

SUMMARY

Satrio Harganto, *Department of Water Resources Engineering, Faculty of Engineering University of Brawijaya, July 2018, Application of Self-Potential Method to Estimate The Potential of Groundwater in Karangrejo District Tulungagung Regency. Academic Supervisor: Hari Siswoyo.*

Farmers in Karangrejo District, Tulungagung Regency generally need bored well to fulfill the needs of irrigation water for its field in dry season. When determining the drilling point to make bored well, farmers often facing failures related to the existence of groundwater. It happens because when determining the drilling point, farmers still use traditional ways in which those ways are not based on scientific approach. Before drilling, it should be predicting the location of potential groundwater. Therefore, this research is done with aims to predict the location of potential groundwater using self-potential method.

In this research, 4 tracks are designed for investigation in the field, i.e. track 1 (309 meters, 39 points), track 2 (451 meters, 58 points), track 3 (560 meters, 70 points), and track 4 (299 meters, 39 points) with the distance between investigation point is 8 meters on all tracks and using fixed based configuration in data retrieval process. Tool calibration aims for gaining accurate data by planting both porous pot electrodes to the ground with a relatively close distance (± 10 cm) and potential difference value that measured must be ≤ 2 mV. Measurement of corrected potential difference value is divided into two stages namely potential difference value measurement as time function and position function. Depiction of isopotential contour map is used to find out the distribution of corrected potential difference value using Surfer 12 computer program package, in which anomalous zone in the research location can be known using this map. The existence of anomalous depth of an object calculated by using sphere method and dipping plate method, which then the result of parameter measurement of both methods compared with lithology data of STDA 616 and farmer's bored well, where one of the suitable methods is used to design the bored well construction in the research location.

From the result of this research obtained the corrected potential difference value on track 1 (-2,80 mV to 2,06 mV), track 2 (-6,36 mV to 6,10 mV), track 3 (-0,74 to 8,48 mV) and track 4 (-1,68 mV to 10,26 mV) with maximum value 10,26 mV, minimum value -6,36 mV, and average value 2,14 mV. Based on isopotential contour map made from corrected potential difference value, can be interpreted that negative potential anomalous zone discovered in North and East region of the research location, which indicates the possibility of accumulated ground water potential from West to North and East. The result of anomalous object depth measurement suspected as groundwater potential is, profile I [sphere method ($h = 9,70$ m), dipping plate method ($h = 21,99$ m, $H = 26,22$)], profile II [sphere method ($h = 19,42$ m), dipping plate method ($h = 20,16$ m, $H = 25,21$)], profile III [sphere method ($h = -$), dipping plate method ($h = 20,77$ m, $H = 25,06$)], and profile IV [sphere method ($h = -$), dipping plate method ($h = 21,05$ m, $H = 22,68$)]. Comparison result using lithology data of SDTA 616 and farmer's bored well, dipping plate method is more suitable to be used in the research location. Based on the chosen method, 4 alternatives of bored well construction are planned.

Keywords : groundwater, self-potential, anomalous object

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