

Cork County Council

Midleton Flood Relief Scheme

Public Participation Day No.2

Summary Report

REP/1

Issue | 26 June 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number **252803-00**


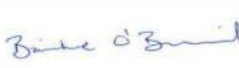




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Appendices

Appendix A

PPD 2 Materials



1 Introduction

The OPW has carried out a Catchment Flood Risk Assessment and Management (CFRAM) Study for the Lee Catchment, which includes the Owenacurra and Dungourney River catchments, as well as tidal flood risk.

Cork County Council has recognised that groundwater and pluvial flooding are also very significant sources of flood risk in Midleton. A robust flood scheme for the town needs to address these flood sources. The scheme is therefore to be developed to defend properties at risk from all four sources of flooding.

Cork County Council, acting as Agents for the OPW, has commissioned Arup to develop a Flood Relief Scheme for Midleton.

This report provides details and analysis of the Public Participation Day (PPD) held on 7th March 2020. This was the second public participation day for the project. The aim was to inform the public and stakeholders of the progress made since the project commenced, and to outline a suite of potential options to alleviate flooding in the Midleton Area.

2 Public Participation Day Arrangements

2.1 Public Participation Day– Presentation of Viable Options

A PPD was held on Saturday 7th March 2020 in the Midleton Park Hotel. It was held on a Saturday as it was thought that this would maximise the number of potential attendees.

The purpose of the PPD was to present a suite of potential options to the general public and to seek feedback in order to identify a preferred scheme. The PPD was held between 11am and 6pm for members of the general public. The objectives of the Public Participation Day were to:

- Provide an update on progress to date
- Outline the Present-Day Flood Extent based on hydraulic model analysis
- Provide information and an opportunity to comment on the Potential Scheme Options
- Obtain other information relevant to the Scheme
- Outline the next steps of the Scheme

The PPD was attended and staffed by members of Arup's engineering and environmental teams, representatives of the Office of Public Works and Cork County Council including an architect. Scheme representatives were available to answer questions from the members of the public who attended, to explain the potential options presented, and to accept feedback and information from the attendees.

2.2 Presentation to Councillors

A presentation was made to elected representatives prior to the PPD consultation on 2nd March at the East Cork and Cobh Municipal District meetings.

2.3 Advertising of the Public Participation Day

The project team prepared publicity brochure, posters, and letters to stakeholders, newspaper and radio advertisements.

Advertising of the PPD was undertaken in the local printed press and on local radio shows in the week preceding the event, as follows.

Advertisements in Local Press:

- East Cork Journal
- Irish Examiner

Advertisements on Local Radio:

- 96 FM
- C103

Information posters were located (10 no) throughout the town as shown in Figure 1 below. In addition, posters were put in place at bus and rail stops, and on railway carriage "arrow cards".

Figure 1: PPD Information Poster



Invitations were sent to stakeholders and individuals who attended previous consultation days via email.

The event was also publicised through the project website, the Cork County Council website, Irish Examiner website and CCC social media platforms (along with ECJ social media).

A number of articles written by various local and national news websites;

- East Cork Journal, 27-02-2020
- Irish Examiner, online article (Native content), (26-02-2020 to 06-03-2020)
- Irish Examiner, 09-03-2020
- <https://www.c103.ie> on 03/03/2020
- <https://www.echolive.ie> on 03/03/2020
- <https://www.rte.ie> on 04/03/2020
- <https://www.thecork.ie> on 06/03/2020

In addition, approx. 11,000 information leaflets were delivered to local residents.

2.4 Landowners Contact

A number of landowners who may not have been aware that they could be impacted by the options (for example, the upstream storage options) were contacted by letter prior to the PPD, inviting them to the PPD and directing to them to the website for further information.

3 Public Participation Day Materials

3.1 PPD2 Information Leaflet

A PPD Information Leaflet was produced for the scheme. This information leaflet outlined the PPD details, the level of protection the scheme will defend to, the number of properties defended and the estimated cost of the scheme. It included a map showing the present day flood extent of Midleton Town Centre and listed the potentially viable options that would be on display at the PPD. A copy of the information leaflet is attached in **Appendix A**.

3.2 PPD 2 Questionnaire

A questionnaire with pre-printed questions was provided to each attendee, in addition to the information leaflet. It provided an opportunity for members of the public to express their views on the potentially viable options presented at the PPD, in addition to other comments they may have had relating the scheme. A copy of the blank questionnaire is attached in Appendix A.

The return date for receipt of completed questionnaires was the 6 April 2020 however this was extended by 2 weeks, to April 22 due to the Covid-19 pandemic. This extension was advertised on the project website, and on CCC social media. The East Cork Journal covered this extension on their publication on the 18-04-2020, as did the Irish Examiner on the 08-04-2020.

Information in addition to the questionnaires was also accepted on the day of the event or subsequently by post/ email. A questionnaire with pre-printed questions was provided to each attendee. A copy of the blank questionnaire is attached in **Appendix A**.

3.3 PPD 2 Posters

The following posters were exhibited at the PPD:

- Scheme Objectives and Overview
- Public consultation process
- Fluvial Flood Extents
- Tidal Flood Extents
- Pluvial Flood Extents
- Preliminary Technical Assessment
- Area 1 Tir Cluain to Willowbank Options
- Area 2 Northern Relief Rd- Cork Rd Bidge Options
- Area 3 Town Centre and Bailick Rd Option
- Area 4 Lauriston and Rugby Club Options
- Area 5 Ballinacurra Options
- Area 6 Water Rock (inc. Dwyers Rd) Option
- Considerations of climate change
- Potential Future Developments
- Architectural Details

Copies of the posters are included in **Appendix A**.

3.4 PPD 2 Props

A scale model presenting a typical proposed defence wall cross section was displayed. A life size prop was also displayed demonstrating the likely maximum flood defence height, this was used to illustrate the defence height relative to attendees and the possible finishes that could be applied to a flood defence.

3.5 Project Website

The dedicated website was updated prior to the PPD. The website address www.midletonfrs.ie was publicised at the PPD, and attendees were informed that all information on display at the public exhibition, including information brochures, posters, questionnaires etc. would be available for download from the website.

It is intended to keep the website live for the duration of the scheme and for it to become a destination for interested members of the public to get project information and news and where project documentation can be made available for download.

4 Public Participation Day Outcome

4.1 Number of Attendees

Members of the public visiting the exhibition were invited to sign a visitors' list to enable a record of the number of attendees to be maintained. A total of 179 attendees signed the attendance list at the event in the Midleton Park Hotel. However, the total attendance was estimated to be approx.210 persons.

4.2 Public Response

It was considered that visitors to the PPD had, in the main, a good understanding of the proposals as presented at the exhibition. Feedback was generally positive. Most of those that attended had a particular interest in properties or lands in the study area and outlined the extent to which their properties had been affected by previous flood events.

There were a number of common topics the public raised as outlined below. Clarifications were also sought on the proposed options at particular locations across the study area. Most of these were reflected in the questionnaires and other submissions.

4.2.1 Common topics raised at the PPD

There occurring topics of public interest discussed with project representatives during the PPD are summarised below:

- Programme and construction start date
- Availability of Insurance
- Confirmation of Funding
- Climate Change
- Upstream Catchment Management / Natural Flood risk Management
- Dredging

A “Frequently Asked Questions” section has been added to the website with responses to these queries amongst others.

4.2.2 Returned Questionnaires

By 20th April 2020 (the extended closing date for receipt of comments), a total of 67 questionnaires were returned.

4.3 Analysis of Questionnaires

A total of 67 completed questionnaires were received.

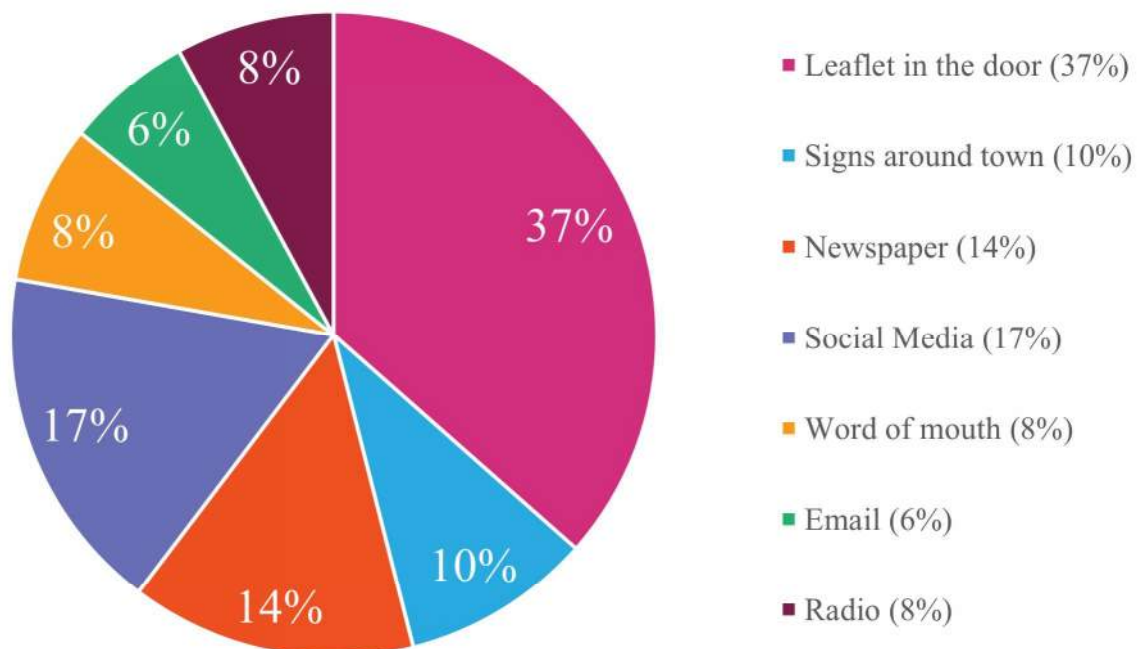
Outlined below is a summary of the information provided in the questionnaires.

4.3.1 Question 1 (Previous attendance)

When asked “*Did you attend the first Public Participation Day held on 27th March 2017?*” 37% of indicated they had while 63% of individuals indicated they had not or left the question unanswered.

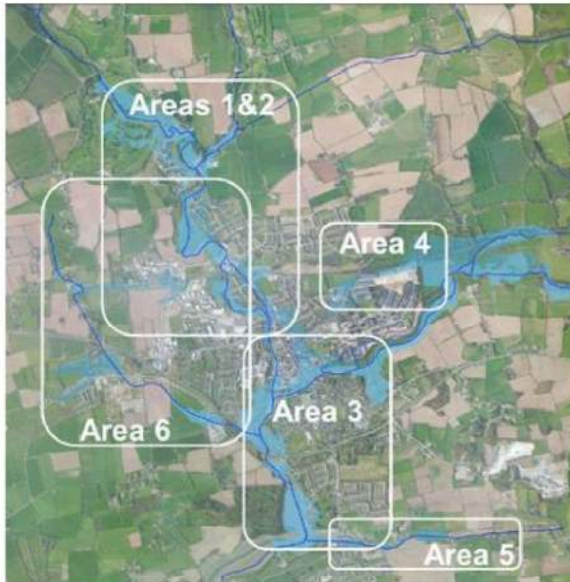
4.3.2 Question 2 (PPD advertisement)

The breakdown of the responses to Question 2: “*How did you hear about today’s Public Participation Day?*” are detailed below;



4.3.3 Question 3 (Areas of interest)

In order to assess the geographical areas in which people were most interested in, attendees were asked “*What part of the study area have you a particular interest in?*”. This question was aided with a map to indicate the extent of the areas.



