per the ROD, nor have they been detected, including the August 2018 event. Based on this, the data are not discussed herein.

Results for the sediment samples are provided in Table 4 in Appendix E. Comparison of these results to NYSDEC's Freshwater Sediment Guidance Values indicates the sediments to be Class B based on the copper, lead, nickel, and zinc results.

Results for the surface water sampling completed in August 2018 are provided in Table 5 in Appendix E and are compared against applicable Class B aquatic type NYSDEC AWQS for surface water, where available. The only reported VOC detected in the surface water samples was toluene, with no detections exceeding the applicable Class B AWQS of 100 µg/L. For metals, aluminum and iron exceeded their respective AWQS. Aluminum exceeded the Class B AWQS of 100 µg/L in one of the surface water samples with a concentration of 13,000 µg/L. Iron exceeded the Class B AWQS of 300 µg/L in all of the surface water samples with concentrations ranging from 2,900 to 46,000 µg/L.

2.5.3 Soil Vapor

There are no structures on or near the site to create a risk of soil vapor intrusion; however, historically there had been odor complaints. While the odor has not been an issue for several years, field monitoring of the passive landfill vents has been a requirement and will continue to be completed. Results from the most recent screening completed in 2018 and 2019 are provided in Table 6 in Appendix E of this SMP. These were collected in the field with the use of a VRAE Multi Gas Meter.

3 Institutional and Engineering Control Plans

3.1 General

Since remaining contamination exists at the site under the landfill cap, ICs and ECs are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix B) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs are required to: (1) implement, maintain and monitor site ECs; (2) prevent future exposure to contamination remaining below the landfill cap; and, (3) limit the use and development of the site. Adherence to these ICs on the site will be required by the Environmental Easement when in place and will be implemented under this SMP. This SMP will be updated with the Environmental Easement when available. Currently, these ICs area governed by the 1993 ROD and this SMP.

ICs identified below and to be included in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Dutchess County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the site must be provided to agents, employees, or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries, and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the site are prohibited.

3.3 Engineering Controls

3.3.1 Landfill Cap

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a 40 mil geomembrane barrier layer, a 24 inch barrier protection layer of clean compacted clay, and a 6 inch clean topsoil layer. The EWP provided in Appendix B outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP). If any such work is completed, a Community Air Monitoring Plan (CAMP) will be prepared.

3.3.2 Site Access Control

A chain-link fence was installed to prevent restricted access to the site. The gate of this fence remains locked at all times except during site maintenance and management activities.

3.3.3 Monitoring Well Network associated with Perimeter Monitoring

Fourteen monitoring wells were installed around the perimeter of the landfill to monitor for contaminants potentially leaching from the capped landfill into the area groundwater. Details related to the construction of these wells are provided in Section 4, and Monitoring Well Construction details are provided in Appendix D.

3.3.4 Passive Landfill Gas Vents

Passive landfill gas vents were installed across the top of the landfill to ensure no buildup of gases below the landfill cap as the waste mass beneath the cap undergoes degradation. A drawing showing the design and placement of these vents within the landfill cap, taken from the 2007 OM&M report (IYERS, 2007), is provided in Appendix C.

3.4 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

3.4.1 Landfill Cap

The landfill cap is a permanent control, and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

3.4.2 Site Access Control

The chain-link fence was installed to restrict access to the landfill area and is therefore also a permanent control. The fence will be inspected at regular intervals in accordance with this SMP in perpetuity.

3.4.3 Monitoring Wells associated with Perimeter Monitoring

Groundwater monitoring activities to ensure the landfill cap continues to prevent infiltration of precipitation into the waste material and transport of contaminated groundwater off-site will continue, as determined by the NYSDEC with consultation with NYSDOH. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional source removal, treatment and/or control measures will be evaluated.

3.4.4 Passive Landfill Gas Vents

The passive landfill gas vents were installed to ensure no buildup of gases below the landfill cap as the waste mass beneath the cap undergoes degradation and is therefore also a permanent control. The gas vents will be inspected, and field monitoring completed at regular intervals in accordance with this SMP. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC.

4 Monitoring and Sampling Plan

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan (QAPP) provided in Appendix G and Appendix H (Field Procedures).

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, surface water, sediment);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs); and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site-wide Inspection

Site-wide inspections will be performed semi-annually. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, a site-wide inspection form and groundwater inspection forms will be completed as provided in Appendix I (Site Management Forms). The forms will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the PRR. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement, when available;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Post-Remediation Media Monitoring and Sampling

Samples will be collected from the wetland sediment, wetland surface water, and groundwater every 15 months (i.e., every fifth quarter). Sampling locations, required analytical parameters, and schedule are provided in Table 4-1 below, and sample locations are provided on Figure 2. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 4-1 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters	Schedule
Landfill Perimeter Monitoring Wells	• TCL VOCs (EPA Method SW846 8260) • Target Analyte List (TAL) Metals (EPA Method 6010B) • PFAS (EPA method 537.1.1) • 1,4-dioxane (EPA Method 8270 SIM) • Chlorides (EPA Method 300.0) • Total Suspended Solids (EPA Method 160.2) • Total Organic Carbon (EPA Method 415.1) • Groundwater Quality Field Parameters	Every 5th quarter
Wetland Surface Water	• TCL VOCs (EPA Method SW846 8260) • TAL Metals (EPA Method 6010B) • Chlorides (EPA Method 300.0) • Total Suspended Solids (EPA Method 160.2)	Every 5th quarter
Wetland Sediment	• TCL Volatile Organic Compounds (EPA Method SW846 8260) • TAL Metals (EPA Method 6010B) • Chlorides (EPA Method 300.0) • Total Organic Carbon (EPA Method 415.1)	Every 5th quarter

Detailed sample collection and analytical procedures and protocols are provided in Appendix G (QAPP) and Appendix H (Field Procedures).

4.3.1 Groundwater Sampling

Groundwater monitoring will be performed every fifth quarter to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC. Locations of the perimeter monitoring wells are shown on Figure 2.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC. Deliverables for the groundwater monitoring program are specified in Section 7.0 (Reporting Requirements).

The network of monitoring wells has been installed to monitor the perimeter of the landfill to ensure no contaminants are leaching from the designed landfill. Table 4-2 summarizes the well identification number, depths, diameter, and screened intervals of the wells.

Table 4-2 – Monitoring Well Construction Details

Well ID	Ground Elevation (ft)	Top of Casing Elevation (ft)	Bedrock Elevation (ft)	Total Depth (ft)	Screened Interval (ft)	Sand Pack (ft)	Bentonite Seal (ft)
DGC-1	158.3	159.7	147.3	71.1	61.1 - 71.1	58.2 – 71.1	54.8 – 58.2
DGC-2S	161.4	162.7	149.9	31.7	21.7 – 31.7	19.2 – 31.7	15.2 – 19.2
DGC-2D	161.5	162.7	150.5	86.5	66.5 – 86.5	63.0 – 96.5	60.0 – 63.0
DGC-3	163.4	164.21	141.4	27.1	16.9 – 26.9	16.0 – 27.1	13.0 – 16.0
DGC-4	159.4	160.5	155.2	51.1	41.1 – 51.1	39.5 – 51.1	36.0 – 39.5
DGC-5	159.7	160.63	157.7	19.7	9.7 – 19.7	8.0 – 19.7	4.5 – 8.0
DGC-6OB	155.5	157.7	NA	18.5	8.0 – 18.0	7.0 – 18.5	4.0 – 7.0
DGC-6D	155.5	156.23	128.5	96.5	76.5 – 96.5	74.4 – 96.5	70.4 – 74.4
DGC-7	223.46	224.87	215.96	56.9	46.9 – 56.9	44.7 – 56.9	41.3 – 44.7
DGC-8	222.5	224.38	212.2	56.2	46.2 – 56.2	43.3 – 56.2	39.8 – 43.4
DGC-9	227.6	228.92	222.4	97.5	77.5 – 97.5	75.7 – 97.5	72.3 – 75.7
DGC-10A	218.3	219.9	215.3	61.5	51.5 – 61.5	48.7 – 61.5	45.5 – 48.7
DGC-11S	170.4	171.89	170.4	21.8	11.8 – 21.8	9.7 – 21.8	6.7 – 9.7
DGC-11D	170.5	171.9	170.5	71.0	61.0 – 71.0	58.2 – 71.0	54.5 – 58.2

Other available monitoring well details are included in Appendix D of this SMP.

4.3.1.1 Groundwater Sampling Techniques

Prior to sample collection, depth to water measurements will be collected with an electronic water level meter from all accessible wells on site. Prior to measuring, the wells will be opened and allowed to equilibrate to atmospheric pressure. After equilibration, depth to water measurements will be taken to the hundredth of a foot. A photoionizaion detector (PID) will be used to monitor the headspace above the wells after opening. See Appendix J of this SMP (HASP) for additional information.

Following water level measurements, low-flow sampling techniques will be used in accordance with Groundwater Sampling Guidelines for Superfund and RCRA Project Managers (USEPA OSWER 542-S-02-001). The default groundwater sampling method will be in accordance with EPA's low stress, often referred to as low flow, sampling technique (Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA/540/S-95/504) and is discussed below.

A bladder pump suitable for collection of samples for PFAS analysis will be used to purge the wells. The pump intake will be set at the midpoint of the saturated screened interval. The pump will be operated at a flow rate of approximately 100 to 500 milliliters per minute (mL/m) and water levels will be monitored to ensure that the pumping rate causes minimal/no drawdown. Dedicated tubing suitable for collection of samples for PFAS analysis will be used for groundwater sample collection. Field parameters will be recorded on the Well Sampling Form every five minutes during purging and will include:

- Purge rate (mL/min)
- Depth to water (0.01 ft)
- Temperature (degrees Celsius)
- pH

- Specific conductance (millisiemens per centimeter [ms/cm])
- Dissolved Oxygen (DO) (milligrams per liter [mg/L])
- Oxidation-Reduction Potential (ORP) (millivolts [mV])
- Turbidity (NTU)

A flow-through cell will be used to obtain temperature, pH, specific conductance, DO, and ORP. Turbidity will be measured using a separate instrument. Purging will be considered complete when the indicator parameters have stabilized over three consecutive readings. Stabilization parameters include the following:

- Drawdown: less than 0.3 ft drawdown during purging;
- pH: ± 0.1 standard unit
- Specific Conductivity: ± 3%
- DO: ± 10 % (mg/L) for values greater than 0.5 mg/L or 3 readings < 0.5 mg/L
- ORP: ±10 mV
- Turbidity: < 5 NTU or ± 10% for readings >5 NTU

During sample collection, the flow-through cell will be disconnected, and the sample tubing discharge will be directed into the laboratory supplied sample containers. The target flow rate will be approximately 100 mL/m and one bladder pulse during sample collection for VOC analysis. Once sampling is complete, the purge water will be placed on the ground in the vicinity of the well. Appendix G includes the analytical QAPP for the site management activities. Appendix J includes the HASP for the site management activities.

Groundwater samples will be collected and decanted into pre-preserved, laboratory-supplied sampling vials. The samples will be placed on ice and shipped, under chain of custody, to an approved laboratory. Additional details related to sample handling are provided below in Section 4.3.4. The samples will be analyzed within the applicable holding time for the respective laboratory analytical methods.

4.3.1.2 Well Repair and/or Replacement

If biofouling or silt accumulation occurs in the monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent PRR. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

4.3.2 Surface Water Sampling

Surface water sampling will be performed every fifth quarter to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC. Sample locations are provided on Figure 2 and have remained consistent since site monitoring activities began.

Surface water samples will be collected and decanted into pre-preserved, laboratory-supplied sampling vials. The samples will be placed on ice and shipped, under chain of custody, to an approved laboratory. Additional details related to sample handling are provided below in Section 4.3.4. The samples will be analyzed within the applicable holding time for the respective laboratory analytical methods.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC. Deliverables for the surface water sampling program are specified in Section 7.0 (Reporting Requirements).

4.3.3 Sediment Sampling

Sediment sampling will be performed every fifth quarter to assess the quality of the sediment following completion of the remedial actions. Modification to the frequency or sampling requirements will require approval from the NYSDEC. Sample locations are provided on Figure 2 and have remained consistent since site monitoring activities began.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC. Deliverables for the sediment sampling program are specified in Section 7.0 (Reporting Requirements).

4.3.4 Sample Handling

4.3.4.1 Sample Packaging and Shipping

Samples collected for laboratory analysis will be transported to the laboratory or delivered via FedEx to the laboratory on the day of collection if possible; otherwise samples will be delivered on the day after collection, following proper identification, chain-of-custody, preservation, and packaging procedures.

A properly completed chain-of-custody form will accompany each sample shipment. The sample identifiers will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to the laboratory, or to/from a secure storage area.

Samples will be properly packaged to avoid breakage, stored on ice at 4° C for shipment and dispatched to the laboratory for analysis. In the event that samples must be held overnight prior to shipment, the temperature of the cooler and presence of sufficient ice will be checked and new ice added prior to shipment. A signed chain-of-custody form will be enclosed and secured to the inside top of each sample box or cooler. The chain-of-custody (white copy), a cooler receipt form (if applicable), and any additional documentation will be placed in a plastic bag to prevent them from getting wet, and one copy will be retained by the field team leader.

Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. Signed custody seals will be covered with clear plastic tape. The cooler will be taped shut with strapping tape in at least two locations. Sample shipments will follow Department of Transportation (DOT) and International Air Transport Association (IATA) regulations and documentation.

4.3.4.2 Field Records and Documentation

The objective of this subsection is to provide consistent procedures and formats by which field records will be kept and activities documented. Field records and documentation to be used during field activities include field log books and standard forms. Standard forms include well sampling forms. Blank forms are provided in Appendix I.

Log book entries will be recorded in indelible, waterproof ink. If errors are made in any field log book, field record (form), chain-of-custody, or any other field record document, corrections will be made by crossing a single line through the error, entering the correct information, and initialing and dating the correction.

4.3.4.3 Decontamination Procedures

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the procedures discussed below. Cross contamination is minimized by the use of vendor-decontaminated, dedicated, disposable equipment to the extent practical. Personnel decontamination is discussed in the HASP (Appendix J),

Small equipment decontamination for non-disposable equipment such as water level meters and submersible pumps will be accomplished using the following procedures:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse; and,
- Distilled/deionized water rinse.

Solvents will not be used in the field decontamination of such equipment. Decontamination will include scrubbing/washing with a laboratory grade detergent (e.g. Alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute.

Equipment should be allowed to dry prior to use. Steam cleaning or high-pressure hot water cleaning may be used in the initial removal of gross, visible contamination.

Electric submersible pumps (such as a Grundfos Redi-Flow II) will be decontaminated using the above steps followed by running a large volume (several gallons) of potable water through the pump, followed by an analyte-free water rinse. Tubing will not be re-used (new tubing will be used for each well). Submersible pumps and supporting lines and cables will be placed in a plastic bucket filled with Liquinox and potable water and then run for several minutes (to decontaminate both exterior and interior parts). The process will be repeated with potable water. Submersible pumps will also be given a final analyte-free water rinse of both interior and exterior parts.

If bladder pumps are used, the pump will be disassembled and cleaned after each use. A new bladder will be used for each sample. Small parts, such as screens and gaskets will be replaced after each use. Dedicated airline tubing and Teflon sample tubing will be used at each monitoring well. Dedicated high-density polyethylene (HDPE) and/or silicon tubing will be used for the monitoring wells being sampled for emerging contaminants as noted in Table 4-1. The pump will be cleaned using the following steps:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse; and,
- Distilled/deionized water rinse, air dry.

4.3.5 Soil Vapor Field Monitoring

While soil vapor samples will not be collected for laboratory analysis, a VRAE Multi Gas Meter or similar will be used to monitor vapor being emitted from the passive landfill vents in the field every fifth quarter and the perimeter soil gas vents semi-annually at a minimum.

4.3.6 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix I (Site Management Forms). Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log.

5 Operation and Maintenance Plan

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems, or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

6 Periodic Assessments/Evaluations

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations, along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation resulting from global climactic change and instability have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated engineering controls. Vulnerability assessments provide information so that the site is prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding. This section briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

Because the site utilizes a landfill cap as an engineering control, a potential vulnerability to the site includes increased erosion resulting from intensity and severity of storm events that have the potential to cause significant runoff, flooding, and erosion.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of the major green remediation components for the site during site management that will be evaluated and summarized in the Periodic Review Report (PRR). Considering the environmental impacts of remedy stewardship over the long term, the major components are as follows.

- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

6.2.1 Frequency of Sampling and Other Periodic Activities

Transportation to and from the site, use of consumables in relation to visiting the site in order to complete inspection, monitoring, and maintenance activities, and collecting/shipping samples to a laboratory for analyses all have direct and/or inherent energy costs. The schedule and/or means of these periodic activities will be prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

6.2.2 Metrics and Reporting

While the anticipated site management activities would not require this, if additional construction is warranted on the site in the future in accordance with the ICs, information on energy usage, solid waste generation, transportation and shipping, water usage, and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the ROD;
- The management of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focuses on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7 Reporting Requirements

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendix I. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 7-1 and summarized in the PRR.

Table 7-1: Reporting Schedule

Task/Report	Reporting Frequency*
Site Media Monitoring Report	Every 5th quarter
Periodic Review Report	Every three years

*The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.

All site media monitoring reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sediment, surface water, groundwater, etc.);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine monitoring event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the engineering controls;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc. (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data are to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department every three years, with the first one completed by AECOM in April 2020. The prior PRR covered the January 12, 2012 through March 1, 2015 reporting period and was completed by Aztech. In the event that the site is subdivided into separate parcels with different ownership, a single PRR will be prepared that addresses the site as will be described in the Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Data summary tables by media (groundwater, surface water, sediment), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends. Data collected in the field (e.g., vent monitoring) will also be included.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data are supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:

  - The compliance of the remedy with the requirements of the site-specific ROD and SMP;
  - The operation and the effectiveness of all engineering controls, including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;
  - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the ROD; and
  - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
- The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;
- Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;
- Use of the site is compliant with the environmental easement;
- The engineering control systems are performing as designed and are effective;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program; and
- The information presented in this report is accurate and complete.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative]."

The signed certification will be included in the PRR, which will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The PRR may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the Department for approval. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8 References

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

Aztech Technologies, Inc. 2011. Site Management Plan for Dutchess Sanitation (FICA) Landfill. Site No. 3-14-047. June 2011.

Aztech Technologies, Inc. 2015. Periodic Review Report for Dutchess Sanitation (FICA) Landfill. January 12, 2012 through March 1, 2015 Reporting Period. Site No. 3-14-047. October 2015.

Dunn Geoscience Engineering Co., P.C. 1993. Remedial Investigation/Feasibility Study Report for the FICA Landfill. Site No. 3-14-047. Prepared for J&T Recycling and submitted to NYSDEC. January 1993.

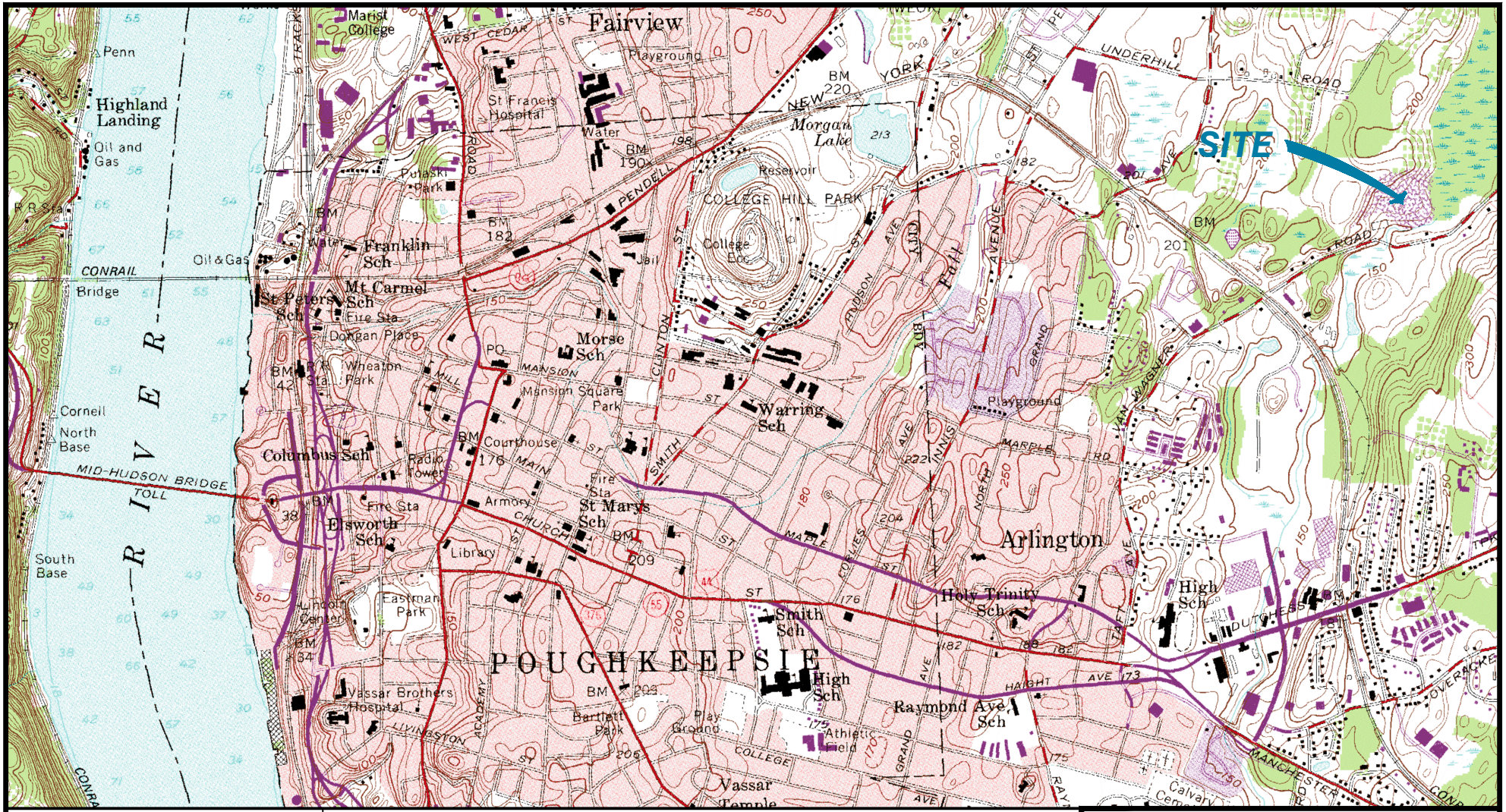
Iyers Environmental Group, PLLC. 2007. OM&M Report for FICA/Dutchess Sanitation Landfill. Site No. 3-14-047. Submitted to NYSDEC by O'Brien & Gere Engineers, Inc. November 2007.

NYSDEC. 1993. Record of Decision for the Dutchess Sanitation Waste Disposal Site, ID No. 314047. March 1993.

NYSDEC. 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

NYSDEC. 2010. DER-10 – "Technical Guidance for Site Investigation and Remediation". May 2010.

Figures



NEW YORK

0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF POUGHKEEPSIE, QUADRANGLE 1982, SCALE: 1" = 2000'.

AECOM

DUCHESS COUNTY SANITATION - FICA LANDFILL
NYSDEC SITE NUMBER: 3-14-047

SITE LOCATION MAP

TOWN OF POUGHKEEPSIE
DUCHESS COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
A1FIG1_130618.dwg	HAP	60562836	8 / 2018	1

Plotted By: heather.pressing
Layout-Sheet Name: LAYOUT1-HORIZ
Plot File Date Created: Aug/14/2018 3:13 PM

Filename: C:\CIVIL 3D PROJECTS\DUTCHESS SANITATION\A1FIG1_130618.DWG

LEGEND

- MONITORING WELL
- SOIL GAS POINT
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- GAS VENT LOCATION

NOTES

1. BASED ON THE 2015 PERIODIC REVIEW REPORT PREPARED BY AZTECH, MONITORING WELL DGC-3 COULD NOT BE LOCATED.
2. THE GAS VENT LOCATIONS ARE APPROXIMATE BASED ON THE AUGUST 2018 SITE MONITORING. THESE ARE NOT SURVEYED LOCATIONS.

N

0’ 150’ 300’

AECOM

DUTCHESS COUNTY SANITATION - FICA LANDFILL
NYSDEC SITE NUMBER: 3-14-047

SITE PLAN

TOWN OF POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
Sitemap Dec 2018.dwg	HAP	60562836	12 / 2018	2

Plotted By: carrie.szczepanski
Layout-Sheet Name: LAYOUT1
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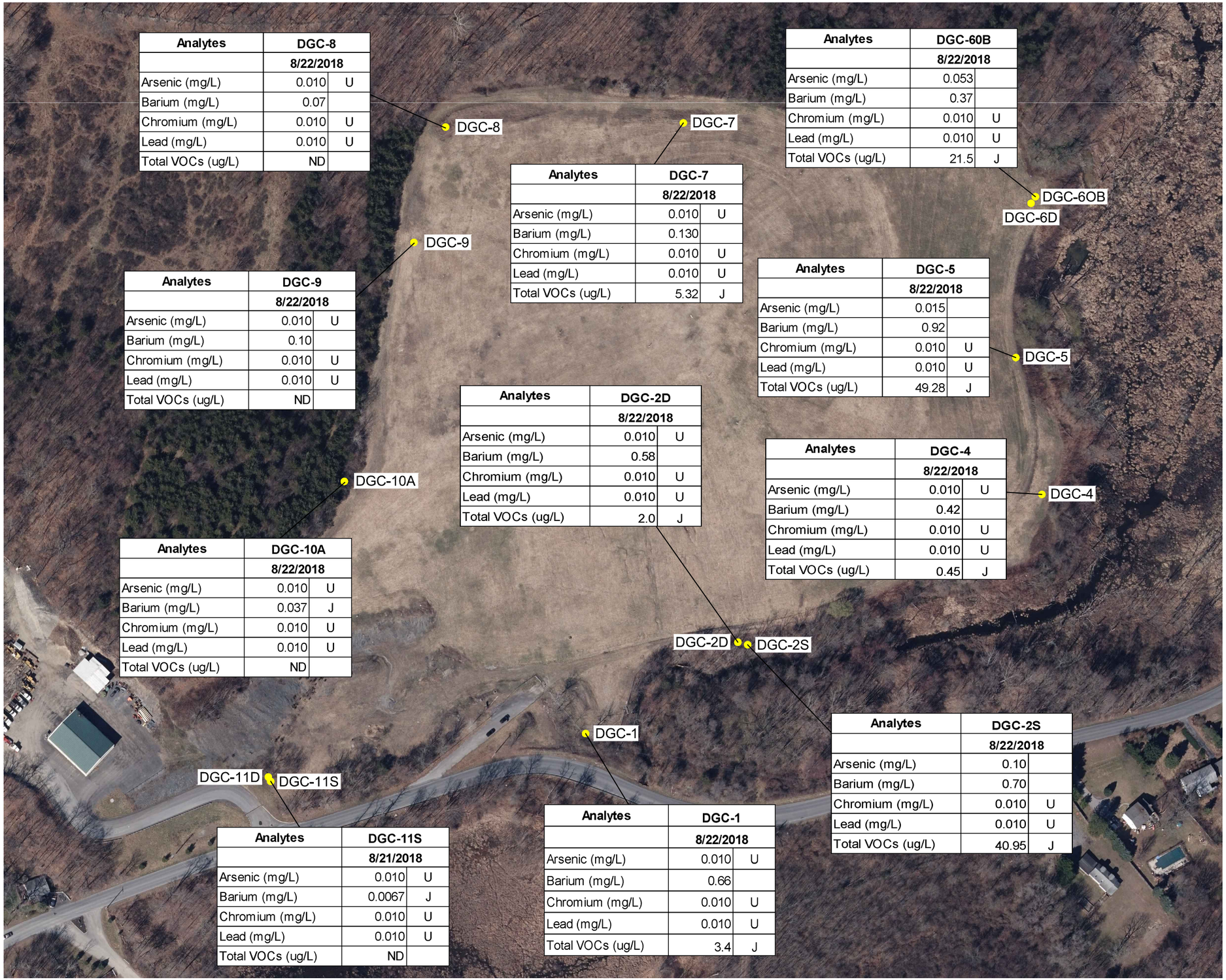

Analytes	DGC-8	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.07	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	ND	

Analytes	DGC-7	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.130	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	5.32	J

Analytes	DGC-60B	
	8/22/2018	
Arsenic (mg/L)	0.053	
Barium (mg/L)	0.37	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	21.5	J

Analytes	DGC-9	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.10	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	ND	

Analytes	DGC-5	
	8/22/2018	
Arsenic (mg/L)	0.015	
Barium (mg/L)	0.92	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	49.28	J

Analytes	DGC-2D	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.58	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	2.0	J

Analytes	DGC-4	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.42	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	0.45	J

Analytes	DGC-10A	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.037	J
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	ND	

Analytes	DGC-2S	
	8/22/2018	
Arsenic (mg/L)	0.10	
Barium (mg/L)	0.70	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	40.95	J

Analytes	DGC-11S	
	8/21/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.0067	J
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	ND	

Analytes	DGC-1	
	8/22/2018	
Arsenic (mg/L)	0.010	U
Barium (mg/L)	0.66	
Chromium (mg/L)	0.010	U
Lead (mg/L)	0.010	U
Total VOCs (ug/L)	3.4	J

LEGEND

MONITORING WELL

NOTES

1. CONSISTENT WITH THE 2015 PERIODIC REVIEW REPORT PREPARED BY AZTECH, MONITORING WELL DGC-3 COULD NOT BE LOCATED.
2. ND=Not Detected

N

0’ 150’ 300’

AECOM

DUTCHESS COUNTY SANITATION - FICA LANDFILL
NYSDEC SITE NUMBER: 3-14-047

RESULTS OF AUGUST 2018 SAMPLING FOR SITE GROUNDWATER CONTAMINANTS OF CONCERN

TOWN OF POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
August 2018 Results.dwg	HAP	60562836	12 / 2018	3

Plotted By: carrie.szczepanski 8:34 AM
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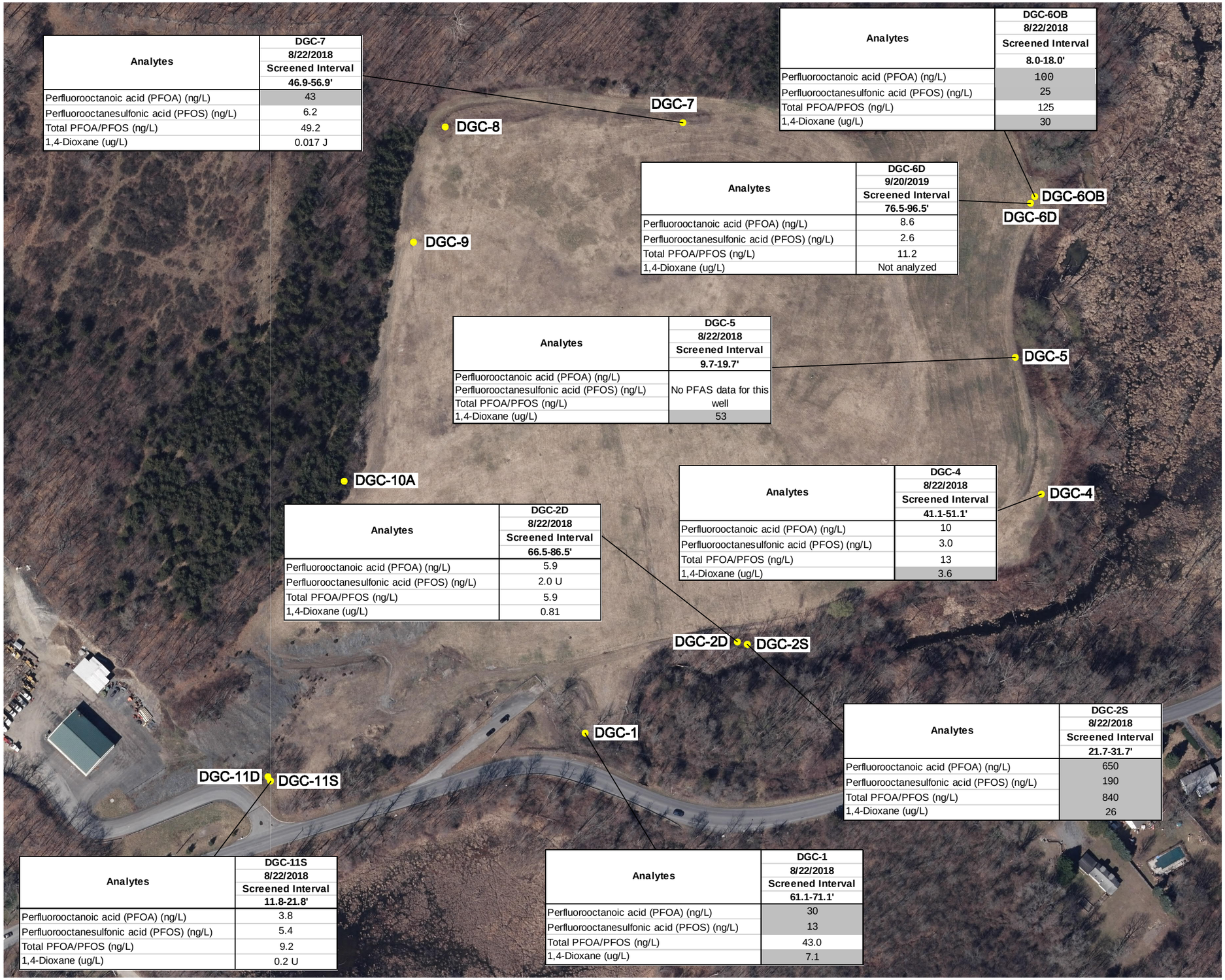

Analytes	DGC-7 8/22/2018 Screened Interval 46.9-56.9'
Perfluorooctanoic acid (PFOA) (ng/L)	43
Perfluorooctanesulfonic acid (PFOS) (ng/L)	6.2
Total PFOA/PFOS (ng/L)	49.2
1,4-Dioxane (ug/L)	0.017 J

Analytes	DGC-6OB 8/22/2018 Screened Interval 8.0-18.0'
Perfluorooctanoic acid (PFOA) (ng/L)	100
Perfluorooctanesulfonic acid (PFOS) (ng/L)	25
Total PFOA/PFOS (ng/L)	125
1,4-Dioxane (ug/L)	30

Analytes	DGC-6D 9/20/2019 Screened Interval 76.5-96.5'
Perfluorooctanoic acid (PFOA) (ng/L)	8.6
Perfluorooctanesulfonic acid (PFOS) (ng/L)	2.6
Total PFOA/PFOS (ng/L)	11.2
1,4-Dioxane (ug/L)	Not analyzed

Analytes	DGC-5 8/22/2018 Screened Interval 9.7-19.7'
Perfluorooctanoic acid (PFOA) (ng/L)	No PFAS data for this well
Perfluorooctanesulfonic acid (PFOS) (ng/L)	
Total PFOA/PFOS (ng/L)	
1,4-Dioxane (ug/L)	53

Analytes	DGC-4 8/22/2018 Screened Interval 41.1-51.1'
Perfluorooctanoic acid (PFOA) (ng/L)	10
Perfluorooctanesulfonic acid (PFOS) (ng/L)	3.0
Total PFOA/PFOS (ng/L)	13
1,4-Dioxane (ug/L)	3.6

Analytes	DGC-2D 8/22/2018 Screened Interval 66.5-86.5'
Perfluorooctanoic acid (PFOA) (ng/L)	5.9
Perfluorooctanesulfonic acid (PFOS) (ng/L)	2.0 U
Total PFOA/PFOS (ng/L)	5.9
1,4-Dioxane (ug/L)	0.81

Analytes	DGC-2S 8/22/2018 Screened Interval 21.7-31.7'
Perfluorooctanoic acid (PFOA) (ng/L)	650
Perfluorooctanesulfonic acid (PFOS) (ng/L)	190
Total PFOA/PFOS (ng/L)	840
1,4-Dioxane (ug/L)	26

Analytes	DGC-11S 8/22/2018 Screened Interval 11.8-21.8'
Perfluorooctanoic acid (PFOA) (ng/L)	3.8
Perfluorooctanesulfonic acid (PFOS) (ng/L)	5.4
Total PFOA/PFOS (ng/L)	9.2
1,4-Dioxane (ug/L)	0.2 U

Analytes	DGC-1 8/22/2018 Screened Interval 61.1-71.1'
Perfluorooctanoic acid (PFOA) (ng/L)	30
Perfluorooctanesulfonic acid (PFOS) (ng/L)	13
Total PFOA/PFOS (ng/L)	43.0
1,4-Dioxane (ug/L)	7.1

LEGEND

- MONITORING WELL

NOTES

1. CONSISTENT WITH THE 2015 PERIODIC REVIEW REPORT PREPARED BY AZTECH, MONITORING WELL DGC-3 COULD NOT BE LOCATED.
2. PFAS SCREENING VALUES BASED ON JANUARY 2020 NYSDEC GUIDELINES FOR SAMPLING AND ANALYSIS OF PFAS. 1,4 DIOXANE SCREENING VALUE BASED ON 2018 RECOMMENDATION BY NY DRINKING WATER QUALITY COUNCIL. SHADING INDICATES THAT RESULT EXCEEDS THE NYS SCREENING VALUE.

