

**APPENDIX F**

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Phase II Environmental Site Assessment  
and Geotechnical Investigation  
Proposed FBI Denver Division Office Site, Denver, CO

September 2007

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## **Introduction**

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Waterstone will conduct a Phase II ESA at the proposed site of the Federal Bureau of Investigation Denver Division Office, Denver Colorado. This Phase II ESA is the follow-on investigation to the Phase I ESA for the proposed site, completed by Waterstone in July 2007.

The Phase I ESA concluded that: “Given the historical industrial use of the area and surrounding area, the presence of potential recognized environmental conditions upgradient of the Site, and the current asbestos remediation activities, GSA should consider completing sampling of groundwater, soil, and soil gas on the site in order to establish a pre-transaction environmental baseline, and protect against construction worker and future office user health liabilities.” (Waterstone 2007)

The purpose of the Phase II ESA is to more fully define and delineate any potential contamination of soil and groundwater at the site. The Phase II ESA will be conducted in accordance with the American Society of Testing and Materials (ASTM) *Standard Guide for Environmental Site Assessments; Phase II Environmental Site Assessment Process*, Designation E1903-97 (2002). In addition, Standard Operating Procedures (SOPs) will be used to conduct field work and to manage the resulting data. Waterstone will use SOPs previously approved by GSA where available and applicable.

## **Background**

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As shown in **Figure 1**, and discussed in the Phase I ESA (Waterstone 2007), the site includes areas of known asbestos contamination and unknown potential contamination from historic airport activities, including potential fuel releases, glycol releases, and solvent use. The assessment revealed the following Recognized Environmental Conditions (RECs):

### RECs on the Property

- Asbestos in surface and subsurface soils throughout the site.
- Petroleum products, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) may be present in groundwater from eight underground storage tanks (USTs) removed prior to 1988 associated with former Hangars 5 and 6.
- Petroleum staining has been observed in one of nine soil borings in locations associated with former buildings 16, 17, 19 and 20. VOCs were not detected in ground water.
- Sanitary sewers and storm drains were formerly located along Ulster Street, and passed through the Site. These drains and sewers may have acted as preferential flow pathways for spilled fuels or glycol.

- Elevated concentrations of nitrates exist beneath the Site at concentrations above cleanup standards.
- VOCs (specifically trichloroethene (TCE) and tetrachloroethene (PCE)) were detected in groundwater samples collected in the oil/water separators associated with Hangars 5 and 6, as well as in other samples collected within the former footprint of the hangars, and in the storm sewer west of the hangars.

#### RECs on Surrounding Properties

- Petroleum products and VOCs may be present in subsurface soil in the vicinity of the former Concourse E, immediately south and hydraulically up gradient to the Site.
- There is a historic landfill 800-feet south-west of the Site. The types and nature of wastes that accumulated in the landfill are unknown.
- Potential groundwater contamination from the CCOD Fire Station #1, ¼ - ½ mile south/south-east of the Site.
- Potential groundwater contamination from the Stapleton International Airport (SIA) Rental Car Zone, ¼ - ½ mile south/south-east of the Site.
- Potential groundwater contamination from the SIA Runways south and east of the Terminal, ¼ - ½ mile south-east of the Site
- Potential groundwater contamination from the Hertz leaking UST (LUST) at 7600 Martin Luther King, Jr. Blvd, ¼ - ½ mile south/south-west of the Site
- Potential groundwater contamination from the retail gas station LUST at 3595 Quebec Street, ¼ - ½ mile west of the Site.
- Historic LUSTs, jet fuel pipelines, and glycol USTs have been remediated at Concourse A and A', approximately 1500 feet south of the Site
- Numerous spills of hydrocarbons, glycols and solvents have been reported in the Concourse B area, approximately 1500 feet south-east of the Site. The area has been subject to remediation.
- A jet fuel plume was identified emanating from Concourse C, approximately 700 feet east/south-east of the Site. Contaminated soils extended north-east to the Concourse D and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) contaminated groundwater extended north-east to north of Smith Road. The area has been subject to remediation.
- Leaking underground storage tanks, fuel pipelines, and hydrants have been identified as sources of contamination at Concourse D, east of the Site. The area has been subject to remediation.
- Numerous areas near the Site formerly contained glycol USTs that were used as deicing pads. Glycol readily degrades, and while no known exceedences of glycol are present on the Site; methane, which is generated during glycol degradation, was measured in numerous borings installed near the Site.

## **Sampling Plan**

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The Phase II ESA will include collection of soil, groundwater, and soil-gas samples.

### *Soil Sampling*

Soil samples will be collected from six locations as shown in Figure 1. The following list includes the sample location number and a description of the six proposed sample locations.

Sample Location Identification	Sample Location Description
01	Area north of former Building 17
02	West of former Hangar 5/6 along sewer with previous TCE detection
03	Northeast of former Hangar 5/6
04	Southwest corner of site
05	West of former Hangar 5/6 along sewer with previous TCE detection
06	Southwest corner of former Hangar 5/6

Because the entire site is expected to have some fill soil and some native soil, in general, two vertical composite samples per borehole are proposed. One composite sample will be collected from the fill material to verify that the fill is uncontaminated. The second composite sample will be from the native soil.

