

# Appendix F

**ECONOMIC ANALYSIS**

# DACORUM BOROUGH SWMP ECONOMIC ASSESSMENT

**DATE:** 12 January 2017

---

## Introduction

This Technical Note has been produced to summarise the potential construction costs and associated economic viability associated with each of the potential flood mitigation schemes identified through the detailed phase of the Dacorum Borough SWMP.

The potential construction cost estimates have been undertaken at a strategic scale to enable the schemes to be assessed for viability and were viable prioritised for further assessment. These cost estimates have been prepared based upon the mitigation schemes provided in Appendix E of the SWMP and the baseline modelling. At this time no post mitigation modelling has been undertaken to refine or test the performance of these options.

The mitigation measures have been identified and their associated requirements sized using engineering judgement, where this involves attenuation/relocation of flow paths the total volume has been estimated from the maximum flood extent maps, using an assessment of the area and average depth across the area to be relocated.

The potential costs associated with the mitigation options have been determined using the Environment Agency's Long Term Costing Tool<sup>1</sup>, which has been developed for this purpose. As these costs have been estimated at a strategic scale several broad assumptions were required, these were:

- All the land required is already within public control or will be allowed to flood more frequently/to greater depths;
- No allowance has been made for working with third parties to make them aware of the risks/measures to reduce these risks;
- No infrastructure constraints exist which would require diversion or alternative construction approaches;
- Works to the highway to ensure that it functions as a preferential flow path would be limited and restricted to minor works, such as vegetation clearance, altering kerb arrangements or liaison with property owners to make minor changes to walls/fences to maintain flow routes. As such no provision has been made for this aspect. The scope of such works would need to be refined following a detailed site visit with appropriate engineers.
- Any spoil can be re-used within the site/scheme; and
- All options considered have an optimism bias of 60% added to their present value costs to allow for uncertainty; this is standard for strategic/feasibility stage of design.

These costs have allowed for design (where contained within the Environment Agency's tool) and construction with operation and maintenance (where contained within the Environment Agency's tool). All costs have been rounded to the nearest £1,000.

