

# Appendix F

**ECONOMIC ANALYSIS**

# EAST HERTS SWMP

## ECONOMIC ASSESSMENT

**DATE:** 03 November 2016

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### 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 East Hertfordshire SWMP.

The potential construction cost estimates have been undertaken at a strategic scale to enable the schemes to be assessed for viability, and where 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. Assumptions regarding the performance have therefore been made as part of this economic assessment, as detailed below.

The mitigation measures have been identified and their associated requirements sized using engineering judgement. For example, 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 protected.

In several hotspots the benefit areas of multiple mitigation options overlap. Understanding the combinations of these options would require further, and more detailed, modelling. Property Level Protection (PLP) has been costed for these areas to understand the baseline economic benefits of protecting these properties. The cost of PLP will likely be more than the combined cost of the recommended options, so benefit cost ratios will be pessimistic.

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;
- Any spoil can be re-used within the site/scheme;
- 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.; 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.

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

These costs have allowed for design and construction with operation and maintenance (where contained within the Environment Agency's tool).

## Buntingford

The Standard of Protection (SOP) assumed for this scheme is 1 % (1 in 100 years) based on the baseline model results. The costs for providing this are detailed below:

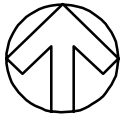
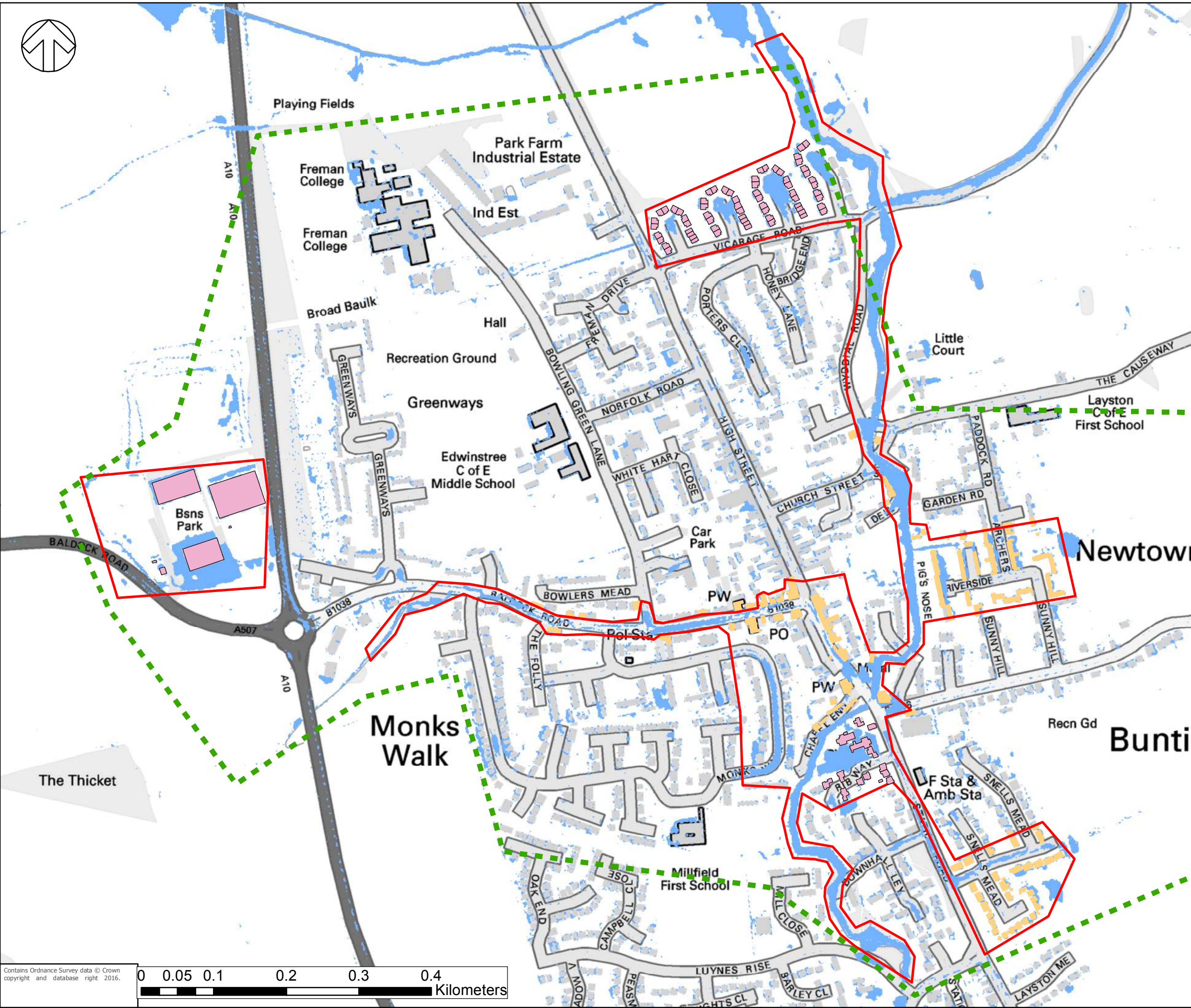
| MEASURE  | ESTIMATED COST [£] |
|--|--------------------|
| Property Level Protection – 66 residential and 14 commercial properties. All costed as medium value properties with premium protection | £1,415,000         |