N

0’ 150’ 300’

AECOM

DUTCHESS COUNTY SANITATION - FICA LANDFILL
NYSDEC SITE NUMBER: 3-14-047

RESULTS OF AUGUST 2018 and SEPTEMBER 2019 SCREENING FOR EMERGING CONTAMINANTS IN LANDFILL PERIMETER WELLS

TOWN OF POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE
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Plotted By: carlieszczepanski
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Appendix A
Environmental Easement – Will be added when available

Appendix B
Excavation Work Plan

AECOM

Excavation Plan
Dutchess Sanitation (FICA) Landfill
Poughkeepsie, New York
NYSDEC Site # 3-14-047

Contents

1.0 Introduction

This Excavation Plan provides a description of the excavation procedures/protocols to be used in support of Site Management activities associated with the Dutchess Sanitation (FICA) Landfill site located in the Poughkeepsie, New York. Any future intrusive work that will penetrate, encounter or disturb the residual contamination will be performed in compliance with this Excavation Plan (EP). Intrusive construction work must also be conducted in accordance with the procedures defined in a Site-specific Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) that will be developed for the excavation. Any intrusive construction work requires the submission of an Excavation Work Plan to the New York State Department of Environmental Conservation (NYSDEC) that will be performed in compliance with the EP, HASP, and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan. This Excavation Plan is designed to be used in conjunction with a NYSDEC approved Site Management Plan (SMP). To the extent that discrepancies exist between this EP and the SMP, the SMP shall control.

All associated parties who prepare remedial documents for submission to the State and parties who perform this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavation.

2.0 Notification

The parties intending to perform the intrusive activities will submit a notification to the NYSDEC at least 10 days prior to the start of any activity that is reasonably anticipated to encounter remaining contamination. Currently, this notification will be made to:

Robert Strang
DER Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7013

This notification should include:

- A detailed description of the work to be performed, including the location and areal extent, plans for Site re-grading, intrusive elements or utilities to be installed below the soil cover, or any work that may impact an engineering control;
- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A statement that the work will be performed in compliance with this EP and 29 CFR 1910.120;
- A copy of the contractor's HASP and CAMP;
- Identification of disposal facilities for potential waste streams;
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

3.0 Material Handling

3.1 Soils Screening Methods

Visual, olfactory and instrument-based soil screening will be performed by a qualified environmental professional during all excavations into residual Site contamination. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during remediation and during Site development, such as excavations for foundations and utility work in the areas where residual contamination is suspected.

Soils will be segregated, based on previous environmental data and screening results, into material that requires off-site disposal, material that requires testing, material that can be returned to the subsurface, and material that can be used as cover soil.

3.2 Stockpile Methods

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be placed on polyethylene liners and kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and will be available for inspection by NYSDEC.

3.3 Materials Excavation and Load Out

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material. NYSEG and its contractors are solely responsible for safe execution of all invasive and other work performed under the submitted work plan.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site.

A truck decontamination pad will be operated on-site. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be decontaminated at the truck wash before leaving the Site until the activities performed under this section are completed. Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation (NYSDOT) requirements (and all other applicable transportation requirements). Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the

Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

3.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 New York Codes Rules and Regulations (NYCRR) Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used. All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Truck transport routes will be identified to: (1) limit transport through residential areas and past sensitive sites; (2) use city-mapped truck routes; (3) minimize off-site queuing of trucks entering the Site; (4) limit total distance to major highways; and (5) promote safety in access to highways.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials, during Site excavation.

3.5 Materials Disposal Off-Site

All soil/fill/solid waste excavated and removed from the areas of potential residual soil contamination on Site will be treated as contaminated and regulated material and will be transported and disposed of in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with work plan will be made to the NYSDEC. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, construction and demolition recycling facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historical fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste pursuant to 6NYCRR Part 360-1.2. Material that does not meet the SCGs for commercial or industrial use will not be taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility) without a beneficial use determination issued by NYSDEC.

3.6 Materials Reuse On-Site

Any excavated materials that are potentially reusable onsite must be sampled and proven suitable prior to reuse. Excavated materials must be stockpiled and secured on-site in accordance with the materials management practices stated above prior to sampling. Stockpiles shall be limited to a maximum size of 500 cubic yards for sampling. A three point composite sample will be collected

from each stockpile and submitted for metals, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) PAHs.

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-Site material, including historical fill and contaminated soil, that is acceptable for re-use on-site will be placed below a demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site.

3.7 Fluids Management

All liquids to be removed from the Site, including excavation dewatering, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering fluids will not be recharged back to the land surface or subsurface of the Site, but will be managed either via a temporary treatment system or transported to an off-site disposal facility.

4.0 Site Restoration

4.1 Cover System Restoration

If the Site is not developed with a structure, after the completion of soil removal and any other invasive remedial activities, the cover system will be restored in kind, in a manner consistent with the 1993 NYSDEC ROD .

4.2 Backfill from Off-Site Sources

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP, applicable regulations (6NYCRR 375-6.7(d)) and guidance prior to receipt at the Site. Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site. All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d).

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

5.0 Stormwater Pollution Prevention

Soil disturbing activities will be limited and exposed soils will be covered to the extent practicable to minimize erosion. Sediment controls (e.g., silt fence, hay bales, check dams) will be installed downgradient from all disturbed areas to capture sediment and prevent it from leaving the Site.

Erosion protection, silt barriers and check dams will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

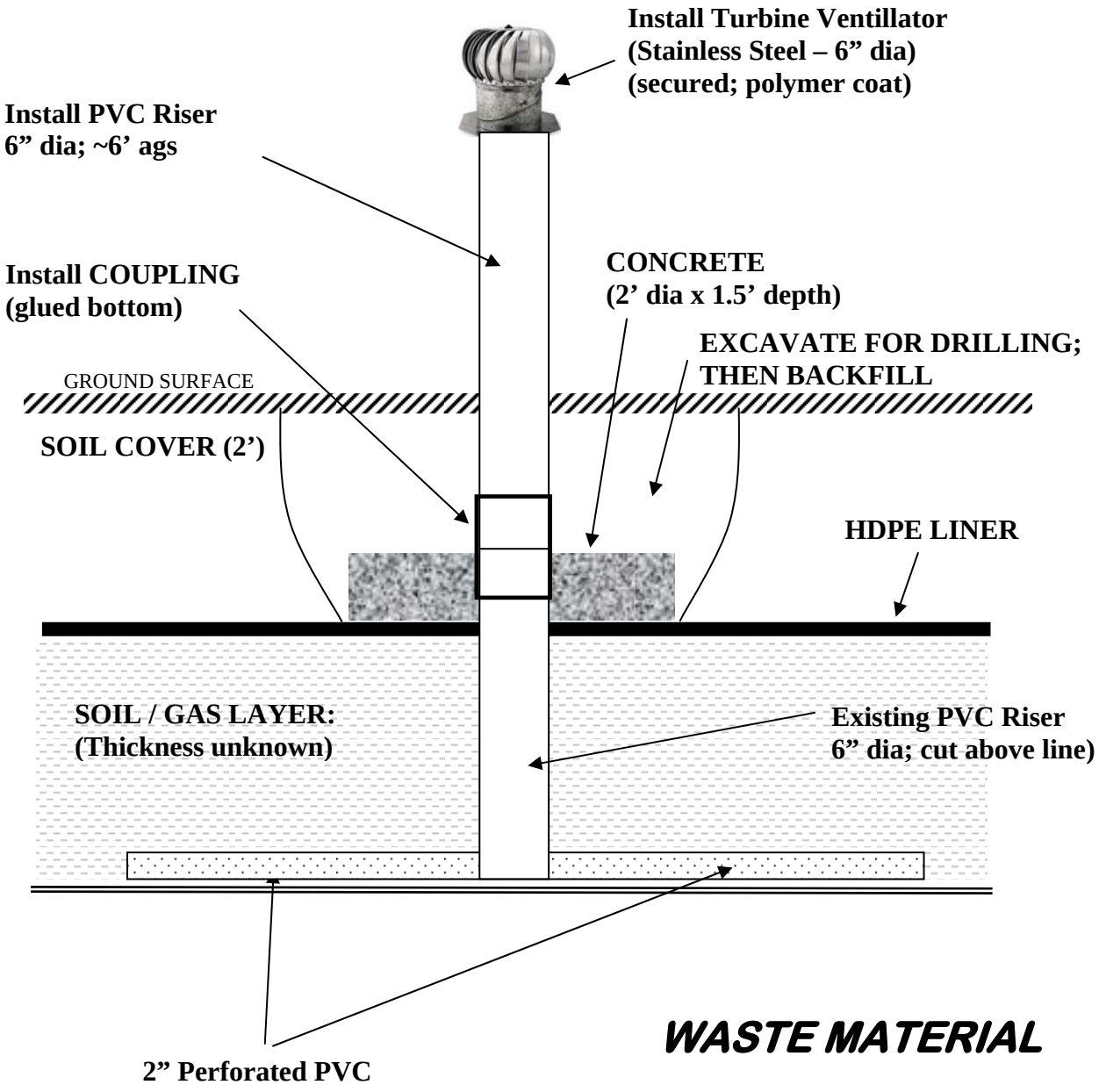
6.0 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

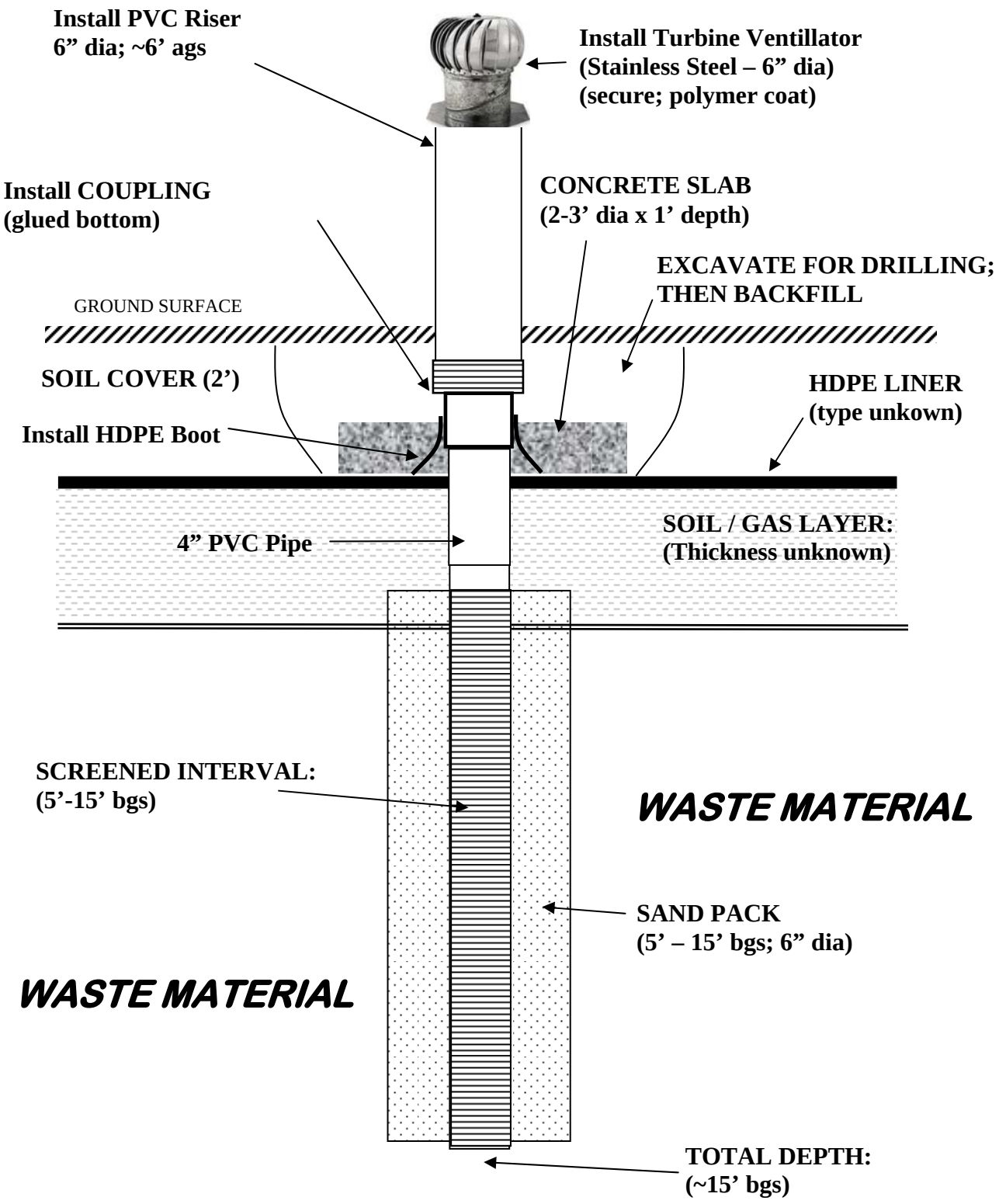
Sampling will be performed on sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for full a full list of analytes, unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in daily and periodic electronic media reports.

Appendix C
Historical Figures



FICA LANDFILL EXISTING GAS VENT DETAILS	FIGURE 4A
	IEG



FICA LANDFILL NEW GAS VENT DETAILS	FIGURE 4B IEG

FIGURE C-6
DUTCHESS LANDFILL O&M
GROUNDWATER LEVEL (6/26/07) - SHALLOW WELLS

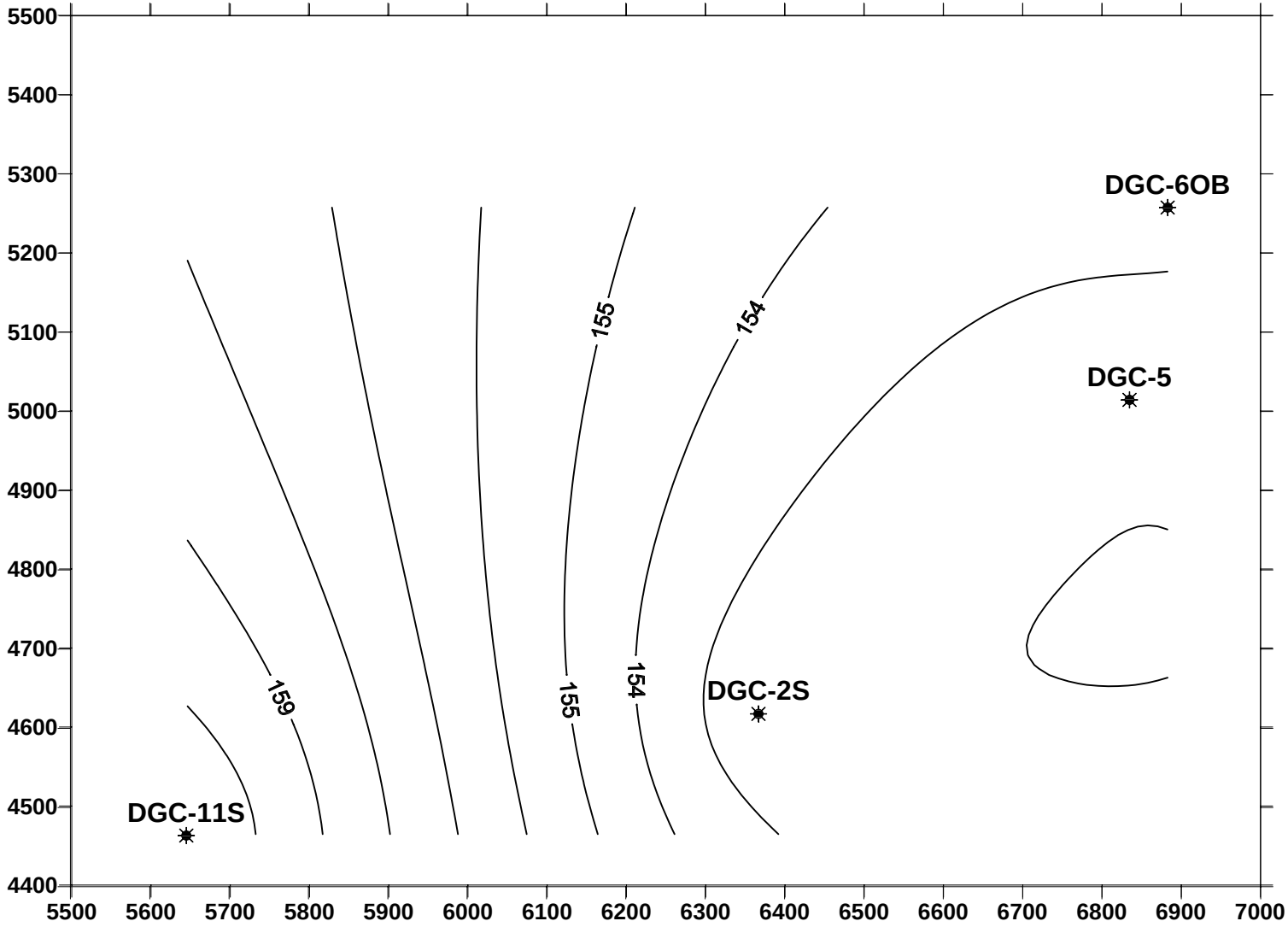
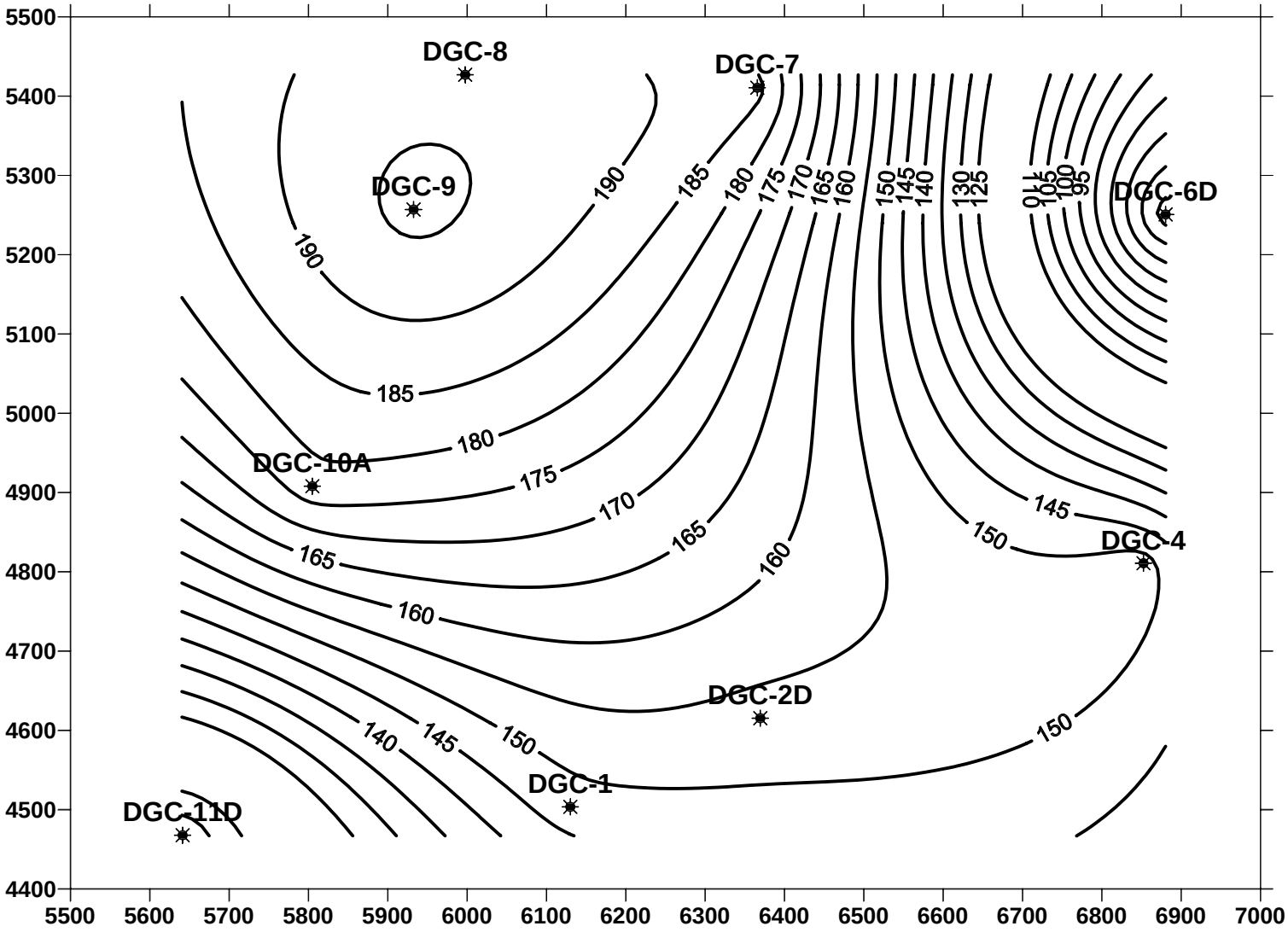


FIGURE C-6
DUTCHESS LANDFILL O&M
GROUNDWATER LEVEL (6/26/07) - DEEP WELLS



Appendix D
Monitoring Well Construction Data

TABLE 2-2

FICA LANDFILL
WELL CONSTRUCTION DETAILS

Well I.D.	Ground Elevation	Meas. Pt. Elevation	Bedrock Elevation	Boring Depth	Screen Setting	Sand Pack	Bentonite Seal
DGC-1	158.3	159.69	147.3	71.1	61.1 - 71.1	58.2 - 71.1	54.8 - 58.2
DGC-2S	161.4	162.66	149.9	31.7	21.7 - 31.7	19.2 - 31.7	15.2 - 19.2
DGC-2D	161.5	162.66	150.5	86.5	66.5 - 86.5	63.0 - 86.5	60.0 - 63.0
DGC-3	163.4	164.21	141.4	27.1	16.9 - 26.9	16.0 - 27.1	13.0 - 16.0
DGC-4	159.4	160.5	155.2	51.1	41.1 - 51.1	39.5 - 51.1	36.0 - 39.5
DGC-5	159.7	160.63	157.7	19.7	9.7 - 19.7	8.0 - 19.7	4.5 - 8.0
DGC-6OB	155.5	157.7	NA	18.5	8.0 - 18.0	7.0 - 18.5	4.0 - 7.0
DGC-6D	155.5	156.23	128.5	96.5	76.5 - 96.5	74.4 - 96.5	70.4 - 74.4
DGC-7	223.46	224.87	215.96	56.9	46.9 - 56.9	44.7 - 56.9	41.3 - 44.7
DGC-8	222.5	224.38	212.2	56.2	46.2 - 56.2	43.4 - 56.2	39.8 - 43.4
DGC-9	227.6	228.92	222.4	97.5	77.5 - 97.5	75.7 - 97.5	72.3 - 75.7
DGC-10	Well abandoned & replaced with DGC-10A.						
DGC-10A	218.3	219.9	215.3	61.5	51.5 - 61.5	48.7 - 61.5	45.5 - 48.7
DGC-11S	170.4	171.89	170.4	21.8	11.8 - 21.8	9.7 - 21.8	6.7 - 9.7
DGC-11D	170.5	171.9	170.5	71.0	61.0 - 71.0	58.2 - 71.0	54.5 - 58.2

Notes:

1. NA = not applicable, well installed in overburden only.
2. All elevations are expressed in feet above mean sea level.
3. All other units are expressed in feet below grade.

TABLE 4-1

FICA Landfill
Ground Water Elevations

Well I.D.	Meas. Pt. Elevation	Water Level Elevation 3/26/92	Water Level Elevation 4/16/92	Water Level Elevation 4/22/92	Water Level Elevation 4/30/92	Water Level Elevation 5/20/92	Water Level Elevation 8/10/92	Water Level Elevation 10/12/92
DGC-1	159.69	150.13	149.94	150.34	150.29	149.66	149.51	147.75
DGC-2S	162.66	153.51	153.45	153.61	152.36	153.31	153.22	152.24
DGC-2D	162.66	153.57	153.81	152.92	152.66	153.94	151.26	152.13
DGC-3	164.21	151.72	151.36	151.94	150.61	151.57	151.09	150.48
DGC-4	160.50	153.93	153.59	154.25	152.80	153.40	152.95	152.23
DGC-5	160.63	156.76	156.00	157.73	156.03	155.46	155.29	154.44
DGC-6OB	157.70	155.06	154.95	155.35	154.00	154.76	154.50	153.97
DGC-6D	156.23	66.02	66.60	66.79	65.73	67.79	62.36	63.35
DGC-7	224.87	191.19	190.09	193.37	191.12	189.32	189.60	184.60
DGC-8	224.38	200.27	197.55	201.58	200.08	196.02	196.05	188.13
DGC-9	228.92	200.83	200.34	201.07	199.92	199.42	192.97	189.79
DGC-10A	219.90	179.79	179.12	180.31	178.20	178.97	179.06	177.73
DGC-11S	171.89	167.08	164.25	167.94	164.19	166.72	168.06	165.12
DGC-11D	171.90	101.14	101.26	101.18	100.20	101.40	101.73	101.81

TABLE 4-2

FICA Landfill,
Hydraulic Conductivity Test Results
August 10-11, 1992

Well ID		Test Method: Hvorslev	Test Method: DM-7
DGC-1	ft/day	1.38E+00	1.43E+00
	cm/sec	4.86E-04	5.05E-04
DGC-2S	ft/day	8.07E-02	3.20E-01
	cm/sec	2.85E-05	1.13E-04
DGC-2D	ft/day	2.25E-05	5.15E-05
	cm/sec	7.92E-09	1.82E-08
DGC-3	ft/day	2.69E+00	2.61E+00
	cm/sec	9.48E-04	9.22E-04
DGC-4	ft/day	5.66E-01	5.79E-01
	cm/sec	2.00E-04	2.04E-04
DGC-5	ft/day	2.67E+00	2.69E+00
	cm/sec	9.44E-04	9.50E-04
DGC-6OB	ft/day	1.03E+01	1.03E+01
	cm/sec	3.63E-03	3.62E-03
DGC-6D	ft/day	6.40E-06	3.45E-06
	cm/sec	2.26E-09	1.22E-09
DGC-7	ft/day	2.70E-01	2.74E-01
	cm/sec	9.52E-05	9.65E-05
DGC-8	ft/day	1.37E+00	1.37E+00
	cm/sec	4.84E-04	4.85E-04
DGC-9	ft/day	7.54E-06	1.96E-05
	cm/sec	2.66E-09	6.93E-09
DGC-10A	ft/day	1.91E+00	1.98E+00
	cm/sec	6.73E-04	6.97E-04
DGC-11S	ft/day	2.30E+00	2.28E+00
	cm/sec	8.12E-04	8.05E-04

Appendix E
Post-Remediation Monitoring Summary Tables

Table 1. Monitoring Well Specifications and Depth to Water During August 2018 Sampling

Well ID	Depth to Bottom in August 2018 (ft)	Depth to Water in August 2018 (ft)	Screened Interval[1] (ft)	Sand pack[1] (ft)	Bentonite Seal[1] (ft)
DGC-1	72.96	8.25	61.1 - 71.1	58.2 - 71.1	54.8 - 58.2
DGC-2S	32.12	10.64	21.7 - 31.7	19.2 - 31.7	15.2 - 19.2
DGC-2D	87.91	10.42	66.5 - 86.5	63.0 - 96.5	60.0 - 63.0
DGC-3	Lost	Lost	16.9 - 26.9	16.0 - 27.1	130. - 16.0
DGC-4	49.44	5.91	41.1 - 51.1	36.9 - 51.1	36.0 - 39.5
DGC-5	22.43	7.21	9.7 - 19.7	8.0 - 19.7	4.5 - 8.0
DGC-6OB	19.23	1.93	8.0 - 18.0	7.0 - 18.5	4.0 - 7.0
DGC-6D[2]	96.50	90.50	76.5 - 96.5	74.4 - 96.5	70.4 - 74.4
DGC-7	57.75	30.01	46.9 - 56.9	44.7 - 56.9	41.3 - 44.7
DGC-8	55.00	20.49	46.2 - 56.2	43.4 - 56.2	39.8 - 43.4
DGC-9	94.96	27.72	77.5 - 97.5	75.7 - 97.5	72.3 - 75.7
DGC-10A	62.99	40.81	51.5 - 61.5	48.7 - 61.5	45.5 - 48.7
DGC-11S	22.87	4.81	11.8 - 21.8	9.7 - 21.8	6.7 - 9.7
DGC-11D	72.2	70.99	61.0 - 71.0	58.2 - 71.0	54.5 - 58.2

