Phase II Brownfields Assessment
of
Frederick Parcel G Property

DRAFT

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Prepared for:

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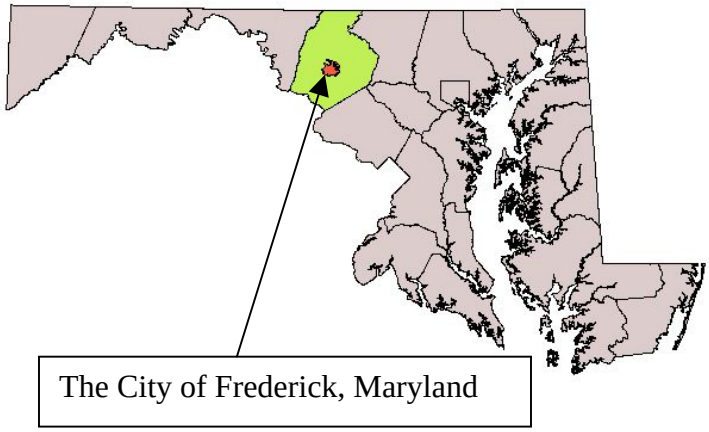
TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

As part of the State of Maryland's Subtitle A Frederick City and Petroleum Sites Brownfield Project Grant Brownfields Site Assessment Initiative, the Maryland Department of the Environment (MDE) conducted a Brownfields Site Specific Assessment of Frederick Parcel G located at East and Commerce Streets in Frederick, Maryland. The assessment was conducted at the request of the City of Frederick in preparation for future redevelopment of the site. According to the City, a Phase I investigation was conducted on this property by Schnabel Engineering in December 1995. There is no record of a prior Phase II investigation having been performed.



Frederick Parcel G is located in southeastern Frederick just outside the city's Historic District on the south side of Commerce Street, between Carroll and East Streets. Four businesses occupy all but two of the structures on the Parcel G property. These businesses are (1) National Parks Service (NPS) Historic Preservation Training Center, (2) Non Profit Building Products, (3) Alpha Design Signs, and (4) the Community Action Agency (a food bank). Two of the buildings are vacant; the historically significant building that housed Lippart's Cabinet Shop, and the one story frame building adjacent to Alpha Design Signs. The center of Parcel G is a grass and gravel covered area surrounded on three sides by structures.

As early as the 1890s, commercial establishments occupied the area. Sanborn Fire Insurance Maps from 1892 detail portions of the Parcel G property as being occupied by the Frederick City Packing Company, the Frederick Elevator Company, Tyson and Zimmerman Shutter Fastener Corporation, the Frederick City Spoke Company, and a small bonded warehouse. Parcel G was the site of the Frederick City Packing Company and the Monocacy Valley Canning Company from 1904 through 1947. By 1972, the date of the last Sanborn update, the bulk of the property was occupied by the Jenkins Brothers Cannery and the warehouses of Harbaugh & Lewis. A feed mill and farmers supply company occupied the Carroll Street boundary from 1911 through 1972.

A plan to sample and characterize the 4.3-acre site was prepared by MDE after site reconnaissance and a review of available historic information of the area. Due to the size and complexity of the site and sample number limitations it was decided to split the sample

collection into two segments along historic use lines. Sampling plans for each of two areas, designated Parcel G887A & G887B, were drafted and submitted to EPA for review. Parcel G887A concentrated on the area of the Frederick City Packing Company. Parcel G887B concentrated on the Monocacy Valley Canning Company. Parcel G887A was sampled on July 27, 2004, and Parcel G887B was sampled on October 10, 2004. MDE collected a total of seventeen surface soil samples, eighteen subsurface soil samples, three surface water samples, five groundwater samples, plus the required quality control samples. No sediment samples were collected. The soil samples were collected and field screened by MDE personnel for the presence of carcinogenic polycyclic aromatic hydrocarbons (cPAHs), the petroleum hydrocarbons benzene, toluene, ethylbenzene and xylenes (BTEX), polychlorinated biphenyls (PCBs), and metals. Samples from locations that revealed the highest field screened levels of contamination were submitted to a fixed laboratory for confirmatory analysis.

For Parcel G887A, eight samples from locations that revealed the highest field screened levels of contamination and the two surface water and two groundwater samples were sent to Martel Laboratories JDS Inc. (Martel), for confirmatory analyses of a suite of fourteen priority pollutant list (PPL) metals, pesticides, PCBs, and semivolatile organic compounds (SVOCs). Eight subsurface soil samples and all aqueous samples were submitted to Martel for VOCs analysis.

For Parcel 887B, nine samples from locations that revealed the highest field screened levels of contamination and the two surface water and two groundwater samples were sent to Phase Separation Science (Phase), for confirmatory analyses of a suite of fourteen priority pollutant list (PPL) metals, pesticides, PCBs, and SVOCs. Nine subsurface soil samples and all aqueous samples were submitted to Phase for volatile organic compounds (VOCs) analysis.

Toxicological evaluations, (Appendix 4) assuming both a residential use scenario and a non-residential use scenario, were prepared by MDE for the Parcel G site utilizing the analytical data provided by the fixed labs. The residential use scenario was evaluated, since the western portion of the site has been designated for residential development (The Hope Project). Since the city plans to develop the eastern portion of parcel G as offices for the Board of Education and the Lippart's Cabinet building is being taken over by the Tourism Council, a non-residential use scenario was also evaluated.

The residential toxicological evaluation revealed elevated levels of risk to all resident populations from the ingestion of surface and subsurface soil for a future residential use scenario. Elevated levels of risk to construction worker and all residential populations were also identified from dermal contact with the surface and subsurface soils. EPA recognizes an acceptable Hazard Index of values less than or equal to 1 (noncarcinogenic chemicals) and a lifetime cancer risk less than or equal to 10^{-6} to 10^{-4}. MDE recognizes threshold Hazard Index values equal to 1 and lifetime cancer risk threshold values less then or equal to 10^{-5}. The child resident population evaluated in the Toxicological Evaluation scored a Hazard Index of 20 for ingestion of surface soil pathway.

The non-residential toxicological evaluation revealed elevated levels of risk to the child visitor population from the ingestion of surface soil for a future use scenario. Elevated levels of risk to the child visitor, youth visitor and the construction worker populations were also identified from the ingestion of and dermal contact with the surface and subsurface soils. The child visitor and construction worker populations evaluated in the Toxicological Evaluation scored a Hazard Index of 8 and 7 respectively for ingestion of surface soil pathway.

The carcinogenic risk for both scenarios exceeded the MDE recommended risk value of 1×10^{-5}. These risk values were driven by the levels of arsenic and benzo(a)pyrene detected in soil samples collected across the site.

Current Site Risks and MDE Recommendations

Under the current site condition, the site presents a minor risk to the health of child visitors and construction workers. MDE recommends that the City of Frederick, at a minimum, place a restriction on the property deed that requires notice to MDE in advance of any planned excavation activity at the site.

I. INTRODUCTION

MDE conducted a Brownfield Site Specific Assessment of Frederick Parcel G utilizing the standards of the American Society for Testing and Materials (ASTM, 1998). The report addresses potential environmental conditions that may pose a risk to human health and the environment and impair the development of the property.

Seventeen surface soil and eighteen subsurface soil grab samples were collected by direct push (Geoprobe®) technology and field screened for BTEX, cPAHs, PCBs, and metals concentrations using immunoassay and X-Ray Fluorescence (XRF) techniques. Select soil samples were analyzed by either Martel or Phase for VOCs, SVOCs, PPL metals, pesticides and PCBs. Three shallow groundwater grab samples (including a field duplicate) and one surface water grab sample were analyzed by Martel for VOCs, SVOCs, PPL metals, pesticides and PCBs. Two shallow groundwater grab samples (including a field duplicate) and two surface water samples were analyzed by Phase for VOCs, SVOCs, PPL metals, pesticides and PCBs. All samples were analyzed utilizing EPA approved methods.

