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November 24, 2015
PGL File: 346-22.01

Via E-mail: **Paul.Savinkoff@gov.bc.ca**

Ministry of Transportation and Infrastructure
4B – 940 Blanshard Street
Victoria, BC
V8W 3E6

Attention: **Paul Savinkoff**

RE: SURPLUS FILL SOIL QUALITY ABOVE 4.6M GASL, SOUTH FRASER PERIMITER ROAD PROPERTY #57, 11932 TANNERY ROAD, SURREY, BC

The Ministry of Transportation and Infrastructure (MOTI) retained PGL Environmental Consultants (PGL) to obtain a Ministry of Environment (MOE) Certificate of Compliance for South Fraser Perimeter Road (SFPR) Property #57, 11932 Tannery Road, Surrey, BC (the Site). The MOTI subsequently requested that PGL prepare this letter to classify stockpiled surplus fill quality on the Site that lies above an elevation of 4.6m geodetic above sea level (gasl) for the purpose of potential offsite relocation.

BACKGROUND

The Site is part of a land package acquired by the MOTI for construction of the SFPR. Now surplus, the land will be divested. The Site is on the south side of Tannery Road in the South Westminster area of Surrey, and it was previously used by a truck repair shop/welding and crane rental business. Since 2009, the Site has been used as a storage location for surplus excavation soils from the construction of the SFPR.

PGL completed a Stage 1 and 2 Preliminary Site Investigation for the Site. The objective of the Stage 2 Preliminary Site Investigation was to confirm the presence/absence of soil and/or groundwater and/or soil-vapour contamination at each area of potential environmental concern. As part of this investigation, a stockpile of surplus fill was identified as an area of potential environmental concern (APEC) based on observations and information from the MOTI. The fill stockpile was placed on the Site for storage during SFPR construction. The fill is surplus excavation soils from locations along the SFPR construction corridor. It is not dredged river sand sourced from the Fraser River.

To assess the APECs, including the surplus fill stockpile, and identified potential contaminants of concern (PCOCs), PGL conducted soil, groundwater, and soil-vapour investigations at the Site.

REGULATORY CONTEXT

Under Section 11 (2) of the BC Contaminated Sites Regulation (CSR), a site is not a contaminated site if the soil, surface water, and groundwater do not exceed the applicable site-specific numerical criteria. The CSR bases the applicability of soil criterion on land use. Standards are specified in the CSR for five land use categories (Agricultural, Urban Park, Residential, Commercial, and Industrial) except in Schedule 10. The applicable CSR Land use is Industrial. At the request of the MOTI, stockpiled fill quality has also been compared to Schedule 7 Columns II through IV to assess their suitability for offsite relocation.

SURPLUS FILL SOIL RESULTS

Upon review of soil data collected above 4.6m gasl:

- Concentrations of PCOCs (metals including sodium, extractable petroleum hydrocarbons, light and heavy extractable petroleum hydrocarbons, and polycyclic aromatic hydrocarbons[1]) were less than the CSR Schedule 4, 5 and 10 Industrial Land use standards (Tables 1 through 3);
- Concentrations of tin exceeded CSR Schedule 7 Column III standards (Soil Relocation to Agricultural Land) in 7 of 12 samples. All other PCOCs met Schedule 7 Column III standards;
- All PCOCs met Schedule 7 Column II standards (Soil relocation to non-Agricultural Land); and
- No samples exceeded Schedule 7 Column IV standards (Waste Disposal Prohibited without Authorization).

The surplus fill stockpile is not dredged river sand, and salt or sodium ion is not considered a PCOC. When dredged river sand is present, the soil is analyzed for sodium ion by saturated paste to determine the soluble salt content. This is not the same as elemental sodium which occurs in soil minerals, and it is determined by strong acid leachable metals (SALM) analysis. This is a total method that captures all forms of sodium as an element. There are standards in Schedule 5 and 7 for sodium ion (saturated paste), not elemental sodium. There are no CSR standards for elemental (i.e., total) sodium.

All of our samples were analyzed using the SALM method. If salt were present, the SALM sodium would be unusually high because it is an analysis for total sodium. The maximum total sodium in the soil samples above 4.6m gasl is 540mg/kg. This can be characterized as normal and not representative of salinity contamination.

In the absence of salt as a PCOC, and based on the total concentrations, we do not suspect sodium ion as a PCOC or a contaminant.

DISCUSSION AND CONCLUSIONS

As part of PGL's Stage 1 and 2 Preliminary Site Investigation, PGL assessed soil quality of stockpiled fill. The MOTI subsequently requested that PGL classify soil quality above 4.6m gasl at the Site for potential offsite relocation. Based on PGL's investigation results, PGL confirmed:

- Salt or sodium ion is not a PCOC or a contaminant;
- Soil above 4.6m gasl can be relocated to federal land;
- Soil above 4.6m gasl can be relocated to non-agricultural land; and
- Soil relocation to agricultural land under the BC CSR is not permitted as tin concentrations exceed CSR Schedule 7 Column III standards.

