Project Number: 0444100
March 10, 2022

Professional Service Industries, Inc.
2930 Eskridge Road
Fairfax, Virginia 22031
Phone: (703) 698-9300
Fax: (703) 698-4414

Mr. Chuck Belser, PMP
Vice President, Transportation Facilities
STV Incorporated
120 East Baltimore Street, Suite 1710
Baltimore, MD 21202

Subject: Comprehensive Site Assessment Report
WMATA Northern Bus Station
4615 14th Street NW
Washington, D.C 20011

Dear Mr. Belser:

Pursuant to your request and in accordance with the DOEE Comprehensive Site Assessment Directive Letter, dated December 10, 2020, Professional Service Industries, Inc. (PSI), an Intertek company, has prepared this Comprehensive Site Assessment (CSA) Report for the above-referenced property. One electronic copy of the CSA Report has been prepared for your use.

Thank you for choosing PSI as your consultant for this project. If you have any questions regarding the information contained herein, or if we can be of additional service, please contact the undersigned at (703) 698 9300.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Andres Acosta, P.G.
Project Geologist/Principal Consultant

Angela C. Garzia
Principal Consultant

Cc: Hamid Riahi, PSI

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

APPENDIX

ACRONYM LIST

AMSL	Above Mean Sea Level
AST	Aboveground Storage Tank
BLS	Below Land Surface
CSA	Comprehensive Site Assessment
DCRBCA	District of Columbia Risk Based Corrective Action
DDOT	District of Columbia Department of Transportation
DOEE	Department of Energy and Environment
DRO	Diesel Range Organics
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
GRO	Gasoline Range Organics
I	Hydraulic Gradient
K	Hydraulic Conductivity
MCL	Maximum Contaminant Level
NELAC	National Environmental Laboratory Accreditation Conference
NPDWR	National Public Drinking Water Regulations
OVA-PID	Organic Vapor Analyzer equipped with Photoionization Detector
OWS	Oil-Water Separator
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PEI	Preliminary Environmental Investigation
ppm	Parts per million
PSI	Professional Service Industries, Inc.
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
RSL	Regional Screening Level
SSL	Site Specific Screening Level
STV	STV Incorporated
SVOCs	Semi-Volatile Organic Compounds
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Top-of-Casing
TPH	Total Petroleum Hydrocarbons
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
WMATA	Washington Metropolitan Area Transit Authority

1. EXECUTIVE SUMMARY

Professional Service Industries, Inc. (PSI), an Intertek company, has prepared this Comprehensive Site Assessment (CSA) Report for the Washington Metropolitan Area Transit Authority (WMATA) Northern Bus Garage on behalf of STV Incorporated (STV) and Clark Construction (Clark). The project is located at 4615 14th Street NW in Washington, District of Columbia (D.C.). This document has been prepared in accordance with the Washington D.C. Department of Energy and Environment (DOEE) Directive for Comprehensive Site Assessment letter, dated December 10, 2020, and CSA Work Plan approval letter, dated June 15, 2021.

The investigation activities documented in this CSA Report are a continuation of assessment activities performed at the site in anticipation of demolition of the on-site building/structures and the construction of a new WMATA bus garage and maintenance facility.

Field investigation and sampling activities were performed by PSI personnel in October and December of 2021 (soil sampling and well installation), and January of 2022 (groundwater sampling). Soil cuttings generated during the performance of the soil borings, groundwater generated during development and sampling of the temporary/permanent monitoring wells, and decontamination water were placed into 55-gallon steel drums, and stored on-site for subsequent disposal.

In accordance with DOEE requirements, PSI obtained soil boring permits prior to performing the drilling activities (permit # SB2100374 and TOPs# 382061). Additionally, in accordance with DOEE and DDOT requirements, for the drilling work being performed in the traffic right-of-way (ROW) along the east side of Arkansas Avenue NW, PSI obtained an occupancy permit (permit # PA10899603-R1).

Soil Assessment Activities

Utilizing hand auger, conventional drilling split-spoon, and/or Geoprobe® drill-rig methodologies, PSI personnel observed the advancement of 40 soil borings. Of the 40 soil borings, nine (9) soil borings were attempted; however, refusal was encountered in these borings at depths ranging from 4 to 13.5 feet BLS. Where refusal was met, a second boring was performed immediately adjacent to the first boring to verify if the encountered obstruction or rock was localized to the previous boring. The groundwater table was encountered at depths ranging from 5 feet below land surface (BLS) to 21 feet BLS in the soil borings performed based on subsequent groundwater measurements in the permanent and temporary monitoring wells.

Based on field observations and on responses from soil screening activities, utilizing an organic vapor analyzer equipped with a photoionization detector (OVA-PID), PSI collected 19 soil samples for laboratory analysis. Analytical results for the soil samples collected during the October/December 2021 sampling events indicated the presence of metals- and petroleum-related soil impacts; however, none of the samples analyzed indicated the presence of test parameters at concentrations above their respective Washington D.C. Department of Energy and Environment Tier 1 Soil Screening Levels for construction workers.

Permanent Monitoring Well Installation Activities

Three (3) shallow (soil) permanent wells were installed to depths of approximately 27 feet BLS, and one (1) deep (bedrock) permanent well was installed to a depth of approximately 38 feet BLS utilizing hollow-stem auger methodologies within the eastern portion of the on-site building.

During well development of monitoring well MW-003, light non-aqueous phase liquid (LNAPL) was identified within the monitoring well. The viscous material measured less than 1-inch in thickness.

Temporary Monitoring Well Installation Activities

Originally, direct groundwater samples via Geoprobe™ water sampler were included in the CSA Work Plan to facilitate the collection of shallow/deep groundwater samples at the site. However, due to concerns regarding slow recharge rates, PSI recommended converting the soil borings performed during the soil investigation activities into temporary monitoring wells utilizing pre-packed well screens.

Where refusal or shallow bedrock was not encountered, PSI installed a shallow (soil) temporary monitoring well, with the screen interval bracketing the groundwater table, and a deep (bedrock) temporary monitoring well with its termination depth directly above the determined depth of bedrock. If sufficient separation (> 5ft) between the shallow temporary monitoring well screen and the deep temporary monitoring well screen was not possible, then only the shallow temporary monitoring well was installed at that location.

Groundwater Sampling Activities

On January 5, 2022, PSI personnel collected depth-to-groundwater measurements from all on-site permanent/temporary monitoring wells for later use in calculating groundwater flow direction at the site. The groundwater levels were collected within a 24-hour period and were measured from top-of-casing (TOC) and recorded to the nearest 0.01 of a foot.

From January 7 to 11, 2022, PSI personnel collected groundwater samples from 23 monitoring wells for laboratory analysis. Analytical results indicated the presence of petroleum- and chlorinated solvent-related test parameters; however only Total Petroleum Hydrocarbons–Diesel Range Organics was identified above its DOEE Tier 1 Screening Levels for Groundwater in one groundwater sample.

Groundwater Flow Determination

Utilizing TOC elevation and depth-to-groundwater measurements collected from the permanent and temporary monitoring wells performed/installed as part of this CSA, groundwater elevations were calculated by subtracting the depth-to-groundwater measurements from the TOC elevations for each borehole/well. Based on these calculations, the groundwater flow direction in the shallow and deep aquifer was determined to be towards the southeast. The shallow and deep aquifer groundwater flows appear to be generally consistent with historic assessments.

Potential Impact

Based on the extent and concentrations of the impacts identified in this CSA, the identified soil and groundwater impacts do not represent a significant threat to the properties in the vicinity of the site property. Additionally, the chlorinated solvent groundwater plume concentrations appear to be consistent with historic environmental assessments performed at the site property, and the groundwater impact plume appears to be stable in size indicating little/no migration.

Recommendations

Recommendations based on field observations and laboratory analytical results provided in this Comprehensive Site Assessment report will be presented by WMATA under separate cover.

2. PURPOSE AND SCOPE

Professional Service Industries, Inc. (PSI), an Intertek company, has prepared this Comprehensive Site Assessment (CSA) Report for the Washington Metropolitan Area Transit Authority (WMATA) Northern Bus Garage on behalf of STV Incorporated (STV) and Clark Construction (Clark). The project is located at 4615 14th Street NW in Washington, District of Columbia (D.C.). This document has been prepared in accordance with the Washington D.C. Department of Energy and Environment (DOEE) Directive for Comprehensive Site Assessment letter, dated December 10, 2020.

The investigation activities documented in this CSA Report are a continuation of assessment activities performed at the site in anticipation of demolition of the on-site building/structures and the construction of a new WMATA bus garage and maintenance facility. Based on the findings of a Preliminary Environmental Investigation (PEI) report prepared by PSI, dated February 7, 2020, metals-, petroleum-, and chlorinated solvent-related compounds were identified in the on-site soil and groundwater at concentrations above their respective DOEE site screening levels (SSLs), District of Columbia Risk-Based Closure Assessment (DCRBCA) contact levels, and/or U.S. Environmental Protection Agency (EPA) regional screening levels (RSLs). As such, this CSA and its associated work plan have been prepared to conduct a background search, fully characterize the on-site soil and groundwater conditions, and to collect site-specific information for use in delineating the extent of the soil/groundwater impact, and evaluate and determine the appropriate remedial technology and/or remedial options.

While the CSA is a continuation of the work begun under the preliminary investigation and confirmation of release, this investigation is a thorough expansion of those activities. The CSA is directed to focus on collecting field data (on and off-site), and to evaluate the efficacy and appropriateness of the corrective action alternatives.

The activities described in this CSA were performed in accordance with the approved May 7, 2021 CSA Work Plan and the District's Comprehensive Site Assessment Protocol guidance document, dated July 2010. Any deviations and reasoning for the deviations from the Work Plan scope of work is discussed in section 4.3.

3. SITE BACKGROUND

3.1 Site Location

The Northern Bus Garage (site) is located in a mixed-use neighborhood surrounded by residential housing and commercial properties. The site is improved with an approximately 270,000 square foot multi-story building, with the oldest portion of the building constructed circa 1906. The Northern Bus Garage is owned by WMATA and is located on Square 2811/2815 and Property ID 2811 0802 of the Washington D.C. Real Estate Map. The on-site building historically has been used for Street Car Storage and maintenance, and consists of administrative offices, an employee parking deck, maintenance/repair bays, bus wash areas, storage rooms, and a garage with capacity for approximately 175 buses.

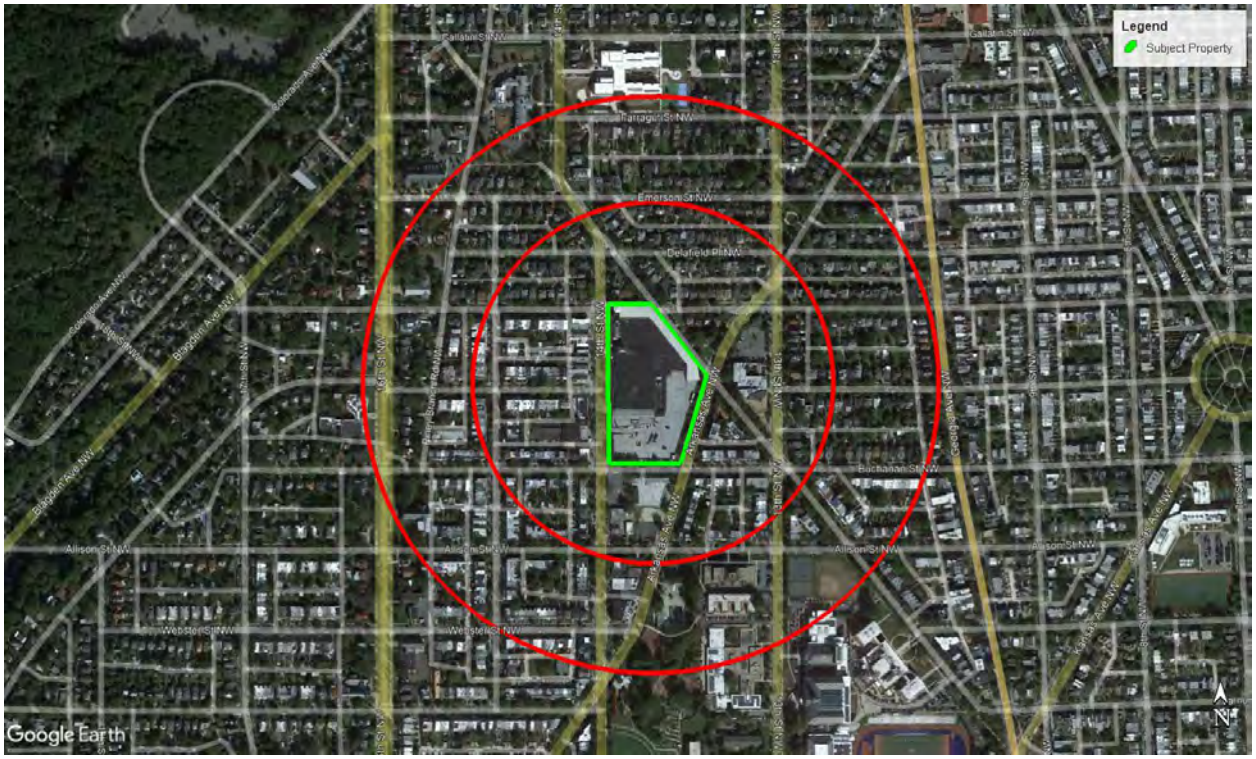


Exhibit 1 - Site Location Map
The approximate Northern Bus Garage property boundary is indicated by a green line, the inner red ring represents an approximate 500-foot radius around the site, and the outer red ring represents an approximate 1,000-foot radius around the site.