II. BACKGROUND

A. Site Location

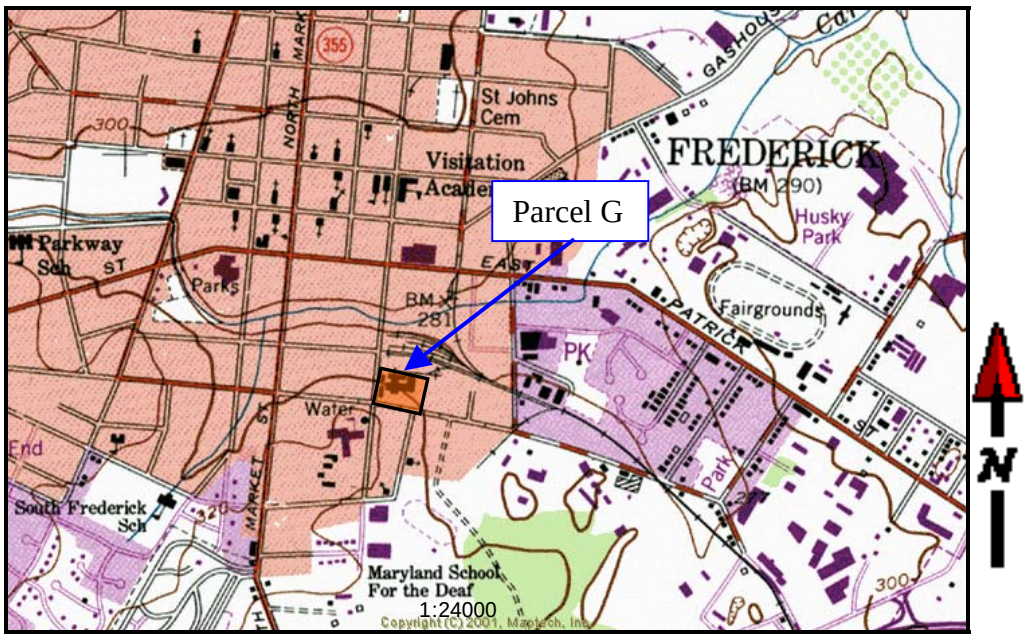
The 4.3-acre site is located on the southwest corner of the intersection of East and Commerce Streets on the edge of the Historic District in the City of Frederick, Frederick County, Maryland. The site occupies a city block bounded by East Street on the east, All Saints Street on the north, Commerce Street on the south, and South Carroll Street on the west. The site is located on the Frederick East quadrangle 7.5-minute topographic map at approximately 39°24'38" North latitude by 77°24'25" West longitude. The Maryland grid

coordinates are approximately 575,100 feet North by 685,050 feet East. The deed reference for the site is 2558/29. The tax description is Map 418, grid 4, parcels 780A, 887A and 887B. The land use is zoned DB, commercial (Appendix 1).

B. Physical Setting

The relatively flat 4.3-acre site is situated approximately 285 feet above mean sea level in the historic flood plain of Carroll Creek. Residential and commercial areas surround the facility. Regionally, the overall topography slopes gently to the south-southeast. The site is situated in a populated mixed use section on the edge of the city's historic district. The site has several building constructed on it; the land not under roof is covered by gravel, concrete or asphalt, with some minimal vegetated edging.

Figure 1: Topographic Map of Vicinity



C. Site History and Land Use

Parcel G was the site of the Frederick City Packing Company and the Monocacy Valley Canning Company from 1904 through 1947. By 1972, the date of the last Sanborn update, the Frederick City Packing Company property was occupied by the Jenkins Brothers Cannery and the Monocacy Valley Canning Company property was managed by Harbaugh & Lewis. By 1979 Jenkins had acquired the Harbaugh & Lewis property and converted most of Parcel G to their ownership.

A feed mill and farmers supply company occupied the Carroll Street boundary from 1911 through 1972. The farmers supply at 126 S. Carroll Street property was replaced by Grimm's Automotive at an unspecified time after 1972. Grimm held the property until its sale to the City in March 1999. This portion of Parcel G was a grassy vacant lot at the time of the site reconnaissance.

The portion of Parcel G known as Lippart Cabinet is located at 20 Commerce Street. Prior to its incarnation as a cabinet shop, the building had housed a warehouse for Monocacy Valley Cannery and a spoke manufacturing shop.

Information on ownership history of the lots making up Frederick Parcel G was obtained from an earlier Phase I report produced in 1995 by Schnabel Engineering for the City of Frederick. The ownership record in the Phase I report begins in 1831 when Lewis Bireley conveyed a section of property to the B&O Railroad Company and ends in 1992 with the conveyance of the eastern portion of Parcel G to the City of Frederick. (Table 1)

TABLE 1 - Property Ownership History

Parcel G887A

OWNER	CONVEYED TO	DATE CONVEYED	LIBER/FOLIO
Frederick City Packing Co.	Jenkins Brothers, Inc.	June 6, 1948	455/344
Colt & Dixon Packing and Manufacturing Co.	Cullen S. Jenkins & J. O'Neill Jenkins	April 5, 1956	
Cullen S. Jenkins & J. O'Neill Jenkins et al	Thomas Foods Corp.	April 30, 1956	564/415
Jenkins Bros. Inc.	Jenkins Food Corp	March 30, 1971	843/737
Thomas Food Corp.	Jenkins Food Corp.	March 30, 1971	843/734

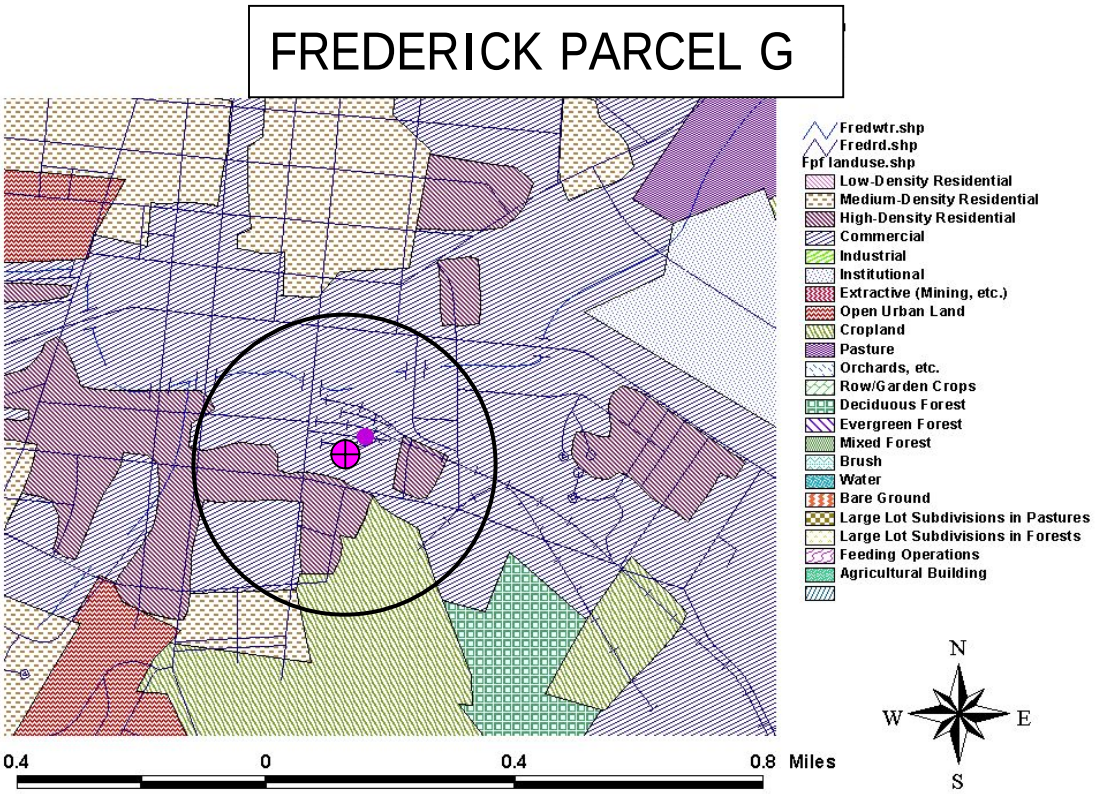
Parcel G887B

OWNER	CONVEYED TO	DATE CONVEYED	LIBER/FOLIO
Charles Stanley & Rebecca Jenkins	Charles W. Ross Jr.	Jan. 31 1920	329/430
Helen S. Ross	Teresa K. Ross	July 10 1933	388/161
Teresa K. Ross et al	Roland W. Harbaugh, et al	November 20, 1950	489/179
Roland W. Harbaugh, et al	Helen F. Mock	June 12, 1952	503/459
Helen F. Mock	Roland W. Harbaugh, et al	June 12, 1952	503/455
Roland W. Harbaugh, et al	J. O'Neill Jenkins & Rebecca M. Jenkins	June 16, 1963	679/69
J. O'Neill Jenkins & Rebecca M. Jenkins	Jenkins Food Corp.	March 20, 1979	1078/315
Jenkins Ford Corp.	Juanita L. Lewis	March 20, 1979	1078/712
Juanita L. Lewis	Juanita F. Lewis, Inc.	Nov. 15, 1985	1310/182
Juanita F. Lewis, Inc.	City of Frederick	Sept. 3, 1992	1829/0737

D. Adjacent Property and Land Use

Properties adjacent to the site are representative of the varied use in this area. The property to the north, 101 East All Saints Street, is a mixed-use office building housing several State and County agencies. The property to the south along Commerce Street is light industrial. A block of row houses and a parking area occupies the property to the east across East Street. The property to the west was formerly a farmers supply, which now houses a café and several small businesses.

Figure 2: Land Use Within ¼-Mile of Frederick Parcel G



E. Summary of Previous Assessments

Schnabel Engineering conducted a Phase I investigation on the area in the mid 1990s. MDE performed a Phase I investigation in 2003 and followed that investigation with a sampling plan for Parcel G887A and Parcel G887B. Sampling was conducted on July 27, 2004 and October 20, 2004 in preparation for this report.

III PHASE II ACTIVITIES

A. Scope of Assessment

After a review of historic information and a site visit conducted on February 26, 2004, MDE determined that further characterization of the site was required. As a result, surface and subsurface soils, surface water and groundwater grab samples were collected and screened by MDE personnel and analyzed by contract laboratories.

