NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
Boundary Modification Report

3/13/2015

Site Code:	828023	**Site Name:**	Emerson Street Dump
City:	Rochester	**Town:**	Rochester (c)
Region:	8	**County:**	Monroe
Current Classification:	03	**Proposed Site Size:**	
Current Site Size (acres):	29.01	**Extra Details:**	Dump, Landfill
Significant Threat:	-	**Site Type:**	
Priority ranking Score:		**Project Manager:**	Todd Caffoe

Summary of Approvals

Originator/Supervisor: Bart Putzig	**03/12/2015**
Regional Hazardous Waste Remedial Engineer: Bart Putzig:	**03/12/2015**
BEEI of NYSDOH:	**03/02/2015**
CO Bureau Director: Michael Cruden, Director, Region 8:	**03/04/2015**
Assistant Division Director: Michael J. Ryan, P.E.:	**03/13/2015**

Site Description

Location:
This former landfill is located at the western edge of the City of Rochester and is bounded by Emerson Street, Lexington Avenue, Lee Road, and McCracken Street.

Site Features:
The size of the entire landfill is approximately 250 acres. However, after several site investigations, the boundaries of the hazardous waste site have reduced the size of the site to 29 acres. There is as much as 30 feet of landfill refuse in the listed portion of the landfill. The average amount of landfill refuse on the remaining developed portions of the site is 8 to 10 feet. These areas are filled primarily with incinerated refuse. There are several buildings on the landfill - some are built over refuse while others excavated refuse before building contruction.

Current Uses/Zoning:
The majority of the currently listed portions of the landfill site are undeveloped. The remaining portions of the landfill are developed and contain commercial and industrial developments. A school is located at the northeast corner of the site.

Past Use of the Site:
This inactive landfill was owned and operated by the City of Rochester from the early 1930s thru 1970. After its purchase by the NYS Urban Development Corporation in 1970, the site was developed into an industrial/commercial park. Community Right-to-Know information, interviews, and on-site sampling have documented the disposal of industrial hazardous wastes.

3/13/2015

Site Code: 828023 **Site Name:** Emerson Street Dump

Site Geology and Hydrogeology:
Groundwater is predominantly in bedrock and overburden consists mainly of landfill refuse. Groundwater flow is divided though the middle of the site. Groundwater at the southern portion of the site flows to the NYS Barge Canal and groundwater at the northern portion of the site general flows north. Localized groundwater flow is influenced by the area sewer system and other buried utilities. Bedrock beneath the site is either Lockport dolomite or Rochester shale.

Contaminants of Concern (Including Materials Disposed)	**Quantity Disposed**
OU 01	
LOW LEVEL RADIOACTIVE LEAD SLUDGE (D008)	0.00
SOLVENTS INCLUDING:	0.00
TRICHLOROETHYLENE (TCE)	0.00
1,1,2,2-TETRACHLORETHANE	0.00
TRANS 1,2-DICHLOROETHENE	0.00

Analytical Data Available for : Air, Groundwater, Surface Water, Soil, Sediment

Applicable Standards Exceeded for: Groundwater, Surface Water

Site Environmental Assessment

Previous Investigations and Remedial Actions: Several independent investigations and IRMs have been conducted by the City of Rochester over the past 25 years. A supplemental investigation in 1989 documented the presence of approximately 100 cubic feet of thoriated waste sludge. Sample results of the thoriated waste failed EP toxicity characteristic for lead and was considered a low-level radioactive waste. The City of Rochester excavated and removed eight cubic yards of mixed hazardous/radioactive waste were excavated in 1992. Prior to demolition of the former Colfax Street incinerator, ash samples obtained inside the building failed EP toxicity for lead and cadmium. The ash was removed and disposed of as hazardous waste.

An independent Remedial Investigation (RI) was completed by the City of Rochester in 1994 which identified two small source areas of contamination. Fifteen drums of paint sludge and solvents were removed and 34 tons of soil contaminated by tetrachloroethylene (PCE) was also removed. After the City completed these isolated source removals the majority of the site was delisted. The current site boundaries are the largely undeveloped portion of the site located north of Emerson Street and West of McCracken Street.

A generic soil management plan is in place for the entire site. Prior to any site development, a site specific soil management plan needs to be developed for DEC approval. The site-specific management plans include provisions for air monitoring, soil and water sampling, vapor mitigation and waste/fill management.

Current Investigations:
The City of Rochester signed a Consent order to conduct a soil vapor intrusion (SVI) investigation of the site and a remedial investigation. Fieldwork for the initial SVI investigation is complete and the investigation report was prepared. Additional SVI investigation is required to identify the extent of soil vapor impacts and mitigate any properties as deemed necessary. A remedial investigation is underway on the remaining listed portion of the site. Further characterization of the source area is required before a remedy is selected.

3/13/2015

Site Code: 828023 **Site Name:** Emerson Street Dump

Site Health Assessment

Drinking contaminated groundwater is not expected because the area is served by public water. NYSDOH and NYSDEC will be evaluating the potential for soil vapor intrusion to enter structures on or near the site. Although the site is not fenced, contact with contaminated soil on-site is not expected because a layer of clean fill is present on the surface of the site.

Remedy Description and Cost

Remedy Description for Operable Unit 01

Total Cost

Remedy Description for Operable Unit 01A

Total Cost

Remedy Description for Operable Unit 01B

Installation of Sub-slab depressurization systems at target building on-site.

Total Cost

OU	Site Management Plan Approval:	Status:

Basis for Boundary Change

Based upon the data presented in the petition, there does not appear to be a consequential amount of hazardous waste within the petition area. Analyses of groundwater and soil show contamination that would typically be associated with an aging municipal solid waste landfill. The LNAPL detected in the "petition well" does not appear to be extensive in nature and extent, and appears to have very localized impacts to groundwater. Based upon these data and the lack of a consequential amount of hazardous waste, the petition should be granted. The new acreage of the site will be 15.69 acres.

New York State Department of Environmental Conservation

PUBLIC NOTICE

State Superfund Program

Receive Site Information by Email. See next page to Learn How.

Site Name: Emerson Street Dump **March 2015**
Site No. 828023 **Tax Map No.** 104.35-1-2.003, 104.27-1-38.001, 104.43-1-4 and 104.35-1-18.002
Site Location: Emerson Street, City of Rochester, Monroe County

Inactive Hazardous Waste Disposal Site Boundary Modification Notice

The Inactive Hazardous Waste Disposal Site Program (the State Superfund Program) is the State's program for identifying, investigating, and cleaning up sites where the disposal of hazardous waste may present a threat to public health and/or the environment. The New York State Department of Environmental Conservation (DEC) maintains a list of these sites in the Registry of Inactive Hazardous Waste Disposal Sites (Registry). The boundary of the Class 3 site (contamination does not presently and is not reasonably foreseeable to constitute a significant threat to public health or the environment) identified above, and located on a map on the reverse side of this page, was modified, effective March 13, 2015. The northern portion of parcel 104.35-1-2.003 (1655 Lexington Ave., 11.73 acres) and all of parcel 104.27-1-38.001 (1635 Lexington Ave., 1.59 acres) were removed from the subject site, decreasing the site size from 29.01 acres to 15.69 on the Registry for the following reason(s):

Based on information received in a petition from the City of Rochester, DEC has determined that, while the subject parcels are contaminated with low levels of petroleum related volatile organic compounds, the portion of the site that has been removed from the Registry does not contain consequential amounts of hazardous waste. In addition, potential exposure to any remaining contamination associated with the former landfill will be managed by the City of Rochester via institutional controls – every property on the landfill, including the petition area, is flagged in the City's permits system and anytime a property owner applies for a permit, they must address any landfill-related issues that may arise from any proposed developments. The City have also required DEC approval on all ground intrusive developments on the site.

DEC will continue to keep you informed throughout the investigation and cleanup of the site.

If you own property adjacent to this site and are renting or leasing your property to someone else, please share this information with them. If you no longer wish to be on the contact list for this site or otherwise need to correct our records, please contact DEC's Project Manager listed below.

FOR MORE SITE INFORMATION

Additional information about this site can be found using DEC's "Environmental Site Remediation Database Search" engine which is located on the internet at: www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3

Comments and questions are always welcome and should be directed as follows:

Project Related Questions
Todd Caffoe, NYSDEC Project Manager
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7017
Email: todd.caffoe@dec.ny.gov
Tel: 585-226-5350

Site Related Health Questions
Melissa Doroski, NYSDOH Project Manager
NYS Department of Health
Empire State Plaza
Corning Tower, Rm 1787
Albany, NY 12237
Email: BEEI@health.state.ny.us
Tel: 518-402-7860

Approximate Site Location
Emerson Street Dump
Site ID: 828023
Emerson Street, Rochester NY

Receive Site Updates by Email

Have site information such as this public notice sent right to your email inbox. DEC invites you to sign up with one or more contaminated sites county email listservs available at the following web page: www.dec.ny.gov/chemical/61092.html It's *quick*, it's *free*, and it will help keep you *better informed*.

As a listserv member, you will periodically receive site-related information/announcements for all contaminated sites in the county(ies) you select.

You may continue also to receive paper copies of site information for a time after you sign up with a county listserv, until the transition to electronic distribution is complete.

Note: Please disregard if you received this notice by way of a county email listserv.

DEC is sending you this notice in accordance with Environmental Conservation Law Article 27, Title 13 and its companion regulation (6 NYCRR 375-2.7(b)(6)(ii)) which requires DEC to notify all parties on the contact list for this site of this recent action.

Electronic copies:

R. Schick, Director, Division of Environmental Remediation
A. English, Director, Bureau of Technical Support
K. Lewandowski, Chief, Site Control Section
M. Cruden, Director, Remedial Bureau E
B. Putzig, RHWRE, Region 8
S. Sheeley, Regional Permit Administrator, Region 8
L. Vera, Regional CPS, Region 8
K. Anders, NYSDOH
J. Deming, NYSDOH Regional Chief
L. Ennist, DER, Bureau of Program Management
T. Caffoe, NYSDEC Project Manager
M. Doroski, NYSDOH Project Manager
B. Anderson, Site Control Section

NEW YORK STATE OF OPPORTUNITY. Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Acting Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

March 3, 2015

Mr. Michael Cruden
Remedial Bureau E
Division of Environmental Remediation
NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233

Re: Boundary Modification – Petition to Delist
Emerson Street Dump
Site #828023
Rochester, Monroe County

Dear Mr. Cruden:

At your Department's request, we have reviewed the December 2014 *Delisting Petition* and the February 2014 *Petition to Delist a Portion of the Site Memo* to determine whether modifying the boundary of the referenced site is protective of public health. Based on that review, I understand that approximately 13.3 acres, including 1635 Lexington Avenue and the Northern Portion of 1655 Lexington Avenue, would be removed from the Emerson Street Landfill Site. I also understand that the subject parcel is contaminated with low levels of petroleum related volatile organic compounds. However, potential exposure to any remaining contamination associated with the former landfill will be managed by the City of Rochester via institutional controls.

Based on the information provided to date, I concur with modifying the site boundary and delisting the portion of the referenced site which is removed. If you have any questions, or would like to discuss this site further, please contact me at (518) 402-7860.

Sincerely,

Justin H. Deming, Chief
Regions 2, 4 & 8
Bureau of Environmental Exposure Investigation

Ec: K. Anders / M. Doroski / e-File
R. Van Houten – NYSDOH RFO
J. Frazer / S. Hallock – MCHD
K. Lewandowski / B. Anderson – NYSDEC Central Office
B. Putzig / T. Caffoe – NYSDEC Region 8

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New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road, Avon, New York 14414-9519
Phone: (585) 226-5353 • **Fax:** (585) 226-8139
Website: www.dec.ny.gov

Joe Martens
Commissioner

To: Bernadette Anderson – Site Control Section
From: Todd Caffoe, P.E. – Region 8
RE: Emerson Street Dump #828023
Petition to Delist a Portion of the Site
Date: February 24, 2015

I have reviewed the referenced petition to delist a 13.3 +/- acre portion of the Former Emerson Street Landfill. Below I have summarized the results presented in the petition and provided my interpretations and conclusions.

- The area has been historically used to consolidate landfill refuse from other portions of the site where developments have occurred. These projects have all been under DEC oversight and no hazardous wastes were allowed to be relocated to this area.

- The petition summarizes soil analytical data from several different studies conducted since 1987. These data are compared to restricted commercial SCOs when some of the data (mainly VOC data) should be compared to the groundwater protection SCOs. That being said, there was only one sample that exceeded the protection of groundwater SCOs for petroleum-related VOCs (BTEX compounds) at GMX-B1 (see attached Figure 4A). This sample data is 15 years old and does not indicate a consequential amount of hazardous waste disposal.

- Groundwater data for some chlorinated and non-chlorinated compounds indicate exceedances of NYS groundwater standards. These data do not appear to be indicative of a significant source of contamination other than what may be detected in a municipal solid waste landfill.

- Light non-aqueous phase liquid (LNAPL) was encountered within the "delist well". Analysis of the LNAPL indicates old petroleum hydrocarbons with very low concentrations of VOCs. No PCBs were detected. The petition erroneously compares the LNAPL analysis with groundwater standards, but that does not impact the results. A bail-down test and additional soil borings analyses were conducted by the City of Rochester in the vicinity of the "delist well" to determine the extent and magnitude of LNAPL. Based upon these studies, it was determined the actual LNAPL thickness on the water table was less than one inch after the bail-down test. Additionally, the soil borings did not indicate the presence of petroleum hydrocarbons in soils adjacent to the "delist well".

CONCLUSIONS:
Based upon the data presented in the petition, there does not appear to be a consequential amount of hazardous waste within the petition area. Analyses of groundwater and soil show contamination that would typically be associated with an aging municipal solid waste landfill. The LNAPL detected in the "petition well" does not appear to be extensive in nature and extent, and appears to have very localized impacts to groundwater. Based upon these data, I believe the petition should be granted.

Future Implications of delisting the petition area:
The City of Rochester has implemented their own institutional controls at the entire landfill site. Every property on the landfill, including the petition area, is flagged in their permits system. Anytime a property owner applies for a permit, they must address any landfill-related issues that may arise from any proposed developments. They also have required DEC approval on all ground intrusive developments on the site. In addition, the City of Rochester is

currently under an Order to complete the RI/FS at this site. The Department has this mechanism to require further work including but not limited to vapor intrusion studies at any time.

Current Site Status:
The site is currently being used as a temporary storage location for a regulated slag material from the Port of Rochester project. The City has applied for a BUD to use this material for the inner loop reconstruction project in downtown Rochester or to be used as a base fill for the proposed photovoltaic panel array located within the petition area. I believe the City needs this portion of the site delisted to proceed with construction of the PV array.

For the remaining listed portion of the site, the City plans to conduct a supplement RI to further define the source of chlorinated solvent contamination and may propose a pilot-scale study for a proposed source area remedy. The City is also proceeding the SVI investigations on the remaining portions of the delisted landfill to determine which areas of the site require mitigation.

cc: B. Putzig
M. Cruden
K. Lewandowski
J. Deming
M. Doroski

Document Path: \\Projects2\ProjectsNZ-2\Rochester, City\210173 FESL\Drawings\Report Figures\Delisting Petition\Figure 4A (AA- 2014-09-02).mxd

LABELLA Associates, D.P.C.

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ROCHESTER, NY 14614
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PROJECT/CLIENT

FORMER EMERSON STREET LANDFILL

CITY OF ROCHESTER

DRAWING TITLE

DELISTING PETITION

PROPOSED DELISTING LAND TESTING LOCATIONS

ISSUED FOR: FINAL

DATE: 11/13/2014

DESIGNED BY: AA

DRAWN BY: AA

REVIEWED BY: DPN

PROJECT/DRAWING NUMBER

210173

FIGURE 4A

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Technical Support, 11th Floor
625 Broadway, Albany, New York 12233-7020
Phone: (518) 402-9543 • **FAX:** (518) 402-9547
Website: www.dec.ny.gov

Joe Martens
Commissioner

MEMORANDUM

TO: Michael Cruden, Director, Remedial Bureau E
Bart Putzig, RHWRE, Region 8
Krista Anders, NYSDOH
Justin Deming, NYSDOH

FROM: Bernadette Anderson, EPS 2, Site Control Section
THRU: Kelly A. Lewandowski, Chief, Site Control Section

SUBJECT: Petition to Delist a Portion of the Emerson Street Dump, Site# 828023

DATE: February 4, 2015

Attached is a copy of a petition from City of Rochester Mayor Lovely A. Warren dated January 13, 2015 to delist a portion of the subject site from the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

Please have this petition reviewed for technical sufficiency and submit your comments or recommendations to me no later than February 25, 2015.

If you have any questions, please contact me or Bernadette Anderson of my staff at (518) 402-9553.

Attachment

ec: K. Lewandowski
T. Caffoe, Project Manager
B. Anderson

PUBLIC NOTICE
Petition to Delist a Portion of Site

Site Name: Emerson Street Dump
Site Address: Emerson Street, City of Rochester, NY 14606
County: Monroe
Site No.: 828023
Petitioner: City of Rochester

The New York State Department of Environmental Conservation (DEC) has received a Petition to delist a portion of the Emerson Street Dump in the New York State Registry of Inactive Hazardous Waste Disposal Site. The site is located on Emerson Street in the City of Rochester, Monroe County.

Additional information about this site can be found via a Remedial Site Database Search at the following DEC web page: http://www.dec.ny.gov/chemical/8437.html

DEC has initiated an internal review of this Petition. Written public comments on the proposed partial delisting may be sent by March 4, 2015 to:

Ms. Kelly Lewandowski
NYS Department of Environmental Conservation
Division of Environmental Remediation, 11th Floor
625 Broadway
Albany, NY 12233-7020

Questions for specific information on the site can be addressed to:

Todd Caffoe
NYS Department of Environmental Conservation – Region 8
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, NY 14414
todd.caffoe@dec.ny.gov

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Technical Support, 11th Floor
625 Broadway, Albany, NY 12233-7020
Phone: (518) 402-9543 • Fax: (518) 402-9547
Website: www.dec.ny.gov

Joe Martens
Commissioner

February 4, 2015

Hon. Lovely A. Warren
Mayor, City of Rochester
City Hall Room 308A
30 Church Street
Rochester, NY 14614-1290

Re: Petition to Delist a Portion of the
Emerson Street Dump
Site ID No. 828023

Dear Mayor Lovely:

This is in response to your letter dated December 2, 2014 that was transmitted to Commissioner Martens from Mark Gregor, Manager, Division of Environmental Quality, City of Rochester via letter dated January 13, 2015. Your letter requests that a portion of the Emerson Street Dump site be delisted from the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

At this time, your request is being reviewed and evaluated. A cursory administrative review of the submission has noted that the petition was not in the form of an affidavit as required under 375-2.7(f)(3)(ii). However, we advise that you not resubmit the petition until the Department has completed a technical review. A decision on your request will be issued to you in the near future.

If you have any questions, please contact me or Bernadette Anderson, of my staff, at (518) 402-9553.

Sincerely,

Kelly A. Lewandowski, P.E.
Chief
Site Control Section

ec: K. Lewandowski
T. Caffoe, Project Manager
B. Anderson, Site Control Section

bec w/o petition:

B. Putzig, RHWRE, Region 8
M. Cruden, Director, Remedial Bureau E
K. Anders, NYSDOH
J. Deming, NYSDOH Regional Chief

bec w/petition:

Byron S. Kennedy, Commissioner, Monroe County Department of Public Health (mchealth@monroecounty.gov)

LABELLA Associates, D.P.C.

Engineering
Architecture
Environmental
Planning

Delisting Petition:

1635 and 1655 Lexington Avenue
Former Emerson Street Landfill
NYSDEC Site #828023

Location:

Former Emerson Street Landfill
Rochester, New York

Prepared for:

City of Rochester
Division of Environmental Quality
Room 300-B
Rochester, New York 14614

LaBella Project No. 210173

November 2014

Relationships. Resources. Results.

Delisting Petition:

1635 and 1655 Lexington Avenue
Former Emerson Street Landfill
NYSDEC Site #828023

Location:

Former Emerson Street Landfill
Rochester, New York

Prepared for:

City of Rochester
Division of Environmental Quality
Room 300-B
Rochester, New York 14614

LaBella Project No. 210173

November 2014

LaBella Associates, D.P.C.
300 State Street
Rochester, New York 14614

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Figures

Tables

Attachments

Executive Summary

This Delisting Petition has been prepared by LaBella Associates D.P.C. (LaBella) on behalf of the City of Rochester (City); owner of 1635 and 1655 Lexington Avenue which are parcels within the Former Emerson Street Landfill (FESL) in Monroe County, City of Rochester, New York. The FESL is generally bounded by Lee Road to the west, Lexington Avenue to the north, Ferrano Street to the south, Colfax Street to the east-northeast and a railroad right-of-way to the east-southeast. The FESL is comprised of 45 parcels totaling approximately 255 acres of land and operated as a landfill beginning between sometime in the 1940's and 1951 until its closure in 1971. A majority of the FESL has since been developed for mainly industrial and commercial use; few parcels, including 1635 and 1655 Lexington Avenue remain vacant.

A majority of the FESL has been delisted from the New York State Department of Environmental Conservation (NYSDEC) Inactive Hazardous Waste Disposal Site (IHWDS) classification; however, 1635 and 1655 Lexington Avenue, and 1660 and 1740 Emerson Street remain a Class 3 IHWDS in the NYSDEC Registry Program. Class 3 IHWDSs within the FESL are shown on Figure 2. A Site is classified as an IHWDS if a consequential amount of hazardous waste is confirmed at the Site.

This Delisting Petition pertains to all of 1635 Lexington Avenue and the northern portion of 1655 Lexington Avenue as shown on Figure 3, attached, and hereinafter referred to as "the Site". The Site is comprised of approximately 13.3 acres of land zoned as "light industrial" (M-1), with use code "vacant industrial land" (340). The purpose of this Delisting Petition is to present and analyze all relevant data to the Site in an effort to declassify it as an IHWDS consistent with 6 New York Codes, Rules, and Regulations (NYCRR) Part 375-2.7(e).

Although significant impacts remain on the 1655 Lexington Avenue parcel, these impacts are limited to the central/southern portion of the parcel (i.e., not within the proposed Site). Groundwater flow at the Site is from the northwest towards the southeast, and is influenced by a sewer line that is installed in bedrock within the McCrackanville Street right-of-way. This Delisting Petition is based on recent work but also the culmination of environmental evaluations and subsurface testing activities that have occurred over 26 years at the FESL. Recent investigations have corroborated previous testing in that no hazardous waste was identified in the area proposed for delisting. This Delisting Petition is based on the following:

1. *Historical Information* – This information was utilized to determine appropriate testing locations for evaluating suspect operations that may be associated with waste disposal (beyond Regulated Solid Waste).
2. *Subsurface Testing Data* – Soil and groundwater samples were utilized to compare actual subsurface concentrations to hazardous waste criteria.
3. *Hydrogeological Information* – The soil types (or lack of soil), bedrock depth and competency, groundwater levels and groundwater contouring/flow information were

utilized to assess the migration routes for contaminants in the fill and bedrock. It should be noted that shallow and deep bedrock flow has been evaluated historically.

The above factors were utilized to determine that although Regulated Solid Waste and some non-hazardous waste (such as petroleum) are present within the Site, there has been no evidence of consequential amounts of characteristic or listed hazardous waste identified within the Site. This Delisting Petition presents details on the above information.

Historical Information

Evaluations of historical information are typical prior to any subsurface testing. Historical evaluations have included reviews of historic mapping and aerial photographs by the Monroe County Environmental Management Council (MCEMC) initially and then again by Haley & Aldrich of New York (H&A) in the 1990s. An additional review was also completed in 2011 by LaBella of historic mapping and aerial photographs but also included an assessment of City of Rochester documents and records relating to the FESL, waste disposal throughout Monroe County and media accounts at the time. These evaluations were utilized in order to assess the types of filling, locations and durations of such filling and the potential for disposal of industrial/ hazardous waste as opposed to non-hazardous Regulated Solid Waste. Based on this review, it appears that the City was not allowing disposal of liquid waste in landfills as late as July 1969 and probably more likely not until May 1970 (if at all) at which time the landfilling activities are limited to north of Emerson Street and generally west of McCrackanville Street. The *Soil Vapor Intrusion Assessment Report* by LaBella dated June 2011 (SVI Report) provides a detailed discussion regarding this matter.

In addition to assessing the landfilling activities at the time of operation, aerial photographs were also reviewed to assess potential unregulated activities after closure of the landfill in 1971. This information indicated where the most significant disturbances were during post landfill operations. In general, the most significant disturbances are on the 1655 Lexington Avenue parcel with some exceptions. The most significant disturbances are limited to the central /southern portion of the 1655 Lexington Avenue property. A detailed review of aerial photographs is provided in the *Remedial Investigation Work Plan: P-1 Plume Area* by LaBella dated November 2012.

Sub-Surface Testing Data

In addition to the above historic evaluations, numerous iterations of subsurface testing have been completed to evaluate the FESL. The testing across the FESL has included 61 test pits, 103 soil borings, 52 groundwater monitoring wells, 20 surface soil samples and 88 soil gas sampling locations. Additional test pits, soil borings and monitoring wells were also completed over the years for private properties as part of environmental due diligence efforts and/or geotechnical evaluations for development. Based on this extensive testing, contaminants of concern for the FESL are predominantly volatile organic compounds (VOCs) and to a much lesser extent, metals. VOCs detected are both aliphatic chlorinated VOCs (CVOCs) and aromatic hydrocarbons (petroleum); however,

CVOCs are the primary contaminant of concern responsible for designation of the Site as an IHWDS. Significant soil and groundwater investigations have been conducted since the City signed a NYSDEC Order on Consent which has resulted in delineation of the general extent of VOC contamination.

On the Site the testing completed to date has included three (3) test pits, three (3) groundwater monitoring wells, six (6) surface soil samples, and eighteen (18) soil borings. None of the soil samples analyzed from the Site have exceeded 6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives for Industrial Use ("Industrial Use SCOs"). Two of three groundwater monitoring wells on the Site resulted in concentrations of VOCs that exceeded 6 NYCRR Part 703 Groundwater Quality Standards; one for VOCs and one for metals. However, these concentrations are relatively low-level. Samples analyzed for VOCs by Toxicity Characteristic Leaching Procedure (TCLP) have not exceeded 6 NYCRR Part 371 standards and are; therefore, not a characteristic hazardous waste. Based on the data collected, a consequential amount of hazardous waste is not present at the Site.

The table on the following page summarizes the previous soil and groundwater data collected at the Site. In addition, all soil, TCLP, and groundwater data is summarized on Figures 4B, 4C and 4D, respectively. Data summary Tables are included as Tables 1 through 13, attached. Field logs for all soil boring and groundwater monitoring well advancements are included in Attachment 1.