Currently, the site is inactive as a WMATA bus division and has limited occupancy for staff planning the reconstruction; however, infrastructure associated with the former bus storage/maintenance facility remains on-site. WMATA plans to demolish the majority of the existing on-site building to redevelop the site for mixed use (new bus garage and retail space) and will preserve a limited portion of the original 1906 trolley barn. The site is bounded by residentially developed properties to the north (Decatur Street NW) and east (along Iowa Avenue NW and Arkansas Avenue NW), and commercially developed properties to the south (along Buchanan Street NW) and west (along 14th Street NW).

The Northern Bus Garage is served by public utilities including water and sewer. Groundwater is not used as a source of potable water on or in the vicinity of the site.

A regional map depicting the site and the surrounding area within a 1-mile radius, is provided as Figure 1. A Neighborhood map depicting the site and surrounding properties within an approximate 2-block radius, including the general use of the properties, is provided as Figure 2.

3.2 Site History

A public transit support facility has operated at the 4615 14th Street NW, Washington, D.C. location since approximately 1906. The location has primarily been utilized for the operation and maintenance of transit vehicles beginning with trolley cars. The facility was managed by a private busing business in the 1940s-1950s; however, in the mid-1970s, WMATA assumed control of operation and maintenance responsibilities of the facility and buses in the metropolitan area. Historically, usage of portions of the Northern Bus Garage property included use as a trolley car barn, bus storage and maintenance, vehicle fueling, auto-maintenance and vehicle washing.

Various facility modifications were performed between the early 1980s through early 2000s, which included the construction of a wall around the facility to minimize community impacts from the on-site activities. During a site geotechnical investigation for the planned renovations/construction activities performed in late 2019/early 2020, petroleum-related vapors were identified in the site soils in the vicinity of the existing on-site underground storage tanks (USTs). Previously USTs were removed from the ground during renovation/construction activities, which were completed in the early 1990s.

Complete historic information regarding maintenance practices and chemical usage at the facility is not available. Several petroleum USTs and aboveground storage tanks (ASTs) have been installed and removed from the site. Additionally, laundry/dry-cleaning facilities existed along 14th Street (west of the site) between 1927 and 1985, as identified on Sanborn Fire Insurance Maps.

A review of available fire insurance maps (Sanborn) and aerial photographs indicated the following information:

- 1927 (Sanborn) – The map depicts the original on-site Car Barn structure for Washington Rapid Transit Co. Bus Station, built circa 1906. Structures depicting shops and garages also appear on the southern portion of the property.

- 1951- 1960 (Aerials & Sanborn) – The site is improved with a bus garage with a gas pump on the eastern portion of the original building. The Sanborn depicts an apparent commercial filling station on the southwest corner.

- 1960-1985 (Sanborn) – The site is improved with a bus garage (northern portion), commercial type structures (southwest corner), and a Cleaning & Dyeing facility (along south property boundary). A filling station is depicted (1960-1991) on the south adjoining property.

- 1963-1985 (Aerials) – Bus operations continue.

- 1988-1991 (Aerials) – The shops and garage structures on the southern portion of the property have been removed by approximately 1989.

- 1992-2017 (Aerials) – The on-site structure was improved with a roof parking lot and bus repair shop over the eastern and southern portion of the property.

Copies of historical aerial photographs and Sanborn maps are provided in Appendix B.

3.3 Existing Conditions

The site is located in a mixed-use neighborhood surrounded by residential housing and commercial properties. The site is improved with an approximately 270,000 square foot multi-story building, with the oldest portion of the building constructed in 1906. The on-site building historically has been used for bus storage and maintenance, and consists of administrative offices, an employee parking deck, maintenance/repair bays, bus wash areas, storage rooms, and a garage with capacity for approximately 175 buses. The bus facility was decommissioned in 2019.

Previous investigations at the Site have been conducted by Versar, Inc., PSI, and others. This section provides a basic overview of assessment activities performed at the site to date and current knowledge of the extent of on-site soil/groundwater impacts.

<u>Petroleum Impacts (Versar, 2003 ESA report)</u>

Based on historical information provided in a Versar 2003 ESA report, petroleum-related soil and/or groundwater impacts have been identified on the site at various times during the facility operation. The petroleum-related impacts have been attributed to leaking USTs utilized at the facility for storing fuel and/or automotive oils. During a geotechnical investigation performed in 1984, petroleum-related odors were observed in soils in the vicinity of several on-site USTs. Following the discovery of the soil impacts, the USTs were scheduled to be removed from the site during planned renovation work. A preliminary contamination assessment (PCA) was performed in 1989 during which five (5) monitoring wells were installed for groundwater monitoring purposes. A groundwater recovery and treatment system was installed in the southeastern portion of the site property in late 1989 and removed in mid-1990. Site renovation activities were also performed from 1990-1991, during which the USTs and approximately 13,750 cubic yards of petroleum-impacted soil were removed from the site for proper disposal.

An aquifer pump test was performed in 1992 to collect hydrologic information for the design of a groundwater treatment system to remediate the identified on-site petroleum-related groundwater impacts. A in-well separator free product recovery pump was installed in one of the on-site monitoring wells with plumbing connected to a storage tank located within the bus garage where the free product would be collected. In 1999, an air sparge unit replaced the in-well separator due to insufficient product recovery.

The historical information additionally indicated that the on-site petroleum-related groundwater impacts appear to be degrading and/or are naturally attenuating. The report also stated that the lack of off-site detected impacts indicate that the bus garage operations and maintenance activities have not significantly impacted the surrounding area.

Chlorinated Solvents (Versar, 2003 ESA Report)

In 1993, chlorinated solvent groundwater impacts were identified on the southern portion of the site. A risk assessment was performed to address concerns regarding the detected concentrations in the groundwater samples collected from Monitoring Wells MW-21 and MW-22. The risk assessment concluded that the detected concentrations posed no excess risk to human health at that time. An ESA report prepared in 2003, indicated that chlorinated solvents impacts were still present in the vicinity of Monitoring Wells MW-21 and MW-22; however, appear to be natural attenuating as observed by the breakdown components associated with tetrachloroethylene (PCE). Additionally, the ESA indicates that the most likely source of these chlorinated solvent groundwater impacts to be historic dry-cleaning facilities previously located adjacent-west of the site along 14th Street NW.

Preliminary Environmental Investigation Report (PSI, February 2020)

Analytical results for the soil samples collected within the on-site building footprint during the November-December 2019 PEI investigation indicated the presence of metals and petroleum-related compounds at concentrations above their respective DOEE Tier 0 SSLs, DCRBCA contact levels, and/or EPA RSLs at various locations throughout the site. Soil impacts were generally localized in the vicinity of the inground structures used for the facility operations, including the following:

- Lower level east UST; polynuclear aromatic hydrocarbons (PAHs), diesel range organics (DRO)
- Former AST storage area; PAHs, DRO
- Bus Wash Area, fuel dispenser; Lead, Arsenic, PAHs, DRO
- Bus wash area, sand filter; PAHs
- North sand filter; PAHs
- OWS, hydraulic lift; DRO
- Bus wash bay, oil water separator (OWS); PAHs, DRO
- Upper floor USTs; GRO, DRO
- Former AST storage area, Non-Haz Waste AST; Arsenic, PAHs, DRO
- Former AST storage area, Non-Haz waste AST; PAHs, DRO
- Bus wash area; Arsenic, PAHs, gasoline range organics (GRO), DRO
- Bus wash area, fuel dispenser; PAHs, GRO, DRO, Ethylbenzene
- South sand filter; PAHs, DRO
- Lower level southeast wall, storage area, coverage purposes; PAHs, DRO
- Coverage purposes; Arsenic, PAHs, DRO
- Bus wash area, coverage purposes; DRO
- Lower level south AST, pump room AST; Arsenic, GRO, DRO
- Storage area, coverage purposes; DRO
- Lower level south wall, coverage purposes; GRO, DRO
- Lower level south wall, coverage purposes; GRO, Ethylbenzene

Analytical results for the groundwater samples collected within the on-site building footprint during the November-December 2019 PEI investigation indicated the presence of polychlorinated biphenyls (PCBs), petroleum-, and/or chlorinated solvent-related test parameters at concentrations above their respective DOEE Tier 1 Screening Levels for Groundwater, DOEE Groundwater Quality Standards, and/or EPA national primary drinking water regulations (NPDWR) maximum contaminant levels (MCLs) in the shallow aquifer.

Shallow aquifer groundwater impacts were generally localized in the vicinity of the inground structures used for the facility operations, including at the following locations:

- Lower level east UST; PCBs
- North sand filter; DRO
- Lower level southern extent, coverage purposes; semi-volatile organic compounds (SVOCs), VOCs
- South sand filter, coverage purposes; volatile organic compounds (VOCs)
- Bus wash bay, OWS; VOCs
- Lower level storage room; SVOCs

The PCB and petroleum-related groundwater impacts appeared to be localized in areas near conveyances for surface water drainage, which may indicate leakage of this system in these areas or residual impacts from historic discharges.

The chlorinated-solvent groundwater impacts appeared to be localized in the southern portion of the site; however, based on review of historical environmental assessments performed at the site as well as review of subsurface groundwater flow and bedrock topography, the chlorinated solvents may have originated, at least partially, from an off-site source.

A copy of PSI's May 7, 2021 PEI report as well as figures summarizing the PSI 2020 PEI findings and Versar 2002 Environmental Site Assessment (ESA) findings are provided in the approved CSA Workplan, which is provided in Appendix A.

3.4 Future Considerations

The assessment and removal of the on-site USTs will be performed following the DOEE *UST Closure Assessment Protocol* and *Standard Procedure for Removal of Underground Storge Tanks* guidance documents.

Currently, dewatering activities associated with the demolition and/or construction activities are not anticipated to be needed. If dewatering is required, prior to dewatering activities, a dewatering permit will be obtained from the local/county/federal authorities with jurisdiction in the work area. A site layout map is provided as Figure 3.

