EARTH
ENVIRONMENT
Engineering and Geology P.C.

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New York State Department of Environmental Conservation
625 Broadway, 12th Floor
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Subject: **Surface Geophysical Scope of Work**
Client ref.: **W.F. Lake Corporation – NYSDEC Site No. 558042**

Dear Brittany:

Earth Environment Engineering & Geology is pleased to provide you this proposal for additional investigation services at the WF Lake Corporation site (Site) located in Queensbury, NY. These services will aid in subsurface characterization and provide information to support monitoring well placement to evaluate data gaps. To aid in this evaluation, we propose a photolineament analysis and surface geophysical survey within the WF Lake area of investigation (Figure 1).

A photolineament analysis will identify surface expression of subsurface features (i.e., fractures/faults) which will provide information on potential preferential pathways capable of transporting impacted groundwater from the site. The data from the photolineament will be used to identify areas to conduct electrical resistivity tomography (ERT). This combined evaluation will be used evaluate bedrock topography and assist in identifying potential bedrock fractures/joint sets that may act as preferential pathways for contaminant migration. These data will be correlated to refine the bedrock conceptual site model (CSM) and aid in monitoring well placement.

Synoptic water level data from existing monitoring wells has identified several downward vertical gradients in groundwater between overburden and bedrock, a key component of the CSM. However, incorporating the gradient data requires a more refined bedrock model that includes the location of bedrock fractures or joints and accurate bedrock topography.

EEEG will use in-house geophysical resources to execute the geophysical program. A total of four ERT locations are proposed throughout the investigation area and are shown in Figure 1. These locations are aligned to encompass data gaps and provide information on overburden stratigraphy and bedrock topography. Line placement is based on the location of existing wells, the location of potential sources of interference, and available property access. Due to the potential for multiple fracture/joint set trends in bedrock, transects are oriented such that these bedrock features, if present, are traversed by one or more profiles with several intersecting transects to provide confirmation.

ERT is performed by transmitting a very low amperage direct current (DC) electrical current in the subsurface between stainless steel electrodes spaced equally along a profile. The subsurface current flow is mapped by measuring the electrical potential at the ground surface using a high-sensitivity resistivity meter. The ERT method is commonly used to image unconsolidated sediments/layering, freshwater/high total dissolved solids (TDS) transition, near-surface geologic stratigraphy, bedrock fractures, and air-filled and clay-filled voids. These features represent zones of variable electrical resistance, and by mapping the flow of electrical current throughout the subsurface, it is possible to image the lateral and vertical distribution of these features.

EEEG equipment used for this investigation will include an Advanced Geosciences, Inc. (AGI) Super Sting R-8 eight channel DC resistivity meter with stainless steel electrodes for the survey array. Resistivity profiles will be positioned to facilitate the desired depth of investigation (approx. 120 ft) and resolution. A single profile will be comprised of up to 84 electrodes with electrode spacing determined by the available profile length and anticipated depth of investigation and resolution. Some transects may consist of more than one segment of 84 electrodes by moving one-half of the deployed array and overlapping in an effort to extend the effective length of coverage without reducing the desired depth of investigation or resolution. Prior to collection, tests will be performed in the field to determine if there is sufficient electrical coupling between the electrodes and soil. This will aid in identifying issues that may result in electrical "noise" or areas requiring further attention prior to data collection.

The following geophysical transects and rationale for placement are proposed:

- Line 1 (1,600 feet) – Extends coverage north of MW-13, which has been identified as a hydraulically upgradient area from the site. Provides additional information between MW-5S and area north along surface water body flowing past site. Length can be adjusted to intersect potential incised bedrock valley at MW-9 and MW-14.
- Line 2 (1,900 feet) – Designed to intersect possible incised valley between MW-9 and MW-14 and further characterize the overburden and bedrock geology northeast of the site where groundwater is likely discharging to surface water. Profile also designed to refine the shape/orientation of the bedrock valley as inferred from drilling at these two locations.
- Line 3 (2,500 feet) – Close the data gap in bedrock topography east of the site and between the site and receptors along Dean Road. Designed to avoid potential interference from utilities with a length sufficient to image at least 120 ft with bedrock at approximately 60 ft bgs.
- Line 4 (2,400 feet) - East-West profile designed to evaluate bedrock and overburden downgradient from the site between MW-11 and MW-15. Oriented to intercept the southern flowpath and discharge area at Unnamed Stream to the south and intersect with Line 3 to the east for correlation of results.

Yours sincerely,

Brian Havens
Project Manager

Christopher Buckman
Technical Lead

Encl. Figure 1 – Proposed Geophysical Lines

Document:\\corp.pbwan.net\glb-e&i\US\USPWM100-PLD2\Project\Projects\NYSDEC__General NYSDEC Information D009809\Database\GIS\WF Lake GIS\Map Documents\WF_Lake_Sample_Locations_11x17LS.mxd PDF: \\corp.pbwan.net\glb-e&i\US\USPWM100-PLD2\Project\Projects\NYSDEC__General NYSDEC Information D009809\Database\GIS\WF Lake GIS\Figures\2024\Figure 1 - Site Map & Sampling Locations.pdf 01-02-2025 3:39 PM madison.bolduc

Service Layer Credits: NYS ITS Geospatial Services, Westchester County GIS (2022)

Line 1

Line 2

Line 3

Line 4

MW-13S
MW-13D
MW-13BR1
MW-13BR2
MW-14
SW-07
MW-9
SB-10
SW-06
MW-5
SB-09
MW-4
MW-4S
MW-4D
SW-05
MW-2
MW-1
MW-12
MW-3
MW-7S
MW-7D
MW-10S
MW-10BR1
MW-10BR2
SB-11
SB-12
SB-14
MW-6S
MW-6"D"
MW-8S
MW-8"D"
SB-15
SB-13
SB-16
SB-17
MW-11S
MW-11D
MW-11BR1
MW-11BR2
MW-15S
MW-15D
SW-03
SW-08
SB-18
SW-04

Park Road

Route 52

Unnamed Stream

Unnamed Stream

Legend

- Monitoring Well Location
- Surface Water Sample Location
- Soil Boring Sample Location
- Stream
- Approximate Property Boundary

N

0 200 400 Feet

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NYSDEC Site # 558042
W.F. Lake Corporation
Glens Falls, New York

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Site Map & Sampling Locations

Project 3616216155 Figure 1