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Date: March 21, 2022

Our Ref: 30106649

Subject: Westchester Garden Center - Labriola Landfill

Site Characterization Work Plan

NYSDEC Site No. 360218, Standby Contract D009804-24

Dear Brittany O'Brien-Drake,

As discussed with the NYSDEC project team, Arcadis of New York, Inc. (Arcadis) has prepared this Site Characterization (SC) Work Plan to support the characterization for the Westchester Garden Center (WGC) - Labriola Landfill (the "Site") in the Town of North Castle, Westchester County, New York (Figure 1). The scope of the site characterization activities is presented below.

## 1. Introduction and Background

### 1.1 History

The Site is an approximately 7-acre property along Wampus Lake Drive in North Castle. The Site is a former landfill located within a residential neighborhood. It consists of the vegetated post-closure landfill cover surrounded by wooded land. The Site is bordered on the northwest and southwest by Wampus Lake Drive and on the northeast by the Westchester Garden Center.

The inactive landfill occupies approximately 3.5 acres of the middle portion of the Site. Historical operation of the landfill occurred from about 1954 to 1974 as an open-faced dump with a waste mass between 30 and 40 feet high, primarily accepting lumber and building debris. In 1979, the owner applied for a permit to receive construction and land clearing debris, however no information was found confirming if disposal of this type of waste occurred. A landfill closure plan was approved in May 1981 which included post-closure monitoring for five years and erosion control measures. However, it is unknown the extent to which this plan was implemented.

In May 2019, the NYSDEC's Division of Materials Management conducted Emerging Contaminant (EC) sampling under the Inactive Landfill Initiative. This sampling included the collection of one groundwater sample from an existing downgradient monitoring well. The analytical results showed the presence of perfluorooctanoic acid (PFOA) at 34 parts per trillion (ppt) and perfluorooctanesulfonic acid (PFOS) at 21 ppt. Samples were also analyzed for 1,4-dioxane, but it was not detected above the reporting limit. PFOA and PFOS were detected in nearby residential and commercial water supply wells. The potential for this contamination to be attributable to

past Site operations or subsequent uncontrolled discharges from the landfill is the subject of the currently-proposed site characterization activities.

## 1.2 Scope of Work

Arcadis will perform the following site characterization activities at and around the WGC Site:

- Monitoring well installation;
- Soil sampling from the monitoring well borings;
- Redevelopment of existing wells;
- Groundwater sampling;
- Seep sampling;
- Sediment sampling; and
- Surface water sampling.

Samples will be analyzed to detect the presence of contaminants including emerging contaminants (ECs), specifically perfluorinated alkyl substances (PFAS) and 1,4-dioxane. Subsequently, data from the SC activities will be compiled and analyzed, and recommendations for subsequent investigations or other actions, if indicated to be necessary, will be made. An SC Report will be prepared to document the SC activities and the results thereof.

## 1.3 Preliminary Groundwater Sampling

Arcadis conducted a preliminary groundwater sampling event in October 2021 at three existing onsite monitoring wells (Figure 2) to assess the presence of PFAS and 1,4-dioxane. Samples were also analyzed for Target Analyte List (TAL) Metals and mercury, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and general chemistry analytes (chloride, sulfate, nitrate as N, phenolics, and total dissolved solids).

The analysis of the groundwater samples from this event were conducted by NYSDEC's standby laboratory, Eurofins TestAmerica. The results indicated that the groundwater at the site exceeded the proposed NYSDEC Ambient Water Quality Guidance Values for PFOA and PFOS at each of the three locations. One or more groundwater samples exceeded the NYSDEC Class GA Standards for iron, manganese, and sodium. None of the samples showed concentrations of VOCs, SVOCs, PCBs, or general chemistry analytes exceeding NYSDEC Class GA Standards.

