



## Seagull Environmental Technologies, Inc.

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December 18, 2009

Mr. Roy Crossland  
Mini-START Project Officer  
U.S. Environmental Protection Agency, Region 7  
901 North 5<sup>th</sup> Street  
Kansas City, Kansas 66101

**Subject: Quality Assurance Project Plan for a Phase II Targeted Brownfields Assessment  
Burlington Northern and Santa Fe Property Site, Lincoln, Nebraska  
EPA Region 7, Mini-START, Contract No. EP-S7-09-01, Task Order No. 0015  
Task Monitor: Ron King, Site Assessment Team Leader**

Dear Mr. Crossland:

Seagull Environmental Technologies, Inc., is submitting the attached Quality Assurance Project Plan for a Phase II Targeted Brownfields Assessment (TBA) for the Burlington Northern and Santa Fe Property site, in Lincoln, Nebraska. If you have any questions or comments, please contact the project manager at (816) 412-1937.

Sincerely,

Jeff Pritchard, CHMM  
Mini-START Project Manager

Hieu Q. Vu, PE  
Mini-START Program Manager

Enclosures

**QUALITY ASSURANCE PROJECT PLAN  
FOR A PHASE II TARGETED BROWNFIELDS ASSESSMENT  
BURLINGTON NORTHERN AND SANTA FE PROPERTY SITE, LINCOLN, NEBRASKA**

**Mini-Superfund Technical Assessment and Response Team (Mini-START)**

**Contract No. EP-S7-09-01, Task Order No. 0015**

Prepared For:

U.S. Environmental Protection Agency  
Region 7  
Superfund Division  
901 N. 5<sup>th</sup> Street  
Kansas City, Kansas 66101

December 18, 2009

Prepared By:

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**for the Burlington Northern and Santa Fe Property Site**

**Project Information:**

<b>Project Name:</b> Burlington Northern and Santa Fe Property		<b>City:</b> Lincoln	<b>State:</b> NE	
<b>EPA Project Manager:</b> Ron King		<b>Project Manager:</b> Jeff Pritchard		
<b>Approved By:</b>		<b>Prepared For:</b> EPA Region 7 Superfund Division		
<b>Title:</b>	Mini-START Project Manager			<b>Date:</b>
<b>Approved By:</b>				
<b>Title:</b>	Mini-START Program Manager			
<b>Approved By:</b>		<b>Prepared By:</b> Ryan Lunt		
<b>Title:</b>	Mini-START QA Manager	<b>Date:</b> December 18, 2009		
<b>Approved By:</b>				
<b>Title:</b>	EPA Project Manager			
<b>Approved By:</b>		<b>Project Number:</b> EPS70901.0015		
<b>Title:</b>	EPA Region 7 QA Coordinator			

**Project Management:**

**1.1 Distribution List**

EPA—Region 7: Ron King, Project Manager  
 Diane Harris, QA Coordinator

Mini-START: Jeff Pritchard, Project Manager

**1.2 Project/Task Organization**

Ron King, of the EPA Region 7 Superfund Division, will serve as the EPA project manager for the activities described in this QAPP. Jeff Pritchard, with Seagull Environmental Technologies, Inc., will serve as the Mini-START project manager for field activities.

**1.3 Problem Definition/Background:**

Description: This site-specific Quality Assurance Project Plan form is prepared as an addendum to the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007), and contains site-specific data quality objectives for the sampling activities described herein.

- Description attached.  
 Description in referenced report: \_\_\_\_\_  
Title Date

**1.4 Project/Task Description:**

- CERCLA PA  CERCLA SI  Brownfields Assessment  Removal Action  
 Other (description attached):  Pre-CERCLIS Screening  Removal Site Evaluation

Other Description:

Schedule: Field work is scheduled to begin in January 2010 and is anticipated to take 5 days to complete.

- Description in referenced report: \_\_\_\_\_  
Title Date

**1.5 Quality Objectives and Criteria for Measurement Data:**

- |                        |   |
|------------------------|---|
| a. Accuracy:           | <input checked="" type="checkbox"/> Identified in attached table. |
| b. Precision:          | <input checked="" type="checkbox"/> Identified in attached table. |
| c. Representativeness: | <input checked="" type="checkbox"/> Identified in attached table. |
| d. Completeness*:      | <input checked="" type="checkbox"/> Identified in attached table. |
| e. Comparability:      | <input checked="" type="checkbox"/> Identified in attached table. |

Other Description:

\*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make decisions based on any or all of the remaining validated data. No "critical samples" have been identified for this project.

**1.6 Special Training/Certification Requirements:**

- OSHA 1910  Special Equipment/Instrument Operator (describe below):  Other (describe below):

Sampling personnel will be experienced in Geoprobe® operation and in the collection of soil, groundwater, and soil gas samples. Geoprobe® operation will be conducted under the supervision of a licensed Nebraska Well Driller. Bulk material samples will be collected by a certified asbestos inspector. Field personnel will be experienced with operation of x-ray fluorescence (XRF) spectrometer instruments.

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**1.7 Documentation and Records:**

- Field Sheets                       Daily Log                       Trip Report                       Area Maps                       Video  
 Chain of Custody                       Health and Safety Plan                       Letter Report                       Photos  
 Sample documentation will follow EPA Region 7 SOP 2420.05.  
 Other: Analytical information will be handled according to procedures identified in Table 2.

