2022-09-14

Mr. Andy De Jong, Landfill Technologist
Regional Municipality of Halton
Public Works - Waste Management and Road Operations
1151 Bronte Road
Oakville, Ontario
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Subject: Supplemental Sampling Program - 2022
Oakville Ninth Line Landfill Site

Dear Mr. De Jong:

We are pleased to provide you with the results of the supplemental sampling program completed at the closed Oakville Ninth Line Landfill Site. The sampling program is based on recommendations in the Surface Water Monitoring Report submitted by WSP in December 2021 and included surface water sampling and analysis at the ten (10) surface water stations.

SURFACE WATER SAMPLING PROGRAM

Surface water samples were obtained on June 22, 2022 at surface water stations SW1 to SW4, SW6, SW7, SW9 to SW11, and SW13 and were submitted to BV Labs for analysis of general chemistry and metals. As recommended by the MECP, and agreed to by WSP and the Region, surface water stations SW5, SW8 and SW12 were removed from the monitoring program.

The results of the surface water sampling program are summarized in Table 1, and include a comparison to the Provincial Water Quality Objectives (PWQO). In general, the parameter concentrations satisfy the PWQO guidelines with the exception of the following.

- Un-ionized Ammonia: SW1
- Aluminum: all stations
- Boron: SW1, SW2, SW6, SW7, and SW9
- Cobalt: SW10 and SW13
- Copper: SW10
- Iron: all stations, except SW1 and SW9
- Phosphorus: all stations

The exceedances noted above are generally consistent with historic results.

TRIGGER EVALUATION

Additionally, the December 2021 Surface Water Monitoring Report recommended the following trigger evaluation. The trigger evaluation for surface water quality includes a comparison of the

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water quality results at downstream station SW4 to the higher value of: i) PWQO concentration and ii) the upgradient surface water concentration at stations SW1 and SW10. A trigger condition will have occurred if trigger exceedances of three (3) or more parameters are observed at SW4, for two (2) consecutive sampling events. A summary of the trigger analysis is provided on the table below. It is noted that only PWQO exceedances observed at station SW4 are included in the table.

LOCATION	STATION	ALUMINUM	IRON	TOTAL PHOSPHORUS
PWQO		0.075	0.30	0.030
Upstream	**SW1**	0.084		0.037
North Tributary	**SW10**	2.00	2.7	0.092
TRIGGER VALUE		2.00	2.7	0.092
Downstream (Trigger station)	**SW4**	0.430	0.61	0.062

NOTES:
1) All values are in mg/L
2) PWQO - Provincial Water Quality Objectives
3) Blank indicates parameter concentration was within the PWQO.
4) TRIGGER VALUE - higher value of PWQO or upgradient concentration at SW1 or SW10.
5) Trigger exceedances are bolded and shaded grey.

As shown in the table above, there were no exceedances of trigger values observed at the downstream trigger station, SW4.

It is recommended that biennial sampling at the surface water stations be continued to assess potential future influences from the landfill site.

We trust that this letter is satisfactory for your needs. If you have any questions or comments, please contact our office.

