Appendix G

Modified Phase I Environmental Site Assessment

PARSONS BRINCKERHOFF

Modified Phase I Environmental Site Assessment

Virginia Avenue Tunnel Reconstruction Project

Virginia Avenue SE
Washington, DC 20003

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Project # 173712E

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Appendices

1.0 EXECUTIVE SUMMARY

Parsons Brinckerhoff, Inc. (PB) has performed a modified Phase I environmental site assessment (ESA) of the Virginia Avenue Tunnel corridor (the Site[1]) along Virginia Avenue SE in Washington, DC for CSX Transportation, Inc. No party other than those listed in Section 2.7 may rely upon any information or opinion contained in this report.

This ESA was performed in partial conformance with the scope and limitations of 40 CFR Part 312 (Standards and Practices for All Appropriate Inquiries) and ASTM Method E 1527-05 (Standard Practice for Environmental Site Assessments). Any exceptions to, or deletions from this practice are described in Section 12.0 of this report.

This executive summary briefly discusses the conclusions of this assessment. Reading it should not be considered a substitute for reading the entire report. Only the report in its entirety should be relied upon to provide complete information regarding PB's observations when reviewing the environmental conditions for this Site.

The ESA included a site walkover, review of government records, assembly and review of data from area maps and directories, and assessment of aerial photographs and Sanborn maps. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for the following:

1) The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-DRO in six of 10 soil samples collected from within the tunnel at concentrations exceeding residential cleanup criteria. The 2012 testing conducted along the tunnel corridor identified at least one SVOC present in soil samples from the zero to 15 foot interval in seven borings at concentrations exceeding the residential cleanup criteria. Hexavalent chromium (Cr^{6+}) was present in samples from the deeper depth intervals in five soil borings at concentrations exceeding the residential cleanup criteria. None of the contaminants are present at concentrations exceeding the industrial cleanup criteria. The borings from which all of these samples were collected were widely spaced, indicating that the contamination is pervasive. PB believes that the presence of contaminants in the soil at concentrations exceeding residential cleanup criteria is a REC.

2) The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-GRO, TPH–ERO, and oil and grease in three of the groundwater seep

[1] Please refer to Section 3.1 for a description of the Site, and how it differs from the Project Area.

samples in the tunnel at concentrations "requiring proper management." The 2012 testing conducted along the tunnel corridor identified naphthalene in the M-8 boring at concentrations exceeding the Tier I residential groundwater standard for domestic use. The contaminants in the groundwater seeps in the tunnel may be the result of contaminants leaching from the fill material surrounding the tunnel, while the contaminants in the M-8 boring are likely the result of contamination originating from a nearby facility of concern. PB believes that the presence of contaminated groundwater along the tunnel at concentrations exceeding residential cleanup criteria is a REC.

3) The asbestos survey conducted on the Virginia Avenue Tunnel in 2012 showed that approximately 8,000 square feet of black felt paper located inside the concrete vaults enclosing the electrical conduit contained asbestos. The report did not indicate whether the material was friable or likely to become friable; however, it did state that the material should not be disturbed or handled by CSX personnel. The report further stated that if tunnel expansion activities would disturb this material, it must be removed and properly disposed by a licensed asbestos abatement contractor. PB believes that the presence of the asbestos containing material in the tunnel is a REC.

4) PB's research revealed the presence of 63 nearby facilities of concern in the vicinity of the Site. Some of these facilities were identified through multiple sources; others were identified from a single source. These facilities include former gasoline stations, vehicle repair facilities, dry cleaners, properties with underground storage tanks, a manufactured gas plant, and an NPL facility. Each of these properties are either known to be contaminated, or were likely to have used, stored, or handled hazardous substances or petroleum products as part of their operations. Based on their distance from the Site, the known or probable contaminants used, and the lithology of the area, PB believes that contamination emanating from these properties could impact the soil and/or groundwater surrounding the tunnel. These facilities are therefore considered to be RECs.

Based on the information gathered as part of this Modified Phase I ESA, review of the relevant data, and understanding of the planned Site uses, PB recommends the following activities be completed:

1) Although soil contamination has been identified at concentrations exceeding residential cleanup criteria, it does not exceed the industrial cleanup criteria or construction worker protection cleanup criteria. Because the borings from which the samples were collected were widely spaced, localized pockets of more highly

contaminated soil could be encountered during construction activities. Construction workers should be informed of the possible presence of contaminated soil surrounding the tunnel, so precautions can be taken to protect the workers. Suspected contaminated soil should be stockpiled and sampled for characterization. Contaminated soil should be handled and managed in accordance with appropriate local, district, and/or federal rules and regulations.

2) Although contaminated groundwater has been identified at concentrations exceeding the Tier I criteria for domestic water use, it does not exceed any of the Tier I standards for incidental dermal contact. Because the borings from which the samples were collected were widely spaced, localized pockets of more highly contaminated groundwater could be encountered during construction activities. Construction workers should be informed of the possible presence of contaminated groundwater, so precautions can be taken to protect the workers. Groundwater that is generated through dewatering activities during construction should be handled, managed, and discharged in accordance with appropriate local, district, and/or federal rules and regulations. This may include temporary storage in a tank, characterization for the possible presence of contaminants, filtering through granular activated carbon, and/or discharge permitting.

3) The black felt material in the utility chase within the Virginia Avenue Tunnel should be properly removed and disposed by a licensed asbestos abatement contractor if these areas are planned for any disturbance (renovation, demolition, replacement, etc.).

4) Because of the presence of the nearby facilities of concern, construction activities should include provisions for evaluating the soil and groundwater for potential contaminants (as discussed in #1 and #2, above). Contaminated soil and groundwater should be handled and/or disposed in accordance with appropriate regulations.

5) Although a CERCLA liability defense is not being sought, CSX Transportation, Inc should review the User's Ongoing Responsibilities (included in Section 11.0 of this report), and comply with the provisions therein.

2.0 INTRODUCTION

2.1 Purpose of ESA

This modified Phase I ESA report was intended to provide an initial step toward evaluating the Site for potential environmental concerns. Because of client-imposed restrictions, several of the normal Phase I ESA activities were not completed (which are discussed in Section(s) 2.2 and 12.0)This modified Phase I ESA is therefore not intended to satisfy all appropriate inquiries (AAI) or be in full compliance with ASTM Method E1527-05.

An "all appropriate inquiries" (AAI) assessment is a necessary component for persons seeking to establish either CERCLA's innocent landowner defense in 42 U.S.C. §9607(b)(3), the bona fide prospective purchaser defense in 42 U.S.C. §9607(r), or the contiguous property owner defense in 42 U.S.C. §9607(q). The User's additional on-going responsibilities, also necessary to establish the above defenses, are summarized in Section 11.0.

According to the rules promulgated by the U.S. EPA pursuant to CERCLA (at 40 CFR Part 312), the primary objectives of an ESA are to identify the following types of information about the Site prior to acquiring the property: (1) current and past property uses and occupancies, (2) current and past uses of hazardous substances, (3) waste management and disposal activities that could have caused releases or threatened releases of hazardous substances, (4) current and past corrective actions and response activities undertaken to address past and on-going releases of hazardous substances, (5) engineering controls, (6) institutional controls, and (7) properties adjoining or located near the Site that have environmental conditions indicative of releases or threatened releases of hazardous substances on, at, in, or to the Site. This information was gathered to evaluate the Site for evidence of conditions indicative of a release.

The ASTM standards were written to not only satisfy the U.S. EPA's requirements for an AAI environmental site assessment, but also to evaluate "business environmental risk" associated with a parcel of commercial real estate. Accordingly, for this ESA, PB evaluated the Site for evidence of hazardous substance disposal or releases from or onto the Site, environmental threats from adjacent properties, and current recognized environmental conditions (RECs[2]) and historic recognized environmental conditions (HRECs[3]). This evaluation involved only a review

[2] According to ASTM, a REC (pronounced "wreck") is "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

[3] According to ASTM, an HREC (pronounced "H-wreck") is a "condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently. The final decision rests with the environmental professional and will be influenced by the impact of the historic recognized environmental condition on the property currently."

of historical information and publicly-available government agency records. PB used this information to decide whether further environmental testing of the Site is warranted.

In the U.S. EPA's "Standards and Practices for All Appropriate Inquires," the phrase "conditions indicative of releases or threatened releases of hazardous substances on, at, in or to the property" was used. PB considers a REC to be synonymous with this phrase. PB elected to use the terms REC and HREC in this report. Commonly used acronyms are defined in Section 14.0.

The work for this modified ESA was completed by Adam W. Heft and reviewed by David R. VanGoethem. All activities were completed by an Environmental Professional, with the exception of the Site walkover. The qualifications of each individual involved in preparing this report are included in Appendix J.

2.2 Detailed Scope-of-Work

2.2.1 Items Included in Scope of Work

PB completed the following tasks during this ESA.

Site Visit

PB personnel conducted a partial, non-comprehensive site visit to observe current conditions and look for obvious characteristics that suggested contamination may be present. Adjacent properties were also viewed from public rights-of-way.

Aerial Photographs

PB reviewed aerial photographs that were available from public sources to identify whether these photographs contained evidence of potential contaminant sources.

Public Records Evaluation

PB subcontracted with Environmental Data Resources (EDR) of Milford, Connecticut to compile information about facilities that use, or store chemicals, or that have suspected or known contamination from governmental databases. Using the information provided by this report, PB evaluated the potential impact that identified facilities might have on the Site.

Fire Insurance Map Review

PB obtained available historic fire insurance maps from EDR that show the past uses of the Site, and identify features such as the former existence of underground and aboveground storage tanks, which now are considered RECs.

City Directory Research and Review

PB subcontracted EDR to provide city directory information. PB reviewed the city directories to help identify former uses of the Site and surrounding areas that indicate the existence of potentially-contaminating businesses. PB personnel also reviewed supplemental city directory information at a local library.

Specialized or Actual Knowledge

The PB personnel conducting this ESA have included any specialized or actual knowledge they have regarding the Site or nearby properties believed likely to have impacted the Site.

2.2.2 User Provided Information

The User of this ESA did not provide PB with all the required information as discussed in Section 4.0 as of the time of this draft.

2.2.3 Items Not Included in Scope of Work

The above services focused on identifying possible soil and/or groundwater contamination on the Site. The proposed scope of work did not, however, include the collection or testing of soil, groundwater, surface water or building materials. Examples of other activities not included in the Phase I ESA are:

- Interviews - PB did not interview the property owners or others familiar with the Site as part of this ESA because of client-imposed restrictions.
- Agency Regulatory Records – Also due to client-imposed restrictions, PB did not review agency files and/or consult with local health department, fire department, building department, and local or state governmental offices to help clarify information provided by the EDR report.
- Environmental Lien Search – PB did not conduct a lien search of the corridor property or review title records.
- Asbestos Inspection – PB did not conduct an asbestos survey of the tunnel; however an asbestos survey was conducted by others. The results of the asbestos survey are discussed in this report.
- Lead Paint Assessment
- Radon and Other Indoor Air Quality Evaluation (vapor intrusion assessment). An assessment of potential contaminant vapor intrusion into the tunnel was not conducted.

- PCB Evaluation – PB did not conduct a PCB survey of the tunnel; however a PCB survey was conducted by others. The results of the PCB survey are discussed in this report.
- Mold Survey
- Review or Analysis for Permit, Regulation, or Statute Violations
- Review of Zoning Restrictions
- Special Flood Hazard Area Determinations
- Cultural and Historic Resource Survey
- Industrial Hygiene Assessment
- Health and Safety Review
- Wetlands, Ecological Resources and Endangered Species Surveys
- High Voltage Power Lines Identification

2.3 PB's Specialized or Actual Knowledge

The PB personnel involved in conducting this ESA have no specialized or actual knowledge regarding the Site.

2.4 Significant Assumptions

Certain information contained in this report was obtained from agencies or from the client. In preparing this report, PB relied on the information provided by these sources unless PB had actual knowledge the information was incorrect, or believed that certain information was incorrect based on other information obtained while performing the ESA. Except as discussed in the report, PB did not verify the accuracy of the information provided to it.

2.5 Objectives of ESA

For this ESA, PB consulted historical sources to learn about the Site's former owners and occupants, developed a history of the previous uses of the property and surrounding area, and used this information to identify the likelihood that either on- or off-site past property uses might have created RECs in connection with the Site. The historic information and uses of the Site and surrounding area are summarized in Section 5.5 and 5.6.

PB attempted to identify obvious property uses from the present back to either the Site's first developed use (including agricultural uses and placement of fill dirt) or to at least 1940, whichever was earliest. Any data gaps or failures have been identified in Section 12.0.

2.6 Special Terms and Conditions

In the professional judgment of PB, the scope of this investigation was sufficient to determine whether further investigation is needed, given the nature and specific circumstances of the Site. PB performed this ESA in conformance with the care and skill currently exercised by reputable environmental consulting firms practicing under similar conditions. No other warranty or representation of any kind, expressed or implied, at common law or created by statute, is extended, made or intended by PB's rendering of consulting services or furnishing oral and/or written reports of its findings.

Contaminants may be hidden in subsurface materials, having been intentionally covered, or because they were covered by foliage, water, snow, concrete, asphalt, or other materials. This contamination may not be present in predictable locations. The most that PB could do is formulate a logical assessment program with reasonable time and cost limits to reduce, but not eliminate, the client's risk of later discovering previously unknown contamination. More extensive exploration could reduce the probability of finding contamination, if present; however, even after extensive exploration, PB would be unable to say with total certainty that no RECs are present on this Site.

PB conducted what it believes was an appropriate inquiry into possible conditions indicative of a release on the Site given the client-imposed restrictions. This inquiry was not an exhaustive assessment. A point exists at which the cost of the information obtained or the time required to gather it outweighs the usefulness of the information and, in fact may be a material detriment to the orderly completion of the transaction. PB attempted to balance the cost and time to perform this ESA with the need to reduce uncertainty about unknown conditions by obtaining additional information.

No warranty can be made that conditions observed were representative of areas not observed. Tests or data collected for this report were obtained only for the purposes stated in this report, and should not be used for reasons other than those intended.

This report does not constitute legal advice, nor does PB purport to give legal advice. Environmental conditions and regulations are subject to constant change and reinterpretation.