### Buntingford Assumptions

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

- Due to the strategic level of modelling the locations of properties requiring PLP may change, it is assumed however, that the general number of properties stated is of the right order of magnitude;
- This is a hotspot where alternative mitigation measures in combination may be appropriate; however, further modelling is required to determine the requirements and therefore costs. The cost of PLP has been utilised as an indication of the likely costs of protection in this area.

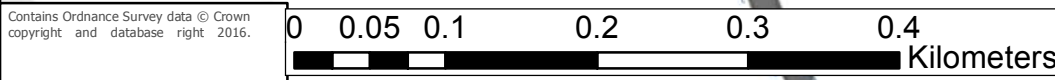




**Key**

- Properties benefitting from mitigation options
- Model Extent
- Economic Analysis Zone
- Properties to be included in Economic Analysis

**1 in 100 yr RP**



TITLE:  
 East Hertfordshire  
 Surface Water Management Plan  
 Hotspot 1 - Economic Analysis

FIGURE No:  
 FIGURE 1

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## Bengeo

The Standard of Protection (SOP) assumed for this scheme is 1.33% (1 in 75 years) based on the baseline model results. The costs for providing this are detailed below:

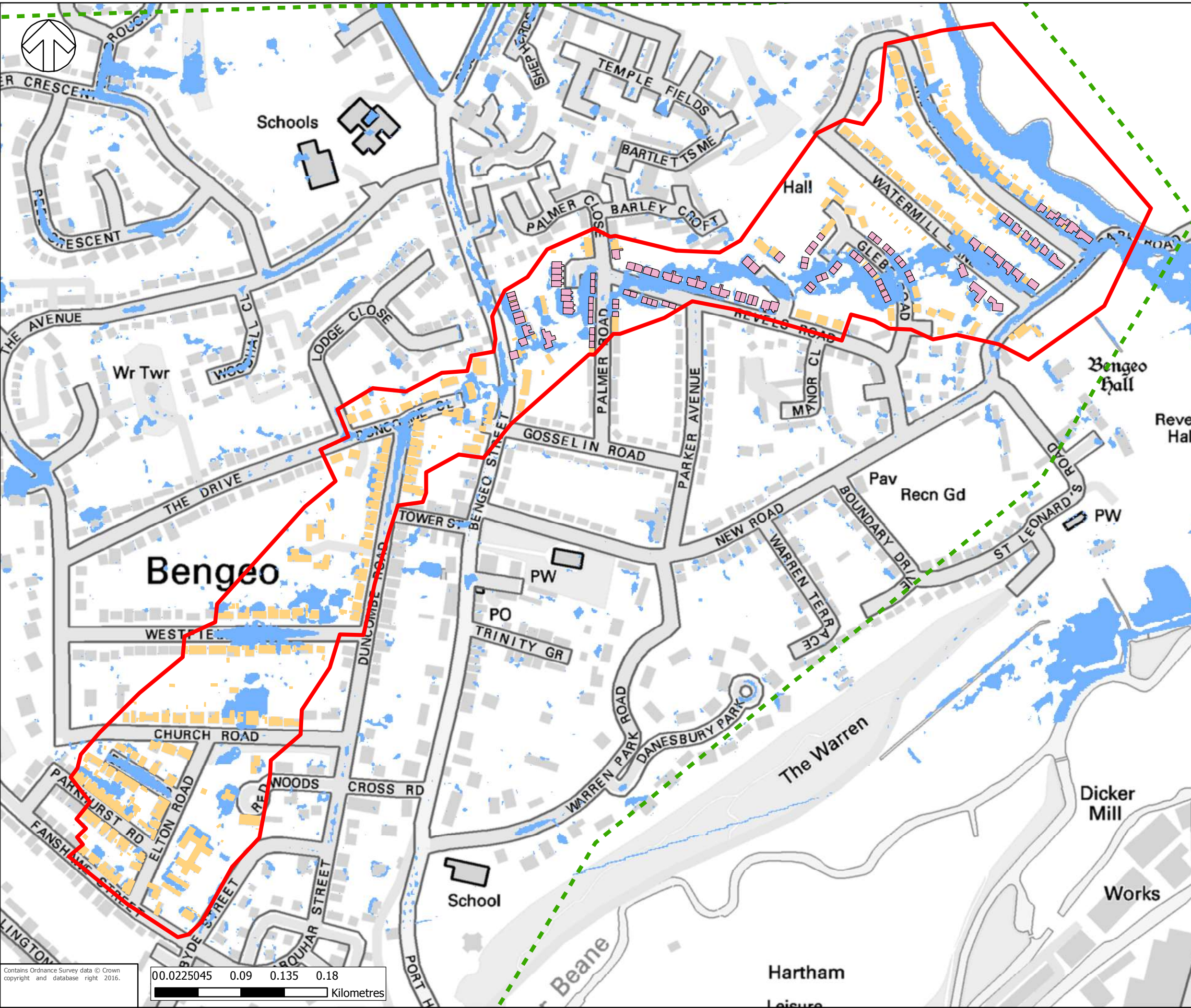
| MEASURE   | ESTIMATED COST [£] |
|---|--------------------|
| Property Level Protection – 106 residential properties. All costed as medium value properties with premium protection | £1,240,000         |

### Bengeo Assumptions

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

- Due to the strategic level of modelling the locations of properties requiring PLP may change, it is assumed however, that the general number of properties stated is of the right order of magnitude;
- This is a hotspot where alternative mitigation measures in combination may be appropriate; however, further modelling is required to determine the requirements and therefore costs. The cost of PLP has been utilised as an indication of the likely costs of protection this area.





**Key**

- Properties benefiting from mitigation options
- Model Extent
- Economic Analysis Zone
- Properties to be included in economic analysis
- 1 in 100yr RP



TITLE:  
 East Hertfordshire  
 Surface Water Management Plan  
 Hotspot 40 - Economic Analysis

FIGURE No:  
 FIGURE 2

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00.0225045 0.09 0.135 0.18

Kilometres



## Hadham Road

The mitigation measures could be implemented to provide a 3.33% SOP (1 in 30 years). The costs for providing this are detailed below:

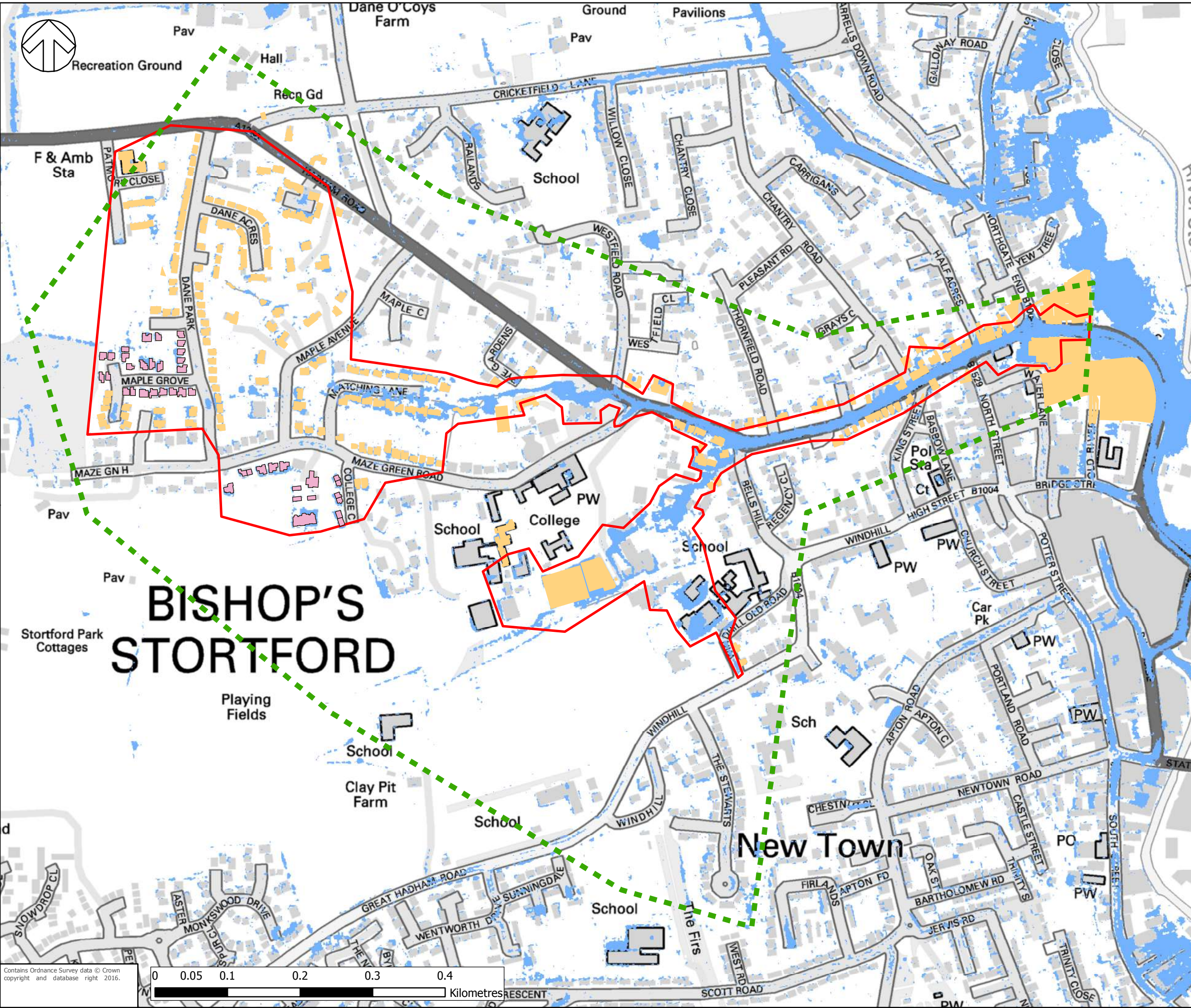
| MEASURE  | ESTIMATED COST [£] |
|--|--------------------|
| Maintain Bund – medium size, 250m length   | £630,000           |
| Bund – medium size, 200m length  | £500,000           |
| Bund – medium size, 450m length  | £1,135,000         |
| Bund – medium size, 150m length  | £380,000           |
| Bund – medium size, 80m length   | £200,000           |
| Increase drainage ditch capacity – 220m length   | £78,000            |
| Property Level Protection – 29 residential properties and 15 commercial properties. All costed as medium value with premium protection | £845,000           |

### Hadham Road Assumptions






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

- Due to the strategic level of modelling the locations of properties requiring PLP may change, it is assumed however, that the general number of properties stated is of the right order of magnitude;
- The bund sizes were approximated; defining more accurate diameters would require further modelling.





