Baker Hall Supplemental Delineation

INTRODUCTION

From October 29 through 31, 2013, EA performed supplemental soil delineation activities at the Baker Hall Property, located adjacent to the east and southeast of the former Lackawanna incinerator site. The supplemental soil delineation activities helped determine the nature and extent of impacted soil at the Baker Hall Property using a gridded sampling approach to fill data gaps in the investigation area. Supplemental soil sampling locations were selected, such that sampling was initially conducted in every other 40 ft × 40 ft grid square, targeting areas of suspected fill (i.e., mounding or visible debris on the ground surface).

EA completed x-ray fluorescence (XRF) field analyses for each of the soil locations and submitted samples for laboratory correlation (for over 10 percent of the samples), using the systematic gridded approach to delineate lead in soil greater than the NYSDEC Residential/Restricted Residential soil cleanup objective (SCO) of 400 milligrams per kilogram (mg/kg). The XRF methods, results, and associated quality assurance/quality control (QA/QC) results are presented in Attachment A-1. Based on a least squares linear regression of the data described in Attachment A, a laboratory concentration of 400 mg/kg of lead was found to equate to an XRF concentration of 325 mg/kg, with a 0.9 coefficient of correlation.

Based on the initial XRF sampling results, and in a triad approach, additional soil samples were collected at 21 additional sampling locations in order to fully delineate the extent of impacted soils. Vertical delineation was considered complete when the top of the silt and clay unit was encountered (at a depth of 2–4 ft below ground surface), or when XRF readings indicate that the lead concentration is less than 200 mg/kg (i.e., half the SCO).

The supplemental delineation results are summarized in **Table 1** and on **Figure 1**. Based on these results, proposed excavation areas were identified, as shown on **Figure 2**.

ATTACHMENT A-1

XRF SCREENING PROCEDURES

A portable XRF analyzer was used to screen for lead in soil samples collected during delineation sampling. Soil analyses were performed using an Innov-X Delta XRF. A 60-second analysis time was utilized. Analytical results were recorded in the field logbook and were also downloaded periodically to a laptop computer. Data collected included the excitation time (per sample), sample analysis number, result, error on the result, and analysis date.

To ensure data quality, calibration checks, blank analyses, calibration verification analyses, and precision assessments were performed daily.

The following sections discuss the data quality of the XRF analyses.

XRF Comparability Analysis

The remediation goal for lead at the former Lackawanna Incinerator site is 400 mg/kg. Per EPA Method 6200 (Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment) a least squares regression analysis was conducted for lead in order to assess the comparability of the XRF screening data and confirmatory data obtained from EPA Method 6010B analyses completed by Chemtech Laboratories. The data were log-transformed to standardize variance due to the range of lead results (varied from less to 10 to over 3,000 mg/kg). A total of 30 of the 31 samples that were submitted for 6010B confirmatory analysis were used in the linear regression for lead. One outlier was removed from the analysis. In general variability in sample composition and grain size was observed in samples over 1,000 mg/kg due to the presence of slag material and/or ash. **Figure A-1** illustrates the least squares regression.

The assessment of comparability between the XRF screening data and confirmatory EPA Method 6010B data resulted in a least squares regression equation with a coefficient of correlation of 0.9 (90%). Per EPA Method 6200 a correlation coefficient 0.7 or greater is valid for screening level data, therefore data generated in this investigation is valid to use for screening level data. The analysis resulted in the following regression equation:

$$Lab = 0.46*XRF^{1.13}$$

Based on this equation laboratory concentration of 400 mg/kg of lead equates to an XRF concentration of 325 mg/kg. As more data become available upon collection of additional confirmatory samples during future site work, the data will be added to the regression analysis and the action levels will be re-evaluated to ensure representativeness.

Precision

The relative standard deviation (RSD) of the sample mean was used to assess the XRF analytical precision. One precision measurement calculation was conducted for each day of XRF screening

by performing 10 replicate analyses of the same sample. The precision was assessed using the same sample preparation and analysis time as the normal environmental samples. The data quality objective (DQO) for precision was less than or equal to 20% and was calculated as follows:

$$RSD = (SD/Mean\ Concentration) \times 100$$

where:

RSD = Relative standard deviation for the precision measurement for the analyte,
SD = Standard deviation of the reported lead concentrations for the precision sample, and
Mean Concentration = Mean lead concentration of the 10 replicate analyses.

Precision analysis was performed on each of the 3 days the XRF was used on-site for the analysis of lead. The precision results for lead were below the 20% DQO with RSDs of 9.9% on October 29, 2013, 7.9% on October 30, 2013, and 8.5% on October 31, 2013. The precision calculations are included in **Table A-1**.

Accuracy

The accuracy of the XRF screening was assessed by evaluating the percent recovery between a known standard reference material (SRM) concentration and the reported XRF concentration. The DQO for percent recovery is between 80% and 120%. The SRMs used during the evaluation were certified by the National Institute of Standards and Technology (NIST) and were designated as NIST 2709a (lead concentration of 17.28 mg/kg), NIST 2710a (lead concentration of 5520 mg/kg), and SRM 2586 (lead concentration of 432 mg/kg). A minimum of two SRM was analyzed each day the XRF was used during site activities.

