

# **PAPER 12**

## Drainage Area Studies 2

by

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# DAS or not DAS 2, DAS is the question

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## 1) Introduction

Severn Trent has finished a complete review of Drainage Area Studies (DAS) and other sewerage areas (RAMPS) in a ten year period from 1985 to 1995. These span a dramatic period in the evolution of methodology and approaches examining the sewerage assets. Moving from building elementary models in WASSP to today's sophisticated versions using Hydroworks which can incorporate a staggering number of ancillaries. (although we always want one more than the software will permit !)

Severn Trent maintains some 52,000km of public sewers and serves a population of 8 million. Over the ten year period some 384 studies were completed. These studies generally met the company's specification but improved significantly in quality over time as a result of better technology and growing experience. They now form the starting line or benchmark for the DAS 2 review. These studies developed notional schemes costing some several millions and as a result many of these schemes have now been constructed. The Drainage Area Studies have permitted the company to better prioritise expenditure and gain a greater knowledge of these hidden assets.

In the ten years since the programme began changes have taken place. Some older Drainage Area Studies may no longer be representative of the catchment because of investment, development or changes in industrial usage. These older studies should be used with great caution, similarly the more recent studies will, sooner or later, become less realistic and need to be updated. Hence, in response to this need to revise and identify significant changes, Severn Trent has embarked on a ten year programme to review and update all the studies.

## 2) Present

Water Companies are now in the tougher regime of AMP2 with all companies wishing to achieve greater efficiencies and savings. This has affected the Drainage Area Studies review programme and strenuous cash limits are now applied to all studies. It is important to note that the company is not starting from scratch again or trying to reinvent the wheel. The DAS2 review will focus on those unresolved problems which the company is funded to resolve by OFWAT in this AMP period, or where there is an operational need to revisit a Drainage Area Study, e.g. closing a treatment plant and transferring the flows. The key triggers for investment in this AMP period are:

- ◆ Flooding of properties
- ◆ Unsatisfactory overflows as agreed with the Environment Agency
- ◆ Structural dereliction
- ◆ Pumping stations

Some studies may require little work to bring them up to date, others will require significant work to update the hydraulic model to develop a better understanding of the problems. This is an ideal opportunity to re-examine various drainage areas with a more critical eye, reappraising previous assumptions made about the networks. This will enable a better understanding of how these complex interactive systems function.

Engineers responsible for these studies are fully aware that there is not a bottomless pit of finance to completely revise studies and have (with agreement) adjusted the work content to suit. They now monitor costs better and know that a compromise has to be reached between what they would like to do and what is needed based on the priorities set by the company.

There were some initial concerns about the conflict between Money Vs Quality, however from the studies completed so far that is not true. The company is obtaining a quality product within the monetary limits and demonstrating value for money.

Wallrus is considered as adequate for the reviews although many agents are investing in Hydroworks. Users are impressed with the ease of use within Hydroworks and the difference it makes to modelling complex ancillary structures is welcomed. The models are now confirming the mechanisms of surcharging and flooding in more detail and with greater accuracy. This leads to a greater confidence which means that better solutions to the problems can be identified.

Certain models are being combined into macro models and this can expose faults at the interface of the two Drainage Area Studies. Often assumption about free outfalls from one Drainage Area Study boundary to the next are not true and further investigation usually highlight areas where erroneous assumptions have been made. The inlets to treatment works are now being modelled with greater accuracy to increase our knowledge of dynamics of the hydraulics and how this effects the sewerage network.

The "know - how network" amongst the engineers producing these studies exists, at present, on an informal level. The company takes every opportunity to encourage knowledge sharing e.g. by circulating procedures and problems on an infrequent basis. The more experienced DAS engineers have helped others with complex problems and have been seconded to other agents to help complete studies.

### **3 Technology**

Technology has progressed so much since 1985, I remember unsuccessfully scoring a sewer from a black and white CCTV tape that looked like an ancient horror movie. The quality of CCTV equipment and tapes have improved dramatically since then I am glad to say.

Computers have changed beyond recognition and that has influenced the quality and quantity of data that can be stored and more importantly managed effectively. One of the greatest frustrations I had was "adopting" a model built by someone who had left the company and did not document the model (and assumptions made), I had to virtually start from scratch. Proper documentation of models is now regarded as a basic skill and programmes like Safe - Dis are now addressing this important area of document management.

Thesis is the standard sewer record database used in the company. More uses of Thesis as a management tool are developing. Gloucester City have produced hydraulic models in less time using Thesis and Key Wallingford. This process has resulted in robust working hydraulic models built in a shorter time. (a word of caution, the data used has to be accurate and verified to STC25)

The production of the report, drawings and plans has been made easier with the advent of word processors and laser printers. Many plans and reports were previously produced by printers, now most engineers have the facility to produce these on a PC using desktop publishing tools. These facilities lead to cost savings and many agents are producing the reports quicker. The reproduction of plans using colour printers and scanners and raster plans has significantly reduced the costs for the reports without sacrificing the quality( although the correct licence permissions from the OS must be sought).

#### **4 Future**

Drainage Area Studies are here to stay, they represent an important asset and management tool . It must be accepted that they represent a snapshot of the catchment at that time and therefore they need to be kept updated to be of use.

Urban Pollution Management (UPM) studies will become more prominent than they are at present. The methodology of UPM is being adopted in the company but the number of full UPM studies is relatively limited to those agreed by the Environment Agency. The company is developing a "partnering " type arrangement with various people and organisations to develop the models and quantify the problems. Hydroworks is invaluable in the recalibration of macro models prior to any simplification into a Simpol model.

It is my firm conviction that the information collected has to be stored and managed in a better way than at present. The bulk of data is stored on paper, plans or photographs. The advent of recordable CD and their ability to store vast quantities of data means companies must take advantage of this (some already are !).The concept of flicking on a CD and being able to read the report, look at the plans, see the hydraulic model, look at the CCTV tape seems in some respects science fiction but it is much nearer science fact than some would believe.

## **5 Conclusions**

Drainage Area Studies are a valuable resource that must be protected and enhanced if they are to be of use. The knowledge of the assets we manage is perhaps the most important knowledge we have. This knowledge leads to capital spend at the right time in the correct location. Drainage Area Studies should not be left on the shelf and never read or used but should be updated to represent the changes in the catchment after development and investment.

H Trueman once said "*There ain't no such thing as a free lunch*" and I believe this also applies to Drainage Area Studies we must view them as an important asset to be maintained and updated.

It has been quoted that "**The company which can't plan effectively will effectively fail**" Drainage Area Studies enable proper planning and investigating of the sewerage assets.

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