



northgate
environmental management, inc.

GROUNDWATER QUALITY INVESTIGATION

901 5th Street NW

Washington, D.C. 20001

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1.0 INTRODUCTION AND SCOPE OF SERVICES

This report presents the results of a Groundwater Quality Investigation performed by Northgate Environmental Management, Inc. (Northgate) at 901 5th Street NW, Washington, D.C. 20001 (the Site). The Site consists of three parcels of land totaling approximately 23,878 square feet or 0.55 acres being used for private parking.

Northgate performed a Phase II Limited Subsurface Investigation at the Site in March 2015 to evaluate the current Site conditions with respect to potential contamination of soil and groundwater at the Site related to the RECs identified in a Phase I ESA. Northgate's *Phase I Environmental Site Assessment* (ESA) report dated April 13, 2014⁵ identified recognized environmental conditions (RECs) warranting further investigation including on and off-Site historical land uses as follows:

- The northern Site lot (Lot 822) was occupied by a dry cleaning facility (Lee Kwong Laundry - 913 5th Street NW) during the 1940s and 1950s. An auto repair facility was located on the northeastern portion of the lot from the late 1920s, on and off, until circa the 1990s. Additionally, a printing/engraving facility (TypeMasters – 463 I Street NW) was located on the eastern portion of this lot from the 1960s until circa the 1990s.
- Properties to the east of the Site have operated historically as auto repair facilities including Gibson Auto Repair (459 I Street NW), Central Auto Works (449-451 I Street NW), S & G Autobody (433/443 I Street NW) and Al S Auto (426 I Street NW). A lithographic operation was historically located to the northwest of the Site along 5th Street and the location of the former Wax Museum (5th & K Street NW) was also located to the northwest, was identified as a US BROWNFIELDS facility. Several historic dry cleaners were also identified to the north and south of the Site.

Northgate concluded that these above suspect uses have the potential to impact Site soils and groundwater quality. As a result, in March 2015, Northgate advanced five soil borings to depths of up to 25 feet below ground surface (bgs) as shown on Figure 2. Representative soil samples were collected for chemical analyses at depths between 2.5 feet bgs and 11 feet bgs. Evidence of groundwater was present in each soil boring; however, only one boring location in center of the Site contained sufficient water volume for sample collection. Results of this investigation identified the presence of benzene in groundwater on Site at a concentration of 7.5 µg/L, which exceeds the District Department of the Environment (DDOE) Tier 1 risk based screening standard of 5.0 µg/L. Commonly used solvents were also detected at concentrations below applicable standards in Site soils analyzed.



The purpose of this Groundwater Quality Investigation is to further evaluate Site groundwater quality by installing groundwater monitoring wells at the Site given the exceedance of benzene in the groundwater and since the Site is proposed to be developed as 13-story mixed use hospitality and residential building with two or three levels of below ground construction.

The scope of work for this investigation included the following services:

- Obtaining monitoring well installation permits from the District Department of the Environment (DDOE) and the District Department of Consumer and Regulatory Affairs (DCRA);
- Coordinating with the client and Site occupants to install four groundwater monitoring wells using a hollow stem auger drill rig to a depths of 27-40 feet below the ground surface (bgs);
- Collecting and analyzing groundwater and selective soil samples from each boring location for analyses of volatile organic compounds (VOCs) by EPA Method 8260B, Total Petroleum Hydrocarbons-Gasoline Range Organics (TPH-GRO) and TPH-Diesel Range Organics (DRO) by EPA Method 8015C; and
- Preparing this written report of findings.



2.0 BACKGROUND

2.1 Site Description

The Site consists of three parcels of land totaling approximately 0.55 acres used as a privately operated pay surface parking lot addressed as 901 5th Street NW in Washington, D.C. The southern lot (0059) is gravel-covered and fenced with some vegetation sparsely located throughout. A silt fence makes up the southeastern boundary of the Site. The two northern lots (0822, 0823) are gravel-covered parking lots and are secured with a chain and a lock to limit access. The parcels are primarily gravel-covered with some sporadic vegetation along the perimeter chain-link fence. No permanent structures are present, only a small parking attendant kiosk. The Site is currently zoned as commercial and located in the DC Water and Sewer Authority's combined sanitary and stormwater sewer district.

The Site is currently operated by Franklin Parking. The perimeter of the parking lot consists of loose gravel with some low spots. The temporary parking attendant kiosk and an access gate are located off 5th Street NW on the western portion of the Site. I Street NW borders the Site to the south and an alleyway associated with Prather Court NW borders the Site to the northeast.

The Site is situated approximately one mile to the southeast of downtown Washington, D.C. in an area known as Mount Vernon. The Site surrounding area is characterized by mixed-use, commercial and residential properties. Milian Park is located to the south of the Site on the corner of I Street NW and Massachusetts Avenue NW.