Notes:
1. Depths taken from the 2011 Site Management Plan prepared by Aztech.
2. Depth to bottom and depth to water for DGC-6D were collected in September 2019 following removal of the obstruction.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-1													
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/12/2013	5/7/2014	10/12/2015	8/22/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	1	1.0	0.70 J	-	0.70 J	0.67 J	0.70 J	0.80 J	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	0.8 J	0.70	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5	-	1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS	-	6.0 U	1.0 U	-	6.0 U	2.5 U	6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	20 U
acetone	50	-	6.0 U	6.0 U	-	6.0 U	5.0 U	6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	50 U
benzene	1	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.10 J	1.0 U	1.0 U	1.0 U	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS	-	9.0	6.0	-	4.0	-	6.0 U	7.0	5.0	-	-	-	-	1.2 J
ethylbenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5	-	1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
methyl-t-butyl ether	NS	-	0.70 J	1.0 U	-	0.40 J	-	0.40 J	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
o-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
tetrahydrofuran	50	-	25 U	25 U	-	25 U	-	25 U	25 U	25 U	-	-	-	-	2.2 J
toluene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
trichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.20 J	1.0 U	1.0 U	1.0 U	2.0 U
Xylenes, total	-	1	-	-	-	-	-	-	-	-	-	-	2.0 U	2.0 U	-
METALS (µg/L)															
Aluminum	NS	-	-	-	-	-	-	-	-	-	-	-	200 U	200 U	100
Antimony	3	-	-	-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	6.9	-	-	-	8.4	8.2	-	-	-	10	-	6 J	15 U	10 U
Barium	1000	-	220	350	350	320	348	400	320	350	371	-	500	570	660
Beryllium	3	-	-	-	-	-	-	-	-	-	-	-	2.0 U	2.0 U	4 U
Cadmium	5	-	-	-	-	-	-	-	-	-	-	-	2.0 U	2.0 U	4 U
Calcium	NS	-	120000	140000	100000	99000	91000	160000	140000	150000	100000	-	112000	110000	89000
Chromium	50	ND	-	-	-	-	-	-	-	-	-	-	1.10 J	4.0 U	10 U
Cobalt	NS	-	-	-	-	-	-	-	-	-	-	-	0.91 J	0.81 J	50 U
Copper	200	-	-	-	-	-	-	-	-	-	-	-	2.7 J	10 U	10 U
Iron	300	5,100	7600	8200	5700	5200	5200	7800	7200	8100	6930	-	3800	3200	2400
Lead	25	5	-	-	-	-	-	-	-	-	1 J	-	10 U	10 U	10 U
Magnesium	35000	-	36000	35000	27000	26000	26000	38000	36000	37000	30800	-	26100	25200	21000
Manganese	300	-	5400	5800	4300	3700	3700	5800	5600	5900	4940	-	3400 B	3200	1500
Mercury	0.7	-	-	-	-	-	-	-	-	-	-	-	0.20 U	0.20 U	0.10 U
Nickel	100	-	-	-	-	-	-	-	-	-	3.7 J	-	3.7 J	3.2 J	10 U
Potassium	NS	-	28000	22000	25000	24000	24000	27000	30000	29000	22600	-	16200	17100	16000
Selenium	10	-	-	-	-	-	-	-	-	-	-	-	25 U	25 U	50 U
Silver	50	-	-	-	-	-	-	-	-	-	-	-	6.0 U	6.0 U	5.0 U
Sodium	20000	-	100000	74000	84000	110000	110000	94000	120000	110000	74300	-	53400	70800	90000
Thallium	0.5	-	-	-	-	-	-	-	-	-	-	-	20.0 U	20 U	50 U
Vanadium	NS	-	-	-	-	-	-	-	-	-	-	-	5.0 U	5.0 U	8 J
Zinc	2,000	-	-	-	-	-	-	-	-	-	9.5 J	-	3.2 J	2.9 J	6 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-2D													
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/10/2013	5/8/2014	10/15/2015	8/22/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5	-	1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS	-	6.0 U	6.0 U	-	6.0 U	6.6	6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50	-	6.0 U	10	-	6.0 U	18	6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	50 U
benzene	1	4	1.0 U	0.60 J	-	1.0 U	1.0 U	2.0	1.0 U	0.3 J	-	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS	-	1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 J
ethylbenzene	5	ND	1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5	-	1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
methyl-t-butyl ether	NS	-	1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
o-xylene	5	-	1.0 U	0.40 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50	-	25 U	25 U	-	25 U	-	25 U	25 U	25 U	-	-	-	-	10 U
toluene	5	-	1.0 U	1.0	-	1.0 U	1.0 U	1.0 U	1.0 U	0.2 J	-	1.0 U	1.0 U	1.0 U	1.0 U
trichloroethene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.2	1.0 U	1.0 U	2.0 U
Xylenes, total	-	7	-	-	-	-	-	-	-	-	-	-	0.96 J	2.0 U	-
METALS (µg/L)															
Aluminum	NS	-	1500	140	990	3100	-	4700	1800	11000	11800	-	200 U	73 J	430
Antimony	3	-	-	-	-	-	-	-	-	9.6	4.8 J	-	20 U	20 U	50 U
Arsenic	25	28	-	-	-	-	-	-	-	-	12.5	-	15 U	15 U	10 U
Barium	1000	-	800	980	830	1100	-	510	350	500	862	-	520	580	580
Beryllium	3	-	-	-	-	-	-	-	-	-	-	-	2 U	2 U	4.0 U
Cadmium	5	-	-	-	-	-	-	-	-	-	-	-	2 U	2 U	4.0 U
Calcium	NS	-	78000	92000	100000	110000	-	120000	100000	110000	105000	-	57700	58700	54000
Chromium	50	24	21	-	-	40	-	38	-	41	20.3	-	1 J	4 U	10 U
Cobalt	NS	-	-	-	-	-	-	-	-	-	4 J	-	4 U	4 U	50 U
Copper	200	-	-	-	-	-	-	-	-	-	20.7	-	10 U	10 U	10 U
Iron	300	16700	3700	870	2600	7100	-	13000	4900	26000	21300	-	460	450	910
Lead	25	33	4.9	-	3.6	18	-	17	8.8	24	15.4	-	10 U	10 U	10 U
Magnesium	35000	-	15000	17000	20000	22000	-	24000	20000	26000	25800	-	11600	11000	9800
Manganese	300	-	510	230	430	850	-	880	770	1100	712	-	210 B	180	150
Mercury	0.7	-	-	-	-	-	-	-	-	-	-	-	0.2 U	0.2 U	0.10 U
Nickel	100	-	-	-	-	44	-	40	-	48	28.3 J	-	5.4 J	0.0047 J	10 U
Potassium	NS	-	9100	9000	9500.00	8900	-	9100	8800	10000	14300	-	6300	6400	6000
Selenium	10	-	-	-	-	-	-	-	-	-	-	-	25 U	25 U	50 U
Silver	50	-	-	-	-	-	-	-	-	-	-	-	6 U	6 U	5.0 U
Sodium	20000	-	190000	190000	170000	160000	-	160000	160000	170000	176000	-	124000	128000	120000
Thallium	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	50 U
Vanadium	NS	-	-	-	-	-	-	-	-	-	24.3 J	-	5 U	5 U	5.8 J
Zinc	2,000	-	32	12	21	150	-	-	67	83	66.6	-	4.9 J	0.0036 J	7.3 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-2S													
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/10/2013	5/8/2014	10/12/2015	8/22/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	ND	0.50 J	0.40 J	-	0.50 J	1.0 U	1.0 U	0.40 J	0.40 J	-	1.0 U	1.0 U	4.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.40 J	1.0 U	1.0 U	4.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	4.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	-	6.0 U	2.5	6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50		6.0 U	4.0 J	-	6.0 U	2.3 J	6.0 U	6.0 U	6.0 U	4.0	3.1 J	4.3 J	40 U	13 J
benzene	1	ND	2.0	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	4.0 U	1.0 U
C-1,2-dichloroethene	5		2.0	3.0	-	3.0	2.8	3.0	3.0	3.0	3.0	1.0 U	-	-	2.8
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	4.0 U	1.0 U
chloroethane	5		0.70 J	0.70 J	-	0.7 J	0.73 J	0.80 J	0.90 J	1.0 U	0.60	0.86 J	0.76 J	4.0 U	2.0 U
diethyl ether	NS		1.0 J	1.0 J	-	1.0 U	-	1.0 U	1.0	1.0 U	-	-	-	-	0.85 J
ethylbenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	4.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	4.0 U	1.0 U
m,p-xylene	5	-	1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
methyl-t-butyl ether	NS		1.0 U	1.0 U	-	1.0 U	-	0.60 J	0.80 J	1.0 U	-	0.34 J	-	-	1.0 U
o-xylene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	25 U	-	18 J	25 U	19 J	-	-	-	-	19
toluene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	4.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	0.40 J	0.20 J	1.0 U	1.0 U	4.0 U	1.0 U
vinyl chloride	2		3.0	4.0	-	3.0	3.1	4.0	4.0	4.0	5.0	6.4 U	7.0	4.0 U	5.3
Xylenes, total	-	ND	1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
METALS (µg/L)															
Aluminum	NS		1300	77	210	2200	-	180	-	-	782	-	720	270	1500
Antimony	3		-	-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	45.5	35	26	22	36	25.9			18	41.9		50	32	100
Barium	1000			270	200	240	207				261.0		590	600	700
Beryllium	3												2 U	2 U	4 U
Cadmium	5						19.9						2 U	0.00068 J	4 J
Calcium	NS		230000	290000	270000	270000	255000	280000	250000	250000	263000		193000	193000	190000
Chromium	50	32.6				14					3 J		2.7 J	4 U	10 U
Cobalt	NS										11.9 J		12	9.7	11 J
Copper	200										1.4 J		6.8 J	10 U	10 U
Iron	300	40900	12000	9500	9400	13000	7910	8800	7000	9200	15700		17600	12600	24000
Lead	25	18	8.2			12	4.5	5.2	4.5		3.8		3.1 J	10 U	10 U
Magnesium	35000		98000	110000	98000	93000	93200	110000	96000	95000	98700		80800	79100	80000
Manganese	300		14000	17000	15000	13000	13900	16000	15000	14000	13800		9500 B	9400	9100
Mercury	0.7												0.2 U	0.2 U	0.1 U
Nickel	100						31.7						23	21	18
Potassium	NS		8800	7900	8100	8500	11700	8400	8500	12000	10400		13600	14800	15000 J
Selenium	10												25 U	25 U	50 U
Silver	50												6 U	6 U	5 U
Sodium	20000		230000	210000	190000	220000	25900	230000	220000	290000	234000		213000	227000	230000
Thallium	0.5												-	-	50 U
Vanadium	NS										1.4 J		1.7 J	5 U	14
Zinc	2,000	-	-	-	-	-	1.6	-	-	-	11 J	-	16	0.004 J	10 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-4													
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/12/2013	5/7/2014	10/12/2015	8/23/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	-	6.0 U	2.5 U	6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50		6.0 U	2.0 J	-	6.0 U	5.0 U	6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	50 U
benzene	1	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS		1.0 U	1.0 U	-	1.0 U	-	2.0	1.0 U	1.0 U	-	-	-	-	0.45 J
ethylbenzene	5	1	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
methyl-t-butyl ether	NS		1.0 U	0.20 J	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
o-xylene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	25 U	-	25 U	25 U	25 U	-	-	-	-	10 U
toluene	5		1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
Xylenes, total	-	1	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
METALS (µg/L)															
Aluminum	NS		410	300	390	-	-	-	-	-	-	-	73 J	110 J	59
Antimony	3		-	-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	3.7										-	15 U	15 U	10 U
Barium	1000		200	310			341	290			388	-	690	310	420
Beryllium	3											-	2 U	2 U	4 U
Cadmium	5											-	2 U	2 U	4 U
Calcium	NS		160000	190000	150000	110000	53700	160000	140000	140000	88400	-	60300	23900	37000
Chromium	50	ND										-	4 U	4 U	10 U
Cobalt	NS											-	4 U	4 U	50 U
Copper	200											-	10 U	10 U	10 U
Iron	300	7980	9400	11000	8100	5400	2530	9100	9000	9100	6020	-	2800	710	1200
Lead	25	13									0.69 J	-	10 U	10 U	10 U
Magnesium	35000		56000	61000	48000	36000	18300	51000	45000	45000	27800	-	18600	9000	10000
Manganese	300		4500	5800	3900	2700	1550	4800	4500	4500	3090	-	1600 B	390	780
Mercury	0.7											-	0.2 U	0.2 U	0.1 U
Nickel	100						2.3				2.3 J	-	1.9 J	0.0013 J	10 U
Potassium	NS		10000	11000	9700	7600	7540	10000	9300	11000	9250	-	7500	22700	5500
Selenium	10											-	25 U	25 U	50 U
Silver	50											-	6 U	6 U	5 U
Sodium	20000		150000	140000	120000	120000	93300	140000	130000	140000	117000	-	94700	95100	110000
Thallium	0.5											-	-	-	50 U
Vanadium	NS											-	5 U	5 U	10 U
Zinc	2,000	-	29	16	77	-	-	-	-	-	9.3 J	-	10 U	0.0038 J	11 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-5													
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/12/2013	5/8/2014	10/14/2015	8/23/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	ND	0.40 J	0.20 J	-	0.30 J	1.0 U	1.0 U	0.30 J	1.0 U	-	1.0 U	1.0 U	1.0 U	0.20 J
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.20 J	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	-	6.0 U	2.5 U	6.0 U	88 E	6.0 U	-	10 U	-	-	20 U
acetone	50		6.0 U	3.0 J	-	2.0 J	5.0 U	6.0 U	6.0 U	6.0 U	2.0	10 U	10 U	10 U	50 U
benzene	1	7	0.70 J	1.0	-	1.0	1.7	1.0	1.0	2.0	0.60	1.0 U	0.60 J	1.4	1.6
C-1,2-dichloroethene	5		1.0 U	0.20 J	-	1.0 U	0.5 J	1.0 U	1.0 U	0.60 J	0.30 J	1.0 U	-	-	1.0 U
chlorobenzene	5	ND	0.50 J	0.60 J	-	0.5 J	0.68 J	0.50 J	0.5 J	0.90 J	0.30 J	1.0 U	1.0 U	0.98 J	1.0
chloroethane	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS		9.0	8.0	-	15	-	5.0	17	6.0	-	-	-	-	8.0
ethylbenzene	5	14	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		0.40 J	0.50 J	-	1.0		1.0 U	1.0 J	1.0 U	-	1.0 U	1.0 U	1.1	1.3
m,p-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	0.43 J
methyl-t-butyl ether	NS		0.30 J	0.20 J	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	0.52 J
o-xylene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	0.23 J
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	25 U	-	25 U	1500 E	25 U	-	-	-	-	36
toluene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
Xylenes, total	-	45	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	0.43 J
METALS (µg/L)															
Aluminum	NS		-	10	-	-	67.7	-	-	-	442	-	-	0.06 U	83
Antimony	3		-	-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	13.4	8.1	390			11.7				6.3 J		15 U	15 U	15
Barium	1000		400	250000		790	680	280000	650		470		280	610	920
Beryllium	3												2 U	2.0 U	4 U
Cadmium	5												2 U	2.0 U	4 U
Calcium	NS		220000		260000	220000	241000		230000	240000	219000		126000	183000	170000
Chromium	50	13.4				11	1.5				4.3 J		1.3 J	0.0017 J	10 U
Cobalt	NS						9.7						2.1 J	4.0	50 U
Copper	200										1.3 J		3.4 J	10 U	10 U
Iron	300	23300	8700	10000	9700	7600	8400	12000	8600	9000	9420		3400	6300	11000
Lead	25	3.8					5.1	3.7	4.3		4.2		10 U	10 U	10 U
Magnesium	35000		96000	79000	61000	120000	107000	56000	130000	46000	81400		40400	78200	88000
Manganese	300		11000	14000	14000	9500	10900	14000	11000	13000	10500		4900 B	8400	6900
Mercury	0.7												0.2 U	0.2 U	0.1 U
Nickel	100		58			110	87.5		100		59.9		21	56	61
Potassium	NS		100000	58000	41000	150000	143000	32000	150000	30000	87400		33600	77200	96000
Selenium	10												25 U	25 U	50 U
Silver	50												6 U	6 U	5 U
Sodium	20000		400000	220000	130000	520000	470000	100000	550000	90000	294000		116000	271000	320000
Thallium	0.5												-	-	50 U
Vanadium	NS						1.8				1.7 J		5.0 U	5.0 U	12
Zinc	2,000	-	-	18	-	-	12.8	-	-	-	14.4 J	-	4.9 J	0.0034 J	20.0 U

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-6OB													
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/11/2013	5/7/2014	10/13/2015	8/22/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	4	2.0	2.0	-	2.0	1.7	2.0	1.0	1.0	-	1.0 U	1.0 U	2.0 U	0.50 J
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.90	1.0 U	1.0 U	2.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U	1.0 U
2-butanone	NS		6.0 u	6.0 U	-	6.0 U	2.5 U	6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50		4.0 J	4.0 J	-	2.0 J	5.0 U	2.0 JB	6.0 U	6.0 U	4.0	10 U	10 U	20 U	50 U
benzene	1	2	0.60 J	1.0	-	0.90 J	1.2	0.80 J	1.0	1.0	1.0	1.0 U	1.3	1.1 J	1.2
C-1,2-dichloroethene	5		0.80 J	0.70 J	-	0.70 J	0.86 J	0.60 J	0.60 J	0.80 J	0.60	1.0 U	-	-	1.1
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U	1.0 U
chloroethane	5		7.0	7.0	-	8.0	7.4	8.0	8.0	7.0	5.0	1.0 U	2.3	1.9 J	2.4
diethyl ether	NS		13	12	-	12	-	14	13	10	-	-	-	-	5.3
ethylbenzene	5	3	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
methyl-t-butyl ether	NS		0.70 J	0.60 J	-	0.60 J	-	0.60 J	0.70 J	1.0 U	-	1.0 U	-	-	1.0 U
o-xylene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.10 J	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	16 J	-	13 J	25 U	25 U	-	-	-	-	11
toluene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U	1.0 U
vinyl chloride	2		0.50 J	0.70 J	-	0.50 J	1.0 U	0.60 J	1.0 U	1.0 U	0.20 J	1.0 U	1.0 U	2.0 U	2.0 U
Xylenes, total	-	3	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
METALS (µg/L)															
Aluminum	NS		950	-	140	-	1440	-	-	-	34 J	-	-	-	130
Antimony	3		-	-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	44.5	60	35	24	35	43.9	20	23	24	33		30	28	53
Barium	1000		520	590	400	510	879	500	380	400	491		300	310	370
Beryllium	3												2 U	2 U	4 U
Cadmium	5												2 U	0.00063 J	2 J
Calcium	NS		150000	170000	150000	140000	143000	170000	130000	140000	137000		87200	94500	100000
Chromium	50	66.7					1.7						4 U	4 U	10 U
Cobalt	NS						9.3						4.5	4.1	50 U
Copper	200						7.9						10 U	10 U	10 U
Iron	300	41300	76000	51000	46000	38000	38500	46000	46000	40000	48700		48000	49600	52000
Lead	25	68.5	17				7.1				1.5 J		10 U	10 U	10 U
Magnesium	35000		58000	63000	56000	53000	52000	64000	50000	51000	49600		30200	29700	34000
Manganese	300		21000	8800	7900	5800	5960	6600	5900	5700	5660		3900 B	4200	4200
Mercury	0.7												0.2 U	0.2 U	0.1 U
Nickel	100					41	36.5				30.6 J		14	17	170
Potassium	NS		40000	38000	39000	37000	36500	38000	3700	43000	40700		23900	24600	25000
Selenium	10												25 U	25 U	50 U
Silver	50												6 U	6 U	5 U
Sodium	20000		220000	210000	200000	220000	223000	220000	200000	230000	191000		78000	86200	110000
Thallium	0.5												-	-	50 U
Vanadium	NS						1.8						5 U	5 U	11
Zinc	2,000	-	20	-	-	-	204	-	-	-	6.7 J	-	2.7 J	0.0044 J	20 U

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-6D								
		1992 (pre-remedy)	10/19/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	9/11/2013	5/8/2014
VOCs (µg/L)[1]										
1,1-dichloroethane	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U		-	1.0 U	-
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	-	6.0 U	2.5 U	-	10 U	-
acetone	50		6.0 U	6.0 U	-	2.0 J	5.0 U	-	4.4 J	4.1 J
benzene	1	3	0.60 J	1.0 U	-	0.40 J	17	17	1.0 U	1.0 U
C-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	-
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
diethyl ether	NS		1.0 U	1.0 U	-	1.0 U		-	-	-
ethylbenzene	5	2	1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U		-	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	0.70 J	-	1.0 U	0.55	0.55	-	-
methyl-t-butyl ether	NS		12 U	1.0 U	-	1.0 U		-	1.0 U	-
o-xylene	5		1.0 U	0.70 J	-	1.0 U	1.0 U	-	2.0 U	-
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	-
tetrahydrofuran	50		25 U	25 U	-	25 U		-	-	-
toluene	5		0.20 J	0.20 J	-	1.0 U	1.0 U	-	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	-	1.0 U	1.0 U	-	1.0 U	1.0 U
Xylenes, total	-	18	1.0 U	0.70 J	-	1.0 U	0.55	0.55	-	-
METALS (µg/L)										
Aluminum	NS		5400	13000	1600	1500	967	960	-	310
Antimony	3		-	-	-	-	-	-	-	20 U
Arsenic	25	NA	17	36						11 J
Barium	1000		400	750		230	568			48
Beryllium	3									2 U
Cadmium	5									1.3 J
Calcium	NS		31000	47000	13000	25000	14200	16000		4200
Chromium	50	NA	45	40			2.4			6.6
Cobalt	NS						1.8			4 U
Copper	200		37	45	41		1.6			11
Iron	300	NA	9600	25000	2900	2600	1200	1700		370
Lead	25	NA	27	43		3.5				3.7 J
Magnesium	35000		4800	9200	3400	4800	3430	4200		720
Manganese	300		840	1200	100	140	57.6	46		19 B
Mercury	0.7									0.2 U
Nickel	100									2.9 J
Potassium	NS		14000	30000	23000	20000	19900	17000		130000
Selenium	10						2.4			25 U
Silver	50									1.8 J
Sodium	20000		120000	130000	150000	170000	151000	170000		156000
Thallium	0.5									-
Vanadium	NS						3.6	3.6		5 U
Zinc	2,000	-	80	98	-	11	239	239	-	20

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.

4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-7												
		1992 (pre-remedy)	10/19/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	5/8/2014	10/14/2015	8/22/2018
VOCs (µg/L)[1]														
1,1-dichloroethane	5	14	5.0	4.0	-	4.0	2.9	3.0	3.0	3.0	-	1.1	1.4	1.2
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.0	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
1,2-dichloropropane	1		0.40 J	0.40 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.30 J	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	-	6.0 U	2.5 U	6.0 U	6.0 U	6.0 U	-	-	-	20 U
acetone	50		8.0	6.0 J	-	6.0 U	5.0 U	6.0 U	6.0 U	6.0 U	1.0	10 U	10 U	50 U
benzene	1	3	0.90 J	2.0	-	0.40 J	0.52 J	0.70 J	0.40 J	0.80 J	0.70 J	1.0 U	1.0 U	0.22 J
C-1,2-dichloroethene	5		2.0	2.0	-	1.0	1.2	1.0	1.0	2.0	2.0	-	-	0.83 J
chlorobenzene	5	ND	1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.10 J	1.0 U	1.0 U	1.0 U
chloroethane	5		0.60 J	0.60 J	-	0.40 J	1.0 U	1.0 U	0.50 J	1.0 U	0.40 J	1.0 U	1.0 U	2.0 U
diethyl ether	NS		16	16	-	9.0	-	12	10	10	-	-	-	2.9
ethylbenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	2.0 U
methyl-t-butyl ether	NS		1.0 U	1.0 U	-	1.0	-	0.70 J	0.90 J	1.0 U	-	-	-	0.17 J
o-xylene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
t-1,2-dichloroethene	5		0.80 J	0.80 J	-	0.50 J	1.0 U	0.70 J	0.60 J	1.0 U	0.70	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	25 U	-	25 U	25 U	25 U	-	-	-	10 U
toluene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
vinyl chloride	2		4.0	5.0	-	3.0	2.2	4.0	4.0	4.0	3	1.0 U	1.1	2.0 U
Xylenes, total	-	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	2.0 U
METALS (µg/L)														
Aluminum	NS		94	64	150	-	2660	-	-	-	65 J	110 J	61 J	58
Antimony	3		-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	24		11		21	23.9		30		9.3 J	6.7 J	15 U	10 U
Barium	1000			230			783				153 J	98	110	130
Beryllium	3											-	2 U	4 U
Cadmium	5										0.4 J	2 U	2 U	4 U
Calcium	NS		170000	210000	180000	180000	180000	200000	170000	200000	165000	102000	124000	120000
Chromium	50	19.5					2.8					1.7 J	4 U	10 U
Cobalt	NS						16.1				5.4 J	8	8.4	50 U
Copper	200						4.1				1.2 J	10 U	10 U	3 J
Iron	300	10100	3900	4100	3800	2900	6550	3700	3000	3000	3730	600	660	790
Lead	25	5.1					8				3.5	10 U	10 U	10 U
Magnesium	35000		43000	48000	41000	41000	41600	43000	38000	38000	36200	23000	25600	25000
Manganese	300		20000	23000	19000	16000	141000	20000	18000	18000	20200	5900 B	6900	5700
Mercury	0.7											0.2 U	0.2 U	0.1 U
Nickel	100						8.8				6.7 J	6.5 J	0.0072 J	10 U
Potassium	NS						5410				3230 J	13500	4400	12000
Selenium	10											25 U	25 U	50 U
Silver	50											6 U	6 U	5 U
Sodium	20000		41000	38000	31000	32000	30300	36000	33000	32000	28800	20500	17500	21000
Thallium	0.5											-	-	50 U
Vanadium	NS						3.2					5 U	5 U	7 J
Zinc	2,000	-	-		100	-	245	-	-	-	4.6 J	5.2 J	0.0083 J	17 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.

4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-8								
		1992 (pre-remedy)	10/19/2000	8/7/2002	11/14/2002	6/1/2004	9/11/2013	5/8/2014	10/13/2015	8/23/2018
VOCs (µg/L)[1]										
1,1-dichloroethane	5	ND	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50		6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	50 U
benzene	1	ND	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5		1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS		1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
ethylbenzene	5	ND	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
methyl-t-butyl ether	NS		12 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
o-xylene	5		1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	25 U	-	-	-	-	10 U
toluene	5		1.0 U	1.0 U	1.0 U	-	0.6 J	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
Xylenes, total	-	ND	1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
METALS (µg/L)										
Aluminum	NS		-	-	-	190 J	-	200 U	270	160
Antimony	3		-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	3						15 U	15 U	10 U
Barium	1000					37 J		38	35	70
Beryllium	3							2 U	2 U	4 U
Cadmium	5							2 U	2 U	4 U
Calcium	NS				88000	39000		69500	51200	88000
Chromium	50	ND				1.4 J		4 U	4 U	10 U
Cobalt	NS							4 U	4 U	50 U
Copper	200					1.7 J		10 U	10 U	10 U
Iron	300	6100				348		88	370	250
Lead	25	3.5				1.3 J		10 U	10 U	10 U
Magnesium	35000			9300	20000	8890		15100	11500	18000
Manganese	300			36	200	2905		87 B	27	53
Mercury	0.7							0.2 U	0.2 U	0.1 U
Nickel	100					2.2 J		10 U	10 U	10 U
Potassium	NS					1270 J		1300	1200	2000 J
Selenium	10							25 U	25 U	50 U
Silver	50							6 U	6 U	5 U
Sodium	20000			4600	6500	4270 J		5000	4500	5800
Thallium	0.5							-	-	50 U
Vanadium	NS							5 U	5 U	7 J
Zinc	2,000	-	-	-	-	20.8	-	1.5 J	0.0035 J	9 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.

4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DCG-09													
		1992 (pre-remedy)	10/19/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	9/11/2013	5/8/2014	10/13/2015	8/23/2018
VOCs (µg/L)[1]															
1,1-dichloroethane	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	0.10 J	-	1.0 U		1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	1.0 U	-	6.0 U	2.5 U	6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50		6.0 U	6.0 U	-	6.0 U	5.0 U	6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	50 U
benzene	1	ND	1.0 U	6.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS		1.0 U	1.0 U	-	1.0 U		1.0 U	1.0 U	1.0 U	-	-	-	-	2.0 U
ethylbenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U		1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	0.50 J	-	1.0 U	1.0 U	1.0 U	1.0 U	0.90 J	-	-	-	-	2.0 U
methyl-t-butyl ether	NS		1.0 U	1.0 U	-	1.0 U		1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
o-xylene	5		1.0 U	0.20 J	-	1.0 U	1.0 U	1.0 U	1.0 U	0.30 J	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	25 U		25 U	25 U	25 U	-	-	-	-	10 U
toluene	5		1.0 U	4.0	-	1.0 U	1.0 U	1.0 U	1.0 U	2.0	-	1.0 U	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
Xylenes, total	-	ND	1.0 U	0.50 J	-	1.0 U	1.0 U	1.0 U	1.0 U	0.90 J	-	-	-	-	2.0 U
METALS (µg/L)															
Aluminum	NS		490	300	150	670	6640	940	960	-	102 J	-	200	92 J	410
Antimony	3		-	-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	ND					5						15 U	15 U	10 U
Barium	1000						555				53.2 J		56	54	100
Beryllium	3												-	2 U	4 U
Cadmium	5												2 U	2 U	4 U
Calcium	NS		35000	39000	32000	34000	34200	38000	39000	34000	33000		31900	30500	37000
Chromium	50	14		20	20	11	29.1	15	11		2.4 J		3.7 J	4 U	10 U
Cobalt	NS						8.5						4 U	4 U	50 U
Copper	200						6.1				1.8 J		10 U	10 U	10 U
Iron	300	10000	820	700	650	1200	6950	1800	2000	160	232		210	110	460
Lead	25	22				6.7	10.3	8.7	3.4				10 U	10 U	10 U
Magnesium	35000		9300	9700	8200	9000	10800	10000	9500	8400	8760		8500	8000	9100
Manganese	300		230	61	41	310	386	380	140		11.6 J		20 B	17	110
Mercury	0.7												0.2 U	0.2 U	0.1 U
Nickel	100						19.5				1.9 J		1.9 J	10 U	10 U
Potassium	NS						3760				2200 J		1300	1300	2100
Selenium	10						1.8						25 U	25 U	50 U
Silver	50												6 U	6 U	5 U
Sodium	20000		7100	5200	4400	6600	7250	6300	9600	5200	5450		5300	5700	8200
Thallium	0.5												-	-	50 U
Vanadium	NS						8.10						5 U	5 U	10 U
Zinc	2,000	-	25	150	59	97	303	380	66	-	11.7 J	-	4.3 J	0.0057 J	7 J

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.

5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-10A												
		1992 (pre-remedy)	10/18/2000	3/27/2001	6/12/2001	9/11/2001	12/12/2001	4/16/2002	8/7/2002	11/14/2002	6/1/2004	5/9/2014	10/13/2015	8/23/2018
VOCs (µg/L)[1]														
1,1-dichloroethane	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	-	6.0 U	2.5 U	6.0 U	6.0 U	6.0 U	-	-	-	20 U
acetone	50		6.0 U	6.0 U	-	6.0 U	5.0 U	6.0 U	6.0 U	6.0 U	-	10 U	10 U	50 U
benzene	1	ND	2.0	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U
diethyl ether	NS		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	-	-	2.0 U
ethylbenzene	5	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	2.0 U
methyl-t-butyl ether	NS		1.0 U	1.0 U	-	1.0 U	-	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
o-xylene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	-	25 U	-	25 U	25 U	25 U	-	-	-	10 U
toluene	5		1.0 U	0.30 J	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	2.0 U
Xylenes, total	-	ND	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	-	-	-	2.0 U
METALS (µg/L)														
Aluminum	NS		150	78	130	-	60	-	-	-	244	200 U	72 J	190
Antimony	3		-	-	-	-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	ND										15 U	15 U	10 U
Barium	1000						68				68.3 J	44	44	37 J
Beryllium	3											2 U	2 U	4 U
Cadmium	5										13.6	2 U	2 U	4 U
Calcium	NS		36000	40000	36000	3300	36100	3700	40000	36000	35600	32800	38100	35000
Chromium	50	15.7									1.8 J	4 U	0.0013 J	10 U
Cobalt	NS											4 U	4 U	50 U
Copper	200										1.8 J	10 U	10 U	10 U
Iron	300	893	200	150	100		167	68	69	110	1310	640	1300	2800
Lead	25	1									2.4 J	10 U	10 U	10 U
Magnesium	35000		9200	9800	8900	8500	8290	9000	9400	8900	9360	8500	9900	8600
Manganese	300		84	89	89	72	132	80	440	79	450	150 B	260	320
Mercury	0.7											0.2 U	0.2 U	0.1 U
Nickel	100										0.9 J	10 U	10 U	10 U
Potassium	NS						1610				3420	1400	1900	2900
Selenium	10											25 U	25 U	50 U
Silver	50											6 U	6 U	5 U
Sodium	20000		6100	6100	6100	7400	6370	6500	7700	6900	6680	5500	7200	5900
Thallium	0.5											-	-	50 U
Vanadium	NS										0.90 J	5 U	5 U	10 U
Zinc	2,000		-	-	-	-	8	-	-	-	28.5	5.5 J	11	50

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.

4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-11D		
		1992 (pre-remedy)	10/19/2000	11/14/2002
VOCs (µg/L)[1]				
1,1-dichloroethane	5	NA	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U
acetone	50		5.0 J	2.0 J
benzene	1	NA	0.20 J	3.0
C-1,2-dichloroethene	5		1.0 U	1.0 U
chlorobenzene	5	NA	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U
diethyl ether	NS		1.0 U	1.0 U
ethylbenzene	5	NA	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	0.30 J
methyl-t-butyl ether	NS		12 U	1.0 U
o-xylene	5	NA	1.0 U	0.30 J
t-1,2-dichloroethene	5		1.0 U	1.0 U
tetrahydrofuran	50		25 U	25 U
toluene	5		0.20 J	1.0 U
trichloroethene	5		1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U
Xylenes, total	-	NA	1.0 U	0.30 J
METALS (µg/L)				
Aluminum	NS		78	-
Antimony	3		-	-
Arsenic	25	NA		
Barium	1000			
Beryllium	3			
Cadmium	5			
Calcium	NS		46000	
Chromium	50	NA		
Cobalt	NS			
Copper	200			
Iron	300	NA	210	
Lead	25	NA		
Magnesium	35000		12000	
Manganese	300		79	
Mercury	0.7			
Nickel	100			
Potassium	NS			
Selenium	10			
Silver	50			
Sodium	20000		7300	
Thallium	0.5			
Vanadium	NS			
Zinc	2,000	-	-	-

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.

4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 2. Groundwater Monitoring Results for VOCs and Metals

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value - GA Groundwater Standards	DGC-11S										
		1992 (pre-remedy)	10/19/2000	3/27/2001	8/7/2002	11/14/2002	6/1/2004	9/10/2013	5/7/2014	10/13/2015	8/21/2018
VOCs (µg/L)[1]											
1,1-dichloroethane	5	ND	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
1,2-dichloropropane	1		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS		6.0 U	6.0 U	6.0 U	6.0 U	-	10 U	-	-	20 U
acetone	50		6.0 U	6.0 U	6.0 U	6.0 U	-	10 U	10 U	10 U	50 U
benzene	1	ND	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
chlorobenzene	5	ND	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
diethyl ether	NS		1.0 U	1.0 U	1.0 U	1.0 U	-		-	-	2.0 U
ethylbenzene	5	ND	1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	5	-	1.0 U	1.0 U	1.0 U	1.0 U	-		-	-	2.0 U
methyl-t-butyl ether	NS		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
o-xylene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	2.0 U	-	-	1.0 U
t-1,2-dichloroethene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	-	-	1.0 U
tetrahydrofuran	50		25 U	25 U	25 U	25 U	-		-	-	10 U
toluene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
trichloroethene	5		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	2		1.0 U	1.0 U	1.0 U	1.0 U	-	1.0 U	1.0 U	1.0 U	2.0 U
Xylenes, total	-	ND							2.0 U	2.0 U	
METALS (µg/L)											
Aluminum	NS		-	210	270	490	50.4 J	-	200 U	68 J	74
Antimony	3		-	-	-	-	-	-	20 U	20 U	50 U
Arsenic	25	ND							15 U	15 U	10 U
Barium	1000						7.4 J		7.6	9.3	7 J
Beryllium	3								2 U	2 U	4 U
Cadmium	5								2 U	2 U	4 U
Calcium	NS			110000	57000	46000	73400		48300	49200	41000
Chromium	50	ND					1.9 J		1.3 J	4 U	10 U
Cobalt	NS								4 U	4 U	50 U
Copper	200						1.1 J		1.8 J	10 U	10 U
Iron	300	698		420	590	780	104		41 J	0.04 J	98
Lead	25	4							10 U	10 U	10 U
Magnesium	35000			28000	14000	12000	20100		11900	11500	9300
Manganese	300			120	370	120	9 J		7.1 B	15	29
Mercury	0.7								0.2 U	0.38	0.1 U
Nickel	100								10 U	10 U	10 U
Potassium	NS						1180 J		1000	1500	1200 J
Selenium	10					7	4.9 J		15 J	25 U	50 U
Silver	50								6 U	6 U	5 U
Sodium	20000			7800	10000	6000	7090		3400	6900	3500
Thallium	0.5								-	-	50 U
Vanadium	NS								5 U	5 U	10 U
Zinc	2,000	-	-	-	-	-	6 J	-	3.5 J	0.0031 J	20 U

Notes:

1. The lab reported 1,4-dioxane with the Method 8260 results; however, because this is not considered a reliable method for this parameter, the results have not been included. 1,4-dioxane results from the modified 8270 scan, considered to be the reliable method, are summarized in Table 3.
2. NS - No standard or Guidance Value.
3. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.

4. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
5. U - Indicates that the analyte was not detected (ND).
6. - - not analyzed or data not available.

