# ASSESSMENT OF LAND SUBSIDENCE SUSCEPTIBILITY WITHIN INDUSTRIAL ESTATE AT ACHCHUVELY IN JAFFNA

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The industrial estate located at Achchuvely in Jaffna was underlain by limestone sedimentary rock. Formation of cavern in limestone sedimentary rock is the major impact for occurrence of sudden collapse of ground including subsidence of structures constructed on the ground. Therefore, assessment of land subsidence susceptibility within the industrial estate was carried out for the total land area of about 64 Acres and most suitable foundation types for building structures within the different zones were proposed.

Within the study area, twenty six (26) boreholes were advanced upto about 10m depth through the bedrock using core drilling technique. Rock core samples and water samples collected from boreholes were used for the testing of unconfined compressive strength and water quality (pH, sulphate and chlorite content) respectively. The elevations of boreholes were obtained with respect to the Temporary Bench Mark established at the study area as 100.000 m RL (Reduce Level). Daily monitoring of groundwater table was carried out using a PVC stand pipe installed into a borehole with respect to rainfall data collected using rain gauge installed by Department of Meteorology.

The upper most part of ground profile indicates rock exposures and red-earth material in few locations. Thereafter, highly to moderately weathered limestone having small cavities filled with red-earth materials was encountered upto highly to moderately weathered limestone having small cavities filled with silt and sand. Large scale caverns filled with water and sand were encountered within northern and central parts of the study area.

The Unconfined Compressive Strengths of intact limestone rock were determined using rock core samples collected form random borehole locations within the study area. pH, chloride and sulphate content of groundwater were tested using water samples collected from three number of boreholes.

Based on the borehole results, vertical ground profile and borehole location plan, land subsidence susceptibility map was produced for the total study area. The area percentages of high, medium and low land subsidence susceptibilities are present as 20%, 23% and 57% respectively. The allowable bearing capacity of limestone was observed within the range of 2487 – 3322 $kN/m^2$. The most suitable foundation type of building structures for high land subsidence susceptible area is pile foundation. Similarly pile foundation is used for the medium land subsidence susceptible area too. However, light weight structures can be proposed for the medium land subsidence susceptible area. Any type of foundations can be applied for the low land subsidence susceptible area. Since the tested pH, sulphate and chloride content in groundwater is observed within the non effective range for cement, special protections for concrete structures are not essential for the normal concrete works at the groundwater area.