



13 November 2019  
Project Number: 190400

Mr. Gordon McKechnie  
Canadian Bank Note Company, Limited  
145 Richmond Road  
Ottawa, ON K1Z 1A1

**Re: 2019 Groundwater Monitoring/Sampling Event Results  
Contaminant Management Plan  
975 Gladstone Avenue, Ottawa, ON**

Dear Mr. McKechnie:

BluMetric Environmental Inc. (BluMetric™) was retained by Canadian Bank Note Company, Limited (CBN) to complete the annual groundwater monitoring/sampling event for the CBN facility located at 975 Gladstone Avenue in Ottawa, Ontario (the "Site"). The 2019 annual groundwater monitoring event was carried out on July 3, 2019. Groundwater monitoring is conducted for environmental due diligence purposes and as part of a Contaminant Management Plan (CMP) as per Recommendation #2 of the BluMetric letter report "2015 Environmental Site Assessment Program, 975 Gladstone Avenue, Ottawa, ON, December 7, 2015" (BluMetric, December 2015).

The objective of the annual groundwater monitoring event is to obtain an update on groundwater quality conditions and assess for any changes/trends in groundwater quality at the Site. Previous assessments have concluded that the Ontario Regulation (O.Reg.) 153/04 (Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act) Table 3 Full Depth Generic Site Condition Standards (SCS) in a Non-Potable Groundwater Condition Industrial/Commercial/ Community Property Use, medium/fine textured soils (herein referred to as the O.Reg. 153/04 Table 3 SCS) are applicable for comparison to groundwater quality sampling results at the Site. A Site Plan showing the groundwater monitoring well network is provided as Figure 1.

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BluMetric Environmental Inc.  
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## BACKGROUND

The 975 Gladstone Avenue property has been used for security printing since 1948. CBN acquired the property in 2013 after British American Bank Note Company (BABN) shut down its operation in 2012. Former underground storage tanks (USTs) are considered the source of two areas of subsurface environmental impact documented for the Site. Assessment of these areas has been on-going since 1993 and a soil/groundwater remediation system was operated between 2001 and 2007. Groundwater monitoring has continued since the remediation system was shut down. The groundwater flow direction in both areas of environmental concern is to the east and towards Loretta Avenue North. Groundwater monitoring and subsurface remediation programs have focused on addressing impacts to the City of Ottawa right-of-way. Background information on the two areas of environmental concern at the Site is provided as follows:

### Former 5000 Imperial Gallon Bunker C Heating Oil Tank at Loretta Avenue North Loading Dock

This former UST was used to contain heating fuel products including Bunker C fuel and No. 2 fuel at different times in the past and was reported to be inactive for at least ten years prior to its removal in 1994. Since 1994, measurable thicknesses of liquid phase hydrocarbon (LPH) have been observed in monitoring wells in the vicinity of the former UST. LPH recovered from the monitoring wells is comprised of a viscous black highly weathered oil/sludge. Bunker C oil impacts are typically characterized by low solubility and low mobility in groundwater with the oil typically becoming entrained in the soils. As the oil continues to weather over time, soil permeability is typically reduced and excavation remains as the only viable option for contaminant mass removal. Soil excavation is currently not an option due to the close proximity of the CBN building (structural concerns) and buried infrastructure (gas line and sanitary sewer). Between 2015 and 2017, viscous/weathered Bunker C oil was observed in monitoring wells (BH104, BH105 and BHD-02) located near the former Bunker C oil UST location and groundwater sample collection from the wells was not possible. Since the oil sludge has potentially been trapped within these wells for many years, the wells were sealed and abandoned as part of the May 2018 well decommissioning program. Two monitoring wells (MW6-18 and MW7-18) were installed in October 2018 to assess soil and groundwater quality near the former UST, as per Recommendation #3 of the BluMetric report “2019 Groundwater Monitoring/Sampling Event Results, 975 Gladstone Avenue, Ottawa, ON,” (BluMetric, October 2018).

Groundwater sampling completed down gradient (to the east) of this former UST location includes monitoring wells MW2 and MW3 located on City of Ottawa property and MW6-18, MW7-18, and BHD-06 located on CBN property near the east property line. The 2015 through 2018 groundwater sampling results for MW2, MW3, and BHD-06 did not identify petroleum hydrocarbon (PHC) impacts to groundwater. The 2015 groundwater sampling event for those wells included polycyclic aromatic hydrocarbon (PAH) analyses and did not identify PAH impacts to groundwater.

In October 2018 MW6-18 and MW7-18 were added as new on site monitoring wells located down gradient (i.e. east and northeast) of the former UST location. The October 2018 groundwater sampling results for these wells did not identify PHC or PAH impacts to groundwater, as described within the BluMetric letter report “Installation and Sampling of Two Monitoring Wells at Former Bunker C Oil UST Location, 975 Gladstone Avenue, Ottawa, Ontario” (BluMetric, December 2018). Additional soil sampling was completed at MW6-18 and MW7-18 in October 2018. Soil analytical results at MW7-18, located closest to the former UST location indicated PHC and PAH impacts from 2.4 to 4.3 m depth. For MW6-18 located approximately 7 m to the east of MW7-18, only PHC impacts to soil are indicated and extend from 3.7 to 5.5 m depth. Since PHCs are more mobile in soil/groundwater than PAHs, the PAH impacts detected at MW7-18 are indicative of a nearby contaminant source (former Bunker C oil UST). The absence of PAH impacts for soils at MW6-18 indicate the PAH impacts are localized to the original source location (i.e. former UST location) while PHC impact has migrated to the MW6-18 borehole location via groundwater flow. The absence of groundwater impacts indicates that contaminants are adsorbed on to the soil particles and are generally immobile.

#### Former Solvent Storage Tank(s) Beneath East End of Plant

Two solvent storage tanks were removed during construction of the eastern plant addition in 1979. Four additional USTs used for solvents and petroleum products were located approximately 10 m southwest of the former UST location and in the mixing room. These USTs were filled with concrete and decommissioned by BABN in 1993. Contents of these former tanks are reported to have included linseed oil, benzene and various different carrier solvents used in the mixing of inks. LPH has been observed in monitoring wells in the vicinity of these former USTs since 1994. Past assessments attribute the subsurface impact at this Site location to the USTs removed in 1979 and not the USTs in the mixing room and decommissioned in 1993.

Groundwater impacts in this Site area are detected as Petroleum Hydrocarbons (PHCs) in the F1 and F2 fraction. A measurable thickness of LPH was originally observed in 1994 at monitoring well BH7, located at the 1979 UST removal location inside the east building wall. The detection of LPH at BH7 is intermittent and was last reported in 2010. Groundwater sampling for BH7 has identified high concentrations of PHC F1 and PHC F2 at this location. Down gradient and approximately 10 m north-northeast of BH7, LPH has continued to be observed at BH12 located on the Loretta Avenue North right-of-way. In 2015, 1 mm of LPH was also measured in new monitoring well MW5, located on the Loretta Avenue North right-of-way and 6 m southeast of BH12. No LPH has been detected at MW5 since 2015 and groundwater sample analyses for MW5 have not identified PHC impacts to groundwater at this well location.

As of 2018, the groundwater impact for this area of environmental concern is delineated as including the location of monitoring well BH7 within the building and the location of BH12 on the Loretta Avenue North sidewalk to the north-northeast. Due to the presence of large diameter water, sanitary sewer and storm sewer trunks beneath Loretta Avenue North, no subsurface investigation to the east of BH12 has been permitted by the City of Ottawa. Based on a water table depth that is consistently below 4.5 m at both BH12 and BH11, subsurface impacts on the roadway are inferred to be below this depth. The BluMetric, December 2015 report provides a cross-section drawing that identifies the municipal water trunk at a depth above 4.5 m while the storm and sanitary sewer trunks are below this depth. Since 2015, the City of Ottawa has indicated plans for upgrades to Loretta Avenue North. The scope of the upgrade program and whether any excavation will extend below 4.5 m depth remains unclear. CBN has maintained communication with the City of Ottawa regarding the Loretta Avenue North upgrades and its potential participation in the removal of subsurface impacts if encountered during this work program.

