

## Abstract

The two significant issues regarding water supply in Karachi city are the existing shortage and the rapid increase in population. Therefore, K-IV is designed for supplying an additional 260 MGD of water. The system comprises of multiple conveyance structures and can affect the efficiency of the system. The main objective of the study is the estimation of different losses associated with the supply structures and determining optimum flow by varying supply conditions and patterns. The modeling process is generally used to analyse the hydraulic behaviour of the conveyance system. PCSWMM (SWMM 5.0.012) model was used to estimate losses induced due to evaporation, and to determine change in flow due to varying geometries. Model was calibrated using depth and velocity data from Hub pumping station (Karachi canal). The results obtained included maximum variation in depth of about 0.163 m and velocity up to 0.209 m/s due to roughness, and entry and exit losses. A minimum evaporation rate of 1.21 mm/day resulted in a loss of 1.3 MGD from the system. The results also show that if manning's roughness exceeds a maximum of 0.021, flooding will be observed at the inlet channel. Proper maintenance of the channel should be kept to avoid flooding. The study will also help in determining any additional amount required, and to take measures for maintaining a constant flow of 13.68 m<sup>3</sup>/s available at the outlet at all time. To fulfil the requirements of the major population of Karachi.