Risk Assessment for Garage Area, St. Thomas Psychiatric Hospital

Client
Ontario Realty Corporation

Location
St. Thomas, Ontario, Ontario

Date Completed
2011

NovaTox prepared a risk assessment (RA) for the northwest portion of the St. Thomas Psychiatric Hospital in St. Thomas, Ontario on behalf of the Ontario Realty Corporation in preparation for redevelopment for a new mental health facility. The RA report was consistent with the mandatory requirements of O. Reg. 153/04, but was not used to support a Record of Site Condition.

The RA investigation focused on an area of the hospital property surrounding the institutional garage. Subsurface investigations had revealed elevated levels of the sodium adsorption ratio (SAR) in soil and sodium and chloride concentrations in groundwater exceeding the Table 2 SCS as a result of road salting activity and/or storage of road salt in this area. Groundwater at the Site is considered to be potable, and therefore Table 2 full depth generic Site Condition Standards (SCS) for a potable groundwater condition from the Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MOE 2004) were used to screen the analytical sampling results and determine potential chemicals of concern (COC).

Risks to human receptors were evaluated using a quantitative assessment predominantly based on drinking water ingestion pathways. As SAR is a parameter that has no direct impact on humans, risks were evaluated for chloride and sodium in groundwater only. The HHRA provided a quantitative comparison of the maximum measured concentration of chloride and sodium in groundwater at the Site to MOE aesthetic objectives (AO) and recommended dietary intake limits. Levels of sodium in drinking water exceed the AO, it was recommended that groundwater not be used as a source of drinking water on the site unless treated to achieve the AO.

The ERA was conducted as a screening level assessment. Based on the COCs carried forward in the ERA, plants were the only ecological receptors assessed. The exposure pathways examined in the ERA included root uptake from soil and groundwater. Risk from SAR was assessed quantitatively using an Exposure Ratio (or Hazard Index), in which a conservative exposure estimate for plants (maximum SAR in soil) was compared to a benchmark toxicity value considered protective of ornamental plants. Risk from COCs in groundwater were assessed qualitatively by comparing to MOE component values protective of terrestrial receptors that might be exposed to groundwater at the site. Based on the risk characterization calculations, existing concentrations of SAR, sodium, and chloride were determined to pose no unacceptable risks to ecological receptors.

Property specific standards (PSS) protective of both human and ecological receptors were calculated for SAR, sodium, and chloride. Because concentrations of sodium in groundwater exceeded the human health-based PSS, the recommended risk management measures (RMM) for the site included a restriction preventing the installation of potable groundwater wells at the site.

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