

Southwell Flood Study Launch Event 17th September 2015

An overview:

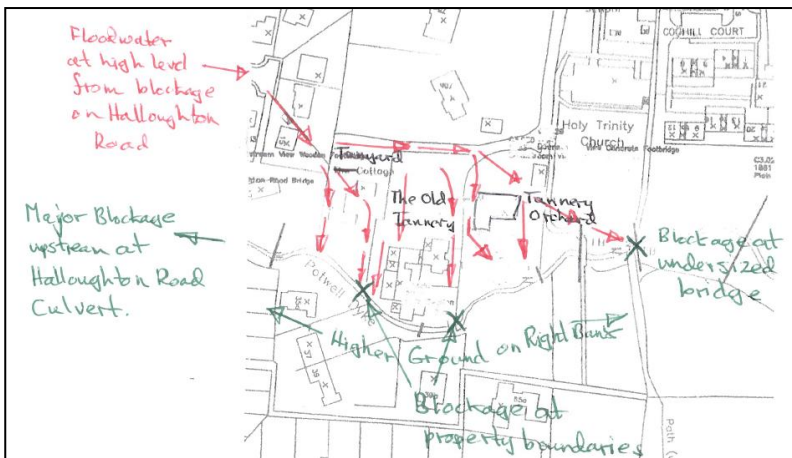
1. What has NCC appointed AECOM to do?
2. What do we know about flooding in Southwell?
3. What happened on the 23rd of July 2013?
4. How do computer models help us to understand flood risk?
5. What potential mitigation options have been assessed?
6. What does the emerging option look like?
7. What are the next steps for Southwell and the community?

Southwell Flood Modelling Study



Data Collection

“What do we know?”



 **SOUTHWELL FLOOD FORUM**
Community Protection & Support

Community Resilience Fundraising Flood Report Form Calendar Blog/Press Gallery Resources Contact

Flooding Events

Posted July 19, 2014
Event: 19th July 2014
Category: Flood Path - Halam Hill, Lower Kirkington Road and below
Tagged: Halam Road

19th July 2014
18th January 2014
28th October 2013
23rd July 2013
20th December 2012
25th November 2012
25th June 2007
August 1922

Categories

- Flood Path - Church Street/Newark Road
- Flood Path - Halam Hill, Lower Kirkington Road and below
- Flood Path - Isolated
- Flood Path - Nottingham Road/Tramchurn





“What happened on the 23rd of July 2013?”

- 93mm of rain fell in just 75 minutes.
- Equivalent to approximately 300 Olympic swimming pools.
- A storm of this intensity and duration has an return period of over 1,000 years.
- The annual probability of this occurring is $<0.1\%$

The 23rd July 2013 storm was described by the MET Office as:

“At the very least, one of the largest hourly rainfall events in the UK”

“What is an annual probability?”

The probability of a ‘1000 year’ or ‘0.1% annual exceedance probability’ (AEP) storm occurring in any given year is similar to:


- Flipping a coin ten times
- Getting 10 heads in a row



The chance of a ‘1000 year’ event occurring is independent of what may have happened in previous years.

Two ‘1000’ year events could happen in two consecutive years, although it is extremely unlikely to do so (the probability of this happening is 0.0001%).

“How can flood risk be visualised?”

 = the equivalent volume of 10 Olympic swimming pools



Rainfall volumes for a 3 hour summer storm over
the Southwell catchment (8 km²)

“What level of risk is typically mitigated?”

