

WaPUG Autumn Meeting and Workshop 1989 - Scarborough

CONTROL OF URBAN RUNOFF AND SEDIMENT REMOVAL STUDIES

**W O Jenkins - Construction Industry Research
and Information Association**

These notes describe two studies with which CIRIA is presently involved which relate to urban drainage. **Scope for control of urban runoff** is an on-going project due for completion in early 1990 and publication later in that year. **Cleaning sediments from sewerage and drainage systems and related above ground area (Stage 2)** is a proposal for future research which has been developed as a result of consultation with the Department of Transport, sewerage undertakers and their respective agents.

CIRIA RESEARCH PROJECT: Scope for Control of Urban Run-off

Design of urban storm-water drainage in the UK has traditionally provided for rapid surface drainage. However it is becoming increasingly necessary to provide surface water storage or attenuation facilities on development sites in order to avoid flooding of downstream sewers or watercourses.

Various methods have been successfully used by developers for controlling run-off from individual properties and sites, and the flows downstream. These include infiltration methods to reduce the amount of run-off entering the system (e.g. porous pavements and soakaways), and attenuation methods to reduce peak run-off (eg ponds, tanks and throttles).

The extent to which measures to control urban run-off can be undertaken is also constrained by non-technical factors such as: existing legislation; mixed responsibilities for planning of surface water drainage; concern over the maintenance of such installations; difficulty in achieving active involvement of property owners; and general resistance due to a lack of understanding.

Notwithstanding these present limitations, the provision of storage or infiltration can be optimised both within the urban sub-catchment and in the catchment as a whole by an integrated catchment plan, thus providing a clearer basis for agreement of allowable discharge from development sites and also providing developers with more positive guidance on the acceptability and suitability of various methods of flow control.

CIRIA's project encompasses both technical guidelines on the selection and design of appropriate control measures within the catchment and a broader examination of the technical and non-technical factors which currently constrain their use.

The principal objectives of the project are to:

- o Review established engineering methods for control of urban runoff
- o Examine the various factors (planning, statutory, economic, social, organizational and operational) which currently influence the extent to which different methods are utilised
- o Develop a realistic framework for appropriate utilization of different methods both in existing urban catchments and in new development sites, together with an identification of the benefits which accrue
- o Make recommendations on how existing constraints might be removed
- o Produce State-of-the-Art reviews both at executive/policy maker level and for practitioners

CIRIA is collaborating with Coventry Polytechnic who are carrying out a review for SERC on retention and attenuation of flow at source and with Middlesex Polytechnic on work relating to catchment management and water quality.

The Research Consortium, which is being lead by Howard Humphreys and Partners also includes CONFLO - the recent initiative organised by Thames Water, Hertsmere BC and Hydro Research & Development - whose "Guidelines for the design of storage systems" for urban catchments will form an integral part of the study. CIRIA will also be liaising with the WAA Technical Group with a view to including further guidance in any further revision to "Sewers for Adoption".

The project is seen by practitioners to be particularly timely in view of the present pressures caused by the construction of residential estates, commercial parks, warehousing, retail premises and other developments which involve increases in impermeable area. The project is being funded by Government (DoE Water Directorate), sewerage undertakers and a commercial group of developers and manufacturers. CIRIA will seek to provide an equitable and unbiased forum out of which acceptable results are able to emerge, with the help of a Steering Group whose membership reflects the broad range of interests in this area.

CIRIA RESEARCH PROJECT 416: Cleaning sediments from sewerage and drainage areas and related above-ground areas

Components of study

- o **Development of framework for the management of cleaning and sweeping activities**

This should be considered the main aim of the study. Its achievement will clearly depend on the results of the various sub-proposals of the study.

- o **Literature review and desk study**

This element of the study will consider both sewerage and drainage systems and related above-ground areas, and is therefore considered to be of equal relevance to highway authorities and sewerage undertakers.

In particular, a review of on-going research in related areas and its applicability to a general scheduling framework will include the following:

- movement of sediment in sewers
- the use of hydraulic models
- the WRc River Basin Management programme.

- o **Compilation and assessment of relevant data and information**

This element of the study will utilise available information from both highway authorities and sewerage undertakers.

The identification of locations prone to sediment problems depends on (a) knowledge of the characteristics of the system; (b) knowledge of the movement of the sediment within the system; and (c) information of the points of ingress of sediment into the system.

The potential significance of (c) should not be overlooked, and it is likely that the development of needs-led sweeping and cleansing activities for above-ground areas will not only lead to an increase in operational effectiveness of highway authorities, but also benefit the sewerage system through the reduction of sediment ingress.

- o **Field trials: The nature of surface sediments entering drainage systems and the use of gully depth as an indicator for scheduling cleaning operations**

One of the principal reasons for undertaking this work is to enable basic data on the nature of sediment (a) on the surface, (b) removed by sweeping and (c) retained in the gully to be collected.

It is hoped that this study, together with literature reviews of (a) the nature of surface-derived sediment sources into sewerage systems and (b) the performance of various sediment traps will provide better information on the nature of sediment entering sewerage systems, and identify means of reducing its ingress.

A minimum number of laboratory tests are proposed at present, partly reflecting the budget limitations of the study. Part of the study will investigate the potential for using actual gully-sediment depth as an indicator for scheduling cleansing operations.

- o **The scope for co-ordinating cleansing activities for sewers and related above-ground areas.**

This element considers the scope for further co-ordination of activities amongst sewerage undertakers and highway authorities (and their agents).

3.3 Control of Urban Run-off and Sediment Removal Studies

W.O. Jenkins - CIRIA

During the presentation of the work on sediment removal some points were emphasised.

It is important to identify the sources of the sediment. Surface sediment seems to come primarily from three sources: winter gritting, resurfacing and construction work.

The division of responsibilities between highways authorities and sewerage authorities is a potential problem, although the highway authorities are often amenable to being told what to do.

David Balmforth - Sheffield City Polytechnic

The work on control of urban runoff will be covered in more detail in a symposium to be held at Sheffield Polytechnic at the start of January 1990.