It should not be assumed that current conditions and/or regulatory positions will remain constant. Furthermore, because the facts stated in this report are subject to professional interpretation, differing conclusions could be reached by other Environmental Professionals.

Since CSX Transportation, Inc. already occupies the Site, it likely could not qualify for a defense from CERCLA liability; however, CSX Transportation, Inc. should still comply with all ongoing responsibilities identified in Section 11.0 of this report.

2.7 Reliance

PB has no obligation to any third party who intends to or will rely on this report and specifically disclaims such responsibility. PB assumes no obligation for reporting any facts revealed by the ESA or contained in the report to any entity other than CSX Transportation, Inc, the District Department of Transportation (DDOT) and the Federal Highway Administration (FHWA). CSX Transportation, Inc., DDOT and FHWA may rely on the conclusions in this report.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The approximately 3,800 feet long Virginia Avenue Tunnel is located in the Capitol Hill neighborhood of the District of Columbia beneath eastbound Virginia Avenue SE from 2nd Street SE to 9th Street SE, Virginia Avenue Park and the 11th Street Bridge right-of-way between 9th and 11th Streets SE, and is aligned on south side of Interstate 695 (I-695). The tunnel portals are located about 100 feet west of 2nd Street SE and about 100 feet east of 11th Street SE (Figure 1 and Figure 2 in 0). PB used an address of 700 Virginia Avenue for purposes of locating the tunnel corridor when ordering research data from EDR; however, the corridor extends to the east and west of this address.

This Modified Phase I ESA focused on evaluating potential RECs that could impact the Virginia Avenue Tunnel as described above. For purposes of this report, the term “Site” will refer to the actual Virginia Avenue Tunnel and surface area overlying the tunnel. The term “Project Area” will refer to the tunnel plus a larger area along the railroad to the east and west, areas of nearby surface streets, and rights-of-way that will be affected by construction activities as described in Section 4.4. Those portions of the Project Area, other than the actual tunnel, were not fully evaluated for the possible presence of RECs.

The extent of the Site is illustrated by the blue line as shown on Figures 3A-C in 0, while the Project Area is outlined in pink in Figure 3 and on Figures 3A-C.

3.2 Photographs of Site and Possible RECs

While performing its reconnaissance of the Site, PB photographed the characteristics of the Site and surrounding properties, and RECs that could be seen. A copy of selected photographs showing conditions on the Site is included in Appendix B.

3.3 Description of Structures and Other Features on the Site

The Site contains a railroad tunnel with a single track; Virginia Avenue SE is on the ground surface above the tunnel. The Project Area extends east and west of the tunnel. No other structures exist within the Site.

3.4 Current Uses of the Site

The Site is used for vehicular traffic on the ground surface along Virginia Avenue SE, while railroad traffic passes through the tunnel below. Both the street and the railroad line are currently in use.

3.5 Current Uses of Adjoining and Nearby Properties

The site investigation included a review of the conditions and uses of nearby and adjoining properties to identify potential environmental problems that might adversely impact the Site. PB viewed these properties from either the Site boundary or readily accessible public rights-of-way. During its reconnaissance, PB attempted to identify the current and historic activities on nearby and adjoining properties, and whether potentially contaminating substances were used as part of these activities. The following list includes properties immediately adjacent to the Site; along with nearby properties PB believes could have stored or used potentially contaminating materials.

Adjacent and Nearby to the North:

- Green space area (landscaped grass with trees and bushes)
- The 695 expressway and ramps
- Garfield Park
- Westbound Virginia Avenue SE
- Streets: 2nd Street through 11th Street
- Residential areas

Adjacent and Nearby to the East:

- Railroad line

Adjacent and Nearby to the South:

- Commercial buildings
- Residential housing
- A church
- Capital Motor Works (closed and fenced)
- DogMa (pet boarding and grooming)
- Community garden
- Streets: 2nd Street through 11th Street
- US Navy Yard complex

Adjacent and Nearby to the West:

- Railroad line

During its reconnaissance of nearby and adjacent properties, and through its other research, PB attempted to identify the current and historic activities on adjoining properties, and whether potentially contaminating substances were used as part of these activities. PB believes that potentially contaminating substances have been used at the former Capital Motor Works facility and within the US Navy Yard complex. The potential impact of the contaminants at these facilities is discussed in Section 8.0 of this report.

4.0 USER-PROVIDED INFORMATION

4.1 Knowledge of the Site

PB requested CSX Transportation to provide any common, actual, or specialized knowledge it has that could help identify RECs on the Site. The information requested by PB included the client's knowledge of the historic uses of the Site, the use or disposal of potential contaminants on the Site, the existence of environmental liens within the title records, or the possible presence of contamination on adjacent or nearby properties. PB was provided with copies of environmental documentation regarding current and prior testing of the tunnel area; these reports are discussed below in Section 4.5.

4.2 Valuation Reduction for Environmental Issues

PB was informed that no transaction is occurring as part of this project, and that a valuation reduction evaluation of a purchase price is inapplicable for this ESA.

4.3 Owner, Site Manager and Occupant Information

The owner of the Site is CSX Transportation, Inc. The Site is not continuously occupied, but is traversed by railroad vehicles. The ground surface is occupied by Virginia Avenue SE and is a public thoroughfare.

4.4 Reason for Performing the Phase I ESA

CSX Transportation, Inc. (CSX) is proposing to reconstruct the Virginia Avenue Tunnel. The tunnel is located in the Capitol Hill neighborhood of the District of Columbia beneath eastbound Virginia Avenue SE from 2nd Street SE to 9th Street SE, Virginia Avenue Park and the 11th Street Bridge right-of-way between 9th and 11th Streets SE, and is aligned on south side of Interstate 695 (I-695). The tunnel portals are located a short distance west of 2nd Street SE and a short distance east of 11th Street SE. CSX also owns or has easements of the rail lines immediately east and west of the tunnel. The tunnel and rail lines running through the District are part of CSX's eastern seaboard freight rail corridor, which connects Mid-Atlantic and Midwest states.

The CSX proposal includes the complete reconstruction of the tunnel, which was built over 100 years ago. In addition to its age, the tunnel is also a bottleneck to the freight rail network with its single-track configuration and with a vertical clearance that does not allow for double-stack intermodal container freight trains. The Project will transform the tunnel to a two-track configuration, matching the number of tracks immediately east and west of the tunnel, and provide the minimum 21 feet of vertical clearance to allow double-stack intermodal container freight train operations. This will allow more efficient freight movement, especially in light of expected increases in freight volume. Reconstructing the tunnel to allow double-stack intermodal container freight trains would require lowering the grade below the rail line's New Jersey Avenue SE Overpass to provide the 21-foot minimum clearance.

The following alternatives are being considered for the Project:

Alternative 1 - No Build: The No Build alternative, which is automatically carried forward into the Draft EIS. The tunnel would not be rebuilt under this alternative. However, the railroad would continue to operate trains through the tunnel and at some point, emergency or unplanned major repairs or rehabilitation could be required to this critical, aging infrastructure that might prove equally disruptive to the community than the Build Alternatives.

Alternative 2 -Rebuilt Tunnel / Temporary Runaround Track: This alternative involves rebuilding the existing Virginia Avenue Tunnel. It would be rebuilt with two tracks and enough vertical clearance to accommodate double-stack intermodal container freight trains. It would be rebuilt in generally the same location, except aligned approximately seven feet to the south of the existing tunnel center line. It would be rebuilt using protected open trench construction methods. During construction, freight trains would be temporarily routed through a protected open trench outside the existing tunnel (runaround track). The runaround track would be aligned to the south and generally parallel to the existing tunnel, and would be located below street level. Due to new columns associated with the rebuilt 11th Street Bridge, the runaround track would slightly separate from the tunnel alignment on the east end starting just west of Virginia Avenue Park. Safety measures such as securing fencing would be used to prevent pedestrians and cyclists from accessing the runaround track.

Alternative 3 - Two New Tunnels: This alternative involves replacing the existing Virginia Avenue Tunnel with two new permanent tunnels constructed sequentially. Each new tunnel would have a single track with enough vertical clearance to allow double-stack intermodal container freight trains. A new parallel south side tunnel would be built first as trains continue operating in the existing Virginia Avenue Tunnel. After the south side tunnel is completed, train operations would switch over to the new tunnel and the existing Virginia Avenue Tunnel would be demolished and rebuilt. With the exception of operating in a protected open trench for approximately 230 feet immediately east of the 2nd Street portal (within the Virginia Avenue SE segment between 2nd and 3rd Streets SE), trains would operate in enclosed tunnels throughout construction under Alternative 3. Throughout most of the length, the two tunnels would be separated by a center wall. This center wall would be the new centerline of the two tunnels, and it would be aligned approximately 25 feet south of the existing tunnel centerline, between 2nd and 9th Streets SE. Due to new columns associated with the rebuilt 11th Street Bridge, the tunnels would be separated on the east end starting just west of Virginia Avenue Park, resulting in two separate single-track tunnels and openings at the east portal.

Alternative 4 - New Partitioned Tunnel / Online Rebuild: Alternative 4 would result in a new tunnel with two permanent tracks. Similar to Alternative 3, the new tunnel would be partitioned and have enough vertical clearance to allow double-stack intermodal container freight trains. It would be aligned approximately 17 feet south of the existing tunnel's centerline. The new partitioned tunnel would be built using protected open trench construction methods. Safety measures such as secure fencing would be used to prevent pedestrians and bikers from accessing the protected open trench. The rebuild would occur 'online' meaning that during the period of construction, the protected open trench would accommodate both construction activities and train operations. Maintaining safe and reliable temporary train operations is a more complicated endeavor under Alternative 4 than under the other two Build Alternatives because of the online rebuild approach.

Regardless of Build Alternative, the Project would extend the east portal by approximately 330 feet to a location northeast of the 12th Street and M Street T-intersection.

CSX intends to use this ESA to help check for RECs prior to commencing project activities, and as part of the documentation required for the project.

4.5 Prior Environmental Reports

PB was provided with environmental reports relevant to the Virginia Avenue Tunnel prepared by others for CSX Transportation. PB reviewed these reports to gather information regarding the conditions on the Site. A copy of relevant portions of the reports is included in Appendix C.

4.5.1 11th Street Bridges FEIS

A final environmental impact statement (FEIS) report for the nearby 11th Street Bridges project contained some background information relevant to this investigation. The FEIS included agency record information for two nearby facilities of concern, including the Washington Navy Yard and the Washington Gas Plant. The documentation included some historical information on the facilities, including operations involving contaminants, a summary of the area known to be contaminated, and remediation activities. Facility specific information is included in Section 8.4.

4.5.2 1998 Material Evaluation Report

A material evaluation report for the Virginia Avenue Tunnel was prepared by Ogden Environmental and Energy Services, Inc. (Ogden) for CSX Transportation, Inc. in 1998. The report documented a sampling program from within and immediately adjacent to the tunnel, and included collecting samples from 10 soil borings drilled above and adjacent to the tunnel, 10 soil samples collected from the sub grade inside the tunnel, seven water samples from inside the tunnel, five electrical duct liquid/sediment samples inside the tunnel, five electrical duct seal samples from inside the tunnel, and one soot sample collected inside the tunnel.

The 10 soil borings drilled adjacent to the tunnel were drilled using hollow stem augers and split-spoons advanced every five feet (providing intermittent lithologic information). The boring logs show that fill soil was present in most of the borings at varying thicknesses up to about 26 feet. The fill appeared to consist of a sandy silty clay mixture with rocks and cobbles. Generally, red and gray clay or silty clay layers were below the fill material to the maximum depth of the borings (35 or 40 feet below the ground surface). Groundwater was not encountered in any of the borings; however, the soil in boring B-7 was very moist.

Samples were analyzed for polychlorinated biphenyls (PCBs), total petroleum hydrocarbons in the gasoline and diesel range organics (TPH-GRO and TPH-ERO), benzene, toluene, ethylbenzene, and xylenes (collectively BTEX compounds), toxicity characteristic leaching

procedure (TCLP) for volatile and semivolatile organic compounds (VOCs and SVOCs), "RCRA 8" metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), asbestos, and oil and grease.

Laboratory analytical results showed that TPH-DRO was present in seven of the 10 soil samples collected within the tunnel, and the concentration of six of the seven samples exceeded the soil action limits established by the DC Municipal Regulations.

Barium was detected in three of the 10 soil samples collected from the borings drilled outside the tunnel; however, the concentration in these samples did not exceed action limits.

Three of the water samples collected from inside the tunnel from seeps contained TPH-GRO, TPH-ERO and oil and grease at concentrations requiring proper management. Other surface water samples contained analyzed parameters at concentrations exceeding method detection limits, but below action levels. The report concluded that soils outside the tunnel at the seep locations may contain the same constituents detected in the seep samples.

The samples collected from the electrical duct did not contain PCBs or asbestos; however, the report concluded that the duct and conduit materials should be properly disposed, and any oil be properly managed as used oil. The tunnel soot sample did not contain TCLP VOCs, SVOCs, or metals.

4.5.3 2012 Shaw Environmental PCB and Asbestos Investigations

In July 2012, Shaw Environmental & Infrastructure, Inc. (Shaw) completed investigations of the Virginia Avenue Tunnel for the possible presence of PCBs and asbestos containing materials.

Shaw collected 15 wipe samples from surfaces surrounding the electrical conduits and three additional samples of sediment and soot underlying the electrical conduits located within the concrete vaults. Each of these samples was submitted to a laboratory for analysis of PCBs. Laboratory analytical results showed that none of the samples contained PCBs at concentrations exceeding the laboratory reporting limits. The report recommended, however, that if the conduits were found to contain oil, that the liquid be placed in drums and sampled to evaluate whether it contains PCBs prior to disposal.

Shaw also evaluated various materials found within the tunnel for the possible presence of asbestos. Suspect materials were sampled and submitted to a laboratory for polarized light microscopy analysis. Laboratory analytical results showed that approximately 8,000 square feet of black felt paper located inside the concrete vaults enclosing the electrical conduit contained asbestos.

4.5.4 2012 Clark-Parsons Investigation

Clark-Parsons subcontracted Mueser Rutledge Consulting Engineers (Mueser) to complete a geotechnical investigation of the project area. Mueser completed the investigation in two phases between March and July 2012.