**Measurement and Data Acquisition:**

**1.8 Sampling Process Design:**

- Random Sampling                       Transect Sampling                       Biased/Judgmental Sampling                       Stratified Random Sampling  
 Search Sampling                       Systematic Grid                       Systematic Random Sampling                       Definitive Sampling  
 Screening wo/ Definitive Confirmation                       Screening w/ Definitive Confirmation  
 Sample Map Attached  
 Other (Provide rationale behind each sample): See Appendix A for additional sampling information.

The proposed sampling scheme will be biased/judgmental, in accordance with the Guidance for *Performing Site Inspections Under CERCLA*, OSWER Directive #9345.1-05, September 1992, and *Removal Program Representative Sampling Guidance, Volume 1: Soil*, OSWER Directive 9360.4-10, November 1991. Judgmental sampling is the subjective (biased) selection of sampling locations based on historical information, visual inspection, and the best professional judgment of the sampler(s). Soil samples will be collected for field screening and definitive laboratory analysis (for a portion of screened samples). Groundwater samples will be collected for definitive laboratory analysis only. See Appendices A and B for additional site-specific information and figures.

For the asbestos inspection, suspect building materials will be collected for definitive laboratory analysis to determine if they contain asbestos. Approximately 50 samples are proposed to characterize pipe wrap, floor tiles, ceiling tiles, and other materials. The inspection is designed to quantify the amount of asbestos-containing building material located on the subject property.

The proposed number of samples is a balance between cost and coverage, and represents a reasonable attempt to meet the study objectives while staying within the budget constraints of a typical Targeted Brownfields Assessment of this type.

Sample Summary Location	Matrix	# of Samples*	Analysis
On-site Geoprobe® borings	Subsurface Soil	18	VOCs, SVOCs, TPH-DRO (OA-2), & RCRA metals (including mercury)
On-site locations – Samples collected from 100-foot by 100-foot grid cells	Surface Soil	5 (30% of surface soil samples screened by XRF)	RCRA metals (including mercury)
On-site Geoprobe® temporary monitoring wells	Groundwater	12	VOCs, SVOCs, TPH-DRO (OA-2), & total and dissolved RCRA metals (including mercury)
On-site building	Structural materials	50	Asbestos by Polarized Light Microscopy (PLM)

\*NOTE: Number is approximate and may change depending on site conditions. Background/QC samples are not included with these totals. See Table 1 for a complete sample summary.

**1.9 Sample Methods Requirements:**

Matrix	Sampling Method	SOP(s) or other Method(s)
Soil	Surface soil samples will be collected with disposable stainless steel spoons. Subsurface soil samples will be collected with a Geoprobe® direct-push apparatus, using Macro-Core samplers fitted with polyvinyl chloride (PVC) liners.	SOPs 4230.07, 4230.03, 4231.2012, & 4231.1707; Method 5035
Groundwater	Groundwater samples will be collected from Geoprobe® temporary monitoring wells. These groundwater samples will be collected through Geoprobe® rods using polyethylene tubing and a check valve.	SOPs 4230.07 & 4230.15
Structural Materials	Samples will be collected using techniques appropriate for the suspect building materials.	ASTM E 2356-04

Other Description:.

**1.10 Sample Handling and Custody Requirements:**

- Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06.  
 COC will be maintained as directed by Region 7 EPA SOP 2420.04.  
 Samples will be accepted according to Region 7 EPA SOP 2420.01.  
 Other (Describe): Samples will be accepted in accordance with procedures established by a contracted laboratory.

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**1.11 Analytical Methods Requirements:**

- Identified in attached table.
- Rationale: The requested analyses have been selected based on historic information about the area and program experience with similar types of sites.
- Other (Describe):

**1.12 Quality Control Requirements:**

- Not Applicable
- Identified in attached table.
- In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- Field QC Samples: For this investigation, field QC samples will include one equipment rinsate blank (water), one water trip blank, and one water field blank. The equipment rinsate will evaluate the effectiveness of decontamination procedures for Geoprobe™ sampling equipment. The trip blank will be used to assess transportation-related contamination. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives and to assess contamination potentially introduced during the sampling and laboratory procedure(s). The blank samples will be submitted for the analyses listed in the attached tables. Evaluation of the blank samples depends on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results of the blank samples will be evaluated on a qualitative basis by the EPA project manager and EPA contractor(s) to determine a general indication of field-introduced and/or lab-introduced contamination. Because it is not necessary for total method precision to be evaluated for this project, no field duplicates will be collected.
- Other (Describe):

**1.13 Instrument/Equipment Testing, Inspection, and Maintenance Requirements:**

- Not Applicable
- In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- Testing, inspection, and maintenance of field instruments (GPS unit, photoionization detector [PID], XRF, etc.) will be performed in accordance with manufacturers' recommendations. Testing, inspection, and maintenance of laboratory equipment will be performed in accordance with the previously referenced SOPs and/or manufacturers' recommendations.

**1.14 Instrument Calibration and Frequency:**

- Not Applicable
- In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- Calibration of laboratory equipment will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.
- Other (Describe): Calibration of field equipment (PID, XRF, etc.) will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.

