Estimating peak flow Based on EPA SWMM and HEC-1 method Using ASSA(Case Study: East Eghbal Catchment, Mashhad, Iran)

Saeed khani (1), Fatemeh Ghobadi (2), Mahmoud Faghfour Maghrebi (3), and Amirsaman tayerani charmchi (4)

(1) Depatment of civil Engineering,Ferdowsi university of mashhad, Iran, Islamic Republic Of(saeed.khani@mail.um.ac.ir), (2) Depatment of Water Science and Engineering,Ferdowsi university of mashhad, Iran, Islamic Republic Of(fatemeh.ghobadi@mail.um.ac.ir), (3) Depatment of civil Engineering, Ferdowsi university of mashhad,Iran, Islamic Republic Of(maghrebi@um.ac.ir), (4) Depatment of Water Science and Engineering,Ferdowsi university of mashhad, Iran, Islamic Republic Of (tayerani@um.ac.ir)

hazards like flooding in rural and urban area are unavoidable in susceptible areas which have severe impact on both individuals and communities, and have social, economic, and environmental consequences. To overcome these issues, storm water drainage systems are considered as essential infrastructure of a modern city which facilities the collection and conveyance of generated runoff within a catchment area during and after rainfall events.To design storm water drainage systems, it is essential to determine flood hydrology which includes estimation of design rainfall, peak flow and remedial steps to combat the flooding and drainage problems.

This paper describes a case study of rainfall-runoff in East Eghbal catchment located south and southeast of Mashhad (Iran) using ASSA software with HEC-1 and EPA SWMM methods. According to hydrological studies and existing regulations, IDF curves(Intensity-Duration-Frequency curve)were obtained for four return periods (2, 5, 10,50 years). The choice of return period depends on various factors, including the size of the drainage systems, the risk of failure, the importance of the structure, and the desired degree of conservatism. Generally, 2-25 year return period of rainfall is selected for the design of drainage system in small cities and 25-50 year return period for the large cities. Herein, 50 year return period was selected as the basis for peak flow estimates. The GIS software with 30 m resolution DEM was used to subdivision of catchments into sub-catchments and providing land use map. Results reveals that the estimated peak flow from ASSA based on HEC-1 and EPA-SWMM method are close to each other, and the maximum runoff in EPA SWMM and HEC-1 methods differed 14.5% in value. Moreover, based on sub-basin analysis (basins of EGH13, EGH14), it was seen that due to the main channel passage into the basins located at East part of Egbal, width of basins was selected bigger and maximum runoff in these basins was overestimated in EPA SWMM comparing to HEC-1.

Keywords: ASSA, GIS, HEC-1, EPA SWMM, peak flow