6th EWA / JSWA / WEF Joint Conference
„The Resilience of the Water Sector“
15-18 May 2018, Munich, Germany

A New Sustainable River Management Approach for Improved Asset Resilience in a Water Utilities Company

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North West England

16th May 2018

Agenda

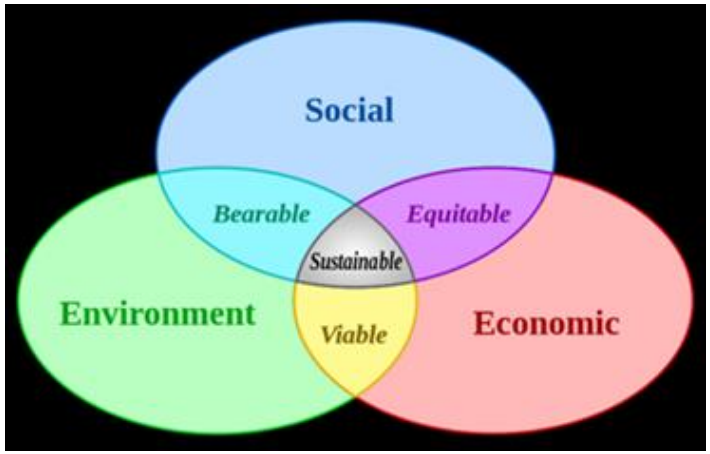
- Background: Resilience in the water and United Utilities
- Why do rivers move and what’s the problem?
- Sustainable options appraisal approach
- Asset resilience at the reach scale
- Lessons learned

Resilience in the water sector

Source: Cabinet office (2011) Keeping the country running: Natural Hazards and Infrastructure, Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61342/natural-hazards-infrastructure.pdf

Key leglislation

- Water Act 2014 (England and Wales)
- Water Framework Directive (WFD)
- Floods Directive
- Habitats Directive