 = the equivalent volume of 10 Olympic swimming pools

‘<100 year’ standard of protection (e.g. Boscastle, Keswick)

‘100 year’ standard of protection (e.g. Trent Left Bank, West Bridgford FAS, Derby)

1% AEP



‘200 year’ standard of protection (e.g. Carlisle)

0.5% AEP



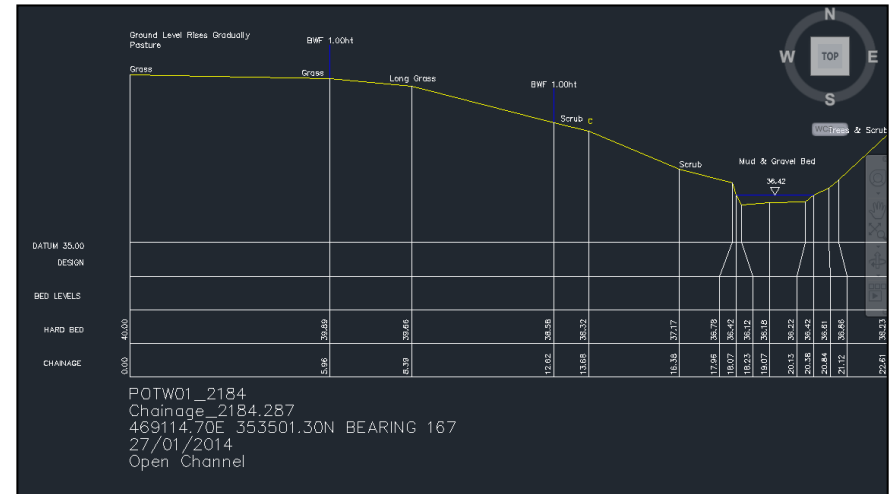
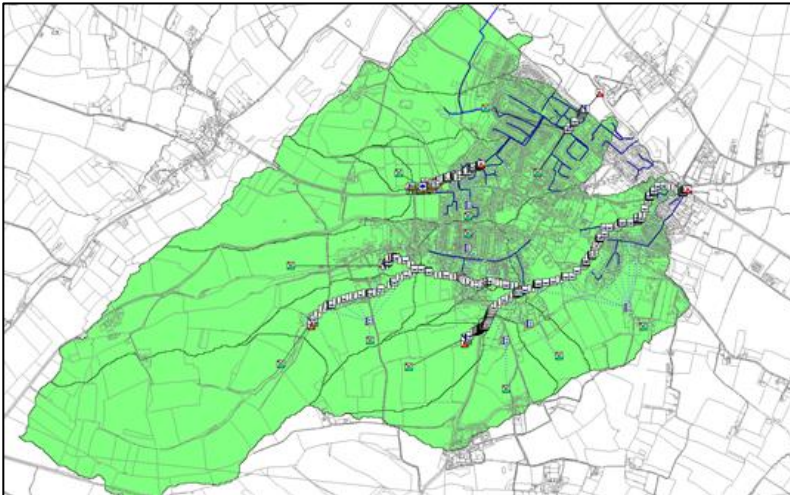
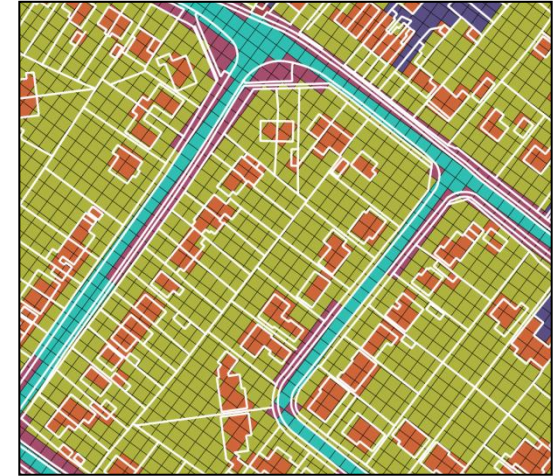
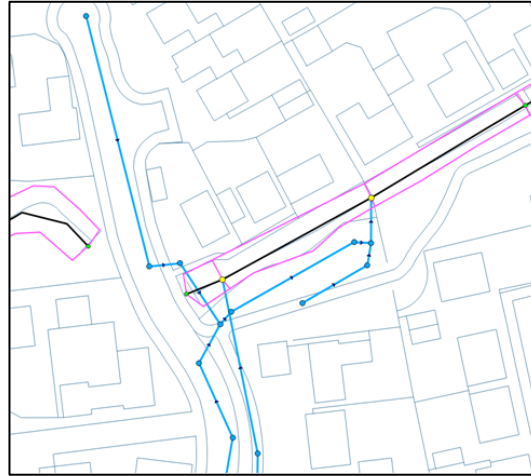
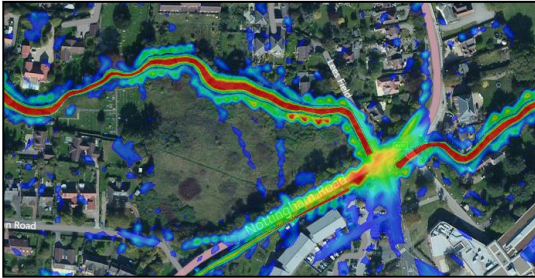
‘1000 year’ standard of protection (e.g. Thames Barrier)

