



Re: Remedial Action Plan and Cost Estimate
Proposed Mixed-Use Development
1166 Bank Street – Ottawa, Ontario
To: Ambassador Realty Inc. – Mr. Arthur Loeb – arthurloeb@gmail.com
Date: July 12, 2022
File: PE5590-RAP.01

Further to your request, Paterson Group (Paterson) has prepared an environmental remedial action plan and associated cost estimate for the property addressed 1166 Bank Street in the City of Ottawa (the subject site).

The following remedial action plan and cost estimate was made based on the analytical test results contained in the report: *“Phase II – Environmental Site Assessment, 1166 Bank Street, Ottawa, Ontario”*, prepared by Paterson and dated June 23, 2022.

Environmental Site Conditions

Paterson completed a Phase I – Environmental Site Assessment (Phase I ESA) for the subject site in April 2022. Based on the findings of the Phase I ESA, several areas of potential environmental concern (APECs) were identified as a result of the following historical on-site or off-site potentially contaminating activities (PCAs):

- A former auto service garage, located in the northwestern portion of the Phase I Property.
- A former underground fuel storage tank nest, located in the southwestern portion of the Phase I Property.
- A former fuel pump island, located in the eastern portion of the Phase I Property.
- Fill material of unknown quality, located beneath the asphaltic concrete parking lot throughout the northern, eastern, and southern portions of the Phase I Property.
- The application of road salt during snow and/or ice conditions, located beneath the asphaltic concrete parking lot throughout the northern, eastern, and southern portions of the Phase I Property.
- A former auto service garage and retail fuel outlet, located approximately 20 m to the east of the Phase I Property (1159 Bank Street).

A Phase II ESA was subsequently carried out to assess the aforementioned APECs identified in the Phase I ESA. The findings of the Phase II ESA are summarized below.





A subsurface investigation, carried out by Golder Associates Ltd., was conducted for the subject site on March 29 and March 30, 2021. At that time, four boreholes (MW21-01 to MW21-04) were advanced throughout the property and terminated within the overburden at depths ranging from approximately 6.6 m to 7.6 m below ground surface. Upon completion, all boreholes were equipped with monitoring wells to allow for the collection of groundwater samples.

A more recent subsurface investigation was conducted by Paterson on May 3, 2022, and consisted of drilling three boreholes (BH1-22 to BH3-22) throughout the subject site, all three of which were equipped with monitoring wells to allow for the collection of groundwater samples. The boreholes were advanced to depths ranging from approximately 6.10 m to 7.62 m below the existing ground surface and terminated within an overburden layer of dense brown silty sand.

In general, the subsurface soil profile encountered at the borehole locations consists of a surficial pavement structure (asphaltic concrete and granular subgrade fill), underlain by fill material (brown silty sand with some clay, gravel, and cobbles) over top of multiple layers of compact to dense native brown sand with varying silt and clay contents, turning grey at deeper depths in line with the long term water table. Bedrock was not encountered in any of the boreholes during the field drilling program, however, a dynamic cone penetration test was carried out at BH2-22, which was terminated on practical refusal on inferred bedrock at a depth of approximately 9.25 m below ground surface.

Between the 2021 and 2022 subsurface investigations, a total of ten soil samples were submitted for laboratory analysis of VOCs, PHCs (F₁-F₄), metals, PAHs, lead, EC, SAR, and pH parameters. Based on the analytical test results, the concentration of PHCs (F₁) in Sample MW21-04-07 (3.66 m to 4.27 m below ground surface) was in excess of the MECP Table 3 Residential Coarse-Grained Soil Standards for Non-Potable Groundwater Conditions. It should be noted that this borehole is located in the vicinity of the former underground fuel storage tank nest in the southern portion of the subject site.

Some elevated levels of EC and SAR were identified within the shallow fill material in BH1-22 as well as the deeper native soils in BH3-22. It should be noted that these EC and SAR exceedances are considered to be the result of a substance which has been applied to the site surface for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both, which according to Section 49.1 of O. Reg. 153/04, the standards for these parameters are considered to have been met. As a result, these exceedances are not considered to represent a contaminant issue to the subject site.

Groundwater samples were recovered from MW21-01 to MW21-04 as part of the 2021 subsurface investigation on April 8, 2021 and submitted for laboratory analysis of VOCs and PHCs (F₁-F₄). In general, the groundwater was encountered at depths ranging from approximately 4.93 m to 5.65 m below ground surface.



Based on the analytical test results, the concentration of chloroform in Sample MW21-02, as well as the concentrations of chloroform, 1-2-Dichloroethane, and benzene in Sample MW21-04 were in excess of the MECP Table 3 Non-Potable Groundwater Standards in Coarse-Grained Soil.

The elevated concentrations of chloroform were suspected to be the result of the use of municipal water during the drilling process, and thus was not considered to present a contaminant issue to the property. The benzene exceedance was suspected to be the result of the historical presence of the former on-site retail fuel outlet. It should be noted that this benzene exceedance was identified in the monitoring well placed within the location of the former underground fuel storage tank nest in the southern portion of the site. The presence of 1-2-Dichloroethane, which is not typical of fuel related impacts, was suspected to be related to the historical use of solvents in an auto service garage which was formerly present on the property.