## 1.4 Access

The NYSDEC will work with the property owners or the Town, as applicable, to permit access to locations where monitoring wells will be installed. To the extent practicable, the new monitoring wells will be located on the right-of-way of the roads and in areas which will require minimal disturbance to existing infrastructure, vegetation or landscaping. If necessary, Arcadis will conduct limited clearing activities to access proposed monitoring well locations. Clearing activities may include the use of a machete or saw. Arcadis does not intend, nor will be responsible for, the removal of trees or large shrubs.

## 2. Site Characterization

The installation of monitoring wells and environmental sampling (Figure 3) within and adjacent to the Site will assist in determining if the site poses a significant threat to public health and or the environment. Laboratory

analytical services for the characterization will be performed by a standby laboratory under contract with the NYSDEC. The following sections outline the specific SC activities that are planned.

## **2.1. Geophysical Survey**

Arcadis will subcontract with a geophysical survey firm to evaluate subsurface conditions at the proposed monitoring well locations. The geophysical surveyor will locate, mark, and map buried utilities and structures within the vicinity of the proposed monitoring well locations prior to drilling activities. Using the results of the geophysical survey, the subcontractor and Arcadis will identify potential points of conflict between existing surface and subsurface structures/utilities and the locations proposed for new monitoring wells. Geophysical survey reports will be produced following completion of field work activities and adjustments to the drilling locations will be made, if necessary.

## **2.2. Land Survey**

Arcadis will retain a land surveyor licensed in New York State to complete survey work at the Site. The surveyor will create base mapping to be used throughout the site characterization process and future investigations, if warranted. This will include:

- Surveys to locate and identify property boundaries and significant natural site features;
- The establishment of horizontal and vertical control points;
- The locating of constructed/physical features, including existing monitoring wells; and
- Surveys to locate the newly-installed monitoring wells, and sediment, surface water, and seep sampling locations.

This work will occur in multiple mobilizations, as needed.

## **2.3. Community Air Monitoring Program**

In accordance with the New York State Department of Health (NYSDOH) generic community air monitoring plan (CAMP) guidelines, a CAMP will be implemented during all intrusive activities at the Site. Two CAMP stations will be utilized for this work, one positioned upwind and the other downwind of the intrusive work. The CAMP stations will monitor for VOCs and air particulates/dust using PIDs and aerosol monitors, respectively.

## **2.4. Groundwater Monitoring Wells**

### **2.4.1. Installation of New Monitoring Wells**

The SC work includes the installation and development of five new groundwater monitoring wells and the redevelopment of the three existing wells to assess groundwater quality at and in the vicinity of the Site. This work will be performed by a water well drilling subcontractor licensed by the state of New York. The drilling subcontractor will also be responsible for conducting an underground utility clearance (Dig Safely New York) and

will be required to submit all utility clearance ticket numbers and related correspondence to Arcadis prior to the start of their subsurface investigatory work.

Locations for the new wells will be hand-cleared to a depth of 5 feet below ground surface (bgs) by the driller, unless otherwise instructed by Arcadis. Drilling will include PFAS-free continuous core sampling from the surface to the total depth of the boring, or as specified by Arcadis. The borings will be collected, characterized, screened with a photo-ionization detector (PID), and visually and olfactory screened. Soil samples will be collected from the new overburden monitoring well locations during installation. These samples will be analyzed to detect the presence of PFAS and a subset (minimum of 20 percent [%]) will also be analyzed for TAL Metals plus mercury and cyanide, VOCs, SVOCs including 1,4-dioxane, PCBs, pesticides, and herbicides. Arcadis anticipates that these soil samples will be collected:

- In the depth interval of 0 to 2”;
- In the depth interval of 2” to 12”;
- At the air/water interface; and
- At refusal or at the rock interface, if encountered.

Soil samples from the 2” to 12” interval will also be analyzed using the Synthetic Precipitation Leaching Procedure (SPLP) for PFAS, pH, and total organic carbon (TOC). Table 1 summarizes the intervals and analyses planned for the soil samples.