A number of responses indicated an interest in more than one area of the scheme. Analysis of this questions resulted in the below findings;



4.3.4 Question 4 (Preferred Option)

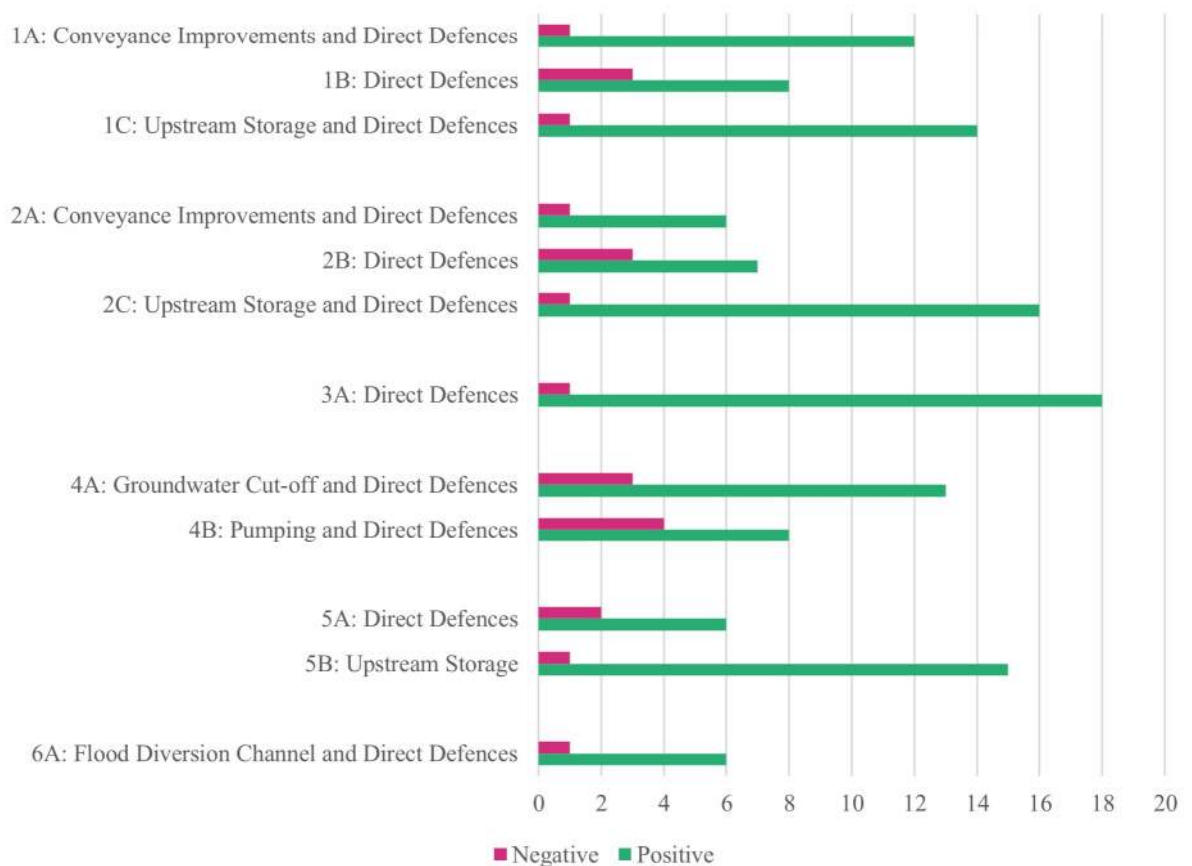
The purpose of question 4 was to assess which of the technically viable options presented were preferred. The outcome of this question will be used to inform the public perception section of the Multi Criteria Analysis.

It is noted that;

- Some responses indicated a preference to several of the options presented
- Some indicated a preference to options in areas they did not state they had an interest in (Question 3)
- One individual responded negatively to all the options across all areas presented at the PPD. They were advocating for solely Natural Flood Risk Management.

The analysis of the Question 4: *“Of those presented and of interest to you, please indicate the option(s) you preferred?”* is detailed below.

Public Preference of Options Presented



Area 1: (Tir Cluain to Willow Bank)

1C: Upstream Storage and Direct Defences received 14 positive responses and 1 negative response resulting in a net of 13 positive responses. There was a slight

preference for 1C: Upstream Storage and Direct Defences over 1A: Conveyance Improvements and Direct Defences (net of 11 positive responses). 1B: Direct Defences received 8 positive responses and 3 negative responses resulting in a net of 5 positive responses.

Despite 23 responses indicating an interest in this area (Question 3), 28 individuals indicated their option preference(s).

Area 2: (Tir Cluain to Willow Bank)

There was a significant preference for 2C: Upstream Storage and Direct Defences (net of 15 positive responses). 2A: Conveyance Improvements and Direct Defences received a net of 5 positive responses. While 2B: Direct Defences received a net of 4 positive responses.

Despite 14 responses indicating an interest in this area (Question 3), 23 individuals indicated their option preference(s).

Area 3: (Town Centre and Bailick Rd)

There was one technically viable option presented for Area 3. Analysis of the questionnaire showed 18 individuals responded positively to option 3A: Direct Defences with one individual responding negatively, a net of 17 positive responses.

28 responses stated they were interested in Area 3 (Question 3) however only 18 individuals expressed an opinion on the option presented.

Area 4: (Lauriston Estate/ Rugby Club)

There was an overall preference for 4A: Groundwater Cut-off and Direct Defences over 4B: Pumping and Direct Defences. There were 13 positive responses to 4A while 3 responded negatively, a net of 10 positive responses. 4B received 8 positive and 4 negative responses, a net of 4 positive responses.

18 individuals stated they were interested in Area 4 (Question 3) however 21 individuals expressed an opinion on the options presented.

Area 5: (Ballinacurra)

There was a significant preference for 5B: Upstream Storage (net of 14 positive responses) over 5A: Direct Defences (net of 4 positive responses) in the Ballinacurra area.

Despite 9 responses indicating an interest in this area (Question 3), 18 individuals indicated their option preference(s).

Area 6: (Water Rock including Dwyer's Rd)

There was one technically viable option presented for Area 6. Analysis of the questionnaire showed 6 positive responses to option 6A: Flood Diversion Channel and Direct Defences with one negative response, a net of 5 positive responses.

Despite 2 responses indicating an interest in this area (Question 3), 7 individuals indicated their option preference(s).

4.3.5 Question 5 (Environmental, Social, Visual, Heritage and Archaeological)

Question 5 was an opportunity for the public to give comments on the potential options presented;

“Having reviewed the details of the potential options, we would appreciate any comments you may have, for example, with regards to Environmental, Social, Visual, Heritage and Archaeological matters”

The responses to this question detailed a range of themes, including but not limited to;

- Natural Habitats
- Tidal Barrier
- Public Realm improvements
- Environmental impacts
- Finishes of defences
- Impacts on tourism

4.3.6 Question 6 (Other comments)

A number of topics were raised by the public in response to Question 6: *“Please let us know if you have any other comments”*. The most common topics are listed below;

- Local drainage issues
- Clearing of debris from the water courses
- Climate Change
- Dredging
- Programme
- Passive scheme- no manual intervention required

Responses to these common questions will be added to “Frequently Asked Questions” section of the project website.

4.4 Other Submissions Received

In addition to the returned questionnaires, 23 other submissions were received by post/ email following the PPD. These comprised of the following:

- Submission from O'Farrell's Funeral Home
- Submission from local resident suggesting tidal barrier
- Submission from Inland Fisheries Ireland
- Submission from Blackpool Developments Ltd. regarding Areas 2 and 6
- Submission from local resident regarding Area 4 - Lauriston
- Submission from local resident regarding Area 5 - Ballinacurra
- Submission from Ballyvodock Road Residents Group
- 2 No. submissions from Irish Distillers Limited, Midleton
- Submission from Midleton 'My Town, My Plan'
- 11 emails from individuals which stated they were opposed to all options presented (4 of which were received after the deadline)
- 2 emails from Green Party Councillors requesting further consultation

Appendix A

PPD 2 Materials

A1 Information Leaflet

A copy of the PPD Information Leaflet is provided overleaf.



MIDLETON FLOOD RELIEF SCHEME

PUBLIC PARTICIPATION DAY

**Saturday 7th March
Midleton Park Hotel
11.00-18.00**

www.midletonfrs.ie



Printed on Recycled Paper



INTRODUCTION

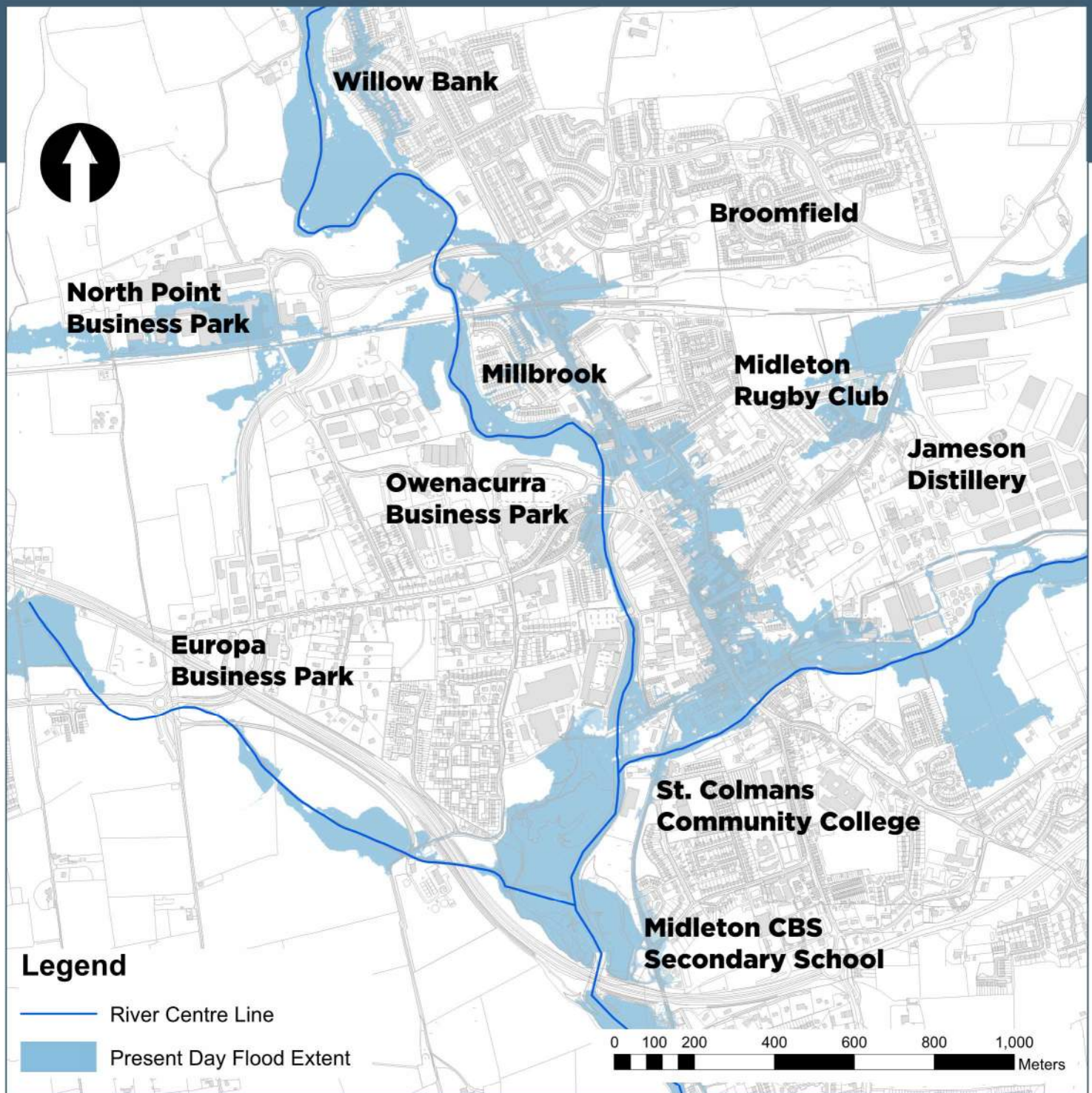
Cork County Council, working with the Office of Public Works, has commissioned Arup to develop a Flood Relief Scheme for the Midleton Area, including Water Rock and Ballinacurra. The purpose of the Midleton Flood Relief Scheme is to assess and develop a viable, cost effective and sustainable Flood Relief Scheme to alleviate flooding in the Midleton Area.

PUBLIC PARTICIPATION

This is the second public participation day for the project.

Our aim is to inform the public and stakeholders of the progress made since we began this project, and to outline a suite of potential options to alleviate flooding in the Midleton Area.





POTENTIALLY VIABLE OPTIONS

As part of the ongoing project work, a series of flood risk management measures have been identified and developed by Arup.

These potentially viable options will be presented at the Public Participation Day and include the following:

- **Upstream storage**
- **Direct flood defences**
- **Diversion channels or culverts**
- **Conveyance improvements**
- **Pumping**

A combination of some of these measures will be brought forward to make up the proposed Flood Relief Scheme.

WHAT HAPPENS NEXT?

All comments received in response to this Public Participation Event will be examined by Cork County Council and the Office of Public Works and will be considered when developing the Emerging Preferred Option for the Midleton Flood Relief Scheme.

A further Public Participation Day will be held once the Emerging Preferred Option has been identified.