**1.15 Inspection/Acceptance Requirements for Supplies and Consumables:**

- Not Applicable
- In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers*.
- Other (Describe):

**1.16 Data Acquisition Requirements:**

- Not Applicable
- In accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- Previous data or information pertaining to the area (including other analytical data, reports, photos, maps, etc. that are referenced in this QAPP) has been compiled by EPA and/or its contractor(s) from other sources. Some of that data have not been verified by EPA and/or its contractor(s); however, that unverified information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data or information.
- Other (Describe):

**1.17 Data Management:**

- All laboratory data acquired will be managed in accordance with Region 7 EPA SOP 2410.01.
- Other (Describe): Laboratory data will be managed in accordance with procedures established by the Seagull-contracted laboratory.

**Assessment and Oversight:**

**1.18 Assessment and Response Actions:**

- Peer Review                       Management Review                       Field Audit                       Lab Audit
- Assessment and response actions pertaining to analytical phases of the project are addressed in Region 7 EPA SOPs 2430.06 and 2430.12.
- Other (Describe): Assessment and response actions pertaining to analytical phases of the project will be in accordance with procedures established by the Seagull-contracted laboratory.

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**3.1A Corrective Action:**

- Corrective actions will be at the discretion of the EPA project manager whenever problems appear that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the area.
- Other (Describe):

**1.19 Reports to Management:**

- Audit Report                       Data Validation Report                       Project Status Report                       None Required
- A letter report describing the sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results will be prepared and submitted to the EPA.
- Reports will be prepared in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- Other (Describe):

**Data Validation and Usability:**

**1.20 Data Review, Validation, and Verification Requirements:**

- Identified in attached table.
- Data review and verification will be performed in accordance with the Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (updated July 2007).
- Data review and verification will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.06 and 2430.12.
- Other (Describe): Data review and verification will be performed by qualified Seagull personnel.

**1.21 Validation and Verification Methods:**

- Identified in attached table.
- The data will be validated in accordance with Region 7 EPA SOPs 2430.06 and 2430.12.
- The EPA project manager will inspect the data to provide a final review. The EPA project manager will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and field blanks and duplicates to ensure the data are acceptable. The EPA project manager will also compare the sample descriptions with the field sheets for consistency, and will ensure appropriate documentation of any anomalies in the data.
- Other (Describe): Data validation will be performed by qualified Seagull personnel.

**1.22 Reconciliation with User Requirements:**

- Identified in attached table.
- If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded and re-sampling or re-analysis of the subject samples may be required by the EPA project manager.
- Other (Describe):

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**Table 1: Sample Summary**

<b>Project Name:</b> Burlington Northern and Santa Fe Property Site				<b>Location:</b> Lincoln, Nebraska; See Appendix B, Figures 1 and 2			
<b>Project Manager:</b> Jeff Pritchard				<b>Activity/ASR #:</b> To be determined			<b>Date:</b> December 18, 2009
<b>No. of Samples</b>	<b>Matrix</b>	<b>Location</b>	<b>Purpose</b>	<b>Depth or other Descriptor</b>	<b>Requested Analysis</b>	<b>Sampling Methods</b>	<b>Analytical Method</b>
18	Subsurface Soil	On-site Geoprobe® boring locations	To assess potential subsurface soil contamination from site operations	2-foot interval (between 0 and 20 feet below ground surface [bgs]) based on field screening	VOCs, SVOCs, TPH-DRO (OA-2), & RCRA metals (including mercury)	EPA SOPs 4230.07, 4230.03, 4231.1707 & 4231.2012; EPA Method 5035	EPA Methods 5035, 8260, 8270, 6010, & 7471; Method OA-2
5 (30% of surface soil samples screened by XRF)	Surface Soil	100 square-foot cells around on-site boreholes	To assess potential surface soil contamination from site operations®	0-2 inches	RCRA metals (including mercury)	EPA SOPs 4231.1707 & 4231.2012	EPA Methods 6010 & 7471
12	Groundwater	On-site Geoprobe® temporary monitoring wells	To assess potential groundwater contamination from site operations	Directly below water table	VOCs, SVOCs, TPH-DRO (OA-2), and total and dissolved RCRA metals (including mercury)	EPA SOPs 4230.07 & 4230.15	EPA Methods 8260, 8270, 6020, & 7470; Method OA-2
50	Structural Materials	On-site building	To quantify any asbestos in building materials	Bulk material from floors, walls, ceilings, and pipes	Asbestos by PLM	ASTM E 2356-04	NIOSH Method 9002
<b>QC Samples</b>							
1	Water	Trip blank	To assess transportation-related contamination	NA	VOCs	NA	EPA Method 8260
1	Water	Equipment Rinsate	To evaluate effectiveness of decontamination procedures for Geoprobe® sampling equipment	NA	VOCs, SVOCs, TPH-DRO (OA-2), and RCRA metals (total only) (including mercury)	NA	EPA Methods 8260, 8270, 6020, & 7470; Method OA-2
1	Water	Field blank	To assess field/laboratory-related contamination	NA	VOCs, SVOCs, TPH-DRO (OA-2), and RCRA metals (total only) (including mercury)	NA	EPA Methods 8260, 8270, 6020, & 7470; Method OA-2

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**Table 2: Data Quality Objective Summary**

