

## **Lithologic study of deep borehole in the Lower Chao Phraya Basin: Suphanburi Province**

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The Lower Chao Phraya Basin is the highest potential sedimentary groundwater basin in Thailand, related to Tertiary Basin, which is composed of 500 to 7,000-meter-thick sediment deposits. Most groundwater investigations in this basin have been developed at a depth of less than 400 meters; however, the deeper wells are scattered and limited only in Bangkok Metropolitan and the nearby areas. Nowadays, the population and industries are expanded and are going to migrate to other surrounding provinces. For this reason, the study of deep borehole's lithology is quite necessary for supporting the future groundwater development, due to the population growth and industrial expansion, to meet the future water demand.

In this case, the study aims to explore the lithology, interpret the electric logging data, as well as prepare the guidelines for future groundwater development, particularly in Suphanburi Province. The study started with gathering the previous geologic data, hydrogeologic data, electric logging (e-logging) data, and other related data. All data were analyzed and separated into 3 main categories; hydrogeology, economy (national strategic plan and GPP), and society (population growth and population density). The drilling site was selected after conducting ArcMap's weight overlay analysis with a series of criteria. The Suphanburi National Sports Center of the Disabled Person is appropriated for being a drilling site. The location is in Bangpho Subdistrict, Muang District, Suphanburi Province (UTM 47P 614487E 1602780N). A 660-meter-deep borehole was drilled together with the sediments' sample collection, and later the electric logging (e-logging) was conducted. The lithology shows all samples are sediments, including several layers of gravel, sand, and clay while bedrock is not presented in this area. The electric logging (e-logging) data mostly shows cylindrical shapes with some bell shapes of gamma-ray log signatures that refer to the fluvial channel's environment. Interestingly, the e-logging data shows more than 10 layers of groundwater potential zones between 407-415, 419-425, 440-447, 468-488, 540-547, 550-556, 583-590, 620-625, 633-639, and 650-660 meters below the surface.

Finally, the rock description coupling with e-logging interpretation can be used for studying the correlation between deep groundwater aquifers in the Lower Chao Phraya Basin. Moreover, the new data, especially at the depth of 400 to 660 meters, becomes a piece of valuable information for future groundwater exploration and investigation. Then people can access to this new high potential resource for daily consumption, which is the basic human rights, and expand their living-lives in the future.

**Keywords:** general hydrogeology, unconsolidated sediments, lithology, electric logging