Phase II Environmental Site Assessment

Gateway South Redevelopment Properties
Eastern Carroll-Camden Industrial Area
Baltimore, Maryland 21230

KCI Job No. 01-054370.06

Prepared for:
Baltimore Development Corporation
36 Charles Street, Suite 1600
Baltimore, MD 21230

Prepared by:
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KCI TECHNOLOGIES

January 25, 2008

KCI TECHNOLOGIES

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

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January 25, 2008

Baltimore Development Corporation
36 South Charles St.
Suite 1600
Baltimore, MD 21201

Attention: Mr. Michael Pokorney

RE: **Phase II Environmental Site Assessment**
Gateway South Redevelopment Properties
Eighteen Properties in Eastern Carroll-Camden Industrial Area
Baltimore, Maryland
KCI Project No. 01-05437006

Dear Mr. Pokorney:

KCI Technologies, Inc. (KCI) appreciates the opportunity to provide our services on this project. Herein is a report of our findings from the Phase II Environmental Site Assessment (ESA) performed at the above referenced properties. If you have any questions with regard to this report or any other aspect of our services, please feel free to contact us at 410-316-7800.

Sincerely,
KCI Technologies, Inc.

William R. Lyman, CHMM, REM
Senior Associate
Geo-Environmental Division

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Environmental Scientist
Geo-Environmental Division

cc: Project File

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Executive Summary

KCI was retained by the Baltimore Development Corporation (Client) to perform a Phase II Environmental Site Assessment (ESA) for eighteen (18) contiguous parcels of real property located within the Carroll-Camden Industrial Area of Baltimore City, Maryland (the subject site). The eighteen parcels comprising the subject site include twelve developed properties (the "business" parcels) and six undeveloped properties (the "waterfront" parcels).

KCI's Phase II ESA was performed in support of the proposed Gateway South redevelopment project, which involves the demolition of existing industrial warehouses and other facilities that currently occupy the business parcels of the subject site, followed by the construction of a new "sportsplex" facility. The sportsplex facility will include office and retail space, a new Greyhound bus terminal, and a new indoor sports arena. A portion of the six waterfront parcels will be established as a public open space or park, while the remaining portion of the waterfront parcels may remain substantially unaltered. At the time this report was completed, the exact boundaries of the proposed public open space had not been decided.

Currently, six of the twelve business parcels are owned by Warner Street, Inc. (WSI) and the remaining six "business" parcels are owned by the City of Baltimore. The City also owns the six waterfront parcels. To support the proposed redevelopment of the subject site, the City is currently engaged in negotiations to acquire the six business parcels that WSI presently owns. Once the City owns all eighteen parcels comprising the subject site, the twelve "business" parcels will be sold to the developer and site redevelopment activities may begin on those parcels. However, the City will retain ownership of the six waterfront parcels.

During the spring and early summer of 2007, KCI completed a Phase I ESA for the twelve "business" parcels, and a separate Phase I ESA for the six "waterfront" parcels of the subject site. During the completion of these assessments, KCI identified numerous "Recognized Environmental Conditions", or "RECs" in association with the subject site. The purpose of this Phase II ESA was to gather additional information concerning these RECs, and to support the anticipated enrollment of most or all of the subject site into Maryland's Voluntary Cleanup Program (VCP).

Due the negotiations with WSI, which were on-going when KCI completed the fieldwork associated with this Phase II ESA, KCI was not permitted to enter any of the six business parcels that WSI owned. Therefore, KCI was unable to complete the investigations that had originally been proposed at these properties. Nevertheless, KCI completed as much of the remaining investigation as possible. The major findings and conclusions from KCI's Phase II ESA are presented as follows:

- Due to the access issues described previously, KCI was unable to complete geophysical surveys at the 1501, 1601, and 1629 Warner Street parcels of the subject site as had originally been planned. However, KCI did complete geophysical investigations at the 1501 Russell Street and 1645 Warner Street parcels of the site. The findings from these surveys revealed the presence of one (1) suspected underground storage tank (UST) at 1501 Russell Street. The UST was identified along the central-southeastern property boundary. No UST was discovered at the 1645 Warner Street property.

- KCI collected a total of fifty-two (52) surface and subsurface soil samples from twenty-six (26) direct-push technology (DPT) borings advanced across the subject site. The analysis of these soil samples revealed the presence of various contaminants; principally including heavy metals, polycyclic aromatic hydrocarbons (PAH), chlorinated solvents, and petroleum compounds, at concentrations which exceeded applicable Maryland Department of the Environment (MDE) clean up standards for soil.

- Based on the currently-proposed site redevelopment scenario, KCI concludes that concentrations of contaminants encountered in most areas of the subject site should be compared against Maryland Department of the Environment (MDE) "Non-Residential" cleanup standards. Specifically, the office and retail buildings, Greyhound bus station, and associated hardscaped areas represent a "Tier II" (commercial) use according to VCP protocols. However, the proposed public open space and the indoor sports arena are a "Tier I" use and trigger the need to compare contaminant concentrations associated with these areas to the more conservative "Residential" cleanup values.

- Comparison of the soil analytical data to relevant MDE cleanup standards revealed certain general trends of contaminant distribution at the subject site:

  1. Chlorinated solvents such as trichloroethene (TCE), tetrachloroethene (PCE), and dichloroethene (DCE) were detected in subsurface soils acquired from the vicinity of the Maryland Chemical facility, and one area located at the north side of this facility appeared to be a potential source area for PCE.

  2. Heavy metals such as lead, arsenic and mercury were generally identified at elevated concentrations (above applicable MDE cleanup standards) in surface and subsurface soils acquired across the entire site.

  3. This investigation revealed that PAH compounds tended to exceed MDE cleanup values most frequently in soil samples acquired southeast of Warner Street.

  4. Soil samples collected from a boring advanced adjacent to an abandoned UST located between the 1645 Warner Street and 2102 Oler Street parcels of the subject site contained some petroleum contamination. This finding suggests that contaminated soils and groundwater may be present near this tank. Additional petroleum impacts identified in surface and subsurface soils acquired from one boring advanced on Lot 6 (i.e., one of the undeveloped "waterfront" parcels) appears indicative of a localized "hotspot" resulting from a past surface spill.

- KCI collected a total of nine (9) groundwater samples from selected borings across the subject site. The analysis of these samples revealed the following general trends:

  1. The analysis of groundwater samples revealed concentrations of TCE, PCE, and DCE exceeding relevant MDE cleanup standards in borings located on and near the Maryland Chemical facility. The pattern of concentrations observed in both groundwater and soils suggests that the Maryland Chemical facility is a source for these analytes.

  2. Elevated concentrations of petroleum compounds were detected in groundwater samples obtained downgradient from 1501 Russell Street, which suggests that the UST identified during KCI's geophysical survey at that parcel is leaking. Relatively high concentrations of petroleum compounds were additionally identified in groundwater obtained from the northwestern (upgradient) boundary of 1551 Russell Street, suggesting that additional petroleum contamination is also migrating to the site from an off-site source.

  3. Numerous PAH compounds were identified at concentrations exceeding relevant MDE cleanup standards in a groundwater sample obtained from the northwestern boundary of the 1629 Warner Street parcel of the subject site. Although KCI analyzed six (6) other groundwater samples from various locations for semi-volatile organic compounds (SVOCs) and PAHs, none of these had detectable concentrations of these compounds. The source of the PAHs identified in the sample acquired near 1629 Warner Street is not clear.

- As part of this investigation, KCI collected a total of ten (10) soil gas samples from various locations across the project site. The soil gas samples were analyzed for VOCs, and the reported concentrations were measured against the values presented in the EPA document *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils.* In summary, the analysis of these samples revealed six (6) VOC analytes in four (4) of the soil gas samples. These analytes, which included benzene, hexane, pentane, 1,1,1-trichloroethane, TCE, and vinyl chloride, were identified in soil gas samples collected from locations near the center of the subject site.

- KCI completed an asbestos-containing materials (ACM) and lead-based paint (LBP) screening on accessible areas of the project site. The screening included the collection and analysis of seventy-eight (78) bulk samples of suspect ACMs and one hundred and forty-seven (147) X-Ray Flourescence (XRF) Analyzer readings to determine the presence of LBP-coated surfaces. As a result of this screening, KCI identified numerous types of ACM and areas of LBP within accessible buildings.

The findings summarized above illustrate that the subject site is impacted by various types and concentrations of contaminants. The presence of these contaminants appears to be a result of current, and historic industrial and manufacturing activities which have occurred at the subject site during the past 100 years. Once application is made to the Maryland VCP, it is likely that:

- Since MDE did not have the opportunity to review KCI's Phase II ESA Work Plan prior to its execution, and because not all parcels of the subject site were accessible at the time of the investigation described herein, the Client should anticipate that MDE may have requirements for additional environmental investigation activities at the subject site following the enrollment of the site in the VCP.

- Following MDE's review of: KCI's Phase I and II ESA reports; new data from any MDE-required follow-on investigations; and, historic data from older environmental reports, records, and documentation, it is likely MDE will require that a Response Action Plan (RAP) be developed and implemented at the subject site. Past experience with similar projects suggests that a Response Action Plan for the subject site could include requirements such as:

    1. A RAP for the subject site may include a requirement for placing clean, imported fill from an MDE-approved source around new site utilities as they are installed. Typically the utility trench is over-excavated on all sides, after which the trench is lined with a geotextile fabric. Working grade is re-established using the clean fill, and following the installation of the utility, additional clean fill is used to backfill the trench.

    2. The RAP may require that areas which are not hardscaped or improved with buildings be "capped" using a layer of clean fill. The thickness of this layer depends on MDE's analysis of the site-specific conditions, and may vary from area to area depending on anticipated usage. However, past experience suggests that the required cap thickness will probably range from eighteen inches to two feet. The Client should also anticipate restrictions regarding types of vegetation that can be planted in areas that have been capped (must have shallow root systems).

    3. MDE may require that new buildings be constructed with sub-slab vapor barriers to prevent excessive levels of VOCs from intruding into the proposed structures. Depending on their analysis of current and future data, active or passive ventilation systems may also be specified.

    Additional requirements including (but not necessarily limited to) the following may also be added to the RAP: groundwater use restrictions; "call-before-dig" requirements; development and

implementation of a monitoring and maintenance plan for paved and capped areas; and, implementation of a site-specific Health and Safety Plan during future site work. It should also be noted that the process of developing a RAP involves some required public notifications and potentially, public participation steps.

Based on the findings from this Phase II ESA, KCI offers the following recommendations:

- KCI recommends that a copy of this report be provided to the MDE VCP for review, along with the VCP application and the Phase I ESA reports completed previously.

- KCI recommends that the geophysical survey, asbestos containing material survey, and lead-based paint screening be completed at the six (6) properties owned by Warner Street, Inc. once access to these properties is permitted. Once access to the property is obtained, KCI also recommends that the drums and storage containers within the warehouse at 1501 Warner Street be properly characterized, staged, and removed from the site for proper disposal in accordance with applicable local, state and federal regulations.

- The findings of this assessment have revealed elevated concentrations of lead and other heavy metals in surface and subsurface soils samples acquired throughout the site. Some of these concentrations appear sufficiently elevated to pose some risk of failing the Toxicity Characteristic. If this is the case, the soils would be considered a hazardous waste once excavated.

  To avoid and/or anticipate the need for hazardous waste disposal during construction, KCI recommends that additional samples of soil be acquired from locations along proposed utility trenches, building foundations, and/or stormwater management facilities prior to construction. These samples should be collected to represent all depths of soils that will be excavated, and then analyzed for Resource Conservation and Recovery Act (RCRA) metals via the Toxicity Characteristic Leaching Procedure (TCLP). Based on the results, estimated quantities and costs for hazardous materials disposal may be developed.

- Two underground storage tanks (USTs) have been identified during this investigation. One is believed to be abandoned in place at the south end of 1501 Russell Street. The second is located near 2102 Oler Street. Additional USTs are suspected at the 1501, 1601, and 1629 Warner Street parcels of the subject site, although access restrictions have so far prevented KCI from investigating these properties further. During site redevelopment, KCI recommends that all USTs and any remaining product in the USTs, as well as associated contaminated soils (if present), be removed from the site and properly disposed of in accordance with applicable sections of COMAR 26.10.

- KCI has identified several Asbestos-Containing Materials (ACM) during the screening-level, Limited ACM Survey conducted as part of this assessment. Prior to demolition of affected buildings, KCI recommends that a more comprehensive survey be completed to meet OSHA regulations for sample quantities (i.e., in order to ensure that the minimum number of samples needed to determine a material is not ACM have been collected). All materials that are determined to be regulated asbestos containing building materials should be removed by a licensed contractor prior to demolishing the buildings in accordance with applicable Federal and State of Maryland regulations.

- During demolition of the existing buildings, KCI recommends that the contractor follow OSHA's "Lead In Construction" standard and implement dust control and containment measures when demolishing building components coated with lead-based paint (LBP) or other lead-containing materials.

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1.0 INTRODUCTION

KCI Technologies, Inc. (KCI) was contracted by the Baltimore Development Corporation (Client) to perform a Phase II Environmental Site Assessment of the Gateway South Redevelopment properties. The Gateway South Redevelopment project encompasses a total of eighteen (18) parcels of real property, which are located in the eastern portion of the Carroll-Camden Industrial Area of Baltimore, Maryland (hereafter referred to as "*project site*", "*subject site*", or "*subject properties*"). Twelve (12) of the properties comprising the subject site (generally referred to as the "Business Parcels") are located along the 1500 and 1600 block of Warner Street, and have the following street addresses:

1501 Warner Street	1525 Russell Street
1601 Warner Street	1551 Russell Street
1629 Warner Street	2119 Haines Street
1633 Warner Street	2110 Haines Street
1645 Warner Street	2104 Worcester Street
1501 Russell Street	2102 Oler Street

Eleven (11) of the twelve (12) "Business Parcels" are currently improved with various industrial warehouses, a chemical repackaging facility, and a Greyhound bus station. It can be generalized that the remaining six (6) parcels of the subject site (referred to as the "Waterfront Parcels") are located between South Eutaw Street and the Patapsco River waterfront. These parcels are presently undeveloped and do not have street addresses. However, they can be described using the following Tax Map block and lot numbers:

Map 21, Section 9; Block 844A; Lot 5A
Map 21, Section 9; Block 844A; Lot 6
Map 21, Section 9; Block 844A; Lot 7
Map 21, Section 9; Block 844A; Lot 8/9
Map 21, Section 9; Block 840; Lot 14
Map 21, Section 9; Block 840; Lot 15

All eighteen (18) parcels of the subject site are summarized in greater detail in Section 2.1 of this report. A Site Location Map (Figure 1) is provided in Appendix A.

1.1 Background

KCI understands that the Client participated in the selection of Cormony Development (Cormony) as the firm that will be responsible for redeveloping the Gateway South project. The overall intent of the project is to revitalize an older and deteriorating, industrialized part of the Baltimore waterfront. In support of this objective, Cormony is proposing to demolish the existing on-site improvements, and replace this aging infrastructure with a 600,000-square-foot office building, a (new, relocated) 50,000-square-foot Greyhound bus terminal, 150,000 square feet of retail and restaurant space, a 100,000-square-foot sportsplex, and approximately 2,100 structured parking spaces. The site will also include a mentoring center for underprivileged youth, known as The Ray of Hope Center. It is KCI's understanding that the waterfront parcels will remain as green space.

As part of the redevelopment, grade changes will be undertaken to allow ground level to be above flood plain (as per City ordinance). It is also likely that utility extensions will be necessary. Except for green

space, storm water retention areas, and planting beds for street trees, the subject site will be hardscaped. The development is estimated to provide 3,200 jobs upon completion.

Working on behalf of the Baltimore Development Corporation, KCI has recently completed two (2) Phase I Environmental Site Assessment (ESA) reports for the project site. Accordingly, reference is made to these reports herein:

1) Phase I Environmental Site Assessment for Gateway South Redevelopment Properties, 12 Parcels in Eastern Carroll-Camden Industrial Area (KCI, May 7, 2007); and,

2) Phase I Environmental Site Assessment for Gateway South Redevelopment Properties, 6 Waterfront Parcels in Eastern Carroll-Camden Industrial Area (KCI, June 7, 2007).

1.2 Purpose

This Phase II Environmental Site Assessment was completed to gather additional information concerning the Recognized Environmental Conditions identified during the two (2) above-referenced Phase I ESAs, and to close the data gaps described therein. The Client has also indicated that copies of this report will be provided to Cormony to assist in development planning. Finally, KCI is assisting the Client to enroll the project site into the Maryland Department of the Environment's (MDE's) Voluntary Cleanup Program (VCP). Therefore, this Phase II ESA was also performed to help address requirements of the VCP.

1.3 Scope of Work

As part of the Phase II ESA at the Gateway South site, KCI has performed the following tasks:

1. Project Initiation / Health and Safety Plan
2. Site Utility Engineering Investigation
3. Limited Geophysical Survey
4. Limited Multimedia Sampling and Field Screening
5. Laboratory Analysis
6. Limited Asbestos and Lead-Based Paint Survey
7. Preparation of this Report documenting the findings to date.

The Phase II ESA was completed in general accordance with a project-specific Sampling and Analysis Plan (SAP), prepared by KCI prior to the commencement of field activities. The SAP was prepared in general accordance with the "*Quality Assurance Project Plan (QAPP) for City of Baltimore Brownfields Pilot Project*", dated September 8, 2001. The SAP presents the methodology and procedures used by KCI and KCI's subcontractors while performing the Phase II ESA.

Note that at the direction of the Client, KCI completed this Phase II ESA without first submitting the SAP to MDE for review. It should therefore be understood that the findings presented herein may not adequately address all of MDE's potential needs for information concerning the site's entry into the Maryland VCP. Further, upon review of this Phase II ESA report it should be anticipated that MDE may have requirements for additional environmental investigation at the subject site.

Finally, it should also be noted that at the time of this investigation, KCI was not permitted access to six (6) of the subject site properties. Specifically, the Client directed KCI not to enter or perform investigations at the following subject site parcels:

1501 Warner Street	1633 Warner Street
1601 Warner Street	2104 Worcester Street
1629 Warner Street	2102 Oler Street

Warner Street Inc. (WSI) owned all six (6) of the above-referenced parcels at the time of this investigation. Since the Client directed KCI not to enter these properties for any reason, KCI attempted to advance borings and collect samples as close to the WSI properties as possible. Generally, samples were collected from the nearest accessible public right-of-way. Further, the WSI properties were not included in the asbestos and lead-based paint screening, or the geophysical survey performed as part of this assessment. Once access to the WSI properties is permitted, KCI may complete such investigations at these properties, and relevant findings can be submitted under separate cover.

2.0 SITE DESCRIPTION

2.1 Description of Study Area

As indicated previously, the Gateway South Redevelopment project includes eighteen (18) properties located in the eastern part of the Carroll-Camden Industrial Area in Baltimore, Maryland. The location of the subject site relative to surrounding roads and features is indicated on Figure 1, in Appendix A.

Table 2-1 (below) presents a summary of the street and legal addresses, and current ownership information for each of the parcels comprising the subject site. KCI obtained the property information summarized in the table from the Maryland Department of Assessment and Taxation (MDAT) Real Property Database. Since the six (6) parcels comprising waterfront portion of the subject site are currently undeveloped, no street addresses were identified for the parcels.

Table 2-1: Property Information

Street Address	Legal Address				Current Owner
	Ward	Section	Block	Lot	
1501 Warner Street*	21	09	0844A	001	Warner Street, Inc.
1601 Warner Street*	21	09	0844A	001A	Warner Street, Inc.
1629 Warner Street*	21	09	0844A	002	Warner Street, Inc.
1633 Warner Street*	21	09	0844A	003	Warner Street, Inc
1645 Warner Street	21	09	0840	002	Mayor & City Council
1501 Russell Street	21	09	0841	001	Mayor & City Council
1525 Russell Street	21	09	0841	003	Mayor & City Council
1551 Russell Street	21	09	0841	004	Mayor & City Council
2119 Haines Street	21	09	0840	003	Mayor & City Council
2110 Haines Street	21	09	0840	004	Mayor & City Council
2104 Worcester Street*	21	09	0844A	010	Warner Street, Inc
2102 Oler Street*	21	09	0844A	005	Warner Street, Inc
(Not Available)	21	09	0844A	005A	Mayor & City Council
(Not Available)	21	09	0844A	006	Mayor & City Council
(Not Available)	21	09	0844A	007	Mayor & City Council
(Not Available)	21	09	0844A	008/9	Mayor & City Council
(Not Available)	21	09	0840	014	Mayor & City Council
(Not Available)	21	09	0840	015	Mayor & City Council

* denotes a Warner Street Inc. Property, which was inaccessible during the performance of this assessment.

The eighteen parcels comprising the subject site total 21.01 acres of land. As indicated previously, the twelve developed parcels of project site occupy the majority of properties along the 1500 and 1600 block of Warner Street. The six waterfront properties are located adjacent and to the east of the developed parcels. Currently, eleven out the twelve subject site parcels are improved with warehouse structures totaling approximately 296,933 square feet (SF). Based on the MDAT Real Property information, these current onsite buildings were constructed at various times between 1919 and 2004.

All of the waterfront parcels are presently undeveloped, with the exception of an asphalt bike path and two associated bike/pedestrian bridges. Lots 5A, 6, 7, and 8 are located in an irregular, triangle-shaped cluster adjacent to and south of South Eutaw Street, and are accessed via Oler Street. Lots 14 and 15 are horseshoe-shaped, and are located southwest of Lots 5A, 6, 7, and 8. These properties are accessed via Haines Street. Lots 14 and 15 are topographically separated from Lots 5A, 6, 7, and 8 by an engineered channel of the Middle Branch of the Patapsco River; however, a bike/pedestrian bridge connects Lots 14 and 15 to the other lots associated with the subject property. The asphalt-paved bike path traverses all the lots comprising the waterfront portion of the subject site.

