

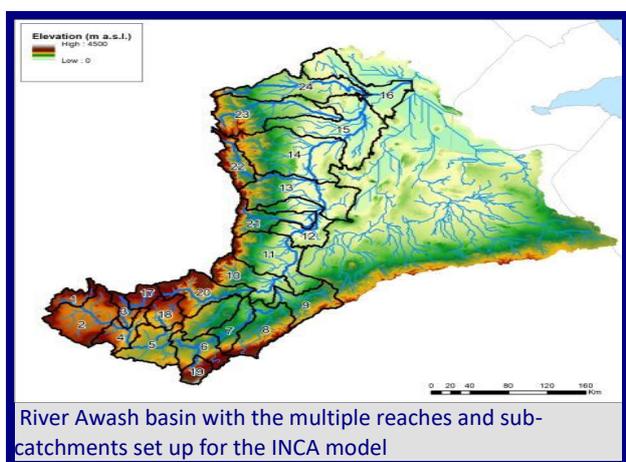
# WRA Bulletin 52

April 2019

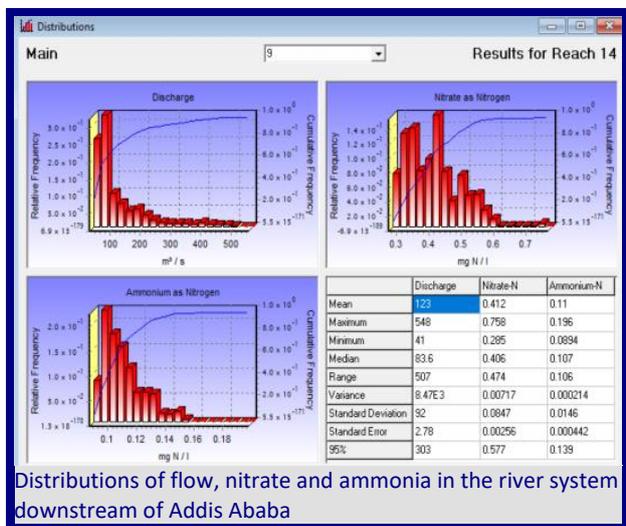
## OVERSEAS WORK

### Modelling the Awash river basin, Ethiopia

As part of the DFID funded REACH project at Oxford University, a flow and water quality modelling study has been undertaken on the River Awash basin in Ethiopia by Partner Paul Whitehead and his colleagues at Oxford.



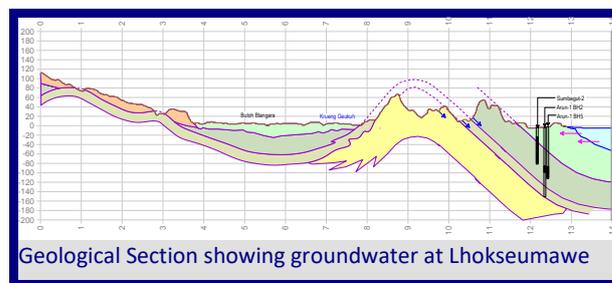
The aim has been to assess the potential impacts both of pollution from Addis Ababa and of population change arising from migration into the city. The INCA flow, nutrients, and salinity models have been set up for the catchment and preliminary studies undertaken to calibrate and validate the flow and water quality. This is ongoing research and a full set of scenarios will be undertaken in the future.



### Groundwater Supply Review in Sumatra, Indonesia

WRA-GeoIndo completed a groundwater supply review study in October 2018 for Spanish client TSK, as part of a feasibility assessment of a freshwater supply scheme for power station cooling and firefighting at Arun and Sumbagut, just north of Lhokseumawe.

During the study, Partner Paul Holmes looked at the quantity and salinity of groundwater that could be pumped from deep boreholes in the sedimentary basement underlying a 50m thick sequence of saline alluvial deposits on the coastal plain.



Groundwater development for the power stations will be challenging and requires significant skill and water well drilling expertise. A deep exploration borehole will be drilled in the next phase to 200 m bgl, and water-bearing layers tested separately using packers to determine individual characteristics.

It is also important to establish the degree of existing usage of groundwater for public water supply and other uses, for example in the LNG-Pertamina complex.