New monitoring wells MW-4S, MW-5, MW-6S, MW-7S, and MW-8 will be installed using 4-inch sonic drilling methods. The five new wells will be 2-inch monitoring wells, constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) risers, with 10-foot-long machine-slotted Schedule-40 PVC screens with a screen slot size of 0.010-inch. The monitoring wells will be installed to the overburden/bedrock interface with assumed depths ranging from approximately 40 feet to 80 feet bgs. Each well will be sealed using a minimum 2-foot thick layer of hydrated bentonite above a #00 morie sand screen filter pack, with the remainder of the annulus grouted to the ground surface with a cement-bentonite grout. Four of the five wells (MW-4S, MW-5, MW-6S, and MW-8) will be completed as flush-mount wells with 6-inch diameter steel protective curb boxes installed in concrete surface pads. MW-7S will be a “stickup” well (minimum 2-foot stickup) completed at the surface with a 4-inch steel stickup protector installed in a concrete surface pad.

The driller will also decontaminate drilling equipment between well locations with a steam cleaner or equivalent.

The driller will provide the equipment necessary to develop the five new monitoring wells via over-pumping and surging with a submersible pump to remove fines from the groundwater, as guided by Arcadis’ onsite personnel. Development of the five new monitoring wells will occur, at minimum, 48 hours after installation. Water quality parameters will be recorded during development and the process will be completed when turbidity is measured at or below 50 Nephelometric Turbidity Units (NTU).

#### **2.4.2. Redevelopment and Repair of Existing Monitoring Wells**

The three existing onsite monitoring wells will be redeveloped, provided enough water is present in them to allow it and the driller will attempt to remove the existing down-well equipment from MW-2. As necessary, a down-well camera may be used to identify the nature of the existing equipment in MW-2 to assist with the determination of the preferred removal process. Repairs to the wells, their covers or their protective casings will be conducted. In a similar manner as proposed for the new monitoring wells, the driller will provide the equipment necessary to redevelop the existing monitoring wells via over-pumping, as guided by the Arcadis onsite personnel. Water

quality parameters will be recorded during development. Equipment will be decontaminated between well locations and decontamination water will be contained in drums.

### **2.4.3. Groundwater Sampling**

Following installation and development of the five new monitoring wells, and redevelopment of the three existing monitoring wells, Arcadis will remobilize to site after one month and collect groundwater samples from the eight wells. Groundwater sampling will be conducted using low-flow sampling techniques in accordance with Arcadis' Generic Field Activities Plan (FAP) for the NYSDEC Standby Engineering Services Contract. Groundwater samples will be analyzed for PFAS and a subset of samples (minimum of 20%) will also be analyzed for TAL Metals (mercury and cyanide), VOCs, SVOCs including 1,4-dioxane, PCBs, pesticides, and herbicides (see Table 2). Analytical results will be utilized to assess groundwater quality at and in the vicinity of the Site.

## **2.5. Seep and Sediment Sampling**

Co-located surface water and sediment samples will be collected from five locations near the Site. Surface water and sediment samples will be analyzed for PFAS, and a subset of the samples will also be analyzed for TAL Metals (mercury and cyanide), VOCs, SVOCs including 1,4-dioxane, PCBs, pesticides, and herbicides. Sediment samples will also be analyzed for TOC.

Two seep (surface water) samples will be collected from locations at or near the toe of the landfill where identifiable daylighting of subsurface water is occurring. Both seep samples will be analyzed for PFAS, TAL Metals (mercury and cyanide), VOCs, SVOCs including 1,4-dioxane, PCBs, pesticides, and herbicides.

## **2.6. Data Validation**

To determine and confirm the quality of the laboratory data developed during the SC, Arcadis will submit the laboratory data packages to a data validation subcontractor for preparation of Data Usability Summary Reports (DUSRs). Subsequently, the validated data will be uploaded into the NYSDEC's EQUIS data management system.