The subject site is positioned within a densely-populated urban area, consisting primarily of commercial and light industrial properties. Adjacent properties will be described in more detail in Section 2.6 of this report. Figure 2 in Appendix A illustrates the locations of the parcels comprising the subject site.

2.2 Current Uses of the Property

The subject site is currently used for recreation and commercial / industrial purposes. Under the management of Second Chance, Inc. (SCI), three of the 18 subject site parcels are currently utilized for commercial warehousing and storage of architectural antiques and salvage building materials. These include 1501 and 1645 Warner St., and 2119 Haines St.

The Maryland Chemical Corporation (MDCHEM) uses another three of the parcels for chemical warehousing and distribution activities. These parcels include: 1501, 1525, and 1551 Russell St. Baltimore Renovation Inc. utilizes 2102 Oler Street for the storage of construction equipment and supplies. 2110 Haines Street is currently utilized as a Greyhound Bus terminal. Four additional parcels are currently improved with vacant warehouse structures; these include: 1601, 1629, 1633 Warner St., and 2104 Worchester St. Some of these buildings (or portions of buildings) are presently in a deteriorated condition. The six waterfront properties are unoccupied and consist of undeveloped land traversed by an asphalt paved bike path.

3.0 HISTORIC DOCUMENT SUMMARY

As stated previously, KCI has recently completed two (2) Phase I ESA reports for the subject site. Summaries of these assessments are provided in the following report sections. Please refer to Figure 3 (REC Location Map), in Appendix A of this report for a map summarizing the locations of identified RECs and potential sources of contamination at the project site.

3.1 Phase I ESA – 12 "Business" Parcels (KCI)

KCI recently prepared a Phase I Environmental Site Assessment for Gateway South Redevelopment Properties, titled "12 Parcels in Eastern Carroll-Camden Industrial Area", and dated May 7, 2007. This Phase I ESA was performed for the twelve "business parcels" of the subject site, and was completed to support the subject site's entry into the Maryland Department of the Environment's (MDE's) Voluntary

Cleanup Program (VCP), and to help facilitate the future redevelopment of the site. A total of seven (7) "Recognized Environmental Conditions" (RECs) were identified during the completion of KCI's assessment. These included:

1. An abandoned underground storage tank (UST) was identified on the 2102 Oler Street property. The tank is more than 55 years old and is not being actively managed.

2. Contaminants, including heavy metals and polycyclic aromatic hydrocarbon (PAH) compounds, have been documented in soils and groundwater at the 2110 Haines Street property.

3. Records indicate that trichloroethene and its daughter compounds (cis-1,2 dichloroethene and vinyl chloride) are present in the groundwater beneath the 1551 Russell Street property.

4. Two (2) USTs were apparently abandoned in place at the 1501 Russell Street property. Information in MDE files indicated that a release of petroleum was identified in association with at least one of the tanks.

5. Regulatory database records indicated that historically, chlorinated solvents were stored in USTs at the 1601 Warner Street property, and that a release of these solvents occurred.

6. KCI identified a potential undocumented UST within the warehouse at 1501 Warner Street. If present, it is likely the UST is relatively old and releases may have occurred from the tank.

7. KCI observed approximately 145 drums within the warehouse at 1501 Warner Street. The drums apparently contain ethylene glycol, windshield wiper fluid and deck and siding stain. Some of the drums are highly corroded and could release their contents at any time.

In addition to the Recognized Environmental Conditions listed above, four (4) data gaps were identified during the assessment. ASTM defines a data gap as a "lack or inability to obtain information via the practice despite good faith efforts by the environmental professional to gather such information". These are listed as follows:

1. Several of the twelve "business parcels", including 1601, 1629, 1633 and 1645 Warner Street; 1501 and 1525 Russell Street; and, 2104 Worcester Street have been used for manufacturing purposes beginning as early as 1890. These historic industrial operations could have resulted in releases of chemicals and/or wastes soils and/or groundwater at these sites. However, during the Phase I ESA KCI did not identify previous environmental data for these properties that would clarify whether such impacts have occurred.

2. KCI identified surface features at 1629 and 1645 Warner Street that may or may not be associated with underground storage tanks (USTs). None of the research or interviews conducted as part of KCI's assessment clarified whether or not USTs are actually located at these properties.

3. KCI identified three (3) groundwater monitoring wells in the vicinity of 1551 Russell Street. KCI was unable to definitively identify the reason for the installation of these wells or the date they were installed.

4. KCI did not identify the historic location of the USTs that reportedly were used to store chlorinated solvents at the 1601 Warner Street property.

During the review of regulatory databases, KCI identified eight (8) off-site properties that appeared to be the most likely to represent environmental concerns with regard to the twelve "business parcels". In general, these were topographically upgradient sites located relatively close to the subject site, with reported leaking underground storage tanks and/or documented contamination. In summary, these included the Bayard Street Station; the Valspar Plant; the Shell Station at 1712 Russell Street; the Public Storage, Inc. facility at 1415 Russell Street; the Bavar Property at 1530 Russell Street; the Lenmar, Inc. site at 1547 Ridgely Street; the Ilex Woodworking site at 1700 Ridgely Street; and, the former Waterford Caseworks site at 1809 Bayard Street.

3.2 Phase I ESA – Six "Waterfront" Parcels (KCI)

KCI recently prepared a Phase I Environmental Site Assessment for the Gateway South Redevelopment Properties titled "6 Waterfront Parcels in Eastern Carroll-Camden Industrial Area", dated June 7, 2007. This Phase I ESA was completed to support the subject site's entry into the Maryland Department of the Environment's (MDE's) Voluntary Cleanup Program (VCP), and to help facilitate the future redevelopment of the site. A summary of the major findings from this assessment is provided below.

One (1) Recognized Environmental Condition (REC) was identified in connection with the subject site during the completion of the Phase I ESA. Specifically, polycyclic aromatic hydrocarbons (PAHs) and heavy metals had been documented at concentrations exceeding relevant human health standards in the top six feet of soils at the subject site. KCI concluded that the reported presence of elevated levels of PAH compounds and heavy metals at the subject site represent a REC.

In addition to the Recognized Environmental Condition described above, one significant data gap was identified during the Phase I ESA. Specifically, concentrations of chlorinated solvents had been documented in the groundwater at the 1601 Warner Street and 1551 Russell Street properties, both of which are located directly upgradient from the "waterfront" parcels. In addition, current and/or historic petroleum underground storage tanks have been reported at several adjacent/upgradient properties. Further, KCI's review of physical setting conditions suggested that the six "waterfront" parcels are a likely receptor for contaminated groundwater migrating from these upgradient properties. However, it appeared that previous assessments conducted at the subject site focused on PAH compounds and metals, rather than chlorinated solvents or petroleum compounds. Therefore, KCI found no data concerning the potential presence of chlorinated solvents and/or petroleum compounds in the groundwater and subsurface soils at the subject site. KCI concluded that this lack of data represented a data gap.

4.0 PHYSICAL SETTING

4.1 Regional Geology

According to the Maryland Geologic Survey; Geologic Maps of Maryland, Baltimore County (1968), the subject site is situated near the Fall Line, which is generalized boundary between the Piedmont Physiographic Province and the Coastal Plain Physiographic Province.

In areas near the Fall Line, Coastal Plain sediments are typically found in thin layers overlying the older geologic formations associated with the Piedmont. The Coastal Plain is characterized by unconsolidated sediments deposited during successive periods of fluctuating sea level and moving shorelines. The

sediments of the Coastal Plain dip eastward at a low angle, generally less than one degree, and range in age from Cretaceous to Quaternary. The younger formations crop out successively to the southeast across Southern Maryland and the Eastern Shore. A thin layer of Quaternary gravel and sand covers the older formations throughout much of the area. Mineral resources of the Coastal Plain are chiefly sand, gravel, and clay. Small deposits of iron ore are of historical interest. Plentiful supplies of ground water are available from a number of aquifers throughout much of this region.

The Piedmont Physiographic Province is an area underlain by ancient hard, crystalline igneous and metamorphic rock types extending from the inner edge of the Coastal Plain westward to Catoctin Mountain, the eastern boundary of the Blue Ridge Province. Bedrock in the eastern part of the Piedmont consists of schist, gneiss, gabbro, and other highly metamorphosed sedimentary and igneous rocks of probable volcanic origin. In several places these rocks have been intruded by granitic plutons and pegmatites. Several domal uplifts of Precambrian gneiss mantled with quartzite, marble, and schist are present in Baltimore County and in parts of adjacent counties.

The site overlies the eastern mapped (upper) edge of the Cretaceous Patuxent Formation (MGS, 1985). The Patuxent Formation is composed chiefly of unconsolidated gravel and sand intebedded with lenses of silty clay. The upper portion of the Patuxent Formation, mapped directly beneath the subject site, consists predominantly of fine sand and silty clay. The Patuxent Formation ranges from 50 to 250 feet in thickness in the area and directly overlies bedrock.

The Patuxent Formation was deposited in a continental environment. The coarse-grained strata characteristic of the lower portion of the formation were likely deposited in a braided stream environment, while the finer-grained strata common in the upper portion of the formation were likely deposited in a meandering stream environment. In the upper portion of the Patuxent Formation, the fine sands were likely deposited in meandering stream channels while the silts and clays were likely deposited in the adjacent flood plain environment.

4.2 Local Geology

Boring logs for the site reveal that most of the surficial deposits are primarily fill materials, with much of the fill consisting of debris. Fills up to 20 feet thick (the maximum depth of the borings) were recorded during the site investigation. Fill thicknesses appear to increase towards the water (i.e. towards the east), although many borings did not encounter the bottom of the fill layer. Along with soil, fill types included brick, glass, wood, plastics, coal, concrete, shells, and cinders. These debris fills may have been deposited as part of the cleanup from the Baltimore Fire of 1904. Where encountered, the soils underlying the fill materials consist largely of silty sand, clayey sand, and clay, with varying amounts of gravel. These descriptions are consistent with the MGS description of the upper Patuxent Formation.

With regard to ground water flow in the underlying unconfined shallow aquifer, ground water flow typically occurs from the higher to lower elevations, discharging to local surface water bodies. However, due to the subordinate occurrences of less pervious materials, the potential exists for artesian conditions, confined flow and/or perched water tables in some localities. Further, in urban environments, local groundwater conditions may be impacted by a variety of anthropogenic features such as utilities, stream rechanneling, cut and fill features, dewatering, industrial groundwater use, and spatially variable recharge due to pavement and stormwater management features. Without specific ground water data, determination of the actual ground water flow direction beneath the study area is highly subjective. However, based on an assumption of unconfined conditions and the local topography, shallow ground water beneath the project site most likely flows in a general southeasterly direction toward the Middle Branch.

Static water levels were not obtained during this investigation. Groundwater in test borings was encountered as shallow as 4 feet below grade and as deep as 16 feet below grade. Based on the site elevation of roughly 10 feet above sea level, a depth to groundwater of 16 feet is not likely. Typical depth to groundwater was 7 to 8 feet below grade, although this will vary across the site.

5.0 SUBSURFACE UTILITY AND FEATURE INVESTIGATION

Prior to the initiation of subsurface investigation performed as part of this assessment, KCI requested a utility mark out from Miss Utility of Maryland. Additionally, KCI performed a geophysical survey of representative areas across the project site in order to identify and/or confirm the locations of underground storage tanks (USTs).

5.1 Site Utility Investigation

Prior to conducting any subsurface drilling activities, KCI submitted utility location and mark out requests to Miss Utility of Maryland. Miss Utility of Maryland then coordinated with local utility companies to have all existing utilities at the project site located and marked. Of noticeable mention is a 24" high pressure natural gas main that travels down the center of Warner St. for nearly the entire length pf the project site. Reportedly this natural gas main supplies natural gas to the Baltimore RESCO waste-to-energy plant. Baltimore Gas and Electric (BGE) had requested that they be notified at least 24-hours in advance of any subsurface work that is to occur within 10-feet of this natural gas main (410-291-4900).

5.2 Geophysical Survey

KCI's subcontractor Enviroscan, Inc. (Enviroscan) performed a geophysical survey of selected portions of the project site in order to detect and delineate underground storage tanks. Originally KCI intended to perform the geophysical survey at five (5) locations across the project site. However, due to access restrictions the geophysical survey was not performed at 1501, 1601, and 1629 Warner St. Once access to these properties is granted, KCI can complete the geophysical survey and submit the findings under separate cover.

The intent of KCI's geophysical survey was to focus on the properties where KCI identified potential evidence of USTs during the Phase I ESA, but for which no records of USTs were identified; and to investigate those properties where there were records of historical USTs, but where no current visual or anecdotal evidence of USTs was identified during the Phase I ESA site reconnaissance. Table 5.1 below illustrates all five of the locations at which the geophysical surveys were originally proposed. It should be noted that the USTs at 1551 Russell St. were reportedly removed, and the location of the undocumented USTs identified at 2102 Oler St. is obvious based on observable surface features.

Table 5-1 - Properties to be Investigated via Geophysical Techniques

Street Address	Current or Historic UST Systems	Status	Comments
1501 Russell Street	1 – 7,000 gallon Gasoline UST 1 – 3,000 gallon Heating Oil UST	Abandoned In Place	Records suggest petroleum impacts identified in tank field.
1501 Warner Street	Unknown	Unknown	Vent and fuel lines disappear into concrete floor – likely UST location.
1601 Warner Street	USTs for chlorinated solvent storage (number and size unknown)	Unknown	USTs and historic release of solvents reported on CERCLIS.
1629 Warner Street	Unknown	Unknown	Possible evidence of USTs identified during reconnaissance

Table 5-1 - Properties to be Investigated via Geophysical Techniques

Street Address	Current or Historic UST Systems	Status	Comments
1645 Warner Street	Unknown	Unknown	Possible evidence of USTs identified during reconnaissance

5.2.1 Geophysical Survey Methodologies

KCI's subcontractor, Enviroscan, Inc. performed the geophysical survey under the direction of KCI field staff. The geophysical survey was conducted utilizing a Fisher TW-6 electromagnetic (EM) Instrument and Geophysical Survey Systems, Inc. (GSSI) Subsurface Interface Radar (SIR)-2000 ground penetrating radar (GPR) instrument.

The Fisher TW-6 deep-focused EM metal detector identifies any electrically conductive materials by creating an electromagnetic field with a transmitting coil. A receiving coil and a fixed separation form the transmitter measures the field strength. As the instrument is swept along the ground surface, subsurface conductive bodies distort the transmitted field. The change in field strength is sensed by the receiver, setting off an audible alarm. The TW-6 EM instrument employed for this survey can normally detect conductive mass equivalent to a ¾ inch pipe to a depth of five (5) feet, and a ten (10) inch pipe to a depth of fifteen (15) feet.

All accessible portions of survey area and areas where metallic anomalies were detected with the TW-6, were subsequently scanned using the Geophysical Survey Systems (GSSI) Subsurface Interface Radar (SIR)-2000 GPR. The system also has a digital control unit with a liquid crystal display, internal hard drive, and a 400-megahertz scanning antenna. The GSSI SIR-2000 GPR system produces cross-sectional images of subsurface features and layers by continuously emitting pulses of radar-frequency energy from a scanning antenna as it is towed along the survey profile. The radar pulses are reflected by interfaces between materials with differing dielectric properties. The reflections return to the antenna and are displayed on video monitors as a continuous cross sections in real time. Since the electrical properties of metallic tanks, pipes, and buried debris are distinctly different from soil and backfill materials, metallic targets produce dramatic and characteristic reflections. Fiberglass, plastic, concrete, and terra-cotta targets as well as subsurface voids, rock surfaces, soil type changes, and concentrations of many non-metallic debris also produce recognizable, but less dramatic, reflections.

5.2.2 Geophysical Survey Results

1501 Russell St.

The geophysical survey showed the presence of one anomalous area at 1501 Russell Street indicative of a UST. The GPR detected high-amplitude, parabolic reflectors typically associated with USTs within the anomalous area, as well as elevated TW-6 anomalies indicative of large buried metallic objects. The anomalous area is located beneath the rear sidewalk of the 1501 Russell Street building, approximately 50 feet west of the intersection of Warner Street and Worcester Street. Both a fill port and vent pipe were observed immediately adjacent to this suspected UST. The orientation and style of the fill port and vent pipe are representative of such hardware typically utilized for heating oil USTs. This corresponds to MDE records which indicate that one of the abandoned USTs at this facility was a 3,000-gallon heating oil tank. It is likely that the identified anomalous area corresponds to MDE registered, 3,000-gallon, abandoned heating oil UST located at 1501 Russell Street.

1645 Warner St.

GPR scanning of the courtyard entrance of 1645 Warner Street, specifically within the area of the observed of 2" x 2" access panel, did not reveal anomalies indicative of USTs. With difficulty, KCI removed the 2" x 2"access panel, noting that the vault contained an historic water meter. The water meter was in a state of disrepair and did not appear to be functional. KCI concludes that no USTs appear to be present at this location.

6.0 MULTIMEDIA SAMPLING AND ANALYSIS METHODS

As part of this investigation, KCI performed surface and subsurface soil sampling, groundwater sampling, surface water sampling, sediment sampling and soil gas sampling at various pre-determined locations across the project site. However, in some cases sample locations were moved due to access issues discussed previously. A sample location map illustrating KCI's sample locations is provided as Figure 4 in Appendix A of this report.

6.1 Soil Sampling

KCI's drilling subcontractor, Tidewater, Inc. of Columbia, Maryland, advanced a total of twenty-six (26) borings across the project site under the supervision of KCI field personnel. This work was completed between September 25 and September 27, 2007. The boring locations were chosen to further investigate environmental concerns discovered during the Phase I ESA, and to gather subsurface environmental data to help support the entry of the subject site into the Maryland VCP. In many instances, boring locations were chosen due to their proximity to the existing underground storage tanks (USTs), or due to the need to further investigate documented historic releases resulting in adverse impacts to soil and groundwater. Each boring was advanced to either eight (8) feet or twenty (20) feet below the existing ground surface (bgs), with the exception of Boring B-10 which was advanced to a depth of sixteen (16) feet bgs. In total, eleven (11) of the twenty-six borings were "deep" borings (i.e., advanced to depths of 16' – 20' bgs). These deeper borings were advanced to accurately catalog the surface geologic conditions across the project site, and collect deeper soil samples from areas near existing USTs or other features of concern.

Every attempt was made to advance the borings and collect samples from properties comprising the project site. However, as previously stated (Section 1.3) KCI did not have access to the six (6) properties owned by Warner Street Inc. at the time of this investigation. However, KCI attempted to advance borings and collect samples as close to these properties as possible. Typically, these samples were collected from the nearest accessible public right-of-way. Please refer to Figure 4 (Sample Location Map) in Appendix A of this report for additional details regarding boring locations.

The subsurface exploration was performed utilizing Geoprobe® equipment mounted on a rubber-tire Bobcat. The test probes were advanced utilizing 2-inch inside diameter probe rods and a hydraulically driven percussion hammer. Sampling was performed at specified intervals utilizing a macrocore sampler with a 48-inch clean plastic liner dedicated to each sample interval.

After the sampler was recovered from the specific sampling interval, the liner containing the soil column was removed to permit visual classification of the subsoils and collection of representative samples for field screening and laboratory testing. Soil samples were collected on two (2) foot intervals throughout each of the sampling columns for each boring. Each soil sample was placed in a dedicated zip-loc style bag, labeled, and placed on ice. Additionally, a small aliquot from each sample interval was collected and placed in a dedicated zip-loc style bag, labeled, and allowed to volatilize for approximately 10 minutes.

Headspace analysis was performed on each two-foot soil interval using a hand-held, Mini Rae 2000 photoionization detector (PID). Headspace analysis was performed as a field screening procedure to estimate the amount of volatile organic compounds (VOCs) in specific strata of soil. PID readings are recorded on the soil boring logs located in Appendix B.

In general, one surface (0-2') and one subsurface (4-6') soil sample was collected from each boring location. However, based on soil recovery and field conditions, the sample collection depths may have been altered. Soils exhibiting elevated PID readings or evidence of impact (i.e. discoloration, staining, and/or odors) were collected and submitted to the fixed laboratory for further analysis. In instances where no elevated PID readings were encountered and no obvious signs of impact were detected, soil samples were collected and submitted at the discretion of field personnel. Table 6-1 below summarizes the location and depth at which the subsurface soil samples were collected. Information regarding quality control and quality assurance samples is located in Section 6.7.

Following field headspace screening of the soils, samples were placed in dedicated, laboratory-supplied four-ounce jars with Teflon-lined lids, labeled, and placed on ice. Once sampling was complete, the laboratory chain-of-custody was completed and the samples were delivered to the contract laboratory.

A total of 55 soil samples including three (3) duplicate (QA/QC) samples were submitted to the contract laboratory for analysis. It should be noted that all field-sampling procedures included proper decontamination between borings to prevent down-hole and cross contamination. Upon completion of the probes and sampling operations, the probe holes were backfilled using the soil recovered through the sampling procedures and bentonite chips. Borings advanced in asphalt covered areas were also sealed with asphalt cold-patch.