The Site consists of a gravel-covered vacant land on top of fill material. Specifically, approximately two feet of compacted gravel was placed on the Site prior to use as a parking lot. The gravel is underlain by suspect fill material consisting of clayey sand with some gravel and crushed brick present to estimated depths up to 12 feet bgs. However, the actual depths of fill soils may be deeper according to a *Draft Geotechnical Engineering Report*, dated August 5, 2015, prepared by Schnabel Engineering DC (Schnabel). This report documents soil boring findings from a 2009 investigation. At that time Schnabel reported that fill soils were present from depths of 2.5 to 23.5 feet bgs and groundwater was encountered at depths of 17 to 33 feet bgs.

Based on Northgate's March 2015 investigation, soils present below the fill materials were generally dense and consisted of clay with a varying sand component with lenses of fine gravels and sand present at each boring. Trace amounts of oxidized mottling were observed within the clay layers at each boring. Groundwater is present in perched lenses of varying quantities and at varying depths across the Site. No consistent zone of saturation was identified during Northgate's prior subsurface investigation.



3.0 SUBSURFACE INVESTIGATION

Northgate installed four groundwater monitoring wells at the Site on July 13-15, 2015. Prior to commencement of field activities, Northgate obtained a soil boring permit from the District of Columbia Department of Consumer and Regulatory Affairs (DCRA) in conjunction with the District Department of the Environment (DDOE).

3.1 Investigation Methods

Four soil borings were advanced to depths of up to 40 feet bgs using a hollow-stem auger (HSA) drill rig operated by a licensed well driller, Earth Matters Inc. of Ellicott City, Maryland. Borings were advanced for the collection of soil samples and for the constructing four permanent groundwater wells (MW-1, MW-2, MW-3 & MW-4). Boring MW-1 was advanced near to the northwest property corner, MW-2 at the northeast corner, MW-3 at the southwest corner and MW-4 near to the southeast property corner. Monitoring well locations are shown on Figure 3.

The borings were performed with a truck mounted hollow stem rotary auger drilling rig. Standard penetration tests yielding split-spoon soil samples were collected at five-foot intervals beginning at a depth of five feet bgs at each location. Samples recovered from the split spoons were screened in the field for total VOCs using a photoionization detector (PID). Split spoon samples were logged in the field in accordance with the Unified Soils Classification System (USCS). Copies of the boring logs are attached in Appendix A.

Selected soil samples were submitted to the laboratory for various analyses intended to compliment Northgate's prior subsurface soil testing investigation. Soil samples selected for laboratory VOC analyses were collected directly from the split spoon using Encore VOC sampling kits. Soils were screened for indications of the possible presence of VOC contamination using a photoionization detector (PID).

During drilling, representative soil samples were collected for chemical analyses of VOCs, TPH-DRO and TPH-GRO. In the absence of field evidence of contamination of the soils, the sample selection depths were intended to focus on fill soils present across the depths of about 10- 12 feet bgs. In addition, one soil sample was collected above the groundwater table interface representing natural soils on Site. Specifically soil samples were collected at boring location B-1/MW-1 at depth 7 feet bgs and from location B-3/MW-3 at a depth of 32 feet bgs for laboratory analyses of VOCs, TPH-GRO and TPH-DRO. A soil sample was collected from boring location B-2/MW-2 at a depth of 7 feet bgs for laboratory analysis of TPH-DRO and from a depth of 7 feet bgs at location B-4/MW-4 for laboratory analyses of TPH-GRO and TPH-DRO.



Following completion of the HSA borings, groundwater monitoring wells were installed in each of the four boring locations. The wells were constructed with 2-inch PVC casings installed within the boring with slotted screen overlapping the vertical water column. The bottom of the casing was capped with a PVC plug. Non-slotted 2-inch PVC pipe was installed above the screened interval to the ground surface. The annular space surrounding the screened interval was back-filled with clean sand. A bentonite seal was installed above the screened/sand pack interval. The remaining annular space was filled with concrete. A locking compression cap was installed on the top of the casing and the well was finished with a flush mounted metal well cover set in a concrete pad. Well construction details are included in the boring logs in Appendix A.

Varying amounts of groundwater were present in each of the boring locations upon drilling completion. The wells were developed upon completion generally by pumping the wells dry as sustainable groundwater did not recharge the wells. Groundwater samples were collected on July 17, 2015 from wells MW-1, MW-3 and MW-4 using dedicated bailers. The groundwater samples were placed in clean, laboratory supplied glassware, labeled, and placed on ice in a cooler for transport to the laboratory under chain of custody control. Groundwater was sampled in the same manner from MW-2 on July 22, 2015 (due to access constraints on July 17, 2015). Non-dedicated sampling equipment was decontaminated using a laboratory grade detergent between sample intervals. All samples were analyzed by Phase Separation Science of Baltimore, Maryland, a certified environmental analytical laboratory.