0.1% AEP

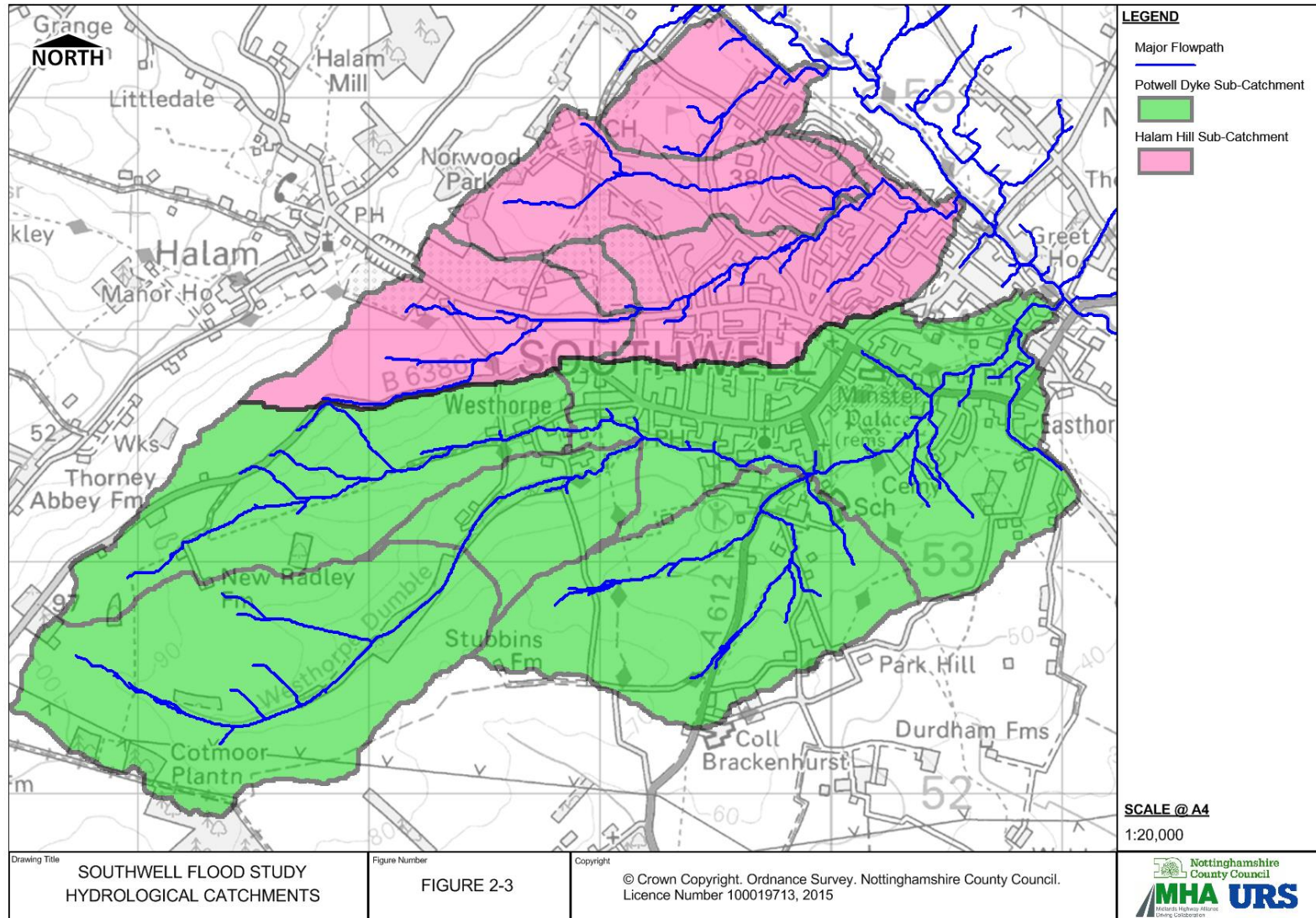


Storm Rarity

“What is at risk?”