Table 6-1 Summary of Surface and Subsurface Soil Samples

Boring	Boring Depth (bgs)	Surface (SS) Sample Depth (bgs)	Subsurface (SB) Sample Depth (bgs)	Additional Sample Depths (bgs)	Sample Date
B-01	20'	0-2'	4-6'		9/26/07
B-02	20'	3-4'	4-6'		9/27/07
B-03	20'	0-2'	4-8'		9/26/07
B-04	8'	1-3'	4-6'		9/26/07
B-05	20'	3-4'	4-6'	11'	9/26/07
B-06	20'	Not Sampled	10-12'		9/26/07
B-07	8'	0-2'	4-5'		9/27/07
B-08	8'	1-3'	4-6'		9/27/07
B-09	8'	0-2'	3-4'		9/27/07
B-10	16'	3'	6-7'	14'	9/25/07
B-11	8'	Not Sampled	Not Sampled		9/25/07
B-12	8'	0-2'	4-6'		9/27/07
B-13	8'	1-2'	4-5'		9/27/07
B-14	8'	0-2'	4-5'		9/27/07
B-15	8'	0-2'	6-7'		9/25/07
B-16	8'	0-2'	4-5'		9/25/07

Table 6-1 Summary of Surface and Subsurface Soil Samples

Boring	Boring Depth (bgs)	Surface (SS) Sample Depth (bgs)	Subsurface (SB) Sample Depth (bgs)	Additional Sample Depths (bgs)	Sample Date
B-17	20'	0-2'	4-6'		9/25/07
B-18	8'	0-1'	4-5'		9/27/07
B-19	20'	0-2'	4-5'		9/27/07
B-20	8'	0-2'	4-6'		9/25/07
B-21	20'	0-2'	4-5'	14'	9/25/07
B-22	8'	0-2'	4-5'		9/25/07
B-23	8'	0-2'	4-5'		9/25/07
B-24	20'	0-4'	4-8'		9/25/07
B-25	8'	0-2'	4-6'		9/25/07
B-26	20'	2-4'	8-10'		9/27/07

Table Notes: Sample numbers correspond to boring numbers (Ex: sample SS-02 was collected from boring B-02 at a depth of 3-4' bgs.)

6.2 Groundwater Sampling

KCI collected ten (10) groundwater samples including one duplicate (QA/QC) sample. Following advancement of a boring at which groundwater was to be collected, a PVC piezometer was inserted into the borehole. One-quarter inch (¼") diameter dedicated polyethylene tubing was inserted into the PVC and a peristaltic pump was used to retrieve groundwater via the inert polyethylene tubing. The groundwater was pumped directly into each of the sample containers, with particular care being taken to eliminate air bubbles within the containers that might distort the analysis results. The samples were then assigned unique sample identifiers, placed on ice in coolers provided by the laboratory and delivered to the contract laboratory for analysis. Disposable nitrile gloves were worn at all times to avoid cross contamination of the samples. Table 6-2 below summarizes the locations at which the groundwater samples were collected. Information regarding quality control and quality assurance samples is located in Section 6.7.

Table 6-2 - Summary of Groundwater Samples

Sample ID	Boring Location	Approx. Depth to Groundwater (bgs)	Sample Date	Sample Time
GW-01	B-01	16 feet	9/26/07	12:05
GW-02	B-05	7.5 feet	9/26/07	15:50
GW-03	B-06	8 feet	9/26/07	10:15
GW-04	B-17	8 feet	9/25/07	1600
GW-05	B-19	16 feet	9/27/07	12:45
GW-06	B-24	17 feet	9/26/07	14:20
GW-07	B-02	12 feet	9/27/07	09:45
GW-08	B-03	8 feet	9/26/07	13:30
GW-09	B-26	8 feet	9/27/07	15:15
GW-DUP01	B-24	17 feet	9/26/07	14:30

6.3 Sediment and Surface Water Sampling

KCI collected sediment and surface water samples from the Middle Branch and docking slips located adjacent to the subject site. The specific sampling locations are illustrated on Figure 4 in Appendix A of this report. All surface water samples were collected using a dedicated, 1-liter amber bottle, with no preservative, supplied by the contract laboratory. The clean 1-liter amber bottle was dipped into the surface water and allowed to fill, the collected water was then transferred into the appropriate laboratory-supplied sampling containers, labeled, logged into the field notebook and laboratory Chain-of-Custody form, and placed into coolers on ice for transport to the fixed laboratory. A new 1-liter, unpreserved amber bottle was used for each sample location.

All sediment samples were placed directly into the laboratory-supplied sampling containers, labeled, logged into the field notebook and laboratory Chain-of-Custody form, and placed into coolers on ice for transport to the fixed laboratory. Disposable nitrile gloves were worn at all times to avoid cross contamination of the samples.

6.4 Soil Gas Sampling

KCI collected ten (10) soil gas samples from the subsurface environment, just above the groundwater table. The soil gas sampling occurred on September 28, 2007, the locations of the soil gas sampling points (SG-01 – SG-10) are illustrated on Figure 4 in Appendix A of this report. The Geoprobe unit was used to conduct the soil gas survey. The soil gas samples were retrieved from the subsurface by driving one-inch diameter rods equipped with a point holder and disposable point to the target sampling depth. The rods were then retracted, opening an intake cavity in the point and creating an annular space from which to draw gas into the rods. A threaded pin was then attached to polyethylene tubing, lowered down the rod, and screwed into the point holder. This procedure ensured that the gas sample was drawn from the bottom of the rod. A peristaltic pump was then used to draw the soil gas samples into the sample containers.

The soil gas samples were collected in 250 ml glass sample bulbs. After purging ambient air from the polyethylene tubing leading down the boring to the soil gas sampler, the soil gas was pumped from the subsurface annular space into the glass bulbs. The containers were then labeled, placed into a cooler on ice, and submitted for analysis. Soil gas samples were analyzed for total Flame Ionization Detector (FID) range volatile organic compounds (VOCs) via EPA Method 8260.

6.5 Field Screening

As indicated previously, field screening of surface and subsurface soils was conducted with a handheld Mini Rae 2000 photo ionization detector (PID). Headspace analysis was performed as a field screening procedure to estimate the amount of volatile organic compounds (VOCs) in specific strata of soil. At the beginning of each day the PID was calibrated in the field, prior to commencement of the day's activities. The PID was first zeroed using fresh air at the project site. Once zeroed, the PID was connected to 100 ppm span calibration gas. The PID was then calibrated to 100 ppm. All calibration procedures were conducted in accordance with manufacturer's specifications. PID readings were obtained during this assessment are recorded on the soil boring logs located in Appendix B.

6.6 Decontamination

Proper decontamination of sampling equipment and field instruments is critical to prevent accidental cross-contamination of samples. A decontamination area was designated for each sampling activity and equipped

with the necessary decontamination equipment (wash buckets, brushes, spray bottles, potable water, distilled water, towels, etc.) to adequately decontaminate the equipment being used.

All non-dedicated sampling equipment was decontaminated as described below. Decontamination procedures for non-dedicated sampling devices such as stainless steel screen point groundwater sampler, and the tip of the DPT probe were followed after each sample was collected. Decontamination procedures were as follows:

- Tap water rinse and Alconox soap wash and brush scrub;
- Nitric or Hydrochloric acid rinse, as necessary;
- Rinse with distilled water and de-ionized water;
- Methanol or hexane rinse, as necessary; and
- Air dry.

6.7 QA/QC Samples

For this assessment, KCI collected a variety of field QA/QC samples to ensure the quality of the data and increase the reliability of the results. The field QA/QC samples were collected in accordance with the City's QAPP and include the follow

1. Three (3) Soil Field Duplicate samples
2. One (1) Groundwater Field Duplicate sample
3. One (1) Temperature Blank per sample cooler
4. Two (2) Field Blank samples
5. One (1) Trip Blank sample
6. Two (2) Equipment Rinsate Blank samples

One soil duplicate sample was collected during each day of sampling, for a total of three duplicate soil samples. Additionally, one (1) groundwater duplicate was also collected. The duplicate samples were collected at the same time as the original samples, utilizing identical methods. The duplicate samples were analyzed for the same parameters as the sample being duplicated.

One (1) trip blank and two (2) field blank samples were also prepared and submitted for analysis. The field blank samples were collected by pouring distilled water into the appropriate sample containers upon arriving at the site and prior to commencement of drilling operations. The trip blank sample was provided by the contract laboratory. The trip blank and field blank samples were analyzed for VOCs only.

Two (2) rinsate blank samples were collected and analyzed to verify proper equipment decontamination between soil intervals and borings. The rinsate blanks were analyzed for the same parameters as the sample collected immediately prior to the decontamination of the sampling equipment.

All QA/QC samples were placed directly into the laboratory-supplied sampling containers, labeled, logged into the field notebook and laboratory Chain-of-Custody form, and placed into coolers on ice for transport to the fixed laboratory. Disposable nitrile gloves were worn at all times to avoid cross contamination of the samples. Table 6-3 below summarizes the QA/QC samples collected as part of this assessment.

A temperature blank was also placed in each of the coolers submitted to the laboratory. The temperature blanks were prepared by the laboratory and were used to verify the temperature of the coolers/ samples at the time a delivery.

Table 6-3 - Summary of QA/QC Samples

Sample ID	Boring Location	Sample Date	Sample Time
SB-DUP01	B-01 (4-6')	9/26/07	11:25
SB-DUP02	B-24 (4-8')	9/25/07	13:20
SS-DUP01	B-02 (3-4')	9/27/07	09:10
GW-DUP01	B-24	9/26/07	14:30
TB-01	--	9/26/07	--
FB-01	--	9/26/07	08:50
FB-02	--	9/27/07	09:20
RB-01	B-05	9/26/07	16:50
RB-02	B-18	9/27/07	11:20

6.8 Sample Handling and Documentation

All soil, sediment, groundwater, and surface water samples were placed in clean containers provided by the contract laboratory, placed on ice, and delivered promptly. Except for soil gas samples, the contract laboratory for this assessment was Microbac Laboratories, Inc. of Baltimore, Maryland. All appropriate chain-of-custody procedures were utilized to track the samples from collection to final disposition. Copies of the chain-of-custody documentation as well as the laboratory certificates of analysis are included as Appendix C of this report.

Soil gas samples were collected in laboratory-supplied glass bulbs. All appropriate chain-of-custody procedures were utilized to track the samples from collection to final disposition. Analytical Laboratory Services, Inc. of Middletown, Pennsylvania was the laboratory utilized to analyze the soil gas samples. Copies of the chain-of-custody documentation as well as the laboratory certificates of analysis are included as Appendix D of this report.

7.0 LABORATORY ANALYSIS

7.1 Laboratory Information and Analytical Methods

Analyses of all soil, groundwater, surface water, and sediment samples were performed by: Microbac Laboratories, Inc. 2101 Van Deman Street, Baltimore, Maryland 21224 (410-633-1800). Analyses of soil gas samples were performed by: Analytical Laboratory Services, Inc. 34 Dogwood Lane, Middletown, Pennsylvania 17057 (717-944-5541).

For this assessment, KCI typically specified that samples be analyzed using the analytical methods necessary to meet MDE Voluntary Cleanup Program requirements. Care was taken to ensure that detection limits were low enough for meaningful comparison to the relevant MDE cleanup standards. Table 7-1 provides a breakdown of the sample types and analytical parameters utilized for this assessment. Table 7-2 summarizes the analytical methods, containers, preservation, and holding times that

were be used. Note that the soil gas samples were collected for screening purposes and were intended to assist decisions concerning the need for and/or scope of potential future investigations.

Table 7-1 - Analytical Summary

Sample	Boring/ Location	Matrix	VOCs	SVOCs/PAHs	Total PPL Metals	Dissolved PPL Metals	Cyanide	Pesticides	Herbicides	PCBs	TPH-GRO	TPH-DRO
Surface and Subsurface Soil Samples												
SS-01	B-1 (0-2')	Surface Soil		X	X			X	X	X	X	X
SB-01	B-1 (4-6')	Subsurface Soil	X	X	X			X	X	X	X	X
SS-02	B-2 (3-4')	Surface Soil		X	X							
SB-02	B-2 (4-6')	Subsurface Soil	X	X	X							
SS-03	B-3 (0-2')	Surface Soil		X	X							
SB-03	B-3 (4-8')	Subsurface Soil	X	X	X							
SS-04	B-4 (1-3')	Surface Soil		X	X			X	X	X		
SB-04	B-4 (4-6')	Subsurface Soil	X	X	X			X	X	X	X	X
SS-05	B-5 (3-4')	Surface Soil		X	X							
SB-05	B-5 (4-6')	Subsurface Soil	X	X	X							
SB-05B	B-5 (11')	Subsurface Soil									X	X
SS-06	Not Sampled	Not Sampled										
SB-06	B-6 (10-12')	Subsurface Soil	X	X	X							
SS-07	B-7 (0-2')	Surface Soil		X	X							
SB-07	B-7 (4-5')	Subsurface Soil	X	X	X							
SS-08	B-8 (1-3')	Surface Soil		X	X			X	X	X	X	X
SB-08	B-8 (4-6')	Subsurface Soil	X	X	X			X	X	X	X	X
SS-09	B-9 (0-2')	Surface Soil		X	X							
SB-09	B-9 (3-4')	Subsurface Soil	X	X	X							
SS-10	B-10 (3')	Surface Soil		X	X							
SB-10	B-10 (6-7')	Subsurface Soil	X	X	X							
SB-10B	B-10 (14')	Subsurface Soil									X	X
SS-11	Not Sampled	Not Sampled										
SB-11	Not Sampled	Not Sampled										
SS-12	B-12 (0-2')	Surface Soil		X	X							
SB-12	B-12 (4-6')	Subsurface Soil	X	X	X							
SS-13	B-13 (1-2')	Surface Soil		X	X							
SB-13	B-13 (4-5')	Subsurface Soil	X	X	X							
SS-14	B-14 (0-2')	Surface Soil		X	X							
SB-14	B-14 (4-5')	Subsurface Soil	X	X	X							
SS-15	B-15 (0-2')	Surface Soil		X	X							
SB-15	B-15 (6-7')	Subsurface Soil	X	X	X							

Table 7-1 - Analytical Summary

Sample	Boring/ Location	Matrix	VOCs	SVOCs/PAHs	Total PPL Metals	Dissolved PPL Metals	Cyanide	Pesticides	Herbicides	PCBs	TPH-GRO	TPH-DRO
SS-16	B-16 (0-2')	Surface Soil		X	X							
SB-16	B-16 (4-5')	Subsurface Soil	X	X	X							
SS-17	B-17 (0-2')	Surface Soil		X	X			X	X	X	X	X
SB-17	B-17 (4-6')	Subsurface Soil	X	X	X			X	X	X	X	X
SS-18	B-18 (0-1')	Surface Soil		X	X							
SB-18	B-18 (4-5')	Subsurface Soil	X	X	X							
SS-19	B-19 (0-2')	Surface Soil		X	X							
SB-19	B-19 (4-5')	Subsurface Soil	X	X	X							
SS-20	B-20 (0-2')	Surface Soil		X	X			X	X	X	X	X
SB-20	B-20 (4-6')	Subsurface Soil	X	X	X			X	X	X	X	X
SS-21	B-21 (0-2')	Surface Soil		X	X							
SB-21	B-21 (4-5')	Subsurface Soil	X	X	X							
SB-21B	B-21 (14')	Subsurface Soil						X	X	X	X	X
SS-22	B-22 (0-2')	Surface Soil		X	X							
SB-22	B-22 (4-5')	Subsurface Soil	X	X	X							
SS-23	B-23 (0-2')	Surface Soil		X	X							
SB-23	B-23 (4-5')	Subsurface Soil	X	X	X							
SS-24	B-24 (0-4')	Surface Soil		X	X							
SB-24	B-24 (4-8')	Subsurface Soil	X	X	X							
SS-25	B-25 (0-2')	Surface Soil		X	X							
SB-25	B-25 (4-6')	Subsurface Soil	X	X	X							
SS-26	B-26 (2-4')	Surface Soil		X	X							
SB-26	B-26 (8-10')	Subsurface Soil	X		X						X	X
		Groundwater Samples										
GW-01	B-01	Groundwater	X	X		X	X	X	X	X	X	X
GW-02	B-05	Groundwater	X	X		X	X	X	X	X	X	X
GW-03	B-06	Groundwater	X			X					X	X
GW-04	B-17	Groundwater	X	X		X	X	X	X	X	X	X
GW-05	B-19	Groundwater	X	X		X					X	X
GW-06	B-24	Groundwater	X			X						
GW-07	B-02	Groundwater	X	X		X	X	X	X	X	X	X
GW-08	B-03	Groundwater	X	X		X	X	X	X	X	X	X
GW-09	B-26	Groundwater	X								X	X
		Surface Water Sediment Samples										
SW-01	SW-01	Surface Water	X	X		X	X					

Table 7-1 - Analytical Summary

Sample	Boring/ Location	Matrix	VOCs	SVOCs/PAHs	Total PPL Metals	Dissolved PPL Metals	Cyanide	Pesticides	Herbicides	PCBs	TPH-GRO	TPH-DRO
SW-02	SW-02	Surface Water	X	X		X	X					
SW-03	SW-03	Surface Water	X	X		X	X					
SED-01	SW-01	Sediment	X	X	X					X		
SED-02	SW-02	Sediment	X	X	X					X		
SED-03	SW-03	Sediment	X	X	X					X		
		QA/QC Samples										
SB-DUP01	B-01 (4-6')	Subsurface Soil	X	X	X							
SB-DUP02	B-24 (4-8')	Subsurface Soil	X	X	X							
SS-DUP01	B-02 (3-4')	Surface Soil		X	X							
GW-DUP01	B-24	Groundwater	X			X						
TB-01	--	Water	X									
FB-01	--	Water	X									
FB-02	--	Water	X									
RB-01	B-05	Water	X	X		X						
RB-02	B-18	Water	X	X		X						
		Soil Gas Samples										
SG-01	SG-01	Soil Gas	X									
SG-02	SG-02	Soil Gas	X									
SG-03	SG-03	Soil Gas	X									
SG-04	SG-04	Soil Gas	X									
SG-05	SG-05	Soil Gas	X									
SG-06	SG-06	Soil Gas	X									
SG-07	SG-07	Soil Gas	X									
SG-08	SG-08	Soil Gas	X									
SG-09	SG-09	Soil Gas	X									
SG-10	SG-10	Soil Gas	X									

Notes:
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds; PAHs = Polycyclic Aromatic Hydrocarbons
PPL = Priority Pollutant List
PCBs = Polychlorinated Biphenyls
TPH-GRO = Total Petroleum Hydrocarbons, Gasoline Range Organics (C-6 to C-10)
TPH-DRO = Total Petroleum Hydrocarbons, Gasoline Range Organics (C-10 to C28)

Table 7-2 - Sample Containers, Preservatives, and Analytical Methods

Analysis	Method	Containers	Preservatives	Holding Time
Surface, Subsurface, and Sediment Soil Samples				
VOCs	EPA 8260B	Tared 40-ml VOA vial	Methanol, Cool 4° C	14 Days to Analysis
SVOCs / PAHs	EPA 8270C	4-oz Glass Jar, Teflon Liner	None, Cool 4° C	14 Days to Analysis
PPL Metals	EPA 6020	4-oz Glass Jar, Teflon Liner	None, Cool 4° C	180 Days to Analysis
PCBs / Pesticides	EPA 8081/ 8082	4-oz Glass Jar, Teflon Liner	None, Cool 4° C	14 Days to Analysis
Herbicides	EPA 8151	4-oz Glass Jar, Teflon Liner	None, Cool 4° C	14 Days to Analysis
TPH-GRO and DRO	EPA 8015M	4-oz Glass Jar, Teflon Liner	None, Cool 4° C	14 Days to Analysis
Groundwater and Surface Water Samples				
VOCs	EPA 8260	Two 40-ml VOA vials	HCL, pH<2, Cool 4° C	14 Days Analysis
SVOCs	EPA 8270C	1L Amber Glass Jar	None, Cool 4° C	7 Days to Extraction
Dissolved PPL Metals	EPA 6020	500 ml Plastic Container	HNO_3, pH<2, Cool 4° C	180 Days to Analysis[1]
Cyanide	EPA 9010	1-300 ml Plastic Bottle	NaOH, pH>12, Cool 4° C	14 Days Analysis
PCBs / Pesticides	EPA 8081/ 8082	1L Amber Glass Jar	None, Cool 4° C	7 Days to Extraction
Herbicides	EPA 8151	1L Amber Glass Jar	NaThio, Cool 4° C	7 Days to Extraction
TPH-GRO	EPA 8015M	Two 40-ml VOA vials	HCL, pH<2, Cool 4° C	14 Days Analysis
TPH-DRO	EPA 8015M	1L Amber Glass Jar	None, Cool 4° C	7 Days to Extraction

Note: [1] = Sample to be field - filtered prior to preserving with HNO_3

8.0 FIELD INVESTIGATION RESULTS

8.1 Analytical Results

Tables summarizing analytical results for the soil samples are presented in Tables A through W in Appendix E. Copies of laboratory certificates of analysis and chain of custody documentation are included in Appendix C and D.

The following discussion of analytical results includes comparisons to concentrations reported in the MDE Cleanup Standards for Soil and Groundwater, Update No. 1, 2001 (the "Cleanup Standards"). For contaminants in soil, site concentrations are compared to Cleanup Standards for Non-Residential Soils. However, future development of the "waterfront parcels" may include the development of a park. As a reference, KCI has included the MDE Cleanup Standards for Residential Soils in the Analytical Results Tables included in Appendix E. For groundwater, site concentrations are compared to Cleanup Standards for Type I and II Aquifers.

For sediment and surface water there are no MDE Cleanup Standards. As such, site concentrations were compared to EPA Region III Screening Benchmarks for Freshwater Sediment (August 2006) and Freshwater (July 2006), respectively.

For comparison purposes, the reported concentrations of soil gas were compared to the values presented in the EPA document *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) Table 2b: Target Indoor Air Concentration to Satisfy Both the Prescribed Risk Level and the Target Hazard Index.* As noted earlier, the collection and analytical methods used for soil gas during this investigation were directed toward a screening-level assessment of soil gas.