Table 3. Groundwater Monitoring Results for Emerging Contaminants (August 2018 and September 2019)

Analytes	New York Screening Values*	DGC-1	DGC-2D	DGC-2S	DGC-4	DGC-6OB	DGC-6D	DGC-7	DGC-11S
		8/22/2018	8/22/2018	8/22/2018	8/23/2018	8/22/2018	9/20/2019	8/22/2018	8/21/2018
PFAS - Perfluorinated Alkyl Substances (ng/L)									
Perfluorobutanesulfonic acid (PFBS)	100	8.2	2.4	130	2.0 U	6.8	2.0 U	2.0 U	2.0 U
Perfluorohexanoic acid (PFHxA)	100	34	13	190	6.3	58	2.8 U	51	2.0 U
Perfluoroheptanoic acid (PFHpA)	100	14	3.5	170	2.6	27	2.2 U	16	2.0 U
Perfluorobutanoic acid (PFBA)	100	9.4	12	57	2.0 U	10	2.0 U	8.1	2.0 U
Perfluorodecanesulfonic acid (PFDS)	100	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluoroheptanesulfonic acid (PFHpS)	100	2.0 U	2.0 U	6.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorooctanesulfonamide (FOSA)	100	2.0 U	2.0 U	2.7	2.0 U	2.0 U	2.0 UJ	2.0 U	2.0 UJ
Perfluoropentanoic acid (PFPeA)	100	17	14	94	5.8	27	2.0 U	39	2.0 U
6:2 Fluorotelomersulfonate (6:2 FTS)	100	4.5	2.0 U	76	2.0 U	7.6	2.0 U	2.0 U	2.0 U
8:2 Fluorotelomersulfonate (8:2 FTS)	100	2.0 U	2.0 U	8.3 J	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorohexanesulfonic acid (PFHxS)	100	10	2.0 U	76	2.0 U	16	2.0 U	2.1	2.0 U
Perfluorononanoic acid (PFNA)	100	2.0 U	2.0 U	16	2.0 U	3.4	2.0 U	2.5	2.0 U
Perfluorodecanoic acid (PFDA)	100	2.0 U	2.0 U	4.8	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
NMeFOSAA	100	2.0 U	2.0 U	4.5	2.0 U	2.1	2.0 U	2.0 U	2.0 U
Perfluoroundecanoic acid (PFUnA)	100	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
NEtFOSAA	100	18	2.0 U	13	2.0 U	14	2.0 U	2.0 U	2.0 U
Perfluorododecanoic acid (PFDoA)	100	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorotridecanoic acid (PFTrDA)	100	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorotetradecanoic acid (PFTA)	100	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Perfluorooctanoic acid (PFOA)	10	30	5.9	650	10	100	8.6	43	3.8
Perfluorooctanesulfonic acid (PFOS)	10	13 J	2.0 UJ	190	3.0 J	25 J	2.6 J	6.2 J	5.4 J
Total PFAS	500	145	50.8	849	24.7	160.9	11.2	162	9.2
1,4-Dioxane (µg/L)[5]	1	7.1	0.81	26	3.6	30	NA	0.017 J	0.2 U

Notes:

1. * PFAS Screening values based on January 2020 NYSDEC Guidelines for Samping and Analysis of PFAS. 1,4 Dioxane Screening value based on 2018 recommendation by NY Drinking Water Quality Council.
2. Shading indicates that result exceeds the NY Screening Value.
3. Data have undergone third party validation.
4. NA=Not Analyzed
5. The laboratory also provided results for 1,4-dioxane from the Method 8260 scan, but this method is typically considered unreliable for 1,4-dioxane, therefore these results have not been summarized in this report. It should however be noted that there was a detection of 53 µg/L reported for Monitoring Well DGC-5, which is consistent with the elevated levels in the nearby wells from the more reliable modified 8270 SIM analysis.

Table 4. Sediment Monitoring Results for VOCs and Metals (August 2018)

Analytes	SED - 1	SED - 2	SED - 3	SED - 4
	8/20/2018	8/20/2018	8/20/2018	8/20/2018
VOCs (µg/kg)				
1,1-dichloroethane	6.5 U	5.7 U	10 U	8.9 U
1,1-dichloroethene	13 U	11 U	21 U	18 U
1,2,4-trimethylbenzene	6.5 U	5.7 U	10 U	8.9 U
1,2-dichloropropane	6.5 U	5.7 U	10 U	8.9 U
1,4-Dioxane	320 U	280 U	510 U	450 U
2-butanone	130 U	110 U	210 U	180 U
Acetone	320 U	280 U	510 U	450 U
Benzene	6.5 U	5.7 U	10 U	8.9 U
C-1,2-dichloroethene	6.5 U	5.7 U	10 U	8.9 U
Chlorobenzene	6.5 U	5.7 U	10 U	8.9 U
Chloroethane	65 U	57 U	100 U	89 U
Diethyl ether	65 U	57 U	100 U	89 U
Ethylbenzene	6.5 U	5.7 U	10 U	8.9 U
Isopropylbenzene	6.5 U	5.7 U	10 U	8.9 U
m,p-xylene	13 U	11 U	21 U	18 U
Methyl-t-butyl ether	13 U	11 U	21 U	18 U
o-xylene	6.5 U	5.7 U	10 U	8.9 U
t-1,2-dichloroethene	6.5 U	5.7 U	10 U	8.9 U
Tetrahydrofuran	32 U	28 U	51 U	45 U
Toluene	6.5 U	15	10 U	8.9 U
Trichloroethene	6.5 U	5.7 U	10 U	8.9 U
Vinyl chloride	32 U	28	51 U	450 U
METALS (mg/kg)				
Aluminum	12000	1300	7600	9600
Antimony	2.8 U	4.1 U	6.6 U	3.8 U
Arsenic	3.2	6.1	5.8 J	2.2 J
Barium	45	65	41	68
Beryllium	0.49	0.51	0.66 U	0.38 U
Cadmium	0.79	0.67	0.78	0.41
Calcium	2600	6500	9000	4600
Chromium	23	23	11	26
Cobalt	10	10	8.8	8.7
Copper	58	38	36	32
Iron	25000	30000	15000	19000
Lead	62	30	18	42
Magnesium	9100	6600	4800	4100
Manganese	240	940	870	730
Mercury	0.13	0.063	0.054 J	0.085
Nickel	25	24	16	18
Potassium	1700	1200	1500	1200
Selenium	5.6 U	8.2 U	13 U	7.5 U
Silver	0.65	0.82 U	1.3 U	0.75 U
Sodium	100	81	220 J	92
Thalium	2.8 U	4.1 U	6.6 U	3.8 U
Vanadium	30	20	15	16
Zinc	150	100	86	74

Table 5. Surface Water Monitoring Results for VOCs and Metals (August 2018)

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	SW - 1	SW - 2	SW - 3	SW - 4
		8/20/2018	8/20/2018	8/20/2018	8/20/2018
VOCs (µg/L)					
1,1-dichloroethane	NS	1.0 U	1.0 U	1.0 U	1.0 U
1,1-dichloroethene	NS	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-trimethylbenzene	33	1.0 U	1.0 U	1.0 U	1.0 U
1,2-dichloropropane	NS	1.0 U	1.0 U	1.0 U	1.0 U
2-butanone	NS	20 U	20 U	20 U	20 U
acetone	NS	50 U	50 U	50 U	50 U
benzene	210	1.0 U	1.0 U	1.0 U	1.0 U
C-1,2-dichloroethene	NS	1.0 U	1.0 U	1.0 U	1.0 U
chlorobenzene	5	1.0 U	1.0 U	1.0 U	1.0 U
chloroethane	NS	2.0 U	2.0 U	2.0 U	2.0 U
diethyl ether	NS	2.0 U	2.0 U	2.0 U	2.0 U
ethylbenzene	17	1.0 U	1.0 U	1.0 U	1.0 U
isopropylbenzene	2.6	1.0 U	1.0 U	1.0 U	1.0 U
m,p-xylene	65	2.0 U	2.0 U	2.0 U	2.0 U
methyl-t-butyl ether	NS	1.0 U	1.0 U	1.0 U	1.0 U
o-xylene	65	1.0 U	1.0 U	1.0 U	1.0 U
t-1,2-dichloroethene	NS	1.0 U	1.0 U	1.0 U	1.0 U
tetrahydrofuran	NS	10 U	10 U	10 U	10 U
toluene	100	0.56	3.3	11	7.0
trichloroethene	NS	1.0 U	1.0 U	1.0 U	1.0 U
vinyl chloride	NS	2.0 U	2.0 U	2.0 U	2.0 U
METALS (µg/L)					
Aluminum	100	39	180	50 U	13000
Antimony	NS	50 U	50 U	50 U	50 U
Arsenic	NS	10 U	10 U	10 U	23
Barium	NS	32	33	35	290
Beryllium	NS	4.0 U	4.0 U	4.0 U	4.0 U
Cadmium	NS	4.0 U	4.0 U	4.0 U	1.8
Calcium	NS	33000	25000	29000	57000
Chromium	NS	10 U	10 U	10 U	42
Cobalt	NS	50 U	50 U	50 U	19
Copper	NS	10 U	10 U	10 U	73
Iron	300	3100	2900	3400	46000
Lead	NS	10 U	10 U	10 U	94
Magnesium	35000	6000	5000	5100	14000
Manganese	NS	770	540	750	7300
Mercury	NS	0.10 U	0.10 U	0.10 U	0.11
Nickel	NS	10 U	10 U	10 U	28
Potassium	NS	2300	1600	2000	34000
Selenium	NS	50 U	50 U	50 U	50 U
Silver	NS	5.0 U	5.0 U	5.0 U	5.0 U
Sodium	NS	20000	12000	11000	26000
Thallium	NS	50 U	50 U	50 U	50 U
Vanadium	NS	10 U	10 U	10 U	26
Zinc	NS	20 U	7.2	20 U	160

1. Detections exceeding the NYSDEC AWQS for Class B surface water aquatic values (total fraction only), where available, are highlighted in gray.
2. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Reporting Limit for the analyte.
3. U - Indicates that the analyte was not detected (ND).
4. NS - No standard or Guidance Value.

Table 6. Landfill Gas Vent and Soil Gas Point Readings (2018 and 2019)

Vent ID[1]	Date	Time	H_2S (ppm)	O_2 (%)	CH_4 (%LEL)	CO (ppm)
V-1	8/21/2018	-	1.7	22	42	0
V-2	8/21/2018	-	0	22	0	0
V-3	8/21/2018	-	0	22.1	0	0
V-4	8/21/2018	-	1.4	22.1	12	0
V-5	8/21/2018	-	0	22.2	0	0
V-6	8/21/2018	-	0	21.8	33	0
V-7	8/21/2018	-	0	22	0	0
V-8	8/21/2018	-	0.6	20.5	18	0
V-9	8/21/2018	-	0	22	0	0
V-10	8/21/2018	-	0	17.5	11	0
V-11	8/21/2018	-	0	16.3	27	0
V-12	8/21/2018	-	0	12.4	99	4
V-13	8/21/2018	-	0	17.8	99	0
V-14	8/21/2018	-	14.6	20	40	0
V-15	8/21/2018	-	0	8.1	38	0
V-16	8/21/2018	-	-	-	-	-
V-17	8/21/2018	-	-	-	-	-
V-18	8/21/2018	-	-	-	-	-
SG-1	8/21/2018	-	0	22	0	0
	11/9/2018	-	0	21.7	0	0
	8/26/2019	17:00	0	21.2	0	0
	8/29/2019	9:08	0	20.9	0	0
	8/29/2019	12:25	0	20.9	0	0
	9/3/2019	14:20	0	20.9	0	0
SG-2	8/21/2018	-	13.9	3.2	99	6
	11/9/2018	-	0	19.6	0	0
	8/27/2019	10:21	0	19.0-20.4	Over Range	0
	8/27/2019	13:45	0	Low (13.5)	Over Range	0
	8/29/2019	9:03	0	20.9	0	0
	8/29/2019	12:30	0	Low (13.5)	Over Range	0
	9/3/2019	14:24	0	Low (13.5)	Over Range	0
SG-3	11/9/2018	-	0	19.6	0	0
	8/27/2019	14:25	0	20.9	0	0
	8/29/2019	9:19	0	20.9	0	0
	8/29/2019	12:35	0	20.9	0	0
	9/3/2019	14:28	0	20.9	0	0
SG-4	8/26/2019	16:38	0	20.9	0	0
	8/27/2019	13:10	0	20.9	0	0
	8/29/2019	9:24	0	20.9	0	0
	8/29/2019	12:41	0	20.9	0	0
	9/3/2019	14:30	0	20.9	0	0
SG-5	8/21/2018	-	0	19.5	0	0
	11/9/2018	-	0	19.5	0	0
	8/26/2019	16:30	0	20.9	0	0
	8/29/2019	9:32	0	20.9	0	0
	8/29/2019	13:40	0	20.9	0	0
SG-6	8/21/2018	-	0	19.5	0	0
	11/9/2018	-	0	19.6	0	0
	8/26/2019	16:27	0	20.9	0	0
	8/29/2019	9:34	0	20.9	0	0
	8/29/2019	13:43	0	20.9	0	0

Notes:
1. The gas vent IDs are based on what was recorded in the field during the August 2018 monitoring event. Coordinates/locations for the vents were not available.
- not collected
LEL - lower explosive level

Appendix F
Data Tables from Remedial Investigation

Table 5-1
FICA Landfill
Volatile Organics
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	Chloro-methane	Bromo-methane	Chloro-ethane	Methylene Chloride	Acetone	Carbon Disulfide	1,1-Dichloro ethane	1,2-Dichloro-ethane	2-Buta-none	Benzene	Toluene	Chloro-benzene	Ethyl-benzene	Styrene	Xylene	1,2-Dichloro-propane	1,1,2,2-Tetra-Chloro-ethane	Vinyl Chloride
Detection Limit	10	10	10	2/5	10	2/5	2/5	2/5	10	2/5	2	2/5	2/5	2/5	2/5	2/5	2/5	2/5
DGC-04	ND+/ND	ND+/ND		ND+/ND		7/ND									1J/ND			
DGC-06(OB)	ND+/ND	ND+/ND	7J/T	ND+/ND	5J/14	2J/ND	4/ND	1J/ND		2J/ND					3/ND			
DGC-05			2J/ND		14/T	2J/T				7/6		6/T	9/ND		45/14			
X-1 Dup. (DGC-05), May 1992					9J/T	3/T				5/6		5/T	14 /ND		41/14			
DGC-03		ND+/ND	2J/ND		5J/11	1J/ND				7/T		6/T	9/6		48/18			
DGC-07				ND+/ND		9/T	14/11	1J/ND		3/ND						1J/ND		3/ND
DGC-08				ND+/ND		3/31												
DGC-10A				ND+/ND														
DGC-11	ND+/ND	ND+/ND		ND+/ND	ND+/ND	1J/ND												
DGC-2S				ND+/ND	ND+/ND	1J/T		3/ND										3/T
DGC-01				ND+/ND		ND/T									1J/ND			
DGC-2D				ND+/ND	ND+/200	ND/8			4J/ND	4/ND					7/T			
TB #2				2BJ/ND	1J/ND													
DGC-6D				ND+/ND	24/32				3J/ND	3/ND			2/ND		18/T			
DGC-09				ND+/ND	ND+/ND													
SW-1, May 1992		ND+/ND		ND+/ND														
Sed-1*, May 1992				ND+/ND														
SW-Dup, May 1992		ND+/ND			2J													
Sed-Dup*, May 1992				ND+/ND														
SW-2					5J/10													
Sed-2*				ND+/ND	14J/75													
SW-3		ND+/ND	ND/T	ND/T	6J/18													
Sed-3*				ND+/ND	31/340				28/ND		5J/ND	ND/T						
SW-4		ND+/ND																
Sed-4*				ND+/ND	15J/300						120/ND							
TB #3		2J/ND																
SW-1A, October 1992					13													
SW-2A, October 1992																		
SW-3A, Octoaber 1992					13													
SW-5, October 1992																		
SW-6, October 1992																		
SED-1A*, October					30													
SED-3A*, October 1992																		
SED-5*, October					630													
SED-6*, October 1992					390													
TB																		

* = Soil Sample
J = The concentration listed is an estimated value, which is less than the specified quantitation limit but greater than zero.
B = The analyte is found in the blanks as well as the sample.
Blank Space = not detected at or above the laboratory reported limit.
NA = not analyzed.
ND = Not detected at or above the laboratory reporting limit.
All aqueous sample results are reported in ug/L.
All soil sample results are reported in ug/kg.
Detection limits for soil samples varies according to thier percent solids and dilution factors.
ND+ = Not detected based on data validation.
T = Trace concentration below the laboratory reporting limit.

Table 5-2
FICA Landfill
Volatile Organics
Preliminary Summary
SDG No. DGC-04
May 1992

	4-Methyl phenol	2,4-Dimethyl-phenol	Benzoic Acid	1,2,4-Trichloro-benzene	Naph-thalene	2-Methyl naphthalene	Acena-phthene	N-nitrosodi-phenylamine	Fluro-anthene	Pyrene	Benzo(a)-anthracene	Bis-(2-Ethylhexyl)-pthalate	Di-n-octylph-halate	Benzo(k) fluoranthene	Benzo(a) pyrene	Phena-threne
Detection Limit	10	10	50	10	10	10	10	10	10	10	10	10	10	10	10	10
DGC-04																
DGC-06																
DGC-05		2J			13			2J				8J				
X-1 Dup. (DGC-05)					13		2J	2J								
DGC-03		2J										4J				
DGC-07																
DGC-08																
DGC-10A																
DGC-11S												7J				
DGC-2S												2J				
DGC-01																
DGC-2D												35				
DGC-6D	4J											31				
DGC-09												20				
SW-1																
Sed-1*									760J	450J	300J				270J	560J
SW-Dup																
Sed-Dup																
SW-2			3J													
Sed-2*											370J				350J	
SW-3			2J													
Sed-3*									490JV			690J		290J	260J	
Sed-3R*E									660J					270J	270J	
SW-4																
Sed-4*																
Sed-4RE																

* = Soil Sample
J = The concentration listed is an estimated value, which is less than the specified quantitation limit but greater than zero.
B = The analyte is found in the blanks as well as the sample.
Blank Space = not detected at or above the laboratory reported limit.
NA = not analyzed.
All aqueous sample results are reported in ug/L.
All soil sample results are reported in ug/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.
V = Estimated value based on data validation.

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Table 5-3
FICA Landfill
Pesticide Organics Analysis
Preliminary Summary
SDG NO. DGC-04
May/October 1992

	Endosulfan I	Endrin Ketone	Delta-BHC	Heptachlor	Heptachlor-epoxide	Dieldrin	4,4'-DDE	Endosulfan sulfate	4,4'-DDT	Methoy-chlor	Alpha-Chlordane	4,4'-DDD	Gamma Chlordane	Aroclor 1242	Aroclor 1254	Endosulfan II
NYSDEC Groundwater Standard																
Detection Limit			0.100	0.100	0.100	0.20	0.20	0.20	0.20	1.0	1.0	0.20				
DGC-04																
DGC-06 (OB)																
DGC-05			.038J/ND										ND/.0009OPJ			
X-1 Dup			.029J/ND													
DGC-03								ND+/ND								
DGC-07				ND+/ND												
DGC-08				ND+/ND												
DGC-10A				ND+/ND												
DGC-11S				ND+/ND												
DGC-2S						.016J/ND										
DGC-01						.042V/ND							ND/0.00087J			
DGC-2D																
DGC-6D																
DGC-09				ND+/ND												
SW-1				ND+/ND												
SW-Dup																
SW-2			NA/ND	NA/ND	NA/ND	NA/ND	NA/ND	NA/ND	NA/ND	NA/ND	NA/ND	NA/ND				
SW-3								ND+/ND								
SW-4																
SW-1A, October 1992																
SW-3A, Octoaber 1992	0.0017JP						0.01			0.00066JP	0.0016JP	0.0022J				
SW-5, October 1992																
SW-6, October 1992																

All values expressed in ug/L.
NA = Not analyzed.
Blank Space = not detected at or above the laboratory reporting limit.
ND = not detected at or above the laboratory report.
ND+ = Not detected based on data validation.
J = The concentration listed is an estimated value, which is less than the specified quantitation limit but greater than zero.
V = Estimated value based on data validation.

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Table 5-4
FICA Landfill
Inorganic
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	200		60.0		10.0		200		5.0		5.0 V	
DGC-04	2,240				3.7 B		1290	1100				
DGC-6OB	46,200 V	5600			44.5 V	34	861 V	590			6.5 V	
DGC-05				69	6.1 VB		622 V	710				
X-1 Dup. (DGC-05)					6.1 B		632	710				
DGC-03	2,490 V	1300	41.6 VB		22.6 V	24	635 V	590				
DGC-07	3,930	640		120	7.6 B	24	276	260				
DGC-08	3,450	780			3 B		58.9 B	ND				
DGC-9		5300						230				
DGC-10A	531	200	53.7 VB				46.3 B	60				
DGC-11 (S)	389	230										
DGC-2S	19,500	350	43 VB		45.5	18	194 B	150				
DG C-2D		8600				28		660				
DGC-01	542	750			6.9 B		1080	1000.0				
SW-1/SW-1A			41 VB									
SW-5	NA		NA		NA		NA		NA			NA
SED-1*/SED-1A	21,300	14,500			10.5		66.0	53.3	1 B			
SW-Dup												
Sed-Dup*	15,500		7.9 VB		8.2		46.8					
SW-2	927	NA	41.8 VB	NA	19.3	NA	362	NA		NA		NA
Sed-2	12,700	6,260	21.7 VB		12.4		82.3 B	21				
SW-3					5.8 B		160 B	190				
Sed-3*	14,900	7,850			5.0		316	314			1.9 V	1.8
SW-4		750										
Sed-4*	12,900	4,570	40.1 VB		8 B		109 B	99.1				

* = Soil Sample
B = Indicates analyte result between IDL and CRDL.
Blank Space = not detected at or above the laboratory reporting limit.
ND = not detected at or above the laboratory reporting limit.
NA = not analyzed.
All aqueous sample results are reported in ug/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.
V = Estimated value based on data validation.

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Table 5-4 (continued)
FICA Landfill
Inorganic
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	Calcium		Chromium		Cobalt		Copper		Iron		Lead	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	5,000		10		50		25.0		100.0		3.0	
DGC-04	117,000	104,000					13.1 VB		7980 V	3000	4.4 B	13
DGC-6OB	213,000 V	216,000	66.7 V	18	40.8 VB	56	147 V	60	121000 V	41300	68.5 V	24
DGC-05	167,000 V	175,000					8 VB		23300 V	12500	3.8 VB	4
X-1 Dup. (DGC-05)	171,000 V	176,000	13.4 V				6 VB		23100 V	12700	3.6 B	7
DGC-03	259,000 V	242,000	14.8 V				43.1 V		23300 V	18300	16.8 V	8
DGC-07	156,000 V	154,000	19.5	15			23.1 VB		10100 V	3600	5.1	
DGC-08	30,700E V	31,400					23 VB		6100 V	1000	3.5 B	
DGC-9		45900.0		14						10000		22
DGC-10A	34,000 V	33900.0	15.7				9.9 VB		893 V	170	1 B	
DGC-11 (S)	23,100 V	35200.0					12.1 VB		698 V	370		4
DGC-2S	255,000 V	267,000	32.6	15	25.6 B	51	40.8 V		40900 V	6700	18.0	
DGC-2D		104,000		24						16700		33.000
DGC-01	104,000 V	105,000					10.7 VB		3200 V	5100		5
SW-1/SW-1A	32,200	46900.0					8.6 VB		374	2200		
SW-5	NA	46300.0	NA		NA		NA		NA	480	NA	
Sed-1*/SED-1A	25,800	2,610	28.5	22.8	20.8	14.6	50.3 VB	37.7	46000	28300	32.7 V	63.2
SW-Dup	31,600						8 VB		367			
Sed-Dup*	10,100		21.5		16.1		36.4 V		32300		16.6 V	
SW-2	28,400		22.0	NA	28.6 B	NA	11.4 VB	NA	95400	NA	6.3	NA
Sed-2	4,370	1,330	29.9	8.8	12.9 B		45.9 V	13.6	20200	12800	78.5 V	31.8
SW-3	121,000	161,000	9.6 B	10	14.3 B		5.4 VB		10700	18500		
Sed-3*	13,900	10,600	84.3	65	12.7 B	11.4	307 V	283	29300	34900	130	115
SW-4	27,500	42,800					8.4 VB		650	6800		11
Sed-4*	14,300	23,300	19.5	10			54.9 V		14100	10800	98.3	

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Blank Space = not detected at or above the laboratory reporting limit.
ND = not detected at or above the laboratory reporting limit.
NA = not analyzed.
All aqueous sample results are reported in ug/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.
V = Estimated value based on data validation.

Table 5-4 (continued)
FICA Landfill
Inorganic
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	Magnesium		Manganese		Nickel		Potassium		Selenium	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	5,000		15		40		5,000		5.0	
DGC-04	36,800	30,600	2,510	1,800	10.4 VB	ND	8,040	7200		
DGC-6OB	86,300 V	68,400	21,200 V	11,200	124 V	53	46,500 VB	39,100		
DGC-05	95,600 V	113,000	10,500 V	8,300	59.2 V	76	199,000 VB	188,000		
X-1 Dup. (DGC-05)	96,500	115,000	10,300	8,500	62.2 V	76	206,000	194,000		
DGC-03	174,000 V	160,000	10,900 V	9,900	138 V	130	189,000 VB	148,000		
DGC-07	35,500	33,500	22,600	22,300	17.9 VB	ND	3,380 B	2,900		
DGC-08	8,010	7,000	431	160			1,720 B	1,400		
DGC-9		11,800		470		ND		5,700		
DGC-10A	8,240	8,400	74	74	11.9 VB	ND	1,650 B	1,400		
DGC-11 (S)	5,870	7,600	86	86	15.6 VB	ND	1,070 B	1,200		
DGC-2S	86,500	76,800	22,300	19,600	67.4 V	ND	7,210	4,700		
DGC-2D		20,800		820				13,000		
DGC-01	31,800	25,600	3,160	3,000	20.9 VB		39,200	30,400		
SW-1/SW-1A	6,430	8,100	194	1,200			570 B	3,800		
SW-5		7,900	NA	210	NA		NA	3,700	NA	
Sed-1*/SED-1A	23,100 V	7,380	1,240	559	46.5 V	27.4	825 B	862		
SW-Dup	6,330		192				630 B			
Sed-Dup*	12,700		867		31.7 V		558 B			
SW-2	62,600	NA	35,600	NA	38.9 VB	NA	22,400 B	NA		NA
Sed-2	4,370	2,760	745	137	40.1 V	11.5	1,040 B	312		
SW-3	43,900	47,800	13,500	13,700	21.6 B	33	27,000	30700.0		
Sed-3*	9,870	5,450	1,190	1,550	52.8 V	30.4	697 B	480	1 B	
SW-4	4,870 B	7,500	209	1,900			530 B	3,200		
Sed-4*	2,740 B	1,730	293	741	28.2 VB	ND	778 B	341	4.1 B	7.5

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Blank Space = not detected at or above the laboratory reporting limit.
ND = not detected at or above the laboratory reporting limit.
NA = not analyzed.
All aqueous sample results are reported in ug/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.
V = Estimated value based on data validation.

Table 5-4 (continued)
FICA Landfill
Inorganic
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	Silver			Sodium			Thallium			Vanadium			Zinc			Mercury		
	May-92		Oct-92	May-92		Oct-92	May-92	Oct-92		May-92		Oct-92	May-92		Oct-92	May-92		Oct-92
Detection Limit	10			50,000			10			50			20			0.2		
DGC-04				125,000		116,000				34.9	B		79.4	V		1.8	V	
DGC-6OB	6.3	VB		314,000	VB	311,000				88.3	V		311	V	46	0.36	V	0.3
DGC-05				488,000	V	603,000				29.8	VB		57.5	V				
X-1 Dup. (DGC-05)	3	B		470,000	B	626,000				38.3	B		55.8	V	22			
DGC-03	2	VB		902,000	V	862,000				34.4	VB		114	V	27			0.4
DGC-07	2.3	B		11,600		10,000							103	V				0.6
DGC-08	2.3	B		3,290	B	3,400				25.6	B		89.5	V	28			0.3
DGC-9						17,700									26			0.3
DGC-10A				7,350		8,200				21.9	B		74.8	V				
DGC-11 (S)				4,330	B	6,900							35.0	V				
DGC-2S	2.9	B		195,000		205,000				41.2	B		145	V				
DGC-2D						217,000									58			0.2
DGC-01				196,000		146,000				32.9	B		62.1	V				1.5
SW-1/SW-1A				21,400	B	30,000							31.4	V				
SW-5	NA					25,000	NA						NA			NA		
Sed-1*/SED-1A	2	B		162	B	182				26.0		23.8	184		141			
SW-Dup	2	B		21,900									35.2	V				
Sed-Dup*				96.4	B					15.9			152	V				
SW-2	8.8	B	NA	139,000		NA		NA				NA	65.3	V	NA			NA
Sed-2	1.8	B		488	B	76.1				43.2		10.5	332		145			
SW-3	2.3	B		144,000		175,000							29.3	V				
Sed-3*	45.7		49.5	240	B	381				20.6		12.6	372		267	1.4		1.7
SW-4				8,600		12,000							29.0	V				
Sed-4*				400	B	370				28.2	B		165	V	35.3			1

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Blank Space = not detected at or above the laboratory reporting limit.
ND = not detected at or above the laboratory reporting limit.
NA = not analyzed.
All aqueous sample results are reported in ug/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.
V = Estimated value based on data validation.

Table 5-5
FICA Landfill
Wet chemistry and Field Analysis
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	TKN		Phenol Total		Nitrate		COD		Total Organic Carbon	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	0.2		0.05		0.2		1.0		1.0	
DGC-04	4.4	2.8					41	28	17	6
DGC-6OB	45	44					155	150	47	54
DGC-05	210	240				1.4	402	370	130	110
X-1 Dup. (DGC-05)	200	250		0.10		1.9	402	420	100	120
DGC-03	220	210				1.1	377	460	170	130
DGC-07	1.9	2.8					37	40	7	12
DGC-08	0.9	1.1			0.4	0.3	17	22	3	1
DGC-9						0.3				
DGC-10A	0.9						28	70	2	27
DGC-11 (S)	0.8				0.3	0.3	20	ND		1
DGC-2S	3.5	0.9					130	110	37	42
DG C-2D								22		12
DGC-01	27	22					100	66	28	26
SW-1 (A)	0.9						18	44	5	15
SW-5	NA		NA		NA		NA		NA	12
SED-1* (A)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-Dup (SW-1)	0.9	NA		NA		NA	21	NA	8	NA
Sed-Dup*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-2	27						170	27	60	12
Sed-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3	28	42					93	110	30	34
Sed-3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-4	0.9						24	33	2	13
Sed-4*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3A	NA	18	NA		NA		NA	130	NA	49
SW-6	NA		NA		NA		NA	33	NA	13

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NA = not analyzed.
All aqueous sample results are reported in mg/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.

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Table 5-5 (continued)
FICA Landfill
Wet chemistry and Field Analysis
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	Dissolved Solid		Color, CPU		Hardness		Sulfate		Turbidity, NTU	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	10		5		2		5		1	
DGC-04	779	690	7	ND	390	440	15	ND	175	16
DGC-6OB	1600	1700	45	25	750	850	31	5	360	45
DGC-05	2400	2900	60	90	880	960	43	16	790	64
X-1 Dup. (DGC-05)	2400	2900	60	90	910	1000	41	14	810	64
DGC-03	4000	4100	70	60	1500	1600	54	14	770	86
DGC-07	620	610	20	ND	550	490	24	18	150	10
DGC-08	140	150	7	ND	110	100	25	27	380	11
DGC-9		230				200		46		26
DGC-10A	170	130			120	140	33	32	190	5
DGC-11 (S)	120	100	5	ND	88	120	28	32	93	2
DGC-2S	1600	1600	50	20	950	1200	300	180	140	10
DGC-2D		830				450		28		9.6
DGC-01	1100	650	75	20	440	410	37	21	180	26
SW-1/SW-1A	190	260	35	70	110	150	15	6	1	2
SW-5	NA	250	NA	50.0	NA	140	NA	9	NA	1
Sed-1*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-Dup (SW-1)	210	NA	25	NA	120	NA	15	NA		NA
Sed-Dup*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-2	1600	263	85	70	1000	140	380	10	40	2
Sed-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3	1000	1000	30	20	540	640	30		9	6
Sed-3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-4	150	140	40	70	96	190	20		2	
Sed-4*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3A	NA	800	NA	50	NA	560	NA	6	NA	46
SW-6	NA	251	NA	60	NA	120	NA	10	NA	1

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NA = not analyzed.
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All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.

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Table 5-5 (continued)
FICA Landfill
Wet chemistry and Field Analysis
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	BOD5		Alkalinity as CaCo3		Boron		Chloride		Ammonia	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	1		2		0.5		2		0.1	
DGC-04	16	15	460	390	0.76	0.63	190	190	3.5	2.3
DGC-6OB	18	11	1000	980	3.0	2.9	390	440	45	45
DGC-05	12	22	2000	2300	3.0	3.3	590	780	210	250
X-1 Dup. (DGC-05)	12	32	1900	2200	3.0	3.4	570	810	210	240
DGC-03	30	56	2500	2300	4.0	3.5	1,400	1,500	220	220
DGC-07	12	9	590	580			8	8	1.3	0.9
DGC-08	5	5	91	82			2	2		
DGC-9		8		130						0.1
DGC-10A		23	110	100				3	0.2	0.2
DGC-11 (S)	1	6	73	100				2		
DGC-2S	5	16	860	840	4.4	4.8	200	250	0.7	1
DGC-2D						1.4		200		0.8
DGC-01	17	8	650	520	1.2	1	210	10	27	2.4
SW-1/SW-1A	2	3	97	110		NA	35	58	0.2	ND
SW-5	NA		NA	110	NA		NA	49	NA	
Sed-1*	NA	NA	NA	NA	NA	NA	NA	NA		NA
SW-Dup (SW-1)	2	NA	98	NA		NA	36	NA	0.2	NA
Sed-Dup*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-2	17	3	670	100	3.1	NA	250	58	16	
Sed-2	NA	NA	NA	NA	NA		NA	NA	NA	NA
SW-3	18	24	710	740	1.4	1.7	190	270	32	38
Sed-3*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-4	2	3	82	130			13	23	0.2	
Sed-4*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3A	NA	34	NA	500	NA		NA	220	NA	11
SW-6	NA		NA	78	NA		NA	67	NA	

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ND = not detected at or above the laboratory reporting limit.
NA = not analyzed.
All aqueous sample results are reported in mg/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.

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Table 5-5 (continued)
FICA Landfill
Wet chemistry and Field Analysis
Preliminary Summary
SDG No. DGC-04
May 1992/October 1992

	PH,S.U.		Conductivity uhmos		Temperature OC		Eh, MV		DO	
	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92	May-92	Oct-92
Detection Limit	-		-		-		-		-	
DGC-04	7.11	7.1	1150	1237	19.0	14.4	400	NA	NA	NA
DGC-6OB	6.70	6.7	2320	2300	18.9	NA	100	NA	NA	NA
DGC-05	6.78	6.9	3950	5940	13.5	15.0	NA	NA	NA	NA
X-1 Dup. (DGC-05)	NA	6.8	NA	NA	NA	NA	NA	NA	NA	NA
DGC-03	6.75	6.7	6000	7790	18.0	11.2	85	NA	NA	NA
DGC-07	6.28	6.7	800	1006	16.5	15.7	128	NA	NA	NA
DGC-08	7.74	6.9	215	306	17.3	14.0	332	NA	NA	NA
DGC-9	NA	8.0	NA	NA	NA	NA	NA	NA	NA	NA
DGC-10A	7.30	8.0	250	210	17.2	NA	403	NA	NA	NA
DGC-11 (S)	7.70	7.0	180	220	18.5	NA	210	NA	NA	NA
DGC-2S	6.93	6.5	1700	NA	13.5	NA	74	NA	NA	NA
DGC-2D	NA	7.8	NA	NA	NA	NA	NA	NA	NA	NA
DGC-01	7.37	7.0	1400	1300	16	NA	145	NA	NA	NA
SW-1/SW-1A	7.79	7.1	160	245	15.2	NA	325	NA	8.6	NA
SW-5	NA	7.1	NA	260	NA	NA	NA	NA	NA	NA
Sed-1*	NA	6.8	NA	NA	NA	NA	NA	NA	NA	NA
SW-Dup (SW-1)	7.80	NA	160	NA	NA	NA	NA	NA	NA	NA
Sed-Dup*	NA	NA	NA	NA	15.2	NA	325	NA	8.6	NA
SW-2	6.53	NA	1700	272	16.3	NA	100	NA	10.2	NA
Sed-2	NA	6.9	NA	NA	NA	NA	NA	NA	NA	NA
SW-3	6.64	6.5	NA	1600	14		106.50	NA	9.8	NA
Sed-3*	NA	8.3	NA	NA	NA	NA	NA	NA	NA	NA
SW-4	7.33	7.2	170	230	14	NA	375	NA	8.6	NA
Sed-4*	NA	7	NA	NA	NA	NA	NA	NA	NA	NA
SW-3A	NA	NA	NA	1250	NA	NA	NA	NA	NA	NA
SW-6	NA	7.0	NA	320	NA	NA	NA	NA	NA	NA

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Blank Space = not detected at or above the laboratory reporting limit.
ND = not detected at or above the laboratory reporting limit.
NA = not analyzed.
All aqueous sample results are reported in mg/L.
All soil sample results are reported in mg/kg.
Detection limits for soil samples varies according to their percent solids and dilution factors.