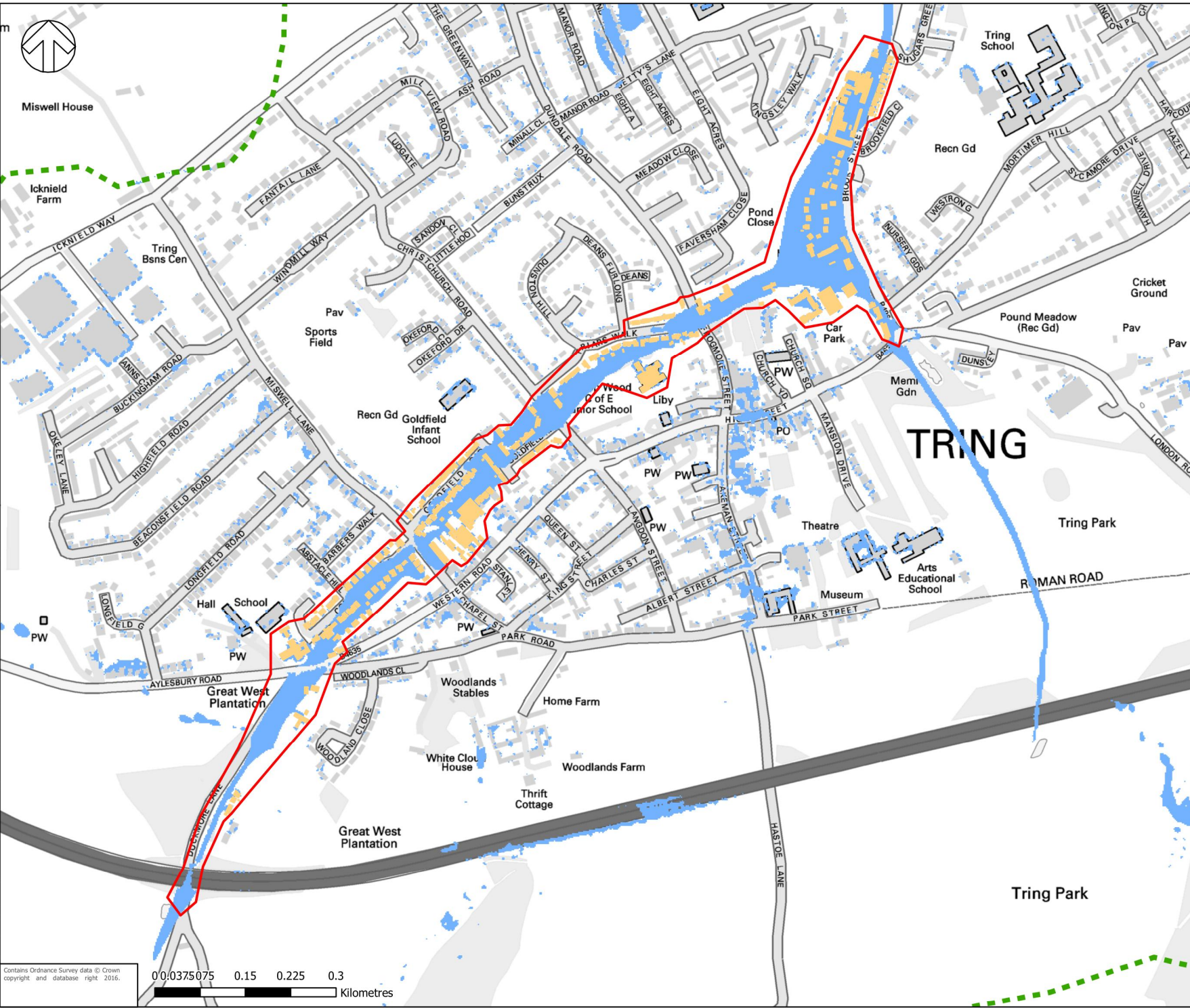
---

<sup>1</sup> <https://www.gov.uk/government/publications/long-term-costing-tool-for-flood-and-coastal-risk-management>

## Hotspot 0 - Tring

No mitigation measures have been recommended within the SWMP.

Figure 1 shows the economic analysis map for Hotspot 0 - Tring.



### Key

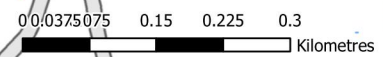
- Model Extents
- Economic Analysis Zone
- Properties to be included in economic analysis
- 1in1000yr RP



TITLE:  
North Herts and Dacorum  
Surface Water Management Plan  
Hotspot 0 - Economic Analysis

FIGURE No:  
**FIGURE 1**

Contains Ordnance Survey data © Crown copyright and database right 2016.



## Hotspot 20 - Berkhamsted

The mitigation measures could be implemented to provide a 1.33% SOP (1 in 75 years), the cost for providing both standards are detailed below:

### Option 1

MEASURE	ESTIMATED COST [£]
Create a preferential flow path from the highway onto Butts Meadow	Not incorporated due to approach required
Attenuation storage on land adjacent to the National Film Archive	Not included as impacts will be limited due to location in the catchment
Assumed 250m of wall 300mm high to keep the water on Kings Road	
160m length of flood embankment 2m high	
13,204m <sup>3</sup> of storage at 2m at deepest location	
PLP for 50 properties in the southern area	
<b>Total cost</b>	<b>5,904,000</b>