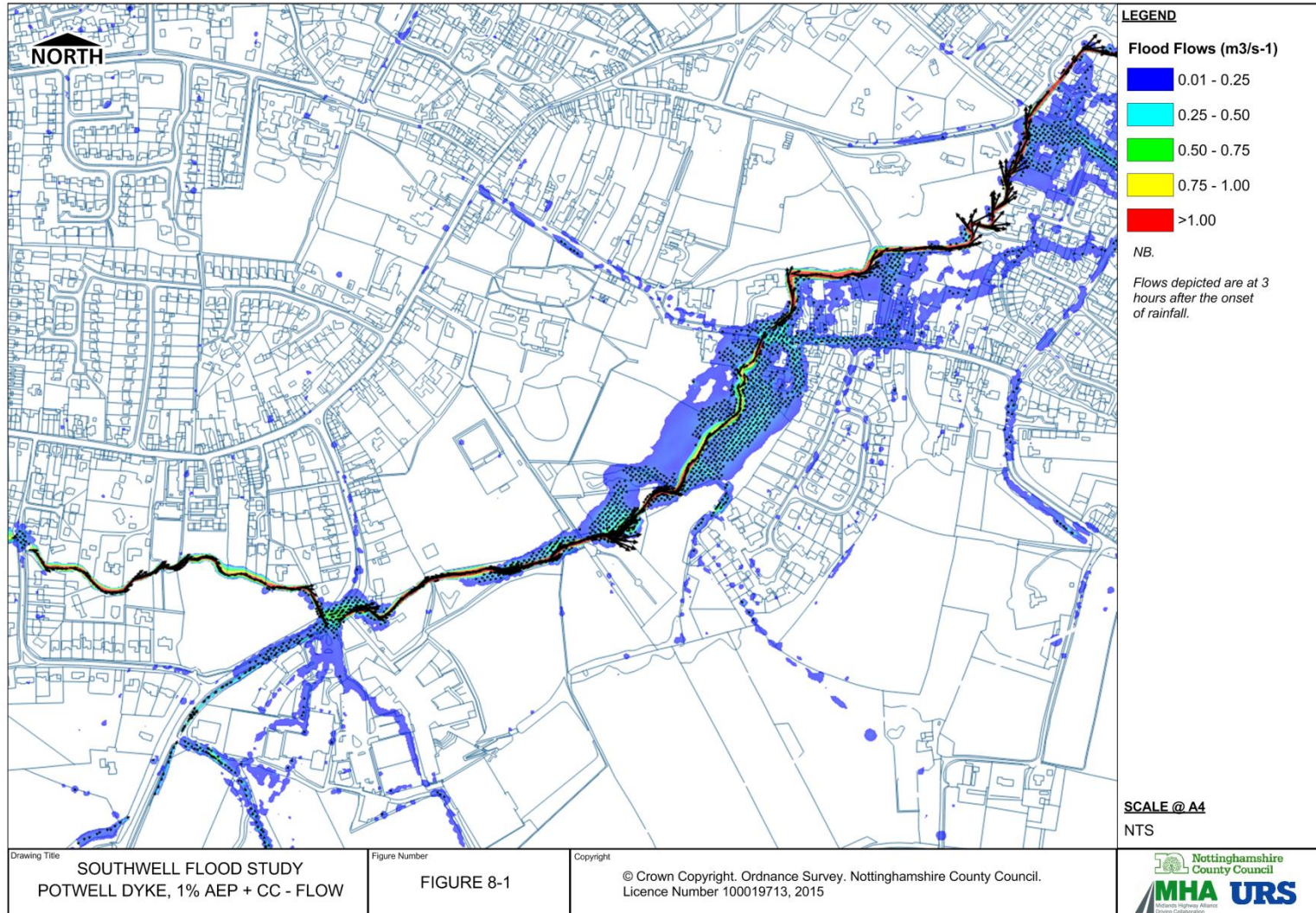
Computer Flood Modelling