#### Former Dual Phase Extraction (DPE) Remediation System

A dual phase extraction (DPE) remediation system was operated at the Site from 2001 to 2007. The system included eight extraction wells located off property on the City of Ottawa right-of-way and four wells located on property near the former Bunker C Heating Oil UST location. The DPE system was shut down in 2007 due to the fouling of the extraction wells. The extraction wells were not replaced because subsurface impacts were assessed as generally immobile and the low permeability soil conditions would hinder any further benefit from DPE system operation. The full decommissioning of the DPE system and former extraction wells was provided as Recommendation #2 of the BluMetric, December 2015 report. Sealing and abandonment of the twelve DPE extraction wells was completed in May 2018 under the supervision of BluMetric.

### Monitoring Well Network

More than 30 monitoring wells have been constructed at the Site since 1993 with some wells removed in conjunction with various UST removals and some wells having been paved or concreted over and lost over time. A monitoring well network inventory was completed in 2015 and 15 wells (including 5 new wells constructed in 2015) were deemed potentially suitable for groundwater monitoring and sampling while other wells were recommended for sealing and abandonment. Monitoring well repairs and well decommissioning recommendations were provided as Recommendation #5 of the BluMetric, December 2015 report.

In 2017, the City of Ottawa identified that the sidewalk along the west side of Loretta Avenue would be removed and replaced in combination with planned road and sewer upgrades and all monitoring wells located on the sidewalk (BH11, BH12 and BH13) will require sealing and abandonment. The City of Ottawa requested that the decommissioning of these wells not occur until the sidewalk upgrades are scheduled. The City of Ottawa request was based on concerns that the decommissioned well locations could present a potential slip/trip hazard for pedestrians.

In May 2018, a monitoring well repair and well decommissioning program was completed under the supervision of BluMetric. This program included the abandonment of monitoring wells BH104, BH105, and BHD-02, in conjunction with the abandonment of twelve DPE extraction wells. In October 2018, monitoring wells MW6-18 and MW7-18 were installed to assess soil and groundwater quality conditions near the former Bunker C oil UST location. The current monitoring well network is shown on Figure 1.

### Contaminant Management Plan (CMP)

The CBN annual groundwater monitoring report is submitted to the City of Ottawa as part of the Contaminant Management Plan (CMP) that has been implemented for the Site. The annual groundwater monitoring/sampling event serves to ensure that subsurface impacts remain generally immobile until such time that soil excavation is possible.

## **2019 MONITORING PROGRAM METHODOLOGY**

The 2019 annual groundwater monitoring/sampling event consisted of LPH and static groundwater level measurement, standpipe combustible vapour measurement, and groundwater sampling. Monitoring/sampling is conducted for monitoring wells situated on the 975 Gladstone Avenue property and on the adjacent City of Ottawa easement for Loretta Avenue North to the east.

The 2019 groundwater sampling program included the following 10 monitoring wells:

- Offsite Wells: MW1, MW2, MW3, MW4, and MW5
- Onsite Wells: BH7, BHD-01, BHD-03, BHD-06, and MW7-18

Onsite monitoring well BH9 was paved over and presumed destroyed and, therefore, was not available for sampling for the 2019 groundwater sampling program. BH9 was replaced by a new monitoring well, MW11-19, that was constructed in October 2019 and will be included for future monitoring/sampling events. In July 2019, viscous/weathered Bunker C oil was observed in monitoring well MW6-18 located near the former Bunker C oil UST location. As a result, groundwater monitoring and sampling of MW6-18 was not conducted.

Monitoring for liquid phase hydrocarbon (LPH)-only was also conducted in 2019 for BH11, BH12, and BH13. The annual groundwater monitoring/sampling program is a component of the CBN Contaminant Management Plan (CMP) that provides assurance that existing subsurface environmental impacts remain immobile and pose minimal risk for adverse environmental impact.

### **Groundwater Elevation and Free Product Monitoring**

A Solinst® Oil/Water Interface Meter Model 122 was used to collect static water levels and to measure LPH thickness, if present, in the monitoring wells. Static water level measurements are presented in Table 1 and groundwater elevations are shown on Figure 1. The meter was decontaminated between well locations using a combination of methanol and de-ionized water.

### **Groundwater Sampling**

The 10 monitoring well locations listed above were sampled using low flow (parameter stabilization) sampling methods with a peristaltic pump. During groundwater sample collection, groundwater was pumped until stabilization of indicator parameters was reached. Indicator parameters included temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), pH and electrical conductivity (EC). Final field readings are presented in Table 2. Upon reaching parameter stabilization, the groundwater was considered representative of in-situ conditions and samples were collected in clean sample bottles provided by the laboratory. Samples were packed on ice in laboratory-supplied coolers and stored at approximately 4°C until they were submitted to the laboratory for analysis. Requested analyses included BTEX (benzene, toluene, ethylbenzene and xylenes) and PHC F1 to F4. These parameters were identified as the contaminants of concern in the BluMetric, December 2015 assessment. One blind



duplicate sample (Dup 1 for BHD-06) was submitted for laboratory analysis to confirm the reproducibility of the analytical results. All groundwater analytical results for 2019 are summarized in Table 3 along with historical (2015 to 2018) data. Laboratory reports of analyses for the 2019 sampling program are provided in Appendix A.

## RESULTS

### Groundwater Elevation and Product Thickness Monitoring

The measured water level depths and available static groundwater elevation data from July 3, 2019 are included in Table 1 and shown on Figure 1. Groundwater levels observed on this date are approximately 0.29 m higher than water levels measured in July 2018, and remain generally consistent with those measured in July 2017. Observations made from the data in Table 1 include the following:

- The static water table elevations at the Site on July 3, 2019 were found to range from a low of 60.54 m above sea level (asl) at MW2 to a high of 62.37 m asl at BHD-01. Several historic maximum groundwater elevations were observed on this date; location specific maximums were measured at MW2, MW3, MW5, BH7, BH11, BH12, BH13, and BHD-03. The general distribution of water level elevations for the Site are consistent with the 2015 to 2018 assessments indicating a groundwater flow direction towards the northeast and suggesting a potential hydraulic influence from the storm sewer trunk beneath Loretta Avenue North.
- LPH was detected at monitoring well BH12, where a hydrophobic bailer was located. BH12 contained 30 mm of measurable free product which was likely present due to fluctuations in the groundwater table which prevented the hydrophobic bailer from intersecting and capturing the LPH. Since LPH was measured in the well, a groundwater sample was not collected. No measurable LPH thickness was detected for any other monitoring well assessed during the July 2019 monitoring event.
- Minor quantities of LPH were collected and removed from BH12 using the hydrophobic bailer on May 24, 2019 and July 3, 2019 (See Table 4); the limited product removal is likely caused by fluctuating groundwater levels, as stated above. On July 3, 2019 the hydrophobic bailer was removed from BH12 and replaced by a hydrophobic absorbent sock, which floats to accommodate groundwater level fluctuations and is therefore more likely to capture/absorb a greater volume of LPH. Follow up inspection of BH12 was conducted on October 7, 2019 and the hydrophobic absorbent sock was replaced on this date. Spring, summer and fall inspection is recommended to determine if the absorbent sock had reached its LPH absorption capacity, and to replace the sock, as required.

## Groundwater Chemistry

Groundwater analytical results along with 2015 to 2018 data are summarized in Table 3. Results are provided in comparison to the respective O. Reg. 153/04 Table 3 SCS. The 2017 to 2019 groundwater analytical results are also provided on Figure 2. The Certificate of Analysis from the July 3, 2019 sampling event is provided in Appendix A.

