# Three Rivers Options Long List

## Long List of Options

**TRDC1 - Batchworth**

| Long list option | Option measure | Description | Option considerations | Viability Score (1 – Low viability, 5 – High viability) | Take Forward to short list? |
|---|---|---|---|---|---|
| Do nothing | Do nothing | All operational and maintenance activities cease | Reducing maintenance could lead to blockages of culverts and sewers which would potentially increase flood risk within the area. | N/A | Yes |
| Do minimum | Do minimum | Continue with current operational and maintenance activities | Continued maintenance will ensure no deterioration in operation of existing assets. However, this option will not provide any betterment to the existing scenario and will remain as per the existing situation Continuing with the existing management scenario would mean the culvert below Harefield Road remains in a poor state. | 3 | Yes |
| Do more | Do more | Increased maintenance regime | Increased maintenance of culverts and sewers to include more regular jetting and of gullies to increase asset capacity. This option would further reduce risks of blockage and localised flooding but would not fundamentally increase standard of protection to properties going forward. | N/A | No |
| Option 1 | Upstream management of the flow path including NFM techniques | Natural flood management techniques (i.e. soil management, slowing water movement through catchment by use of planting, etc) | The upper areas of the hotspot are largely greenfield, with a mixture of open fields and areas of woodland. These areas provide opportunity for NFM techniques to reduce the speed and volumes produced by the surface water flow path that is responsible for flooding downstream. The large areas of woodland already will provide a method of slowing flows, however further options should be considered. Leaky dams could be constructed along the flow path to limit flows and volumes associated. Other methods for consideration include use of earth bunds to obstruct the | 3 | Yes |

| Long list option | Option measure | Description | Option considerations | Viability Score (1 – Low viability, 5 – High viability) | Take Forward to short list? |
|---|---|---|---|---|---|
| | | | flow, or excavation of ponds/detention features. | | |
| Option 2 | Embankments | Installation of an embankment / bund along Harefield Road | The construction of a bund or embankment on the east of Harefield Road, beside Greenbroom Spring, would reduce the volumes of surface water flooding on the opposite side of the road. This would potentially reduce the flooding along Harefield Road whereby previous incidents have been recorded. | 2 | No |
| Option 3 | Increasing culvert capacity | Enlarging the culvert below Harefield Road | Increasing the diameter of the culvert below Harefield Road would potentially alleviate pressure on the existing culvert through increased conveyance and capacity. Maintenance of the culvert, and ensuring the pipe remains clear, would ensure that flow through could be controlled. | 2 | No |
| Option 4 | Retrofitting of SuDS within the downstream built up areas | Disconnect direct runoff from existing roofs and roads from public sewers and route it via SuDS before re-connecting to public sewers. | In the north of the hotspot, areas of local ponding occur, which are disconnected from the main surface water flow path.<br>The implementation of SuDS within these areas could be used to aid infiltration and / or increase areas of storage.<br>There are various small areas of green space along Harefield Road which could be adopted as storage areas to reduce surface ponding.<br>SuDS should also be considered for the greenspace upstream of St Mary's Primary school. SuDS methods including ponds, swales, detention features and bunds could be installed to slow down the flow path which results in flooding along Stockers Farm Road. | 4 | Yes |
| Option 5 | Property Flood resilience (PFR) | Protection to individual properties (e.g. via air brick covers, door guards etc.). | Along Harefield Road, whereby the watercourse is culverted, modelling suggests that flood depths are typically low (up to 0.5m during a 1 in 75-year flood event) and so | 3 | Yes |

| Long list option | Option measure | Description | Option considerations | Viability Score (1 – Low viability, 5 – High viability) | Take Forward to short list? |
|---|---|---|---|---|---|
| | | | property level protection would be suitable. The depths further north along Harefield Road are similar.<br>In these cases, the cost of property flood resilience is likely to outweigh the cost of property flood risk.<br>These measures should be considered whereby other options do not effectively remove flood risk to the associated property. | | |

*Table 1: Viability scoring criteria*

| Assessment Criteria | | Do Minimum | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
|---|---|---|---|---|---|---|---|
| **Construction & Maintenance** | Disruption for construction and maintenance are minimised | 5 | 5 | 3 | 1 | 4 | 3 |
| **Design Capabilities** | Number of properties protected from flooding by surface water runoff | 0 | 2 | 2 | 2 | 3 | 2 |
| | Level of additional environmental benefit provided | 0 | 3 | 2 | 1 | 4 | 1 |
| **Health & Safety** | Risk to maintenance operatives is minimised | 5 | 3 | 2 | 2 | 3 | 4 |
| **Public Acceptability** | Overall acceptability of the scheme to the public | 3 | 4 | 3 | 3 | 4 | 4 |
| **Natural Environment & Visual Amenity** | No adverse ecological effect on flora and fauna | 5 | 5 | 2 | 3 | 5 | 4 |
| | Scheme minimises visual impact on surrounding area | 5 | 4 | 2 | 2 | 5 | 4 |
| **Climate Change Adaptation** | Design can be easily adapted to accommodate climate change impacts | 0 | 1 | 1 | 1 | 1 | 3 |
| **Cost** | Low capital investment required | 5 | 3 | 3 | 3 | 3 | 3 |
| | Low maintenance costs | 5 | 3 | 3 | 2 | 3 | 4 |
| | **Total (out of 50)** | **33** | **33** | **23** | **21** | **35** | **32** |
| | **Viability Score (out of 5)** | **3** | **3** | **2** | **2** | **4** | **3** |

| | |
|---|---|
| **Scoring Criteria**<br>*Please Note: All options are ranked comparatively* | 0 = Does Not Meet Criteria<br>5 = Fully Meets Criteria |

**Short list of Options taken forward:**

- **Do nothing**
- **Do minimum**
- **Option 1 – Upstream Management of Surface Water**
- **Option 4 – Retrofitting of SuDS**
- **Option 5 - Property flood resilience**
- Note: Options 1 and 2 relate to wider LLFA and LPA policy recommendation and therefore have not been taken forward for further investigation at this time.