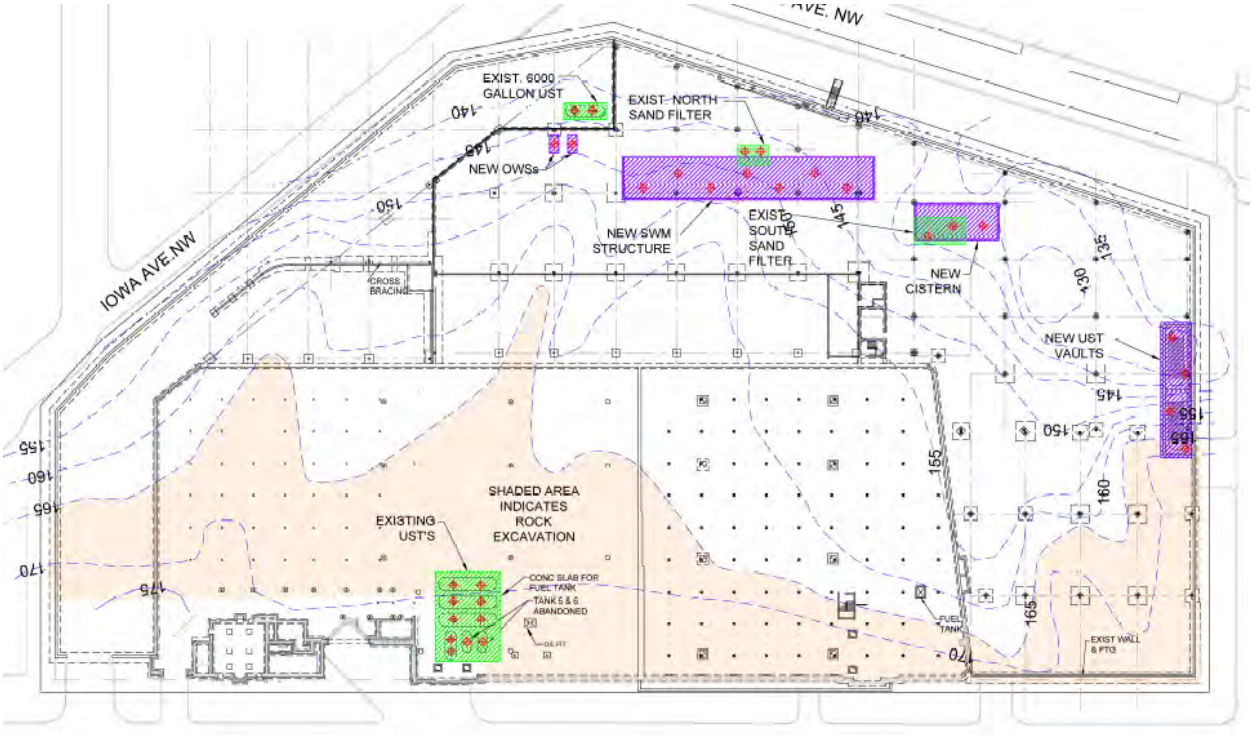


Exhibit 2 - Planned In-ground Structure Removal/Installation Map
The above figure depicts locations where in-ground structures (green) will be removed, and planned future in-ground structures will be installed (purple). Shading indicates bedrock planned to be excavated during construction.

3.5 Hydrogeology

Regional Geology

The site is located within the Piedmont physiographic province and is mapped as the Laurel Gneiss (granitic gneiss) which grades into early Paleozoic-aged Wissahickon Formation. The Laurel Gneiss was apparently derived from the Wissahickon Formation rock by hydrothermal alteration. The Wissahickon Formation, as seen in the Washington, D.C. area, consists of quartz-mica schist, phyllite, and quartzite (Johnston, 1964). At lower elevations (eastern and southern portions of the site), the site is underlain by unconsolidated valley bottom materials (soil) of the Patuxent Formation containing clay, silt, sand, gravel, along with weathered/ decomposed rock fragments from upslope areas.

Site Topography/Geology

The United States Department of Agriculture (USDA) 1976 Soil Survey for the District of Columbia and the current USDA Web Soil Survey listing identify site soils primarily as Urban Land. Urban Land is used to designate areas where natural soils have been disturbed by development or are covered by impervious surface or structures.

The site is situated at an approximate average elevation of 199 feet above mean sea level (AMSL) to the north, with a gradual topographic slope to 177 feet AMSL to the southeast.

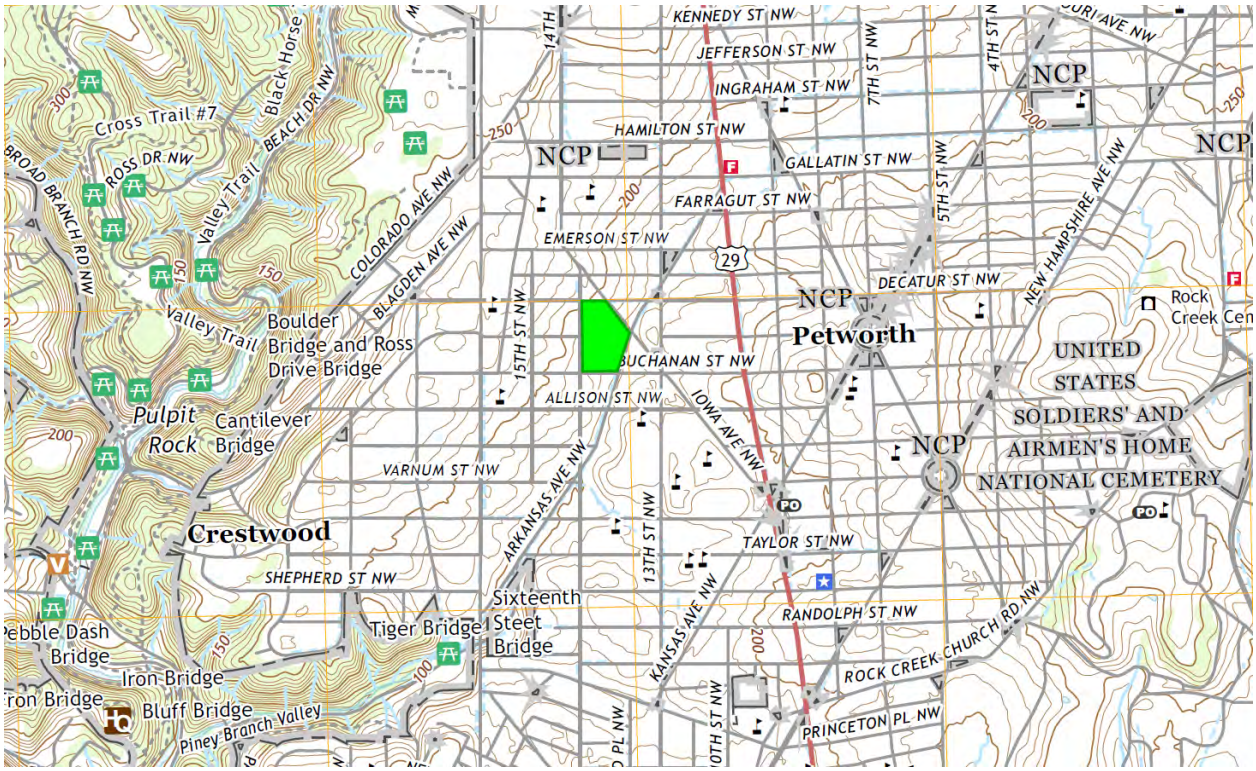


Exhibit 3 - Site Vicinity Topographic Map

As provided in the February 7, 2020 Preliminary Geotechnical report prepared by PSI, at a regional scale Southworth et al. 2006 mapped the Project Site location as being an unconformable contact between the Laurel Formation (Lower Cambrian) and sand-dominated lithofacies of the Potomac Formation (Lower Cretaceous). The mapped contact between the two formations approximately bisects the Project Site from north to south. As mapped, the Potomac Formation underlies the western portion of the Project Site and the Laurel Formation underlies the eastern portion of the Project Site.

The Laurel Formation is a sedimentary mélange that underwent metamorphism in areas, resulting in partial melting and migmatization. The Laurel Formation was subsequently intruded at depth in the crust by mafic and felsic magmas while the Rock Creek Park shear zone was active (Thornberry-Ehrlich, 2009).

Approximately a mile east of the Rock Creek Park shear zone, where the Project Site is located, the Potomac Formation consists of sand-dominated coastal plain sediments likely associated with the ancestral Potomac River. The ancestral Potomac River eroded and cut into regional bedrock, unconformably depositing fluvial terraces and flood plain sediments over the underlying rocks, including the Laurel Formation and intrusive igneous units (Southworth et al. 2006).

Subsurface characterization of bedrock at the Project Site conducted as part of a geotechnical engineering study performed by PSI indicated that the underlying geology of the Project Site consists of intermediate to mafic igneous rocks, rather than the Laurel Formation or Potomac Formation as mapped. Rock cores collected

at the Project Site were classified as massive to foliated metadiorite. The metadiorite is predominantly intermediate in composition, although variation was observed across the Project Site and in some areas the bedrock is more mafic, bordering on a gabbroic composition. In select areas of the Project Site the metadiorite is foliated enough to be considered a gneiss. The Laurel Formation was intruded throughout by igneous rocks, many of which are known collectively as the Georgetown Intrusive Suite (Early Ordovician) (Southworth et al. 2006). Based on mineralogical assemblages, country rock xenoliths, and cross-cutting relationships of the rock samples recovered from the geotechnical investigation, bedrock at the Northern Bus Garage location is likely associated with the Georgetown Intrusive Suite which intruded into the Laurel Formation.

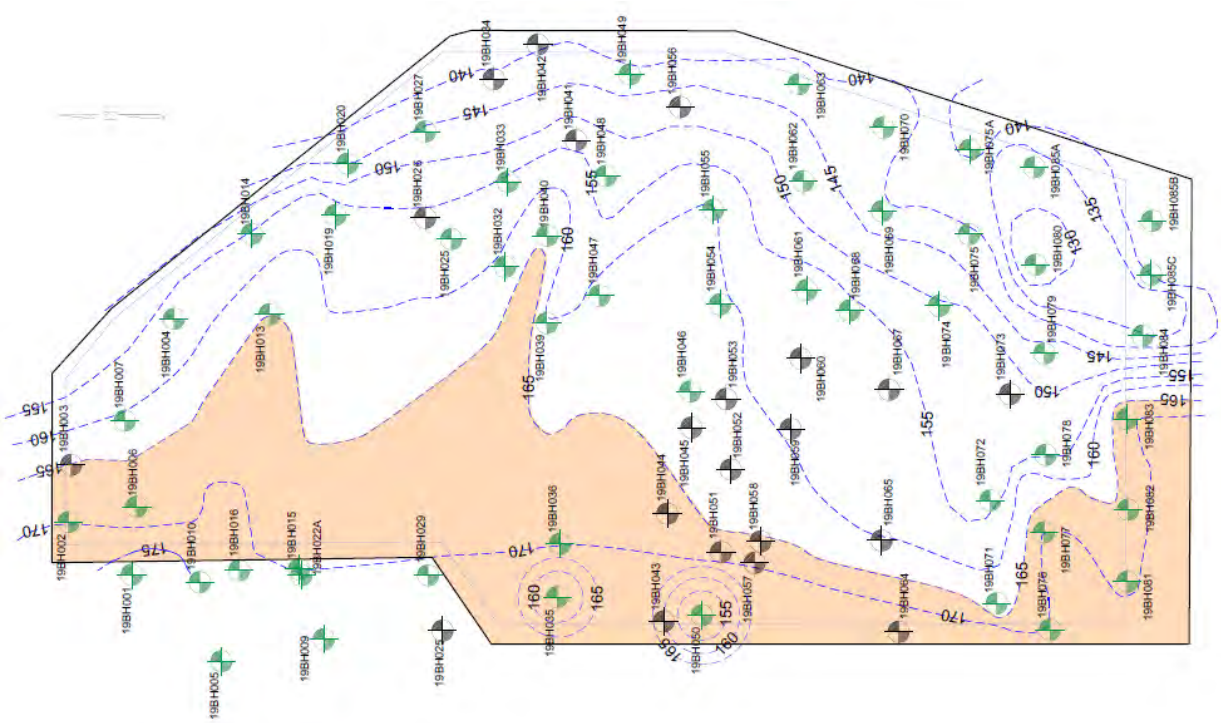


Exhibit 4 - Bedrock Contour Map
Shading indicates bedrock planned to be excavated during construction; bedrock is sloping towards the southeast.

Hydrology

Groundwater on the site is encountered under unconfined conditions in the shallow saprolitic aquifer matrix. The depth to groundwater in the shallow monitoring wells (soil wells) ranged from approximately 5 to 17 feet below land surface (BLS). The depth to groundwater in the deep monitoring wells (bedrock wells) ranged from approximately 8 to 21 feet BLS. The more competent underlying fractured bedrock aquifer becomes semi-confined with increasing depth.

Based on groundwater velocity calculations provided in the Versar Site Assessment Report, the hydraulic gradient (I) across the site for the shallow soils has historically been documented to be approximately 0.07 (foot/foot, dimensionless) in both the northern portion and the southern portion of the site.

A United States Geological Survey (USGS) topographic map of the surrounding area is provided as Figure 4.

4. FIELD INVESTIGATIONS

Field investigation and sampling activities were performed by PSI personnel in October and December of 2021 (soil sampling and well installation) and January of 2022 (groundwater sampling). Soil cuttings generated during the performance of the soil borings, groundwater generated during development and sampling of the temporary/permanent monitoring wells, and decontamination water were placed into 55-gallon steel drums, and stored on-site for subsequent disposal.

In accordance with DOEE requirements, PSI obtained soil boring permits prior to performing the drilling activities (permit # SB2100374 and TOPs# 382061). Additionally, in accordance with DOEE and DDOT requirements, for the drilling work being performed in the traffic right-of-way (ROW) along the east side of Arkansas Avenue NW, PSI obtained an occupancy permit (permit # PA10899603-R1). All field activities were performed and sampling locations selected in accordance with the approved CSA work plan, dated May 7, 2021. Copies of the soil boring permits and occupancy permit are included in Appendix C.