Cumulative Delist Area Soil and Groundwater Testing Results Summary

Media	Year	Identification	Sample Analysis	Table	Exceeded Regulatory Standard*	Notes
Soil- Borings (TCLP)	1993	B-102, B-105, B-106	TCLP Metals, Hazardous Characteristics	1	No	Non-hazardous
Surface Soil	2000	SS-1, SS-2, SS-5, SS-6, SS-9, SS-10	VOCs- all locations, SVOCs and Metals- 4 locations	2	No	VOCs non-detect in all samples
Soil- Borings	2000	GMX-MW-2, GMX-B-1, GMX-B-3, GMX-B-4	VOCs- all locations, SVOCs and Metals-3 locations	2	No	
Soil- Test Pits	2013	LAB-TP2013-01, LAB-TP2013-02, LAB-TP2013-03	VOCs- all locations	3	No	
Soil- Borings	2013-2014	2013-SB-6, 2013-SB-7, Delist Well	VOCs- all locations	4,6	No	
Soil- Test Pit and Boring (TCLP)	2013-2014	LAB-TP2013-01, Delist Well	TCLP Metals, VOCs, BNAs, Pesticides, Herbicides	5	No	Non-hazardous
Soil- Borings	2014	2014-SB-03, 2014-SB-04, 2014-SB-05, 2014-SB-06,	TPH- all locations	7	NA	
Groundwater	1987-1989, 1993	GW-5	VOCs, SVOCs, Metals	8	Yes- metals	VOCs non-detect
Groundwater	2000	GMX-MW-2	VOCs	9	Yes- VOCs	44 ppb total VOCs
Groundwater	2013-2014	Delist Well	VOCs	11	No	22.19 ppb total VOCs
LNAPL	2014	Delist Well	VOCs, PCBs, Metals	10	NA	670 ppb total VOCs, PCBs non-detect, chromium= 725 ppb, lead= 314 ppb

**Soil sample results compared to 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 Industrial Use SCO. Samples analyzed by Toxicity Characteristic Leaching Procedure (TCLP) compared to 6 NYCRR 371.3Toxicity Characteristics. Groundwater sample results compared to NYSDEC Part 703 Groundwater Quality Standards.*
NA indicates "Not Applicable"

It should be noted that the recent testing in support of this Delisting Petition identified the presence of light non-aqueous phase liquid (LNAPL) in the Delist Well; however, this apparent petroleum product was non-detect for PCBs and resulted in a concentration of 670 parts per billion (ppb) total VOCs (120 ppb CVOCs); as such, the LNAPL is non-hazardous. The volume of product was evaluated through additional test borings and LNAPL recharge testing. Following removal of approximately seven gallons of LNAPL and recharge monitoring as well as the advancement of soil borings in proximity to the Delist Well in July 2014, it appears the LNAPL observed was localized, and as confirmed

by calculations of actual thickness of free product, is limited in volume. As such, it is sought after by the City to delist the portion of the FESL as shown on Figure 3.

Hydrogeological Information

As part of each of the subsurface studies, hydrology, geology and utilities have been evaluated across the FESL, at the Site and in proximity of the Site. These portions of the subsurface studies provide information on the thickness of cover material, thickness of landfill materials, depth to bedrock and groundwater flow. Borings, test pits and wells advanced within the Site have indicated that surface cover material generally consists of sand, silt, and gravel with thickness ranging from 10 inches to 30 inches. Underlying the cover material, landfill materials consist of ash, fine sand, and gravel with varying amounts of wood, paper, plastic, metal and glass with a maximum thickness of approximately 21 feet. The depth to bedrock across the Site ranges from 18 to 28 feet below ground surface. Groundwater across the FESL is significantly influenced by subsurface utilities. Specifically, sewers throughout the FESL extend into bedrock and porous bedding backfill materials likely provide preferential pathways for groundwater. In the area of the Site this groundwater flow is influenced by the storm sewer in McCrackanville Street which based on previous groundwater contours (refer to 2011 SVI Report) indicates groundwater flow from the northwest to the southeast.

The cumulative environmental testing when coupled with the historical documentation review provides a comprehensive understanding of the landfill materials, contaminants of concern, and contaminant fate and transport (i.e, migration pathways). Extensive data interpretation has led to a better understanding of the historic filling during and post landfill operations, as well as hydrogeological conditions including groundwater flow directions and the extent of contamination. Although petroleum impacts were identified and regulated solid waste is present, adequate cover materials are in-place on the Site and the subsurface testing data has not identified any areas of hazardous waste within the Site as defined by NYCRR Part 375 1.2(w). Significant contamination is present south of the Site within the 'P-1' area; however, the groundwater flow direction and extensive testing within this area indicate that impacts extend from the P-1 area to the southeast and do not impact the Site.

Delisting the Site as an IHWDS will allow for 13.3 acres of vacant industrial land to be utilized by the City. The City is evaluating the Site for a photovoltaic (PV) solar array and intends to retain ownership of the Site and to improve its use to benefit the community.

The City has several institutional controls in place for the Site to minimize the potential for exposure to contamination and protect human health and the environment. All properties within the FESL are flagged in the City's Building Information System (BIS) which notifies the owner and permit issuer that the property has environmental concerns. In addition, several guidance documents and environmental management plans have been created for the FESL which are intended to be referenced by property owners and Site workers during intrusive work. If the Site is delisted as an IHWDS, the current institutional controls will remain in place. The most updated guidance documents to be referenced include:

- *City of Rochester's Former Emerson Street Landfill Sub-Slab Ventilation Guidance Document*, prepared by LaBella and dated October 2013; and
- *City of Rochester's Former Emerson Street Landfill Guidance for Waste-fill Management During Site Development on the FESL,* prepared by LaBella and dated October 2013

The requirement for delisting in NYCRR Part 375-2.7(e) includes confirming that consequential amounts of hazardous waste disposal did not occur and if necessary an environmental easement be put in place. Based on the cumulative testing completed at the Site, these criteria have been substantially met. The Site can be sub-divided and an easement put in place to complete the delisting.

1.0 FESL Background

The FESL consists of approximately 255 acres of land comprised of 45 individual parcels, seven of which are owned by the City of Rochester (Refer to Figure 2). The remaining 38 parcels are owned by 25 private owners. The FESL is predominantly occupied by industrial and commercial properties (15 and 20, respectively based on use codes). In addition, City use codes indicate five parcels as vacant land, one parcel as "unknown" (McCrackanville Street) and four parcels are listed as community/public service (one of which is Edison Tech school). The surrounding area contains industrial and commercial properties; however, residential properties are also located to the northeast.

Prior to FESL landfilling operations, the area was primarily vacant and relatively flat lying, with a wetland located in the north-central portion of the site. As a result of landfilling activities, portions of the FESL site has been elevated approximately 15 or more feet above the surrounding area. An industrial park presently occupies most of the FESL site, including larger facilities and various smaller industrial and commercial facilities, as well as several undeveloped parcels and undeveloped land on otherwise developed parcels.

The FESL was operated by the City as a landfill beginning sometime between the 1940's and 1951. The landfill was used to dispose of ash derived from the incineration of municipal waste at the City's incinerators. Ash, fill and to a lesser extent, construction and demolition debris were the primary waste materials placed in the landfill. Landfilling began south of Emerson Street and gradually expanded northward and eastward to include areas between Emerson Street and Lexington Avenue, east of Colfax Street and south of Emerson Street. Fires due to incomplete incineration and open burning of refuse reportedly occurred in the late 1960s and early 1970s due to operational problems with the incinerators. Fill during this timeframe was reportedly being placed north of Emerson Street. In May of 1971 the City's incinerators were shut down; however, un-incinerated municipal refuse continued to be placed north of Emerson Street until August of 1971. In August 1971, refuse disposal was ceased at the FESL and disposal shifted to a different landfill. In 1971 the landfill was officially closed and a contract for the closure of the eastern half of the landfill specified two feet of cover material (preferred to be a sandy loam) to be placed and compacted to 30% in one foot lifts. In September 1971 a contract was awarded for the closure of the western portion of the landfill. Since its closure, portions of the FESL have been developed by various private parties.

The general types of wastes encountered in investigations at the FESL site include the following:

- Municipal Incinerator Ash- Generally consisting of ash, cinders, charred refuse, glass and metal slag. Most ash observed in investigations appears to be fly ash and bottom ash (clinker) from the municipal solid waste incinerators. This generally consists of soil and rock fill with traces of plastic, metal, wood, concrete, bricks, tiles, and asphalt.
- Construction and demolition debris- This material observed in past investigations generally fits the definition of construction demolition debris contained in NYSDEC's Part 360. Construction demolition debris fill is common in areas adjacent to current and

former roadways on the FESL, and particularly in the lobe of fill south of Emerson Street and east of Colfax Street.

- Soil and Municipal Refuse - This material generally consists of silty sand cover material and disposed, un-incinerated municipal refuse.
- Low-activity Radioactive Waste - This material was encountered in a limited area south of Emerson Street (not within the Site proposed for delisting) and consisted of a sludge-like waste material associated with glass lenses. The sludge was found to contain low levels of radioactive thorium. This material was primarily encountered in a relatively small area in the southwest portion of the FESL and was associated with incinerator ash and refuse fills. This material was removed by Sevenson Environmental Services on behalf of the City of Rochester.
- The majority of the FESL has a soil cover. Cover ranges in thickness from 0 feet up to approximately 6 feet. Cover materials generally consist of topsoil with grass, gravel, asphalt, or glacial till-derived sandy silt.

During the 2011 Soil Vapor Intrusion (SVI) Assessment conducted by LaBella, the FESL was divided into quadrants. Quadrant A is the northwestern portion of the FESL and is defined on the north by Lexington Avenue, the west by Lee Road, the south by Emerson Street, and the east along the property line between 1570 and 1580 Emerson Street and bisects 60 McCrackanville, 575 Colfax and 655 Colfax. Quadrant B is the northeastern portion of the FESL and is defined on the north by Lexington Avenue, the east by Colfax Street and the South by Emerson Street. Quadrant C is the southwestern portion of the FESL. The eastern border of Quadrant C is Quadrant D at Colfax Street. Quadrant D is the southeastern portion of the FESL. The quadrants are based on significant differences in subsurface conditions (i.e., fill materials, groundwater impacts, etc.). The Site is located within Quadrant A.

A majority of the FESL has been delisted; however, four parcels (1660 and 1740 Emerson Street, 1635 and 1655 Lexington Avenue) comprising approximately 29 acres are currently listed as a Class "3" site (No. 828023) on the NYSDEC Registry of IHWDS. A "3" classification indicates a site "at which contamination does not presently constitute significant threat to public health or the environment".

1.1 Infrastructure

Monroe County geographic information system (GIS) files were provided to LaBella including locations of manholes, catch basins, utility and light poles, storm sewers, sanitary sewers, combined sewers and underground electric, gas, and City of Rochester water supply lines. The following major utilities exist at, and adjacent to, the FESL:

- Monroe County Department of Environmental Services, Division of Pure Waters (storm, sanitary and combined sewers and water mains). The deep storm sewer which was constructed approximately 10 feet into bedrock consists of a 60-inch diameter sewer aligned parallel to the eastern site boundary and a 72-inch diameter sewer below Emerson Street.

- Rochester Gas and Electric (RG&E)
- Frontier Telephone (Formerly Rochester Telephone)

In addition, private utilities exist, generally connecting buildings located on the FESL to public utilities. Utilities are included on Figure 5. A storm sewer exists beneath 1635 Lexington Avenue, runs south beneath McCrackanville Street and connects to Emerson Street. No known utilities exist at 1655 Lexington Avenue.

1.2 Geology and Hydrogeology

Top soil ranging from 10 inches to 30 inches in thickness covers the Site. Fill material consisting of incinerated and non-incinerated landfill materials including ash, plastic, papers, wood, glass, metal, etc. mixed with sand, silt, and/or gravel is present from depths ranging from 10 inches to 28 feet below ground surface. Bedrock is present at depths ranging from 18 feet to 28 feet below ground surface and consists of Lockport and Rochester Formations. A discontinuous layer of native sand and silt is present at the Site below fill material in some locations where the fill material does not extend to bedrock.

Static water levels from groundwater monitoring wells have been recorded at several occurrences; including most recently, May 2014. Groundwater is largely influenced by the sewer that runs north-south beneath McCrackanville Street. Groundwater at the Site generally flows southeast towards the sewer. A groundwater contour map derived from the most recent static water level measurements is included as Figure 6.

1.3 Summary of P-1 Plume

A CVOC plume was identified at the 1655 Lexington Avenue parcel and designated the "P-1 Plume", with the source area at, or in close proximity to, the P-1 well which was installed during the 1987-1989 RECRA Investigation. The CVOC groundwater plume is largely influenced by the storm sewer system which runs south beneath McCrackanville Street to Emerson Street. A substantial amount of soil and groundwater data has been collected to reinforce the identified source area in proximity to P-1. Further delineation has confirmed that the source area is south of and hydraulically down gradient of the Site. Total CVOC concentrations in groundwater samples in the P-1 well reduced from 54.4 parts per million (ppm) in the year 2000 to 18.5 ppm in 2014.

The influence of the plume in a south-southeast direction towards the storm sewer was identified as early as the 1987-1988 RECRA Investigation and confirmed during the 1992-1993 H&A Investigation, 2001 LaBella/Geomatrix Investigation and 2011 LaBella SVI Assessment which included FESL-wide collection of groundwater samples and elevations. Groundwater elevations collected in 2010 were compared to the sewer inverts and indicated steep gradients in proximity to sewers where the invert is at or below the interpolated groundwater elevation. This results in groundwater flows on both sides of the storm sewer piping/bedding flowing towards the sewer. The groundwater sampling data from the 2011 investigation confirmed the sewer influence on groundwater flow and thus contaminant migration. These two significant pieces of data were used to determine

the direction of the P-1 plume to be southeast and; therefore, hydraulically down gradient of the Site.

Based on the southeast influence of the P-1 plume and; therefore, contaminants associated with the plume and the nature of contamination north of the plume (i.e., at the Site), the P-1 plume does not extend northward onto the Site, nor does groundwater flow towards the Site from P-1.

1.4 Studies Conducted at Other Landfills

The NYSDEC approved *Delisting Petition for Properties Associated with the Former Emerson Street Landfill Site* by Haley and Aldrich (H&A) dated July 1995 for a significant portion of the FESL which included literature on typical VOC concentrations detected in landfill leachate from municipal solid waste landfills. Table 13 which was also included in the 1995 Delisting Petition compares ranges of VOCs detected in leachate from three different sources including landfills in Minnesota, Wisconsin (Sabel and Clark, 1948), and a 1988 USEPA study of leachate in landfills across the United States that were active prior to 1980. VOC concentrations in groundwater at the FESL, with exceptions of the wells located south of the proposed Delist Area and in close proximity and hydraulically down gradient (south) of well P-1 are well within the ranges identified during these studies. Specifically, VOCs detected in groundwater samples collected from the monitoring wells located within the proposed Delist Area at the Site are below the lower limit of the range of VOCs identified in leachate during these studies. Furthermore, groundwater samples from these wells span 26 years (sampling events in 1988, 1989, 1993, 2000, 2010, 2013, 2014) and has consistently documented the lack of VOCs or minor detections in groundwater samples. As such, VOCs detected in groundwater at the Site (i.e., Delist Area) do not suggest or represent consequential amounts of hazardous waste disposal, but rather are consistent with low concentrations of VOCs found non-hazardous municipal solid waste landfills.

2.0 Proposed Future Use

It is the City's intent to retain ownership and utilize the Site as shown on Figure 3. Proposed use includes the installation of a photovoltaic (PV) solar panel array to generate power that will supplement the City's energy supply. According to National Renewable Energy Laboratory (NREL) statistics, the proposed 13.3 acres proposed for delisting can generate between 1.1 and 6.0 megawatts (MW) of electricity. According to the United States Energy Information Administration (EIA) in 2012 the average annual electricity consumption for a United States utility customer was 1.23 kilowatts; therefore, the Site can supply enough power for up to 4,878 utility customers.

The USEPA has permitted renewable energy sources to be installed on contaminated land including Superfund Sites and former landfills through its *RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land and Mine Sites* initiative in conjunction

with the Office of Solid Waste and Emergency Response (OSWER) and the Center for Program Analysis (OCPA). Developing a PV array on the FESL will provide an economically viable opportunity for land that would otherwise remain undeveloped and underutilized.

3.0 Site Background and Previous Investigations

The Site consists of approximately 13.3 acres of vacant industrial land and is surrounded by a manufacturing facility adjacent to the west, vacant industrial land to the north across Lexington Avenue, an athletics field for a school to the east and across McCrackanville Street, manufacturing facility to the south across Emerson Street, distribution facility adjacent to the south, and manufacturing facility adjacent to the southeast.

Many investigations have occurred at the FESL since its closure. For the purpose of this Delisting Petition, previous investigations that occurred at the Site were reviewed in detail. Previous investigations at the Site were conducted from 1987 to 2014 and include surface soil samples, soil borings, test pits, soil vapor samples, and groundwater monitoring wells. The table on the following page summarizes the investigations relevant to this Delisting Petition in chronological order. Testing locations and results are summarized on Tables 1 through 11, and Figures 4A, 4B, 4C, and 4D.

Summary of Delist Area Investigations

Year(s)	Report	Study Area	Description	Testing Locations Installed on the Land Proposed for Delisting
1987-1989	RECRA Phase II Investigation	Entire FESL	Hazardous Ranking System Scoring. Geophysical, surface/stormwater, sampling, soil sampling, installation of 12 monitoring wells ("GW" series	GW-5
1992-1993	Haley & Aldrich Modified Remedial Investigation	Entire FESL	Soil ("B-100" series), bedrock and soil gas sampling, installation of 6 shallow bedrock wells and 4 deep bedrock wells, and 2 shallow 'well points.'	B-101, B-102, B-105, B-106
2000	Geomatrix Consultants, Inc./ LaBella Associates Remedial Investigation	IHWDS – 1635 & 1655 Lexington Ave.	Soil and bedrock sampling, installation of 6 shallow and 1 deep bedrock monitoring wells ("GMX" series), storm sewer sampling	SS-01, SS-02, SS-05, SS-06, SS-09, SS-10, GMX-B1, GMX-B3, GMX-B-4, GMX-MW-2
2011	LaBella Soil Vapor Intrusion Assessment	Entire FESL	Vapor intrusion assessment at buildings on the FESL, FESL-wide static water level measurements, sampling and groundwater monitoring well inventory	None
2013	LaBella Associates Remedial Investigation	IHWDS – 1655 Lexington Ave.	Advancement and sampling of 16 test pits ("LAB-TP2013" series), installation of 7 monitoring wells ("LAB-SBW" series), and 17 soil borings ("2013-SB" series)	LBA-TP2013-01, LBA-TP2013-02, LAB-TP2013-03, 2013-SB-06, 2013-SB-07
2013-2014	LaBella Associates Remedial Investigation	IHWDS – 1655 Lexington Ave. Proposed Delisting Portion	Installation and sampling of one shallow bedrock monitoring well ("Delist Well") and six soil borings ("2014-SB" series). Bail-down test of Delist Well.	Delist Well, 2014-SB-01, 2014-SB-02, 2014-SB-03, 2014-SB-04, 2014-SB-05, 2014-SB-06

3.1 Summary of RECRA Environmental 1987-1989 Investigation

RECRA Research Inc. (RECRA) completed a Phase I Environmental Site Assessment (ESA) in 1983 using a NYSDEC-adopted Hazardous Ranking System (HRS) for the FESL. RECRA completed a Phase II Investigation from 1987-1989 across the entire FESL to fill in data gaps and further investigate the FESL. The Phase II ESA consisted of a review of additional literature not reviewed during the Phase I ESA including aerial photographs, utility maps, County and City records and correspondence, a subsurface investigation including monitoring well installations, geophysical testing, and permeability testing.

One location tested during the Phase II ESA (GW-5) is located at the Site; specifically at 1635 Lexington Avenue. GW-5 was installed in 1988 and was subsequently sampled for VOCs, SVOCs, and metals. The well was constructed approximately 11.5 feet into bedrock and the well construction log is included in Attachment 1. GW-5 was sampled again in 1989 for metals, in 1993 for VOCs and SVOCs, and in 2010 for VOCs. VOCs were non-detect on all sampling occasions. The samples collected in 1988 and 1989 exceeded NYSDEC Part 703 Groundwater Quality Standards for metals (the samples in 1993 and 2010 were not analyzed for metals). Groundwater flow direction was determined to be from the northwest towards the southeast and influenced by the storm sewer beneath McCrackanville Street. A data summary is included in Table 8.

3.2 Summary of H&A 1992-1993 Investigation

Haley & Aldrich (H&A) performed an investigation across the entire FESL which included soil, soil vapor, and groundwater sampling. Soil test borings B-101, B-102, B-105, and B-106 were advanced at the Site in May 1993. Fill material and ash were encountered in the soil test borings from depths ranging from three to twenty-three feet below ground surface. Pertinent H&A soil test boring logs are included in Attachment 1.

Soil samples from B-102, B-105, and B-106 were submitted to a laboratory and analyzed for metals by TCLP. Concentrations detected in these soil borings did not exceed 6 NYCRR Part 371 Toxicity Characteristics Standards and are; therefore, non-hazardous. A data summary is included in Table 1. Groundwater flow direction was determined to be from the northwest towards the southeast and influenced by the storm sewer beneath McCrackanville Street.

In addition, two off-Site bedrock wells installed during this investigation at 500 Lee Road are in close proximity to the Site; MW-14D and MW-14S. These two wells are to the west/southwest of the Site and are included in Figure 4A. Due to the close proximity to the Site, these two wells are included herein in support of this Delisting Petition. Well construction logs are included in Attachment 1.Both wells were sampled in July 1993 for VOCs and SVOCs. VOCs were non-detect in both wells and SVOCs were detected below NYSDEC Part 703 Groundwater Quality Standards. A summary of detected compounds is included in Table 12B.

3.3 Summary of Geomatrix and LaBella 2000 Investigation

In 2000, Geomatrix Consultants Inc. (Geomatrix) and LaBella performed a Remedial Investigation (RI) for the four IHWDS parcels within the FESL. The RI consisted of surface soil sampling, soil borings, and groundwater monitoring wells. Surface soil samples SS-1, SS-2, SS-5, SS-6, SS-9 and SS-10, and soil borings GMX-MW-2, GMX-B-1, GMX-B-3, and GMX-B-4 were advanced at the Site.

Surface soil samples were collected from 0-2 inches below ground surface and analyzed for VOCs and a select number for SVOCs and metals; none of which exceeded NYCRR Part 375 Restricted Use Soil Cleanup Objectives (SCOs) for Industrial Use ("Industrial Use SCOs"). VOCs were non-detect in all surface soil samples.

A soil sample collected from GMX-MW-2 was analyzed for VOCs and was non-detect. Soil samples collected from GMX-B-1, GMX-B-3, and GMX-B-4 were analyzed for VOCs and GMX-B-3 and GMX-B-4 analyzed for VOCs, SVOCs and Metals. Concentrations of VOCs, SVOCs and metals did not exceed Industrial Use SCOs. GMX-B-1 resulted in a total VOC concentration of 97,600 ppb, GMX-B-3 resulted in a total VOC concentration of 909 ppb, and GMX-B-4 resulted in a total VOC concentration of 87 ppb. Soil boring logs are included in Attachment 1. A data summary table is included in Table 2.

GMX-MW-2 was installed into bedrock and the groundwater was sampled for VOCs. Two VOCs were detected at concentrations ranging from 21 ppb to 23 ppb, which exceeded NYSDEC Part 703 Groundwater Quality Standards. Groundwater flow direction was determined to be from the northwest towards the southeast and influenced by the storm sewer beneath McCrackanville Street. The well construction log is included in Attachment 1. In 2010 GMX-MW-2 was sampled by a LaBella representative and analyzed for VOCs. Total VOCs in GMX-MW-2 were 2.2 ppb (all CVOCs). Detected compounds in groundwater at this location are included in Table 9.

Soil vapor sampling was conducted across the Site as part of the investigation in 2000. Nearly 60 soil cores recovered during the soil vapor investigation were evaluated for depth landfill material. Thickness of cover material ranged from 10 inches to 30 inches in thickness. Due to the absence of regulatory standards for soil vapor testing and the substantial amount of soil and groundwater testing across the Site, soil vapor sampling is not considered to be supporting data for this Delisting Petition.

3.4 Summary of Day Environmental, Inc. 2000-2001 Investigation

Day Environmental, Inc. (Day) conducted a subsurface investigation at 500 Lee Road, adjacent to the west of the Site, in 2000-2001 which included the installation of two groundwater monitoring wells. DAY-MW-1 2000 is in close proximity to the Site and is included herein in support of this Delisting Petition. DAY-MW-1 2000 was sampled for VOCs and TPH and resulted in a TPH concentration of 1,030 ppb and identified as lube oil; VOCs were non-detect. A data summary from this investigation is included in Table

12B. Due to limited documentation on this investigation, a well construction log is not included.

3.5 Summary of LaBella 2011 Investigation

LaBella conducted an SVI Assessment at the 45 parcels across the FESL consisting of additional historic review, and a four step SVI assessment process including 1) a consultation with the property owner to discuss project scope and NYSDEC requirements, 2) an initial building survey (i.e., site reconnaissance) to evaluate for building conditions/factors that could impact SVI, 3) SVI investigation (if necessary), and 4) building mitigation (if necessary). The SVI Assessment divided the FESL into quadrants as described in section 1.0 of this report, with the Site residing in Quadrant A. The following summarizes characteristics of each quadrant as determined by historical testing and defined in the 2011 investigation.

Quadrant A (Northeast)– The fill material in this area ranges in thickness from no fill material observed in the western portion of the quadrant to approximately 23 feet thick in the central portion of the quadrant. The cover thickness in this quadrant ranges from less than 1 foot in the northeastern portion of the quadrant to greater than 3 feet in the central portion of the quadrant. Underlying the cover material, the fill consists of putrescible waste (wood, paper, misc. refuse,), metal, plastic, rubber, brick, glass and some ash in the central and northern portions of the quadrant and predominantly ash in the southern portion of the quadrant in proximity to Emerson Street. This is consistent with the historic information reviewed. Some locations within this quadrant were noted to have fill material placed directly on bedrock, which would indicate portions of the quadrant were excavated prior to filling. Some testing locations indicated apparent native material beneath the fill materials and overlying the bedrock. This native material included in some locations silt and peat deposits which would be consistent with a marsh/swamp area. In locations without fill materials (generally the western portion of the quadrant), the native material consisted of silts and sands.

Quadrant B (Northwest)– The fill material in this area ranges from no fill material in the northeast portion of the quadrant to 22.5 feet thick in the western central in portion of the quadrant. The cover thickness in this quadrant ranged from less than 6 inches to up to 2 feet thick. Underlying the cover material, the fill consists of ash, putrescible waste (wood, paper, and misc. refuse), metal, plastic, rubber, brick, glass, etc. in the central and northern portions of the quadrant and predominantly ash with some putrescible waste in the southern portion of the quadrant. Fill material in some locations was noted to be directly on top of bedrock, while other locations indicated apparent native material between the fill and bedrock. Native organic materials (peat) were noted in several borings overlying the bedrock. Locations without fill materials (generally the western portion of the quadrant), the native material consisted of silts and sands.

Quadrant C (Southeast)– The fill material in this area ranges from no fill material in the western portion of the quadrant to 11.2 feet thick in the central and north-central portion of the quadrant. The cover thickness in this quadrant ranged from no cover to up to 3 feet thick. Underlying the cover material, the fill consists predominantly of ash material with some slag and cinders. It should be noted that some borings indicated lesser (trace) amounts of paper or wood; however, these were not the predominant material. Some locations within this quadrant were noted to have fill material overlying directly on bedrock, while others contained native materials between the fill and bedrock. The native materials included apparent marsh deposits (clayey silt with organics) in some locations up to 5 feet thick.

Quadrant D (Southwest)– The fill material in this area ranges from no fill material in the eastern and portions of the northern section of the quadrant to 11.5 feet thick in the central portion of the quadrant. The cover thickness in this quadrant ranged from less than 6 inches to less than 3 feet thick. Underlying the cover material, the fill consists predominantly of ash with some cinders, slag and glass noted. In addition, some wood and charred paper was noted in select borings. Some locations within this quadrant were noted to have filled material overlying directly on bedrock, while other locations noted apparent native material between the fill material and bedrock. The native material in some locations included apparent marsh deposits (clayey silt with organics) in some locations up to 6.8 feet thick.

As part of the SVI Assessment, groundwater was evaluated which included the installation of nine additional groundwater monitoring wells (not at the Site), and sampling all newly installed and existing groundwater monitoring wells for VOCs including GMX-MW-2 as described in section 3.3 and GW-5 as described in section 3.1. In addition, the 2001 defined P-1 plume direction was confirmed by static water level data and groundwater sampling results from this investigation which determined the groundwater flow direction to be from the northwest towards the southeast.