As part of the 2022 assessment, groundwater samples were recovered from BH1-22 to BH3-22, as well as MW21-02 and MW21-04, and submitted for laboratory analysis of VOCs and PHC (F₁-F₄) parameters. Based on the analytical test results, all detected VOC parameter concentrations in the groundwater samples analyzed are in compliance with the selected MECP Table 3 Non-Potable Groundwater Standards in Coarse-Grained Soil. It should be noted that no chloroform was detected in the samples analyzed as part of the 2022 groundwater sampling program, confirming our theory that the initial concentrations identified in the 2021 sampling program were likely the result of the use of municipal water. The benzene concentration detected in MW21-04 as part of the 2022 groundwater sampling program was also significantly lower than initially identified in the 2021 sampling program. It is possible that the initially identified elevated levels of benzene could be the result of suspended sediment collected in the water samples due to improperly established wells.

Remedial Action Plan Summary

The suggested remedial action plan consists of a generic approach, where the excavation and subsequent disposal of contaminated soil at an approved waste disposal facility would be undertaken during the redevelopment of the subject site.

Due to a change in land use (commercial to residential), the proposed mixed-use development will require a Record of Site Condition (RSC) to be filed with the Ontario Ministry of the Environment, Conservation and Parks (MECP). To meet the conditions of an RSC, the suggested remedial action plan is as follows:



- ❑ It is our understanding that the proposed development will require the excavation of one level of underground parking. Based on the approximate depth of the contaminated soil, it is likely that the shoring system for construction will have to be extended along the southern and western property lines. It is assumed that the excavation for the proposed building will extend to a depth of approximately 4.0 m below ground surface, while the contaminated soil may extend to a depth of approximately 5.5 m below ground surface.
- ❑ Paterson personnel will therefore be present on-site at the time of site excavation to aid in the segregation of clean soil from impacted soil and to monitor the removal of any identified contaminated soils.
- ❑ During the excavation of contaminated soils, a screening procedure will be implemented using visual and olfactory observations as well as a portable soil vapour analyser. Field observations will be used in combination with the collection and analysis of verification samples to determine the remedial excavation limits.
- ❑ In accordance with Ontario Regulation (O. Reg.) 347/558, a toxicity characteristic leaching procedure (TCLP) sample will be obtained and submitted for laboratory analysis prior to the transportation of any contaminated soil to a licensed waste disposal site.
- ❑ Any impacted soil identified in excess of the selected MECP Table 3 Residential Coarse-Grained Soil Standards for Non-Potable Groundwater Conditions will be placed into trucks and hauled to an approved waste disposal facility.
- ❑ Excess non-contaminated soil to be removed from the property will be placed into trucks and hauled off-site for possible re-use as clean material or for disposal. Excess soil is required to be handled in accordance with O.Reg. 406/19 – On-Site and Excess Soil Management. Additional soil testing is expected to be required to determine the suitability of any excess soil generated as part of the proposed redevelopment activity.
- ❑ Existing groundwater monitoring wells are required to be decommissioned by a licenced well driller in accordance with O. Reg. 903. It is recommended that the monitoring wells be retested, prior to their decommissioning, to confirm the groundwater quality.

Following the successful removal of contaminated soil from the subject site, a remediation report will be prepared and an RSC will be submitted to the MECP for acknowledgement.



Assumptions, Quantities, and Costs

Based on the available information, the total estimated quantity of contaminated soil, in excess of the MECP Table 3 Standards requiring removal and disposal, consists of the following:

- Disposal of contaminated soil at an approved landfill site.....250 m³

Although the groundwater tested clean during the most recent Phase II ESA, it is recommended that an allowance be carried to deal with a nominal volume of impacted groundwater.

- Allowance to dispose of contaminated groundwater.....\$20,000

The Phase II ESAs have been somewhat limited to date, as no boreholes have been placed in the area of the former auto service garage, where the current convenience store is located. This area will have to be investigated prior to the filing of an RSC for the property. It is possible that there is contaminated soil beneath the convenience store that also requires remediation.

It should be noted that this estimate does not account for soils that comply with the site standards, but that may not comply with all off-site soil standards. As a result, there could be additional charges associated with the disposal of marginally impacted soils that have to be removed for construction purposes.

This estimate does not account for extending the shoring deeper, which may be required in order to reach and excavate the contaminated soil.

The estimated incremental cost to remediate the site in conjunction with development will be approximately **\$116,750 using 2022 dollars** and is detailed in the enclosed table.

We trust that this information satisfies your requirements,





Mr. Arthur Loeb
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Best Regards,

Paterson Group Inc.

Nick Sullivan, B.Sc.

Mark D'Arcy, P.Eng.