STANDARD LIMITATIONS

PGL prepared this report for our client and their agents. PGL accepts no responsibility for any damages that may be suffered by third parties as a result of decisions or actions based on this report.

The report's purpose is to provide the client with a summary of investigation work conducted at the subject property. The investigation work consisted of screening for contamination and, as is true for all environmental investigations, potential remains for the presence of unknown, unidentified, or unforeseen surface or subsurface contamination. Because the conclusions rely on interpolation between sample locations selected based only on field judgement, small pockets of contamination may remain. More or different remediation and investigation may be required if other risks are

[1] Extractable petroleum hydrocarbons, light/heavy extractable petroleum hydrocarbons, polycyclic aromatic hydrocarbons

identified. The data presented in this report are valid for the date of sampling, but Site conditions may change with time.

The findings and conclusions are Site-specific and were developed in a manner consistent with that level of care and skill normally exercised by environmental professionals currently practicing under similar conditions in the area. Changing assessment techniques, regulations, and Site conditions mean that environmental investigations and their conclusions can quickly become dated, so this report is for use now. The report should not be used after that without PGL review/approval.

The project has been conducted according to our instructions and work program. Additional conditions and limitations on our liability are set forth in our work program/contract. This report is neither an endorsement nor a condemnation of the subject property. No warranty, expressed or implied, is made.

We trust that this meets your needs. If you have any questions or require clarification, please contact Stewart Brown at and 604-895-7612.

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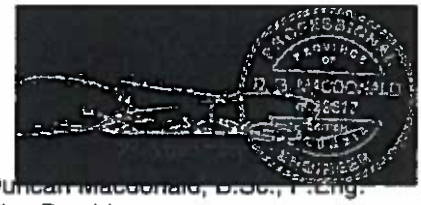
Per:



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CSB/DGM/mtl
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Attachments: Figure 1
Tables 1–3

Subject Site - 11932 Tannery Road

Legal Parcels

Water

Storm

Sanitary - Vacuum

Monitoring Well

Soil Vapour Port

Investigation locations surveyed by Bennet Land Surveying Ltd., Feb 2, 2015.

0 90 m

2014 ortho image obtained through the City of Surreys' open data catalogue.

PGL Pottinger Gaherty Environmental Consultants Ltd.

MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

11932 Tannery Road, Surrey, BC

INVESTIGATION LOCATIONS

Dwg No.: PS1 | File No.: 0340-22.01

Drawn by: IRB | Date: FEB 2015

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FIGURE 5

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Standard Table Notes
Soil Samples

Soil sample results are presented as mg/kg (ppm) on a dry weight basis.
Where standards are pH dependent the most stringent applicable standard is applied unless otherwise noted.

(pH)	Parameter has pH dependent standards
EPH	Extractable Petroleum Hydrocarbons, not corrected for PAH
LEPH	Light Extractable Petroleum Hydrocarbons, corrected for PAH
HEPH	Heavy Extractable Petroleum Hydrocarbons, corrected for PAH
PAH	Polycyclic Aromatic Hydrocarbons
MAH	Monocyclic aromatic hydrocarbons (benzene, ethylbenzene, toluene and xylenes)
VH C6-C10	Volatile hydrocarbons
VPH C6-C10	Volatile petroleum hydrocarbons excluding benzene, ethylbenzene, toluene and xylenes
MTBE	Methyl tertiary butyl ether
VOC	Volatile organic compounds
sg	Silica gel applied to sample
MDL	Method detection limit
m	Metres
BH	Borehole
BH_M	Monitoring Well
GW	Groundwater
SW	Surfacewater
Z	Replicate/Duplicate Sample
gasl	Geodetic above sea level
<	Less than the stated detection limit
-	Not analyzed
CSR	Contaminated Sites Regulation (1997, and amendments)
IL	Industrial Land Use
~	No Standard
^	LEPH/HEPH Standard has been applied to EPH
*	Lowest applicable pH dependent standard is displayed. The standard is applied based on the tables below.
**	Total sodium
Bold	Detection limit greater than standard
Shaded & Bold	Greater than the most stringent of the applicable CSR Standard

