

**Pre-remedial Design Investigation
Residential Soil Sampling and Analysis Plan
Former Geneva Foundry Site, Operable Unit No. 3
NYSDEC Site No. B00019
Geneva, New York
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Prepared for: New York State Department of Environmental Conservation (NYSDEC)

Prepared by: Ecology and Environment Engineering, P.C. (EEEPC)

1 Objective

This Sampling and Analysis Plan (SAP) was prepared for pre-design investigation activities associated with Operable Unit [OU] 3) of the Former Geneva Foundry site (Site). OU3 includes soil in off-site areas impacted by contaminant deposition related to historical air emissions from the former foundry (see Figure 1). This SAP will be implemented in areas designated for remedial action by NYSDEC. The objective of the investigation is threefold:

- To characterize the lateral and vertical extent of lead and arsenic contamination on property parcels in the design phase to determine the extents of excavation required to meet the remediation goals set forth by NYSDEC in the Record of Decision (ROD) (NYSDEC 2017);
- To determine through property “screening sampling” which parcels within the boundary of OU3 are impacted by historical air emissions and require remedial action in accordance with the ROD; and
- To more accurately determine the boundary of OU3 by performing property “screening sampling” along and outside of the OU3 boundary identified in the ROD.

2 Pre-sampling Activities

Prior to initiating on-site activities, EEEPC 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. The status of property access agreements will be tracked by EEEPC. A factsheet will be distributed by EEEPC and NYSDEC to all property owners and tenants within (and some outside) of the OU3 boundary.

Property owners will be contacted by letter to request access for the purpose of developing remedial designs. This is a multiyear cleanup effort. Parcels selected for design during each phase of work will be approved by NYSDEC prior to contact. Phase 1 will include properties closest to the former foundry site and licensed day care. Remedial design activities will include property feature, boundary, and topographic surveys; pre-design soil sampling; photo documentation of the property; interior and exterior structural inspection; and tree/shrub inventory.

A separate letter will be sent to the owners of additional parcels within and along the boundary of OU3 to request access for the purpose of performing additional screening sampling. This parcel list includes those not previously sampled by NYSDEC or where preliminary surficial sampling indicated that there was no impact to the property as a result of lead or arsenic contamination.

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, EEEPC will attempt to obtain tenant contact information from the property owner before contacting the tenant.

After a property has been identified as being impacted by past air emissions from the former Geneva Foundry, EEEPC's or NYSDEC's surveying subcontractor will perform an initial property boundary, topographic, and existing site features survey. These survey maps will be utilized for determination of sampling locations during pre-design sampling and for depiction of sampling results.

The Site contractor, LaBella Associates, will provide direct push sampling services and will be responsible to contact 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, EEEPC's field team leader will be present to oversee sampling and to coordinate directly with property owners and address any concerns. The field team leader will notify the property owners when investigation activities are completed on their property. Following the completion of the investigation, EEEPC's public outreach coordinator will be available to receive requests for information and pass them along to the appropriate party.

3 Soil Core Sampling Locations

3.1 Screening Sample Cores

To determine if a property has been contaminated by air emissions from former foundry operations, samples will be collected from multiple one-foot deep soil core locations. Sampling locations will be determined based on parcel size, hardscape coverage and other conditions with the following considerations:

- Minimum of two soil core locations per parcel;
- Where possible, collect four soil cores locations surrounding the main structure on a property to represent the front, back, and two sides of the primary structure;
- For properties exceeding 5,000 square feet in size, one soil core location will be added for each additional 5,000 square feet of unpaved/undeveloped area. Initial size estimates will be based on Ontario County real property records, which represents the entire parcel area. EEEPC's field team leader may reduce the number of additional soil core locations on specific parcels based on field observations of structures and hardscape features.
- Soil core locations will be collected from unpaved areas and will be biased towards bare soil areas. Hardscape features such as driveway, sidewalks, and patios will be avoided as will raised garden beds or areas of obvious recent, clean fill. Vegetable gardens may be sampled if requested by the property owner.

- In order to avoid potential lead contamination from other sources (primarily lead paint), soil core locations will not be placed near downspouts, within 5 feet of building walls, or under overhanging soffits, where possible;

Table 1 shows the approximately number of sample locations expected per parcel based on lot size. Actual sampling locations will be determined in the field by EEEPC's field team leader based on the considerations above and actual conditions encountered.

3.2 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 grid 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 EEEPC's field team leader based on these considerations as well as actual conditions encountered.