Note that as stated previously, sample numbers correspond to boring numbers (Ex: sample SS-02 was collected from boring B-02)

8.1.1 Soil Sample Analytical Results

KCI directed the laboratory to use the specific analytical methods needed to meet MDE Voluntary Cleanup Program requirements for soil samples collected during this assessment. Care was taken to ensure that instrument detection limits were low enough for meaningful comparison of the analytical results to relevant MDE cleanup standards. A total of 52 soil samples plus three (3) duplicate (QA/QC) samples were collected and analyzed for a variety of analytical parameters including: VOCs, SVOCs, TPH-GRO/DRO, PCBs, Priority Pollutant List metals, chlorinated herbicides, and pesticides. The following sections provide summaries of the findings from soil sample analysis for each of these analytical parameters. Soil sampling results were compared to MDE Clean-up Standards (CUS) for Non-residential soils.

Volatile Organic Compounds (VOCs)

A summary of the analytical results for VOC analysis can be found on Table A in Appendix E. VOC analysis was performed on deeper subsurface soil samples, collected from approximately four to 12 feet bgs. VOCs were only detected in nine (9) of the twenty-five (25) soil samples submitted for VOC analysis. A total of eight (8) VOCs were detected in the analyzed soil samples; these included acetone, carbon disulfide, methylene chloride, cis-1,2-dichloroethene, chloroform, benzene, trichloroethene, 2-hexanone, and tetrachloroethene. All detected concentrations of VOCs were below the MDE CUS for non-residential soils.

It should be noted that both acetone and methylene chloride are common laboratory contaminants. A review of analytical results from trip blanks and field blanks prepared and submitted as part of this investigation, revealed detectable concentrations of acetone and methylene chloride within the blanks. Based on these results it appears that the acetone and methylene chloride detected in soil samples are probably laboratory contaminants and are not necessarily indicative of actual on-site conditions.

Semi-Volatile Organic Compounds (SVOCs)

A summary of the analytical results for SVOC analysis can be found on Table B in Appendix E. SVOC analysis was performed on all of the surface and subsurface soil samples collected and submitted for analysis. SVOCs were detected in all but 16 of the 48 soil samples submitted for SVOC analysis. Moreover, a total of 22 SVOC compounds (and/or polycyclic aromatic hydrocarbons (PAHs), a subset of the SVOCs) were detected in the soil samples. These included naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, diethyl phthalate, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, butyl benzyl phthalate, 3,3-dichlorobenzidine, benzo(a)anthracene, chrysene, bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. Of these, the MDE CUS for non-residential soils was exceeded for five of the PAH analytes, including: benzo (a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene.

Benzo(a)anthracene was detected in two samples (SS-16 and SS-20) at concentrations which exceeded the MDE CUS for non-residential soils of 7,800 µg/kg. The detected concentrations in these two samples were 25,000 µg/kg and 9,500 µg/kg, respectively. Likewise, dibenz(a,h)anthracene was also detected in samples SS-16 and SS-20 at concentrations which exceeded the MDE CUS for non-residential soils of

780 µg/kg. The detected concentrations in these two samples were 4,400 µg/kg and 1,600 µg/kg, respectively.

Benzo(b)fluoranthene was detected in one sample (SS-16) at a concentration of 19,000 µg/kg, which exceeded the MDE CUS for non-residential soils of 7,800 µg/kg. Likewise, indeno(1,2,3-cd)pyrene was also detected in one sample (SS-16) at a concentration of 11,000 µg/kg, which exceeded the MDE CUS for non-residential soils of 7,800 µg/kg.

Benzo(a)pyrene was detected in twelve (12) samples at concentrations which exceeded the MDE CUS for non-residential soils (780 µg/kg). The concentrations of benzo(a)pyrene in these twelve (12) samples ranged from 850 µg/kg 22,000 µg/kg. In ten (10) of these twelve (12) samples, benzo(a)pyrene was the only SVOC analyte with concentrations exceeding the MDE CUS for non-residential soils. Concentrations of benzo(a)pyrene were detected at concentrations exceeding the MDE CUS in the following samples: SS-03, SB-03, SS-10, SS-16, SS-17, SS-18, SS-20, SB-21, SS-22, SB-22, SS-24, and SS-26. It should be noted that of the twelve (12) samples with SVOC analytes that exceeded the MDE CUS for non-residential soils, nine (9) of them were from surface soil samples collected at depths ranging from zero to four feet bgs. The remaining three samples were collected from depths ranging from four to eight feet bgs.

Total Petroleum Hydrocarbons (TPH)

A summary of the analytical results for TPH-GRO/DRO analysis can be found on Table C in Appendix E. TPH analysis was performed on soil samples collected from various locations across the project site. Several borings were advanced in the vicinity of known or suspected USTs or in close proximity to off-site properties with known or suspected petroleum impacts. A total of thirteen (13) soil samples were collected and submitted for TPH-GRO/DRO analysis. Of those thirteen (13) samples, detectable concentrations of TPH-GRO were identified in two (2) samples, SB-05B, and SB-26. Concentrations of TPH-GRO in samples SB-05B and SB-26 were 96 mg/kg and 2.4 mg/kg, respectively. Neither of these concentrations exceeded the MDE CUS for TPH-GRO of 620 mg/kg.

Detectable concentrations of TPH-DRO were identified in twelve (12) of the thirteen (13) samples. Concentrations of TPH-DRO in these twelve (12) samples ranged from 11.0 mg/kg to 14,000 mg/kg. Four (4) samples exceeded the MDE CUS for TPHDRO in non-residential soils; these included SB-05B (1,500 mg/kg), SS-17 (14,000mg/kg), SB-17 (710 mg/kg), and SB-21B (2,500 mg/kg).

Polychlorinated Biphenyls (PCBs)

A summary of the analytical results for PCB analysis can be found on Table D in Appendix E. PCB analysis was performed on surface (0-3' bgs) and subsurface (4-6' bgs) soil samples from selected boring locations. These included borings B-01, B-04, B-08, B-17 and B-20. Additionally, one supplemental sample (SB-21B) was collected at boring location B-21 at a depth of 14' bgs, due to the presence of discolored soils and petroleum odors. No detectable concentrations of PCBs were found in the surface or subsurface soils samples collected from borings B-01, B-04, B-08, B-17 and B-20. However, detectable concentrations of Aroclor 1242 and Aroclor 1254 were detected in sample SB-21B, collected from a depth of 14' bgs. The concentrations of Aroclor 1242 and Aroclor 1254 were reported as 1,400 µg/kg and 1,700 µg/kg, respectively. These concentrations were below the MDE CUS for non-residential soils of 2,900 µg/kg.

Priority Pollutant Metals

A summary of the analytical results for PPL metals analysis can be found on Table E in Appendix E. Total PPL metals analysis was performed on all of the surface and subsurface soil samples collected and submitted for analysis. Detectable concentrations of all thirteen (13) priority pollutant metals were found in each of the forty-nine (49) soil samples submitted for analysis. The MDE CUS for non-residential soils was exceeded for three specific metals, arsenic, lead, and mercury.

Detectable concentrations of arsenic were found in all but one (1) of the forty-nine (49) samples (i.e., SS-03). Arsenic was detected in forty (40) of the forty-nine (49) samples at concentrations which exceeded the MDE CUS for non-residential soils (3.8 mg/kg). The detected concentrations of arsenic in these forty (40) samples ranged from 4.1 mg/kg to 130 mg/kg.

Detectable concentrations of lead were found in each of the forty-nine (49) samples. Lead was detected in six (6) of the forty-nine (49) samples at concentrations which exceeded the MDE CUS for non-residential soils (400 mg/kg). These six samples included: SB-09, SB-12, SS-17, SS-20, SB-22, and SS-24. The detected concentrations of lead in these six (6) samples ranged from 440 mg/kg to 920 mg/kg.

Detectable concentrations of mercury were found in forty-five (45) of the forty-nine (49) samples. Moreover, mercury was detected in thirty-six (36) of the forty-nine (49) samples at concentrations which exceeded the MDE CUS for non-residential soils (0.12 mg/kg). The detected concentrations of mercury in these thirty-six (36) samples ranged from 0.13 mg/kg to 3.6 mg/kg.

Note that in accordance with Maryland VCP protocols, KCI has requested speciation of the mercury results in the two (2) soil samples having the highest mercury concentrations. At the time of the completion of this report, the results were not yet available from the laboratory. Once they become available, KCI will either add these results to the final version of this report, or (if necessary) forward them as an addendum.

Chlorinated Herbicides

A summary of the analytical results for Chlorinated Herbicides analysis can be found on Table F in Appendix E. Chlorinated herbicide analysis was performed on surface (0-3' bgs) and subsurface (4-6' bgs) soils samples from selected boring locations. These included borings B-01, B-04, B-08, B-17 and B-20. Additionally, one supplemental sample (SB-21B) was collected at boring location B-21. No detectable concentrations of chlorinated herbicides (2,4-D or 2,4,5-TP) were found in any of the analyzed samples.

Pesticides

A summary of the analytical results for Pesticides analysis can be found on Table G in Appendix E. Pesticide analysis was performed on surface (0-3' bgs) and subsurface (4-6' bgs) soils samples from selected boring locations. These included borings B-01, B-04, B-08, B-17 and B-20. Additionally, one supplemental sample (SB-21B) was collected at boring location B-21. No detectable concentrations of pesticides were found in any of the analyzed samples.

8.1.2 Groundwater Sample Analytical Results

A total of nine (9) groundwater samples plus one (1) duplicate (QA/QC) sample were collected and analyzed for a variety of analytical parameters including: VOCs, SVOCs, TPH-GRO/DRO, PCBs, Priority Pollutant metals (dissolved), chlorinated herbicides, pesticides, and cyanide. The sample

locations are illustrated on Figure 4 in Appendix A. The following sections provide summaries of the findings from groundwater sample analysis for each of the analytical parameters. Groundwater sampling results were compared to MDE Clean-up Standards (CUS) for Type I and II Aquifers.

Volatile Organic Compounds (VOCs)

A summary of the analytical results from the VOC analysis of groundwater samples can be found in Table H in Appendix E. VOC analysis was performed on nine (9) groundwater samples and one (1) duplicate groundwater sample. VOCs were detected in six (6) of the nine (9) groundwater samples submitted for VOC analysis. These samples included GW-01 (B-01), GW-02 (B-05), GW-04 (B-17), GW-07 (B-02), GW-08 (B-03), and GW-09 (B-26).

A total of twenty-one (21) VOC compounds were detected in the groundwater samples. These included: chloromethane, 1,1-dichloroethene, 1,1-dichloroethane, trichloroethene, trans-1,2-dichloroethene, cis-1,2-dichloroethene, chloroform, 1,1,1-trichloroethane, 4-methyl-2-pentanone, tetrachloroethane, benzene, MTBE, toluene, ethylbenzene, m,p-xylene, o-xylene, total xylenes, 1,4-dichlorobenzene, 1,2-dichlorobenzene, acetone, and methylene chloride. The relevant MDE CUS values for groundwater were exceeded for six analytes which include: chloromethane, trichloroethene, cis-1,2-dichloroethene, benzene, MTBE, and tetrachloroethene.

Chloromethane was detected in one (1) sample (GW-08) at a concentration of 2.2 µg/L, which exceeded the MDE CUS (2.1 µg/L). GW-08 was collected from boring B-03 advanced on the western portion of 1645 Warner St.

Trichloroethene (TCE) was detected in three (3) samples, GW-01 (B-01), GW-02 (B-05), and GW-09 (B-26), at concentrations which exceeded the MDE CUS (5.0 µg/L). The concentrations of TCE in these three samples were 16 µg/L, 36 µg/L, and 5.1 µg/L, respectively. In each groundwater sample where TCE concentrations exceeded the MDE CUS, detectable concentrations of cis-1,2-dichlorethene (DCE) were also identified. Cis-1,2-dichloroethene is formed during the breakdown of TCE, and this "daughter" compound was identified in groundwater sample GW-02 at a concentration of 160 µg/L. This exceeds that MDE CUS (70 µg/L). Detectable concentrations of cis-1,2-dichloroethene were also detected in samples GW-01 and GW-09; however, the concentrations of DCE identified in these samples were below the MDE CUS.

Tetrachloroethene (PCE) was detected in two (2) groundwater samples at concentrations that exceeded the MDE CUS (5 µg/L). Tetrachloroethene concentrations of 2,000 µg/L and 9.4 µg/L were detected in samples GW-01 (B-01) and GW-02 (B-05), respectively. These were the only detectable concentrations of tetrachloroethene encountered in the groundwater samples.

MTBE was only detected in one groundwater sample (GW-09), which was collected from boring B-26. The concentration of MTBE detected in sample GW-09 was reported as 83 µg/L, which exceeds the MDE CUS of 20 µg/L.

Benzene was detected in one (1) of the nine (9) groundwater samples at a concentration that exceeded the MDE CUS (5 µg/L). Specifically, a concentration of 14 µg/L was detected in sample GW-02, which was collected from boring B-05.

It should be noted that of the nine (9) groundwater VOC "hits" that exceeded the MDE CUS, four (4) were identified in sample GW-02, which was collected from boring B-05. These also included the highest

detected concentrations of TCE and cis-1,2-dichloroethene, and the only concentration of benzene that exceeded the MDE CUS. However, two (2) of these analytes, tetrachloroethene and TCE, were also detected in groundwater collected from a boring (B-01) advanced upgradient from boring B-05. The concentration of tetrachloroethene in groundwater from boring B-01 was 2,000, µg/L compared to the 9.4 µg/L detected in groundwater from boring B-05.

Semi-volatile Organic Compounds (SVOCs)

A summary of the analytical results for SVOC analysis can be found on Table J in Appendix E. SVOC analysis was performed on six (6) groundwater samples collected from across the project site. Detectable concentrations of SVOCs were only found in two (2) of the six (6) groundwater samples submitted for SVOC analysis, GW-02 and GW-04. A total of nineteen (19) SVOCs were detected in these groundwater samples, and included naphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo (b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. All detected concentrations of SVOCs exceeded the MDE CUS for type I and II aquifers, with the exception of acenaphthylene, which was detected in sample GW-02 only.

In sample GW-04, which was collected from boring B-17, naphthalene was the only analyte detected. At a concentration of 27 µg/L, it exceeded the MDE CUS of 10 µg/L.

The remaining SVOC "hits" were detected in groundwater sample GW-02, collected from boring B-05. A total of nineteen (19) SVOC analytes were detected in sample GW-02, all of which exceeded the MDE CUS (with the exception of acenaphthylene). Further, fifteen (15) of the SVOC analytes detected in sample GW-02 exceeded the MDE CUS by one (1) order of magnitude.

Total Petroleum Hydrocarbons (TPH)

A summary of the analytical results for TPH-GRO/DRO analysis can be found on Table K in Appendix E. A total of eight (8) groundwater samples were collected and submitted for TPH-GRO/DRO analysis. TPH-DRO concentration in six (6) of the eight (8) groundwater samples exceeded the MDE CUS of 47 µg/L. Concentrations of TPH-DRO in the remaining two (2) samples were below the laboratory detection limit of 40 µg/L. The six (6) groundwater samples with concentrations of TPH-DRO in excess of the MDE CUS were collected from the following borings: B-01 (280 µg/L), B-03 (50 µg/L), B-05 (110,000 µg/L), B-06 (1,700 µg/L), B-17 (270 µg/L), and B-26 (39,900 µg/L).

Concentrations of TPH-GRO exceeded the MDE CUS in three (3) of the eight (8) groundwater samples. These included samples GW-01, GW-02 and GW-09, collected at borings B-01, B-05, and B-26, respectively. Concentrations of TPH-GRO collected from borings B-01, B-05 and B-26 were 3,100 µg/L, 1,200 µg/L, and 290 µg/L, respectively. It should be noted that due to miscommunication with the laboratory, the remaining five (5) groundwater samples analyzed for TPH-GRO were analyzed at a detection limit (250 µg/L) that exceeds the MDE CUS of 47 µg/L. Therefore, it is possible that TPH-GRO may exist at concentrations in excess of the MDE CUS in these samples. However, the concentrations of TPH-GRO in these samples would be below 250 µg/L.

Polychlorinated Biphenyls (PCBs)

A summary of the analytical results for PCB analysis can be found on Table L in Appendix E. PCB analysis was performed on five (5) groundwater samples. These included groundwater samples collected

from borings B-01, B-02, B-03, B-05 and B-17. No detectable concentrations of PCBs were found in any of the analyzed samples.

Priority Pollutant Metals (dissolved)

A summary of the analytical results for PPL metals analysis can be found on Table M in Appendix E. A total of eight (8) groundwater samples were collected and submitted for dissolved metals analysis. Detectable dissolved phase concentrations of eight (8) priority pollutant metals were identified in the submitted samples. These included antimony, arsenic, chromium, copper, nickel, selenium, silver and zinc. However, none of the detected concentrations of dissolved metals exceeded the MDE CUS for type I and II aquifers.

Chlorinated Herbicides

A summary of the analytical results for Chlorinated Herbicides analysis can be found on Table N in Appendix E. A total of five (5) groundwater samples were analyzed for chlorinated herbicides. These included groundwater samples collected from borings B-01, B-02, B-03, B-05 and B-17. No detectable concentrations of chlorinated herbicides were found in any of the analyzed samples.

Pesticides

A summary of the analytical results for pesticides analysis can be found on Table O in Appendix E. A total of five (5) groundwater samples were analyzed for pesticides. These included groundwater samples collected from borings B-01, B-02, B-03, B-05 and B-17. No detectable concentrations of pesticides were found in any of the analyzed samples.

Cyanide

A summary of the analytical results for cyanide analysis can be found on Table P in Appendix E. A total of five (5) groundwater samples were analyzed for cyanide. These included groundwater samples collected from borings B-01, B-02, B-03, B-05 and B-17. Detectable concentrations of cyanide were found in each of the groundwater samples ranging from 15 µg/L to 38 µg/L. However, none of the detected concentrations of cyanide exceeded the MDE CUS of 200 µg/L.

It should be noted that due to laboratory error, the cyanide samples were analyzed after their recommended holding time. Since no other reasonable option was available, KCI directed the contract laboratory analyze the samples anyway. A note was included in the Laboratory Certificates of Analysis (Appendix C) indicating that the analyses were performed after the recommended holding time. Since the samples were properly preserved with NaOH and the hold time was not greatly exceeded, KCI concludes that the data may still prove useful.

8.1.3 Sediment and Surface Water Analytical Results

Surface water and sediment samples were collected from each of three (3) sample locations (SW-01, SW-02, and SW-03) and analyzed for a variety of analytical parameters including: VOCs, SVOCs, PCBs, Priority Pollutant metals (dissolved), pesticides, and cyanide. The following sections provide summaries of the findings from surface water and sediment sample analysis for each of the analytical parameters. Analytical results were compared to EPA Region III Screening Benchmarks for Freshwater Sediment (August 2006) and Freshwater (July 2006), respectively.

Regarding the sediment and surface water samples, sediment sample SED-01 and surface water sample SW-01 were both collected from the same sample location, identified as SW-01 on Figure 4 in Appendix A. A similar schema also applies to the remaining two sets of samples.

Volatile Organic Compounds (VOCs)

A summary of the analytical results for VOC analysis of sediment and surface water can be found on Table Q in Appendix E. A total of seven (7) VOC analytes were detected in the sediment and surface water samples analyzed as part of this investigation. Of those seven (7) analytes, acetone and methylene chloride were detected in both sediment and surface water samples. Carbon disulfide and chlorobenzene were detected only in sediment samples. Chloroform, bromodichloromethane, and 1,4-dichlorobenzene were detected only in surface water samples. It should be noted that surface water samples were analyzed for several analytes for which the sediment samples were not, and one of these was 1,4-dichlorobenzene.

Of the three (3) sediment samples, the BTAG screening benchmark was exceeded for two (2) analytes: carbon disulfide and chlorobenzene. Carbon disulfide was detected in samples SW-01 and SW-03 at concentrations of 500 µg/kg and 52 µg/kg, respectively. These concentrations exceeded the BTAG screening benchmark of 0.851 µg/kg. Chlorobenzene was only detected in sample SED-01; the concentration of chlorobenzene in this sample was 58 µg/kg, which exceeded the BTAG screening benchmark of 8.42 µg/kg.

Regarding the surface water samples, the BTAG screening benchmark was only exceeded in one (1) sample and for one (1) analyte. Specifically, chloroform was detected in sample SW-01 at a concentration of 26 µg/L, which exceeds the BTAG screening benchmark of 1.8 µg/L.

Semi-Volatile Organic Compounds (SVOCs)

A summary of the results for SVOC analysis of sediment and surface water can be found on Table R in Appendix E. No detectable concentrations of SVOCs were found in any of the surface water samples. Detectable concentrations of sixteen (16) SVOC analytes were identified in the sediment samples. Of those sixteen (16) detected analytes, ten (10) were detected at concentrations that exceeded the applicable BTAG screening benchmark. Most SVOCs "hits" were found in samples SED-01 and SED-03, collected from the southwestern portion of the project site. Only one (1) analyte (pyrene) was detected in sample SED-02. The estimated concentration of pyrene in sample SED-02 (840 µg/kg), exceeded the BTAG screening benchmark of 195 µg/kg.

Of the ten (10) SVOC analytes that exceeded applicable BTAG screening benchmarks, six (6) were identified in both sample SED-01 and SED-03. These included phenanthrene, pyrene, benzo(a)anthracene, chrysene, bis(2-ethylhexyl)phthalate, and benzo(g,h,i)perylene. The remaining four (4) analytes, anthracene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene were only detected in sample SED-01.

Polychlorinated Biphenyls (PCBs)

A summary of the analytical results for PCB analysis can be found on Table S in Appendix E. PCB analysis was only performed on the three (3) sediment samples. No detectable concentrations of PCBs were found in any of the analyzed sediment samples.

Priority Pollutant Metals

A summary of the analytical results for PPL metals analysis can be found on Table T in Appendix E. Metals analysis was performed on both surface water and sediment samples. Regarding the sediment samples, detectable concentrations of twelve (12) priority pollutant metals (i.e., all except thallium), were identified in the sediment samples. Of those twelve (12) metals, ten (10) were identified at concentrations that exceeded the applicable BTAG screening levels. These included antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.

