

NEWS FROM THE SHIRES

Something stirs in the wilds of fenland....

WEST OF OUSE INTERNAL DRAINAGE BOARD FUTURE DRAINAGE STRATEGY STUDY



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The West of Ouse Internal Drainage Board administers an internal drainage district of some 145 km² lying between Wisbech, King's Lynn and the Wash. The Board over many years has taken positive action regarding its responsibilities of providing good drainage to a highly productive arable area which also serves major conurbations such as Wisbech, Terrington's, Clenchwarton and West Lynn. The catchment has seen, over the last two decades, intensive investment in providing good channels and extensions to the major Pumping Station at Islington providing a level of service which, whilst being somewhat stretched in the 1998 Easter Flood Event, did fortunately provide good drainage throughout the area. It is recognised, therefore, that this investment has proved sound but the Board, however, are not complacent in carrying out their duties and meeting their responsibilities.

To this end the Board have concerns regarding the future of their internal drainage district and have put in place a strategic study and review of its needs in the future. Consideration is being given to climate change and sea rise and essentially the ever changing role of arable land and development within it. To meet this challenge the Board have gone into partnership with Messrs Bullen Consulting Engineers who are reviewing current operations with help from the Engineer and staff. The review, carried out over a two year period, will be investigating all aspects and needs of the Boards district to enable works required in the future to be programmed and more importantly to be financially profiled. It is hoped that any such scheme as this will attract grant aid from the Ministry which currently stands at 25%. Every opportunity will be taken to ensure that environmental enhancement takes place and also that the future needs of farming may be appreciated should water resources storage reservoirs be required for irrigation purposes. The strategy will provide a holistic review of the Boards district covering all aspects of development in what is considered to be a dynamic area and will allow the Board to progress into the next two to three decades with a positive, confident attitude to the level of service it provides for the rate payer.

Messrs Bullen Consultants were given the brief of carrying out an overview strategy study of the Boards drainage and to identify potential improvement works.

The West of Ouse IDB has 4 catchments under its jurisdiction. The largest of these is Smeeth Lode catchment, which covers an area of 102 km² of flat farmland between Wisbech and Kings Lynn. There are some 150 km of open channel drains that outfall to the Islington Pumping Station. From here water is pumped into a further storage reservoir, which is then discharged to the tidal Great Ouse.

The West Lynn catchment covers 43 km² of land to the north of the Smeeth Lode catchment and the Billy Kerkham catchment (24 km²) lies between the Wash and the West Lynn catchment both discharge, by gravity outfall, into the Great Ouse. At only 3 km² Pullover catchment is the smallest of the catchment areas and lies to the east. Like the West Lynn and Billy Kerkham catchments, the Pullover catchment has gravity outfalls into the Great Ouse.

Detailed information on rainfall, specifying duration and intensity, is required to enable a hydrological analysis to be carried out. There are no appropriate weather recording stations within the catchment, however, suitable facilities exist at Denver and Holbeach, both of which are close to the catchment boundary. Rainfall over the catchment during the Easter 1998 event was measured at Denver and Holbeach. The resultant return periods were identified as 1 in 28 years at Denver and 1 in 20 years Holbeach. Unit hydrographs were derived for the Smeeth Lode, West Lynn and Billy Kerkham catchments using the application methods detailed in the Flood Studies Report.

Calibration and design hydrographs were then constructed based on a third rainfall event. The effects of the tidal range in the Great Ouse were also a significant factor in the operational efficiency of the various gravity outfalls within the network.

The ISIS hydrodynamic model was selected and used to predict peak water level and extent of flooding within the catchment. Initially a topographic survey was carried out along the length of each watercourse to obtain details of the channel cross section and details of bridges and control structures. Three separate models were constructed, one for each catchment with the exception of Pullover, which was considered to be too small to be modelled. Only the key downstream sections of the watercourse were included in the model at this stage as the urban areas are largely located in the upstream parts of the catchment.

Calibration of the mathematical model is a critical element where the model is compared to the physical process being considered. Very limited data was available for calibration, however, there were sufficient peak water levels recorded and, in conjunction with details of the pumping operation at Islington, the models were calibrated to an acceptable degree.

Having been calibrated, the model is now ready to consider the effects of the "design storms". Storms with return periods of 1 in 25 years and 1 in 50 years were used, representing the standards of protection for rural and urban areas of the catchment. The output from the design events gave the

anticipated freeboard at specified intervals along the channel, thereby giving lengths of channel where overtopping can occur. This approach provided sufficient data to identify deficiencies within the drainage network.