4.1 Soil Investigation Activities

Utilizing hand auger, conventional drilling split-spoon, and/or Geoprobe® drill-rig methodologies, PSI personnel observed the advancement of 40 soil borings. Of the 40 soil borings, nine (9) soil borings were attempted; however, refusal was encountered in these borings at depths ranging from 4 to 13.5 feet BLS. Where refusal was met, a second boring was performed immediately adjacent to the first boring to verify if the encountered obstruction or rock was localized to the previous boring. The groundwater table was encountered at depths ranging from 5 feet BLS to 21 feet BLS in the soil borings performed based on subsequent groundwater measurements in the permanent and temporary monitoring wells.

The difference in elevation between the top of the interior soil borings (level with the bus garage foundation) and the top of the exterior soil borings vary greatly from approximately level on the west exterior of the bus garage to approximately 5 to 8 feet on the east exterior of the bus garage.

Soil samples were collected from each soil boring area on approximate 1- to 2-foot intervals for field screening utilizing an organic vapor analyzer equipped with a photoionization detector (OVA-PID). The termination depth of the soil borings ranged from 4 feet BLS to 23 feet BLS, depending on the lithology encountered and/or depth to the groundwater table. Airtight 1-quart capacity plastic bags were partially filled with the soil samples, sealed, and set aside to allow volatile gases, if any, to accumulate throughout the headspace. The organic vapor response for each soil sample was determined by inserting the probe of the OVA-PID into the headspace of the sample container and recording the highest sustained reading.

Based on field observations and OVA-PID responses, PSI collected 19 soil samples for laboratory analysis including EPA Method 8260 for VOCs, EPA Method 8270 for SVOCs, EPA Method 8015D for Total Petroleum Hydrocarbons (TPH) DRO/GRO, and EPA Method 6010C and 7471B for four Resource Conservation and Recovery Act (RCRA) metals (arsenic, cadmium, chromium, and lead).

Upon completion of the soil sampling activities, the soil borings were converted to soil or bedrock monitoring wells, depending on the scope of work included in the work plan or termination depth of the soil boring. Discussion of the well installation activities is included in Section 4.2. A soil boring and well

installation summary is provided as Table 1. The locations of the soil borings are provided on Figure 5. Copies of the field equipment calibration forms, and boring logs, are provided in Appendix D.

4.2 Groundwater Investigation Activities

Permanent Monitoring Well Installation Activities

Three (3) shallow (soil) permanent wells (MW-001, MW-002, MW-003) were installed to depths of approximately 27 feet BLS, and one (1) deep (bedrock) permanent well was installed to a depth of approximately 38 feet BLS utilizing hollow-stem auger methodologies within the eastern portion of the on-site building. Soil samples were collected at continuous 2-foot intervals to depths extending to approximately 20 feet BLS, where the apparent groundwater was identified. Each soil sample was visually classified for staining and any observed odors were recorded.

The shallow permanent wells were constructed of 10-feet of 2-inch diameter schedule 40 polyvinyl chloride (PVC) 0.006-inch factory slotted screen coupled with a 2-inch diameter solid PVC riser and placed so that the well screen bracketed the groundwater table. A filter pack was then placed around the screen interval followed by fine sand and a hydrated bentonite seal. The deep monitoring well was similarly installed/constructed; however, the deep monitoring well was installed with a 5-foot section of screen and the bottom of the screen interval placed at the top of the bedrock. All permanent monitoring wells were finished at the surface with a 8-inch steel manhole and neat grout.

Temporary Monitoring Well Installation Activities

Originally, direct groundwater samples via Geoprobe™ water sampler were included in the CSA Work Plan to facilitate the collection of shallow/deep groundwater samples at the site. However, due to concerns regarding slow recharge rates, PSI recommended converting the soil borings performed during the soil investigation activities into temporary monitoring wells utilizing 1-inch diameter factory pre-packed well screens, which was approved by both WMATA and DOEE personnel. Shallow temporary monitoring wells were constructed with 10-feet of factory pre-packed well screen, and deep temporary monitoring wells were constructed with 5-feet of factory pre-packed well screen.

Where refusal or shallow bedrock was not encountered, PSI installed a shallow (soil) temporary monitoring well, with the screen interval bracketing the groundwater table, and a deep (bedrock) temporary monitoring well with its termination depth directly above the determined depth of bedrock. If sufficient separation (> 5ft) between the shallow temporary monitoring well screen and the deep temporary monitoring well screen was not possible, then only the shallow temporary monitoring well was installed at that location.

Monitoring Well Development

Upon the completion of each newly installed monitoring well, PSI personnel developed the wells utilizing a centrifugal pump with disposable polyethylene tubing in conjunction with a surge block as a means of removing fine sediment from the well screen and filter pack. Once visual observations indicated a significant reduction in sediment, well development activities were discontinued. All development water was placed into 55-galon steel drums and stored on-site for subsequent proper disposal.

During well development of monitoring well MW-003, light non-aqueous phase liquid (LNAPL) was identified within the monitoring well. The viscous material measured less than 1-inch in thickness.

Groundwater Sampling Activities

On January 5, 2022, PSI personnel collected depth-to-groundwater measurements from all on-site permanent/temporary monitoring wells for later use in calculating groundwater flow direction at the site. The groundwater levels were collected within a 24-hour period and were measured from top-of-casing (TOC) and recorded to the nearest 0.01 of a foot.

From January 7 to 11, 2022, PSI personnel collected groundwater samples from 23 monitoring wells for laboratory analysis by EPA Method 8260 for VOCs, EPA Method 8270 for SVOCs, TPH-GRO/DRO, and 4 RCRA metals. No groundwater sample was collected from Monitoring Well MW-003 due to the presence of a petroleum-type product identified in the well during the well development activities.

A soil boring and well installation summary is provided as Table 1. The locations of the permanent/temporary monitoring wells are provided on Figure 5. Copies of the field equipment calibration forms and groundwater sampling logs are provided in Appendix D.

4.3 Deviations From Work Plan

The performed scope of work in this work plan was performed in accordance with the approved CSA Work Plan. However, due to the current site conditions and selected methodologies used for the performance of the work, some modifications were needed to complete the scope of work as presented in the Work Plan, including moving some of the sample locations, not collecting all soil samples from a selected soil boring, installing only one well at a location due to shallow bedrock, and not installing a well due to refusal from unknown in-ground structures. Deviations from the work plan are provided below.

- SB/MW-003 - Adjustment to the planned location for SB/MW-003 was made due to unknown in-ground structures, and a groundwater sample was not collected from this well due to the presence of LNAPL identified in the well.
- SB/TMW-001(S,D) and SB/TMW-003(S,D) - Soil samples from the intervals exhibiting the highest OVA-PID response and soil-water interface were unable to be collected due to refusal encountered in the boreholes at depths of approximately 5 to 6 feet BLS.
- TMW-001(S,D), TMW-002(D), TMW-003(S,D), TMW-005(S,D), TMW-007(S,D), TMW-0010(D), TMW-011(D), TMW-015(D), TMW-016(D), TMW-017(D), TMW-018(D) – Temporary monitoring wells were not installed due to refusal from an unknown in-ground structure, shallow bedrock, and/or depth to bedrock was sufficiently shallow enough not to allow proper separation (≥ 5 feet) of the shallow and deep well screens.

4.4 Quality Assurance/Quality Control

All field decontamination and sampling procedures were performed in accordance with the EPA Operating Procedures for Soil and Groundwater Sampling, and Chapter 20 Sections 6100 and 6205 of the District of Columbia Municipal Regulations, where applicable. Quality Assurance and Quality Control (QA/QC) samples included trip blanks for laboratory analysis of VOCs per EPA Method 8260 were collected for laboratory analysis. All downhole equipment utilized during the field activities was decontaminated prior to and between each soil boring and monitoring well. Decontamination of said equipment will be accomplished by washing the equipment with a non-phosphate detergent and distilled water solution

followed by a final distilled water rinse. Single-use disposable gloves and disposable tubing were used for each sampling point in an attempt to eliminate cross-contamination between sampling locations.

Laboratory analytical procedures were performed by National Environmental Laboratory Accreditation Conference (NELAC)-certified Hampton-Clarke, Inc. (NELAC/NJ #07071) located in Fairfield, New Jersey.

5. SUMMARY OF RESULTS

Analysis and interpretation of the data generated during the field investigation and laboratory analyses is presented in the following sections. Where appropriate, the results are compared with regulatory limits for the test parameters identified in the applicable media. All laboratory analytical procedures were performed by Hampton-Clarke Inc.

5.1 Soil Screening Results

OVA-PID responses in the soil samples collected for screening purposes ranged from below the minimum equipment detection limit of 0.1 parts per million (ppm) to a maximum of 1,668 ppm. The highest OVA-PID response was recorded in the soil sample collected from Soil Boring SB-011SS at approximately 10-12 feet BLS. Soil Boring SB-011ASS was located in the traffic right-of-way immediately south of the south garage entrance. Additionally, OVA-PID responses of at least 10 ppm were observed in the vadose zone (approximately 0-10 feet BLS) soil samples collected from Soil Borings SB-002SS1, SB-005SS, SB-007SS, SB-011SS, SB-013SS, and SB-015SS.

Petroleum related odors and/or staining were observed in the soil samples collected for screening purposes generally located along the eastern and southern property boundaries. A soil boring and well installation summary is provided as Table 1.

5.2 Soil Analytical Results

Analytical results for the soil samples collected during the October/December 2021 sampling events, indicated the presence of metals- and petroleum-related soil impacts; however, none of the samples analyzed indicated the presence of test parameters at concentrations above their respective Washington D.C. Department of Energy and Environment Tier 1 Soil Screening Levels for construction workers.

Laboratory analysis of soil sample SB-017 SS collected from approximately 6-8 feet BLS indicated the presence of lead at a concentration of 800 mg/kg. Due to leachability concerns and the potential for the soil to be classified as hazardous, the sample was further analyzed via the toxicity characteristic leaching procedure (TCLP) for lead. The laboratory analytical results for the TCLP analysis did not indicate he presence of lead in the sample at a concentration above its laboratory method detection limit.

A soil analytical data summary table is provided as Table 2a. A historic soil analytical data summary table is provided as Table 2b. A Soil Analytical Summary Map is provided as Figure 6. Copies of the laboratory analytical reports and chain-of-custody documentation are provided in Appendix E.

5.3 Groundwater Analytical Results

Analytical results indicated the presence of petroleum- and chlorinated solvent-related test parameters; however only Total Petroleum Hydrocarbons–Diesel Range Organics (TPH-DRO) was identified above its DOEE Tier 1 Screening Levels for Groundwater in the groundwater sample collected from monitoring well MW-002.

A groundwater analytical data summary table is provided as Table 3a. A historic groundwater analytical data summary table is provided as Table 3b. A Groundwater Analytical Summary Map is provided as

Figure 7. Copies of the laboratory analytical reports and chain-of-custody documentation are provided in Appendix E.

5.4 Groundwater Flow Determination

Utilizing TOC elevation and depth-to-groundwater measurements collected from the permanent and temporary monitoring wells performed/installed as part of this CSA, groundwater elevations were calculated by subtracting the depth-to-groundwater measurements from the TOC elevations for each borehole/well. Based on these calculations, the groundwater flow direction in the shallow and deep aquifer was determined to be towards the southeast. The shallow and deep aquifer groundwater flows appear to be generally consistent with historic assessments and the migration of groundwater impacts observed at and around the site. Groundwater elevation maps for the shallow (soil) and deep (top of bedrock) wells are provided as Figures 8a and 8b, respectively.

6. POTENTIAL IMPACT

The neighborhood map provided as Figure 2 depicts the properties in the vicinity of the site property within an approximate 500-foot radius and 1,000-foot radius. The map additionally indicates potential sensitive receptors and DOEE permitted wells within these radii. All permitted wells listed within 1,000 feet of the site property (provided on Figure 2) consist of Geotechnical, Monitoring, Infiltration Test, Soil Vapor, Abandonment, and Geothermal Wells. According to the Open Data DC GIS mapping system, there are no supply wells within at least one mile of the site.