YOUR FEEDBACK IS IMPORTANT

Cork County Council and the Office of Public Works want to consider all viewpoints in relation to the Options being proposed. This is your opportunity to take part and make your views and comments known. Following this public participation event, the Emerging Preferred Option will be developed and the scheme will be finalised. Time spent communicating your views on the proposed options is appreciated.

The general public and all interested parties are invited to give their opinions on the proposed options. Please examine the range of proposed options on display at the Public Participation Day and online on the project website www.midletonfrs.ie and let your views be known before **Monday 6th April 2020** by:

1. Completing and returning the Questionnaire at the Public Participation Day, or
2. Emailing us at midletonfrs@arup.com, or
3. Writing to the address below

Contact Us

All queries, questionnaires and comments in relation to this project can be addressed to:

Bairbre O'Breasail
Project Manager
Arup
One Albert Quay
Cork

Tel: +353 (021) 422 3200
Email: midletonfrs@arup.com
www.midletonfrs.ie

A2 Questionnaire

A copy of the blank questionnaire is provided overleaf.

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Midleton Flood Relief Scheme PUBLIC PARTICIPATION DAY NO.2 OPTIONS QUESTIONNAIRE

(Please complete this questionnaire and return to Bairbre O'Breasail, Arup, One Albert Quay, Cork, T12 X8N6, or midletonfrs@arup.com by Monday 6th April 2020)

Questions:

1. Did you attend the first Public Participation Day held on 23rd March 2017? Yes ☐ No ☐

2. How did you hear about today's Public Participation Day? _____

3. What part of the study area have you a particular interest in (indicate with ✓)?

Area 1: (Tir Cluain to Willow Bank) ☐

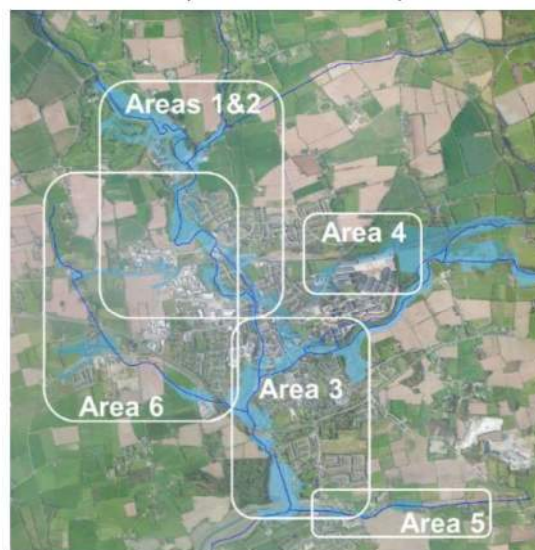
Area 2: (Northern Relief Rd to Cork Rd Bridge) ☐

Area 3: (Town Centre and Bailick Rd) ☐

Area 4: (Lauriston Estate/ Rugby Club) ☐

Area 5: (Ballinacurra) ☐

Area 6: (Water Rock including Dwyer's Rd) ☐



4. Of those presented and of interest to you, please indicate the option(s) you preferred?

<u>Area 1: (Tir Cluain to Willow Bank)</u>			
1A: Conveyance Improvements and Direct Defences	Yes	No	
1B: Direct Defences	Yes	No	
1C: Upstream Storage and Direct Defences	Yes	No	
<u>Area 2: (Northern Relief Rd to Cork Rd Bridge)</u>			
2A: Conveyance Improvements and Direct Defences	Yes	No	
2B: Direct Defences	Yes	No	
2C: Upstream Storage and Direct Defences	Yes	No	
<u>Area 3: (Town Centre and Bailick Rd)</u>			
3A: Direct Defences	Yes	No	
<u>Area 4: (Lauriston Estate/ Rugby Club)</u>			
4A: Groundwater Cut-off and Direct Defences	Yes	No	
4B: Pumping and Direct Defences	Yes	No	
<u>Area 5: (Ballinacurra)</u>			
5A: Direct Defences	Yes	No	
5B: Upstream Storage	Yes	No	
<u>Area 6: (Water Rock including Dwyer's Rd)</u>			
6A: Flood Diversion Channel and Direct Defences	Yes	No	

5. Having reviewed the details of the potential options, we would appreciate any comments you may have, for example, with regards to Environmental, Social, Visual, Heritage and Archaeological matters:

6. Please let us know if you have any other comments:

Name (optional): _____

Address (optional): _____

Email (optional): _____ Phone (optional): _____

I agree to Cork County Council using my contact details to inform me regarding this scheme.

Signed: _____

Privacy & Data Protection:

Personal information collected by Cork County Council is done so in order for us to engage with you in relation to the Midleton Flood Relief Scheme. Legally we can process this information as you have given your consent by signing this form. If you wish to remove your name from this list email midletonfrs@arup.com. The protection of your personal data is a key priority for the Council and your data will be processed in line with our Privacy policy which is available at <https://www.corkcoco.ie/privacy-statement-cork-county-council> or hardcopy from our offices at County Hall, Carrigrohane Road Cork, Ireland. Should you have any questions about our privacy policy or the information we hold about you please contact us by email to dpo@corkcoco.ie or write to us at Data Protection Officer, Cork County Council, County Hall, Carrigrohane Road Cork, Ireland.

THANK YOU FOR YOUR CO-OPERATION

A3 Posters

Copies of the posters are provided overleaf.



Scheme Objectives and Overview



Viable, Cost-effective and Sustainable Flood Relief Scheme

Cork County Council has commissioned Arup to assess and develop a viable, cost-effective and sustainable Flood Relief Scheme.

The Project Team includes Cork County Council (CCC), the Office of Public Works (OPW) and Arup (Consulting Engineers). Shown is an indicative flow chart outlining the process from inception through to construction for the Flood Relief Scheme.

Preliminary
Flood Risk
Assessment



CFRAMS Study
Flood Risk
Assessment
and
Management



Prioritisation of
Scheme



December 2015
Flood Event



Construction
2023



Detailed Design
and
Procurement
2022



Statutory
Consent
Process
2021



Development of
Scheme
Midleton FRS
commenced
December 2016



Indicative Flow chart



Public Involvement

The purpose of this Public Participation Day (PPD) is to:

- Provide an update on progress to date
- Outline the Present Day Flood Extent based on hydraulic model analysis
- Provide information and an opportunity to comment on the Potential Scheme Options
- Obtain other information relevant to the Scheme
- Outline the next steps of the scheme

Members of the project team are present today to answer any questions you have, or take note of any relevant information. A questionnaire is available for you to complete and return with your comments, or please email us at midletonfrs@arup.com

Following this public consultation, there will be further opportunities for involvement through attendance at future information days, when updates on the scheme progress will be presented.

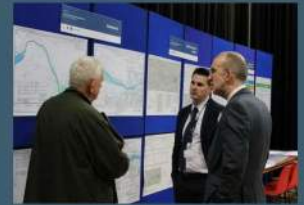


Public Consultation Process



Stakeholder Input and Consultation

An important element of the Scheme involves consultation with all interested parties including the public to give their views on the viable options, thereby influencing the decision-making process. All comments are considered and, where relevant, further updates to the options will be carried out.



Public Participation Day No.2

7th March 2020

A chance to take part and make your views and comments known on the Viable Options

You are here



Public Participation Day No.1

23rd March 2017

- Purpose of project set out
- Constraints study explained
- Overview of potential outcomes
- Your views were sought



What has happened since?

- Constraints Study
- Groundwater Investigations and Monitoring
- Hydrology Analysis and Hydraulic Modelling
- Development of Viable Options



What happens next?

- Multi Criteria Analysis taking into consideration feedback from the public
- Detailed Geotechnical Investigations
- Development of Emerging Preferred Option



Public Participation Day No.3

- Presentation of the Emerging Preferred Option
- A third chance to have your views heard



What happens then?

- Scheme Review
- Production of Scheme Documentation
- Appropriate Assessment
- Environmental Impact Assessment



Statutory Consent Process

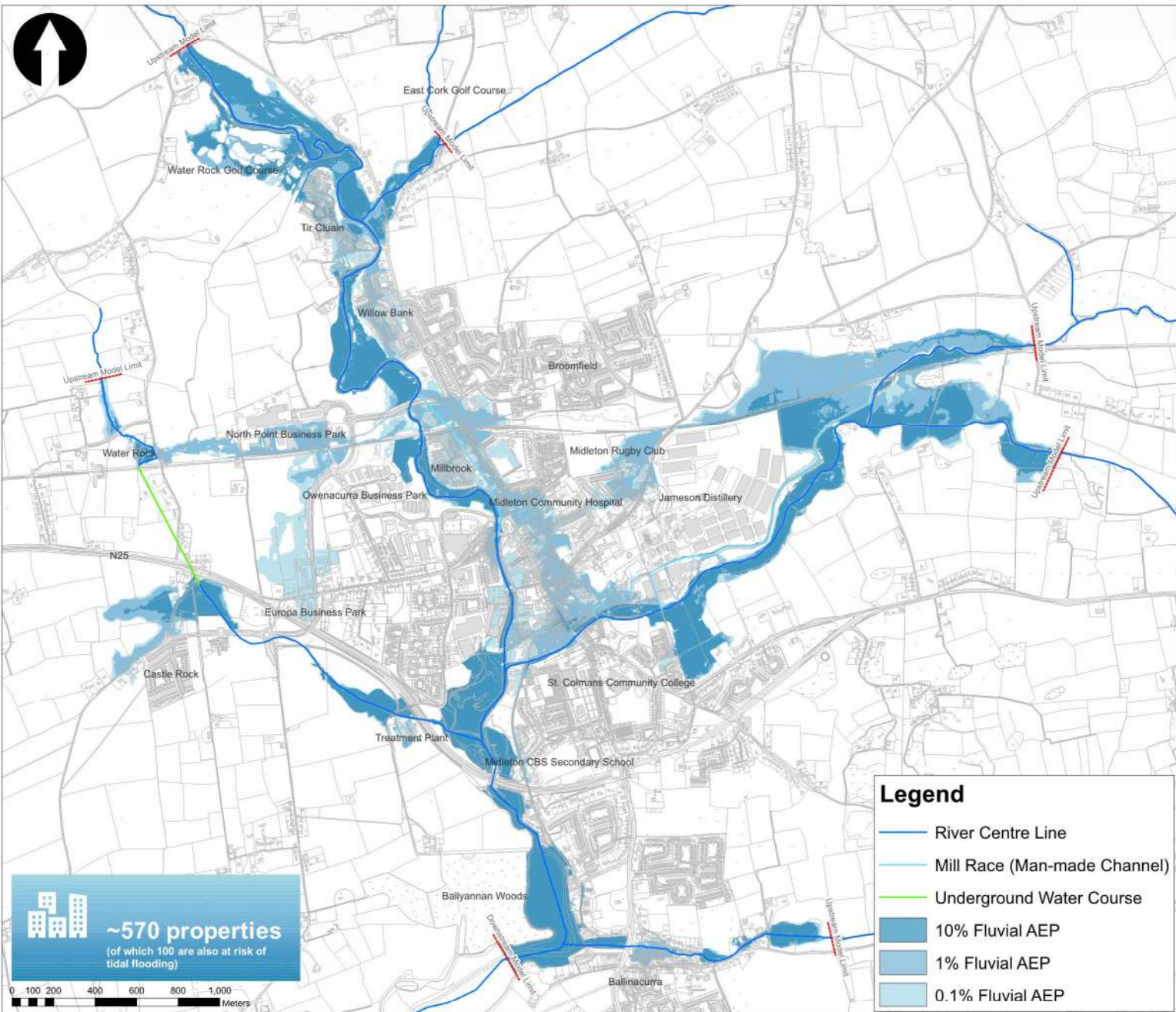
- A fourth chance to have your views heard

And then?

- Scheme Refinement
- Ministerial Approval
- Detailed Design
- Procurement and Construction



Predictive Fluvial Flood Extent Map



Fluvial (River) Flooding

Fluvial flooding occurs when rivers and streams break their banks and water flows out onto the adjacent low-lying areas.

The fluvial flood risk to Midleton Town is from the Owenacurra River, its tributaries (Elfordstown and Glenathonacash Streams), the Owenacurra Millrace and the Dungourney River.

The fluvial flood risk to Ballinacurra is from the Ballinacurra Stream.

The fluvial flood risk to the Water Rock area is from the Water Rock Stream.

The 'predictive' flood map shows areas that are predicted to be flooded during a theoretical or 'design' flood event with an estimated probability of occurrence. In other words, a computer model has predicted that these areas would flood in a design flood event. It is not based on flood records from actual flood events in the past.

The map refers to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'.

Annual Exceedance Probability Definition

The size of a flood is described in terms of its probability (or how likely it is to occur).