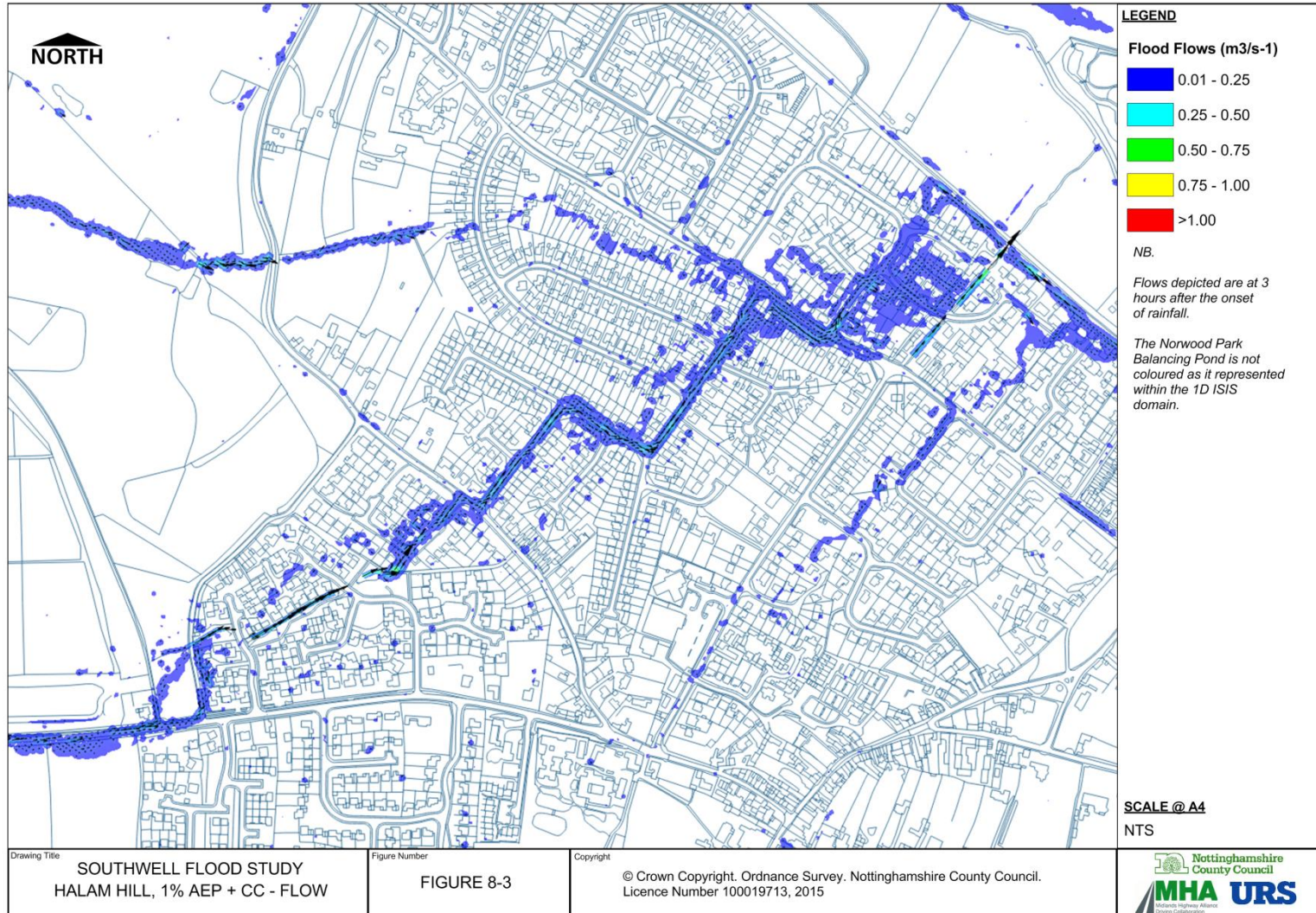
1% AEP flood plus climate change (animation)



