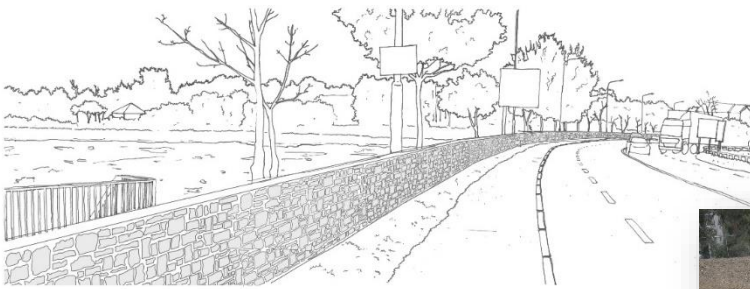




Measures & Options Considered



Flood Risk Management Measures

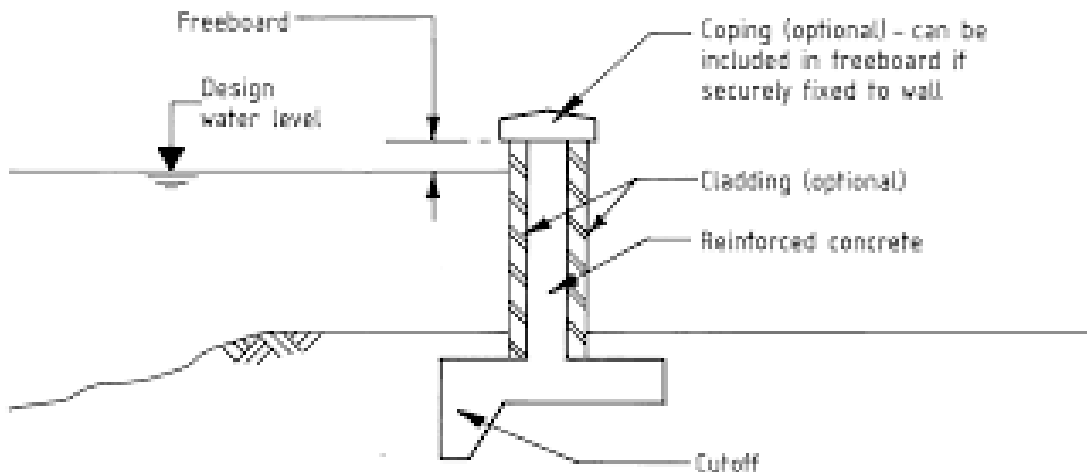
- The Flood Relief Scheme will consist of one or a combination of flood risk management measures.
- Flood management measures that we are initially considered include:
 - Flood embankments
 - Flood walls
 - Raised road and footpath levels
 - Diversion channel
 - Dredging / channel cleaning
 - Landscaped ground levels
 - Individual property protection
 - Temporary / demountable gates and barriers
 - Changes in land management practice (such as forestry and agriculture)
- Different measures may be selected for different parts of the town.
- Viable measures were tested to see what impact they had on flooding, and where they had a benefit, they were combined with other measures to optimise the reduction in flood risk overall.
- The preferred scheme will be identified by balancing the economic, social, cultural heritage and environmental aspects of each of the measures.





Design standard for the defences

- The target standard of protection (SoP) for the final scheme is to prevent flooding to properties and built assets during flood events with a 1% annual exceedance probability (AEP) (or event that has a 1% chance of happening in any year, otherwise called the 1 in 100 year flood).
- As well as the direct water level, the defences also have an element of freeboard, so are 300mm higher than the water level for walls and 500mm higher for embankments, where settlement can happen over time.