Take the example of the 1 in 100 year flood:

The 1 in 100 year flood is the same as the 1% AEP flood.

This is a large flood with ;

- Very large volumes of flood water
- Very high flood levels
- A large area of land, not normally covered by water is covered by flood water

But the probability (or likelihood) of this flood occurring is low;

- Every single year there is a 1 in 100 chance or 1% probability of this flood occurring

And compare to the example of the 1 in 10 year flood:

The 1 in 10 year flood is the same as the 10% AEP flood.

This is a much lower sized flood with;

- A volume of flood water, greater than normal conditions, but much less than during the 1 in 100 year flood
- Flood levels higher than normal conditions, but much less than during the 1 in 100 year flood
- An area of land not normally covered by water is covered by flood water, but much less than during the 1 in 100 year flood

And the probability (or likelihood) of this flood occurring is much higher than the 1 in 100 year flood;

- Every single year there is a 1 in 10 chance or 10% probability of this flood occurring

Annual Exceedance Probability	Odds of Occurrence in a Given Year	Return Period (Years)
10% (High Probability)	10 : 1	10
1% (Medium Probability)	100 : 1	100
0.1% (Low probability)	1000 : 1	1000

Predictive Tidal Flood Extent Map (in combination with Fluvial Event)



Tidal/ Coastal Flooding

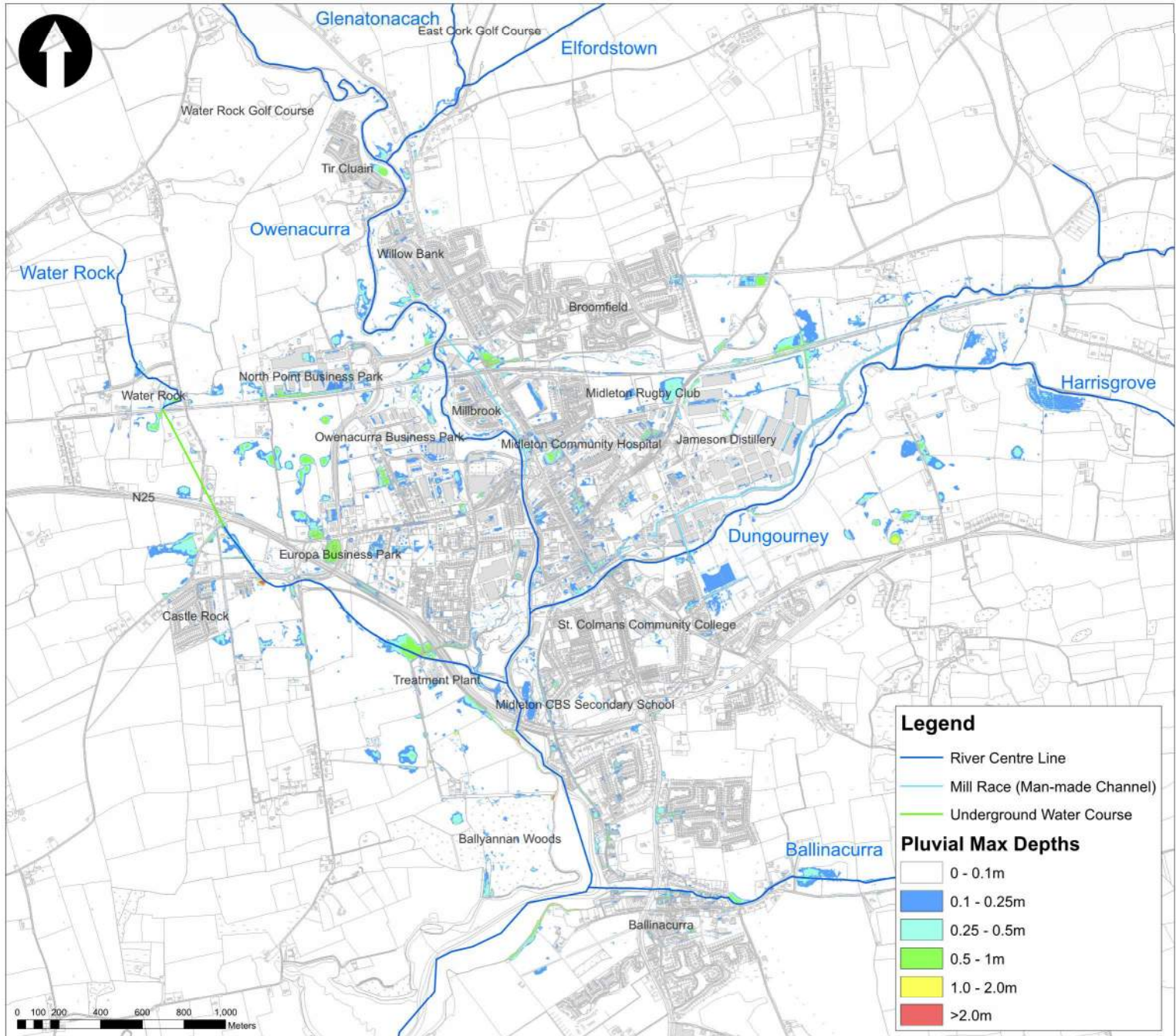
Tidal flooding may occur during a surge event in the Atlantic Ocean.

The 'predictive' flood map shows areas predicted to be flooded during a theoretical or 'design' flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past.

Annual Exceedance Probability	Odds of Occurrence in a Given Year	Return Period (Years)
10% (High Probability)	10 : 1	10
0.5% (Medium Probability)	200 : 1	200
0.1% (Low probability)	1000 : 1	1000

The map refers to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'. This represents the probability of an event of this, or greater, severity occurring in any given year. These probabilities may also be expressed as odds (e.g. 200 to 1) of the event occurring in any given year. They are also commonly referred to in terms of a return period (e.g. the 200-year flood), although this period is not the length of time that will elapse between two such events occurring, as, although unlikely, two very severe events may occur within a short space of time.

Predictive Pluvial Extent Map



Scale 1:7,000

Pluvial Flooding

Pluvial flooding occurs when the capacity of the local urban drainage network is exceeded during periods of intense rainfall. At these times, the rain water can collect at low points and cause flooding.

The 'predictive' flood map shows areas that are predicted to be flooded during a theoretical or 'design' flood event with an estimated probability of occurrence. In other words, a computer model has predicted that these areas would flood in a design flood event. It is not based on flood records from actual flood events in the past.

Preliminary Technical Assessment of the Flood Alleviation Engineering Measures 2 of 2



Non Viable Measures (not included in Options Development)

The measures found to be unviable as part of the Preliminary Technical Assessment are detailed below and on sheet 1 of 2.



Direct defences greater than 3.5m for Water Rock Stream at Water Rock House (upstream of cave system)

Not considered viable for following reasons:

- Excessively high defences required and are located adjacent to existing residential properties
- Negative impact on landscape and visual
- Limited scope for climate change adaptability

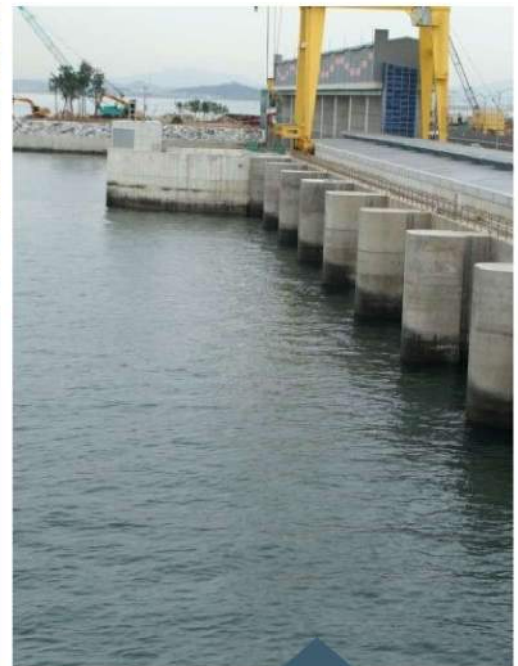


Dredging

Dredging of the river bed is not technically viable in the tidally dominated reach as the maximum water level of the tide will still be reached regardless of how much the elevation of the bed may be reduced. Dredging in the fluvially dominated reach is deemed viable in combination with other measures and has therefore been brought forward to the optioneering stage.

Dredging as an isolated measure in the fluvially dominated reach is not considered viable for the following reasons:

- Significant negative environmental impact
- Extensive underpinning of the existing bridges would be required which would be technically very challenging



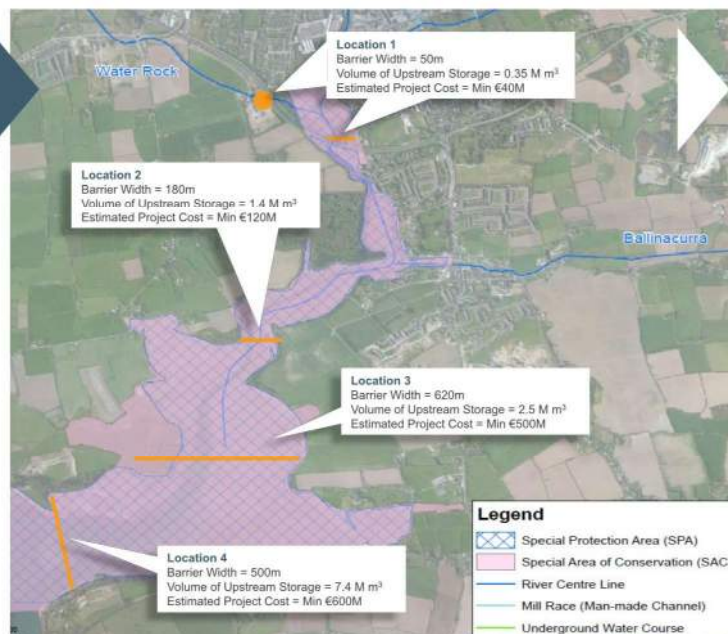
Tidal Barrier

A tidal (or storm surge) barrier is a fully or partly moveable barrier structure which is located across a river or estuary. It can be closed temporarily to prevent the ingress of a tidal surge upstream of the barrier in order to reduce the frequency and severity of tidal flooding. During normal conditions, the barrier is kept open to allow for tidal exchange and navigation.

A key technical consideration of implementing a barrier is to ensure there is a sufficient volume upstream of the barrier for storing water from the Owenacurra and Dungourney rivers when the barrier is closed to prevent fluvial flooding.

Circa 2.6M m³ of storage for water from the rivers is required for a 1 in 100 year fluvial flood event. Four tidal barrier locations were investigated as shown.

The available storage volume upstream of each barrier location assumes water can be stored to a level of 2.5mOD (existing threshold of flooding at Ballick Road).



Viability of a Tidal Barrier

Not considered viable for a number of reasons:

- Direct defences still required to protect the areas of the town that are at risk from both fluvial flooding and tidal flooding i.e. Lower Main St and Baby Walk area.
- Tidal barrier project cost estimates are significantly greater than the total economic benefit of the scheme.
- Owenacurra estuary is a European designated site - Special Area of Protection (SPA) and Special Area of Conservation (SAC). Construction of a tidal barrier would result in significant environmental impacts.

However, due to the increasing tidal risk associated with rising sea levels in an extreme future climate scenario, a tidal surge barrier or tidal barrage located within the East and West Passage of Cork Harbour will be considered as part of the Climate Change Adaptation strategy of the scheme.



Preliminary Technical Assessment of the Flood Alleviation Engineering Measures 1 of 2



Assessment of viability with regard to a range of criteria:

1. Technical viability

2. Cost

3. Environment

4. Archaeological

5. Social and cultural

6. Landscaping and visual

7. Adaptability to climate change

Engineering measures considered to address flood risk in Midleton



Based on this assessment a number of the measures were found to be unviable and were not deemed suitable for inclusion in the detailed options development.

Non Viable Measures (not included in Options Development)

The measures found to be not viable as part of the Preliminary Technical Assessment are detailed below and on sheet 2 of 2.