<b>Project Name:</b> Burlington Northern and Santa Fe Property Site				<b>Location:</b> Waverly, Iowa; See Appendix B, Figures 1 and 2				
<b>Project Manager:</b> Jeff Pritchard				<b>Activity/ASR #:</b> To be determined			<b>Date:</b> December 18, 2009	
Analysis	Analytical Method	Data Quality Measurements					Sample Handling Procedures	Data Management Procedures
		Accuracy	Precision	Representativeness	Completeness	Comparability		
<b>WATER</b>								
VOCs, SVOCs, TPH-DRO (OA-2), and total and dissolved RCRA metals (including mercury)	see Table 1	per analytical method	per analytical method	judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.
<b>SOIL</b>								
VOCs, SVOCs, TPH-DRO (OA-2), and RCRA metals (including mercury)	see Table 1	per analytical method	per analytical method	judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples have been defined	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.
<b>STRUCTURAL MATERIALS</b>								
Asbestos by PLM	See Table 1	Per analytical method	Per analytical method	judgmental sampling, based on professional judgment of the sampling team	100%; no critical samples identified.	Standardized procedures for sample collection and analysis will be used.	See Section 2.3 of QAPP form.	See Section 2.10 of QAPP form.

**APPENDIX A**

**SITE-SPECIFIC INFORMATION FOR THE BURLINGTON NORTHERN AND SANTA FE  
PROPERTY SITE**

## **INTRODUCTION**

Seagull Environmental Technologies, Inc. (Seagull) has been tasked by the U.S. Environmental Protection Agency (EPA), under the Mini-Superfund Technical Assessment and Response Team (Mini-START) contract, to conduct a Phase II Targeted Brownfields Assessment (TBA) at the Burlington Northern and Santa Fe (BNSF) Property site, located in Lincoln, Nebraska. The purpose of the investigation is to determine whether past site operations have resulted in releases of hazardous contaminants to the soil and groundwater. In addition, the investigation will determine if on-site structures contain asbestos. This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for this investigation.

## **SITE LOCATION/DESCRIPTION**

The site, which is approximately 26.4 acres in size, is located west of the downtown business district of the City of Lincoln, Lancaster County, Nebraska. The BNSF Property site covers the southwest quarter of Section 23 and the northwest quarter of Section 26 in Township 10 North, Range 6 East. It should be noted that the BNSF Property site includes several small parcels of land currently owned by the Lower Platte South Natural Resource District (LPSNRD), as well as platted right-of-ways owned by the City of Lincoln. For the purposes of this investigation, the LPSNRD and City of Lincoln properties are considered part of the BNSF Property site. The BNSF Property site is a railroad yard with active railroad tracks running north and south. Currently, Quonset buildings, a communication tower, and several small out buildings are located on the site property. Adjoining properties include a City of Lincoln maintenance building and the Haymarket Sports complex to the north; railroad tracks and commercial and industrial buildings to the west; and commercial and industrial buildings to the south and east. The geographic coordinates for the approximate center of the site are 40.815254 degrees north latitude and 96.712556 degrees west longitude.

The BNSF property has been railroad property for over 100 years, and railroad tracks have been present as far back as 1886. During railroad operations, the BNSF property historically contained ice houses, railroad turntables, a railroad roundhouse, repair shops, and coal and lime yards. An old railroad roundhouse was once located at the northern portion of the BNSF property (HWS Consulting Group [HWS] 2007).

The Cretaceous Dakota sandstones and shales typically form the uppermost bedrock in this portion of Lancaster County, with underlying Pennsylvanian-age limestones forming the uppermost bedrock along the Salt Creek Valley. Unconsolidated Quaternary-age deposits overlie bedrock throughout the County.

Light gray silts of the late-Nebraskan Fullerton formation outcrop at various locations west and north of Lincoln. Kansan glacial till is present at the surface in western, northern, and central Lancaster County. Previous studies within the site area indicate that groundwater is expected to be encountered between 6 feet to 20 feet below ground surface (bgs). In addition, groundwater flow is anticipated to be southwest-west, towards Salt Creek.

## **PREVIOUS INVESTIGATIONS**

### Phase I Environmental Site Assessment

In August 2007, HWS, under contract with the City of Lincoln, completed a Phase I Environmental Site Assessment (ESA) to identify recognized environmental conditions (REC) associated with the BNSF Property site. The Phase I ESA was performed as part of an EPA Targeted Brownfields Assessment Grant. The Phase I ESA identified several RECs associated with the BNSF property. The identified RECs included the following:

- In 1987, diesel fuel was discovered as part of a site assessment conducted in a railroad yard northwest of the railroad depot. A recovery system (currently in operation) was implemented to recover diesel fuel from the groundwater.
- In 1993, while conducting sewer repairs in the BNSF railroad yard, City of Lincoln work crews discovered a diesel fuel spill. The diesel fuel spill was determined to be associated with the previously identified spill (from 1987) and was migrating westward along sanitary sewer lines. A cleanup action involving the recovery of the diesel fuel was conducted so the repairs could be made.
- In 2004, BNSF conducted a Tier 2 Risk-Based Corrective Action Assessment related to previously documented diesel spills at locations west of the railroad depot on the BNSF property. The diesel-contaminated plume is still currently being remediated under the Nebraska Department of Environmental Quality (NDEQ) Title Program 200.
- In 2007, NDEQ received notice of a diesel fuel spill in the passenger yard near the depot. A crack was discovered in a locomotive machine fuel tank during refueling, and an estimated 100 gallons of fuel reportedly spilled onto the ballast and soil (HWS 2007).
- Historical documents identified a former railroad roundhouse structure located in the north portion of the site. Railroad roundhouse facilities are possible sources of soil and groundwater

contamination, generally associated with the fueling, maintenance, and repair of locomotives. Contaminants often associated with railroad roundhouses include petroleum products, degreasing solvents, and heavy metals.