The first phase consisted of drilling 12 geotechnical soil borings outside the tunnel at depths up to 150 feet below the ground surface. Eight standpipe piezometers were installed south of the tunnel, and four inclinometers were installed north of the tunnel. The location of each of the borings is depicted on Figures 3A-3C in 0.

The soil borings were drilled using mud rotary drilling techniques. A 24-inch long, two-inch diameter split-spoon was advanced every five feet ahead of the mud rotary drill bit to obtain undisturbed soil samples. These soil samples were used to identify the lithology of the tunnel corridor, establish geotechnical properties of the soils, and to also evaluate whether the soil was contaminated.

Each of the soil borings was divided into three 15-foot deep intervals (zero to 15 feet, 15 to 30 feet, and 30 to 45 feet, respectively). The three split-spoon samples obtained from these intervals were screened using a photoionization detector (PID meter); the sample with the highest reading was selected for laboratory analysis of VOCs. After the sample for VOC analysis was collected, the remaining soil from the three split-spoons within the interval was composited, and a sample obtained for laboratory analysis of SVOCs, heavy metals on the "RCRA 8" list, PCBs, TPH-GRO, and TPH-DRO. Three soil samples were therefore collected from each geotechnical boring.

After the borings were drilled to the maximum depth, the lower portion of the borings were abandoned, and 4¼-inch diameter hollow stem augers were used to ream out the borehole, and a two-inch diameter piezometer was installed. Piezometers were installed in 16 of the borings; however, only five of the piezometers contained groundwater. Groundwater samples were obtained from those piezometers, and the samples were submitted to a laboratory for analysis of VOCs, SVOCs, RCRA 8 metals, PCBs, TPH-GRO, and TPH-DRO.

The second phase consisted of drilling five geotechnical soil borings in the track bed of the tunnel, several liner probes into the wall of the tunnel, tunnel invert slab probes, and five geotechnical soil borings drilled at track level outside the tunnel portals. The geotechnical borings drilled in the tunnel were advanced to a depth of 20 feet, while the borings drilled outside the tunnel were drilled to depths between 15 and 25 feet. Split-spoon samples were obtained at approximately four-foot intervals within these borings.

The geotechnical borings provided lithologic information for the vicinity of the tunnel corridor. Fill soil and natural terrace deposits were present in all of the borings along the tunnel corridor, and generally range in thickness from about 10 to 45 feet. These soils consist of clayey or silty sands. Below the fill and terrace deposits is an upper clay horizon. This unit consists of stiff to hard mottled gray, brown, and red silts and clays. The clays have occasional fissures and slickenside features, indicating some deformation has occurred. A compact gray and brown, fine to medium grained sand is present below the upper clay. The sand includes some silt, trace silty clay, or clayey sand layers. A lower clay horizon was encountered below the sand in the two deep borings; the lower clay is a hard mottled gray, brown or red color.

Groundwater was generally found to be present within the upper clay at depths between 30 and 45 feet below the ground surface. A perched water table was also found within the fill materials. This perched groundwater table is generally present below about 20 feet, with a locally higher elevation of around 18 feet below the ground surface near 7th Street SE.

Laboratory analytical results of the soil samples collected as part of the geotechnical investigation showed that the soil in the shallow interval (zero to 15 feet) in several borings (M-2, M-5, M-13, I-1, I-4, I-5, and I-6) and the soil in the 15 to 30 foot interval in the I-5 boring contained at least one SVOC at concentrations exceeding the DDOE Tier I residential standards or the EPA residential standards. Hexavalent chromium was present in soil from either the 15 to 30 foot interval or the 30 to 45 foot interval in borings M-1, M-2, M-5, M-8, and M-13 at concentrations exceeding the EPA residential standards. Arsenic was present in almost all of the samples collected in all of the borings at concentrations exceeding the EPA residential standards. No other analyzed parameters were present in the soil samples at concentrations exceeding the method detection limits. The SVOCs, hexavalent chromium, and arsenic that were present at concentrations exceeding the residential standards do not exceed the industrial standards. The arsenic concentrations were also believed to be within acceptable regional background concentrations.

Laboratory analytical results of the groundwater samples collected from the piezometers installed as part of this investigation showed that groundwater in borings M-4, M-8, M-10, and WB-1 contained VOCs, SVOCs, and heavy metals at concentrations exceeding method detection limits. Only naphthalene in boring M-8 was present at a concentration exceeding the DDOE Tier I groundwater standard for domestic water use; no other standards were exceeded in any of the water samples.

5.0 RECORDS REVIEW

PB searched for reasonably ascertainable documents and photographs to assist in compiling information about the historic use of the Site. These reasonably ascertainable items included aerial photographs, street directory listings, fire insurance maps, and other historical records. PB also obtained an EDR report that identified facilities included in governmental databases that are known to be contaminated or that use contaminating substances.

5.1 Environmental Record Sources

5.1.1 Street Directories

PB reviewed city directory information compiled by EDR. City directory information was provided for a portion of the area around the Site. Coverage for this area was included in Haines Company, The Chesapeake and Potomac Telephone Company of Virginia, C&P Telephone, and Polk's Directories for the surrounding area, including parts of Virginia Avenue SE, 7th Street SE, I Street SE, and K Street SE from 1922 to 2006. No coverage for the area was available by address listing prior to 1922. Specifically, information was obtained from the 1922, 1926, 1931, 1936, 1940, 1943, 1948, 1954, 1960, 1964, 1969, 1973, 1978, 1983, 1993, 2000, and 2006 directories. A copy of the city directory information obtained from EDR is included in Appendix D.

PB personnel also reviewed city directory information at the Martin Luther King Jr. Memorial Library in Washington DC to supplement the information provided by EDR. Coverage for the area around the Site was included in the Haines Criss-Cross Directory, Polk's Washington City Directory, and Boyd's District of Columbia Directory from 1918 through 2011. No coverage for the area was available by address listing prior to 1918. Specifically, information was obtained from the 1918, 1923, 1928, 1933, 1938, 1943, 1948, 1954, 1960, 1965, 1970, 1975, 1981, 1986, 1991, 1996, 2001, 2006, and 2011 directories. A summary table of information obtained from the directories is included in Appendix D.

Most of the listings identified in the directories were for residential occupants for the entire period of coverage. Several commercial listings were also included, and of those, some have the potential to have used or stored hazardous substances or petroleum products. These include the following listings:

- Evening Star News at 225 Virginia Avenue SE in the 1960s and 1970s
- Eareckson Carpet Cleaner at 502 Virginia Avenue SE from 1918 until 1948
- Tower Cleaners & Launderers at 636 Virginia Avenue SE in 1960

- Phillips Clothing Cleaner at 700 Virginia Avenue SE in the 1940s and 1950s
- Hill Auto Repair (most recently) at 701 Virginia Avenue SE. This property was a gas station from the early 1930s until the late 1970s.
- Tune-up Kit (most recently) at 801 Virginia Avenue SE. This property was a gas station from the early 1930s until the early 1970s.
- A laundry at the southwest corner of Virginia Avenue SE and 8th Street SE in the 1920s and early 1930s.
- Mathiason Metal Works at 821 Virginia Avenue SE in the late 1920s and 1930s.
- Anacastia Auto Body (auto repairs) at 1113 Virginia Avenue SE in the 1960s.
- The Evening Star Garage at 841 2nd Street from the early 1930s to the early 1970s
- Speed Queen Laundry at 809 3rd Street during the 1960s and early 1970s
- AM Forest Pond Printing Department at 811 3rd Street in 1970
- Thompson Cleaners at 700 4th Street in the 1950s, followed by Lillian's Beauty Salon in the early 1960s
- A laundry with different names at 801 4th Street from 1918 until the mid 1920s
- Townsend Beauty Shop at 1132 5th Street in the late 1940s
- Cleaners & Dyers with multiple names at 732 6th Street from the mid 1920s until the mid 1940s
- An auto repair with multiple names at 728 7th Street from the mid 1920s until the late 1970s
- An auto repair at 730 7th Street in the mid 1970s
- Torchinsky Cleaners at 900 8th Street in the 1930s
- Clothing cleaner/tailor with multiple names at 904 8th Street during the 1930s and 1940s
- Wash it Yourself Laundry at 908 8th Street in 1960
- A laundry at 911 8th Street in the late 1940s

- Zimmerman Cleaner at 912 8th Street in 1918
- Lee Jas Laundry at 922 8th Street from the mid 1930s to the mid 1940s
- Cleaners with multiple names at 924 8th Street from the mid 1930s to the late 1960s
- Chin Laundry at 1001 8th Street from the mid 1930s to the early 1960s
- Sing Lee Laundry at 1013 8th Street from 1918 until the mid 1920s
- An auto repair at 1015 8th Street from 1918 until the mid 1920s
- Greers Cleaners at 1110 8th Street in 1970
- Eddies Dry Cleaners at 1112 8th Street from the mid 1940s (possibly earlier) through the late 1950s
- The Navy Yard Garage at 1102 9th Street in 1928
- Burrows Motor Sales at the southwest corner of 9th and Potomac Avenue SE from the mid 1940s through the late 1950s
- An Exxon gas station at 900 11th Street from the early 1970s through the early 1980s; Martins Automotive in the late 1980s, and Auto Wash Club from the early 1990s until the late 2000s
- Capitol Lithographers at 914 11th Street in 1960
- Hooe Coal, Chesapeake Motor Auto Repairs, Prices Service Station at 1100 11th Street from 1918 through the late 1920s, the mid 1940s, and the late 1940s through the late 1950s, respectively
- An auto supply/repair facility with multiple names at 1101 11th Street from the mid 1930s until the early 1970s
- An auto wrecker with multiple names at 1102 11th Street from the mid 1920s to the late 1930s
- A gas station with multiple names at 1110 to 1112 11th Street from the early 1930s to the late 1960s
- Miller gas station at 1260 11th Street in the early 1940s

- Brown Trucking at 600 I Street SE in the 1960s
- Terdrlinsky Dyer at 717 I Street in 1918
- Superior Cleaners at 641 K Street SE in the late 1940s
- BHB Printers at 718 L Street in the mid 1980s
- Warner Coal at 1009 L Street in the early 1930s
- A gas station with multiple names at 1101 Potomac Avenue SE from the early 1930s until the late 2000s

5.1.2 Aerial Photographs

Digital aerial photographs for the years 1949, 1957, 1960, 1971, 1977, 1980, 1988, 1994, 1988, 2005, and 2007 were obtained from EDR. A 2010 satellite aerial photograph was obtained from the Google Earth Pro website. No aerial photographs were available from before 1949. The aerial photographs are included in Appendix E.

1949 Aerial Photograph

The clarity of the photograph was fair. The east and west ends of the railroad tunnel were visible east of 11th Street and west of 2nd Street, respectively. Virginia Avenue SE was present between 2nd Street and 9th Street; an extension of the road connected to 11th Street and Potomac Avenue SE near the east end of the corridor. Virginia Avenue SE was fronted by buildings on both the north and south sides, although the buildings were set back almost the width of the road from the edge of the Street. There were no buildings along Virginia Avenue SE between 4th and 5th Streets on the south side, on part of the south side between 6th and 7th Streets, and on the south side between 9th and 11th Streets. Garfield Park was on the north side of Virginia Avenue SE between 2nd and 3rd Streets.

1957 Aerial Photograph

The clarity of the photograph was excellent. The conditions on the Site and in the surrounding area were similar to those in the 1949 photograph; however, numerous trees lined both sides of Virginia Avenue SE. A new large commercial building was immediately south of Virginia Avenue SE and east of 2nd Street, replacing the smaller structures that had been previously present.

1960 Aerial Photograph

The clarity of the photograph was poor and had a larger scale. The conditions on the Site and in the surrounding area were similar to those in the 1957 photograph; however, the commercial building immediately south of Virginia Avenue SE and east of 2nd Street was larger than was

shown in 1957. The area east of the Site was visible in this photograph, and a bulk petroleum storage facility was present, with several large cylindrical ASTs visible north and south of the railroad tracks.

1971 Aerial Photograph

The clarity of the photograph was fair. The conditions on the Site and in the surrounding area were similar to those in the 1960 photograph; however, the 695 expressway was present immediately north of Virginia Avenue SE. Several buildings formerly occupying this area were no longer present, and some north-south cross streets no longer crossed Virginia Avenue SE. The AST on the north side of the railroad tracks and slightly east of the east portal was no longer visible, although the ASTs south of the railroad tracks were still present.

1977 Aerial Photograph

The clarity of the photograph was poor. The conditions on the Site and in the surrounding area could not be discerned beyond a few general features.

1980 Aerial Photograph

The clarity of the photograph was fair. The conditions on the Site and in the surrounding area were similar to those in the 1977 photograph.

1988 Aerial Photograph

The clarity of the photograph was poor. The conditions on the Site and in the surrounding area were similar to those in the 1980 photograph; however, the large petroleum ASTs east of the corridor were no longer present. Five smaller ASTs were still visible.

1994 Aerial Photograph

The clarity of the photograph was poor. The conditions on the Site and in the surrounding area could not be discerned beyond a few general features.

1998 Aerial Photograph

The clarity of the photograph was good. The conditions on the Site and in the surrounding area were similar to those in the 1994 photograph; however, the south half of the block immediately north of the expressway between 6th and 7th Streets was bare soil, indicating the structures previously present had been demolished. All of the petroleum ASTs east of the Site had been removed and were no longer present.

2005 Aerial Photograph

The clarity of the photograph was fair. The conditions on the Site and in the surrounding area were similar to those in the 1998 photograph; however, the area south of the Site between 5th

and 7th Streets had been redeveloped. The structures formerly present had been removed, and the area was either bare soil or occupied by new structures and green space. New buildings were present north of the expressway between 6th and 7th Streets. The commercial buildings that were present south of the west portal on the west side of 2nd Street had been demolished, and a parking lot was present.

2007 Aerial Photograph

The clarity of the photograph was good. The conditions on the Site and in the surrounding area were similar to those in the 2005 photograph; however, most of the buildings between 3rd and 6th streets north of M Street and south of the Site had been demolished.

2010 Aerial Photograph

The clarity of the photograph was excellent. The conditions on the Site and in the surrounding area were similar to those in the 2007 photograph; however, several of the properties where buildings had previously been demolished south of the Site had been redeveloped. The property southeast of the east portal had also been redeveloped.

