

### 3. RAINFALL AND RUNOFF

#### 3.1. Introduction

This section provides information about key rainfall parameters, catchment characteristics and modelling methods to be used in storm water design in Emirate of Abu Dhabi. The methods should be used when an estimate of flow from an urban, non-urban or mixed catchment in response to storm rainfall is required. The method that should be used is summarised in Table 3-1, and described in detail in the rest of this chapter. If flood volumes are also required, the recommended approach for calculating these is given in Section 3.6.

Summary of rainfall runoff methods	
1 Select required design standard. In case the rational method will be used, select the time of concentration multiplier.	
2 Calculate time of concentration $t_c$ , as appropriate to the rural or urban nature of the catchment	
3 Calculate rainfall depth and intensity from IDF relationships	
<b>Rational Method</b> For catchment areas < 80 ha and / or $t_c < 30$ mins and no significant retention and / or back water effects, the <b>rational method</b> will be used.	<b>SCS Method</b> For catchment areas > 80 ha and / or $t_c > 30$ mins, the <b>SCS method</b> is recommended for use in the design of new networks. However, the SCS method can be used in the design and analysis of networks for all sizes of catchments.
4 Estimate runoff coefficients based on land use.	Estimate curve number based on land use. Check runoff and replace with coefficient of runoff estimate if necessary.
5 Apply rational equation for network calculations for sub-catchments.	Apply SCS unit hydrograph method. Use hydrodynamic model for network calculations.
6 Calculate runoff volumes if necessary.	Calculate runoff volumes.

Table 3-1 - Summary of rainfall-runoff methods

#### 3.2. Design Storms

##### 3.2.1. Design Return Period

The first step in generating the design rainfall is to determine the required design standard. These should be taken as:

Event	Area
1 in 5 Years Storm	This is the design standard for all areas served by storm water networks, with the exceptions highlighted in the rows below.
1 in 10 Years Storm	Major roads, airports, seaports, palaces and other critical areas, as approved by DMAT.
1 in 25 Years Storm	Culverts on minor roads (check for 1 in 50 years storm); lagoons that do not have an outlet and where overtopping may lead to flooding of properties*
1 in 50 Year Storm	Underpasses and underground car parks (Ramps);