The 2019 analytical results for groundwater are below the O. Reg. 153/04 Table 3 SCS for all sampled locations with the exception of BH7, located near the former solvent UST location. The groundwater sample collected from BH7 was found to exceed the O. Reg. 153/04 Table 3 SCS for PHC F2 (260 µg/L versus an SCS of 150 µg/L); this is the lowest PHC F2 result at BH7 since 2015. The BH7 PHC F2 result is approximately 1.7 times the Table 3 SCS, and is approximately 98% lower compared to the 2018 sampling result for BH7. No other parameters at BH7 were measured at levels exceeding the applicable SCS. The 2019 PHC F1 result at BH7 represents the first result below the Table 3 SCS since 2015, and is approximately 96% lower compared to the 2018 sampling result for BH7. Higher water table conditions permitting greater dilution may be contributing to the lower concentrations in 2019.

As indicated previously herein, monitoring well MW5 contained 1 mm of measurable free product in July 2015 and has contained no measurable LPH from October 2016 through July 2019. Laboratory analytical results for MW5 have been below laboratory detection limits from October 2016 through July 2019.

As indicated in Table 3, BTEX was detected at BH7 and MW7-18 for the July 2019 sampling event. All detections are well below the applicable O. Reg. 153/04 Table 3 SCS.

In July 2018, PHC F3 and PHC F4 were detected at BH9. All detections were less than two times the laboratory detection limit of 100 µg/L and were well below the O. Reg. 153/04 Table 3 SCS of 500 µg/L. BH9 was destroyed and could not be sampled in July 2019. The replacement monitoring well, MW11-19, will be included in the 2020 annual sampling/monitoring event.

The blind duplicate sample Dup 1 was collected from monitoring well BHD-06. Laboratory analytical results were below the laboratory method detection limits. Based on this assessment, the laboratory analytical data for groundwater samples from the 2019 annual monitoring event is considered reliable.



## DISCUSSION OF RESULTS

The results of the 2019 annual groundwater monitoring/sampling event for the CBN facility at 975 Gladstone Avenue in Ottawa, Ontario remain consistent with previous annual monitoring events. Groundwater impacts remain apparent at the east end of the building (BH7) and extending on to the City of Ottawa right-of-way at Loretta Avenue North (BH12). Due to the presence of low permeability soils, the mobility of groundwater impacts is considered limited. The 2019 groundwater sampling results for the two areas of environmental concern are discussed as follows.

### Former 5000 Imperial Gallon Bunker C Heating Oil Tank at Loretta Avenue North Loading Dock

The 2019 analytical results are below the O. Reg. 153/04 Table 3 SCS and/or method detection limit for all sampled locations near the former Bunker C Heating Oil UST location. As previously discussed, sample collection from nearby monitoring wells BH9 and MW6-18 could not be completed. The replacement monitoring well, MW11-19, will be included in the 2020 annual sampling/monitoring event. An effort to remove the LPH at MW6-18 is considered warranted to determine whether the LPH source is limited to the soil fissures intersected during monitoring well construction or if a more significant LPH source exists at this Site location.

### Former Solvent Storage Tank(s) Beneath East End of Plant

The groundwater sample collected from BH7 in 2019 was found to exceed the O. Reg. 153/04 Table 3 SCS for PHC F2; this is the lowest measured concentration at BH7 since 2015. Higher water table conditions permitting greater dilution of residual groundwater impacts may be contributing to the lower concentrations measured in 2019 compared with previous years. Sampling results for 2020 will be used to determine whether any actual trend in water quality exists for BH7.

Groundwater sampling results for 2019 indicate that contaminants are not migrating away from the vicinity of existing impacts that include the vicinity of BH7 and BH12 as indicated on Figure 2. For the 2019 monitoring event, 30 mm of LPH was detected at monitoring well BH12, where a hydrophobic bailer was located. Minor quantities of LPH were collected by the hydrophobic bailer during 2019; likely due to fluctuations in the groundwater table which prevent the hydrophobic bailer from intersecting and capturing the LPH. In July 2019 the hydrophobic bailer was replaced by a hydrophobic absorbent sock, which floats to accommodate groundwater level fluctuations and is therefore more likely to capture a greater volume of LPH. Spring, summer and fall inspection of BH12 is recommended to determine if the absorbent sock had reached its LPH absorption capacity, and to replace the sock, as required.

The lateral extent of groundwater impact towards the northeast of BH12 cannot be delineated further due to the presence of water, sanitary and storm trunks beneath Loretta Avenue North. The low static groundwater levels (>4.5 m below ground surface) for nearby monitoring wells indicate that groundwater impacts are at a significant depth and any overlying soil impact due to upward vapour intrusion are likely to be limited. Based on the findings herein, it is recommended that the CMP continue to be implemented by CBN until such time that subsurface impacts can be safely excavated and removed.

As indicated previously herein, the City of Ottawa has informed CBN of plans for road and municipal servicing upgrades to Loretta Avenue North. The scope of the upgrade program and whether any excavation will extend below 4.5 m depth and encounter potential environmental impacts remains unclear at the time of preparation of this report. CBN has communicated to the City of Ottawa its desire to participate in the removal/disposal of any subsurface impacts encountered during this work program and to be kept informed of the scheduled work.

## SUMMARY

Based on the results of the 2019 annual groundwater monitoring/sampling program for the CBN facility located at 975 Gladstone Avenue in Ottawa, Ontario, the following conclusions and recommendations have been developed:

- Static groundwater levels were obtained for the monitoring well network at the site on July 3, 2019. The 2019 data was found to be consistent with the 2015 to 2018 groundwater level observations indicating a groundwater flow direction towards the east/northeast. Static groundwater levels on July 3, 2019 were observed to be at a historic high for most monitoring well locations.
- LPH was detected at monitoring well BH12, where a hydrophobic bailer was located. BH12 contained 30 mm of measurable free product. Since LPH was measured in the well and observed in the bailer, a groundwater sample was not collected. Minor quantities of LPH were collected and removed during 2019; this is likely due to fluctuations in the groundwater table which prevent the hydrophobic bailer from intersecting and capturing the LPH. The hydrophobic bailer was replaced by a hydrophobic absorbent sock. Spring, summer and fall inspection of BH12 is recommended to determine if the absorbent sock had reached its LPH absorption capacity, and replace the sock, as required. No measurable LPH thickness was detected for any other monitoring well assessed during the July 3, 2019 monitoring event.


- In July 2019, bunker C oil was observed in monitoring well MW6-18 and groundwater sample collection was not possible. Prior to the 2020 annual monitoring event, MW6-18 should be cleaned to determine whether the LPH source is limited to the soil fissures intersected during monitoring well construction or if a more significant LPH source exists at this Site location.
- The 2019 groundwater quality analytical results are below the O. Reg. 153/04 Table 3 SCS for all sampled locations with the exception of BH7 located near the former solvent UST location. The groundwater sample collected from BH7 was found to exceed the O. Reg. 153/04 Table 3 SCS for PHC F2 (260  $\mu\text{g/L}$  versus an SCS of 150  $\mu\text{g/L}$ ); this is the lowest measured concentration at BH7 since 2015. Higher water table conditions permitting greater dilution of residual groundwater impacts may be contributing to the lower concentrations measured in 2019 compared with previous years. Sampling results for 2020 will be used to determine whether any actual trend in water quality exists for BH7.
- In 2018, PHC F3 and PHC F4 were detected at BH9. All detections were less than two times the laboratory detection limit of 100  $\mu\text{g/L}$  and were well below the comparison standard of 500  $\mu\text{g/L}$ . BH9 was destroyed and could not be sampled in July 2019. A replacement monitoring well, MW11-19, was constructed in October 2019 and will be included in the 2020 annual sampling/monitoring event.
- Groundwater sampling results for 2019 indicate that contaminants are not migrating away from the vicinity of existing impacts that include the vicinity of BH7 and BH12. The lateral extent of groundwater impact towards the northeast of BH12 cannot be delineated further due to the presence of water, sanitary and storm trunks beneath Loretta Avenue North. The low static groundwater levels (>4.5 m below ground surface) for nearby monitoring wells indicate that groundwater impacts are at a significant depth and any overlying soil impact due to upward vapour intrusion are likely to be limited. It is recommended that the CMP continue to be implemented by CBN until such time that subsurface impacts can be safely excavated and removed.