5.1.3 Sanborn Maps

During the late 1800's and throughout much of the 1900's, the Sanborn Map Company periodically prepared detailed maps showing the locations and types of buildings, and uses of properties in areas of many towns and cities throughout the United States. Included on these maps are the locations of aboveground and underground storage tanks, and other features now recognized as RECs. Environmental Data Resources, Inc. (EDR) of Milford, Connecticut now possesses the most complete archive of these maps.

PB requested EDR to search for fire insurance maps for the Site. EDR identified and provided PB with Sanborn maps for the years 1888, 1904, 1928, 1959, 1977, 1984, 1988, 1990, 1991, 1992, 1994, and 1998. A copy of the portion of the maps which includes the Site is included in Appendix F. Details of the tunnel and businesses that potentially used, stored, or handled hazardous substances or petroleum products shown on the maps are discussed below:

- The 1904 maps showed the route of the Virginia Avenue Tunnel. The tunnel was depicted as beginning just east of 11th Street and south of L Street, and running beneath Virginia Avenue SE to a point between 7th Street and 6½ Street. Two railroad lines exited the tunnel and continued west along K Street. Subsequent maps showed only the portal locations (the east portal east of 11th Street, and the west portal west of 2nd Street).

- The block bounded by Virginia Avenue, K Street, 9th Street and 10th Street was a coal yard in 1904.

- A business near the southwest corner of Virginia Avenue and 4th Street was depicted as a Chinese Laundry in 1904.
- A tin shop was depicted at the southeast corner of Virginia Avenue and 9th Street in 1928.
- Two gas stations were at the southeast corner of Virginia Avenue and 8th Street in 1928. Only one of these gas stations was present in 1959.
- A UST was in the southwest part of the block bounded by 6½ and 7th Streets and K and L Streets in 1928.
- A business depicted as a dyer & cleaner (possibly a dry cleaner) was on the east side of 6th Street north of the alley north of I Street in 1928 and 1959.
- A gas station was at 701 Virginia Avenue at the southeast corner of Virginia Avenue and 7th Street in 1928 and 1959.
- A carpet cleaner and machine shop were at the northeast corner of Virginia Avenue and 5th Street in 1928.
- A UST was in the center of the block south of Virginia Avenue and west of 2nd Street in the Evening Star warehouse building in 1928.
- Three USTs were depicted in the block west of 2nd Avenue and south of the west portal in the 1959 through 1998 maps. Two of the USTs were north of the Evening Star garage in the southeast part of the block, and the third was in the alley in the southwest part of the block.
- Three USTs were located in the block bounded by 2nd Street, 3rd Street, I Street, and Virginia Avenue in 1959 and 1977. One of the tanks had a capacity of 10,000 gallons, and the other two had a capacity of 20,000 gallons; all three tanks contained fuel oil used by the Evening Star Newspaper Company.
- A gas station was at the southeast corner of the intersection of 11th and I Streets in 1977 and 1984.
- A UST was associated with a police station in the small block bounded by Virginia Avenue, 9th Street, and K Street in 1959.
- A gas station with five USTs was about 50 feet north of the east portal on the north side of L Street, the east side of 11th Street, and the south side of Potomac Avenue in 1959.

- The block between 12th and 13th Streets south of L Street and north of the railroad tracks was occupied by a 1,000,000-gallon gasoline UST, a fueling shed, and a large fuel oil AST in 1959.

5.1.4 Historic Topographic Maps

PB obtained a copy of historic topographic maps for the years 1885, 1894, 1906, 1943, 1950, 1951, 1956, 1965, 1971 (photorevised from 1965), 1979 (photorevised from 1965) 1980 (photorevised from 1965) 1983 (photorevised from 1965) and 1994 (photorevised from 1965), from EDR. Not all of the maps include full coverage of the Site. A copy of these historic topographic maps is included in Appendix G.

1885 Historic Topographic Map

The 1885 Historic Topographic map (15-minute map series) showed only the western portion of the Site, which was within the District of Columbia urban area. Virginia Avenue was present. A railroad line was depicted on K Street south of Virginia Avenue. This line probably connected to Virginia Avenue on the eastern part (not shown) of the Site.

1894 Historic Topographic Map

The 1894 Historic Topographic map (30 minute series) showed similar conditions and coverage area as the 1885 map, but fewer details could be discerned due to the scale of the map.

1906 Historic Topographic Map

The 1906 Historic Topographic map (30 minute series) showed similar conditions as the 1894 map; however, the map showed the entire Site. Potomac Avenue extended through Virginia Avenue.

1943 Historic Topographic Map

The 1943 Historic Topographic map (7.5 minute series) showed the entire Site. The railroad line along Virginia Avenue was depicted as dashed (indicating it was subsurface) from west of 2nd Street to east of 11th Street. Buildings were depicted between 4th and 5th Streets north and south of Virginia Avenue. Potomac Avenue was not present between 10th and 12th Streets.

1950 Historic Topographic Map

The 1950 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1943 map.

1951 Historic Topographic Map

The 1951 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1950 map; however, buildings were now shown between 3rd and 5th Streets north of the Site.

1956 Historic Topographic Map

The 1956 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1951 map.

1965 Historic Topographic Map

The 1965 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1956 map; however, an expressway was on the north side of Virginia Avenue to the west of 6th Street.

1971 Historic Topographic Map

The 1971 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1965 map; however, the expressway was present along Virginia Avenue and the Site from west of 2nd Street to 11th Street, where it turned south.

1979 Historic Topographic Map

The 1979 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1971 map; however the map only showed the corridor east of 5th Street.

1980 Historic Topographic Map

The 1980 Historic Topographic map (7.5 minute series) showed conditions on the Site to be similar to those depicted on the 1971 map; however, the map only showed the corridor west of 5th Street.

1983 Historic Topographic Map

The 1983 Historic Topographic map (7.5 minute series) showed conditions and coverage area on the Site to be similar to those depicted on the 1980 map.

1994 Historic Topographic Map

The 1994 Historic Topographic map (15 minute series) showed conditions and coverage area on the Site to be similar to those depicted on the 1983 map.

5.1.5 Historic Plat Maps

PB did not search for historic plat maps as part of this ESA, because it believed that this information would not provide significant information.

5.1.6 Other Historic Maps

The information provided in the Clark-Parsons Geotechnical Data Report (discussed in Section 4.5.4) included portions of three historic maps of Washington DC. A copy of these maps is included with the text of the geotechnical report in Appendix C.

1870 Plan of the City of Washington DC

The 1870 map shows that Virginia Avenue SE and the cross streets as currently configured were present through the Project Area. Potomac Avenue SE was named Georgia Avenue. The railroad was not present in the Project Area. The US Navy Yard was present to the south, but only occupied the area south of M Street between about where 6th Street would extend to and 9th Street. A cove was immediately west of the Navy Yard. The US Marine barracks was north of I Street between 8th and 9th Streets. A canal extended north from the Anacostia River along the 2nd Street alignment as far north as I Street, and then to the northwest where it crossed Virginia Avenue at South Capitol Street.

1879 Plan of the City of Washington DC

The 1879 map shows that the B&P Railroad was present in the area. It extended along Virginia Avenue SE from the southeast end at the Anacostia River to just west of 6th Street. From there, the railroad ran west along I Street to west of 2nd Street, and then followed the former path of the canal (now filled north of I Street) back to Virginia Avenue and then northwest. The entire length of the railroad appeared to be on the surface; the Virginia Avenue Tunnel was not present.

1902 Business Atlas Map of Washington DC

The 1902 map shows that the railroad had been reconfigured. Rather than following Virginia Avenue SE from the river, it followed the current path to the portal of the Virginia Avenue Tunnel just east of 11th Street. The tunnel extended under Virginia Avenue as far as 7th Street, where it ended. From there, the railroad ran west along K Street to a point just west of 2nd Street, and then northwest back to Virginia Avenue. Virginia Avenue SE was not present between 3rd Street and South Capitol Street, since this area was occupied by Garfield Park. The canal that formerly extended along the position of 2nd Street only extended as far north as N Street.

5.1.7 Review of State and Federal Databases

Databases maintained by various state and federal agencies were reviewed for information regarding the Site and nearby properties. The compilation of data was performed by EDR in

February 2012. EDR uses computers to search governmental agency databases for information about contaminated properties and potentially contaminated properties within search ranges (specified in 40 CFR §312.26) around the Site. The search distances range from the Site boundary to one mile from the Site depending on the database. Information regarding the listed facilities is included in the EDR report in Appendix H.

PB reviewed the information about the facilities in the databases to ascertain the potential impact of these facilities on the Site. While doing this review, PB considered (a) the likely contaminating substances that were or could have been released, (b) the pathways these contaminants would likely follow to reach surface water or underlying groundwater, (c) the potential that groundwater or surface water would migrate from these facilities onto or beneath the Site, and (d) the potential that pumping from water wells on the Site or in the area might influence the movement of groundwater and contaminants.

When facilities were identified as being within the ASTM search distance, they were included and mapped in the EDR report. Several facilities in the EDR report are unmapped (referred to as "orphan" sites) due to an incomplete address, an inaccurate address, or a street address that could not be accurately identified. Where possible, PB ascertained the locations of the unmapped sites, and evaluated the potential impact of these sites for this assessment. A brief summary of each database that contained facility listings within the specified search range is presented below.

NPL: National Priorities List

The National Priorities List (NPL) identifies the most serious hazardous waste sites regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Sites on the NPL have been targeted by the U.S. EPA for priority cleanup. This database was last updated in June 2011.

The Washington Navy Yard facility identified in the search is not the Site; however, it is approximately 375 feet south of the Site. Its potential impact to the Site is discussed in Section 8.0. Further information regarding this facility is also in the EDR report in Appendix H.

CERCLIS: Comprehensive Environmental Response, Compensation and Liability Act Information System

The Comprehensive Environmental Response, Compensation and Liability Act Information System (CERCLIS) assists U.S. EPA headquarters and regional offices in managing and overseeing the Superfund program. It has two purposes: to maintain an automated inventory of abandoned, inactive, or uncontrolled hazardous waste sites, and to allow EPA regional offices to track the status of site clean-ups and report this information to EPA headquarters. This database was last updated in February 2011.

The facilities identified in the search did not include the Site; however, the listed Washington Navy Yard and Washington Gas – East Station facilities are approximately 375 feet south and 500 feet southeast of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

CERC–NFRAP: CERCLIS—No Further Remedial Action Planned

The No Further Remedial Action Planned (NFRAP) data is a collection of sites removed from the U.S. EPA's CERCLIS list where no contamination was found following an initial investigation, contamination was removed quickly without the need for the Site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. This database was last updated in February 2011.

The facilities identified in the search did not include the Site or the immediately adjacent or nearby properties listed in Section 3.5 of this report. PB identified the locations of listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding these facilities is in the EDR report in Appendix H.

CORRACTS: Corrective Action Report

The CORRACTS database includes facilities that handle hazardous wastes and at which RCRA corrective action has occurred. This database is maintained by the U.S. EPA and was last updated by EDR in August 2011.

The facilities identified in the search did not include the Site; however, the listed Washington Navy Yard facility is approximately 375 feet south of the Site. Its potential impact to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

RCRA Generators:

The Resource Conservation and Recovery Act – Generators Database contains data compiled in accordance with the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA. RCRA Generator Facilities are divided into three categories: Fully Regulated Generators (FRGs) producing more than 1,000 kilograms of hazardous and/or one kilogram of acutely hazardous waste per month, Small Quantity Generators (SQGs) producing between 100 and 1,000 kilograms of hazardous and/or less than one kilogram of acutely hazardous waste per month, and Conditionally Exempt SQGs (CESQGs) producing less than 100 kilograms of hazardous waste and less than one kilogram of acutely hazardous waste. This database was last updated in June 2011.

The facilities identified in the search did not include the Site; however, the listed Washington Navy Yard, Washington Gas – East Station, Alpha Auto Service, Tune Up Kit of Capitol Hill, and Washington Post Newspaper South facilities are approximately 375 feet south, 500 feet southeast, 100 feet north, 120 feet south, and 100 feet south of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

ERNS Spills: Emergency Response Notification System

The Emergency Response Notification System (ERNS) is a national database with information regarding releases of oil and hazardous substances. This database was last updated in October 2011.

The facilities identified in the search did not include the Site; however, the listed Virginia Avenue Rail Tunnel incident is approximately 475 feet east of the east portal of the tunnel. Its potential impact to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

US ENG CONTROLS: Engineering Controls Sites List

The USEPA created this database, which lists facilities with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health. This database was last updated in December 2011.

The facilities identified in the search did not include the Site; however, the listed Washington Navy Yard and Washington Gas – East Station facilities are approximately 375 feet south and 500 feet southeast of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

US INST CONTROL: Sites with Institutional Controls

The U.S. EPA developed a listing of properties with institutional controls in place. The institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on the property. Deed restrictions are generally required as part of the institutional controls. This database was last updated in December 2011.

The Washington Gas – East Station facility identified in the search is not the Site; however, it is approximately 500 feet southeast of the Site. Its potential impact to the

Site is discussed in Section 8.0. Further information regarding this facility is also in the EDR report in Appendix H.

DOD: Department of Defense Sites

The DOD database consists of federally owned or administered lands that are administered by the Department of Defense, and are greater than 640 acres in size. These properties are located in the United States, Puerto Rico, and the U.S. Virgin Islands. This database was last updated in July 2011.

The facility identified in the search was neither the Site nor an immediately adjacent or nearby property listed in Section 3.5 of this report. PB identified the location of the listed facility and believes it is at a distance that does not pose a risk of environmental contamination to the Site. Further information regarding this facility is in the EDR report in Appendix H.

FUDS: Formerly Used Defense Sites

The US Army Corps of Engineers created this database, which includes the locations of formerly used defense site properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions. This database was last updated in December 2009.

The facilities identified in the search did not include the Site; however, the listed Washington Navy Yard facility is approximately 375 feet south of the Site. Its potential impact to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

ROD: Records of Decision System

The Records of Decision System (RODS) data are obtained from the U.S. EPA Office of Emergency and Remedial Response and contains the text of signed Superfund Records of Decision. RODS serves as an information base so that sites with similar environmental characteristics are treated consistently by the U.S. EPA. The RODS data provide additional information regarding Superfund sites also listed in either the CERCLIS or NPL databases. EDR does not identify RODS sites separately on the maps included in its reports. This database was last updated in September 2011.