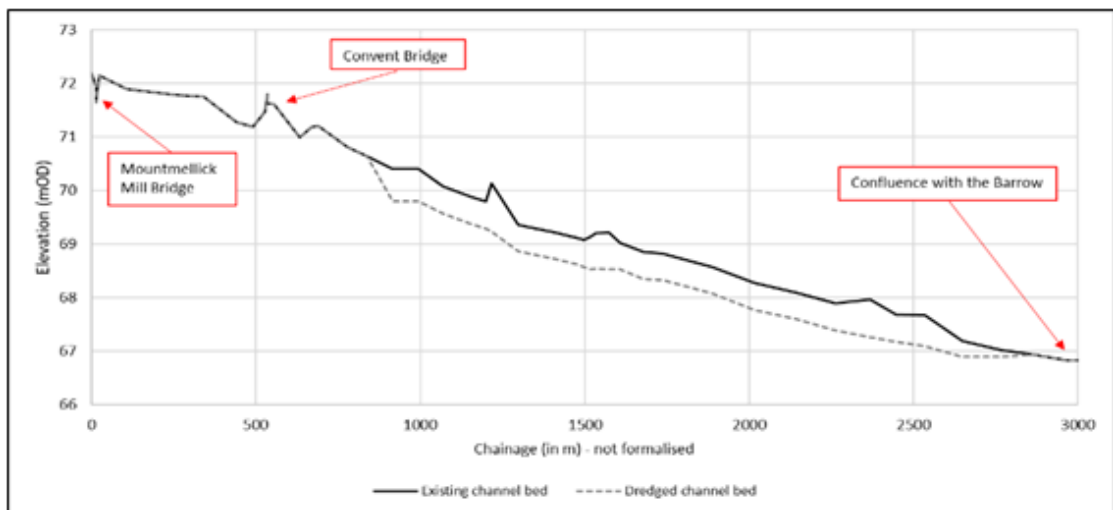
- This design standard means that parts of Mountmellick which benefit from the scheme will be protected from all flood events up to and including the 1% AEP.
- As part of the scheme development we will be testing more extreme flood events to see where, and to what depth and extent, overtopping may happen.
- We will also ensure the defence can be adapted to operate under climate change scenarios.



Flood Risk Management Measures Tested

Dredging (downstream of Convent bridge)

- Not possible in the town area due to channel condition and critical bridge structures (e.g. Mountmellick Mill Bridge).
- Dredging downstream of Convent bridge had no significant impact on flood levels because the critical area of spill into the floodplain is upstream of the dredged section.



Upstream Storage and Natural Flood Management (NFM)

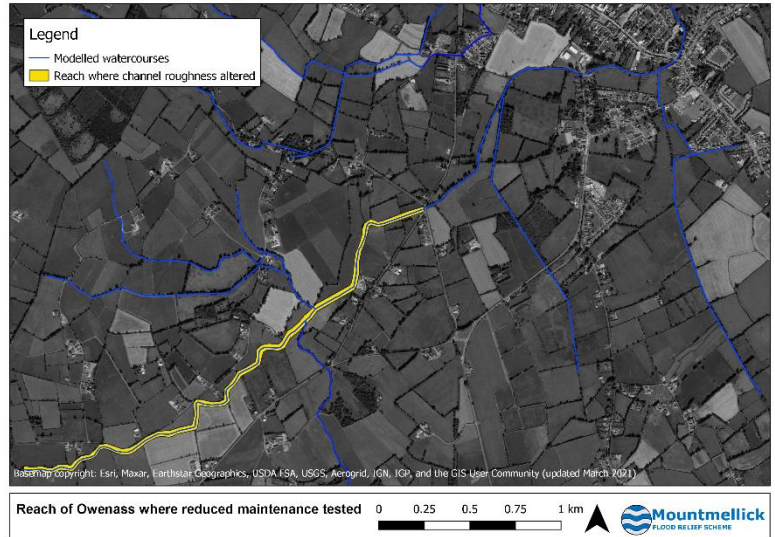
- NFM features include: Leaky barriers, bunds, buffer zones, re-naturalising channels
- Tested on various rivers and tributaries. Reduction in flood levels around the town were minimal and there was still a need for defences.
- Significant wider environmental benefits and localised flood improvements mean NFM will still be considered as a supplementary measure.



Flood Risk Management Measures Tested

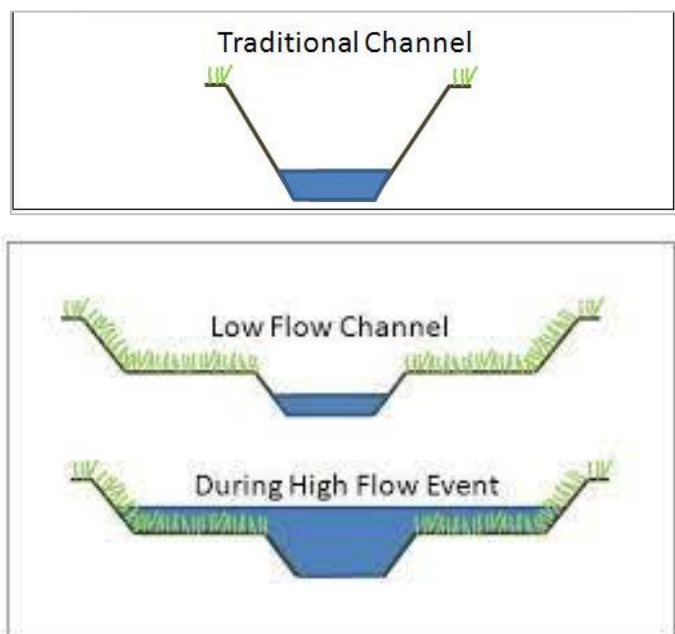
Changes in river maintenance regime

- Using nature based solutions to slow the flow through the system and provide in-channel storage upstream of the main flood risk area.
- No notable changes in water levels downstream as a result of the changes.