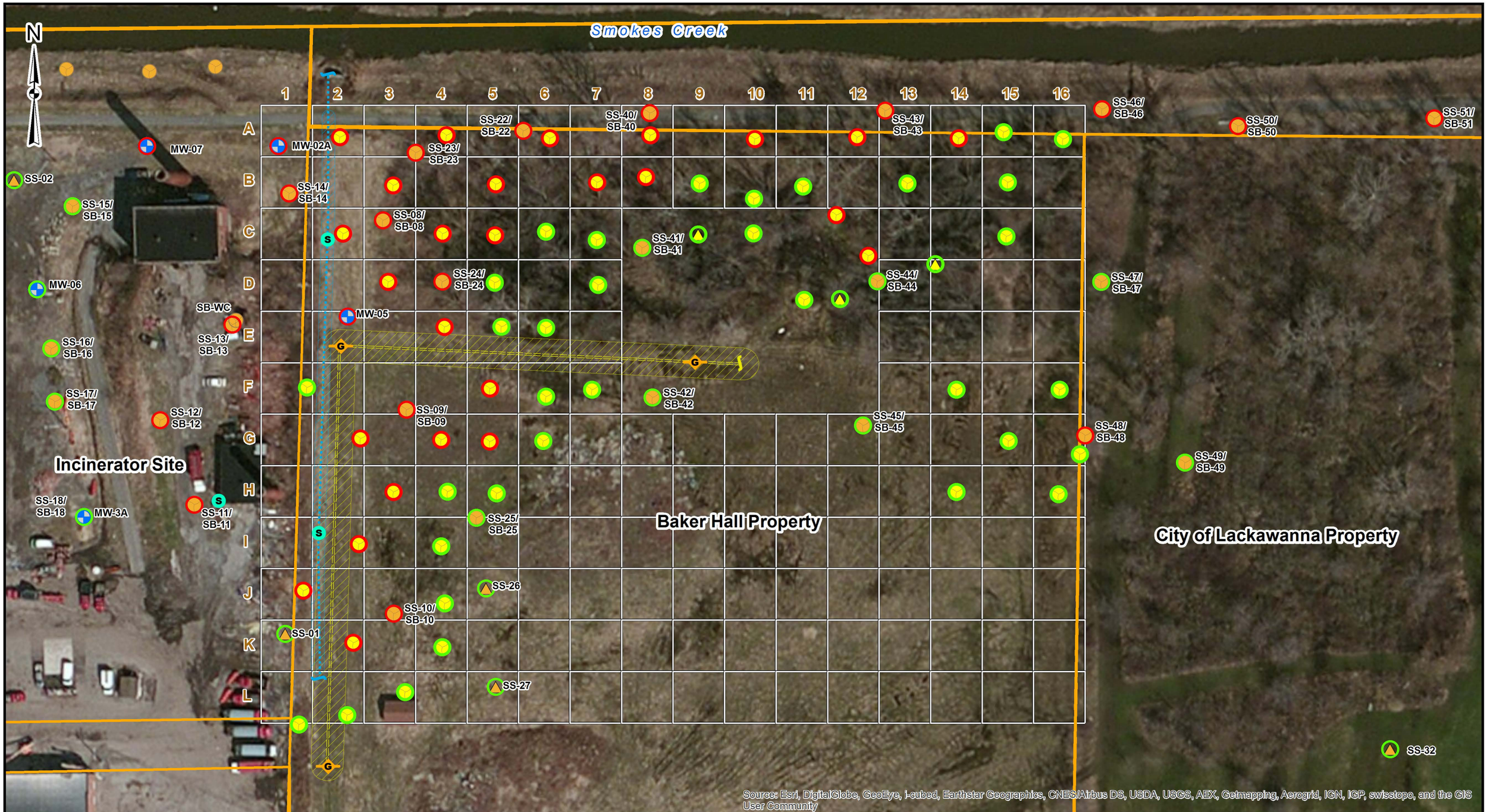
The percent recoveries for each of the SRMs for lead that were analyzed during the course of the investigation are included in **Table A-2**. Of the 23 lead SRM analyses, 22 results (95.7%) were within the DQO recovery range indicating the XRF data was accurate for lead. One result for SRM 2709a had a low recovery (67%).

Blank Analyses

Analysis of a silicon dioxide blank was performed a minimum of once each day that XRF analyses were conducted. The blank was analyzed to ensure there was no cross-contamination occurring during XRF sample analysis. Lead was not detected in the blank analyses. Results are summarized in **Table A-2**.

Duplicate Analyses

Duplicate samples were collected at a rate of 10% (1 in 10) for XRF analysis, with a total of 25 duplicates analyzed. The duplicate sample for XRF analysis was analyzed from the same sample bag as the parent with additional homogenization between analyses. Sample results for lead are presented in **Table A-3**. Of the 25 duplicates, 9 duplicate pairs exceeded a RSD of 20% with the maximum RSD being 48.5%. Samples that exceed 20% relative percent difference between parent and duplicate samples can be attributed to matrix interference and variability between low detected concentrations.