	pH Dependant Soil Standards			
	Cadmium (pH)	Copper (pH)	Lead (pH)	Zinc (pH)
CSR Sch5 IL (GW used for drinking water)	pH <6.5 = 1.5 pH 6.5 - <7.0 = 3 pH 7.0 - <7.5 = 15 pH 7.5 - <8.0 = 200 pH >=8.0 = 1000	pH <5.0 = 250 pH 5.0 - <5.5 =400 pH 5.5 - <6.0 = 1500 pH 6.0 - <6.5 = 15000 pH >=6.5 = 350000	pH <6.0 = 100 pH 6.0 - <6.5 = 250 pH >=6.5 = 4000	pH <5.0 = 150 pH 5.0 - <5.5 = 200 pH 5.5 - <6.0 = 300 pH 6.0 - <6.5 = 1000 pH 6.5 - >7.0 = 7500 pH >=7.0 = 15000
CSR Sch5 IL (GW flow to freshwater SW used by aquatic life)	pH <7.0 = 2 pH 7.0 - <7.5 = 2.5 pH 7.5 - <8.0 = 25 pH >=8.0 = 150	pH <5.0 = 90 pH 5.0 - <5.5 =100 pH 5.5 - <6.0 = 200 pH 6.0 - <6.5 = 1500 pH >=6.5 = 30000	pH <5.5 = 150 pH 5.5 - <6.0 = 250 pH 6.0 - <6.5 = 2000 pH >=6.5 = 40 000	pH <6.0= 150 pH 6.0 - <6.5 = 300 pH 6.5 - <7.0 = 1500 pH >=7.0 = 3000
CSR Sch5 IL (GW flow to marine SW used by aquatic life)	pH <7.0 = 2 pH 7.0 - <7.5 = 3.5 pH 7.5 - <8.0 = 35 pH >=8.0 = 200	pH <5.0 = 90 pH 5.0 - <5.5 =100 pH 5.5 - <6.0 = 200 pH 6.0 - <6.5 = 1500 pH >=6.5 = 30000	pH <5.5 = 150 pH 5.5 - <6.0 = 250 pH 6.0 - <6.5 = 2000 pH >=6.5 = 40 000	pH <6.5 = 150 pH 6.5 - <7.0 = 300 pH 7.0 - >7.5 = 2000 pH >=7.5 = 35000

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Table 1
Surplus Soil Results - Metals
11932 Tannery Road, Surrey, BC
MOTI, PGL File 346-22.01

	Metals																				
	pH (Lab)	Antimony	Arsenic	Barium	Beryllium	Cadmium (pH)	Chromium	Cobalt	Copper (pH)	Lead (pH)	Mercury	Molybdenum	Nickel	Selenium	Silver	Sodium**	Thallium	Tin	Uranium	Vanadium	Zinc (pH)
	pH_Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL	0.1	0.1	0.1	0.5	0.1	0.05	0.5	0.1	0.5	0.5	0.05	0.1	0.5	0.2	0.1	50	0.05	2	0.05	0.2	2
CSR Sch4 IL	-	40	-	-	8	-	-	300	-	-	-	40	500	10	40	-	-	300	-	-	-
CSR Sch5 (Intake of Contam Soil, IL)	-	-	100	1,000,000	-	3500	-	-	200,000	4000	2000	-	-	-	-	-	-	-	-	-	1,000,000
CSR Sch5 (Toxicity to soil invertebrates and plants, IL)	-	-	100	1500	-	70	700	-	250	2000	150	-	-	-	-	-	-	-	-	-	500
CSR Sch5 (GW used for drinking water, IL)	-	-	15	400	-	1.6*	60	-	250*	100	-	-	-	-	-	-	-	-	-	-	150*
CSR Sch5 (GW flow to fresh SW used by aquatic life, IL)	-	-	20	3500	-	2*	-	-	90*	150	-	-	-	-	-	-	-	-	-	-	150*
CSR Sch 10 IL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300	200	-	-
CSR Sch7 Column II	-	20	16	400	4	1.6	60	50	90	100	16	10	100	3	20	-	-	50	-	200	150
CSR Sch7 Column III	-	20	16	400	4	1.6	50	40	90	100	0.6	5	150	2	20	-	-	5	-	200	150
CSR Sch7 Column IV	-	40	16	400	8	1.6	60	300	90	100	150	40	500	10	40	-	-	300	-	-	150