Computer Flood Modelling



Computer Flood Modelling



“What does the model tell us about flood risk in Southwell?”

- Flood risk in Southwell is a result of:
 - Fluvial (river) flooding;
 - Surface water flooding.
- The flooding mechanisms in Halam Hill are different to those in Potwell Dyke.
- A solid understanding of the baseline flooding mechanisms helps to identify appropriate mitigation.



“What could be done to reduce flood risk?”

A long-list of potential flood mitigation options was determined in consultation with Nottinghamshire County Council and other key stakeholders, including the Southwell Flood Forum.

The proposed mitigation schemes typically focus on:

- Improving the temporary storage of floodwater.
- Improving the conveyance of floodwater through Southwell.
- Implementing hard defences and/ or local protection.

13 standalone or combined options have been assessed from the long-list.

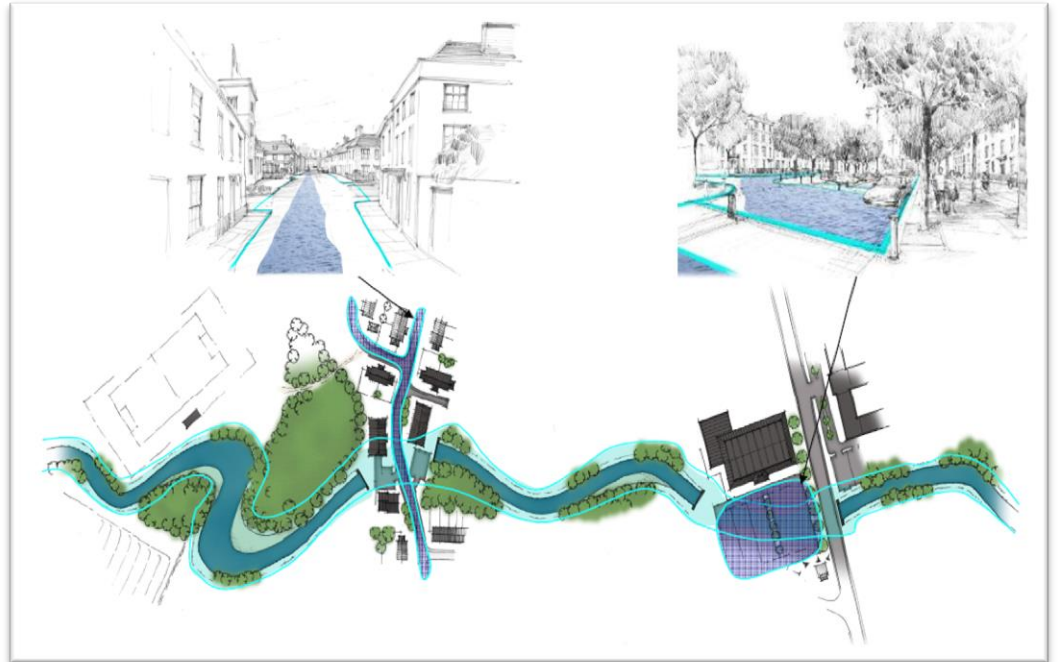
Flood Storage



Informal Storage (Belford)
Check weirs and/or control structures

Formal Storage (County Durham)
Impounding structure

Flood Conveyance



Developing Urban Blue Corridors
(Defra, AECOM)

Flood Relief Culverts

Flood Mitigation Options

Flood Walls and Gates



Flood Wall and Damboard
(Cambridgeshire)



Flood Wall (Sunderland)



Flood Wall



Flood Wall and Flood Gate (York)

Flood Mitigation Options

Demountable Defences



Demountable Defence (Bridgwater)



Demountable Defence (Sandwich)

Flood Mitigation Options

Property Level Protection (PLP)



Flood Mitigation Options

“What could be done to reduce flood risk?”