Seventeen surface soil and eighteen subsurface soil grab samples, including two QA/QC samples, were collected by Geoprobe® and analyzed for BTEX, cPAHs, PCBs, and metals concentrations using immunoassay and XRF techniques. Seventeen of these thirty-five soil grab samples, three surface water, and five shallow groundwater grab samples were also analyzed by fixed laboratories. The select soil samples were analyzed

for VOCs, SVOCs, PPL metals, pesticides and PCBs. The water grab samples were analyzed for VOCs, SVOCs, total and dissolved PPL metals, pesticides and PCBs. Locations of samples are detailed in Tables 2 and 3 and shown on the map at Figure 3.

TABLE 2 – Sample Location Summary Table Parcel G887A

Sample ID	Sample Location	Sample Depth	Rationale
SOILS			
AS-1	Frederick Parcel G	0-1 ft	Characterize surface soil in site central area.
ASS-1	Frederick Parcel G	4-5 ft	Characterize subsurface soil in site central area.
AS-2	Frederick Parcel G	0-1 ft	Characterize surface soil in area of on-site manufacturer.
ASS-2	Frederick Parcel G	4-5 ft	Characterize subsurface soil in area of on-site manufacturer.
AS-3	Frederick Parcel G	0-1 ft	Characterize surface soil in site sign shop area.
ASS-3	Frederick Parcel G	4-5 ft	Characterize subsurface soil in sign shop area.
AS-4	Frederick Parcel G	0-1 ft	Characterize surface soil in auto paint shop area.
ASS-4	Frederick Parcel G	4-5 ft	Characterize subsurface soil in auto paint shop area.
AS-5	Frederick Parcel G	0-1 ft	Characterize surface soil in area of Farmers Supply.
ASS-5	Frederick Parcel G	4-5 ft	Characterize subsurface soil in area of Farmers Supply.
AS-6	Frederick Parcel G	0-1 ft	Characterize surface soil in area of NPS facility.
ASS-6	Frederick Parcel G	4-5 ft	Characterize subsurface soil in area of NPS facility.
AS-7	Frederick Parcel G	0-1 ft	Characterize surface soil in area of sign shop.
ASS-7	Frederick Parcel G	4-5 ft	Characterize subsurface soil in area of sign shop.
AS-8	Frederick Parcel G	0-1 ft	Area Background
ASS-8	Frederick Parcel G	4-5 ft	Area Background
AS-9	Frederick Parcel G	0-1 ft	Duplicate of S-6
ASS-9	Frederick Parcel G	4-5 ft	Duplicate of SS-6
SURFACE WATER			
ASW -1	Storm Drain to Carroll Creek Adjacent to parcel	n/a	Determine if there is an impact to surface water at this location
ASW -2	Carroll Creek Uprstream	n/a	Determine surface water background.
ASW -3	Carroll Creek Downstream	n/a	Determine if there is an impact to surface water at this location
GROUNDWATER			
AGW-1	Frederick Parcel G	N/a	Upgradient/ Site Background
AGW-2	Frederick Parcel G	N/a	Determine if there is site attributed contamination
AGW-3	Frederick Parcel F	N/a	Determine if there is site attributed contamination

TABLE 3 – Sample Location Summary Table Parcel G887B

Sample ID	Sample Location	Sample Depth	Rationale
SOIL			
BS-1	Frederick Parcel G	0-1 ft	Characterize surface soil in northeast corner of site.
BSS-1	Frederick Parcel G	4-5 ft	Characterize subsurface soil in northeast corner of site.
BS-2	Frederick Parcel G	0-1 ft	Characterize surface soil in former UST location.
BSS-2	Frederick Parcel G	4-5 ft	Characterize subsurface soil in former UST location
BS-3	Frederick Parcel G	0-1 ft	Characterize surface soil in southeast corner of site.
BSS-3	Frederick Parcel G	4-5 ft	Characterize subsurface soil in southeast corner of site.
BS-4	Frederick Parcel G	0-1 ft	Characterize surface soil in site central area.
BSS-4	Frederick Parcel G	4-5 ft	Characterize subsurface soil in site central area.
BS-5	Frederick Parcel G	0-1 ft	Characterize surface soil in site central area.
BSS-5	Frederick Parcel G	4-5 ft	Characterize subsurface soil in site central area.
BS-6	Frederick Parcel G	0-1 ft	Characterize surface soil in area of Lippart Cabinet shop.
BSS-6	Frederick Parcel G	4-5 ft	Characterize subsurface soil in area of Lippart Cabinet shop.
BS-7	Frederick Parcel G	0-1 ft	Characterize surface soil in north central area.
BSS-7	Frederick Parcel G	4-5 ft	Characterize subsurface soil in north central area.
BS-8	Frederick Parcel H	0-1 ft	Area Background
BSS-8	Frederick Parcel H	4-5 ft	Area Background
BSS-9	Frederick Parcel G	4-5 ft	Duplicate of SS-6
SURFACE WATER			
BSW -1	Storm Drain to Carroll Creek Adjacent to parcel	n/a	Determine if there is an impact to surface water at this location
BSW -2	Carroll Creek Uprstream	n/a	Determine surface water background.
BSW -3	Carroll Creek Downstream	n/a	Determine if there is an impact to surface water at this location
GROUNDWATER			
BGW-1	Frederick Parcel G	n/a	Upgradient/ Site Background
BGW-2	Frederick Parcel G	n/a	Determine if there is on site contamination
BGW-3	Frederick Parcel F	n/a	Determine if there is site attributed contamination downgradient of site
BGW-4	Frederick Parcel G	n/a	Duplicate of GW-2

B. Field Explorations and Methods

Site visits were conducted by MDE in February 2004 prior to sampling. Reconnaissance of the site and potential sampling locations were determined at that time. Physical hazards observed on the site included buried gas and electrical lines, underground storage tanks and vehicular traffic in and out of the parking area.

C. Sampling and Analytical Methods

1. Soil Sampling and Analysis

Seventeen surface and eighteen subsurface soil grab samples were collected during this investigation. Surface and subsurface soil samples were collected from Geoprobe® soil borings using disposable scoops. The surface soil grab samples were collected from 0 to 1 foot below the surface and designated "AS-#" for Parcel 887A and "BS-#" for Parcel 887B. The subsurface soil grab samples were collected concurrently with the corresponding surface location from 4 to 5 feet below grade and designated "ASS-#" for Parcel 887A and "BSS-#" for Parcel 887B.

Sample AS-1, was collected at the southeast corner of the Alpha Design building. Sample AS-2, was collected in a grassy area east of the northeast corner of the Alpha Design building. Sample AS-3, was collected from the parking area due south of the Alpha Design building. Sample AS-4, was collected from the south end of the lot once occupied by the auto paint shop. Sample AS-5, was collected at the north end of the lot once occupied by the auto paint shop. Sample AS-6, was collected from the geographic center of the fenced parking lot adjacent to the Training Center building. Sample AS-7, was collected from the courtyard between the Training Center and the Alpha Design building. Sample AS-8, was collected from the parking area on the northeast corner of the intersection of East and South Streets. The subsurface samples were collected at the same locations but at a depth of four feet below ground surface. These sixteen soil grab samples were analyzed by MDE personnel using field screening technology.

Sample BS-1, was collected at the northeast corner of the Lippart Cabinet building. Sample BS-2, was collected in a gravel area near an abandonded set of gas pumps on the south end of the Lippart Cabinet building. Sample BS-3, was collected from the northwest corner of East and South Streets, in a grassy area outside of the Frederick Non-Profit Building Supply (FNBS) building. Sample BS-4, was collected from the parking area west of FNBS. Sample BS-5, was collected at the northwest corner of the FNBS building. Sample BS-6, was collected from the southwest corner of the foundation surrounding the Lippart Cabinet building. Sample BS-7, was collected from the grassy area between the Training Center and the Lippart Cabinet building. Sample BS-8, was collected from the parking area on the northeast corner of the intersection of East and South Streets. The subsurface samples were collected at the same locations but at a depth of four feet below ground surface. These sixteen soil grab samples were analyzed by MDE personnel using field screening technology.

Analysis by field screening techniques included immunoassay screening for cPAHs using Strategic Diagnostics, Inc. (SDI) immunoassay test kits on a SDI RaPID Photometric Analyzer and XRF screening for metals on a Spectrace QuanX Analyzer System with an electronically cooled detector.

All samples collected at depth (eighteen total) were submitted to the fixed laboratories for VOCs analysis. For Parcel G887A, five surface and four subsurface samples were submitted to Martel as determined by results of immunoassay and XRF

technology sample results. For Parcel G887B, five surface and four subsurface soil samples, determined from cPAH immunoassay and XRF technology, were submitted to Phase for SVOCs, PPL metals, pesticides and PCBs analysis. Two samples from each parcel were submitted to the fixed laboratories for speciation, one each for hexavalent chromium and one each for elemental mercury. All soil samples were analyzed utilizing EPA approved methods as specified in the MDE QAPP.