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Table 5-6
FICA Landfill
Sediment Pesticide/PCB
Analytical Results
May/October 1992

Compound	Endrin Ketone	Heptachlor-epoxide	Dieldrin	4,4'-DDE	Endosulfan sulfate	4,4'-DDT	Methoxy-chlor	Alpha-Chlordane	4,4'-DDD	Gamma Chlordane	Endosulfan II	PCBs
SED-1, May 1992				0.12P		1.2J						
SED-2				ND/2.0				1.22/ND	2.4P/1.9			
SED-3		1.63P/ND	6P/ND	11J/21	25J/ND		31J/ND	6.4P/ND		ND/20P		ND/260
SED-4				20J/7.7					ND/3.3			
SED-1A, October 1992			3.7JP	3.4P								359
SED-3A, October 1992				4.1J					1.5J			
SED-5, October 1992				4.3					2.7J			
SED-6, October 1992				16					13			
SED-DUP				0.32P/ND		1.2J/ND						
USEPA Sediment Criteria Guidance Value			63.9**									
NYSDEC Sediment Criteria Guidance Value		1.29**/4.29*		35.5**		35.5*	25.74**	0.257*/0.257*	35.5*	0.257*/0.257*	1.29**	11,840**/25.74*

All values expressed in ug/L.
* Based on wildlife residue criteria.
** Based on aquatic toxicity criteria.
J = Estimated value.
P = High % difference between quantitation on the DB608 and the DB1701 analytical columns.
ND = Not detected.
Blank = Not detected.

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Table 5-7
Volatile Organic
Sub-Surface Soil Samples
EPA Method 8240
FICA Landfill
August and September 1991

	Chloro-methane	Methylene Chloride	Toluene	Ethyl-benzene	Acetone	Carbon Disulfide	Xylene	2-Butanone	Benzene
DGC-8		8.5			9.2B				
DGC-9		10		7.5	25B		23		
Trip Blank		4.0J			3.4JB				
DGC-7		10	6.6	35	31B		110	7.7	
DGC-10		8.2			48B			7.2	
DGC-1		9.5			69B		1.6J	8.4	
Trip Blank		3.8J			12B				
DGC-6		14B			49B			6.5	
DGC-5, S-1					3.8B				1.8J
DGC-4, S-2		7.0B			7.0B				
DGC-3, S-7		7.6B			14B				
Trip Blank		3.2JB			3.1JB				
DGC-2		8.3B			23B	21			
Trip Blank		2.9JB			4.9JB				
DGC-6		7.4JB			26B				
X-1	26J	97JB			800B			280	
Trip Blank		4.1B			4.4B				

All samples presented in Table 5-6 are soils and units are expressed in ppb.
All Trip Blanks were distilled water and units expressed in ug/L.
A blank space indicates non-detectable.
J indicates result is less than the practical quantitation limits.
B = Detected in laboratory blank.

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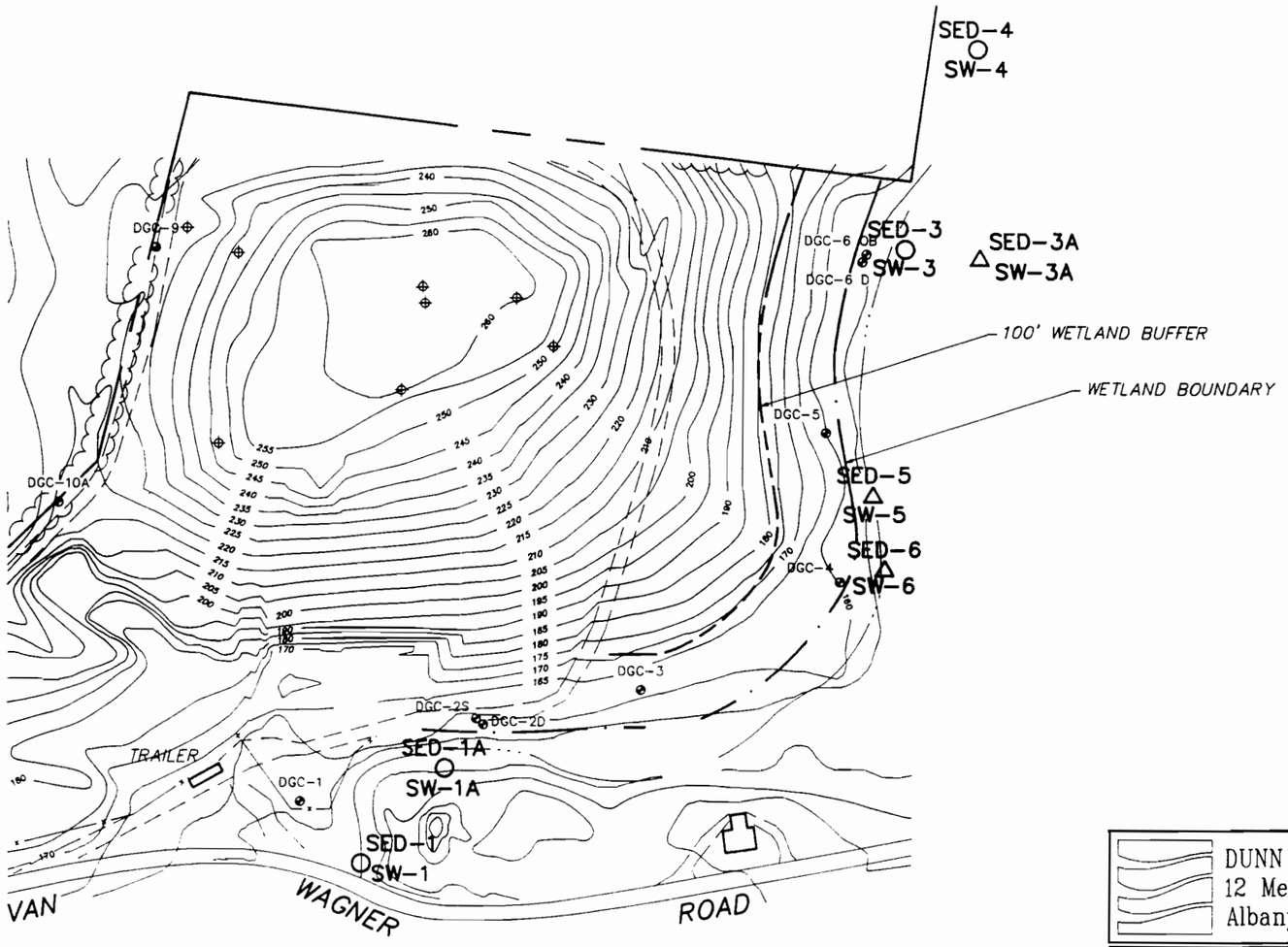
Table 5-8
Sub-Surface Soil Samples
Metals and Inorganics
FICA Landfill
August and September 1991

	DGC-8	DGC-9	DGC-7	DGC-10	DGC-1	FB	DGC-6	DGC-5 S-1	DGC-4 S-2	DGC-3 S-7	DGC-2	DGC-6
Aluminum	20,700	18,700	23,500	19,200	13,200	364	14,700	16,600	20,100	14,800	15,400	22,700
Arsenic	24.5	5.3	5.9	7.3	6.1		7.1	12.5	7.1	19.6	2.6	
Barium	25.9	45	35.9	18.9	43.6		32.5	40.8	55.8	28.3	58.5	99.8
Beryllium	0.56		0.78	0.81					0.81	0.58	0.58	1.8
Calcium	873	1,050	1,280	873	1,870	2,970	1,080	7,250	1,110	928	966	7,430
Chromium	26	19.8	29.7	24.1	18.3		18.3	22.4	20.5	17.9	17.6	22.2
Cobalt	104	11	16.5	13.7	11.6		9.3	15	10.6	15.3	10.0	
Copper	43.4	25.5	42.2	39.6	34.2		19.0	46.9	24.4	19.1	20.6	10.8
Iron	42,100	28,200	45,900	38,500	37,400	590	34,600	35,800	75,500	45,900	28,700	9,600
Lead	22.6	15.2	23.5	27.5	17.8	0.005	11.1	34	19.8	13.2	27.6	18.5
Magnesium	11,200	6,840	11,500	10,200	6,330		7,380	12,800	6,380	6,280	5,610	3,420
Manganese	918	483	1,360	675	3,520	30	420	2,400	756	437	413	720
Mercury		0.46										
Nickel	35	24.2	37.8	31.5	26.4		23.9	30.8	25.1	23.9	20.4	17
Potassium	901	791	833	769	753		650	682	620	710	825	1400
Selenium												8.9
Silver	1.2		1.1		1.1					1.2		
Sodium							118				123	775
Vandium	19.9	19.4	21.6	18.4	13.7		14.8	21.5	18.2	13.8	15	11.5
Zinc	91.1	70.4	82.4	66.9	76.7	2.6	67.6	90.2	76.9	73.6	190	28.7
PH, SU	- -	- -	7.0	6.7	7.7	7.6	7.0	6.9	6.3	6.0	6.2	7.0
% Total Solids	95	94	96	93	90		84	89	86	84	81	40

B = Also found in associated method blank.
All samples presented in Table 5-7 are soils and units and are expressed in mg/kg, unless otherwise specified.
A blank space indicates non-detectable.
- - = Not analyzed for.
Field Blank was distilled water and units are expressed in mg/L.



LEGEND

○ May and October 1992

△ October 1992

DUNN GEOSCIENCE ENGINEERING Co.
12 Metro Park Road
Albany, NY 12205

SURFACE WATER/SEDIMENT SAMPLING LOCATIONS
FICA LANDFILL

POUGHKEEPSIE DUTCHESS CO., N.Y.

PROJECT NO. 00296-01601		DWG. NO. EC-112
SCALE: 1"=200'	DATE 21JAN93	FIGURE NO. 5-1

Appendix G
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR SITE MANAGEMENT ACTIVITIES

Dutchess Sanitation (FICA) Landfill

DUTCHESS COUNTY

POUGHKEEPSIE, NEW YORK

NYSDEC Site Number: 3-14-047

Work Assignment D007626-42

Prepared for:

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by:

AECOM Technical Services Northeast, Inc.
40 British American Boulevard
Latham, New York 12110

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Dutchess Sanitation (FICA) Landfill

POUGHKEEPSIE, NEW YORK

NYSDEC Site Number: 3-14-047

Work Assignment No. D007626-42

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1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVE

The purpose of this Quality Assurance Project Plan (QAPP) is to document planned investigative activities and establish the criteria for performing these activities at a predetermined quality for the work conducted completed by AECOM Technical Services Northeast, Inc. (AECOM) under NYSDEC Standby Engineering Contract D007626 at the Dutchess Sanitation (FICA) Landfill located in Poughkeepsie, Dutchess County, New York (hereinafter referred to as the "site").

Project work will be conducted in general accordance with the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010a), technical requirements in Contract D007626 between NYSDEC and AECOM (NYSDEC and AECOM, 2010), and United States Environmental Protection Agency (USEPA) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988).

The QAPP is intended to be a companion document to the site-specific Work Plan prepared for each work assignment. A QAPP Addendum has been prepared as an Appendix included in the site-specific Work Plan for each Work Assignment to address site-specific conditions and project-specific requirements.

1.2 PROJECT MANAGEMENT AND ORGANIZATION

1.2.1 Personnel

The general responsibilities of key project personnel are listed below.

Program Manager – Michael Spera, PE will have responsibility for overall program management and coordination of subcontractors to complete the work.

Project Manager – Kelly Lurie will have responsibility for overall project management and coordination with NYSDEC, and will coordinate the initiation and implementation of the Task 2 activities.

Task Leaders/Field Team Leaders – Kelly Lurie, will share the responsibility of implementing and coordinating the field and office project activities.

QA Officer – Mr. Robert Montione (AECOM) will serve as the Program Quality Assurance Officer (QAO) for work assignments issued under this contract. The QAO will be responsible for oversight of the data validation and laboratory subcontractors, as well as data usability reports. The QAO will work with the AECOM database manager to assure that electronic deliverables provided by the laboratory are accurate and are formatted consistent with AECOM and NYSDEC requirements. The Program QAO may designate another qualified individual to serve as project QA officer to oversee the data-to-day quality assurance aspects of specific work assignments.

H & S Officer – Wendy Smith (AECOM) will be responsible for oversight of the preparation of the project health and safety plan, approving it, and tracking of its implementation.

Database Manager – Angela Toma-Eisele (AECOM) will serve as database manager. The database manager is responsible for verifying that laboratory deliverables meet AECOM and NYSDEC electronic deliverable specifications, and for preparing the final EQuIS deliverable for submission to NYSDEC.

Resumes for most of the AECOM personnel have previously been submitted to the Contract Development Section. An updated personnel list is being submitted under separate cover.

1.2.2 Specific Tasks and Services

AECOM has obtained the following subcontractor specialists for services relating to laboratory/analytical services and data validation services.

Laboratory Analysis – Con-Test Analytical Laboratory has been assigned for the project, selected from laboratories subcontracted by AECOM based on a solicitation conducted in mid-2011. Con-Test Analytical Laboratory is certified for aqueous and non-aqueous matrices. Con-Test Analytical Laboratory is also certified for air sample analysis;

Data Validation – Third party data validation will not be conducted for this work.

Field surveying and mapping- will be provided by qualified surveyor, when additional surveying is required.

1.3 SITE DESCRIPTION AND LOCATION

Background data on the site, including the site description and location, site history, previous investigations, and current conditions, are summarized in the in the site-specific Site Monitoring report (2018) , and Site Management Plan (2020).

2.0 SITE INVESTIGATION

Site investigation procedures are provided below.

2.1 Field Sampling Procedures

Field activities are detailed in the standard procedures and are not repeated in the QAPP.

2.2 Equipment Decontamination

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the procedures specified in the Work Plan.

Field equipment rinsate blanks (see Section 3.6.1) are generated and analyzed to monitor the effective of field decontamination procedures.

Cross contamination is minimized by the use of vendor-decontaminated, dedicated, disposable equipment to the extent practical.

2.2.1 Small Equipment Decontamination

Small equipment decontamination for non-disposable equipment such as bladder pumps, transducer probes and cables, etc., will be accomplished using the following procedures:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;

Solvents will not be used in the field decontamination of such equipment. Decontamination will include scrubbing/washing with a laboratory grade detergent (e.g. Alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute.

Equipment should be allowed to dry prior to use.

If bladder pumps are used, the pump will be disassembled and cleaned after each used. A new bladder will be used for each sample. Small parts, such as screens and gaskets will be replaced after each use. Dedicated air line tubing and Teflon sample tubing will be used at each monitoring well. The pump will be cleaned using the following steps:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;
- Solvent (reagent or pesticide grade) rinse if samples are collected for organic analysis;
- Dilute (10%) nitric acid rinse if samples are collected for metals analysis;
- Distilled/deionized rinse, air dry.

2.2.2 Personnel Decontamination

Wash buckets and potable water will be set up at the decontamination pad or alternate location as indicated in the Site Management Plan, or Health and Safety Plan (HASP). This includes washing

hands and a boot wash. Details of the personnel decontamination procedures will be provided in the HASP.]

3.0 SAMPLE HANDLING

3.1 SAMPLE IDENTIFICATION AND LABELING

Samples will be assigned a unique identification using the sample location or other sample-specific identifier.

Collected samples will be assigned a unique identification using the sample location or other sample-specific identifier.

For groundwater samples, the sample identification will adhere to the following example format:

DGC-27-092216 (Well – Well number-MMDDYY)

For surface water samples, the sample identification will adhere to the following example format:

SW-4-092216 (Surface water- location number -MMDDYY)

For sediment samples, the sample identification will adhere to the following example format:

SED-4-092216 (Sediment – location number-MMDDYY)

Other designations include

FB = Field (Equipment Rinsate) Blank

TB = Trip Blank

QC field duplicate samples will be submitted blind to the laboratory. The sample identifications (of the original sample and its field duplicate) will be marked in the field book and on the copy of the chain-of-custody kept by the sampler and copied to the project manager. As the field duplicates are blind to the laboratory, the NYSDEC Valid Value for a field duplicate (FD) along with the identification of the parent sample will be done by AECOM after the EQuIS deliverable is received from the laboratory.

Affixed to each sampling container will be a non-removable label on which the following information will be recorded with permanent water-proof ink:

- Site name, location, and job number;
- Sample name;
- Date and time;
- Sampler's name;
- Preservative;
- Type of sample (e.g., water, soil, sludge, sediment, air); and,
- Requested analyses].

3.2 SAMPLE BOTTLES, PRESERVATION, AND HOLDING TIME

Table 1 identifies the sample preparation and analytical method, matrix, holding time, containers, and preservatives for the typical analyses to be performed under this contract. Sample bottle requirements, preservation, and holding times are discussed further below.

3.2.1 Sample Containers

The selection of sample containers used to collect samples is based on the criteria of sample matrix, analytical method, potential contaminants of concern, reactivity of container material with the sample, QA/QC requirements and any regulatory protocol requirements.

Sample bottles will be provided by the analytical laboratory and will conform to the requirements of the USEPA Specifications and Guidance for Contaminant-Free Sample Containers. Aqueous samples for volatile organic compound (VOC) analysis will be collected in 40-mL vials with teflon septa.

3.2.2 Sample Preservation

Samples will be preserved as indicated below and summarized on Table 1.

Aqueous Samples:

Volatile organics - cooled to 4º C; HCl added to pH ≤ 2.

Metals - cooled to 4º C; HNO_3 added to pH ≤ 2.

Other organic fractions (semivolatiles, pesticides, PCBs) – no chemical preservation.

Chemical preservatives will be added to the sample bottles (prior to sample collection) by the analytical laboratory. The pH of samples will be spot-checked in the field and additional preservative will be added as needed. Sample preservation is checked upon sample receipt by the laboratory; this information is reported to the AECOM Quality Assurance Officer (QAO). If it appears that the level of chemical preservation added is not adequate, laboratory preservative preparation and addition will be modified or additional preservative will be added in the field by the sampling team.

Non-Aqueous (e.g., soil and sediment) Samples:

No chemical preservatives are added to non-aqueous samples

3.2.3 Holding Times

Contractual holding times (see Table 1) are calculated from the validated time of sample receipt (VTSR) by the laboratory; samples will be shipped from the field to arrive at the lab no later than 48 hours from the time of sample collection. Holding time requirements will be those specified in the NYSDEC ASP 2005 with 2008 update for TO-15 analysis.

Although trip blanks are prepared in the analytical laboratory and shipped to the site prior to the collection of environmental samples, for the purposes of determining holding time conformance, trip blanks will be considered to have been generated on the same day as the environmental samples with which they are shipped and delivered. Procurement of bottles and blanks will be scheduled to prevent trip blanks from being stored for excessive periods prior to their return to the laboratory; the goal is that trip blanks should be held for no longer than one week prior to use.

3.3 CHAIN OF CUSTODY AND SHIPPING

A chain-of-custody form will trace the path of sample containers from the project site to the laboratory. Chain-of-custody forms are typically provided by the analytical laboratory.

Sample bottle tracking sheets or the chain-of-custody will be used to track the containers from the laboratory to the containers' destination. The project manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples, and the anticipated date of arrival. Insulated sample shipping containers (typically coolers) will be provided by the laboratory for shipping samples. Sample bottles within each shipping container will be individually labeled with an adhesive identification label provided by the laboratory. Project personnel receiving the sample containers from the laboratory will check each cooler for the condition and integrity of the bottles prior to field work.

Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at 4º C. The field sampler will indicate the sample designation/location number in the space provided on the chain-of-custody form for each sample. The chain of custody forms will be signed and placed in a sealed plastic Ziploc bag in the cooler. The completed shipping container will be closed for transport with nylon strapping, or a similar shipping tape, and two paper seals will be affixed to the lid. The seals must be broken to open the cooler and will indicate tampering if the seals are broken before receipt at the laboratory. A label may be affixed identifying the cooler as containing "Environmental Samples" and the cooler will be shipped by an overnight delivery service to the laboratory. When the laboratory receives the coolers, the custody seals will be checked and lab personnel will sign the chain-of-custody form.

3.4 LABORATORY SAMPLE RECEIPT

Upon receipt at the laboratory, a laboratory representative inspects the samples for integrity and checks the shipment against the chain-of-custody/analytical task order form. Discrepancies are addressed at this point and documented on the chain-of-custody form and the cooler checklist (an example will be provided in each of the project-specific Field Sampling and Analysis Plans). Discrepancies are reported to the Laboratory Project Manager who contacts the AECOM Project Manager or QAO for resolution.

When the shipment and the chain-of-custody are in agreement, the custodian enters the samples into the Laboratory Information Management System and assigns each sample a unique laboratory number. This number is affixed to each sample bottle. The custodian then enters the sample and analysis information into the laboratory computer system.

3.4.1 Laboratory Sample Custody

The laboratory must satisfy the sample chain-of-custody requirements by implementing the following procedures for laboratory/sample security:

- Samples are stored in a secure area
- Access to the laboratory is through a monitored area
- Visitors sign a visitor's log and are escorted while in the laboratory
- Only the designated sample custodians have keys to sample storage area(s)
- Transfers of samples in and out of storage are documented.

3.4.2 Sample Storage, Security, and Disposal

While in the laboratory, the samples and aliquots that require storage at 4° C ± 2°C are maintained in a locked refrigerator unless they are being used for analysis. The laboratory is responsible for sample storage and security so that:

- Samples and extracts are stored for 60 days after the final analytical data report has been submitted to AECOM. The samples, extracts, and digestates are then disposed by the laboratory in accordance with laboratory SOPs and applicable regulations.
- Samples are not stored with standards or sample extracts.

4.0 DATA QUALITY REQUIREMENTS

4.1 ANALYTICAL METHODS

Soil and water sample analyses for these contracts will typically utilize USEPA SW-846 methods as listed below.

Analytical and extraction/sample preparation methods typically used are shown on Table 1 and summarized below.

Volatile Organics - SW-846 Method 8260C

Semivolatile Organics – SW-846 Method 8270D

PCBs – SW 846 Method 8082A

Mercury – SW-846 Methods 7470A (water) and 7471 (soil)

Other target analyte list metals – SW-846 Method 6010D.

Chlorides (EPA Method 300.0

Total Suspended Solids (EPA Method 160.2)

Total Organic Carbon (EPA Method 415.1)

Air samples (soil gas vents) will typically be measured in the field with a VRAE Multi Gas Meter.

Analytical methods used for project under these contracts are presented in the NYSDEC Analytical Services Protocol (ASP), 2005 (February 2008 supplement for TO-15). It is the laboratory's responsibility to be familiar with this document and procedures and deliverables within it pertaining to New York State work.

AECOM has assigned an analytical laboratory Con-Test Analytical Laboratory to this project under subcontracts approved by NYSDEC. The proposed laboratory is certified by the NYSDOH Environmental Laboratory Approved Program (see Section 1.2). The laboratory is in good standing for the applicable parameter groups.

4.2 QUALITY ASSURANCE OBJECTIVES

Data quality objectives (DQOs) for measurement data in terms of sensitivity and the PARCC parameters (precision, accuracy, representativeness, comparability, and completeness) are established so that the data collected are sufficient and of adequate quality for their intended uses. Data collected and analyzed in conformance with the DQO process described in this QAPP will be used in assessing the uncertainty associated with decisions related to this site.

4.2.1 Sensitivity

The sensitivity or detection limit desired for each analysis or compound is based on the DQOs established for the project. The method detection limit is determined in accordance with the procedure in ASP Exhibit A, section 4.9.2.12, which is consistent with the procedure in 40 CFR Part 136 Appendix B.

The RL for nondetected analytes will be the lowest calibration standard associated with the analysis. Reporting limits will be equal to or lower than those presented in Exhibit C of ASP 2005 for the

applicable method. Analytes detected analytes at concentrations below the RL but above the MDL will be flagged "J" (estimated) by the laboratory. Typical RLs are summarized on Table 2.

The reporting limits and MDLs of the assigned laboratory will be reviewed by AECOM's QAO for each project to verify that the laboratory sensitivity is sufficient to meet the project objectives. These will typically include meeting the applicable standards, criteria, and guidance (SCGs) including soil cleanup objectives (6 NYCRR 375-6.8), supplemental soil cleanup objectives (NYSDEC, 2010b), groundwater and surface water criteria (compiled in TOGS 1.1.1), and indoor air screening levels (NYSDOH, 2006, 2007).

4.2.2 Precision

The laboratory objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated by the analyses of laboratory and field duplicates. Matrix spike duplicate analyses will be performed once for every 20 samples for VOCs.

Relative Percent Difference (RPD) criteria determined from laboratory performance data are used to evaluate precision between duplicates. A matrix spike duplicate will be performed once for every twenty samples for volatile organics.

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. Precision is usually stated in terms of standard deviation but other estimates such as the coefficient of variation, relative standard deviation, range (maximum value minus minimum value), and relative range are common, and may be used pending review of the data.

The overall precision of measurement data is a mixture of sampling and analytical factors. Analytical precision is easier to control and quantify than sampling precision; there are more historical data related to individual method performance and the "universe" is not limited to the samples received in the laboratory. In contrast, sampling precision is unique to each site or project.

Overall system (sampling plus analytical) precision will be determined by analysis of field duplicate samples. Analytical results from laboratory duplicate samples will provide data on measurement (analytical) precision.

Precision will be determined from field duplicates, as well as laboratory matrix duplicate samples for metals analyses, and matrix spikes and matrix spike duplicates for organic analyses; it will be expressed as the relative percent difference (RPD):

$$RPD = 100 \times 2(|X_1 - X_2|) / (X_1 + X_2)$$

where:

> X_1 and X_2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values.

Criteria for evaluation of laboratory duplicates are specified in the applicable methods. The objective for field duplicate precision is ≤ 50% RPD for all matrices for analytes detected at concentrations at least 2 times the reporting limit. Where one or both analytes are detected at less than 2 times the RL, the criterion is the absolute difference "D" ($X_1 - X_2$), and D should be less than the RL for the analyte.

4.2.3 Accuracy

The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical method on similar samples. Percent method recovery criteria and those determined from laboratory performance data, are used to evaluate accuracy in matrix (sample) spike and blank spike quality control samples. A matrix spike and blank spike or laboratory control will be performed once for every analytical batch or as specified in the method or ASP. Other method-specific laboratory QC

samples (such as continuing calibration standards) may also be used in the assessment of analytical accuracy. Sample (matrix) spike recovery is calculated as:

$$\% \text{ Recovery} = 100 \times (SSR-SR)/SA$$

Where:

SSR = Spiked sample Result

SR = Sample Result, and

SA = Spike Added

Accuracy measures the bias in a measurement system. It is difficult to measure accuracy for the entire data collection activity. Accuracy will be assessed through use of known QC samples. Accuracy values can be presented in a variety of ways. For projects under this NYSDEC contract, accuracy will be normally presented as percent recovery.

Routine organic analytical protocol requires a surrogate spike in each sample. Surrogate recovery will be defined as:

$$\% \text{ Recovery} = (R/S) \times 100$$

Where:

S = surrogate spike concentration

R = reported surrogate compound concentration

Recovery criteria for laboratory spikes and other laboratory QC samples through which accuracy may be evaluated are established in the applicable analytical method.

4.2.4 Representativeness

The representativeness of data is only as good as the representativeness of the samples collected. Sampling and handling procedures, and laboratory practices are designed to provide a standard set of performance-driven criteria to provide data of the same quality as other analyses of similar matrices using the same methods under similar conditions. Representativeness will be determined by a comparison of the quality controls for these samples against data from similar samples analyzed at the same time.

4.2.5 Comparability

Comparability of analytical data among laboratories becomes more accurate and reliable when all labs follow the same procedure and share information for program enhancement. Some of these procedures include:

- Instrument standards traceable to National Institute of Standards and Technology (NIST), the US Environmental Protection Agency (USEPA), or the New York State Departments of Health or Environmental Conservation;
- Using standard methodologies;
- Reporting results for similar matrices in consistent units;
- Applying appropriate levels of quality control within the context of the laboratory quality assurance program; and,
- Participation in inter-laboratory studies to document laboratory performance.

By using traceable standards and standard methods, the analytical results can be compared to other labs operating similarly. The QA Program documents internal performance. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance.

Comparability within any specific project is also assessed by comparison of the project data to data generated previously; and, if available, comparison of the data for multiple sampling events conducted for the project. Comparability (consistency) of sampling techniques is also assessed, to some extent, by analysis of field duplicates; although it should be noted that large differences between field duplicates may result from a wide variety of causes, not just inconsistent sampling.

4.2.6 Completeness

The goal of completeness is to generate the maximum amount possible of valid data for all planned samples. Completeness of 100 percent indicates that all planned samples were collected; and the resultant data were fully valid and acceptable. As completeness is a function of both field activities and laboratory activities, separate completeness goals are established for each.

The default goal for sampling completeness is 95 percent, as is calculated as

$$\text{Sampling Completeness (\%)} = (Sc/Sp) \times 100$$

Where:

Sc = Samples collected (submitted) for analysis (documented from field records or COC)

Sp = Samples planned (as documented in the FAP or QAPP)

The default goal for analytical completeness is also set at 95 percent. Analytical completeness may be less than 100 percent either due to systemic failures that result in the rejection or loss of data for an entire sample; or compound-specific rejection (e.g., 2-hexanone) within an otherwise valid analysis.

For typical work assignments, the default overall completeness goal is 90 percent useable data. The impact of rejected or unusable data will be made on a case-by-case basis. If the goals of the project can be achieved without the missing datum or data, or if data from a different sampling event can be used to fill the data gap, no further action would be necessary. However, loss of critical data may require resampling or reanalysis.

4.3 FIELD QUALITY ASSURANCE

Blank water generated for use during this project must be “demonstrated analyte-free.” The criteria for analyte-free water are based on the USEPA-assigned values for the Contract Required Quantitation Limits (CRQLs) for CLP analyses, or the RL for SW-846 or other methods.

However, specifically for the common laboratory contaminants (acetone and 2-butanone), the allowable limits are five times the CRQL (or RL). For methylene chloride, the limit is 2.5 times the CRQL. For common SVOC contaminants (phthalate esters such as bis(2-ethylhexyl) phthalate), the limit is 5 times the CRQL.

The analytical testing required for the water to be demonstrated as analyte-free must be performed prior to the start of sample collection; thus, blank water will be supplied by the laboratory.

Table 2 of this QAPP shows typical QA/QC samples and reporting limits. QA/QC samples are discussed below.

4.3.1 Field Equipment (Rinsate) Blanks

Equipment blanks consist of demonstrated, analyte-free water that show if sampling equipment has the potential for contaminant carryover to give a false impression of contamination in an environmental sample. When blank water is used to rinse a piece of sampling equipment (before it is used to sample), the rinsate is collected and analyzed to see if sampling could be biased by contamination from the equipment.

Rinsate blanks are not required when samples are collected directly into laboratory-provided sample containers (e.g., if specified as such in the FAP for matrices such as surface water or leachate seeps).

Field Equipment (Rinsate) blanks for bladder pumps: For initial sampling, as well as at subsequent rounds of sampling, will be used to generate equipment (rinsate) blanks during groundwater sampling.

Typically, one rinsate blank will be collected for every 20 field samples collected or one per week, whichever is more frequent, for each type of sampling equipment. The rinsate blanks will be collected from the soil and groundwater sampling equipment.

4.3.2 Field Duplicate Samples

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method.

Aqueous field duplicate samples are second samples collected from the same location, at the same time, in the same manner as the first, and placed into a separate container (technically, these are co-located samples). Each duplicate sample will be analyzed for the same parameters as the original sample collected that day.

Soil duplicate samples are collected from a single location and device (e.g., split spoon sampler). Soil duplicates for VOC analysis are collected first, without homogenization. If other parameters are being analyzed, the remaining soil is homogenized (e.g., by mixing in a clean stainless steel bowl) and prior to generating the sample and duplicate.

The default field duplicate precision (RPD) objective is ≤50% percent RPD for all matrices where the sample concentration is at least two times the reporting limit. Where the analyte is detected in both samples but the concentration is less than 2 times the reporting limit, precision is assessed by the absolute difference, which should be less than the reporting limit. The RPD is not calculable when the analyte is not detected in one or both analyses. A more detailed discussion of the calculation is provided in Section 4.2.2 (Precision), above.

Field duplicates will be collected at a frequency of one per 20 environmental samples for aqueous and non-aqueous sample for all analyses..

4.3.3 Split Samples

Split samples are used for performance audits or inter-laboratory comparability of data. Collection of split samples may be conducted only when specifically requested by NYSDEC.

4.3.4 Trip Blanks

The purpose of a VOC trip blank (using demonstrated analyte-free water) is to place a mechanism of control on sample bottle preparation and blank water quality, and sample handling. The trip blank travels from the lab to the site with the empty sample bottles and back from the site with the collected samples. There will be a minimum of one trip blank per shipment containing aqueous samples for VOC analysis.

Trip blanks will be collected only when aqueous volatile organics are being sampled and shipped; except that a trip blank is not required when the only aqueous samples in a shipment are QC samples (rinsate blanks).

4.3.5 Temperature Blanks

The laboratory will use either an infrared instrument to measure the temperature of liquid samples, or a temperature blank will be used to measure the temperature of liquid samples. If used, temperature blanks will be supplied by the analytical laboratory. If multiple coolers are necessary to store and transport aqueous samples, then each cooler will contain an individual temperature blank (if used).

4.4 FIELD TESTING QC

Field testing of groundwater will be performed during purging of wells prior to sampling for laboratory samples. Field QC checks of control limits for pH, specific conductance (conductivity) and turbidity are detailed below. The calibration frequencies discussed below are the minimum. Field personnel can and should check calibration more frequently in adverse conditions, if anomalous readings are obtained, or subjective observations of instrument performance suggest the possibility of erroneous readings. Calibration logs for the instruments discussed below will be provided in the work plan or FAP.

4.4.1 pH Meter

The pH meter is calibrated daily, using two standards bracketing the range of interest (generally 4.0 and 7.0). If the pH QC control sample (a pH buffer, which may be the same or different than those used to initially calibrate the instrument) exceeds 0.1 pH units from the true value, the source of the error will be determined and the instrument recalibrated. If a continuing calibration check with pH 7.0 buffer is off by more than 0.1 pH units, the instrument will be recalibrated. Expired buffer solutions will not be used.