During static water level measurements across the FESL during this investigation, upon opening MW-15D located off-Site at 1769 Emerson Street, a strong sulfur-like odor was noted. It was determined that the gas from this well was associated with a natural gas pipeline leak or was thermogenic natural gas from the Rochester Shale formation rather than methane from the FESL. This is due to the fact that methane gas production from the FESL should be limited to above the bedrock and areas north of Emerson Street. As confirmation for the source of methane gas, a methane gas evaluation was conducted which included sampling of a former soil gas survey testing point. This testing point was designated "Stickup Gas Well" in the 2011 SVI Report and is located at 1655 Lexington Avenue within the Site. The location was installed and sampled during the 2000 Geomatrix investigation and was used as a control point for comparison to the gas identified in MW-15D. The approximate location of the Stickup Gas Well is shown on

Figure 4A. In December 2010, a LaBella representative collected a field reading of 30% methane gas using a landfill gas meter from this gas well. A sample was collected and fixed gases were analyzed for by USEPA Method 3 which resulted in 1.45% by volume methane. This data suggests that the landfill gas meter was inaccurate and that methane concentrations are well below the lower explosive limit (LEL) which is 5% by volume.

3.6 Summary of LaBella 2013-2014 Investigation

In 2013-2014, LaBella conducted a RI at 1655 Lexington Ave, specifically to further evaluate VOCs in the area of the P-1 plume. In addition, a well designated as the "Delist Well" was installed in support of this Delisting Petition to further evaluate groundwater quality north of the P-1 plume. The investigation consisted of the advancement of sixteen test pits, seventeen soil borings, seven bedrock groundwater monitoring wells, and one overburden groundwater monitoring well.

Soil Borings

A total of seventeen soil borings were advanced at 1655 Lexington Avenue to equipment refusal (i.e., apparent bedrock) which ranged from 22.7 to 27 feet below ground surface. Two soil boring locations are within the Site (2013-SB-06 and 2013-SB-07) as shown on Figure 4A. A sample was collected from each location and analyzed for VOCs. 2013-SB-06 resulted in a total VOC concentration of 105.5 ppb (7.5 ppb CVOCs) and 2013-SB-07 resulted in a total VOC concentration of 489.4 ppb (0.3 ppb CVOCs) In general, VOC concentration increased in closer proximity to P-1. Results are included in Table 6, attached.

This soil boring data was used to determine the southern boundary of the area proposed for delisting; 2013-SB-01 resulted in the highest total VOC concentration (2,982,990 ppb) of the seventeen soil borings, and exceeded Industrial Use SCOs. As such, the southern boundary line was drawn approximately 112 feet north of this soil boring, excluding it from the Site.

Test Pits

A series of test pits were advanced at 1655 Lexington Avenue based on historic fill material locations. Aerial photographs from 1966, 1967, 1968, 1970, 1971, 1972, 1973, 1974, 1980, and 1988 were extensively reviewed to identify areas where disturbances were apparent. Test pit locations were selected in areas where anomalies were present. A total of 16 test pits were advanced and material was logged by a LaBella representative. Material was screened with a photoionization detector (PID), landfill gas meter, and a radiation meter.

Three test pits were advanced at the Site; LBA-TP2013-01, LBA-TP2013-02, and LB-TP2013-03. The locations of LAB-2013TP-01, and LAB-2013TP-02 were determined from a 1973 aerial photograph which indicated apparent areas of

disturbance. The aerial and test pit locations are included as Figure 7, attached. Test pit logs are included in Attachment 1.

LBA-TP2013-01 was advanced to nine feet below ground surface and resulted in no elevated readings above background on a PID, landfill gas meter, or radiation meter. Materials encountered included reworked soil, cinders, gravel, concrete, metal and brick. A sample was collected at nine feet below ground surface and was sampled by TCLP analysis for metals, VOCs, base-neutral acids (BNAs), pesticides, and herbicides. Only metals were detected above laboratory reporting limits but were below 6 NYCRR Part 371 Toxicity Characteristic Standards. As such, the sample was non-hazardous. Results are included in Table 5, attached. In addition, a soil sample was analyzed for VOCs and resulted in a total concentration of 8.4 ppb. Concentrations did not exceed Industrial Use SCOs.

LBA-TP2013-02 was advanced to nine feet below ground surface, resulted in elevated readings up to 6.5 ppm on a PID, and no readings on a landfill gas meter or radiation meter greater than background levels. Materials encountered included reworked soil cover, gravel, and petrucilbe household municipal solid waste. A sample was collected at nine feet below ground surface, and analyzed for VOCs, resulting in a total concentration of 63.2 ppb. Concentrations did not exceed Industrial Use SCOs.

LAB-TP2013-03 was advanced to 8.5 feet below ground surface, resulted in elevated readings up to 12 ppm on a PID, and no readings on a landfill gas meter or radiation meter greater than background levels. Materials encountered included reworked soil cover, gravel, and petrucilbe household municipal solid waste. A sample was collected from seven feet below ground surface and analyzed for VOCs, resulting in a total concentration of 214.1 ppb. Concentrations did not exceed Industrial Use SCOs.

Off-Site Groundwater Monitoring Wells

Five shallow bedrock wells ("LAB-SBW" series), one overburden well ("LAB-OBW" series), and one deep bedrock well ("LAB-DBW" series) were installed in the vicinity of the P-1 well to further evaluate the extent of the P-1 plume. The southernmost boundary of the Site was placed approximately 8 feet north of LAB-SBW-01 and approximately 130 feet north of the P-1 well. Data collected from LAB-SBW-01 is included in this Delisting Petition due to its close proximity down gradient of the Site. LAB-SBW-01 was advanced 51 feet below ground surface (approximately 23.3 feet into bedrock). The well construction log is included in Attachment 1.

A soil sample was collected directly above bedrock, at a depth of 24 to 27 feet below ground surface and was analyzed for VOCs. VOCs were detected totaling 437.7 ppb at levels below Industrial Use SCOs. A bedrock sample was collected

at a depth of 30.1 to 30.5 feet below ground surface and was analyzed for VOCs. VOCs were detected totaling 45 ppb at levels below Industrial Use SCOs.

During installation of LAB-SBW-01, groundwater samples were collected continuously in bedrock from three depth intervals. Total VOC concentrations were 10.09 ppb (1.3 ppb CVOCs) at the 28-31 feet interval, 19.98 ppb (1.38 ppb CVOCs) at the 31-41 feet interval and 5.00 ppb (0.40 ppb CVOCs) at the 41-51 feet interval.

In May 2014, LaBella collected groundwater samples from all eight newly installed wells including LAB-SBW-01 and existing wells GMX-MW-3, GMX-MW-4, and P-1. LAB-SBW-01 resulted in a total VOC concentration of 6.16 ppb (5.3 ppb CVOCs) at 32-37 feet below ground surface. Results are included on Table 12, attached. Concentrations of VOCs detected are representative of municipal solid waste landfills and are not evidence of disposal of hazardous waste.

On-Site Groundwater Monitoring Wells

The Delist Well was advanced into bedrock to a depth of 41 feet below ground surface in an attempt to classify the northern portion of the Site as "clean" and to provide additional support for this Delisting Petition. The well construction log is included in Attachment 1. Petroleum-like odors and staining were identified from depths between 24 and 28 feet below ground surface (i.e., top of bedrock). The well construction log is included in Attachment 1. The following table summarizes the Delist Well details.

Depth (feet below ground surface)	Comment
24-28	Petroleum odors and staining
28	Top of bedrock (auger refusal)
28-31	Rock socket
31-41	Open bedrock hole

A soil sample was collected from the Delist Well at 28 feet (i.e., top of bedrock) below ground surface and sampled for VOCs which resulted in a total VOC concentration of 287.9 ppb. The sample did not exceed Industrial Use SCOs. Detected compounds are included in Table 4, attached.

In addition, the soil sample was analyzed by TCLP for metals, VOCs, BNAs, pesticides, and herbicides. Only metals were detected above laboratory reporting limits, and were below 6 NYCRR Part 371 Toxicity Characteristic Standards. As such, the sample is non-hazardous. Results are included in Table 5, attached.

During installation of the Delist Well, a groundwater sample was collected at 28-31 feet below ground surface and analyzed for VOCs which resulted in a total concentration of 22.19 ppb (CVOCs were non-detect). Detected compounds did not exceed 6 NYCRR Part 703 Groundwater Quality Standards, and are included in Table 11, attached.

During the May 2014 sampling event, LNAPL was identified in the Delist Well. A sample of the LNAPL was collected on May 20th, 2014 for analysis of VOCs, PCBs, and metals. The analysis resulted in detection of VOCs at a total concentration of 100 ppb (CVOCs were non-detect), lead, and chromium at levels exceeding Part 375 Groundwater Quality Standards but well below TCLP regulatory standards; PCBs were non-detect. Due to the laboratory exceeding sample holding times, an additional LNAPL sample was collected on June 18th, 2014 and analyzed for VOCs and PCBs. This analysis resulted in a total VOC concentration of 670 ppb (120 ppb CVOCs) and non-detect PCBs (the second LNAPL sample was not analyzed for metals). Concentrations of VOCs detected are representative of municipal solid waste landfills and are not evidence of disposal of hazardous waste. Results for the two LNAPL samples are included in Table 10, attached.

3.6.1 Delist Well Bail-down Test

Further investigation in the vicinity of the Delist Well in July 2014 consisted of measuring, removing, and monitoring the volume of LNAPL, and delineation of the horizontal extent of LNAPL. The additional investigation consisted of a bail-down test and six additional soil borings that were advanced radially from the Delist Well.

The bail-down test commenced on day-one with measuring the initial depth to LNAPL and depth to water with an oil-water interface probe. An approximate 5.19 foot thick layer (~3.4 gallons) of LNAPL was present. Subsequently, a bailer was used to remove approximately 3.5 gallons of free product. On day two and day three, an additional two gallons and one gallon respectively of LNAPL were removed until groundwater was present in the bailer. A total of 6.5 gallons of LNAPL were removed from the Delist Well. Contents removed were containerized in a 55 gallon drum on-Site. The following table indicates the schedule followed for measuring the LNAPL recharge rate.

Time From Ceasing Bailing	Measurement Intervals
0-15 minutes	1 per minute
15-30 minutes	1 per 5 minutes
30 – 2 hrs	1 per 15 minutes
2 hrs – 4 hrs	1 per 30 minutes
4 hrs – 8 hrs	1 per 60 minutes

Monitoring of the Delist Well was performed daily for an additional four days, and on day twelve; one week after the completion of the initial week of monitoring. The following table indicates the measured thickness each day the well was monitored.

Day	LNAPL Measured Thickness (feet)	Notes
1	5.19	Initial measurement (Prior to bailing 3.5 gallons LNAPL)
2	2.41	Initial day 2 measurement
2	0.29	After bailing an additional 2.0 gallons LNAPL
2	0.14	After 8 hours of monitoring
3	0.92	Initial day 3 measurement
3	0.67	After bailing 1.0 gallons LNAPL
4	0.44	
5	0.35	
12	1.05	

By day twelve, the LNAPL thickness in the Delist Well was reduced from 5.19 feet (3.4 gallons) to 1.05 feet (0.7 gallons); a 79 percent reduction in volume.

The purpose of the bail-down test was to remove as much free product as possible, then to measure the recovery rate over a period of time to determine if the LNAPL was recharging. Due to the capillary rise of water in monitoring wells, the volume of LNAPL in the well appears greater than in actuality in the water table. To account for the capillary rise, calculations of actual free product thickness were conducted using equation (1) from *Practical Design Calculations for Soil and Groundwater* Remediation by Jeff Kuo. Relevant excerpts from the book are included in Attachment 3.

$$(1)\ t_g = t(1-S_g)-h_a$$

Where:

t_g= actual thickness of free product (inches)
t= apparent thickness of free product (measured in inches)
S_g= specific gravity of free product
h_a= distance from bottom of product to water table

The actual thickness of free product was calculated to be 5.98 inches on day one and 0.27 inches on day twelve. Calculations and assumptions are included in Attachment 3. During the bail-down test, the static water level was measured to be approximately two feet below bedrock. As such, it is apparent that the LNAPL encountered in the Delist Well was localized and limited.

3.6.2 Delist Well Soil Borings

To delineate the horizontal extent of petroleum contamination in the Delist Well and confirm the results of the baildown test, soil borings were advanced radially from the Delist Well in all directions, at varying distances ranging from 15 to 40 feet from the Delist Well. Soil boring locations are included in Figure 8, attached. No evidence of petroleum-related odors or staining was identified. Soil boring logs are included in Attachment 1. Select samples with the highest PID readings, and/or from the bottom of the boring in the locations closest to the Delist Well were analyzed for total petroleum hydrocarbons (TPH). Results are included in Table 7, attached.

There is no USEPA or NYSDEC standards for TPH and concentrations of up to several thousand parts per million are often found in native organic material. Concentrations were below 1,000 ppm with the exception of 2014-SB-06 which had a low-fraction TPH concentration of 16,000 ppm and high-fraction TPH concentration of 5,000 ppm at 20 to 22 feet below ground surface. Low-fraction TPH consists of compounds with five to twelve carbon atoms (i.e., gasoline) whereas high-fraction TPH consists of compounds with twelve to thirty carbon atoms (i.e., diesel fuel, motor oil).

Using Excerpts from *USEPA 510-R-96-001 Methods for Evaluating Recoverability of Free Product,* September 1996, included in Attachment 2, the total petroleum saturation was determined for each sample submitted for analysis. Total petroleum saturation and residual hydrocarbon saturation were calculated using equations (2) and (3), respectively.

(2) $$S_0 = TPH\ x\ \frac{(1-\varphi)\rho_{gr}\ x\ 10^{-6}\ kg/mg}{\varphi\ \rho_0}$$

(3) $$S_{of} = S_0 - S_r$$

Where:

So = total petroleum saturation (dimensionless)
TPH = total petroleum hydrocarbon concentration (mg/kg)
Φ = porosity (dimensionless)
ρ_{gr} = grain density (typically 2.65 g/cm3)
ρ_0 = density of the hydrocarbon, liquid (g/cm3)
S_{of} = free hydrocarbon saturation
S_r = residual hydrocarbon saturation

The highest TPH detected (high-fraction or low-fraction) and its corresponding density was used in calculating the TPH saturation for each sample. Calculations and assumptions are included in Attachment 2. Residual hydrocarbon saturation was assumed based on literature as noted in Attachment 2. Porosity was assumed to be 25%. Calculated free hydrocarbon saturation was zero for each sample except for 2014-SB-06 which was 0.0119. As such, it appears that the area surrounding the Delist Well is not saturated with free product. Additionally, low TPH concentrations indicate that the free product in the Delist Well does not extend horizontally to the six other soil boring locations.

4.0 Conclusions

Several previous investigations have been conducted and extensively analyzed at the FESL and in particular at the Site. In addition, more recent investigations were designed and conducted at the Site to facilitate proposing a portion of the FESL for delisting as a Class 3 IHWDS. Such investigations have determined that consequential amounts of hazardous waste are not present at the Site. The following summary of investigation results and conclusions were obtained from investigations conducted at the Site as described herein:

- All soil samples at the Site have resulted in concentrations below Industrial Use SCOs. The current and proposed future use is industrial; therefore, soil at the Site does not exceed the applicable regulatory standards for its current or proposed use.
- All soil samples at the Site analyzed using TCLP were below 6 NYCRR Part 371.3 Characteristics of Hazardous waste; as such, the material is not a characteristic hazardous waste.
- Evaluation of the existing cover resulted in a reported thickness varying from 10 inches to 30 inches. As such, landfill materials are present at least 10 inches below ground surface at the Site. The City is evaluating the potential for a PV solar facility which would require that additional cover material be placed.
- No evidence of characteristic hazardous waste or other evidence of disposal of industrial hazardous waste (e.g., evidence of drums) was identified during test pit or soil boring advancement.
- The most recent groundwater data from each of the three groundwater monitoring wells at the Site resulted in concentrations below NYSDEC Part 703Groundwater Quality Standards. Three groundwater sampling events from GW-05 in the northeast portion of the Site were non-detect for VOCs. Total VOCs in GMX-MW-02 on the eastern portion of the Site have declined from 44 ppb in 2000 to 2.2 ppb in 2010. Groundwater in the Delist Well near the center of the Site resulted in a total VOC concentration of 22.19 ppb. One of three groundwater monitoring wells on the Site have contained VOCs at concentrations that exceeded NSYDEC Part 703 Groundwater Quality Standards (GMX-MW-02 in 2000). The greatest detection of total VOCs in any groundwater sample was 44 ppb (GMX-MW-02 in 2000). Based on the most recent groundwater data from each of

the three groundwater monitoring wells at the Site, VOCs in groundwater do not exceed NYSDEC Part 703 Groundwater Quality Standards. In addition, VOCs were non-detect in all three off-Site wells to the west (DAY-MW-1 2000, MW-14D and MW-14S).

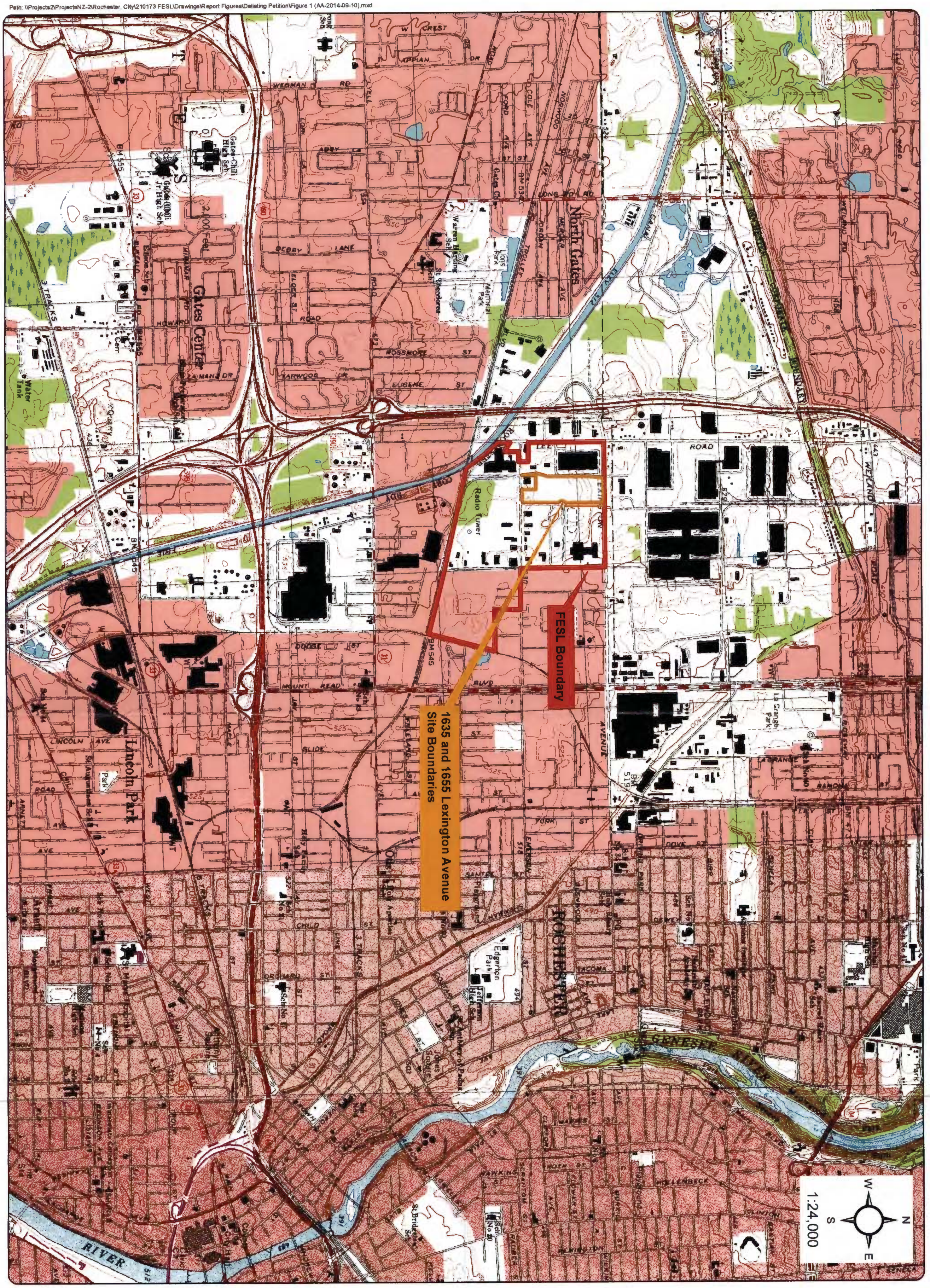
- Delineation of the LNAPL identified in the Delist Well verified that LNAPL was localized and did not extend 15 feet radially from the Delist Well. Removal of as much free product as possible and subsequent monitoring resulted in an actual free product thickness of only 0.27 inches. In addition, the LNAPL sample contained only 670 ppb total VOCs (120 ppb CVOCs) and PCBs were non-detect.
- Groundwater flow directions from investigations in 1987-1989, 1992-1993, 2000, 2010, and 2014 all consistently identify groundwater at the Site flows southeast and is influenced by the sewer that runs beneath McCrackanville Street to Emerson Street. As such, the P-1 plume centered south and hydraulically down gradient of the Site does not impact the Site itself.

Extensive investigations have resulted in sufficient data collection to better understand the subsurface at the Site. It is apparent that the data collected and described herein does not document the presence of consequential amounts of hazardous waste at the Site, and the Site does not warrant classification as an Inactive Hazardous Waste Disposal Site. As such, the City proposes to delist the portion of the FESL as shown on Figure 3 from the NYSDEC Registry of IHWDS. If the NYSDEC concurs with this Delisting Petition, the City will initiate a subdivision plan to sub-divide 1655 Lexington Avenue and combine the northern portion with 1635 Lexington Avenue to create a new parcel corresponding to the boundaries of the Proposed Delisting Land as shown on Figure 3; this coupled with existing Site Management Plans satisfies the requirements of NYCRR Part 375-2.7(e).

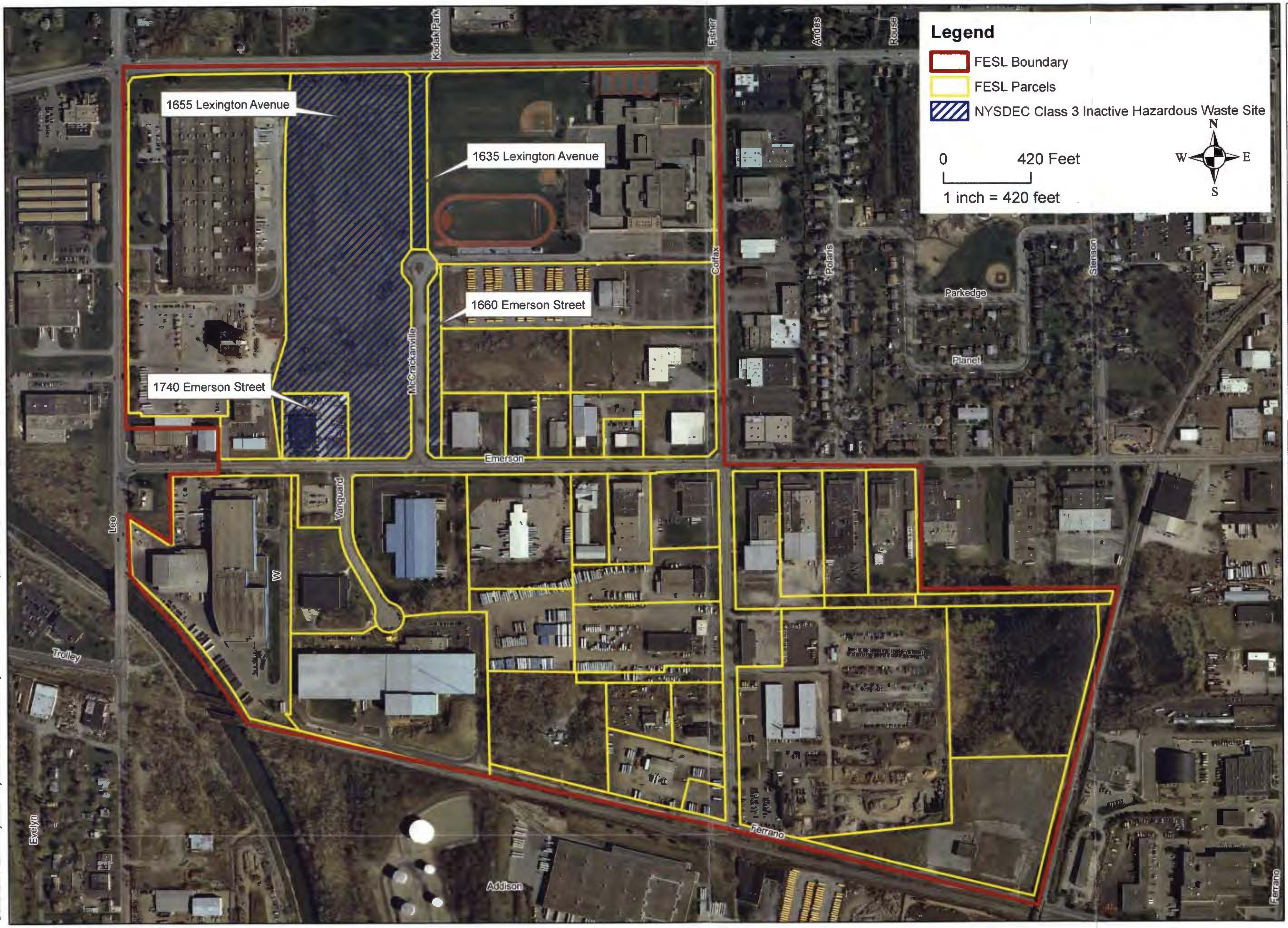
References

- *Volatile Organic Compounds as indicators of Municipal Solid Waste Leachate Contamination* Clark and Sabel 1984
- *Former Emerson Street Landfill Phase II* Investigation by RECRA Environmental dated February 1990
- *Former Emerson Street Landfill Modified Remedial Investigation* by Haley & Aldrich dated January 1994
- *Delisting Petition For Properties Associated with the Former Emerson Street Landfill Site* by Haley and Aldrich (H&A) dated July 1995
- *Former Emerson Street Landfill Remedial Investigation Report for City of Rochester Parcels 4, 10, and 11* by Geomatrix Consultants, Inc./ LaBella Associates dated April 2001
- *Phase I Environmental Site Assessment: Portion of 500 Lee Road, Rochester, New York* by Day Environmental, Inc. dated November 2007
- *Soil Vapor Intrusion Assessment Report* by LaBella Associates dated June 2011

Path: \\Projects2\ProjectsNZ-Z\Rochester, City\210173 FESL\Drawings\Report Figures\Delisting Petition\Figure 1 (AA-2014-09-10).mxd



PROJECT/DRAWING NUMBER 210173 FIGURE 1	DRAWING TITLE DELISTING PETITION PROJECT LOCUS MAP ISSUED FOR FINAL DATE: 10/24/2014 DESIGNED BY AA DRAWN BY AA REVIEWED BY DPN	PROJECT/CLIENT FORMER EMERSON STREET LANDFILL CITY OF ROCHESTER	LABELLA Associates, D.P.C. 300 STATE STREET ROCHESTER, NY 14614 P: (585) 454-6110 F: (585)454-3066 www.labellapc.com COPYRIGHT 2003



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DRAWING TITLE
DELISTING PETITION
NYSDEC CLASS 3 INACTIVE HAZARDOUS WASTE SITE
ISSUED FOR: FINAL
DATE: 10/24/2014
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DRAWN BY: AA
REVIEWED BY: DPN