ID	Scheme Name	Targeted Area		Scheme Type		
		‘Potwell’	‘Halam’	Storage	Conveyance	Defences
A	Harvey's Field Storage Area	✓		✓		✓
B	Rural Land Management	✓	✓	✓	✓	
C	1990's Flood Relief Culvert		✓		✓	
D	Halam Balancing Pond		✓	✓		
E	Halam Road & Pond		✓	✓	✓	
F	Southwell Trail Conveyance		✓		✓	
G	Halam Combined (E and F)		✓	✓	✓	
H	Potwell Conveyance	✓			✓	
I	Local Measures - Hotspots	✓	✓			✓
J	Local Measures - Widespread	✓	✓			✓
K	Options F, G and I	✓	✓	✓	✓	✓
L	Options A, F, G and I	✓	✓	✓	✓	✓
M	Options A and G	✓	✓	✓	✓	

“What could be done to reduce flood risk?”

ID	Scheme Name	Targeted Mechanism		Success Criteria		
		Fluvial	Surface Water	Local Community Benefit	Wider Community Benefit	Cost-Benefit
A	Harvey's Field Storage Area	✓		✓		
B	Rural Land Management	✓			✓	
C	1990's Flood Relief Culvert		✓	✓		
D	Halam Balancing Pond		✓	✓		
E	Halam Road & Pond		✓	✓		
F	Southwell Trail Conveyance		✓	✓		✓
G	Halam Combined (E and F)		✓	✓		✓
H	Potwell Conveyance	✓	✓	✓		
I	Local Measures - Hotspots	✓	✓		✓	
J	Local Measures - Widespread	✓	✓		✓	
K	Options F, G and I	✓	✓		✓	✓
L	Options A, F, G and I	✓	✓		✓	✓
M	Options A and G	✓	✓	✓		

“Which schemes might qualify for funding?”

An initial review of the options with the highest cost-benefit ratios showed that the benefits to the wider community were otherwise limited.

The preferred options with the greatest community benefits were then assessed to determine which options may be successful in gaining Defra Grant-in-Aid funding.

Key to the assessment is the funding available from other sources (i.e. local government and local levy), as this increases the likelihood of Defra Grant-in-Aid funding being released.

Should a scheme not be applicable for Grant-in-Aid funding, then other funding mechanisms may be considered.

“What is the option for managing flood risk?”

Based on the benefits of the options to the wider community, Options ‘K’, and ‘L’ were considered to be the most viable options.

ID	Scheme Name	Targeted Mechanism		Success Criteria		
		Fluvial	Surface Water	Local Community Benefit	Wider Community Benefit	Cost-Benefit
I	Local Measures - Hotspots	✓	✓		✓	
J	Local Measures - Widespread	✓	✓		✓	
K	Options F, G and I	✓	✓		✓	✓
L	Options A, F, G and I	✓	✓		✓	✓
M	Options A and G	✓	✓	✓		