## CLOSURE

The information presented herein is based on field observations and laboratory testing of groundwater samples collected at the specified locations. It is not intended to be a definitive investigation of contamination or other environmental concerns that may exist on-site. Every effort was made to collect representative samples from the groundwater monitoring locations. The conclusions presented in this report represent our professional opinion, in light of the terms of reference, scope of work, and any limiting conditions noted herein.

Should you have any questions regarding this report or require more information, please do not hesitate to contact the undersigned at (613) 839-3053.

Respectfully Submitted,  
**BluMetric Environmental Inc.**

  
Robert Hillier, B.Sc., P. Geo., QP<sup>ESA</sup>  
Project Manager / Senior Hydrogeologist

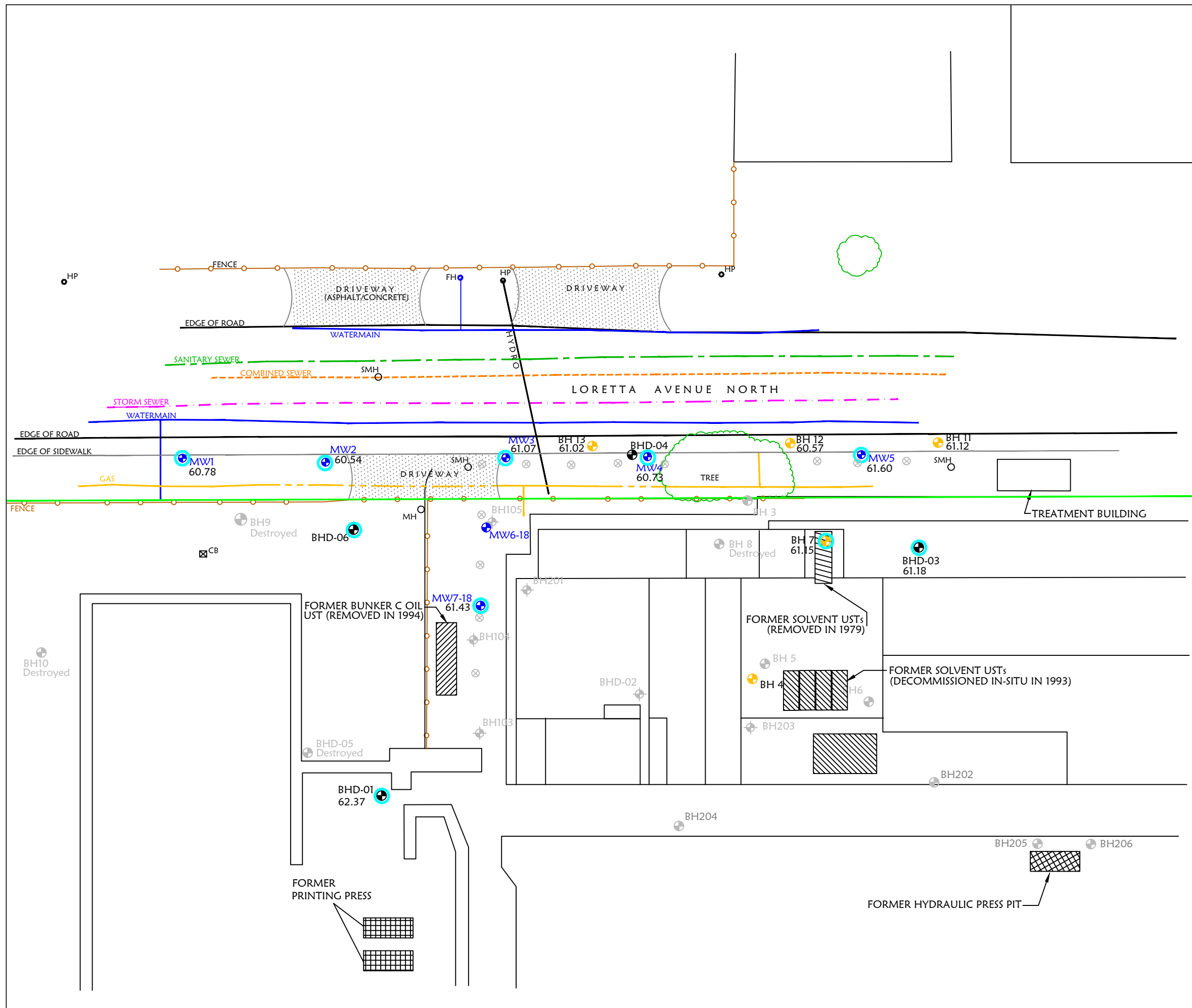
  
Carolyn Miller, EIT  
Engineer In Training

Encl.    Figure 1 – Monitoring Well Site Plan  
          Figure 2 - Groundwater Analytical Results  
          Table 1 – Static Groundwater Level Measurements  
          Table 2 – Groundwater Headspace Reading and Field Parameters  
          Table 3 – Summary of Groundwater Quality Data  
          Table 4 - Product Recovery at BH12  
          Appendix A –Laboratory Certificate of Analysis

*Ref: 190400 CBN Gladstone 2019 GW Monitoring - November 13 2019.docx*

## FIGURES





LEGEND

- Groundwater Monitoring Well Sampled July 2019
- Monitoring Well (BluMetric) (2 Inch)
- Monitoring Well (AMEC) (4 Inch)
- Monitoring Well (WESA) (1 1/4 Inch)
- Monitoring Well (Dillon) (1 1/4 Inch)
- Monitoring Well - Abandoned
- DPE Recovery Well - Abandoned
- Monitoring Well - Destroyed
- Property Boundary

60.37 Denotes Static Groundwater Elevation on July 3, 2019

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES

PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

0 10 20  
( metres )