The facilities identified in the search did not include the Site; however, the listed Washington Navy Yard and Washington Gas – East Station facilities are approximately 375 feet south and 500 feet southeast of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

FINDS: Facility Index System

The Facility Index System (FINDS) contains a computerized inventory of over 600,000 facilities regulated by the U.S. EPA. FINDS is used as a cross-check for sites identified though other sources. EDR has on-line access to the FINDS system. This database was last updated in August 2011.

The facilities identified in the search did not include the Site or the immediately adjacent or nearby properties listed in Section 3.5 of this report. PB identified the locations of listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding these facilities is in the EDR report in Appendix H.

Leaking USTs: Leaking Underground Storage Tanks

LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. This database was last updated in October 2011.

The facilities identified in the search did not include the Site; however, the listed Sound Car Auto Repair, Washington Post Newspaper – South, 636 I Street, Greenwood Warehouse, 1022 M Street, 841 2nd Street, 912 4th Street, 901 M Street, and 1016 4th Street facilities are approximately 120 feet south, 100 feet south,350 feet north, 425 feet north, 150 feet south, 80 feet south, 225 feet south, 520 feet south, and 525 feet south of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

UST: Underground Storage Tanks

UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program. This database was last updated in October 2011.

The facilities identified in the search did not include the Site; however, the listed Capital Motor Works, Washington Post Newspaper Company, Lenox, Arthur Capper Apartment buildings, National Medical Care, and 1003 4th Street facilities are approximately 100 feet south, 100 feet south, 360 feet north, 150 to 530 feet south, 400 feet south, and 500 feet south of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

VCP: Voluntary Cleanup Program

The Voluntary Cleanup Program oversees owner or developer initiated voluntary remediation of contaminated lands and buildings that return actual or potentially contaminated properties to productive uses. This database was last updated in July 2011.

The facilities identified in the search did not include the Site or the immediately adjacent or nearby properties listed in Section 3.5 of this report. PB identified the locations of listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding these facilities is in the EDR report in Appendix H.

HIST UST: Historical UST Listing

During the process of the database upgrade, all facilities that the UST Program was unable to confirm their existence were removed from the working revelation UST Database before the conversion and put into an excel spreadsheet. These facilities became known as "Project Unknown." This listing is not current and has been not updated.

The facilities identified in the search did not include the Site; however, the listed 1102 to 1112 11th Street, 1102 9th Street, 502-04 Virginia Avenue, 704 I Street, 1100 M Street, Arthur Capper Community Center, and Calomiris GP facilities are immediately adjacent, approximately 350 feet south, 50 feet south, 300 feet north, 300 feet south, 150 to 530 feet south, and 350 feet south of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

Brownfields

The Brownfield database contains a listing of potential Brownfields site locations. This is not a complete listing of all potential Brownfield properties. This database was last updated in August 2011.

The facilities identified in the search did not include the Site; however, the listed Washington Gas – East Station and 225 Virginia Avenue facilities are approximately 500 feet southeast and 100 feet south of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

Coal Gas

Coal Gas was manufactured at numerous facilities throughout the United States in the late 1800's and early 1900's. Wastes generated at these facilities often were poorly handled, and many of these former plant sites contain impacted soil and groundwater. The locations of many

of these facilities were researched by Real Property Scan, Inc., and are included in the EDR database.

The facilities identified in the search did not include the Site; however, the listed Washington Gas Light Co. at 1240 12th Street SE is approximately 500 feet southeast of the Site. The potential impact of this facility to the Site is discussed in Section 8.0. PB identified the location of the other listed facility and believes it is at a distance that does not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

EDR Historical Auto Stations

A proprietary database compiled by EDR researchers reviewing collections of business directories. This database includes categories of sources including gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, etc.

The facilities identified in the search did not include the Site; however, the listed Price Service Station, Chesapeake Motor Co., and Sanford Amoco Service Station (these three collectively at 1100 to 1110 11 Street), and the Fenwick Service station and Rundlett Rim & Wheel (these two at the northwest corner of 11th Street and M Street) facilities are immediately adjacent and approximately 150 feet south of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

EDR Historical Cleaners

A proprietary database compiled by EDR researchers reviewing collections of business directories. This database includes categories of sources including dry cleaners, cleaners, laundry, Laundromat, cleaning/laundry, wash & dry, etc.

The facilities identified in the search did not include the Site; however, the listed Anna Rice/Lee Chong, Sam Moy/Thos Sweeney, Mon Der/B&B Cleaners, and Unity Cleaners facilities are approximately 420 feet north, 560 feet north, 780 feet north, and 560 feet north of the Site, respectively. The potential impact of each facility to the Site is discussed in Section 8.0. PB identified the locations of the other listed facilities and believes they are at distances that do not pose a risk of environmental contamination to the Site. Further information regarding all listed facilities is in the EDR report in Appendix H.

5.2 Title Records

PB was not provided with title records by the client, and did not independently obtain them. PB believes, however, that other information obtained by PB was sufficient to identify the historical uses of the Site.

5.3 Activity and Use Limitations and Environmental Liens

PB was not provided with information regarding potential environmental liens or activity and use limitations, and did not independently request them as part of this ESA.

5.4 Geologic Setting

5.4.1 Surficial Soils

PB reviewed the soil survey maps prepared by the U.S. Department of Agriculture, Natural Resources Conservation Services (formerly the Soil Conservation Service) for the District of Columbia to obtain general information about the surficial soils along the Site.

The soil conservation maps show that soils along the Site fall within the Urban Land classification and the Udorthents, clayey, smoothed, classification. The soils in these classifications are generally well drained, and are moderately permeable.

5.4.2 Soils Overlying the Bedrock Formation

The map, "Geological Map of Washington DC and Vicinity" (Johnson, 1958), shows that the surficial soil along the Site is part of the Pleistocene Age Wicomico Formation. This formation consists of gravel, sand, and silt, and has local basal deposits of carbonaceous clay containing tree stumps and other woody debris.

The more recent Geologic Map of Maryland (Conkwright, 1968) shows that the surficial soil along the Site is Lowland Deposits of Pleistocene Age, and consists of gravel, sand, silt, and clay. Medium to coarse grained sand and gravel with cobbles and boulders near the base commonly contain reworked Eocene glauconite. Varicolored silts and clays and brown to dark gray lignitic clay contain estuarine to marine fauna in some areas. The thickness of the deposits ranges from zero to 150 feet.

PB obtained information about the geology of the surrounding area while reviewing soil boring logs for soil borings drilled by others along the Site. Fill soil and natural terrace deposits were present in all of the geotechnical borings drilled along the tunnel, and generally range in thickness from about 10 to 45 feet. These soils consist of clayey or silty sands. Below the fill and terrace deposits is an upper clay horizon. This unit consists of stiff to hard mottled gray, brown, and red silts and clays. The clays have occasional fissures and slickenside features, indicating some deformation has occurred. A compact gray and brown, fine to medium grained sand is present below the upper clay. The sand includes some silt, trace silty clay, or clayey sand layers. A lower clay horizon was encountered below the sand in the two deep borings; the lower clay is a hard mottled gray, brown or red color.

5.4.3 Site Hydrology and Hydrogeology

The surface topography of the Site and the surrounding area is generally flat to gently sloped. According to the USGS 7½-minute topographic map of the Washington East and Washington West Quadrangles, the Site is approximately 40 to 50 feet above mean sea level (Figure 2 in 0).

Surface water on the Site drains into storm sewers along Virginia Avenue, or into collection sumps within the tunnel. During the 2012 geotechnical investigation completed by Clark-Parsons, groundwater was generally found to be present within the upper clay at depths between 30 and 45 feet below the ground surface. A perched water table was also found within the fill materials. This perched groundwater table is generally present below about 20 feet, with a locally higher elevation of around 18 feet below the ground surface near 7th Street SE. The direction of groundwater flow in the unconsolidated glacial materials above the bedrock is unknown, but is believed to be to the south-southeast.

5.4.4 Anticipated Susceptibility of Groundwater to Contamination

Based on the geology of the Site and the general area, PB believes that contaminants leaked or spilled on the Site would have a moderate potential to migrate vertically to underlying water-bearing zones. Information obtained by PB suggests that the uppermost water-bearing zone is moderately permeable, thus lateral groundwater movement and contaminant migration from potentially impacted areas are expected to be moderately slow.

5.5 Historic Use Information Regarding the Site

Based upon the foregoing historical information, it appears as though the Site was originally developed as Virginia Avenue SE for use as a public thoroughfare. A railroad was constructed along the surface of Virginia Avenue SE from the Anacostia River past 11th Street to about 6th Street where it curved onto I Street as far west as 2nd Street, and then northwest back to Virginia Avenue SE at South Capitol Street in the 1870s, possibly in 1872. The eastern part of the Virginia Avenue tunnel (from the existing east end to a point between 7th and 8th Streets was constructed between 1879 and 1902. In 1904, the remainder of the tunnel was constructed. Virginia Avenue SE has been present over the tunnel since that time, and was disrupted during construction of the tunnel.

5.6 Historic Use Information Regarding the Nearby and Adjoining Properties

Based upon the foregoing historical information, it appears as though the surrounding properties have been used for a wide variety of purposes. Some properties have been occupied by dwellings and residential units, while others were used for commercial purposes, including gas stations, motor vehicle repair facilities, dry cleaners, beauty shops, restaurants, tailors, and

laundries. The property at the southeast corner of M Street and 12th Street was part of the Washington Gas Plant, and the area south of M Street and west of 11th Street was part of the Washington Navy Yard.

6.0 SITE RECONNAISSANCE

6.1 Methodology and Limiting Conditions

Only a partial, non-comprehensive site walkover was conducted as part of this ESA. Mike Folli and Mark Cheskey, the PB staff members who performed the site walkover, are not Environmental professionals as defined in 40 CFR §312.10(b)(1). The purpose of the site walkover was to observe current conditions and look for obvious characteristics that suggest contamination may be present. They performed the site walkover on June 18 and 19, 2012.

6.2 General Site Observations

The Project Area consists of the railroad line from South Capitol Street to about 15th Street; the area between 2nd Street and 11th Street is within the Virginia Avenue Tunnel (the Site) with Virginia Avenue SE (eastbound) located above the tunnel.

PB did not observe any hazardous substances or petroleum products, storage tanks, odors, drums or containers (in connection with an identified use, unidentified use, or unidentified substances), or possible PCB-containing equipment within the project area during its walkover. Two 500-gallon ASTs were within a construction area beneath the elevated expressway east of 11th Street and south of the railroad line.

6.3 Exterior Areas

The area overlying the tunnel was mostly occupied by eastbound Virginia Avenue SE. The area overlying the eastern part of the tunnel was occupied by a park and community garden. The area along the south side of Virginia Avenue SE was occupied by sidewalks and landscaped grassy areas with trees. The north side of Virginia Avenue SE was maintained grass bordering the I-695 expressway and expressway ramps.

The eastern and western parts of the Project Area were occupied by the railroad line and its associated right-of-way. The western end of the project area was part of a railroad yard. The area south of the main railroad line was used as a storage and staging area. Numerous 55-gallon drums of soil cuttings from the environmental and geotechnical soil borings were stockpiled in this area while awaiting characterization and disposal. A decontamination area was located near the drums.

PB did not observe any pits, ponds, or lagoons, stained soil or pavement, or stressed vegetation during its walkover.

6.3.1 Solid Waste

The area immediately surrounding the tunnel was fill soil that was placed after construction of the tunnel. This soil consisted of a mixture of clay, silt, and sand.

The area beneath the expressway in close proximity to the west end of the tunnel contained a significant amount of household items and trash. No hazardous materials were noted in this area, and none of the items appeared likely to potentially contaminate the underlying soil.

6.4 Interior Areas

PB personnel viewed the interior of the tunnel to identify the uses of the Site, and whether potentially contaminating activities have taken place on the Site.

The interior of the tunnel was generally dirty, with soot coating parts of the walls and ceiling. The tunnel walls were constructed of stone blocks in the lower part, and bricks and concrete in the upper part. A concrete utility chase was along the base of the wall of the tunnel. The chase contained pipes and electrical lines.

The floor of the tunnel was generally covered with stone ballast for the railroad tracks; however, soil was present within, and sometimes covering the stone. In places, “mud volcanoes” were present between the rail lines. These features were caused by the vibration of trains passing, and causing some of the underlying soil to liquefy and migrate upward through the stone ballast onto the surface, where the soil was deposited.

PB personnel noted that a partially open sanitary sewer was present in one section of the tunnel. The top of the sewer was covered by steel plates beneath the railroad ties and rails. It was unclear what condition the sewer was in, only that the sewer crossed the tunnel.

6.4.1 Pools of Liquids

Standing water was noted within the tunnel between the walls and the rails. Some of the pools of water were murky and rust-colored. The standing water was probably the result of groundwater infiltrating into the tunnel.

6.4.2 Stains or Evidence of Corrosion

PB observed soot and similar staining on the walls and ceiling of the tunnel. The soot was likely the result of exhaust from trains (particularly early, coal-fired engines) and maintenance equipment.

6.4.3 Floor Drains or Sumps

Several sump pits were present within the tunnel. Groundwater (probably perched within the fill material surrounding the tunnel) accumulated in the pits where sump pumps would pump the water into pipes located within the utility chase along the edge of the tunnel. The water in the sumps was generally murky and sometimes iron stained.

7.0 FINDINGS

Through the activities described above, PB identified the following potential RECs, HRECs, and *de minimis* environmental conditions on the Site or in the surrounding area. PB's opinion as to the potential impact of these issues on the Site is discussed in Section 8.0.

7.1 Contaminated Soil

The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-DRO in six of 10 soil samples collected from within the tunnel at concentrations exceeding residential cleanup criteria. The 2012 testing conducted along the tunnel corridor identified at least one SVOC present in soil samples from the zero to 15 foot interval in seven borings at concentrations exceeding the residential cleanup criteria. Hexavalent chromium (Cr^{6+}) was present in samples from the deeper depth intervals in five soil borings at concentrations exceeding the residential cleanup criteria.

