

**REMEDIAL INVESTIGATION SUMMARY REPORT- REVISION 3**

**Falls Dump**

**Gastonia, Gaston County, North Carolina**

ID No. NONCD0000808

State Contract No. N15003i

Task Order 808SUM - Final

**Prepared By:**



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**Submitted To:**

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Environmental Quality  
Division of Waste Management  
Superfund Section  
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August 12, 2016

**TABLE OF CONTENTS**

**1.0 INTRODUCTION..... 1**

**2.0 SENSITIVE ENVIRONMENTS ..... 2**

**3.0 GEOLOGY AND HYDROGEOLOGY ..... 2**

**4.0 WASTE DISPOSAL AREA..... 3**

**5.0 MEDIA CHARACTERIZATION..... 4**

    5.1 Soil and Sediment Characterization ..... 4

        5.1.1 Soil and Sediment Remedial Goals ..... 4

        5.1.2 Soil Sampling..... 5

        5.1.3 Sediment Sampling ..... 5

    5.2 Water Characterization ..... 5

        5.2.1 Groundwater..... 5

        5.2.2 Surface Water and Seeps..... 6

    5.3 Landfill Gas Characterization..... 7

**6.0 REFERENCES..... 8**

**7.0 SOLE USE STATEMENT ..... 9**

**8.0 REPORT CERTIFICATION ..... 9**

**TABLES**

Table 1: Naturally Occurring Regional Background Element Ranges in Soil, Gaston County, North Carolina

**FIGURES**

Figure 1: Site Vicinity Map

Figure 2: Site Map

Figure 3: Investigation Sample Location Map

Figure 4: Cover Soil Thickness Map

Figure 5a: Soil Concentrations Exceeding SRGs in Cover Soil (0-5 ft. bgs)

Figure 5b: Soil Concentrations Exceeding SRGs in Subsurface Soil (5-10 ft. bgs)

Figure 5c: Soil Concentrations Exceeding SRGs in Cover Soil (10-15 ft. bgs)

Figure 6: Groundwater and Surface Water Sampling Results Exceeding NC Standards

Figure 7: Subsurface Landfill Gas Exceeding the NCDEQ IHSB Soil Gas Concentrations

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**ACRONYMS**

<u>ACM</u>	Asbestos Containing Material
<u>BGS</u>	Below Ground Surface
<u>DWM</u>	Division of Waste Management
<u>EPA</u>	Environmental Protection Agency (United States)
<u>ESP</u>	ESP Associates, P.A.
<u>ft</u>	Feet
<u>LEL</u>	Lower Explosive Limit
<u>MCL</u>	Maximum Contaminant Level
<u>MSL</u>	Mean Sea Level
<u>NC 2L</u>	North Carolina Title 15A NCAC Subchapter 2L Groundwater Quality Standards
<u>NCDEQ</u>	North Carolina Department of Environmental Quality
<u>NCDHHS</u>	North Carolina Department of Health and Human Services
<u>NRCS</u>	Natural Resources Conservation Services
<u>PIN</u>	Parcel Identification Number
<u>PSRG</u>	Preliminary Soil Remediation Goal
<u>RI</u>	Remedial Investigation
<u>SRG</u>	Soil Remediation Goal
<u>SVOC</u>	Semi-Volatile Organic Compound
<u>TCE</u>	Trichloroethylene
<u>USDA</u>	United States Department of Agriculture
<u>USGS</u>	United States Geological Survey
<u>VI</u>	Vapor Intrusion
<u>VOC</u>	Volatile Organic Compound

## 1.0 INTRODUCTION

This Remedial Investigation Summary Report provides an executive summary of the remedial investigation activities previously conducted at the Falls Dump (ID Number NONCD0000808). Remedial investigation reports used to complete this Remedial Investigation Summary Report are referenced in Section 6.0.

The Falls Dump (Site) is located at 2731 Forbes Road, Gastonia, North Carolina. The Site is accessible from a minor dirt road, Genes Ridge, traveling west on Safeway Drive, off of Forbes Road. The Site waste disposal area is approximately 1.92 acres, and is located on a total of six parcels (see Figures 1 and 2). The majority of the Site waste disposal area (main dump area) is concentrated on one parcel, which is an undeveloped property (Parcel Identification Number (PIN) 3543-43-8083). The Site waste is also located on five other adjacent parcels (PIN 3543-52-7385 (Gene Falls property), PIN 3543-52-5954, PIN 3543-53-4043, PIN 3543-53-3122, and PIN 3543-52-6866) that are all residential properties containing mobile homes (Gaston County, 2014).

The Site was operated as Falls Dump from the late 1950s to the late 1970s (Schnabel Engineering, December 22, 2011). The parcel associated with the main dump area consists of deciduous trees, briars, kudzu, vines, and underbrush, while the surrounding adjacent parcels which contain waste are manicured lawns. In addition, the parcel containing the main dump area includes two perennial streams located at the western end of the parcel. The main dump area is zoned as residential or “Single Family Limited” (R-1) and the adjacent parcels containing the remaining waste are zoned as residential or “Single Family Moderate” (R-2), (Gaston County, 2014). Water supply wells were not identified within a 1000 foot radius of the Site, or were found to be topographically upgradient (ESP Associates, July 28, 2015).

To the northeast of the Site, is the Hemphill Road Trichloroethene (TCE) site (ID Number NCO 002374445), which has a documented TCE groundwater plume. Elevated concentrations of TCE have been detected in the unnamed tributary adjacent to the Hemphill Road TCE site (ESP Associates, July 28, 2015) (Figure 6).

## **2.0 SENSITIVE ENVIRONMENTS**

No sensitive environments were identified in the site vicinity.

## **3.0 GEOLOGY AND HYDROGEOLOGY**

The site is located in the Kings Mountain Geologic Belt of the Piedmont Physiographic Province. According to USGS Geologic maps the Site is underlain by intrusive, foliated to massive granite rock, known as the High Shoals Granite, and is estimated to be 270-320 million years old. Maps indicated that the granitic bedrock is megacrystic to equigranular in composition (NC Geological Survey, 1998).

The Natural Resources Conservation Service (NRCS) indicate that soils for this area are Cecil Sandy Clay Loams, with a typical soil profile defined as sandy clay loam, clay, clay loam, and loam (USDA NRCS, 2014). Soils encountered on Site during edge of waste delineation included silts, sandy clays, silty clays, clayey silts, and silty sands, some of which were micaceous and contained rock fragments (ESP Associates, P.A., December 1, 2015). Naturally occurring regional background level ranges for elements in Gaston County Soils are shown in Table 1 and discussed in section 5.1.1 below (U.S. Geological Survey (USGS)).

Elevations across the site range from approximately 745 to 770 feet above mean sea level (ft MSL), therefore, groundwater flow direction on Site is anticipated to generally flow toward the northwest. Static groundwater levels from temporary wells indicate flow direction to the northwest; groundwater measurements ranged from approximately 4 feet below ground surface (BGS) at the northwestern end of the Site to 33 feet BGS in the southeastern side of the Site. In addition, a drainage ditch is located approximately 330-660 feet northwest of the Site and flows in the northwest direction toward the unnamed tributary, which flows southwest toward Crowders Creek, a Class C stream (ESP Associates, July 28, 2015).

No official background soil samples have been collected to date, however, iron and manganese concentrations found on Site in groundwater and sediment are considered to be naturally occurring as a result of local geology and soils. Arsenic, chromium, selenium, and nitrate concentrations in groundwater from temporary wells on Site also exceeded the PRSGs but were

below the Gaston County regional background levels in private wells. (NCDHHS, Epidemiology Section) (Table 1).

#### **4.0 WASTE DISPOSAL AREA**

Surface waste was documented on the main dump area and on the southwestern perimeter of the Site. Surficial waste was also documented in the center and southern corner of the Gene Falls property. The documented surficial waste included household and/or possible construction debris such as bricks, bubble wrap, concrete blocks, fabric, glass, metal, plastic, styrofoam, and wood. Buried waste was not documented in the areas containing exposed surficial waste, and therefore there may have been dumping not associated with the historical landfill (ESP Associates, July 28, 2015).

