



November 23, 2015

File: PR-105809

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Ministry of Environment

RE: Water Quality at Cobble Hill Holdings Collected November 17, 2015

Water quality samples were collected at Cobble Hill Holdings quarry and landfill site (PR-105809) following heavy rainfall events that occurred November 12 - 14, 2015. Ministry staff were on site to sample and observe conditions on November 17, 2015. Sample locations were at the settling pond discharge, surface runoff from a diversion ditch at the southwest property perimeter and at Shawnigan Creek upstream the PR-105809 landfill. The purpose of sampling was to determine whether the settling pond discharge meets permit limits and the perimeter ditch diversion runoff meet ambient water quality guidelines as well how it compares to background water quality conditions.

Samples of surface water runoff were collected on November 17, 2015 at two locations at PR-105809 with an additional sample collected in Shawnigan Creek several hundred meters upstream. A brief summary of sampling locations:

- E292898 – Settling pond discharge
- S1 – Perimeter – collected from runoff leaving the site at the southwest boundary perimeter
- E294426 – South Shawnigan Creek upstream Cobble Hill Holdings property

Parameters analyzed were turbidity, total suspended solids (TSS), pH, metals, chloride, sulphate and polycyclic aromatic hydrocarbons. All samples were collected following standard MOE sampling protocols. The samples were put on ice in a cooler and shipped overnight to ALS Global in Burnaby, BC. Results are summarized in the table below.

Water sample results were compared to applicable BC and Health Canada Drinking Water Guidelines¹ and BC Water Quality Guidelines (WQGs) for the protection of aquatic life². The settling pond discharge permit limits must meet BC Approved WQG and a Compendium of Working WQGs for Freshwater Aquatic Life and TSS must not exceed 25mg/L. Most water quality results were below applicable guideline levels except where noted below.

Results for the settling pond discharge TSS (25.7 mg/L) slightly exceeded the permit limit of 25 mg/L TSS. Results for S1-Perimeter TSS exceeded the BC water quality chronic guideline for the protection of aquatic life. BC TSS guidelines for the protection of aquatic life are change of <5mg/L (chronic exposure) and change of < 25 mg/L (acute exposure) from background levels. The Shawnigan Creek upstream sample TSS was <3.0 mg/L.

¹ http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php#t2

² <http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines>

Turbidity levels for both the settling pond discharge and S1-Perimeter sample results were 61.4 and 30.3 NTU (nephelometric turbidity units) respectively. These results exceeded the BC drinking water quality guideline of change <1 NTU from background levels and the BC aquatic life guideline of change <5 NTU. Background levels in Shawnigan Creek upstream were 1.09 NTU. Both the TSS and turbidity levels measured were elevated but given the relative flow volumes observed, it is unlikely TSS and turbidity impacts to aquatic life in Shawnigan Creek would occur from these individual flows alone. Downstream samples, collected on November 14th (SC location, November 17, 2015 memo) showed similar turbidity and TSS levels as the November 17th South Shawnigan Creek upstream sample results.

A review of the metals results showed generally no exceedances except for the aluminum Health Canada Drinking Water guideline at all three sampling locations including South Shawnigan Creek upstream. The aluminum guideline is intended as drinking water treatment operational guidance for facilities that use aluminum-based coagulants and is not a health risk at the levels measured.

The settling pond discharge exceeded the Health Canada iron and manganese guidelines which are both aesthetic guidelines referring to taste and laundry staining. The Settling Pond Discharge iron and manganese concentrations found were 3.14mg/L and 0.0887mg/L respectively. The S1-Perimeter sample (2.20 mg/L) exceeded the Health Canada iron guideline.

All surface water polycyclic aromatic hydrocarbons analyses were below the lowest analytical detection limits.

Overall the settling pond discharge water quality exceeded permit limits for TSS, turbidity, aluminum, iron and manganese. The S1-Perimeter water quality results exceeded ambient water quality guidelines TSS, turbidity, aluminum and iron. These exceedances are not expected to pose a significant risk to aquatic life nor human health downstream.