One of the UK’s largest water utilities companies

7 million people

3,000,000 homes

200,000 businesses

2000 million litres of clean water

72, 000km of sewer network

1400 aqueducts

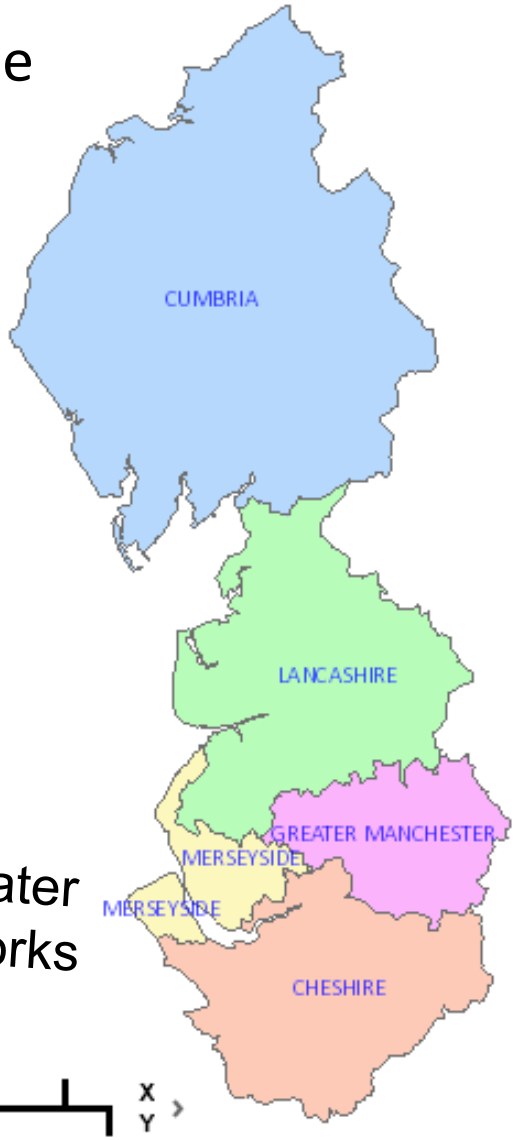
42, 000km of water mains

57,000 hectares of land

184 reservoirs

96 water treatment works

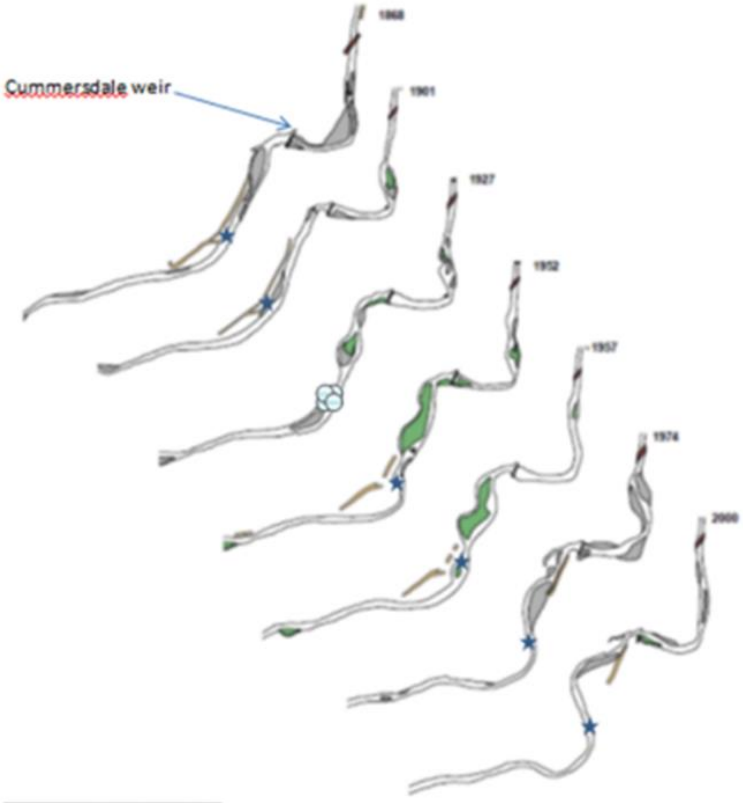
575 wastewater treatment works



http://corporate.unitedutilities.com/media-press-questions.aspx

Why do rivers move?

- Gradual natural channel changes
- Rapid channel changes
- Human influenced channel changes



What’s the problem?

- Assets vulnerable to extreme events

What’s the problem?

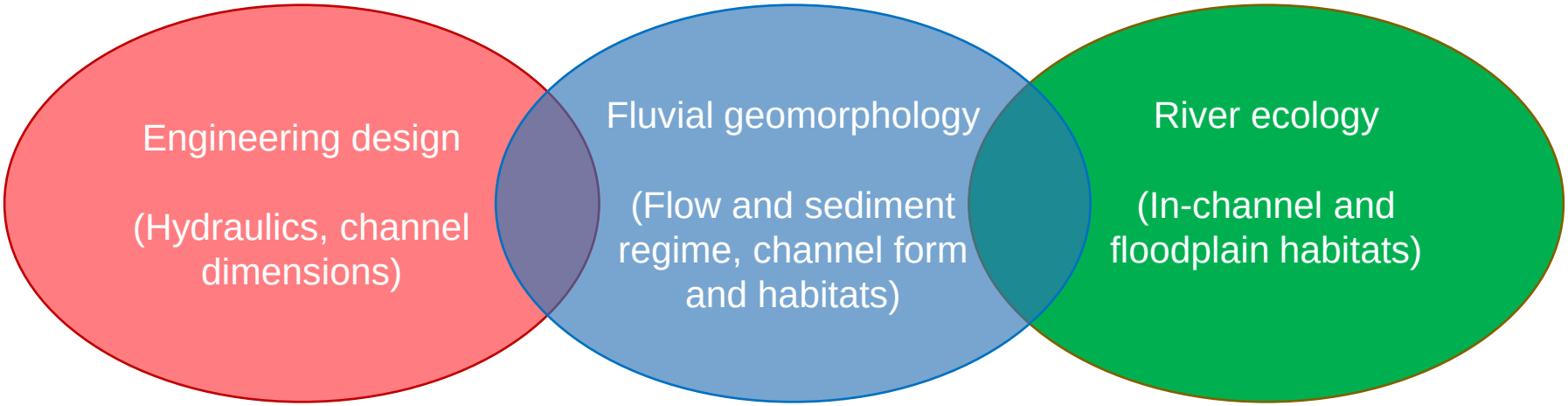
- Assets vulnerable to ongoing fluvial geomorphological processes

Traditional approach

- Civil engineer design
- Concrete bank protection
- Gabions
- River realignment
- Bank reprofiling
- Dredging