Buried waste was encountered in soil borings throughout the 1.92 acre Site area. Waste encountered included wood and shredded wood, stumps, plastic, brick, asphalt, glass, concrete blocks, wire, metal scraps, fibrous material, cloth, fiberglass, shingles, and Styrofoam. See the final estimated waste disposal area as denoted by ESP (ESP Associates, P.A., December 1, 2015) and shown in our Figures 2-7.

The soil cover over the buried waste ranges in thickness from 0.5 feet to 8.5 feet. A significant portion of the Site was found to generally have less than 18 inches of soil cover (see shaded areas in Figure 4). In most cases the borings were terminated before reaching the bottom of the buried waste, however, waste was found as deep as 23.7 feet bgs. Therefore, the vertical depth of the buried waste is unknown and it is not possible to calculate the estimated volume of waste for potential removal. In four soil borings, the bottom of the buried waste was found to be at depths ranging from 2.5-9.5 feet.

Asbestos Containing Material (ACM) with greater than 1% asbestos was detected in the tar of one shingle sample collected from soil boring (SB-79). ESP noted that this would require special handling for removal. Observations were made of a chemical odor in soil borings SB-73 and SB-74 (ESP Associates, P.A., December 1, 2015). No physical hazards were identified in previous reports.

## 5.0 MEDIA CHARACTERIZATION

Soil, sediment, surface water, groundwater samples, asbestos, and landfill gas samples were collected on Site. Laboratory analyses for soil, sediment, surface water, and groundwater include the following parameters: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), 15 selected metals (antimony, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc), ammonia, nitrate and sulfate (Full Suite analyses). Additional soil, sediment, and surface water samples were collected for laboratory analysis of limited parameters as discussed in subsequent sections. Landfill gas samples were field screened for oxygen, carbon dioxide, methane, mercury, hydrogen sulfide, and total VOCs. Sample results for each media were screened against the latest applicable regulatory criteria as indicated in the subsequent sections.

### 5.1 Soil and Sediment Characterization

#### 5.1.1 Soil and Sediment Remedial Goals

Soil and sediment analytical results were initially compared to the Preliminary Soil Remediation Goals (PSRGs) established by the North Carolina Inactive Hazardous Sites Branch (IHSB). When PSRGs were exceeded, results were provided to the IHSB's toxicologist and site specific Soil Remediation Goals (SRGs) were calculated. SRGs for Lead and Selenium were determined to be the same as PSRGs. Remediation goals are established in a manner consistent with applicable standards. The following site specific health based SRGs include the following:

- Arsenic – 22.5 milligrams per kilogram (mg/kg);
- Hexavalent chromium – 0.5 mg/kg;
- Lead – 400 mg/kg;
- Selenium – 78 mg/kg;
- Thallium – 0.8 mg/kg;
- Benzo(a)pyrene – 0.5 mg/kg; and
- Benzo(b)fluoranthene – 5 mg/kg.

Detected analytes greater than PSRGs but explained as naturally occurring by ESP are not included in the descriptions below.

### **5.1.2 Soil Sampling**

No official background soil samples were collected. A total of twenty cover soil samples were collected. In addition to the full suite analyses a subset of soil samples from the estimated waste disposal zone were additionally analyzed for 1,4,-dioxane and asbestos. One sample, SB-33 exceeds SRGs (400 mg/kg) for Lead at 940 mg/kg, (Figure 5a) (ESP Associates, P.A., Decemeber 10, 2014). According to published naturally occurring regional background ranges for lead in Gaston County soils range from 18.6 parts per million (ppm or mg/kg) to 51.5 ppm (Table 1). To date a total of eighty eight soil borings (including cover soils) have been taken within the Site and surrounding the Site area. ESP found that thallium levels in four soil borings (SB-32C, SB-4, SB-5, and SB-35) at various depths were over SRGs of 0.8 mg/kg (Figure 5b and 5c). Four of the analytes detected in the waste zone samples (benzoperylene, phenanthrene, ammonia, and sulfate) are not a concern since neither SRGs nor PSRGs have been established for these analytes.

### **5.1.3 Sediment Sampling**

A total of six sediment samples were collected from locations along the unnamed tributary and the drainage ditch to the west of the Site for the full suite of analyses listed in Section 5.0. Five additional sediment samples were collected at locations along the unnamed tributary and drainage ditch for hexavalent chromium analysis, and four sediment samples were collected at locations along the unnamed tributary and drainage ditch for TCE analysis (Figure 3). No analytes were found to exceed SRGs.

## **5.2 Water Characterization**

### **5.2.1 Groundwater**

Five temporary wells were installed on Site (TW-1 through TW-5). Static groundwater levels from these temporary wells indicated a flow direction to the northwest. Groundwater measurements ranged from approximately 4 feet BGS at the northwestern end of the Site to 33 feet BGS in the southeastern side of the Site (Figure 6) (Schnabel Engineering, July 9, 2012). General flow of groundwater is noted on Figure 6; however, a groundwater contour map could not be established with the available report data which did not include top of casing elevation surveys.

Groundwater samples were analyzed for the following parameters: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), 15 selected metals (antimony, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc), ammonia, nitrate and sulfate. Groundwater analytical results were compared to North Carolina's 15A NCAC 02L.0202. The following well samples exceeded the 2L Standards; GW-2 (arsenic, beryllium, chromium, manganese, selenium, nitrate, and sulfate), GW-3 and GW-4 (manganese), and GW-5 (iron, manganese, and nitrate) (Figure 6) (Schnabel Engineering, July 9, 2012).

Private well water test results for Gaston County suggest that most of the elevated concentrations of inorganic analytes exceeding 2L standards are due to naturally occurring conditions. Groundwater results on Site for manganese, arsenic, chromium, selenium, and nitrate fall within the minimum and maximum range, but above the average concentrations reported by private well tests conducted within Gaston County. Results for iron also fell within the minimum and maximum concentration ranges, but were below the average concentration. There was no information regarding beryllium or sulfate concentrations in private well water (NCDHHS, Epidemiology Section).

### **5.2.2 Surface Water and Seeps**

Seven surface water samples were taken from the unnamed tributary and the drainage ditch (SW-1, SW-1A, SW-1B, SW-1C, SW-2, SW-2A, and SW-3 (Figure 3)). Surface water samples were analyzed for the following parameters: volatile organic compounds (VOCs) (cis-1,2 dichloroethene and trichloroethene), various semi-volatile organic compounds (SVOCs), 15 selected metals (antimony, arsenic, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc), ammonia, nitrate and sulfate. Surface water results are compared to applicable North Carolina's 15A NCAC 2B.0200 Surface Waters (2B Standards). The only analyte in the surface water samples detected at concentrations exceeding the 2B Standards was iron in sample SW-2 in the drainage ditch (Figure 6). Trichloroethylene was detected in samples SW-1 and SW-1A taken from the unnamed tributary, however concentrations are below the 2B Standards (30

micrograms / Liter ( $\mu\text{g/L}$ ) The Hemphill Road TCE site is the source of the detected TCE concentrations in the surface water of the unnamed tributary, because the TCE levels upstream of the site and adjacent to the Hemphill Road site were higher (ESP Associates, P.A., July 10-11, 2014). The EPA is currently mitigating the Hemphill Road site.

### **5.3 Landfill Gas Characterization**

No landfill gas was detected at the ground surface (Schnabel Engineering, June 27, 2012). Four subsurface landfill gas probes (GP-1 – GP-4) were later installed within the Site boundary (Figure 3). Each gas probe was field screened during two to four separate events. Hydrogen sulfide was not detected in the subsurface landfill gas screenings. Mercury was the only gas detected at concentrations above the NCDEQ IHSB Residential Vapor Intrusion Screening Concentrations (DWM screening levels) for soil gas of 0.00209 milligrams per cubic meter ( $\text{mg/m}^3$ ) in GP-1, GP-2, and GP-3 (Figure 7) (Division of Waste Management, March, 2016).