### Option 2

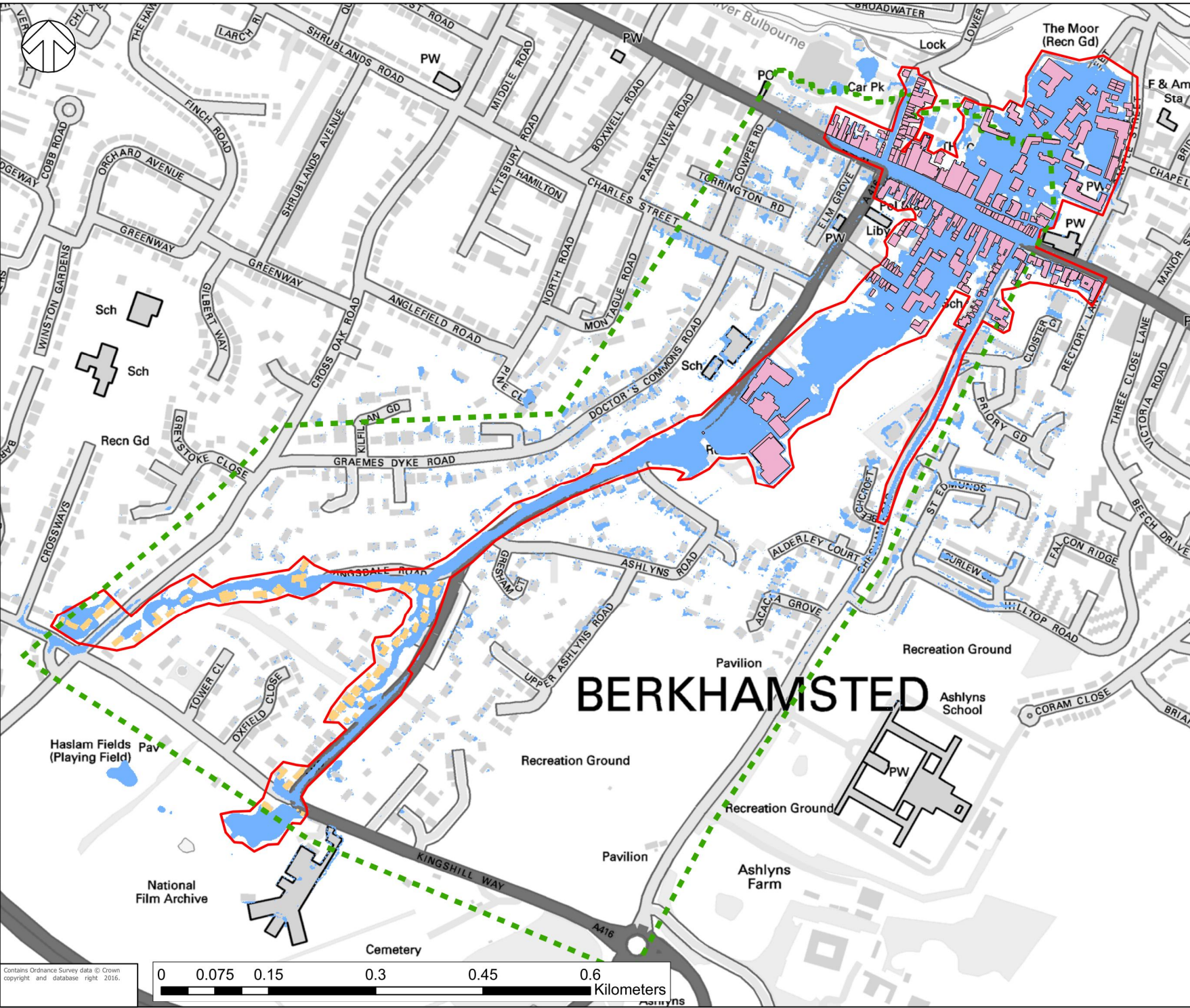
MEASURE	ESTIMATED COST [£]
PLP for all benefit area	4,987,000

### Assumptions

To provide a cost estimate for this hotspot several location specific assumptions were required, these are outlined below:

- It was assumed that 155 commercial properties would need PLP measures, if no other measures are implemented. PLP costs have been based on:
  - Commercial properties being in the *medium* cost bracket
  - PLP protection being required for 100yrs
  - O&M costs being 5% of capital costs
- The increase at the National Film Archive has been estimated based upon an estimate of the potential land that may be available to increase the pond size, as opposed to a volume required due to it's position in the upper stretch of the catchment.
- Further costs may be required for the costs associated with extending into the allotment site and removal and offsite disposal of the elevated ground.

Figure 2 shows the economic analysis map for Hotspot 20 - Berkhamsted.



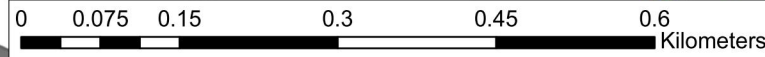
**Key**

- Properties benefiting from mitigation measures
- Model Extents
- Economic Analysis Zone
- Properties to be included in economic analysis

**1in1000yr RP**

- 

# BERKHAMSTED



TITLE:  
North Herts and Dacorum  
Surface Water Management Plan  
Hotspot 20 - Economic Analysis

FIGURE No:  
**FIGURE 2**

Contains Ordnance Survey data © Crown copyright and database right 2016.