The results from the design events for the Smeeth Lode catchment indicated that channel capacity was inadequate for the 1 in 25 year event, particularly in the Black Ditch area. The preliminary model also indicated that extensive flooding could be anticipated for the 1 in 50 year event. Within the urban areas, the channel capacity may not be adequate for the 1 in 50 year event, confirmation of the extent could be obtained by extending the coverage of the model.

Following an inspection of the Islington Pumping Station, it was revealed that, whilst some were approaching 40 years old, the diesel pumps are in good working order and still have a reasonable working life remaining. The pumping station structure was showing some signs of deterioration and although no major works would be required in the medium term, significant works would probably be demanded in the more long-term future.

The pumping station discharges flow into an open channel known as the 'Straight Mile.' Between the pumping station and the outfall is a flood storage area, which retains flows when river levels in the tidal Great Ouse are high. Floodwater is subsequently discharged by gravity at low tide.

Improvements to the operational regime of the pumping station, by telemetry, automation, and further optimisation would improve the drainage in general and may improve the level of protection at Black Ditch. More efficient use of the flood storage area and the creation of 'on line' storage areas upstream of the pumping station may improve the drainage over a short-term. However, over the longer-term the pumping station will need major refurbishment, moreover, alternative locations for a new pumping station, nearer the Eubrink Outfall structure, could reduce the need for storage within the catchment.

Within the West Lynn catchment, the preliminary model indicated that capacity for the 1 in 25 year event is adequate but with a reduced freeboard standard. Similar to Smeeth Lode for the urban areas, the capacity was considered to be inadequate, although the model would need to be extended. The conclusions for West Lynn catchment were to carry out further modelling to consider the potential effects of the future development areas.

The results for the Billy Kerkham catchment also showed inadequate freeboard on the 1 in 25 year event. As this catchment was largely rural with little potential for development no major works were envisaged.

Although the Pullover catchment was not modelled, the outfalls were identified as needing some refurbishment. An alternative option would be to examine the viability of transferring all flows to a relocated Islington Pumping Station and abandoning the gravity outfalls.

The strategy study identified a range of capital works that may be required on the short, medium and long term planning horizons. The study also identified a range of factors that are interrelated and that could influence the efficiency and overall capital costs of improving the drainage of each catchment.

This combination of variables creates an opportunity to optimise the drainage of the catchment. Further feasibility studies will consider the variables in detail and have been commenced by Bullen Consultants. During the next phase the mathematical models will be extended and refined. The options for improvement will be considered in detail to enable plans for capital works to be developed.

During the following phase, the detailed feasibility study, the opportunity will be taken to produce water level management plans for each catchment. In addition, opportunities exist to consider environmental enhancement of the engineering options by extending wetland habitats and storage areas.



Islington Pumping Station



The Straight Mile

CHANGES TO THE UK WATER ABSTRACTION LICENSING SYSTEM



After graduating from Cranfield University in 1996 with an MSc degree, **Paul Wilman** worked for a number of years as a hydrogeologist in the Southern Region of the Environment Agency. Since 1999 he has held the position of Abstraction Licence Review Co-ordinator for the Anglian Region of the Agency. Here he outlines some of the proposed changes to the water abstraction licensing system in England and Wales.

Nearly everyone in England and Wales who needs to abstract water from rivers, canals, reservoirs, lakes or from a groundwater source requires a licence from the Environment Agency. There are about 48,000 licensed abstractions in England and Wales.

The present system for the control of water resources was introduced in 1965 with the Water Resources Act, 1963. Since then the demand for water has increased. In addition to the increased demand, environmental uncertainties and expectations are growing and commercial practices have changed. The existing licensing system thus no longer reflects the best way of managing water resources for the future.

After the series of droughts in the 1990's and increased public awareness that some licensed abstractions are contributing to environmental damage, the British Government undertook a review of the abstraction licensing system of England and Wales¹. Its final decisions were published in March 1999 in the document "Taking Water Responsibly"². The proposed changes will affect all licence holders and other parties with an interest in the management and control of water resources.

What Changes are Proposed?