Plan Reference: Pinchin Environmental, Sept. 2013

CLIENT

CANADIAN BANK NOTE COMPANY LTD.  
975 GLADSTONE AVENUE  
OTTAWA, ON

PROJECT

ENVIRONMENTAL SITE  
ASSESSMENT PROGRAM

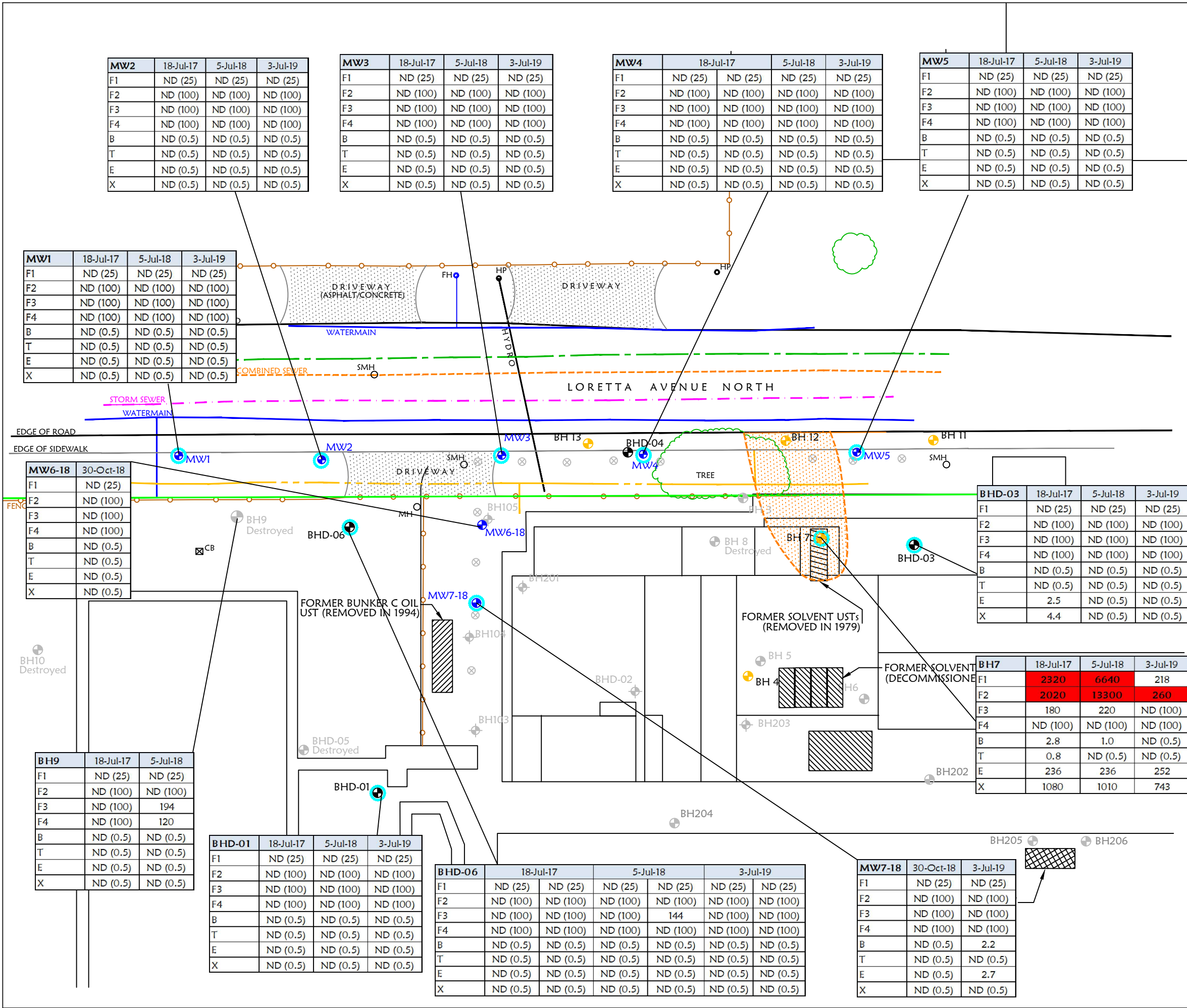
TITLE

2019 MONITORING WELL SITE PLAN

3108 Carp Road PO Box 430  
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FAX: (613) 839-5376  
Email: info@blumetric.ca  
Web: http://www.blumetric.ca

PROJECT # 190400		DATE 2019-08-27	
DRAWN AL	CHECKED RH	DWG NO. 1	REV 0





**LEGEND**

- Groundwater Monitoring Well Sampled July 2019
- Monitoring Well (BluMetric) (2 Inch)
- Monitoring Well (AMEC) (4 Inch)
- Monitoring Well (WESA) (1 1/4 Inch)
- Monitoring Well (Dillon) (1 1/4 Inch)
- Monitoring Well - Abandoned
- DPE Recovery Well - Abandoned
- Monitoring Well - Destroyed
- Property Boundary
- Inferred Area of Groundwater Impact Exceeding MECP Table 3 SCS

**MECP Table 3<sup>1</sup>**

Parameter	Abbreviation	Units	MECP Table 3 <sup>1</sup>
<b>F1-F4 Petroleum Hydrocarbons (PHCs)</b>			
F1 (C6-C10 Hydrocarbons)	F1	µg/L	750
F2 (C10-C16 Hydrocarbons)	F2	µg/L	150
F3 (C16-C34 Hydrocarbons)	F3	µg/L	500
F4 (C34-C50 Hydrocarbons)	F4	µg/L	500
<b>BTEX</b>			
Benzene	B	µg/L	430
Toluene	T	µg/L	18000
Ethylbenzene	E	µg/L	2300
Xylenes (Total)	X	µg/L	4200

**Notes:**

- ND (100) - Non detect (< indicated method detection limit)
- 2320 - Concentration exceeds MECP Table 3 SCS
- <sup>1</sup> - MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, O.Reg. 153/04 as amended, Table 3 Standards for Medium/Fine Textured Soil in a Industrial/Commercial/Community Property Use Setting, Effective July 1, 2011.

**REV.**

REV.	DESCRIPTION	YY/MM/DD	BY	CHK
1				

**REFERENCES**

PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.

**CLIENT**

**CANADIAN BANK NOTE COMPANY LTD.**  
975 GLADSTONE AVENUE  
OTTAWA, ON

**PROJECT**

**ENVIRONMENTAL SITE ASSESSMENT PROGRAM**

**TITLE**

**GROUNDWATER ANALYTICAL RESULTS JULY 2019**

**PROJECT #**  
190400

**DATE**  
2019-08-27

**DRAWN**  
AL

**CHECKED**  
RH

**DWG NO.**  
2

**REV**  
0

**BluMetric Environmental**

3108 Carp Road PO Box 430  
Ottawa, Ontario K0A 1L0  
TEL: (613) 839-3053  
FAX: (613) 839-5376  
Email: info@blumetric.ca  
Web: http://www.blumetric.ca

## TABLES



Table 1: Static Groundwater Level Measurements  
Canadian Bank Note Company Limited  
975 Gladstone Avenue, Ottawa, ON

Well ID	Reference Elevation (masl)*				8-Jul-15				16-Jul-15				19-Oct-16			
					Depth to		Elevation		Depth to		Elevation		Depth to		Elevation	
	Top of PVC	Ground Surface	Top of Screen	Bottom of Screen	LNAPL (mbTPVC)	Water (mbTPVC)	LNAPL (mbTPVC)	Water (masl)	LNAPL (mbTPVC)	Water (mbTPVC)	LNAPL (mbTPVC)	Water (masl)	LNAPL (mbTPVC)	Water (mbTPVC)	LNAPL (mbTPVC)	Water (masl)
MW1	64.47	64.54	60.69	57.54	-	3.93	-	60.54	-	4.02	-	60.46	-	4.15	-	60.32
MW2	64.47	64.73	61.03	58.03	-	4.28	-	60.19	-	4.43	-	60.05	-	4.62	-	59.85
MW3	64.89	64.96	61.64	58.64	-	4.56	-	60.33	-	4.65	-	60.25	-	4.58	-	60.31
MW4	65.23	65.30	62.81	59.81	-	4.63	-	60.60	-	4.83	-	60.41	-	4.71	-	60.52
MW5	65.76	65.81	63.21	60.21	5.109	5.110	60.651	60.65	5.219	5.220	60.541	60.54	-	5.23	-	60.53
MW6-18	65.00	65.09	62.32	59.29	-	-	-	-	-	-	-	-	-	-	-	-
MW7-18	65.00	65.09	62.67	59.68	-	-	-	-	-	-	-	-	-	-	-	-
BH7	65.18	65.25	-	-	-	4.45	-	60.73	-	4.52	-	60.66	-	4.64	-	60.54
BH9	64.40	64.49	-	-	-	2.30	-	62.10	-	3.89	-	60.51	-	4.10	-	60.30
BH11	65.88	65.96	-	-	-	5.05	-	60.83	-	5.14	-	60.74	-	5.23	-	60.65
BH12	65.54	65.62	-	-	-	bailer	-	-	-	bailer	-	-	-	bailer	-	-
BH13	65.07	65.15	-	-	-	4.43	-	60.64	-	4.49	-	60.58	-	-	-	-
BHD-01	65.16	65.25	-	-	-	dry	-	-	-	-	-	-	-	3.07	-	62.09
BHD-03	65.17	65.25	-	-	-	4.40	-	60.77	-	4.40	-	60.77	-	4.43	-	60.74
BHD-04	65.11	65.27	-	-	-	4.80	-	60.31	-	-	-	-	-	-	-	-
BHD-06	-	-	-	-	-	-	-	-	-	3.84	-	-	-	4.29	-	-

Notes:

\* Reference elevation of 64.66 for combined sewer manhole lid on Loretta Ave, opposite east plant entrance.