### Limited Phase II Subsurface Assessment

Based on the Phase I ESA findings, HWS conducted a Limited Phase II Subsurface Assessment at the location of the BNSF roundhouse (see Appendix B, Figure 1). In October 2007, HWS collected four soil borings (SB-1 through SB-4) around the former BNSF roundhouse facility. The soil borings were advanced to 12 feet bgs. Soil samples were submitted for laboratory analysis of volatile organic compounds (VOC), semi-volatile organic compounds (SVOC) (polynuclear aromatic hydrocarbons [PAH], in particular), and metals regulated under the Resource Conservation and Recovery Act (RCRA). Laboratory results determined that a soil sample collected from SB-1 (from 6 to 7 feet bgs) contained elevated concentrations of PAHs. The PAHs benzo(a)anthracene and benzo(b)fluoranthene were detected at 8.45 milligrams per kilogram (mg/kg) and 4.72 mg/kg, respectively. Both of those concentrations of PAHs exceeded established health-based benchmarks (NDEQ Remediation Goals and EPA Region 9 Preliminary Remediation Goals [PRG]). Other PAHs, including fluorene, phenanthrene, pyrene, chrysene, and benzo(k)fluoranthene, were also detected in the sample. A soil sample collected from 1 to 3 feet bgs at SB-1 contained chromium (total) and lead at 34.2 mg/kg and 4,870 mg/kg, respectively. Those metals concentrations both exceeded respective health-based benchmarks. HWS concluded that the BNSF property may warrant additional sampling prior to redevelopment (HWS 2008).

### **SAMPLING STRATEGY AND METHODOLOGY**

The sampling activities are tentatively scheduled to be conducted in January or February 2010, and will require approximately 5 days to complete. During this Phase II TBA, soil samples (both surface and subsurface) and groundwater samples will be collected from the site to determine if contamination exists as a result of historical site activities. As previously discussed, a recovery/remediation system is currently in operation at the site to address diesel-contaminated groundwater. The approximate extent of that plume is identified on Figure 1 in Appendix B. This Phase II TBA will not specifically target contaminated soil or groundwater associated with the previously identified diesel-contaminated groundwater plume. In addition, bulk samples will be collected from building materials associated with on-site structures suspected to contain asbestos. Identification of asbestos-containing building materials (ACBM) will assist in future demolition planning for those on-site structures. It is anticipated that three Seagull employees will be required to perform the activities described in this QAPP. When applicable,

the standard operating procedures (SOP) and chain-of-custody (COC) procedures referenced in the QAPP will be followed throughout the sampling activities to verify the integrity of the samples from the time of collection until submittal to the laboratory for analysis. Disposal of investigation-derived wastes (IDW) and procedures for equipment and personal decontamination will be addressed in a site-specific health and safety plan prepared by Seagull. Most IDW is expected to consist of disposable sampling supplies (gloves, paper towels, tubing, etc.) that will be disposed of off site as uncontaminated solid waste.

## Soil Screening and Sampling

### Subsurface Soil Sampling/Screening

Subsurface soil samples will be collected from 18 locations at the site (see Appendix B, Figure 2). At each of those boring locations, continuous soil cores will be collected with a Geoprobe® direct-push apparatus. Geoprobe® sample locations were selected based on current and historical site activities, future redevelopment plans, and to cover the geographic extent of the site. Table 1 summarizes the soil sampling locations and rationale for their placement.

**TABLE 1  
PROPOSED BORING LOCATIONS**

Sample Location	GPS Coordinates	Depth (ft bgs)	Sample Location Rationale
SB-1 <sup>GW</sup>	40.820548 °N 96.717257 °W	0-20	General railyard activities, future parking area
SB-2	40.820573 °N 96.714918 °W	0-20	General railyard activities, proximity to former roundhouse, future parking area
SB-3 <sup>GW</sup>	40.820123 °N 96.714439 °W	0-20	General railyard activities, proximity to former roundhouse, future parking area
SB-4	40.820239 °N 96.713065 °W	0-20	General railyard activities, proximity to former roundhouse, future parking area
SB-5 <sup>GW</sup>	40.820684 °N 96.711711 °W	0-20	General railyard activities
SB-6 <sup>GW</sup>	40.818856 °N 96.715938 °W	0-20	General railyard activities
SB-7	40.818606 °N 96.713770 °W	0-20	General railyard activities
SB-8	40.818779 °N 96.712473 °W	0-20	General railyard activities, future arena site
SB-9 <sup>GW</sup>	40.817985 °N 96.714589 °W	0-20	General railyard activities
SB-10	40.817985 °N 96.712892 °W	0-20	General railyard activities, future arena site
SB-11	40.818071 °N 96.712092 °W	0-20	General railyard activities, future arena site