Legend

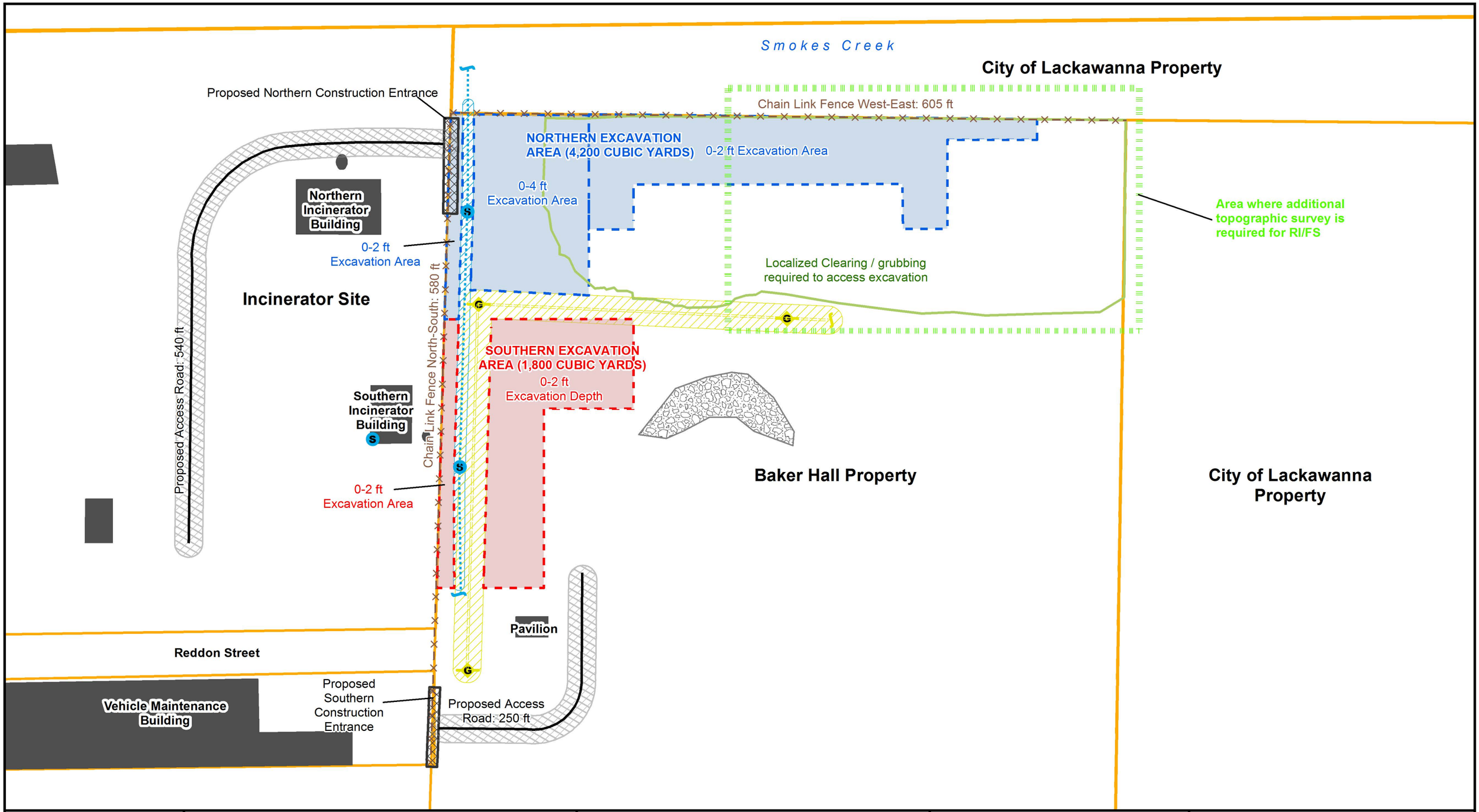
- Tax Parcels
- Monitoring Well
- Surface Soil
- Surface Soil / Soil Boring
- 40 x 40 Grid
- XRF Surface Soil
- XRF Soil Boring
- Lead <400 mg/kg
- Lead >400 mg/kg
- Gas Line Marker
- Sewer Manhole
- Gas Line
- Sewer Line

LACKAWANNA INCINERATOR SITE (NO. 915206)
REMEDIAL INVESTIGATION REPORT
LACKAWANNA, NEW YORK

FIGURE 1
APPENDIX A
BAKER HALL DELINEATION
SOIL SAMPLING RESULTS

Feet
0 35 70 140
1 inch = 70 feet

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
JMB	ALK	HAW	FD	AS SHOWN	OCTOBER 2014	14907.10	14907.10 - Lackawanna Incinerator/ GIS/MXD/RI



Site Features

- Tax Parcels
- Building / Structure
- Debris Pile
- Tree Area
- Gas Line Marker
- Sewer Manhole
- Gas Line
- Sewer Line
- 10 ft Sewer Line Right-Of-Way
- 25 ft Gas Line Right-Of-Way

LACKAWANNA INCINERATOR SITE (NO. 915206)
REMEDIAL INVESTIGATION REPORT
LACKAWANNA, NEW YORK

FIGURE 2
APPENDIX A
PROPOSED EXCAVATION SITE LAYOUT

Feet
0 40 80 160
1 inch = 80 feet

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
JMB	ALK	HAW	FD	AS SHOWN	OCTOBER 2014	14907.10	14907.10 - Lackawanna Incinerator/ GIS/MXD/RI