Improved conveyance of the Owenass River (two-stage channel)

- Creating additional storage by restoring the Owenass floodplain and providing improved conveyance using a higher level second stage channel which is only activated in higher flow events.
- Additional storage created not sufficient to contain the flood waters and did not result in any considerable changes in flood levels



Flood Risk Management Measures Tested

Hard defences

- Combination of embankments and walls to contain flow and protect properties from flooding.
- Example of flood walls and embankments, both as cross sections and images from other schemes are included at the end of this document.



Floodplain embankment

- Key flood mechanism in Mountmellick is the interaction and cross flow between the Pound and Owenass.
- Tested putting in a barrier through the floodplain from Mountmellick Mill Bridge to upstream of Owenass Bridge to prevent cross flow.
- Reduced flooding observed on the Pound (no flooding around Manor Court) but defences still needed in town area to defence against the Owenass.





Flood Risk Management Measures Tested

Removal of structures along the Pound at Manor Court

- Structures on the Pound constrict flow. For this test the structures were removed to assess the potential impact of conveying additional flow down the Pound rather than the allowing to spill across the flood plain.
- While there was increased flow moving down the Pound the volume of flow was still too great and flooding along the Pound and Mountmellick area still occurred. Works at Wolfe Tone and N80 would be required.
- Wholesale upgrading of structures would also be impractical and costly.



Removing Mountmellick Mill bridge

- Removed bridge to assess its impact on flood levels.
- Removal of bridge decreased levels upstream in Baker's field but resulted in increased flooding of properties downstream.
- The bridge acts as a constriction holding water on the floodplain protecting properties.