PROJECT/DRAWING NUMBER
210173
FIGURE 2

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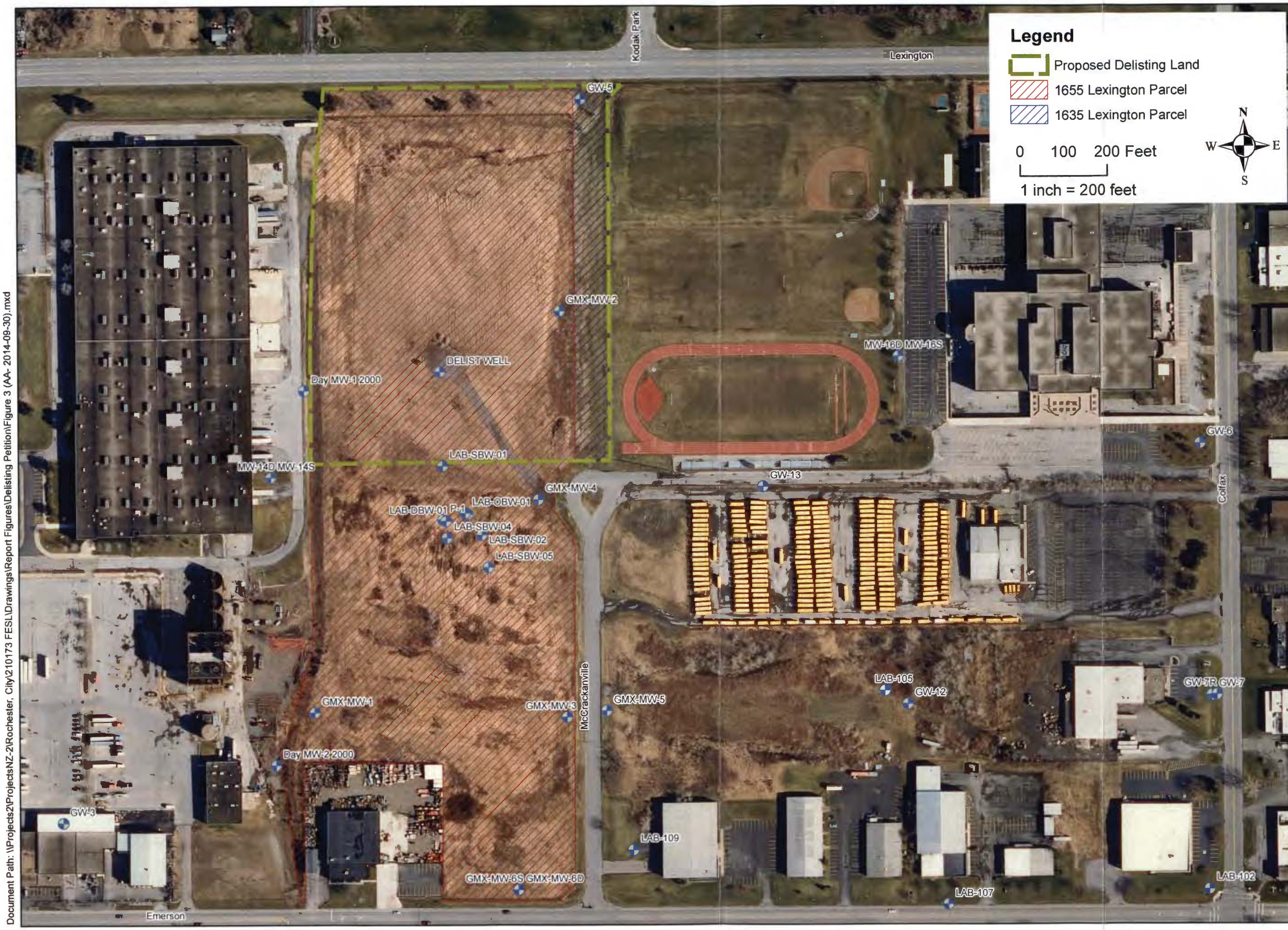

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PROJECT/CLIENT
FORMER EMERSON STREET LANDFILL
CITY OF ROCHESTER

DRAWING TITLE
DELISTING PETITION
SITE BOUNDARY AND PROPOSED DELISTING LAND

ISSUED FOR: FINAL
DATE: 11/13/2014
DESIGNED BY: AA
DRAWN BY: AA
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PROJECT/DRAWING NUMBER
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FIGURE 3

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DRAWING TITLE
DELISTING PETITION
PROPOSED DELISTING LAND TESTING LOCATIONS

ISSUED FOR: FINAL
DATE: 11/13/2014
DESIGNED BY: AA
DRAWN BY: AA
REVIEWED BY: DPN

PROJECT/DRAWING NUMBER
210173
FIGURE 4A

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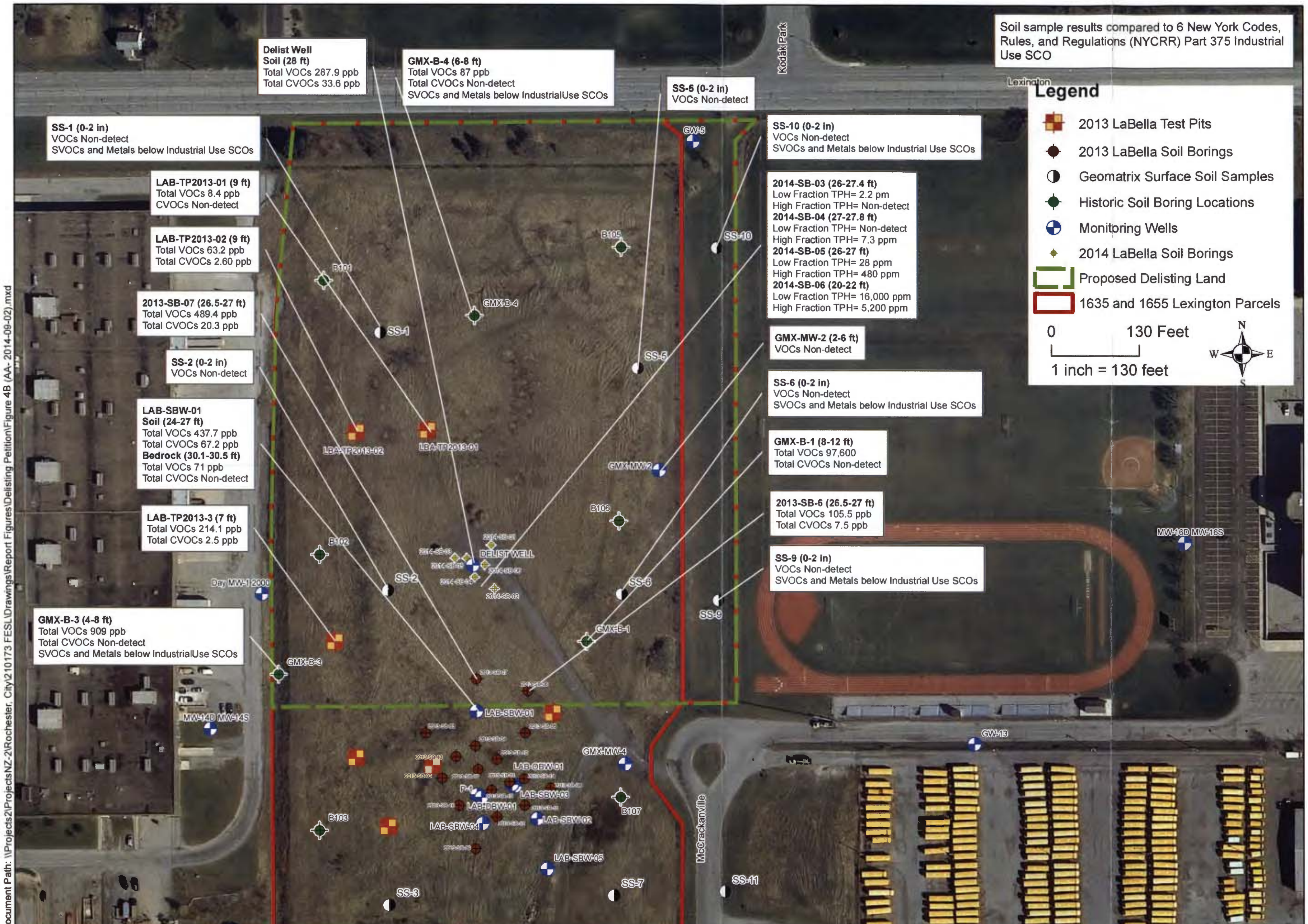

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DRAWING TITLE
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SOIL DATA

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PROJECT/DRAWING NUMBER
210173
FIGURE 4B

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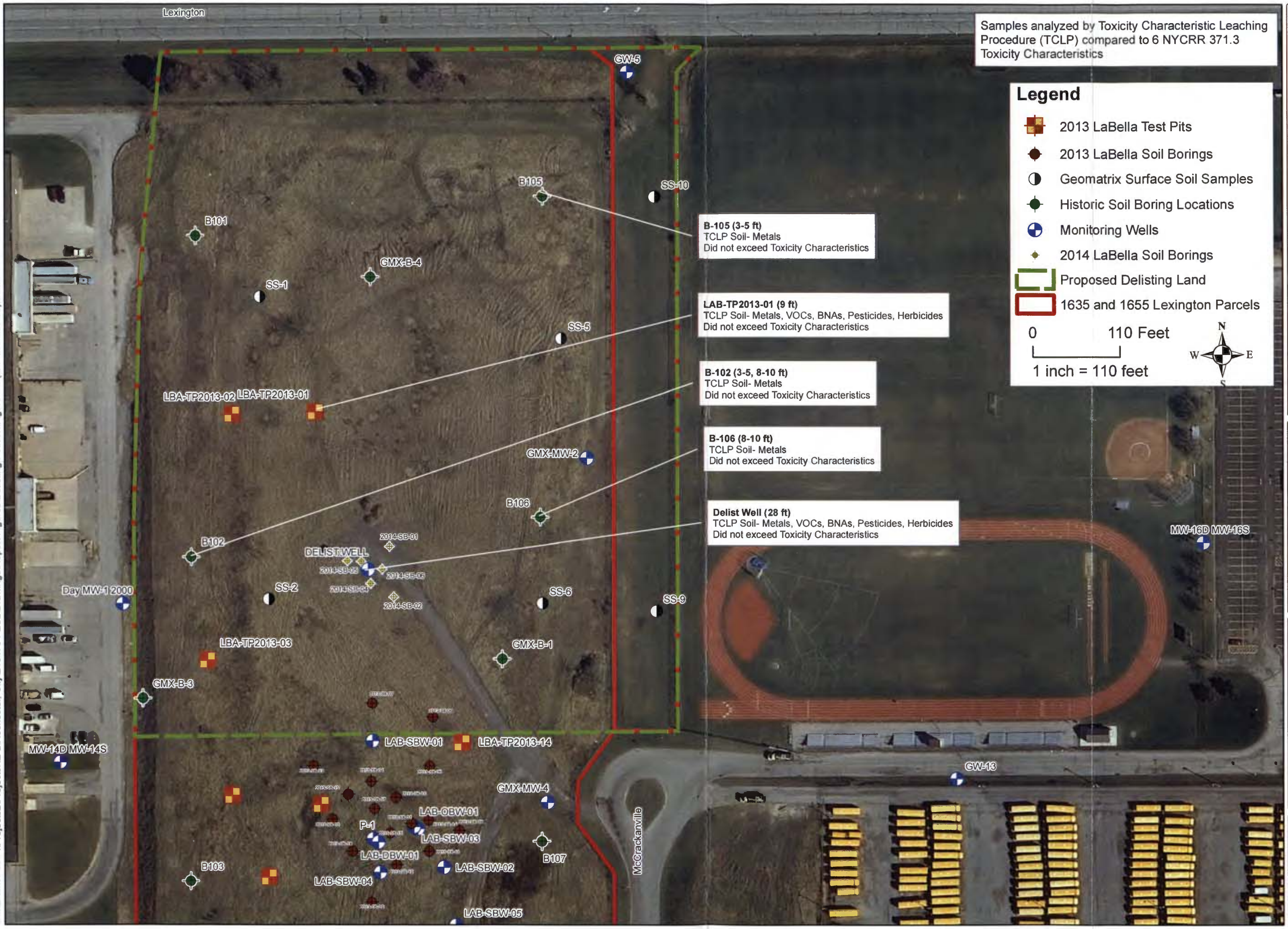

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TCLP SOIL DATA

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DATE: 11/13/2014
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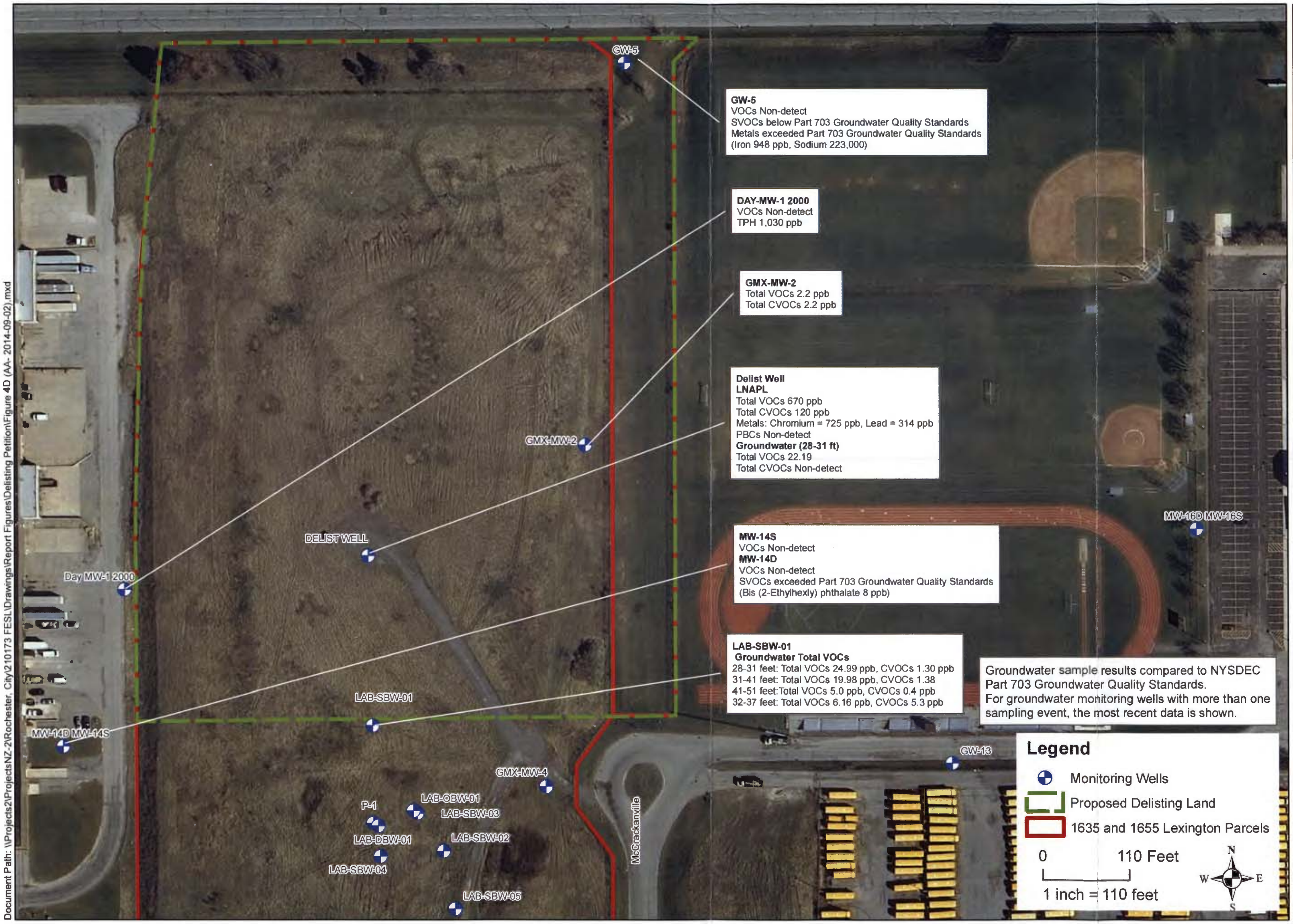
PROJECT/DRAWING NUMBER
210173
FIGURE 4C



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CITY OF ROCHESTER

DRAWING TITLE

DELISTING PETITION

GROUNDWATER DATA

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DATE: 11/13/2014

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PROJECT/DRAWING NUMBER

210173

FIGURE 4D

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FIGURE 5

210173

DELISTING PETITION

FESL UTILITIES

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DELISTING PETITION
GROUNDWATER CONTOUR MAP

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DATE: 10/24/2014
APPROVED BY: DPN

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FIGURE 6

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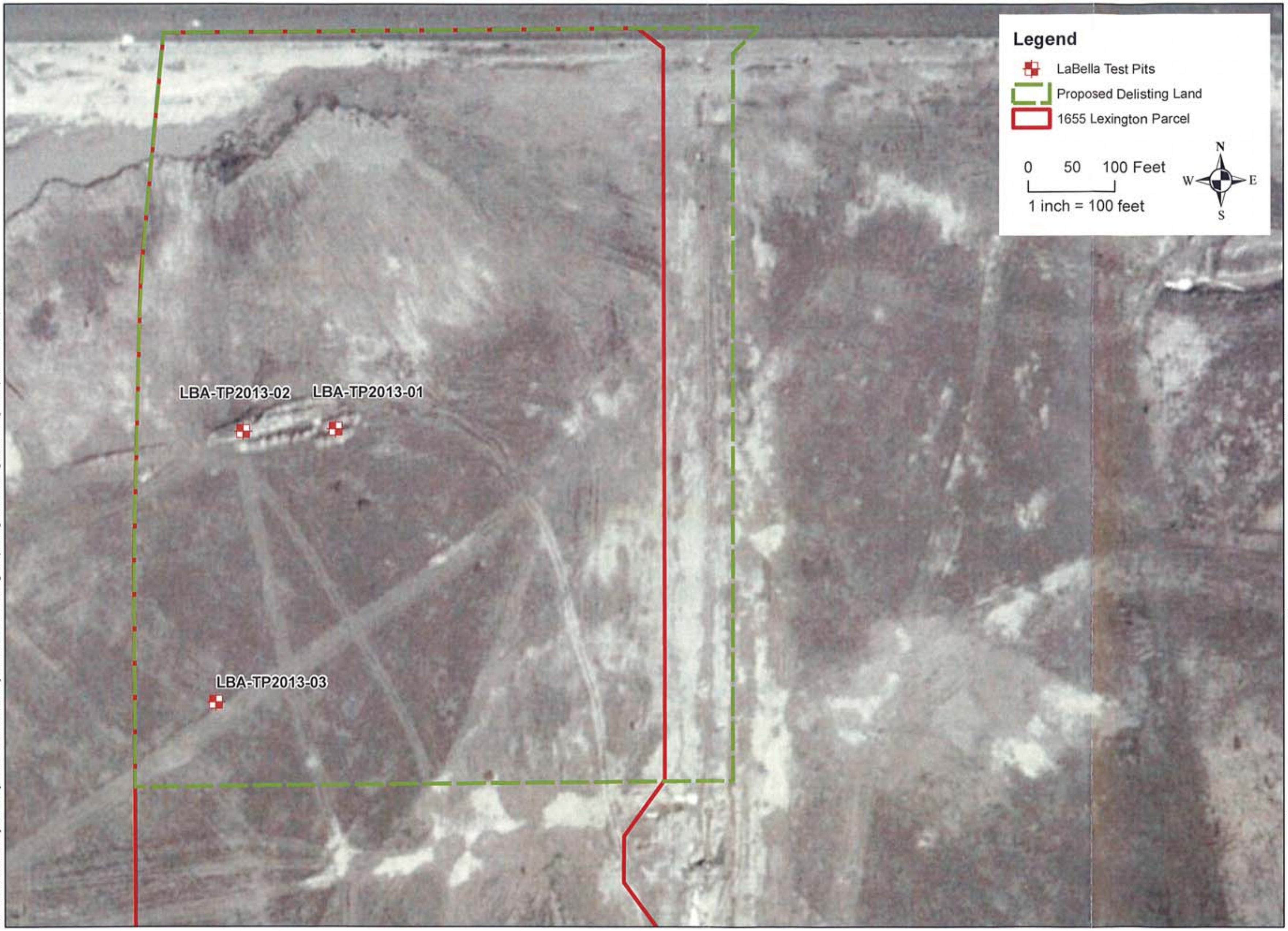

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MARCH 27, 1973 HISTORIC AERIAL PHOTOGRAPH

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FIGURE 7

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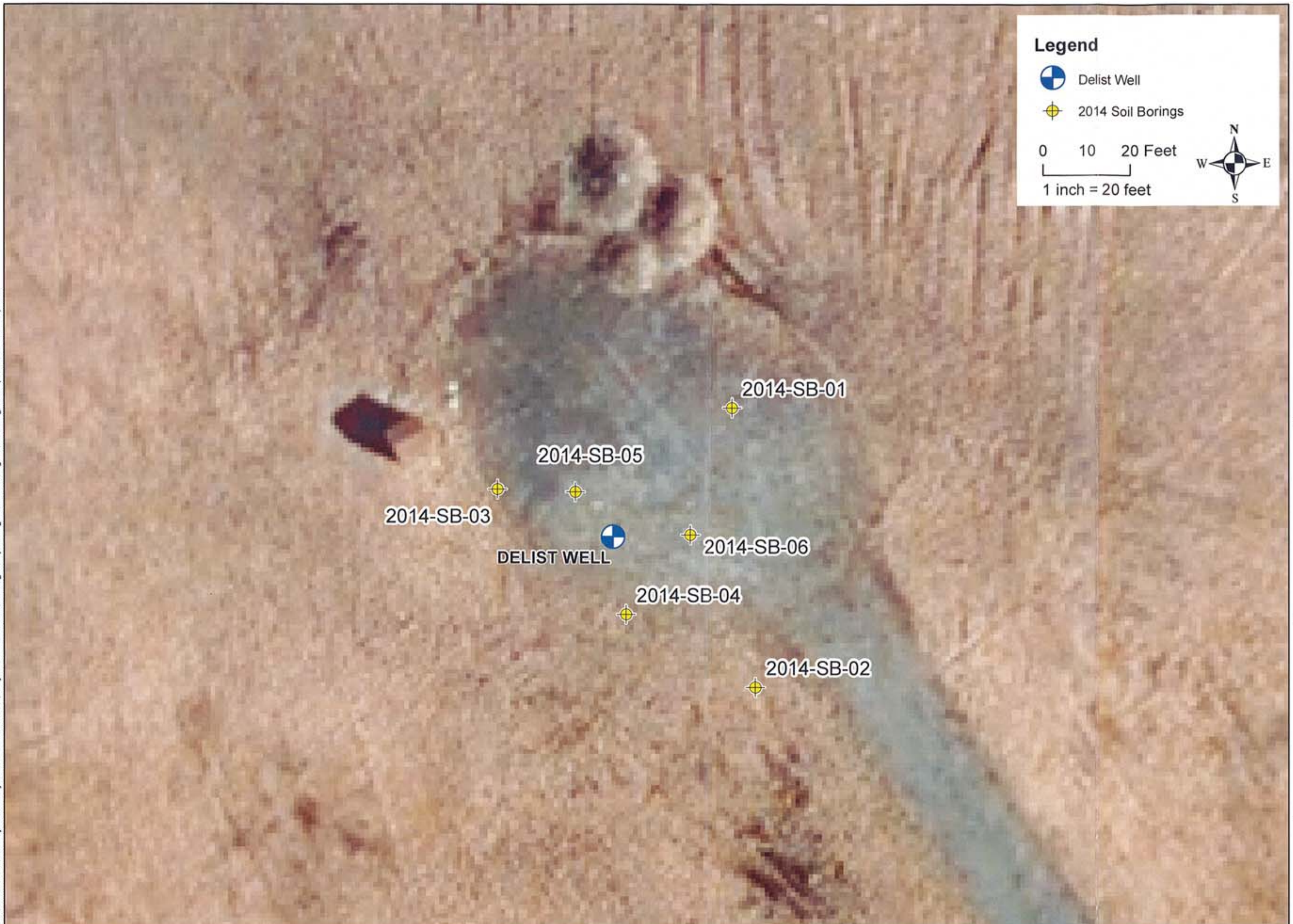

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PROJECT/CLIENT
FORMER EMERSON STREET LANDFILL
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DRAWING TITLE
DELISTING PETITION
DELIST WELL SOIL BORINGS

ISSUED FOR: FINAL
DATE: 10/24/2014
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PROJECT/DRAWING NUMBER
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FIGURE 8

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Former EmersonStreet Landfill
1635 and 1655 Lexington Avenue
Delisting Petition
Table 1
Haley and Aldrich 1993 Soil Boring Samples

Test Boring: / Sample Depth (ft.) / Date Sampled:	B-102 3-5 5/13/93	B-102 8-10 5/13/93	B-105 3-5 5/13/93	B-106 8-10 5/13/93	6 NYCRR Part 371.3 Toxicity Characteristics [5]
TCLP Metals (ppm)					
Arsenic	ND	ND	ND	ND	5.0
Barium	1.32	ND	1.19	1.98	100.0
Cadmium	ND	ND	ND	ND	1.0
Chromium	ND	ND	ND	ND	5.0
Lead	ND	0.242	ND	0.113	5.0
Mercury	ND	ND	ND	ND	0.2
Selenium	ND	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	5.0
Haz. Characteristics					
pH	8.88	NS	7.71	8.08	NA
Ignitability	>100	NS	>100	>100	NA
Reactivity					NA
Total Available Cyanide	ND	NS	ND	ND	NA
Total Available Sulfide	ND	NS	ND	ND	NA

Notes:

1. "ND" indicates analyte not detected above laboratory method detection limit (MDL).
2. "NA" indicates sample not applicable.
3. "NS" indicates not sampled for the given parameter
4. TCLP concentrations in mg/L or parts per million (ppm).
5. **Bold** Exceeds TCLP values compared to 6 NYCRR Part 371.3- Characteristics of Hazardous Waste