Flood diversion culvert for the Dungourney River

Not considered viable for following reasons:

- Significant clashes with existing services
- Negative environmental impacts during isolation of channel to facilitate flow diversion
- Significant disruption during construction
- Significant works required upstream of the diversion



Flood diversion culvert for the Ballinacurra

Not considered viable for following reasons:

- Significant clashes with existing services
- Negative environmental impacts during isolation of channel to facilitate flow diversion
- Significant disruption during construction
- Significant works required upstream of the diversion



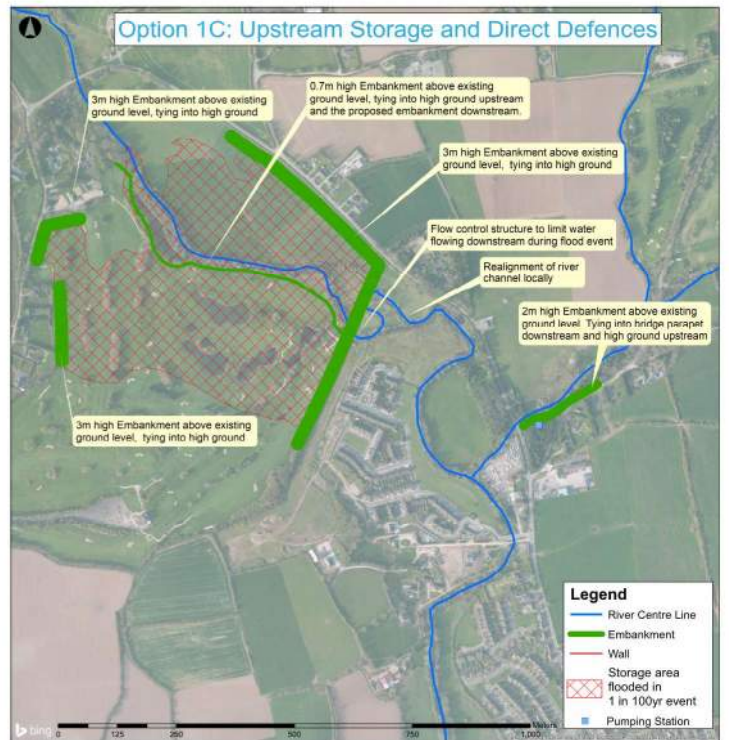
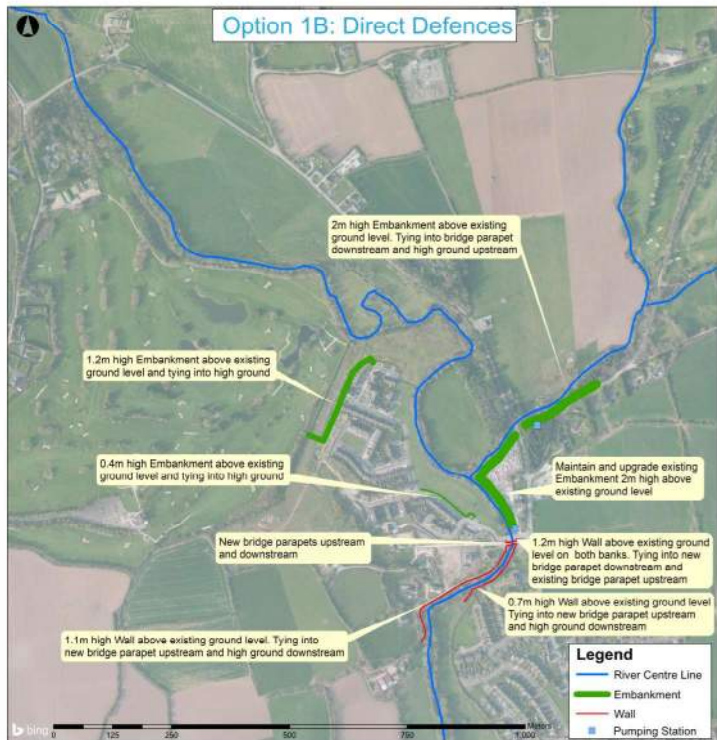
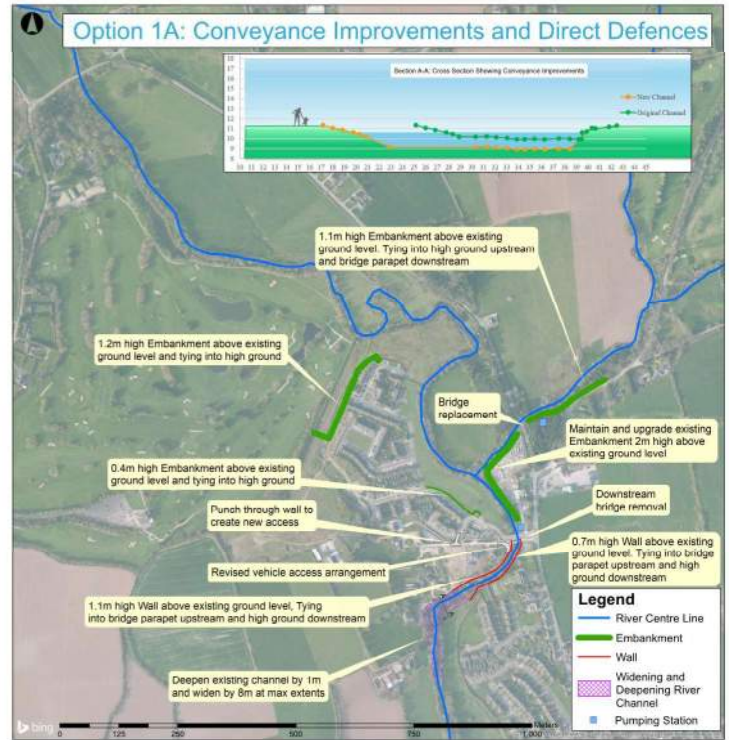
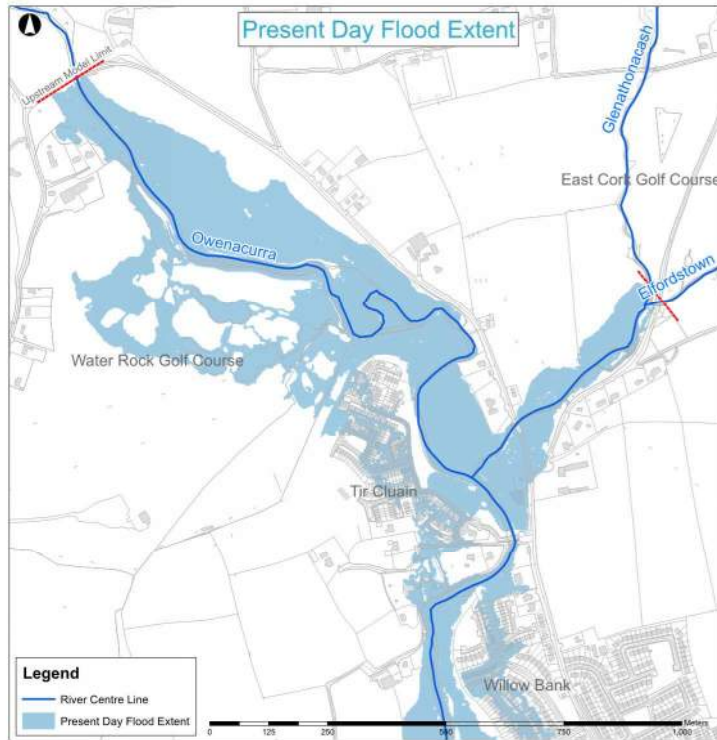
Natural Flood Management (NFM)

NFM is the alteration, restoration or use of small scale localised landscape features to reduce flood risk by storing flow.

Not considered viable for the following reasons:

- Not effective for large flows and therefore can not offer the required standard of protection of the scheme
- In combination with other measures, it would require extensive change of use of large tracts of private land, thus requiring significant landowner agreements.
- Difficult to achieve logistically both for construction and maintenance in the long term.

Area 1: Tir Cluain to Willowbank Options



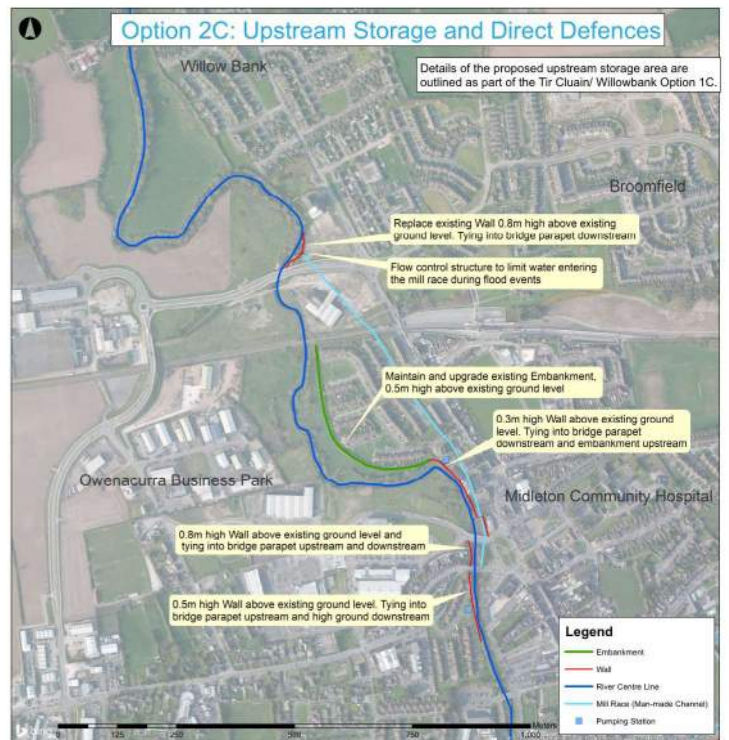
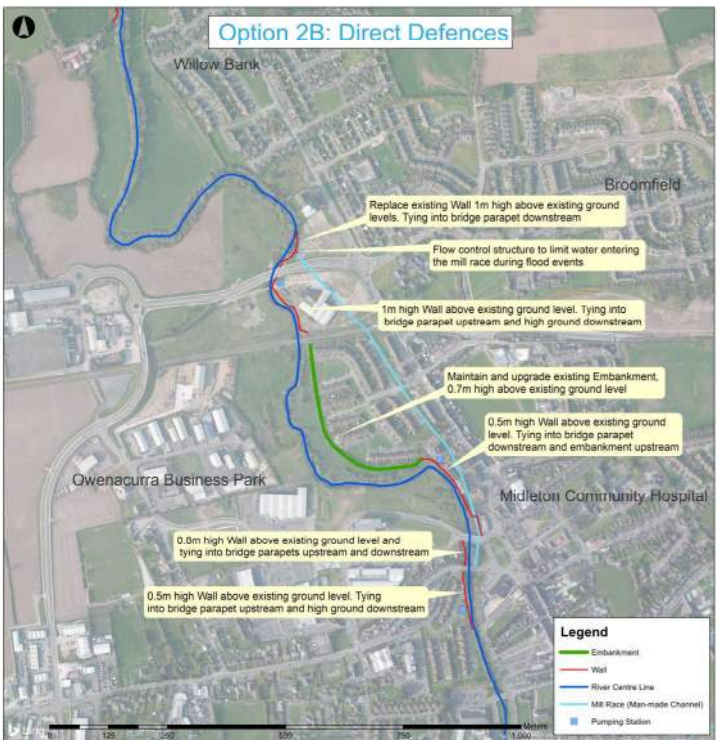
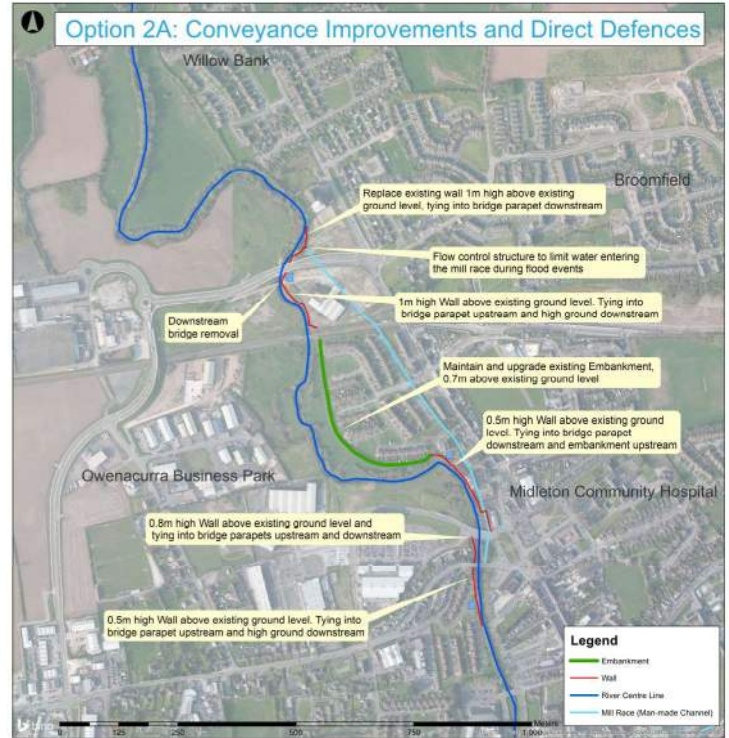
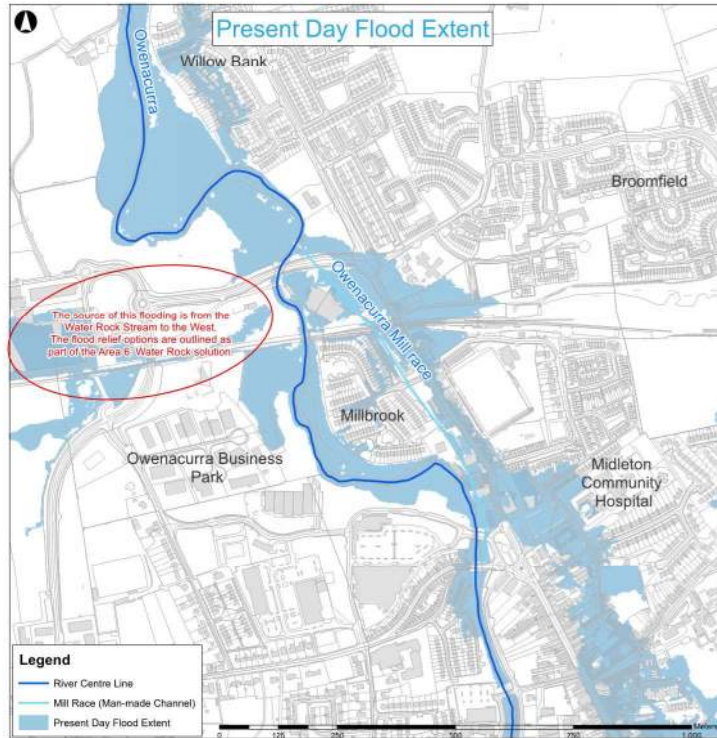
Option 1A: Conveyance Improvements and Direct Defences	Option 1B: Direct Defences Only
<p>Description</p> <p>This option involves the improvement of the river flow (conveyance) and construction of direct defences.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Bridge replacement upstream of Chibsey's Yard Removal of Moore's Bridge Dredging works downstream of Moore's Bridge Embankment at rear of Tir Cluain (typ. 1.2m high) Embankment at Broomfield Ridge (typ. 1.1m high) Wall on left bank downstream of Moore's Bridge (typ. 0.7m high) Wall on right bank downstream of Moore's Bridge (typ. 1.1m high) <p>Estimated Project Cost for Area 1 and Area 2: €9.5-10.5 million</p>	<p>Description</p> <p>This option involves the construction of an upstream storage area to store flood water during a flood event and direct defences downstream. The extent of the direct defences will be reduced in comparison to Option B.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankments at Water Rock Golf Course east and west (typ. 3m high) Flow control structure at Water Rock Golf Course Embankment at Broomfield Ridge (typ. 2m high) <p>Estimated Project Cost for Area 1 and Area 2: €8.5-9 million</p>
<p>Biodiversity/Water Quality</p> <p>Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat Habitat where tree/crush removal proposed Impact on Otter Habitat where bankside works proposed Impact on Water Quality of salmonid river where instream works/dredging works proposed Impact on Fishless Habitat where dredging works proposed Spread of existing widespread Japanese knotweed if not managed properly <p>Visual</p> <p>Potential for visual impacts/change in character of landscape to nearby residents due to Tree Removal and/or location of Direct Defences</p> <p>Archaeological/Architectural Heritage</p> <p>Construction works have the potential to impact:</p> <ul style="list-style-type: none"> Boundary wall associated with a late 19th century house listed in the NAH (20060119) <p>Access/Amenity</p> <p>Removal of Moore's Bridge would impact access to properties downstream of Moore's Bridge</p> <p>Dredging activities would impact access to properties downstream of Moore's Bridge during the construction phase</p>	<p>Biodiversity/Water Quality</p> <p>Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Otter Habitat where tree/crush removal proposed Impact on Otter Habitat where bankside works proposed Impact on Water Quality of salmonid river where instream works proposed Impact on Fishless Habitat where instream works proposed Spread of existing widespread Japanese knotweed if not managed properly <p>Visual</p> <p>Potential for visual impacts/change in character of landscape to nearby residents due to Tree Removal and/or location of Flood Defences</p> <p>Archaeological/Architectural Heritage</p> <p>Construction works have the potential to impact:</p> <ul style="list-style-type: none"> Boundary wall associated with a late 19th century house listed in the NAH (20060119) <p>Access/Amenity</p> <p>Construction works on Moore's Bridge could impact access to properties downstream of Moore's Bridge</p>