The composite samples will be analyzed for semivolatile organic compounds (SVOCs) using SW-846 Method 8270C, total petroleum hydrocarbons (TPH) using SW-846 Method 8015B, and 8 Resource Conservation and Recovery Act (RCRA) metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) using SW-846 Method 6010B, and asbestos using Asbestos PLM Bulk Sample Analysis for soil.

Samples will also be collected for volatile organic carbon (VOC) analyses; VOC samples will not be composited. Instead, a single sample will be taken from an approximately 1-foot interval within the native soil; no VOC samples will be collected/analyzed from fill material. The VOC sample interval in the native soil will be selected based on the highest photoionization detector (PID) reading encountered during drilling. If no soil interval exhibits distinctly high PID readings, then the VOC sample interval will be collected from just above the saturated zone. VOC analyses will be performed using SW-846 Method 8260B.

A qualified geologist will be present during sampling to determine the appropriate sampling intervals from each sampling location.

### *Groundwater Sampling*

Six grab groundwater samples will be collected from the upper alluvial aquifer in the same boreholes as the soil samples described above. Three samples will be collected hydrogeologically upgradient (south side of site) and three will be hydrogeologically downgradient (north side of site). The groundwater samples will be analyzed for: VOCs using SW-846 Method 8260B, SVOCs using SW-846 Method 8270C, TPH using SW-846 Method 8015B, and 8 RCRA metals (dissolved) using SW-846 Method 6010B, and Nitrate using SW-846 Method 9056.

### *Soil Gas Sampling*

One soil gas sample will be collected from each of the six identified sample locations. The soil gas samples will be analyzed for: VOCs using EPA Method TO-15 by the laboratory.

### *Laboratory*

The Laboratory that is proposed to be used is TestAmerica (formerly Severn Trent Laboratories, Inc./STL Denver). Laboratory costs, project details, terms and conditions are attached at the end of this proposal.

## **Sampling Procedures**

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The quality of data collected in an environmental study is critically dependent upon the quality and thoroughness of field sampling activities. General field operations and practices, and specific sample collection and inventory will be well planned and carefully implemented.

Topics described in this plan relating to sampling are:

- Techniques used to select sampling locations
- Collection of background samples
- Sample collection by matrix, parameter, location and frequency
- Use of quality control samples, such as field duplicates and field blanks

SOPs and field data sheets have been developed for field investigation activities and are included in the appendices. The purpose for these procedures is to obtain samples that represent the environment under investigation. The procedures that should be used for investigation activities are listed below:

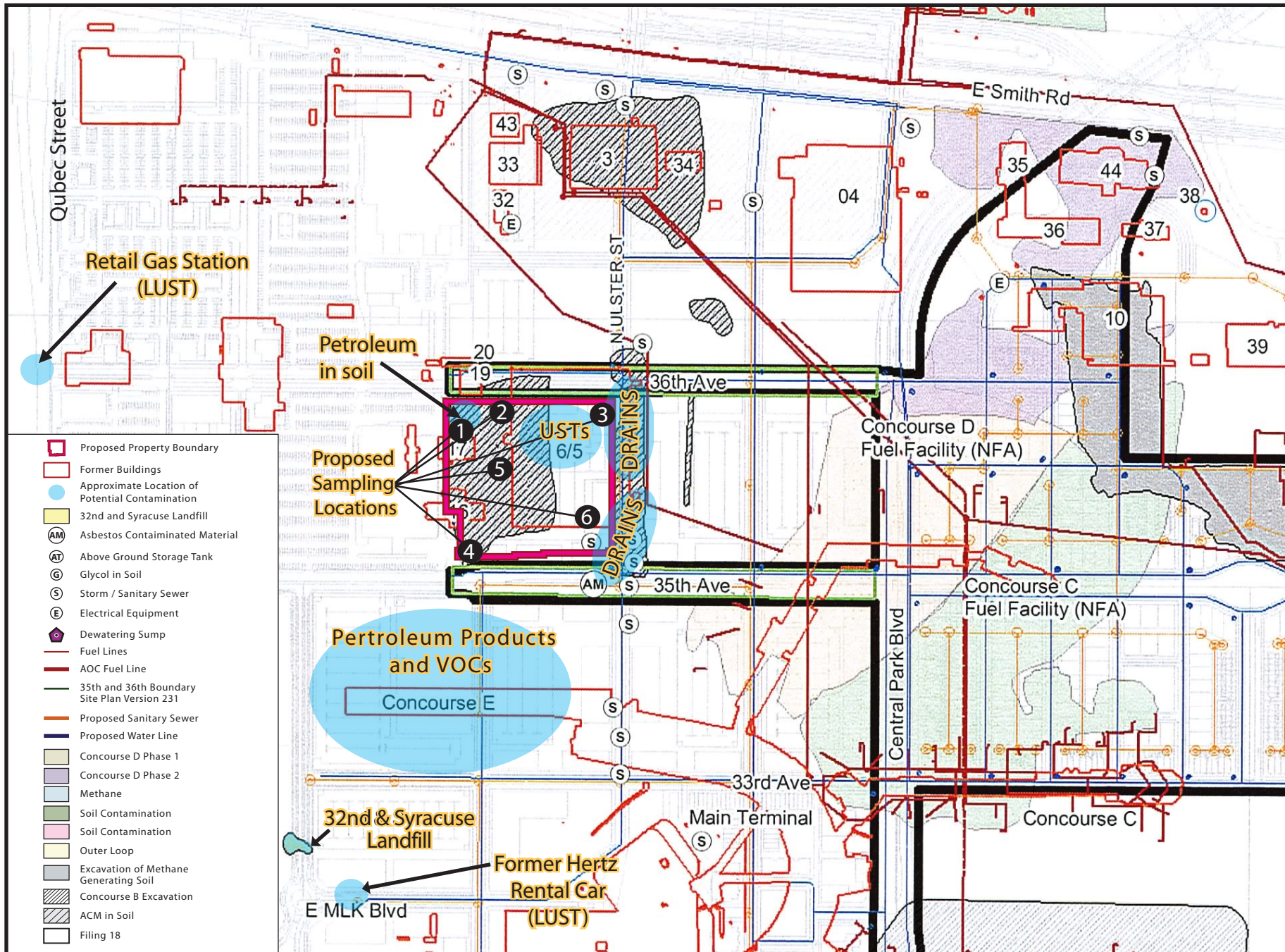
**GSA Standard Operating Procedures (SOPs)**