In sample SED-01, ten (10) of the thirteen (13) metals were found at concentrations in excess of the applicable BTAG screening benchmark. These included antimony (11 µg/kg), arsenic (20 µg/kg), cadmium (3.8 µg/kg), chromium (120 mg/kg), copper (520 mg/kg), lead (640 mg/kg), mercury (0.76 mg/kg), nickel (78 mg/kg), silver (1.3 mg/kg), and zinc (1,700 mg/kg).

In sample SED-03, nine (9) of the thirteen (13) metals were found at concentrations in excess of the applicable BTAG screening benchmark. These included antimony (3 µg/kg), arsenic (20 µg/kg), cadmium (1.6 µg/kg), chromium (110 mg/kg), copper (88 mg/kg), lead (340 mg/kg), mercury (0.30 mg/kg), nickel (26 mg/kg), and zinc (1,400 mg/kg).

In sample SED-02, five (5) of the thirteen (13) metals were found at concentrations in excess of the applicable BTAG screening benchmark. These included arsenic (11 µg/kg), chromium (66 mg/kg), copper (120 mg/kg), lead (110 mg/kg), and zinc (150 mg/kg).

In general the concentration of metals in the sediment samples were highest in sample SED-01, then decreased slightly in sample SED-03, and then slightly more in sample SED-02. Likewise the number of analytes that exceeded the applicable BTAG screening benchmarks decreased from sample SED-01 (10) to SED-03 (9) to SED-02 (5).

With regard to the surface water samples, detectable concentrations of seven (7) priority pollutant metals were identified, four (4) of which were found at concentrations that exceeded the applicable BTAG screening levels. These included copper, lead, selenium and zinc. It should be noted that the surface water samples were analyzed for total metals, rather than dissolved metals.

Copper was detected in all three (3) of the surface water samples at concentrations which exceeded the applicable BTAG screening benchmark of 9 µg/L. The detected concentrations of total copper in samples SW-01, SW-02, and SW-03 were reported as 35 µg/L, 36 µg/L, and 9.3 µg/L, respectively.

Lead was detected in all three (3) of the surface water samples at concentrations which exceeded the applicable BTAG screening benchmark of 2.5 µg/L. The detected concentrations of total lead in samples SW-01, SW-02, and SW-03 were reported as 4.2 µg/L, 11 µg/L, and 3.5 µg/L, respectively.

Selenium was detected in all three (3) of the surface water samples at concentrations which exceeded the applicable BTAG screening benchmark of 1 µg/L. The detected concentrations of total selenium in samples SW-01, SW-02, and SW-03 were reported as 8.2 µg/L, 16 µg/L, and 29 µg/L, respectively.

Zinc was detected in all three (3) of the surface water samples, however only the concentration of zinc in sample SW-03 exceeded the applicable BTAG screening benchmark of 120 µg/L. The detected concentrations of total zinc in sample SW-03 was reported as 550 µg/L.

Pesticides

A summary of the analytical results for pesticides in sediment can be found on Table U in Appendix E. No detectable concentrations of pesticides were found in any of the analyzed sediment samples.

Cyanide

A summary of the analytical results for cyanide analysis of surface water samples can be found on Table V in Appendix E. Detectable concentrations of cyanide were found in each of analyzed samples. Concentrations of cyanide in surface water samples SW-01, SW-02 and SW-03 were 21 µg/L, 20 µg/L, and 19 µg/L, respectively. These concentrations of cyanide all exceed the EPA BTAG screening benchmark for freshwater of 5 µg/L.

It should be noted that due to laboratory error, the cyanide samples were analyzed after their recommended holding time. Since no other reasonable option was available, KCI directed the contract laboratory analyze the samples anyway. A note was included in the Laboratory Certificates of Analysis (Appendix C) indicating that the analyses were performed after the recommended holding time. Since the samples were properly preserved with NaOH and the hold time was not greatly exceeded, KCI concludes that the data may still prove useful.

8.1.4 Soil Gas Sample Analytical Results

Table W in Appendix E presents the analytical results from the soil gas screening completed as part of this investigation. A total of ten (10) soil gas samples were collected from across the project site. The soil gas samples were analyzed for VOCs via EPA Method 8260. For sake of comparison, the reported concentrations were measured against the values presented in the EPA document *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) Table 2b: Target Indoor Air Concentration to Satisfy Both the Prescribed Risk Level and the Target Hazard Index.* A map depicting the location of soil gas samples is included as Figure 4 in Appendix A.

A total of six (6) VOC analytes were detected in the collected soil gas samples. Each of these analytes, which included benzene, hexane, pentane, 1,1,1-trichloroethane, TCE, and vinyl chloride, were detected in four (4) of the soil gas samples: SG-02, SG-05, SG-07, and SG-09.

SG-02 was advanced on the south end of 1551 Russell St. Only one analyte, 1,1,1-trichloroethane, was found at a detectable concentration in this sample. However, the detected concentration of 1,1,1-trichloroethane (0.84 mg/m^3), was below the EPA target indoor air concentration hazard index of 2.2 mg/m^3.

Sample SG-05 was collected just south of the intersection of Worchester and Warner Streets. Only one analyte, pentane, was found at a detectable concentration. The concentration of pentane at sample location SG-05 was 1.6 mg/m^3. Currently there is no EPA target indoor air concentration hazard index for pentane.

Sample SG-07 was collected from a boring advanced along Oler Street. Detectable concentrations of benzene, pentane, and TCE were identified in this sample. The concentrations of benzene, pentane, and TCE were reported as 2.4 mg/m^3, 555 mg/m^3, 0.73 mg/m^3, respectively. All concentrations are below the applicable EPA target indoor air concentration hazard index.

Sample SG-09 was collected from a boring advanced south of 2104 Worchester St. Detectable concentrations of hexane, pentane, and vinyl chloride were identified in this sample. The concentrations of hexane (1.1 mg/m^3) and vinyl chloride (9.1 mg/m^3) exceeded the applicable EPA target indoor air concentration hazard index of 0.0011 mg/m^3 and 0.0028 mg/m^3, respectively.

8.1.5 QA/QC Sample Analytical Results

As discussed in section 6.7 of this report, KCI collected a variety of field QA/QC samples to ensure the quality of the data and increase the reliability of the results. The field QA/QC samples were collected in accordance with the City's QAPP, and includes the following:

- Three (3) Soil Field Duplicate samples
- One (1) Groundwater Field Duplicate sample
- One (1) Temperature Blank per sample cooler
- Two (2) Field Blank samples
- One (1) Trip Blank sample
- Two (2) Equipment Rinsate Blank samples

The trip blank sample (TB-01) collected during this investigation was analyzed for VOCs only. Detectable concentrations of methylene chloride (3.4 µg/L) were reported in this sample. Likewise the two field blank samples (FB-01 and FB-02) collected as part of this investigation were analyzed for VOCs only. Only methylene chloride was detected in sample FB-01, at a concentration of 2.3 µg/L. Both methylene chloride and acetone were detected in sample FB-02 at 2.3 µg/L and 9.1 µg/L, respectively. Acetone and methylene chloride are both common laboratory contaminants.

Two (2) rinsate blank samples were also collected and analyzed to verify proper equipment decontamination between soil intervals and borings. The rinsate blanks were analyzed for the same parameters as the sample collected immediately prior to the decontamination of the sampling equipment. Rinsate blank sample RB-01 was collected immediately following boring B-05. This sample was analyzed for VOCs, SVOCs and Metals. Detectable concentrations of acetone and methylene chloride were detected during the VOC analysis. As stated above, both acetone and methylene chloride are common laboratory contaminants. No SVOCs were detected in sample RB-01; however chromium was detected in this QA/QC sample at a concentration of 6.8 µg/L. It should be noted that this rinsate blank sample was collected after the last boring of the day (09/26/07).

Rinsate blank sample RB-02 was collected immediately following boring B-18. This sample was analyzed for VOCs, SVOCs and Metals. Detectable concentrations of acetone and methylene chloride were detected during the VOC analysis. As stated above, both acetone and methylene chloride are common laboratory contaminants. No SVOCs were detected in sample RB-01; however both chromium and antimony were detected in this rinsate sample at concentrations of 5.9 µg/L and 5.7 µg/L, respectively. Although chromium and antimony were detected in this rinsate blank sample, no concentrations of antimony or chromium in soil or groundwater collected during the course of the investigation exceed the applicable MDE CUS. Also, antimony was not detected in any of the groundwater samples collected during this investigation.

Three (3) duplicate soil samples were collected during this investigation. The duplicate samples were analyzed for the same parameters as the sample being duplicated. The duplicate soil sample SB-DUP01 was collected from boring B-01 at a depth of 4-6' bgs. This duplicate corresponds to sample SB-01.

Duplicate sample SB-DUP01 was analyzed for VOCs, SVOCs, and metals. Results from this duplicate sample were nearly identical to the original sample (SB-01). The same analytes were detected in both the duplicate and the original samples. Each sample had detectable concentrations of tetrachloroethene, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, and zinc. All of the reported concentrations in both the duplicate sample and the original sample were on the same order of magnitude, with the exception of lead which was detected at a concentration of 43 mg/kg in the original sample and 110 mg/kg in the duplicate sample. This variance can readily be attributed to the non-heterogeneous nature of soil.

The duplicate soil sample SB-DUP02 was collected from boring B-24 at a depth of 4-8' bgs. This duplicate corresponds to sample SB-24. Duplicate sample SB-DUP02 was analyzed for VOCs, SVOCs, and metals. Results from this duplicate sample were nearly identical to the original sample (SB-24). The same analytes were detected in both the duplicate and the original samples with the exception of indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene, which were detected in the duplicate sample only at estimated concentrations of 360 µg/kg and 430 µg/kg, respectively. It should be noted that these were estimated concentrations identified above the method detection limit but below the Limit of Quantitation. All of the reported concentrations in both the duplicate sample and the original sample were on the same order of magnitude, with the exception of indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene, which were discussed above, and phenanthrene, fluoranthene, and arsenic. Each of these analytes were reported at greater concentrations in the duplicate sample then in the blank samples. Phenanthrene and fluoranthene were one order of magnitude higher in the duplicate sample when compared to the original sample and arsenic was two orders of magnitude higher when compared to the original sample. As mentioned previously, these types of variations are probably attributable to the non-heterogeneous nature of soil.

The duplicate soil sample SS-DUP01 was collected from boring B-02 at a depth of 3-4' bgs. This duplicate corresponds to sample SS-02. Duplicate sample SS-DUP01 was analyzed for SVOCs and metals. No SVOCs were detected in either sample. Antimony, arsenic, chromium, copper, lead, nickel and zinc were detected in both the duplicate and the original samples. The concentration of these analytes reported in both the duplicate sample and the original sample were on the same order of magnitude, with the exception of nickel which was detected at a concentration of 13 mg/kg in the original sample and 4.1 mg/kg in the duplicate sample. Beryllium was detected in the original sample (1.0 mg/kg) but not the duplicate sample, while mercury, silver, and thallium were detected in the duplicate sample and not in the original sample. The concentrations of mercury, silver, and thallium in the duplicate sample were all below the applicable MDE CUS. Previous qualifications concerning the non-heterogeneous nature of soil apply again in this instance.

One duplicate groundwater sample was collected during this investigation. The duplicate groundwater sample GW-DUP01 was collected from boring B-24. This duplicate sample corresponds to sample GW-06. Duplicate sample GW-DUP01 was analyzed for VOCs and metals. Results from this duplicate sample were nearly identical to the original sample (GW-06). No VOCs were detected in either sample with the exception of acetone detected in the duplicate sample at a concentration of 12 µg/L. Each sample had detectable concentrations of chromium, nickel and selenium. All of the reported concentrations in both the duplicate sample and the original sample were on the same order of magnitude, with the exception of chromium which was detected at a concentration of 10 µg/L in the original sample and 8.2 µg/L in the duplicate sample.

8.1.6 Analytical Results for Soils within the Proposed Park Area (Lots 5A, 6, 7, and 8/9)

As stated previously, proposed development of portions of the "waterfront parcels" may involve the development of a park area. Based on information provided to KCI, this park will likely occupy portions of Lots 5A, 6, 7, and 8/9; due to this proposed development, soils in the area will have to meet the MDE Residential Soil Cleanup Standards. A total of six (6) borings were advanced in Lots 5A, 6, 7, and 8/9; these included borings B-15, and B-20 through B-24. This section provides a summary of the results from the surface and subsurface soil investigations preformed on Lots 5A, 6, 7, and 8/9 compared against the MDE CUS for Residential Soils.

Volatile Organic Compounds (VOCs)

VOC analysis was performed on deeper subsurface soil samples, collected from approximately four to eight feet bgs in this portion of the project site. VOCs were only detected in one (1) of the (6) soil samples submitted for VOC analysis. Acetone was identified in sample SB-15, collected from boring B-15. The detected concentration of acetone (500 µg/kg) was below the MDE CUS for residential soils (780,000 µg/kg).

As stated previously, acetone is a common laboratory contaminant. A review of analytical results from trip blanks and field blanks prepared and submitted as part of this investigation, revealed detectable concentrations of acetone within the blanks. Based on these results it appears that the acetone detected in soil samples is probably a laboratory contaminant and are not necessarily indicative of actual on-site conditions.

Semi-Volatile Organic Compounds (SVOCs)

SVOC analysis was performed on all of the surface and subsurface soil samples collected and submitted for analysis from the "proposed park area" portion of the project site. SVOCs were detected in all of the 12 soil samples submitted for SVOC analysis. A total of five SVOC compounds (and/or polycyclic aromatic hydrocarbons (PAHs), a subset of the SVOCs) were detected in the soil samples at concentrations above the MDE CUS for Residential Soils. These included benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene.

Benzo(a)anthracene was detected in six samples at concentrations which exceeded the MDE CUS for residential soils of 870 µg/kg. The concentrations of benzo(a)anthracene in these six samples ranged from 1,000 µg/kg to 9,500 µg/kg. Of these six samples, only one sample (SS-20) exceeded the MDE CUS for non-residential soils (7,800 µg/kg).

Benzo(b)fluoranthene was detected in three samples (SS-20, SB-21, and SB-22) at concentrations which exceeded the MDE CUS for residential soils of 870 µg/kg. The concentrations of benzo(b)fluoranthene in these three samples was reported as 6,300, 1,300, and 1,400 µg/kg, respectively. None of these concentrations exceeded the MDE CUS for non-residential soils (7,800 µg/kg).
Similarly, indeno(1,2,3-cd)pyrene was detected also only detected in samples SS-20, SB-21, and SB-22 at concentrations which exceeded the MDE CUS for residential soils of 870 µg/kg. The concentrations of indeno(1,2,3-cd)pyrene in these three samples was reported as 5,600, 1,100, and 1,000 µg/kg, respectively. None of these concentrations exceeded the MDE CUS for non-residential soils (7,800 µg/kg).

Benzo(a)pyrene was detected in ten (10) of the twelve (12) samples at concentrations which exceeded the MDE CUS for residential soils (330 µg/kg). The concentrations of benzo(a)pyrene in these ten (10) samples ranged from 430 µg/kg 10,000 µg/kg. The concentrations in five of these samples also exceeded the MDE CUS for non-residential soils.

Dibenz(a,h)anthracene was detected only detected in one (1) of the twelve (12) samples collected from the "proposed park area" portion of the project site. Dibenz(a,h)anthracene was detected in sample SS-20 at a concentration of 1,600 µg/kg. This concentration exceeds both the MDE CUS for residential and non-residential soils of 330 µg/kg and 780 µg/kg, respectively.

Total Petroleum Hydrocarbons (TPH)

TPH analysis was performed on three soil samples collected from the "proposed park area" portion of the project site; these included samples SS-20, SB-20, and SB-21B. Of those three samples, detectable concentrations of TPH-DRO were identified in all three. However, only sample SB-21B, had a concentration of TPH-DRO (2,500 mg/kg) that exceeded MDE CUS for residential soils (230 mg/kg). This concentration also exceeds the MDE CUS for non-residential soils.

Detectable concentrations of TPH-GRO were not identified in any of the three analyzed samples from this area of the project site.

Polychlorinated Biphenyls (PCBs)

PCB analysis was performed on three soil samples collected from the "proposed park area" portion of the project site; these included samples SS-20, SB-20, and SB-21B. Sample SB-21B was collected at boring location B-21 at a depth of 14' bgs, due to the presence of discolored soils and petroleum odors. Detectable concentrations of Aroclor 1242 and Aroclor 1254 were detected in sample SB-21B, collected from a depth of 14' bgs. The concentrations of Aroclor 1242 and Aroclor 1254 were reported as 1,400 µg/kg and 1,700 µg/kg, respectively. These concentrations were above the MDE CUS for residential soils of 320 µg/kg, but below the MDE CUS for non-residential soils of 2,900 µg/kg.

Priority Pollutant Metals

Total PPL metals analysis was performed on all twelve (12) of the surface and subsurface soil samples collected and submitted for analysis from the "proposed park area" portion of the project site. The MDE CUS for residential soils was exceeded for three specific metals, arsenic, chromium, lead, and mercury.

Arsenic was detected in eleven (11) of the twelve (12) samples at concentrations which exceeded the MDE CUS for residential soils (2.0 mg/kg). The detected concentrations of arsenic in these eleven (11) samples ranged from 4.1 mg/kg to 14 mg/kg. It should be noted that the concentration of arsenic in each of these eleven (11) samples also exceeded the MDE CUS for non-residential soils (3.8 mg/kg).

Lead was detected in three (3) of the twelve (12) samples at concentrations which exceeded the MDE CUS for residential soils (390 mg/kg). These samples included SS-20, SB-22, and SS-24. The detected concentrations of lead in these three (3) samples was reported at 680, 590, and 440 mg/kg, respectively. It should be noted that the concentration of lead in these three (3) samples also exceeded the MDE CUS for non-residential soils (400 mg/kg).

Mercury was detected in six (6) of the twelve (12) samples at concentrations which exceeded the MDE CUS for residential soils (0.1 mg/kg). The detected concentrations of mercury in these six (6) samples ranged from 0.16 mg/kg to 1.3 mg/kg. It should be noted that the concentration of mercury in each of these six (6) samples also exceeded the MDE CUS for non-residential soils (0.12 mg/kg).

Chromium was detected in all twelve (12) samples at concentrations which exceeded the MDE CUS for Chromium VI in residential soils (23 mg/kg). The detected concentrations of chromium in these twelve (12) samples ranged from 47 mg/kg to 370 mg/kg. It should be noted that none of the detected concentrations of chromium in these twelve (12) samples exceeded the MDE CUS for non-residential soils (610 mg/kg).

Chlorinated Herbicides

Chlorinated herbicide analysis was performed on three soil samples collected from the "proposed park area" portion of the project site; these included samples SS-20, SB-20, and SB-21B. No detectable concentrations of chlorinated herbicides (2,4-D or 2,4,5-TP) were found in any of the analyzed samples.

Pesticides

Pesticide analysis was performed on three soil samples collected from the "proposed park area" portion of the project site; these included samples SS-20, SB-20, and SB-21B. No detectable concentrations of pesticides were found in any of the analyzed samples.

9.0 CONSTITUENTS OF CONCERN

The analytical findings from this investigation revealed that the primary constituents of concern at the Gateway South Redevelopment properties appear to be chlorinated solvents, petroleum compounds, PAHs, and heavy metals. Additional discussion concerning these findings is provided in the following report sections. Conclusions and recommendations are provided in Section 11.0 of this report.

9.1 Chlorinated Solvents in Soil and Groundwater

Previous investigations, reviewed during KCI's Phase I ESA of the subject site, indicated that chlorinated solvents such as trichloroethene (TCE), tetrachloroethene (PCE) and 1,2-dichloroethene (DCE) have historically been detected in the groundwater beneath the 1551 Russell Street property. The results from this investigation appear generally consistent with the findings from these previous environmental studies. As described in Sections 8.1.1. and 8.1.2, the chlorinated organic compounds PCE, TCE and DCE were identified in both soils and groundwater beneath and in the vicinity of the three Maryland Chemical properties, (1551, 1525, and 1501 Russell St.).

Chlorinated Solvents in Soil

As discussed previously, detectable concentrations of PCE, TCE, DCE were identified in certain subsurface soil samples obtained during this assessment. Although the concentrations of these soil analytes were in all cases found to be lower than their respective MDE non-residential clean-up values, the pattern and distribution of these compounds in subsurface soils has assisted KCI in developing conclusions concerning potential sources of these contaminants.

The highest soil concentrations of PCE were found in the subsurface soil sample collected from boring B-01, from a depth of 4-6 feet bgs. Specifically, the concentration of PCE in this soil sample was approximately one-half of the MDE CUS value for non-residential soils. Boring B-01 was an upgradient sampling location, and was advanced just inside the north property boundary of 1551 Russell Street (i.e., part of the Maryland Chemical facility). It should be noted that groundwater was observed at a depth of sixteen feet below the surface at Boring B-1; therefore, the elevated levels of PCE observed at 4-6 feet bgs in Boring B-1 are most likely the result of an historic surface or near-surface release.

PCE was also identified at lower concentrations in subsurface soil samples acquired at borings B-04 and B-16 (depths ranging from 4-6 feet bgs). Boring B-04 was advanced on the opposite (i.e., downgradient) side of the 1551 Russell Street property relative to Boring B-01, and Boring B-16 was advanced even further downgradient, on the north end of Lot 7. Note that groundwater was encountered at depths of 7.0 and 4.0 feet bgs in Borings B-04 and B-16, respectively. Therefore, the soil sample acquired at B-16 was collected from within the water table.

TCE was detected in soil samples acquired from Borings B-04 and B-16, at concentrations approximately one order of magnitude below the MDE non-residential CUS. As discussed above, PCE was also detected in the soil samples acquired from these borings.

