- For small catchments (A<80 ha and t_c<30 min) an Excel spreadsheet system can be used (based on the rational equation)

Where the system contains the following, hydraulic modelling is to be used:

- Retention / detention tanks with significant volumes are used
- Retention in the network needs to be considered
- Backwater condition (e.g. from tide cycle) needs to be considered
- Flow restricting options need to be applied

Whichever method is used, the total runoff must be checked against a manual calculation to verify the magnitude of the runoff is correct.

The hydraulic model Info SWMM or shape file exports are to be submitted to DMAT for input by DMAT into their Info SWMM model to verify the results and extend the overall Abu Dhabi hydraulic models. Section 8 details DMAT's requirements for the submission of model files.

3.5. Special considerations for mixed catchments

The method described above assumes that the catchment behaves as a reasonably homogeneous hydrological unit. In this case, a single representative time of concentration and coefficient of runoff/curve number can be derived and will give reliable results.

Where one part of a catchment could dominate runoff, this may need to be treated independently. A typical example is where an urban sub-catchment, with high runoff coefficient and short time of concentration, dominates storm water runoff, and the rest of the catchment does not contribute significantly to runoff.

Where a catchment includes areas of very different hydrological characteristics, the analysis should be performed for the sub area or areas which may dominate the hydrological response. Where the flow from this sub catchment is greater than the flow predicted from the catchment when considered as a whole, the higher value from the sub-catchment should be used. Where the remainder of the catchment could contribute significant addition flow, this should also be modelled separately and the flows added together to give the total flow estimate. Section 8 details DMAT's requirements for the submission of model files.

3.6. Flood volume calculations

Some applications will require calculation of flood volumes, as well as peak flows. Examples include the design of retention basins and lagoons, sub-surface storm water storage tanks etc. This requires an estimate of the volume of storage required to reduce the outflow downstream of the storage device to a manageable flow rate. Two methods are recommended: the method for flood volumes and the hydrodynamic / SCS method. The design standard should be as for flow calculations (see Section 3.2.1); no time of concentration multipliers should be applied.

The rational method for flood volumes should be used only for initial sizing of retention basins etc, for catchments where the rational method is valid for estimation of peak flows. The rational method for flood volumes estimates peak flow in exactly the same way as the rational method, but in addition assumes the catchment outflow hydrograph (i.e. the flow entering the storage structure) is trapezoidal and symmetrical in form (see Figure 3-8). The rise/fall time of the outflow hydrograph is taken as the catchment time of concentration. The procedure is illustrated in Figure 3-8.

For a trial storm duration (not necessarily equal to the time of concentration) and the design return period, the rational method is used to estimate peak flow, and the hydrograph determined. In the example below, the area between the hydrograph and the line