3.2 Investigation Results

3.2.1 Subsurface Conditions

Exterior surface conditions at the Site consist of asphalt/concrete pavement and gravel parking areas. Approximately two feet of compacted gravel was placed on the Site prior to use as a parking lot. The gravel is underlain by fill material consisting of clayey sand with some gravel and some crushed brick present to depths up to 1 foot bgs. A brick fragment was observed at a depth of 15 feet bgs at location MW-3 indicating the potential for fill soil to be present to greater depths. Alternating layers of clayey sand and sandy clay were observed below 12 feet bgs as soils graded from sandy clay (SC) with some gravel seams to more massive clay (CL) at depths greater than 20 feet bgs. Light yellow and red-brown gravel seams were present in the upper 20 feet. Trace amounts of oxidized mottling were observed within the clay layers at each boring. Soils below the fill layer were generally dense. Boring logs are attached as Appendix A.

No apparent saturated soil zone or free groundwater was observed in any of the borings during drilling. Groundwater was limited to being present in narrow permeable seams at varying depths across the Site. Varying amounts of groundwater collected in the borings within one-hour after



completion of drilling. The Site area is fairly flat with a slight slope to the southeast. Groundwater is presumed to flow to the south and southeast towards the Anacostia and Potomac Rivers.

Monitoring well depths varied across the Site in the absence of the presence of groundwater table across the Site. Monitoring well depths were determined in order to minimize total well depths and thus minimize the potential to penetrate a confining or semi-confining layer while still allowing for adequate volumes of groundwater to filter into the wells for sample collection (consistent with DDOE well permitting requirements). Depths to groundwater and total well depths are presented below:

Groundwater/Well Depths (feet bgs)				
	MW-1	MW-2	MW-3	MW-4
Depth to Water	34.9'	29.6'	33.8'	20.1'
Depth of Well	39.5'	30.0'	36.5'	24.5'

A HNu PID, calibrated to an isobutylene standard in accordance with manufacturer's requirements, was used to screen soil samples collected above the groundwater table for the presence of VOCs. The PID measures relative concentrations of total VOCs in the headspace of sealed sample containers, reported as parts per million (ppm). Field screening conducted on collected soil samples after completion of drilling activities showed no elevated PID readings. However, extremely humid conditions were present during field activities which may have impacted the accuracy of the PID due to the moisture content in the air. PID results are provided on the boring logs in Appendix A. No visual or olfactory evidence of potential contamination was observed during drilling.

3.2.2 Chemical Testing Results

Soil Test Results

Soil samples were collected from the fill soil zone at about 7 feet bgs at boring locations B-1/MW-1, B-2/MW-2 and B-4/MW-4. A Soil sample was collected from above the water table at about 32 feet bgs at boring location B-3/MW-3. One soil sample was collected from each boring and was submitted for analyses of THP-DRO using EPA Method 8015C. Soils from locations B-1/MW-1, B-3/MW-3 and B-4/MW-4 were also analyzed for TPH-GRO using EPA Method 8015C and soils from locations B-1/MW-1 and B-3/MW-3 were additionally analyzed for VOCs according to EPA Method 8260B.

Soil sample analytical results are presented in Table 1. The laboratory analytical report is included in Appendix B. Acetone, a common laboratory artifact, was detected in each soil



sample collected. The maximum concentration of acetone detected was 46 microgram per kilogram ($\mu\text{g/kg}$) in the sample from soil boring SB3/MW-3 at a depth of 32 feet bgs. The detected concentrations of acetone in soil samples collected at the Site are well below the EPA Region 3 Regional Screening Level (RSL) of 61,000,000 $\mu\text{g/kg}$. Naphthalene was detected at a concentration of 11 $\mu\text{g/kg}$, also well below the DDOE Tier 1 Screening Level, 706,000 $\mu\text{g/kg}$ and the EPA Region 3 RSL, 110,000 $\mu\text{g/kg}$.

Benzene was detected at a concentration of 47 $\mu\text{g/kg}$ from soil collected at a depth of 32 feet bgs from location B-3/MW-3, which is above the DDOE Tier 0 Soil Screening Level of 5 $\mu\text{g/kg}$. Tetrachloroethene (PCE) was also detected in the soil collected from B-3/MW-3 at a concentration of 13.0 $\mu\text{g/kg}$, exceeding the EPA Region 3 Soil RSL of 2.3 $\mu\text{g/kg}$. Detectable concentrations of TPH-GRO were present ranging in concentration from 100 $\mu\text{g/kg}$ to 210 $\mu\text{g/kg}$, all well below the DDOE Tier 0 Soil Screening Level of 100,000 $\mu\text{g/kg}$. No other VOCs or TPH-DRO were detected in laboratory analyzed soil samples above the method reporting limits (MRLs).