Methane was detected in only one of the gas probes (GP-2). The measured methane concentration at this location was 12% of the lower explosive limit (LEL) but was not confirmed during subsequent screening events. Carbon dioxide was detected in all four gas probes. Low levels of total VOCs (less than 3 ppm) were detected in all four gas probes the first time each was screened; however, total VOC detections were not confirmed during subsequent screening events.

The four mobile homes that are located on the Site parcels along Safeway Drive are approximately 100 feet to the northeast of estimated waste disposal boundary. Three of the four homes are visible on the attached figures. In general, the mobile homes are built on crawl spaces, and each has a septic system in its back yard. Additional mobile homes built on crawl spaces and an enclosed shed built on a slab foundation (located to the southeast) are located greater than 100 feet away from the Site (ESP Associates, July 28, 2015).

## 6.0 REFERENCES

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**7.0 SOLE USE STATEMENT**

The report was prepared solely for the intended use of NCDEQ Inactive Hazardous Sites Branch performed in the scope of work for Task Order 808SUM-FINAL. Use of this document for other purposes is at the sole risk of the user.

**8.0 REPORT CERTIFICATION**

Remedial Investigation – Summary Report

Falls Dump

ID #: NONCD0000808

Task Order: 808SUM-Final

I certify that, to the best of my knowledge, after thorough investigation, the information contained in or accompanying this certification is true, accurate, and complete.

David A. Stoner, P.G., P.E.

Signature



Before me personally appeared David A. Stoner, P.G., P.E. to me known and known to me to be the person described in and who executed the foregoing instrument, and acknowledge to and before me that David A. Stoner, P.G., P.E. executed said instrument for the purposes therein expressed.

Witness my hand and official seal this 12<sup>th</sup> day of August, 2016.

Susan Griffin  
Notary Public

July 23, 2018  
My Commission Expires On

North Carolina  
State of

mecklenburg  
County of

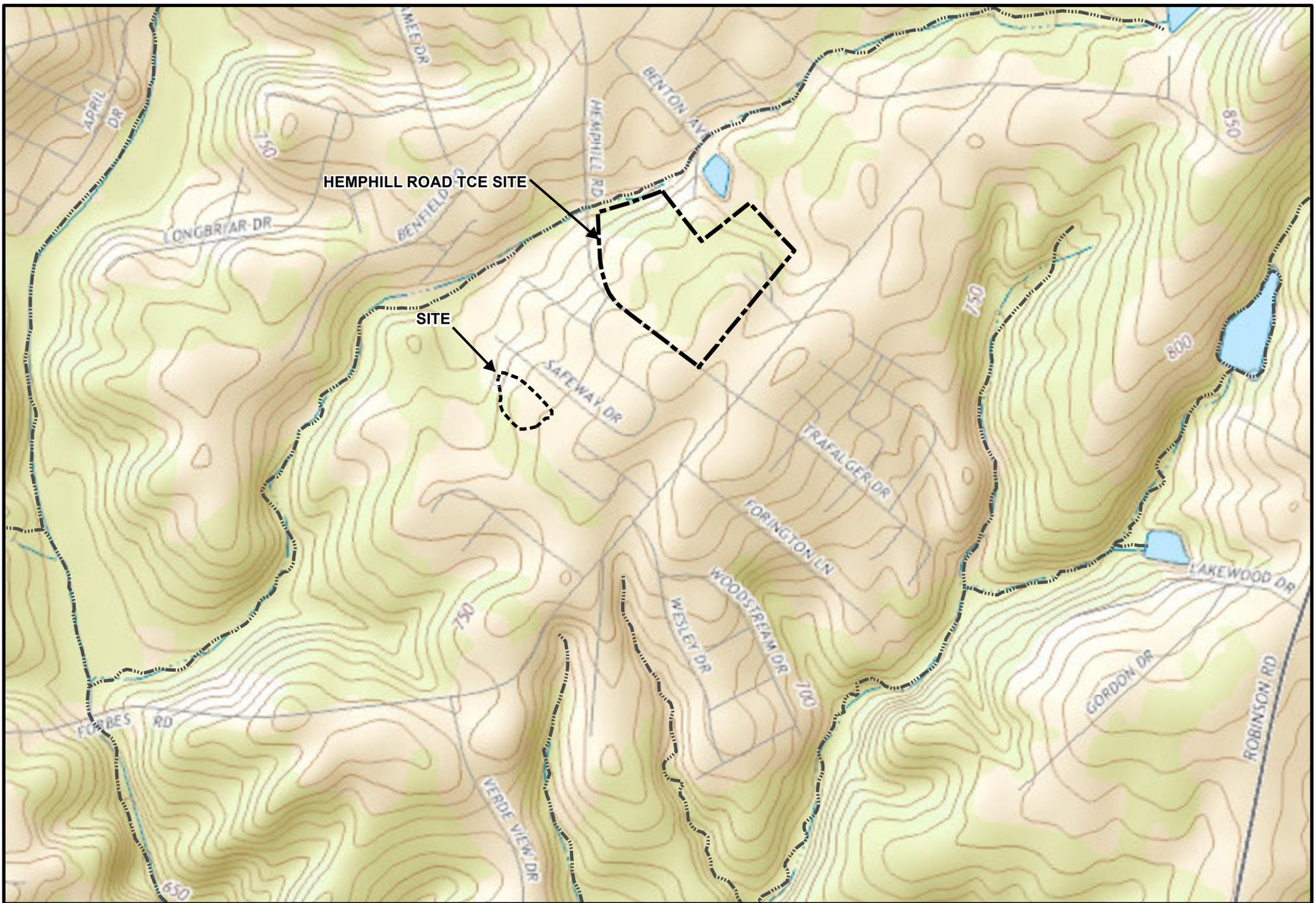


## **TABLES**

**Table 1: Naturally Occurring Regional Background Element Ranges in Soil, Gaston County, North Carolina**

Element	Symbol	Mean	Std. dev.	Minimum	Maximum
Aluminum	Al (wt%)	4.347	0.587	3.205	6.269
Arsenic	As (ppm)	1.611	0.45	0.733	2.826
Calcium	Ca (wt%)	0.805	0.357	0.089	2.053
Copper	Cu (ppm)	16.14	6.347	5.784	36.209
Iron	Fe (wt%)	3.248	1.211	1.834	7.741
Mercury	Hg (ppm)	0.041	0.013	0.021	0.088
Magnesium	Mg (wt%)	0.383	0.091	0.239	0.805
Manganese	Mn (ppm)	684.302	318.631	201.24	2197.64
Sodium	Na (wt%)	0.417	0.143	0.064	0.856
Phosphorus	P (wt%)	0.026	0.006	0.013	0.059
Lead	Pb (ppm)	30.601	6.253	18.646	51.497
Selenium	Se (ppm)	0.103	0.006	0.1	0.137
Titanium	Ti (wt%)	0.556	0.119	0.442	1.275
Zinc	Zn (ppm)	50.426	12.616	27.168	93.551