Option 1C: Upstream Storage and Direct Defences
<p>Description</p> <p>This option involves the construction of an upstream storage area to store flood water during a flood event and direct defences downstream. The extent of the direct defences will be reduced in comparison to Option B.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankments at Water Rock Golf Course east and west (typ. 3m high) Flow control structure at Water Rock Golf Course Embankment at Broomfield Ridge (typ. 2m high) <p>Estimated Project Cost for Area 1 and Area 2: €8.5-9 million</p>
<p>Biodiversity/Water Quality</p> <p>Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Otter Habitat where tree/crush removal proposed Impact on Otter Habitat where bankside works proposed Impact on Water Quality of salmonid river where instream works proposed Impact on Fishless Habitat where instream works proposed Spread of existing widespread Japanese knotweed if not managed properly <p>Visual</p> <p>Potential for visual impacts/change in character of landscape to nearby residents due to Tree Removal and/or location of Flood Defences</p> <p>Archaeological/Architectural Heritage</p> <p>Construction works have the potential to impact:</p> <ul style="list-style-type: none"> Boundary wall associated with a late 19th century house listed in the NAH (20060119) <p>Access/Amenity</p> <p>Temporary loss of amenity at Water Rock Golf Course during flood events</p>

Option 1B: Direct Defences Only
<p>Description</p> <p>This option involves the construction of direct defences only.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankment at rear of Tir Cluain (typ. 1.2m high) Embankment at Broomfield Ridge (typ. 1.1m high) Wall on left bank downstream of Moore's Bridge (typ. 0.7m high) Wall on right bank downstream of Moore's Bridge (typ. 1.1m high) <p>Estimated Project Cost for Area 1 and Area 2: €9.5-10.5 million</p>
<p>Biodiversity/Water Quality</p> <p>Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Otter Habitat where tree/crush removal proposed Impact on Otter Habitat where bankside works proposed Impact on Water Quality of salmonid river where instream works proposed Impact on Fishless Habitat where dredging works proposed Spread of existing widespread Japanese knotweed if not managed properly <p>Visual</p> <p>Potential for visual impacts/change in character of landscape to nearby residents due to Tree Removal and/or location of Flood Defences</p> <p>Archaeological/Architectural Heritage</p> <p>Construction works have the potential to impact:</p> <ul style="list-style-type: none"> Boundary wall associated with a late 19th century house listed in the NAH (20060119) <p>Access/Amenity</p> <p>Construction works on Moore's Bridge could impact access to properties downstream of Moore's Bridge</p>

Option 1C: Upstream Storage and Direct Defences
<p>Description</p> <p>This option involves the construction of an upstream storage area to store flood water during a flood event and direct defences downstream. The extent of the direct defences will be reduced in comparison to Option B.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankments at Water Rock Golf Course east and west (typ. 3m high) Flow control structure at Water Rock Golf Course Embankment at Broomfield Ridge (typ. 2m high) <p>Estimated Project Cost for Area 1 and Area 2: €8.5-9 million</p>
<p>Biodiversity/Water Quality</p> <p>Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Otter Habitat where tree/crush removal proposed Impact on Otter Habitat where bankside works proposed Impact on Water Quality of salmonid river where instream works proposed Impact on Fishless Habitat where instream works proposed Spread of existing widespread Japanese knotweed if not managed properly <p>Visual</p> <p>Potential for visual impacts/change in character of landscape to nearby residents due to Tree Removal and/or location of Flood Defences</p> <p>Archaeological/Architectural Heritage</p> <p>Construction works have the potential to impact:</p> <ul style="list-style-type: none"> Boundary wall associated with a late 19th century house listed in the NAH (20060119) <p>Access/Amenity</p> <p>Temporary loss of amenity at Water Rock Golf Course during flood events</p>

Area 2: Northern Relief Rd to Cork Rd Bridge Options



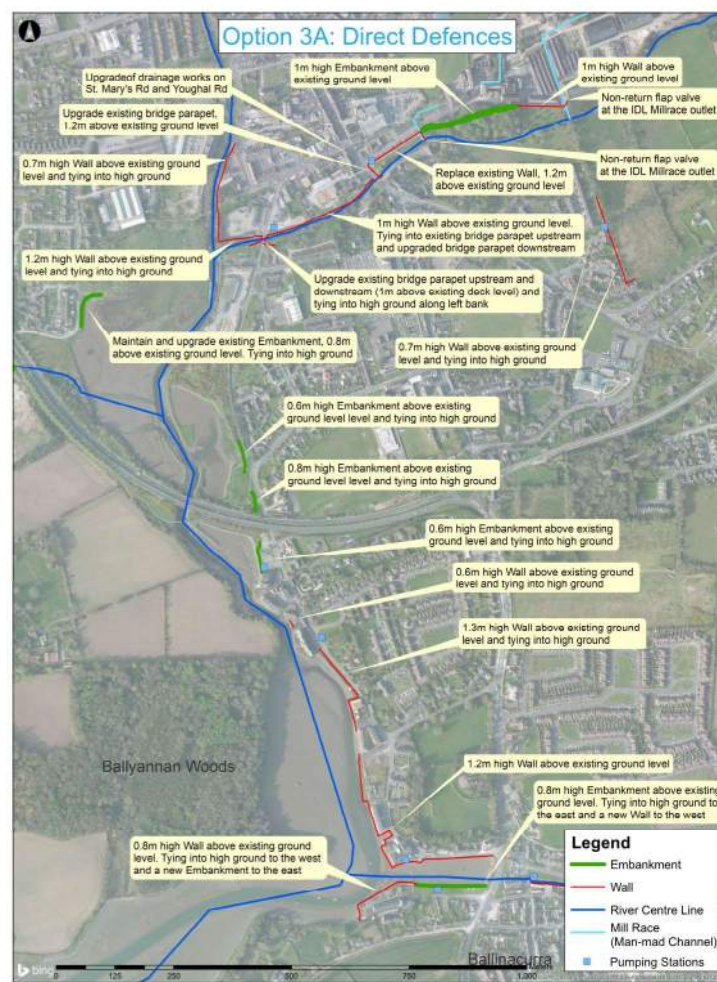
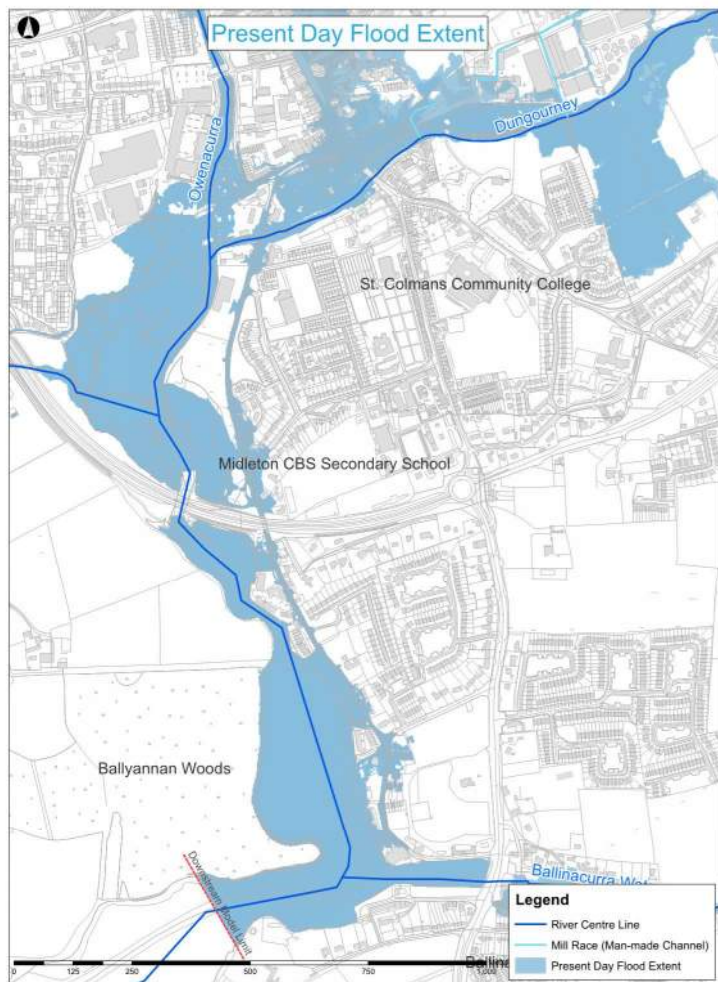
Option 2A-Conveyance Improvements and Direct Defences		
Description	Constraints	
This option involves the improvement of the river flow (conveyance) and construction of direct defences.		
In this area, the main proposed works are as follows:		
• Wall replacement at site north of Northern Relief Rd		
• Flow control structure at mill race entrance on site north of Northern Relief Rd		
• Removal of minor bridge downstream of Northern Relief Rd		
• Wall at rear of River Wharf (typ. 0.5m high)		
• Wall between Tesco bridge and Cork Rd bridge (typ. 0.8m high)		
• Wall at The Woodlands (typ. 0.5m high)		
Estimated Project Cost for Area 1 and Area 2: €9.5-10.5 million		

