



E-Bulletin #7 Belford Burn

The village of Belford is located within a small (5.7km²) rural catchment in Northumberland. The 100-year flood in Belford presents a risk to 34 properties, a caravan park, the A1 and the East Coast Mainline railway. The catchment size and short time from the onset of rainfall to the resulting flood response (2 hours) make it very similar in some respects to that of the Potwell Dyke.

After failing to meet requirements for a traditional flood defence scheme estimated to cost around £3.5 million (Halcrow, 2007) several alternatives were explored. The EA and Defra, keen to trial an upland storage and attenuation approach conducted pilot work in the area, and went on to install 35 runoff attenuation features (RAFs) with a total storage capacity of 8000m³. More have been proposed by the EA (as of August 2013).

These features included a range of offline diversion ponds, permeable timber barriers, overland flow interception measures and large woody debris (see example photographs to right). Initial monitoring of the features showed that individual features have a relatively minor effect (approximately a 2% reduction) on downstream discharge. Often features were filling too quickly, and not storing the water that contributed to the 'peak flow' (Nicholson, 2013).

Modelling by Alex Nicholson and others at Newcastle has shown a carefully designed and placed sequence of 35 RAFs could reduce discharge in the 100-year storm by 18% and by up to 30% for smaller events. The estimated total cost of such a scheme is £70-£100k.

Whilst the approach remains highly experimental, Belford is providing good practice that may be used within similar rural catchments across the UK. It is unknown yet as to how well these features perform or cope in very severe events, but if carefully designed and positioned, their ability to reduce peak flow during smaller nuisance flooding events (<30-year) appears to offer promise.



Runoff attenuation features:

Temporary pond at Netherton Farm, Belford (left).

Permeable timber barriers (below and below left).



For further reading see:

<http://langcent.ncl.ac.uk/proactive/belford/papers/Nicholsonetal.pdf>

<https://research.ncl.ac.uk/proactive/belford/papers/BelfordBHS1.pdf>

Next Steps

Workshop Five will take place on Thursday 28th May from 7:00pm—9:00pm at a venue to be confirmed. This workshop will involve the exploration of four future scenarios for Southwell: post-2013 baseline, road closure programme, community stewardship and personal innovation. All are welcome.

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