Pre-Interim Remedial Design Investigation
Sampling and Analysis Plan
837 Bailey Avenue Offsite IRM
NYSDEC Site No. C915298A
Buffalo, New York

Prepared for: New York State Department of Environmental Conservation (NYSDEC)

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Issue Date: June 18, 2020

1 Objective

This Sampling and Analysis Plan (SAP) was prepared for pre-design investigation activities associated with the off-site residential and commercial properties (the Site) surrounding the 837 Bailey Avenue property. The Site includes soil in areas impacted and potentially impacted by historical activities at the 837 Bailey Avenue property (see Figure 1). This SAP will be implemented in areas designated for sampling and or interim remedial action by NYSDEC. The objective of the investigation is to determine the presence of lead and arsenic contamination in soil. Up to 10 property parcels on the south side of the 837 Bailey Avenue property will be sampled to determine whether contaminants related to historical activities on the 837 Bailey Avenue property are present and warrant cleanup. Up to seven property parcels on the north side of the 837 Bailey Avenue property will be sampled to characterize the lateral and vertical extent of lead and arsenic contamination in soil to determine the extent of excavation required to meet the remediation goals set forth by NYSDEC.

This SAP was prepared for the collection of design data at properties listed in Table 1. Properties will only be sampled if access has been granted by the property owner. This SAP shall remain applicable for all remaining properties potentially affected by prior operations at 837 Bailey Avenue unless otherwise amended.

2 Pre-sampling Activities

Prior to initiating on-site activities, E & E and NYSDEC will attempt to contact each property owner to obtain signed access permission for pre-design activities. Only properties for which the owner has granted written access permission will be entered upon for sampling and surveying purposes. E & E will track the status of property access agreements.

Property owners will be contacted by letter to request access for the purpose of developing remedial designs. This SAP will also be implemented for possible future phases of the project to be determined. Parcels selected for design during each phase of work will be approved by NYSDEC prior to contact.

Prior to sampling, property owners who have previously agreed to sampling will be contacted to inform them of the proposed schedule, discuss any property access restrictions (such as opening gates when dogs are present), and determine whether any private utilities may be present. In the case of tenants, E & E will encourage property owners to inform tenants of planned soil sampling activities.

Other pre-remedial design activities will include:

- Surveying of property boundaries, features, and topography by E & E's subcontractor (Ravi Engineering and Land Surveying, P.C.), applicable to all properties;

- Photo documentation of the properties by E & E, applicable to all properties;
- Interior and exterior structural inspections by a subcontracted structural engineer (Lu Engineering), applicable only to properties being prepared for interim remedial action;
- Shrub and plant inventories by E & E, applicable to only properties being prepared for interim remedial action; and
- As needed, tree inventories and evaluation by E & E's subcontractor, applicable to only properties being prepared for interim remedial action.

E & E's subcontractor, LaBella Associates, will provide direct-push sampling services and will be responsible for contacting Dig Safely New York to request mark-out of underground utilities prior to beginning intrusive activities, in accordance with New York Code Rule 753.

During the implementation of the pre-design investigation activities, E & E's field team leader will be present to oversee sampling and to coordinate directly with property owners and address any concerns. E & E's public outreach coordinator will be available to respond to inquiries from property owners prior to, during, and after the investigation.

3 Soil Core Sampling Locations

3.1 Pre-design Sample Cores

Proposed design-level sampling locations will be determined initially by establishing a 30- by 30-foot grid on a map of each parcel. The size of the grid meets the requirements of NYSDEC's DER-10 guidance, Section 5.4(b), which calls for post-excavation confirmation sampling on a grid no larger than 900 square feet (NYSDEC 2010). One soil core will be collected from each 900-square-foot gird area; however, locations may be moved or removed based on the presence of structures, surface obstructions, etc. Additional sample locations will be added where property owners have indicated a concern regarding possible preservation of site features such as trees, planting areas, patios, etc. Final sampling locations will be determined in the field by E & E's field team leader based on these considerations as well as actual conditions encountered.

All pre-design soil core locations will be identified with a unique identifier and marked in the field for later surveying by E & E's surveying subcontractor.