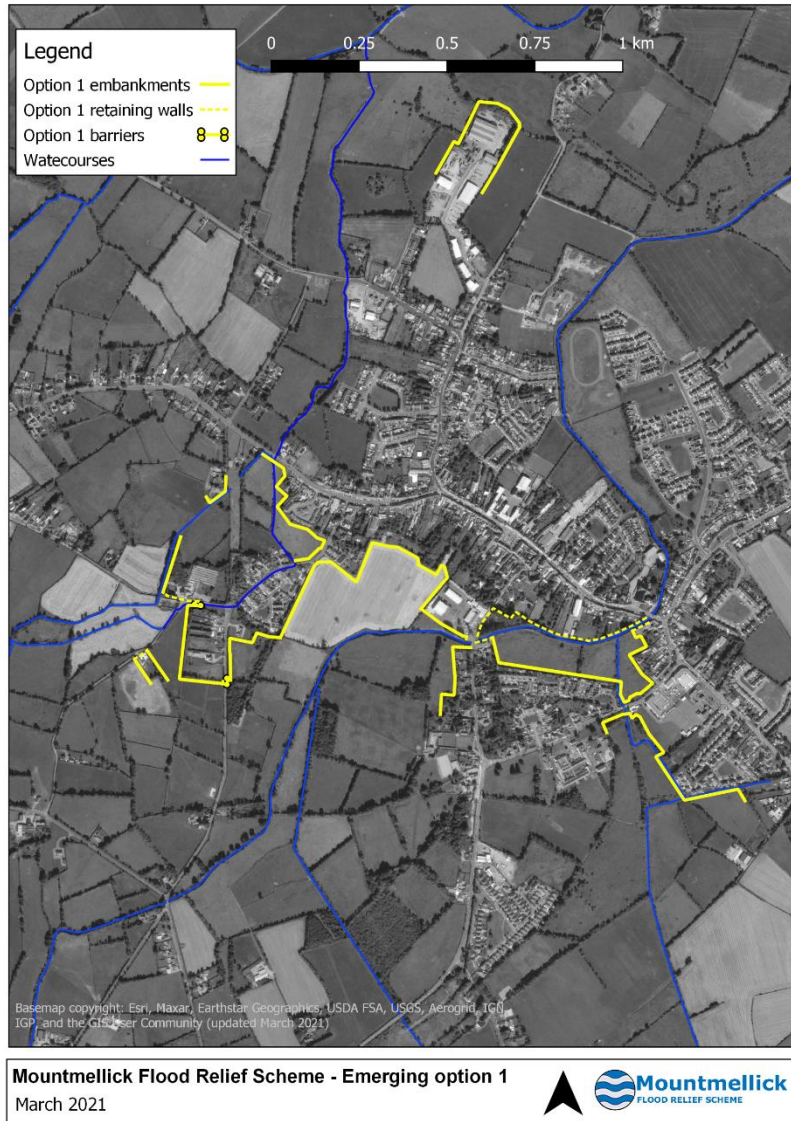
Emerging Options

- From the measures tested we've found two successful approaches to reducing flood risk:
 - Containment – building walls and embankments around the town area to hold flood waters back from impacting risk receptors.
 - Separating the Owenass and Pound catchments – by isolating the systems the cross catchment flow flood mechanism is removed.
- With these approaches in mind, three emerging options (created by combining different measures) have been developed.
 - Option 1: Walls and embankments around Mountmellick town
 - Option 2A: Embankment along the Owenass River
 - Option 2B: Embankment along Manor Road
- Each of the emerging options has their own benefits and constraints which are discussed further in the next set of posters.





Emerging Option 1



- Embankments and walls provide protection to properties and businesses in the town and around the various Manor Road estates alongside the Pound.
- A throttle will be needed on the Pound to reduce flows alongside Manor Road to a manageable level.
- There will be no impact (either reduction or increase) in flood risk upstream of Mountmellick.
- Refer to detailed poster for more information on this Option.



Emerging Option 2A



- This option divides the catchments of the Owenass and Pound but still needs walls and embankments in town, but much lesser defences are needed on the Pound
- It follows the shortest route along the left bank of the Owenass
- Protection will be provided to a number of properties upstream of Mountmellick
- There will also be some increase in flood extents upstream of Mountmellick
- Refer to detailed poster for more information on this option



Emerging Option 2B

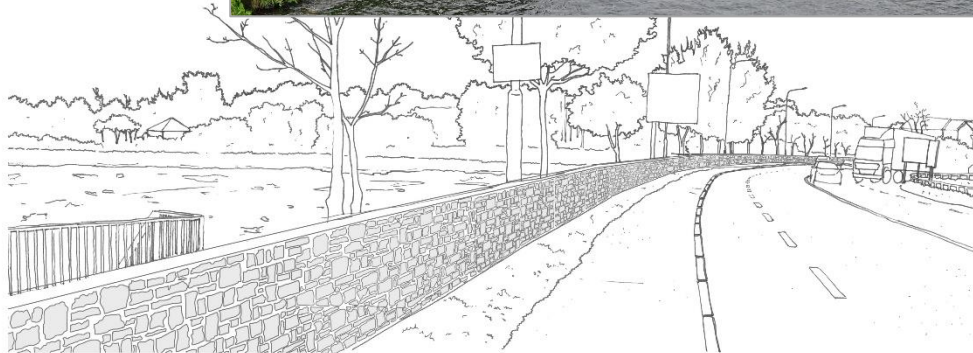


- This option also divides the catchments of the Owenass and Pound. It retains a maximum amount of upstream of Mountmellick flood plain by following the road and property boundaries
- It still needs walls and embankments in town, but much lesser defences are needed on the Pound
- Protection will be provided to a number of properties upstream of Mountmellick
- There will also be some increase in flood extents upstream of Mountmellick
- Refer to detailed poster for more information on this option



Examples of Flood Walls

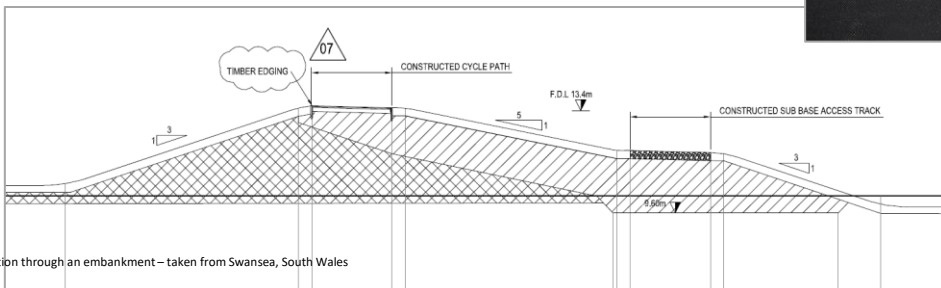
- A wall built along a river bank to prevent floods by giving a raised, uniform crest level.





Examples of Flood Embankments

- Embankments are usually made of earth and have a clay core to prevent water seeping through.
- They need more space than a flood wall
- There are better opportunities to integrate them into the surrounding landscape.



Typical section through an embankment – taken from Swansea, South Wales