The closest potential sensitive receptors identified in the vicinity of the site include:

- The Ethiopian Orthodox Tewahedo Religion Church (1350 Buchanan St NW); located approximately 95 feet to the south
- The Peoples Congregation United Church of Christ (1320 Farragut St NW); located approximately 165 feet to the east
- Numerous single-family and townhome units located to the north, east, south and west at varying distances from the site, including on adjoining properties
- Dorothy I. Heights Elementary School (1300 Allison Street NW) located approximately 500 feet southeast.

Based on the extent and concentrations of the impacts identified in this CSA, the identified soil and groundwater impacts do not represent a significant threat to the properties in the vicinity of the site. Additionally, the chlorinated solvent groundwater plume concentrations appear to be consistent with historic environmental assessments performed at the site, and the groundwater impact plume appears to be stable in size indicating little/no migration.

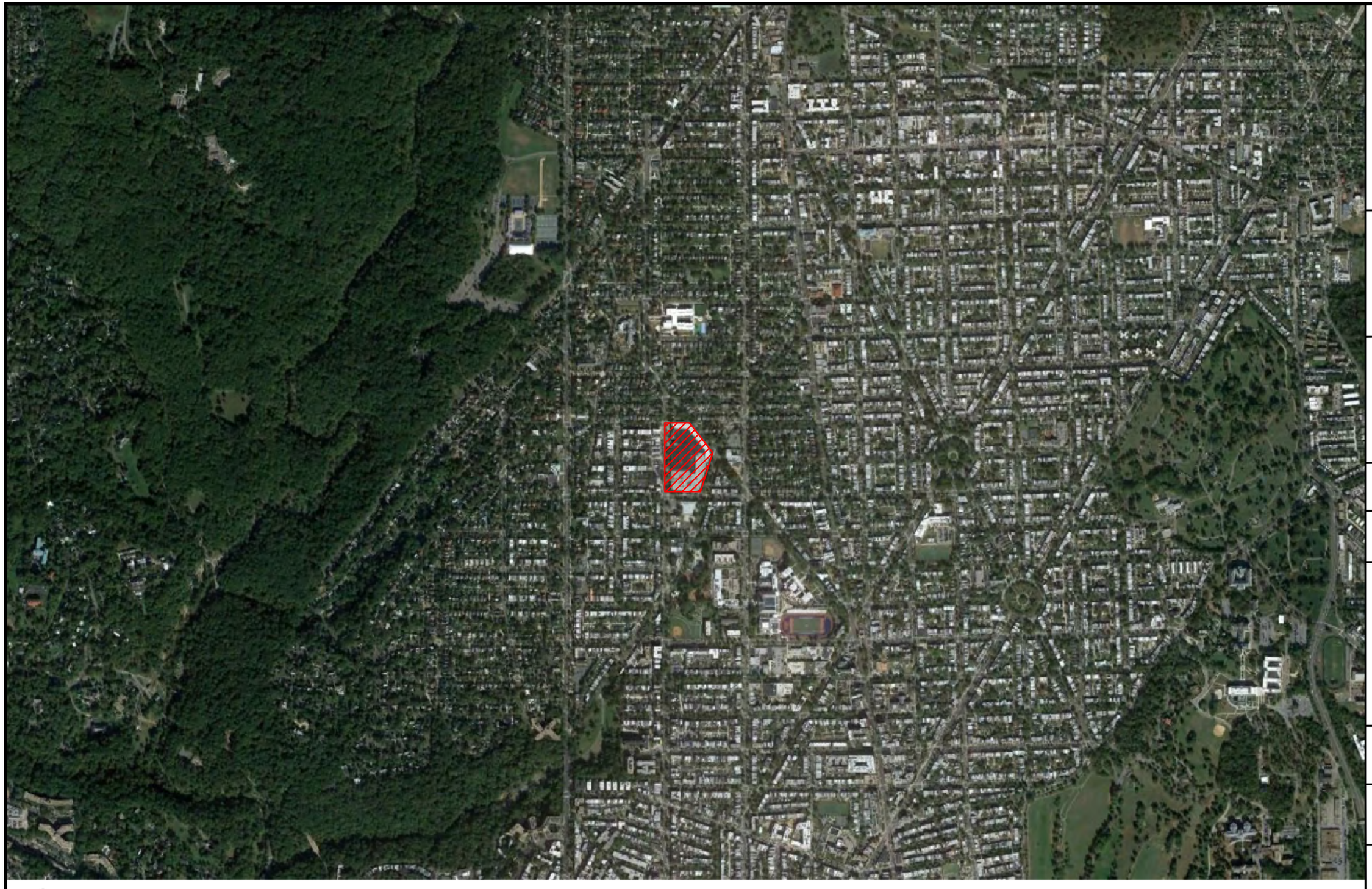
If construction activities are performed on the site, within the traffic ROWs adjoining, or on adjoining properties, prior evaluation of the type of work (soil excavation, site grading, dewatering, etc.) planned to be performed may be necessary to prevent potential exacerbation of the identified impacts. A figure depicting the planned in ground structures to be installed/removed and their respective excavation areas is depicted on Figure 9.

7. RECOMMENDATIONS

Recommendations based on field observations and laboratory analytical results provided in this Comprehensive Site Assessment report will be presented by WMATA under separate cover.

TABLES

FIGURES



LEGEND:

SUBJECT PROPERTY

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698-9300

Project Name:

WMATA Northern
Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Regional Map

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 500' 1000'
APPROXIMATE SCALE IN FEET

Project Number:

0444100

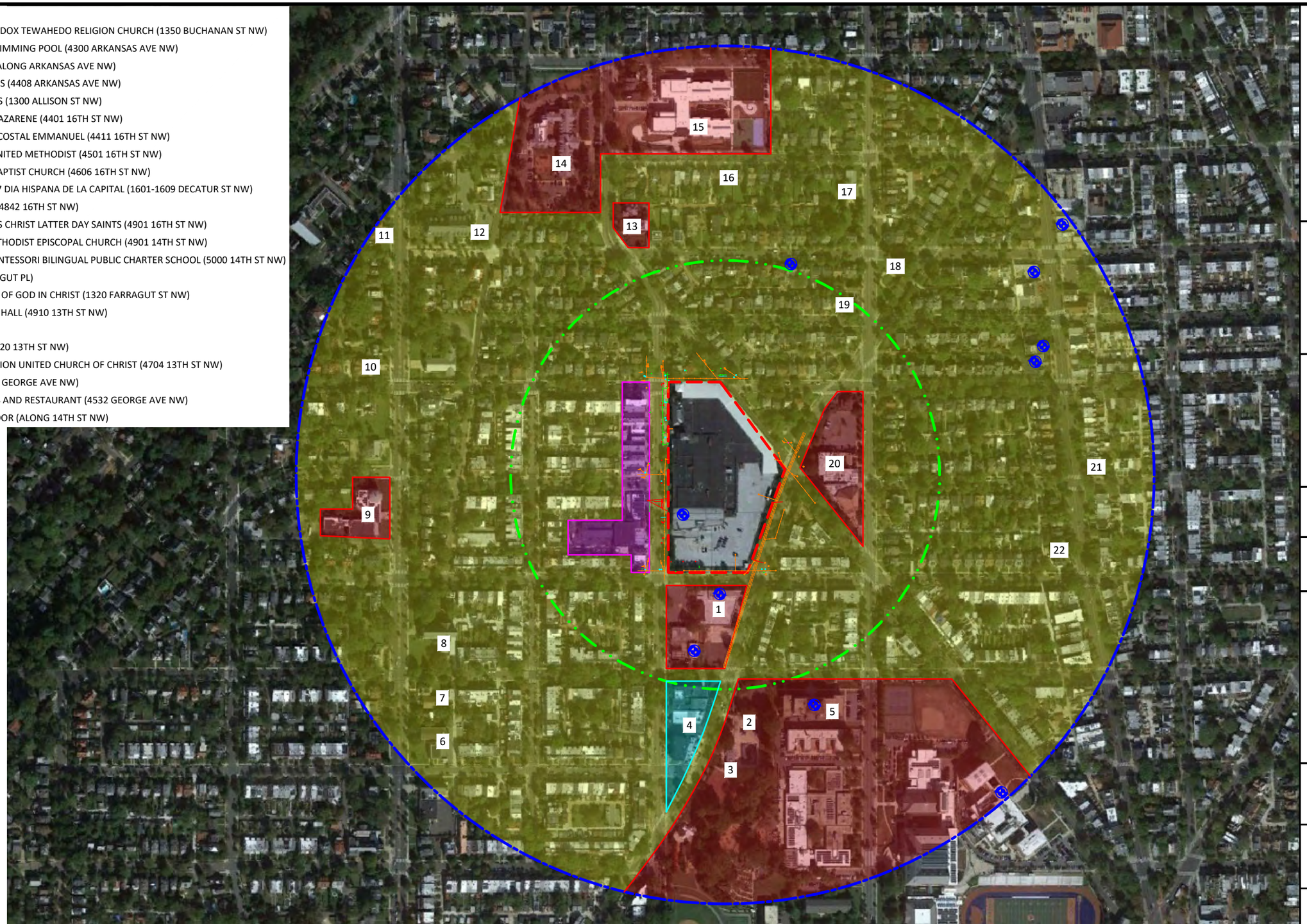
Figure Date:

03-24-2022

Figure Number:

1

1 - THE ETHIOPIAN ORTHODOX TEWAHEDO RELIGION CHURCH (1350 BUCHANAN ST NW)
2 - UPSHUR PARK AND SWIMMING POOL (4300 ARKANSAS AVE NW)
3 - BASKETBALL COURTS (ALONG ARKANSAS AVE NW)
4 - STERLING DRYCLEANERS (4408 ARKANSAS AVE NW)
5 - DOROTHY I. HEIGHTS ES (1300 ALLISON ST NW)
6 - MOSAIC CHURCH OF NAZARENE (4401 16TH ST NW)
7 - IGLESIA DE DIOS PENTICOSTAL EMMANUEL (4411 16TH ST NW)
8 - SIMPSON-HAMLINIE UNITED METHODIST (4501 16TH ST NW)
9 - NINETEENTH STREET BAPTIST CHURCH (4606 16TH ST NW)
10 - IGLESIA ADVENTISTA 7 DIA HISPANA DE LA CAPITAL (1601-1609 DECATUR ST NW)
11 - PARKMONT SCHOOL (4842 16TH ST NW)
12 - THE CHURCH OF JESUS CHRIST LATTER DAY SAINTS (4901 16TH ST NW)
13 - ST PAUL AFRICAN METHODIST EPISCOPAL CHURCH (4901 14TH ST NW)
14 - LATIN AMERICAN MONTESSORI BILINGUAL PUBLIC CHARTER SCHOOL (5000 14TH ST NW)
15 - WEST ES (1335 FARRAGUT PL)
16 - MACEDONIA CHURCH OF GOD IN CHRIST (1320 FARRAGUT ST NW)
17 - MARANATHA GOSPEL HALL (4910 13TH ST NW)
18 - TRIANGLE PARK
19 - SMILE HQ DENTAL (4820 13TH ST NW)
20 - PEOPLES CONGREGATION UNITED CHURCH OF CHRIST (4704 13TH ST NW)
21 - MIDNIGHT DELI (4701 GEORGE AVE NW)
22 - COMMERCIAL STORES AND RESTAURANT (4532 GEORGE AVE NW)
23 - COMMERCIAL CORRIDOR (ALONG 14TH ST NW)



LEGEND:

- SUBJECT PROPERTY
- 500 FOOT RADIUS
- 1000 FOOT RADIUS
- RESIDENTIAL
- POTENTIAL SENSITIVE RECEPTORS
- COMMERCIAL
- MIXED USE
- PERMITTED WELL - GEOTECHNICAL, MONITORING, INFILTRATION TEST, SOIL VAPOR, ABANDONMENT, GEOTHERMAL. NO POTABLE OR SUPPLY WELLS.