2. Groundwater Sampling and Analysis

Six groundwater samples, including one duplicate, plus a field blank were collected during the investigation. The groundwater grab samples designated "MW-#" were collected from two inch monitoring wells installed in May 2003 using air rotary drilling technology. Groundwater sample GW-1 was collected at location AS-3 from a 25-foot temporary well screened from 15 to 25 feet below grade. Groundwater sample GW-2 and GW-4 (aqueous duplicate of GW-2) was collected from a 22-foot monitoring well screened from 12 to 22 feet below grade. Groundwater samples GW-3 were collected from a 25-foot temporary well set on Frederick Parcel F between Parcel G and Carroll Creek. All groundwater samples were sent to the fixed lab for VOCs, SVOCs, dissolved metals, pesticide and PCB analyses. Groundwater sample GW-4 (field blank) was collected from deionized water supplied by the Department of Health and Mental Hygiene.

3. Surface Water Sampling and Analysis

The Frederick Parcel G site sits on a flat terrace of manmade and alluvial fill material along Carroll Creek. The bulk of the surface water runoff is directed to culverts which flow parallel to and below the elevated and channelized Carroll Creek streambed.

For the Parcel G887A sampling, two surface water samples were collected; one at the Carroll Street Crossing of Carroll Creek and one at the base of Water Street. A third planned sample from the culvert flowing under Parcel G was not collected due to a no-flow condition. Per current EPA protocol, surface water samples for metals analysis were field filtered.

For the Parcel G887B sampling, two surface water samples were collected; one at the Carroll Street Crossing of Carroll Creek and one at the base of Water Street. A third planned sample from the culvert flowing under Parcel G was not collected due to a no-flow condition. Per current EPA protocol, surface water samples for metals analysis were field filtered.

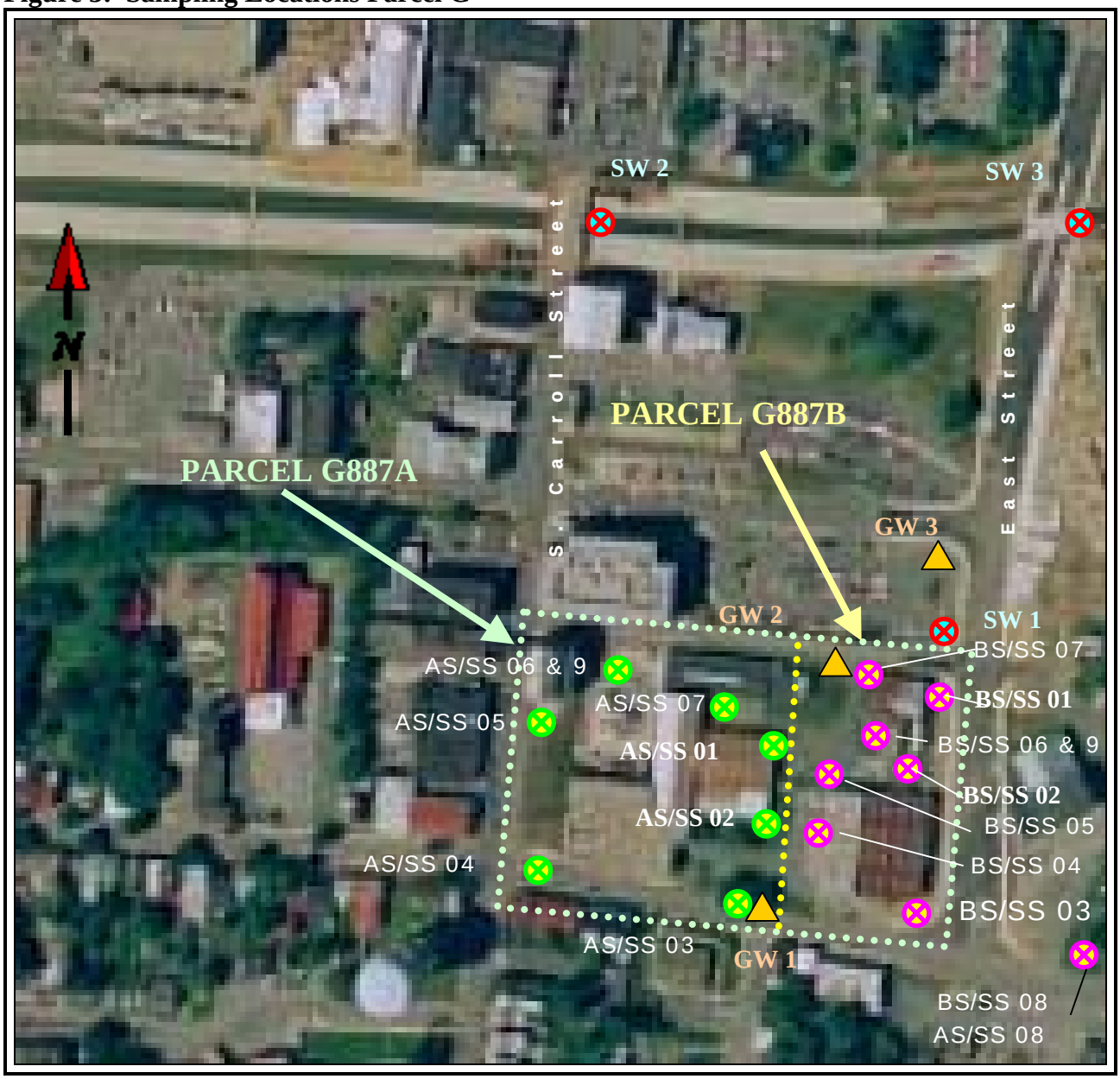
4. Sediment Sampling and Analysis

Due to the channelization of Carroll Creek, sediment is not present on site; therefore, no sediment samples were collected.

5. Other Sampling and Analysis

No other sampling occurred in conjunction with the Brownfields Assessment.

Figure 3: Sampling Locations Parcel G



D. Decontamination Procedures

Samples were collected using disposable scoops and samplers changed gloves between samples. The Geoprobe® used disposable macro-core liners and equipment was decontaminated between borings using a mixture of Alconox® and water.

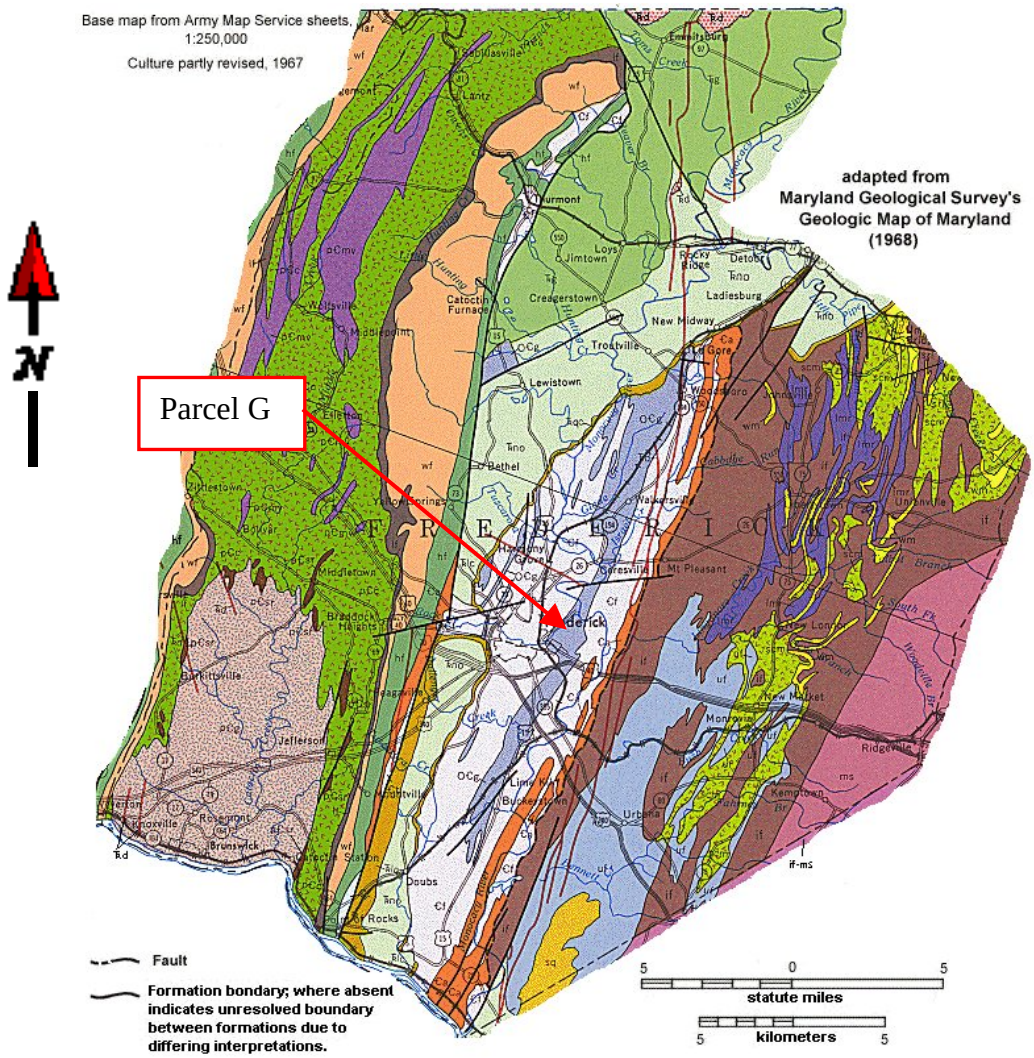
IV. EVALUATION AND PRESENTATION OF RESULTS

A. Subsurface Conditions

1. Geologic Conditions

The Frederick Parcel G site is situated in the low-lying Frederick Valley. The valley is underlain by Cambrian and Ordovician limestone. A thin layer of soil overlies these base rocks. Parcel G is situated on the fine sandy loam soils of the Hagerstown Complex. The site is also within the Urban Land Complex, which is characterized as having more than 80% of the surface covered by asphalt, concrete, buildings, or other impervious structures and exhibits a 0-15% slope. The site lays in the Piedmont Physiographic Province on the 100 year floodplain of Carroll Creek in Quaternary unconsolidated deposits of sand, clay, gravel, and cobbles and the remnants of mountain-wash deposits.