## **2.7. Investigation-Derived Waste (IDW) Drums/Disposal**

Potential wastes generated during the SC include monitoring well installation drill cuttings, spent consumable sampling supplies and equipment, decontamination materials, decontamination water, purged groundwater and other materials. These will be containerized in 55-gallon steel, UN-approved drums and temporarily placed on pallets in a staging area located on or adjacent to the landfill. Materials generated during the site characterization activities shall be characterized and categorized for disposal. Materials will be sampled and analyzed using the Toxicity Characteristic Leaching Procedures (TCLP) for VOCs, SVOCs, metals and mercury, PCBs, pesticides and herbicides. They will also be analyzed for corrosivity, reactivity, ignitability, and pH. Depending on the results of these analyses, the materials may be transported to a permitted facility for offsite disposal or, in the case of accumulated liquid and soil containing contaminants at levels not exceeding applicable standards, disposed onsite.

Brittany O'Brien-Drake  
NYSDEC Site No. 360218  
March 21, 2022

### 3. Reporting

Following receipt of validated data from the SC, Arcadis will upload the laboratory analytical data to the NYSDEC EQUIS database. In addition, Arcadis will prepare an SC Report documenting the work performed and compiling and analyzing the data from the SC activities. Recommendations for subsequent investigations or other actions regarding the Site, if indicated to be necessary, will be made.

Please contact me at (518) 250-7309 or David.Hiss @arcadis.com if you have any questions or need additional information.

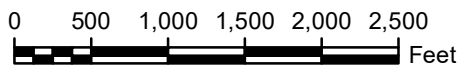
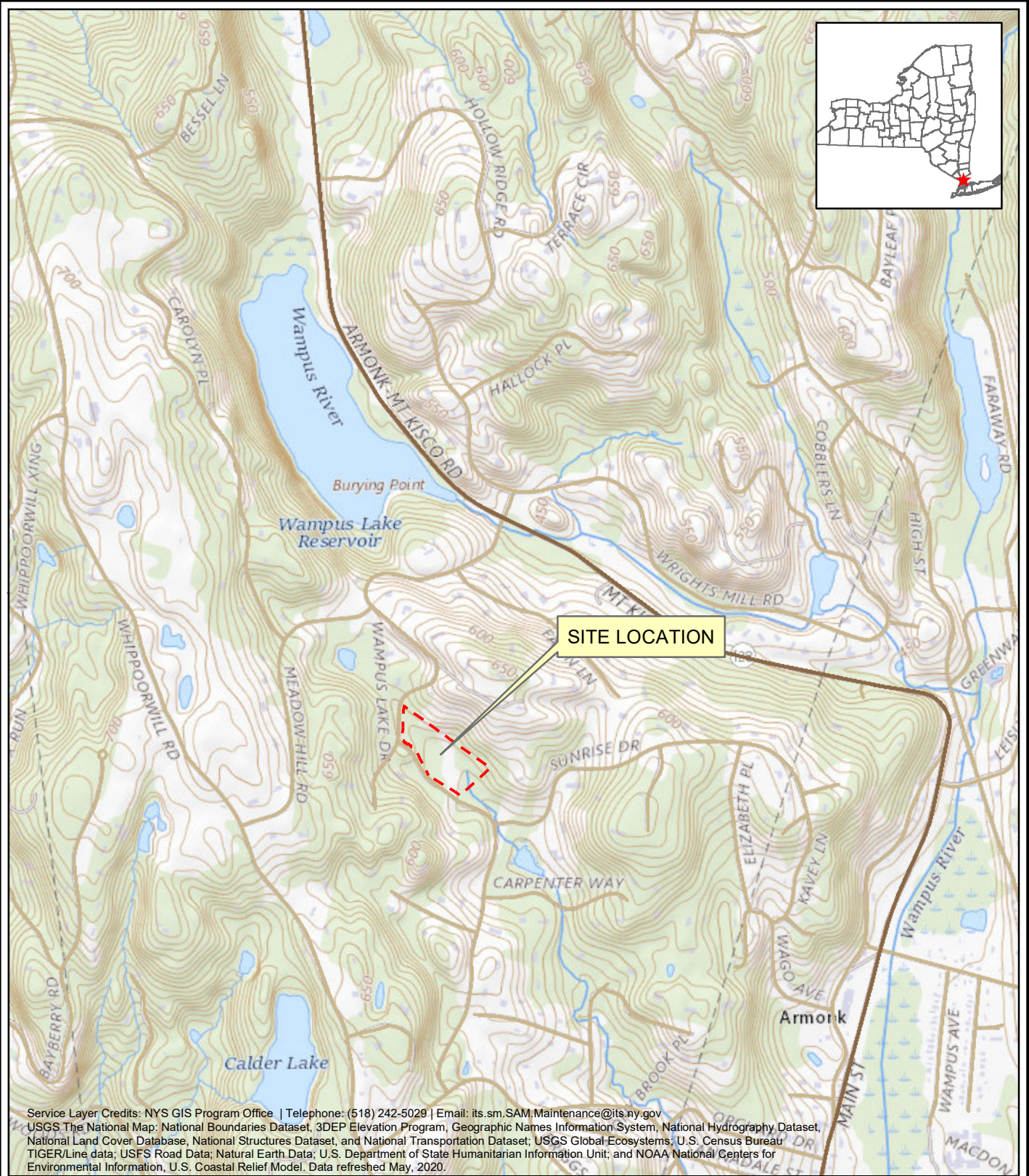
Sincerely,  
Arcadis of New York, Inc.