Former EmersonStreet Landfill
1635 and 1655 Lexington Avenue
Delisting Petition

Table 2

Geomatrix 2000 Soil Boring and Surface Soil Samples

Test Boring/ Surface Soil:	GMX-MW-2	GMX-B-1	GMX-B-3	SS-1	SS-2	SS-5	SS-6	SS-9	SS-10	Restricted Use SCOs: Commerical [7]	Restricted Use SCOs: Industrial [8]
Sample Depth (ft.):	2-6	8-12	4-8	0-2	0-2	0-2	0-2	0-2	0-2		
Date Sampled:	6/13/2000	6/16/2000	6/19/2000	5/3/2000	5/3/2000	5/3/2000	5/3/2000	10/18/2000	10/18/2000		
VOCs (ppb)											
m,p-Xylene	ND	45,600	440	ND	NS	ND	ND	ND	ND	500,000	1,000,000
o-Xylene	ND	5,600	140	ND	NS	ND	ND	ND	ND	500,000	1,000,000
Acetone	ND	ND	98	ND	NS	ND	ND	ND	ND	500,000	1,000,000
2-Butanone	ND	ND	31	ND	NS	ND	ND	ND	ND	500,000	1,000,000
Toluene	ND	37,600	ND	ND	NS	ND	ND	ND	ND	500,000	1,000,000
Ethylebenzene	ND	10,000	260	ND	NS	ND	ND	ND	ND	390,000	780,000
m,p-Xylenes	ND	ND	ND	ND	NS	ND	ND	ND	ND	50,000	1,000,000
o-Xylene	ND	ND	ND	ND	NS	ND	ND	ND	ND	NA	NA
Methylene Chloride	ND	ND	ND	ND	NS	ND	ND	ND	ND	500,000	1,000,000
2-Butanone	ND	ND	ND	ND	NS	ND	ND	ND	ND	NA	NA
Total CVOCs	*ND*	*ND*	*ND*	*ND*	*NS*	*ND*	*ND*	*ND*	*ND*	NA	NA
Total VOCs	*ND*	*97,600*	*999*	*ND*	*NS*	*ND*	*ND*	*ND*	*ND*	NA	NA
SVOCs (ppb)											
Acenaphthene	NS	NS	ND	ND	NS	NS	ND	41 J	ND	500,000	1,000,000
Phenanthrene	NS	NS	250 J	330 J	NS	NS	140 J	560	56 J	500,000	1,000,000
Anthracene	NS	NS	ND	80 J	NS	NS	ND	130 J	ND	500,000	1,000,000
Carbazole	NS	NS	ND	ND	NS	NS	ND	42 J	ND	NA	NA
Di-n-butyl phthalate	NS	NS	140 J	ND	NS	NS	84 J	67 J	ND	NA	NA
Fluorene	NS	NS	ND	ND	NS	NS	ND	ND	ND	500,000	1,000,000
Fluoranthene	NS	NS	220 J	410	NS	NS	270 J	930	130 J	500,000	1,000,000
Pyrene	NS	NS	240 J	1,300	NS	NS	360 J	860	140 J	500,000	1,000,000
Butylbenzene phthalate	NS	NS	130 J	ND	NS	NS	ND	ND	ND	NA	NA
Benzo(a)anthracene	NS	NS	85 J	500	NS	NS	210 J	450	83 J	5,600	11,000
Chrysene	NS	NS	140 J	540	NS	NS	270 J	430	85 J	56,000	110,000
Bis(2-Ethylhexyl) Phthalate	NS	NS	4,500	ND	NS	NS	930	500	71 J	NA	NA
Benzo(b)fluoranthene	NS	NS	140 J	640	NS	NS	390 J	690	140 J	5,600	11,000
Benzo(k)fluoranthene	NS	NS	ND	310 J	NS	NS	110 J	250 J	43 J	56,000	110,000
Benzo(a)pyrene	NS	NS	93 J	500	NS	NS	200 J	470	84 J	1,000	1,100
Indeno(1,2,3-cd)pyrene	NS	NS	ND	350 J	NS	NS	120 J	260 J	54 J	5,600	11,000
Dibenz(a,h)anthracene	NS	NS	ND	ND	NS	NS	ND	62 J	ND	560	1,100
1,4-Dichlorobenzene	NS	NS	1,400	ND	NS	NS	ND	ND	ND	130,000	250,000
4-Methylphenol	NS	NS	2,700	ND	NS	NS	ND	ND	ND	500,000	1,000,000
2,4-Dimethylphenol	NS	NS	46	ND	NS	NS	ND	ND	ND	NA	NA
Naphthalene	NS	NS	130 J	ND	NS	NS	ND	ND	ND	500,000	1,000,000
2-Methylnaphthalene	NS	NS	67	ND	NS	NS	ND	ND	ND	NA	NA
Dimethyl phthalate	NS	NS	340 J	ND	NS	NS	ND	ND	ND	NA	NA
Benzo(g,h,i)perylene	NS	NS	ND	460	NS	NS	120 J	240 J	51 J	500,000	1,000,000
Dibenzofuran	NS	NS	ND	ND	NS	NS	ND	ND	ND	350,000	1,000,000
Diethyl phthalate	NS	NS	ND	ND	NS	NS	ND	ND	ND	NA	NA
Phrysene	NS	NS	ND	ND	NS	NS	ND	ND	ND	56,000	110,000
Bis-2-ethylhexyl phthalate	NS	NS	ND	ND	NS	NS	ND	ND	ND	NA	NA
Metals (ppm)											
Arsenic	NS	NS	4.8	2.5	NS	NS	7.2	3.7	2.4	16	16
Beryllium	NS	NS	0.5	ND	NS	NS	0.343	0.487 B	0.316 B	590	2,700
Cadmium	NS	NS	0.2	ND	NS	NS	2.04	ND	ND	9.3	60
Chromium	NS	NS	11.8 J	5.36	NS	NS	30.5	10.2	8.7	400	800
Copper	NS	NS	39.4	18.4	NS	NS	646	42.3 J	18.3 J	270	10,000
Lead	NS	NS	91.4	21	NS	NS	715	74.7	44.1 J	1,000	3,900
Mercury	NS	NS	0.48	0.093	NS	NS	1.3	0.34	0.1	2.8	5.7
Nickel	NS	NS	13	6.99	NS	NS	52.6	14.4	10.5	310	10,000
Silver	NS	NS	ND	ND	NS	NS	1.55	ND	ND	1,500	6,800
Thallium	NS	NS	ND	ND	NS	NS	ND	0.77 B	0.38 B	NA	NA
Zinc	NS	NS	76.9	47.2	NS	NS	1320	141	59	10,000	10,000

Notes:

1. "ND" indicates analyte not detected above laboratory method detection limit (MDL).
2. "NA" indicates sample not applicable.
3. "NS" indicates not sampled for the given parameter
4. Soil concentrations for VOCs and SVOCs in ug/kg or parts per billion (ppb). Metals concentrations in mg/kg or parts per million (ppm).
5. "J" indicates an estimated concentration
6. "B" indicates analyte is found in associated blank as well
7. **Bold**- Exceeds NYCRR Part 375-6 8(b): Restricted Use Soil Cleanup Objectives for Commercial Use
8. **Bold and underlined**- Exceeds NYCRR Part 375-6 8(b): Restricted Use Soil Cleanup Objectives for Industrial Use
9. Total CVOCs represents total chlorinated volatile organic compounds above laboratory method detection limits
10. Total VOCs represents total volatile organic compounds above laboratory method detection limits (excluding TICs)

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Table 3
LaBella 2013 Test Pit Soil Samples

Test Location: / Sample Depth (ft.): / Date Sampled:	LBA-TP2013-01 9 12/11/2013	LBA-TP2013-02 9 12/11/2013	LBA-TP2013-03 7 11/5/2013	Restricted Use SCOs: Commercial [6]	Restricted Use SCOs: Industrial [7]
VOCs (ppb)					
Acetone	ND	23.90	9.7 J	500,000	1,000,000
Methylene Chloride	ND	2.60	2.5 J	500,000	1,000,000
Ethyl Benzene	ND	3.20	7.8	390,000	780,000
m/p-Xylnes	ND	10.10	83	500,000	1,000,000
o-Xylenes	ND	10.70	6.9	500000	1000000
1,3,5-Trimethylbenzene	ND	3.00	12.7 J	380,000	NA
1,2,4-Trimethylbenzene	ND	4.90	42.9 J	380,000	NA
Naphthalene	8.4	4.80	8.7 J	500,000	1,000,000
Diethyl Ether	ND	ND	7.6 J	NA	NA
Isopropylbenzene	ND	ND	3.4 J	NA	NA
n-Propylbenzene	ND	ND	3.5 J	500,000	1,000,000
Tert-butyl alcohol	ND	ND	25.4 J	NA	NA
Methylcyclohexane	ND	ND	ND	NA	NA
VOC TICs	*8.4*	*12.7*	*192*	*NA*	*NA*
Total CVOCs	*ND*	*2.60*	*2.5*	*NA*	*NA*
Total VOCs	*8.4*	*63.2*	*214.1*	*NA*	*NA*

Notes:

1. Concentrations in micrograms per kilogram (ug/kg) or parts per billion (ppb)
2. ND - Indicates the analyte was not detected in the Tentatively Identified Compounds
3. J - Indicates an estimated value.
4. B- Indicates the analyte was found in the blank as well as the sample
5. NA - Not applicable
6. **Bold**- Exceeds NYCRR Part 375-6.8(b): Restricted Use Soil Cleanup Objectives for Commerical Use
7. **Bold and underlined-** Exceeds NYCRR Part 375-6.8(b): Restricted Use Soil Cleanup Objectives for Industrial Use
8. VOC TICs represent total tentatively identified compounds
9. Total CVOCs represents total chlorinated volatile organic compounds above laboratory method detection limits
10. Total VOCs represents total volatile organic compounds above laboratory method detection limits (excluding TICs)

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Table 4
LaBella 2013 Delist Well Soil Sample

Test Boring: / Sample Depth (ft.): / Date Sampled:	DELIST WELL 28 12/11/2013	Restricted Use SCOs: Commercial (11)	Restricted Use SCOs: Industrial (12)
VOCs (ppb)			
Vinyl Chloride	2.3 J	13,000	27,000
1,1,2-Trichlorotrifluroethane	7.6	NA	NA
Acetone	120	500,000	1,000,000
Carbon Disulfide	3.8 J	NA	NA
1,1-Dichloroethane	5 J	240,000	480,000
2-Butanone	85.2	500,000	1,000,000
cis-1,2-Dichloroethene	15.8	500000	1,000,000
Methylcyclohexane	2.9 J	NA	NA
4-Methyl-2-Pentanone	24.4 J	NA	NA
Toluene	3.1 J	500,000	1,000,000
Ethylbenzene	1.4 J	390,000	780,000
m/p-Xylenes	5.1 J	500,000	1,000,000
o-Xylene	1.6 J	500,000	1,000,000
Isopropylbenzene	9.7	NA	NA
VOC TICs	*ND*	*NA*	*NA*
Total CVOCs	*33.6*	*NA*	*NA*
Total VOCs	*287.9*	*NA*	*NA*

Notes:

2. Soil concentrations in microgramgs per kilogram (ug/kg) or or parts per billion (ppb)
4. ND - Indicates the analyte was not detected in the Tentatively Identified Compounds
5. J - Indicates an estimated value.
8. NA - Not applicable
9. Total VOCs - denotes summation of all detected compounds (i.e., constituents below the detection limits are assumed to be zero).
10. TICs indicates total tentatively identitfied compounds
11. **Bold**- Exceeds NYCRR Part 375-6.8(b): Restricted Use Soil Cleanup Objectives for Commerical Use
12. **Bold and underlined-** Exceeds NYCRR Part 375-6.8(b): Restricted Use Soil Cleanup Objectives for Industrial Use
13. VOC TICs represent total tentatively identified compounds
14. Total CVOCs represents total chlorinated volatile organic compounds above laboratory method detection limits
15. Total VOCs represents total volatile organic compounds above laboratory method detection limits (excluding TICs)

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Table 5

LaBella 2013 Delist Well and Test Pit TCLP Soil Samples

Test Location:	DELIST WELL		LBA-TP2013-01		6 NYCRR Part 371.3 Toxicity Characteristics [6]
Sample Depth (ft.):	28		9		
Date Sampled:	12/11/2013		12/11/2013		
TCLP Metals (ppb)					
Arsenic	100	U	100	U	5,000
Barium	1400	N	1300	N	100,000
Cadmium	5.8	J	30	U	1,000
Chromium	50	U	50	U	5,000
Lead	98.2		60	U	5,000
Mercury	2	U	2	U	200
Selenium	100	U	100	U	1,000
Silver	50	UN	50	U	5,000
TCLP VOCs (ppb)					
Vinyl Chloride	25	U	25	U	200
1,1-Dichloroethene	25	U	25	U	700
2-Butanone	130	U	130	U	200,000
Carbon Tetrachloride	25	U	25	U	500
Chloroform	25	U	25	U	6,000
Benzene	25	U	25	U	500
1,2-Dichloroethane	25	U	25	U	500
Trichloroethene	25	U	25	U	500
Tetrachloroethene	25	U	25	U	730
Chlorobenzene	25	U	25	U	100,000
TCLP BNAs (ppb)					
Pyridine	100	U	100	U	5,000
1,4-Dichlorobenzene	100	U	100	U	7,500
2-Methylphenol	100	U	100	U	200,000
3+4-Methylphenols	100	UQ	100	UQ	200,000
Hexachloroethane	100	U	100	U	3,000
Nitrobenzene	100	U	100	U	2,000
Hexachlorobutadiene	100	U	100	U	500
2,4,6-Trichlorophenol	100	U	100	U	2,000
2,4,5-Trichlorophenol	100	U	100	U	400,000
2,4-Dinitrotoluene	100	U	100	U	130
Hexachlorobenzene	100	U	100	U	130
Pentachlorophenol	100	U	100	U	100,000
TCLP Pesticides (ppb)					
gamma-BHC (Lindane)	0.5	U	0.5	U	400
Heptachlor	0.5	U	0.5	U	8
Heptachlor epoxide	0.5	U	0.5	U	8
Endrin	0.5	U	0.5	U	20
Methoxychlor	0.5	U	0.5	U	10,000
Toxaphene	5	U	5	U	500
Chlordane	5	U	5	U	30
TCLP Herbicides (ppb)					
2,4-D	20	U	20	U	10,000
2,4,5-TO (Silvex)	20	U	20	U	200

Notes:

1. Units in micrograms per Liter (ug/L) or parts per billion (ppb)
2. U - Indicates the compound was analyzed for as part of the standard list but not detected, with the detection limit shown as the value.
3. J - Indicates an estimated value.
4. Q - Indicates LCS control criteria did not meet requirements
5. N - Indicates the spike sample recovery was not within control limits
6. **Bold** Exceeds 6 NYCRR Part 371.3- Characteristics of Hazardous Waste

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Table 6
LaBella 2013 Soil Boring Soil Samples

Test Boring:	2013-SB-6 (26.5-27')		2013-SB-7 (26.5-27')		LBA-SBW-1 (24-27')		LBA-SBW-1 (30.1-30.5')		Restricted Use SCOs: Commercial [6]	Restricted Use SCOs: Industrial [7]
Sample Date:	12/12/2013		12/12/2013		12/13/2013		12/13/2013			
VOCs (ppb)										
Tetrachloroethene	8	U	6.4	U	26.2		12	UH	150,000	300,000
Trichloroethene	8	U	6.4	U	8.6	U	9.7	UH	200,000	400,000
cis-1,2-Dichloroethene	8	U	8		13.9		6.9	UH	500,000	1,000,000
trans-1,2-Dichloroethene	8	U	6.4	U	8.6	U	9.2	UH	500,000	1,000,000
1,1-Dichloroethane	8	U	1.9	J	5.3	J	17	UH	240,000	480,000
Vinyl chloride	8	U	1.4	J	8.6	U	18	UH	13,000	27,000
1,1,1-Trichloroethane	8	U	6.4	U	8.6	U	21	UH	500,000	1,000,000
1,1,2- Trichloroethane	8	U	6.4	U	8.6	U	12	UH	NA	NA
1,1-Dichloroethene	8	U	6.4	U	8.6	U	18	UH	500,000	1,000,000
1,2-Dichloroethane	8	U	6.4	U	8.6	U	10	UH	30,000	60,000
Chloroethane	8	U	6.4	U	8.6	U	61	UH	NA	NA
Chloromethane	8	U	6.4	U	8.6	U	14	UH	NA	NA
1,2-Dichlorobenzene	8	U	1.7	J	8.6	U	8.6	UH	500,000	1,000,000
1,4-Dichlorobenzene	8	U	6.4	U	8.6	U	8	UH	130,000	250,000
Chlorobenzene	8	U	1.6	J	8.6	U	6.4	UH	500,000	1,000,000
Chloroform	8	U	6.4	U	8.6	U	8.8	UH	350,000	700,000
Dibromochloromethane	8	U	6.4	U	8.6	U	9.9	UH	NA	NA
Dichlorodifluoromethane	8	U	6.4	U	8.6	U	16	UH	NA	NA
Bromochloromethane	8	U	6.4	U	8.6	U	NR		NA	NA
Methylene chloride	7.5	J	6.4	U	21.8		77	UH	500,000	1,000,000
1,1,2-Trichlorotrifluoroethane	8	U	5.7	J	8.6	U	39	UH	NA	NA
Benzene	8	U	1.6	J	8.6	U	12	UH	44,000	89,000
Toluene	8	U	7.7		41.3		17	UH	500,000	1,000,000
Ethyl Benzene	8	U	6	J	8.6	U	5.4	UH	390,000	780,000
Xylenes, Total	2.7	J	52.4	J	54.4		11		500,000	1,000,000
1,4-Dioxane	160	U	130	U	170	U	2200	UH	130,000	250,000
Acetone	86		150		220		170	UH	500,000	1,000,000
2-Butanone	39.8	U	64.5		43	U	43	UH	NA	NA
Bromomethane	8	U	6.4	U	8.6	U	29	UH	NA	NA
Carbon Disulfide	2.3	J	18.3		8.6	U	26	JH	NA	NA
Cyclohexane	8	U	4.6	J	8.6	U	40	UH	NA	NA
Diethyl Ether	ND		ND		ND		NR		NA	NA
2-Hexanone	39.8	U	31.9	U	43	U	20	UH	NA	NA
Isopropylbenzene	1.7	J	12.5		9.5		6.5	UH	NA	NA
4-Methyl-2-Pentanone	39.8	U	26.8	J	43	U	48	UH	NA	NA
Methyl Acetate	8	U	6.4	U	8.6	U	34	JH	NA	NA
Methyl tert-butyl ether	8	U	6.4	U	8.6	U	7.1	UH	500,000	1,000,000
Methylcyclohexane	8	U	7.5		3.2	J	12	UH	NA	NA
Naphthalene	ND		29.5	J	3.7	J	NR		500,000	1,000,000
n-Propylbenzene	ND		4.9	J	2.5	J	NR		500,000	1,000,000
Styrene	8	U	1.7	J	8.6	U	5.6	UH	NA	NA
Tert-butyl alcohol	ND		ND		ND		NR		NA	NA
1,2,4-Trimethylbenzene	3.4	J	61.1	J	24.6	J	NR		190,000	380,000
1,3,5-Trimethylbenzene	1.9	J	20	J	11.3	J	NR		190,000	380,000
VOC TICs	*278.6*		*304.1*		*251.6*		*NR*		*NA*	*NA*
Total CVOCs	*7.5*		*20.3*		*67.2*		*ND*		*NA*	*NA*
Total VOCs	*105.5*		*489.4*		*437.7*		*71*		*NA*	*NA*

Notes:
Units in micrograms per kilogram (ug/kg) or parts per billion (ppb)
U - Indicates the compound was analyzed but
ND - Indicates the analyte was not detected in the Tentatively Identified Compounds
J - Indicates an estimated value.
D = Indicates that the reported
B- Indicates the analyte was found in the blank as well as the sample
Q - Indicates the LCS did not meet the control limits requirements
H- Sample was prepped or analyzed beyond the specified holding time
NA - Not applicable
NR - Not reported
11. **Bold-** Exceeds NYCRR Part 375-6.8(b): Restricted Use Soil Cleanup Objectives for Commerical Use
12. **Bold and underlined-** Exceeds NYCRR Part 375-6.8(b): Restricted Use Soil Cleanup Objectives for Industrial Use
13. VOC TICs represent total tentatively identified compounds
14. Total CVOCs represents total chlorinated volatile organic
15. Total VOCs represents total volatile organic compounds

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Table 7
LaBella 2014 Delist Area Soil Boring Soil Samples

Test Boring:	2014-SB-03	2014-SB-04	2014-SB-05	2014-SB-06
Sample Depth (ft.):	26-27.4	27-27.8	26-27	20-22
Date Sampled:	7/29/2014	7/30/2014	7/30/2014	7/30/2014
TPH (ppm)				
TPH GRO (low fraction)	2.2	<0.6	28	16,000
TPH DRO (high fraction)	<4.9	7.3	480	5,200

Notes:
1. Units in miligrams per kilogram (mg/kg) or parts per million (ppm)
2. "<" inidcates non detect above laboratory reporting limits with the limit shown

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Table 8
GW-5 Groundwater Samples

Monitoring Well:	GW-5				Part 703 Groundwater Quality Standards [1]
Date Sampled:	9/1988	8/7/1989	5/13/1993	7/14/2010	
VOCs (ppb)	ND	NS	ND	ND	NA
SVOCs (ppb)					
Bis(2-Ethylhexyl) Phthalate	ND	NS	3 JB	NS	5
Di-n-Butylphthalate	ND	NS	1 JB	NS	50
TICs	ND	NS	120	NS	NA
Metals (ppb)					
Aluminum	820	ND	NS	NS	NA
Antimony	NS	ND	NS	NS	3
Arsenic	9.3	ND	NS	NS	25
Barium	ND<121	138 B	NS	NS	1000
Beryllium	ND	ND	NS	NS	NA
Cadmium	ND	ND	NS	NS	5
Calcium	139,000	130,000	NS	NS	NA
Chromium	ND	ND	NS	NS	50
Cobalt	ND	ND	NS	NS	NA
Copper	ND	ND	NS	NS	200
Iron	**1,350**	**948**	NS	NS	300
Lead	ND	ND w	NS	NS	25
Magnesium	64,000	57,600	NS	NS	NA
Manganese	39	26.6	NS	NS	300
Mercury	NS	ND N	NS	NS	0.7
Nickel	ND	ND	NS	NS	100
Potassium	8,500	7,190	NS	NS	NA
Selenium	NS	ND w	NS	NS	10
Silver	ND	ND	NS	NS	50
Sodium	**205,000**	**223,000**	NS	NS	20,000
Thallium	NS	ND w	NS	NS	NA
Vanadium	NS	ND	NS	NS	NA
Zinc	ND	39.7	NS	NS	NA
Cyanide	NS	49.2 N	NS	NS	200

Notes:

1. "ND" indicates analyte not detected above laboratory method detection limit (MDL).
2. "NA" indicates sample not applicable.
3. "NS" indicates not sampled for the given parameter
4. Groundwater concentrations in micrograms per liter (ug/L)or parts per billion (ppb).
5. TICs identifies total concentration of tentatively identified compounds
6. "J" indicates an estimated concentration
7. "B" indicates analyte is found in associated blank as well
8. "w" indicates post-digestion spike out of conrol limits; sample absorbance is less than 50% of spike absorbance
9. "*" indicates duplicate analysis not within control limits
10. "N" indicates spiked sample recovery is not within control limits
11. **Bold** Exceeds NYSDEC Part 703 Groundwater Quality Standards
12. "<" Indicates the result is greater than or equal to the instrument detection limit but less than the contract required detection limit

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Table 9
Geomatrix Groundwater Monitoring Well Groundwater Samples

Monitoring Well:	GMX-MW-2		Part 703 Groundwater Quality Standards [1]
Date Sampled:	7/5/2000	7/13/2010	
VOCs (ppb)			
1,1-Dichloroethane	**21**	2.2	5
1,1,1-Trichloroethane	**23**	ND	5
Chloroethae	ND	ND	5
cis-1,2-Dichloroethene	ND	ND	5
Trichloroethene	ND	ND	5
Vinyl chloride	ND	ND	2
Benzene	ND	ND	1
1,4-Dioxane	ND	ND	NA
Methyl tert-butyl ether	ND	ND	10
VOC TICs	*ND*	*ND*	*NA*
Total CVOCs	*44*	*2.2*	*NA*
Total VOCs	*44*	*2.2*	*NA*

Notes:

1. **Bold** Exceeds NYSDEC Part 703 Groundwater Quality Standards
2. Groundwater concentrations in micrograms per liter (ug/L) or parts per billion (ppb).
3. "ND" indicates not detected above laboratory method detection limits
4. "J" indicates an estimated value by the laboratory
5. "NA" indicates not applicable
6. VOC TICs represent total tentatively identified compounds
7. Total CVOCs represents total chlorinated volatile organic compounds
8. Total VOCs represents total volatile organic compounds above laboratory method

Former EmersonStreet Landfill
1635 and 1655 Lexington Avenue
Delisting Petition
Table 10
LaBella 2014 Delist Well LNAPL Samples

Monitoring Well:	DELSIT WELL		Part 703 Groundwater
Date Sampled:	5/20/2014	6/18/2014	Quality Standards [13]
VOCs (ppb)			
Chlorobenzene	ND	120 J	5
Isopropylbenzene	ND	170 J	5
m/p-Xylene	100 J	160 J	5
Methylcyclohexane	ND	220 J	NA
VOC TICs	ND	ND	NA
TOTAL CVOCs	*ND*	*120*	NA
TOTAL VOCs	*100*	*670*	NA
PCBs (ppb)			
Aroclor-1016	500 U	500 U	NA
Aroclor-1221	500 U	500 U	NA
Aroclor-1232	500 U	500 U	NA
Aroclor-1242	500 U	500 U	NA
Aroclor-1248	500 U	500 U	NA
Aroclor-1254	500 U	500 U	NA
Aroclor-1260	500 U	500 U	NA
Aroclor-1262	500 U	500 U	NA
Aroclor-1268	500 U	500 U	NA
Metals (ppb)			
Arsenic	844 U	NA	25
Barium	4220 UN	NA	1,000
Cadmium	253 U	NA	5
Chromium	**725** N	NA	50
Lead	**314** J	NA	25
Mercury	10 U	NA	0.7
Selenium	844 U	NA	10
Silver	422 U	NA	50

Notes:

1. Units in micrograms per kilogram (ug/L) or parts per billion (ppb)
2. U - Indicates the compound was analyzed for as part of the standard list but not detected, with the detection limit shown as the value.
3. N- Indicates spiked sample recovery not within control limits
4. ND - Indicates not detected
5. J - Indicates an estimated value.
6. D- Indicates the the reported concentration was from a diluted sample due to initial detection being above the calibrated range.
7. NA- Not applicable
8. Total VOCs - denotes summation of all detected compounds (i.e., constituents below the detection limits are assumed to be zero).
9. TICs indicates total tentatively identitfied compounds
10. VOC TICs represent total tentatively identified compounds
11. Total CVOCs represents total chlorinated volatile organic compounds above laboratory method detection limits
12. Total VOCs represents total volatile organic compounds above laboratory method detection limits (excluding TICs)
13. **Bold** Exceeds NYSDEC Part 703 Groundwater Quality Standards

Former EmersonStreet Landfill
1635 and 1655 Lexington Avenue
Delisting Petition
Table 11
LaBella 2014 Delist Well Groundwater Samples

Monitoring Well: **Sample Depth (ft.):** **Date Sampled:**	**DELIST WELL** **28-31** **12/11/2013**		**Part 703 Groundwater Quality Standards**
VOCs (ppb)			
Acetone	16.6	J	50
Methylcyclohexane	0.57	J	NA
Benzene	0.73	J	1
Toluene	1.6	J	5
Ethyl Benzene	0.3	J	5
m/p-Xylenes	1.8	J	5
o-Xylene	0.59	J	5
VOC TICs	*1.78*	*J*	*NA*
Total CVOCs	*ND*		*ND*
Total VOCs + TICs	*22.19*		*NA*

Notes:

1. **Bold** Exceeds NYSDEC Part 703 Groundwater Quality Standards
2. Groundwater concentrations in micrograms per liter (ug/L) or parts per billion (ppb).
3. "ND" indicates not detected above laboratory method detection limits
4. "J" indicates an estimated value by the laboratory
5. "NA" indicates not applicable
6. VOC TICs represent total tentatively identified compounds
7. Total CVOCs represents total chlorinated volatile organic compounds above laboratory method detection limits
8. Total VOCs represents total volatile organic compounds above laboratory method detection limits (excluding TICs)

Former EmersonStreet Landfill
1635 and 1655 Lexington Avenue
Delisting Petition
Table 12
Off-Site Groundwater Data

	LAB-SBW-1				
Sample Depth (ft.):	**28-31**	**31-41**	**41-51**	**32-37[12]**	**Part 703 Groundwater Quality Standards**
Date Sampled:	**12/17/2013**	**12/18/2013**	**12/18/2013**	**5/20/2014**	
VOCs (ppb)					
Chloroethane	0.9 J	1 U	1 U	**5.3**	5
Chlorobenzene	1 U	0.23 J	1 U	1 U	5
cis-1,2-Dichloroethene	1 U	0.3 J	1 U	1 U	5
1,1-Dichloroethene	1 U	1 U	1 U	1 U	5
1,1-Dichloroethane	1 U	0.85 J	1 U	1 U	5
1,2-Dichloroethane	1 U	1 U	1 U	1 U	5
Methylene chloride	1 U	1 U	1 U	1 U	5
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	5
1,1,2-Trichlorotrifluoroethane	1 U	1 U	1 U	1 U	5
Tetrachloroethene	1 U	1 U	1 U	1 U	5
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	5
Trichloroethene	1 U	1 U	1 U	1 U	5
Vinyl chloride	1 U	1 U	1 U	1 U	2
Benzene	**2.1**	**13.3**	1 U	0.86 J	1
Toluene	0.30 J	0.53 J	1 U	1 U	5
Ethyl Benzene	1 U	1 U	1 U	1 U	5
m/p-Xylene	0.62 J	2 U	2 U	2 U	5
o-Xylene	0.20 J	1 U	1 U	1 U	5
Acetone	4.80 J	3.90 J	3.20 J	5 U	50
Carbon Disulfide	0.31 J	0.87 J	1.40	1 U	60
Cyclohexane	1 U	1 U	1 U	1 U	NA
1,4-Dioxane	100 U	100 U	100 U	100 U	NA
Isopropylbenzene	0.46 J	1 U	1 U	1 U	5
Methyl tert-butyl ether	1 U	1 U	1 U	1 U	10
Methylcyclohexane	0.40 J	1 U	0.40 J	1 U	NA
Styrene	1 U	1 U	1 U	1 U	5
1,3,5-Trimethylbenzene	ND	ND	ND	1 U	5
1,2,4-Trimethylbenzene	ND	ND	ND	1 U	5
VOC TICs	*14.90*	*17.20*	*1.50*	*ND*	*NA*
Total CVOCs	*1.30*	*1.38*	*0.40*	*5.3*	*NA*
Total VOCs	*10.09*	*19.98*	*5.00*	*6.16*	*NA*