7.2 Contaminated Groundwater

The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-GRO, TPH-ERO, and oil and grease in three of the groundwater seep samples in the tunnel at concentrations "requiring proper management." The 2012 testing conducted along the tunnel corridor identified naphthalene in the M-8 boring at concentrations exceeding the Tier I residential groundwater standard for domestic use.

7.3 Asbestos Containing Materials

The asbestos survey conducted on the Virginia Avenue Tunnel in 2012 showed that approximately 8,000 square feet of black felt paper located inside the concrete vaults enclosing the electrical conduit contained asbestos.

7.4 Nearby and Adjacent Properties of Concern

PB's research revealed the presence of 63 nearby facilities of concern in the vicinity of the Site. Some of these facilities were identified through multiple sources; others were identified from a

single source. These facilities include former gasoline stations, vehicle repair facilities, dry cleaners, properties with underground storage tanks, a manufactured gas plant, and an NPL facility. The complete listing of these facilities is presented below and is summarized in Table 1 included in Appendix A:

1. Virginia Ave Rail Tunnel, Mile Post 113.7 (Capitol Subdivision), chemical spill
2. Washington Navy Yard, 1013 O Street SE, NPL facility
3. Price Service Station/Chesapeake Motor Co./Sanford Amoco Service Station/Hooe Coal, 1100 to 1112 11th Street SE, former gas station
4. 502-04 Virginia Avenue SE facility, Carpet Cleaning and machine shop, USTs
5. 841 2nd Street SE facility/Evening Star Garage, 841 2nd Street SE, LUST facility
6. Washington Post Newspaper, 225 Virginia Avenue SE/804 2nd Street, USTs
7. Alpha Auto Service/Capitol Motor Works/Hill Auto Repair, 701 Virginia Avenue SE, USTs/former gas station
8. Sound Car Audio Repair/Tune Up Kit of Capitol Hill, 801 Virginia Avenue SE, LUST facility
9. Arthur Capper Properties, 501 Virginia Avenue SE/601 L Street SE/1000 5th Street SE, USTs
10. Rundlett Rim & Wheel Co/Warner Coal, 1014 M Street SE/1022 M Street SE/1009 L Street SE, former gas station
11. DC Housing, 912 4th Street SE, LUST facility
12. 704 I Street SE facility, 704 I Street SE, USTs
13. 1100 M Street SE facility, USTs
14. Boiler Plant Building, 636 I Street SE, LUST facility
15. Navy Yard Garage, 1102 9th Street SE, USTs
16. Calomiris GP, 816 Potomac Avenue SE, USTs
17. Lenox, 725 5th Street SE, USTs
18. National Medical Care, 900 M Street SE, USTs
19. Anna Rice/Lee Chong property/Capitol Lithographers, 916/914 11th PL SE, former cleaners/printer
20. Greenwood Warehouse/former Rainbow Dyeing & Cleaning/former Atlantic Cleaners & Dyers, 732 6th Street SE, LUST facility/former dry cleaner
21. Washington Gas, M St SE / 12th St SE intersection, contaminated property
22. Fenwick Service Station, 1024 Potomac Avenue SE, former gas station
23. 1003 4th Street SE facility, USTs
24. part of Washington Navy Yard, 901 M Street SE, LUST facility
25. 1016 4th Street SE facility, LUST facility
26. Sam Moy / Thos Sweeny property, 1200/1202 Potomac Avenue SE, former cleaners
27. Unity Cleaners, 1224 Potomac Avenue SE, former cleaners
28. Mon Der / B&B Cleaners, 1215/1217 Potomac Avenue SE, former cleaners
29. Evening Star/Reis paper Co./US Dept of Labor, 811/831 2nd Street SE, USTs
30. former Chinese laundry, 801 4th Street SE, former cleaners
31. former storage facility, 626 L Street SE, USTs

32. former Metropolitan Police Boys Club, SEC of K St SE and 9th Avenue SE (under highway), USTs
33. Mathiason Metal Works, 821 Virginia Avenue SE, former tin shop
34. former HC Emrich Coal, block bounded by Virginia Avenue, 9th, 10th, K Street SE, coal yard
35. Exxon Station; Martins Automotive; Auto Wash Club, 900 11th Street SE, former gas station
36. former gasoline filling station, 1101 Potomac Avenue SE, former gas station
37. former petroleum UST, SEC of 12th Street and L Street, east of portal, USTs
38. Tower Cleaners and Launderers, 636 Virginia Avenue SE, former cleaners
39. Phillips Clothing Cleaner , 700 Virginia Avenue SE, former cleaners
40. Laundry, SWC of Virginia Avenue SE & 8th St SE, former cleaners
41. Anacastia Auto Body, 1113 Virginia Avenue SE, former auto repair
42. Speed Queen Laundry, 809 3rd Street SE, former cleaners
43. Thompson Cleaners/Lillian's Beauty Shop, 700 4th Street SE, former cleaners & beauty shop
44. auto repair with several names, 728 / 730 7th Street SE, former auto repair facility
45. Torchinsky Cleaners, 900 8th Street SE, former dry cleaners
46. Berlinsky Cleaners, 904 8th Street SE, former cleaners
47. Wash it Yourself, 908 8th Street SE, former cleaners
48. Gong Laundry, 911 8th Street SE, former cleaners
49. Zimmerman Laundry, 912 8th Street SE, former cleaners
50. Lee Jas Laundry, 922 8th Street SE, former cleaners
51. Smiths Cleaners, 924 8th Street SE, former cleaners
52. Gong Laundry, 1001 8th Street SE, former cleaners
53. Sing Lee Laundry, 1013 8th Street SE, former cleaners
54. auto repair, 1015 8th Street SE, former auto repair
55. Greers Cleaners, 1110 8th Street SE, former cleaners
56. DeMarco Cleaners, 1112 8th Street SE, former cleaners
57. Auto repair with multiple names, 1101 11th Street SE, former auto repair
58. Auto wrecker with multiple names, 1102 11th Street SE, former auto repair
59. Miller gas station, 1260 11th Street SE, former gas station
60. Brown Trucking, 600 I Street SE, former auto maintenance
61. Terdrlinsky Dyer, 717 I Street SE, former cleaners
62. Superior Cleaners, 641 K Street SE, former cleaners
63. BHB Printers, 718 L Street SE, former printers

8.0 OPINION

Using information gathered as part of this ESA, PB evaluated the potential RECs, HRECs, and *de minimis* environmental conditions identified in Section 7.0 on both the Site and at nearby facilities as to their possible impact to the Site. To assess these issues, PB used its best professional efforts to evaluate the possible contaminants that could be present, the toxicity and

mobility of these contaminants, and geological factors that could influence the migration of possible contaminants.

8.1 Contaminated Soil

The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-DRO in six of 10 soil samples collected from within the tunnel at concentrations exceeding residential cleanup criteria. The 2012 testing conducted along the tunnel corridor identified at least one SVOC present in soil samples from the zero to 15 foot interval in seven borings at concentrations exceeding the residential cleanup criteria. Cr^{6+} was present in samples from the deeper depth intervals in five soil borings at concentrations exceeding the residential cleanup criteria. None of the contaminants are present at concentrations exceeding the industrial cleanup criteria. The borings from which all of these samples were collected were widely spaced, indicating that the contamination is pervasive. PB believes that the presence of contaminants in the soil at concentrations exceeding residential cleanup criteria is a REC.

8.2 Contaminated Groundwater

The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-GRO, TPH–ERO, and oil and grease in three of the groundwater seep samples in the tunnel at concentrations "requiring proper management." The 2012 testing conducted along the tunnel corridor identified naphthalene in the M-8 boring at concentrations exceeding the Tier I residential groundwater standard for domestic use. The contaminants in the groundwater seeps in the tunnel may be the result of contaminants leaching from the fill material surrounding the tunnel, while the contaminants in the M-8 boring are likely the result of contamination originating from a nearby facility of concern. PB believes that the presence of contaminated groundwater along the tunnel at concentrations exceeding residential cleanup criteria is a REC.

8.3 Asbestos Containing Materials

The asbestos survey conducted on the Virginia Avenue Tunnel in 2012 showed that approximately 8,000 square feet of black felt paper located inside the concrete vaults enclosing the electrical conduit contained asbestos. The report did not indicate whether the material was friable or likely to become friable; however, it did state that the material should not be disturbed or handled by CSX personnel. The report further stated that if tunnel expansion activities would disturb this material, it must be removed and properly disposed by a licensed asbestos abatement contractor. PB believes that the presence of the asbestos containing material in the tunnel is a REC.

8.4 Nearby and Adjacent Properties of Concern

PB's research revealed the presence of 63 nearby facilities of concern in the vicinity of the Site. Some of these facilities were identified through multiple sources; others were identified from a single source. These facilities include former gasoline stations, vehicle repair facilities, dry cleaners, properties with underground storage tanks, a manufactured gas plant, and an NPL facility. Each of these properties are either known to be contaminated, or were likely to have used, stored, or handled hazardous substances or petroleum products as part of their operations. Based on their distance from the Site, the known or probable contaminants used, and the lithology of the area, PB believes that contamination emanating from these properties could impact the soil and/or groundwater surrounding the tunnel. These facilities are therefore considered to be RECs. The complete listing of these facilities is presented below:

8.4.1 Virginia Ave Rail Tunnel, Mile Post 113.7

This facility was listed in the ERNS database in the "Unmapped" summary of the Executive Summary. The EDR Site Report for this incident was obtained; however, it does not provide specific information regarding the spill incident or whether contamination exists at the spill location. PB was able to determine that the spill incident occurred approximately 475 feet east of the north portal on the railroad tracks. PB believes this spill incident should be classified as a high risk due to its close proximity to the tunnel and the unknown extent of contamination resulting from the spill.

8.4.2 Washington Navy Yard

This facility is listed in the NPL, CERCLIS, CORRACTS, RCRA-LQG, US Engineering Controls, ROD, and Manifest databases. The Washington Navy Yard is the oldest continuously operating Navy facility in the United States, having operated since the 1800s. Industrial operations ceased in the 1960s; however, many former shops and storage buildings were converted into offices. This is an approximately 70-acre property (the area is enclosed by M Street SE on the north, 11th Street SE on the east, 4th Street SE on the west, and the Anacostia River on the south) which is known to be contaminated with a wide variety of substances, including volatile organic compounds (VOCs), PCBs, and heavy metals. At its closest point, it is approximately 375 feet from the tunnel. Some remediation activities have occurred; however, contamination remains on the property. Although contamination is present on the Yard property, there is no indication that widespread contamination has migrated north of M Street. Since NPL/CERCLIS sites; however, are considered among the most contaminated facilities, PB believes that this facility should be considered a high risk to potentially impact the area near the tunnel.

8.4.3 Price Service Station/Chesapeake Motor Co./Sanford Amoco Service Station/Hooe Coal

This property is immediately adjacent to the tunnel (approximately 50 feet), and is listed in the HIST UST and Historic Auto Stations databases. No information is available to indicate whether this property is contaminated, but the former presence of an operating gasoline service station makes it likely that contamination exists. It is also possible that underground storage tanks could remain on the property. Due to its close proximity to the tunnel and the nature of potential petroleum contamination, PB believes this facility should be classified as a high risk.

8.4.4 502-04 Virginia Avenue SE

This property is listed in the HIST UST database, and was once likely situated approximately 50 feet north of the tunnel. No information is available regarding the size and contents of the former UST or whether this property is contaminated. Due to its close proximity to the project area and the uncertainty regarding the use of the former UST, this facility is classified by PB as a high risk.

8.4.5 841 2nd Street SE facility/Evening Star Garage

This facility is listed in the LUST database. A release of gasoline occurred from this property, and although the release incident is listed as "Closed," it is unclear whether residual contamination remains and the property is still contaminated. The facility was situated about 80 feet south of the tunnel area. Due to its close proximity, PB believes this facility should be classified as a medium risk.

8.4.6 Washington Post Newspaper

This facility is listed in the UST, RCRA-NonGen, FINDS, LUST, and Brownfields databases and is about 100 feet south of the tunnel. The facility formerly had nine USTs that ranged in size from 1,000 to 20,000 gallon capacity, and contained gasoline, diesel fuel, heating oil, "hazardous substance" (unspecified), and "other." The facility has had two separate release incidents, both involving gasoline; one in 1990, and one in 2002. Both release incidents are listed as "Closed," however, PB believes residual contamination may remain. Due to its close proximity, PB believes this facility should be classified as a medium risk.

8.4.7 Alpha Auto Service/Capitol Motor Works/Hill Auto Repair

This facility is listed in the UST, RCRA-CESQG, FINDS, and Manifest databases and was formerly situated approximately 80 feet from the tunnel. Four 1,000-gallon gasoline underground storage tanks have been removed from the property. No information was available regarding whether the property is contaminated. Due to its close proximity and unknown nature, PB believes this facility should be classified as a high risk.

8.4.8 Sound Car Audio Repair/Tune Up Kit of Capitol Hill

This facility was situated about 60 feet from the tunnel area and was listed in the RCRA-NonGen, FINDS, and LUST databases. The LUST investigation is listed as "Open" and the products released from underground storage tanks include heating oil and diesel fuel. The facility also formerly generated small quantities of waste, including benzene and tetrachloroethylene. Some contamination exists on the property; however, the extent of the contamination was not included in the EDR report. Due to its close proximity and unknown nature, PB believes this facility should be classified as a high risk.

8.4.9 Arthur Capper Properties

The "Arthur Capper" properties are listed at 501 Virginia Avenue SE, 601 L Street SE, and 1000 5th Street SE, and range from about 150 feet to 530 feet from the tunnel. These listings are all in the UST databases; one is also in the HIST UST database. The properties contained either heating oil USTs or a small diesel UST. No information is available to indicate whether the properties are contaminated, and PB believes the facility poses a low risk.

8.4.10 Rundlett Rim & Wheel Co / Warner Coal / Historic Gasoline Station

These facilities are listed in the EDR Historic Auto Stations, HIST UST, and LUST databases and are situated approximately 175 feet from the tunnel. The property has had two releases of gasoline; and both releases are listed as "Closed." PB believes that residual contamination associated with this facility is likely and that it should be classified as high risk.

8.4.11 DC Housing

This facility is listed in the UST and LUST databases. A release of heating oil from a former 3,000-gallon UST was reported; the release is listed as "Closed." Residual contamination may remain; however due to its distance to the tunnel (225 feet), PB believes the facility poses a low risk.

