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Abstract— This research study presents a close up view of the engineering behaviour of surface and sub-surface soils as associated to weather conditions in a semi-arid region. The expansive clay shale and salty shale soils in the region of Tabuk in Saudi Arabia is linked to serious damage to light structures including buildings, roads and various light structures. The expansive soils expand when moisture increase is introduced and shrink when drying or losing moisture. The scale of damage is highlighted through various examples from the region. The objective of this work is to provide a guide to construction industry on the most appropriate construction times based on the environmental trends and engineering properties of soils in the area. A comprehensive study including testing and survey of the literature data were put together to predict the expansion and shrinkage behaviour of Tabuk near surface soil formation. The swell and compressibility tests were performed for a series of samples. Average compressibility and swell index were obtained. Soil water characteristic information for typical clay is presented. Ten years of environmental and metrological records were gathered and analysed for frequency and intensity of rainfall, humidity and temperature. Periods of significant variations and impact on the soil volume behaviour were grouped and compared over the whole ten years period. The construction on a pre-wetted ground and on entirely dry formation was discussed. The approach followed for selecting appropriate construction times is given.

Keywords: swelling; shrinkage; shale; temperature; precipitation and humidity.