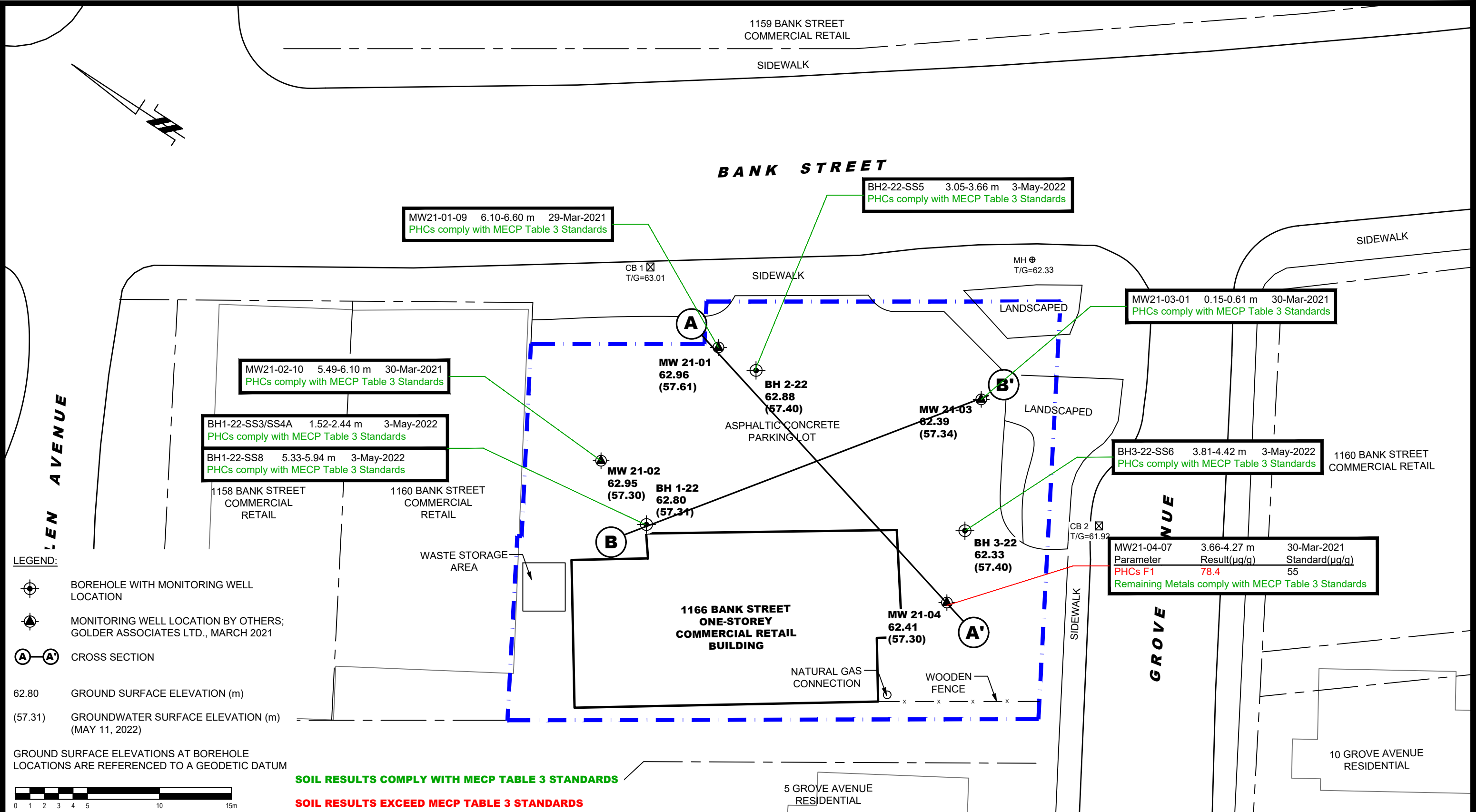
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Table 1
Generic Approach for Entire Site
1166 Bank Street – Ottawa, Ontario

Item and Estimated Quantity	Unit Rate	Estimated Cost
Site Preparation	Lump Sum	\$7,500
Removal of Contaminated Soil		
Excavation of contaminated soil (approx. 250 m ³)	\$10/m ³	\$2,500
Transfer of contaminated soil (approx. 500 tonnes)	\$10/tonne	\$5,000
Tipping fees at an approved waste disposal facility (approx. 500 tonnes)	\$65/tonne	\$32,500
Allowance for disposal of contaminated groundwater	Lump Sum	\$20,000
Reinstatement of founding level in area of contaminated soil (import and pack up to approx. 250 m ³ of GA or GB material)	\$85/m ³	\$21,250
Sub Total – Engineered Controls (excluding applicable taxes)		\$88,750
Engineering and Analytical Costs		
Remediation supervision, sample screening, analytical testing, report preparation, meeting and consultation		\$28,000
Sub Total – Engineering and Analytical Costs (excluding applicable taxes)		\$28,000
TOTAL (excluding applicable taxes)		\$116,750



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NO.	REVISIONS	DATE	INITIAL

AMBASSADOR REALTY INC.
PHASE II - ENVIRONMENTAL SITE ASSESSMENT
1166 BANK STREET
OTTAWA, ONTARIO

Title: **ANALYTICAL TESTING PLAN - SOIL (PHCs)**

Scale:	1:250	Date:	05/2022
Drawn by:	JM	Report No.:	PE5590-2
Checked by:	NS	Dwg. No.:	PE5590-5
Approved by:	MSD	Revision No.:	