

USE OF LOCAL AVAILABLE MATERIAL FOR THE PERMEABLE REACTIVE BARRIER TO TREAT CONTAMINATED GROUNDWATER AND THE LINER SYSTEM WITH EXPANSIVE CLAY TO COLLECT LEACHATE FOR REHABILITATION OF WASTE DISPOSAL SITES

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ABSTRACT

Under the project of “Pollution Control and Reduction of Environmental Burden in Solid Waste Management in Sri Lanka” implemented by Japan International Corporation Agency (JICA) and Central Environmental Authority (CEA) of Sri Lanka, the rehabilitation of Sundarapura disposal site in Kurunegala Municipal Council (MCK) and Galapitagalayaya disposal site in Kataragama Pradeshiya Sabha (KPS) were conducted as a pilot project from 2017 to 2018. In this project, it is expected to introduce inexpensive technologies with less maintenance requirements utilizing local available materials for Permeable Reactive Barrier (PRB) system and landfill liner system with an expansive clay for leachate collection, proposed by the project of JST-JICA Science and Technology Research Partnership for Sustainable Development (SATREPS). The PRB was introduced in Sundarapura disposal site in MCK, while the liner system with an expansive clay was introduced in the semi-aerobic engineering landfill at Galapitagalayaya dumpsite in KPS. The PRB, one of in-situ methods for treating contaminated groundwater, is an emplacement of reactive media in the subsurface designed to intercept a contaminated plume, provide a flow path through the reactive media, and transform the contaminant(s) into environmentally acceptable forms to attain remediation concentration goals down-gradient of the barrier. The basic substance of a PRB is a reactive material, which is placed across the plume of contaminated groundwater. The PRB in Sundarapura disposal site in MCK consists of crushed bricks, crushed coconuts charcoal, and Bangadeniya clay-loamy soil. Based on the extensive lab scale tests done during the SATREPS project, it is anticipated that several advantages by constructing a compacted clay liner system for leachate collection using locally available materials in Galapitagalayaya dumpsite in KPS. The expansive soil found in arid and semi-arid regions of Sri Lanka, is a good material as the clay liner due to its high water absorption capacity and high plasticity.

Keywords: Permeable reactive barrier, Expansive clay soil, Landfill site rehabilitation, Semi-Aerobic Engineering Landfill site, Leachate treatment,

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