APPENDIX A, TABLE 1 - SUMMARY OF X-RAY FLUORESCENCE AND LABORATORY RESULTS FOR LEAD IN SOIL

Sampling Location	Sample Name	Date	XRF Lead	Lab Lead
A2	A2-0-1	10/29/2013	290	---
	A2-1-2	10/29/2013	**848**	---
	A2-2-3	10/29/2013	**796**	---
	A2-3-4	10/29/2013	149	---
	A2-4-5	10/29/2013	48	---
	A2-5-6	10/29/2013	17.3	---
A4	A4-0-1	10/29/2013	**1,422**	**3,300**
	A4-1-2	10/29/2013	**1,381**	---
	A4-2-2.3	10/29/2013	**596**	**683**
	A4-2.3-3	10/29/2013	89	---
	A4-3-4	10/29/2013	14	---
	A4-4-5	10/29/2013	15.1	---
A6	A6-0-1	10/30/2013	**978**	---
	A6-1-2	10/30/2013	79	---
	A6-2-3	10/30/2013	69	---
	A6-4-5	10/30/2013	18.1	---
A8	A8-0-1	10/30/2013	**1,004**	**2,300**
	A8-1-2	10/30/2013	**701**	---
	A8-2-2.6	10/30/2013	13.6	---
	A8-4-5	10/30/2013	19.3	---
A10	A10-0-1	10/30/2013	**2,385**	**5,700**
	A10-1-2	10/30/2013	103	---
	A10-2-3	10/30/2013	15.9	---
A12	A12-0-1	10/30/2013	**536**	**837**
	A12-1-2	10/30/2013	31.6	---
	A12-2-3	10/30/2013	17.9	---
A14	A14-0-1	10/30/2013	233	335
	A14-1-2	10/30/2013	25.5	---
	A14-2-3	10/30/2013	26.8	---
	A14-3-4	10/30/2013	12.5	---
A15	A15-0-1	10/31/2013	252	---
	A15-1-2	10/31/2013	16.6	---
	A15-2-3	10/31/2013	12.6	---
A16	A16-0-1	10/30/2013	76.0	---
	A16-1-2	10/30/2013	11.5	---
	A16-2-3	10/30/2013	14.0	---
B3	B3-0-1	10/29/2013	**1,482**	**1,200**
	B3-1-2	10/29/2013	**2,063**	**3,200**
	B3-2-3	10/29/2013	**1,293**	---
	B3-3-4	10/29/2013	**3,625**	**3,600**
	B3-4-5	10/29/2013	128	---
	B3-5-6	10/29/2013	15.2	---

APPENDIX A, TABLE 1 - SUMMARY OF X-RAY FLUORESCENCE AND LABORATORY RESULTS FOR LEAD IN SOIL

Sampling Location	Sample Name	Date	XRF Lead	Lab Lead
B5	B5-0-1	10/30/2013	**1,501**	**1,600**
	B5-1-2	10/30/2013	73	---
	B5-2-3	10/30/2013	17.1	---
B7	B7-0-1	10/30/2013	**2,262**	**1,200**
	B7-1-2	10/30/2013	155	---
	B7-2-3	10/30/2013	13.6	10.99
B8	B8-0-1	10/31/2013	**1,499**	---
	B8-1-2	10/31/2013	84.0	---
	B8-2-3	10/31/2013	20.9	---
B9	B9-0-1	10/30/2013	127	---
	B9-1-2	10/30/2013	16.9	---
	B9-2-3	10/30/2013	19.1	---
	B9-3-4	10/30/2013	20.7	---
B10	B10-0-1	10/31/2013	150	---
	B10-1-2	10/30/2013	16.6	---
	B10-2-3	10/31/2013	16.6	---
B11	B11-0-1	10/30/2013	46.9	---
	B11-1-2	10/30/2013	10.3	---
	B11-2-3	10/30/2013	17.3	---
	B11-3-4	10/30/2013	23.4	---
B12	B12-0-1	10/31/2013	**712**	---
	B12-1-2	10/31/2013	**412**	---
	B12-2-3	10/31/2013	26.4	---
	B12-3-4	10/31/2013	30.2	---
B13	B13-0-1	10/30/2013	70.0	---
	B13-1-2	10/30/2013	11.7	---
	B13-2-3	10/30/2013	14.9	---
B15	B15-0-1	10/30/2013	35.8	---
	B15-1-2	10/30/2013	11.7	---
	B15-2-3	10/30/2013	18.5	---
C2	C2-0-1	10/29/2013	**1,097**	---
	C2-1-2	10/29/2013	300	103
	C2-2-3	10/29/2013	**1,351**	---
	C2-3-4	10/29/2013	**2,444**	**2,200**
	C2-4-5	10/29/2013	169	95.1
	C2-5-6	10/29/2013	13.6	---
	C2-6-7	10/29/2013	8.1	---
C4	C4-0-1	10/29/2013	**529**	**733**
	C4-1-1.5	10/29/2013	**1,169**	---
	C4-1.5-2	10/29/2013	55	---
	C4-2-3	10/29/2013	13.4	---
	C4-3-3.5	10/29/2013	14.4	---
C5	C5-0-1	10/29/2013	**611**	---
	C5-1-2	10/31/2013	34.6	---
	C5-2-3	10/31/2013	20.3	---