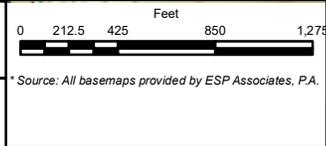
## **FIGURES**



**Legend**

--- Estimated Waste Disposal Area Perimeter

**Figure 1**  
 Site Location Map  
 Falls Dump  
 NONCD0000808  
 Gastonia, Gaston County, NC

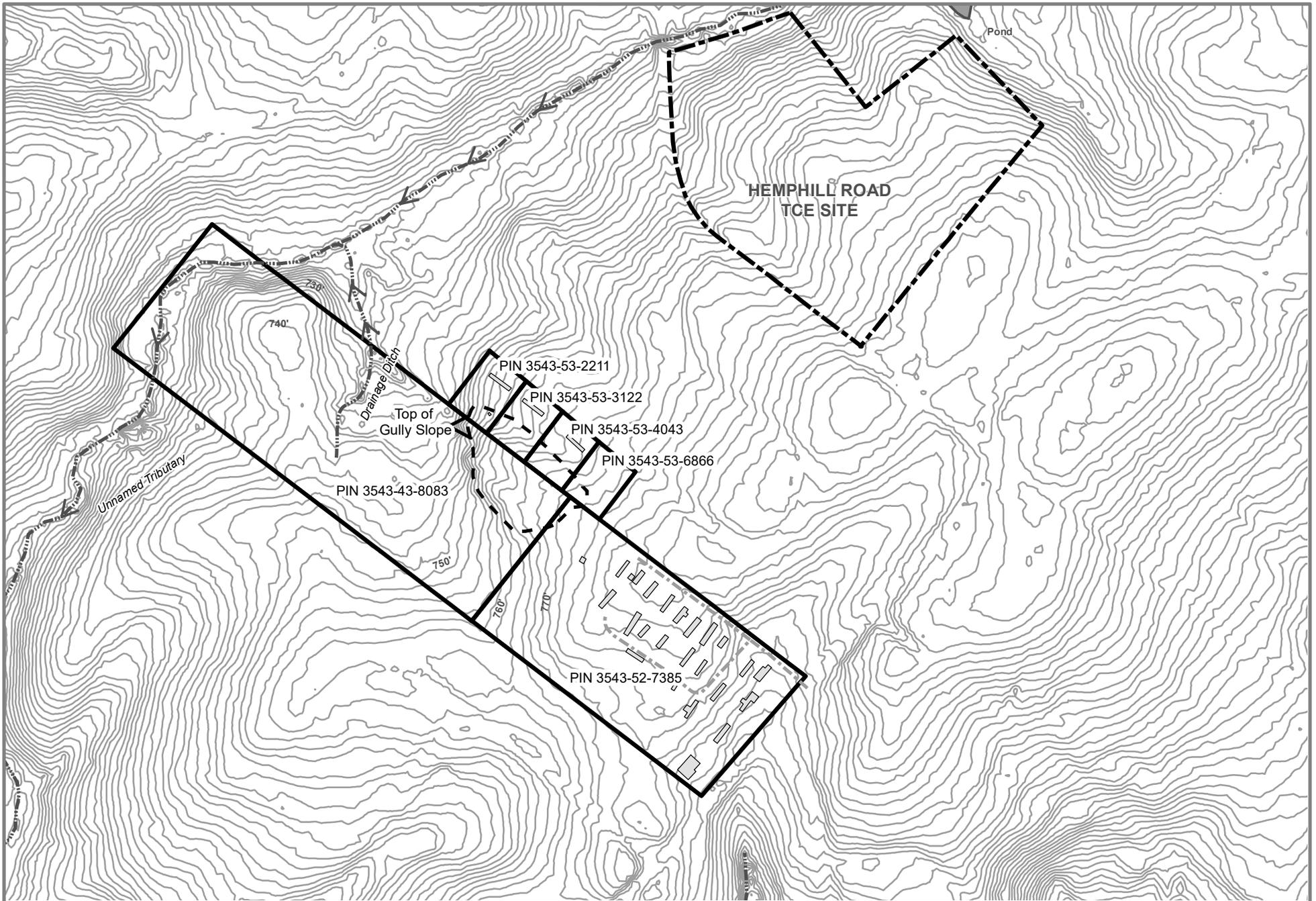


**N**

**DATE**  
 August 10, 2016

<b>PROJECT NO.</b>	BN12.608
<b>SCALE</b>	As Shown
<b>DRAWN BY</b>	RD
<b>CHECKED BY</b>	RD

Shield Engineering, Inc.  
 4301 Taggart Creek Road  
 Charlotte NC, 28208  
[www.shieldengineering.com](http://www.shieldengineering.com)  
 Phone: 704-394-6913



Legend	
Property Line	pond
Minor Roads	Perennial Stream
Existing Buildings	Parcel Line
Estimated Waste Disposal Area Perimeter	Hemphill Road TCE Site

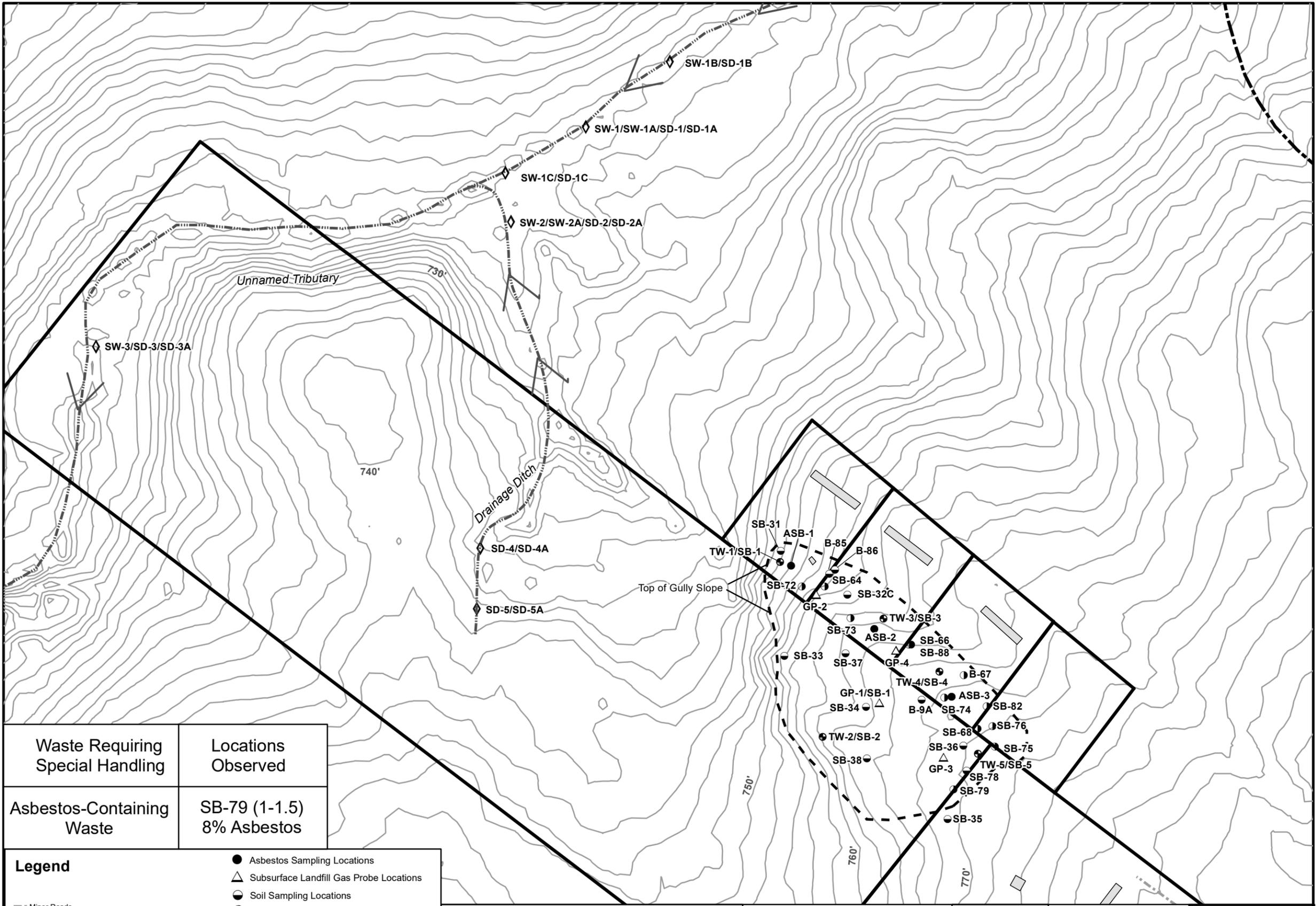
**Figure 2**  
 Site Map  
 Falls Dump  
 NONCD0000808  
 Gastonia, Gaston County, NC

Feet  
 0 95 190 380 570  
 \* Source: All basemaps provided  
 by ESP Associates, P.A.

