



FINAL YEAR PROJECT

**GROUNDWATER QUALITY CHANGES IN RICHMOND
SUBURB OVER TIME.**

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ABSTRACT

Leachate, surface water and groundwater samples were collected from Richmond landfill-site and its adjacent area (Cowdray Park and Richmond suburbs) to study the possible impact of leachate percolation on groundwater and surface water quality. Sampling was done in 2ℓ polyethylene plastic containers and different preservation techniques were employed for different parameters. T – test statistical analysis, proper field sampling techniques and (APHA, 2004) analytical methods were used to ascertain quality assurance of the grab samples. Concentration of various physico-chemical parameters including heavy metal (Cd, Cu, Fe and Mn) concentration was determined in surface water, groundwater and leachate samples. Groundwater concentration for Cd ranged from 0.006 to 0.034 mg/l well above (WHO, 2004) guideline of 0.003 mg/l. Fluorides and Calcium were also above the local guidelines (SAZ, 1997) with mean concentrations of 1.42 mg/l and 134.39 mg/l respectively compared to 1.0 mg/l for fluorides and 100 mg/l for calcium (SAZ, 1997). The moderately high concentrations of Cl⁻, NO₃⁻, SO₄²⁻, Fe, Mn and COD in groundwater, likely indicate that groundwater quality is being significantly affected by leachate percolation. Further they proved to be as tracers for groundwater contamination. The effect of rainfall and distance of the wells from the pollution source (landfill) was also investigated. Although some remedial measures are suggested to reduce further groundwater contamination via leachate percolation, the present study demand for the city council to drill monitoring wells around the landfill to check possible leachate leaks to water sources and take remedial actions.

Keywords: *Solid waste; landfill; leachate; groundwater contamination; health risk; tracer; remedial measure.*