

**PROBLEMS WITH PERCENTAGE RUNOFF FACTORS IN AREAS WITH
SIGNIFICANT PERVIOUS CONTRIBUTIONS**

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Background

Littleborough is a town of 14,000 population, situated at the head of the Roch Valley in the foothills of the Pennines. Development has generally been confined to the town centre and a series of developments along the main roads, most of which follow the river valley. The soils are mainly peats and boulder clays.

A hydraulic analysis was being carried out as a part of a Sewerage Rehabilitation Manual drainage area study of Littleborough. A flow survey was carried out in November 1984 during a period of prolonged wet weather.

A significant discrepancy was found between the observed flows and those predicted by a WASSP-SIM model in a major upstream subcatchment. This led to the discovery that a small watercourse had been inadvertently connected into the combined sewerage system. The watercourse has a catchment of 13 ha of steep hillside. However when this feature was included as a pervious contribution in the Simulation model, the predicted flows were unreasonably low.

The Wallingford Procedure Percentage runoff model

The Simulation and Hydrograph methods both calculate the percentage runoff factors for pervious and impervious areas as a single procedure at the start of each event. These factors are used for every pipe length throughout the catchment.

The procedure is broadly as follows:

- a) The overall percentage runoff factor (PR) is calculated from the regression equation:

$$PR = 0.829PIMP + 25SOIL + 0.078UCWI - 20.7$$

Where: PIMP is the percentage impervious area

SOIL is the soil index

and UCWI is the urban catchment wetness index.

GRAPHICAL plots for time periods ranging between 1 hour and 7 days:

- a) Flow/average rainfall.
- b) Flow only.
- c) Depth only.
- d) Depth/average rainfall.
- e) Depth/velocity.
- f) Rainfall for individual sites.

TABULATED printout of values listed in a) to f).

COMPUTER tape or **FLOPPY** diskette of flow, depth and rainfall for the selected storm events.

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The WRc software for processing the data on a micro computer (IBM compatible) will be available in April 1986.