4 Sampling and Analysis

4.1 Pre-design Sample Collection

Pre-design soil cores will be collected using disposable plastic core tubes (e.g., Geoprobe MacroCore® tubes), which will be driven into the ground using either direct-push technology (Geoprobe 66DT or equivalent) or manually. In instances where access to a sampling location is limited (such as in the vicinity of trees, between structures and fences, etc.), soil cores will be collected manually with hand augers or with the assistance of portable direct-push tooling. Where necessary as determined by E & E's field team leader, protective mats will be placed on non-paved areas to protect grass/soil areas from damage from the direct-push technology equipment to the extent practicable. The soil cores will be driven to a depth of 4 feet where possible. Soil samples will be collected from each core at the following intervals, all measured in **inches** below grade:

0-3	3-6	6-9	9-12	12-18	18-24

For all soil cores, if soil recovery is less than 75% in an individual core tube, at least two more attempts will be made within 3 feet of the marked sample location to obtain cores with adequate soil recovery for sample collection. After collecting each core, the tube will be capped and taken to a nearby sample-processing area. The soil in the top 24 inches will be visually classified and logged by a qualified professional. The field team will sub-sample the top 24 inches of the core in the intervals described above, maintain the chain- of-custody, and package the samples for the laboratory.

Soil samples collected to a depth of 24 inches will be submitted to the laboratory for analysis. The soil below 24 inches will remain in the plastic core tube, capped on each end, and stored/archived by E & E pending evaluation of the overlying sample results. The remaining soil core will be clearly labelled with sampling location and collection time, and the top and bottom ends of the tube will be marked. The archived cores will be stored at ambient temperature in a locked facility such as the site field trailer. If additional soil sample testing below 24 inches is necessary to define the vertical extent of lead and/or arsenic contamination above the residential soil cleanup objectives, then the archived core will be visually classified and logged by a qualified professional and additional sub-samples will be collected by E & E in 6-inch increments. The sample holding time for arsenic and lead is 6 months; samples will not be analyzed beyond the method holding time.

4.3 Sampling Procedures

Each sampling interval will be placed into a decontaminated stainless-steel bowl, disposable paper bowl, or disposable plastic zip-lock bag, and thoroughly mixed with a clean stainless-steel spoon. Enough of each sample interval will be prepared to fill a 2- to 4-ounce certified clean glass jar. Additional jars will be filled for field quality control (QC) samples.

After each use, the stainless-steel bowls and spoons will be decontaminated. Excess soil will be scraped into buckets for disposal during the remedial action. The bowl and spoon will be decontaminated using the following process:

- Wash using a laboratory-grade detergent (e.g., Alconox) solution;
- Rinse with deionized/distilled water;
- Rinse with a 1-5% nitric acid solution;
- Rinse with deionized/distilled water; and
- Air dry or dry with paper towel.

The decontamination wastewater from this process will be collected and disposed of with site contact water during the remedial action.

The samples will be submitted to Eurofins TestAmerica Environmental Laboratory (TestAmerica). All samples will be analyzed for total arsenic and total lead by EPA SW-846 Method 6010 (latest update). Results will be reported on a dry weight basis. The anticipated method detection limits are 0.40 mg/kg for arsenic and 0.24 mg/kg for lead (limits are adjusted based on specific soil moisture content and may vary depending on which laboratories in the TestAmerica network performs the analyses). The analytical methods and volume requirements for soil samples are provided in Table 2.

The sample nomenclature to be used is described below and will be printed on the chain-of-custody form, sample labels, field forms, and the project logbooks. All parcels have been assigned a unique parcel identifier based on the parcel number and street name. Parcel ID codes are provided in Table 1. Each soil core at a parcel will be identified by a two-digit code starting with “01” and increasing

incrementally. The depth interval of each soil sample measured in inches will follow the core location ID and be preceded by the letter "Z" to identify depth. For example, a sample collected from core number 04 at 853 Bailey Avenue from a depth of 0 to 3 inches would have the sample ID **853BLY-04-Z00-03.**

Each field duplicates will be identified in the same manner but with the suffix "-Q" to differentiate it from the parent sample. Rinsate blanks will be identified as "**RB-yyyymmdd**" where "yyyymmdd" represents the year, month, and day of sample collection.