N  
  
 DATE July 12, 2016

PROJECT NO.	1160108-01
SCALE	As Shown
DRAWN BY	BM
CHECKED BY	RD

Shield Engineering, Inc.  
 4301 Taggart Creek Road  
 Charlotte NC, 28208  
[www.shieldengineering.com](http://www.shieldengineering.com)  
 Phone: 704-394-6913



Waste Requiring Special Handling	Locations Observed
Asbestos-Containing Waste	SB-79 (1-1.5) 8% Asbestos

Legend	
— Minor Roads	● Asbestos Sampling Locations
— Property Line	△ Subsurface Landfill Gas Probe Locations
— Perennial Stream	● Soil Sampling Locations
— Topographic Contour (2ft)	● Soil Sampling Locations (Including Asbestos)
— Estimated Waste Disposal Area Perimeter	◇ Surface Water/Sediment Sample Locations
— Hemphill Road TCE Site	● Temporary Groundwater Well Locations
	□ Parcel Line
	▭ Existing Buildings

**Figure 3**  
Investigation Sample Location Map  
Falls Dump  
NONCD0000808  
Gastonia, Gaston County, NC

Feet  
0 40 80 160 240

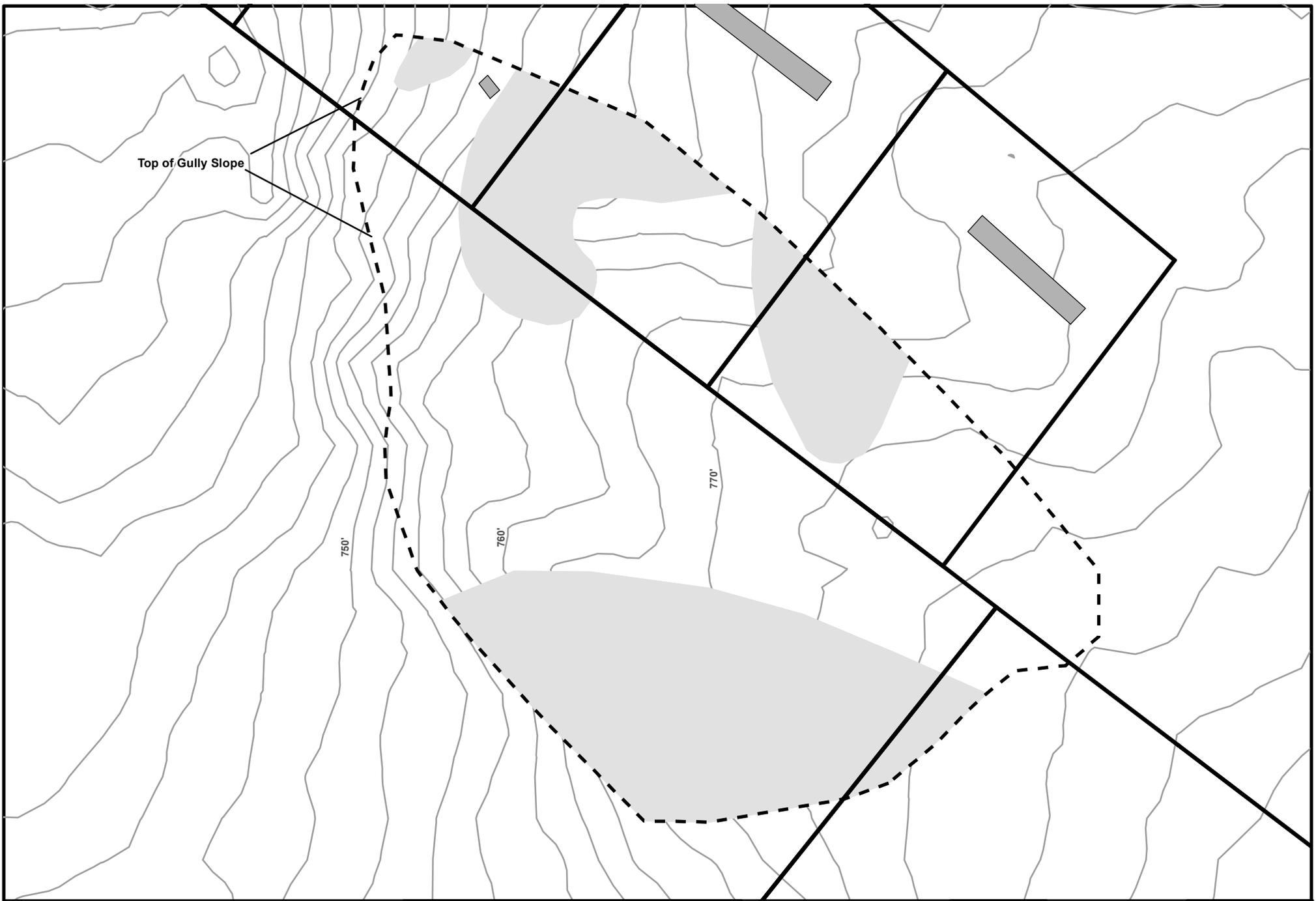
\* Source: All basemaps provided by ESP Associates, P.A.

N  
▲

DATE July 7, 2016

PROJECT NO.	1160108-01
SCALE	As Shown
DRAWN BY	BM
CHECKED BY	RD

**SHIELD**  
ENGINEERING, INC.  
Shield Engineering, Inc  
4301 Taggart Creek Road  
Charlotte NC, 28208  
www.shieldengineering.com  
Phone: 704-394-6913



Top of Gully Slope

750'

760'

770'

**Legend**

- Property Line
- Gastonia TOPO
- Cover Soil Thickness Less than 18 inches ( ESP, 2014)
- Existing Buildings
- Estimated Waste Disposal Area Perimeter