APPENDIX A, TABLE 1 - SUMMARY OF X-RAY FLUORESCENCE AND LABORATORY RESULTS FOR LEAD IN SOIL

Sampling Location	Sample Name	Date	XRF Lead	Lab Lead
C6	C6-0-1	10/30/2013	171	---
	C6-1-2	10/30/2013	14.9	---
	C6-2-3	10/30/2013	20.2	---
C7	C7-0-1	10/31/2013	124	---
	C7-1-2	10/31/2013	16.4	---
	C7-2-3	10/31/2013	18.6	---
	C7-3-4	10/31/2013	24.8	---
C9	C9-0-0.5	10/31/2013	97	---
C10	C10-0-1	10/31/2013	84.0	---
	C10-1-2	10/31/2013	16.8	---
	C10-2-3	10/31/2013	16.5	---
C12	C12-0-0.5	10/30/2013	**405**	---
	C12-0-1	10/31/2013	**458**	**675**
	C12-1-2	10/31/2013	326	---
	C12-2-3	10/31/2013	13.1	---
C15	C15-0-1	10/31/2013	53.0	---
	C15-1-2	10/31/2013	67.0	---
	C15-2-3	10/31/2013	16.9	---
D3	D3-0-1	10/29/2013	**691**	---
	D3-1-1.6	10/29/2013	**554**	**440**
	D3-1.6-2	10/29/2013	92	---
	D3-2-3	10/29/2013	13.8	---
D5	D5-0-1	10/29/2013	70	---
	D5-1-2	10/29/2013	18.1	---
	D5-2-3	10/29/2013	15.0	---
D7	D7-0-1	10/29/2013	50	90.3
	D7-1-2	10/29/2013	12.8	---
	D7-2-3	10/29/2013	18.3	---
	D7-3-4	10/29/2013	15.6	---
D11	D11-0-1	10/31/2013	104	---
	D11 1 FT ROCK/SLAG	10/31/2013	11.0	---
	D11-1-2	10/31/2013	15.0	---
	D11-2-3	10/31/2013	15.5	---
D12	D12-0-0.5	10/31/2013	50.3	---
D14	D14-0-0.5	10/30/2013	57	---
E4	E4-0-1	10/29/2013	**2,187**	---
	E4-1-2	10/29/2013	84	---
	E4-2-3	10/29/2013	15.5	---
E5	E5-0-1	10/31/2013	128	---
	E5-1-2	10/31/2013	16.0	---
	E5-2-3	10/31/2013	15.4	---

APPENDIX A, TABLE 1 - SUMMARY OF X-RAY FLUORESCENCE AND LABORATORY RESULTS FOR LEAD IN SOIL

Sampling Location	Sample Name	Date	XRF Lead	Lab Lead
E6	E6-0-1	10/29/2013	107	---
	E6-1-2	10/29/2013	18.5	---
	E6-2-3	10/29/2013	14.9	---
	E6-3-3.7	10/29/2013	20.9	---
F1	F1-0-1	10/29/2013	233	---
	F1-1-2	10/29/2013	43	---
	F1-2-3	10/29/2013	318	123
	F1-4-4.5	10/29/2013	32	---
F5	F5-0-1	10/29/2013	**2,284**	---
	F5-1-2	10/29/2013	92	---
	F5-2-3	10/29/2013	16.8	---
F6	F6-0-1	10/31/2013	107	---
	F6-1-2	10/31/2013	11.5	---
	F6-2-3	10/31/2013	11.2	---
F7	F7-0-1	10/29/2013	52	---
	F7-1-2	10/29/2013	13.8	---
	F7-2-3	10/29/2013	12.9	---
	F7-3-4	10/29/2013	21.4	---
F14	F14-0-1	10/30/2013	43.9	---
	F14-1-2	10/30/2013	21.8	---
	F14-2-3	10/30/2013	15.1	---
F16	F16-0-1	10/30/2013	51	---
	F16-1-2	10/30/2013	11.8	---
	F16-2-3	10/30/2013	19.7	---
G2	G2-0-1	10/29/2013	**984**	**1,100**
	G2-1-2	10/29/2013	**2,290**	---
	G2-2-3	10/29/2013	16	---
G4	G4-0-1	10/30/2013	**867**	**1,000**
	G4-1-2	10/30/2013	349	230
	G4-2-3	10/30/2013	13.9	---
G5	G5-0-1	10/31/2013	**583**	---
	G5-1-2	10/31/2013	48.0	---
	G5-2-3	10/31/2013	8.8	---
G6	G6-0-1	10/30/2013	69.0	---
	G6-1-2	10/30/2013	14.1	---
	G6-2-3	10/30/2013	13.2	---
G15	G15-0-1	10/30/2013	38.8	---
	G15-1-2	10/30/2013	8.4	---
	G15-2-3	10/30/2013	23.9	---
G16	G16-0-1	10/31/2013	46.0	---
	G16-1-2	10/31/2013	27.8	---
	G16-2-3	10/31/2013	14.0	---