4.4 Pre-design Construction Material and Disposal Characterization Sampling

To assist with identification of appropriate backfill for remediated properties, composite samples of existing topsoil (0-6" interval) and composite samples of existing subsoil (12-24" interval or deeper depending on topsoil thickness) will be collected. Composite samples will be collected from each geographical area where pre-design sampling is performed. The number of properties to be included in each composite sample will be determined by the project manager or project engineer at the time of sampling based on the number of parcels and acreage of each "block". Each composite topsoil and composite subsoil sample will represent up to approximately 3 acres. The composite samples will be tested for the following parameters:

- Grain size distribution (sieve, plus hydrometer if applicable) analysis by American Society for Testing and Materials (ASTM) standards D6913 and D7928;
- Description/classification by the Unified Soil Classification System ASTM D2487;
- Total organic carbon by Lloyd Kahn Method; and
- pH by Standard Method 4500-H, or equivalent.

Refer to Table 2 for sample volume requirements.

5 Quality Assurance/Quality Control

Quality assurance/Quality Control (QA/QC) procedures will be performed in accordance with E & E's Quality Assurance Project Plan (QAPP) for NYSDEC projects (E & E 2020). Specific QA/QC activities that apply to the implementation of this sampling plan include:

- Field duplicates will be collected at a rate of 1 per 20 samples from the 0- to 24-inch depth interval of the cores that are collected, plus one additional field duplicate before the end of sampling.
- MS/MSDs will be collected at a rate of 1 per 20 samples from the 0- to 24- inch depth interval of the cores that are collected.
- For samples collected from archive (24 to 48 inches), an MS/MSD or duplicate will be designated at the time of sample selection. Enough sample should be present in the original jar for normal and QC analyses.
- One rinsate blank will be collected daily from the reusable bowls and/or spoons used for sample compositing.

- Field duplicates, MS/MSDs, and rinsate blanks are not required for construction material and disposal characterization samples.
- For each sample shipment, the field team leader shall submit copies of all COCs electronically to the lab project manager and E&E project chemist;
- All data must be documented on field data sheets or in the field logbooks;
- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer unless otherwise specified; and
- All laboratory deliverables will be validated by an E & E chemist prior to release.

6 Project Logbook and Photo-Documentation

A logbook will be maintained to record all on-site activities. Photos will be taken to document sampling locations. Data from the sampling events will be forwarded to NYSDEC and summarized in a pre-design investigation report.

7 Sample Packaging and Shipping

The samples will be placed in coolers with ice to begin the cooling process. If sample shipment by common carrier is required, inert packaging material such as bubble wrap will be added to the cooler to minimize the chance of breakage during transport.

Samples will be delivered directly to the laboratory at the address below by E & E staff or picked up by a lab courier:

TestAmerica Laboratories, Inc.
10 Hazelwood Drive
Amherst, New York 14228
Attn: Sample Custodian
(716) 691-2600

8 Investigation-Derived Waste Disposal

It is expected three waste streams will be generated during sampling activities: expendable material solid wastes such as personal protective equipment (PPE) and soil core sleeves; excess soil; and decontamination water. Waste streams will be segregated and not mixed when possible. All expendable materials generated during the investigation (including, but not limited to gloves, core sleeves, disposable paper bowls, and plastic sheeting) will be bagged and disposed of off-site as non-hazardous solid waste. Excess soil from borings and decontamination water will be stored separately from one another in sealed buckets or drums in a secure location pending off-site disposal by the Site contractor during the remedial action.

9 Site-Specific Health and Safety Plan

A site-specific health and safety plan (HASP) has been prepared and will be implemented throughout the interim remedial measure (including sampling). Dust monitoring will not be performed for efforts because the soil disturbance from this sampling method will be minimal.

10 Reporting

E & E will document the details of daily activities in daily reports.

For each analytical batch of samples, preliminary data will be provided to NYSDEC and NYSDOH prior to or during validation of the lab results. This will allow for the selection of deeper samples to be analyzed from the archived soil cores.

The laboratory will provide Analytical Services Protocol Category B deliverables including a complete electronic (PDF) report and NYSDEC EQuIS electronic data deliverable (EDD) to E & E. The project chemist will review the report for completeness and process the EDD to assign appropriate location codes, sample matrices, parent sample codes, etc. The laboratory data will be validated by E & E and will include review of the deliverables, assessment of the validity and usability of the results, and preparation of data usability summary reports. The validator will update the EDDs with validator qualifiers and prepare an EQuIS submittal for NYSDEC, upload the data to E & E's EQuIS database, and prepare final report tables. Validated screening sample data will be presented in a table accompanied by publicly available aerial photographs depicting the sampling locations. Validated pre-design data will be presented in a tabular format on surveyed property parcel maps for determination of proposed excavation limits.