Option 2B-Direct Defences Only		
Description	Constraints	
This option involves the construction of direct defences.		
In this area, the main proposed works are as follows:		
• Wall replacement at site north of Northern Relief Rd		
• Flow control structure at mill race entrance on site north of Northern Relief Rd		
• Wall at rear of River Wharf (typ. 0.5m high)		
• Wall between Tesco bridge and Cork Rd bridge (typ. 0.8m high)		
• Wall at The Woodlands (typ. 0.5m high)		
Estimated Project Cost for Area 1 and Area 2: €8.5-9 million		

Option 2C-Upstream Storage and Direct Defences		
Description	Constraints	
This option involves the construction of an upstream storage area to store flood water during a flood event and direct defences downstream. The extents of the direct defences will be reduced in comparison to Option B.		
In this area, the main proposed works are as follows:		
• Wall replacement at site north of Northern Relief Rd		
• Flow control structure at mill race entrance on site north of Northern Relief Rd		
• Wall at rear of River Wharf (typ. 0.3m high)		
• Wall between Tesco bridge and Cork Rd bridge (typ. 0.8m high)		
• Wall at The Woodlands (typ. 0.5m high)		
Estimated Project Cost for Area 1 and Area 2: €8.5-9 million		

Option 2C-Upstream Storage and Direct Defences		
Description	Constraints	
This option involves the construction of an upstream storage area to store flood water during a flood event and direct defences downstream. The extents of the direct defences will be reduced in comparison to Option B.		
In this area, the main proposed works are as follows:		
• Wall replacement at site north of Northern Relief Rd		
• Flow control structure at mill race entrance on site north of Northern Relief Rd		
• Wall at rear of River Wharf (typ. 0.3m high)		
• Wall between Tesco bridge and Cork Rd bridge (typ. 0.8m high)		
• Wall at The Woodlands (typ. 0.5m high)		
Estimated Project Cost for Area 1 and Area 2: €8.5-9 million		

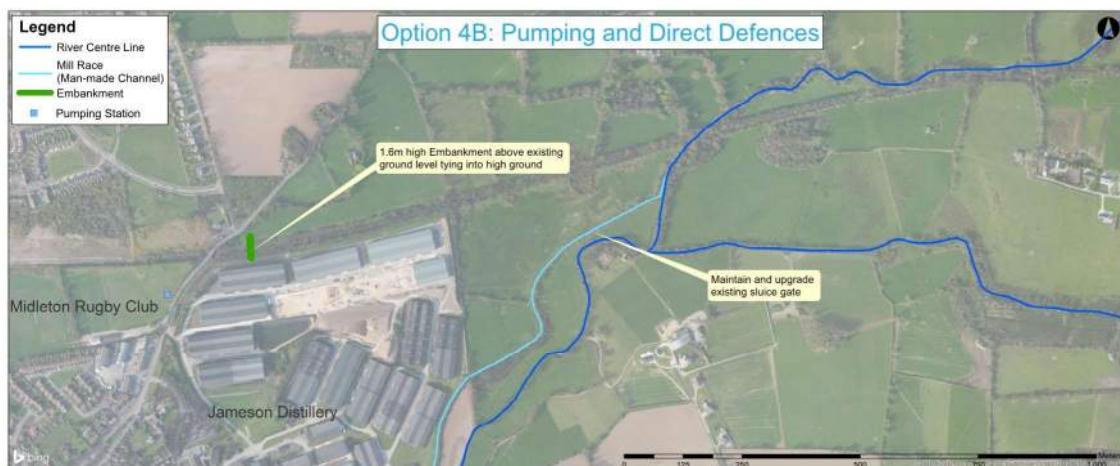
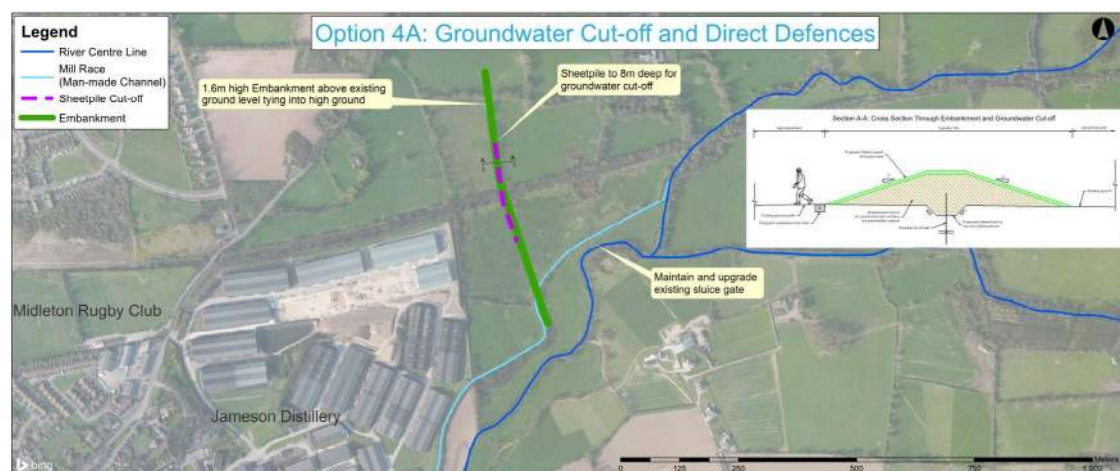
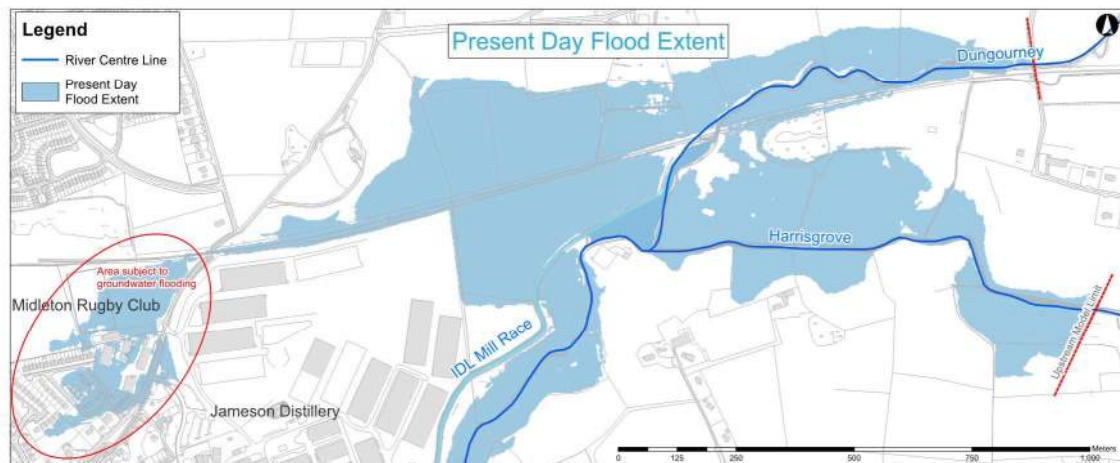
Area 3: Town Centre and Bailick Road Option



Option 3A – Direct Defences Only

Description	Constraints
<p>This option involves the construction of direct defences.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankment at People's Park (typ. 1m high) Wall replacement (typ. 1.2m high) and Lewis Bridge parapet upgrade works at Baby Walk Wall at rear of Funeral Home (typ. 1.2m high) Wall at ESB site (typ. 0.7m high) Embankments at Choctaw Memorial Park on Bailick Road (typ. 0.6 and 0.8m high) Walls along Bailick Rd (typ. 1.2-1.3m high) Embankment at South Quay (typ. 0.8m high) <p>Estimated Project Cost for Area 3: €14.5-15.5 million</p>	<p>Biodiversity/Water Quality Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Impact on the Cork Harbour SPA and Great Island Channel SAC due to construction of Embankments at Choctaw Memorial Park Tree Removal where bankside works proposed Impact on Bat Habitat where tree/scrub removal or bridge works proposed Impact on Bird Habitat where tree/scrub removal proposed Impact on Otter Habitat where bankside works proposed Impact on Water Quality of salmonid river where instream works proposed Impact on Fisheries Habitat where instream works proposed <p>Visual Potential for visual impacts/change in character of landscape to nearby residents and the public due to Tree Removal and location of Flood Defences in the Public Realm</p> <p>Archaeological/Architectural Heritage Construction works have the potential to impact:</p> <ul style="list-style-type: none"> The Lewis Bridge which is a Protected Structure (PS 40) listed in the Midleton Local Area Plan (2013). The bridge is also listed in the RMP (CO076-073002), and NIAH (20830067). Midleton House which is a Protected Structure (PS 51) listed in the Midleton Local Area Plan (2013). It is also listed in the NIAH (20830097). Gasworks complex (late 19th century) which is listed in the RMP (CO076-115) Quayside warehouse which is a Protected Structure (PS00517) on the Cork County Development Plan (2014). The warehouse is also listed in the RMP (CO076-111) and (NIAH – 20907624). Charleston Maltings which is a Protected Structure (PS 00521) on the Cork County Development Plan (2014). The maltings is also listed in the RMP (CO076-074) and NIAH (20907627). Maltings listed in the RMP (CO076-080). Wall to the south of Midleton Distillery complex which is Protected Structure (PS 1) in Midleton LAP (2013). The distillery complex is also listed in the RMP (CO076-025) and NIAH (20830052-065). The outbuilding (NIAH 20830064) and warehouse (20830060) lie adjacent to a proposed wall in this area. Burnt Mound which listed in the RMP (CO076-138) located c. 50m to the southwest of a proposed embankment. This RMP site will not be impacted by proposed works but similar subsurface sites may exist in this low-lying area.