APPENDIX A, TABLE 1 - SUMMARY OF X-RAY FLUORESCENCE AND LABORATORY RESULTS FOR LEAD IN SOIL

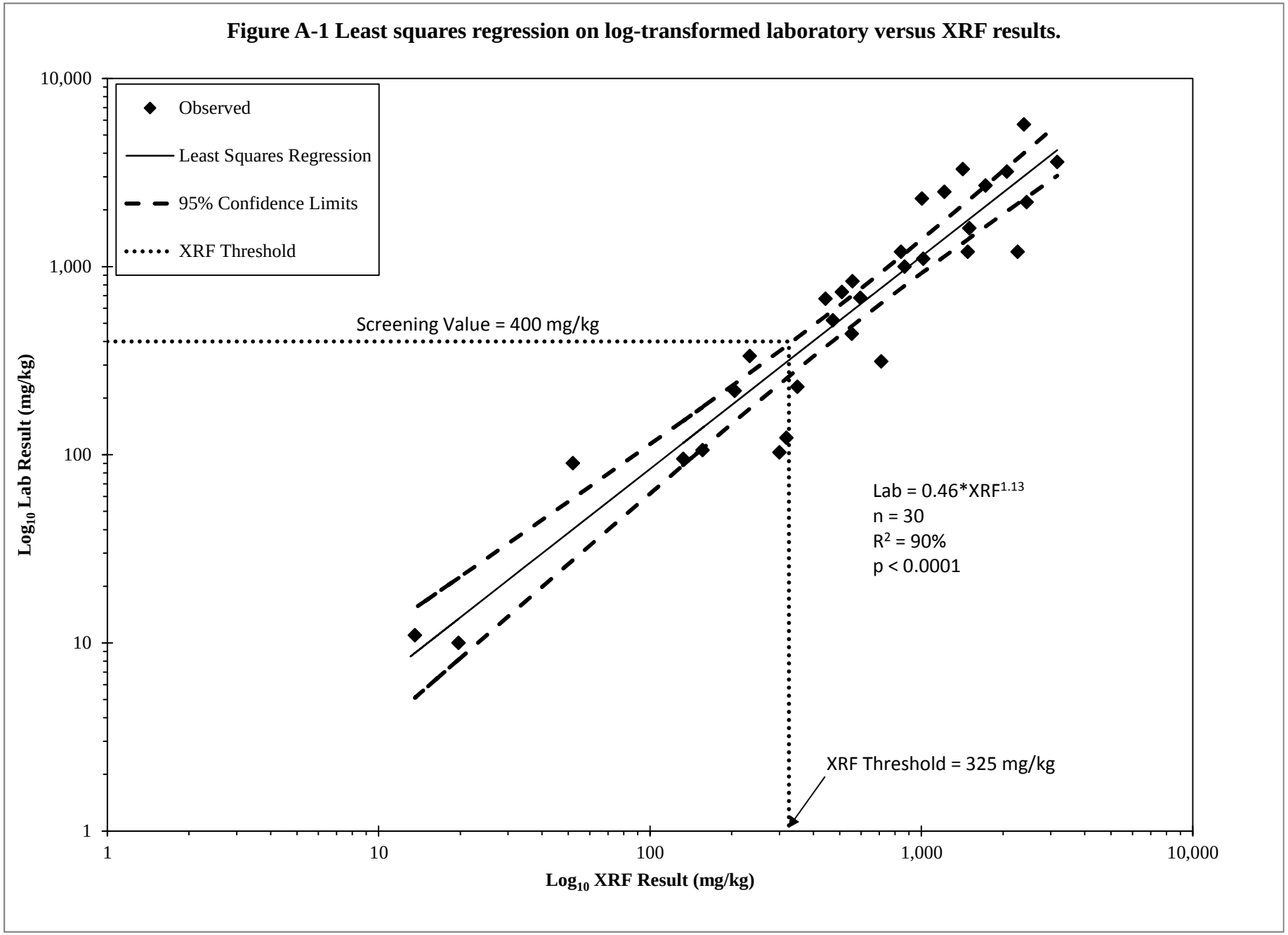
Sampling Location	Sample Name	Date	XRF Lead	Lab Lead
H3	H3-0-1	10/30/2013	**1,214**	**2,500**
	H3-1-2	10/30/2013	88	---
	H3-2-3	10/30/2013	13.0	---
H4	H4-0-1	10/31/2013	130	---
	H4-1-2	10/31/2013	10.5	---
	H4-2-3	10/31/2013	11.4	---
H5	H5-0-1	10/31/2013	165	---
	H5-1-2	10/31/2013	36.2	---
	H5-2-3	10/31/2013	8.2	---
H14	H14-0-1	10/30/2013	48.1	---
	H14-1-2	10/30/2013	10.8	---
	H14-2-3	10/30/2013	13.1	---
H16	H16-0-1	10/30/2013	34.0	---
	H16-1-2	10/30/2013	20.4	---
	H16-2-3	10/30/2013	14.1	---
I2	I2-0-1	10/29/2013	**711**	314
	I2-1-2	10/29/2013	**841**	**1,200**
	I2-2-3	10/29/2013	16.2	---
I4	I4-0-1	10/30/2013	216	---
	I4-1-2	10/30/2013	14.8	---
	I4-2-3	10/30/2013	11.3	---
J1	JI-0-1	10/29/2013	157	106
	JI-1-2	10/29/2013	**1,721**	**2,700**
	J1-2-3	10/29/2013	328	---
	J1-3-4	10/29/2013	9.9	---
J4	J4-0-1	10/31/2013	137	---
	J4-1-2	10/31/2013	31.2	---
	J4-2-3	10/31/2013	16.5	---
K2	K2-0-1	10/29/2013	193	---
	K2-1-2	10/29/2013	205	219
	K2-2-3	10/29/2013	**472**	**518**
	K2-3-4	10/29/2013	110	---
	K2-4-5	10/29/2013	15.7	---
	K2-5-6	10/29/2013	20.8	---
	K2-6-7	10/29/2013	21.3	---
K4	K4-0-1	10/30/2013	190	10
	K4-1-2	10/30/2013	19.7	---
	K4-2-3	10/30/2013	13.4	---
L1	L1-0-1	10/31/2013	350	---
	L1-1-2	10/31/2013	32.3	---
	L1-2-3	10/31/2013	34.9	---