David Hiss, P.E., BCEE  
Principal Engineer

CC. Erica Hausamann – NYSDEC  
Jasmine Mullins E.I.T. – Arcadis  
Andy Vitolins P.G. – Arcadis

Enclosures:

- Figure 1 – Site Location
- Figure 2 – Site Map
- Figure 3 – Proposed Sampling Locations
- Table 1 – Proposed Soil Samples
- Table 2 – Proposed Groundwater Samples



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
 Westchester Garden Center Labriola Landfill Site #360218  
 Armonk, New York

**SITE LOCATION**

**Legend**


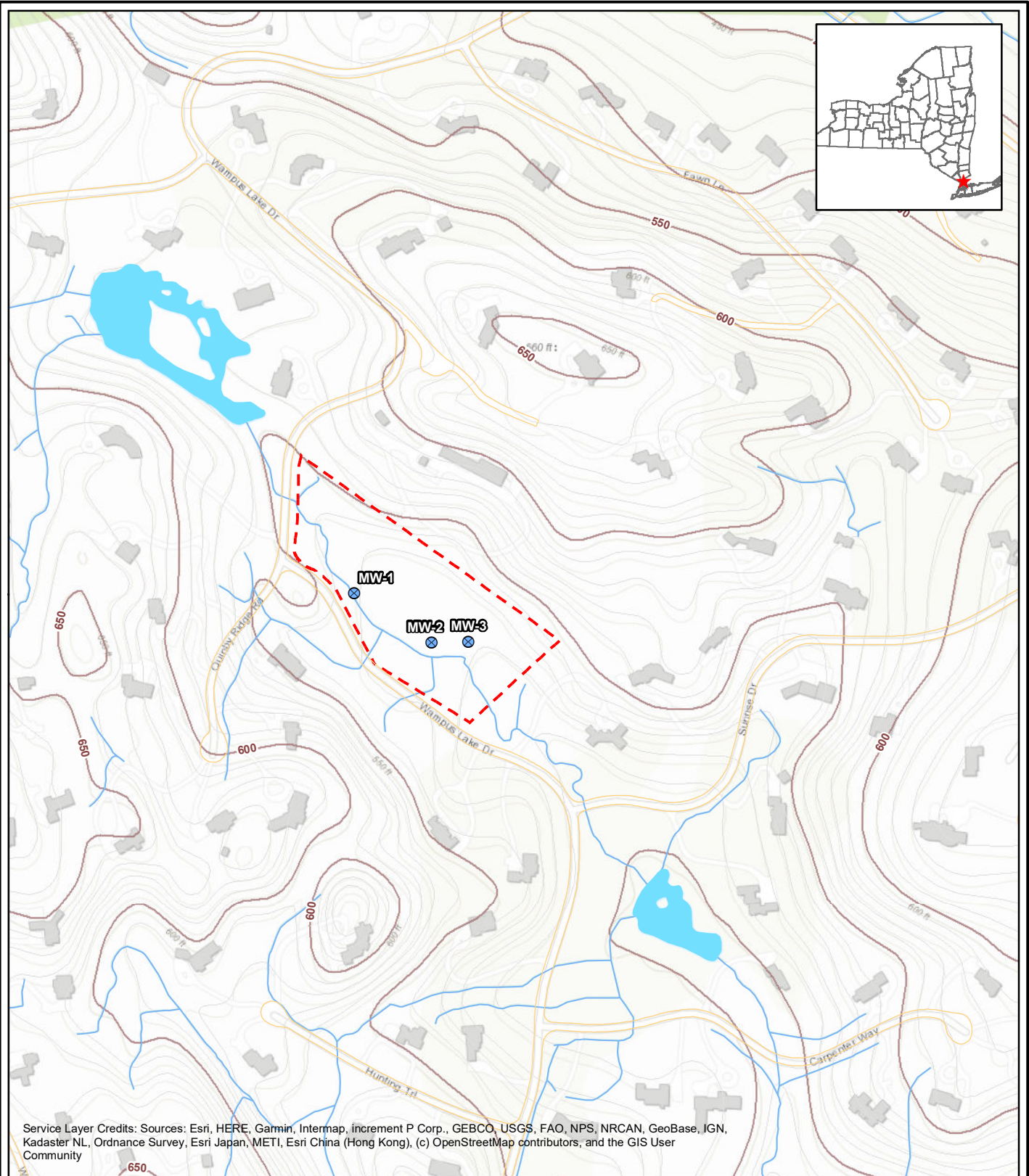
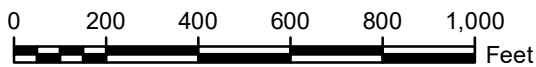
 Westchester Garden Center Labriola Landfill (Approximate)



