

UK WORK

Flooding in Iffley Oxford

WRA LLP was commissioned by the Friends of The Fields Iffley, Oxford, to undertake a hydrological survey of the Meadow Lane/Church Way field in order to assess the risk of flooding and possible impacts to the environment if the area is developed for housing.

This work presented information on the background environment at the site, the hydrology and the flood risk, in the level of detail which is associated with a Flood Risk Assessment submitted to accompany a planning application. The study has also undertaken some hydrological modelling, to identify flow pathways and estimate the greenfield and developed site surface runoff. The development of the site would be possible if appropriate surface water management measures were included to reduce flood risk and to enhance the environment, such as incorporating wildlife ponds. The impact on CO₂ sequestration was also considered. It was recommended that any changes to the habitats on site should aim to mitigate the loss of important carbon stocks and to ensure similar sequestration rates can be achieved in order to make the development carbon neutral.

Figure of Iffley Field and recent flooding.



Flood Assessment Penley Mill Lake, Wetland and Wildflower Meadow near Wrexham, Wales

Penley Mill Lake was assessed from a flooding perspective, to assess the impacts of a new lake on floodplain level and flood storage, thereby reducing downstream flooding. The FCA demonstrated that any increase in ground level which results from the re-distribution of soil arising from the excavation lies outside the area of predicted maximum flooding.

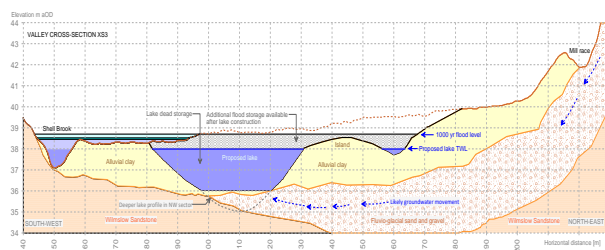
Excavation is likely to intercept the underlying glacio-fluvial sand and gravel containing groundwater, in addition to minor seepages in silty sand lenses in the clay alluvium. These deposits were confirmed in hillside exposures to the east of the proposed lake area.

A disused mill race bund and ditch at the edge of the floodplain still has sufficient definition to intercept, divert and focus local overland flow, during intense rainfall from the local catchment. Breakthrough drainage points were identified on the millrace aligned across the floodplain and feeding areas of marshy grassland. These linear features are mainly present to the south of the proposed lake and cross the area of proposed spoil disposal to form the wildflower meadow.

Mitigation measures were designed to divide the mound into segments, moulded into the side of the existing slope up to the millrace bund, maintaining existing gradients of 1:7 to 1:13, down-hill from the old millrace.



Emral Brook upstream of Penley Mill and geology



OVERSEAS WORK

New Multibranch Model of Water Quality for Bangladesh Rivers

As part of the ongoing Oxford REACH programme Paul Whitehead, Gianba Bussi and Li Jin from WRA and Prof Abed Hossain from BUET (Bangladesh University of Engineering and Technology) have further developed the INCA model to simulate all the rivers in the Dhaka Region (Figure below). The models simulate flow, nutrients (N, P, Ammonia), Dissolved Oxygen, BOD, pathogens, sediments and 8 heavy metals. Scenarios for pollution clean up are being undertaken to design optimal strategies to spend the \$8billion of funding planned over the next 20 years.



SAGIS Development

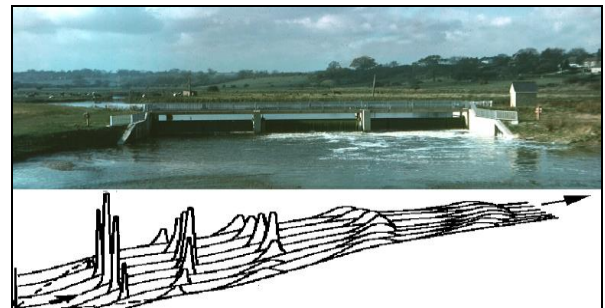
Sean Comber has participated in a project using the SAGIS model as used by the Water Industry and regulators to set policy for those responsible for discharges of pollution into UK waters. The Source Apportionment Geographical Information System – water quality model (SAGIS-SIMCAT) completed in 2015 to apportion loads and concentrations of pollutants, including agricultural runoff, and sewage effluent entering rivers and lakes, has been continually developed through a series of projects to date.

The recent projects have focused on inclusion of Chemical Investigation Programme (CIP) data into the SAGIS model, WRA systematically analysed data acquired via the £130 million Chemical Investigation Programme undertaken by the Water Industry to quantify the chemicals entering and leaving sewage treatment works across the UK, to establish their significance as sources of pollution to UK rivers and incorporate the data into SAGIS. SAGIS has been used to inform £4.5bn spend on water quality improvements by the Water Industry between 2020-25.

New International Lecture Course: Surface Water Quality and Management

In September Paul Whitehead will offer online a new course of surface water quality, Modelling and Management. This will be available from WRA and will include a set of 14 lectures and free training software from Paul and guest speakers from the UK EA, Atkins global, Sweden and Australia. Introductory lectures on water quality and pollution issues, lectures on modelling techniques, river and catchment modelling, case studies, the EA approach, the Atkins approach, key management issues with free modelling software for the Integrated Catchment Model and practical, demonstrations and self-learning guidance. Contact paul.whitehead@watres.com to enroll in the course. WRA Certificate available.

Figure: Modelling a slug of pollutant moving down a river system



Frank Farquharson Retirement

Sadly, Frank Farquharson is retiring this summer as a partner of WRA, Frank has been a staunch supporter of WRA since he joined in 2014. His extensive knowledge of hydrology and his great experience in the UK and overseas will be sorely missed, as will his excellent sense of humour. However, Frank is staying on as an Associate, so I suspect Frank will make future contributions to the WRA portfolio of work, and we look forward to working with him in the future.



Next WRA Board Meeting -- October 13th, 2022 at 09.30 hrs in Blewbury.

The WRA Bulletin is a quarterly publication, and relies on contributions submitted by Partners, Associates and Consultants. The document is circulated by email, and published on the WRA web-site, aiming to keep the WRA network up-to-date with respect to current activities. Please email contributions for future issues to Paul Whitehead: paul.whitehead@watres.com

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