Figure 4: Generalized Geologic Map



2. Hydrogeologic Conditions

Groundwater recharge in this area occurs mainly through infiltration of precipitation in the few exposed areas in the vicinity of the site. Most of the entire area in covered by asphalt and/or concrete. The only vegetation on site is found in small 'islands' on the edge of the property. Due to the slope of the immediate area and the proximity to Carroll Creek, area groundwater would normally discharge to the creek. However, due to the Carroll Creek channelization project, surface water has been diverted through a system of storm drains into several large culverts which flow below the channelized streambed. Groundwater flows to the southeast to the unchannelized stretches of Carroll Creek. The elevation of the site is approximately 290 feet above Mean Sea Level. Groundwater is expected to be encountered at a point just below the grade of the stream, or at the sediment/bedrock interface, approximately 20 feet below grade.

On Thursday, June 12, 2003, MDE measured the elevations of site groundwater in the three monitoring wells. An analysis of the results revealed that the local groundwater flow was parallel to the direction of the channelized Carroll Creek, trending towards the Monocacy River.

B. Analytical Data

1. Soil Sampling Results

Analytical results for metals in the soil samples collected during this investigation were compared to MDE Clean-up Standards for non-residential soil and Anticipated Typical Concentrations (ATC) for metals in Central Maryland as derived in the *State of Maryland, Department of the Environment Cleanup Standards for Soil and Groundwater, August 2001*. The ATC represents a reference level that indicates likely background concentrations of naturally occurring metals that are expected to be encountered in the central region of Maryland.

All soil samples were submitted for field screening on the days they were collected. The field screening results were then used to determine which samples would be submitted for fixed laboratory analysis. Field screening results indicated low levels of priority pollutant metals (pp-metals) and cPAHs in most samples. Chromium, arsenic and mercury were measured in several samples at levels above MDE clean-up standards (see Table 4 and Appendix 3 for field screening results).

Eight samples from Parcel G887A were submitted to Martel and nine samples from Parcel G887B were submitted to Phase for confirmatory analysis. These samples included samples with the highest elevations of cPAHs (AS4, ASS4, AS6, ASS6, AS7, AS8, AS9, BS1, BS2, BS3, BS6, and BSS9), samples with elevated pp-metals content (ASS2, ASS4, ASS5, AS7, AS8, AS9, BS1, BS2, BSS2, BS3, BSS4, BSS6, and BS7) plus the field duplicate pair samples. The first duplicate pair is AS6/AS9 and the second pair is BS6/BS9. Six soil samples were speciated, two for hexavalent chromium and four for

elemental mercury. Both Martel and Phase analyzed the soil samples utilizing EPA approved methods.

The fixed laboratory analytical results revealed one soil sample, ASS4, with elevations of several metals above MDE Clean-up Standards for non-residential soil. Field screening for metals revealed very low levels of chromium in samples collected from Frederick Parcel G. Two samples, ASS-4 and ASS-5, were submitted to a contract lab for hexavalent chromium speciation. Analysis did not detect hexavalent chromium in the soils above the detection limit of 10 mg/kg. Mercury was detected in three separate soil samples submitted to the contract laboratories (ASS4, BS3, & BS6), at a level slightly above MDE Clean-up Standards for non-residential soils. Based on field screening results, samples ASS-4, ASS-5, BSS-4 and BS-7 were analyzed for the presence of elemental mercury. This analysis failed to detect elemental mercury above the 0.051 mg/kg quantitation limit in samples ASS-5, BSS-4 and BS-7. Sample results for ASS-4 however indicated total mercury for this sample was 0.4 mg/kg, above the detection limit of 0.1 mg/kg. Third party validation found that the data could be used for its intended purpose. No results were rejected.

Elemental mercury was reported in this sample at 0.6 mg/kg, above the level of total mercury. Third party validation gave all of Phases non-detect elemental mercury samples an R qualifier, indicating the samples were unusable. Refer to Table 4.

Table 4. Fixed Laboratory Metals Results For Soil Samples

Analyte mg/kg	Residential Clean-up Standard	Non-Residential Clean-up Standard	AS4	AS6	AS7	AS9 (Dup AS6)	Back Ground AS8	ASS2	ASS4	ASS5	ASS9	BS1	BS2	BS3	BS6	BS7	BSS2	BSS4	BSS6	BSS9 (Dup BSS6)	ATC
ANTIMONY	12	82	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**7.9**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	
ARSENIC	2.0	3.8	**3.5**	**3.8**	**4.7**	**4.3**	**11**	**10**	**240**	**3.2**	**1.5**	**2.1**	**18**	**7.7**	**8.9**	**15**	**3**	**3.5**	**3.3**	**3.7**	4.9
BERYLLIUM	16	410	**0.47**	**1.4**	**1.2**	**1**	**1**	**2.2**	**0.89**	**0.86**	**0.6**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	
CADMIUM	3.9	100	**ND**	**0.2**	**0.2**	**0.3**	**0.4**	*ND*	**0.6**	**0.5**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	--
CHROMIUM	1.2E+04	3.1E+05	**7.5**	**11**	**16**	**18**	**14**	**31**	**12**	**9.4**	**4.6**	**15**	**17**	**12**	**17**	**11**	**20**	**12**	**13**	**22**	30
Cr+6	23	610	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**ND**	**ND**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	
COPPER	310	8200	**16**	**23**	**29**	**22**	**27**	**40**	**27000**	**27**	**7**	**22**	**17**	**16**	**200**	**21**	**20**	**23**	**37**	**25**	--
LEAD	400	400	**52**	**38**	**58**	**39**	**70**	**16**	**2300**	**37**	**4.7**	**32**	**42**	**30**	**180**	**36**	**13**	**14**	**170**	**26**	--
MANGANESE	160	4100	**270**	**520**	**1200**	**710**	**460**	**230**	**690**	**240**	**250**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	
MERCURY	0.10	0.12	**0.3**	**0.1**	*ND*	*ND*	**0.1**	*ND*	**0.4**	*ND*	*ND*	*ND*	*ND*	**0.11**	**0.12**	*ND*	*ND*	*ND*	*ND*	*ND*	.14
Elemental Hg	--	--	NA	NA	NA	NA	NA	NA	**0.6**	*ND*	NA	NA	NA	NA	NA	*R*	NA	*R*	NA	NA	--
NICKEL	160	4100	**9.1**	**20**	**20**	**23**	**14**	**35**	**17**	**17**	**12**	**21**	**20**	**13**	**21**	**14**	**14**	**23**	**16**	**17**	--
SILVER	39	1000	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**34**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	--
ZINC	2300	61000	**48**	**58**	**86**	**100**	**140**	**81**	**5200**	**160**	**25**	**120**	**73**	**150**	**370**	**33**	**32**	**41**	**130**	**74**	--

Yellow Highlighted values indicate concentrations above Non-residential Clean-up Standards.
Pink Highlighted values are 3X background.
R=Data Unusable ND=Analyte Not Detected above Reportable Quantity NA=Analyte Not Analyzed for in this sampling.

Analytical results for VOCs in soil samples submitted to the contract laboratories failed to reveal contamination in the soil. Acetone and methylene chloride were detected in most of the soil samples analyzed by Martel at low levels and are likely present as a laboratory artifact. There were no VOCs detected in the samples submitted to Phase. However, third party validation of the Phase data found that there was a possibility of false negatives due to the temperature that the samples as submitted to the laboratory. (Cooler temperature was above 4 °C.) Third party validation recommended that the data be used with caution.

Analytical results for SVOCs in soil samples revealed up to sixteen constituents in one or more of the soil samples submitted to Martel and Phase. The only constituents detected at a level of concern were Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Indeno-(1,2,3 c-d)-pyrene which were detected in surface sample BS-2 at concentrations above the MDE Clean-up Standard for non-residential soil (Table 5). Many of the remaining SVOCs were greater than three times the level detected in AS-8, the site background sample. Contamination detected at levels greater than three times background indicates site attribution. Three times background being indicative of a contaminant release according to federal guidelines as detailed in CERCLA. Third party validation found that the data from Phase met set data quality objectives as specified in the method with respect to precision, accuracy, and completeness, and could be used for their intended purpose.