**Figure 4**  
 Cover Soil Thickness Map  
 Falls Dump  
 NONCD0000808  
 Gastonia, Gaston County, NC



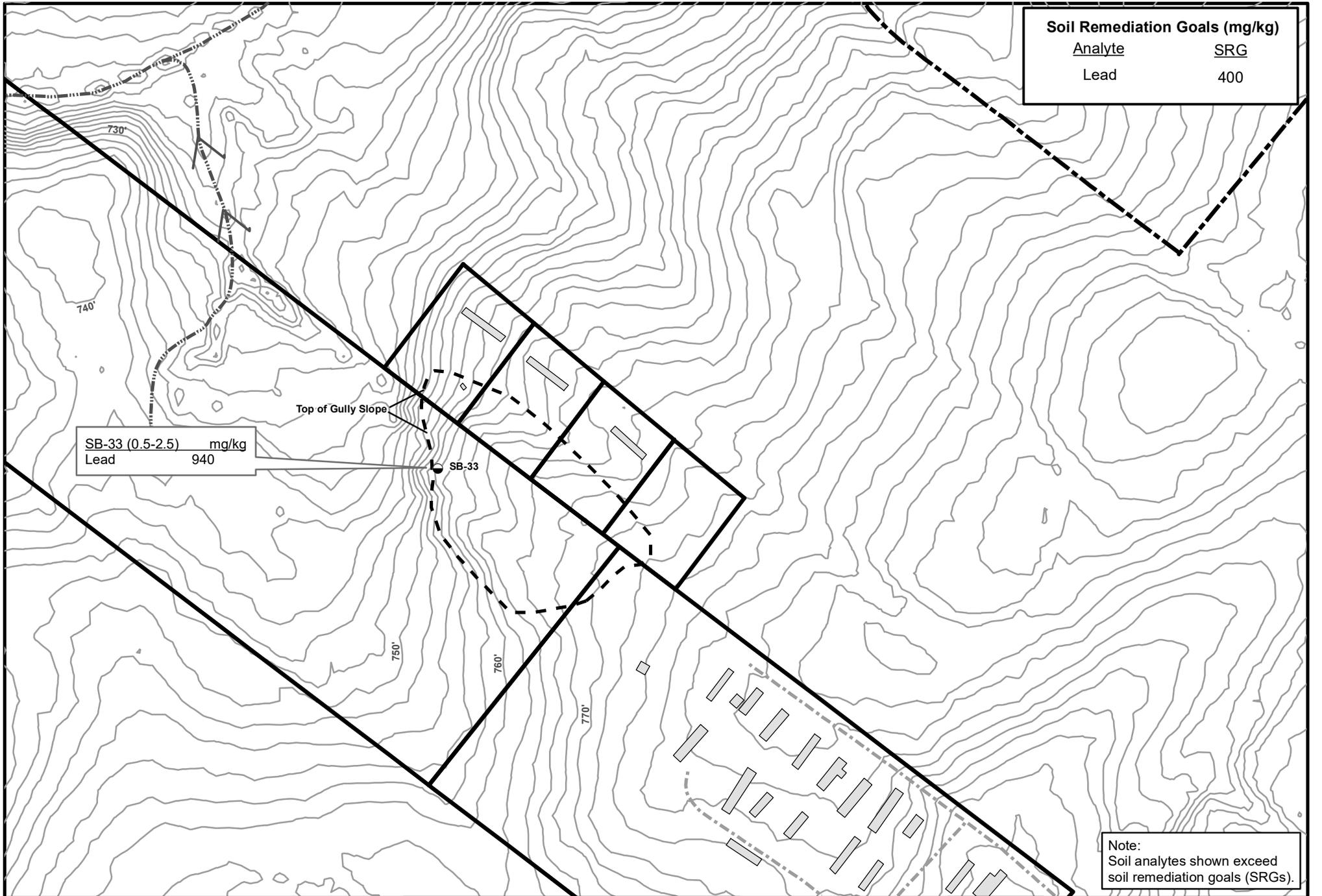
\* Source: All basemaps provided by ESP Associates, P.A.

N  
  
 DATE  
 July 7, 2016

PROJECT NO.	1160108-01
SCALE	As Shown
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CHECKED BY	RD

Shield Engineering, Inc.  
 4301 Taggart Creek Road  
 Charlotte NC, 28208  
[www.shieldengineering.com](http://www.shieldengineering.com)  
 Phone: 704-394-6913

Soil Remediation Goals (mg/kg)	
Analyte	SRG
Lead	400



SB-33 (0.5-2.5) mg/kg  
Lead 940

Note:  
Soil analytes shown exceed  
soil remediation goals (SRGs).

Legend	
● Sampling Locations ( ESP, 2015)	— Topographic Contour (2ft)
— Minor Roads	▭ Existing Buildings
— Property Line	— Perennial Stream
--- Estimated Waste Disposal Area Perimeter	

**Figure 5a**  
Soil Concentration Exceeding SRGs  
in Cover Soil – 0 to 5 ft bgs  
Falls Dump  
NONCD0000808  
Gastonia, Gaston County, NC

0 50 100 200 300 Feet

\* Source: All basemaps provided  
by ESP Associates, P.A.

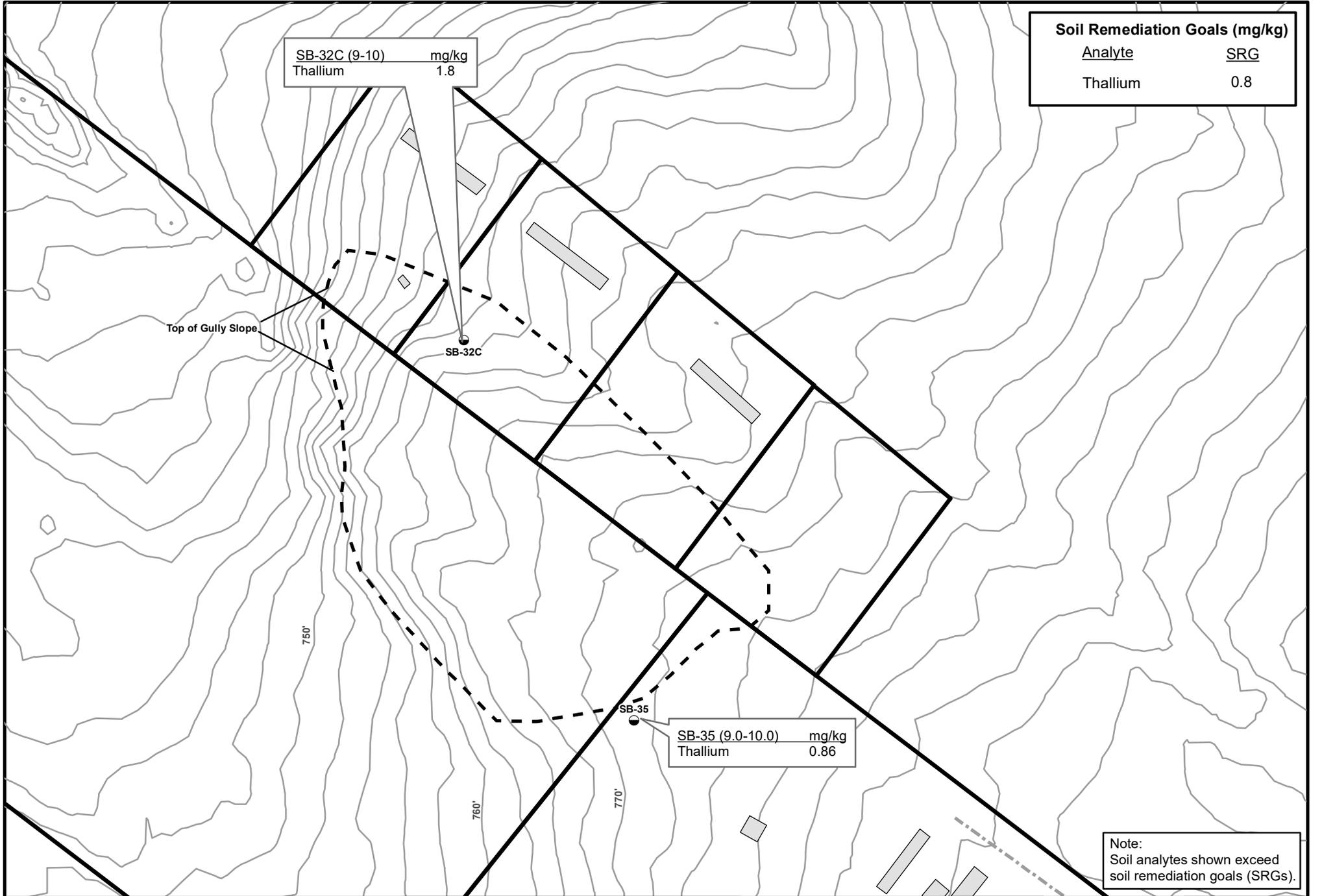
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DATE  
July 13, 2016

PROJECT NO.	1160108-01
SCALE	As Shown
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CHECKED BY	RD

**SHIELD**  
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Phone: 704-394-6913

Soil Remediation Goals (mg/kg)	
Analyte	SRG
Thallium	0.8



SB-32C (9-10) mg/kg  
Thallium 1.8

SB-35 (9.0-10.0) mg/kg  
Thallium 0.86

Note:  
Soil analytes shown exceed  
soil remediation goals (SRGs).