Groundwater Test Results

Groundwater samples collected from the newly constructed wells were analyzed for VOCs using EPA Method 8260B, and TPH-GRO and TPH-DRO using EPA Method 8015C. Insufficient amounts of groundwater collected in MW-2 and consequently, Northgate was not able to collect a groundwater sample for TPH-DRO analysis from this location. Groundwater sample analytical results are shown in Table 1 (including the groundwater test result from Northgate's March 2015 investigation). The laboratory analytical reports are included in Appendix B.

No TPH-GRO was detected above MRLs in the groundwater samples collected from the four monitoring wells. TPH-DRO was detected above MRLs from one location, MW-4 at a concentration of 200 micrograms per liter ($\mu\text{g/L}$), below the respective DDOE Tier 1 groundwater standard of 3,570 $\mu\text{g/L}$. Two gasoline related VOCs and four chlorinated solvent VOCs were detected above MRLs in each of the four groundwater monitoring wells. None of concentrations present in MW-1 or MW-4 exceeded their respective DDOE Tier 1 standards.

Benzene, PCE, 1,2 dichloroethene and trichloroethene (TCE) were present at levels which exceed applicable standards from groundwater collected MW-2 and/or MW-3. In addition, groundwater collected from MW-2 exceeds the allowable discharge level for benzene to the Washington Area Sewer Authority (WASA), relevant if groundwater discharge is required during construction or post-construction de-watering.

Remaining VOCs present in the groundwater were detected at low concentrations that did not exceed published standards.



4.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this Groundwater Quality Investigation was to further evaluate contamination of soil and groundwater at the Site related to the presence of on and off-Site historical uses identified during the Phase I ESA completed by Northgate in March 2015. Soils encountered generally consisted of clayey sand fill materials in the upper 12 feet generally followed by clay with a varying sand component and lenses of sand and gravel. Clay soil generally became more predominant with depth. Groundwater is present at depths of 20 to 35 feet bgs. The variation may be in part due to the grade change at the eastern portion of the parking lot where the property slopes downward at the perimeter. More likely the variation is a result of perched groundwater conditions where the groundwater present is limited to permeable seams which vary in thickness and depths across the Site.

Based on the findings of this investigation there is no evidence to indicate that a material spill or release has occurred on-Site. Based on Northgate's soil investigations to date, the only evidence of impact to shallow soils is a slight VOC odor that was detected from the center portion of the property (SB-5). While there is no evidence that a significant release has occurred to the shallow soils, it is likely that localized areas of impacted fill and shallow soils are present on-Site, typical of Washington D.C. area fill materials and typical of historical urban uses of the property. These localized areas of soil contamination may require special handling and disposal if excavated during future Site redevelopment.

Impacted soils were present on-Site at a depth of 32 feet bgs, likely reflective of the regionally impaired groundwater quality. Soils excavated to depths greater than 20 feet bgs on-Site are anticipated to contain low levels of contamination consistent with contaminants present in the groundwater. These soils may require special handling and disposal if excavated during future Site redevelopment.

Elevated levels of benzene and chlorinated solvents were detected in the groundwater collected from MW-2 and MW-3. The wells are located at opposite corners of the property and these locations do not yield any information with respect to a source area or anticipated direction of flow. It is likely the results depict impacted regional groundwater conditions. Benzene was detected at a concentration of 22 µg/L in groundwater collected from MW-2 from a depth of about 30 feet bgs. This concentration is above the WASA allowable level for discharge to the municipal collection system.

In summary, the presence of extensive fill materials and varying groundwater depths across the Site characterize it as a non-homogeneous, urban fill site. Northgate's past experience with similar urban sites in the DC area indicate that offsite disposal of excavated fill materials may be



problematic due to odors and random pockets of impacted soil. In order to maintain compliance with the WASA permitted discharge standards, groundwater treatment (e.g. with a carbon filtration system) may be necessary prior to discharging groundwater from a dewatering system during construction and/or from a permanent subslab underdrain system post construction.

Northgate recommends a Site Specific Impacted Material Management Plan be prepared prior to redevelopment activities to ensure all soil and groundwater removed from the Site is characterized by qualified environmental personnel to meet applicable handling and disposal requirements. The VOC levels in groundwater should be further evaluated during construction dewatering to determine if vapor intrusion management is necessary. In addition, Northgate recommends that the foundation design of the proposed building take into account the findings presented in this report.

