

APPENDIX I

Hydrograph Methods

There are a variety of hydrologic analysis packages available to calculate the runoff from a watershed. These are classified into single event (i.e. HEC-1) or continuous simulation models (i.e. HSPF). Several programs are listed below.

HEC-HMS Hydrologic Modeling System

The U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC) developed HEC-HMS. The HEC-HMS program supercedes HEC-1 and provides a similar variety of options for simulating precipitation-runoff processes.

HEC-1, The Flood Hydrograph Package

The HEC-1 model is designed to simulate the surface runoff response of a drainage basin to a precipitation input. The model represents the basin as an interconnected system of hydrologic and hydraulic components. Each component models an aspect of the precipitation-runoff process within a portion of the basin. A component may represent a surface runoff entity, a stream channel, or a reservoir. The result of the model is the computation of streamflow hydrographs at desired locations.

HSPF, The Hydrological Simulation Program – FORTRAN

HSPF is a comprehensive package developed by the U.S. EPA for simulating water quantity and quality for a wide range of organic and inorganic pollutants from agricultural watersheds. The model uses continuous simulations of water balance and pollutant generation, transformation, and transport. Time series of the runoff flow rate, sediment yield, and user-specified pollutant concentrations can be generated at any point in the watershed.

TR20, Technical Release No. 20

The Technical Release No. 20, "Computer Program for Project Formulation - Hydrology", TR-20 was originally developed by the USDA, Soil Conservation Service (SCS) and has been modified by the Natural Resources Conservation Service (NRCS) and other groups. TR-20 uses the procedures described in the NRCS National Engineering Handbook, Section 4, Hydrology (NEH-4), except for the newly revised reach routing procedure (Att-Kin method) which has superseded the Convex method.

TR55, Technical Release No. 55

The Technical Release No. 55, "Urban Hydrology for Small Watersheds", TR-55 presents simplified procedures to calculate storm runoff volume, peak rate of discharge, hydrographs, and storage volumes required for detention structures. These procedures are applicable in small watersheds, especially urbanizing watersheds. First issued in January 1975, TR-55 incorporates current NRCS procedures described in the NRCS national Engineering Handbook, Section 4, Hydrology (NEH-4).

Storm Water Management Model (SWMM)

Developed by the EPA, SWMM is a comprehensive watershed-scale model used to represent urban storm water runoff and combined sewer overflow phenomena. SWMM simulates the runoff of a drainage basin for any prescribed rainfall pattern. A total watershed is segmented into a number of smaller basins that can be readily described by its hydraulic or geometric properties. The SWMM model simulates both water quantity and quality aspects that are associated with urban runoff and combined sewer systems.