Note that gel-type probes take longer to equilibrate (up to 15 minutes at near-freezing temperatures); this must be taken into account in calibrating the instrument and reading samples and standards.

4.4.2 Specific Conductivity

A vendor-provided conductivity standard will be used to check the calibration of the conductivity meter daily. Specific conductance QC samples will be on the order of 0.01 or 0.1 molar potassium chloride (KCl) solutions in accordance with manufacturer's recommendations.

4.4.3 Turbidity

The turbidity meter should be calibrated using a standard as close as possible to 50 NTU (the critical value for determining effectiveness of well development and evacuation). The turbidimeter will be checked daily. The turbidity QC sample will be a commercially prepared polymer standard (Advanced Polymer System, Inc., or similar).

4.4.4 Temperature

Temperature probes associated with instruments (such as the YSI SCT-33 conductivity and temperature meter) are not subject to field calibration, but the calibration should be checked to monitor instrument performance. It is recommended that the instrument temperature reading be checked against a NIST-traceable thermometer concurrently with checking the conductivity calibration. The instrument manual will be referenced for corrective actions if accurate readings cannot be obtained.

4.5 LABORATORY QUALITY ASSURANCE

4.5.1 Method Blanks

A method blank is laboratory water on which every step of the method is performed and analyzed along with the samples. Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instruments as the sample is prepared and analyzed in the laboratory. Method blanks will be analyzed at a frequency of one for every twenty samples analyzed or as otherwise specified in the analytical protocol.

4.5.2 Laboratory Duplicates

Laboratory duplicates are sub-samples taken from a single aliquot of sample after the sample has been thoroughly mixed or homogenized (with the exception of volatile organics), to assess the

precision or reproducibility of the analytical method on a sample of a particular matrix. Laboratory duplicates will be performed on spiked samples as a matrix spike and a matrix spike duplicate (MS/MSD) for volatile organics.

4.5.3 Spiked Samples

Two types of spiked samples will be prepared and analyzed as quality controls: matrix spikes and matrix spike duplicates (MS/MSD), which are analyzed to evaluate instrument and method performance and performance on samples of similar matrix. MS/MSD samples will be analyzed at a frequency of one (pair) for every 20 samples. In addition, matrix spike blanks (MSBs) will also be prepared and analyzed by the laboratory as required by NYSDEC ASP.

4.5.4 Laboratory Control Sample

A fortified clean matrix (laboratory control sample, or LCS) is analyzed with each analysis. In some cases a “Laboratory-Fortified Blank” (LFB) may serve as the LCS. These samples generally consist of a standard aqueous or solid matrix fortified with the analytes of interest for single-analyte methods and selected analytes for multi-analyte methods according to the appropriate analytical method. The LCS may be analyzed in duplicate for some methods (LCSD). The analyte recovery from each analysis (LCS and LCSD) is used to monitor analytical accuracy; analytical precision can be assessed from evaluation of the LCS/LCSD in the same manner as the MS/MSD.

5.0 EQUIPMENT CALIBRATION AND MAINTENANCE

Quality assurance for instrumentation and equipment used for a project is controlled by a formal calibration program, which verifies that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. Instruments and equipment that measure a quantity, or whose performance is expected at a stated level, are subject to calibration. Calibration is performed using reference standards or externally by calibration agencies or equipment manufacturers.

5.1 STANDARD WATER AND AIR QUALITY FIELD EQUIPMENT

Field equipment used during the collection of environmental samples typically includes a turbidimeter (turbidity per EPA Method 180.1), pH meter (pH per EPA Method 150.1), conductivity meter (specific conductance per EPA Method 120.1), thermometer, and photoionization detector. See also Section 4.4 of this QAPP for additional discussion.

The organic vapor analyzer (VRAE Multi Gas Meter) used for soil gas /vent air monitoring will be calibrated following the manufacturer's instructions, at the beginning of the day, whenever the instrument is shut off for more than two hours, and at the field technician's discretion.

5.2 LABORATORY EQUIPMENT CALIBRATION

Laboratory equipment will be calibrated according to the method-specific requirements of the 2005 NYSDEC ASP**,** Exhibit E, Parts II and III, and maintained following professional judgment and the manufacturer's specifications, and additional requirements as specified in the ELAP certification manual.

5.2.1 Calibration Procedure

Written procedures are used for all instruments and equipment subject to calibration. For chemical analyses typically performed for these contracts, the calibration procedures are specified in the methods as compiled in the ASP. If established procedures are not available, a procedure is developed considering the type of equipment, stability characteristics of the equipment, required accuracy, and the effect of operational error on the quantities measured.

5.2.2 Calibration Frequency

Calibration frequency is based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended data use, specified analytical methods, effect of error upon the measurement process, and prior experience.

5.2.3 Calibration Reference Standards

Two types of reference standards will be used by the standby laboratories for calibration:

Physical standards, such as weights for calibrating balances and certified thermometers for calibrating working thermometers, refrigerators and ovens, are generally used for periodic calibration.

Chemical standards, such as Standard Reference Materials (SRMs) provided by the National Institute of Standards and Technology (NIST) or USEPA, may also include vendor-certified materials traceable to NIST or USEPA SRMs. These are primarily used for operational calibration.

5.2.4 Calibration Failure

Equipment that cannot be calibrated or becomes inoperable is removed from service. Such equipment must be repaired and satisfactorily recalibrated before re-use. For laboratory equipment that fails calibration, analysis cannot proceed until appropriate corrective action is taken and the analyst achieves an acceptable calibration.

Laboratory managers are responsible for development and implementation of a contingency plan for major equipment failure. The plan includes guidelines on waiting for repairs, use of other instrumentation, subcontracting analyses, and evaluating scheduled priorities.

5.2.5 Calibration Records

Records are prepared and maintained for each piece of equipment subject to calibration. Records demonstrating accuracy of preparation, stability, and proof of continuity of reference standards are also maintained. Copies of the raw calibration data are kept with the analytical sample data.

5.3 OPERATIONAL CALIBRATION

Operational calibration is generally performed as part of the analytical procedure and refers to those operations in which instrument response (in its broadest interpretation) is related to analyte concentration. Included are the preparation of a standard response (calibration) curve and often the analysis of blanks.

Preparation of a standard calibration curve is accomplished by the analysis of calibration standards, which are prepared by adding the analyte(s) of interest to the solvent that is introduced into the instrument. The concentrations of the calibration standards are chosen to cover the working range of the instrument or method. For most methods, five calibration standards are used, with the concentration of the lowest calibration standard being the reporting or quantitation limit for that analysis. Sample measurements are made and reported within this working range; apparent concentrations which exceed the high end of the calibrated range (“E”-flagged data for organic analyses) are diluted (or a smaller sample is used) and re-analyzed. The calibration curve is prepared by plotting or performing a linear regression of the instrument responses against the analyte concentration.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

The guidance followed to perform quality data validation, and the methods and procedures outlined herein and elsewhere in the Work Plan, pertain to initiating and performing data validation, as well as reviewing data validation performed by others (if applicable). An outline of the data validation process is presented here, followed by a description of data validation review summaries.

6.1 LABORATORY DATA REPORTING AND REDUCTION

Data reduction is the process by which raw analytical data generated from laboratory instrument systems is converted into usable concentrations. The raw data, which may take the form of area counts, instrument responses, or observations, are processed by the laboratory and converted into concentrations expressed in the parts per million (mg/kg or mg/L) or parts per billion (µg/kg or µg/L) range. Raw data from these systems include compound identifications, concentrations, retention times, and data system print-outs. Raw data are usually reported in graphic form, bar graph form, or tabular form. The laboratory will follow standard operating procedures consistent with the data handling requirements of the applicable methods.

The laboratory will meet the applicable documentation, data reduction, and reporting protocols as specified in the 2005 revision of the NYSDEC ASP. ASP Deliverables are either Category B (full deliverables; similar to USEPA CLP requirements) or Category A (a reduced deliverable level). For this contract, Category A deliverables are the default and will be provided for all deliverables generated under the contract unless explicitly indicated otherwise on a site-specific basis.

To meet NYSDEC electronic data deliverable (EDD) requirements, standby laboratories subcontracted by AECOM for this work will be required to submit electronic deliverables in an EQuIS 4-file format. AECOM personnel will be responsible for submitting a final EQuIS deliverable to NYSDEC that meets NYSDEC EDD requirements.

In addition to the hard copy of the data report, the laboratory will be asked to provide the sample data in spreadsheet form (submitted electronically or on computer diskette). The data spreadsheet will be generated to the extent possible directly from the laboratory's electronic files or information management system to minimize possible transcription errors resulting from the manual transcription of data.

6.2 DATA VALIDATION

Data generated for work assignments under these contracts will be typically not be validated by a third-party subcontractor.

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6.3 DATA USABILITY

Subsequent to receipt of the laboratory reports, AECOM's QA staff then reviews the data for data usability. The data usability review, encompasses both quantitative and qualitative aspects, although the qualitative element is the most significant.

The quantitative aspect is a review of the data quality as expressed by qualifiers applied to the data; the percent rejected, qualified (i.e., estimated), missing, and fully acceptable data are reported.

The qualitative element of the data usability summary is the QA officer's interpretation of the data quality. The qualitative aspect will include the significance of the qualifications applied to the data, especially in terms of those most relevant to the intended use of the data. The usability review will also assess whether there is a suspected bias (high or low) in qualified data, and will also provide a subjective overall assessment of the data quality. If similar analyses are performed by more than one method, an assessment

of the extent of agreement among the various methods will be included, as well as assessment of any discrepancies among the data sets.

The QAO will also indicate if there is a technical basis for selecting one data type over another for multiple measurements which are not in agreement.

6.4 FIELD DATA VERIFICATION

Field personnel will record all field data in bound field logbooks and on standard forms. After checking the validity of the data in the field notes, the Project Manager or his/her designee will reduce the data to tabular form, when possible, by entering the data into data files. Where appropriate, the data files will be set up for direct input into the project database. Subjective data will be filed as hard copies for later review by the Project Manager and incorporation into technical reports, as appropriate.

Verification of field data will be performed at two different levels. The first level of data verification will be performed at the time of collection by following standard procedures and QC checks. The second level of review consists of the Project Manager, Task Manager, or other competent personnel, reviewing the data to confirm that the correct codes and units have been included. After data reduction into tables and arrays is complete, the Site Manager will review data sets for anomalous values. The Project Manager, who will review field reports for reasonableness and completeness, will validate subjective field and technical data.

7.0 CORRECTIVE ACTIONS

If instrument performance or data fall outside acceptable limits, then corrective actions will be taken. These actions may include recalibration or standardization of instruments, acquiring new standards, replacing equipment, repairing equipment, and reanalyzing samples or redoing sections of work.

Subcontractors providing analytical services should perform their own internal laboratory audits and calibration procedures with data review conducted at a frequency so that errors and problems are detected early, thus avoiding the prospect of redoing large segments of work.

Situations related to this project requiring corrective action will be documented and made part of the project file. For each measurement system identified requiring corrective action, the responsible individual for initiating the corrective action and also the individual responsible for approving the corrective action, if necessary, will be identified.

As part of its quality management system (QMS) program, AECOM provides relevant excerpts and conclusions from data validation reports to the analytical laboratories. The laboratories are therefore made aware of non-critical items and areas where improvement may be made in subsequent NYSDEC ASP work.

The objectives of the corrective action procedures presented below are to ensure that recognized errors in performance of sample and data acquisition lead to effective remedial measures and that those steps are documented to provide assurance that any data quality deficiencies are recognized in later interpretation and are not recurrent.

7.1 RATIONALE

Many times corrective measures are undertaken in a timely and effective fashion but go undocumented. In other cases, corrective actions are of a complex nature and may require scheduled interactions between departmental groups. In either case, documentation in a formal or informal sense can reinforce the effectiveness and duration of the corrective measures taken.

7.2 CORRECTIVE ACTION METHODS

7.2.1 Immediate Corrective Actions

Immediate corrective actions are of a minor or routine nature such as correcting malfunctioning equipment, correction of data transcription errors, and other such activities routinely made in the field, laboratory, or office by technicians, analysts, and other project staff.

7.2.2 Long-Term Corrective Actions

Long-term corrective action will be used to identify and eliminate causes of non-conformances which are of a complex nature and that are formally reported between management groups.

7.2.3 Corrective Action Steps

For long-term corrective actions, steps comprising closed-loop corrective action system are as follows:

- Define the problem
- Assign responsibility for investigating the problem
- Investigate and determine the cause of the problem
- Determine a corrective action to eliminate the problem
- Assign and accept responsibility for implementing the corrective action

Verify that the corrective action has eliminated the problem.

Non-conformance events associated with analytical work are documented by the laboratories' Non-Conformance Records, which are reviewed and approved by the laboratory's Quality Assurance Manager.

7.2.4 Audit-Based Non-Conformances

Following audits, corrective action is initiated by documenting the audit finding and recommended corrective action on an Audit Finding Report.

7.3 CORRECTIVE ACTION REPORT REVIEW AND FILING

Immediate and long-term corrective actions require review to assure that, during the time of non-conformance, erroneous data were not generated or that, if possible, correct data were acquired instead. Such confirmation and review is the responsibility of the supervisor of the staff implementing the corrective action. Confirmation will be acknowledged by notation and dated signature on the affected data record or appropriate form or by memorandum to AECOM project management.

8.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Fundamental to the success of this QA/QC is the active participation of the Project Manager and the Program QA Officer. The Program QA Officer will be advised of project activities and will participate in development, review, and operation of the project. Project management will be informed of QA activities through the receipt, review, and/or approval of:

- Project-specific QA project plans
- Corporate and project-specific QA/QC plans and procedures
- Corrective action notices
- Non-conformance records.

Assessment of field and laboratory QA/QC activities and data accuracy, precision, and completeness will be conducted and reported by the Program QA Officer. Items to be included where applicable:

- Assessment of adherence to work scope and schedule for the audited task
- Assessment of the precision, accuracy, and completeness of sample batches and
- subsequent status of data processing and analyses
- Significant QC problems and the status of any ongoing corrective actions
- Changes to the site-specific Work Plan
- Status of implementation of the site-specific Work Plan.

Project status reporting to the NYSDEC will include aspects of quality control that were pertinent during site activities. Problems revealed during review of the site activities will be documented and addressed. These reports will include a description of completed and on-going activities, and an indication how each task is progressing relative to the project schedule.

The project manager, through task managers, will be responsible for verifying that records and files related to the work assignment are stored appropriately and are retrievable.

The laboratory will submit any memoranda or correspondence related to quality control of this project's samples as part of its deliverables package.

9.0 REFERENCES

New York State Department of Environmental Conservation (NYSDEC), 2005. *Analytical Services Protocol (ASP) Manual*. July.

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Tables

Table 1
Generic Quality Assurance Project Plan
NYSDEC Standby Engineering Contract (D007626)

Sample Bottle, Volume, Preservation, and Holding Time Summary

MATRIX/ANALYSIS	Sample Prep Method [1]	Analytical Method [(2)]	Sample Bottles (3)				Minimum Vol Rqd	Preservation (4)	Holding Time (4, 5)		Comment
			Mat'l	Size	Qty	Source			Extraction	Analysis	
Aqueous Samples											
Volatile Organics	SW 846 5030B	SW 846 8260C	G	40 mL	2 or 3	Lab	40 mL	HCl to pH ≤ 2	NA	14 days	7 days if not preserved.
Semivolatile Organics	SW 846 3510C/3520C/3535	SW 846 8270D	G	1 L	2	Lab	1 L	None	7 days	40 days	
PCBs	SW 846 3510C/3520C/3535	SW 846 8082A	G	1 L	1	Lab	1 L	None	7 days	40 days	
Metals (except mercury)	SW 846 3005A/3010A/3020A	SW 846 6010D	P	250 mL	1	Lab	200 mL	HNO_3 to pH≤ 2	NA	180 days	180 days for TAL metals except Hg.
Mercury	SW 846 7470A	SW 846 7470A	"	"	"	"	"	"	NA	28 days	28 days for Hg.
Non-Aqueous Samples											
Volatile Organics	SW 846 5035	SW 846 8260C	Encore	5 or 25 g	3 or 1	Vendor [7]	5 g	None	NA	48 hours [8]	
Semivolatile Organics	SW 846 3540C/3541/3545C	SW 846 8270D	G	8 oz [(6)]	1	Lab	30 g	None	14 days	40 days	
PCBs	SW 846 3540C/3541/3545C	SW 846 8082A	G	"	"	Lab	30 g	None	14 days	40 days	
Metals (except mercury)	SW 846 3050B/3051/3052	SW 846 6010D	G	"	"	Lab	10 g	None	NA	180 days	180 days for TAL metals except Hg.
Mercury	SW 846 7471A	SW 846 7471A	"	"	"	"	2 g	"	NA	28 days	28 days for Hg.

(1) Laboratory may propose alternate extraction/preparation methods, subject to AECOM approval.
(2) More recent versions of SW-846 methods may be used subject to AECOM approval.
(3) Bottles typical. EnCore samplers for VOCs in soil will be provided by laboratory or AECOM on a case-by-case basis.
(4) All samples for chemical analysis should be held at 4 degrees C in addition to any chemical preservation required.
(5) Holding time calculated from day of collection, unless noted as being from time of extraction. Laboratory holding times (ASP 2005, Exhibit I) are two days shorter to allow for field handling and shipping.
(6) A single 8-oz sample is sufficient for SVOCs, PCBs, and metals.
(7) Encore samplers are typically purchased from an outside supplier by AECOM but may also be requested (for a fee) from the analytical laboratory.
(8) Encore samplers must be prepared/preserved in the laboratory within 48 hours of collection. Soil samples in glass bottles and preserved Encores have a 14 day (total) holding time.

G = Glass
P = Plastic
SS = Stainless Steel
SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. USEPA SW-846. Complete through Update VI, July 2018.

Table 2
Generic Quality Assurance Project Plan
NYSDEC Standby Engineering Contract (D007626)

Reporting Limits and QA/QC Sample Quantity Summary

MATRIX/ANALYSIS	Analytical Method	Laboratory	Reporting Limit -Typical (units as specified)	Field Sample Quantity [1]	Matrix Spike (MS) or LCS	MS Duplicate or Matrix Duplicate	Field Duplicate	Equipment Blank [3]	Trip Blank	Total Billable Analyses
Aqueous Samples										
Volatile organics	SW 846 8260B	Con-Test	0.5 - 1.0 µg/L (typical)	20	1	1	1	1	1	25
Semivolatile organics	SW 846 8270C	Con-Test	10 - 20 µg/L (typical)	20	1	1	1	1	0	24
PCBs	SW 846 8082	Con-Test	33 µg/L	20	1	1	1	1	0	24
Metals (TAL except Hg)	SW 846 6010B	Con-Test	Analyte-specific	20	1	1	1	1	0	24
Mercury	SW 846 7470A	Con-Test	0.2 µg/L	20	1	1	1	1	0	24
Soil Samples										
Volatile organics	SW 846 8260B	Con-Test	5 µg/kg (typical) [2]	20	1	1	1	1	0	24
Semivolatile organics	SW 846 8270C	Con-Test	330 µg/kg (typical) [2]	20	1	1	1	1	0	24
PCBs	SW 846 8082	Con-Test	57 - 70 µg/kg [2]	20	1	1	1	1	0	24
Metals (TAL except Hg)	SW 846 6010B	Con-Test	Analyte-specific	20	1	1	1	1	0	24
Mercury	SW 846 7471A	Con-Test	0.2 µg/kg [2]	20	1	1	1	1	0	24

TAL = Target Analyte List (23 Metals)

Notes

1 Field sample quantity shown (20) is for illustration only. QC quantities shown are typical requirements for each group of 20 or fewer field samples.

2 Reporting limits for soils, when adjusted for dry weight, will be higher. Detections above the MDL but less than reporting limits will be reported and flagged estimated (J).

3 Field equipment rinsate blank quantity will vary depending on sample collection rate and types of sampling equipment used; quantity may be greater or less than that shown. See Work Plan or FAP.

Appendix H
AECOM Field Procedures

Appendix I
Site Management Forms

SITE NAME: _____ SITE ID.: _____

INSPECTOR: _____

MONITORING WELL FIELD INSPECTION LOG

DATE/TIME: _____

WELl ID.: _____

	YES	NO
WELL VISIBLE? (If not, provide directions below)		

WELL COORDINATES? NYTM X_____ NYTM Y_____

PDOP Reading from Trimble Pathfinder:_____ Satelites:_____

GPS Method (circle) Trimble And/Or Magellan

	YES	NO
WELL I.D. VISIBLE?		
WELL LOCATION MATCH SITE MAP? (if not, sketch actual location on back).....		

WELL I.D. AS IT APPEARS ON PROTECTIVE CASING OR WELL: .....

	YES	NO
SURFACE SEAL PRESENT?		
SURFACE SEAL COMPETENT? (If cracked, heaved etc., describe below)		
PROTECTIVE CASING IN GOOD CONDITION? (If damaged, describe below)		

HEADSPACE READING (ppm) AND INSTRUMENT USED..... _____

TYPE OF PROTECTIVE CASING AND HEIGHT OF STICKUP IN FEET (If applicable) _____

PROTECTIVE CASING MATERIAL TYPE: ..... _____

MEASURE PROTECTIVE CASING INSIDE DIAMETER (Inches): ..... _____

	YES	NO
LOCK PRESENT?		
LOCK FUNCTIONAL?		
DID YOU REPLACE THE LOCK?		
IS THERE EVIDENCE THAT THE WELL IS DOUBLE CASED? (If yes,describe below)		
WELL MEASURING POINT VISIBLE?		

MEASURE WELL DEPTH FROM MEASURING POINT (Feet): ..... _____

MEASURE DEPTH TO WATER FROM MEASURING POINT (Feet): ..... _____

MEASURE WELL DIAMETER (Inches): ..... _____

WELL CASING MATERIAL: ..... _____

PHYSICAL CONDITION OF VISIBLE WELL CASING: ..... _____

ATTACH ID MARKER (if well ID is confirmed) and IDENTIFY MARKER TYPE ..... _____

PROXIMITY TO UNDERGROUND OR OVERHEAD UTILITIES..... _____

DESCRIBE ACCESS TO WELL: (Include accessibility to truck mounted rig, natural obstructions, overhead power lines, proximity to permanent structures, etc.); ADD SKETCH OF LOCATION ON BACK, IF NECESSARY.

_____

_____

_____

DESCRIBE WELL SETTING (For example, located in a field, in a playground, on pavement, in a garden, etc.) AND ASSESS THE TYPE OF RESTORATION REQUIRED.

_____

_____

IDENTIFY ANY NEARBY POTENTIAL SOURCES OF CONTAMINATION, IF PRESENT (e.g. Gas station, salt pile, etc.):

_____

_____

_____

REMARKS:

_____

_____

Sketch

Site-Wide Semi-Annual Inspection Form

Dutchess County Landfill
Van Wagner Road
Poughkeepsie, New York

Engineering Control (s):_____ Inspection Date:_____

Item	Yes	No	N/A	Comments
Does the Engineering Control continue to perform as designed?				
Does the Engineering Control continue to protect human health and the environment?				
Does the Engineering Control comply with requirements established in the SMP?				
Has remedial performance criteria been achieved or maintained?				
Has sampling and analysis of appropriate media been performed during the monitoring event?				
Have there been any modifications made to the remedial or monitoring system?				
Does the remedial or monitoring system need to be changed or altered at this time?				
Has there been any intrusive activity, excavation, or construction occurred at the site?				
Were the activities mentioned above, performed in accordance with the SMP?				
Was there a change in the use of the site or were there new structures constructed on the site?				
In case a new occupied structure is constructed or the use of the current building changed, was a vapor intrusion evaluation done?				
Were new mitigation systems installed based on monitoring results?				
Were the groundwater wells in the monitoring network inspected during this site inspection? If so, were the Monitoring Well Field Inspection Logs Completed?				

Note: Upon completion of the form any non-conforming items warranting corrective action should be identified here within.

Name of Inspector: _____ Signature of Inspector: _____
Inspector's Company: _____ Date: _____

IMMEDIATELY REPORT ANY FAILURE OR DEFECT TO THE PROJECT MANAGER SO A COUNTERMEASURE PLAN CAN BE IMPLEMENTED.

Dutchess County Landfill Gas Vent Sample Form

Date:

Weather:

Sample Personnel:

Access Gate Condition Upon Arrival:

Vegetation Notes:

Gas Vents Piping Notes:

Cap:

Vent ID	H_2S (ppm)	O_2 (%)	CH_4 (%LEL)	CO (ppm)
V-1				
V-2				
V-3				
V-4				
V-5				
V-6				
V-7				
V-8				
V-9				
V-10				
V-11				
V-12				
V-13				
V-14				
V-15				
V-16				
V-17				
V-18				
SG-1				
SG-2				
SG-3				
SG-4				
SG-5				
SG-6				

Notes:

Appendix J
Health and Safety Plan

HEALTH AND SAFETY PLAN

Dutchess Sanitation (FICA) Landfill

Dutchess County
Poughkeepsie, NY

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7017

Prepared by:

AECOM
40 British American Boulevard
Latham, New York 12110

Project No: 60562836

HEALTH AND SAFETY PLAN APPROVAL

This project Health and Safety Plan (HASP) was prepared for employees performing a specific, limited scope of work. It was prepared based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project site. While it is not possible to discover, evaluate, and protect in advance against all possible hazards which may be encountered during the completion of this project, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

By signing below, I acknowledge that I have reviewed and hereby approve the HASP for Site No. 3-14-047, Dutchess Sanitation (FICA), Poughkeepsie, New York. This HASP has been written for the exclusive use of AECOM employees. The plan is written for specified site conditions, dates, and personnel, and must be amended if these conditions change.

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1.0 Introduction

This Health and Safety Plan (HASP) (including Attachments A-D) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee associated with the remedial program for the Dutchess Sanitation (FICA) Site (site) located in Poughkeepsie, New York. This HASP also identifies chemical and physical hazards known to be associated with the AECOM-managed activities addressed in this document.

HASP supplements will be generated as necessary to address any additional activities or changes in site conditions which may occur during field operations.

General

The provisions of this HASP are mandatory for all AECOM personnel engaged in fieldwork associated with the remedial program being conducted at the site. A copy of this HASP and any applicable HASP supplements shall be maintained on-site and available for review at all times. The 000 SH&E Series Essentials are available to review on Ecosystem. Record keeping will be maintained in accordance with this HASP and the applicable SH&E Procedures. In the event of a conflict between this HASP, the procedures, and federal, state, and local regulations, workers shall follow the most stringent/protective requirements.

Policy Statement

It is the policy of AECOM to provide a safe and healthy work environment for all of its employees. AECOM considers no phase of operations or administration is of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At AECOM, we believe every accident and every injury is avoidable. We will take every reasonable step to reduce the possibility of injury, illness, or accident. This policy is detailed in SH&E S3NA 001 PR, Safe Work Standards and Rules.

The practices and procedures presented in this HASP and any supplemental documents associated with this HASP are binding on all AECOM employees while engaged in the subject work. In addition, all site visitors shall abide by these procedures as the minimum acceptable standard for the work site. Operational changes to this HASP and supplements that could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the AECOM Project Manager (PM) and the assigned Area SH&E Manager.

References

This HASP conforms to the regulatory requirements and guidelines established in the following documents:

- Title 29, Part 1910 of the Code of Federal Regulations (29 CFR 1910), *Occupational Safety and Health Standards* (with special attention to Section 120, *Hazardous Waste Operations and Emergency Response*).
- Title 29, Part 1926 of the Code of Federal Regulations (29 CFR 1926), *Safety and Health Regulations for Construction*.
- National Institute for Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, Publication No. 85-115, 1985.
- Title 49 of the Code of Federal Regulations (49 CFR), *Department of Transportation* (with a special emphasis on Chapter II, Federal Railroad Administration regulations).

The requirements in this HASP also conform to AECOM's Corporate SH&E Program requirements as specified in the 000 SH&E Series Essentials, which are available to review on Ecosystem.

2.0 Site Background and Scope of Work

Work will be performed in accordance with the applicable Scope of Work (SOW) and associated Site Management Plan (SMP) developed for the project site. Deviations from the listed SOW will require that a Safety Professional review any changes made to this HASP, to ensure adequate protection of personnel and other property.

The following is a summary of relevant data concerning the site, and the work procedures to be performed. The SMP prepared by AECOM as a companion document to this HASP provides significantly greater details concerning both site history and planned work operations.

Site Background

This section provides a general description and historical information associated with the site.

As summarized in the site's March 1993 Record of Decision (ROD) and the October 2015 Periodic Review Report (PRR) from the previous contractor that managed site activities, the site is a 17 acre capped landfill located on a 56 acre parcel surrounded by undeveloped land to the north, east, and west. There are NYSDEC registered wetlands (PK-13) to the east of the site, Van Wagner Road is adjacent to the south side of the site, and the Schatz Federal Bearings Landfill (NYSDEC Site 3-14-003).

The site was a privately owned and operated landfill used for disposal of municipal and commercial waste from 1971 through1983. In 1980, the site was listed as a NYSDEC inactive hazardous waste site. The landfill was closed after a significant fire at the site in 1984. During fire-fighting activities leachate contaminated with volatile organic compounds was generated. The site was designated Class 2 site in 1986, indicating it posed a significant threat to public health and the environment. Site inspections following the fire identified leachate seeps along the eastern landfill slope that were discharging toward the adjacent NYSDEC wetland. A Phase I investigation was completed and indicated an Interim Remedial Measure (IRM) and a Remedial Investigation/Feasibility Study (RI/FS) would be necessary. In 1993, a ROD was executed that required removal of surface water and sediment from the wetland area adjacent to the site and construction of a landfill cap in conformance with 6NYCRR Part 360 regulations. The landfill cover was installed in 1995 as well as landfill gas and leachate collection and treatment systems. For a period of time, the landfill gas was collected and burned off in a flare system. This flare system is no longer in operation.

Routine maintenance and monitoring activities have been completed since remediation required by the ROD was completed. In October 2010, the site was reclassified as Class 4, indicating the site has been properly closed but requires continued site management.

Scope of Work

The specific objective of this work assignment is to conduct site management activities to ensure the engineering and institutional controls in place at the site continue to be effective at maintaining the site remedy. This will be accomplished through the collection of groundwater, surface water, and sediment samples from site monitoring wells; through field monitoring of landfill and soil gas; and through site inspections that verify the remedy remains in place and functioning as intended.

Additional Work Operations

Operations at the site may require additional tasks not identified in this section or addressed in Attachment A, Job Hazard Analyses (JHAs). Before performing any task not covered in this HASP, a Task Hazard Analysis (THA) must be prepared and approved by the Safety Professional.

The following additional tasks will also be performed as necessary in support of planned site activities:

Mobilization/Demobilization: Mobilization and demobilization represent limited pre- and post-task activities. These activities include driving to and from the site; initial site preparations, such as equipment setup; and post-work activities, such as general housekeeping and packaging and shipping samples.

Equipment Decontamination: AECOM personnel will perform decontamination of non-dedicated equipment used to perform sample collection or that may otherwise come into contact with site contaminated media.

3.0 Project Health And Safety Organization

Project Manager, Kelly Lurie

The Project Manager (PM) has overall management authority and responsibility for all site operations, including safety. The specific safety responsibilities for the PM are listed in Section 4.2 of SH&E Procedure S3NA-209-PR, Risk Assessment & Management. The PM will provide the site supervisor with work plans, staff, and budgetary resources, which are appropriate to meet the safety needs of the project operations.

Safety Professional

The Safety Professional is the member of the AECOM Safety, Health and Environmental Department assigned to provide guidance and technical support for the project. Duties include the following:

- Approving this HASP and any required changes.
- Approving the designated SSO.
- Reviewing all personal exposure monitoring results.
- Investigating any reported unsafe acts or conditions.

Site Supervisor (Task-Specific)

The site supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans. The PM may act as the site supervisor while on-site.

3.1.1 Responsibilities

The site supervisor is responsible to:

- Discuss deviations from the work plan with the PM.
- Discuss safety issues with the PM and other field personnel.
- Assist the Safety Professional with the development and implementation of corrective actions for site safety deficiencies.
- Assist the Safety Professional with the implementation of this HASP and ensuring compliance.
- Assist the Safety Professional with inspections of the site for compliance with this HASP and applicable Procedures.

3.1.2 Authority

The site supervisor has authority to:

- Verify that all operations are in compliance with the requirements of this HASP, and halt any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the Safety Professional, Area SH&E Manager, and the PM.

3.1.3 Qualifications

In addition to being Hazardous Waste Operations and Emergency Response (HAZWOPER)-qualified (see Section 4.1), the Site Supervisor is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4).

Employees

3.1.4 Employee Responsibilities

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to health and safety management relating to omissions and modifications in the HASP or other safety policies.

- Notifying the Safety Professional, in writing, of unsafe conditions and acts.
- Adhere to AECOM Code of Conduct guidelines set forth in the Employee Handbook - U.S.

3.1.5 Employee Authority

The health and safety authority of each employee assigned to the site includes the following:

- The right to refuse to work and/or stop work authority when the employee feels that the work is unsafe (including subcontractors or team contractors), or where specified safety precautions are not adequate or fully understood.
- The right to refuse to work on any site or operation where the safety procedures specified in this HASP or other safety policies are not being followed.
- The right to contact the Safety Professional at any time to discuss potential concerns.

Subcontractors

The requirements for subcontractor selection and subcontractor safety responsibilities are outlined in SH&E Procedure S3NA 213 PR, Subcontractor Management. Each AECOM subcontractor is responsible for assigning specific work tasks to their employees. Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personnel protective equipment (PPE).

AECOM considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures, in order to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to AECOM for review prior to the start of on-site activities, if required.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the AECOM PM or the Site Supervisor prior to beginning work operations. The Site Supervisor or authorized representative has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

Visitors

Visitors to any HAZWOPER controlled-work area must comply with the health and safety requirements of this HASP, and demonstrate an acceptable need for entry into the work area. All visitors desiring to enter any controlled work area must observe the following procedures:

- A written confirmation must be received by AECOM documenting that each of the visitors has received the proper training and medical monitoring required by this HASP. Verbal confirmation can be considered acceptable provided such confirmation is made by an officer or other authorized representative of the visitor's organization.
- Each visitor will be briefed on the hazards associated with the site activities being performed and acknowledge receipt of this briefing by signing the appropriate tailgate safety briefing form.
- All visitors must be escorted by an AECOM employee.

If the site visitor requires entry to any work area but does not comply with the above requirements, all work activities within the area must be suspended. Until these requirements have been met, entry will not be permitted.

Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

4.0 Safety Programs

HAZWOPER Qualifications

Personnel performing work at the job site must be qualified as HAZWOPER workers (unless otherwise noted in specific THAs or by the Safety Professional), and must meet the medical monitoring and training requirements specified in the following safety procedures:

- S3NA-003-PR, SH&E Training
- S3NA-115-PR, Hazardous Materials Communication
- S3NA-209-PR, Risk Assessment & Management
- S3NA-117-PR, Hazardous Waste Operations

Personnel must have successfully completed training meeting the provisions established in 29 CFR 1910.120 (e)(2) and (e)(3) (40-hour initial training). As appropriate, personnel must also have completed annual refresher training in accordance with 29 CFR 1910.120 (e)(8); each person's most recent training course must have been completed within the previous 365 days. Personnel must also have completed a physical exam in accordance with the requirements of 29 CFR 1910.120 (f), where the medical evaluation includes a judgment of the employee's ability to use respiratory protective equipment and to participate in hazardous waste site activities. These requirements are further discussed in SH&E Procedure S3NA 117 PR Hazardous Waste Operations.

If site monitoring procedures indicate that a possible exposure has occurred above the OSHA permissible exposure limit (PEL), employees may be required to receive supplemental medical testing to document symptoms specific to the particular materials present.

4.2 Site-Specific Safety Training

All personnel performing field activities at the site will be trained in accordance with SH&E S3NA-003-PR SH&E Training. For this project, training will include the requirements specified in the following:

1. S3NA-209-PR, Risk Assessment & Management
2. S3NA-115-PR, Hazardous Materials Communication
3. S3NA-117-PR, Hazardous Waste Operations

In addition to the general health and safety training programs, personnel will be:

- Instructed on the contents of applicable portions of this HASP and any supplemental health and safety information developed for the tasks to be performed.
- Made aware of task-specific physical hazards and other hazards that may be encountered during site work.

4.1.1 Competent-Person Training Requirements

There are no specific competent-person training requirements for the scope of work covered by this HASP. This section will be updated in the future if a competent-person should become required.

4.1.2 Tailgate Meetings

Prior to the commencement of daily project activities, a tailgate meeting will be conducted when two or more personnel are on site to review the specific requirements of this HASP and applicable THAs. Attendance at the daily tailgate meeting is mandatory for all employees at the site covered by this HASP and must be documented on the attendance form. All safety training documentation is to be maintained in the project file.

Hazard Communication

Section 5.2 provides information concerning the materials that may be encountered as environmental contaminants during the work activities. In addition, any organization wishing to bring any hazardous material onto any AECOM-controlled work site must first provide a copy of the item's Safety Data Sheet (SDS) to the

Safety Professional for approval and filing. SDSs may not be available for locally-obtained products, in which case some alternate form of product hazard documentation will be acceptable. In accordance with the requirements of S3NA 507 PR Hazardous Materials Communication - WHMIS, all personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all SDSs.

4.1.3 Container Labeling

AECOM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on-site by operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.).

4.1.4 Safety Data Sheets

Attachment B provides copies of SDSs for those items planned to be brought on-site at the time this HASP is prepared. This information will be updated as required during site operations.

4.1.5 Employee Information and Training

Training employees on chemical hazards is accomplished through an ongoing corporate training program. Additionally, chemical hazards are communicated to employees through daily safety meetings held at AECOM field projects and by an initial site orientation program.

At a minimum, AECOM and subcontractor employees will be instructed about the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- What the company has done to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals
- How to read and interpret labels and SDSs for hazardous substances found on AECOM sites
- Emergency spill procedures
- Proper storage and labeling

Before a new chemical is introduced on-site, each AECOM and related subcontractor employee will be given information in the same manner as during the initial site orientation program. The Safety Professional will be responsible for seeing that the SDS for the new chemical is available for review by on-site personnel. The information pertinent to the chemical hazards will be communicated to project personnel.

Confined Space Entry

The Safety Professional/Site Supervisor shall identify all potential confined spaces in accordance with SH&E S3NA-301-PR, Confined Spaces. In addition, the Safety Professional/Site Supervisor will inform all employees of the location of confined spaces. Confined space entry procedures and training requirements are listed in SH&E 301. Currently Confined Spaces are not anticipated to be encountered during this project.

Hazardous, Solid, Or Municipal Waste

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable Federal, State, and/or local regulations.

General Safety Rules

All site personnel shall adhere to SH&E S3NA 001 PR, Safe Work Standards and Rules, during site operations. In addition, the housekeeping, sanitation, and personal hygiene requirements in SH&E S3NA-013-PR, Housekeeping Worksite will be observed. Specific excerpts from SH&E 013 are listed below.

4.1.6 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags,

garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with contaminated materials.

4.1.7 Smoking, Eating, or Drinking

Smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking). Consumption of alcoholic beverages is prohibited at any AECOM site.

4.1.8 Weather

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress. For additional requirements, refer to SH&E S3NA-113-PR, Heat Stress and SH&E S3NA-112-PR, Cold Stress.

Severe weather can occur with little warning. The employee must be aware of the potentials for lightning, flash flooding and high wind events. AECOM Work Instruction S3NA 19 WI7, Hazardous Weather Operations provides additional guidance.

Be Prepared, Know What is Coming your Way

- Listen to the radio for severe weather alerts.
- Check the Storm Prediction Center's web page for alerts and warnings.

  http://www.spc.noaa.gov/products/wwa/
- Pay attention to the weather in your area, up wind of your location, and in the watershed upstream from your location.
- When in the field, be aware of the route you must take to get to shelter.

When working in low areas, be aware of the potential for flash flooding and the route to higher ground.

4.1.8.1 Heat Stress

Types of Heat Stress

Heat related problems include **heat rash, fainting, heat cramps, heat exhaustion and heat stroke**. **Heat rash** can occur when sweat isn't allowed to evaporate; leaving the skin wet most of the time and making it subject to irritation. **Fainting** may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. **Heat cramps** are painful spasms of the muscles due to excessive salt loss associated with profuse sweating.

Heat exhaustion typically results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. **EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.** A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling.

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

decline in task performance	excessive fatigue	incoordination reduced
vigilance	decline in alertness	muscle cramps

unsteady walk	dizziness	

Susceptibility to Heat Stress Increases due to:

lack of physical fitness	obesity	lack of acclimatization
drug or alcohol use	increased age	sunburn
dehydration	infection	

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should exceed sweat produced. Most workers exposed to hot conditions drink an insufficient amount of fluids than needed because of a lack of thirst. **DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK**. Consume enough liquid to force urination every two hours. In humid climates ice water or ice should be consumed to help maintain normal body temperature since evaporation does not provide an efficient mechanism for heat removal.
- Eat light meals before and during work shifts. Avoid highly salted foods.
- Drink sports drinks such as Gatorade® diluted 1:1 with water.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the Project Manager and the Site Safety Officer. Potable water should be made available each day for the field team.

Table 4-1: Temperature Adjustment Factors

Time of Day	
Before daily temperature peak[1]	+2°F
10 am – 2 pm (peak sunshine)	+2°F
Sunshine	
No clouds	+1°F
Partly Cloudy (3/8 – 5/8 cloud cover)	-3°F
Mostly Cloudy (5/8 – 7/8 cloud cover)	-5°F
Cloudy (>7/8 cloud cover)	-7°F
Indoor or nighttime work	-7°F
Wind (*ignore if indoors or wearing CPC*)	

[1] This adjustment accounts for temperature rise during the day. If the temperature has already reached its daytime peak it can be ignored.

Gusts greater than 5 miles per hour at least once per minute	-1°F
Gusts greater than 10 miles per hour at least once per minute	-2°F
Sustained greater than 5 miles per hour	-3°F
Sustained greater than 10 miles per hour	-5°F
Humidity (*ignore if wearing CPC*)	
Relative Humidity greater than 90%	+5°F
Relative humidity greater than 80%	+2°F
Relative Humidity less than 50%	-4°F
Chemical Protective Clothing (CPC)	
Modified Level D (coveralls, no respirator)	+5°F
Level C (coveralls w/o hood, full-face respirator)	+8°F
Level C (coveralls with hood, full-face respirator)	+10°F
Level B with airline system	+9°F
Level B with SCBA	+9°F and right one column[2]
Level A	+14°F and right one column[2]
Other	Specified in the HASP
Miscellaneous	
Unacclimated work force	+5°F
Partially acclimated work force	+2°F
Working in shade	-3°F
Breaks taken in air conditioned space	-3°F

Table 4-2: Work Rest Schedule

Work-Rest Regimen	Adjusted Temperature (°F)			
	Light Work	Moderate Work	Heavy Work	Very Heavy Work
No specified requirements	< 80	< 75	< 70	< 65
15 minute break every 90 minutes of work	80 – 90	75 - 85	70 - 80	65 – 75
15 minute break every 60 minutes of work	>90 – 100	> 85 - 95	>80 - 85	>75 - 80
15 minute break every 45 minutes of work	>100 – 110	>95 - 100	>85 - 90	>80 - 85
15 minute break every 30 minutes of work	>110 - 115	>100 - 105	>90 - 95	>85 - 90
15 minute break every 15 minutes of work	>115 - 120	>105 - 110	>95 -100	>90 - 95
Stop Work	**>120**	**>110**	**>100**	**>95**

Note: Time spent performing decontamination or donning/doffing CPC should not be included in calculating work or break time lengths.

[2] Locate the proper column based on work rate, then move one column to the right (next higher work rate) before locating the corresponding adjusted temperature.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method:

Radial pulse rates should be checked by using fore-and middle fingers and applying light pressure top the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beats/minute, the next work cycle will be shortened by one-third and the rest period will be kept the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, the work cycle will be shortened again by one-third.

4.1.8.2 Responding to Heat-Related Illness

The guidance below will be used in identifying and treating heat-related illness.

Table 4-3: Identification and Treatment of Heat-Related Illness

Type of Heat-Related Illness	Description	First Aid
Mild Heat Strain	The mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.	• Provide the victim with a work break during which he/she may relax, remove any excess protective clothing, and drink cool fluids. • If an air-conditioned spot is available, this is an ideal break location. • Once the victim shows improvement, he/she may resume working; however, the work pace should be moderated to prevent recurrence of the symptoms.
Heat Exhaustion	Usually begins with muscular weakness and cramping, dizziness, staggering gait, and nausea. The victim will have pale, clammy moist skin and may perspire profusely. The pulse is weak and fast and the victim may faint unless they lie down. The bowels may move involuntarily.	• Immediately remove the victim from the work area to a shady or cool area with good air circulation (*avoid drafts or sudden chilling*). • Remove all protective outerwear. • Call a physician. • Treat the victim for shock. (*Make the victim lie down, raise his or her feet 6–12 inches, and keep him/her cool by loosening all clothing*). • If the victim is conscious, it may be helpful to give him/her sips of water. • Transport victim to a medical facility ASAP.
Heat Stroke	The most serious of heat illness, heat stroke represents the collapse of the body's cooling mechanisms. As a result, body temperature may rise to 104 degrees Fahrenheit or higher. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, nausea can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. Heat stroke can occur suddenly.	• Immediately evacuate the victim to a cool/shady area. • Remove all protective outerwear and as much personal clothing as decency permits. • Lay the victim on his/her back w/the feet slightly elevated. • Apply cold wet towels or ice bags to the head, armpits, and thighs. • Sponge off the bare skin with cool water. • The main objective is to cool without chilling the victim. • Give no stimulants or hot drinks. • Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help should be summoned immediately to provide on-site treatment of the victim and proper transport to a medical facility.

4.1.8.3 Cold Stress

Type of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30° F. When fluids around the cells of the body tissue freeze, skin turns white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There might be a tingling, stinging or aching feeling in the affected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and can become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95° F. Productive physical and mental work is limited when severe shivering occurs. Shivering is a serious sign of danger. Immediately remove any person who is shivering from the cold.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40° F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and waterproof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or similar types of synthetic material that wick away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it might become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20° F.

Dehydration occurs in the cold environment and can increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

Table 4-4: Cold Weather Break Calculation

Sunny Sky Air Temperature		No Noticeable Wind		Wind 8 km/h (5 mph)		Wind 16 km/h (10 mph)		Wind 24 km/h (15 mph)		Wind 32 km/h (20 mph)	
°C below zero*	°F below zero*	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours s
26 to 28	15 to 19	normal breaks	1	normal breaks	1	75 minutes	2	55 minutes	3	40 minutes	4
29 to 31	20 to 24	normal breaks	1	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5

<table>
<tr><td>32 to 34</td><td>25 to 29</td><td>75 minutes</td><td>2</td><td>55 minutes</td><td>3</td><td>40 minutes</td><td>4</td><td>30 minutes</td><td>5</td><td rowspan="5">Non-emergency work should stop</td></tr>
<tr><td>35 to 37</td><td>30 to 34</td><td>55 minutes</td><td>3</td><td>40 minutes</td><td>4</td><td>30 minutes</td><td>5</td><td colspan="2" rowspan="4">Non-emergency work should stop</td></tr>
<tr><td>38 to 39</td><td>35 to 39</td><td>40 minutes</td><td>4</td><td>30 minutes</td><td>5</td><td colspan="2" rowspan="3">Non-emergency work should stop</td></tr>
<tr><td>40 to 42</td><td>40 to 44</td><td>30 minutes</td><td>5</td><td colspan="2" rowspan="2">Non-emergency work should stop</td></tr>
<tr><td>43 and below</td><td>45 and below</td><td colspan="2">Non-emergency work should stop</td></tr>
</table>

4.1.8.4 Ultraviolet Radiation Protection

To protect against exposure to ultraviolet (UV) radiation, workers will observe the following requirements:

1. All workers will wear sunglass-type safety glasses at all times when working outdoors during daylight hours.
2. Workers will utilize a commercial sunblock with a minimum solar protection factor (SPF) of 15 or higher.
3. Wide-brim hard hats are recommended as they provide additional UV protection.

Use of Utility Knives or Other Open-Bladed Cutting Tools

All utility knives with manually retracting blades (including "pocket knives" and other "collapsible, open-blade cutting tools") are no longer permitted on any AECOM jobsite, unless specifically authorized on a task-specific basis in this HASP and associated THA/JSA. The only acceptable type of utility knife will be those with automatically retracting blades. Other "cutters" must be equipped with a completely enclosed and guarded blade. Additional recommendations regarding the use of cutting tools can be found in SH&E S3NA-305-PR, Hand & Power Tools.

Equipment Safety Cards

Equipment safety cards have been produced by the SH&E Department for review prior to operating portable mechanized equipment (e.g., chainsaws, chop saws, power washers, etc.). Equipment safety cards should be used as a point of reference prior to using the specified piece of equipment. The cards will be used in conjunction with the manufacturers operating instructions. Personnel must be adequately trained in the tools usage prior to operation, thus using the card as a reminder or THA/JSA for additional safe operation. The cards are not a substitute for training, which at a minimum, must consist of having an observed skill set indicating good working knowledge and equipment operation time. The applicable Equipment Safety Cards will be added to Attachment C of this HASP as needed.

Stop Work Authority

All employees have the right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions as outlined in SH&E S3NA-002-PR, Stop Work Authority for Unsafe Work. Whenever the SSO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors.

Upon issuing the stop work order, the SSO shall implement corrective actions so that operations may be safely resumed. Resumption of safe operations is the primary objective; however, operations shall not resume until the Safety Professional has concurred that workplace conditions meet acceptable safety standards.

Environmental Compliance and Management

This project and the individual tasks will comply with all federal, state, provincial, and local environmental requirements as well as S3NA-204-PR, Environmental Compliance.

4.1.9 Air Emissions

The air emissions produced during this project will not exceed any applicable federal, state, county, or municipal emission limits, nor will the planned emissions require a regulatory air permit.

4.1.10 Hazardous Waste Management

Soil cuttings (if generated) and monitoring well purge water will be containerized and stored on-site in 55-gallon steel drums pending receipt of analytical results. Disposal options will be developed based on the laboratory results. It is currently anticipated that none of the investigation-derived waste (IDW) will exhibit hazardous characteristics, and that only monitoring well purge water will be generated.

4.1.11 Wetlands Protection

After reviewing the U.S. Fish and Wildlife Service's National Wetlands Inventory Mapper, wetlands were identified within 1 mile of the site.

4.1.12 Critical Habitat Protection

After reviewing the U.S. Fish and Wildlife Service's Critical Habitat Mapper, no critical habitats were noted within close proximity of the project site or the general area.

5.0 Hazard Assessment

5.1 Hazard Analysis

Task hazard analysis (THA) is a technique used to identify hazards and hazard controls associated with a specific job function. THAs focus on the relationship between the workers, the task, the resources required to complete the task, and the work environment. These variables must be evaluated to identify the potential hazards associated with the task. Once identified, steps can be taken to eliminate, reduce, or control the hazards to an acceptable risk level. Guidelines for developing THAs are located in S3NA-209-PR, Hazard Assessment and Project Planning. A blank THA template can be found on AECOM forms intranet site; S3NA-209-FM, Task Hazard Analysis.

Section 2.2 describes the work activities anticipated to be performed during this project. Individual THAs/JSAs for the tasks associated with this work can be found in Attachment A.

5.1.1 Unanticipated Work Activities/Conditions

Operations at the site may require additional tasks not identified in Section 2.2 or addressed in Attachment A THAs/JSAs. Before performing any task not covered in this HASP a THA/JSA must be prepared, and approved by the Safety Professional.

5.2 Environmental Contaminant Exposure Hazards

The following is a discussion of the hazards presented to worker personnel during this project from on-site chemical hazards known or suspected to be present on-site. Hazards associated with chemical products brought to the site during work operations are addressed separately, under the Hazard Communication process described in Section 4.3.

5.1.2 Assessment of Exposure Hazards

Inhalation – Various equipment will be used to sample the wells below ground surface. Since only small volumes of water are disturbed, the potential for airborne release of contaminants when performing this work is minimal. Greatest potential for exposure would be when opening sealed wells from the head space. Wells will be allowed to vent prior to ground water sampling.

Skin Contact – To avoid direct dermal contact with contaminated media, protective clothing, as described in Section 7, will be required when collecting samples and decontaminating sampling equipment.

Ingestion – Protection against exposure via ingestion can be accomplished by performance of proper decontamination procedures when exiting contaminated work areas.

Physical Hazards

The physical hazards that may be encountered at the Site are discussed below.

- Power Hand/Manual Hand Tools and Equipment -The use of manual hand or power tools or other equipment (e.g., water pumps) presents workers with hazards such as cuts, abrasions, contusions, and electrocution (power tools only). AECOM S3NA 305 PR Hand & Power Tools provides additional guidance
- Severe Weather - The site personnel will monitor local radio, NOAA weather radio, Internet weather sites, or other weather warning systems to plan for and identify possible severe weather situations at the project site. Site work may be delayed, postponed, or cancelled due to severe weather.
- Lightning
    - Lightning can strike up to a distance of 10 miles, but thunder can only be heard at a distance of 8 miles. If you can hear thunder, you are at risk of being struck by lightning.
    - Therefore, if site personnel working outdoors hear thunder or see lightning, work will be stopped and personnel will move to an indoor location.

  - If indoor facilities are not available, personnel should seek shelter inside passenger vehicles such as cars and pickups. Avoid touching metal parts of the vehicle.
  - During a thunderstorm avoid trees/poles, standing water, high areas, very low areas and streams, and metal structures (fences, scaffolding, etc.).
  - Work will resume 30 minutes following the final observance of thunder and/or lightning and when the storm is moving away from the work area.

- Back Safety – Using the proper techniques to lift and move heavy pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:
  - Bend at the knees, not the waist. Let your legs do the lifting;
  - Do not twist while lifting;
  - Bring the load as close to you as possible before lifting;
  - Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards;
  - Use mechanical devices to move objects that are too heavy to be moved manually; and,
  - If mechanical devices are not available, ask another person to assist you.

Biological Hazards

Contact with bodies of water, animals, insects, and plants can cause injury and illness to personnel. Care must be taken to ensure that these types of injuries are avoided. Preventative measures are outlined in S3NA-313-PR Wildlife, Plants and Insects. Snakes, spiders, and insects are the biological hazards that are anticipated to be most applicable to this Site.

5.1.3 Insects and Spiders

Spiders and wasps may be found in derelict buildings, sheltered areas, and even on open ground. Exercise care when collecting samples and avoid reaching into areas where visibility is limited. If stung by a wasp or bee, or bitten by a spider, notify a co-worker or someone who can help if you should you have an allergic reaction. Stay calm and treat the area with ice or cold water. Seek medical attention if you have any reactions to the sting such as developing a rash, excessive swelling or pain at the site of the bite or sting or any swelling or numbness beyond the site of the bite or sting.

Studies have determined that repellants containing DEET as a main ingredient are most effective against spiders, mosquitoes, and other insects. DEET can be directly applied to the exposed skin of adults and/or clothing. Permanone® is another repellent however; it can only be directly applied to clothing.

5.1.4 Small Mammals

Working in the field either directly or indirectly with small mammals have inherent risks of injury or exposure to zoonotic diseases (infectious diseases that can be transmitted from animals to humans) that all field staff need to protect themselves against.
The risks are usually higher when there is direct contact with a wild animal, either through a break in the skin (blood), saliva, or excrement; however, there are also risks through air-borne diseases (e.g., Hantavirus).

Obviously, wildlife biologists directly handling wildlife, dead or alive, or working with wildlife feces or in enclosed habitats (such as caves), have an increased risk of exposure to a wider range of zoonotic diseases and should take extra precautions.

5.1.5 Venomous Animals

Some animals have the ability to inject venom. These include: rattlesnakes, black widow spiders, and scorpions. These all have limited distributions, so in most areas you are unlikely to encounter them. Other spiders possess

venom but they are not harmful to humans. Shrews have poisonous saliva but the chance of being envenomated by them is extremely unlikely unless they are handled.

If bitten by any of these animals special care should be taken to treat the wound as it may lead to complications due to the toxin.

A bite from a venomous snake, which may inject varying degrees of toxic venom, is rarely fatal but should always be considered a medical emergency.

5.1.6 Snakes

Poisonous snakes are found in most of the states we work in. The same cautions discussed regarding spiders and wasps apply. If bitten, stay calm and seek help. Do NOT cut the bite area, but use a snakebite kit if available. Try to be able to identify the snake to medical personnel. Remember that bites of nonpoisonous snakes can become infected. Get medical attention for any animal bite.

Radiological Hazards

Radiological hazards are not anticipated to be applicable to this project.

Ultraviolet Hazards

Currently the average UV Index for January through March is LOW. The average forecasted UV Index for the New York area from April through September runs from 6 to 8, with July averaging 8 to 10 meaning that workers' UV exposures normally are in the MODERATE TO HIGH range. Workers performing field work outdoors may be susceptible to sunburn if not properly protected with sunscreen or protective clothing and hats.

Other Hazards

Due to recent health concerns throughout the United States (such as bird flu), hands should be frequently washed with soap/water or an alcohol-based antibacterial hand wash, especially prior to eating/drinking.

6.0 Activity-Specific Requirements

Supplemental Safety Procedures

As discussed in Section 5.0, personnel may be exposed to a variety of chemical, physical, and biological hazards resulting from task- or equipment-specific activities. The requirements for the control of many of these hazards are discussed in SH&E Procedures found on AECOM Ecosystem.

Specific procedures applicable to this project include the following and listed in Attachment E.

S3AM-004-PR1	Incident Reporting, Notification & Investigation
S3AM-005-PR1	Driving
S3AM-014-PR1	Manual Lifting
S3AM-111-PR1	Bloodborne Pathogens
S3AM-112-PR1	Cold Stress
S3AM-113-PR1	Heat Stress
S3AM-115-PR1	Hazardous Materials Communication
S3AM-117-PR1	Hazardous Waste Operations
S3AM-123-PR1	Respiratory Protection
S3AM-126-PR1	Flammable & Combustible Liquids
S3AM-127-PR1	Exposure Monitoring
S3AM-208-PR1	Personal Protective Equipment
S3AM-213-PR1	Subcontractor Management
S3AM-305-PR1	Hand & Power Tools
S3AM-313-PR1	Wildlife, Plants & Insects

In addition, the following supplemental procedures have been developed to address requirements not covered within the established AECOM Procedures. Procedures are specified on a task-specific basis in the individual THAs found in Attachment A.

6.1.1 Slip, Trips and Fall Hazards

On any work area, it is expected that the ground might be uneven. The ground surface might be unreliable due to settling. Surface debris might be present and wet or swampy areas can exist.

Employees should walk around, not over or on top of debris or trash piles. When carrying equipment, identify a path that is clear of any obstructions. It might be necessary to remove obstacles to create a smooth, unobstructed access point to the work areas on-site.

During the winter months, snow shovels and salt crystals should be kept in field vehicles to keep work areas free of accumulated snow and ice.

Maintaining a work environment that is free from accumulated debris is the key to preventing slip, trip and fall hazards at construction sites. Essential elements of good housekeeping include

- Orderly placement of materials, tools and equipment;
- Placing trash receptacles at appropriate locations for the disposal of miscellaneous rubbish;
- Prompt removal and secure storage of items that are not needed to perform the immediate task at hand; and,
- Awareness on the part of all employees to walk around, not over or on, equipment that might have been stored in the work area.

6.1.2 Manual Lifting

Most materials associated with investigation, remedial, or construction-related activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not

observed in the handling process. Whenever possible, use at least two people to lift, or roll/lift with your arms as close to the body as possible. Under no circumstances should any one person lift more than 49 pounds unassisted. For additional requirements refer to SH&E S3NA-014-PR, Manual Lifting.

6.1.3 Hand and Power Tools

The use of any powered hand tool will comply with the requirements in SH&E S3NA-305-PR, Hand and Power Tools. All electrically powered hand tools will be connected through a ground fault circuit interrupter (GFCI). All tools will be inspected prior to use. For those tool(s) that are damaged or otherwise defective, the tool will be red tagged and taken out of service. Workers utilizing powered hand tools will be provided with the applicable Equipment Safety Cards in Attachment C and briefed regarding the hazards presented by that particular tool. All workers must be trained on the use of the particular tool they are utilizing and this training must be documented. The SSO/site supervisor will maintain the training records on-site.

6.1.4 Heavy Equipment and Vehicle Operations

Heavy equipment and site vehicles present serious hazards to site personnel. Blind spots, failure to yield, and other situations may cause heavy equipment/vehicles to come into contact with personnel. To reduce the possibility of contact between equipment/traffic and personnel, always adhere to the following:

- Personnel must wear a high visibility, reflective safety vest at all times when working near heavy equipment and/or other vehicle traffic.
- Personnel must always yield to equipment/vehicle traffic and stay as far as possible from all equipment/vehicle traffic. Always maintain eye contact with operators.
- When feasible, place barriers between work areas and equipment/vehicle traffic.
- Always ensure reverse warning alarms are working and louder than surrounding noise. Personnel must report inoperative reverse warning alarms.
- Confirm Daily Equipment Safety Inspections, when applicable, are being performed and documentation filed at the site.

6.1.5 General Electrical Hazards

Electrical and powered equipment may be used during a variety of site activities. Injuries associated with electrical and powered equipment include electric shock, cuts/lacerations, eye damage (from flying debris), and burns. To reduce the potential of injury from the hazards associated with electrical and powered equipment, always comply with the following:

- Use ground fault circuit interrupters (GFCIs) when using electrical powered tools/equipment. GFCIs prevent electrical shock by detecting the loss of electricity from a power cord and/or electrical device.
- Confirm that generators are properly grounded, including the use of a grounding rod, driven to a depth of 3-feet.
- Wear ANSI-approved (Z87.1) safety glasses. Face shields may be required to provide additional face protection from flying debris.
- Wear appropriate work gloves. Work gloves may reduce the severity of burns and cuts/lacerations.

All temporary electric installations will comply with OSHA (29 CFR 1926, Subpart K, and 29 CFR 1910, Subpart S) guidelines. Only qualified and competent individuals (licensed electrician) will provide electrical service/servicing. Refer to SH&E 712, *Hazardous Energy Control*, for additional requirements and information.

6.1.6 Slips, Trips, Falls, and Protruding Objects

A variety of conditions may exist that may result in injury from slips, trips, falls, and protruding objects. Slips and trips may occur as a result of wet, slippery, or uneven walking surfaces. To prevent injuries from slips and trips, always keep work areas clean; keep walkways free of objects and debris; and report/clean up liquid spills. Serious injuries may occur as a result of falls from elevated heights. Always wear fall protection while working at heights of 6 feet or greater above the next lower level. Protruding objects are any object that extends into the

path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible remove or label the protruding object with an appropriate warning.

6.1.7 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with contaminated materials. Additional information on the requirements of housekeeping can be found in S3NA 307 PR, *Housekeeping, Worksite*.

6.1.8 Hazardous Noise Environments

While not anticipated to occur during the prescribed scope of work, working around drill rigs and other heavy equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

AECOM has compiled noise monitoring data that indicates that work locations within 25 feet of operating heavy equipment (e.g., drill rigs, earthworking equipment) can result in exposure to hazardous levels of noise (levels greater than 90 dBA). Accordingly, all personnel are required to use hearing protection (earplugs or earmuffs) within 25 feet of any operating piece of heavy equipment.

6.1.9 Manual Lifting

Most materials associated with investigation and remedial activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use mechanical assistance to lift or move materials and at a minimum, use at least two people to lift, or roll/lift with your arms as close to the body as possible. For additional requirements, refer to S3NA 308 PR, *Manual Lifting* and S3NA 308 WI, *Manual Lifting Safe Work Practices.*

6.1.10 Utilities

Various forms of underground/overhead utility lines or pipes may be encountered during site activities. Although not anticipated during execution of the prescribed scope of work, prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. If insufficient data is available to accurately determine the location of the utility lines, AECOM will hand clear to a depth of at least 5 feet below ground surface in the proposed areas of subsurface investigation. Should intrusive operations cause equipment to come into contact with utility lines, the SSO and an AECOM SH&E Professional will be notified immediately. Work will be suspended until the applicable utility agency is contacted and the appropriate actions for the particular situations can be taken. The phone number for the applicable state agency is provided in the Emergency Contacts list found in Section 8. For additional requirements, refer to S3NA 417 PR, *Utilities Underground*.

Ensure backhoe operator, truck drivers, etc. and signal person are aware of overhead power lines when working around overhead power lines. Overhead power and utility lines may be present on, or adjacent to, the site and represent a potential hazard during the mob /demob of equipment and supplies. Maintain a minimum of 10 feet between overhead power lines and the bucket and/or arm of the backhoe bed/cab of trucks, etc. Any deviation must be approved by the Regional Health & Safety Manager. Additional information on working adjacent to overhead power and utility lines can be found in S3NA 406 PR, *Electrical Lines, Overhead*.

6.1.11 Drilling Operations

Drilling operations are not anticipated to occur during execution of the prescribed scope of work. Drilling operations, including hollow-stem, rotary and/or direct push drilling, present their own set of hazards. Several basic precautions that should be taken include, but are not limited to, confirming locations of underground and overhead utilities, wearing of appropriate PPE and the avoidance of loose clothing or jewelry, staying clear of moving parts, knowing the locations of emergency shut-off switches. Other operational safety precautions regarding moving the drilling equipment, raising and lowering the derrick (mast), and drilling can be found in S3NA 405 PR, *Drilling and Boring*.

6.1.12 Groundwater Sampling

This activity will include the collection of groundwater samples from the existing monitoring well network. Groundwater samples will be collected through low-flow sampling techniques using a peristaltic or submersible pump. Prior to groundwater collection, appropriate air monitoring will be conducted using a calibrated photoionization detector (PID) and the appropriate chemical resistant PPE will be worn to protect against exposure. The major activities involved with collecting groundwater samples from the site and surrounding properties include the following:

- Pre-sampling event notifications and approval
- Set-up for sampling activities
- Groundwater samples from monitoring wells will be collected low-flow sampling techniques
- Sample prep and sample shipping
- Administrative activities

6.1.13 Groundwater Level Static Checks

Prior to performing any groundwater level static checks, ensure a PID is present and field checked for operational compliance. Obtain an appropriate instrument for measuring water level and ensure it is operating correctly prior to departing to the field. If the groundwater level you are measuring is in a preexisting well, use caution while opening well cap for critters that may have entered and let it air out for 15 minutes. Use the PID to measure the head space (see section 6.2.1, Table 6-2) and if the air meets acceptable criteria, proceed with the task.

6.1.14 Soil Sampling

Soil sample collection is not anticipated under the current scope of work. Soil samples can be collected from Geoprobe points, hand augering, from the surface and during well installation activities. During sampling activities, appropriate air monitoring will be conducted and the appropriate chemical resistant PPE will be worn to protect against exposure. The major activities involved with collecting samples from the site and surrounding properties include the following:

- Pre-sampling event notifications and approval
- Set-up for sampling activities
- Soil samples will be collected during well installation activities using HSA drilling techniques or from Geoprobe points.
- Sample prep and sample shipping
- Administrative activities

6.1.15 Rotating Parts

Drilling is not anticipated under the current scope of work. Exposure to rotating parts can occur when working near the drilling rig or the internal combustion engine. All rotating parts should be covered with guards to prevent access by workers. When performing maintenance activities that require the rotating parts to be exposed, workers should not allow loose clothing, hands, or tools to approach the rotating parts. Guards must be replaced as soon as possible after completing the maintenance task.

Operation of drilling equipment also creates hazards associated with pinch points and rotating equipment. Employees will evaluate work procedures to avoid placing their body and extremities in the path of rotating equipment and tools to avoid being struck by moving equipment, tools and machinery. Similarly, these hazards also create pinch point hazards where the body and extremities, especially the hands, can be caught in moving equipment and crushed. Employees will evaluate equipment and tool use procedures to identify pinch points and develop procedures to avoid placing body parts in a position where they can be caught in moving equipment, tools and machinery.

6.1.16 Pinch Points

The use of hand tools, mechanical equipment, heavy machinery and more can create pinch points within the working area. Pinch points can be recognized when moving objects are present in the work space in close proximity to employees, and it is reasonable to assume that a part of the employee's body can be caught between the moving objects. Pinch points will be considered when performing a THA/JSA for the task being performed and recommendations will be made to reduce the potential for body parts to become caught in moving parts, including but not limited to:

- The use of PPE (e.g., gloves, boots, etc.) to protect exposed body parts;
- Guarding machinery and equipment to prevent body parts from being caught in the moving objects; and

When tools are used as an extension of the body consideration will be given to how the tool may become a hazard if it is caught within moving parts.

6.1.17 Spill Prevention

Work activities may involve the use of hazardous materials (i.e., fuels, solvents) or work involving drums or other containers. The following procedures will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.

At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e., speedy dri) shall be available at each work site (more as needed).

- All hazardous commodities in use (i.e., fuels) shall be properly labeled.
- Containers shall only be lifted using equipment specifically manufactured for that purpose.
- For drums/containers, follow the procedures in S3NA 308 WI, *Manual Lifting Safe Work Practices*, to minimize spillage.

Exposure Monitoring Procedures

Monitoring procedures will be employed during site characterization activities to assess employee exposure to chemical and physical hazards (as required). Monitoring will consist primarily of on-site determination of various parameters (e.g., airborne contaminant concentrations and heat stress effects), but may be supplemented by more sophisticated monitoring techniques, if necessary.

6.1.18 Real-Time Exposure Measurement

Monitoring shall be performed within the work area on-site in order to detect the presence and relative levels of toxic substances (as required). The data collected throughout monitoring shall be used to determine the appropriate levels of PPE. Monitoring shall be conducted as specified in each THA/JSA (Attachment A) as work is performed.

Table 6-1 specifies the real-time monitoring equipment, which may be used for this project.