Legend	
	Sampling Locations
	Minor Roads
	Property Line
	Estimated Waste Disposal Area Perimeter
	Topographic Contour (2ft)
	Parcel Line
	Existing Buildings

**Figure 5b**  
Soil Concentrations Exceeding SRGs  
in Subsurface Soil – 5 to 10 ft bgs  
  
Falls Dump  
NONCD0000808  
Gastonia, Gaston County, NC

0 25 50 100 150 Feet

\* Source: All basemaps provided by ESP Associates, P.A.

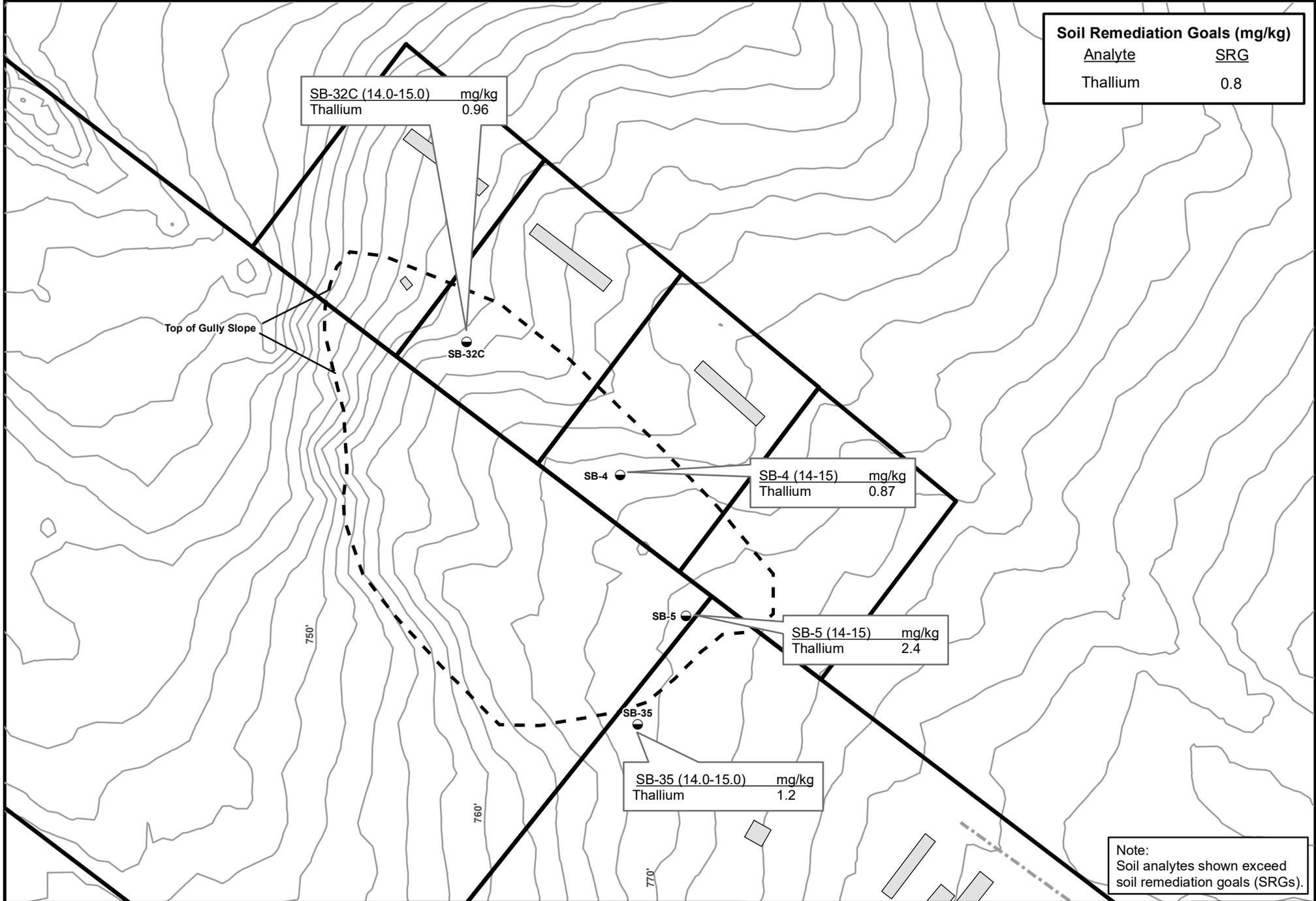
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DATE  
July 12, 2016

PROJECT NO.	1160108-01
SCALE	As Shown
DRAWN BY	BM
CHECKED BY	RD

**SHIELD**  
ENGINEERING, INC.  
Shield Engineering, Inc.  
4301 Taggart Creek Road  
Charlotte NC, 28208  
[www.shieldengineering.com](http://www.shieldengineering.com)  
Phone: 704-394-6913

Soil Remediation Goals (mg/kg)	
Analyte	SRG
Thallium	0.8



Note:  
Soil analytes shown exceed soil remediation goals (SRGs).

Legend	
Minor Roads	Sampling Locations
Property Line	Topographic Contour (2ft)
Estimated Waste Disposal Area Perimeter	Parcel Line
	Existing Buildings

**Figure 5c**  
Soil Concentrations Exceeding SRGs  
Subsurface Soil – 10 to 15 ft bgs  
**Falls Dump**  
NONCD0000808  
Gastonia, Gaston County, NC

0 25 50 100 150  
Feet

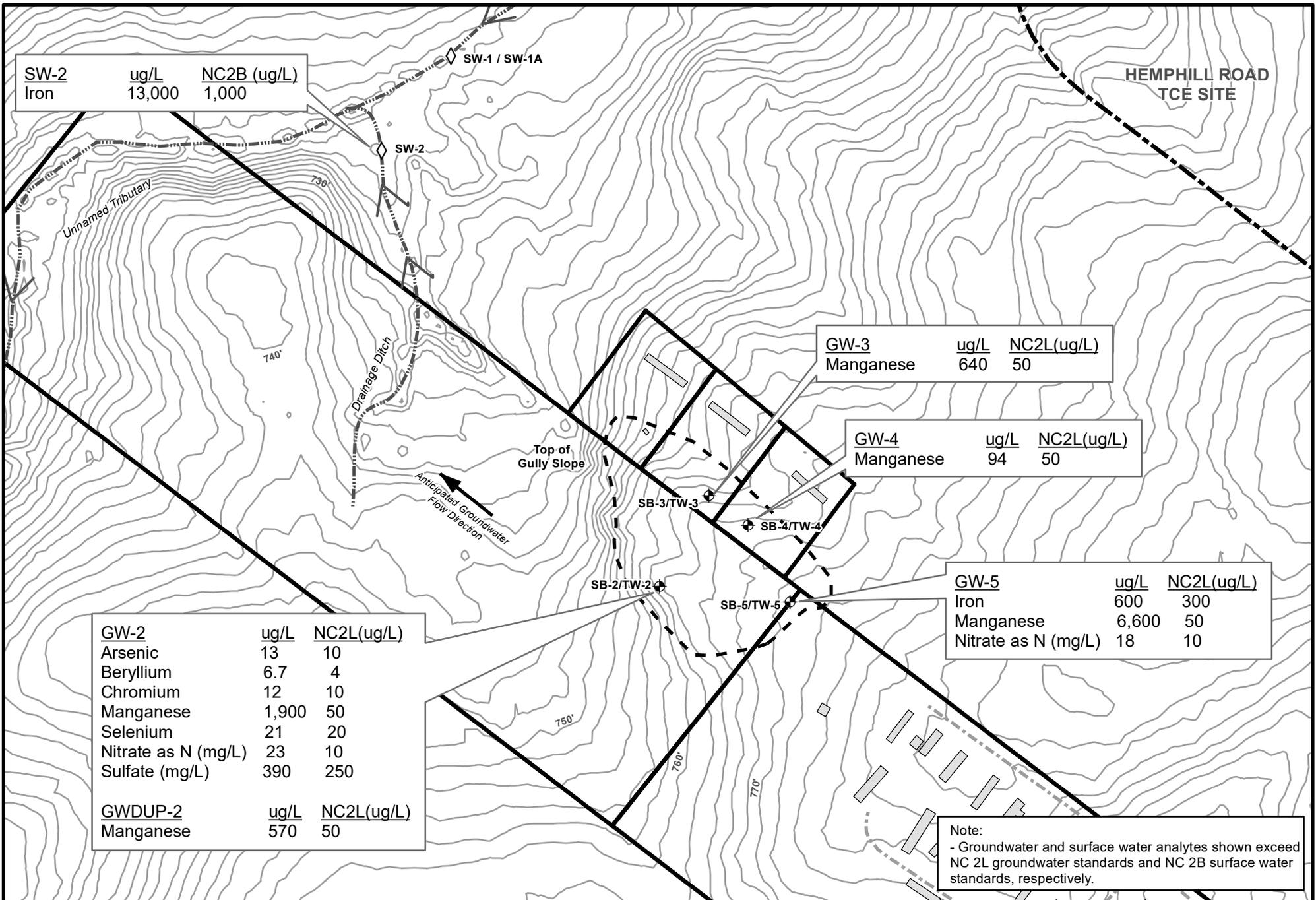
\* Source: All basemaps provided by ESP Associates, P.A.

