

DISTRIBUTED URBAN STORMWATER MODELLING WITHIN GIS  
INTEGRATING ANALYTICAL PROBABILISTIC HYDROLOGIC MODELS AND  
DIGITAL IMAGERY

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**ABSTRACT**

An analytical probabilistic hydrologic model and digital imagery are integrated within GIS as an alternative to lumped continuous simulation hydrologic modelling at a planning-level. The hypothesis is that a more representative stormwater runoff estimate may be produced to reduce model calibration requirements. Digitized storm sewers and surface channels are 'burned-into' a 10m resolution digital elevation model (DEM) delineating a sewershed employing ArcMap 9.0's Hydrology tools. An unsupervised classification of a .30m resolution orthophotograph is aggregated to a runoff coefficient raster and a depression storage raster is developed from a slope-based equation (Viessman, 1967). The rasters are distributed inputs to the hydrologic model embedded within ArcMap using the Raster calculator. An uncalibrated average annual runoff estimate distributed over 100m<sup>2</sup> cells is 3.55% - 29.13% less than prior unvalidated estimates. The integration validates the hypothesis through a refined modelling approach acknowledging DEM and classification error and the upfront labour to delineate the sewershed.