Both DCE and vinyl chloride are compounds commonly associated with the degradation of TCE in the environment. A relatively minor amount of DCE was detected in the soil samples acquired at Boring B-04. Specifically, DCE was present at a concentration roughly four (4) orders of magnitude below the MDE non-residential CUS value in the sample acquired from this boring. No detectable concentrations of vinyl chloride were identified in any soil sample acquired during this investigation.

Chlorinated Solvents in Groundwater

KCI collected a total of nine (9) groundwater samples as part of this investigation. The compounds DCE, TCE, and PCE were identified at concentrations exceeding their MDE CUS values in some of the groundwater samples.

KCI observed a groundwater elevation of 7.5 feet below existing grade in Boring B-05, which was advanced just northwest of 1629 Warner Street, and downgradient from the Maryland Chemical facility at 1525 and 1501 Russell Street. All three of the above-referenced chlorinated organic compounds were detected at concentrations exceeding their respective MDE CUS values in the groundwater sample acquired at B-05. Moreover, these compounds were detected at concentrations that are approximately double their respective CUS values.

TCE and PCE were also detected at concentrations exceeding their MDE CUS values in a groundwater sample obtained from Boring B-01. In particular, PCE was detected at a concentration roughly three orders of magnitude higher than its CUS in this boring. As indicated earlier, the highest soil concentrations of PCE were also found in Boring B-01, which is located on the northwestern edge of 1551 Russell Street. It therefore appears that this boring was advanced near a source for this contaminant, possibly an historic spill or release.

The concentration of TCE in the groundwater sample obtained from Boring B-01 was approximately three times the MDE CUS, but was still only half of the concentration of TCE that was detected in Boring B-05. It is noted that Boring B-05 is situated downgradient and to the southeast of the Maryland Chemical

facility, whereas Boring B-01 is located northwest of and upgradient from the Maryland Chemical facility.

Concentrations of TCE elevated very slightly above the MDE CUS were detected in the groundwater sample acquired from Boring B-26. Groundwater was observed at a depth of 8.0 feet below the ground surface in this boring, which was advanced immediately southeast of the Maryland Chemical facility at 1501 Russell Street. It is noted that the concentration of TCE detected in the groundwater sample obtained from Boring B-05 was nearly seven times higher; however, Boring B-05 is located less that half a block west of Boring B-26.

Chlorinated Solvents Summary

At some time between 1914 and 1950, until 1973 the Maryland Chemical properties (i.e., 1551, 1525, and 1501 Russell Street) were used by the American Cyanamid Company, Industrial Chemicals Division for the manufacture of chemicals and pesticides. Since 1973, this property has been used by the Maryland Chemical Company, Inc. to store, blend, and repackage bulk quantities of chemicals. As discussed above, the results of this investigation illustrate an increase in PCE, TCE, and DCE concentrations in soil and groundwater samples acquired at and in the vicinity of the Maryland Chemical facility, relative to the rest of the subject site. Moreover, the findings suggest that the northern portion of 1551 Russell Street may be a source area for PCE, possibly containing a "hot spot" of impacted soils resulting from an historic spill.

9.2 Petroleum Compounds in Soil and Groundwater

The results of this investigation indicate that petroleum contamination is generally present in groundwater samples collected from borings advanced directly downgradient from 1501 Russell Street. The highest concentrations of Total Petroleum Hydrocarbons - Diesel Range Organics (TPH-DRO) were detected in groundwater samples acquired from Borings B-05 and B-26, both of which are situated downgradient from 1501 Russell Street property. Moreover, the only exceedances of benzene in groundwater encountered during this assessment was identified in the groundwater sample acquired from Boring B-05, and the only exceedance of methyl-tert-butyl ether (MTBE) was observed in the groundwater sample obtained from Boring B-26. Note that MTBE is a common additive to gasoline, but it is also commonly found in other petroleum products, such as heating oil. Boring B-26 was advanced immediately adjacent to an abandoned UST discovered during the geophysical survey completed as part of this investigation. Elevated concentrations of TPH-DRO were also encountered in a soil sample collected from boring B-05 at a depth of eleven feet below the ground surface.

Concentrations of TPH-DRO that exceeded the MDE CUS were also identified in groundwater samples obtained from three (3) other borings, including Borings B-01, B-03, and B-17. Boring B-01 is situated at the northwestern edge of the 1551 Russell Street property. Since this boring is positioned upgradient from the rest of the subject site, it is possible that the TPH-DRO is migrating to the site from an off-site source.

Boring B-03 was advanced at the southwestern boundary of 1645 Warner Street. While present at levels exceeding the MDE CUS, the concentration of DRO was low in this boring relative to B-05 and B-26. However, based on the location of the boring from which it was acquired, the TPH-DRO encountered in groundwater sample obtained from Boring B-03 is likely to have originated from an off-site source.

Soil and groundwater collected from boring B-17 possessed concentrations of TPH-DRO in excess of the applicable MDE CUS. Boring B-17 was advanced south of 2104 Worchester St., adjacent to several concrete pads. The purpose of these pads is currently unknown. It is possible that these pads were

historically used to store ASTs, which were used to dispense fuel. Based on the depths and concentrations of TPH-DRO detected: 14,000 mg/kg in the surface soil sample (0-2' bgs) and 710 mg/kg in the subsurface soil sample (4-6' bgs), it appears that the TPH-DRO contamination was the result of a surface spill and could be attributed to spills occurring during refueling activities.

Soil collected from boring B-21 at a depth of 14' bgs had concentrations of TPH-DRO above the MDE-CUS for non-residential soils. This property is currently undeveloped and according to the Phase I ESA, has always been undeveloped. The Phase I ESA gave no indication that petroleum storage tanks historically existed on this potion of the project site. However, as discussed in previous sections, the upper six feet of soil located on this portion of the project site, is reportedly comprised of fill material originating from the Great Baltimore fire of 1904. According to the Boring logs (Appendix B) petroleum-impacted soils were evident at this boring from 3.5 – 12' bgs. It is possible that these petroleum-impacted soils were the result of discarded contaminated fill. It should be noted that this was the only sample location at which PCBs were detected (refer to Section 8.1.1).

Boring B-10 was advanced adjacent to an abandoned UST located between the 1645 Warner Street and 2102 Oler Street properties. The soil sample from this boring (acquired at 14 feet below grade) indicated relatively minor amounts of TPH-DRO contamination. Based on field screening and visual inspection of soils in this boring, no groundwater sample was collected. However, it should be anticipated that some petroleum impacted soil and groundwater may exist in the vicinity of this UST.

9.3 Polycyclic Aromatic Hydrocarbons in Soil and Groundwater

Semi-Volatile Organic Compound (SVOC) analysis was performed on all of the surface and subsurface soil samples collected for this assessment. SVOCs were detected in all but sixteen (16) of the forty-eight (48) soil samples collected for this assessment. A total of twenty-two (22) SVOCs were detected, fifteen (15) of which were polycyclic aromatic hydrocarbons (PAHs).

PAHs are a group of chemicals formed during incomplete combustion processes. Toxicological studies have identified several PAHs as being carcinogenic. Review of the data from this assessment appears to indicate that both surface and subsurface soils collected south of Warner Street contain elevated levels of PAHs. Specifically, five PAHs were detected at concentrations that exceeded the MDE CUS for non-residential soils. These included: benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno (1,2,3-cd)pyrene, and dibenz(a,h)anthracene. Each of these 5 analytes were detected in the surface soil sample (0-2' bgs) collected at boring B-16. Two were identified in the surface soil sample (0-2' bgs) collected at boring B-20. Of significance was the prevalence and concentrations of benzo(a)pyrene encountered across the project site. Twelve (12) samples possessed concentrations of benzo(a)pyrene above the MDE CUS for non-residential soils.

During KCI's Phase I ESA of the subject site, KCI reviewed an MDE report indicating that the top six feet of soils at the six (6) "waterfront" parcels are comprised of fill material originating from the Great Baltimore fire of 1904. KCI also reviewed previous MDE findings related to the presence of PAH and heavy metal contamination in excess of human health standards in soils located across the six "waterfront" parcels. Moreover, the MDE VCP Fact Sheet for the 2110 Haines Street parcel of the subject site also eludes to elevated levels of PAH compounds.

It should be noted that of the twelve (12) samples with SVOC analytes that exceeded the MDE CUS for non-residential soils, nine (9) of them were from surface soil samples collected at depths ranging from zero to four feet bgs. The remaining three (3) samples were collected from depths ranging from four to

eight feet bgs. This Phase II Investigation confirms the presence of PAH compounds in surface and subsurface soil across the majority of the project site located southeast of Warner St. Based on the distribution of PAH "hits" in soils, it appears possible that the PAH contamination encountered in soils is associated with the historic importation of cinders and ash-laden fill material from the Great Baltimore Fire of 1904.

Based on the sample results, SVOC groundwater contamination exists only in the vicinity of boring B-05. Boring B-05 was advanced adjacent to the northwestern portion of 1629 Warner Street. A total of 19 SVOC analytes were detected in the groundwater sample collected from this boring, all exceeded the MDE CUS for Type I and II aquifers, with the exception of acenaphthylene. Fifteen (15) of SVOC analytes detected in this sample exceeded the MDE CUS by one order of magnitude.

The source of SVOC/PAH impacts to groundwater collected from boring B-05 is not known, since the prevalence of SVOC and PAH compounds in soils were found on the southeastern portion of the project site (southeast of Warner St.), downgradient from boring B-05.

9.4 Heavy Metals in Soil and Groundwater

Heavy metal contamination exists across much of the project site. Specifically, arsenic, lead, and mercury were detected in surface and subsurface soils at numerous locations at concentration above the MDE-CUS for non-residential soils. Arsenic was detected in forty (40) of the forty-nine (49) samples at concentrations which exceeded the MDE CUS for non-residential soils. Likewise, mercury was detected in thirty-six (36) of the forty-nine (49) samples; and lead was detected in six (6) of the forty-nine (49) soil samples at concentrations which exceeded the MDE CUS for non-residential soils.

These findings are similar to previous data for portions of the site obtained from a 2006 MDE report and discussed in KCI's Phase I ESA. In that report, MDE determined that the heavy metals arsenic, lead, and mercury were present in the fill soils comprising the upper six feet of the six water front parcels and that the concentration of these metals exceeded the human health standards. The findings from this investigation demonstrate the heavy metal contamination is not isolated to the water front parcels but also extends across the project site (note that MDE's investigation was for the waterfront parcels only). Heavy metal contamination across the developed portions of the project site can most likely be attributed to the historic manufacturing and industrial activities occurring over the past two centuries.

KCI observed that although dissolved concentrations of heavy metals were found in groundwater samples collected as part of this investigation, none of the detected concentrations exceeded the MDE CUS values.

9.5 COCs in Sediment and Surface Water

PAHs and heavy metals were the most prevalent contaminants identified in sediment and surface water samples. PAHs were detected in the greatest quantity and highest concentration in sample SED-01. As discussed previously, PAH contamination at the project site is most likely attributable to the placement of fill material, originating from the Great Baltimore Fire of 1904, along the six waterfront parcels of the project site. Since sample SED-01 was collected from the docking slip bisecting a portion of the project site it is logical to assume that that sample would contain he highest concentrations of PAHs.

Eleven (11) of thirteen (13) metals were detected in sediment and surface water samples at concentrations above the applicable BTAG screening benchmarks. The quantity and concentrations of heavy metals in the collected sediment samples were highest in sample SED-01, then decreased slightly in sample SED-

03, and then slightly more in sample SED-02. The results of surface water sampling indicated that copper, lead, selenium and zinc were generally present at concentrations that exceeded the applicable BTAG screening levels.

Unsurprisingly, sediment and surface water samples showed minimal VOC impacts. Carbon disulfide and chlorobenzene were detected in sediment samples at concentrations above the BTAG screening benchmark for freshwater sediment. Chloroform was detected in one surface water sample at a concentration in excess of the BTAG screening benchmark for freshwater. Cyanide was detected in all three of the surface water samples. No detectable concentrations of PCBs or pesticides were identified in the analyzed sediment / surface water samples.

9.6 VOCs in Soil Gas

A total of six (6) VOC analytes were detected in four (4) of the soil gas samples collected for this assessment. These include benzene, hexane, pentane, 1,1,1-trichloroethene, TCE, and vinyl chloride. All of the detected VOC analytes can be used as solvents. Three of the soil gas sample locations, SG-05, SG-07, and SG-09 were collected adjacent to 1633 Warner, 1629 Warner, 1601 Warner, and 2104 Worchester Streets.

According to the Phase I ESA report, various solvents were likely to have been in use at these properties at various times in the past. The 1633 Warner Street parcel was historically used for color mixing and grinding operations, an activity that would likely use solvents for a variety of functions. 1601 Warner Street was historically used as a paint and varnish manufacturing plant, and for commercial printing operations. Both of these operations commonly involve the use of solvents. Also a historic release of chlorinated solvents reportedly occurred from USTs located at this property. Hexane, one of the analytes detected in soil gas samples, is commonly used as a degreaser in the printing industry. 2014 Worchester St. was historically used as a paint and varnish stripping facility, an operation that would almost certainly have utilized solvents.

The fourth soil gas sample location was at the south end of 1551 Russell St. This property was historically used to produce chemicals and pesticides and is currently used for the storage and repacking of bulk quantities of chemicals. Currently, a portion of the property is leased to a company that blends cleaners and soaps. The only analyte detected at this location was 1,1,1-trichloroethane. 1,1,1-trichloroethane is commonly used as an ingredient in household products such as cleaners.

10.0 ASBESTOS AND LEAD-BASED PAINT SCREENING

KCI conducted a screening-level investigation of accessible on-site buildings for suspect asbestos containing materials (ACMs). The screening investigation included a visual inspection of all accessible areas, assessment of potential inaccessible areas (trenches, concealed piping in walls and ceiling), and limited sampling of suspect ACM for laboratory analysis.

Note that the purpose of the asbestos screening described herein was to gather baseline information concerning the presence and extent of ACM within the on-site buildings, rather than provide the type of data required to meet OSHA "Asbestos In Construction" requirements during building demolition. Therefore, the sampling performed during this screening does necessarily conform to the Asbestos Hazard Emergency Response Act (AHERA) sampling protocols. Moreover, it should be noted that additional, supplemental sampling and analysis of building materials may be necessary prior to building demolition in order to meet OSHA requirements.

KCI also performed a screening of the onsite buildings for surfaces and components coated with lead-based paint (LBP). The screening included onsite testing with an X-Ray Fluorescence (XRF) Analyzer to determine general prevalence of LBP in the buildings.

KCI representatives Mr. Michael D. Hauser and Ms. Tehsin Aurangabadwala conducted the ACM and lead-based paint screening at six (6) locations associated with the proposed Gateway South Redevelopment properties. These locations included 1501, 1525, and 1551 Russell St., 1645 Warner St., and 2110 Haines St.

It should be noted that the scope of work for the asbestos and lead-based-paint screening originally included twelve (12) properties. However access to six (6) of the properties, owned by Warner Street Inc. (WSI Properties) was not permissible at the time of this investigation. Investigation of these properties can be performed at a later time once access is granted to KCI, and these findings may be submitted later under separate cover.

10.1 Asbestos-Containing Materials (ACM) Survey

KCI representatives Mr. Michael D. Hauser and Ms. Tehsin Aurangabadwala conducted the ACM survey at 1501, 1525, and 1551 Russell St., 1645 Warner St., and 2110 Haines St. The survey was conducted between October 15^{h} and October 16th 2007. Mr. Hauser and Ms. Aurangabadwala are Environmental Protection Agency (EPA)-AHERA accredited asbestos building inspectors. The scope of work included a visual evaluation of potential ACMs and the collection of bulk samples of these materials. Assumptions were made, as appropriate, concerning the presence and quantity of asbestos containing materials within inaccessible areas. Based on professional experience with similar types of projects, certain materials were assumed to contain asbestos. These included roofing materials, fire doors, and smokestack / boiler materials.

10.1.1 Sampling Methods

KCI's building inspectors collected bulk samples of the suspect ACMs using a metal utility knife that was driven through the suspect material to the substrate in order to obtain a sample containing all discrete layers. The samples were then placed in sealable plastic bags and assigned unique identifiers that were recorded on the bags and on the bulk survey sampling sheets. The suspect asbestos bulk samples collected by KCI's building inspector were submitted, along with a chain-of-custody form, to Batta Laboratories, Inc., of Newark, Delaware.

10.1.2 Analytical Methods

All samples were analyzed via Polarized Light Microscopy (PLM). Samples with non-friable, organically bound (NOB) matrices were prepared via gravimetric reduction prior to analysis. PLM is an optical microscopic technique that distinguishes the different types of asbestos fibers by their shape and unique optical properties. The technique is based on the refraction of light from various crystalline asbestos structures and the observation of the corresponding color changes through the microscope. All PLM analysis was performed following the methodologies documented in the EPA method 600/R-93/116, July 1993, "Method for the Determination of Asbestos in Bulk Building Materials".

The PLM method of analysis incorporates two different techniques for determining the percentage of asbestos present in any given material: visual estimation and point count. Visual estimation requires that

samples are first examined with a stereo binocular microscope and then representative portions of the sample are mounted on slides with refractive index oils and analyzed with a Polarized Light Microscope. If the sample is determined to be a non-asbestos containing material or is found to have low concentrations of asbestos, the point count method can be used to more accurately determine the percentage of asbestos. Point count methodology uses larger quantities of material and systematically analyzes individual particles, whereas visual estimation analyzes fields of view.

The PLM-NOB method of analysis (i.e., following gravimetric prep) is a point counting method which overcomes some of the subjectivity of the visual estimate typically employed in PLM analysis.

While on-site, seventy-eight (78) bulk samples of suspect ACMs were collected and subsequently delivered to Batta Laboratories, Inc., of Newark, Delaware. Batta Laboratories, Inc. is accredited by the American Industrial Hygiene Association, AIHA #100448, and National Institute of Standards and Technology through the National Voluntary Laboratory Accreditation Program (NVLAP) for Bulk Asbestos Analysis, NVLAP # 101032. Samples of bulk material were analyzed using polarized light microscopy (PLM)/Dispersion Staining following the EPA method 600/R-93/116, July 1993, "Method for the Determination of Asbestos in Bulk Building Materials".

10.1.3 Analytical Results

The results of the analysis of the bulk samples are summarized in Table 10-1 below. The laboratory certificates of analysis and chain-of-custody documentation are included in Appendix F of this report. The structure currently occupying 2110 Haines St. was reportedly constructed circa 2005. Due to the recent construction date it is unlikely that asbestos-containing building materials are present within the building; as such, no samples were collected from this facility. However the roofing materials associated with this building have been assumed to contain asbestos.

Table 10-1 - Suspect ACM Bulk Sample Log

Sample Number	Material Description	Sample Location	Final Result/ Asbestos Type	Analysis Type	Friability
1645-01	12" Floor Tile (Red)	1645 Warehouse #2 East Area	1.90% Chrysotile	PLM-NOB	Non Friable
1645-02	12" Floor Tile (Black)	1645 Warehouse #2 East Area	<1% Chrysotile	PLM-NOB	Non Friable
1645-03	Plaster Ceiling (White)	1645 Warehouse #2 East Area	NAD	PLM	Friable
1645-04	Window Glazing (White)	1645 Warehouse #2 East Area	<1% Anthophyllite	PLM	Non Friable
1645-05	Wall Caulk (Tan)	1645 Warehouse #2 Southeast Area (Door Area)	<1% Chrysotile	PLM-NOB	Non Friable
1645-06	Door Caulk (Tan)	1645 Warehouse #2 Southeast Area (Door Area)	3.81% Chrysotile	PLM-NOB	Non Friable
1645-07	Transite Ceiling (White)	1645 Warehouse #2 Southeast Area (Door Area)	20% Chrysotile	PLM	Non Friable
1645-08	Window Glazing (Tan)	1645 Warehouse #2 Southeast Area (Door Area)	2% Chrysotile	PLM	Non Friable
1645-09	Pipe Wrap (White)	1645 Warehouse #2 Southeast Area (Door Area)	30% Chrysotile	PLM	Non Friable
1645-10	Sealant (Black)	1645 Warehouse #2 Southeast Area (Door Area)	<1% Chrysotile	PLM-NOB	Non Friable
1645-11	Door Caulk (White)	1645 Warehouse #2 Southwest Area (Bathroom/Sink Area)	NAD	PLM-NOB	Non Friable