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<b>SW-2</b>	<b>ug/L</b>	<b>NC2B (ug/L)</b>
Iron	13,000	1,000

<b>GW-3</b>	<b>ug/L</b>	<b>NC2L(ug/L)</b>
Manganese	640	50

<b>GW-4</b>	<b>ug/L</b>	<b>NC2L(ug/L)</b>
Manganese	94	50

<b>GW-5</b>	<b>ug/L</b>	<b>NC2L(ug/L)</b>
Iron	600	300
Manganese	6,600	50
Nitrate as N (mg/L)	18	10

<b>GW-2</b>	<b>ug/L</b>	<b>NC2L(ug/L)</b>
Arsenic	13	10
Beryllium	6.7	4
Chromium	12	10
Manganese	1,900	50
Selenium	21	20
Nitrate as N (mg/L)	23	10
Sulfate (mg/L)	390	250

<b>GWDUP-2</b>	<b>ug/L</b>	<b>NC2L(ug/L)</b>
Manganese	570	50

Note:  
 - Groundwater and surface water analytes shown exceed NC 2L groundwater standards and NC 2B surface water standards, respectively.

Gastonia TOPO	Topographic Contour (2ft)	Property Line
Perennial Stream	Estimated Waste Disposal Area Perimeter	Parcel Line
Minor Roads	TW-2 Temporary Well Locations ( Schnabel, 2012)	Existing Buildings
Hemphill Road TCE Site	SW-1 Surface Water Sample ( Schnabel, 2012)	Gastonia TOPO

**Figure 6**  
**Groundwater and Surface Water Sampling Results**  
 Falls Dump  
 NONCD0000808  
 Gastonia, Gaston County, NC



\* Source: All basemaps provided by ESP Associates, P.A.

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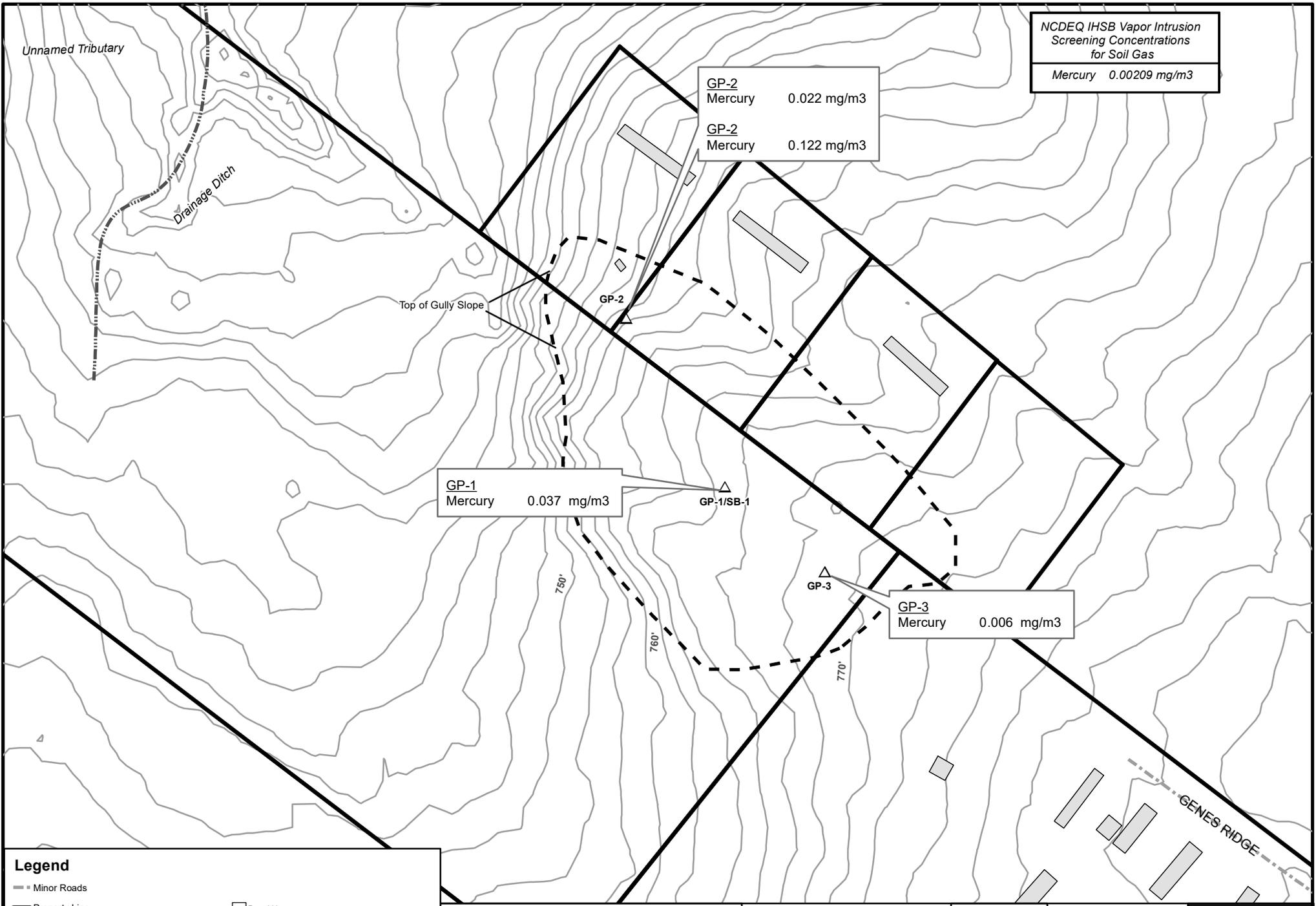
DATE July 7, 2016  
 REVISION AUGUST 8, 2016

PROJECT NO.	1160108-01
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Shield Engineering, Inc.  
 4301 Taggart Creek Road  
 Charlotte NC, 28208  
 www.shieldengineering.com  
 Phone: 704-394-6913

NCDEQ IHSB Vapor Intrusion  
Screening Concentrations  
for Soil Gas

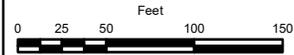
Mercury	0.00209 mg/m <sup>3</sup>
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**Legend**

- Minor Roads
- Property Line
- Perennial Stream
- Topographic Contour (2ft)
- Estimated Waste Disposal Area Perimeter
- Hemphill Road TCE Site
- Parcel Line
- ▭ Existing Buildings
- △ Subsurface Landfill Gas Probe Locations

**Figure 7**  
Subsurface Landfill Gas Exceeding  
the NCDEQ IHSB Soil Gas Concentrations  
Falls Dump  
NONCD0000808  
Gastonia, Gaston County, NC



\* Source: All basemaps provided  
by ESP Associates, P.A.

N  
DATE July 18, 2016

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**SHIELD**  
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