8.4.12 704 I Street SE

This property is listed in the HIST UST database and is situated about 300 feet from the tunnel. No information is available regarding the size and contents of the former UST or whether this property is contaminated. Due to its distance to the tunnel, PB believes the facility poses a low risk.

8.4.13 1100 M Street SE

This property is listed in the HIST UST database and was likely near the historic gasoline station at the northwest corner of M Street SE and 11th Street SE (see #10 above). No information is

available regarding the size and contents of the former UST or whether this property is contaminated. PB believes this facility is a low risk.

8.4.14 Boiler Plant Building

This facility is listed in the UST and LUST databases and is about 350 feet from the tunnel. Two 10,000 gallon heating oil USTs were formerly present on the property, and a release of gasoline and heating oil was reported. The release incident is listed as "Closed," and it is unclear whether the property is still contaminated. Due to its distance to the tunnel, PB believes this facility poses a low risk.

8.4.15 Navy Yard Garage

This 1102 9th Street SE facility is listed in the HIST UST database and is approximately 350 feet from the tunnel. No information is available regarding the size and contents of the former UST or whether this property is contaminated. Due to its distance to the tunnel, PB believes this facility poses a low risk.

8.4.16 Calomiris GP

This property is listed in the HIST UST database and is about 350 feet from the tunnel. No information is available regarding the size and contents of the former UST or whether this property is contaminated. Due to its distance to the tunnel, PB believes this facility poses a low risk.

8.4.17 Lenox

This facility is listed in the UST database and is about 360 feet from the tunnel. A 5,000-gallon heating oil UST is currently in use on the property. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.18 National Medical Care

This facility is listed in the UST database and is approximately 400 feet from the tunnel. The property formerly contained a 2,000-gallon heating oil UST and a 550-gallon diesel UST. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.19 Anna Rice/Lee Chong property/Capitol Lithographers

The facility listings are in the EDR proprietary Historical Cleaners database, and were cleaners & dyers and a Chinese Laundry about 420 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with

dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.20 Greenwood Warehouse/former Rainbow Dyeing & Cleaning/former Atlantic Cleaners & Dyers

The facility formerly had six USTs that ranged in size from 1,000 to 4,350 gallon capacity and contained either gasoline or heating oil. The release incident is listed as "Closed," however residual contamination may remain. The Sanborn maps identify this facility as a large cleaning company, and street directories list multiple cleaner/dyer businesses from 1920 until the 1940s. Although the facility is approximately 425 feet from the tunnel, solvent contamination associated with these types of facilities can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.21 Washington Gas

This facility listing was situated southeast of the intersection of M Street SE and 12th Street SE, and was a former coal gasification plant. Based on historical aerial photographs, this facility probably occupied the entire piece of property southeast of this intersection, and as such, is about 450 feet from the tunnel at its closest point. The aerial photographs also show multiple large aboveground storage tanks on the property. The EDR Site Report for this facility was obtained; however, it does not provide specific information regarding the contamination on the property. Since the property is listed in the US Brownfield database, the property is contaminated.

Information regarding the nature of the contamination associated with this facility was obtained from the 11th Street Bridges FEIS report. This facility produced manufactured gas from the 1880s until 1948. Generation of the gas was from coal and oil; byproducts included tar, oil, coke, and lampblack. Woodchips were used to absorb some of the tar, and were placed on the property as fill material. Beginning in 1976, investigations and corrective actions were undertaken at the facility. Contaminants of concern included VOCs, SVOCs, PAHs, metals, and cyanide. In addition, a coal tar based dense nonaqueous phase liquid (DNAPL) was identified at three locations on the property near and south of Water Street. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.22 Fenwick Service Station

This property is listed in the Historical Auto Stations database, and was a gas station that operated under various names in the 1940s and 1950s. This former facility may have been situated beneath the highway near the Potomac Avenue and 11th Street intersection, approximately 100 feet from the tunnel. No information is available to indicate whether this

property is contaminated; however, based on its close proximity to the tunnel, PB believes this facility should be classified as a high risk.

8.4.23 1003 4th Street SE

The property formerly contained a 3,000-gallon heating oil UST about 500 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.24 Part of Washington Navy Yard

This facility is listed in the LUST database and is associated with the Washington Navy Yard discussed in Section 8.4.2 above. Multiple releases have been reported from this facility, which includes different buildings within the Navy Yard complex. Some releases are listed as "Closed," and others are listed as "Open." PB believes these LUST releases should be classified as a medium risk to the tunnel.

8.4.25 1016 4th Street SE

This facility is listed in the LUST database and is approximately 525 feet from the tunnel. A release of heating oil occurred from this property, and the release is listed as "Closed." Residual contamination may remain; however due to its distance to the tunnel, PB believes the facility poses a low risk.

8.4.26 Sam Moy / Thos Sweeny property

The facility is listed in the Historical Cleaners database, and was formerly a Chinese Laundry and a clothes presser & cleaner about 560 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.27 Unity Cleaners

The facility listing is in the Historical Cleaners database, and was a cleaner & dyer in the 1950s about 560 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.28 Mon Der / B&B Cleaners

The facility is listed in the Historical Cleaners database, and was a laundry and a cleaner & dyer about 780 feet to the tunnel. No information is available to indicate whether this property is

contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.29 Evening Star/Reis paper Co./US Dept of Labor

This facility is approximately 250 feet from the tunnel and was identified on the Sanborn maps as having USTs on the property. Two USTs were on the north side of the Evening Star garage from about 1959 until 1998, one UST was in the alley in the southwest part of the block from 1959 until 1998, and one UST was in the center of the block in 1928. No information is available to indicate whether this property is contaminated; however, the sources show that these USTs were in place for about 40 years. Based on its distance to the tunnel and the age of the USTs, PB believes this property should be classified as a medium risk.

8.4.30 801 4th Street SE

The 801 4th Street property was formerly situated approximately 50 feet from the tunnel. Sanborn maps and city directory listings identified this property as a Chinese laundry and cleaners from the early 1900s to the mid-1920s. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its close proximity to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.31 626 L Street SE

The property is a former storage facility about 325 feet from the tunnel. A UST was identified in the 1928 Sanborn map. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.32 Former Metropolitan Police Boys Club

The facility was situated near the southeast corner of K Street SE and 9th Avenue SE, under the current highway and about 50feet from the tunnel. A UST was identified in the 1959 Sanborn map. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.33 Mathiason Metal Works

Based on Sanborn maps and city directory research, this facility was a former tin shop and metal working facility present in the 1920s and 1930s, and was situated approximately 50 feet from the

tunnel. The types of contaminants (heavy metals) associated with this land use are typically immobile, therefore, PB believes this facility should be classified as a low risk.

8.4.34 Former HC Emrich Coal

Based on Sanborn maps, this facility was a coal storage facility, formerly situated under the current highway, approximately 50 feet from the tunnel. The types of contaminants (heavy metals, acid drainage, etc.) associated with this land use are typically immobile, therefore, PB believes this facility should be classified as a low risk.

8.4.35 Exxon Station/Martins Automotive/Auto Wash Club

The facility is a gasoline service station approximately 440 feet from the tunnel that likely operated in the 1970s and 1980s. It is currently closed and now operates as a car wash. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.36 1101 Potomac Avenue SE – Former Gasoline Station

Sanborn maps and city directory research showed that five USTs were associated with this former gasoline service station. This property is approximately 100 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, based on its distance to the tunnel, PB believes this facility should be classified as a high risk.

8.4.37 Southeast Corner of 12th Street and L Street

The 1959 Sanborn map identified a 1,000,000-gallon, five compartment UST containing petroleum and a large AST containing fuel oil. PB did not obtain any information indicating whether this property is contaminated. Although the tank location is about 330 feet from the tunnel, PB believes this property should be classified as a high risk based on the large volume of petroleum storage and potential for significant contamination.

8.4.38 Tower Cleaners and Launderers

The Tower Cleaners and Launderers facility was identified in the 1960 street directory and was formerly situated approximately 50 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a high risk.

8.4.39 Phillips Clothing Cleaners

Based on city directory information, the Phillips Clothing Cleaners facility operated in the 1940s and 1950s, and was formerly situated approximately 50 feet from the tunnel. No information is

available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a high risk.

8.4.40 Former Laundry at the Southeast Corner of Virginia Avenue & 8th Street

Based on city directory information, the former laundry facility and possible dry cleaner operated in the 1940s and 1950s, and was situated approximately 100 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.41 Anacastia Auto Body

Based on city directory information, this facility was an automotive repair facility in the 1960s, and was formerly situated approximately 100 feet from the tunnel. Automotive repair facilities use a variety of petroleum and solvent based contaminants as part of its operations; however, no information is available to indicate whether this property is contaminated. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.42 Speed Queen Laundry

Based on city directory information, the Speed Queen Laundry facility and possible dry cleaner operated in the 1960s and 1970s, and was formerly situated approximately 50 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.43 Thompson Cleaners/Lillian's Beauty Shop

According to city directory information, this facility was a dry cleaner in the 1950s and a beauty salon in the 1960s. The facility was situated about 450 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.44 728/730 7th Street Auto Repair Facilities

Based on city directory information, this facility was an automotive repair facility from the 1920s until the 1970s. It was situated approximately 670 feet from the tunnel. Automotive repair facilities use a variety of petroleum and solvent based contaminants as part of its operations;

however, no information is available to indicate whether this property is contaminated. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.45 Torchinsky Cleaners

Based on city directory information, the Torchinsky Cleaners facility operated in the 1930s, and was formerly situated approximately 150 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a high risk.

8.4.46 Berlinsky Cleaners

Based on city directory information, the Berlinsky Cleaners facility operated in the 1930s and 1940s, and was formerly situated approximately 130 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a high risk.

8.4.47 Wash it Yourself

Based on city directory information, the Wash it Yourself laundry facility and possible dry cleaner operated in the 1960s, and was formerly situated approximately 110 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.48 Gong Laundry (911 8th Street)

Based on city directory information, the Gong Laundry facility and possible dry cleaner at 911 8th Street operated in the 1960s, and was formerly situated approximately 100 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.49 Zimmerman Laundry

Based on city directory information, the Zimmerman Laundry facility and possible dry cleaner operated in the 1910s, and was formerly situated approximately 90 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface.

Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.50 Les Jas Laundry

Based on city directory information, the Les Jas Laundry facility and possible dry cleaner operated in the 1930s and 1940s, and was formerly situated approximately 70 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.51 Smiths Cleaners

Based on city directory information, the Smiths Cleaners facility operated from the 1930s to the 1960s, and was formerly situated approximately 50 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a high risk.

8.4.52 Gong Laundry (1001 8th Street)

Based on city directory information, the Gong Laundry facility and possible dry cleaner at 1001 8th Street operated from the 1910s to the 1960s, and was formerly situated approximately 50 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.53 Sing Lee Laundry

Based on city directory information, the Sing Lee Laundry facility and possible dry cleaner operated in the 1910s and 1920s, and was formerly situated approximately 150 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.54 1015 8th Street Auto Repair

Based on city directory information, this facility was an automotive repair facility in the 1920s and was situated approximately 170 feet from the tunnel. Automotive repair facilities use a variety of petroleum and solvent based contaminants as part of its operations; however, no information is

available to indicate whether this property is contaminated. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.55 Greers Cleaners

Based on city directory information, the Greers Cleaners facility operated in the 1970s and was formerly situated approximately 360 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.56 DeMarco Cleaners

Based on city directory information, the DeMarco Cleaners facility operated in the 1940s and 1950s, and was formerly situated approximately 380 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.57 1101 11th Street Auto Repair

Based on city directory information, this facility was an automotive repair facility from the 1930s until the 1970s and was situated approximately 120 feet from the tunnel near the southwest corner of the 11th Street and L Street intersection. PB believes that this facility is associated with the former gasoline station discussed in Section 8.4.10 above. Based on its distance to the tunnel and its likely affiliation with the former gasoline service station, PB believes this facility should be classified as a high risk.

8.4.58 1102 11th Street Auto Wrecker

Based on city directory information, this facility was an automotive wrecker (towing) in the 1920s and 1930s, and was situated approximately 60 feet from the tunnel. It is unknown whether any automotive repair activities occurred at the property and no information is available to indicate whether this property is contaminated. PB believes this facility should be classified as a low risk.

8.4.59 Miller Gas Station

The Miller Gas Station facility was identified in the 1940s city directories and was approximately 875 feet from the tunnel. No information was available regarding the USTs or whether contamination exists on the property. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.60 Brown Trucking

The Brown Trucking facility was identified in the 1960s city directories and was likely formerly situated under the current highway location, approximately 120 feet from the tunnel. No information was available to indicate whether USTs were present on the property or if contamination exists on the property. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.61 Terdrlinsky Dyer

Based on city directory information, the Terdrlinsky Dyer facility operated in the 1910s, and was formerly situated approximately 250 feet from the tunnel. No information is available to indicate whether this property is contaminated. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

8.4.62 Superior Cleaners

Based on city directory information, the Superior Cleaners facility operated in the 1940s, and was formerly situated approximately 300 feet from the tunnel. No information is available to indicate whether this property is contaminated; however, solvent contamination associated with dry cleaners can travel significant distances in the subsurface. Based on its distance to the tunnel, PB believes this facility should be classified as a medium risk.

8.4.63 BHB Printers

The BHB Printers facility was identified in the 1980s city directories, approximately 200 feet from the tunnel. No information was available to indicate whether contamination exists on the property. Based on its distance to the tunnel, PB believes this facility should be classified as a low risk.

9.0 CONCLUSIONS

Parsons Brinckerhoff, Inc. (PB) has performed a modified Phase I environmental site assessment (ESA) of the Virginia Avenue Tunnel corridor (the Site) along Virginia Avenue SE in Washington, DC for CSX Transportation, Inc. No party other than those listed in Section 2.7 may rely upon any information or opinion contained in this report.

This ESA was performed in partial conformance with the scope and limitations of 40 CFR Part 312 (Standards and Practices for All Appropriate Inquiries) and ASTM Method E 1527-05 (Standard Practice for Environmental Site Assessments). Any exceptions to, or deletions from this practice are described in Section 12.0 of this report.