Asset resilience at the reach scale

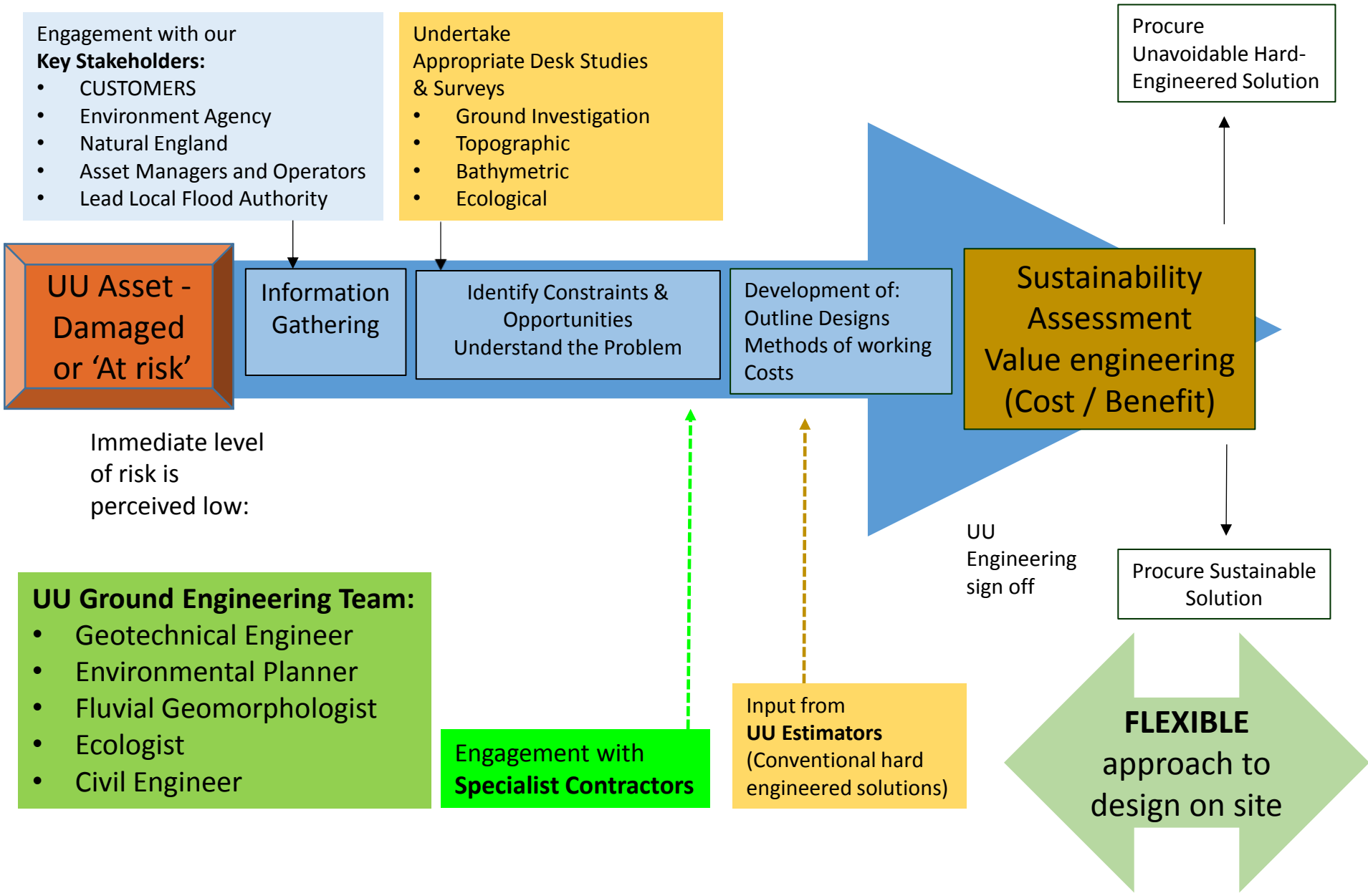
Sustainable approach



Geomorphological risk matrix

Likely magnitude of impact	**Significant**	**Risk Level 7** Considerable Management Required	**Risk Level 8** Necessary management and monitor risks	**Risk Level 9** Extensive management essential
	Moderate	**Risk Level 4** Risks may be worth accepting, with monitoring	**Risk Level 5** Management intervention worthwhile	**Risk Level 6** Management intervention required
	Minor	**Risk Level 1** Accept risks	**Risk Level 2** Accept, but monitor risks	**Risk Level 3** Manage and monitor risks
		Low	**Medium**	**High**
		Likelihood of adverse outcome		

