THE STUDY ON SUSTAINABLE GROUNDWATER DEVELOPMENT FOR BOGOTA PLAIN IN THE REPUBLIC OF COLOMBIA

FINAL REPORT SUPPORTING REPORT

PART 3

GEOPHYSICAL SURVEY

Final Report (Supporting Report)

Part 3 Geophysical Survey

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PART - 3 GEOPHYSICAL SURVEY

The purpose of the geophysical survey is as follows;

- To know Aquifer structure of the Study Area
- To know the depth of the distribution of Cretaceous aquifers

In this Study, CSAMT method was employed for geophysical survey. The method and observation points of the CSAMT are summarized as follows;

CHAPTER 1 Method of Geophysical Survey

CSAMT (Controlled source audio magnetotelluric) method was employed for geophysical survey. CSAMT method is one of Electro-magnetic methods similar to MT (Magnetotelluric method). In CSAMT method, geological information in each depth of the ground can be obtained by changing the electric transmitting frequency. Transmitting frequency was changed in order to know the resistivity of different depth. In this Study, fourteen frequencies shown below were used to detect the geological structure up to 1,000 - 1,500m in depth.

Frequencies to be used in the CSAMT (Hz); 5120, 2560, 1280, 640, 320, 160, 80, 40, 20, 10, 5, 2.5, 1.25, 0.625

CHAPTER 2 Survey Location

Observation points of CSAMT survey are shown in Figure-3.1. Observation points are grouped to 10 areas as shown in Figure-3.1. In general, fieldwork of CSAMT method is much easier than the other conventional electrical resistivity methods such as Schlumberger and Wenner method, and more suitable for deep sounding. Hence, CSAMT method seems most suitable for deep sounding in Bogotá Plain. On the other hand, CSAMT method needs 2 km of wire line on the ground to induce electrical currency into the ground. However, Bogotá Plain is much populated and there are many houses and facilities that prevent 2 km electrical wire to be laid on the ground. Moreover, some of those facilities bring about artificial electro-magnetic field which interrupt CSAMT exploration. Therefore, sites where CSAMT exploration can be available are very limited in Bogotá Plain. The observation points shown in Figure-3.1 have relatively good condition for CSAMT exploration.

CHAPTER 3 Result of Analysis

3.1 Method for Analysis

Electric resistivity structure of the earth was analyzed by transmitted frequency and received electro-magnetic field. Apparent resistivity of the earth was calculated from received electro-magnetic field, then the apparent resistivity and corresponding transmitted frequency were plotted on log-log coordinate graph on computer display. One dimensional model was applied for sites with flat topography (A, B, C, D, E, G, H and I site), and two dimensional model was applied for sites with hilly topography (G, I site) to analyse topographical effect. Electric structure was automatically analyzed by special program. By this program, initial electrical structure was repeatedly modified automatically until theoretical observed result corresponds to actual observed result.

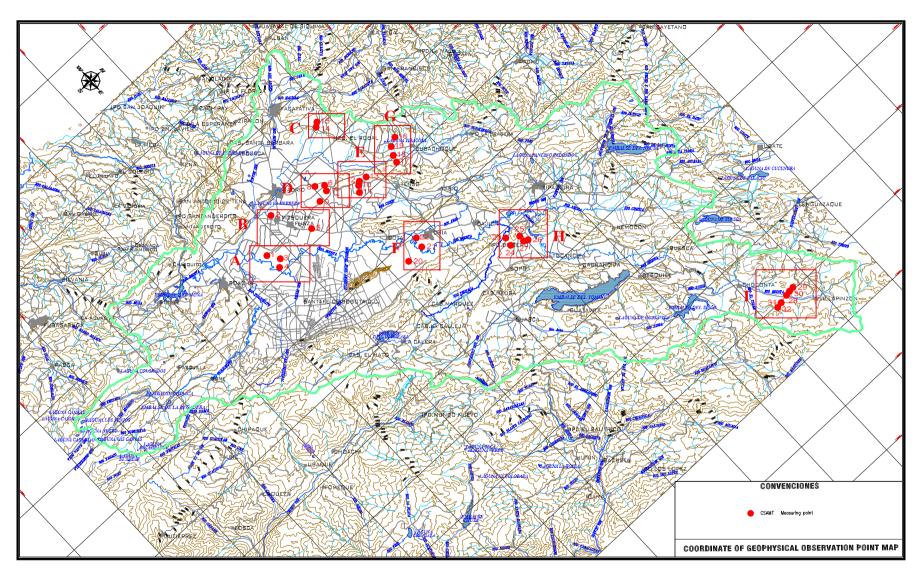


Figure-3.1 Site of CSAMT Exploration