### Do-nothing Option Data

| **Summary Description of Option** |
|---|
| No active intervention within the study area. No maintenance of watercourses / sewers undertaken. All assets approaching the end of their life allowed to fail. |

| **Summary Advantages of Option** |
|---|
| No costs incurred. |

| **Summary Disadvantages of Option** |
|---|
| Channel capacities will be reduced due to vegetation and debris. The risk of blockage of culverts and sewers will increase due to accumulated debris / sediment. The existing measures would cease to protect properties to the current standard. Overall flood risk would be expected to increase and additional properties could be put at flood risk. |

| **Summary of Option Viability and Deliverability** |
|---|
| The Do-nothing scenario is not viable in a well-developed area like Batchworth and should not be considered further. This option is however taken to the short list as it forms the comparative case in the economic analysis. |

### Do-minimum Baseline Option Data

| **Summary Description of Option** |
|---|
| Existing maintenance regime to continue and existing assets to be repaired as required to ensure the current standard of protection is maintained. This scenario still poses flood risk to number of properties in the area. This will not prevent future increases in flood risk as a result of climate change. |

| **Summary Advantages of Option** |
|---|
| • Affordable (No capital spend).<br>• Maintains the existing situation. |

| **Summary Disadvantages of Option** |
|---|
| • Does not provide any reduction in flood risk.<br>• Potential for maintenance requirements (and costs) to increase over time. |

| **Summary of Option Viability and Deliverability** |
|---|
| This option is viable and can be delivered but offers no betterment to the existing scenario and will still result in an increased flood risk in the future due to climate change. |

| **Standard of Protection Provided by Option** | Based on the integrated surface water modelling of the area the level of protection offered by the current arrangement is less than a 1 in 5-year standard. | | |
|---|---|---|---|
| **Properties at Risk from Flooding in Baseline Do-minimum Scenario** | | | |
| Very Significant Risk (>5% AEP) | Significant Risk (Between 5% and 1.3% AEP) | Moderate Risk (Between 1.3% and 0.5% AEP) | Low Risk (< 0.5% AEP) |
| **Number of Residential Properties at Risk from Flooding** | | | |
| 40 | 7 | 27 | 28 |
| **Number of Non-Residential Properties at Risk from Flooding** | | | |
| 2 | 0 | 2 | 5 |

## Option 1 – Upstream management of surface water

| **Summary Description of Option** |
|---|
| The dominant flow path is associated with an ordinary watercourse which flows within an area of woodland. This provides an ideal opportunity to implement methods to store and slow down the flow before it causes flooding downstream. Ideally, natural flood management techniques (such as leaky dams) would be prioritized over engineered options. Attenuation areas should also be considered. |

| **Summary Advantages of Option** |
|---|
| • No impact upon individual properties.<br>• Directly addresses the source of flood risk.<br>• No environmental degradation as a result (based on using NFM techniques).<br>• There is large areas of green/wooded space which provides ideal area for flood mitigation. |

| **Summary Disadvantages of Option** |
|---|
| • Difficult to quantify the benefits of NFM. |

| **Summary of Option Viability and Deliverability** |
|---|
| Upstream management is a viable option as it directly addresses the issue of flood risk and the upstream catchment here is still in a natural state and therefore there is opportunity to implement actions. It should be noted that this option may not be as effective during higher order events. |

## Option 4 – Retrofitting of SuDS

| **Summary Description of Option** |
|---|
| 1. Utilisation of small areas of green space within the built up as areas of storage.<br>2. There are many grassed spaces between roads and pavements which could be used to intercept flow paths along the highway.<br>3. Whereby extended parcels of grass are present, swales could be excavated to both store and convey water. |

| **Summary Advantages of Option** |
|---|
| • Reduces flow entering the downstream surface water sewer network.<br>• Combination of small-scale actions, less reliance on one action. |

- Area-wide management scheme.

| Summary Disadvantages of Option |
|---|
| • Increased maintenance may be required, as a result of additional greenspaces, dependent upon existing regime.<br>• Retrofitting of SuDS may result in a loss of amenity space. |

| Summary of Option Viability and Deliverability |
|---|
| The area is highly developed and opportunity to incorporate SuDS into existing greenspace should be taken. The greatest opportunity and most impact would be achieved in the north of the hotspot whereby the majority of the recorded flood incidents are located. This is a viable and deliverable option, as it simply involves a change of use for greenspace that currently has no purpose. |

### Option 5 – Property Flood Resilience (PFR)

| Summary Description of Option |
|---|
| Passive Property Flood Resilience measures including flood doors, self-closing air bricks, etc. to be offered to all residential properties at risk of 1 in 75-year flooding. |

| Summary Advantages of Option |
|---|
| • No land take.<br>• Work areas limited to individual properties thus limited risk of difficult ground conditions, utility clashes, access constraints etc. |

| Summary Disadvantages of Option |
|---|
| • Does not address causes of flooding.<br>• Some properties may not be suitable/ property owners may not want such measures.<br>• Adoption by all properties within allocated area is required to ensure full potential of protection is achieved. |

| Summary of Option Viability and Deliverability |
|---|
| PFR remains a viable standalone option particularly for smaller groups of affected properties and may also be considered as an alternative or complimentary to other capital schemes.<br>Deliverability will be subject to the outcomes of a PFR survey and resident consultations. |

| | |
|---|---|
| **Standard of Protection Provided by Option** | 1 in 75-year to all affected properties. |