Table 10-1 - Suspect ACM Bulk Sample Log

Sample Number	Material Description	Sample Location	Final Result/ Asbestos Type	Analysis Type	Friability
1645-12	Window Caulk (Black)	1645 Warehouse #2 Southwest Area (Bathroom/Sink Area)	<1% Chrysotile	PLM-NOB	Friable
1645-13	Plaster Ceiling (White)	1645 Warehouse #2 Southwest Area (Bathroom/Sink Area)	NAD	PLM	Friable
1645-14	Plaster Ceiling (White)	1645 Warehouse #2 South Area (Radiator Room)	NAD	PLM	Friable
1645-15	Window Glazing (Tan)	1645 Warehouse #2 South Area Radiator Room	NAD	PLM	Non Friable
1645-16	Drywall (White)	1645 Warehouse #1 West Area (Bathroom)	NAD	PLM	Friable
1645-17	Drywall (White	1645 Warehouse #1 West Area (Bathroom)	NAD	PLM	Friable
1645-18	Mastic (Beige)	1645 Warehouse #1 West Area (Entrance)	<1% Chrysotile	PLM-NOB	Non Friable
1645-19	Tar Insulation Material (Black)	1645 Warehouse #1 West Area (Entrance)	<1% Chrysotile	PLM-NOB	Non Friable
1645-20	Window Glazing (Tan)	1645 Warehouse #1 Southwest (Back Door Area)	NAD	PLM	Friable
1645-21	Drywall (White)	1645 Warehouse #1 North Area (Estate Room)	NAD	PLM	Friable
1645-22	Carpet Mastic (Beige)	1645 Warehouse #1 North Area (Estate Room)	NAD	PLM-NOB	Non Friable
1645-23	Drywall (White)	1645 Warehouse #1 North Area (Passage to Exit Room)	NAD	PLM	Friable
1645-24	2 x 2 Ceiling Tile	1645 Warehouse #1 North Area (Passage to Exit Room)	NAD	PLM	Friable
1645-25	Carpet Mastic (Beige)	1645 Warehouse #1 North Area (Passage to Exit Room)	4.90 % Tremolite	PLM-NOB	Non Friable
1645-26	Floor Mastic (Beige)	1645 Warehouse #1 West Area (Office Lunch Room)	NAD	PLM-NOB	Non Friable
1551-27	Window Glazing (White)	1551 Russell St. North Area (Upper Office)	NAD	PLM	Non Friable
1551-28	Cove Base Mastic	1551 Russell St. North Area (Upper Office)	2.21% Anthophyllite	PLM-NOB	Non Friable
1551-29	Floor Tile (Black)	1551 Russell St. North Area (Upper Office)	17.99% Chrysotile	PLM-NOB	Non Friable
1551-30	Drywall	1551 Russell St. North Area (Upper Office)	NAD	PLM	Friable
1551-31	Floor Tile (Tan)	1551 Russell St. North Area (Upper Office)	NAD	PLM-NOB	Non Friable
1551-32	Linoleum Floor (Green)	1551 Russell St. North Area (Upper Office)	NAD	PLM	Non Friable
1551-33	Floor Tile (Tan)	1551 Russell St. North Area (Upper Office)	NAD	PLM-NOB	Non Friable
1551-34	Floor Leveling Compound (Tan)	1551 Russell St. North Area (Lower Office)	NAD	PLM	Non Friable
1551-35	Window Glazing (White)	1551 Russell St. North Area (Lower Office)	NAD	PLM	Non Friable
1551-36	9" Floor Tile (White)	1551 Russell St. North Area (Lower Office)	8% Chrysotile	PLM	Non Friable
1551-37	9" Floor Tile (Green)	1551 Russell St. North Area (Lower Office)	3% Chrysotile	PLM	Non Friable
1551-38	Floor Tile Mastic (Black)	1551 Russell St. North Area (Lower Office)	14.16% Chrysotile	PLM-NOB	Non Friable

Table 10-1 - Suspect ACM Bulk Sample Log

Sample Number	Material Description	Sample Location	Final Result/ Asbestos Type	Analysis Type	Friability
1551-39	Window Glazing (Pink)	1551 Russell St. Northeast Area (Outside Office)	NAD	PLM	Friable
1551-40	Floor Tile (Black)	1551 Russell St. Northeast Area (Outside Office)	NAD	PLM-NOB	Non Friable
1551-41	Door Caulk (White)	1551 Russell St. Warehouse	NAD	PLM-NOB	Non Friable
1551-42	Window Glazing (Grey)	1551 Russell St. Warehouse	NAD	PLM	Friable
1551-43	Insulation - Calmeg (White)	1551 Russell St. Warehouse	15% Chrysotile	PLM	Friable
1551-44	Drywall (White)	1551 Russell St. Warehouse	NAD	PLM	Friable
1551-45	Window Glazing (Grey)	1551 Russell St. Warehouse Southwestern Area (Break Room)	<1% Anthophyllite	PLM	Friable
1551-46	Wall Plaster (White)	1551 Russell St. Warehouse Southwestern Area (Break Room)	NAD	PLM	Friable
1551-47	Tar Material on Flashing (Black)	1551 Russell St. Northeast Area (Outside Office)	2.14% Chrysotile	PLM-NOB	Non Friable
1551-48	Tar Layer (Black)	1551 Russell St. Northeast Area (Outside Office)	NAD	PLM-NOB	Non Friable
1551-49	Red Shingle (Black Base)	1551 Russell St. Northeast Area (Outside Office)	NAD	PLM-NOB	Non Friable
1525-50	Window Glazing (White)	1525 Warehouse South Area (Small Brick Entrance)	2% Chrysotile	PLM	Friable
1525-51	Drywall on Ceilings (Tan)	1525 Warehouse South Area (Small Brick Entrance)	NAD	PLM	Friable
1525-52	12" Floor Tile (Beige)	On the 1525 Warehouse East Area (Women's Bathroom)	NAD	PLM-NOB	Non Friable
1525-53	Window Glazing (White)	1525 Warehouse Southwest Side	NAD	PLM	Friable
1525-54	Roof Decking (White)	1525 Warehouse Floor	NAD	PLM	Non Friable
1501-55	Drywall on Walls (White)	In 1501 Warehouse North Area (Office)	NAD	PLM	Friable
1501-56	Window Glazing (White)	In 1501 Warehouse South Area	<1% Chrysotile	PLM	Non Friable
1501-57	12" Floor Tile (Grey)	In 1501 Warehouse North Area (Office)	NAD	PLM-NOB	Non Friable
1501-58	Wood Panel Mastic (Tan)	In 1501 Warehouse North Area (Office)	NAD	PLM-NOB	Non Friable
1501-59	9" Floor Tile (Tan)	In 1501 Warehouse North Area (Office)	15.05% Chrysotile	PLM-NOB	Non Friable
1501-60	Drywall on Ceilings (White)	In 1501 Warehouse North Area (Office)	NAD	PLM	Friable
1501-61	Carpet Mastic (Beige)	In 1501 Warehouse North Area (Office)	NAD	PLM-NOB	Non Friable
1501-62	12" Floor Tile (Green)	In 1501 Warehouse Northeast Area (Office)	1.27% Chrysotile	PLM-NOB	Non Friable
1501-63	12" Floor Tile (White)	In 1501 Warehouse Northeast Area (Office)	2.15% Chrysotile	PLM-NOB	Non Friable
1501-64	3" Cove Base (Black)	In 1501 Warehouse Northeast Area (Office)	NAD	PLM	Non Friable
1501-65	Cove Base Mastic (Tan)	In 1501 Warehouse Northeast Area (Office)	NAD	PLM-NOB	Non Friable
1501-66	Floor Tile Mastic (Black)	In 1501 Warehouse Northeast Area (Office)	NAD	PLM	Non Friable

Table 10-1 - Suspect ACM Bulk Sample Log

Sample Number	Material Description	Sample Location	Final Result/ Asbestos Type	Analysis Type	Friability
1501-67	Ceiling Tile (White)	In 1501 Warehouse Northeast Area (Office)	NAD	PLM-NOB	Friable
1501-68	12" Floor Tile (Yellow)	In 1501 Warehouse Northeast Area (Office)	<1% Chrysotile	PLM-NOB	Non Friable
1501-69	Floor Tile Mastic (Black)	In 1501 Warehouse Northeast Area (Office)	3% Chrysotile	PLM	Non Friable
1501-70	Window Glazing (Grey)	1501 Warehouse East Area (Chemical Processing Area)	NAD	PLM-NOB	Non Friable
1501-71	Carpet Mastic (Beige)	1501 Warehouse Northeast Area (Front Main Office Area)	NAD	PLM-NOB	Non Friable
1501-72	Roof Decking (White)	1501 Warehouse Northeast Area (Upper Area)	NAD	PLM	Non Friable
1501-73	Window Glazing (White)	Exterior Of 1525 Warehouse (South Side)	<1% Chrysotile, <1% Anthophyllite	PLM-NOB	Non Friable
1501-74	Window Caulk (White) Brittle	Exterior Of 1501 Warehouse (Northeast Side)	9.97% Anthophyllite	PLM-NOB	Friable
1501-75	Door Caulk (Tan)	Exterior Door of 1501 Warehouse (South Side)	1.51% Chrysotile	PLM-NOB	Non Friable
1501-76	Door Caulk (Tan)	Exterior Door of 1501 Warehouse (Southwest Side)	<1% Chrysotile	PLM-NOB	Non Friable
1501-77	Door Caulk (Tan)	Exterior Door of 1501 Warehouse (North Side)	NAD	PLM-NOB	Non Friable
1645-78	Mastic on Floor (Beige)	1645 Warehouse North Area (Estate Room)	NAD	PLM-NOB	Non Friable
Note: NAD – No asbestos detected					

The EPA defines an asbestos containing material as "any material containing greater than one percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, Section 1, PLM." Based on the results of the asbestos analysis, twenty (20) of the seventy-eight (78) samples of suspect ACMs were determined to contain greater than 1% asbestos by PLM analysis, and are therefore considered ACM under the EPA's definition.

10.1.4 Findings From ACM Screening

Based on the analysis results and assumptions made regarding asbestos content of probable ACMs, the following Homogenous Material Table (Table 10-2) describes each homogenous material category in terms of: material type, associated sample numbers, analysis results, and total quantity of each positive homogenous material found throughout each of the buildings. Positive materials have been shaded.

Table 10-2 - Homogenous Material Table

Material Description	Location in Building	Sample Numbers	Sample Results	Quantity
1645 Warner Street Warehouse #2				
12" Floor Tile (Black)	Floor of the Door Storage Area	1645-02	<1% Chrysotile	
12" Floor Tile (Red)	Floor of the Door Storage Area	1645-01	1.90% Chrysotile	750 SF
Door Caulk (Tan)	On Exterior Door and Wall next to Roll up Door of the Door Area	1645-06	3.81% Chrysotile	26 LF

Table 10-2 - Homogenous Material Table

Material Description	Location in Building	Sample Numbers	Sample Results	Quantity
Door Caulk (White)	On Door Between Bathroom/Sink Area and Radiator Cover Room	1645-11	NAD	
Fire Door	In Warehouse #2, Next to Northeast Entrance	Not Sampled	Assumed	1 EA
Pipe Wrap (White)	On Exposed Pipe within the Door Area	1645-09	30% Chrysotile	2 LF
Plaster Ceiling (White)	Ceiling Within Warehouse #2	1645-03, 1645-13, 1645-14	NAD, NAD, NAD	
Roofing Materials	Roof	Not Sampled	Assumed	12,500 SF
Sealant (Black)	On Pipe in the Door Area	1645-10	<1% Chrysotile	
Transite Ceiling (White)	Exposed Ceiling	1645-07	20% Chrysotile	6750 SF
Wall Caulk (Tan)	On Wall Next to Bay Door within the Door Area	1645-05	<1% Chrysotile	
Window Glazing (Tan)	On Windows on South Side of Warehouse	1645-08, 1645-15	2% Chrysotile, NAD	TBD
Window Caulk (Black)	On Northern Windows of Warehouse	1645-12	<1% Chrysotile	
Window Glazing (White)	On Interior Windows Between Walls	1645-04	<1% Anthophyllite	
1645 Warner Street Warehouse #1				
2 x 2 Ceiling Tile	Drop Ceiling within Back Office Area	1645-24	NAD	
Carpet	On Floor of the Estate Room	Not Sampled	Assumed Due to Mastic	1600 SF
Carpet Mastic (Beige)	Beneath Carpet in the Estate Room	1645-22, 1645-25	NAD,4.90 % Tremolite	1600 SF
Drywall (White)	On Ceiling	1645-17, 1645-23	NAD, NAD	
Drywall (White)	On Walls	1645-16, 1645-21	NAD, NAD	
Mastic (Beige)	On Floor	1645-18, 1645-26, 1645-78	<1% Chrysotile, NAD, NAD	
Roofing Materials	Roof (Exposed)	Not Sampled	Assumed	14,000 SF
Tar Insulation Material (Black)	On Copper Lines in opposite side of cash register	1645-19	<1% Chrysotile	
Window Glazing (Tan)	On Windows	1645-20	NAD	
1551 Russell Street				
9" Floor Tile (Green)	Beneath Carpet in Lower Office Area	1551-37	3% Chrysotile	410 SF
9" Floor Tile (White)	Beneath Carpet in Lower Office Area	1551-36	8% Chrysotile	410 SF
Cove Base Mastic	Along Bottom of Walls In Upper Office Area	1551-28	2.21% Anthophyllite	210 LF
Door Caulk (White)	On Doors In Front Warehouse	1551-41	NAD	
Drywall (White)	On Back Wall of Front Warehouse	1551-30, 1551-44	NAD, NAD	
Fire Door	Within Office Area North Area	Not Sampled	Assumed	8 EA

Table 10-2 - Homogenous Material Table

Material Description	Location in Building	Sample Numbers	Sample Results	Quantity
Floor Leveling Compound (Tan)	Beneath The Green Linoleum Floor in Lower Office Area	1551-34	NAD	
Floor Tile (Black)	Beneath Carpet on upper level office (North Area)	1551-29	17.99% Chrysotile	820 SF
12" Floor Tile (Black Mottled)	On Floor of outside office	1551-40	NAD	
Floor Tile (Tan)	Beneath Tan Carpet of upper office area	1551-31, 1551-33	NAD, NAD	
Floor Tile Mastic (Black)	Lower Office Area Beneath 9" White and Green Floor Tile	1551-38	14.16% Chrysotile	820 SF
Pipe Insulation - (White)	Within Warehouse Area	1551-43	15% Chrysotile	450 LF
Linoleum Floor (Green)	On Top Layers in Bathroom	1551-32	NAD	
Red Shingle (Black Base)	Exposed Layer of the outside office	1551-49	NAD	
Roofing Materials	Roof	Not Sampled	Assumed	28,000 SF
Tar Layer (Black)	Beneath Shingles on outside office	1551-48	NAD	
Tar Material on Flashing (Black)	On Exterior of outside Office	1551-47	2.14% Chrysotile	75 SF
Wall Plaster (White)	On Wall	1551-46	NAD	
Window Glazing (White)	On Windows Front Office Area	1551-27, 1551-35	NAD, NAD	
Window Glazing (Grey)	On Windows In Warehouse	1551-42, 1551-45	NAD, <1% Anthophyllite	
Window Glazing (Pink)	On Windows on outside Office	1551-39	NAD	
1525 Russell Street				
12" Floor Tile (Beige)	Floor	1525-52	NAD	
Drywall on Ceilings (Tan)	On Ceilings	1525-51	NAD	
Fire Doors	Between Warehouse Entrances	Not Sampled	Assumed	3 EA
Roof Decking (White)	Roof, Between the Tar Layer and Drywall Layer	1525-54	NAD	
Roofing Materials	Roof	Not Sampled	Assumed	40,000 SF
Window Glazing (White)	On Windows of Small brick entrance(South Side)	1525-50	2% Chrysotile	30 LF
Window Glazing (White)	On Windows in Warehouse	1525-53	NAD	
1501 Russell Street				
12" Floor Tile (Green)	On Floor North Office Area	1501-62	1.27% Chrysotile	64 SF
12" Floor Tile (Grey)	On Floor North Office Area	1501-57	NAD	
12" Floor Tile (White)	On Floor North Office Area	1501-63	2.15% Chrysotile	64 SF
12" Floor Tile (Yellow)	On Floor North Office Area	1501-68	<1% Chrysotile (Positive due to mastic)	640 SF

Table 10-2 - Homogenous Material Table

Material Description	Location in Building	Sample Numbers	Sample Results	Quantity
3" Cove Base (Black)	Along Bottom of Walls	1501-64	NAD	
9" Floor Tile (Tan)	On Floor	1501-59	15.05% Chrysotile	264 SF
Carpet Mastic (Beige)	Beneath Carpet	1501-61, 1501-71	NAD, NAD	
Ceiling Tile (White)	Exposed Ceiling	1501-67	NAD	
Smokestack Materials (Refractory Brick / Packings)	Southern Portion of 1501 Warehouse	Not Sampled	Assumed	TBD
Cove Base Mastic (Tan)	Beneath Black Cove Base	1501-65	NAD	
Door Caulk (Tan)	On Door of Rear of Building	1501-75, 1501-76, 1501-77	1.51% Chrysotile, <1% Chrysotile, NAD	75 LF
Drywall on Ceilings (White)	On Ceilings	1501-60	NAD	
Drywall on Walls (White)	On Walls	1501-55	NAD	
Fire Doors	Between Building Entrances	Not Sampled	Assumed	11 EA
Floor Tile Mastic (Black)	Beneath 12 Blk/Wht Floor Tile North Office Area	1501-66	NAD	
Floor Tile Mastic (Black)	Beneath 12" Yellow Floor Tile North Office Area	1501-69	3% Chrysotile	640 SF
Pipe Fitting Insulation	Above Ceiling Tiles in 1501 Office Area	Not Sampled	Assumed	10 EA
Pipe Insulation	Above Ceiling Tiles, Along Ceilings	Not Sampled	Assumed	1850 LF
Roof Decking (White)	On Ceilings	1501-72	NAD	
Roofing Materials	Roof	Not Sampled	Assumed	80,000 SF
Window Caulk (White) Brittle	On 3" Exterior Windows	1501-74	9.97% Anthophyllite	500 LF
Window Glazing (Grey)	On Windows	1501-70	NAD	
Window Glazing (White)	On Windows	1501-56	<1% Chrysotile	
Window Glazing (White)	On Exterior Windows	1501-73	<1% Chrysotile, <1% Anthophyllite	
Wood Panel Mastic (Tan)	Beneath Wood Panel North Office Area	1501-58	NAD	

Note : NAD – No asbestos detected
SF-Square feet
LF- Linear feet
TBD: To be determined after further investigation.

Clarification needs to be made concerning the methods and underlying rationale used to determine the quantity and location of several of the materials considered to be asbestos containing materials. The following are descriptions of materials determined to be asbestos containing materials at the 1645 Warner Street Warehouse #1:

- **Carpet Mastic (beige):** KCI has determined that the beige carpet mastic located beneath the beige carpet within the warehouse (Estate Room) shall be treated as ACM. The mastic is located on an elevated level in the northern portion of the warehouse.

- **Roofing Materials:** For the purpose of this inspection, KCI has assumed that the roofing materials contain asbestos. For the purposes of this report roofing materials shall include, but are not limited to asphalt roofing products, including built-up roofing; asphalt-containing single ply membrane systems; asphalt shingles; asphalt-containing underlayment felts; asphalt-containing roof coatings and mastics; asphalt-containing base flashings; and ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches).

The following are descriptions of materials determined to be asbestos containing materials at the 1645 Warner Street Warehouse #2:

- **12" Floor Tile (red):** KCI has determined that the red 12" floor tile located on the floor of the northeastern portion of the warehouse (door storage area) shall be treated as ACM.

- **Door Caulk (tan):** KCI has determined that the door caulk located along the perimeter of the roll up door and on an interior wall shall be treated as ACM. The caulk is located within the eastern portion of the warehouse (adjacent to and east of the door storage area).

- **Fire Door:** For the purpose of this inspection, KCI has assumed that one (1) fire door located inside the eastern portion of the warehouse (adjacent to and east of the door storage area) contain asbestos.

- **Pipe Wrap:** KCI has determined that the white pipe wrap located on the exposed pipe on the western wall of the warehouse (adjacent to and east of the door storage area) shall be treated as ACM. The pipe and associated pipe wrap extends approximately 1 foot into the room and appears to be cut.

- **Roofing Materials:** For the purpose of this inspection, KCI has assumed that the roofing materials contain asbestos. For the purposes of this report roofing materials shall include, but are not limited to asphalt roofing products, including built-up roofing; asphalt-containing single ply membrane systems; asphalt shingles; asphalt-containing underlayment felts; asphalt-containing roof coatings and mastics; asphalt-containing base flashings; and ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches).

The following are descriptions of materials determined to be asbestos containing materials at the 1551 Russell Street Warehouse.

- **9" Floor Tiles:** KCI has determined that the 9" green and 9" white floor tiles located beneath the carpet and in the closet of the lower office area shall be treated as ACM. KCI assumed that the floor tile is located throughout the lower office area.

- **Floor Tile Mastic (black):** KCI has determined that the black floor tile mastic beneath the 9" black and white floor tiles in the lower office area shall be treated as ACM.

- **Floor Tile (Black):** KCI has determined that the black floor tile located beneath the carpet on the upper office area shall be treated as ACM. The size of the floor tile was unable to be determined as a result of the carpet.

- **Cove Base Mastic:** KCI has determined that the mastic beneath the blue cove base located along the bottoms of the walls of the upper offices shall be treated as ACM.

- **Fire Door:** For the purpose of this inspection, KCI has assumed that one (1) fire door located between the warehouse and lower office area contain asbestos.

- **Pipe Insulation (white):** KCI has determined that the white preformed pipe insulation (cal-mag) located in all areas of the warehouse except the office portion, shall be treated as ACM. The exposed insulation material was located along the roof of the warehouse and on one vertical pipe on the exterior of the northeastern side of the warehouse.

- **Roofing Materials:** For the purpose of this inspection, KCI has assumed that the roofing materials contain asbestos. For the purposes of this report roofing materials shall include, but are not limited to asphalt roofing products, including built-up roofing; asphalt-containing single ply membrane systems; asphalt shingles; asphalt-containing underlayment felts; asphalt-containing roof coatings and mastics; asphalt-containing base flashings; and ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches).

- **Tar Material on Flashing (black):** KCI has determined that the black tar material located on the flashing of the warehouse office shall be treated as ACM. The warehouse office is located on the northeastern portion of the property. The tar material is beneath the red shingles which is used as siding material.

The following are descriptions of materials determined to be asbestos containing materials at the 1525 Russell Street Warehouse.

- **Fire Doors:** For the purpose of this inspection, KCI has assumed that three (3) fire doors located between the connecting warehouses contain asbestos.

- **Window Glazing (white):** KCI has determined that the white window glazing located on the windows of the brick building shall be treated as ACM. This building is located attached to the southern portion of the warehouse.

- **Roofing Materials:** For the purpose of this inspection, KCI has assumed that the roofing materials contain asbestos. For the purposes of this report roofing materials shall include, but are not limited to asphalt roofing products, including built-up roofing; asphalt-containing single ply membrane systems; asphalt shingles; asphalt-containing underlayment felts; asphalt-containing roof coatings and mastics; asphalt-containing base flashings; and ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches).