Yours sincerely,

Craig Leger, M.Sc., C.E.T.
Environmental Consultant

Leigh Davis, P.Eng.
Project Engineer, Earth & Environmental

Encl. Table 1
WSP ref.: 181-30000-07-106

TABLE 1
SURFACE WATER GENERAL CHEMISTRY RESULTS
CLOSED OAKVILLE NINTH LINE LANDFILL SITE

			UPSTREAM	NORTH TRIBUTARY	ADJACENT TO REFUSE AREA					SOUTH DITCH		DOWNSTREAM
PARAMETER	UNITS	PWQO Objectives	SW1 Jun-22	SW10 Jun-22	SW2 Jun-22	SW7 Jun-22	SW9 Jun-22	SW11 Jun-22	SW6 Jun-22	SW3 Jun-22	SW13 Jun-22	SW4 Jun-22
pH	**units**	**6.5-8.5**	7.83	8.06	7.96	7.98	8.03	8.08	8.10	8.01	8.06	8.12
Conductivity	**µS/cm**		1900	1200	1900	1900	1300	1300	1300	1400	1300	1300
Turbidity	**NTU**		5.7	34	7.6	5.7	6.9	9.7	6.9	6.2	19	9.9
Chloride	**mg/L**		350	140	350	390	210	220	220	150	200	200
Phosphate-ortho	**mg/L**		<0.010	0.047	0.010	<0.010	0.013	0.015	0.018	<0.010	0.016	0.019
Sulphate	**mg/L**		120	150	120	130	69	68	69	60	67	67
Alkalinity	**mg/L**		240	230	300	260	230	230	230	430	250	240
Bicarbonate	**mg/L**		240	230	300	260	230	230	230	420	250	230
Carbonate	**mg/L**		1.5	2.5	2.6	2.4	2.3	2.6	2.7	4.1	2.7	2.9
Hardness	**mg/L**		400	380	420	400	370	360	370	470	370	370
Nitrate	**mg/L**		<0.10	0.83	0.42	0.20	0.70	0.71	0.71	0.38	0.57	0.62
Nitrite	**mg/L**		0.027	0.011	0.394	0.035	0.020	0.026	0.027	0.047	0.019	0.024
Ammonia: total	**mg/L**		0.81	<0.050	0.44	0.17	0.11	<0.050	<0.050	0.10	<0.050	<0.050
Ammonia: un-ionized	**µg/L**	**20**	**21**	<2	15	4	5	<2	<3	2	<2	<2
Total Organic Carbon	**mg/L**		7.7	5	9.8	8	3.6	4	3.8	6.6	4.4	4.1
Aluminum	**mg/L**	**0.075**	**0.08**	**2.0**	**0.25**	**0.67**	**0.18**	**0.63**	**0.26**	**0.22**	**1.2**	**0.43**
Antimony	**mg/L**	**0.02**	<0.0005	<0.0005	0.00095	0.00075	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic	**mg/L**	**0.1**	0.0010	0.0014	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001
Barium	**mg/L**		0.064	0.090	0.070	0.068	0.076	0.076	0.075	0.120	0.083	0.073
Beryllium	**mg/L**	**1.1**	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Boron	**mg/L**	**0.200**	**0.22**	0.13	**0.32**	**0.22**	**0.21**	0.20	**0.21**	0.20	0.19	0.20
Cadmium	**mg/L**	**0.0005**	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Calcium	**mg/L**		110	100	110	110	95	93	96	120	96	94
Chromium	**mg/L**	**0.0089**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	**mg/L**	**0.0009**	<0.005	**0.0012**	0.00058	0.00077	<0.0005	0.00054	<0.0005	<0.0005	**0.0011**	<0.0005
Copper	**mg/L**	**0.005**	0.0018	**0.0053**	0.0027	0.0030	0.0020	0.0029	0.0022	0.0019	0.0047	0.0025
Iron	**mg/L**	**0.300**	0.24	**2.7**	**0.46**	**1.1**	0.25	**0.99**	**0.37**	**0.83**	**2.0**	**0.61**
Lead	**mg/L**	**0.025**	<0.0005	0.0013	0.0015	0.0028	<0.0005	0.0012	<0.0005	0.0025	0.0027	0.00083
Magnesium	**mg/L**		34	32	35	33	32	32	32	45	33	32
Manganese	**mg/L**		0.39	0.23	0.36	0.72	0.16	0.22	0.10	0.33	0.35	0.18
Molybdenum	**mg/L**		0.0029	0.0026	0.0030	0.0035	0.0026	0.0026	0.0027	0.0025	0.0027	0.0027
Nickel	**mg/L**	**0.040**	0.0013	0.0036	0.0020	0.0025	<0.001	0.0016	0.0012	0.0019	0.0029	0.0015
Phosphorus	**mg/L**	**0.030**	**0.037**	**0.092**	**0.052**	**0.087**	**0.048**	**0.082**	**0.047**	**0.035**	**0.070**	**0.062**
Potassium	**mg/L**		7	6	9	7	6	6	6	9	6	6
Selenium	**mg/L**		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Silicon	**mg/L**		0.58	6.1	1.1	1.5	2.3	2.7	2.3	4.1	3.9	2.6
Silver	**mg/L**	**0.0001**	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Sodium	**mg/L**		230	94	230	240	110	110	110	120	120	120
Strontium	**mg/L**		1.2	1.6	1.2	1.2	2.2	2.0	2.0	2.9	2.0	2.1
Thallium	**mg/L**	**0.0003**	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Titanium	**mg/L**		<0.005	0.056	0.0062	0.014	0.0053	0.016	0.0091	0.0058	0.025	0.012
Vanadium	**mg/L**	**0.006**	0.00057	0.0041	0.00086	0.0018	0.00094	0.0017	0.00096	0.00052	0.0026	0.0013
Zinc	**mg/L**	**0.030**	<0.005	0.017	0.006	0.0082	0.0066	0.011	0.0059	0.012	0.015	0.0071
Total Dissolved Solids	**mg/L**		1000	670	1000	1100	660	680	680	760	680	670

NOTES: 1) PWQO - Provincial Water Quality Objectives
2) Bold and shaded indicates exceedance of PWQO