**Key**

-  Properties benefiting from mitigation options
-  Model Extent
-  Economic Analysis Zone
-  Properties to be included in Economic Analysis
-  1 in 100 yr RP

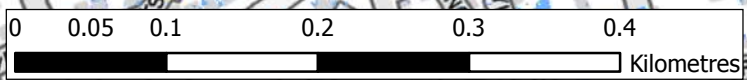
# BISHOP'S STORTFORD

# New Town



TITLE: East Hertfordshire  
Surface Water Management Plan  
Hotspot 43 - Economic Analysis

FIGURE No: FIGURE 3



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## Benhooks Ave

The SOP assumed for this scheme is 3.33% (1 in 30 years). The costs for providing this are detailed below:

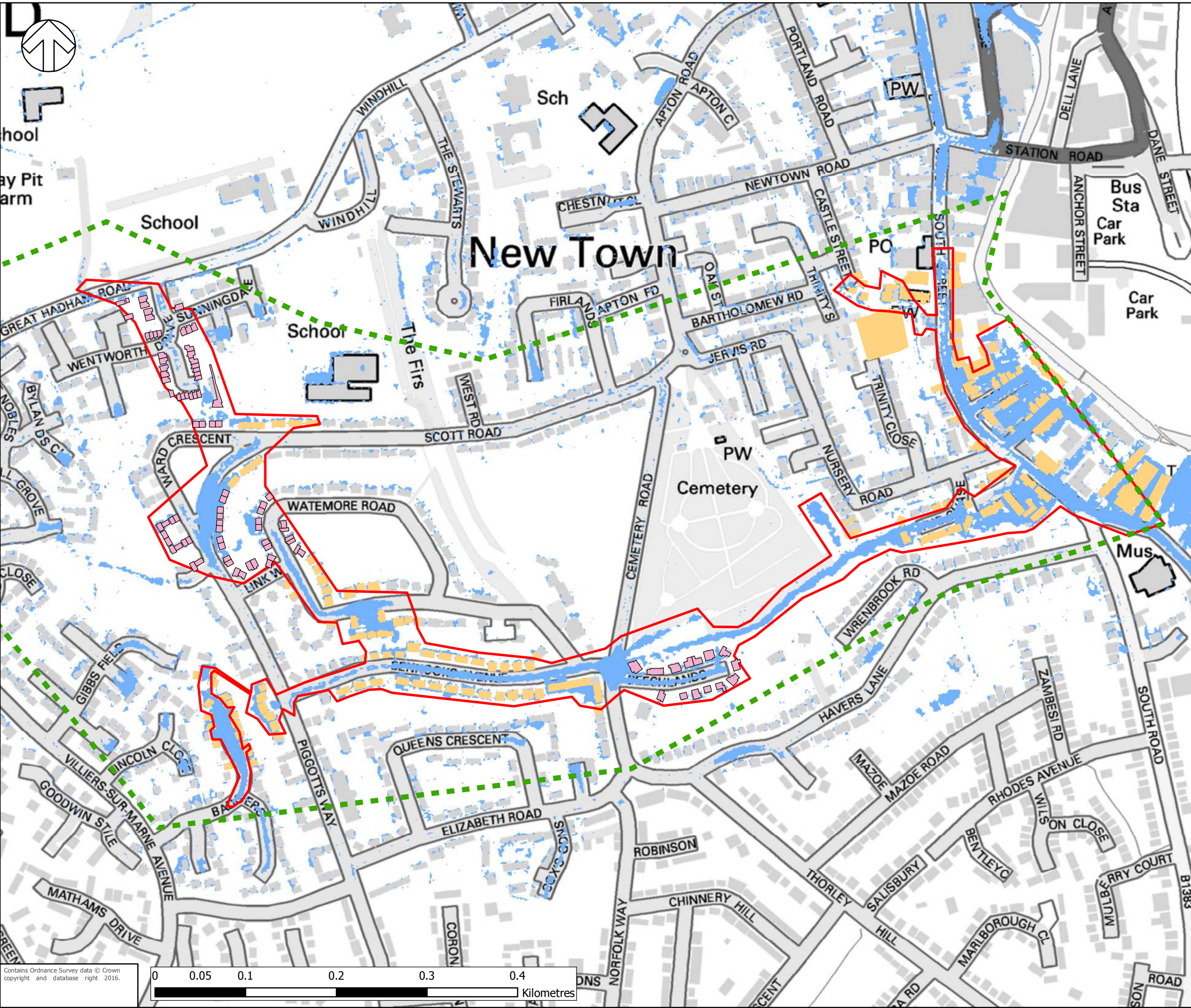
| MEASURE  | ESTIMATED COST [£] |
|--|--------------------|
| Property Level Protection – 121 residential properties and 4 commercial properties. All costed as medium value with premium protection | £2,020,000         |
| Bunds:   | £990,000           |
| → Hadham Road – medium size, 250m length   |                    |
| → Ward Crescent – medium size, 150m length   |                    |

