

WRA Bulletin 37

March 2014

Flooding

Flooding is the natural hazard which has the greatest impact on the UK whether the source of the excess water is from rivers, the sea, surface water or groundwater. This has been particularly evident over the current winter with many communities and essential infrastructure being badly affected.

WRA partners and associates have a wealth of expertise in flood related studies over a range of scales from local flooding issues affecting a single property through to catchment scale flood modelling and strategic studies at a countrywide level. This bulletin highlights some of the recent projects undertaken in the UK and overseas.

The issue of flood risk in the UK and in particular the control of development on floodplains has been an integral part of the planning process since 2001. In areas deemed to be at a risk of flooding as shown by the Environment Agency flood zone maps, all developments should be accompanied by a flood risk assessment (FRAs). All too often however FRAs are undertaken by unqualified organisations and seen as a simple engineering type checklist. The Environment Agency and local authorities are also often guilty of ignoring the flood risk and allowing developments through the rubber stamping poorly written FRAs in areas of high flood risk (see below).



Development on sites such as these is often allowed following approval of poor FRAs.

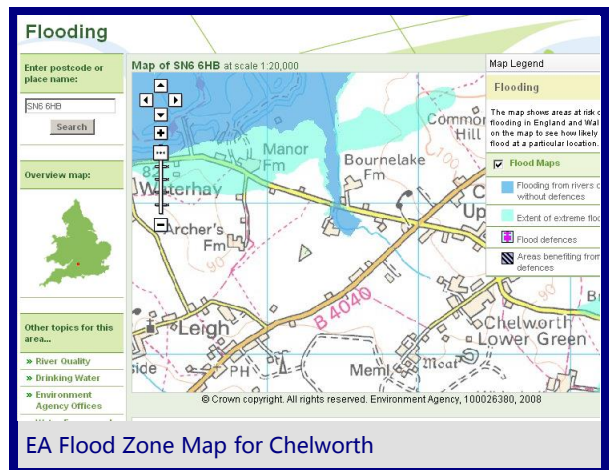
WRA always provides in depth hydrological studies as a key part of any flood risk assessment, supported by hydrological modelling, hydrodynamic modelling and geographical information systems (GIS) where necessary. A number of WRA partners and associates have worked on original Flood Studies Report and Flood Estimation Handbook research projects, which

are the key flood related studies to have been undertaken in the UK.

In addition WRA partners and associates have managed flood risk mapping projects for the Environment Agency and therefore have a detailed understanding of how these maps have been generated. It is often the case that the Environment Agency maps as shown on the internet do not provide an entirely accurate indication of flood risk because used a very general approach. More detailed studies undertaken for a specific site can give a much better assessment of the risk and in many cases show a lower degree of flood risk.

Chelworth Lodge Flood Risk Assessment

A landowner wished to develop a 2.5ha site in Wiltshire to accommodate 16 permanent caravan pitches for travellers (gypsies). However the planning authority and the Environment Agency (EA) objected to this on the grounds that the bulk of site was within flood zone 3 and affected by backwater from the Thames approximately 0.9 km north of the outflow from the site (see EA flood map). The blue area south of the road from Waterhay past Bournelake Farm indicates the site of the study.



The unnamed watercourse draining into the south eastern boundary of the site from Chelworth Lower Green drains a small catchment area of 3.4 km² covered predominantly with Oxford clay. The EA claimed that the flooding was caused primarily by backwater from the Thames yet hydraulic modelling by WRA demonstrated that this was not the case; flooding was caused by runoff from the upstream catchment, exacerbated by significant increase in

runoff from industrial developments within the catchment.

Flood water from upstream was impounded behind the embanked road, which was some 0.5 to 1m above general site level, and by a small brick arch culvert in the northwest corner of the site, which modelling showed was under-capacity as shown in the photo below.



Culvert overtopping in July 2007

Two planning inquiries took place during which WRA presented results of a series of hydraulic modelling studies demonstrating that previous planning consents upstream allowed by the local authority combined with impeded flows from the road embankment and under size culvert were responsible for flooding of the site, not backwater effects from the Thames. Consequently the Planning Inspector rejected the local authority objections to the planning application and instructed Wiltshire County Council (the owners of the road and culvert) to enlarge the culvert in order to remove the flow impediment such that the site can be developed.

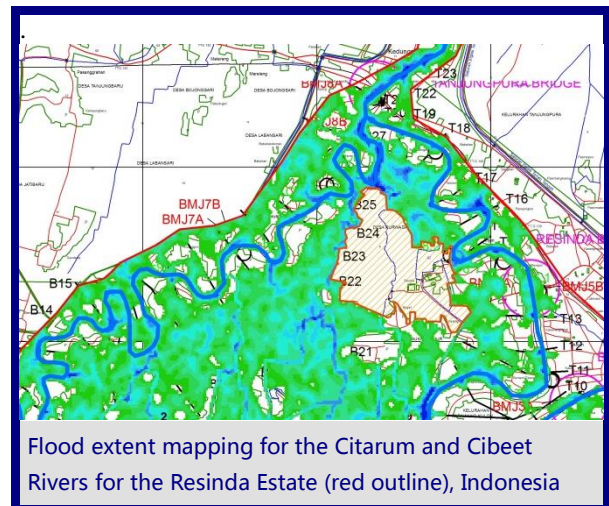
Other flood related work in the UK where WRA LLP has expertise includes the preparation of hydrology reports to assist with the insurance, sale or purchase of property, preparation of hydrology reports as part of the requirements of the Code for Sustainable Homes, the design of sustainable drainage systems (SUDS) preparation of surface water management plans, and local studies involving river, surface, groundwater and coastal flooding.

WRA Overseas Flood Studies

Overseas, WRA LLP has undertaken flood related studies across the globe with current studies on-going in Europe, the Middle East, Africa, India, central and south-east Asia. A recently completed study involved

the design of flood defences for an industrial complex at Resinda in Indonesia, on the Island of Java some 50km east of Jakarta. The site in question was located on the floodplain of the Citarum and Cibeet rivers and had been flooded in January and February 2013. The site owners were looking to build new flood defences but the residents of local villages were concerned that any new flood defences would divert floodwaters into their neighbourhood.

The study included a hydrological analysis of rainfall and flow data, a detailed topographic survey of the river channels, development site and surrounding area, hydrodynamic modelling using the ISIS 1-d hydraulic modelling software and mapping of the flood extent using GIS. The study provided a recommended level for flood defences to be effective against the 1 in 100 year flood and also tested scenarios to ensure that the raising of flood defences would not adversely affect local villages.



Flood extent mapping for the Citarum and Cibeet Rivers for the Resinda Estate (red outline), Indonesia

WRA Partner/Associate News

Paul Whitehead, Harvey Rodda and Richard Bradford were amongst 200 delegates at a CIWEM conference on Fracking held in Regents Park on 6th November 2013. The presentations gave more details on what is generally a poorly understood industrial process in this UK.

Next WRA Board Meeting

4th April 2014, Blewbury

The WRA Bulletin is a quarterly publication, and relies on contributions submitted by Directors, 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 Harvey Rodda: harvey@watres.com

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