Sample Location	GPS Coordinates	Depth (ft bgs)	Sample Location Rationale
SB-12 <sup>GW</sup>	40.817538 °N 96.712396 °W	0-20	General railyard activities, future arena site
SB-13 <sup>GW</sup>	40.814984 °N 96.713119 °W	0-20	General railyard activities, future parking garage
SB-14 <sup>GW</sup>	40.815319 °N 96.712110 °W	0-20	General railyard activities, future mixed use development
SB-15 <sup>GW</sup>	40.814037 °N 96.713061 °W	0-20	General railyard activities, future ice center
SB-16 <sup>GW</sup>	40.814253 °N 96.712204 °W	0-20	General railyard activities, future ice center
SB-17 <sup>GW</sup>	40.813084 °N 96.713968 °W	0-20	General railyard activities, proximity (downgradient) to Alter Scrap Yard and FMGP
SB-18 <sup>GW</sup>	40.811951 °N 96.714077 °W	0-20	General railyard activities, proximity (downgradient) to Alter Scrap Yard and FMGP

Notes:

- ° Degrees
- GW Soil boring is collocated with groundwater sample location
- FMGP Former Manufactured Gas Plant
- ft bgs Feet below ground surface
- GPS Global positioning system
- N North
- SB Soil boring
- W West

At each borehole, a 4-foot-long Geoprobe<sup>®</sup> Macro-Core soil sampler fitted with a disposable polyvinyl chloride (PVC) sleeve will be advanced to 20 feet bgs, groundwater, or refusal, whichever is first encountered. The soil core from each 4-foot interval will be retrieved and screened for VOCs with a photoionization (PID), and for metals (lead in particular) with an x-ray fluorescence (XRF) spectrometer. Samples for laboratory analysis will be collected (from each borehole) from the 2-foot interval that yields the highest PID and/or XRF result, or from the top 2-foot section of the soil core if no field screening results above background levels are recorded.

Soil samples for analysis of VOCs will be collected following EPA Method 5035. Then, remaining soil from the selected sample intervals will be removed from the PVC sleeves and placed in disposable aluminum pie pans for homogenization prior to transfer to 8-ounce jars for the remaining analyses (SVOCs, total petroleum hydrocarbons [TPH]-diesel range organics [DRO] [OA-2], and RCRA metals, including mercury). Following sample collection, the open boreholes will be abandoned in accordance with state regulations.

### Surface Soil Sampling/Screening

At each of the 18 Geoprobe<sup>®</sup> boring locations, a 100-foot by 100-foot cell will be created, with the borehole serving as the center of the grid (see Appendix B, Figure 2). In each cell, a nine-aliquot composite sample will be collected from the upper 2 inches of soil with a disposable stainless steel spoon. The surface soil samples will be placed in clean dedicated aluminum pie pans, homogenized, passed through a number 10 (2 millimeter [mm]) sieve, and then screened for lead and other metals with the XRF. Three separate XRF readings will be obtained from each sample. The average of the three XRF readings (for lead) will be calculated and recorded on the sample's respective field sheet. Approximately 30 percent (approximately 5) of the surface soil samples screened with the XRF will be transferred to 8-ounce jars and submitted for laboratory analysis of RCRA metals, including mercury. The XRF readings for this project will be considered valid screening level data, if a comparison between the XRF values and the corresponding laboratory results for lead yields a regression coefficient ( $r^2$ ) of at least 0.7.

Pertinent data, including analyses to be performed and exact sample locations, will be recorded on field sheets for each sample. All soil samples will be stored in coolers maintained at or below 4 degrees Celsius (°C) pending submittal to the Mini-START-contracted laboratory.

### **Groundwater Sampling**

Groundwater samples will be collected from 12 temporary Geoprobe<sup>®</sup> wells that will be installed at the site (see Appendix B, Figure 2). Groundwater sample locations were selected based on current and historical site activities, future redevelopment plans, and to cover the geographic extent of the site. Table 1 summarizes the soil sampling locations and rationale for their placement. At each temporary Geoprobe<sup>®</sup> well location, a Geoprobe<sup>®</sup> Screen Point 15 groundwater sampling apparatus will be driven below the water table, and a disposable 4-foot-long PVC screen will be deployed. Either a peristaltic pump or check valve with disposable polyethylene tubing will be used for collection of groundwater samples from the temporary Geoprobe<sup>®</sup> wells. Immediately after sampling, the temporary wells will be removed, and the open boreholes will be abandoned in accordance with state regulations.

A field sheet will be completed for each groundwater sample. The field sheets will include the exact sample locations and analyses to be performed. Groundwater samples will be submitted for analysis of VOCs, TPH-DRO (OA-2 analysis), SVOCs, and total and dissolved RCRA metals, including mercury. Water samples submitted for VOCs will be collected in four 40-milliliter vials preserved with hydrochloric acid (HCl) to a pH<2. Water samples that will be analyzed for SVOCs and TPH-DRO will be collected in 128-ounce glass jugs (two per sample). Water samples that will be analyzed for metals

will be collected in two 1-liter cubitainers (one each for total and dissolved metals) and preserved with nitric acid (HNO<sub>3</sub>) to a pH<2. Dissolved metals samples will be filtered in the field. All water samples will be stored in coolers maintained at or below 4 °C until they are submitted to the Seagull-contracted laboratory.