### Benhooks Ave Assumptions





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

- Due to the strategic level of modelling the locations of properties requiring PLP may change, it is assumed however, that the general number of properties stated is of the right order of magnitude;
- The bund sizes were approximated; defining more accurate diameters would require further modelling.

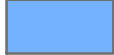




**Key**

-  Properties benefiting from mitigation measures
-  Model Extent
-  Economic Analysis Zone
-  Properties to be included in Economic Analysis

**1 in 100 yr RP**

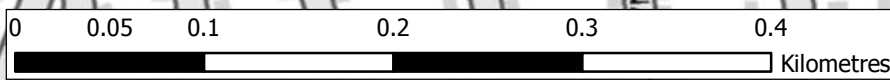
- 



TITLE: East Hertfordshire  
Surface Water Management Plan  
Hotspot 44 - Economic Analysis

FIGURE No:  
**FIGURE 4**

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## Raynham Road

The SOP assumed for this scheme is 1 % (1 in 100 years). The costs for providing this are detailed below:

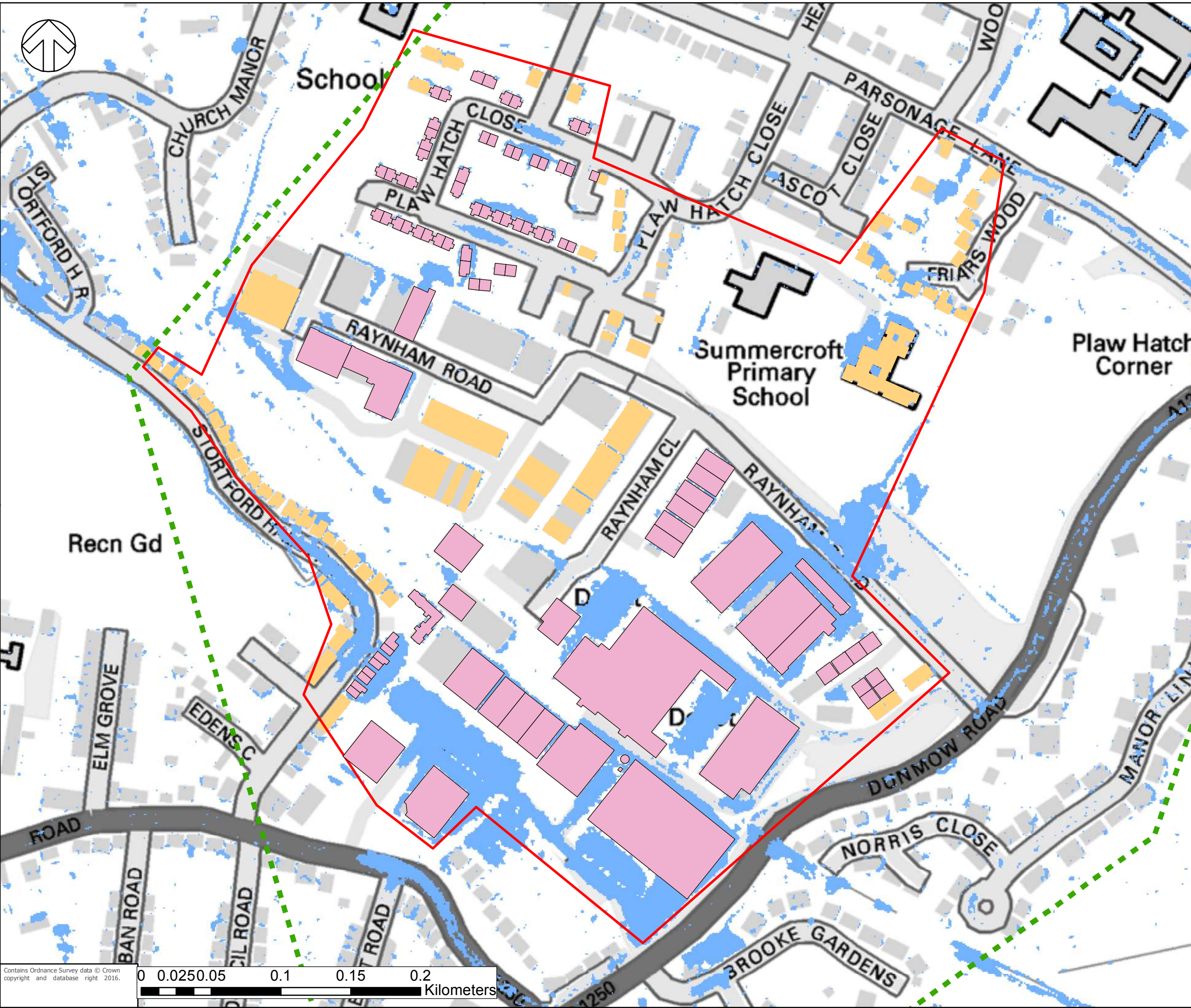
| MEASURE  | ESTIMATED COST [£] |
|--|--------------------|
| Property Level Protection – 63 residential properties, 33 commercial properties. All costed as medium value properties with premium protection | £1,850,000         |

### Raynham Road Assumptions

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

- Due to the strategic level of modelling the locations of properties requiring PLP may change, it is assumed however, that the general number of properties stated is of the right order of magnitude.
- This is a hotspot where alternative mitigation measures in combination may be appropriate; however, further modelling is required to determine the requirements and therefore costs. The cost of PLP has been utilised as an indication of the likely costs of protection this area.





**Key**

- Properties benefiting from mitigation options
- Model Extent
- Economic Analysis Zone
- Properties to be included in Economic Analysis

**1 in 100 year RP**

- 



TITLE:  
 East Hertfordshire  
 Surface Water Management Plan  
 Hotspot 47 - Economic Analysis

FIGURE No:  
 FIGURE 5

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 0 0.0250.05 0.1 0.15 0.2 Kilometers