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

4 Sampling and Analysis

4.1 Screening Sample Collection

Screening sample cores will be collected manually (e.g., step probes, hand augers, etc.) to a depth of 12 inches. Soil samples will be collected from each core at the following intervals, all measured in **inches** below grade:

0-2"	2-6"	6-12"
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In instances where soil cores are taken through grass, sample depth intervals will begin immediately below the sod root mat.

4.2 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 EEEPC'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:

0-6"	6-12"	12-18"	18-24"
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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 geologist. The field team will sub-sample the top 24 inches of the core in the 6-inch intervals described above, maintain the chain-of-custody, and package the samples for the laboratory.

Soil samples collected from the top four intervals of each core 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 EEEPC 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 geologist and additional sub-samples will be collected by EEEPC 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, 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 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 TestAmerica Laboratories in Amherst, New York. All samples will be analyzed for total arsenic and total lead by EPA SW-846 Method 6010. 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). 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 associated with OU3 have been assigned a unique parcel identifier based on the parcel number and street name. Street name codes are provided in Table 3. 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 08 at 55 State Street from a depth of 0 to 6 inches would have the sample ID:

55STA-08-Z00-06.

Field duplicates will be identified in the same manner but with the suffix “-FD” 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.

Following receipt and validation of the initial analytical results, EEEPC will return to each parcel to collect one additional soil sample from vicinity of the soil core and depth interval containing the highest total lead and/or total arsenic concentrations. This supplemental sample will be collected manually (hand auger or equivalent) and submitted to TestAmerica for analysis of lead and arsenic using the Toxicity Characteristic Leaching Procedure (TCLP). Local landfills anticipated to accept soil as non-hazardous waste for use as daily cover have indicated that periodic TCLP testing will be required. By testing the “hottest” sample at each property, the need for extensive TCLP testing may be avoided. TCLP testing will be used to determine whether the soil should be identified as a characteristic hazardous waste (D004 for arsenic; D008 for lead). The regulatory level for both is 5.0 mg/L (6 NYCRR 371.3).

4.4 Pre-design Construction Material and Disposal Characterization Sampling

To assist with identification of appropriate backfill for remediated properties, one composite sample of topsoil (0-6” interval) and one composite sample of subsoil (12-24” interval or deeper depending on topsoil thickness) will be collected. Each composite sample will consist of existing topsoil/subsoil from a minimum of three design properties during each phase of pre-design investigation. 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.

Prior to the start of excavation, the Site contractor will identify the disposal facility that will accept the contaminated soil for disposal. EEEPC will work with the contractor and the disposal facility’s approvals department to determine sampling and testing requirements for development of the waste profile in accordance with the disposal facility’s permit.

5 Quality Assurance/Quality Control

Quality assurance (QA)/QC procedures will be performed in accordance with EEEPC’s Quality Assurance Project Plan (QAPP) for NYSDEC projects (EEEPC 2011). 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.

- 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 re-usable bowls and/or spoons used for sample compositing.
- 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 EEEPC chemist prior to release.

6 Project Logbook and Photo-Documentation

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

7 Sample Packaging and Shipping

The sample containers will be placed inside sealed plastic bags as a precaution against cross-contamination caused by leakage or breakage. 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 EEEPC 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 for this stud and has been provided to NYSDEC. Dust monitoring will not be performed for pre-design or screening sampling efforts because the soil disturbance from this sampling method will be minimal.

10 Reporting

EEEEPC will document the details of daily activities in a daily report to be submitted to NYSDEC and NYSDOH on a minimum weekly basis.

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 EEEPC. 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 EEEPC and will include review of the deliverables, assessment of the validity and usability of the results, and preparation data usability summary reports. The validator will update the EDDs with validator qualifiers and prepare an EQuIS submittal for NYSDEC, upload the data to EEEPC's EQuIS database, and prepare final report tables. Validated screening sample data will be presented in a table accompanied by publically 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, EEEPC 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 in order 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. (EEEP). 2011. *Master Quality Assurance Project Plan for New York State Department of Environmental Conservation Projects*, Contract No. D007617. April 2011.

New York State Department of Environmental Conservation (NYSDEC). 2017. *Record of Decision, Former Geneva Foundry Site, Environmental Restoration Project, Operable Units 1,2 and 3, Geneva (C), Ontario County, Site No. B00019*, Division of Environmental Remediation, January 2017.