More than 40 proposals are set out in *Taking Water Responsibly*. Some of the most significant are summarised below:

- local Catchment Abstraction Management Strategies (CAMS) will be developed;
- new authorisations will be time-limited, and most existing authorisations will be converted to time-limited over a period of time;
- some major abstractions, including those for trickle irrigation, dewatering and navigation will be brought into the licensing system;
- various water resource management powers will be introduced, including a duty on all abstractors to use water in an efficient manner;

¹ *The Review of the water Abstraction Licensing System in England and Wales – Government Consultation Paper. DETR and Welsh Office, June 1998.*

² *Taking Water Responsibly – Government decisions following the consultation on changes to the abstraction licensing system in England and Wales. DETR and Welsh Office, March 1999.*

Some of the Government proposals require new primary legislation, whereas other areas do not. Initially the Environment Agency is concentrating on those areas that do not require new legislation. These include:

- Catchment Abstraction Management Strategies (CAMS);
- time-limiting of licences;
- restoring sustainable abstraction by dealing with damaging abstractions;
- reviewing licence administration procedures;

Catchment Abstraction Management Strategies

This major initiative will provide the opportunity, at a local level, for groups and individuals to contribute to the development of the strategy to be adopted for the catchment. The Agency's vision for CAMS is that they represent a "a shared strategy for the sustainable management of water resources". CAMS will provide information on:

- the availability of water in a catchment;
- licensing practice in dealing with new applications;
- changes needed to the abstraction regime in the catchment in order to achieve the sustainable long term use of water resources;

CAMS will provide a transparent basis for planning by abstractors, the Agency and all other interested parties.

Time-limiting Licences

The Agency already imposes time-limits on some abstraction licences, but in the future all new abstraction authorisations will be time-limited. Existing licences will also be converted to a time-limited basis.

Restoring Sustainable Abstraction

At present there are a number of abstractions that may be affecting sites of environmental importance. The Government has confirmed that the Agency should continue to seek voluntary action by licence holders whose abstractions are shown to be damaging sites. Where no agreement is reached the Agency can use existing powers to alter or revoke licences. Where changes are achieved by varying or revoking licences, the Agency may need to pay compensation to licence holders who incur losses.

Review of Licence Administration Procedures

New licence administration procedures will be aimed at improving the flexibility, accountability and administrative efficiency of the existing authorisation process. Particular areas that are being considered are:

- *widening the availability of information on applications, perhaps using the Internet;*
- *reviewing performance on the determination of applications;*
- *ensuring that decisions made on applications are explained clearly;*

When will the Changes Take Effect?

Some of the proposals in "Taking Water responsible" require new primary legislation. An example includes bringing trickle irrigation, dewatering and abstraction for navigation into the licensing system. The Government has announced its intention to produce a draft bill in 2000. The Agency is thus making plans on the basis that the new legislation may be approved in the next parliamentary session.

Consultation – April 2000

The Agency is currently consulting on its proposals for the production of CAMS and the approach to time-limiting of

abstraction licences. The consultation exercise commenced in April 2000 and the closing date for responses is 31 July 2000. Following the consultation the Agency will produce a consultation response document before commencing the production of CAMS for individual river catchments (or groups of catchments) from April 2001.

A consultation pack entitled "Managing water Abstraction: Towards a Shared Strategy" has been produced. This can be obtained from the Agency's web site: www.environment-agency.gov.uk, or by writing to: **Gwyn Williams, Environment Agency, Wrens Court, 15-17 Lower Queen Street, Sutton Coldfield, West Midlands, England, B72 1RT.**

IRRIGATED AREA IN THE UK

ICID central office recently requested some updated figures. **Kelth Weatherhead** provided them:-

MAFF reported that 155,650 ha were irrigated in England in 1995. All of this is sprinkler (mostly hosereel-gun or hosereel-boom) except for a small area of trickle.

The MAFF Irrigation Survey for 1995 suggested trickle accounted for 2.5% of the total area irrigated in England (MAFF, 1997). According to the MAFF surveys, the total area equipped with trickle irrigation grew steadily until 1982, declined slowly until 1987, and is now growing strongly again. The area under trickle more than doubled between 1992 and 1995. Recent industry estimates confirm that the market share of trickle is still growing strongly.

Unfortunately, the MAFF statistics do not indicate which crops are being trickle irrigated, nor on which crops the growth is occurring. However, regional growth trends can be observed. The MAFF data confirms that trickle usage remains heavily concentrated in areas growing top fruit, small fruit and vegetables. In 1995, a quarter of the entire trickle irrigated area was in Kent alone, where it accounted for 14% of the total irrigated area. Kent was also the predominant user of mains water for irrigation, suggesting another possible link.

The MAFF figures are lower than private estimates from within the industry.

MAFF have not repeated the survey since 1995.