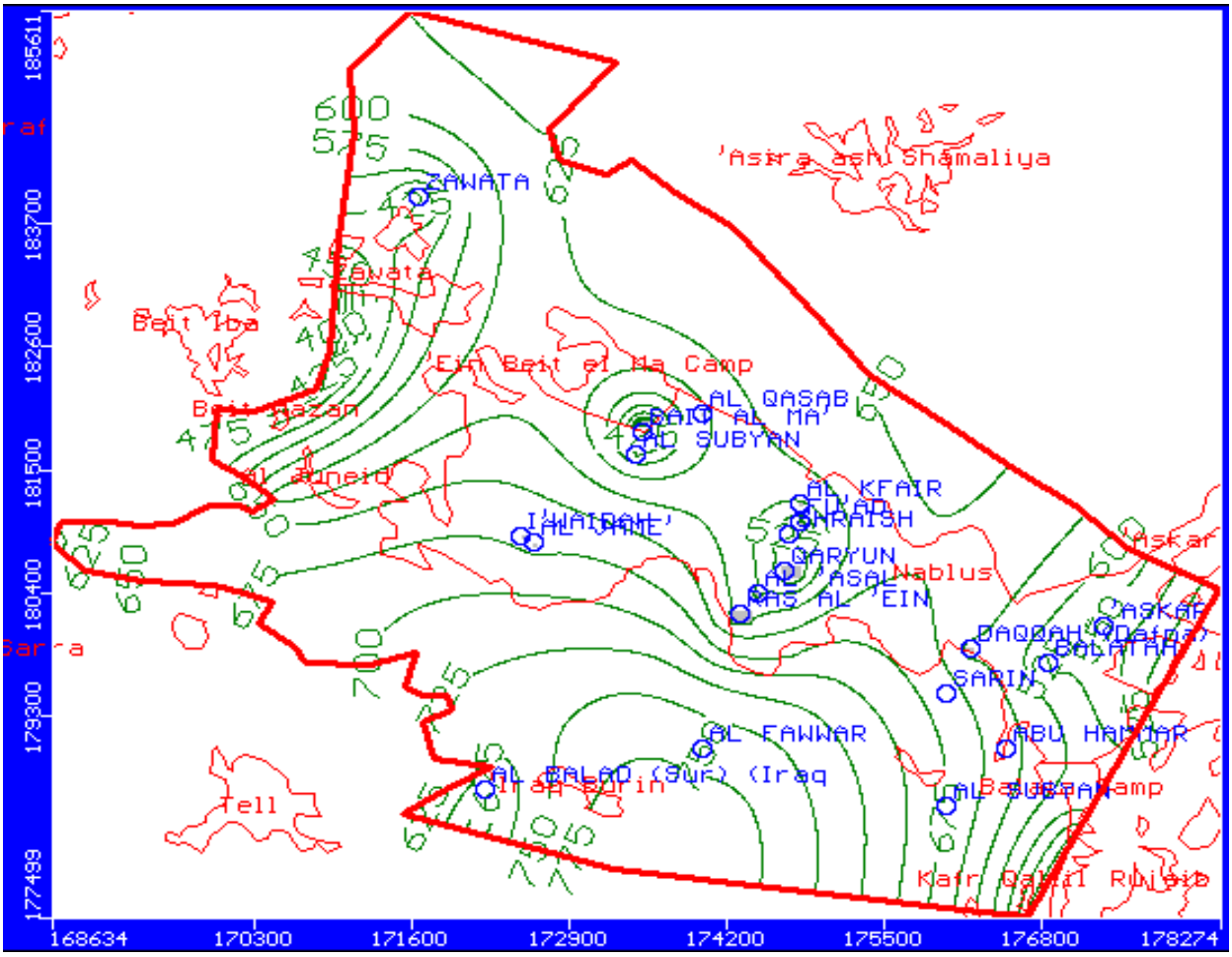
HOUSE OF WATER & ENVIRONMENT

A PRELIMINARY STEADY-STATE GROUNDWATER FLOW MODEL FOR THE EOCENE AQUIFER OF THE CITY OF NABLUS



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1. INTRODUCTION AND OBJECTIVES

The chief problems related to the water supply in Nablus City, West Bank (see Figure 1 for geographic location) include in general the limited water availability, inefficient operation of water supply systems, excessive energy costs, aged infrastructure, high water losses and leakage, elevated population growth rates, urbanization and city expansion, rise in living standards, and industrialization. These problems are commonly of great importance when considering that the principal objective of urban water management is to efficiently and adequately provide *safe* water to consumers at all times.

The Water Supply and Sanitation Department (WSSD) of Nablus Municipality are expected to meet these challenges while providing drinkable water to consumers at affordable prices and adequate pressure limits. In Nablus City, No development of new water resources took place for the past decade despite the fact that water demand and use are increasing from year to the next year. Under this situation, water shortage arises and it becomes so challenging to efficiently distribute the available water quantities. The situation will get even worse when considering the negative impacts of climate change accompanied with declining replenishment of water resources due to the decrease in rainfall amounts and frequency and the increase in water demand due to the increase in temperatures.

Due to the drastic elevation differences in surface elevations between Nablus City and the supplying groundwater wells utilized by the WSSD providing water to the city is very costly and very much influenced negatively by the surrounding communities. This challenging situation has triggered the view that supports the idea of digging a new groundwater well within the municipal borders of the City of Nablus. The basic premise behind this viewpoint is that by doing so you can abstract the rainwater that recharges the local aquifer that underlies the City of Nablus while at the same time the Municipality is spared the complicated politics with the neighboring communities. In addition, this alternative would lessen to some extent the excessive operational cost of supplying water from the remote groundwater wells. However, the City of Nablus is so famous in its scattered springs that are utilized in domestic water supply where these springs account for almost 20% of the total water demand. Developing a new groundwater well in Nablus City might negatively affect the yield of these springs that are tapped with the water supply system components (reservoirs, pumps, network, etc.). Nevertheless, a careful selection of a potential location of the prospective groundwater well will definitely minimizes the negative influence on the spring yield. In order to be able to optimally identify such a location, a groundwater flow model for the City of Nablus ought to be developed and utilized.

The main objective of this study is to develop a groundwater flow model for the local aquifer (Eocene) of the City of Nablus. This report documents broadly the steps of model developments along with a general background regarding the water resources of the City.

Another objective of this study is to test the impact of drilling and operating a number of groundwater wells in the Eocene Aquifer of Nablus on the yield of the major springs that issue from the same local aquifer of Nablus. It should be noted that this is the first study of its kind ever to be carried out on the Eocene Aquifer of Nablus.

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