## UK WORK

### Thames Water Reservoir, South Oxfordshire

As part of the new proposals for a reservoir situated on land south of Abingdon, a feasibility study prepared by Thames Water was submitted in 2017. WRA LLP were engaged by two local groups, East Hanney Parish Council and the Group Against Reservoir Development (GARD), to consider the potential impact of flooding from the reservoir on the villages of East Hanney and Steventon; Partner Harvey Rodda undertook this review.

The planned location of the reservoir would incorporate alterations to the course of local streams draining from the Berkshire Downs and flowing north towards the Thames. The impacts on the Ginge Brook,

the stream flowing through Steventon, and on the Letcombe Brook, which flows through East Hanney, would be minimal because the proposed reservoir lies outside their respective catchment areas. However smaller streams, notably the Cow Common Brook and Portobello Ditch, would need to be diverted to the west if the reservoir was built and could cause flooding of the main road between Steventon and East Hanney. Revised proposals for the reservoir would need to address this issue of flooding, and provide a proper design of any flood alleviation measures.



Proposed location of the Thames Water reservoir shown in blue, with the potential area of increased flood risk to the Steventon-East Hanney main road circled in red.

### Public Water Supply and Ashford Local Plan

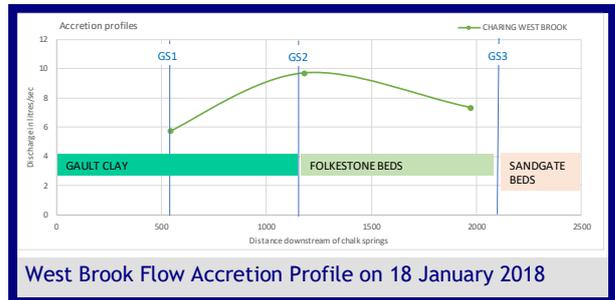
In 2018, WRA assisted local activists in the preparation of the Ashford Local Plan, Charing Neighbourhood Plan and village guidelines. This involved Paul Holmes and Harvey Rodda making a hydrological assessment of the Upper Stour catchment in Kent, with particular focus on flood risk, stream baseflow and environmental flows in the context of proposed development and public water supply in the area of Lenham and Charing.



Aerial view of the headwaters of Charing West Brook

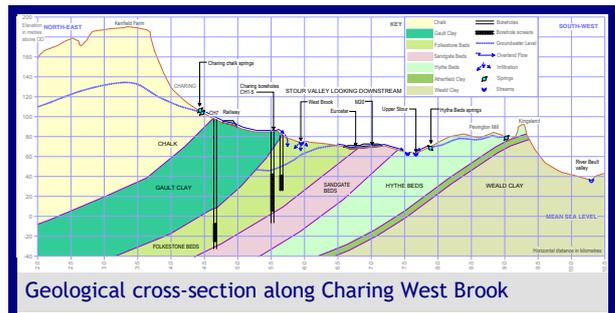
In particular the work scrutinised proposed residential development of 530 new homes in sensitive Chalk spring areas. Springs occur at the Chalk-Gault Clay GC boundary along the North Downs escarpment, which give origin to streams flowing across the Gault

Clay and Folkestone Beds FB that then discharge into the Upper Stour stream. Accretion profiling of the stream showed that discharge reduced by 24% feeding the FB aquifer.



South East Water operates five boreholes at Charing drilled through Gault Clay into the Folkestone Beds aquifer and located at a key point in the supply network between Maidstone and Ashford. While there are regional plans to increase supply through schemes such as Broad Oak Reservoir, district planning should ensure that development plans do not have an adverse impact on the existing yield of water supply sources.

Activities and land development which reduce recharge of the Folkestone Beds aquifer will result in a reduction in the yield of the existing boreholes at Charing.



Unfortunately, there is a fatal flaw in current local planning procedures, when addressing water resource matters, due to the fact that hydrology is not always fully understood, and planning rules and guidelines are insufficiently comprehensive to analyse all aspects of the water dilemma. Basic planning tests place undue focus on flooding and pollution, making it possible to miss important aspects of “water quantity and water balance”.

The proposals for large-scale development across an important Chalk scarp spring-line demonstrated an inherent lack of understanding of hydrological processes, and the adverse impact on public water supply and environmental baseflows in the Upper Stour stream.

### Next WRA Board Meeting

Friday 5<sup>th</sup> July 2019, Marlow.

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 Nick Mandeville: [nick@watres.com](mailto:nick@watres.com)

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