APPENDIX A, TABLE 1 - SUMMARY OF X-RAY FLUORESCENCE AND LABORATORY RESULTS FOR LEAD IN SOIL

Sampling Location	Sample Name	Date	XRF Lead	Lab Lead
L2	L2-0-1	10/31/2013	89.0	---
	L2-1-2	10/31/2013	40.0	---
	L2-2-3	10/31/2013	14.4	---
L3	L3-0-1	10/30/2013	152	---
	L3-1-2	10/30/2013	16.6	---
	L3-2-3	10/30/2013	12.5	---
	L3-3-4	10/30/2013	9.5	---

Notes:
All results in milligrams per kilogram.
LOD = level of detection
Sample Name includes sample grid location and depth in units of feet
Bolded values are equal to or exceed the Part 375 Restricted Residential Soil Cleanup Objective.

Figure A-1 Least squares regression on log-transformed laboratory versus XRF results.



APPENDIX A, ATTACHMENT A, TABLE A-1 X-RAY FLUORESCENCE PRECISION RESULTS

Sample ID	Sample Date	Preliminary XRF Lead Result (mg/kg)	Error +/-	Precision Analysis	
C4-0-1	29-Oct-13	558	13.17	Mean =	506.7
C4-0-1	29-Oct-13	444	13.29	Standard Deviation =	50.3963182
C4-0-1	29-Oct-13	598	13.04	Relative Standard Deviation =	0.09945987
C4-0-1	29-Oct-13	499	13.25	**Precision =**	**9.9%**
C4-0-1	29-Oct-13	426	13.38	Data Quality Objective =	20%
C4-0-1	29-Oct-13	498	12.99		
C4-0-1	29-Oct-13	531	14.66		
C4-0-1	29-Oct-13	521	14.62		
C4-0-1	29-Oct-13	484	13.74		
C4-0-1	29-Oct-13	508	13.71		
A12-0-1	30-Oct-13	484	13.17	Mean =	559.4
A12-0-1	30-Oct-13	552	13.29	Standard Deviation =	44.1139937
A12-0-1	30-Oct-13	508	13.04	Relative Standard Deviation =	0.07885948
A12-0-1	30-Oct-13	599	13.25	**Precision =**	**7.9%**
A12-0-1	30-Oct-13	548	13.38	Data Quality Objective =	20%
A12-0-1	30-Oct-13	520	12.99		
A12-0-1	30-Oct-13	580	14.66		
A12-0-1	30-Oct-13	613	14.62		
A12-0-1	30-Oct-13	590	13.74		
A12-0-1	30-Oct-13	600	13.71		
C12-0-1	31-Oct-13	454	13.17	Mean =	441.6
C12-0-1	31-Oct-13	441	13.29	Standard Deviation =	37.5919613
C12-0-1	31-Oct-13	410	13.04	Relative Standard Deviation =	0.08512672
C12-0-1	31-Oct-13	453	13.25	**Precision =**	**8.5%**
C12-0-1	31-Oct-13	423	13.38	Data Quality Objective =	20%
C12-0-1	31-Oct-13	426	12.99		
C12-0-1	31-Oct-13	445	14.66		
C12-0-1	31-Oct-13	372	14.62		
C12-0-1	31-Oct-13	502	13.74		
C12-0-1	31-Oct-13	490	13.71		

APPENDIX A, ATTACHMENT A, TABLE A-2 X-RAY FLUORESCENCE STANDARD REFERENCE RECOVERIES

Date	Time	Reading	Sample	Lead	Lead +/-	NIST Lead [(a)]	Percent Recovery
10/29/2013	14:49:09	#2	blank	<LOD	1.1		
10/29/2013	14:55:51	#3	2709A	15	2	17.28	86.81
10/29/2013	15:00:57	#9	2709A	11.7	1.3	17.28	67.71
10/29/2013	15:05:07	#17	2710A	5657	35	5520	102.48
10/29/2013	15:06:58	#18	2586	421	6	432	97.45
10/29/2013	16:10:31	#25	BLANK	<LOD	1.1		
10/29/2013	16:14:33	#26	2710A	5510	34	5520	99.82
10/29/2013	16:20:14	#27	2709A	19.7	1.8	17.28	114.00
10/29/2013	16:23:56	#28	2586	418	6	432	96.76
10/29/2013	22:34:49	#130	2586	404	6	432	93.52
10/29/2013	22:36:47	#131	2709a	17.7	1.8	17.28	102.43
10/29/2013	22:38:29	#132	2710a	5577	34	5520	101.03
10/29/2013	22:40:08	#133	blank	<LOD	1.1		
10/30/2013	10:19:12	#2	blank	<LOD	1.1		
10/30/2013	10:22:57	#3	2709A	17.9	1.7	17.28	103.59
10/30/2013	10:27:56	#4	2710A	5281	33	5520	95.67
10/30/2013	10:30:22	#5	2710A	5437	34	5520	98.50
10/30/2013	10:32:39	#6	2586	408	6	432	94.44
10/30/2013	16:18:39	#117	2586	420	6	432	97.22
10/30/2013	16:20:31	#118	2710A	5597	35	5520	101.39
10/30/2013	16:22:08	#119	2709A	18.6	1.8	17.28	107.64
10/30/2013	16:23:44	#120	BLANK	<LOD	1		
10/31/2013	8:36:42	#3	2709A	16.1	1.7	17.28	93.17
10/31/2013	8:39:34	#4	2710A	5478	34	5520	99.24
10/31/2013	8:41:35	#5	2586	407	6	432	94.21
10/31/2013	14:44:32	#86	2586	409	6	432	94.68
10/31/2013	14:46:46	#87	2710A	5377	34	5520	97.41
10/31/2013	14:49:44	#88	2709A	19.4	1.8	17.28	112.27

(a) National Institute of Standards and Technology (NIST) certified standards were designated as NIST 2709a (lead concentration of 17.28 mg/kg), NIST 2710a (lead concentration of 5520 mg/kg), and SRM 2586 (lead concentration of 432 mg/kg)

<LOD = Below level of detection.

