THE WATER HUB

Driving innovation and practical application in the water sector

\\\ Innovation Challenge:

Reducing the impacts of flooding by harnessing new technologies

MULTIPLE PERSPECTIVES

A. Improving localised flood warning services (Environment Agency)
B. Communicating flood risk more effectively (Durham University)
C. Bespoke support for people at risk of flooding - before, during and after the event (Northumbrian Water)

CONTEXT
NEED:

- Routine monitoring for flood warning is focused on main rivers. This makes it difficult for regulatory bodies to understand how floods develop and evolve in small catchments and hard to issue bespoke flood warnings in these areas. Sensing flooding in remote areas is a key challenge and offers an exciting opportunity for innovation.
- Sensing flooding to better predict sewer flooding....
- How can high quality flood warnings be issued earlier to give people as much time to respond as possible? Often warnings offer short lead in times, do not chart the likely progression of a flood and may not provide information in as useable form as people would like. There are many opportunities to harness new measurement and communication technologies to improve warnings through bespoke messaging to help those at risk make better informed decisions.
- Many organisations are involved in managing flood risk and supporting those who are flooded. Flood impacts are also complicated and can affect health, infrastructure, economics and safety in many ways. Joining up and integrating information to make communities more resilient provides an opportunity for innovation.

INSIGHTS:

- More can be done to reduce vulnerability and improve trust and understanding in flooding information by ensuring people know how to and have access to the right information at the right time and therefore know the most appropriate response to take.
- Emerging technologies and information products in sensing, data sharing, and forecasting means there's potential for cost effective, adaptable and improved products and services which could be more intuitive to learn from previous events.
- Traditional warning systems were based on recorded river levels upstream of warning areas based on sensors located a few hours travel time up the catchment and once a trigger met – a warning was triggered. But rapid response catchments do not allow this due to short response times. New technologies could help statutory authorities to reach more, and smaller, rural communities with flood forecasting and flood warning information to help them be aware of the potential for flooding.
- New data sets are being opened up for access which offers opportunities for communicating data differently, but also sharing data across users in more effective ways.

WHAT ARE THE DESIRED BUSINESS OUTCOMES?

- Create the best, most accessible flood forecasting, warning information and response service possible using all data out there, in a way which improves communication and reach to responders AND the public, especially for those in areas out with formal flood warning schemes.

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WHAT IS BEING DONE ALREADY TO TACKLE THIS CHALLENGE AND IS IT WORKING?

- Flood forecasting is a complicated science which involves computer modelling, operating forecasts, rainfall gauging, knowledge and interpretation of weather and hydrology, how catchments operate and what happens in rivers and on the coast.
- The Environment Agency manage a network of river and coastal gauging stations, which sends data into online displays. These are usually part of formal flood warning schemes, and the data feeds analytical tools, which helps create public-facing flood warnings.
- Priorities for community engagement around flooding are determined by the level of risk and protection and whether those communities are signed up to flood warning services. In some more remote areas the Environment Agency are unable to provide formal flood warning schemes, so smaller at-risk communities cannot receive more localised and timely alerting to potential flooding.
- Northumbrian Water is exploring ways in which flooding impacts water supply and treatment infrastructure to try to limit impacts of flooding on customers.
- Northumbrian Water is exploring causes of sewer flooding, the ways in which it is linked to heavy rainfall and how they can work with customers to limit impacts.

WHAT STANDS IN THE WAY OF GETTING TO THE DESIRED OUTCOMES?

- Current methods of data and information gathering for sewers....
- Traditional practices utilising national rainfall date, modelling and warning systems tend to focus on larger areas as investment is directed to where it can help most. A more flexible cost effective system which is easily installed and learns from past events would allow more targeted deliverables and potentially allow role out to river and sewered catchments.
- Environment Agency river level sensing capacity is limited to main rivers and so there is potential to install and maintain more localised sensors through communities as well as capturing rainfall data.

CHALLENGE SPONSORS

- Northumbrian Water offer;
  Funding package of up to £2.5k for 3 businesses and/or consortia to work with Northumbrian Water and The Water Hub to develop initial proof of concept ideas.
- Environment Agency offer;
  As part of their current work to scope this challenge area the Environment Agency would like to identify initial ideas and organisations who may be interested in collaborating further.
- Durham University offer;
  Durham University has funds available to support part of the costs involved in developing new products and processes in collaboration with other challenge sponsors.