Following completion of all sample analyses (as determined by NYSDEC and NYSDOH) and completion of data validation, E & E will prepare a pre-design investigation report. The report will include a description of the activities performed, methods employed, any deviations from approved procedures, sampling locations depicted on individual parcel maps and analytical results in tables. The tables will be separated by address to facilitate sharing of the data with individual property owners. Property ownership information will be excluded from the report to the extent practicable. Draft reports will be submitted electronically to NYSDEC and NYSDOH for review. Final electronic versions will be prepared that will include original laboratory reports as PDF files on a separate compact disc. Photos, videos, survey maps, and other ancillary information collected during the investigation will be maintained for internal use by the project team and will not be included in the reports.

11 References

American Society for Testing and Materials (ASTM). 2016. *D7928 Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis.*

_____. 2011. *D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*

_____. 2009. *D6913 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.*

Ecology and Environment Engineering, P.C. (E & E). 2020. *Master Quality Assurance Project Plan for New York State Department of Environmental Conservation Projects*, Contract No. D009807. May 2020.

_____. 2010. *DER-10, Technical Guidance for Site Investigation and Remediation*, Division of Environmental Remediation, Albany, New York, May 2010.

_____. New York Codes, Rules, and Regulation (NYCRR), Title 6, Part 371.3, *Characteristics of hazardous waste*, Albany, New York.

Table 1 Property Parcel Information, 837 Bailey Avenue Offsite Properties

	Design Phase	Parcel Identifier	Property Address	Property Code	Access Granted	Property Area (square feet)	Estimated No. of Cores
Northern Properties	1A	112.80-1-16	853 Bailey Ave.	853BAILEY	YES	12000	13
	1A	112.80-1-17	861 Bailey Ave.	861BAILEY	YES	4500	6
	1A	112.80-1-18.1	863 Bailey Ave.	863BAILEY		3600	5
	1A	112.80-1-19	11 Dingens St.	11DINGENS	YES	3750	5
	1A	112.80-1-20	15 Dingens St.	15 DINGENS	YES	4500	5
	1A	112.81-1-1	17 Dingens St.	17 DINGENS	YES	4500	5
	1A	112.81-1-2	19 Dingens St.	19 DINGENS		4500	6
Southern Properties	1B	112.80-1-10	817 Bailey Ave.	817BAILEY		8580	10
	1B	112.80-1-11	825 Bailey Ave.	825BAILEY		4320	6
	1B	112.80-1-9	16 Peru Pl.	16PERU		3210	4
	1B	112.80-1-8	18 Peru Pl.	18PERU		3210	4
	1B	112.80-1-7	20 Peru Pl.	20PERU		3210	4
	1B	112.80-1-6	24 Peru Pl.	24PERU	YES	3210	4
	1B	112.80-1-5	26 Peru Pl.	26PERU		3210	4
	1B	112.80-1-4	28 Peru Pl.	28PERU		3225	4
	1B	112.80-1-3	32 Peru Pl.	32PERU		3210	4
	1B	112.80-1-2	36 Peru Pl.	36PERU		6420	8

Table 2 Sample Bottles, Volumes, and Preservatives for Soils

Analytical Parameter	Bottle Type[1,2]	Holding Time	Analytical Method[3]	Preservative	Turnaround Time
Lead & Arsenic	One 2-oz glass jar	6 months (180 days)	SW-846 - 6010C	Ice	5 - 20 business days[4]
Grain Size	1 gallon size zip-lock bag	None	ASTM D6913/D7928		20 business days
Unified Soil Classification		None	ASTM D2487		
TOC	One 4-oz glass jar	28 days	Lloyd Kahn Method		

Note:
[1] Certified pre-cleaned bottles and containers; minimum size indicated.
[2] Bottle type and size subject to laboratory's request.
[3] All methods performed by NYSDOH ELAP certified lab.
4 Five business days for samples from the northern properties and 20 business days for samples from the southern properties (refer to Table 1).

Key:
oz = ounce

837 Bailey Avenue Off-Site Project
837 Bailey Avenue, Buffalo, NY
Site No. C915298A