Table 5. Fixed Laboratory SVOC Results For Soil Samples

Analyte (µg/Kg)	Residential Clean-up Standard	Non-Residential Clean-up Standard	ASS2	AS4	ASS4	AS6	AS7	Back Ground AS8	AS9	ASS9	BS1	BS2	BS3	BS6	BS7
2-Methylnaphthalene	1.6E+5	4.1E+06	*ND*	**1200**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Acenaphthylene	4.7E+5	1.2E+07	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**280**	*ND*	*ND*	*ND*
Di-n-butyl phthalate	7.8E+05	2.0E+07	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**900**	*ND*	*ND*	*ND*	*ND*	*ND*
Fluorene	3.1E+05	8.2E+06	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**250**	*ND*	*ND*	*ND*
Anthracene	2.3E+06	6.1E+07	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**1400**	*ND*	*ND*	*ND*
Carbazole	3.2E+04	2.9E+05	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**970**	*ND*	*ND*	*ND*
Phenanthrene	2.3E+06	6.1E+07	*ND*	**1700**	*ND*	*ND*	*ND*	**4400**	*ND*	*ND*	*ND*	**5700**	**45**	**50**	*ND*
Fluoranthene	3.1E+05	8.2E+06	*ND*	**810**	*ND*	*ND*	*ND*	**4200**	*ND*	*ND*	*ND*	**16000**	**100**	**240**	*ND*
Pyrene	2.3E+05	6.1E+06	*ND*	**1100**	*ND*	*ND*	*ND*	**5200**	*ND*	*ND*	*ND*	**12000**	**87**	**170**	*ND*
Benzo(a)anthracene	8.7E+02	7.8E+03	*ND*	*ND*	*ND*	*ND*	*ND*	**810**	*ND*	*ND*	*ND*	**7300**	*ND*	**110**	*ND*
Chrysene	8.7E+04	7.8E+05	*ND*	**860**	*ND*	*ND*	*ND*	**2200**	*ND*	*ND*	*ND*	**7200**	**59**	**120**	*ND*
Benzo(b)fluoranthene	8.7E+02	7.8E+03	*ND*	*ND*	*ND*	*ND*	*ND*	**1400**	*ND*	*ND*	*ND*	**5400**	**48**	**180**	*ND*
Benzo(k)fluoranthene	8.7E+03	7.8E+04	*ND*	**590**	*ND*	*ND*	*ND*	**2200**	*ND*	*ND*	*ND*	**6900**	**50**	**160**	*ND*
Benzo(a)pyrene	3.3E+02	7.8E+02	*ND*	*ND*	*ND*	*ND*	*ND*	**1300**	*ND*	*ND*	*ND*	**6700**	**50**	**180**	*ND*
Indeno-(1,2,3 c-d)-pyrene	8.7E+02	7.8E+03	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**3300**	*ND*	**270**	*ND*
Benzo(ghi)perylene	2.3E+05	6.1E+06	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	**3300**	*ND*	**490**	*ND*

Highlighted values indicate concentrations above Non-residential Clean-up Standards.
R=Data Unusable ND=Analyte Not Detected above Reportable Quantity NA=Analyte Not Analyzed for in this sampling.

Analytical results for Pesticides and PCBs in soil samples revealed four constituents (DDD, DDT, Endrin Aldehyde and Methoxychlor) in the background sample (AS8) and two of the same constituents (DDD and Methoxychlor) in a site sample (AS6). This detection of pesticides in sample AS6 was not mirrored in sample AS9, the duplicate sample. Therefore the result is questionable. No PCBs were detected in the samples from Frederick Parcel G. No pesticides were detected at three times background or at any level of concern. Third party validation found that the pesticide data met data quality objectives as specified in the method and that the data could be used for its intended purpose.

Table 6. Fixed Laboratory Pesticide/PCB Results For Soil Samples

Analyte (µg/Kg)	Residential Clean-up Standard	Non-Residential Clean-up Standard	AS4	AS6	AS7	Back Ground AS8	AS9	ASS9	BS1	BS2	BSS2	BS3	BSS4	BS6	BSS6	BS7	BSS9
DDD	2700	24,000	*ND*	**50**	*ND*	**50**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
DDT	1900	1,7000	*ND*	*ND*	*ND*	**33**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Endrin Aldehyde	2300	61,000	*ND*	*ND*	*ND*	**43**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*
Methoxychlor	39,000	1.0E+6	*ND*	**150**	*ND*	**77**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*

Yellow Highlighted values indicate concentrations above Non-residential Clean-up Standards.
Pink Highlighted values are 3X background.
R=Data Unusable ND=Analyte Not Detected above Reportable Quantity NA=Analyte Not Analyzed for in this sampling.

2. Groundwater Sampling Results

The site sampling plan called for groundwater samples to be collected from two 1-inch temporary wells (AGW-1 and BGW-1) installed in Geoprobe borings, and from two 2-inch monitoring wells (GW-2 and GW-3) that were installed on May 22 and 23, 2003 for the investigation of an adjacent property (Frederick Parcel F). The wells installed in the Geoprobe borings did not yield sufficient quantity of sample for analysis. Samples were obtained from the two wells installed in a water table located at approximately 25 feet below grade. The Geoprobe wells (AGW-1 and BGW-1) were originally designated as the site background wells. The two preinstalled down-gradient wells (GW-2 and GW-3) were set to define groundwater contamination and flow direction. Results for these two wells are reported as AGW-2 and AGW-3, and BGW-2 and BGW-3 for aliquots collected during the two phases of the Frederick Parcel G investigation.

Analytical results for the groundwater samples submitted to the fixed laboratories were compared to MDE Cleanup Standards for groundwater. The Martel results revealed low levels of acetone and methylene chloride in the samples. As low levels of these compounds were also detected in the trip blank, its presence is considered to be a laboratory artifact. Analytical results for SVOCs in the groundwater samples submitted to the fixed labs revealed no levels of the target compounds.

It should be noted that the Martel data contained analysis for the metal manganese, which is not on the list of priority pollutant metals. Phase did not submit a report for analysis of this metal. Martel's results indicated manganese at slightly above the MDE clean-up standard in the total metals samples. Analytical results for dissolved metals in groundwater samples submitted to the fixed labs did not detect any dissolved metals at levels that approached the MDE Groundwater Standard for Type I and II Aquifers. (Refer to Table 7 and 8)

Table 7. Fixed Laboratory Total Metals Results For Groundwater Samples

Analyte (µg/L)	Groundwater Standard	AGW2	AGW3	AGW4 Dup AGW2	BGW2	BGW3
Arsenic	50	*ND*	*ND*	*ND*	*ND*	*ND*
Chromium	100	*ND*	*ND*	*ND*	*ND*	*ND*
Copper	1300	**3.2**	**2**	**3**	*ND*	*ND*
Lead	15	**4.6**	*ND*	**3.9**	*ND*	*ND*
Manganese	50	**80**	*ND*	**70**	*NA*	*NA*
Nickel	73	*ND*	*ND*	*ND*	*ND*	*ND*
Selenium	50	*ND*	*ND*	*ND*	*ND*	*ND*

Values highlighted in yellow exceed MDE Groundwater Standards for Type I and II Aquifers.

Table 8. Fixed Laboratory Filtered Metals Results For Groundwater Samples

Analyte (µg/L)	Groundwater Standard	AGW2	AGW3	AGW4 dup of AGW2	BGW2	BGW3
Arsenic	50	*ND*	*ND*	*ND*	*ND*	**5.2**
Chromium	100	**2.2**	**2.3**	**2.2**	*ND*	*ND*
Copper	1300	*ND*	*ND*	*ND*	**7.1**	**31**
Lead	15	*ND*	*ND*	*ND*	*ND*	**11**
Manganese	50	*ND*	**5.3**	**4.7**	*NA*	*NA*
Nickel	73	*ND*	*ND*	*ND*	*ND*	**27**
Selenium	50	*ND*	*ND*	*ND*	*ND*	**5.6**

Values highlighted in yellow exceed MDE Groundwater Standards for Type I and II Aquifers.

3. Surface Water Sampling Results

Surface water samples collected from Carroll Creek contained trace amounts of copper and manganese; no other metals were detected in either total or dissolved metals samples collected from Carroll Creek (Table 9). There were no measurable levels of pesticides, PCBs, VOCs or SVOCs in the same surface water samples.