Table 6-1: Monitoring Parameters and Equipment

INSTRUMENT	MANUFACTURER/MODEL*	SUBSTANCES DETECTED
Photoionization Detector (PID)	RAE Systems mini-RAE Photovac Microtip (min. 11.7eV lamp)	Petroleum hydrocarbons Organic Solvents

INSTRUMENT	MANUFACTURER/MODEL*	SUBSTANCES DETECTED
Multi- or 4-Gas Detectors	RAE Systems Multi-RAE	Lower Explosive Limit Oxygen (O_2) Carbon Monoxide (CO) Hydrogen Sulfide (H_2S)
Combustible Gas Indicator (CGI) May be combined with individual or multi-gas detectors.		Explosivity

*Or similar unit, as approved by the SH&E Professional

6.1.18.1 Health and Safety Action Levels

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area or other environmental conditions. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone.

If ambient levels are measured which exceed the action levels in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and mitigative actions, etc.) must be implemented prior to commencing activities at the specific work area.

Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of the Safety Professional.

Reasons to upgrade:

- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas, vapor, or dust emission.
- Change in work task that will increase the exposure or potential exposure to hazardous materials.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally suspected.
- Change in site conditions that decrease the potential hazard.
- Change in work task that will reduce exposure to hazardous materials.

6.1.18.2 Monitoring Procedures

The monitoring procedures shown below will be followed during all groundwater monitoring and sampling activities.

Any well which has been sealed for longer than 6 hours will be allowed to ventilate for a minimum of 5 minutes upon opening, then monitored for VOC concentration using a PID. A reading in excess of 10 ppm will require additional ventilation, followed by re-monitoring. If an acceptable VOC concentration cannot be reached within 30 minutes of opening a well, reseal it and contact the PM or Safety Professional for guidance.

Table 6-2: Monitoring Procedures and Action Levels for Intrusive Activities (Including Sampling)

PARAMETER	ZONE LOCATION AND MONITORING INTERVAL	RESPONSE LEVEL (ABOVE BACKGROUND)	RESPONSE ACTIVITY
VOCs (total by PID)	Breathing Zone, every 30 minutes during well development activities	< 10 units	Continue work in required PPE and continue monitoring.
		10-25 units (sustained for more than 5 minutes)	Continue work in required PPE, continue monitoring, and use benzene detector tubes
		25-50 units (sustained for more than 5 minutes)	Contact the SSO, implement mitigation measures, upgrade PPE to Level C (organic vapor cartridge).
		> 50 units (sustained for more than 5 minutes)	Cease work, exit, and contact the SP and PM.
Hydrocarbons (Total by PID)	Every 30 minutes in the worker's breathing zone or in the immediate work area.	< 1 ppm	Continue Level D or Modified Level D work and continue monitoring.
		>1 ppm – 5 ppm	Upgrade to Level C PPE (minimum full-face APR with GMA cartridges or equivalent). Continue environmental monitoring
		>10 ppm – 100 ppm	Cease activities, implement more effective dust suppression measures; contact the SSO & SP
LEL (combustible gas indicator, CGI)	After allowing well to vent for 15 minutes monitor at cap, in the worker's breathing zone or in the immediate work area.	> 10%	Cease work, exit, and contact the SSO, PM and SP.

Note: All VOC monitoring will be conducted using PID only.

6.1.18.3 Monitoring Equipment Calibration

All instruments used will be calibrated at the beginning and end of each work shift, in accordance with the manufacturer's recommendations. If the owner's manual is not available, the personnel operating the equipment will contact the applicable office representative, rental agency or manufacturer for technical guidance for proper calibration. If equipment cannot be pre-calibrated to specifications, site operations requiring monitoring for worker exposure or off-site migration of contaminants will be postponed or temporarily ceased until this requirement is completed.

6.1.18.4 Personal Sampling

Should site activities warrant performing personal sampling to better assess chemical exposures experienced by AECOM employees, the SSO, under the direction of a Certified Industrial Hygienist (CIH), will be responsible for specifying the monitoring required. Within five working days after the receipt of monitoring results, the CIH will notify each employee, in writing, of the results that represent that employee's exposure. Copies of air sampling results will be maintained in the project files.

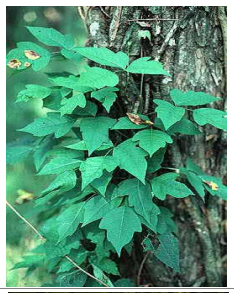
If the site activities warrant, the subcontractor will ensure its employees' exposures are quantified via the use of appropriate sampling techniques. The subcontractor shall notify the employees sampled in accordance with health and safety regulations, and provide the results to the SSO for use in determining the potential for other employees' exposure.

6.1.19 Biological Hazard Injury and Illness Prevention

Contact with bodies of water, animals, insects, and plants can cause injury and illness to personnel. Care must be taken to ensure that these types of injuries are avoided. Preventative measures are outlined in SH&E S3NA-313-PR, Wildlife Plants and Insects. Some examples of biological hazards include:

1. Natural and artificial bodies of water (e.g., lakes, rivers, ponds, lagoons, etc.) may contain a variety of microorganisms. Microorganisms, in particular, present a significant hazard to personnel who may come into contact with water bodies. Contact with microorganisms in water may result in dermatitis, infection (i.e., in cuts/lacerations), digestive distress, and other diseases. Always be aware of areas that may contain excessive amounts of microorganisms. Such areas may include areas of standing water; areas of warm water (i.e., cooling tower effluents, etc.); and areas downstream of municipal wastewater treatment. To prevent exposure to microorganisms in water, always adhere to the following:
    - Wear protective gloves (i.e., nitrile, etc.) and other appropriate PPE to prevent skin contact with water.
    - Never drink from natural or artificial bodies of water. Such water is considered non-potable and is not safe for drinking.
2. Wild animals, such as bears, snakes, raccoons, squirrels, and rats. These animals not only can bite and scratch, but can carry transmittable diseases (e.g., rabies). Avoid the animals whenever possible. If bitten, go to the nearest medical facility.
3. Insects such as mosquitoes, ticks, bees, and wasps. Mosquitoes can potentially carry and transmit the West Nile Virus. Ticks can transmit Lyme disease or Rocky Mountain Spotted Fever. Bees and wasps can sting by injecting venom, which causes some individuals to experience anaphylactic shock (extreme allergic reaction). Whenever you will enter areas that provide a habitat for insects (e.g., grass areas, woods), wear light-colored clothing, long pants and shirt, and spray exposed skin areas with a DEET-containing repellent. Keep away from high grass wherever possible. Keep your eyes and ears open for bee and wasp nests. If bitten by insects, see a doctor if there is any question of an allergic reaction.
4. Plants such as poison ivy and poison oak can cause severe rashes on exposed skin. Be careful where you walk, wear long pants, and minimize touching exposed skin with your hands after walking through thickly vegetated areas until after you have thoroughly washed your hands with soap and water. Examples of common poisonous or irritating plant species, common to the United States, are shown in Table 6-3.

Table 6-3: Hazardous Plant Identification Guide

Poison Ivy • Grows in West, Midwest, Texas, East • Several forms – vine, trailing shrub, or shrub • Three leaflets (can vary 3-9) • Leaves green in summer, red in fall • Yellow or green flowers • White berries	 
Poison Oak • Grows in the East (NJ to Texas), Pacific Coast • 6-foot tall shrubs or long vines • Oak-like leaves, clusters of three • Yellow berries	 

Poison Sumac • Grows in boggy areas, especially in the Southwest and Northern states • Shrub up to 15 feet tall • Seven to 13 smooth-edged leaflets • Glossy pale yellow or cream-colored berries	 

6.1.19.1 Response Measures for Contact with Poisonous Plants

If you have been exposed to poison ivy, oak, or sumac, act quickly because the toxin in the plants penetrates the skin within minutes. If possible, stay outdoors until you complete the first two steps:

1. Cleanse the exposed skin with generous amounts of isopropyl alcohol
2. Wash the skin with water
3. Take a regular shower with soap and warm water. Do not use soap until this point because it will pick up the toxin from the surface and move it around
4. Wash clothes, tools, and anything else that may have been in contact with the toxin, with alcohol and water. Be sure to wear hand protection during that process

Signs and symptoms of exposure include redness and swelling that appears 5 mins to 2 hours after exposure. Blistering and itching will follow. If you have had a severe reaction in the past, you should see an occupational physician right away. After binding, plain soap and water may not be effective in removing urushiol (the oil commonly disseminated by these particular plants). Otherwise, according to the Federal Drug Administration (FDA), there are quite a few effective over-the-counter (OTC) products to help with symptoms, including Cortaid and Lanacort, baking soda, Aveeno oatmeal bath, and calamine lotion. These OTC remedies may produce mild and temporary relief of the itch but will not remove the oil. Again, cleanse immediately after exposure w/plain soap/water, then wash with products like OTC Zanfel per package instructions. Wash all clothing/bedding in hot soapy water since urushiol oil from the plant will stay on them and if worn/touched, will continue to re-expose if contracted with any part of one's skin. AECOM's occupational care consultant, or a pharmacist, can help you make an educated choice.

6.1.20 Environmental Protection

Protection of the surrounding environment is not expected to be an issue as a result of the proposed work at the Pioneer Truck Stop site. Environmental THAs for various tasks may be developed by AECOM to assess the risks of the proposed work at the site. Environmental Task hazard analysis is a technique used to identify environmental hazards and hazard controls associated with the work being performed at a site. An Environmental THA focuses on the relationship between the environment, the task, the resources required to complete the task, and the work environment. These variables must be evaluated to identify the potential environmental hazards associated with the task. Once identified, steps can be taken to eliminate, reduce, or control the hazards to an acceptable risk level.

7.0 Personal Protective Equipment

Personal Protective Equipment

The purpose of personal protective equipment (PPE) is to provide a barrier, which will shield or isolate individuals from the chemical and/or physical hazards that may be encountered during work activities. SH&E S3NA-208-PR, Personal Protective Equipment Program, lists the general requirements for selection and usage of PPE. Table 7-1 lists the minimum PPE required during site operations and additional PPE that may be necessary. The specific PPE requirements for each work task are specified in the individual JSA/THAs found in Attachment A.

By signing this HASP you are agreeing that you have been properly trained in the use, limitations, care and maintenance of the protective equipment you will use at this project. If you have not received training on the proper use, care, and, limitations of the PPE required for this project, then contact the PM/SSO for the proper training prior to signing this HASP.

Table 7-1: Personal Protective Equipment

TYPE	MATERIAL	ADDITIONAL INFORMATION
Minimum PPE		
Safety Vest	ANSI Type II high-visibility	Must have reflective tape/be visible from all sides
Boots	Leather	ANSI approved safety toe
Safety Glasses		ANSI Approved; ≥98% UV protection
Hard Hat		ANSI Approved; recommended wide-brim
Work Uniform		No shorts/cutoff jeans or sleeveless shirts
Additional PPE:		
Hearing Protection	Ear plugs and/ or muffs	In hazardous noise areas
Leather Gloves		If working with sharp objects or powered equipment.
Protective Chemical Gloves	Inner: Outer: Nitrile/Butyl Rubber	
Level C Respiratory Protection	MSA (Full Face or equivalent) equipped with GMA/P100	
Faceshield		Safety glasses or goggles must be worn concurrently.
Sunscreen	SPF 30 or higher	
Cold Weather Gear	Hard hat liner, hand warmers, insulated gloves	

PPE Doffing and Donning Information

The following information is to provide field personnel with helpful hints that, when applied, make donning and doffing of PPE a more safe and manageable task:

- Never cut disposable booties from your feet with basic utility knives. This has resulted in workers cutting through the booty and the underlying sturdy leather work boot, resulting in significant cuts to the legs/ankles. Recommend using a pair of scissors or a package/letter opener (cut above and parallel with the work boot) to start a cut in the edge of the booty, then proceed by manually tearing the material down to the sole of the booty for easy removal.
- When applying duct tape to PPE interfaces (wrist, lower leg, around respirator, etc.) and zippers, leave approximately one inch at the end of the tape to fold over onto itself. This will make it much easier to

remove the tape by providing a small handle to grab while still wearing gloves. Without this fold, trying to pull up the tape end with multiple gloves on may be difficult and result in premature tearing of the PPE.

- Have a "buddy" check your ensemble to ensure proper donning before entering controlled work areas. Without mirrors, the most obvious discrepancies can go unnoticed and may result in a potential exposure situation.
- Never perform personal decontamination with a pressure washer.

Decontamination

7.1.1 General Requirements

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials, etc).

Decontamination procedures may vary based on site conditions and nature of the contaminant(s). If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel must assess the potential exposures created by the decontamination chemical(s) or solutions. The applicable Safety Data Sheet (SDS) must be reviewed, implemented, and filed by personnel contacting the chemicals/solutions.

All contaminated PPE and decontamination materials shall be contained, stored and disposed of in accordance with site-specific requirements determined by site management.

7.1.2 Decontamination Equipment

The equipment required to perform decontamination may vary based on site-specific conditions and the nature of the contaminant(s). The following equipment is commonly used for decontamination purposes:

- Soft-bristle scrub brushes or long-handled brushes to remove contaminants;
- Hoses, buckets of water or garden sprayers for rinsing;
- Large plastic/galvanized wash tubs or children's wading pools for washing and rinsing solutions;
- Large plastic garbage cans or similar containers lined with plastic bags for the storage of contaminated clothing and equipment;
- Metal or plastic cans or drums for the temporary storage of contaminated liquids; and
- Paper or cloth towels for drying protective clothing and equipment.

7.1.3 Personal/Equipment Decontamination

All equipment leaving the EZ shall be considered contaminated and must be properly decontaminated to minimize the potential for exposure and off-site migration of impacted materials. Such equipment may include, but is not limited to: sampling tools, heavy equipment, vehicles, PPE, support devices (e.g., hoses, cylinders, etc.), and various handheld tools.

All employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors. Following equipment decontamination, employees may be required to follow the proper personal decontamination procedures above.

For smaller equipment, use the following steps for decontamination:

1. Remove majority of visible gross contamination.
2. Wash equipment in decontamination solution with a scrub brush and/or power wash heavy equipment.

3. Rinse equipment.
4. Visually inspect for remaining contamination.
5. Follow appropriate personal decontamination steps outlined above.

All decontaminated equipment shall be visually inspected for contamination prior to leaving the site. Signs of visible contamination may include an oily sheen, residue or contaminated soils left on the equipment. All equipment with visible signs of contamination shall be discarded or re-decontaminated until clean. Depending on the nature of the contaminant, equipment may have to be analyzed.

8.0 Emergency Response Planning

Emergency Action Plan

Although the potential for an emergency to occur is remote, an emergency action plan has been prepared in accordance with SH&E S3NA-010-PR, Emergency Response Planning for this project should such critical situations arise. The only significant type of on-site emergency that may occur is physical injury or illness to a member of the AECOM team. The Emergency Action Plan (EAP) will be reviewed by all personnel prior to the start of field activities.

Three major categories of emergencies could occur during site operations:

1. Illnesses and physical injuries (including injury-causing chemical exposure)
2. Catastrophic events (fire, explosion, earthquake, or chemical)
3. Safety equipment problems

8.1.1 Emergency Coordinator

The duties of the Emergency Coordinator (EC) include:

- Implement the EAP based on the identified emergency condition
- Notify the appropriate project and SH&E Department personnel of the emergency (Table 9-3)
- Verify emergency evacuation routes and muster points are accessible
- Conduct routine EAP drills and evaluate compliance with the EAP

8.1.2 Site-Specific Emergency Procedures

Prior to the start of site operations, the EC will complete Table 8-1 with any site-specific information regarding evacuations, muster points, communication, and other site-specific emergency procedures. AECOM personnel are required to participate in any evacuation drills scheduled and conducted at the site by site personnel.

Table 8-1: Emergency Procedures

Emergency	Response Procedures		
	Communications	Mitigation/Control	Evacuation
Medical Emergency	If life-threatening, **contact 911** immediately and notify site supervisor.	If qualified, perform First Aid-CPR. Keep victim calm and watch for symptoms of shock. Emergency response personnel will transport victims to hospital.	Do not move victim unless imminent threat (e.g., fire, explosion, chemical exposure, etc.) is present.
Chemical Exposure	Report incident to site supervisor immediately.	Refer to chemical safety card or MSDS for appropriate treatment measures.	Remove individual from danger area.
Other Incident/Near Miss	Report incident to site supervisor immediately. Site supervisor will contact safety department.	For non-life threatening injuries or illness, transport victim to the hospital listed in Figure 9-1.	None anticipated
Severe Weather	Site supervisor will notify personnel via radio when severe weather is approaching or use the following signal:	Allow sufficient time for decontamination and shut down of operations.	If severe weather is imminent, evacuate to the following shelter(s):
Tornado	Site supervisor will notify personnel via radio if severe weather may result in tornado activity **or use the following signal:**	Allow sufficient time for decontamination and shut down of operations.	**Tornado shelter location(s):**
Small Fire* **Less than the size of a small trash can*	Notify site supervisor to **contact 911** immediately. **Notify all personnel to evacuate**	Determine if fire can be safely contained with a fire extinguisher.	See evacuation route map(s). **Exit facility and muster at the following location(s):** **Front of Former Staples Store**
Large Fire/Explosion	Notify site supervisor to **contact 911** immediately. **Notify all personnel to evacuate**	None anticipated. Evacuate immediately.	See evacuation route map(s). **Exit facility and muster at the following location(s):** **Front of Home Depot Store**
Spills/Release	Notify site supervisor. Site supervisor will contact OSC and determine if additional agencies must be notified.	Don Level B PPE (see HASP). Complete THA. Use spill kit and diking procedures to contain spill.	See evacuation route map(s). Exit facility and move upwind at least 1000 feet.
Security Threat	Notify site supervisor. **Contact 911**.	Keep vehicles locked and valuables out of sight.	None anticipated.
Confined Space Emergency	See Permit.	See Permit.	See Permit.

8.1.3 Spill Containment Procedure

Work activities may involve the use of hazardous materials (i.e., fuels, solvents) or work involving drums or other containers. Where these activities exist, a site-specific Spill Reporting Card will be developed (Attachment D). Procedures in SH&E S3NA-117-PR, Hazardous Waste Operations well as those outlined below will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.

At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e., speedy dri) shall be available at each work site (more as needed).

- All hazardous commodities in use (i.e., fuels) shall be properly labeled.
- Containers shall only be lifted using equipment specifically manufactured for that purpose.
- For drums/containers, follow the procedures in S3NA-308-PR, Manual Lifting, Field, to minimize spillage.

8.1.4 Safety Accident/Incident Reporting

All accidents and incidents that occur on-site during any field activity will be promptly reported to the SSO and the immediate supervisor in accordance with SH&E S3NA-004-PR, Incident Reporting, Notifications & investigation. In addition, all work-related injury/illness must be promptly reported to your MDEQ Project Representative.

If any AECOM employee is injured and requires medical treatment, the Site Supervisor will contact the **Regional Safety Manager, AECOM's Incident Reporting Line at (800) 348-5046, and the applicable Area Manager immediately**. The Site Supervisor will initiate IndustrySafe on the AECOM Intranet Safety Site or a written report, using the ***Supervisor's Report of Incident*** form (see S3NA-004-PR). The Site Supervisor will support the PM in the completion of IndustrySafe or the Supervisor's Report of Incident. The incident number or report will then be provided to the Area SH&E Manager before the end of the following shift.

If any employee of a subcontractor is injured, documentation of the incident will be accomplished in accordance with the subcontractor's procedures; however, copies of all documentation must be provided to the SSO within 24 hours after the accident has occurred.

All accidents/incidents will be investigated in accordance with SH&E S3NA-004-PR, Incident Reporting, Notifications & Investigation. Investigation and Review. Copies of all subcontractor accident investigations, whether accomplished in accordance with their own procedures or SH&E 603, will be provided to the SSO within five (5) days of the accident/incident.

8.1.5 Environmental Spill/Release Reporting

All environmental spills or releases of hazardous materials (e.g., fuels, solvents, etc.), whether in excess of the Reportable Quantity or not, will be reported according to the sequence identified in the *Site-Specific Spill Reporting Card*. In determining whether a spill or release must be reported to a regulatory agency, the Site Supervisor will assess the quantity of the spill or release and evaluate the reporting criteria against the state-specific reporting requirements, your applicable regulatory permit, and/or client-specific reporting procedures. In order to support the Site Supervisor and expedite the decision to report to a state regulatory agency, a site-specific Spill Reporting Card will be developed (Attachment D). **If reporting to a state or Federal regulatory agency is required, AECOM has 15 minutes from the time of the spill/release to officially report it.**

Chemical-specific Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Reportable Quantities for chemicals to be brought on-site will be added to Table 8-2. Currently, none are expected.

Table 8-2: CERCLA Reportable Quantities

Hazardous Substance	Regulatory Synonyms	Final RQ (lbs)

CERCLA RQ's can be found at: http://www.epa.gov/oem/docs/er/302table01.pdf.

Table 8-3: Emergency Contacts

Emergency Coordinators / Key Personnel			
Name	**Title/Workstation**	**Telephone Number**	**Mobile Phone**
Carl Hoffman	NYSDEC – Project Manager	(518) 402-9813	
Kelly Lurie	AECOM Project Manager		(518) 542-2944
Stacy Wells	Regional SH&E Manager	(212) 377-8583	(917) 324-2554
Incident Reporting	**Incident Reporting Line**	**(800) 348-5046**	

Organization / Agency	
Name	**Telephone Number**
Police Department (local)	911 or 845-485-3666
Fire Department (local)	911 or 845-451-4079
Ambulance Service ***(EMT will determine appropriate hospital for treatment)***	911
Non-Emergency Clinic ***(Use by site personnel is only for non-emergency cases)***	
OMNI Medical Care	(845) 566-6664
1400 Route 300	
Newburgh, New York 12550	
Non-Emergency Clinic Route: See Figure 8-1; Emergency Clinic Route: See Figure 8-2	
WorkCare Hotline: 24-hr On-Call Occupational Nurse (*minor First Aid assistance only*)	(877) 878-9525
AECOM Incident Reporting Hotline	(800) 348-5046
Poison Control Center	(800) 222-1222
Pollution Emergency	(800) 292-4706
National Response Center	(800) 424-8802
INFOTRAC (*AECOM's account number 74984)*	(800) 535-5053
Tier II or SARA Title III Hot Line	(800) 424-9346
NYC/LI ONE CALL	(800) 272-4480

Utility Clearance	
Name	**Telephone Number**
Common Ground Alliance Nationwide *Call Before You Dig*	811

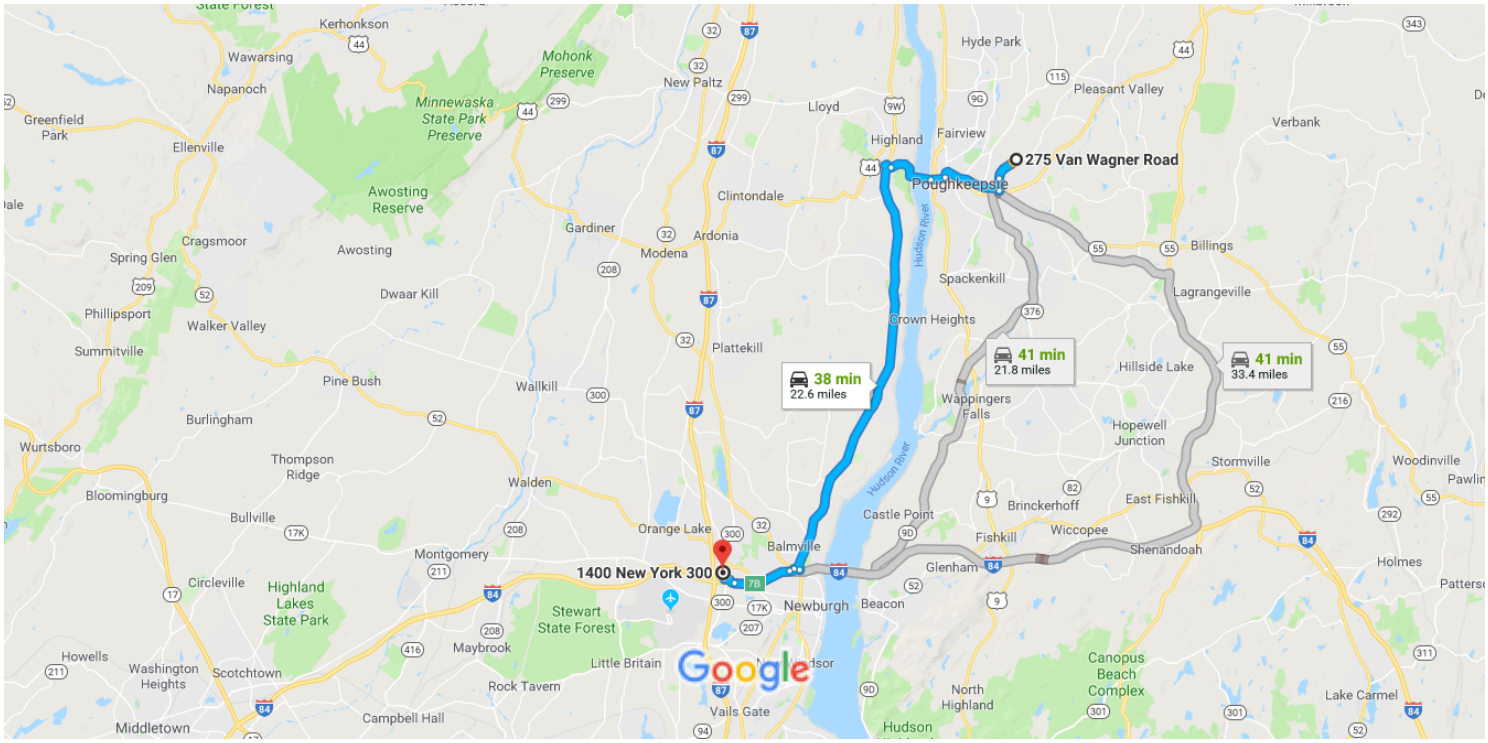
Figure 8-1: Non-Emergency Occupational Medicine Clinic Route/Detail Map

OMNI Medical Care
1400 Route 300
Newburgh, New York 12550
(845) 566-6664

Google Maps

275 Van Wagner Road, Arlington, NY to 1400 NY-300, Newburgh, NY 12550

Drive 22.6 miles, 38 min



Map data ©2018 Google 2 mi

275 Van Wagner Rd

Arlington, NY 12603

Take Van Wagner Rd to East-West Arterial in Arlington

3 min (1.3 mi)

1. Head west on Van Wagner Rd toward Tucker Dr

0.9 mi

2. Continue onto Taft Ave

0.4 mi

Take US-9W S to NY-300 N/Union Ave in Gardnertown. Take exit 7B from I-84

35 min (21.1 mi)

3. Turn right onto East-West Arterial

2.0 mi

4. Use the right 2 lanes to turn slightly right onto Church St/Columbus Dr/East-West Arterial
   Continue to follow Church St

0.5 mi

5. Continue onto US-44 W/Mid-Hudson Bridge
   Continue to follow US-44 W

1.6 mi

6. Keep left at the fork, follow signs for US-9W S/Newburgh and merge onto US-9W S

14.3 mi

7. Turn right onto N Plank Rd

0.2 mi

8. Use the left 2 lanes to turn left onto the I-84 W/NY-52 W ramp

0.2 mi

9. Merge onto I-84/NY-52 W
   Continue to follow I-84

1.9 mi

10. Take exit 7B for NY-300/Union Ave

0.3 mi

11. Keep right at the fork and merge onto NY-300 N/Union Ave

180 ft

12. Merge onto NY-300 N/Union Ave
    Destination will be on the right

28 s (0.2 mi)

1400 NY-300

Newburgh, NY 12550

These directions are for planning purposes only. You may find that construction

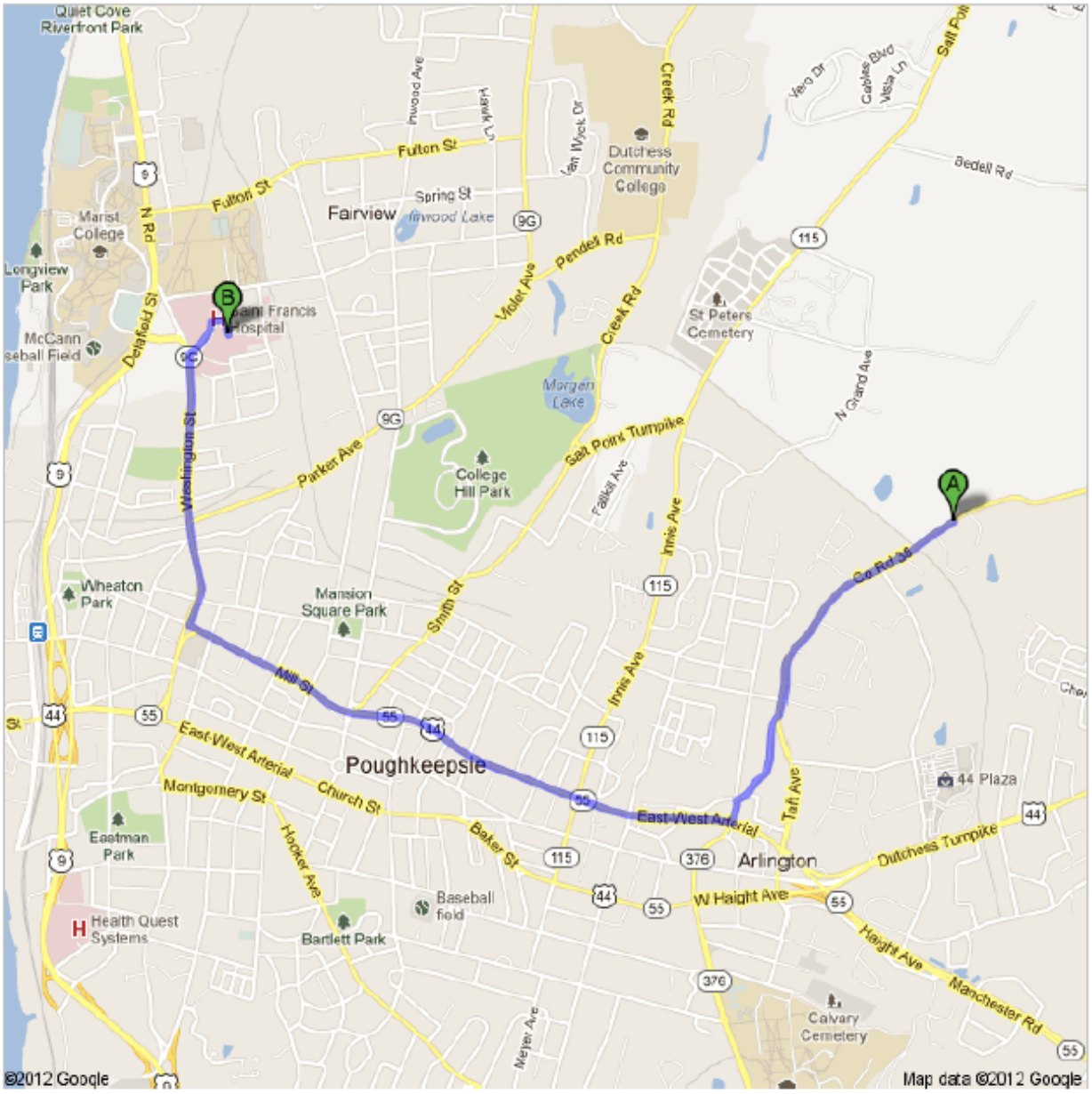
Figure 8-2: Hospital Route Map – for Medical Emergencies
Saint Francis Hospital
241 North Road
Fairview, New York

- Hospital Route/Detail Map

2/1/12 247 Van Wagner Rd, Poughkeepsie, NY 12603 to Saint Francis Hospital - G...

Google

Directions to Saint Francis Hospital
241 North Road, Fairview, New York - (845) 483-5000
3.8 mi – about 8 mins



A 247 Van Wagner Rd, Poughkeepsie, NY 12603

1.	Head **southwest** on **Co Rd 38/Van Wagner Rd** toward **Tucker Dr** About 2 mins	go 1.1 mi total 1.1 mi
2.	Turn left onto **Van Wagner Rd**	go 361 ft total 1.2 mi
3.	Turn right onto **East-West Arterial** About 3 mins	go 1.7 mi total 2.8 mi
4.	Turn right onto **Columbus Dr**	go 400 ft total 2.9 mi
5.	Continue onto **Washington St** About 2 mins	go 0.7 mi total 3.6 mi
6.	Turn right onto **Baker Ave**	go 0.2 mi total 3.8 mi
7.	Turn right Destination will be on the right	go 236 ft total 3.8 mi

B **Saint Francis Hospital**
241 North Road, Fairview, New York - (845) 483-5000

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

9.0 Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has read and reviewed the AECOM Health and Safety Plan for the Dutchess Sanitation (FICA) site. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein.

PRINT NAME	SIGNATURE	ORGANIZATION	DATE

Attachment A
Task Hazard/Job Safety Analyses

Pre-Job Hazard Assessment/ Job Safety analysis

A pre-job hazard assessment or JSA is to be developed for each discrete task planned as part of the project. This assessment lays out the steps of the job, potential hazards, and mitigation measures. Form S3AM-209-FM4 or a client required equivalent may be used.

Task Hazard Assessment

The THA is a handwritten field form which is based on "Stop and Think" as the first thing you do before starting work activities often paired with the daily tailgate meeting or work permit issuance. Not all risks can be anticipated in this HASP or the pre-job hazard assessment process; therefore, the THA is used to assess, mitigate, and document the site-specific conditions and changes to the hazard profile prior to and throughout the work task. Proper implementation of the THA program protects worker health and safety. The THA must be signed by all employees each day and initialed whenever a changed condition provokes a change in hazard controls.

Attachment B

Safety Data Sheets

Attachment C

Equipment Safety Cards

Attachment D

Spill Reporting Card

Attachment E

SH&E Procedures

Appendix K
Responsibilities of Owner and Remedial Party

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Dutchess Sanitation (FICA) Landfill site (the "site"), number 3-14-047, are divided between the site owner(s) and the Remedial Party, as defined below. The owner is currently listed as undetermined due to the previous owners walking away from the property (the "owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

Robert Strang
NYSDEC
DER Project Manager
625 Broadway – 12th Floor
Albany, New York 12233-7017

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In the event the site is delisted, the owner remains bound by the Environmental Notice and shall submit, upon request by the NYSDEC, a written certification that the Environmental Notice is still in place and has been complied with.

3) The owner shall grant access to the site to the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

4) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the NYSDEC in accordance with the timeframes indicated in Section 2.4.2 - Notifications.

5) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the NYSDEC in accordance with the time frame indicated in Section 2.4.2- Notifications and (ii) coordinate the performance of necessary corrective actions with the RP.

6) The owner must notify the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html and have been included as Attachment 4 of this SMP.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html and have been included as Attachment 4 of this SMP.

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 2.4.2 (Notifications) of the SMP.

7) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

8) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

9) In accordance with a periodic time frame determined by the NYSDEC, the RP shall periodically certify, in writing, that all Institutional Controls set forth in the ROD remain in place and continue to be complied with.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.