The following are descriptions of materials determined to be asbestos containing materials at the 1501 Russell Street Warehouse.

- **Floor Tile:** A total of five floor tiles were sampled in the warehouse. Of the five floor tiles, KCI has determined that the 12" green floor tile, 12' white floor tile, and 9" tan floor tile located on the northwestern portions of the warehouse shall be treated as ACM. The 12" green and white floor tiles are located in one office and the 9" green tile is located in a different office within the warehouse.

- **Floor Tile Mastic (black):** KCI has determined that the black floor tile mastic located beneath the 12" yellow floor tile shall be treated as ACM. The mastic and associated floor tile is located in an office located within the northern portion of the warehouse.

- **Pipe Insulation (white):** For the purpose of this inspection, KCI has assumed that the white preformed pipe insulation (cal-mag) located in all areas of the warehouse shall be treated as ACM. The insulation is either exposed along the warehouse ceilings or above the ceiling tiles of the office areas.

- **Pipe Fitting Insulation (white):** Asbestos-containing pipe fitting insulation was observed on visible pipes located above drop ceilings of the northeastern office area of the warehouse.

- **Door Caulk (tan):** KCI has determined that the tan door caulk located on the southeastern exterior door shall be treated as ACM.

- **Fire Doors:** For the purpose of this inspection, KCI has assumed that eleven (11) fire doors located between warehouse dividing walls contain asbestos.

- **Roofing Materials:** For the purpose of this inspection, KCI has assumed that the roofing materials contain asbestos. For the purposes of this report roofing materials shall include, but are not limited to asphalt roofing products, including built-up roofing; asphalt-containing single ply membrane systems; asphalt shingles; asphalt-containing underlayment felts; asphalt-containing roof coatings and mastics; asphalt-containing base flashings; and ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches).

- **Window Caulk (white/brittle):** KCI has determined that the brittle, white window caulk located along the parameter of the exterior 3" window systems shall be treated as ACM.

- **Smokestack Materials/Packaging:** KCI has assumed that smokestack materials and packaging materials located in the southeastern portion of the warehouse contain asbestos.

10.2 Lead-based Paint Screening

KCI's Lead Inspector Ms. Tehsin Aurangabadwala performed a LBP screening of the subject site in order to generally characterize interior and exterior painted surfaces for lead content. The following painted structures were surveyed for LBP: doors, door components, window components, ceilings, walls, baseboards, cabinets, ceramic tiles, support beams, and bathroom fixtures.

As noted above, the LBP screening was only performed at 1501, 1525, and 1551 Russell St., 1645 Warner St., and 2110 Haines St. The six WSI properties were not evaluated during this screening. Investigation of these properties will be performed at a later time and the results of those findings will be submitted under separate cover.

10.2.1 LBP Screening Methods

The testing for lead content in paints was performed with a SCITEC MAP-4 x-ray fluorescence (XRF) Spectrum Analyzer, an instrument which detects lead in the field by reading the fluorescence emanating from a painted surface when exposed to small amounts of radiation. The XRF used for the screening was a SCITEC MAP-4, serial #1415, which is licensed in the State of Maryland. XRF readings are reported

in mg/cm^2, a mass per area reading. LBP is defined as >0.7 mg/cm^2 by the MDE and >1.0 by the U. S. Dept. of Housing and Urban Development (HUD). This LBP screening included one hundred and forty-seven (147) XRF readings including twelve (12) calibration readings.

10.2.2 LBP Screening Results

Table 10.3 below summarizes the positive results of the LBP screening. The LBP datasheets showing the results from each of the XRF-screening are included in Appendix G of this report.

Table 10-3 - Results of Positive XRF Readings

Test Number	Substrate	Component	Color	Location / Description	XRF Reading (mg/cm^2)	LBP
1645-77	Block	Wall	White	1645 Warner St. Warehouse No 1, Exterior wall of warehouse 1	1.1	Positive
2645-71	Ceramic	Sink	Off-white	1645 Warner St. Warehouse No 1, Women's lounge	0.8	Positive
2645-69	Ceramic	Toilet tank	White	1645 Warner St. Warehouse No 1, Women's lounge	0.7	Positive
2645-62	Wood	Wall	Bluish Grey	1645 Warner St. Warehouse No 1, Wall made of door panels, side D	8.9	Positive
2645-61	Wood	Wall	Pink	1645 Warner St. Warehouse No 1, Wall made of door panels, side D	9.1	Positive
2645-59	Brick	Wall	White	1645 Warner St. Warehouse No 1, Estate room, side C	0.8	Positive
1645-57	Concrete	Floor	Yellow	1645 Warner St. Warehouse No 1, Estate room	1.0	Positive
1645-55	Block	Wall	White	1645 Warner St. Warehouse No 1, Interior shutter room in store room 1	0.8	Positive
1645-52	Metal	Stair	White	1645 Warner St. Warehouse No 1, Stair landing	9.9	Positive
1645-49	Block	Wall	White	1645 Warner St. Warehouse No 1, Wall on side B	0.9	Positive
1645-46	Wood	Wall	Dark green	1645 Warner St. Warehouse No 1, Above entrance door, side D	2.3	Positive
1645-42	Block	Wall	Grey	1645 Warner St. Warehouse No 2, Wood planks area in radiator room	1.1	Positive
1645-38	Wood	Door panel	White	1645 Warner St. Warehouse No 2, Entrance door to radiator room	1.1	Positive
1645-37	Wood	Door frame	White	1645 Warner St. Warehouse No 2, Entrance door to door panel room	0.7	Positive
1645-34	Block	Wall	White	1645 Warner St. Warehouse No 2, Wood planks area, side A	0.7	Positive
1645-27	Metal	Support beam	White	1645 Warner St. Warehouse No 2, Tub/sink room	2.5	Positive
1645-25	Wood	Door panel	White	1645 Warner St. Warehouse No 2, Door between radiator cover room and tub/sink area	2.1	Positive
1645-22	Metal	Support beam	White	1645 Warner St. Warehouse No 2, Tub/sink area, Beam at entrance, side B	6.8	Positive
1645-16	Block	Wall	Green	1645 Warner St. Warehouse No 2, Side A	0.9	Positive
1645-15	Wood	Door	Grey	1645 Warner St. Warehouse No 2, Side A	1.6	Positive
1645-13	Block	Wall	Green	1645 Warner St. Warehouse No 2, Side A	1.2	Positive
1645-09	Wood	Wall	White	1645 Warner St. Warehouse No 2, Side D	1.1	Positive
1645-08	Wood	Wall	Brown	1645 Warner St. Warehouse No 2, Side C, wall made of door panels	9.6	Positive
1645-07	Wood	Wall	White	1645 Warner St. Warehouse No 2, Side C, wall made of door panels	5.7	Positive
1645-05	Wood	Door frame	White	1645 Warner St. Warehouse No 2, Side C	3.7	Positive
1645-04	Wood	Door frame	White	1645 Warner St. Warehouse No 2, Side C	9.2	Positive
1551-99	Metal	Stand for tank	Green	1551 Russell Street, Stand for 2000 gal chemical tank - back of warehouse	1.7	Positive

Table 10-3 - Results of Positive XRF Readings

Test Number	Substrate	Component	Color	Location / Description	XRF Reading (mg/cm^2)	LBP
1551-96	Wood	Wall	Dark green	1551 Russell Street, Side A (Rear door)	0.8	Positive
1551-95	Wood	Fire extinguisher box	Red	1551 Russell Street, Side B	1.8	Positive
1551-93	Block	Wall	White	1551 Russell Street, Warehouse, side B	1.1	Positive
1551-92	Block	Wall	White	1551 Russell Street, Warehouse, side A	1.0	Positive
1551-89	Wood	Door frame	Peach	1551 Russell Street, Lower level office, side C	1.1	Positive
1551-87	Wood	Window frame	Light blue	1551 Russell Street, Foyer, side A	1.6	Positive
1551-86	Wood	Door	White	1551 Russell Street, Door from foyer towards office, side A	1.1	Positive
1551-84	Ceramic	Toilet bowl	White	1551 Russell Street, Toilet	1.1	Positive
1551-83	Ceramic	Toilet tank	White	1551 Russell Street, Toilet	0.7	Positive
1551-103	Wood	Door	Green	1551 Russell Street, Locker room	5.6	Positive
1551-102	Block	Wall	White	1551 Russell Street, Locker room	0.8	Positive
1525-124	Metal	Door	Dark green	1525 Russell Street, Rear room in warehouse	0.8	Positive
1525-123	Metal	Tank	Orange	1525 Russell Street, Chemical storage tank , rear room in warehouse	2.5	Positive
1525-116	Brick	Wall	Light grey	1525 Russell Street, Warehouse	1.1	Positive
1525-114	Brick	Wall	Red	1525 Russell Street, Brick door entrance	1.1	Positive
1525-111	Metal	Support beam	Orange	1525 Russell Street, Shed for chemical storage, opp, Dona Lee's office	2.2	Positive
1501-144	Block	Wall	Brown	1501 Russell Street, Exterior of warehouse	0.8	Positive
1501-143	Wood	Door	Dark green	1501 Russell Street, Warehouse, upper level, above staging area	0.7	Positive
1501-142	Block	Wall	White	1501 Russell Street, Warehouse, upper level, above staging area	0.7	Positive
1501-140	Metal	Door	Dark grey	1501 Russell Street, Warehouse, chemical processing area (totes)	12.6	Positive
1501-139	Wood	Pillar	White	1501 Russell Street, Warehouse, chemical processing area	1.2	Positive
1501-138	Concrete	Pillar	Yellow	1501 Russell Street, Warehouse, chemical processing area	2.0	Positive
1501-129	Block	Wall	Grey	1501 Russell Street, Warehouse	0.8	Positive
1501-128	Wood	Pillar	Red	1501 Russell Street, Warehouse	0.8	Positive
1501-127	Wood	Pillar	White	1501 Russell Street, Warehouse	1.8	Positive

Table Notes: Side A in a room faces the front of the property (facing the road), Side B, C and D follows in clockwise direction respectively.

Based on the results of the LBP survey, it was determined that the following surfaces within the 1645 Warner Street Warehouse contain LBP or have lead-containing finishes or materials:

- Block Wall (White, Grey, and Green)
- Wood Wall (White, Brown, Bluish Grey, Pink, and Dark Green)
- Wood Door Frame (White)
- Wood Door Panel (White)
- Wood Door (Grey)
- Ceramic Sink/Toilet (White, and Off-White)
- Concrete (Yellow)
- Metal Support Beam (White)
- Brick Wall (White)

Based on the results of the LBP survey, it was determined that the following surfaces within the 1551 Russell Street Warehouse contain LBP or have lead-containing finishes or materials:

- Block Wall (White)
- Wood Wall (Dark Green)
- Wood Door Frame (Peach)
- Wood Door Panel (White)
- Wood Window Frame (Light Blue)
- Wood Fire Extinguisher Box (Red)
- Wood Door (White, Green)
- Ceramic Sink/Toilet (White)
- Metal Stand for 2000 Gal Chemical Tanks (Green)

Based on the results of the LBP survey, it was determined that the following surfaces within the 1525 Russell Street Warehouse contain LBP or have lead-containing finishes or materials:

- Brick Wall (Red, Light Grey)
- Metal Door (Dark Green)
- Metal Support Beam (Orange)
- Metal Chemical Storage Tank (Orange)

Based on the results of the LBP survey, it was determined that the following surfaces within the 1501 Russell Street Warehouse contain LBP or have lead-containing finishes or materials:

- Block Wall (Brown, White, Grey, Light Grey)
- Metal Door (Dark Grey)
- Concrete Pillar (Yellow)
- Wood Door (Dark Green)
- Wood Pillar (White, Red)

The structure currently occupying 2110 Haines St. was reportedly constructed circa 2005. Due to the recent construction date it is unlikely that LBP exists within the building, as such this facility was omitted from the LBP Screening.

11.0 CONCLUSIONS AND RECOMENDATIONS

11.1 Conclusions

KCI was retained by the Baltimore Development Corporation (Client) to perform a Phase II Environmental Site Assessment (ESA) of the subject site. KCI has completed the Phase II ESA in general accordance with our proposal, dated August 16, 2007 and the site-specific Sampling and Analysis Plan (SAP), dated July 13, 2007. The scope of this assessment included a geophysical survey, multimedia sampling and laboratory analysis, and a limited Asbestos-Containing Materials (ACM) and Lead-Based Paint (LBP) survey. The following is a summary of KCI's conclusions from this assessment:

- Due to access restrictions, KCI performed geophysical surveys at only two (2) of the original (5) areas at which geophysical surveys were originally planned. Specifically, KCI completed geophysical surveys at suspected UST locations within the 1501 Russell Street and 1645 Warner

Street parcels of the subject site. The findings from these surveys confirmed the presence of a UST at 1501 Russell Street. The UST is located beneath the rear sidewalk of the 1501 Russell Street building, approximately 50 feet west of the intersection of Warner Street and Worcester Street. The findings of the geophysical investigation at the 1645 Warner Street parcel demonstrated that no UST was present within the area surveyed.

- KCI collected a total of fifty-two (52) surface and subsurface soil samples from twenty-six (26) borings advanced across the subject site. The findings of this assessment revealed that concentrations of several PAH compounds, particularly benzo(a)pyrene, were detected in soils located on the southeastern portion of the project site, southeast of Warner St. These soils typically possessed concentrations of benzo(a)pyrene and/or other PAHs in excess of the MDE CUS for residential and/or non-residential soils. Based on the apparent pattern of PAH "hits", KCI concludes that the PAH contamination may be attributable to fill material from the Great Baltimore Fire of 1904.

- The findings of this assessment indicate that elevated concentrations of heavy metals (i.e., above the MDE non-residential cleanup standards) are present in surface and subsurface soils across much of the project site. Specifically, elevated levels of arsenic, lead, and mercury were detected. KCI concludes that these findings concur with a 2006 MDE report describing the presence of arsenic, lead, and mercury in the fill soils comprising the upper six feet of the six "waterfront" parcels. However, KCI also concludes that the findings from the current investigation demonstrate the heavy metal contamination is not just isolated to the "waterfront" parcels, but rather extends across the project site.

- KCI collected a total of nine (9) groundwater samples from selected borings. Analytical results from this investigation revealed the presence of trichloroethene (TCE), tetrachloroethene (PCE), and dichloroethene (DCE) at concentrations exceeding relevant MDE cleanup standards in borings located on and near the Maryland Chemical facility (i.e., 1551, 1525, and 1501 Russell Street). Historically these three properties have been utilized for the manufacturing, storing, blending and/or repackaging of chemicals and pesticides. The elevated concentrations of TCE, PCE, and DCE appear to have resulted from historical releases at these properties. KCI also concludes that the northern end of 1551 Russell Street is potentially a source area for some PCE impacts observed in groundwater.

- The geophysical survey performed as part of this investigation revealed the presence of one UST along the central-southeastern property boundary at 1501 Russell St. KCI collected both soil and groundwater samples from a boring advanced immediately adjacent this tank (B-26). Analytical results revealed concentrations of TPH-GRO, TPH-DRO, and MTBE above the MDE cleanup standards. Petroleum contamination was also present in groundwater samples collected from borings advanced directly downgradient from 1501 Russell Street. KCI concludes that a petroleum release has occurred from the current and/or historic USTs at this property, resulting in petroleum impacts to groundwater.

- Groundwater collected at boring location B-01 (1551 Russell St.), possessed concentrations of both TPH-GRO and TPH-DRO in excess of MDE groundwater standards. Since this boring was advanced in an upgradient location relative to the rest of the site, KCI concludes that 1551 Russell Street may be a receptor for petroleum-impacted groundwater migrating from an off-site source.

- Soil and groundwater collected from Boring B-17 possessed concentrations of TPH-DRO in excess of the applicable MDE CUS. Based on the depths and concentrations of TPH-DRO that were detected, KCI concludes that the TPH-DRO contamination observed at B-17 was the result of a surface spill.

Moreover, boring B-17 was advanced south of 2104 Worchester Street, adjacent to several concrete pads. KCI concludes that the concrete pads may historically have been used to support aboveground fuel tanks.

- Soil collected from Boring B-21, at a depth of fourteen feet below the ground surface, had concentrations of TPH-DRO above the MDE-CUS for non-residential soils. KCI observed petroleum-impacted soils in this boring from 3.5 – 12 feet bgs. KCI concludes that these petroleum-impacted soils were included within fill that was historically placed on the property. As discussed previously, the upper six feet of soil located on this portion of the project site is apparently comprised of fill material.

- Boring B-10 was advanced adjacent to an abandoned UST located between the 1645 Warner Street and 2102 Oler Street properties. The soil sample from this boring (acquired at 14 feet below grade) indicated relatively minor amounts of TPH-DRO contamination. Based on field screening and visual inspection of soils in this boring, no groundwater sample was collected. However, KCI concludes that some petroleum impacted soil and groundwater may exist in the vicinity of this UST.

- A total of six (6) VOC analytes were detected in four (4) of the soil gas samples collected for this assessment. These included benzene, hexane, pentane, 1,1,1-trichloroethene, TCE, and vinyl chloride. The concentrations of two (2) of these analytes, hexane and vinyl chloride, exceeded the EPA target indoor air concentration hazard index. This soil gas sample was collected from a boring advanced south of 2104 Worchester Street.

11.2 Recommendations

- KCI recommends that a copy of this report be provided to the MDE VCP for review, along with the VCP application and the Phase I ESA reports completed previously. Because MDE did not have the opportunity to review the Work Plan for this assessment prior to its completion, the Client should anticipate MDE requirements for additional or supplemental Phase II ESA investigations at the subject site.

- KCI recommends that a site-specific Response Action Plan (RAP) be developed in cooperation with MDE staff following their review of the Phase I and II ESA reports for the subject site. Following MDE approval of the RAP, site development activities should be performed in conformance with the relevant provisions of the approved RAP. Proper implementation of site development activities related to the RAP should be documented during construction.

- KCI recommends that the geophysical survey, asbestos containing material survey, and lead-based paint screening be completed at the six (6) properties owned by Warner Street, Inc. once access to these properties is permitted. Once access to the property is permitted, KCI also recommends that the drums and storage containers within the warehouse at 1501 Warner Street be properly characterized, staged, and removed from the site for proper disposal in accordance with applicable local, state and federal regulations.

- The findings of this assessment have revealed elevated concentrations of lead and other heavy metals in surface and subsurface soils samples acquired throughout the site. Some of these concentrations appear sufficiently elevated to pose some risk of failing the Toxicity Characteristic. If this is the case, the soils would be considered a hazardous waste once excavated.

To avoid and/or anticipate the need for hazardous waste disposal during construction, KCI recommends that additional samples of soil be acquired from locations along proposed utility trenches, building foundations, and/or stormwater management facilities prior to construction. These samples should be collected to represent all depths of soils that will be excavated, and then analyzed for Resource Conservation and Recovery Act (RCRA) metals via the Toxicity Characteristic Leaching Procedure (TCLP). Based on the results, estimated quantities and costs for hazardous materials disposal may be developed.

- Two underground storage tanks (USTs) have been identified during this investigation. One is believed to be abandoned in place at the south end of 1501 Russell St. The second is located near 2102 Oler St. KCI recommends that any product located in these or other USTs encountered during redevelopment of the site, along with any remaining product and or contaminated soils, be removed from the site and properly disposed of according to applicable sections of COMAR 26.10.

- KCI has identified several Asbestos-Containing Materials (ACM) during the screening-level, Limited ACM Survey conducted as part of this assessment. Prior to demolition of affected buildings, KCI recommends that a more comprehensive survey be completed to meet OSHA regulations for sample quantities (i.e., in order to ensure that the minimum number of samples needed to determine a material is not ACM have been collected) All materials that are determined to be regulated asbestos containing building materials should be removed by a licensed contractor prior to demolishing the buildings in accordance with applicable Federal and State of Maryland regulations.

- KCI recommends that the contractor follow OSHA's "Lead In Construction" standard and implement dust control and containment measures when demolishing building components coated with lead-based paint (LBP) or other lead-containing materials.

12.0 LIMITATIONS, RESTRICTIONS, AND QUALIFICATIONS

12.1 Limitations

The conclusions and recommendations presented within this report are based upon a reasonable level of investigation within normal bounds and standards of professional practice for a site in this particular geographic and geologic setting. All observations, conclusions, and recommendations pertaining to environmental conditions at the subject site are necessarily limited to conditions observed, and or materials reviewed at the time this study was undertaken. No other warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report.

12.2 Restrictions

This Phase II Environmental Site Assessment was performed to identify and characterize the potential areas of environmental concern. KCI will not be held liable for the discovery or elimination of hazards encountered that may potentially cause damage, accidents or injuries. The recommendations rendered from work performed in no way eliminate hazards or the owner's obligation to federal, state, or local laws. The property owner is solely responsible for notifying the proper authorities of any conditions, which violate current laws and regulations.

Data and information regarding current site conditions and operations have been provided to KCI in part by the client and other sources. As is customary, we have assumed these data and information to be

complete and factually correct. The conclusions rendered from these data and information are subject to professional opinion, and thus could result in differing interpretations.

Additionally, the conclusions rendered from this work are based on qualitative and quantitative information gathered on or near the date of this report. This work has been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. Changes as to the content or form of this report may be made only with KCI's expressed written approval.

It should be noted that at the time of this investigation, KCI was not permitted access to six (6) of the subject site properties. Specifically, the Client directed KCI not to enter or perform investigations at the following subject site parcels:

1501 Warner Street	1633 Warner Street
1601 Warner Street	2104 Worcester Street
1629 Warner Street	2102 Oler Street

Once access to these properties is permitted, KCI may complete the required investigations and submit relevant findings under separate cover.

12.3 Qualifications

KCI has employed certain investigative and research procedures during the course of this assessment, and it should be understood that such procedures indicate actual conditions only at the location investigated and that, as is customary, we have made certain inferences based on the results of our assignment.