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M E M O R A N D U M

May 30, 2013

TO: Kelly Andreoli
District Engineer
Peterborough District Office
Eastern Region

FROM: Greg Faaren
Hydrogeologist
Technical Support Section
Eastern Region

RE: Phase II Environmental Site Assessment
513 Taylor's Road, Oakwood, Ontario

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## Purpose

I have reviewed the hydrogeologically pertinent sections of the document entitled "Phase II Environmental Site Assessment, 513 Taylor's Road, Oakwood, City of Kawartha Lakes, Ontario" prepared by D.L. Services Inc. (DLS) and dated March 20, 2013. This report was provided to document recent soil and groundwater sampling activities conducted at the site located at 513 Taylor's Road in the City of Kawartha Lakes (Oakwood), Ontario. I offer the following comments for your consideration.

## Background

The subject property is located at 513 Taylor's Road in the City of Kawartha Lakes (Oakwood), Ontario. The subject site is located on the west side of Taylor's Road south of Quaker Road approximately 10 km west of Lindsay, Ontario. The subject site is located in an agricultural area and is currently used as a horse ranch. The southern portion of the site was formerly used as a small gravel pit. The gravel pit was reportedly 5.6 ha in size.

The property owner reportedly began to reclaim the gravel pit area in order to increase the size of the available pasture land in 2005. DLS reports that during this time, fill of an unknown quantity and quality was brought to the site. In 2012, the property owner retained the services of GFL Environmental Inc. (GFL) to complete the reclamation of the former gravel pit area. DLS reports that approximately 4,000 truck loads of additional fill were imported to the site in 2012.

The MOE visited the site in 2012 in response to concerns raised regarding the fill material being delivered to the site. The MOE collected samples in April and June of 2012 and submitted the samples for laboratory analysis. The analytical results of these samples indicated that the fill material contained concentrations of petroleum hydrocarbons and metals above the applicable site condition standards for the site. As a result the MOE requested the fill operation cease, and that environmental investigations be conducted at the site to assess the quality of the fill. The results of the investigations conducted by DLS are discussed below.

Geology/Hydrogeology

The geology of the site is comprised of:

- A grey silt fill unit;
- A brown silt fill unit;
- A silt unit; and,
- A limestone bedrock unit.

The depth to bedrock at the site was not determined, but is greater than 7 m based on borehole logs.

DLS did not provide detailed analysis of the hydrogeological characteristics of the site. However, DLS does indicate that groundwater was typically encountered at a depth of 1.7 to 4.0 m below grade. DLS reports that groundwater flow is towards the west, at an approximate gradient of 0.01 m/m. No other hydrogeological information (i.e. groundwater flow velocities, hydraulic conductivities, etc.) was provided.

Site Restoration Criteria Selection

DLS determined that the site is not environmentally sensitive (i.e. a shallow soil property). Therefore, DLS selected the 2011 MOE Table 2: Full Depth Generic Site Condition Standards for Use at Sites in a Potable Groundwater Condition (agricultural/other land use) as outlined in the “Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MOE, 2011)” as the target soil and groundwater standards for clean-up activities at this site.

Soil Sampling Program

DLS conducted borehole drilling program on the subject site at 513 Taylor’s Road. DLS reports that a total of thirty-five (35) boreholes were drilled at the site to assess the fill material. DLS reports that a total of forty-six (46) soil samples were submitted for analysis from the boreholes. Each soil sample was submitted for laboratory analysis of volatile organic compounds (VOCs), petroleum hydrocarbon (PHC) fractions F1 to F4, polycyclic aromatic hydrocarbons (PAHs) and metals.

DLS reports that exceedances of the MOE Table 2 standards for one (1) or more of antimony, boron, cadmium, cobalt, copper zinc, and PHC fraction F3 were noted in most soil samples. In addition, PAHs and/or VOCs were also noted in several soil samples. In total, 36 of the 46 analysed soil samples showed exceedances of the MOE Table 2 standards for at least one (1) parameter. The majority of the exceedances were for metals parameters and most of these were from samples within the upper (i.e. newly placed) fill material.

Groundwater Sampling Program

DLS supervised the installation of four (4) monitoring wells at the site. These wells were located upgradient, cross gradient and downgradient of the main areas of fill placement. A single monitoring well was also placed centrally within the area of fill placement. DLS collected groundwater samples from these monitoring wells in February of 2013. Each sample was submitted for laboratory analysis of VOCs, PHC Fractions F1 to F4, metals and PAHs.

DLS reports that the analysed groundwater sample from well MW4 showed an exceedance of the MOE Table 2 standard for vanadium. DLS reports that none of the soil samples showed exceedances for vanadium and therefore the exceedance is not likely related to the imported fill material. No other exceedances were observed in the remaining analysed groundwater samples.

Conclusions and Recommendations

DLS has completed their investigation of the imported fill material. Based on the results of their investigation, DLS concludes that the recently imported is much more impacted with metals than the previously imported fill, but the concentrations of PAHs, hydrocarbons and VOCs were similar to the previously imported fill. DLS also notes that the impacted fill material does not appear to have caused any significant groundwater impacts, as evidenced by the lack of groundwater exceedances observed during the February 2013 sampling event. As such, DLS recommends that a monitoring program be implemented for the site. DLS also recommends that a site specific risk assessment be conducted for the site to determine the potential for adverse impacts to human health or ecological receptors as a result of the fill placement. DLS also suggests that the SSRA develop soil and groundwater remediation criteria specific to the site.

Based on my review of the information provided I make the following conclusions and recommendations:

- DLS reports that groundwater flow is towards the west at an approximate gradient of 0.01 m/m. No other hydrogeological information (i.e. groundwater flow velocities, hydraulic conductivities, etc.) was provided. More detailed hydrogeological information should be provided for the site.

- DLS has selected the MOE Table 2: Full Depth Generic Site Condition Standards for Use at Sites in a Potable Groundwater Condition (agricultural/other land use) as outlined in the "Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MOE, 2011)" as the target soil and groundwater standards for clean-up activities at this site. The use of the 2011 MOE Table 2 Standards is appropriate for this site.

- I agree with DLS' conclusion that the recently imported fill is much more impacted with metals than the previously imported fill. However, the data provided by DLS indicates that only one (1) of the samples from the previously imported fill (i.e. sample BH-15@ 5-7') showed an exceedance of the MOE Table 2 standards and only for lead. The soil samples with exceedances for PAHs, VOCs and/or petroleum hydrocarbons were all obtained from the recently placed fill material.

- DLS indicates that the groundwater sampling program did not show any significant impacts to groundwater. I agree with DLS that the single groundwater sample that showed an exceedance for vanadium is not likely related to the fill material. However, DLS did report that petroleum hydrocarbon odour was noted during the sampling of well MW-1. I agree that a groundwater monitoring program should be developed and implemented for the site.

- DLS recommends that a SSRA be conducted for the site and that the SSRA develop site soil and groundwater remediation criteria specific to the site. I have no objections to this approach provided that the SSRA is done in accordance with Ontario Regulation 153/04 as amended, and that property owner is made aware of and fully understands the long term implications of this approach and gives their consent. However, it is my understanding that the area of the site in question (due to its former use as gravel pit) is zoned industrial. This may mean that a record of site condition (RSC) is required to switch the property to agricultural land use. This issue should be addressed.

Greg Faaren, P.Geo.
GF/gl

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