### **Structural Materials Sampling for Asbestos**

Bulk samples (anticipated 50 samples) will be collected from building materials suspected to contain asbestos. Sample locations will be based on a site inspection conducted by Seagull. Bulk samples will be collected with sampling devices appropriate for the suspect building materials. A coring device will be used to collect interior and exterior wall, floor, pipe-wrap, ceiling tile, and roof samples. The samples will be placed into whirl-pak bags. Non-dedicated sampling equipment will be decontaminated between sample locations. All samples will be stored in coolers, pending submittal to a Seagull-contracted laboratory for analysis for asbestos by polarized light microscopy (PLM).

### **QUALITY CONTROL**

To evaluate sample quality control (QC), one equipment rinsate blank, one field blank (water), and one trip blank (water), will be collected, as specified in Section 2.5 of the QAPP form. Because it is not necessary for total method precision to be evaluated for this project, no field duplicates will be collected.

### **ANALYTICAL METHODS**

All samples will be submitted to a Seagull-contracted laboratory. Seagull will competitively bid the analytical work from its pool of pre-qualified laboratories. Soil and groundwater samples will be analyzed according to EPA SW-846 Methods for VOCs (Method 8260), TPH-DRO (Iowa Method OA-2 [this is not a SW-846 Method]), SVOCs (Method 8270), and metals (including mercury) (Methods 6010 and 7471 for soil and Methods 6020 and 7470 for water). Groundwater samples will be analyzed for both total and dissolved metals. Samples of bulk structural materials will be analyzed for asbestos by National Institute for Occupational Safety and Health (NIOSH) Method 9002, which is analysis by PLM. All samples will be analyzed according to SOPs and methods referenced on the QAPP form. Standard detection limits and turnaround times for those methods will be adequate for this project. Appropriate containers and physical/chemical preservation techniques will be employed during the field activities to help verify that representative analytical results are obtained. Submittal of samples to the laboratory is expected in January or February 2010.

## **REFERENCES**

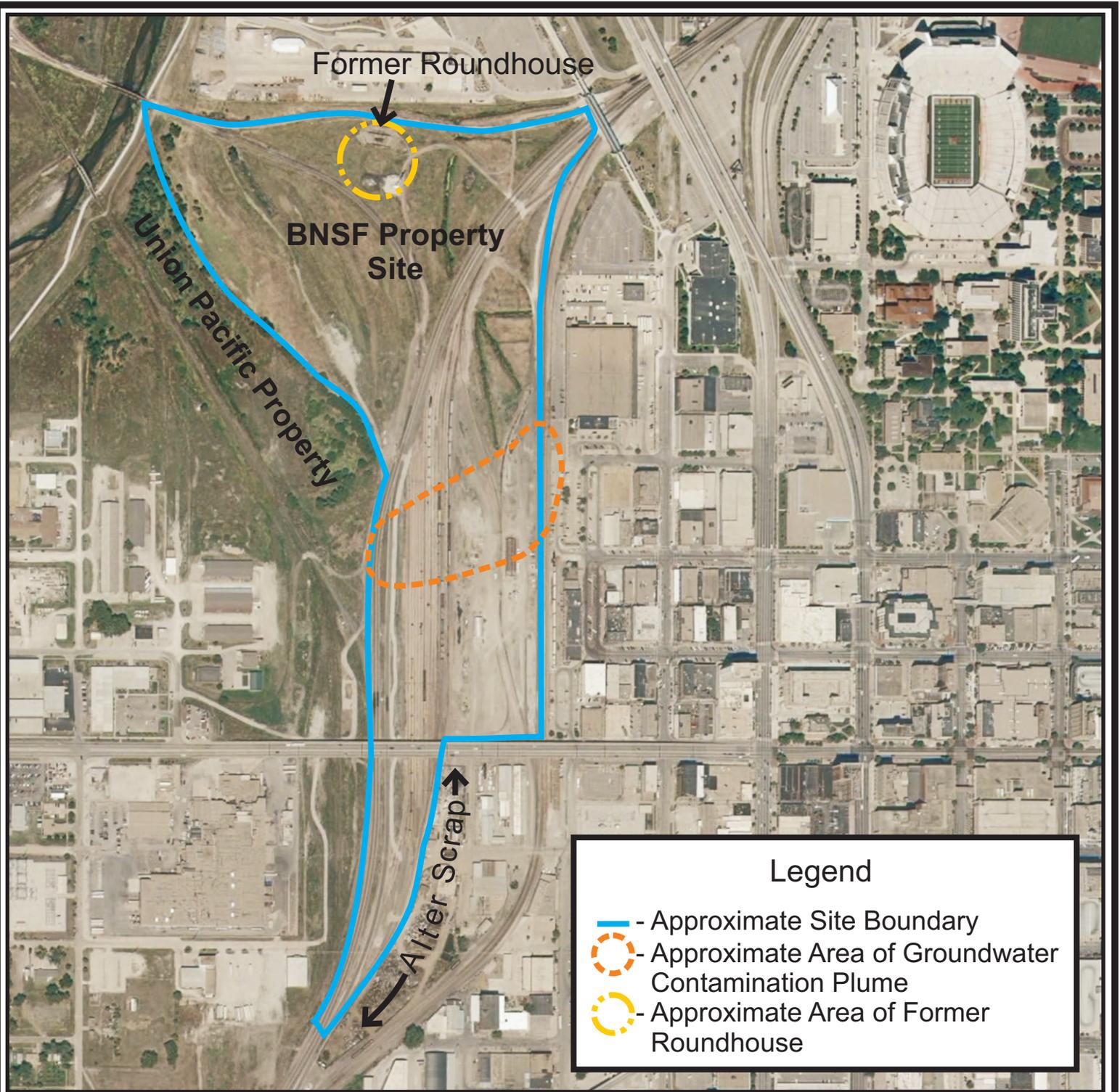
HWS Consulting Group (HWS).