\* Reference elevation of 65.25 (finished concrete floor) for monitoring wells within building

mbTPVC - metres below top of PVC

masl - metres above sea level

LNAPL - Light non-aqueous phase liquid (free product)

Table 1: Static Groundwater Level Measurements  
Canadian Bank Note Company Limited  
975 Gladstone Avenue, Ottawa, ON

Well ID	Reference Elevation (masl)*				18-Jul-17					5-Jul-18				
					Depth to			Elevation		Depth to			Elevation	
	Top of PVC	Ground Surface	Top of Screen	Bottom of Screen	LNAPL (mbTPVC)	Water (mbTPVC)	Water (mbgs)	LNAPL (mbTPVC)	Water (masl)	LNAPL (mbTPVC)	Water (mbTPVC)	Water (mbgs)	LNAPL (mbTPVC)	Water (masl)
MW1	64.47	64.54	60.69	57.54	-	3.69	3.77	-	60.79	-	4.01	4.08	-	60.46
MW2	64.47	64.73	61.03	58.03	-	4.03	4.10	-	60.45	-	4.37	4.63	-	60.10
MW3	64.89	64.96	61.64	58.64	-	4.07	4.15	-	60.82	-	4.07	4.14	-	60.82
MW4	65.23	65.30	62.81	59.81	-	4.39	4.48	-	60.84	-	4.82	4.89	-	60.41
MW5	65.76	65.81	63.21	60.21	-	4.62	4.69	-	61.14	-	5.11	5.16	-	60.65
MW6-18	65.00	65.09	62.32	59.29	-	-	-	-	-	-	-	-	-	-
MW7-18	65.00	65.09	62.67	59.68	-	-	-	-	-	-	-	-	-	-
BH7	65.18	65.25	-	-	-	4.12	4.24	-	61.06	-	4.39	4.51	-	60.79
BH9	64.40	64.49	-	-	-	3.62	3.71	-	60.78	-	3.93	4.02	-	60.47
BH11	65.88	65.96	-	-	-	4.78	4.86	-	61.11	-	5.25	5.33	-	60.63
BH12	65.54	65.62	-	-	-	-	-	-	-	-	5.17	5.25	-	60.37
BH13	65.07	65.15	-	-	-	-	-	-	-	-	4.33	4.41	-	60.74
BHD-01	65.16	65.25	-	-	-	2.76	2.82	-	62.40	-	2.94	-	-	62.22
BHD-03	65.17	65.25	-	-	-	4.05	4.14	-	61.12	-	4.28	-	-	60.89
BHD-04	65.11	65.27	-	-	-	-	-	-	-	-	-	-	-	-
BHD-06	-	-	-	-	-	3.94	4.02	-	-	-	4.19	-	-	-

Notes:

\* Reference elevation of 64.66 for combined sewer manhole lid on Loretta Ave, opposite east plant entrance.

mbTPVC - metres below top of PVC

masl - metres above sea level

LNAPL - Light non-aqueous phase liquid (free product)

Table 1: Static Groundwater Level Measurements  
Canadian Bank Note Company Limited  
975 Gladstone Avenue, Ottawa, ON

Well ID	Reference Elevation (masl)*				30-Oct-18					3-Jul-19				
					Depth to			Elevation		Depth to			Elevation	
	Top of PVC	Ground Surface	Top of Screen	Bottom of Screen	LNAPL (mbTPVC)	Water (mbTPVC)	Water (mbgs)	LNAPL (mbTPVC)	Water (masl)	LNAPL (mbTPVC)	Water (mbTPVC)	Water (mbgs)	LNAPL (mbTPVC)	Water (masl)
MW1	64.47	64.54	60.69	57.54	-	-	-	-	-	-	3.69	3.75	-	60.78
MW2	64.47	64.73	61.03	58.03	-	-	-	-	-	-	3.93	3.99	-	60.54
MW3	64.89	64.96	61.64	58.64	-	-	-	-	-	-	3.82	3.89	-	61.07
MW4	65.23	65.30	62.81	59.81	-	-	-	-	-	-	4.50	4.59	-	60.73
MW5	65.76	65.81	63.21	60.21	-	-	-	-	-	-	4.16	4.21	-	61.60
MW6-18	65.00	65.09	62.32	59.29	-	3.93	-	-	61.07	-	-	-	-	-
MW7-18	65.00	65.09	62.67	59.68	-	4.97	-	-	60.03	-	3.57	3.68	-	61.43
BH7	65.18	65.25	-	-	-	-	-	-	-	-	4.03	4.10	-	61.15
BH9	64.40	64.49	-	-	-	-	-	-	-	Destroyed				
BH11	65.88	65.96	-	-	-	-	-	-	-	-	4.76	4.85	-	61.12
BH12	65.54	65.62	-	-	-	-	-	-	-	4.94	4.97	5.05	60.60	60.57
BH13	65.07	65.15	-	-	-	-	-	-	-	-	4.05	4.10	-	61.02
BHD-01	65.16	65.25	-	-	-	-	-	-	-	-	2.79	2.88	-	62.37
BHD-03	65.17	65.25	-	-	-	-	-	-	-	-	3.99	4.07	-	61.18
BHD-04	65.11	65.27	-	-	-	-	-	-	-	-	-	-	-	-
BHD-06	-	-	-	-	-	-	-	-	-	-	3.92	4.01	-	-

Notes:

