

## **Evaluation of methods for representing urban terrain in stormwater modeling**

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**Abstract.** Many stormwater modeling problems consider watersheds comprised of complex flow networks including surfaces, streets, pipes, and channels. Ideally, hydrologic methods would be used to model the accumulation of runoff on surfaces while hydraulic methods would be used to explicitly model the flow in each street, pipe, and channel. In many practical circumstances, however, only the largest pipes and channels are explicitly modeled with hydraulic methods. Thus, most subcatchments include numerous streets and small pipes that can affect the accumulation and movement of water. Digital Elevation Models (DEMs) are widely used to determine geometric characteristics of these subcatchments, but street gutters and pipes are not resolved in such data. To overcome this problem, known streets and pipes are often “burned” into the surface by reducing the local elevations by a specified amount before calculating flow paths and the associated subcatchment characteristics. In this paper, existing and proposed methods for including these conduits into DEM surfaces are evaluated. The results suggest that the derived characteristics are sensitive to the selected method. We also find that a new method, which makes use of known pipe elevations, is most successful at reproducing realistic flow paths. Finally, we find that errors in the implied watershed characteristics are difficult to overcome by calibration of other model parameters.

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