## Potter Street

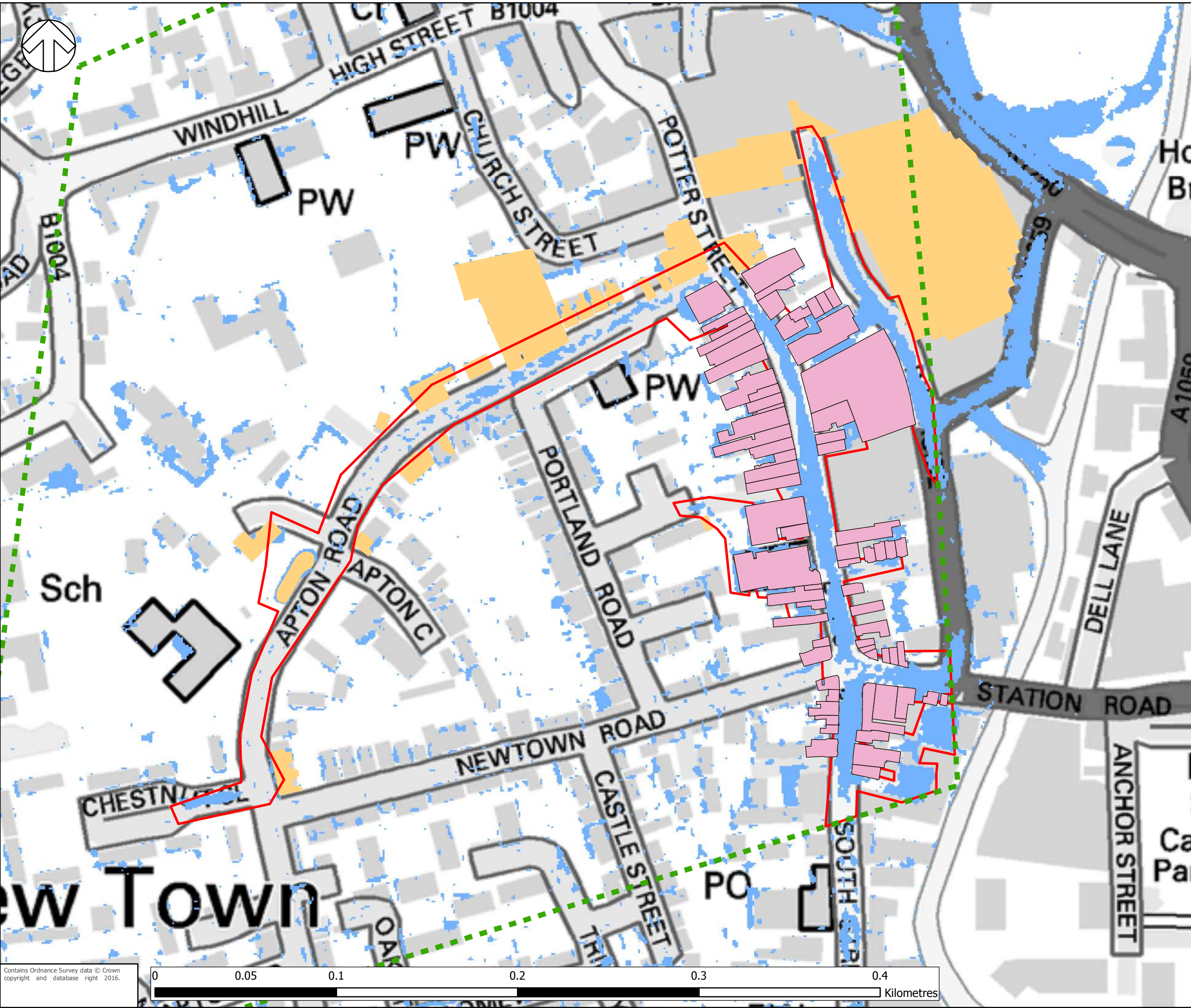
The SOP assumed for this scheme is 1 % (1 in 100 years). The costs for providing this are detailed below:

| MEASURE  | ESTIMATED COST [£] |
|--|--------------------|
| Property Level Protection – 5 residential properties and 62 commercial properties. All costed as medium value properties with premium protection | £1,690,000         |

### Potter Street Assumptions

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

- Due to the strategic level of modelling the locations of properties requiring PLP may change, it is assumed however, that the general number of properties stated is of the right order of magnitude.



**Key**

Properties benefiting from mitigation options

Model Extent

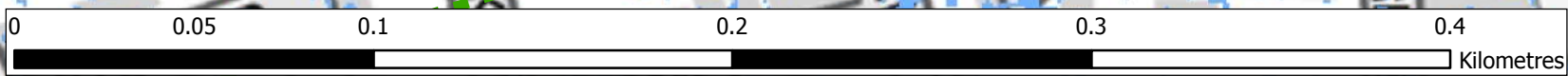
Economic Analysis Zone

Properties to be included in Economic Analysis

1 in 100 yr RP



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TITLE: East Hertfordshire Surface Water Management Plan Hotspot 60 - Economic Analysis

FIGURE No: FIGURE 6