2007. Phase I Environmental Site Assessment, Burlington Northern and Santa Fe Property Site.  
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**APPENDIX B**

**FIGURES**



Burlington Northern Property, Lincoln, Nebraska

**Figure 1**  
Site Aerial Map

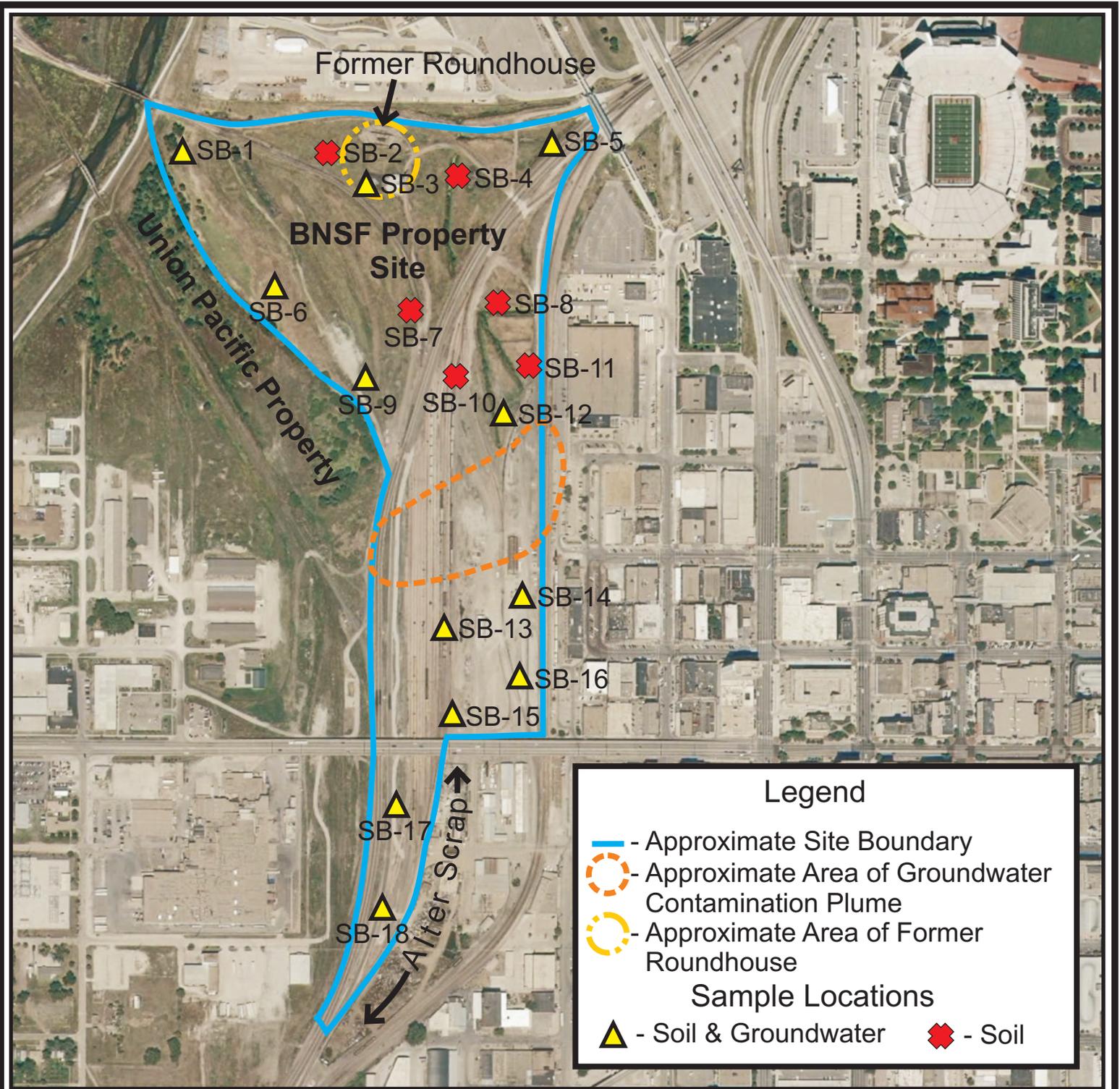


Seagull Environmental Technologies, Inc.

Date: December 2009

Project No: EPS70901.0015

Source: USDA Farm Service Agency, Google Earth  
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Burlington Northern Property, Lincoln, Nebraska

**Figure 2**  
Proposed Sample Location Map



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