Notes:

1. Grounwdater concentrations in micrograms per liter (ug/L) or parts per billion (ppb)
3. U - Indicates the compound was analyzed but not detected, with the detection limit shown as the value.
4. ND - Indicates the analyte was not detected
5. J - Indicates an estimated value.
7. Q - Indicates the LCS did not meet the control limits requirements
8. NA - Not applicable
9. Total VOCs - denotes summation of all detected compounds (i.e., constituents below the detection limits are assumed to be zero).
10. TICs indicates total tentatively identitfied compounds
11. **Bold** Exceeds NYSDEC Part 703 Groundwater Quality Standards
12. Estimated interval based on top of pump placement during sampling
13. VOC TICs represent total tentatively identified compounds
14. Total CVOCs represents total chlorinated volatile organic compounds above laboratory method detection limits
15. Total VOCs represents total volatile organic compounds above laboratory method detection limits (excluding TICs)

Former EmersonStreet Landfill
1635 and 1655 Lexington Avenue
Delisting Petition
Table 12B
Off-Site Groundwater Data

Date Sampled:	MW-14-D 7/1993	MW-14S 7/1993	DAY-MW-1 2001	Part 703 Groundwater Quality Standards
VOCs (ppb)	ND	ND	ND	NA
TPH (ppb)	NA	NA	1,030	NA
SVOCs (ppb)				
Bis (2-Ethylhexyl) phthalate	**8** J	ND	NA	5
Di-n-butylphthalate	2 J	ND	NA	50
SVOC TICs	929	89	NA	NA

Notes:

1. Grounwdater concentrations in micrograms per liter (ug/L) or parts per billion (ppb)
2. ND - Indicates the analyte was not detected
3. J - Indicates an estimated value.
4. NA - Not applicable
5. TICs indicates total tentatively identitfied compounds
6. **Bold** Exceeds NYSDEC Part 703 Groundwater Quality Standards
7. SVOC TICs represent total tentatively identified compounds

Table 13
From H&A 1995 Delisting Petition

VOCS COMMONLY DETECTED IN
MUNICIPAL SOLID WASTE LANDFILL LEACHATE
FORMER EMERSON STREET LANDFILL DELISTING PETITION

Commonly Detected VOCs	Minnesota Leachate		Wisconsin Leachate		Pre-1980 Landfills USEPA Study	
	Concentration Range (ppb)	No. of Sites	Concentration Range (ppb)	No. of Sites	Concentration Range (ppb)	No. of Sites
Acetone	140-13,000	6/6	---	---	170-390	2/25
Benzene	17-540	6/6	19	1/5	---	---
2-Butanone (MEK)	110-27,000	6/6	---	---	195-2,800	7/25
1,1-Dichloroethene	0.6-46	5/6	510-6,300	3/5	4-6,300	12/25
Trans-1,2-Dichloroethene	3.8-88	3/6	96-2,200	3/5	7-3,130	13/25
Ethylbenzene	12-820	6/6	100-250	3/5	---	---
Methylene Chloride	64-1,300	4/6	106-20,000	6/6	2-57,000	15/29
Toluene	7.5-600	6/6	280-1,600	5/5	5.55-13,300	16/25
1,1,2-Trichloroethene	0.7-125	5/6	160-600	2/5	---	---

Notes:

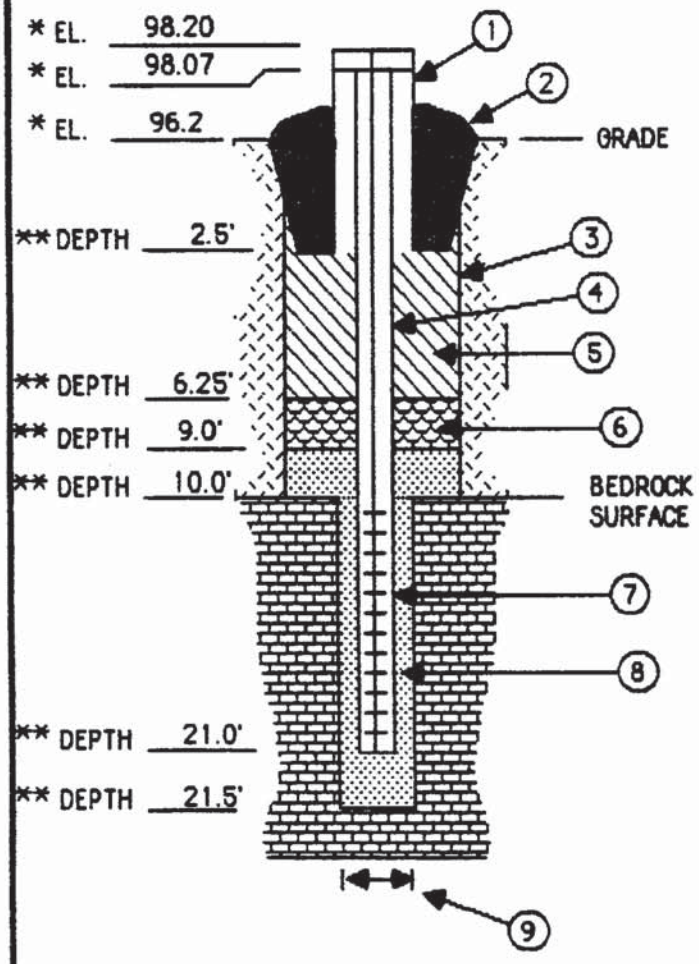
1. From Sabel and Clark, 1984.
2. From USEPA, 1988
3. * No. of sites refers to the number of sites where the parameter was detected per number of sites sampled.

jwl:70352-50\tabIX.wp

Attachment 1

LABELLA

TOP OF ROCK MONITOR WELL CONSTRUCTION DIAGRAM



* Ref. Edward O. Watts & Associates, Dwg. No. EJ121188

** Depth in feet below grade.

WELL NO. GW-5
SITE NO. 828023
DATE OF INSTALLATION 8/12/88

1. PROTECTIVE CASING I.D. 4 INCHES
2. SURFACE SEAL TYPE Cement/Sand Mix
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
   - A. Type Schedule 40 PVC
   - B. I.D. 2 INCHES
   - C. Length 13 FEET
   - D. Joint Type Flush Threaded
5. BACKFILL:
   - A. Type Cement/Bentonite Grout
   - B. Installation Side discharge Tremie
6. TYPE OF SEAL Bentonite Pellets
7. SCREEN
   - A. Type Schedule 40 PVC
   - B. I.D. 2 INCHES
   - C. Slot Size .010 INCHES
   - D. Length 10 FEET
8. SCREEN FILTER TYPE No. 3 graded quartzite sand
9. ROCK HOLE DIAMETER 3.9 INCHES

RECRA ENVIRONMENTAL, INC.

SCALE: NTS	BY	DATE
DWN.	PCB	12/19/88
CKD.	RES	8/89
APPVD.		
REV.		

NYSDEC PHASE II INVESTIGATION
EMERSON STREET LANDFILL
ROCHESTER, NY

TOP OF ROCK MONITOR WELL CONSTRUCTION DIAGRAM

PROJECT NO. 8C1307A6 | A | PB.00213.3

DATE
STARTED 8/11/88
FINISHED 8/12/88
SHEET 1 OF 1

RECRA ENVIRONMENTAL, INC.

SUBSURFACE LOG

HOLE NO. GW-5
SURFACE ELEV. 96.2
G.W. ELEV. 87.02

PROJECT NYSDEC PHASE II INVESTIGATION
SITE #828023

LOCATION EMERSON STREET LANDFILL
ROCHESTER, NEW YORK

DEPTH-FT	RECOVERY	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER 0/6	BLOWS ON SAMPLER 6/12	BLOWS ON SAMPLER 12/18	BLOWS ON SAMPLER 18/24	DESCRIPTION	NOTES
	1.8'	SB	1	6	6	12	18	Light brown SILT, some sand, some gravel, little assorted trash and organic debris, dry, medium dense.	Boring advanced with 4 1/4 in. I.D. HSA, truck mounted CME-55 drill rig. Driller - Rocky Baye Assistant - Shawn Penrod HNU = 1 ppm - SB1-3 Explosimeter = 0% LEL Geiser Counter = 0 mr/hr. Micro R Meter = 6-8 micro-rem/hr. Water level measured at 8.73' on 11/9/88. Auger drilling refusal at 10.0 ft. NX core run 1 drilled from 8.7 ft. - 13.7 ft. on 8/11/88. Rock fragments and cobbles were recovered from 8.7 ft. to 10.0 ft. NX Core run 2 drilled from 13.7 ft. - 18.7 ft. on 8/11/88. Begin to encounter water entering hole at approximately 14.0. Rotary drilled with 3-7/8 in. tri-cone bit from 10.0 ft. to 21.5 ft. Coring was done with a long ear 5 ft. NQ core barrel. Run 1 was drilled with a long ear Series 2 drill bit. Run 2 was drilled with a long ear 58-60 carat drill bit. Boring completed at 21.5 ft. G.W. elevation taken on 12/16/88.
	0.5'	SB	2	7	3	2	2		
5								At 2.0 ft.: Loose in situ.	
	1.5'	SB	3	5	3	4	12		
	2.0'	SB	4	10	20	40	21	At 6.0 ft.: Little gravel, trash is absent, moist.	
								[FILL] 9.0'	
10								Weathered bedrock zone 10.0'	
	REC 71% RQD 38%	RUN	1					Light gray fine textured dolomite, numerous horizontal fractures, large fracture at 13.2 ft. where drilling fluid was lost. Highly weathered zones from 14.0 ft. to 15.25 ft., slight drilling fluid loss. No precipitate or vugs present. Rock was soft at weathered zones to moderately hard.	
15	REC 100% RQD 64%	RUN	2						
								[DOLOMITE BEDROCK] 21.5'	
20									
25									
30									
35									

CLASSIFICATION VISUAL

METHOD OF INVESTIGATION ASTM D1586-84, D2113-83

LOG DEVELOPED BY ROBERT STEINER

PB.00214.5

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B101

PROJECT: FORMER EMERSON STREET LANDFILL MODIFIED REMEDIAL INVESTIGATION
CLIENT: CITY OF ROCHESTER
CONTRACTOR: NOTHNAGLE DRILLING

FILE NO. 70352-46
SHEET NO. 1 OF 1
LOCATION: AC Rochester (See Plan)
ELEVATION: ---
DATUM: ---
START: 13 May 1993
FINISH: 13 May 1993
DRILLER: S. Loranty
H&A REP: J. Marschner

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	S	---
INSIDE DIAMETER (IN)	4-1/4	1-3/8	---
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck-Mounted
BIT TYPE: 4-1/4 in. I.D. H.S. Augers
DRILL MUD: ---
OTHER: Advanced augers to 13.0 ft. while standard sampling.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		7 5 8 10	S1 19"/24"	3.0 5.0		Medium dense dark brown to black ASH, and clayey SILT, some wood, glass, dry, -FILL-
5						
		4 4 3 2	S2 5"/24"	8.0 10.0		Loose black ASH and dark brown clayey SILT, and organic material, some glass, cinders and/or coal, ceramic fragments, brick, damp. -FILL-
10						Loose black ASH with plastic, glass and organic material.-FILL-
					13.2	
		5 9 43 100/.3	S3 19"/22"	13.0 14.8	13.8	Medium dense gray and brown SILT with black laminae, damp. -LACUSTRINE/FLUVIAL-
15						Moderately hard, highly weathered, gray, very fine-grained dolomitic MUDSTONE. -ROCHESTER FORMATION-
						Bottom of Boring at 14.8 ft.
20						
25						

Note:

1. Backfilled borehole to ground surface with soil cuttings.
2. OVA readings from sample screening noted as follows:
   S1 = 0 ppm
   S2 = 10 ppm (methane)
   S3 = 15 ppm (methane)
   No OVA readings above background in the breathing zone.
3. No explosimeter or radioactivity meter readings above background from sample screening or in the breathing zone.

WATER LEVEL DATA					
DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY	
OVERBURDEN (LIN FT):	14.8
ROCK CORED (LIN FT):	---
SAMPLES:	3S
BORING NO.	B101

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B102

PROJECT: FORMER EMERSON STREET LANDFILL MODIFIED REMEDIAL INVESTIGATION
CLIENT: CITY OF ROCHESTER
CONTRACTOR: NOTHNAGLE DRILLING

FILE NO. 70352-46
SHEET NO. 1 OF 2
LOCATION: AC Rochester (See Plan)
ELEVATION: ---
DATUM: ---
START: 13 May 1993
FINISH: 13 May 1993
DRILLER: S. Loranty
H&A REP: J. Marschner

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	S	---
INSIDE DIAMETER (IN)	4-1/4	1-3/8	---
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck-Mounted
BIT TYPE: 4-1/4 in. I.D. H.S. Augers
DRILL MUD: ---
OTHER: Advanced augers to 23.5 ft. while standard sampling.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		7 13 18 7	S1 24"/24"	3.0 5.0		Dense brown SILT little coarse to fine sand, trace gravel with paper, plastic, carpet, dry. -FILL-
5						
		2 3 2 23	S2 12"/24"	8.0 10.0	9.5	Loose brown SILT, trace clay with glass, dry.
10						Dense ASH with charred wood. -FILL-
		6 8 12 15	S3 9"/24"	13.0 15.0		Medium dense ASH, some brick, wood and brown silt with newspaper, plaster board, cardboard, damp. -FILL-
15						
		4 6 9 9	S4 2"/24"	18.0 20.0		Medium dense ASH with wood, damp.
20						Loose ASH and dark brown clayey SILT with wood, trace fabric, cardboard and glass, dry. -FILL-
		100/.5	S5 5"/6"	23.0 23.5	23.3	Moderately hard, highly weathered, gray, very fine-grained dolomitic MUDSTONE. -ROCHESTER FORMATION-
25						Bottom of Boring at 23.5 ft.

WATER LEVEL DATA					
DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	23.5
ROCK CORED (LIN FT):	---
SAMPLES:	5S
BORING NO.	B102

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B102 FILE NO. 70352-46 SHEET NO. 2 OF 2

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS

Notes:

1. Backfilled borehole to ground surface with soil cuttings.

2. OVA readings from sample screening noted as follows:
   S1 = 3 ppm
   S2 = 10 ppm (methane)
   S3 = 18 ppm (methane)
   S4 = 100 ppm (methane)
   S5 = 0 ppm
   No OVA readings above background in the breathing zone.

3. No explosimeter or radioactivity meter readings above background from sample screening or in the breathing zone.

4. Sample S1 submitted for TCLP metals and hazardous charcteristics analyses. Sample S2 submitted for full TCLP analysis.

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B105

PROJECT: FORMER EMERSON STREET LANDFILL MODIFIED REMEDIAL INVESTIGATION
CLIENT: CITY OF ROCHESTER
CONTRACTOR: NOTHNAGLE DRILLING

FILE NO. 70352-46
SHEET NO. 1 OF 1
LOCATION: AC Rochester (See Plan)
ELEVATION: ---
DATUM: ---
START: 13 May 1993
FINISH: 13 May 1993
DRILLER: R. Bauer
H&A REP: M. Corrigan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	S	---
INSIDE DIAMETER (IN)	2-1/4	1-3/8	---
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE:Diedrich D-50, Truck-Mounted
BIT TYPE: 2-1/4 in. I.D. H.S. Augers
DRILL MUD: ---
OTHER: Advanced augers to 18.2 ft. while standard sampling.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		47 67 7 4	S1 4"/24"	3.0 5.0		Very dense REFUSE, with plastic, cardboard, wood metal, carpet, dry. -FILL-
5						
		9 7 4 3	S2 2"/24"	8.0 10.0		Medium dense brown fine sandy SILT, with wood, moist. -FILL-
10						
		1 3 8 9	S3 15"/24"	13.0 15.0		Loose brown fine sandy SILT, trace wire, moist to wet. -FILL-
15					16.5	
		100/.2	S4 2"/3"	18.0 18.2		Dark gray-brown PEAT with shell fragments and clayey silt (MARL). -MARSH DEPOSIT-
20						Bottom of Boring at 18.2 ft. Apparent Top of Rock at 18.2 ft.
25						

Notes:
1. Backfilled borehole to ground surface with soil cuttings.
2. OVA readings from sample screening noted as follows:
   S1 = 15 ppm (methane) S2 = 30-50 ppm (10 ppm methane)
   S3 = 100 ppm (45 ppm methane) S4 = 10 ppm (methane)
   No OVA readings above background in the breathing zone.
3. No explosimeter or radioactivity meter readings above background from sample screening or in the breathing zone.
4. Sample S1 submitted for TCLP metals and hazardous characteristics analyses.

WATER LEVEL DATA					
DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY	
OVERBURDEN (LIN FT):	18.2
ROCK CORED (LIN FT):	---
SAMPLES:	4S
BORING NO.	B105

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B106

PROJECT: FORMER EMERSON STREET LANDFILL MODIFIED REMEDIAL INVESTIGATION
CLIENT: CITY OF ROCHESTER
CONTRACTOR: NOTHNAGLE DRILLING

FILE NO. 70352-46
SHEET NO. 1 OF 2
LOCATION: AC Rochester (See Plan)

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	S	---
INSIDE DIAMETER (IN)	2-1/4	1-3/8	---
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE:Diedrich D-50, Truck-Mounted
BIT TYPE: 2-1/4 in. I.D. H.S. Augers
DRILL MUD: ---
OTHER: Advanced augers to 23.0 ft. while standard sampling.

ELEVATION: ---
DATUM: ---
START: 13 May 1993
FINISH: 13 May 1993
DRILLER: S. Loranty
H&A REP: J. Marschner

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
		15 16 9 12	S1 18"/24"	3.0 5.0		Medium dense, brown fine sandy SILT, some glass, with wood plastic and paper, damp. -FILL-
5						
		13 9 12 23	S2 4"/24"	8.0 10.0		Medium dense WOOD, little fine sand and silt, with metal, moist to wet. -FILL-
10						
		6 9 15 10	S3 4"/24"	13.0 15.0		Medium dense brown WOOD, with metal pieces, moist to wet.
15					16.5	
		18 21 16 9	S4 4"/24"	18.0 20.0		Dense black-brown ASH, with wood, paper, metal, wet. -FILL-
20					21.5	
		8 100/.4	S5 6"/10"	23.0 23.9	23.9	Medium dense red-brown medium to fine SAND, moist to wet. -LACUSTRINE/FLUVIAL-
25						Bottom of Boring at 23.9 ft. Apparent Top of Rock at 23.9 ft.

WATER LEVEL DATA					
DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY	
OVERBURDEN (LIN FT):	23.9
ROCK CORED (LIN FT):	---
SAMPLES:	5S
BORING NO.	B106

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B106 FILE NO. 70352-46 SHEET NO. 2 OF 2

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS

Notes:

1. Backfilled borehole to ground surface with soil cuttings.

2. OVA readings from sample screening noted as follows:
   S1 = 10 ppm (methane)
   S2 = 150 ppm (methane)
   S3 = 300-500 ppm (methane)
   S4 = 1000+ ppm (methane)
   S5 = 85 ppm (methane)
   No OVA readings above background in the breathing zone.

3. No explosimeter or radioactivity meter readings above background from sample screening or in the breathing zone.

4. Sample S3 submitted for TCLP metals and hazardous characteristics analyses.

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. MW-14S

PROJECT: FORMER EMERSON STREET LANDFILL MODIFIED REMEDIAL INVESTIGATION
CLIENT: CITY OF ROCHESTER
CONTRACTOR: NOTHNAGLE DRILLING

FILE NO. 70352-46
SHEET NO. 1 OF 1
LOCATION: AC Rochester (See Plan)

ELEVATION: 534.61
DATUM: NGVD
START: 28 May 1993
FINISH: 1 June 1993
DRILLER: S. Loranty
H&A REP: M. Corrigan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	---	---
INSIDE DIAMETER (IN)	4-1/4	---	---
HAMMER WEIGHT (LB)	---	---	---
HAMMER FALL (IN)	---	---	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck-Mounted
BIT TYPE: 4-1/4 in. I.D. H.S. Augers
DRILL MUD: ---
OTHER: Advanced augers to 12.0 ppm.

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
5						Advanced augers to 12.0 ft. without split spoon sampling.
10						
15						
20						
25						

Auger Refusal at 12.0 ft.
Apparent Top of Competent Rock at 12.0 ft.

Notes:

1. No OVA readings above background in breathing zone.
2. No explosimeter or radioactivity meter readings above background in breathing zone.
3. Set 6.0 in temporary casing to 12.0 ft.
4. Reamed with 3-7/8 in. tri-cone rollerbit from 12.0 ft. to 20.0 ft. and set 2.0 in. PVC monitoring well.
5. Installed monitoring well in completed borehole, see Groundwater Monitoring Well Report.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	12.0
ROCK CORED (LIN FT):	---
SAMPLES:	---
BORING NO.	MW-14S

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. MW-14D

PROJECT: FORMER EMERSON STREET LANDFILL MODIFIED REMEDIAL INVESTIGATION
CLIENT: CITY OF ROCHESTER
CONTRACTOR: NOTHNAGLE DRILLING

FILE NO. 70352-46
SHEET NO. 1 OF 2
LOCATION: AC ROCHESTER

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Auger	S	NX
INSIDE DIAMETER (IN)	4-1/4	1-3/8	2-1/8
HAMMER WEIGHT (LB)	---	140	---
HAMMER FALL (IN)	---	30	---

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck-Mounted
BIT TYPE: ---
DRILL MUD: ---
OTHER: Advanced augers to 12.5 ft.

ELEVATION: 534.81
DATUM: NGVD
START: 27 May 1993
FINISH: 1 June 1993
DRILLER: S. Loranty
H&A REP: M. Corrigan

DEPTH (FT)	CASING BLOWS PER FT	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
0		5 7 8 8	S1 20"/24"	0.0 2.0		Medium dense brown silty fine SAND, little coarse to medium sand, trace gravel, damp to dry. -FILL-
		4 5 5 8	S2 23"/24"	2.0 4.0		Medium dense brown silty fine SAND, damp.
5		3 4 4 5	S3 3"/24"	4.0 6.0		Loose brown silty fine SAND, little gravel, damp to moist.
		3 5 3 5	S4 20"/24"	6.0 8.0		Same, except moist to wet. -FILL-
		3 6 7 7	S5 23"/24"	8.0 10.0		Medium dense brown silty fine SAND, little coarse sand, damp.
10		3 7 8 50	S6 15"/24"	10.0 12.0	11.5	Medium dense brown silty fine SAND, moist to wet. -FILL- Moderately hard, highly weathered, gray dolomitic MUDSTONE, moist. -ROCHESTER FORMATION-
15						Auger Refusal at 12.5 ft. Apparent Top of Competent Rock at 12.5 ft.
20						Notes: 1. OVA readings from sample screening noted as follows: S1 = 0 ppm S2 = 0 ppm S3 = 1 ppm S4 = 13 ppm (10 ppm methane) S5 = 10 ppm (7 ppm methane) S6 = 1 ppm No OVA readings above background in the breathing zone. 2. No explosimeter or radioactivity meter readings above background from sample screening or in the breathing zone. 3. See Core Boring Report, page 2. 4. Installed monitoring well in borehole.
25						

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	12.5
ROCK CORED (LIN FT):	20.5
SAMPLES:	6S
BORING NO.	MW-14D

H & A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	CORE BORING REPORT	BORING NO. MW-14D FILE NO. 70352-46 SHEET NO. 2 OF 2

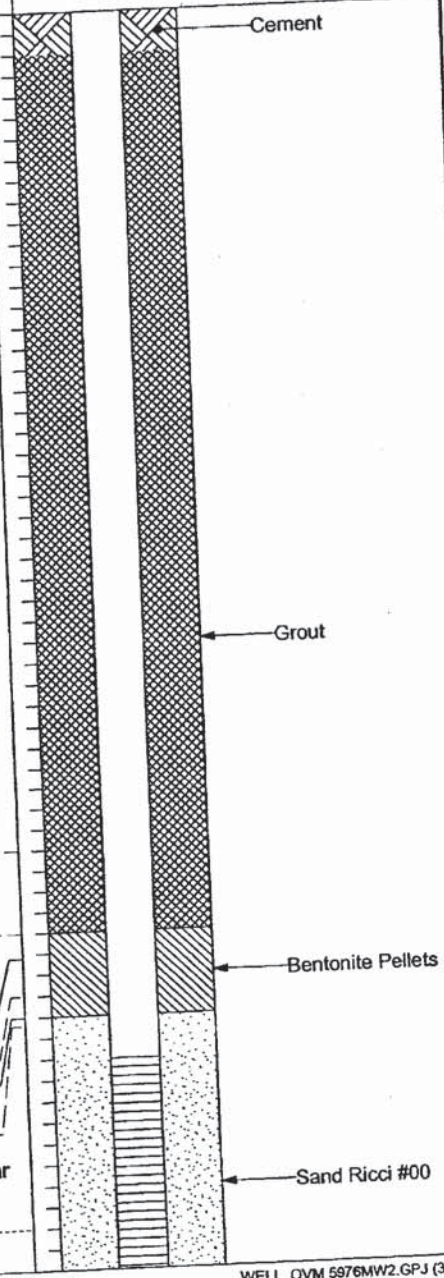
DEPTH (FT)	DRILLING RATE (MIN./FT.)	CORE NO. — DEPTH(FT)	RECOVERY/RQD IN.	RECOVERY/RQD %	WEATHERING	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
							Began Coring at 12.5 ft.
	2	12.5					Light to dark gray, fine-grained, dolomitic MUDSTONE, very thinly color-banded. Trace pits and small vugs throughout. Closely to very closely spaced partings.
	3						
	2						-ROCHESTER FORMATION-
15	5	R1	87/4	102/5*			
	2						
	3				MOD		* RQD based on rock core recovered.
	3						
	3	19.6					Core block at 19.6 ft.
20	3	19.6					Rough, vertical joints from 15.0 ft. to 15.7 ft. and from 17.9 ft. to 18.4 ft.
	3	R2	35/6	100/17			
	2	22.5					
	2	22.5			MOD		Gypsum nodule at 24.2 ft.
	2						
25	2						
	2						
	2	R3	118/76	98/63			
	2						
	2				SL		Gypsum nodule, vug and parting at 27.8 ft.
30	2						
	2	32.5					
							Bottom of Boring at 32.5 ft.
							Notes:
35							1. Lost 320 gallons during coring and reaming process.
40							
45							

Log of Well No. GMX-MW-2

PROJECT: Former Emerson Street Landfill RI/FS Rochester, New York	TOP OF RISER ELEVATION: fmsl	DATUM:
BORING LOCATION:	DATE STARTED: 6/13/00	DATE FINISHED: 6/14/00
DRILLING CONTRACTOR: Nothnagle	TOTAL DEPTH: 36.0 fbgs	SCREEN INTERVAL: 25 to 35 fbgs
DRILLING METHOD: 1 1/4" HSA/Rock Coring CHQ	DEPTH TO WATER: | FIRST | COMPL.	CASING:
DRILLING EQUIPMENT: CME-75	LOGGED BY: BCH	
SAMPLING METHOD: Split-Spoon	RESPONSIBLE PROFESSIONAL: Richard Frappa	REG. NO.
HAMMER WEIGHT: 140 lbs | DROP: 30"		

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation: fmsl
1	1		42	0	**ORGANIC SILT (OL):** dark brown, 70% fines, 20% fine gravel, 10% rootletts, medium plasticity, moist, firm, TOPSOIL
2					**SAND with GRAVEL (SW):** dark grey/brown, moist, 70% fine sand, 20% fine gravel, 10% low plasticity fines, loose, iron stained
3	2		6	1.5	**WELL GRADED GRAVEL with SILT (GW-GM):** light grey/white, dry, 70% coarse gravel, 20% fine gravel, 10% low plasticity fines, loose
4					**WASTE:** brown, moist, 50% fine sand, 30% medium plasticity fines, 20% fine gravel with waste (glass, paper, metal), firm, strong odor
5	3		6	2.5	**WASTE:** black, moist, 70% coarse sand, 20% fine gravel with waste (glass, plastic, paper, ceramic), 10% nonplastic fines, loose
6					-strong odor with paper, glass, string, wire, metal, etc.
7	4		8	2.9	**WASTE:** light brown/tan, moist, 60% fines, 20% fine sand, 5% fine gravel, 5% waste (as above), medium plasticity, firm
8					-wood, glass
9	5		9	2.7	**WASTE:** black, wet, 60% fine sand, 20% fine gravel, 10% coarse gravel, 10% waste (paper, wood), loose
10					
11	6		8	0.7	-wet, purple foundary sand, wood, paper, plastic
12					
13	7		4	1.7	
14					
15	8		9	0.2	
16					
17	9		49		**WASTE** as above, wet (wood, paper, plastic, glass)
18					
19	10		9	1.0	
20					-black, wet, more organics (peat-like), wood, foundary sand, plastic, paper
21	11		6	1.0	
22					**WASTE:** dark grey, wet, 60% fines, 35% fine sand, 5% rootletts (at waste native contact), medium plasticity, grades from soft to firm
23	12			0	SILT and FINE SAND (ML-SP): dark grey, wet, 50% fines, 50% fine sand, low plasticity, firm, NATIVE
24					-weathered bedrock
25					**ROCHESTER SHALE:** dark grey, moderately hard, several horizontal fractures
26					**LOCKPORT DOLOMITE: dark grey, calcite filled vugs, several horizontal fractures, occassional angular fracture, fine grained**
27					Run #1 (24-29) Recovery = 90% RQD = 34%
28					-fewer horizontal fractures
29					
30					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



PROJECT: Former Emerson Street Landfill RI/FS
Rochester, New York

Log of Well No. GMX-MW-2 (cont'd)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/foot	OVM (ppm)	DESCRIPTION: NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
31–66					-angular fracture Run #2 (29-34) Recovery = 94% RQD = 54% -occassional vugs Run #3 (34-36) Recovery = 95%, RQD = 76%	Screen, 2" 0.010-slot PVC

WELL_OVM 5976MW2.GPJ (3/01)

PROJECT: Former Emerson Street Landfill RI/FS Rochester, New York	**Log of Well No. GMX-B-1**	
BORING LOCATION:	TOP OF RISER ELEVATION: fmsl	DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 6/16/00	DATE FINISHED: 6/16/00
DRILLING METHOD: 1 1/4" HSA	TOTAL DEPTH: 20.0 fbgs	SCREEN INTERVAL: fbgs
DRILLING EQUIPMENT: CME-55	DEPTH TO WATER: FIRST: COMPL.:	CASING:
SAMPLING METHOD: Split-Spoon	LOGGED BY: BCH	
HAMMER WEIGHT: 140 lbs DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard Frappa	REG. NO.