- Personnel and Equipment Decontamination
- Drilling and Sampling Using Hollow-Stem Auger Techniques
- Borehole Logging
- Surface Soil Sampling
- Sample Handling
- Borehole Abandonment
- Water Level Measurement
- Field Parameter Measurements
- Land Surveying
- Utility Clearance
- Direct Push Sampling for Soil and Groundwater
- Standard Operating Procedures Manual - Spatial Data Submittals

**Waterstone SOPs**

- Investigation Derived Waste Management (per Denver requirements)
- Soil Gas Sampling





- Proposed Property Boundary
- Former Buildings
- Approximate Location of Potential Contamination
- 32nd and Syracuse Landfill
- AM Asbestos Contaminated Material
- AT Above Ground Storage Tank
- G Glycol in Soil
- S Storm / Sanitary Sewer
- E Electrical Equipment
- ⬇ Dewatering Sump
- Fuel Lines
- AOC Fuel Line
- 35th and 36th Boundary Site Plan Version 231
- Proposed Sanitary Sewer
- Proposed Water Line
- Concourse D Phase 1
- Concourse D Phase 2
- Methane
- Soil Contamination
- Soil Contamination
- Outer Loop
- Excavation of Methane Generating Soil
- Concourse B Excavation
- ACM in Soil
- Filing 18



0 500 1000 Feet



**Figure 1: Recognized Environmental Conditions and Proposed Sampling Locations**

sampling locations.ai

Author: J. Kasynski  
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**Table 1**  
**Sample Containers, Preservation, and Holding Times**

MEDIA	VOCs/8260B				SVOCs/8270C				DRO/8015B				GRO/8015B				Metals*/6010B			
	No. of Samples	Containers	Preservation	Holding Time	No. of Samples	Containers	Preservation	Holding Time	No. of Samples	Containers	Preservation	Holding Time	No. of Samples	Containers	Preservation	Holding Time	No. of Samples	Containers	Preservation	Holding Time
Groundwater	8 <sup>+</sup>	2-40 ml VOA vials	4°C, HCl	14 days	6	2-1 L amber glass**	4°C	7/40 days	6	2-1 L amber glass**	4°C	7/40 days	6	2-40 ml VOA vials	4°C	14 days	7 <sup>++</sup>	1-1 L poly**	4°C, HNO <sub>3</sub>	180 days, Hg 28 days
Soil	12	1-4oz amber glass	4°C	14 days	12	1-8oz amber glass	4°C	14/40 days	12	1-4oz amber glass	4°C	14/40 days	12	1-4oz amber glass	4°C	14 days	13 <sup>++</sup>	1-8oz poly	4°C	180 days, Hg 28 days

Soil Gas	VOCs/TO-15			
	No. of Samples	Containers	Preservation	Holding Time
	6	SUMMA	--	

<sup>+</sup> Includes 2 trip blanks

VOCs = Volatile organic compounds

SVOCs = Semivolatile organic compounds

DRO = Diesel range organics

GRO = Gasoline range organics

\* 8 RCRA Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag)

<sup>++</sup> Includes 1 duplicate sample

VOA = Volatile organic analysis

ml = milliliter

HCl = Hydrochloric acid

L = liter

\*\* Laboratory requires a minimum of half this amount

4°C = 4 degrees Celsius

oz = ounce

HNO<sub>3</sub> = Nitric acid