## Hotspot 24 - Highfield, Hemel Hempstead

The mitigation measures could be implemented to provide either a 3.33% Standard of Protection (SOP) (1 in 30 years) or 1.33% SOP (1 in 75 years); the costs for providing both standards are detailed below:

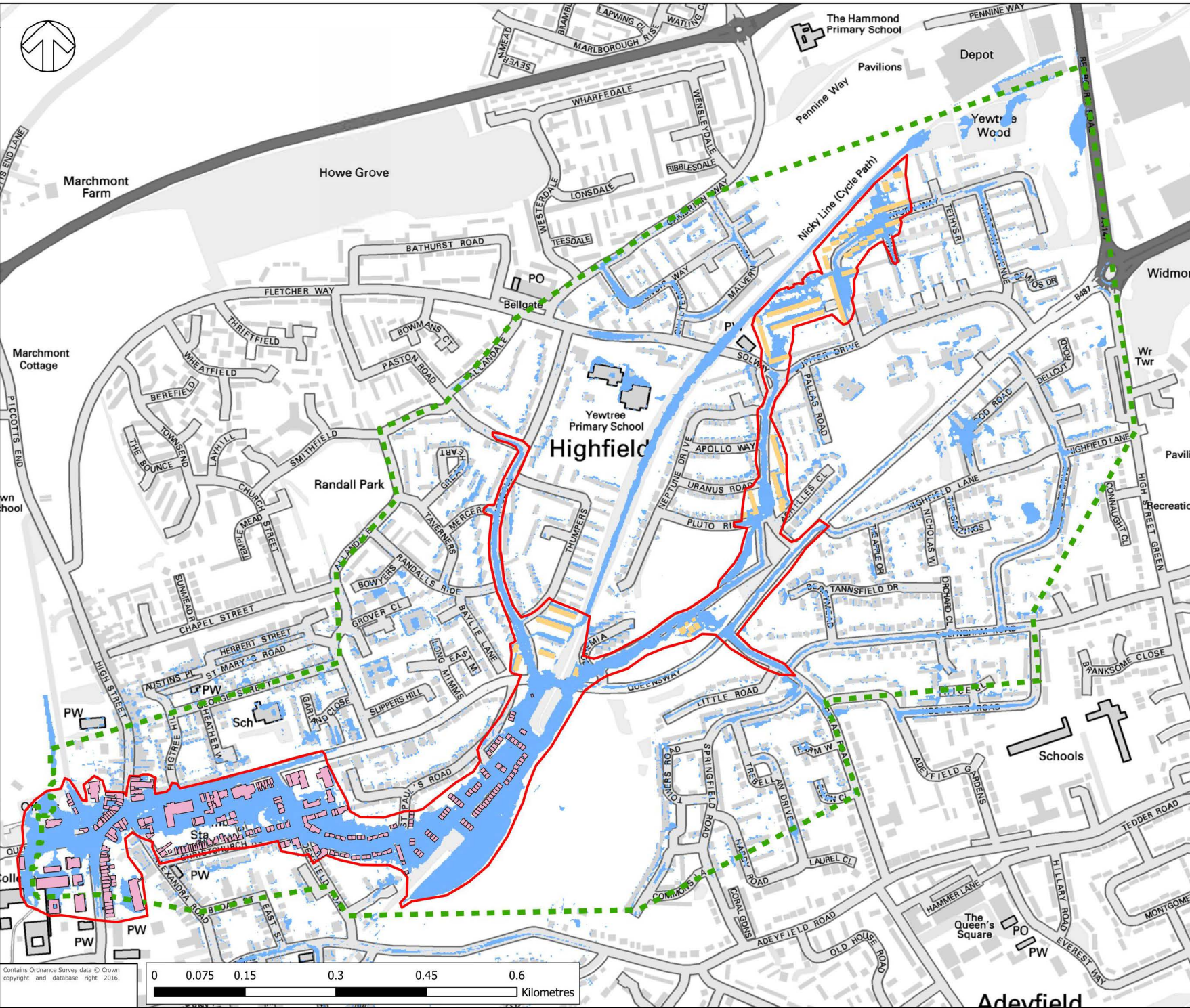
MEASURE	SOP 3.33%	SOP 1.33%	ESTIMATED COST [£]
Attenuate 7,000 m <sup>3</sup> within Keen Fields with a control	✓		1,658,000
Attenuate 15,707m <sup>3</sup> within Keen Fields with a control		✓	2,294,000