Table 9. Fixed Laboratory Metals Results For Surface Water Samples

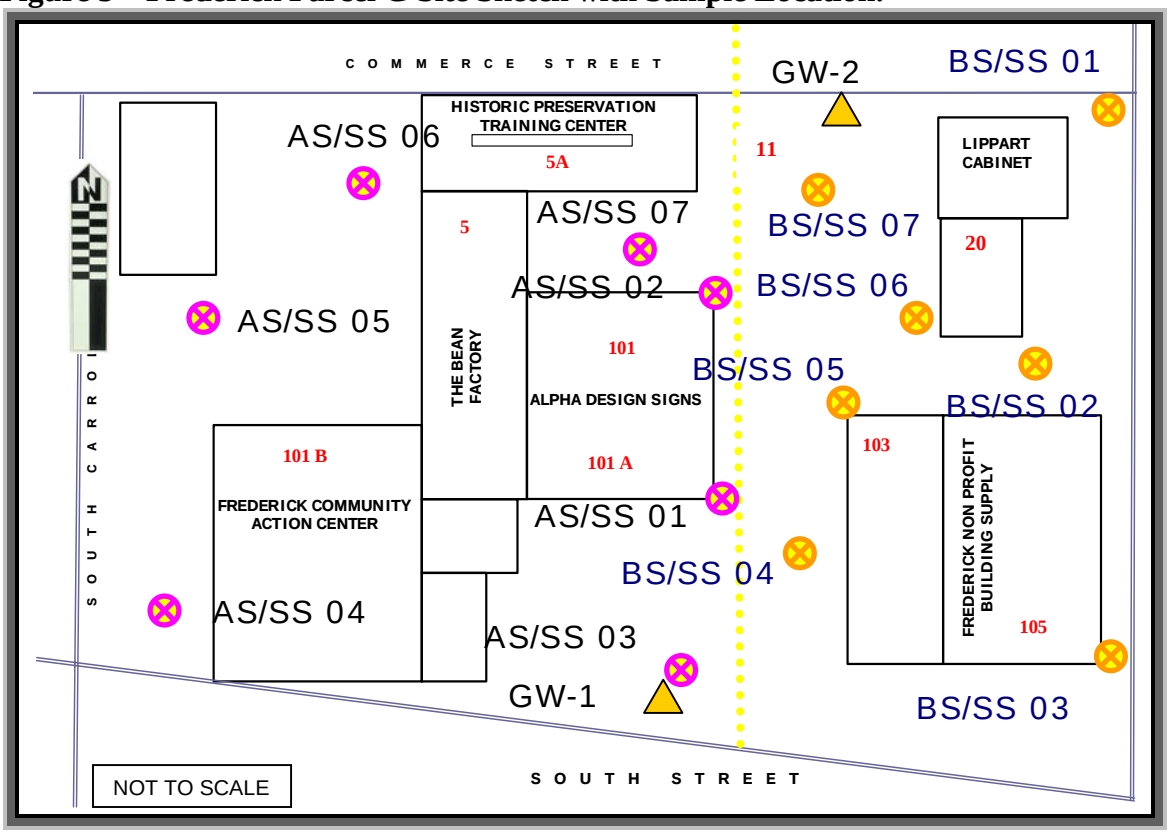
Analyte (µg/L)	Ambient Surface Water Standard	ASW3 Total	ASW3 FF	BSW-1 FF	BSW-3 FF	BSW-4 FF
Copper	1300	3.4	*ND*	*ND*	*ND*	*ND*
Manganese	--	22	9	*ND*	*ND*	*ND*

Values highlighted in yellow exceed MDE Ambient Surface Water Criteria (26.08.02.02.03.2.)

3. Other Sampling Results

No other sampling occurred in conjunction with this Brownfields Assessment.

Figure 5 – Frederick Parcel G Site Sketch with Sample Location.



V. FINDINGS AND CONCLUSIONS

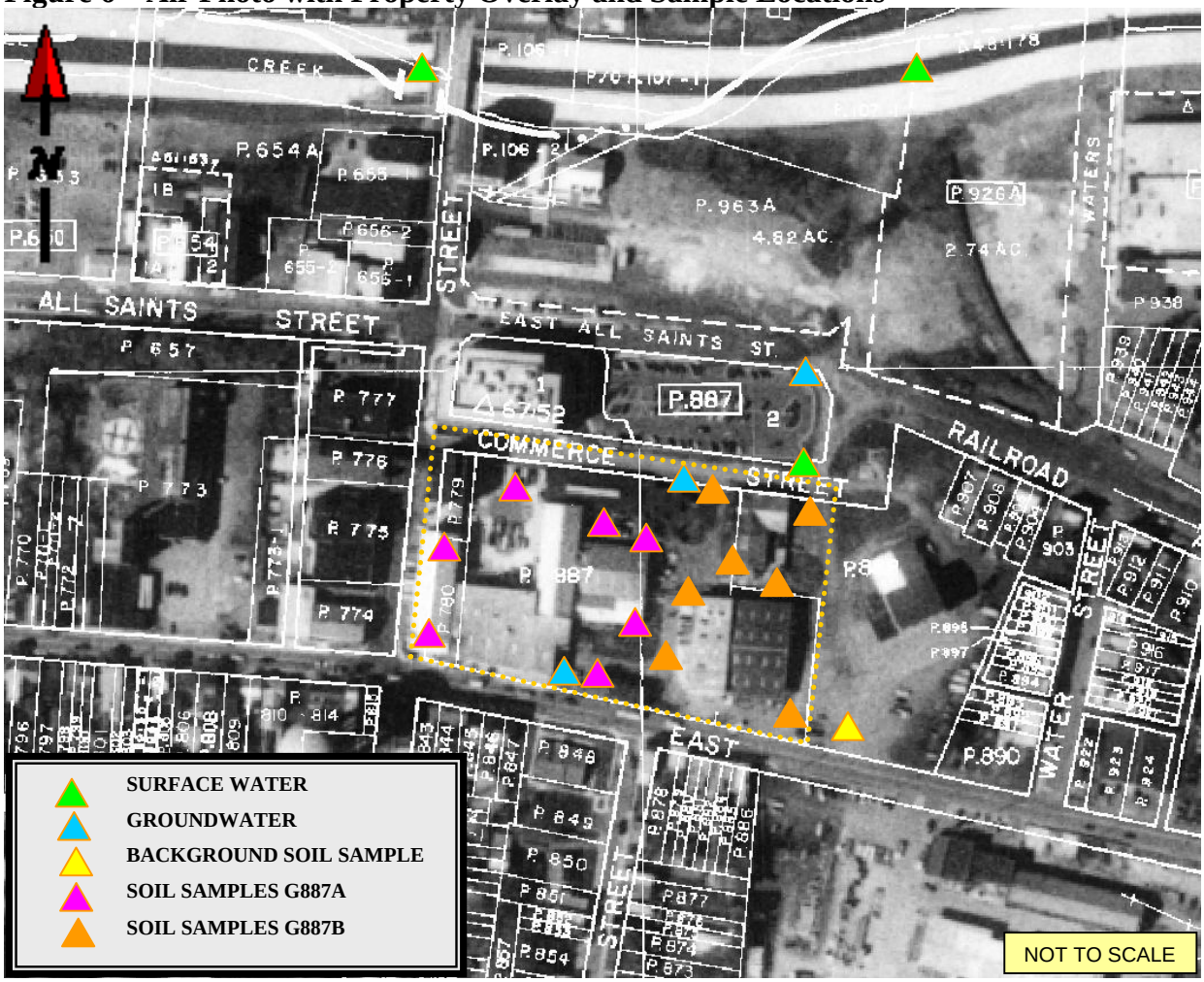
MDE prepared two toxicological evaluations of the Frederick Parcel G site (refer to Appendix 4) utilizing the analytical data provided by the fixed laboratories. Both residential and commercial use scenarios were evaluated since the site is expected to be redeveloped into a mix of residential, commercial and office space. In evaluating risk to human health, maximum concentrations of all chemicals detected in the sampling were compared to medium-specific screening levels, EPA Region III RBCs and assumed 100% bioavailability of each contaminant. The evaluation of groundwater was performed as if the water were being used as drinking water. Relevant toxicological data and RBC values from structurally similar compounds were used for some of the chemicals with no corresponding RBC value. The EPA directive recommending a soil screening level of 400 mg/Kg of lead for commercial scenarios was used in the evaluation for soils.

Eight contaminants, (antimony, arsenic, copper, lead, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno-(1,2,3 c-d)-pyrene) were detected at levels above screening benchmarks. The elevations occurred primarily in the sample collected from the former site of Grimms Auto (ASS-4). This site is now a grass covered lot and according to the City will be redeveloped in the near future.

Several contaminants detected on-site exceeded MDE and EPA acceptable levels using both risk exposure assumptions. Arsenic and copper exceeded the hazard index for

ingestion of subsurface soils by all populations. Arsenic and benzo(a)pyrene exceeded a cancer risk of 1 X 10^{-5} for ingestion and dermal contact with surface and subsurface soils by children. Arsenic also exceeded a cancer risk of 1 X 10^{-5} for youths and construction workers. Potential additive effects of contaminants detected on the site exceeded the cancer risk to all resident populations, youth visitor and adult worker from ingestion of surface soils. The site is in an urban environment. Once redevelopment has been accomplished, soils will not be exposed anywhere on the site with the exception of small green border areas. The main risk for the site will be to construction workers. A viable health and safety plan will be necessary for any future construction on the site. Although the toxicological evaluations revealed risks above the most conservative acceptable level, once redevelopment has been completed the contamination that was detected in the soils will not be exposed. Once exposure pathways are not available, MDE will have no further requirements for this site. MDE does, however, reserve the right to require additional investigation if previously undiscovered or exacerbated levels of contamination are discovered.

Figure 6 – Air Photo with Property Overlay and Sample Locations



Findings indicate significantly elevated levels of arsenic on the South Carroll Street end of the parcel and levels of concern across the site. Levels of arsenic approaching the non-residential clean-up standard of 3.8 mg/kg were detected in most surface soil samples. Soil sample ASS-4 contained arsenic at 60 times greater than the non-residential standard of 3.8 mg/kg. However, other studies in the area have revealed similarly high levels of arsenic on parcels adjacent to the site. Future excavation on the property will require the development of both a remedial action plan and a health and safety plan. Excavated material will require testing and proper disposal.