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698–9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Neighborhood Map

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 100' 200'
APPROXIMATE SCALE IN FEET

Project Number:

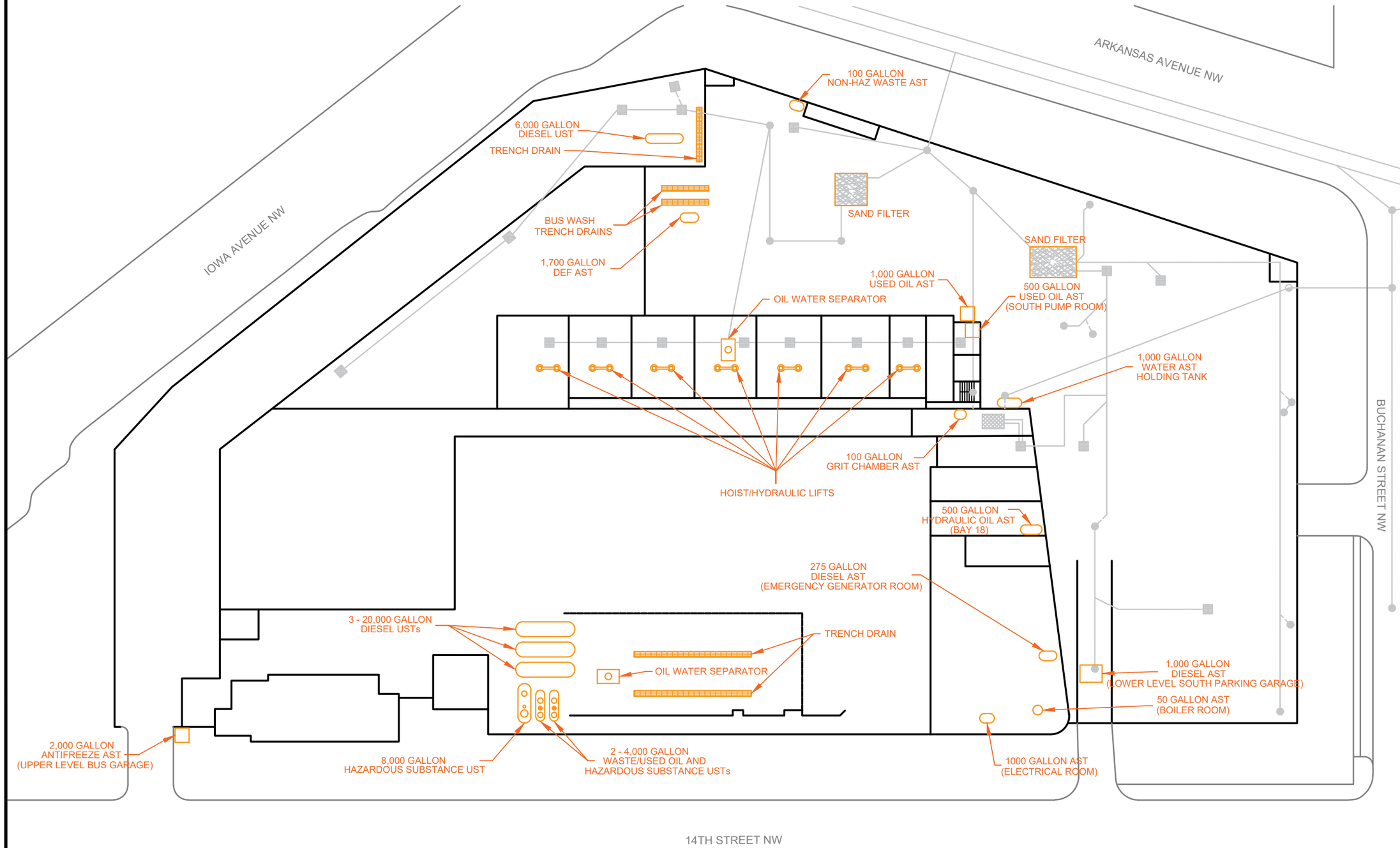
0444100

Figure Date:

03–24–2022

Figure Number:

2



Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698-9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Site Layout Map

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 25' 50'

APPROXIMATE SCALE IN FEET

Project Number:

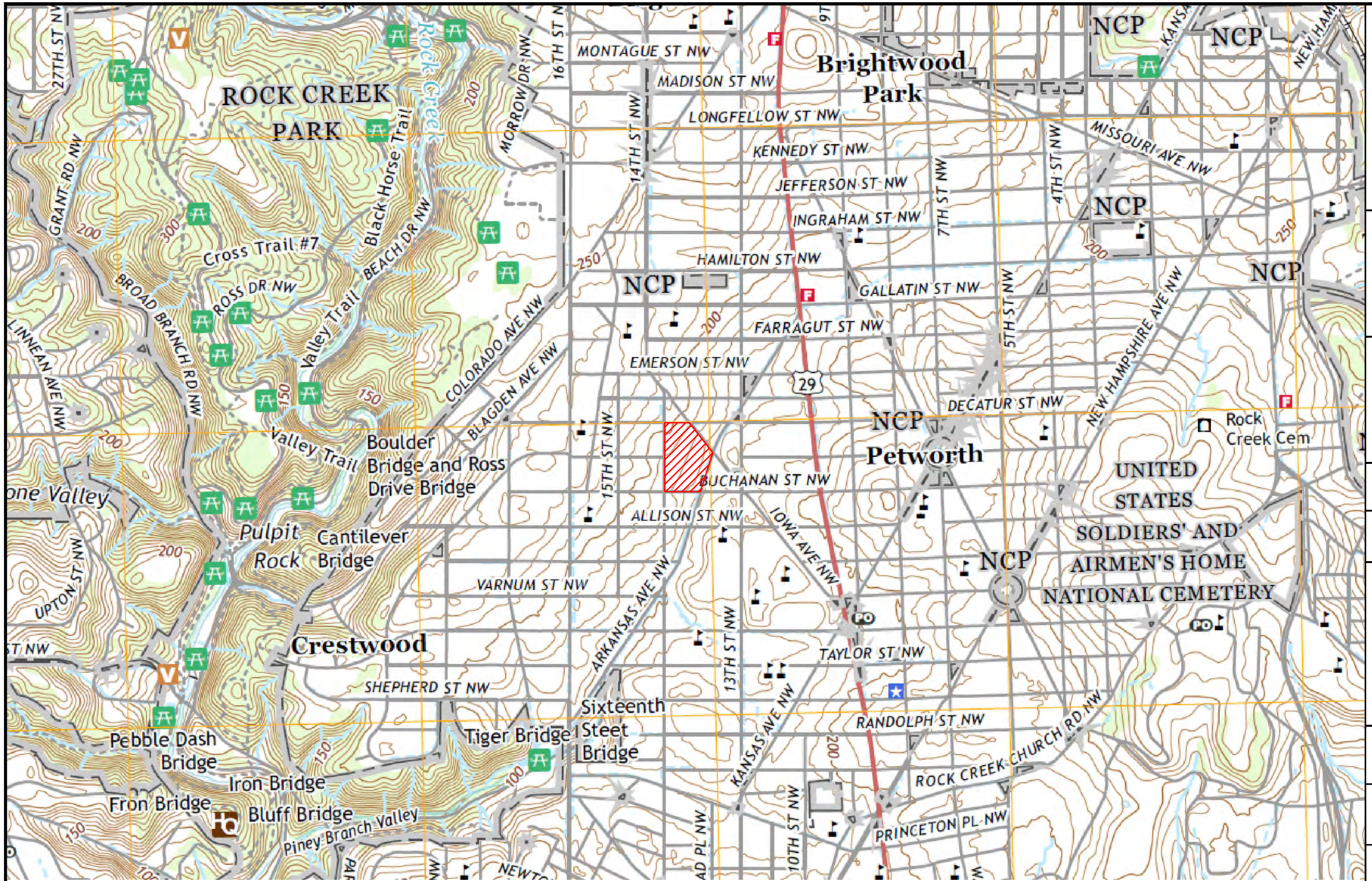
0444100

Figure Date:

03-24-2022

Figure Number:

3



LEGEND:

SUBJECT PROPERTY

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698-9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

USGS Topographic Map

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 500' 1000'

APPROXIMATE SCALE IN FEET

Project Number:

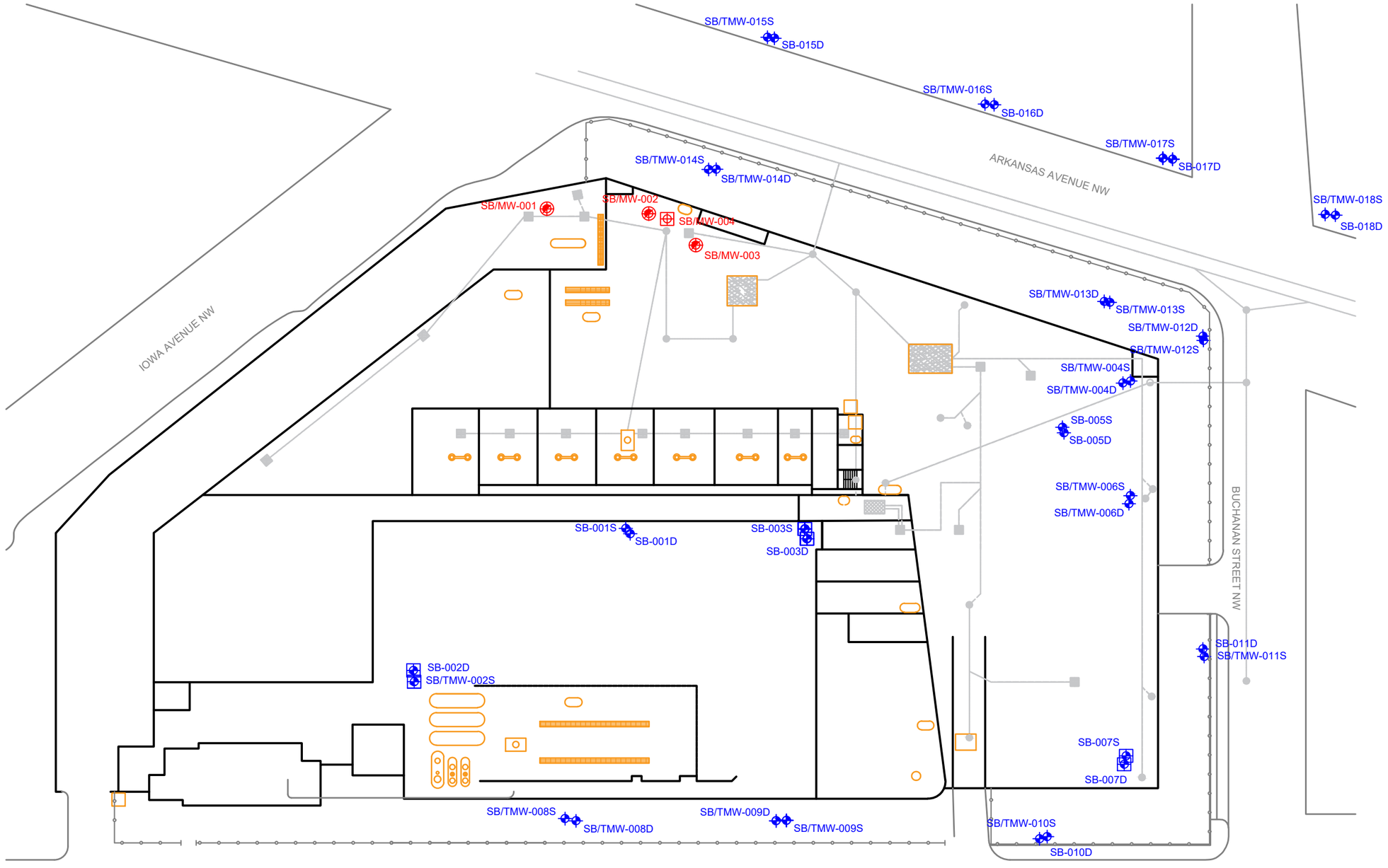
0444100

Figure Date:

03-24-2022

Figure Number:

4



LEGEND:

- FENCING
- MONITORING WELL DIRECT WATER SAMPLING LOCATION; WITH VADOSE SOIL SAMPLING
- MONITORING WELL DIRECT WATER SAMPLING LOCATION; GROUNDWATER INTERFACE AND BEDROCK INTERFACE
- PERMANENT SHALLOW MONITORING WELL LOCATION; 2"; MAX 15' BLS
- PERMANENT DEEP MONITORING WELL LOCATION; 2"; MAX 30' BLS

NOTE:
REFERENCE TABLE 1 FOR ADDITIONAL SOIL BORING AND WELL INSTALLATION DETAILS.