The ESA included a site walkover, review of government records, assembly and review of data from area maps and directories, and assessment of aerial photographs and Sanborn maps. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for the following:

1) The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-DRO in six of 10 soil samples collected from within the tunnel at concentrations exceeding residential cleanup criteria. The 2012 testing conducted along the tunnel corridor identified at least one SVOC present in soil samples from the zero to 15 foot interval in seven borings at concentrations exceeding the residential cleanup criteria. Hexavalent chromium (Cr^{6+}) was present in samples from the deeper depth intervals in five soil borings at concentrations exceeding the residential cleanup criteria. None of the contaminants are present at concentrations exceeding the industrial cleanup criteria. The borings from which all of these samples were collected were widely spaced, indicating that the contamination is pervasive. PB believes that the presence of contaminants in the soil at concentrations exceeding residential cleanup criteria is a REC.

2) The 1998 materials investigation report for the Virginia Avenue Tunnel identified TPH-GRO, TPH-ERO, and oil and grease were present in three of the groundwater seep samples in the tunnel at concentrations "requiring proper management." The 2012 testing conducted along the tunnel corridor identified naphthalene in the M-8 boring at concentrations exceeding the Tier I residential groundwater standard for domestic use. The contaminants in the groundwater seeps in the tunnel may be the result of contaminants leaching from the fill material surrounding the tunnel, while the contaminants in the M-8 boring are likely the result of contamination originating from a nearby facility of concern. PB believes that the presence of contaminated groundwater along the tunnel at concentrations exceeding residential cleanup criteria is a REC.

3) The asbestos survey conducted on the Virginia Avenue Tunnel in 2012 showed that approximately 8,000 square feet of black felt paper located inside the concrete vaults enclosing the electrical conduit contained asbestos. The report did not indicate whether the material was friable or likely to become friable; however, it did state that the material should not be disturbed or handled by CSX personnel. The report further stated that if tunnel expansion activities would disturb this material, it must be removed and properly disposed by a licensed asbestos abatement contractor. PB believes that the presence of the asbestos containing material in the tunnel is a REC.

4) PB's research revealed the presence of 63 nearby facilities of concern in the vicinity of the Site. Some of these facilities were identified through multiple sources; others were identified from a single source. These facilities include former gasoline stations, vehicle repair facilities, dry cleaners, properties with underground storage tanks, a manufactured gas plant, and an NPL facility. Each of these properties are either known to be contaminated, or were likely to have used, stored, or handled hazardous substances or petroleum products as part of their operations. Based on their distance from the Site, the known or probable contaminants used, and the lithology of the area, PB believes that contamination emanating from these properties could impact the soil and/or groundwater surrounding the tunnel. These facilities are therefore considered to be RECs.

10.0 RECOMMENDATIONS

Based on the information gathered as part of this Modified Phase I ESA, review of the relevant data, and understanding of the planned Site uses, PB recommends the following activities be completed:

1) Although soil contamination has been identified at concentrations exceeding residential cleanup criteria, it does not exceed the industrial cleanup criteria or construction worker protection cleanup criteria. Because the borings from which the samples were collected were widely spaced, localized pockets of more highly contaminated soil could be encountered during construction activities. Construction workers should be informed of the possible presence of contaminated soil surrounding the tunnel, so precautions can be taken to protect the workers. Suspected contaminated soil should be stockpiled and sampled for characterization. Contaminated soil should be handled and managed in accordance with appropriate local, state, and/or federal rules and regulations..

2) Although contaminated groundwater has been identified at concentrations exceeding the Tier I criteria for domestic water use, it does not exceed any of the Tier I standards for incidental dermal contact. Because the borings from which the samples were collected were widely spaced, localized pockets of more highly contaminated groundwater could be encountered during construction activities. Construction workers should be informed of the possible presence of contaminated groundwater, so precautions can be taken to protect the workers. Groundwater that is generated through dewatering activities during construction should be handled, managed, and discharged in accordance with appropriate local, district, and/or federal rules and regulations. This may include temporary

storage in a tank, characterization for the possible presence of contaminants, filtering through granular activated carbon, and/or discharge permitting. .

3) The black felt material in the utility chase within the Virginia Avenue Tunnel should be properly removed and disposed by a licensed asbestos abatement contractor if these areas are planned for any disturbance (renovation, demolition, replacement, etc.)Because of the presence of the nearby facilities of concern, construction activities should include provisions for checking the soil and groundwater for potential contaminants (as discussed in #1 and #2, above). Contaminated soil and groundwater should be handled and/or disposed in accordance with appropriate regulations.

4) Although a CERCLA liability defense is not being sought, CSX Transportation, Inc should review the User's Ongoing Responsibilities (included in Section 11.0 of this report), and comply with the provisions therein.

11.0 USER'S CONTINUING OBLIGATIONS UNDER CERCLA

Conducting this ESA does not alone provide a landowner with protection against CERCLA liability. Landowners who want to maintain a Bona Fide Prospective Purchaser, an Innocent Landowner, or a Contiguous Property Owner Defense must also comply with other pre- and post-acquisition requirements in the CERCLA regulations and AAI standards.

Since the User already occupies the Site, it likely could not qualify for a defense from CERCLA liability; however, the User of this report should still comply with all ongoing responsibilities summarized below.

11.1 Bona Fide Prospective Purchaser Responsibilities

The Bona Fide Prospective Purchaser defense is intended for individuals or entities purchasing a property known to be contaminated. To obtain and maintain the defense, the individual or entity seeking the defense must also satisfy the following requirements (AAI, Section II D. 1.):

- Have acquired a property after all disposal activities involving hazardous substances ceased at the property;
- Provide all legally required notices with respect to the discovery or release of any hazardous substances at the property;

- Exercise appropriate care by taking reasonable steps to stop continuing releases, prevent any threatened future releases, and prevent or limit human, environmental, or natural resources exposure to any previously released hazardous substance;
- Provide full cooperation, assistance, and access to persons authorized to conduct response actions or natural resource restorations;
- Comply with land use restrictions established or relied on in connection with a response action;
- Not impede the effectiveness or integrity of any institutional controls;
- Comply with any CERCLA request for information or administrative subpoena; and
- Not be potentially liable, or affiliated with any other person who is potentially liable for response costs for addressing releases at the property.

11.2 Innocent Landowner Responsibilities

The Innocent Landowner Defense protects individuals or entities (ultimately the "property owner") purchasing a property that is not known to be contaminated. The property owner must also satisfy the following requirements to obtain and maintain the defense (AAI, Section II D. 3 and CERCLA Section 107(b)(3)):

- Have no reason to know that any hazardous substance which is the subject of a release or threatened release was disposed of on, in, or at the facility;
- Provide full cooperation, assistance and access to persons authorized to conduct response actions at the property;
- Comply with any land use restrictions and not impeding the effectiveness or integrity of any institutional controls;
- Take reasonable steps to stop continuing releases, prevent any threatened release, and prevent or limit human, environmental, or natural resource exposure to any hazardous substances released on or from the landowner's property;
- Demonstrate that the act or omission that caused the release or threat of release of hazardous substances and the resulting damages were caused by a third party with whom the person does not have employment, agency, or a contractual relationship;

- Exercise due care with respect to the hazardous substance concerned, taking into consideration the characteristics of such hazardous substance, in light of all relevant facts and circumstances;
- Take precautions against foreseeable acts or omissions of a third party and the consequences that could result from such acts or omissions.

11.3 Contiguous Property Owner Defenses

The Contiguous Property Owner Defense protects individuals or entities purchasing a property that is not known to be contaminated, but could be contaminated by migration from a contiguous property owned by someone else. To qualify as a contiguous property owner, a landowner must have no knowledge of contamination prior to acquisition and meet all of the criteria set forth in AAI Section II. D. 2. and CERCLA Section 107(q)(1)(A):

- Not cause, contribute, or consent to the release or threatened release;
- Not be potentially liable nor affiliated with any other person potentially liable for response costs at the property;
- Take reasonable steps to stop continuing releases, prevent any threatened release, and prevent or limit human, environmental, or natural resource exposure to any hazardous substances released on or from the landowner's property;
- Provide full cooperation, assistance, and access to persons authorized to conduct response actions or natural resource restorations;
- Comply with land use restrictions established or relied on in connection with a response action;
- Not impede the effectiveness or integrity of any institutional controls;
- Comply with any CERCLA request for information or administrative subpoena;
- Provide all legally required notices with respect to discovery or release of any hazardous substances at the property.

12.0 DEVIATIONS

PB deviated from the procedures in ASTM Standard E 1527-05 and 40 CFR Part 312 in the following ways:

PB did not conduct interviews with CSX (the tunnel owner) since CSX provided general information regarding the tunnel. No interviews were conducted with governmental agencies that would have ownership of Virginia Avenue at the request of CSX. PB did not conduct an agency records review of any of the nearby facilities of concern at the request of CSX and due to the voluminous number of facilities and amount of file information. PB also did not request a lien search of the tunnel corridor since no defined parcel exists.

13.0 DATA GAPS AND DATA FAILURES

Data failure occurs when all of the standard historical sources that are reasonably ascertainable and likely to be useful have been reviewed and yet the historical research objectives have not been met. A data gap is a lack or inability to obtain information required by the ASTM and AAI standards, in spite of PB's "good faith efforts[4]" to obtain the information.

PB does not believe that any data failures or data gaps exist for this report since it completed each of the tasks identified in Section 2.2.1 and has achieved the historical research objectives.

14.0 GLOSSARY

This section of the report provides definitions of acronyms and special terms used in the report. It is not all inclusive.

AAI: All Appropriate Inquiry. An investigation into the historical use and possible presence of contamination on a property that is a necessary component for persons seeking to establish one of the three CERCLA defenses as part of conducting due diligence.

ACM: Asbestos Containing Material. This is a material that contains more than one percent of an asbestos mineral. These materials are only identified in PB's reports if an asbestos survey was performed prior to, or in conjunction with, PB's environmental assessment.

AST: Aboveground Storage Tank. Any aboveground storage container larger than a 55-gallon drum, either empty or full.

ASTM: American Society of Testing Materials. This is the organization that creates standards for materials and testing; in this case, the standard for environmental site assessments, which is also based on the U.S. EPA standards for all appropriate inquiry.

[4] According to AAI, good faith effort is defined as "…the absence of any intention to seek an unfair advantage or to defraud another party; an honest and sincere intention to fulfill one's obligations in the conduct or transaction concerned."

AUL: Activity and Use Limitation. A legal mechanism that imposes land use controls (such as an ordinance barring the installation of water wells in a municipal area) or engineering controls (such as a deed restriction limiting a property's use to commercial zoning).

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act. Facilities regulated by this act are listed in the CERCLIS database.

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System. The CERCLIS database lists properties that are on or are proposed to be on the National Priorities List.

CFR: Code of Federal Regulations. The regulatory code developed by federal agencies pursuant to acts passed by the US Congress.

Data Failure: Data failure occurs when all of the standard historical sources that are reasonably ascertainable and likely to be useful have been reviewed and yet the historical research objectives have not been met.

Data Gap: A data gap is a lack or inability to obtain information required by the ASTM and AAI standards, in spite of good faith efforts to obtain the information.

DDOE: District Department of the Environment.

***de minimis*:** Conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

Due Diligence: The care a reasonable person should take before entering into a transaction with another party.

EDR: Environmental Data Resources. This company owns the Sanborn Fire Insurance Map Company holdings, and provides the governmental records search used in PB's reports.

Environmental Professional: An individual who, as defined in the standards for all appropriate inquiry, possess the education and experience requirements to conduct and/or oversee certain aspects of environmental site assessments.

EPA: The U.S. Environmental Protection Agency.

ESA: Environmental Site Assessment.

Good Faith Effort: According to the AAI standards, good faith effort is "the absence of any intention to seek an unfair advantage or to defraud another party; an honest and sincere intention to fulfill one's obligations in the conduct or transaction concerned."

HREC: Historic Recognized Environmental Condition. A condition which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently.

LUST: Leaking Underground Storage Tank.

NPL: National Priorities List. A list of contaminated properties whose cleanup is being overseen by the U.S. EPA.

PCBs: Polychlorinated Biphenyls. A contaminant commonly found in old hydraulic equipment or electrical transformers.

RCRA: Resource Conservation and Recovery Act. The RCRA database includes selective information on facilities that generate, transport, store, treat and/or dispose of hazardous wastes.

RCRA 8 Metals: The list of heavy metals includes arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

REC: Recognized Environmental Condition. The presence or likely presence of any hazardous substance or petroleum products on a property that indicates an existing release, past release, or material threat of a release at the property. In PB's ESA reports, all issues identified as a recognized environmental condition are listed in the executive summary and conclusion. These are issues that warrant additional investigation and/or testing.

SHWS: State Hazardous Waste Sites. Properties included in the SHWS database have been identified by the State environmental regulatory agency as having been contaminated with hazardous wastes.

SVOCs: Semivolatile organic compounds.

TPH-DRO: Total petroleum hydrocarbons – diesel range organics.

TPH-GRO: Total petroleum hydrocarbons – gasoline range organics.

USC: U.S. Code. The full set of Laws passed by the U.S. Congress.

User: The individual or entity for which the Phase I environmental assessment has been prepared.

UST: Underground Storage Tank. Any buried storage container larger than a 55-gallon drum, either empty or full. Underground storage tanks do not include septic tanks.

VOCs: Volatile organic compounds.

15.0 REFERENCES

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The *EDR City Directory Abstract, Virginia Avenue Tunnel, 700 Virginia Avenue SE, Washington DC 20003*, Environmental Data Resources, Inc., Milford, Connecticut, June 5, 2012, (1922, 1926, 1931, 1936, 1940, 1943, 1948, 1954, 1960, 1964, 1969, 1973, 1978, 1983, 1993, 2000, 2006).

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Shaw Environmental & Infrastructure, Inc., *Polychlorinated Biphenyl Sampling Report, for the Virginia Avenue Tunnel, Virginia Avenue SE, Washington DC*, performed for CSX Transportation, Inc., July 23, 2012.

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16.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

We declare that, to the best of our knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR Part 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in partial conformance with the standards and practices set forth in 40 CFR Part 312. All work done by other individuals who might not meet the definition of an Environmental Professional was done under our supervision.

Adam W. Heft, CPG
Senior Supervising Geologist

David R. VanGoethem, P.E.
Senior Supervising Engineer

APPENDICES NOT INCLUDED