Location	Date	Elevation (m gasl)																			
BH01M-2	1/19/2015	9.2-8.9	7.67	0.28	2.6	68.7	0.22	0.123	17.9	5.49	13.7	11.7	<0.05	0.7	17.9	<0.2	<0.1	240	<0.05	3.3	0.507	33.9	40.1
BH08M-1	1/20/2015	10.6-10.5	7.33	0.49	4.16	89.9	0.24	0.234	25.4	7.61	27.6	55.2	0.051	0.68	23.5	<0.2	<0.1	440	0.056	6.8	0.561	49.8	65.8
Z04 (Dup of BH08M-1)	1/20/2015	10.6-10.5	7.52	0.51	4.64	88.6	0.26	0.22	27.1	8.11	26.5	53	0.056	0.64	24.8	<0.2	<0.1	450	0.061	12.1	0.604	50.1	75.5
BH08M-3	1/20/2015	7.7-7.5	8.13	0.3	3.16	49.4	0.2	0.108	23.6	7.13	15.2	7.42	<0.05	0.37	29.4	<0.2	<0.1	260	<0.05	7.4	0.297	42.8	39.5
BH11M-1	1/21/2015	8.8-8.7	5	0.27	2.54	39.8	0.18	0.079	30.6	7.14	12	6.56	<0.05	0.3	32.4	<0.2	<0.1	230	<0.05	8.3	0.261	49.3	35.6
BH13M-1	1/21/2015	8.8-8.6	8.11	0.2	2.86	59.1	0.19	0.089	20.3	7.1	13	4.9	<0.05	0.41	23.5	<0.2	<0.1	240	<0.05	2.2	0.315	46.6	38
BH13M-2	1/21/2015	6.1-5.7	8.06	0.33	4.23	80.8	0.25	0.16	32.7	9.17	23	12.9	<0.05	0.41	31	<0.2	<0.1	530	0.074	8.9	0.515	57.1	51.8
BH14M-1	1/22/2015	8.5-8.2	8.33	0.37	4.94	87	0.28	0.194	30.1	9.2	20.8	8.94	<0.05	0.46	30.9	<0.2	<0.1	335	0.077	11.2	0.596	62.3	42.7
BH14M-2	1/22/2015	8.6-8.4	8.3	0.26	4.13	76.6	0.25	0.132	28.6	8.93	20.2	8.5	<0.05	0.42	27	<0.2	<0.1	514	0.069	6	0.481	53	42.6
BH15M-1	1/22/2015	10.2-9.7	7.9	0.24	2.92	48	0.19	0.1	20.6	6.64	13.6	5.6	<0.05	0.42	24.1	<0.2	<0.1	240	<0.05	<2	0.288	40.2	37.5
BH15M-2	1/22/2015	4.7-4.2	7.88	0.24	4.48	63.8	0.24	0.101	32.4	8.13	18.4	8.1	<0.05	0.35	31.3	<0.2	<0.1	260	<0.05	4.3	0.444	48.6	39.3
BH16M-2	1/22/2015	7.6-7.5	7.99	0.28	3.48	55.4	0.19	0.123	24.5	7.47	16.4	6.88	<0.05	0.4	25.7	<0.2	<0.1	261	<0.05	3.1	0.327	39.7	40.7

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Table 2
Surplus Soil Results - Extractable Petroleum Hydrocarbons
11932 Tannery Road, Surrey, BC
MOTI, PGL File 346-22.01

			EPH					
			EPH10-19 (sg)^	EPH19-32 (sg)^	EPH C10-C19^	EPH C19-C32^	LEPH	HEPH
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL			200	200	200	200	200	200
CSR Sch4 IL			2000	5000	2000	5000	2000	5000
CSR Sch7 Column II			1000	1000	1000	1000	1000	1000
CSR Sch7 Column III			1000	1000	1000	1000	-	-
CSR Sch7 Column IV			2000	5000	2000	5000	2000	5000
Location	Date	Elevation (m gasl)						
BH01M-2	1/19/2015	9.2-8.9	<200	<200	<200	210	<200	210
BH15M-2	1/22/2015	4.7-4.2	<200	<200	<200	<200	<200	<200

Table 3
Surplus Soil Results - Polycyclic Aromatic Hydrocarbons
11932 Tannery Road, Surrey, BC
MOTI, PGL File 348-22.01

	PAH																
	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MDL	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
CSR Sch4 IL	-	-	-	-	10	-	-	10	10	-	10	-	-	10	50	50	100
CSR Sch6 (Intake of Contam Soil, IL)	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-	-	-
CSR Sch6 (Toxicity to soil invertebrates and plants, IL)	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-
CSR Sch7 Column II	-	-	-	-	1	1	-	1	1	-	1	-	-	1	5	5	10
CSR Sch7 Column III	-	-	-	-	0.1	0.1	-	0.1	0.1	-	0.1	-	-	0.1	0.1	0.1	0.1
CSR Sch7 Column IV	-	-	-	-	10	10	-	10	10	-	10	-	-	10	50	50	100
Location	Date	Elevation (m gasl)																
BH01M-2	1/19/2015	9.2-8.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.052	<0.05	<0.05	<0.05	0.069	<0.05	<0.05	<0.05	0.061	0.066
BH15M-2	1/22/2015	4.7-4.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05