FIGURE  
**1**



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



**Legend**

- - - Westchester Garden Center Labriola Landfill (Approximate)
- Approximate Monitoring Well
- Elevation Contour (feet amsl)



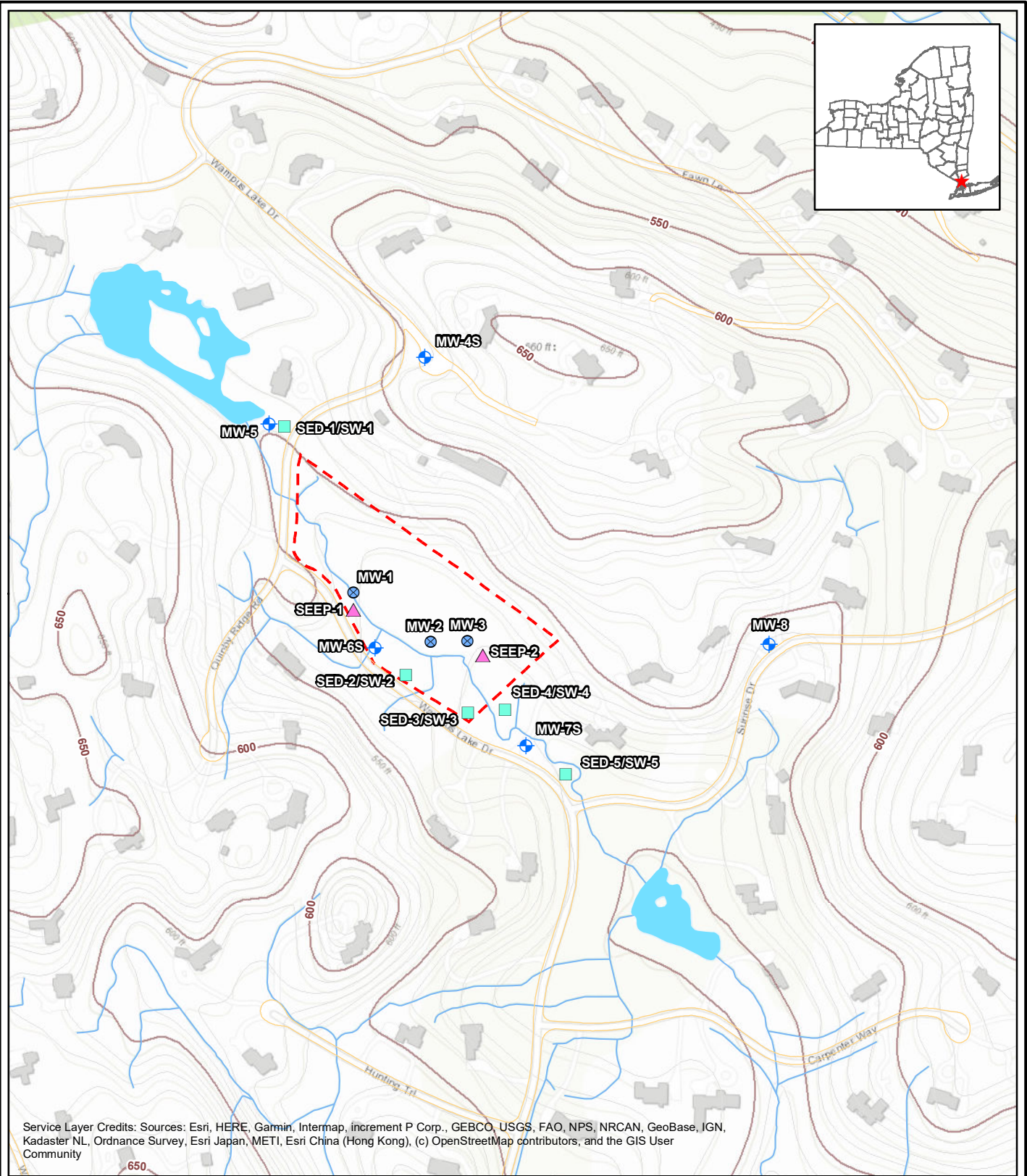
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
 Westchester Garden Center Labriola Landfill Site #360218  
 Armonk, New York  
**SITE CHARACTERIZATION**

**SITE MAP**



**FIGURE  
2**





Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



**Legend**

Westchester Garden Center Labriola Landfill (Approximate)

Approximate Monitoring Well

Elevation Contour (feet amsl)

**Proposed Locations**

Monitoring Well

Sediment/Surface Water Samples

Seep Sample



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
 Westchester Garden Center Labriola Landfill Site #360218  
 Armonk, New York  
**SITE CHARACTERIZATION**

**PROPOSED SAMPLING LOCATIONS**



FIGURE  
**3**

Table 1. Proposed Soil Samples  
 Westchester Garden Center Labriola Landfill  
 Site No. 360218

ID	Location	X	Y	Elevation	Proposed Depth (ft-bmp)	Proposed Sampling Interval(s) (ft-bmp)	2022 Site Characterization Analytes
MW-1	Landfill	TBD	TBD	TBD	N/A	N/A	N/A
MW-2	Landfill	TBD	TBD	TBD	N/A	N/A	N/A
MW-3	Landfill	TBD	TBD	TBD	N/A	N/A	N/A
MW-4S	North of Landfill	TBD	TBD	TBD	40	0-2"	PFAS