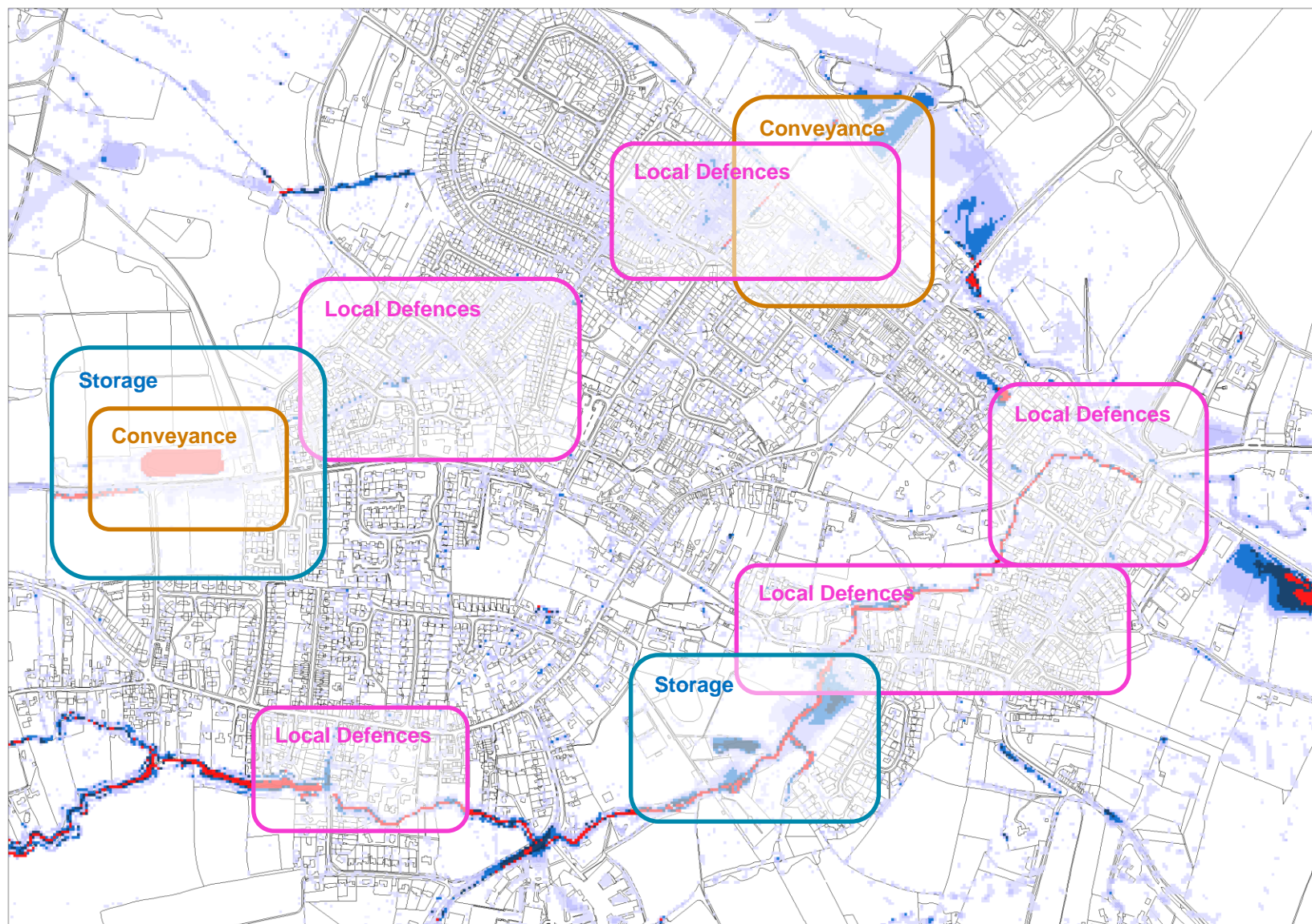
The Partnership Funding Calculator has shown that Option ‘K’ exceeds the 100% threshold* required to make the scheme applicable for Grant-in-Aid funding.

* Adjusted partnership funding score

“What might the preferred option look like?”



**Nottinghamshire
County Council**



“How many people might benefit from the scheme?”

The strategic feasibility modelling indicates that:

- Option ‘K’ reduces flood risk from both surface water and rivers in both the Potwell Dyke and Halam Hill sub-catchments.
- 50+ properties removed from risk of flooding from a 1% annual probability flood (i.e. a 100 year return period storm).
- Further properties are also likely to benefit from a reduction in flood risk and lower damages.

The computer modelling undertaken has investigated the strategic feasibility of possible flood mitigation schemes.

Technical and environmental considerations will be investigated as part of outline and detailed design. Design will also look to maximise the number of properties that can be defended.

“What are the next steps?”