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698–9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Sample Location Map

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 40' 80'
APPROXIMATE SCALE IN FEET

Project Number:

0444100

Figure Date:

03–24–2022

Figure Number:

5

ND - Not detected above RLs
NS - Not sampled

SB-014SS	8-10'
12/09/21	
Metals (mg/kg)	
Lead	150
Arsenic	3.6
SVOCs (mg/kg)	
Benzo[a]anthracene	4.8
Benzo[a]pyrene	4.4
Benzo[b]fluoranthene	5.6
Dibenz o[a,h]anthracene	0.64
TPHs (mg/kg)	
Gasoline Range Organics	110
Diesel Range Organics	ND

SB-015SS	6-8'
12/17/21	
Metals (mg/kg)	
Lead	10
Arsenic	3.1
SVOCs (mg/kg)	
Benzo[a]anthracene	0.058
Benzo[a]pyrene	0.063
Benzo[b]fluoranthene	0.088
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	79
Diesel Range Organics	ND

SB-016 SS	8-10'
12/16/21	
Metals (mg/kg)	
Lead	9.9
Arsenic	3.5
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-017 SS	6-8'
12/16/21	
Metals (mg/kg)	
Lead/TCLP	860/NS
Arsenic	8.1
SVOCs (mg/kg)	
Benzo[a]anthracene	0.25
Benzo[a]pyrene	0.2
Benzo[b]fluoranthene	0.32
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-018 SS	8-10'
12/16/21	
Metals (mg/kg)	
Lead	35
Arsenic	1.9
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-003SS	6-8.5'
10/19/21	
Metals (mg/kg)	
Lead	10
Arsenic	1.9
SVOCs (mg/kg)	
Benz o[a]anthracene	ND
Benz o[a]pyrene	ND
Benz o[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	680

SB-001SS	4-6'
10/18/21	
Metals (mg/kg)	
Lead	NA
Arsenic	NA
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-002SS1	16-18'
10/18/21	
Metals (mg/kg)	
Lead	NA
Arsenic	NA
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	870
Diesel Range Organics	130

SB002SS2	18-20'
10/18/21	
Metals (mg/kg)	
Lead	NA
Arsenic	NA
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	2,000
Diesel Range Organics	390

SB-013SS	8-10'
12/08/21	
Metals (mg/kg)	
Lead	28
Arsenic	4.3
SVOCs (mg/kg)	
Benzo[a]anthracene	0.12
Benzo[a]pyrene	0.14
Benzo[b]fluoranthene	0.2
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-012SS	6-8'
12/08/21	
Metals (mg/kg)	
Lead	26
Arsenic	7.7
SVOCs (mg/kg)	
Benzo[a]anthracene	0.18
Benzo[a]pyrene	0.16
Benzo[b]fluoranthene	0.22
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-004 SS	8-10'
10/14/21	
Metals (mg/kg)	
Lead	270
Arsenic	5.8
SVOCs (mg/kg)	
Benzo[a]anthracene	0.84
Benzo[a]pyrene	0.71
Benzo[b]fluoranthene	0.98
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-008 SS	20-22'
12/06/21	
Metals (mg/kg)	
Lead	ND
Arsenic	1
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-009SS	8-10'
12/07/21	
Metals (mg/kg)	
Lead	6.1
Arsenic	3.3
SVOCs (mg/kg)	
Benzo[a]anthracene	0.087
Benzo[a]pyrene	0.092
Benzo[b]fluoranthene	0.11
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-005SS	2-4'
10/15/21	
Metals (mg/kg)	
Lead	15
Arsenic	2
SVOCs (mg/kg)	
Benzo[a]anthracene	0.058
Benzo[a]pyrene	0.06
Benzo[b]fluoranthene	0.086
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	120
Diesel Range Organics	370

SB-006SS	14-16'
10/15/21	
Metals (mg/kg)	
Lead	64
Arsenic	2.9
SVOCs (mg/kg)	
Benzo[a]anthracene	0.74
Benzo[a]pyrene	0.66
Benzo[b]fluoranthene	0.87
Dibenz o[a,h]anthracene	0.12
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-010SS	4-6'
12/07/21	
Metals (mg/kg)	
Lead	7.4
Arsenic	3.3
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	ND
Diesel Range Organics	ND

SB-007SS	4-6'
10/19/21	
Metals (mg/kg)	
Lead	9.3
Arsenic	1.8
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	220
Diesel Range Organics	ND

SB-011SS	10-12'
12/07/21	
Metals (mg/kg)	
Lead	7.1
Arsenic	5.9
SVOCs (mg/kg)	
Benzo[a]anthracene	ND
Benzo[a]pyrene	ND
Benzo[b]fluoranthene	ND
Dibenz o[a,h]anthracene	ND
TPHs (mg/kg)	
Gasoline Range Organics	330
Diesel Range Organics	5,400

SB/TMW-015S
SB-015D
SB/TMW-016S
SB-016D
SB/TMW-017S
SB-017D
SB/TMW-018S
SB-018D
SB/TMW-014S
SB/TMW-014D
SB/MW-001
SB/MW-002
SB/MW-004
SB/MW-003
ARKANSAS AVENUE NW
IOWA AVENUE NW
SB/TMW-013D
SB/TMW-013S
SB/TMW-012D
SB/TMW-012S
SB/TMW-004S
SB/TMW-004D
SB-005S
SB-005D
SB/TMW-006S
SB/TMW-006D
BUCHANAN STREET NW
SB-001S
SB-001D
SB-003S
SB-003D
SB-002D
SB/TMW-002S
SB-011D
SB/TMW-011S
SB-007S
SB-007D
SB/TMW-008S
SB/TMW-008D
SB/TMW-009D
SB/TMW-009S
SB/TMW-010S
SB-010D
NW

LEGEND:

- FENCING
- MONITORING WELL DIRECT WATER SAMPLING LOCATION; WITH VADOSE SOIL SAMPLING
- MONITORING WELL DIRECT WATER SAMPLING LOCATION; GROUNDWATER INTERFACE AND BEDROCK INTERFACE
- PERMANENT SHALLOW MONITORING WELL LOCATION; 2"; MAX 15' BLS
- PERMANENT DEEP MONITORING WELL LOCATION; 2"; MAX 30' BLS

NOTE:
REFERENCE TABLE 1 FOR ADDITIONAL SOIL BORING AND WELL INSTALLATION DETAILS.

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698–9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Soil Analytical Summary Map

2021 Data

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 40' 80'
APPROXIMATE SCALE IN FEET

Project Number:

0444100

Figure Date:

03–24–2022

Figure Number:

6

Highlighted orange indicates constituents concentration greater than DOEE Tier 1 screening levels for groundwater
ND - Not detected above RLs
NS - Not sampled

TMW-015	TWD 18.6'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-015	TWD 18.6'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-13D	TWD 21.2'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	22
Tetrachloroethene (PCE)	33
Trichloroethene (TCE)	21
Vinyl chloride	4.7

TMW-13S	TWD 15.9'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-017	TWD 16.8'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-018	TWD 17.7'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-14S	TWD 15.0'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-014D	TWD 19.9'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

MW-001	TWD 27.6'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	660
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

MW-002	TWD 28.7'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	4,450
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

MW-004	TWD 38.6'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	930
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-002	TWD 18.8'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-012D	TWD 25.5'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	68
Tetrachloroethene (PCE)	160
Trichloroethene (TCE)	220
Vinyl chloride	5.3

TMW-012S	TWD 19.6'
01/10/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	15
Tetrachloroethene (PCE)	66
Trichloroethene (TCE)	21
Vinyl chloride	2.5

TMW-004S	TWD 25.7'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	14
Tetrachloroethene (PCE)	520
Trichloroethene (TCE)	38
Vinyl chloride	ND

TMW-004D	TWD 26.9'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	17
Tetrachloroethene (PCE)	630
Trichloroethene (TCE)	48
Vinyl chloride	ND

TMW-005S	TWD 25.7'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	50
Tetrachloroethene (PCE)	100
Trichloroethene (TCE)	150
Vinyl chloride	9.2

TMW-005D	TWD 26.5'
01/07/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	170
Tetrachloroethene (PCE)	98
Trichloroethene (TCE)	33
Vinyl chloride	22

TMW-011	TWD 13.6'
01/11/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	24
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	1.9
Vinyl chloride	43

TMW-008S	TWD 24.5'
01/11/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-008D	TWD 19.4'
01/11/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-009D	TWD 23.8'
01/11/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

TMW-009S	TWD 20.0'
01/11/22	
SVOCs (ug/L)	
bis(2-Ethylhexl)phthalate	ND
TPHs (mg/L)	
Diesel Range Organics	NA
VOCs (ug/L)	
cis-1,2-Dichloroethene	ND
Tetrachloroethene (PCE)	ND
Trichloroethene (TCE)	ND
Vinyl chloride	ND

SB/TMW-015S
SB-015D
SB/TMW-016S
SB-016D
SB/TMW-017S
SB-017D
SB/TMW-018S
SB-018D
SB/TMW-014S
SB/TMW-014D
SB/MW-001
SB/MW-002
SB/MW-004
SB/MW-003
SB/TMW-013D
SB/TMW-013S
SB/TMW-012D
SB/TMW-012S
SB/TMW-004S
SB/TMW-004D
SB-005S
SB-005D
SB/TMW-006S
SB/TMW-006D
SB-001S
SB-001D
SB-003S
SB-003D
SB-011D
SB/TMW-011S
SB-002D
SB/TMW-002S
SB-007S
SB-007D
SB/TMW-008S
SB/TMW-008D
SB/TMW-009D
SB/TMW-009S
SB/TMW-010S
SB-010D

IOWA AVENUE NW
ARKANSAS AVENUE NW
BUCHANAN STREET NW
14TH STREET NW

LEGEND:

- FENCING
- MONITORING WELL DIRECT WATER SAMPLING LOCATION; WITH VADOSE SOIL SAMPLING
- MONITORING WELL DIRECT WATER SAMPLING LOCATION; GROUNDWATER INTERFACE AND BEDROCK INTERFACE
- PERMANENT SHALLOW MONITORING WELL LOCATION; 2"; MAX 15' BLS
- PERMANENT DEEP MONITORING WELL LOCATION; 2"; MAX 30' BLS
- APPROXIMATE EXTENT OF PETROLEUM-RELATED GROUNDWATER IMPACTS ABOVE DOEE TIER 1 SCREENING LEVELS FOR GROUNDWATER (JANUARY 2022 DATA)

NOTE:
REFERENCE TABLE 1 FOR ADDITIONAL SOIL BORING AND WELL INSTALLATION DETAILS.

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698–9300

Project Name:
WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:
Groundwater Analytical Summary Map

2022 Data

Drawn By:
Adam Smak

Project Manager:
Andy Acosta

Figure Legend:

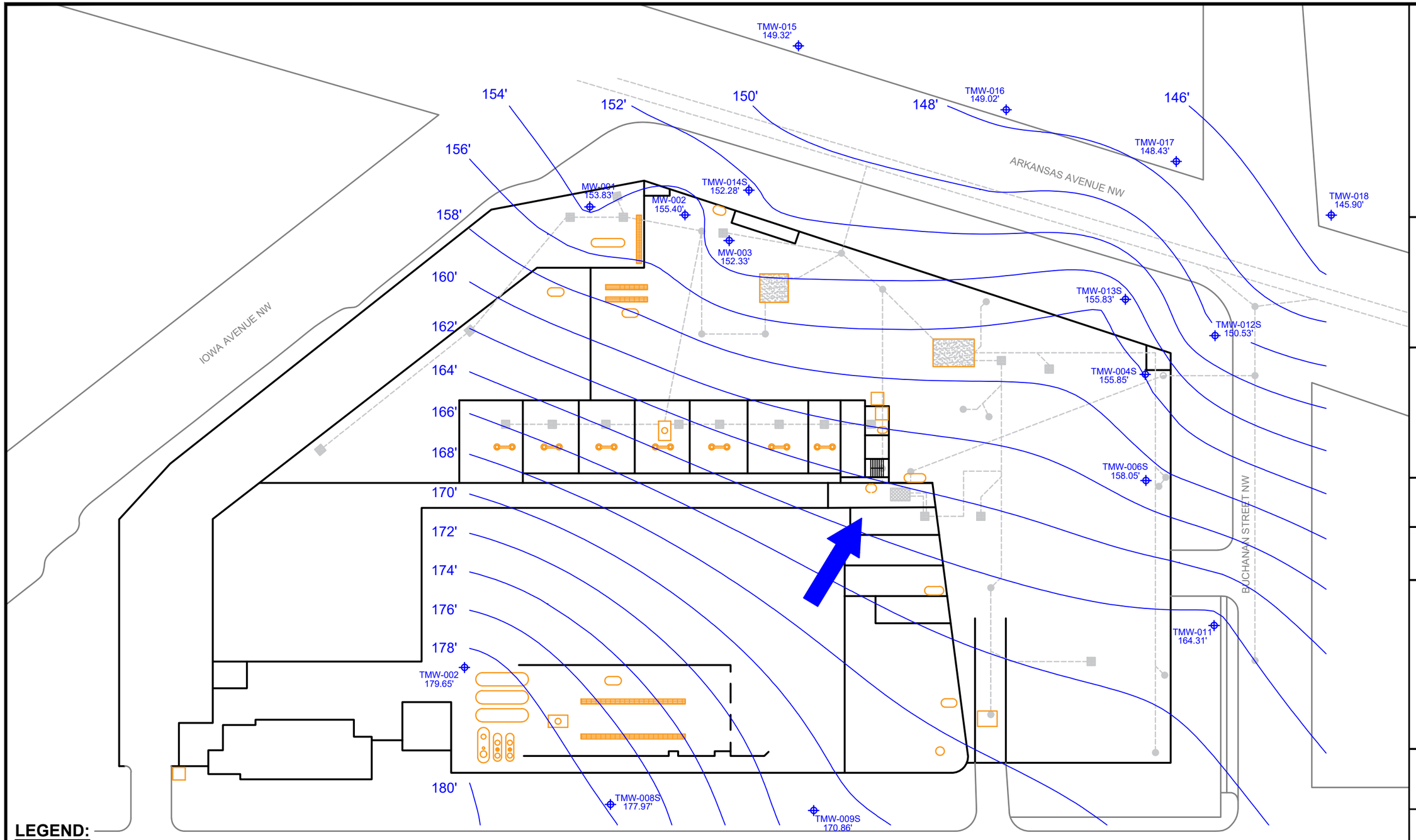
NORTH

0 40' 80'
APPROXIMATE SCALE IN FEET

Project Number:
0444100

Figure Date:
03–24–2022

Figure Number:
7



LEGEND:

