

TECHNICAL MEMORANDUM

DATE June 29, 2022

Project No. 21451149

TO Pamela Whyte
Parsons

FROM Keith Holmes - Golder-WSP

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FUTURE OTTAWA HOSPITAL SITE – SEWER DISCHARGE RESULTS COMPARISON

At the request of the client, Golder has completed a review of available groundwater quality information from the site of the future Ottawa Hospital against the City of Ottawa Sewer Use Bylaw 2003-514 for both storm sewer and sanitary sewer discharge. The objective of the review was to identify any exceedances that may indicated a concern with respect to groundwater management during construction.

The review included 62 distinct groundwater samples collected from the site between 2016 and 2021. The samples collected were for the purpose of ongoing Phase II Environmental Site Assessments or other specific purposes, none of which were for sewer discharge compliance. As such not all samples included the same analytical packages and none of the samples included total metals analysis which is a requirement for sewer discharge but not for Phase II ESAs which includes dissolved (filtered) metals. As such, metals results may not be representative of final excavation dewatering.

The groundwater results compared to both City of Ottawa sewer discharge criteria is included in the attached table and is summarized below.

When compared to the sanitary/combined sewer discharge criteria the following is noted:

- There were no exceedances of any of the analysed parameters compared to the applicable sanitary/combined sewer discharge criteria.

When compared to the compared to the storm sewer discharge criteria the following is noted:

- The concentration of manganese in several samples including the average of all results was in excess of the storm sewer discharge criteria. The average concentration of manganese was 189 ug/L, compared to the discharge criteria of 50 ug/L. Manganese is known to be naturally elevated regionally.
- With one exception, total suspended solids (TSS) were in excess of the storm sewer criteria with an average concentration of 84 ug/L vs the criteria of 15 ug/L. The TSS is a reflection of the amount of solids in the sample and can be reduced by filtration or settlement. Slightly elevated TSS is most likely due to the method of sample collection from a monitoring well.

- Copper in monitoring well 16-01 within the former John Carling Building exceeded the storm sewer criteria (177ug/L vs the criteria of 40 ug/L). It is understood that this location has been excavated as part of the ongoing remediation work in that area.
- Toluene in monitoring well 17-10 at the southern limit of the site exceeded the storm sewer criteria (4.1 ug/L vs the criteria of 2 ug/L). Although present at other locations, none exceeded the storm sewer concentration, and the average toluene concentration was less than half of the discharge criteria.

In conclusion there does not appear to be a widespread groundwater quality issues at main hospital site that would prevent sewer discharge, subject to the following.

- A dewatering monitoring program should be implemented to monitor groundwater quality during construction.
- An exemption for the naturally elevated manganese would be required from the City to discharge to storm sewer.
- Total metals analysis would be required to supplement the dissolved metals concentrations completed to date.

We trust the above is sufficient for your current requirements. The conclusions presented herein are based on the data available and included in the attached table. There may be additional data that has been collected by others that is not included in this review. If you have any questions on the above, please contact the undersigned.

Golder Associates Ltd.



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[https://golderassociates.sharepoint.com/sites/140130/project files/6 deliverables/01 - environmental/21451149-tech memo sewer discharge.docx](https://golderassociates.sharepoint.com/sites/140130/project%20files/6%20deliverables/01%20-%20environmental/21451149-tech%20memo%20sewer%20discharge.docx)

Attachments Groundwater Quality Results – Sewer Use Discharge Comparison, Ottawa Hospital Site