**Table 2: Field Parameters**  
**Canadian Bank Note Company Limited**  
**975 Gladstone Avenue, Ottawa, ON**

Location	Dates	DO (mg/L)	ORP (mV)	Temperature ( °C)	pH	Conductivity (µS/cm)	PVC Standpipe CGD Reading (ppm)
BH7	16-Jul-15	2.5	79	17.59	6.04	14.23	25
	19-Oct-16	2.22	-90	19.81	6.93	1080	-
	18-Jul-17	14.79	-75.5	17.55	6.59	956	-
	5-Jul-18	2.88	-102.5	17.99	6.79	1194	100% LEL
	3-Jul-19	0.8	-101.2	19.2	6.82	928	80
BH9	16-Jul-15	0.41	-66	18.93	8.11	307	<10
	19-Oct-16	9.18	-50.4	17.16	7.57	1504	<10
	18-Jul-17	18.91	-53.3	20.1	7.4	1878	-
	5-Jul-18	4.43	128.6	19.42	7.22	633	<15
	3-Jul-19	-	-	-	-	-	-
BH11	16-Jul-15	1.49	46.9	15.54	6.92	2334	20
	19-Oct-16	10.59	170	15.98	7.23	1610	65
	18-Jul-17	7.89	148.9	16.35	7.29	857	<15
	5-Jul-18	-	-	-	-	-	<15
	3-Jul-19	-	-	-	-	-	20
BH12	16-Jul-15	-	-	-	-	-	<10
	19-Oct-16	-	-	-	-	-	-
	5-Jul-18	-	-	-	-	-	100% LEL
	3-Jul-19	-	-	-	-	-	600
	-	-	-	-	-	-	-
BH13	15-Jul-16	4.65	106.9	16.73	7.11	2116	<10
	5-Jul-18	-	-	-	-	-	<15
	3-Jul-19	-	-	-	-	-	<15
BH104	19-Oct-16	9.75	-36	9.49	6.86	3950	-
MW1	16-Jul-15	1.75	203.2	14.37	5.84	3563	25
	19-Oct-16	10.11	190	15.73	6.89	2470	95
	18-Jul-17	0.44	112.1	16.94	6.8	1972	<15
	5-Jul-18	1.89	144.2	14.59	6.75	2042	<15
	3-Jul-19	1.05	134.4	19.1	6.86	2038	-
MW2	16-Jul-15	2.4	153.8	14.25	6.32	5074	<10
	19-Oct-16	9.99	123.4	15.05	9.7	5037	50
	18-Jul-17	3.89	132.7	17.82	6.55	5328	<15
	5-Jul-18	4.98	138.7	15.94	6.72	3529	<15
	3-Jul-19	3.84	155.1	19.8	6.98	4813	-
MW3	16-Jul-15	0.56	61.9	14.59	7.07	2890	45
	19-Oct-16	2.15	182	16.15	7.29	3200	80
	18-Jul-17	5.43	143.4	17	7.39	3754	<15
	5-Jul-18	4.24	19.6	18.41	7.41	2844	<15
	3-Jul-19	3.37	147.4	18.9	7.55	3795	-
MW4	16-Jul-15	6.36	166.9	14.48	7.29	1188	30
	19-Oct-16	14.98	124.8	16.49	7.18	2452	75
	18-Jul-17	7.06	146.8	17.72	7.16	3621	<15
	5-Jul-18	7.62	89.8	17.96	6.98	3425	<15
	3-Jul-19	7.53	158.4	20	7.38	3438	-
MW5	16-Jul-15	-	-	-	-	-	6% LEL
	19-Oct-16	10.08	52.1	15.81	7.16	590	100
	18-Jul-17	31.18	194.4	19.13	6.77	623	40
	5-Jul-18	7.11	166.9	15.67	6.97	649	<15
	3-Jul-19	4.49	155.5	19.8	7.1	576	-
MW6-18	30-Oct-18	1.99	293.1	17.3	7.18	2623	-
MW7-18	30-Oct-18	4.13	323	15.4	6.47	5176	-
	3-Jul-19	0.94	-131.1	22.3	6.99	9275	-
BHD-01	19-Oct-16	13.39	100.4	20.08	7.52	1992	-
	18-Jul-17	23.12	193.2	19.06	7.34	2069	-
	5-Jul-18	6.34	39.1	19.07	7.46	2369	<15
	3-Jul-19	4.54	78.1	20.1	7.67	2153	<15
BHD-03	16-Jul-15	1.01	50.4	17.33	6.37	4151	<10
	19-Oct-16	9.44	-2.3	17.47	7.17	2602	-
	18-Jul-17	8.2	-48.9	17.17	6.73	1994	-
	5-Jul-18	1.85	-84.2	17.42	7.06	2256	105
	3-Jul-19	0.44	-136.7	18.2	6.96	2928	<15
BHD-04	16-Jul-15	-	-	-	-	-	<10
BHD-06	16-Jul-15	0.49	-87.1	16.52	6.71	3388	<10
	19-Oct-16	0.79	-32	17.61	6.8	5470	100
	18-Jul-17	30.64	-40.4	17.51	6.89	11886	-
	5-Jul-18	0.72	18.8	20.61	6.93	10750	<15
	3-Jul-19	0.6	99.4	23.4	7.02	11189	<15

*Notes:*

field measurements for groundwater obtained with YSI 556 MPS

DO - Dissolved Oxygen

ORP - Oxidation-Reduction Potential

CGD - Combustible Gas Detector (RKI Eagle Portable Multi-Gas Detector)

LEL - lower explosive limit

- not measured



**Table 3: Summary of Groundwater Quality Data**  
**Canadian Bank Note Company Limited**  
**975 Gladstone Avenue, Ottawa, ON**

Sample Location	Parameters	BTEX						Petroleum Hydrocarbons (PHCs)			
		Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Xylenes, Total	F1 (C6-C10)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		MDL	0.5	0.5	0.5	0.5	0.5	25	100	100	100
		MECP Table 3	430	2300	18000	NV	NV	4200	750	150	500
BHD-01	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
BHD-03	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	2.5	ND (0.5)	4.4	ND (0.5)	4.4	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
BHD-06	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
DUP1	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	144	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
BH104	19-Oct-16	6.6	11.4	ND (0.5)	5.6	4.1	9.7	103	1570	6470	3130
BH7	16-Jul-15	1.2	ND (0.5)	47.8	181	ND (0.5)	181	3200	9200	340	ND (100)
	18-Jul-17	2.8	0.8	236	1080	4.6	1080	2320	2020	180	ND (100)
	5-Jul-18	1	ND (0.5)	236	1010	ND (0.5)	1010	6640	13300	220	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	252	743	ND (0.5)	743	218	260	ND (100)	ND (100)
BH9	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	194	120
BH11	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
BH13	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW1	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW2	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW3	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW4	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	16-Jul-15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW5	3-Jul-19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	19-Oct-16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	18-Jul-17	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	5-Jul-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW6-18	30-Oct-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
MW7-18	30-Oct-18	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)
	3-Jul-19	2.2	ND (0.5)	2.7	ND (0.5)	ND (0.5)	ND (0.5)	ND (25)	ND (100)	ND (100)	ND (100)

**Notes:**

1 - MECP Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011, O.Reg. 153/04 as amended, Table 3 (Non-Potable) Standards for Coarse Textured Soil in a Industrial/Commercial/Community Property Use Setting, Effective July 1, 2011.

ND (0.5) Not detected at (reported method detection limit)

- Not analysed

NV - No value

Denotes respective Site Condition Standard is exceeded

Denotes MDL is higher than respective Site Condition Standard

**Table 4: Product Recovery at BH12**  
**Canadian Bank Note Company Limited**  
**975 Gladstone Avenue, Ottawa, ON**

Location	Dates	Depth to			Elevation*		Product Thickness (m)	Comments
		LNAPL (mbTPVC)	Water (mbTPVC)	Water (mbgs)	LNAPL (mbTPVC)	Water (masl)		
BH12	5-Jul-18	5.17	5.25	5.33	60.37	60.29	0.08	Removed ~10 L oily water
	29-Oct-18	5.07	5.15	5.23	60.47	60.39	0.08	~2 L product recovered
	24-May-19	ND	4.62	4.70	ND	60.92	ND	~0.2 L product recovered
	3-Jul-19	4.94	4.97	5.05	60.60	60.57	0.03	~0.05 L product recovered

Notes: \* Reference elevation of 64.66 for combined sewer manhole lid on Loretta Ave, opposite east plant entrance.

mbTPVC - metres below top of PVC

mbgs - metres below ground surface

masl - metres above sea level

LNAPL - Light Non-Aqueous Phase Liquid (free product)

ND - not detected with oil/water interface meter

## APPENDIX A

### Laboratory Certificates of Analysis

## Certificate of Analysis

**BluMetric Environmental Inc. (Carp)**

P.O. Box 430, 3108 Carp Rd.  
Carp, ON K0A 1L0  
Attn: Rob Hillier

Client PO: 190400  
Project: CBN  
Custody: 48261/262

Report Date: 9-Jul-2019  
Order Date: 3-Jul-2019

**Order #: 1927344**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1927344-01	MW1
1927344-02	MW2
1927344-03	MW3
1927344-04	MW4
1927344-05	MW5
1927344-06	BHD-06
1927344-07	MW7-18
1927344-08	BHD-01
1927344-09	BH7
1927344-10	BHD-03
1927344-11	Dup 1

Approved By:



Mark Foto, M.Sc.  
Lab Supervisor

Certificate of Analysis

Client: BluMetric Environmental Inc. (Carp)

Client PO: 190400

Report Date: 09-Jul-2019

Order Date: 3-Jul-2019

Project Description: CBN

**Analysis Summary Table**

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX by P&T GC-MS	EPA 624 - P&T GC-MS	8-Jul-19	9-Jul-19
PHC F1	CWS Tier 1 - P&T GC-FID	8-Jul-19	9-Jul-19
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	5-Jul-19	8-Jul-19

Certificate of Analysis

Report Date: 09-Jul-2019

Client: BluMetric Environmental Inc. (Carp)

Order Date: 3-Jul-2019

Client PO: 190400

Project Description: CBN

	<b>Client ID:</b>	MW1	MW2	MW3	MW4
	<b>Sample Date:</b>	03-Jul-19 00:00	03-Jul-19 00:00	03-Jul-19 00:00	03-Jul-19 00:00
	<b>Sample ID:</b>	1927344-01	1927344-02	1927344-03	1927344-04
	<b>MDL/Units</b>	Water	Water	Water	Water

