SEACOR ENVIRONMENTAL INC.

SEACOR JOB NO: 201.10021

CLIENT: Imperial Oil
PROJECT: Langley Bulk Plant R00156
20361 Imperial Ave
Langley, BC

BOREHOLE LOG

BOREHOLE NO: BH02-1
ELEVATION: 100.149 m

DEPTH (m)	SAMPLE TYPE	SOIL TYPE	SOIL DESCRIPTION	TEST DATA: HYDROCARBON VAPOUR LEVEL (ppmv)	WELL COMPLETION	WATER LEVEL	FIELD NOTES	DEPTH (m)
			SAND AND GRAVEL fine to coarse-grained sand, sub-angular to sub-rounded gravel, some silt, grey, wet	375			GW=0.13 m Feb. 5, 2002 stick-up w/ slip cap bentonite	
1.0			**silty CLAY** grey, damp	3000				1.0
							silica sand	
2.0			wet at 2.3 m	400			50 mm 010 slot PVC pipe end cap	2.0
							bentonite	
3.0				100				3.0
				100			slough	
4.0				100				4.0
			End of borehole at 4.6 m Screened interval between 0.9 m to 2.3 m Elevation at top of pipe (TOP) = 101.025 m Depth of groundwater from (TOP) = 1.01 m					

TEST DATA: HYDROCARBON VAPOUR LEVEL (ppmv) — 10 100 1000 10000

DRILLING METHOD: Solid Stem Auger; logged by NA

DATE DRILLED: 1/15/02

Notes: Auger Sample

4.3.2 Hydrogeology

Based on the monitoring events conducted between February 2002 and February 2003, the average depth to groundwater ranged from 0.3 m below grade in January 2003 to 1.8 m below grade in October 2002. A summary of groundwater depths measured in the monitoring wells during the monitoring events is presented in Table 8.

Groundwater measurements taken at the site indicate that the groundwater table fluctuates and is within the sand and gravel layer during high water seasons and within the silty clay layer during dry seasons.

Results from the water well search indicated that the closest registered wells are located approximately 300 m to the south and southeast of the site, and screened beneath a thick layer of clay. Therefore, none of the registered wells are screened in the surficial sand and gravel layer at the site, and perched groundwater in the sand and gravel would not likely reach these wells.

Results of slug tests completed by O'Connor on wells screened within the silty clay layer indicated that the hydraulic conductivity of the unit was approximately 5.0×10^{-7} m/s. Using a conservative gradient of approximately 0.01 and an effective porosity of 0.3, it is estimated that the velocity of groundwater flowing through the silty clay layer would migrate in the direction of the regional groundwater flow is approximately 0.5 m/year or 50 m in 100 years.

In addition, the City of Langley has a by-law stating that in areas where potable water is provided by the City private wells for drinking water purposes are not to be used. The area within a 1.5 km radius of the site is located within an area of the City of Langley that is supplied by municipal water and thus the use of a well for domestic potable water supply would not be used.

Based on the groundwater elevations measured during the monitoring events conducted by SEACOR on January 30, 2002, February 5, 2002 and October 16, 2002, groundwater generally flows out radially from the centre of the site. The inferred groundwater contour plans are presented in Appendix I. This is likely due to the presence of underground services to the south and ditches and underground services to the north and west of the site and representative of the shallow groundwater flow pattern, which is likely in response to precipitation events. In addition, a contour of the groundwater elevations measured during a monitoring event conducted by O'Connor on July 6, 1992 indicates similar flow. A copy of this contour plan (Drawing No. 1.5) is included in the O'Connor report dated August 19, 1992 which is included in Appendix C. The ditches are connected with the municipal storm sewer system which runs along Locke Road via the culvert at its eastern end. According to the City of Langley's Engineering Department, the City's storm sewers ultimately discharge to the Nicomekl River, the closest aquatic receptor located approximately 500 m south-southeast of the site. Therefore, the groundwater from the site likely takes less than 50 years to reach Nicomekl River.