Three Rivers Options Long List

Long List of Options

TRDC4 - Chorleywood

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 sewers and reduction in system capacity which in turn could lead to further flooding. Blocked gullies would increase the volumes of water remaining within the highway.	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 and systems. However, this option will not provide any betterment to the existing scenario and will remain as per the existing situation.	3	Yes
Do more	Do more	Increased maintenance regime	Increased maintenance of culverts and sewers to include more regular jetting and clearing. This option would further reduce risks of blockage and localised flooding but would not fundamentally increase conveyance capacity and standard of protection to properties going forward.	N/A	No
Option 1	Natural Flood Management Techniques	Natural flood management techniques (i.e. soil management, slowing water movement through catchment by use of planting, etc)	In the northern and eastern areas of the hotspot, there are woodland and open field areas whereby overland flow paths are generated, which contribute to the main flow path that exists within the highway (Whitelands Avenue). Limiting the flow over the fields in the east of the hotspot would limit the flows reaching Homefield Road which consequently impact upon Whitelands Avenue. Using NFM options would slow down flows and limit the total volume of water within the road. Options for consideration include woodland creation, construction of bunds,	3	No

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
			excavation of ponds or temporary detention features etc. However, the volumes contributed by these flow paths is not significant, and removing them does not have a significant impact downstream.		
Option 2	Control of flow below the railway embankment	Construction of a culvert under the railway embankment to prevent ponding upstream	At Common Gate Road, there is a large area of ponding that occurs adjacent to the railway embankment. This is associated with the main flow path present through the hotspot. Flow could be controlled through the railway embankment via the use of a culvert. This would prevent the backing up of the flow path, assuming the culvert is maintained	2	No
Option 3	Retrofitting of SuDS	Disconnect direct runoff from existing roofs and roads from public sewers and route it via SuDS features before re-connecting	To limit the large flow paths within the hotspot that are present along several of the roads, features could be installed which would capture and store some of the volumes produced. Options could be considered on most of the roads within the hotspot, however control along both Whitelands Avenue and Homefield Road would particularly impact upon the downstream flood risk whereby there have been reported flood incidents. For example, between Orchard Drive and Homefield Road there are grassed areas which could be used for storage, whether in the form of small detention basins or ran gardens. Similarly, along Whitelands Avenue (near the area of shops) there are currently small green areas which could be used to store water. Swales could be installed along Carpenters Wood Road to manage the flows which	3	Yes

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
			contribute to flood risk downstream. Along Shire Road there is an existing strip of vegetation which could provide an area of storage.		
Option 4	Flow routing within the highway	Control flows within the highway to improve conveyance of surface water and route away for key receptors	The installation of obstructions such as speed bumps can be used a method of routing flow away from at risk areas. This method could be utilized along Green Street whereby property flood incidents have been reported previously. Similar methods could also be considered along both Whitelands Avenue and Lower road whereby there is a significant flow path.	2	No
Option 5	Property flood resilience	Protection to individual properties (e.g. via air brick covers, door guards etc.).	The flood depths shown to occur, within the modelling, around the at-risk areas, are typically low and so installation of property flood resilience may be a viable option. Based upon EA guidance, PFR should only protect against flood depths up to 0.6m; beyond this the structural integrity of a property is at risk. Flood incidents have been previously reported at the junction between Shire Road and Lower Road. Modelling shows that the flood depths here are significant and property flood resilience would not be possible. This is considering flooding with no other mitigation methods. Property protection may be suitable if other methods limit flood depths. Other properties that have reported flooding are along Chorelywood Bottom. Here, depths are lower (approximately 0.5m during a 1 in 75-year event, when no other actions are implemented), and property level protection may be a viable option (if other methods do not remove the flood risk).	3	Yes

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	4	2	4	2	3
Design Capabilities	Number of properties protected from flooding by surface water runoff	0	2	2	3	2	2
	Level of additional environmental benefit provided	0	3	1	4	1	1
Health & Safety	Risk to maintenance operatives is minimised	5	2	2	3	2	4
Public Acceptability	Overall acceptability of the scheme to the public	3	4	3	4	2	4
Natural Environment & Visual Amenity	No adverse ecological effect on flora and fauna	5	4	1	4	3	4
	Scheme minimises visual impact on surrounding area	5	4	1	4	3	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	2	3	3	3	3
	Low maintenance costs	5	2	2	2	3	4
	Total (out of 50)	**33**	**28**	**18**	**32**	**22**	**32**
	Viability Score (out of 5)	**3**	**3**	**2**	**3**	**2**	**3**

Scoring Criteria *Please Note: All options are ranked comparatively*	0 = Does Not Meet Criteria 5 = Fully Meets Criteria

Short list of Options taken forward:

- **Do nothing**
- **Do minimum**
- **Option 3 – 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 Chorleywood 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). • Maintains the existing situation.

Summary Disadvantages of Option
• Does not provide any reduction in flood risk. • 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			
210	52	172	141
Number of Non-Residential Properties at Risk from Flooding			
51	3	8	10

Option 3 – Retrofitting of SuDS

Summary Description of Option

1. Utilisation of small areas of green space within the built up as areas of storage.
2. There are many grassed spaces between roads and pavements which could be used to intercept flow paths along the highway.
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.
- 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.
- 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 roads surrounding Avior Drive. Here there are larger areas of greenspace. However, the small areas along Batchworth Lane and the side roads should also be adopted as areas of storage as there is a clear flood risk here.

Option 5 – Property Flood Resilience

Summary Description of Option

Passive 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.
- 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. • Some properties may not be suitable/ property owners may not want such measures. • 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.

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