The site poses a potential risk to public health. MDE recommends that as a contingency the City of Frederick place a deed restriction on the property which, requires notice to MDE in advance of any planned excavation activity at the site.

VI. REFERENCES

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2. http://www.topozone.com/find.asp

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7. Maryland Department of the Environment, *Cleanup Standards for Soil and Groundwater: Interim Final Guidance (Update No. 1),* August 2001.

8. Natural Resources Conservation Service, *Soil Survey of Frederick County, Maryland,* 2002

9. http://sanborne.umi.com/sanborn/image/

10. U.S. Environmental Protection Agency, 1999, Risk-Based Concentration Tables, Region III.

VII PHOTOGRAPHS

East Street Façade of Lippart's Cabinet

Empty Lot – Former Site of Grimms Auto

"Green" Area between Lipparts and FNPBS

NPS Training Center – The Bean Factory

Frederick Non-Profit Building Supply

NPS Training Center – Commerce St Side

Frederick Food Bank Building

Lippart's Cabinet Building

Green Area in Center of Site

Area between Lippart's Cabinet and FNPBS – UST Area

NPS Training Center Courtyard

Fuel Dispenser in UST Area

Alpha Design Sign Company

APPENDIX 1 - DEPARTMENT OF ASSESSMENTS AND TAXATION PROPERTY REPORT

APPENDIX 2 PRIORITY POLLUTANT LIST METALS

Antimony
Arsenic
Beryllium
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Zinc

APPENDIX 3 - FIELD SCREENING DATA

RAW XRF DATA

Analyte (mg/kg)	AS-1	ASS-1	AS-2	ASS-2	AS-3	ASS-3	AS-4	ASS-4	AS-5	ASS-5	AS-6	ASS-6	AS-7	ASS-7	AS-8	ASS-8	AS-9	ASS-9
TL	ND	0.3	ND	ND	ND	ND	0.5	ND	ND	0.1	ND	0.3	ND	ND	ND	ND	0.3	ND
CR	84.5	95.5	49.7	100.0	76.6	80.1	112.6	57.2	62.3	81.9	58.7	47.8	73.8	67.1	73.0	95.0	46.0	18.7
MN	274.5	318.5	849.1	127.0	309.7	286.0	300.2	787.7	76.7	407.1	477.0	421.8	1058.7	342.7	584.8	286.0	436.7	498.3
CU	27.1	34.8	5.2	13.3	19.5	19.5	49.4	51.4	ND	43.1	20.9	8.6	17.1	19.8	27.5	15.2	8.8	6.4
ZN	76.7	101.7	105.7	113.1	61.8	73.0	69.9	196.6	25.7	275.0	72.7	89.4	120.3	66.2	195.6	73.9	53.7	66.5
SE	ND	1.7	1.0	ND	1.1	0.2	0.7	ND	ND	1.5	1.3	ND	ND	1.3	0.6	ND	0.2	1.0
AS	4.5	7.3	1.5	8.4	6.8	3.0	10.0	0.7	ND	5.4	0.6	3.5	6.8	8.4	13.7	3.3	7.5	2.0
AG	ND	1.0	ND	1.1	ND	0.6	3.0	ND	ND	0.2	ND	ND	ND	1.2^{ND}	ND	2.4	2.0	ND
CD	ND	ND	0.5	ND	2.6	ND	2.5	1.3	0.2	1.2	0.1	2.0	1.5	ND	0.5	ND	0.7	0.7
PB	32.0	18.7	58.3	14.1	14.7	10.3	44.8	115.2	10.8	55.1	40.6	31.4	68.6	23.2	88.8	22.1	12.8	12.5
HG	ND	ND	ND	ND	ND	ND	2.2	2.2	ND	8.0	ND	ND	ND	ND	ND	0.3	ND	ND

Analyte (mg/kg)	BS-1	BSS-1	BS-2	BSS-2	BS-3	BSS-3	BS-4	BSS-4	BS-5	BSS-5	BS-6	BSS-6	BS-7	BSS-7	BS-8	BSS-8	BSS-9
TL	0.7	0.3	ND	0.7	ND	ND	ND	0.4	ND	0.8	1.0	0.7	ND	ND	0.8	ND	ND
CR	80.4	70.3	67.3	67.9	82.3	52.1	66.5	95.3	50.4	55.8	55.8	73.7	85.0	84.2	34.8	31.6	109.0
MN	611.1	935.5	1139.4	535.6	581.8	704.9	637.9	293.8	1487.0	693.1	610.7	634.0	267.1	127.1	450.9	431.8	368.4
CU	25.4	6.2	43.8	33.8	41.6	16.1	24.3	22.1	35.3	18.7	153.7	67.3	17.9	54.2	1.7	35.3	45.0
ZN	115.6	89.9	261.8	73.9	131.7	90.6	85.1	94.4	142.2	78.5	803.6	221.3	65.8	72.7	90.2	95.1	176.4
SE	ND	1.8	4.3	ND	ND	2.4	ND	ND	0.5	2.2	ND	ND	1.1	ND	ND	1.9	1.7
AS	3.0	3.3	22.7	9.3	8.6	6.9	7.7	10.3	8.6	8.7	13.1	8.3	16.4	10.8	5.3	6.3	4.4
AG	ND	ND	ND	ND	4.8	5.5	ND	0.8	4.7	ND	ND	2.3	1.3	6.2	ND	10.1	3.4
CD	0.1	ND	3.6	2.4	1.8	0.7	ND	ND	ND	ND	1.0	2.2	5.3	ND	2.0	ND	2.3
PB	42.9	24.1	209.8	23.7	40.2	22.2	28.8	18.4	48.3	42.4	626.7	179.5	46.0	12.6	17.6	7.1	94.5
HG	6.2	ND	ND	1.2	ND	ND	ND	7.3	ND	ND	ND	2.3	7.8	ND	ND	0.4	ND

RAW IMMUNOASSAY FIELD SCREEN DATA – PARCEL G887A

CPAH IMMUNOASSAY

Site: 6692D

DATE SAMPLES COLLECTED: 7/28/04

DATE ANALYZED: 7/28/04 ANALYST: Mark Mank

Calibration Results:

R^2=	0.9973
Slope	-0.513
Y-intercept	1.0131

Sample ID	Diluent Final Volume (mL)	Sample Extract Diluent Volume (uL)	Dilution Factor	Concentration at Instrument(ppb)	Soil Concentration (ug/kg)
Control[1]	-	-	-	1.79	-
AS-1	10	200	100	4.55	455
ASS-1	10	200	100	3.14	314
AS-2	10	200	100	4.35	435
ASS-2	10	200	100	2.81	281
AS-3	10	200	100	1.76	176
ASS-3	10	200	100	3.31	331
AS-4	10	200	100	25.69	2569
ASS-4	10	200	100	19.41	1941
AS-5	10	200	100	0.67	67
ASS-5	10	200	100	5.56	556
AS-6	10	200	100	11.55	1155
ASS-6	10	200	100	13.63	1363
AS-7	10	200	100	20.48	2048
ASS-7	10	200	100	5.81	581
AS-8	10	200	100	29.81	2981
ASS-8	10	200	100	3.71	371
AS-9	10	200	100	12.64	1264
ASS-9[2]	10	200	100	12.64	1264

Calibration range from 10 to 500 ug/kg.

[1]Control sample actual concentration 2.00 ppb. 89.5% correlation.

[2]Sample concentration below calibration range.

RAW IMMUNOASSAY FIELD SCREEN DATA – PARCEL G887B

CPAH IMMUNOASSAY

Site: 6692D

DATE SAMPLES COLLECTED: 10/20/04

DATE ANALYZED: 10/22/04 ANALYST: Nicole Allen

Calibration Results:

R^2=	0.9956
Slope	-0.847
Y-intercept	1.489

Sample ID	Diluent Final Volume (mL)	Sample Extract Diluent Volume (uL)	Dilution Factor	Concentration at Instrument(ppb)	Soil Concentration (ug/kg)
Control[1]	-	-	-	2.03	-
BS-1	10	25	800	7.17	5736
BSS-1	10	25	800	0.85	680
BS-2	10	25	800	12.72	10176
BSS-2	10	25	800	Nd	
BS-3	10	25	800	2.78	2224
BSS-3	10	25	800	0.14	112
BS-4	10	25	800	0.6	480
BSS-4	10	25	800	0.05	40
BS-5	10	25	800	Nd	
BSS-5	10	25	800	Nd	
BS-6	10	25	800	3.07	2456
BSS-6	10	25	800	0.14	112
BS-7	10	25	800	0.35	280
BSS-7	10	25	800	Nd	
BS-8	10	25	800	Nd	
BSS-8	10	25	800	Nd	
BSS-9	10	25	800	0.63	504

Calibration range from 80 to 4000 ug/kg.

[1]Control sample actual concentration 2.00 ppb. 102% correlation.

[2]Analyte concentration below calibration range.

APPENDIX 4 – MDE TOXICOLOGY REPORT

APPENDIX 5 - THIRD PARTY VALIDATION PACKAGE

APPENDIX 6 - LABORATORY ANALYTICAL DATA

APPENDIX 7 - SOIL/GEOLOGY LOG