						2-12"	PFAS, TAL Metals plus Mercury and Cyanide, VOCs, SVOCs including 1,4-Dioxane, PCBs, Pesticides, Herbicides, SPLP PFAS, SPLP pH, SPLP TOC
						Air/Water Interface	PFAS
						Refusal or Rock Interface	PFAS
MW-5	Northwest of Landfill	TBD	TBD	TBD	80	0-2"	PFAS
						2-12"	PFAS, SPLP PFAS, SPLP pH, SPLP TOC
						Air/Water Interface	PFAS, TAL Metals plus Mercury and Cyanide, VOCs, SVOCs including 1,4-Dioxane, PCBs, Pesticides, Herbicides
						Refusal or Rock Interface	PFAS
MW-6S	West of Landfill	TBD	TBD	TBD	60	0-2"	PFAS
						2-12"	PFAS, TAL Metals plus Mercury and Cyanide, VOCs, SVOCs including 1,4-Dioxane, PCBs, Pesticides, Herbicides, SPLP PFAS, SPLP pH, SPLP TOC
						Air/Water Interface	PFAS
						Refusal or Rock Interface	PFAS
MW-7S	Southeast of Landfill	TBD	TBD	TBD	60	0-2"	PFAS
						2-12"	PFAS, SPLP PFAS, SPLP pH, SPLP TOC
						Air/Water Interface	PFAS
						Refusal or Rock Interface	PFAS, TAL Metals plus Mercury and Cyanide, VOCs, SVOCs including 1,4-Dioxane, PCBs, Pesticides, Herbicides
MW-8	East of Landfill	TBD	TBD	TBD	60	0-2"	PFAS
						2-12"	PFAS, SPLP PFAS, SPLP pH, SPLP TOC
						Air/Water Interface	PFAS, TAL Metals plus Mercury and Cyanide, VOCs, SVOCs including 1,4-Dioxane, PCBs, Pesticides, Herbicides, SPLP PFAS, SPLP pH, SPLP TOC
						Refusal or Rock Interface	PFAS

