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## Investigations of leachate migration in bedrock and glacial deposits around the Hyllstofta landfill in Southern Sweden

The Hyllstofta landfill was established 1975. It is owned by N rab. About 1.1 million ton of waste has been deposited at the landfill. Approximately 30 % of the waste is municipal solid waste (MSV) and the rest consists of industrial wastes, sludges and ashes. During the first 15 years a lot of chemical waste (not hazardous) with high nitrogen content was deposited. The leachate has very high nitrogen content, about 1000 mg/l. N rab has a sequential biological cleansing plant to treat the leachate.

The landfill is situated in a landscape with moraine hills. The glacial deposits consist of a rather coarse till with an estimated hydraulic conductivity of about  $10^{-7}$ . The bedrock consists of gneiss with dolerite patches. The hydraulic gradient is towards the SW in the till as well as in the bedrock. The landfill is not sealed at the bottom. Leachate is collected by drainage pipes under the landfill and along the margins of the landfill.

At the southwestern part of the landfill area a pond was constructed to store leachate. This pond was constructed with asphalt as the only barrier. This means that the underlying ground and groundwater was contaminated with leachate until a new pond was constructed at the same place in 1996 with bottom sealed with liner.

In 2004 N rab contracted Ramb ll in Malm  to investigate the leachate migration in the groundwater around the landfill. The investigations consisted of studies of old hydrological and geological data, hydraulic testing of critical wells, additional sampling and analyses of groundwater and resistivity investigations in altogether 11 lines. The resistivity investigation showed three structures in the bedrock with very low resistivity indicating leachate in the groundwater up to about 500 m SW of the landfill. Deep wells were constructed in the indicated structures to enable groundwater sampling. There sampling showed no indications of leachate in the groundwater south of the railway, corresponding to a distance of about 200 m SW of the landfill.

As a means of further examining the direction of groundwater flow from the landfill, a numerical groundwater model was constructed. The results of the modelling support the conclusion that the predominant direction of groundwater flow is to the SW. The model was also used to estimate leachate migration in groundwater since the establishment of the landfill. Even though the results are much dependant of the assumed porosity, the model supports the conclusion that there is no leachate south of the railway.

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