CHEMICAL_NAME	SAMPLE_NAME		Units	MW17-10	MW17-10 LAB-DUP
	Ottawa Sewer Use - Sanitary ¹	Ottawa Sewer Use - Storm ¹		31 Jul 2017	31 Jul 2017
Ottawa-General Chem					
Fluoride	10	-	mg/L	0.15	0.14
Sulfide	2	-	mg/L	0.0065	
Sulphate	1500	-	mg/L	32	
Total Suspended Solids	350	15	mg/L		
Ottawa-Metals					
Aluminum	50000	-	ug/L	6.81	
Antimony	5000	-	ug/L	0.191	
Arsenic	1000	20	ug/L	0.334	
Bismuth	5000	-	ug/L	< 0.005	
Boron	25000	-	ug/L	35	
Cadmium	20	8	ug/L	< 0.005	
Chromium	5000	80	ug/L	0.22	
Cobalt	5000	-	ug/L	2.09	
Copper	3000	40	ug/L	1.82	
Lead	5000	120	ug/L	0.007	
Manganese	5000	50	ug/L	<u>569</u>	
Mercury	1	0.4	ug/L	< 0.01	
Molybdenum	5000	-	ug/L	25	
Nickel	3000	80	ug/L	3.23	
Selenium	5000	20	ug/L	0.151	
Silver	5000	120	ug/L	< 0.005	
Tin	5000	-	ug/L	0.84	
Titanium	5000	-	ug/L	< 0.5	
Vanadium	5000	-	ug/L	0.23	
Zinc	3000	40	ug/L	0.86	
Ottawa-PCBs					
Aroclors (PCBs), Total	-	0.4	ug/L		
Ottawa-PHC					
Benzene	10	2	ug/L	0.39	
Ethylbenzene	57	2	ug/L	0.15	
Petroleum Hydrocarbons - F1 (C6-C10)			ug/L	< 25	
Petroleum Hydrocarbons - F2 (C10-C16)	500	500	ug/L	< 100	
Petroleum Hydrocarbons - F3 (C16-C34)			ug/L	< 200	
Petroleum Hydrocarbons - F4 (C34-C50)			ug/L	< 200	
Toluene	80	2	ug/L	<u>4.1</u>	
Xylenes, Total	320	4.4	ug/L	0.87	
Ottawa-Phenols					
2,4-Dichlorophenol	44.0	-	ug/L	0.1	
Ottawa-Semi-VOCs					
1-Methylnaphthalene	32	-	ug/L	0.014	
2-Methylnaphthalene	22	-	ug/L	0.019	
Fluorene	59	0.04	ug/L	< 0.01	
Hexachlorobenzene	0.1	-	ug/L	< 0.005	
Naphthalene	59	6.4	ug/L	0.062	
Styrene	40	-	ug/L	< 0.2	
Tetryl	-	-	ug/L		
Ottawa-VOCs					
1,1,1-Trichloroethane	54	-	ug/L	< 0.1	
1,1,2,2-Tetrachloroethane	40	17	ug/L	< 0.2	
1,1,2-Trichloroethane	800	-	ug/L	< 0.2	
1,1-Dichloroethane	200	-	ug/L	< 0.1	
1,1-Dichloroethylene	40	-	ug/L	< 0.1	
1,2-Dibromoethane	28	-	ug/L	< 0.2	
1,2-Dichlorobenzene	88	5.6	ug/L	< 0.2	
1,2-Dichloroethane	210	-	ug/L	< 0.2	
1,2-Dichloropropane	850	-	ug/L	< 0.1	
1,3-Dichlorobenzene	36	-	ug/L	< 0.2	
1,4-Dichlorobenzene	17	6.8	ug/L	< 0.2	
Bromodichloromethane	350	-	ug/L	< 0.1	
Bromoform	630	-	ug/L	< 0.2	
Bromomethane	110	-	ug/L	< 0.5	
Carbon Tetrachloride	57	-	ug/L	< 0.1	
Chlorobenzene	57	-	ug/L	< 0.1	
Chloroform	80	-	ug/L	< 0.1	
cis-1,2-Dichloroethene	200	5.2	ug/L	< 0.1	
cis-1,3-Dichloropropene	70	-	ug/L	< 0.2	
Dibromochloromethane	57	-	ug/L	< 0.2	
Methylene Chloride	210	-	ug/L	< 0.5	
Styrene	40	-	ug/L	< 0.2	
Tetrachloroethylene	50	4.4	ug/L	< 0.01	
trans-1,3-Dichloropropene	70	5.6	ug/L	< 0.2	
Trichloroethene	54	7.6	ug/L	< 0.1	

Notes:
¹ City of Ottawa Sewer Use ByLaw 2003-514 Discharge Criteria
Bold underlined indicates an exceedance of the storm sewer discharge criteria
 "-" no discharge criteria exist