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: fmsl	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1	1		22	0.0	**SANDY ORGANIC SOIL with GRAVEL (OL/OH):** dark red/brown, moist, 60% fines, 20% fine sand, 10% fine, gravel, 10% rootletts, medium plastictiy, soft, TOPSOIL	
2					**SANDY SILT with GRAVEL:** dark greyish brown, moist, 60% fines, 30% fine sand, 10% fine gravel, medium plasticity, firm	
3	2		7	2.8	**WELL GRADED GRAVEL with SAND and SILT (GP-GM):** grey/white, dry, 80% coarse gravel, 10% fine sand, 10% non-plastic fines, loose	
4					**SANDY SILT with GRAVEL:** dark greyish brown, moist, 60% fines, 30% fine sand, 10% fine gravel, medium plasticity, firm	
5	3		9	1.6	**WASTE:** dark brown/black, moist, paper, wood, glass	
6					**SANDY SILT with GRAVEL:** dark greyish brown, moist, 60% fines, 30% fine sand, 10% fine gravel, medium plasticity, firm	
7	4		16	17.1	**WASTE:** dark brown/black, moist, paper, wood, glass -plastic, wood, rope, metal, glass, yellow substance -moist to wet, wood, plastic, glass	
8						
9	5		12	165.2		
10						
11	6		14	7.0		
12					**WASTE:** black, wet, 90% fine sand, 10% no plastictiy fines, medium dense, 0.0 to 0.3 layers with light grey foundary sand -wood, moist (14.0-14.3) **WASTE:** black, moist, foundary sand, glass, ash	
13	7		18	0.0		
14						
15	8		14	0.0		
16						
17	9		27	0.4		
18					-wet	
19	10			1.5		
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

PROJECT: Former Emerson Street Landfill RI/FS Rochester, New York		**Log of Well No. GMX-B-3**	
BORING LOCATION:		TOP OF RISER ELEVATION: fmsl	DATUM:
DRILLING CONTRACTOR: Nothnagle		DATE STARTED: 6/19/00	DATE FINISHED: 6/19/00
DRILLING METHOD: 1 1/4" HSA		TOTAL DEPTH: 22.0 fbgs	SCREEN INTERVAL: fbgs
DRILLING EQUIPMENT: CME-55		DEPTH TO WATER: | FIRST | COMPL.	CASING:
SAMPLING METHOD: Split-Spoon		LOGGED BY: BCH	
HAMMER WEIGHT: 140 lbs	DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard Frappa	REG. NO.

DEPTH (feet)	SAMPLES Sample No.	SAMPLES Sample	SAMPLES Blows/ foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Surface Elevation: fmsl	
1	1		22	0.0	**ORGANIC SOIL with SAND (OL/OH):** black, moist, 70% fines, 20% fine sand, 10% rootletts, soft, low plasticity, TOPSOIL	
2					**GRAVELLY SILT (ML):** dark red/brown, moist, 60% fines, 30% fine gravel, 5% coarse gravel, 5% rootletts, firm, medium plasticity	
3	2		47	0.0	**SILTY SAND (SM):** dark red/brown, moist, 70% fine sand, 30% low plasticity fines, medium dense	
4					**WASTE:** black, moist, 70% fines, 30% waste (plastic, paper, wood), low plasticity, firm	
5	3		24	7.7	**WASTE:** dark grey/black, moist, 70% fines, 30% waste (plastic, wood, coal, ash, cloth/fabric), medium plasticity, firm	
6						
7	4			14.8	-moist to wet	
8						
9	5		5	0.0		
10					-moist	
11	6			0.0		
12					-moist to dry, nails, wood, paper, plastic, sponge, coarse gravel	
13	7		56	3.7		
14					-moist	
15	8		27			
16					**WELL GRADED SAND with SILT (SW-SM):** dark grey/black, wet, 60% medium-coarse sand, 30% fines, no plasticity, 10% coarse gravel, loose	
17	9			0.0	**SILTY SAND (SM):** dark grey/black, wet, 70% fine sand, 30% low plasticity fines, medium dense, medium dilatency	
18					**ORGANIC SOIL (OL/OH):** black, organic with rootletts, moist, PEAT	
19	10		10	0.0	**SILTY SAND (SM):** dark grey, moist-wet, 70% fine sand, 30% medium plasticity fines, soft	
20						
21	11			0.0		
22						
23						
24						
25						
26						
27						
28						
29						
30						

PROJECT: Former Emerson Street Landfill RI/FS Rochester, New York	**Log of Well No. GMX-B-4**
BORING LOCATION:	TOP OF RISER ELEVATION: fmsl / DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 6/20/00 / DATE FINISHED: 6/20/00
DRILLING METHOD: 1 1/4" HSA	TOTAL DEPTH: 18.0 fbgs / SCREEN INTERVAL: fbgs
DRILLING EQUIPMENT: CME-55	DEPTH TO WATER: FIRST: COMPL.: / CASING:
SAMPLING METHOD: Split-Spoon	LOGGED BY: BCH
HAMMER WEIGHT: 140 lbs / DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard Frappa / REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: fmsl	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1	1		26	0.0	**ORGANIC SOIL sith SAND (OL/OH):** dark brown, moist, 70% fines, 25% fine sand, 5% rootletts, medium plasticity, soft, TOPSOIL	
2					-same with waste (styrafoam)	
3	2		7	0.0		
4					**WASTE:** black, moist, 70% fines with plastic, paper, glass, soft	
5	3		8	0.0		
6					**WASTE:** dark red/brown, moist, 70% silt, 10% fine sand, 10% coarse gravel, 10% waste (plastic, paper, metal)	
7	4		7	5.5	-black, waste with incinerator ash	
8					-dark brown	
9	5		10	0.0		
10					-dark brown to black, wood	
11	6		4	0.8		
12					-moist to wet	
13	7		2	0.0		
14						
15	8		13			
16					**SILTY SAND (SM):** dark grey/brown, wet, 60% fine sand, 30% medium plasticity fines, soft, medium dilatency, reworked vegetative roots/leaves	
17	9			0.0		
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT

Former Emerson Street Landfill
Rochester, NY

TEST PIT: LBA-TP2013-01
SHEET 1 OF 1
JOB:
CHKD BY:

CONTRACTOR: OpTech
OPERATOR: Mike Myers
LABELLA REPRESENTATIVE: Jason

TEST PIT LOCATION: 1655 Lexington Ave, Rochester, NY
GROUND SURFACE ELEVATION NA
START DATE: 11/5/13

DATUM: NA

TYPE OF EQUIPMENT: Mini Excavator

DEPTH (FEET)	SAMPLE NO. AND DEPTH	STRATA CHANGE (FEET)	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0			Long Grass Top-soil / Cover - loamy soil	0	0
		0.8'	Loamy soil with gravel and brick	0	
2				0	2
		3'	Concrete, cinders, gravel and soil	0	
4				0	4
				0	
6				0	6
				0	
8		8'	Abundant brick, scrap metal, gravel and soil	0	8
	9'	8.10'	Sandy material	0	
10					10
12					12
14					14
16					16

WATER LEVEL DATA			DEPTH (FT)		
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
NA	NA	NA	NA	9'	

NOTES: No readings on the landfill gas meter or the radiation meter.
ND = Non Detect
BGS = Below the Ground Surface
NA = Not Applicable

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT

Former Emerson Street Landfill
Rochester, NY

TEST PIT: LBA-TP2013-02
SHEET 1 OF 1
JOB:
CHKD BY:

CONTRACTOR: OpTech
OPERATOR: Mike Myers
LABELLA REPRESENTATIVE: Jason

TEST PIT LOCATION: 1655 Lexington Ave, Rochester, NY
GROUND SURFACE ELEVATION NA
START DATE: 11/5/13

DATUM: NA

TYPE OF EQUIPMENT: Mini Excavator

DEPTH (FEET)	SAMPLE NO. AND DEPTH	STRATA CHANGE (FEET)	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0			Long Grass	0	0
			Soil / Cover - loamy	0	
2		1.5'	Soil (loamy) and gravel	0	2
				0	
4		4.5'	Dark silt and gravel	0.2	4
				0.8	
6		6.9'	Petrucible trash - lots of plastic sheeting, wood, household trash	5.6	6
				1.2	
8	9'	8.5'	Sandy grey material	6.5	8
		9'	Petrucible trash - lots of plastic sheeting, wood, household trash		
10					10
12					12
14					14
16					16

WATER LEVEL DATA			DEPTH (FT)		
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
NA	NA	NA	NA	9'	

NOTES: No readings on the landfill gas meter or the radiation meter.
ND = Non Detect
BGS = Below the Ground Surface
NA = Not Applicable

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANT

PROJECT

Former Emerson Street Landfill
Rochester, NY

TEST PIT: LBA-TP2013-03
SHEET 1 OF 1
JOB:
CHKD BY:

CONTRACTOR: OpTech
OPERATOR: Mike Myers
LABELLA REPRESENTATIVE: Jason

TEST PIT LOCATION: 1655 Lexington Ave, Rochester, NY
GROUND SURFACE ELEVATION NA
START DATE: 11/5/13

DATUM: NA

TYPE OF EQUIPMENT: Mini Excavator

DEPTH (FEET)	SAMPLE NO. AND DEPTH	STRATA CHANGE (FEET)	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		1'	Long Grass Top soil - loamy	0	0
			Soil and gravel - silty	0	
2		3'	Petrucible fill - plastic, cans, glass (household trash), paper	1.8	2
				1.6	
4		5'	Heavy wood debris	2.1	4
				4.6	
6	7'	7'	Hotwater tank	4.2	6
				12	
8	8.5'		Petrucible fill - plastic, cans, glass, (household trash), cardboard	2	8
10					10
12					12
14					14
16					16

WATER LEVEL DATA			DEPTH (FT)			NOTES: No readings on the landfill gas meter or the radiation meter.
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED	ND = Non Detect BGS = Below the Ground Surface
NA	NA	NA	NA	9'		NA = Not Applicable

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER

Boring Location

NORTHING: 1,158,821.62 EASTING: 1,390,263.21 STATION: _____ OFFSET: N/A
HORIZONTAL DATUM: NAD83 West Zone STATION CENTERLINE: _____
VERTICAL DATUM: NAD83 ESTIMATED GROUND SURFACE ELEV. (FT): 547.40
LOCATION: P-1 Area

BORING

2013-SB-06

PAGE 1 of 1

Drilling Information

DATE START / END: 12/12/2013 - 12/12/2013
CONTRACTOR: TREC Environmental DRILLER: Jim
EQUIPMENT: Geoprobe 6620DT
AUGER ID/OD: N/A / N/A CASING ID/OD: N/A / N/A
HAMMER TYPE: Hydraulic Hammer HAMMER WEIGHT (lbs): N/A
WATER LEVEL DEPTHS (ft): _____

TOTAL DEPTH (FT): 27.0
LOGGED BY (Person): M. Cummings
BORING METHOD: Geoprobe
CORE INFO: Type: N/A
HAMMER DROP (inch): N/A

GENERAL NOTES: All samples were scanned with a Ludlum Model 2-1 GM radiation detector. No activity above background was detected.

ABBREVIATIONS:
ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length
bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample
U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter
Q_p = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Casing Pen. (bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field Test Data	GRAPHIC LOG	Sample Description & Classification	H_2O Depth	Remarks
545	0		1		0 to 4	48/46		OVM=0		**FILL-** Dark brown fine sand with silt and trace medium angular gravel. Little red brick and glass, moist, firm.		
	5		2		4 to 8	48/10		OVM=1.7		As above with plastic, glass, wood, black to grey sand, no odors.		
540			3		8 to 12	48/4		OVM=0.1		Poor recovery with little **FILL** as above in sampling shoe.		
	10											
535			4		12 to 16	48/6		OVM=0.2				
	15											
			5		16 to 20	48/6		OVM=1.4				
530	20		6		20 to 24	48/14		OVM=8.5		**FILL-** black fine to medium sand with silt, little wood fiber, trace white ash-like material, saturated.		
525			7		24 to 27	36/22		OVM=0.0		**FILL-** As above, black fine sand and silt with wood pieces, soft to loose, saturated.		
	25										SOIL: 2013-SB-6 (26.5-27.0')	
520										sampler refusal at 27.0' bgs with little dolomitic limestone returned in sampler. End of Boring at 27 feet		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CLIENT: City of Rochester
PROJECT NAME: Former Emerson Street Landfill
CITY/STATE: Rochester, New York
GEI PROJECT NUMBER: 1331890

GEI Consultants, Inc. PC
90B John Muir Drive Suite 104
Amherst, NY 14228
(716) 204-7154

GEOTECHNICAL BORING LOG 02 FESL GINT LOGS.GPJ GEI TEMPLATE 11-7-13.GDT 5/22/14

Boring Location

NORTHING: 1,158,839.13 EASTING: 1,390,187.39 STATION: _____ OFFSET: N/A
HORIZONTAL DATUM: NAD83 West Zone STATION CENTERLINE: _____
VERTICAL DATUM: NAD83 ESTIMATED GROUND SURFACE ELEV. (FT): 547.79
LOCATION: P-1 Area

BORING

2013-SB-07

Drilling Information

DATE START / END: 12/12/2013 - 12/12/2013
CONTRACTOR: TREC Environmental DRILLER: Jim
EQUIPMENT: Geoprobe 6620DT
AUGER ID/OD: N/A / N/A CASING ID/OD: N/A / N/A
HAMMER TYPE: Hydraulic Hammer HAMMER WEIGHT (lbs): N/A
WATER LEVEL DEPTHS (ft): _____
GENERAL NOTES: All samples were scanned with a Ludlum Model 2-1 GM radiation detector. No activity above background was detected.

TOTAL DEPTH (FT): 27.0
LOGGED BY (Person): M. Cummings
BORING METHOD: Geoprobe
CORE INFO: Type: N/A
HAMMER DROP (inch): N/A

ABBREVIATIONS:
ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length
bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample
U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter
Q_p = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Casing Pen. (bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field Test Data	GRAPHIC LOG	Sample Description & Classification	H_2O Depth	Remarks
545	0		1		0 to 4	48/42		OVM=0.1		**FILL-** Brown fine sand with silt, fine to coarse gravel, red brick, glass, soft to firm, dry.		
	5		2		4 to 8	48/36		OVM=0.2		**FILL-** Wood chips, fine sand with silt and little gravel, dry to moist, no odors.		
540			3		8 to 12	48/35		OVM=0.5				
	10		4		12 to 16	48/12		OVM=5.8		**FILL-** Black fine to medium sand with fine rounded gravel, metal fragments, glass, moist throughout. Slight sweet odor.		
535	15		5		16 to 20	48/6		OVM=1.0		**FILL-** as above, no odors.		
530	20		6		20 to 24	48/5		OVM=0.8				
525	25		7		24 to 27	36/12		OVM=0.2		**FILL-** as above, black fine sand with silt, wood pieces, metal fragments, saturated, loose.		SOIL: 2013-SB-7 (26.5-27.0)
520										sampler refusal at 27.0' bgs. Little shale and limestone bedrock returned in sampler. End of Boring at 27 feet		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CLIENT: City of Rochester
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CITY/STATE: Rochester, New York
GEI PROJECT NUMBER: 1331890

GEI Consultants
GEI Consultants, Inc. PC
90B John Muir Drive Suite 104
Amherst, NY 14228
(716) 204-7154

GEOTECHNICAL BORING LOG 02 FESL GINT LOGS.GPJ GEI TEMPLATE 11-7-13.GDT 5/22/14

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	PROJECT P-1 Remedial Investigation (Delist Area) Former Emerson Street Landfill 1655 Lexington Avenue, Rochester, NY	BORING: Delist Well SHEET 1 OF 1 JOB # 210173 CHKD. BY:

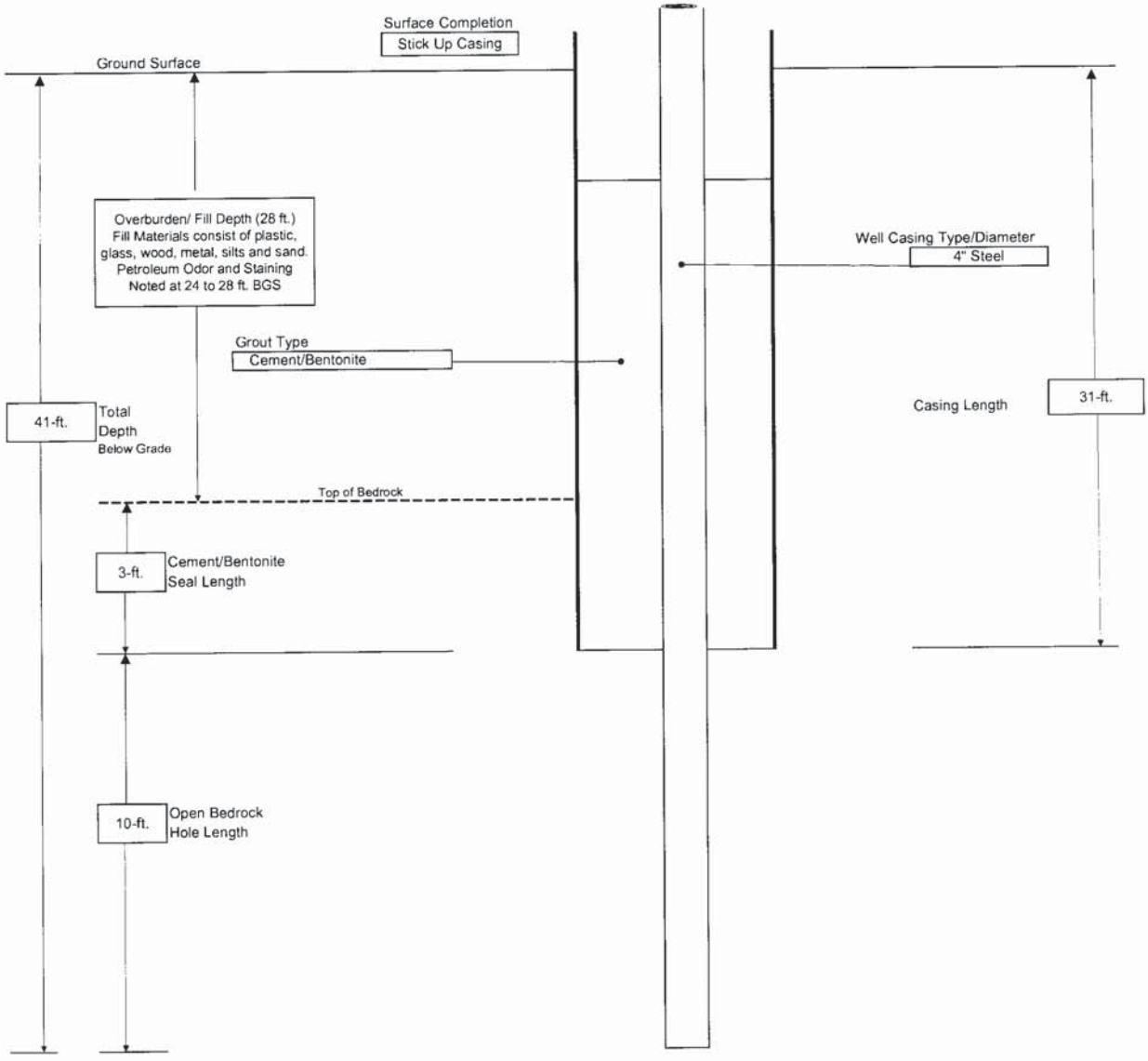
CONTRACTOR: Nothagle Drilling
DRILLER: Kevin Bush
LABELLA REPRESENTATIVE: J. Jaskowiak

BORING LOCATION: Northing: 1159006.14 Easting: 1390182.43
GROUND SURFACE ELEVATION: 548.46 feet DATUM:
START DATE: 3/6/14 END DATE: 3/6/14

TYPE OF DRILL RIG: CME75
AUGER SIZE AND TYPE: 4 1/4 HSAs
OVERBURDEN SAMPLING METHOD: Direct-Push
ROCK DRILLING METHOD: NX Core

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS



NOTE: NOT TO SCALE
ALL DIMENSIONS IN FEET UNLESS OTHERWISE INDICATED

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

Boring Location

NORTHING: 1,158,792.41 **EASTING:** 1,390,187.89 **STATION:** _____ **OFFSET:** N/A

HORIZONTAL DATUM: NAD83 West Zone **STATION CENTERLINE:** _____

VERTICAL DATUM: NAD83 **ESTIMATED GROUND SURFACE ELEV. (FT):** 547.52

LOCATION: P-1 Area

BORING/MONITORING WELL

LAB-SBW-01

Drilling Information

DATE START / END: 12/13/2013 - 12/13/2013

TOTAL DEPTH (FT): 51.0

CONTRACTOR: Nothnagle Drilling DRILLER: Steve Loranty

LOGGED BY (Person): M. Cummings

EQUIPMENT: CME 850

BORING METHOD: Hollow Stem Auger/ Macrocore

AUGER ID/OD: 4.25 in / N/A CASING ID/OD: 6 in / N/A

CORE INFO: Type: NX/ Air Rotary Core and Ream

HAMMER TYPE: Automatic Hammer HAMMER WEIGHT (lbs): 140

HAMMER DROP (inch): 30

WATER LEVEL DEPTHS (ft): _____

GENERAL NOTES: All samples were scanned with a Ludlum Model 2-1 GM radiation detector. No activity above background was detected.

