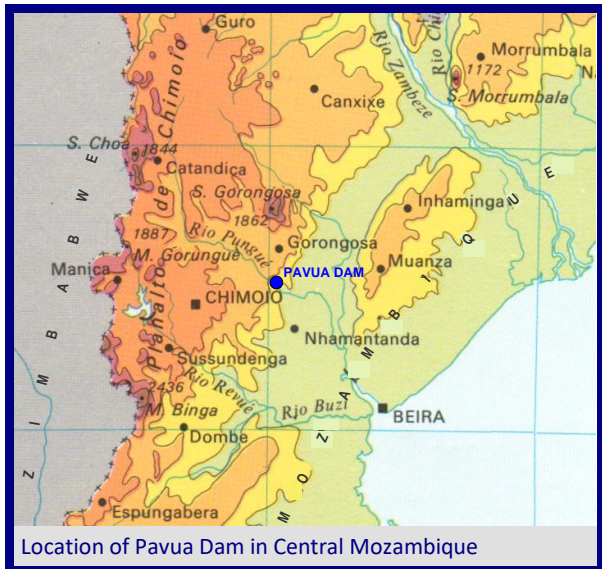


## OVERSEAS WORK

### Pavua Dam, Mozambique

Frank Farquharson, supported by other Partners Paul Holmes and Ron Manley, carried out a review of the flood studies for Pavua Dam on the Rio Pungue in central Mozambique, which included estimation of the Probable Maximum Flood (PMF).

The Pungue rises on the western flank of Inyangani, Zimbabwe's highest mountain, and then flows across a relatively rocky Chimoio plateau with scattered monadnocks before cutting down to the floor of the East African rift system, where Gorongosa National Park is located.



Location of Pavua Dam in Central Mozambique

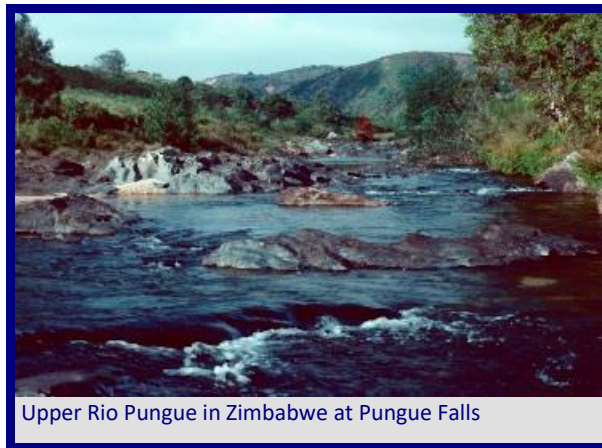
Several possible hydropower sites were identified by consultant SWECO in 2004 where the river falls down to the rift, of which one is at Pavua dam site.



Artist's impression of proposed Pavua Dam

More than a third of the mean annual runoff at Pavua is generated within Zimbabwe because of its higher annual rainfall. Satellite-derived TRMM rainfall data, supplied by Associate David Plinston, were used to

support the analysis of 60 years of observed rainfall data at Catandica.



Upper Rio Pungue in Zimbabwe at Pungue Falls

Good river flow data were available for 1950-1975 at Bué Maria, which is located 17 km downstream of Pavua and has a catchment area of 15,320 km<sup>2</sup>. Hydrological records were generally disrupted by the country's civil war between 1975 and 1995.

The unit hydrograph derived PMF of 17,450 m<sup>3</sup>/s was adopted as the best estimate, although this was 20% higher than the Zone 5.0 estimate drawn from the regional statistical flood analysis of southern Africa, prepared by Kovacs in 1988, which was extrapolated into Mozambique as part of this study.