APPENDIX A, ATTACHMENT A, TABLE A-3 X-RAY FLUORESCENCE DUPLICATE SAMPLE RESULTS

Date	Time	Reading	Sample Name	XRF Lead (ppm)	Lead +/-	Relative Percent Difference
10/29/2013	16:48:11	#38	B3-3-4	3625	34	
10/29/2013	16:53:44	#39	B3-3-4 dup	2944	28	20.7
10/29/2013	16:55:32	#40	B3-3-4 dup	2933	28	21.1
10/29/2013	17:18:24	#51	D7-0-1	50	2	
10/29/2013	17:21:00	#52	D7-0-1 dup	53	2	5.8
10/29/2013	17:41:24	#63	C4-1-1.5	1169	10	
10/29/2013	17:43:00	#64	C4-1-1.5 dup	1198	10	2.5
10/29/2013	20:53:24	#86	J1-0-1	157	3	
10/29/2013	20:55:00	#87	J1-0-1 dup	155	3	1.3
10/29/2013	21:17:33	#97	G2-0-1	984	11	
10/29/2013	21:19:22	#98	G2-0-1 dup	1046	12	6.1
10/29/2013	21:50:13	#108	F1-1-2	233	4	
10/29/2013	21:51:49	#109	F1-1-2 dup	315	5	29.9
10/29/2013	22:15:07	#120	K2-6-7	21.3	1.7	
10/29/2013	22:16:46	#121	K2-6-7 dup	17.7	1.7	18.5
10/29/2013	22:31:29	#128	E6-3-3.7	20.9	1.8	
10/29/2013	22:33:02	#129	E6-3-3.7 dup	22.3	1.8	6.5
10/30/2013	11:18:09	#16	A6-0-1	978	8	
10/30/2013	11:20:27	#17	A6-0-1 DUP	1604	13	48.5
10/30/2013	11:23:51	#18	A6-0-1 DUP	1175	11	18.3
10/30/2013	12:13:57	#28	A10-2-3	15.9	1.7	
10/30/2013	12:15:54	#29	A10-2-3 DUP	18.4	1.8	14.6
10/30/2013	12:54:04	#39	B9-0-1	127	3	
10/30/2013	12:56:10	#40	B9-0-1 DUP	114	3	10.8
10/30/2013	13:22:37	#51	A12-0-1	536	6	
10/30/2013	13:24:30	#52	A12-0-1 DUP	565	6	5.3
10/30/2013	14:53:05	#78	F16-0-1	51	2	
10/30/2013	14:56:29	#79	F16-0-1 DUP	50	2	2.0
10/30/2013	15:14:35	#88	H14-0-1	48.1	2	
10/30/2013	15:16:10	#89	H14-0-1 DUP	56	2	15.2
10/30/2013	15:38:43	#99	G6-1-2	14.1	1.5	
10/30/2013	15:40:16	#100	G6-1-2 DUP	11.3	1.4	22.0
10/30/2013	15:53:09	#106	H3-1-2	88	3	
10/30/2013	15:55:13	#107	H3-1-2 DUP	91	3	3.4
10/30/2013	15:58:50	#109	C12-0-0.5	405	5	
10/30/2013	16:00:39	#110	C12-0-.5 DUP	400	5	1.2
10/30/2013	16:15:20	#115	L3-3-4	9.5	1.4	
10/30/2013	16:17:00	#116	L3-3-4 DUP	10.3	1.4	8.1
10/31/2013	9:44:08	#25	D11-2-3	15.5	1.9	
10/31/2013	9:45:58	#26	D11-2-3 DUP	18.9	1.8	19.8
10/31/2013	10:23:56	#36	E5-2-3	15.4	1.5	
10/31/2013	10:25:58	#37	E5-2-3 DUP	11.7	1.4	27.3
10/31/2013	11:06:21	#47	L1-0-1	350	5	
10/31/2013	11:09:30	#48	L1-0-1 DUP	278	4	22.9
10/31/2013	13:04:28	#59	B10-1-2	16.6	1.6	
10/31/2013	13:06:11	#60	B10-1-2 DUP	14.3	1.5	14.9
10/31/2013	13:52:11	#70	A15-1-2	16.6	1.8	
10/31/2013	13:53:51	#71	A15-1-2 DUP	23.9	1.8	36.0
10/31/2013	14:27:30	#81	G5-1-2	48	2	
10/31/2013	14:29:11	#82	G5-1-2 DUP	38.9	1.9	20.9
10/31/2013	14:33:47	#84	D12-0-0.5	50.3	2	
10/31/2013	14:35:30	#85	D12-0-0.5 DUP	54	2	7.1