**Notes**

1. Monitoring wells MW-1, MW-2, and MW-3 are existing wells thus soil sampling will not be conducted.

**Definitions**

" - inches

bmp - below measuring point

ft - feet

mg/L - milligram per liter

N/A - not applicable

PCBs - Polychlorinated Biphenyls

PFAS - Perfluorinated Alkyl Substances

SPLP - Synthetic Precipitation Leaching Procedure

SVOCs - Semi-volatile Organic Compounds

TAL - Target Analyte List

TBD - To Be Determined

TOC - Total Organic Carbon

VOCs - Volatile Organic Compounds

Table 2. Proposed Groundwater Samples  
 Westchester Garden Center Labriola Landfill  
 Site No. 360218

ID	Location	X	Y	Elevation	Previous Sampling Event	Previous Analytes	Previous Sampling Event Exceedances	2022 Site Characterization Analytes
MW-1	Landfill	TBD	TBD	TBD	10/2021	PFAS, 1,4-Dioxane, TAL Metals, VOCs, PCBs	PFAS, Iron, Manganese, Sodium	PFAS
MW-2	Landfill	TBD	TBD	TBD	10/2021	PFAS, 1,4-Dioxane, TAL Metals, SVOCs, VOCs, PCBs	PFAS, Iron	PFAS
MW-3	Landfill	TBD	TBD	TBD	10/2021	PFAS, 1,4-Dioxane, TAL Metals, SVOCs, VOCs, PCBs	PFAS, Iron	PFAS
MW-4S	North of Landfill	TBD	TBD	TBD	N/A	N/A	N/A	PFAS, TAL Metals plus Mercury and Cyanide, SVOCs including 1,4-dioxane, VOCs, PCBs, Pesticides, Herbicides
MW-5	Northwest of Landfill	TBD	TBD	TBD	N/A	N/A	N/A	PFAS, TAL Metals plus Mercury and Cyanide, SVOCs including 1,4-dioxane, VOCs, PCBs, Pesticides, Herbicides
MW-6S	West of Landfill	TBD	TBD	TBD	N/A	N/A	N/A	PFAS, TAL Metals plus Mercury and Cyanide, SVOCs including 1,4-dioxane, VOCs, PCBs, Pesticides, Herbicides
MW-7S	Southeast of Landfill	TBD	TBD	TBD	N/A	N/A	N/A	PFAS, TAL Metals plus Mercury and Cyanide, SVOCs including 1,4-dioxane, VOCs, PCBs, Pesticides, Herbicides
MW-8	East of Landfill	TBD	TBD	TBD	N/A	N/A	N/A	PFAS, TAL Metals plus Mercury and Cyanide, SVOCs including 1,4-dioxane, VOCs, PCBs, Pesticides, Herbicides

**Definitions**

bmp - below measuring point

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