UU Risk based sustainable options assessment process



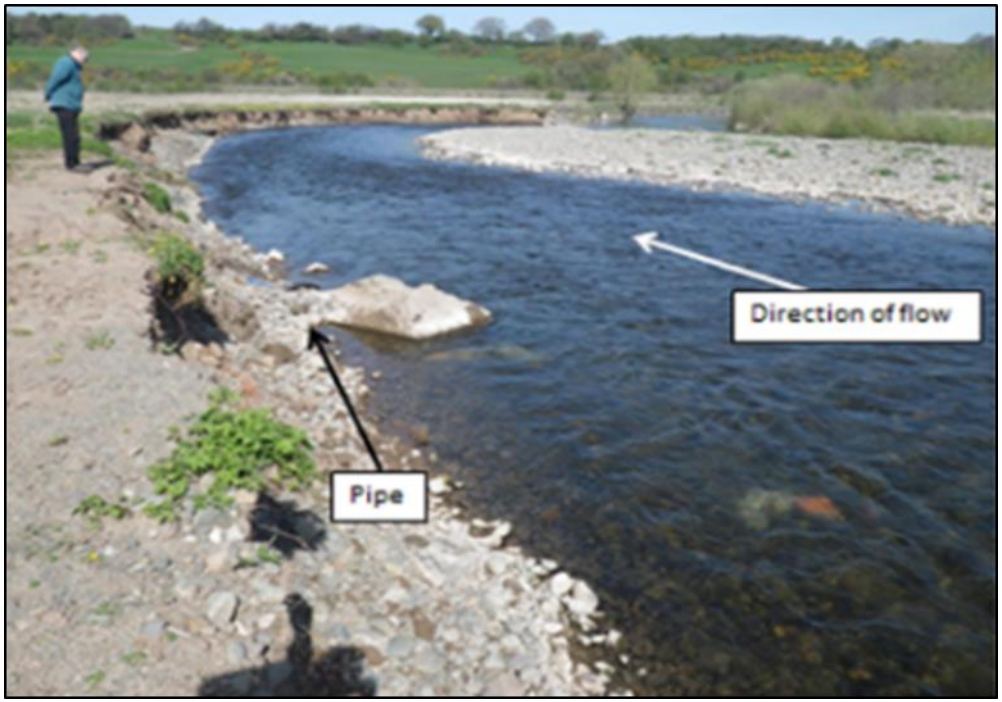
Case Study – River Caldew Cummersdale

Problem: Exposed water main

Diagnosis: Human induced channel change

Initial solution: Pipe bridge, reconstruct the river bank, gabion baskets/ rock armour protection.

Sustainable solution: Bury pipe at least 2m below river bed up to 40m either side.



Costs: circa £500k but significant savings compared to option for bank protection (circa £1m) and increased asset resilience

Case Study – Hugbridge washout chamber

Problem: Exposed washout chambers

Diagnosis: Gradual natural and human induced channel change.

Initial solution: Remove asset and reconstruct original river bank and protect with gabion baskets.

Sustainable solution: Remove asset, reprofile banks and leave to naturally recover (i.e. no hard bank protection).

Cost savings: Approximately £300k of savings compared with initial solution

Case Study - Thirlmere Catchment

Problem: Storm Desmond caused significant damage across whole catchment – UU landowner. Major erosion of A591.

Diagnosis: Rapid natural and anthropogenic channel change

Initial solution: Hydraulic modelling exercise and gabion basket solution to patches of erosion along Raise Beck

Sustainable solution: Natural, softer engineered solutions where possible with mixture of harder (but more sustainable) techniques

Cost/ Savings: £30k instead of £150k with minimal maintenance. Significant improvements to asset resilience as well as impacts on land / highways

Lessons Learned

What’s been key to success of the approach?

- Education of sustainable approach
- Landowner and stakeholder engagement
- Communicating relevance of key drivers
- Collaboration with key regulators
- Enforcement of legislation
- Successful project delivery

Where is there room for improvement?

- Early involvement of risk based approach
- Understanding of environmental risk by insurance companies
- Environmental clerk of works on site
- Proactive management using GIS
- Cost benefit analysis

Thank you

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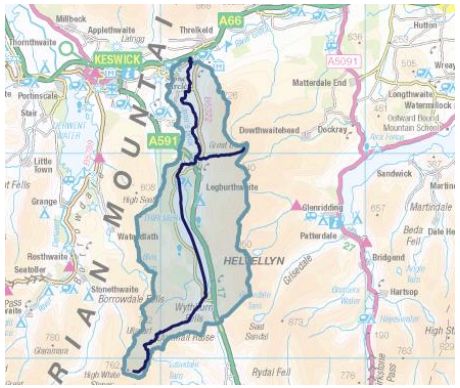
Asset management at the catchment scale

Asset Management at Catchment Scale

Catchment Managers



ScAMP

Reservoir discontinuance / Re-naturalisation of Watercourses

Sediment Management Plans