ABBREVIATIONS:
ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length
bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample
U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter
Q_p = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Casing Pen. (bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field Test Data	GRAPHIC LOG	Sample Description & Classification	H_2O Depth	WELL CONSTRUCTION DETAILS
545	0		1	SS	0 to 4	48/35		OVM=0.2		**Cover soil (GM)** silt with fine gravel.		
										FILL -silt, cinders and glass, moist, soft.		
	5		2	SS	4 to 8	48/7		OVM=1		**FILL-** as above with ash-like material and wood chips.		6" permanent steel casing installed to 28.0' bgs.
540			3	SS	8 to 12	48/5		OVM=12.5				
	10											Cement/ bentonite grout.
535			4	SS	12 to 16	48/10		OVM=3.8				
	15		5	SS	16 to 20	48/12		OVM=5.3		**FILL-** as above. Wood, paper, glass, putrescible waste. Moist.		
530	20		6	SS	20 to 24	48/10		OVM=5.2				
525	25		7	SS	24 to 27.7	44/7		OVM=1.4		**FILL-** as above. Wood chips, cinders, silt, metal. Moist.		
520			1	SS	28 to 31	36/29	10	OVM=0.0		Sampler refusal at 27.7' bgs. **BEDROCK- Lockport Formation- Runs 1 & 2: Penfiled Member-** Thinly bedded,		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CLIENT: City of Rochester

PROJECT NAME: Former Emerson Street Landfill

CITY/STATE: Rochester, New York

GEI PROJECT NUMBER: 1331890

GEI Consultants, Inc. PC
90B John Muir Drive Suite 104
Amherst, NY 14228
(716) 204-7154

GEOTECHNICAL BORING LOG 02 FESL GINT LOGS.GPJ GEI TEMPLATE 11-7-13.GDT 3/31/14

Boring Location

NORTHING: 1,158,792.41 EASTING: 1,390,187.89 STATION: _____ OFFSET: N/A

HORIZONTAL DATUM: NAD83 West Zone STATION CENTERLINE: _____

VERTICAL DATUM: NAD83 ESTIMATED GROUND SURFACE ELEV. (FT): 547.52

LOCATION: P-1 Area

BORING/MONITORING WELL

LAB-SBW-01

Elev. (ft)	Depth (ft)	Casing Pen. (bpf) or Core Rate (mpf)	Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field Test Data	GRAPHIC LOG	Sample Description & Classification	H_2O Depth	WELL CONSTRUCTION DETAILS
515	35	4	2		31 to 41	120/110	11	OVM=0.0		moderately hard, grey to dark grey fine to medium grained argillaceous dolostone. Intensely fractured with several mechanical breaks along shale partings. Occasional undulating bedding, slightly dolomitic throughout with few very small (1 mm dia.) vugs. Very little vertical/ high angle fracturing top 3.0' of core. No visual impacts noted.		ROCK: LAB-SBW-1 (30.1-30.5')
510	40											
505	45	6	3		41 to 51	120/105	51	OVM=0.0		**Run 3:** Hard, grey to dark grey argillaceous dolostone (as above). Intensely to moderately fractured with several horizontal mechanical breaks along shale partings. No high angle/vertical fracturing present. Few very small (1 mm dia.) vugs throughout. Minimal weathering throughout core.		5-7/8" diameter open bedrock corehole
500	50											
495	55									End of Boring at 51 feet		
490	60											
485	65											
480												

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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GEOTECHNICAL BORING LOG 02 FESL GINT LOGS.GPJ GEI TEMPLATE 11-7-13.GDT 3/31/14

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-01
SHEET 2 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~40' NE of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/29/2014 END DATE: 7/29/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
16	16-18	9 10%			1.2 1.2		
18	18-20	10 10%			2.8 0.2		Limited Recovery due to soft fill material
20	20-22	11 10%			0.2 0.2		
22	22-24	12 5%	22'	Dark brown silty fine sand, trace fill material (wood chips), moist	0.3 0.3		
24	24-26	13 60%			0.6 0.6		Sample 24-26'
26	26-28	14 20%	27.25'	Dark brown silty fine sand, wet	0.0		Sample 26-27.25'
28				Refusal @ 27.25' Auger to ~28' into shallow bedrock, no sample, no odors or evidence of petroleum			
30							

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCURE DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING:

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-02
SHEET 1 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: 40' SE of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/29/2014 END DATE: 7/29/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
0	0-2	1 70%		Dark brown loamy soil/ cover, trace vegetation, moist	0.0 0.0	0.0	
2	2-4	2 60%	4'	Dark brown loamy soil/ cover, and coarse gravel, trace vegetation, moist	0.0 0.0	0.2	
4	4-6	3 80%	6'	Dark brown loamy soil/ cover, some coarse gravel, some fill material (glass, plastic, paper, metal, cloth), moist	0.0 0.0	0.0	
6	6-8	4 10%			0.0 0.0		
8	8-10	5 30%			0.0 0.0	0.0	
10	10-12	6 20%			0.0 0.0	0.2	
12	12-14	7 10%			0.0 0.0		
14	14-16	8 50%	14'	Dark brown/ black silty course sand, trace coarse gravel, trace fill material (wood chips, metal, glass, paper), moist	0.0 0.0	0.0	Sample 14-16'

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCURE DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING:

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-02
SHEET 2 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~40' SE of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/29/2014 END DATE: 7/29/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
16	16-18	9 50%	16'	Dark brown-black silty course sand and fill material (wood chips, metal, glass, paper), moist	0.0 0.4	0.0	
18	18-20	10 10%			0.0 0.0		
20	20-22	No Recovery					Limited Recovery due to soft fill material
22	22-24	11 5%			0.0 0.0		
24	24-26	12 30%			0.1 0.1		Sample 25-26'
26	26-27.5	13 60%	26' 27.5'	Dark brown-grey silty fine sand, wet	0.0	0.0	Sample 26-27.5'
28				Refusal at 27.5' Auger to ~28' into shallow bedrock, no sample, no odors or evidence of petroleum			
30							

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCURE DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING:

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-03
SHEET 1 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: 40' NW of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/29/2014 END DATE: 7/29/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0	0-2	1 60%		Dark brown loamy soil/ cover, some coarse gravel, trace vegetation, moist		
2	2-4	2 80%				
4	4-6	3 60%				
6	6-8	4 40%	6'	Dark brown loamy soil/ cover, some fill material (wood chips, plastic, metal), trace coarse gravel, moist		
8	8-10	5 40%				
10	10-12	6 30%	10'	Dark brown-black coarse sand and fill material (wood chips, foam), moist		
12	12-14	7 20%				
14	14-16	8 20%	14'	Dark brown silty sand and fill material (metal, plastic, wood chips, cloth), some coarse gravel, moist		

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
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BORING:

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-03
SHEET 2 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~40' NW of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/29/2014 END DATE: 7/29/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
16	16-18	9 10%			0.0 0.0		
18	18-20	10 10%			0.0 0.0		Limited Recovery due to soft fill material
20	20-22	11 5%			5.6 0.0		
22	22-24	12 10%			0.0 0.0		
24	24-26	13 20%	24'	Dark brown fill material (wood chips), moist	0.2 0.2	2.0	Sample 25-26'
26	26-28	14 50%	26' 27.4'	Dark brown-black silty sand, some fill material (wood chips), wet	0.3		Sample 26-27.4'
28				Refusal @ 27.4'			
30							

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
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BORING:

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
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1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-04
SHEET 1 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~15' SW of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/30/2014 END DATE: 7/30/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
0	0-2	1 15%		Dark brown loamy soil/ cover, trace vegetation, moist	0.0 0.0	0.1	
2	2-4	2 40%	2'	Dark brown-grey loamy soil/ cover and coarse gravel, moist	0.0 0.0	0.1	
4	4-6	3 10%			0.0 0.0		
6	6-8	4 25%			0.0 0.0		Sample 6-8'
8	8-10	5 15%			0.0 0.0	0.1	
10	10-12	6 40%	10'	Dark brown-grey silty coarse sand and coarse gravel, and fill material (glass, plastic, wood chips), moist	0.0 0.0		Sample 10-12'
12	12-14	7 10%			0.0 0.0		
14	14-16	8 10%			0.0 0.0	0.1	Limited Recovery due to soft fill material

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCURE DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

BORING:

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-04
SHEET 2 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~15' SW of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/30/2014 END DATE: 7/30/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
16	16-18	9 10%		(same as previous)	0.0 0.0		Limited Recovery due to soft fill material
18	18-20	10 5%			0.0 0.0		
20	20-22	11 5%			0.0 0.0		
22	22-24	12 5%			0.0 0.0		
24	24-26	No Recovery					Screened drill cuttings with PID; 0.0 ppm
26	26-28	13 30%	27' 27.8'	Dark brown-grey silty coarse sand and coarse gravel, trace fill material (glass, plastic, wood chips), moist	0.0 0.0		Sample 27-27.8'
28				Refusal @ 27.8'			
30							

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
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BORING:

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300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-05
SHEET 1 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~15' NW of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/30/2014 END DATE: 7/30/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
0	0-2	1 10%		Dark brown loamy soil/ cover and coarse gravel, trace vegetation, moist	0.0 0.0	0.0	
2	2-4	2 50%	2'	Dark brown loamy soil/ cover and coarse gravel, some fill material (wood chips, glass), moist	0.0 0.0	0.0	
4	4-6	3 30%			0.0 0.0		Sample 5-6'
6	6-8	4 10%			0.0 0.0		
8	8-10	5 20%		Dark brown-black coarse sand and fill material (paper, glass, wood chips, metal, plastic), moist	0.0 0.0	0.6	
10	10-12	6 40%			0.0 0.0		Sample 11-12'
12	12-14	7 20%			0.0 0.5	0.5	
14	14-16	8 20%			0.0 0.5		

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

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BORING:

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ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-05
SHEET 2 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~15' NW of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/30/2014 END DATE: 7/30/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
16	16-18	9 40%		(same as previous)	0.0 0.0	0.0	Sample 17-18'
18	18-20	10 20%			0.0 0.0	0.0	
20	20-22	11 30%			0.0 1.4	0.0	Sample 20-22'
22	22-24	12 10%			0.3 0.0		
24	24-26	13 15%			2.0 10.1	12.8	
26	26-28	14 25%			0.0		Sample 26-27'
			27'	Brown silty fine sand, wet	0.0		Sample 27-27.5'
28			27.5'	Refusal @ 27.5' Auger to ~28' into shallow bedrock, no sample, no odors or evidence of petroleum			
30							

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

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BORING:

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300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-06
SHEET 1 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~15' E of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/30/2014 END DATE: 7/30/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
0	0-2	1 40%		Dark brown loamy soil/ cover and coarse gravel, trace vegetation, moist	0.0 0.0	0.0	
2	2-4	2 50%			0.0 0.0	0.0	
4	4-6	3 5%			0.0 0.0	0.0	
6	6-8	4 40%			0.0 0.0	0.0	Sample 6-8'
8	8-10	5 60%	8'	Dark brown loamy soil/ cover and coarse gravel, some fill (styrofoam), moist	0.0 0.0	0.0	Sample 8-10'
10	10-12	6 40%	10'	Dark brown-black coarse sand and gravel, some fill material (glass, plastic, paper, wood), moist	0.0 0.0	2.2	
12	12-14	7 30%			0.0 0.0	0.0	
14	14-16	8 30%	14'	Brown-grey silty fine sand and fill material (glass, wood), moist	0.0 0.0	1.2	

WATER LEVEL DATA			DEPTH (FT)			NOTES:
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BORING:

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300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

PROJECT
Former Emerson Street Landfill
1655 Lexington Ave
Rochester, New York

BORING: 2014-SB-06
SHEET 2 OF 2
JOB:
CHKD BY:

CONTRACTOR: Parratt-Wolff
DRILLER: M. Carnie
LABELLA REPRESENTATIVE: A. Aquilina

BORING LOCATION: ~15' E of Delist Well
GROUND SURFACE ELEVATION
START DATE: 7/30/2014 END DATE: 7/30/2014

DATUM:

TYPE OF DRILL RIG:
AUGER SIZE AND TYPE: 4.25" hollow stem auger
OVERBURDEN SAMPING METHOD: 2' split spoon

DRIVE SAMPLER TYPE: Direct push
INSIDE DIAMETR: 2"
OTHER:

DEPTH	SAMPLE DEPTH	SAMPLE NO. AND RECOVERY	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	PID HEAD-SPACE (PPM)	REMARKS
16	16-18	9 10%			0.0 0.0	0.7	
18	18-20	10 20%	18'	Fill material (rubber, palstic, wood), some dark brown-black coarse sand, moist	2.1 12.8	4.2	
20	20-22	11 10%			2.9 20.2		Sample 20-22'
22	22-24	12 5%			3.6 1.4		
24	24-26	13 10%			16.1 7.7		Sample 24-26'
26	26-28	14 50%			0.5		
			27'	Brown silty fine sand, moist	0.0		Sample 26-28'
			28'	Some rock fragments			
28				Refusal at 28' Auger to ~28' into shallow bedrock, no sample, no odors or evidence of petroleum			
30							

WATER LEVEL DATA			DEPTH (FT)			NOTES:
DATE	TIME	ELASPED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED	

GENERAL NOTES

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BORING:

Attachment 2

Calculation Procedure To Convert TPH Data From Soil Samples To Hydrocarbon Saturations

TPH analysis results for soil samples may be converted to hydrocarbon saturation by the following equation:

$$S_o = TPH \times \frac{(1-\phi)\,\rho_{gr} \times 10^{-6}\,\frac{kg}{mg}}{\phi\ \rho_o}$$

where:

S_o = total hydrocarbon saturation (dimensionless)

TPH = total petroleum hydrocarbon concentration in mg/kg

ρ_{gr} = grain density (typically 2.65 g/cm^3)

ϕ = porosity (dimensionless)

ρ_o = density of the hydrocarbon, liquid (g/cm^3).

This equation applies to both the unsaturated and saturated zones.

The amount of free hydrocarbon present can be calculated if residual hydrocarbon saturation is known or estimated. Usually residual saturations are not known or measured, but literature values (*e.g.*, Mercer and Cohen, 1990) can be used as estimates. The free hydrocarbon saturation is given by:

$$S_{of} = S_o - S_r$$

where:

S_{of} = free hydrocarbon saturation

S_r = residual hydrocarbon saturation.

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1655 Lexington Avenue
Delisting Petition
Attachment 2
Recoverability of Free Product Calculations

	TPH (mg/kg)	Total Hydrocarbon Saturation, S_0	Free Hydrocarbon Saturation, S_{of}
SB-03 (26-27.4 ft)	2.2	0.0000	0
SB-04 (27-27.8 ft)	7.3	0.0001	0
SB-05 (26-27 ft)	480	0.0047	0
SB-06 (20-22 ft)	16000	0.1719	0.0119

$$S_0 = TPH\ x\ \frac{(1-\varphi)\rho_{gr}\ x\ 10^{-6}\ kg/mg}{\varphi\ \rho_0}$$

$S_{of} = S_0 - S_r$

Note: The highest TPH concentration from each sample was used in the calculations with its corresponding density (high-fraction or low-fraction)

S_0	total petroleum saturation (dimensionless)
TPH	total petroleum hydrocarbon concentration (mg/kg)
ϕ	porosity (dimensionless)
ρ_{gr}	grain density (typically 2.65 g/cm3)
ρ_0	density of the hydrocarbon, liquid (g/cm3)
S_{of}	free hydrocarbon saturation
S_r	residual hydrocarbon saturation (assume 0.16)

DENSITIES	
High-Fraction Hydrocarbons	**density (g/cm3)**
Fuel Oil	0.82
Motor Oil	0.9
Low-Fraction Hydrocarbons	**density (g/cm3)**
Gasoline	0.74

SB-03			
S_0	**0.0000**	S_r	0.16
TPH	2.2	S_{of}	0
ϕ	25%		
ρ_{gr}	2.65		
ρ_0	0.74		

SB-04			
S_0	**0.0001**	S_r	0.16
TPH	7.3	S_{of}	0
ϕ	25%		
ρ_{gr}	2.65		
ρ_0	0.82		

SB-05			
S_0	**0.0047**	S_r	0.16
TPH	480	S_{of}	0
ϕ	25%		
ρ_{gr}	2.65		
ρ_0	0.82		

SB-06			
S_0	**0.1719**	S_r	0.16
TPH	16000	S_{of}	0.0119
ϕ	25%		
ρ_{gr}	2.65		
ρ_0	0.74		

$$= 1.181 \times 10^4 \text{ g}$$

Mass of toluene = (139,000 kg)(50 mg/kg) = 6.950×10^6 mg

$$= 6.950 \times 10^3 \text{ g}$$

Mass of ethylbenzene = (139,000 kg)(35 mg/kg) = 4.865×10^6 mg

$$= 4.865 \times 10^3 \text{ g}$$

Mass of xylenes = (139,000 kg)(40 mg/kg) = 5.560×10^6 mg

$$= 5.560 \times 10^3 \text{ g}$$

c. Mass fraction of a compound = (mass of the compound)/(mass of TPH)

Mass fraction of benzene = $(1.181 \times 10^4)/(1.39 \times 10^5) = 0.085$
Mass fraction of toluene = $(6.95 \times 10^3)/(1.39 \times 10^5) = 0.05$
Mass fraction of ethylbenzene = $(4.865 \times 10^3)/(1.39 \times 10^5) = 0.035$
Mass fraction of xylenes = $(5.56 \times 10^3)/(1.39 \times 10^5) = 0.04$

d. Moles of a compound = (mass of the compound)/(molecular weight of the compound)

Moles of TPH = $(1.39 \times 10^5)/(100) = 1390$ g-mole
Moles of benzene = $(1.181 \times 10^4)/(78) = 151.4$ g-mole
Moles of toluene = $(6.95 \times 10^3)/(92) = 77.5$ g-mole
Moles of ethylbenzene = $(4.865 \times 10^3)/(106) = 45.9$ g-mole
Moles of xylenes = $(5.56 \times 10^3)/(106) = 52.5$ g-mole

e. Mole fraction of a compound = (moles of the compound)/(moles of TPH)

Mole fraction of benzene = (151.4)/(1390) = 0.109
Mole fraction of toluene = (77.5)/(1390) = 0.056
Mole fraction of ethylbenzene = (45.9)/(1390) = 0.033
Mole fraction of xylenes = (52.5)/(1390) = 0.038

Discussion. The mass fraction of each compound can also be determined directly from the ratio of the compound concentration to the TPH concentration. Using benzene as an example, mass fraction of benzene = (85 mg/kg)/(1000 mg/kg) = 0.085 = 8.5%.

II.1.5 *Height of the capillary fringe*

The capillary fringe (or capillary zone) is a zone immediately above the water table of unconfined aquifers. It extends from the top of the water table due to the capillary rise of water. The capillary fringe often creates complications

Material	Grain size (mm)[a]	Pore radius (cm)[b]	Capillary rise (cm)	
Coarse gravel		0.4		0.38[b]
Fine gravel	5–2		2.5[a]	
Very coarse sand	2–1		6.5[a]	
Coarse sand	1–0.5	0.05	13.5[a]	3.0[b]
Medium sand	0.5–0.2		24.6[a]	
Fine sand	0.2–0.1	0.02	42.8[a]	7.7[b]
Silt	0.1–0.05	0.001	105.5[a]	150[b]
Silt	0.05–0.02		200[a]	
Clay		0.0005		300[b]

[a] Reid, R. C., Prausnitz, J. M., and Poling, B. F., *The Properties of Liquids and Gases*, 4th ed., McGraw-Hill, New York, 1987. With permission.

[b] Fetter, C. W., Jr., *Applied Hydrogeology*, Charles E. Merrill Publishing, Columbus, OH, 1980. With permission.

in site remediation projects. In general, the size of the plume in the groundwater would be much larger than that in the vadose zone because of the spread of the dissolved plume in the groundwater. If the water table fluctuates, the capillary fringe will move upward or downward with the water table. Consequently, the capillary fringe above the dissolved groundwater plume can become contaminated. In addition, if free-floating product exists, the fluctuation of the water table will cause the free product to move away vertically and laterally. The site remediation for this scenario will be more complicated and difficult.

The height of capillary fringe at a site strongly depends on its subsurface geology. For pure water at 20°C in a clean glass tube, the height of capillary rise can be approximated by the following equation:

$$h_c = \frac{0.153}{r} \qquad \text{[Eq. II.1.9]}$$

where h_c is the height of capillary rise in centimeters, and r is the radius of the capillary tube in centimeters. This formula can be used to estimate the height of the capillary fringe. As shown in Eq. II.1.9, the thickness of the capillary fringe will vary inversely with the pore size of a formation. Table II.1.B summarizes the information from two references with regard to capillary fringe. As the grain size becomes smaller, the pore radius gets smaller, and capillary rise increases. The capillary fringe of a clayey aquifer can exceed 10 ft.

Example II.1.5 Thickness of the capillary fringe

A core sample was taken from a contaminated unconfined aquifer and analyzed for pore size distributions. The effective pore size was determined tc be 5 μm. Estimate the thickness of the capillary fringe of this aquifer.

Pore size = 5×10^{-6} m = 5×10^{-4} cm.

Using Eq. II.1.9, we obtain capillary rise = $(0.153)/(5 \times 10^{-4})$ = 306 cm = 3.06 m = 10.0 ft

Discussion. The units of h_c and r in Eq. II.1.9 are in centimeters.

II.1.6 *Estimating the mass and volume of the free-floating product*

The product leaked from a UST may accumulate on top of the water table and form a nonaqueous phase liquid (NAPL) layer. For site remediation it is often necessary to estimate the volume or mass of this free-floating product. The thickness of free product found in the monitoring wells has been directly used to calculate the volume of the free product. However, these calculated values are seldom representative of the actual free product volume existing in the formation.

It is now well known that the thickness of free product found in the formation (the actual thickness) is much smaller than that floating on top of the water in a monitoring well (the apparent thickness). Using the apparent thickness, without any adjustment, to estimate the volume of free product may lead to an overestimate of the free product volume and overdesign of the remediation system. The overestimate of free product in the RI phase may cause difficulties in obtaining approval for final site closure because the remedial action can never recover the full amount of free product reported in the site assessment report.

Factors affecting the difference between the actual thickness and the apparent thickness include the densities (or specific gravity) of the free product and the groundwater and the characteristics of the formation (especially the pore sizes). Several approaches have been presented in the literature to correlate these two thickness. Recently, Ballestero et al.[1] developed an equation using heterogeneous fluid flow mechanics and hydrostatics to determine the actual free product thickness in an unconfined aquifer. The equation is

$$t_g = t(1 - S_g) - h_a \qquad \text{[Eq. II.1.10]}$$

where t_g = actual (formation) free product thickness, t = apparent (wellbore) product thickness, S_g = specific gravity of free product, and h_a = distance from the bottom of the free product to the water table.

If no further data for h_a are available, average wetting capillary rise can be used as h_a. Information on capillary rise can be found in Section II.1.5.

To estimate the actual thickness of free product, the following procedure can be used:

ity of gasoline can be reasonably assumed as 0.75 to 0.85 if no additional information is available.)

Step 2: Determine the apparent thickness of the free product in the well.

Step 3: Determine the actual thickness of free product in the formation by inserting values of the above parameters into Eq. II.1.10.

Information needed for this calculation

- Specific gravity (or density) of the free product, S_g
- Measured thickness of free product in the well, t
- Capillary rise, h_c

To determine the mass and volume of the free-floating product the following procedure can be used:

Step 1: Determine the areal extent of the free-floating product.

Step 2: Determine the true thickness of the free-floating product.

Step 3: Determine the volume of the free-floating product by multiplying the area with the true thickness and the porosity of the formation.

Step 4: Determine the mass of the free-floating product by multiplying the volume with its density.

Information needed for this calculation

- Areal extent of the free-floating product
- True thickness of the free-floating product
- Porosity of the formation
- Density (specific gravity) of the free-floating product

Example II.1.6A *Determine the true thickness of the free-floating product*

A recent survey of a groundwater monitoring well showed a 75-in thick layer of gasoline floating on top of the water. The density of gasoline is 0.8 g/cm^3, and the thickness of the capillary fringe above the water table is 1 ft. Estimate the actual thickness of the free-floating product in the formation.

Solution:

Using Eq. II.1.10, we obtain:

Actual free product thickness = (75)(1 – 0.8) – 12 = 3 in

product is only 3 in, while the apparent thickness within the monitoring well is much higher at 75 in.

Example II.1.6B *Estimate the mass and volume of the free-floating product*

Recent groundwater monitoring results at a contaminated site indicate the areal extent of the free-floating product is approximately a rectangular shape of 50 ft × 40 ft. The true thicknesses of the free-floating product in the four monitoring wells inside the plume are 2, 2.6, 2.8, and 3 ft, respectively. The porosity of the subsurface is 0.35. Estimate the mass and volume of the free-floating product present at the site. Assume the specific gravity of the free-floating product is 0.8.

Solution:

a. The areal extent of the free-floating product = (50′)(40′) = 2000 ft².

b. The average thickness of the free-floating product

$$= (2 + 2.6 + 2.8 + 3)/4 = 2.6 \text{ ft}$$

c. The volume of the free-floating product = (area)(thickness)(porosity of the formation)

$$= (2000 \text{ ft}^2)(2.6 \text{ ft})(0.35) = 1820 \text{ ft}^3$$

$$= (1820 \text{ ft}^3)(7.48 \text{ gal/ft}^3) = 13{,}610 \text{ gal}$$

d. Mass of the free-floating product = (volume of the free-floating product)(density of the free-floating product)

$$= (1820 \text{ ft}^3)\{0.8 \text{ g/cm}^3)[(62.4 \text{ lb/ft}^3)/(1 \text{ g/cm}^3)]\}$$

$$= 90{,}854 \text{ lb} = 41{,}300 \text{ kg}$$

II.1.7 *Determination of the extent of contamination — a comprehensive example calculation*

This subsection presents a comprehensive example related to the assessment of a contaminated site starting from tank pull, soil boring, and groundwater monitoring.

Example II.1.7 *Determination of the extent of contamination*

A gasoline station is located in the greater Los Angeles Basin within the floor plain of the Santa Ana River. The site is underlain primarily with coarser-grained river deposit alluvium. Three 5000-gal steel tanks were excavated and removed in May of 1997, with the intention that they would be replaced with three dual-wall fiberglass tanks within the same excavation.

During the tank removal it was observed that the tank backfill soil exhibited a strong gasoline odor. Based on visual observations, the fuel hydrocarbon in the soil appeared to have been caused by overspillage during filling at unsealed fill boxes or minor piping leakage at the eastern end of the tanks. The excavation resulted in a pit of 20′ × 30′ × 18′ (L × W × H). The excavated soil was stockpiled on site. Four samples were taken from the piles and analyzed for TPH using EPA method 8015. The TPH concentrations were ND (not detectable, <10), 200, 400, and 800 ppm, respectively.

The tank pit was then backfilled with clean dirt and compacted. Six vertical soil borings (two within the excavated area) were drilled to characterize the subsurface geological condition and to delineate the plume. The borings were drilled using the hollow-stem-auger method. Soil samples were taken by a 2″-diameter split-spoon sampler with brass soil sample retainers every 5 ft bgs. The water table is at 50 ft bgs, and all the borings were terminated at 70 ft bgs. All the borings were then converted to 4-in groundwater monitoring wells.

Selected soil samples from the borings were analyzed for TPH and BTEX (EPA method 8020). The analytical results indicated that the samples from the borings outside the excavated area were all ND. The other results are listed below:

Boring No.	Depth (ft)	TPH (ppm)	Benzene (ppb)	Toluene (ppb)
B1	25	800	10,000	12,000
B1	35	2000	25,000	35,000
B1	45	500	5,000	7500
B2	25	<10	<100	<100
B2	35	1200	10,000	12,000
B2	45	800	2000	3000

It was also found that free-floating gasoline product was present in the two monitoring wells located within the excavated area. The apparent thickness of the product in these two wells was converted to its actual thickness in the formation as 1 and 2 ft, respectively. The porosity and bulk density of both soil and aquifer matrices are 0.35 and 1.8 g/cm³, respectively.

Former EmersonStreet Landfill
1655 Lexington Avenue
Delisting Petition
Attachment 3
Actual Thickness of Free Product

Day 1 of Bail-Down Test 7/28/2014

Calculation of Volume of Apparent Free Product		
Depth to product	30.61	feet
Depth to water	35.8	feet
Apparent thickness of LNAPL	5.19	feet
Well diameter	0.33333	feet
Volume of LNAPL	0.4529	ft3
Volume of LNAPL in well	**3.4**	**gallon**

Conversions	
Cubic feet to gallon	7.48052
centimeters to inches	0.3937

Specific Gravities (g/cm3)			
Gasoline	0.74		
Kerosene	0.8		
Motor Oil	0.9		
Petroleum Oil	0.82		
Fuel Oils	0.82	to	0.95
	Average	0.885	

Calculation of Actual Free Product Thickness	**Value Used**
$t_g=t(1-S_g)-h_a$	
tg= actual thickness of free product (inches)	
t= apparent thickness of free product (measured in inches)	62.28
Sg= specific gravity of free product	0.885
ha= distance from bottom of product to water table	1.18
(if unknown use capillary rise in inches)	
tg=	**5.98 inches**

Capillary Rise		
Coarse Sand	3	cm
Coarse Sand	1.18	in
Fine Sand	7.7	cm
Fine Sand	3.03	in

Day 12 of Bail-Down Test 8/8/2014

Calculation of Volume of Apparent Free Product		
Depth to product	29.65	feet
Depth to water	30.7	feet
Apparent thickness of LNAPL	1.05	feet
Well diameter	0.33333	feet
Volume of LNAPL	0.09163	ft3
Volume of LNAPL in well	**0.7**	**gallon**

Conversions	
Cubic feet to gallon	7.48052
centimeters to inches	0.3937

Specific Gravities (g/cm3)			
Gasoline	0.74		
Kerosene	0.8		
Motor Oil	0.9		
Petroleum Oil	0.82		
Fuel Oils	0.82	to	0.95
	Average	0.885	

Calculation of Actual Free Product Thickness	**Value Used**
$t_g=t(1-S_g)-h_a$	
tg= actual thickness of free product (inches)	
t= apparent thickness of free product (measured in inches)	12.6
Sg= specific gravity of free product	0.885
ha= distance from bottom of product to water table	1.18
(if unknown use capillary rise in inches)	
tg=	**0.27 inches**

Capillary Rise		
Coarse Sand	3	cm
Coarse Sand	1.18	in
Fine Sand	7.7	cm
Fine Sand	3.03	in