### Assumptions

To provide a cost estimate for this hotspot several location specific assumptions were required, these are outlined below:

- The attenuation volume has been assumed to equate to an area of 0.95ha and be stored at a depth of 0.75m for the 3.33% SOP with displaced materials lost across the Keen Fields
- The attenuation volume has been assumed to equate to an area of 1.5ha and be stored at a depth of 1m for the 1.33% SOP with displaced materials lost across the Keen Fields
- No allowance has been made for including blue corridor features along the Nickey Line, as site specific investigations will be required to demonstrate locations where these will be feasible and their potential to be incorporated. These are intended to slow and provide minor attenuation volumes and are likely to be shallow swales alongside the cycle path.
- No costs to ensure flows from Catsdell to the enlarged attenuation area within Keen Fields were able to be provided, as this would require works to the highway, which could only be determined following further investigations.

Figure 3 shows the economic analysis map for Hotspot 24 – Highfield, Hemel Hempstead.



**Key**

- Properties benefiting from mitigation measures
- Model Extents
- Economic Analysis Zone
- Properties to be included in economic analysis

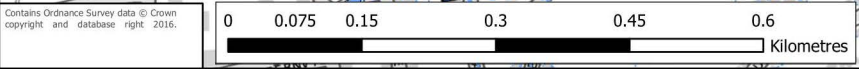
**1in1000yr RP**

- 



TITLE:  
North Herts and Dacorum  
Surface Water Management Plan  
Hotspot 24 - Economic Analysis

FIGURE No:  
**FIGURE 3**



Contains Ordnance Survey data © Crown copyright and database right 2016.



## Hotspot 53 - Kings Langley

As the hydraulic modelling demonstrated three discrete areas of flooding within Kings Langley it has been assumed that they will be implemented as individual schemes, thus provisional costs have been provided for each option.

### Northern Benefit Area

The SOP assumed for this scheme is 3.33%, the costs for providing this is detailed below:

MEASURE	ESTIMATED COST [£]
<i>Kings Meadow</i> - Improve drainage connectivity to the River Gade/Grand Union Canal (assumed 30m of pipe of 600mm diameter)	150,000

### Central Benefit Area

The SOP assumed for this scheme is 3.33%, the costs for providing this is detailed below:

MEASURE	ESTIMATED COST [£]
<i>Riverside Close</i> - Improve drainage connectivity to the River Gade/Grand Union Canal (assumed 30 m of pipe of 600mm diameter and an interception swale 200 m long, 1m wide)	151,000

### Southern Benefit Area

The SOP assumed for this scheme is 1.33%, the costs for providing this is detailed below:

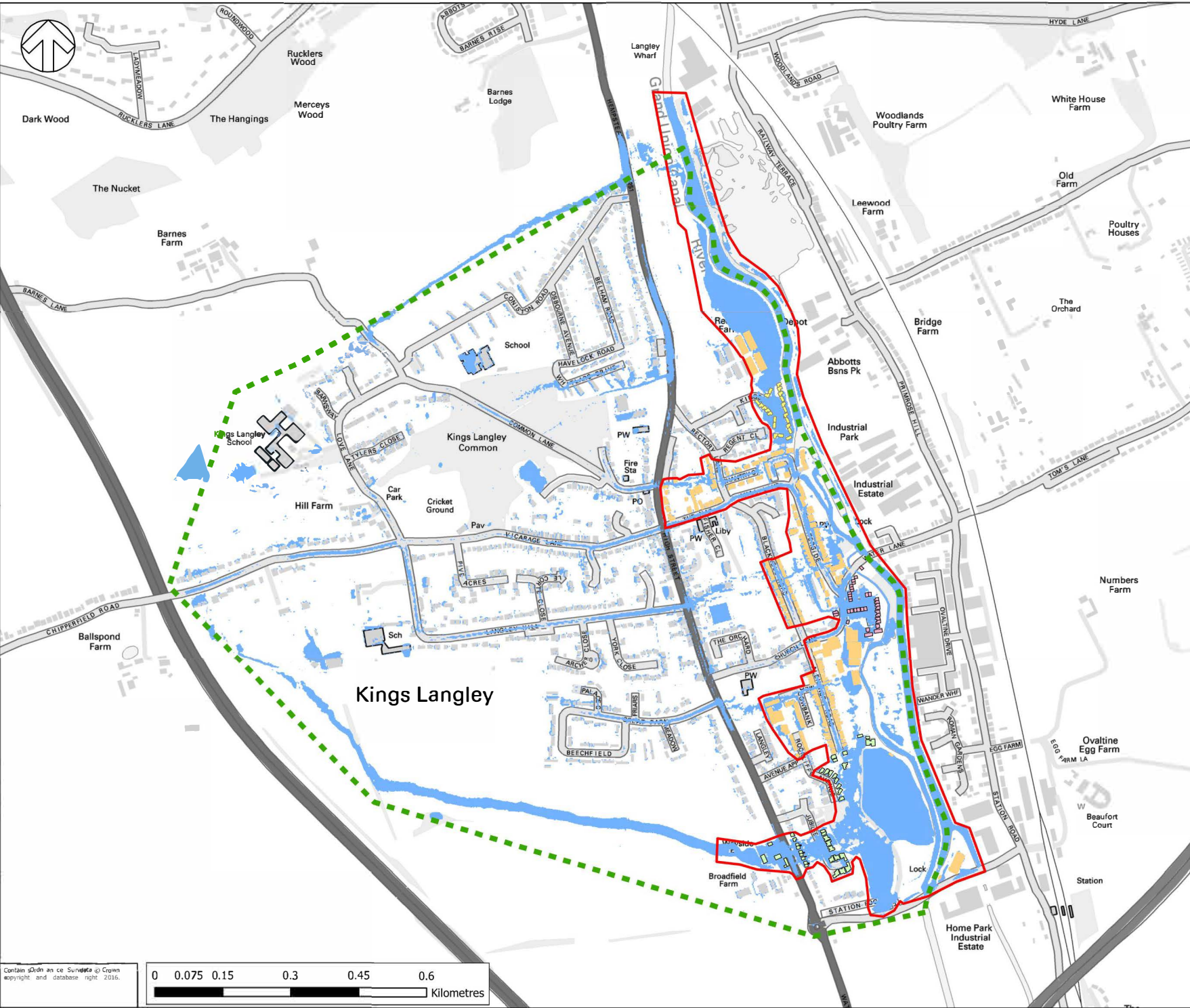
MEASURE	ESTIMATED COST [£]
Interception swale 310 m long 1 m wide and an increase the storage in Wayside Farm assumed to be 7000m <sup>3</sup>	2,107,000

### Assumptions

To provide a cost estimate for this hotspot several location specific assumptions were required, these are outlined below:

- Access through third party land between the highway (for both 'Kings Meadow' and Riverside Close) and the River Gade/Grand Union Canal will be difficult due to the nature of the property construction. It is likely that additional abnormal costs will be required.
- Operation and Maintenance of the swale in the central area has not been allowed for, it is assumed that this will be included within the maintenance of the area.

Figure 4 shows the economic analysis map for Hotspot 53 – Kings Langley.



**Key**

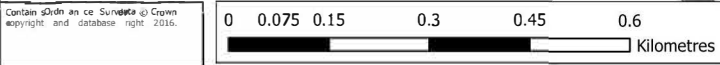
- Properties benefiting from mitigation measures (North)
- Properties benefiting from mitigation measures (Central)
- Properties benefiting from mitigation measures (South)
- Model Extents
- Economic Analysis Zone
- Properties to be included in economic analysis

**1in100yr RP**



TITLE:  
North Herts and Dacorum  
Surface Water Management Plan  
Hotspot 53 - Economic Analysis

FIGURE No:  
**FIGURE 4**



Contains Ordnance Survey © Crown copyright and database right 2015.