- ENVIRONMENTAL SURVEY LOCATIONS
- GROUNDWATER ELEVATION CONTOUR LINES
- GROUNDWATER FLOW DIRECTION
- SAMPLE LOCATION
- GROUNDWATER ELEVATION

NOTE: DATUM USED FOR GROUNDWATER ELEVATION: NAD88
GROUNDWATER ELEVATION CONTOURS ESTIMATED BASED ON TWO DATA SETS
(OPEN BOREHOLE AND TEMPORARY MONITORING WELL MEASUREMENTS).

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698-9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Shallow (Soil) Groundwater Elevation Map

January 5, 2022 Data

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 30' 60'
APPROXIMATE SCALE IN FEET

Project Number:

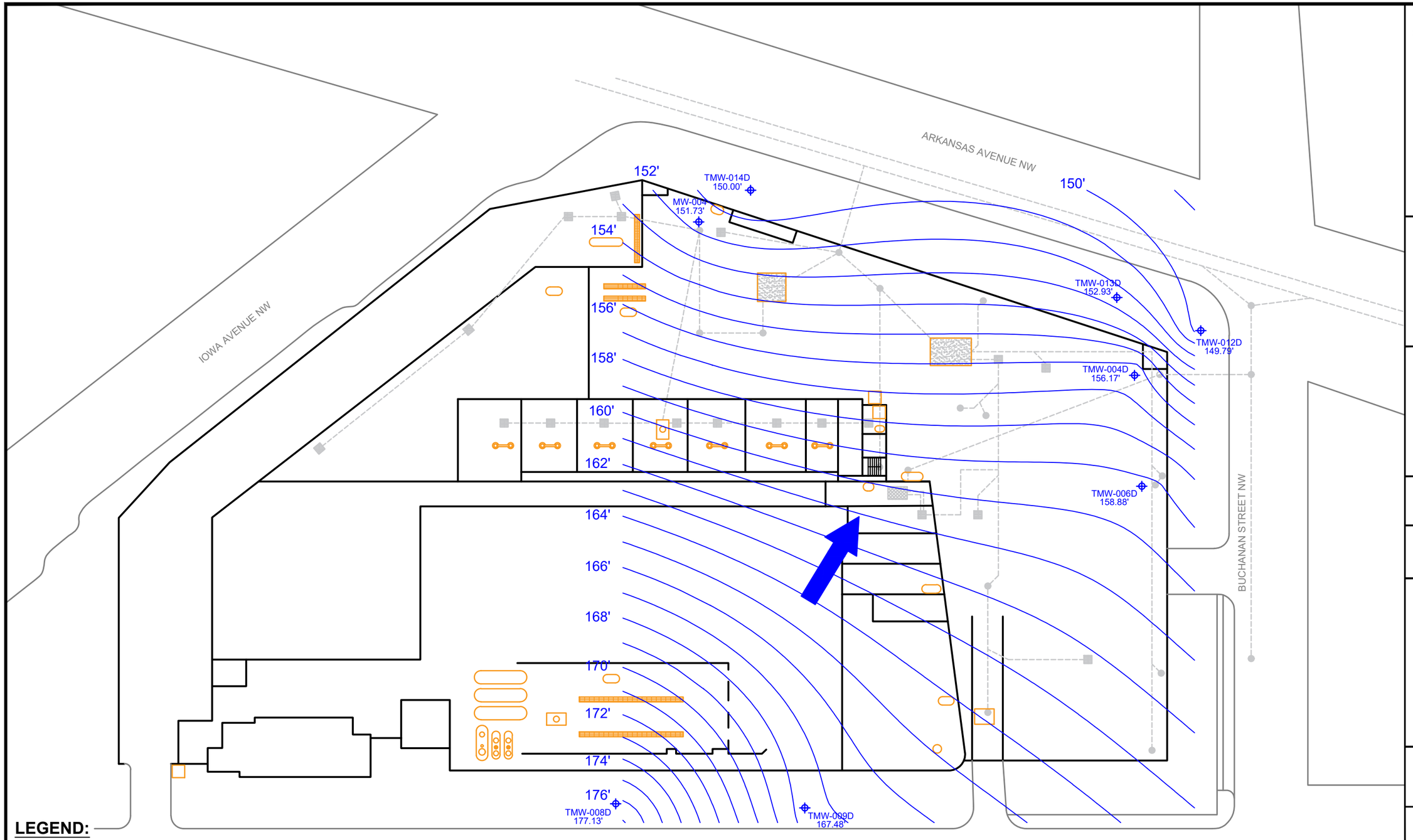
0444100

Figure Date:

03-24-2022

Figure Number:

8A



LEGEND:

- ENVIRONMENTAL SURVEY LOCATIONS
- GROUNDWATER ELEVATION CONTOUR LINES
- GROUNDWATER FLOW DIRECTION
  - SAMPLE LOCATION
  - GROUNDWATER ELEVATION

NOTE: DATUM USED FOR GROUNDWATER ELEVATION: NAD88
GROUNDWATER ELEVATION CONTOURS ESTIMATED BASED ON TWO DATA SETS
(OPEN BOREHOLE AND TEMPORARY MONITORING WELL MEASUREMENTS).

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698-9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Deep (Top of Bedrock) Groundwater Elevation Map

January 5, 2022 Data

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 30' 60'
APPROXIMATE SCALE IN FEET

Project Number:

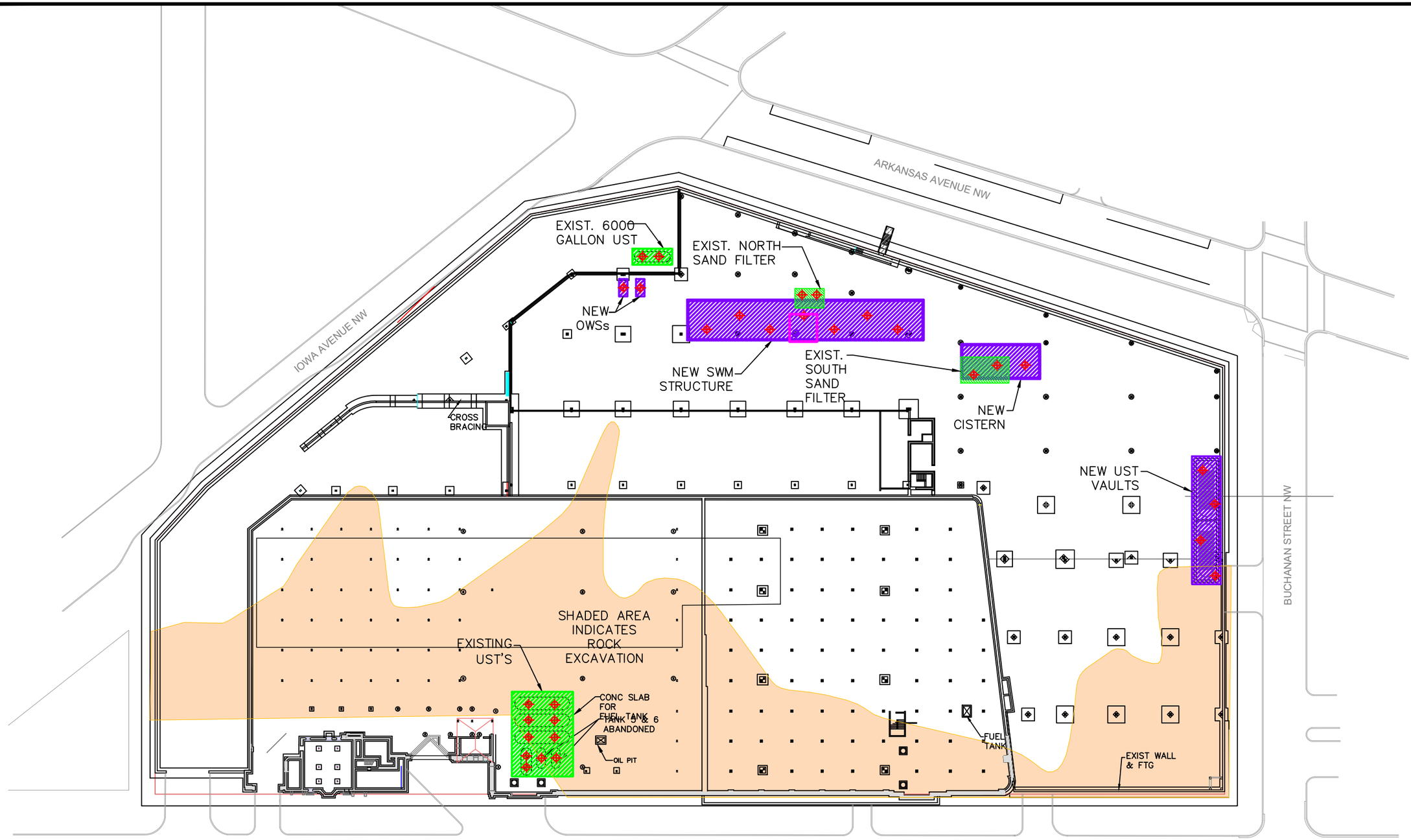
0444100

Figure Date:

03-24-2022

Figure Number:

8B



LEGEND:

- PROPOSED SOIL SAMPLE LOCATIONS
- NEW UST/FILTER FEATURE LOCATIONS
- EXISTING UST/FILTER FEATURE LOCATIONS
- EXCAVATION INTO WEATHERED/COMPETENT BEDROCK TO REACH THE PROPOSED GENERAL EXCAVATION ELEVATION OF 165 ft NAD88
- EXCAVATION INTO FILL AND NATURAL SOIL TO REACH THE PROPOSED GENERAL EXCAVATION ELEVATION OF 165 ft NAD88

NOTE: DATUM USED FOR GROUNDWATER ELEVATION: NAD88
GROUNDWATER ELEVATION CONTOURS ESTIMATED BASED ON TWO DATA SETS (OPEN BOREHOLE AND TEMPORARY MONITORING WELL MEASUREMENTS).

Environmental Services

2930 Eskridge Road,
Fairfax, Virginia 22031
Tel (703) 698–9300

Project Name:

WMATA Northern Bus Garage
4615 14th Street NW,
Washington, DC 20011

Figure Title:

Planned Structure Installation/Removal (Excavation) Areas and Proposed Sample Locations

Drawn By:

Adam Smak

Project Manager:

Andy Acosta

Figure Legend:

NORTH

0 30' 60'
APPROXIMATE SCALE IN FEET

Project Number:

0444100

Figure Date:

03–24–2022

Figure Number:

9

APPENDIX A

DOEE Comprehensive Site Assessment Directive Letter, dated December 10, 2020, Approved Comprehensive Site Assessment Work Plan, dated May 7, 2021

APPENDIX B

Historical Sanborn Maps and Historical Aerial Photographs

APPENDIX C

DOEE Soil Boring Permits
and
DDOT Occupancy Permit

APPENDIX D

Field Forms, Boring Logs, Well Construction Logs, and Groundwater Sampling Forms

APPENDIX E

Laboratory Analytical Reports
And
Chain-of-Custody Documentation