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Attachment: Table of Results

Cobble Hill Holdings November 17, 2015 Water Quality Results									
Parameter	Lowest Detection Limit	Units	E292898 Settling Pond Discharge ³	S1-Perimeter	E294426 South Shawnigan Upstream CHH	Drinking Water Quality Guidelines (approved and working)		Water Quality Guidelines (approved and working) for the Protection of Aquatic Life	
						BC DW	Health Can DW	Chronic	Acute
Physical Tests (Water)									
Conductivity	2.0	uS/cm	348	17.4	28.0				
Hardness (as CaCO ₃)	0.50	mg/L	152	7.86	9.99				
pH	0.10	pH	7.58	6.00	6.83				
Total Suspended Solids	3.0	mg/L	25.7	19.4	<3.0			Change of 5	Change of 25
Turbidity	0.10	NTU	61.4	30.3	1.09	Change of 1			Change of 5
Chloride (Cl) total	0.50	mg/L	9.21	1.05	2.07	250 (dissolved)	250(dissolved)	150(dissolved)	600(dissolved)
Sulfate (SO ₄)	0.30	mg/L	71.0	1.55	1.36	500	500	218	
Total Metals (Water)									
Aluminum (Al)-Total	0.0030	mg/L	3.28	2.62	0.193		0.100 ¹		
Antimony (Sb)-Total	0.00010	mg/L	0.00019	<0.00010	<0.00010	0.014	0.006		0.02
Arsenic (As)-Total	0.00010	mg/L	0.00049	0.00041	0.00012		0.01		0.005
Barium (Ba)-Total	0.000050	mg/L	0.0261	0.0162	0.00283		1	1	5
Beryllium (Be)-Total	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.004		0.0053	
Bismuth (Bi)-Total	0.000050	mg/L	<0.000050	<0.000050	<0.000050				
Boron (B)-Total	0.010	mg/L	0.015	<0.010	<0.010	5	5		1.2
Cadmium (Cd)-Total	0.0000050	mg/L	0.0000166	0.0000073	<0.0000050	0.005	0.005		Under review
Calcium (Ca)-Total	0.050	mg/L	49.1	1.83	3.06				
Chromium (Cr)-Total	0.00010	mg/L	0.00558	0.00365	0.00027	0.05	0.05		0.001
Cobalt (Co)-Total	0.00010	mg/L	0.00240	0.00103	0.00013			0.004	0.11
Copper (Cu)-Total	0.00050	mg/L	0.00866	0.00537	0.00094	0.5	1	0.001-0.0028	0.0064-0.0085
Iron (Fe)-Total	0.0050	mg/L	3.14	2.20	0.114		0.3 ²		1
Lead (Pb)-Total	0.000050	mg/L	0.00171	0.000464	0.000054	0.05	0.01	0.0045-0.0053	0.0317-0.0519
Magnesium (Mg)-Total	0.0050	mg/L	7.26	0.801	0.571				
Manganese (Mn)-Total	0.00010	mg/L	0.0887	0.0369	0.00867		0.050 ²	0.8	1.1
Molybdenum (Mo)-Total	0.000050	mg/L	0.00164	0.000102	<0.000050	0.25		1	2
Nickel (Ni)-Total	0.00050	mg/L	0.00484	0.00345	<0.00050				0.025
Phosphorus (P)-Total	0.010	mg/L	0.084	0.055	<0.010				
Potassium (K)-Total	0.050	mg/L	1.45	0.301	0.136				373
Selenium (Se)-Total	0.000050	mg/L	0.000503	0.000053	<0.000050	0.01	0.01	0.002	
Silicon (Si)-Total	0.050	mg/L	8.38	4.81	2.42				
Silver (Ag)-Total	0.000010	mg/L	0.000017	<0.000010	<0.000010			0.00005	0.0001
Sodium (Na)-Total	0.050	mg/L	9.16	1.10	1.74		200		
Strontium (Sr)-Total	0.00020	mg/L	0.141	0.0107	0.0152				
Sulfur (S)-Total	0.50	mg/L	23.2	<0.50	<0.50				
Thallium (Tl)-Total	0.000010	mg/L	0.000020	0.000010	<0.000010	0.002			0.0003
Tin (Sn)-Total	0.00010	mg/L	<0.00010	<0.00010	<0.00010				
Titanium (Ti)-Total	0.00030	mg/L	0.189	0.156	0.00339				2
Uranium (U)-Total	0.000010	mg/L	0.00150	0.000037	0.000010		0.02		0.3
Vanadium (V)-Total	0.00050	mg/L	0.00913	0.00710	0.00059				0.006
Zinc (Zn)-Total	0.0030	mg/L	0.0077	0.0039	<0.0030	5	5	0.0075	0.033
PAHs (Water)									
All congeners below lowest analytical detection limit: <0.000050									
1. AI guideline for operational consideration for dw treatment using coagulants						Exceeded ambient guideline			
2. Aesthetic guideline for taste and laundry staining									
3. Settling Pond Discharge permit limits are BCA WQG and BCWWQG for Freshwater Aquatic Life uses and Total Suspended Solids (TSS) must not exceed 25 mg/L for up to 1 in 10 year return period flood event of 24 hour duration limit of 25 mg/L									