**Volatiles**

Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene-d8	Surrogate	106%	107%	107%	106%

**Hydrocarbons**

F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

	<b>Client ID:</b>	MW5	BHD-06	MW7-18	BHD-01
	<b>Sample Date:</b>	03-Jul-19 00:00	03-Jul-19 00:00	03-Jul-19 00:00	03-Jul-19 00:00
	<b>Sample ID:</b>	1927344-05	1927344-06	1927344-07	1927344-08
	<b>MDL/Units</b>	Water	Water	Water	Water

**Volatiles**

Benzene	0.5 ug/L	<0.5	<0.5	2.2	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	2.7	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Toluene-d8	Surrogate	106%	104%	103%	102%

**Hydrocarbons**

F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100



Certificate of Analysis

Report Date: 09-Jul-2019

Client: BluMetric Environmental Inc. (Carp)

Order Date: 3-Jul-2019

Client PO: 190400

Project Description: CBN

<b>Client ID:</b>	BH7	BHD-03	Dup 1	-
<b>Sample Date:</b>	03-Jul-19 00:00	03-Jul-19 00:00	03-Jul-19 00:00	-
<b>Sample ID:</b>	1927344-09	1927344-10	1927344-11	-
<b>MDL/Units</b>	Water	Water	Water	-

**Volatiles**

Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	252	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
m,p-Xylenes	0.5 ug/L	743	<0.5	<0.5	-
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Xylenes, total	0.5 ug/L	743	<0.5	<0.5	-
Toluene-d8	Surrogate	98.9%	103%	104%	-

**Hydrocarbons**

F1 PHCs (C6-C10)	25 ug/L	218	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	260	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-

**Certificate of Analysis**
**Client: BluMetric Environmental Inc. (Carp)**
**Client PO: 190400**
**Report Date: 09-Jul-2019**
**Order Date: 3-Jul-2019**
**Project Description: CBN**
**Method Quality Control: Blank**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
<b>Volatiles</b>									
Benzene	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: Toluene-d8	83.7		ug/L		105	50-140			

Certificate of Analysis

Report Date: 09-Jul-2019

Client: BluMetric Environmental Inc. (Carp)

Order Date: 3-Jul-2019

Client PO: 190400

Project Description: CBN

### Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
<b>Volatiles</b>									
Benzene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: Toluene-d8	84.1		ug/L		105	50-140			

Certificate of Analysis

Report Date: 09-Jul-2019

Client: BluMetric Environmental Inc. (Carp)

Order Date: 3-Jul-2019

Client PO: 190400

Project Description: CBN

### Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Hydrocarbons</b>									
F1 PHCs (C6-C10)	1960	25	ug/L		97.8	68-117			
F2 PHCs (C10-C16)	1630	100	ug/L		102	60-140			
F3 PHCs (C16-C34)	4150	100	ug/L		106	60-140			
F4 PHCs (C34-C50)	2470	100	ug/L		99.6	60-140			
<b>Volatiles</b>									
Benzene	28.8	0.5	ug/L		72.0	60-130			
Ethylbenzene	44.2	0.5	ug/L		111	60-130			
Toluene	35.4	0.5	ug/L		88.4	60-130			
m,p-Xylenes	84.6	0.5	ug/L		106	60-130			
o-Xylene	44.6	0.5	ug/L		112	60-130			
Surrogate: Toluene-d8	76.0		ug/L		95.0	50-140			

Certificate of Analysis

Client: BluMetric Environmental Inc. (Carp)

Client PO: 190400

Report Date: 09-Jul-2019

Order Date: 3-Jul-2019

Project Description: CBN

**Qualifier Notes:*****Login Qualifiers :***

Samples received submerged in water, possibly melted ice. This condition can compromise sample integrity.

*Applies to samples: MW1, MW2, MW3, MW4, MW5, BHD-06, MW7-18, BHD-01, BH7, BHD-03, Dup 1***Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

***CCME PHC additional information:***

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.



Client Name: <u>Blumetric</u>	Project Reference: <u>CBN</u>	<b>Turnaround Time:</b> <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <u>Rob Hillier</u>	Quote #	
Address: <u>3108 Cap Rd</u> <u>PO Box 430 Cap On</u>	PO # <u>190400</u>	
Telephone: <u>613-839-3053 ext 233</u>	Email Address: <u>rhillier@blumetric.ca</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PQWO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: \_\_\_\_\_ ☐ Other: \_\_\_\_\_

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm-Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Sample ID/Location Name		Matrix	Air Volume	# of Containers	Sample Taken											
					Date	Time										
1	MW1	GW		3	July 3/19		✓	✓								
2	MW2			3			✓	✓								
3	MW3			3			✓	✓								
4	MW4			3			✓	✓								
5	MW5			3			✓	✓								
6	BHD-06			3			✓	✓								
7	MW7-1B			3			✓	✓								
8	BHD-01			3			✓	✓								
9	BH7			3			✓	✓								
10	BHD-03			3			✓	✓								

Comments: <u>Removed bags of ice and 1 cm of water from cooler, samples in open bubble bags. Sample integrity may be compromised.</u>		Method of Delivery: <u>Rob Walker</u>	
Relinquished By (Sign): <u>[Signature]</u>	Received by Drop Depot: <u>[Signature]</u>	Received at Lab: <u>Juneeporn Roh mai</u>	Verified By: <u>[Signature]</u>
Relinquished By (Print): <u>L. Miller</u>	Date/Time: <u>07/03/19 3:18pm</u>	Date/Time: <u>Jul 04, 2019 12:40</u>	Date/Time: <u>July 4/19</u>
Date/Time: <u>2019/07/03 14:00</u>	Temperature: <u>14.9°C</u>	Temperature: <u>2.3°C</u>	pH Verified   By: <u>N/A</u>

*Proceed regardless of water in cooler per Rob Walker*



Paracel ID: 1927344

TRL  
RES  
REL

urent Blvd.  
K1G 4J8  
47  
icellabs.com

Chain of Custody  
(Lab Use Only)

No 48262

Page 2 of 2

Client Name: <u>Blumetric</u>	Project Reference: <u>CBN</u>	<b>Turnaround Time:</b> <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input checked="" type="checkbox"/> Regular Date Required: _____
Contact Name: <u>Rob Hillier</u>	Quote #	
Address: <u>3108 Corp Rd</u> <u>PO Box 430 Corp, ON</u>	PO # <u>190400</u>	
Telephone:	Email Address: <u>rhillier@blumetric.ca</u>	

Criteria: ☒ O. Reg. 153/04 (As Amended) Table \_\_ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: \_\_\_\_\_ ☐ Other: \_\_\_\_\_

Matrix Type: S (Soil Sed.) GW (Ground Water) SW (Surface Water) SS (Storm Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analyses

Parcel Order Number: 1927344		Matrix	Air Volume	# of Containers	Sample Taken		PHC <sup>15</sup> FI-H <sup>4</sup>	BTX											
Sample ID/Location Name					Date	Time													
1	Dup1	GW		3	July 3/19	—	✓	✓											
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments: \_\_\_\_\_ Method of Delivery: \_\_\_\_\_

Relinquished By (Sign): <u>[Signature]</u>	Received by Driver (Sign): <u>[Signature]</u>	Received at Lab: <u>Suneparm Dokman</u>	Verified By: <u>[Signature]</u>
Relinquished By (Print): <u>C. Miller</u>	Date/Time: <u>July 3/19 3:18</u>	Date/Time: <u>July 04, 2019 12:40</u>	Date/Time: <u>July 4/19</u>
Date/Time: <u>201907103 14:00</u>	Temperature: <u>14.9 °C</u>	Temperature: <u>7.3 °C</u>	pH Verified   By: <u>N/A</u>

Chain of Custody (Blank) - Rev 0.4 Feb 2016

1:40P