_____. 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 2 Sample Bottles, Volumes, and Preservatives for Soils

Analytical Parameter	Bottle Type ^{1,2}	Holding Time	Analysis ³	Preservative	Turnaround Time
Lead & Arsenic	One 2-oz glass jar	6 months (180 days)	EPA SW-846 Method 6010	Ice	20 business days
Grain Size	1 gallon size zip-lock bag	None	ASTM D6913/D7928		
Unified Soil Classification		None	ASTM D2487		
TOC	1 4-oz glass jar	28 days	Lloyd Kahn Method		
pH		Analyze as soon as possible	SM 4500-D		

Note:

¹ Certified pre-cleaned bottles and containers; minimum size indicated.

² Bottle type and size subject to lab's request.

³ SW-846 method compliant with NYSDOH ELAP program.

Key:

oz = ounce

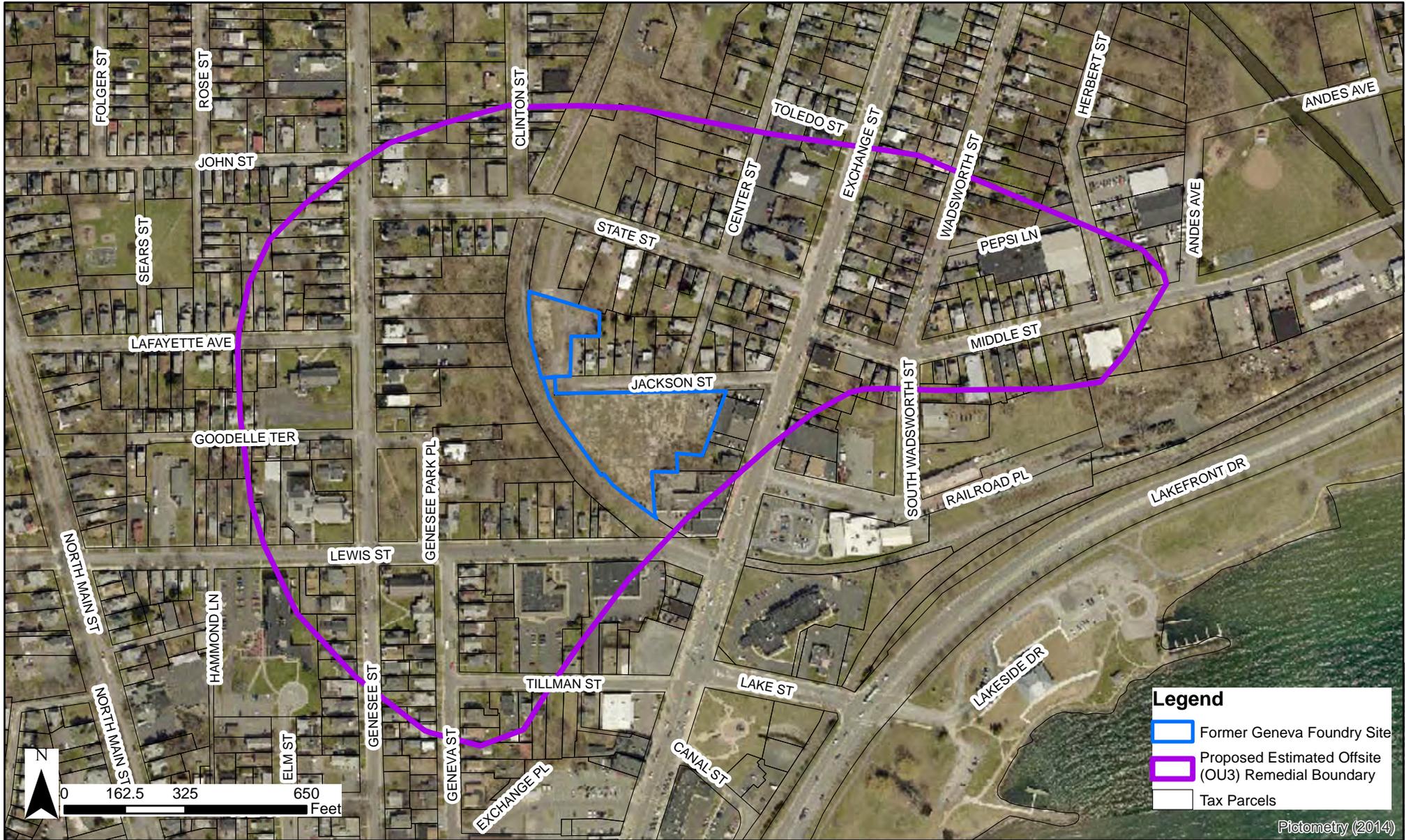


Figure 1 Former Geneva Foundry Site
 Site No. C835027A
 Geneva, Ontario County, New York