## UK WORK

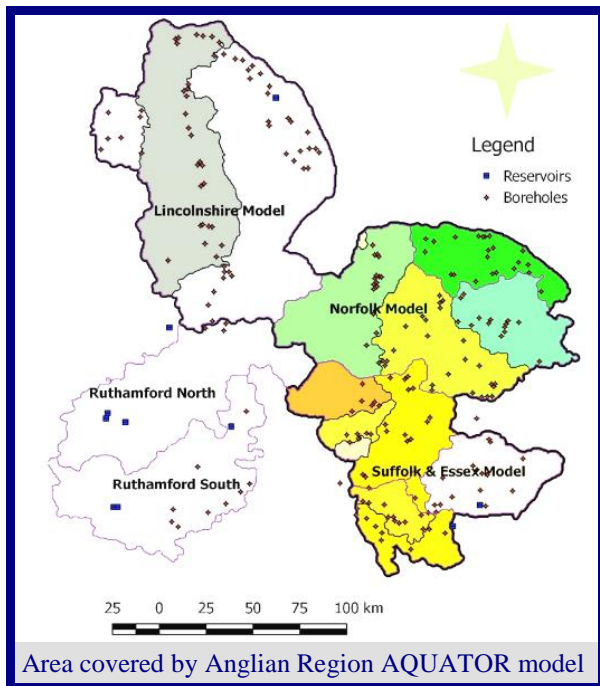
### Peer Review of Anglian Region Model

Bulletin No 44 in April 2017 contained a summary of the Water Resource Management Plan studies being conducted by WRA, leading up to the periodic review in 2019. The clients include South East Water, Affinity Water, SES Water and Anglian Water. This section describes in more detail the study undertaken for the last of these four clients.

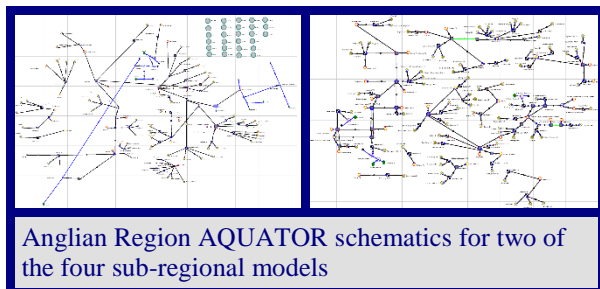
Anglian Water Services has developed a water resources system model of their water supply system using the AQUATOR model for the WRMP 2019. The model was initially configured as four sub-regional models, by consultants Hydrologic and Mott MacDonald.

WRA Associates, Rob Brown and Rachel Evans, have just completed a peer review of the modelling with particular focus on the following key areas: model build and assumptions used, reservoir control curves, the integration of water resource zones, deployable output methodology, resource zone running order,

representation of peak deployable output, system constraints, and comparison with other users' modelling across the British water industry.



Anglian Water has made a good start in making the transition from the previous MISER model to AQUATOR, in what is an ambitious project, both in scale and timing. WRA provided recommendations to improve the modelling to appropriate standards using a traffic-light system of priority ■ High, ■ Medium, and ■ Low.



### Steventon Public Inquiry

WRA Partners Harvey Rodda and Frank Farquharson, together with Associate Julian Smith, provided expert witness services to the Vale of White Horse District Council, as part of a Public Inquiry in May 2017. The Inquiry was held following an appeal by the developer after planning permission for some 30 houses at Brewer Close, Steventon, Oxfordshire was refused by the local authority. WRA were able to demonstrate that the proposed development, located on the floodplain of the Ginge Brook, was not feasible, despite revisions of the flood maps using 1d/2d

hydraulic modelling and proposed flood alleviation measures.



The key point against the development was the lack of safe access from the site during times of flood. The appellant had claimed that the July 2007 flood, which was filmed showing a torrent of fast flowing water some 0.3-0.5m deep down the only access road to the development site, was somewhere between a 10 and 20-year event. They then incorrectly argued that access during the design 100-year flood would be safe. This error was made clear by WRA to the planning inspector, and it was amongst the reasons that the appeal was rejected.



### WRA Board Meetings

12<sup>th</sup> January 2018, Chalgrove

13<sup>th</sup> April 2018, 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 Nick Mandeville: [nick@watres.com](mailto:nick@watres.com)

Water Resource Associates LLP, PO Box 838, Wallingford, Oxon OX10 9XA. Tel: +44[0] 1491 838 190, [www.watres.com](http://www.watres.com)