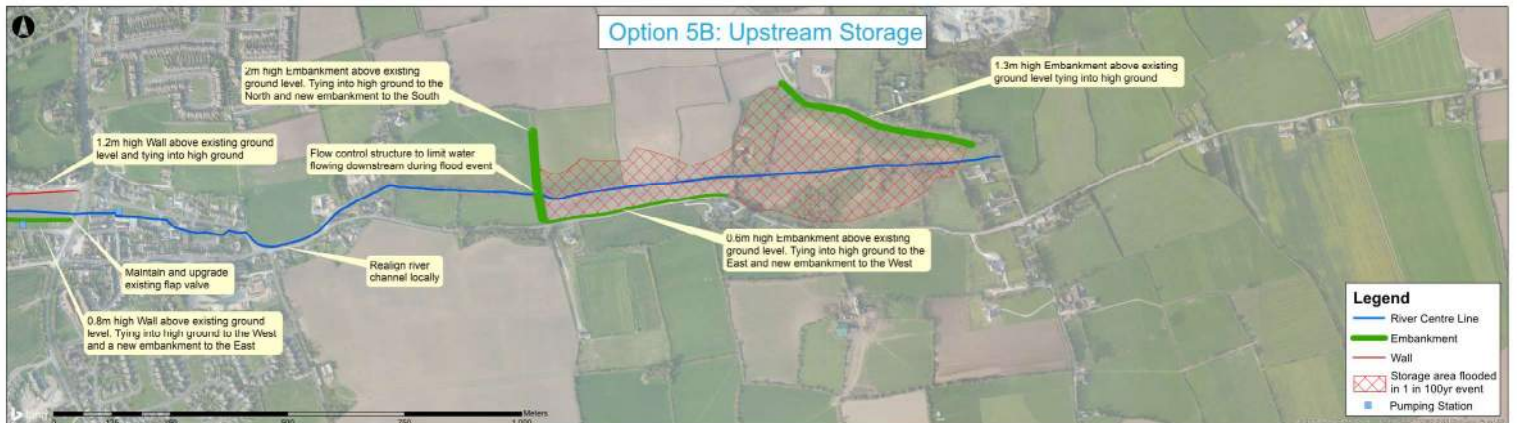
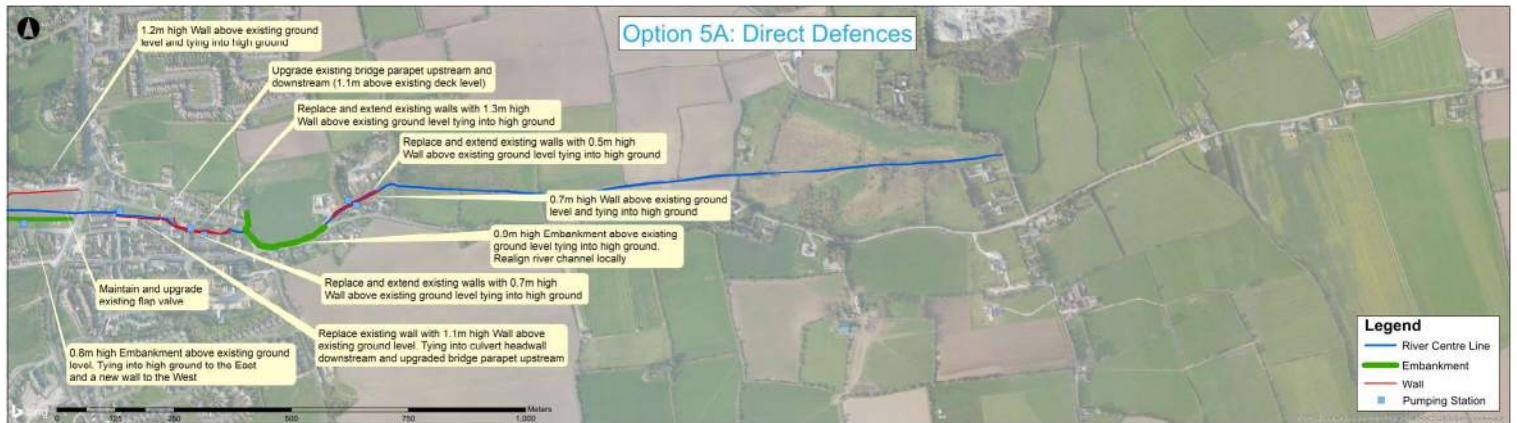
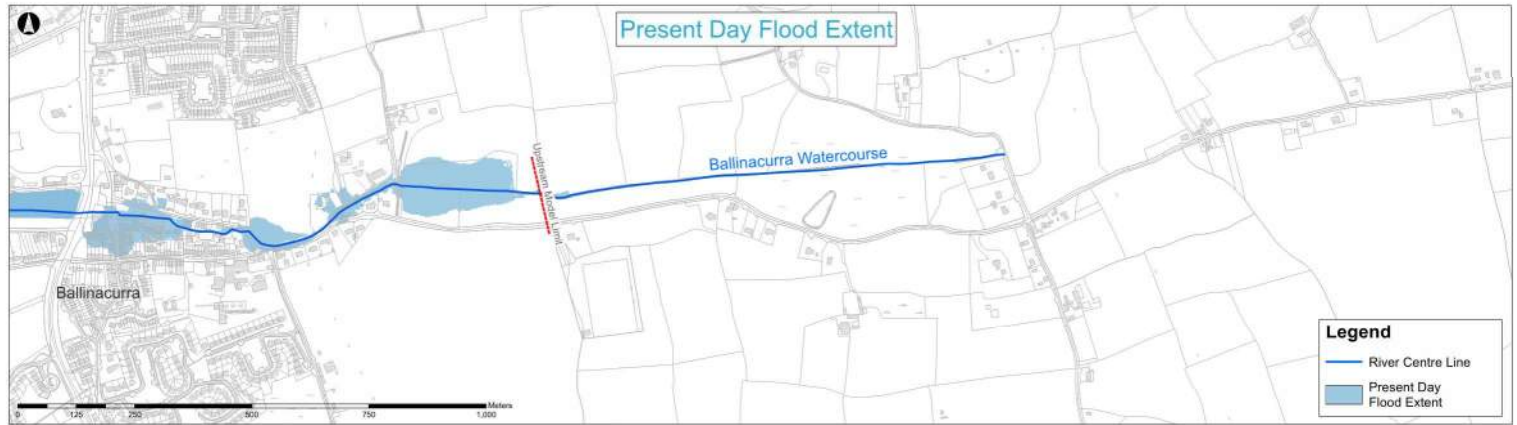
Area 4: Lauriston Estate/ Rugby Club Options



Option 4A- Cut-offs and Overland Direct Defences	
Description	Constraints
<p>This option involves the construction of direct defences for fluvial flood and groundwater cut-offs.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankment east of IDL site (typ. 1.6m high) Sheetpile to 8m depth for groundwater cut-off <p>Estimated Project Cost for Area 4: €2-2.5 million</p>	<p>Biodiversity/Water Quality Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Bird Habitat where tree/scrub removal proposed Impact to groundwater regime: within the gravel aquifer (however impact to limestone aquifer, and therefore impact to groundwater abstraction, is considered to be negligible) <p>Visual Potential for visual impacts/change in character of landscape due to location of Flood Defences across proposed Greenway.</p> <p>Archaeological/Architectural Heritage Burnt mound (CO076-134) and fulacht fia (CO076-026) lie c. 100m and 80m respectively outside the proposed embankment. These sites will not be impacted by development works but similar subsurface sites may exist in this low lying area.</p> <p>Access/Amenity Potential impact to amenity value of the proposed Greenway (former Middleton to Youghal trainline).</p>

Option 4B- Pumping and Overland Direct Defences	
Description	Constraints
<p>This option involves the construction of direct defences and pumping station.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Embankment east of railway line bridge (typ. 1.6m high) Pumping station <p>Estimated Project Cost for Area 4: €0.5-1 million</p>	<p>Biodiversity/Water Quality Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Bird Habitat where tree/scrub removal proposed <p>Visual Potential for visual impacts/change in character of landscape due to location of Flood Defences across proposed Greenway.</p> <p>Archaeological/Architectural Heritage Proposed works will not impact on any known/recorded archaeological or architectural sites in this area</p> <p>Access/Amenity Potential impact to amenity value of the proposed Greenway (former Middleton to Youghal trainline).</p>

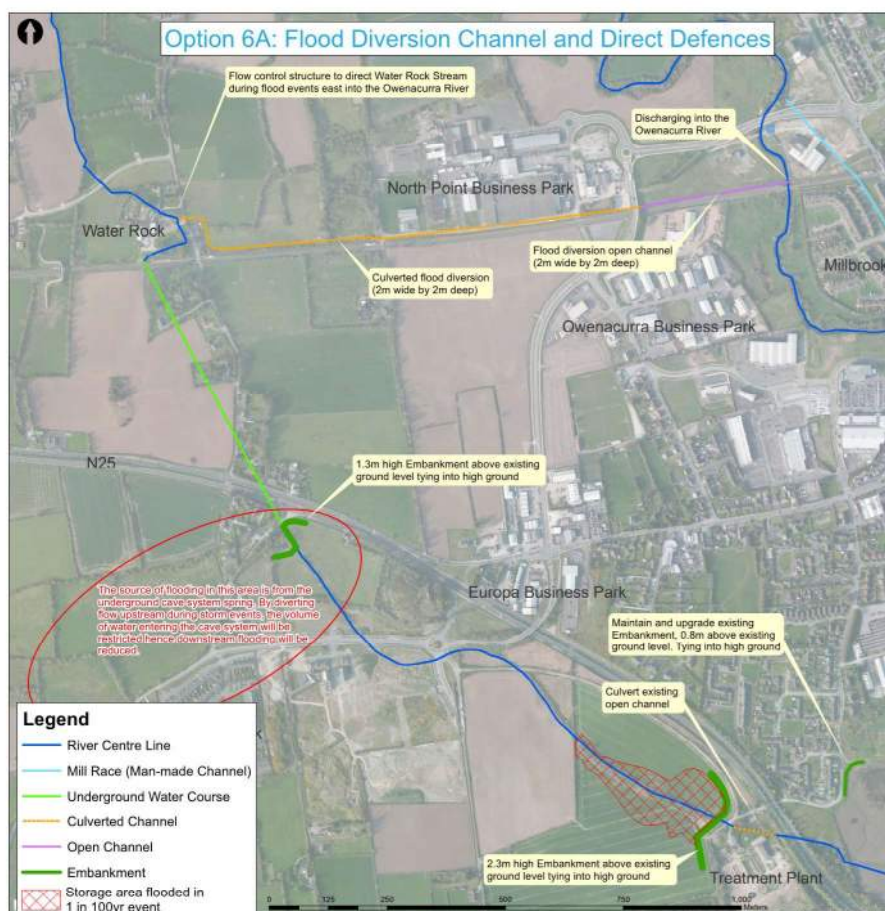
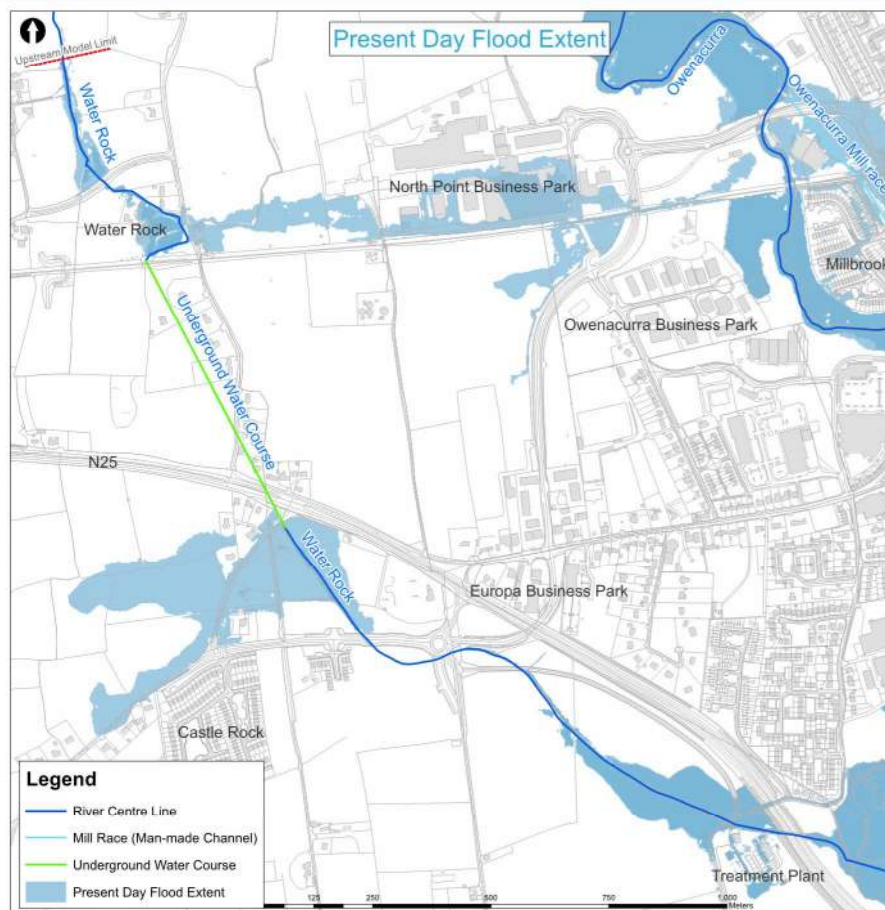
Area 5- Ballinacurra Options



Option 5A- Direct Defences	
Description	Constraints
<p>This option involves the construction of direct defences.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> Replacement of existing walls at Lower Rd (typ. 1.1m high) Replacement and extending existing walls @ Gearagh Rd (typ. 1.1m) Realignment of channel at Kearney's Cross <p>Estimated Project Cost for Area 5: €5-5.5million</p>	<p>Biodiversity/Water Quality Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Bird Habitat where tree/scrub removal proposed Impact on Water Quality of river where instream works proposed Impact on Fisheries Habitat where instream works proposed <p>Visual Potential for visual impacts/change in character of landscape to nearby residents and the public due to Tree Removal and location of Flood Defences in the Public Realm</p> <p>Archaeological/Architectural Heritage Proposed works will not impact on any known/recorded archaeological or architectural sites in this area</p>

Option 5B- Upstream Storage	
Description	Constraints
<p>This option involves the construction of an upstream storage area to store flood water during a flood event.</p> <p>In this area, the main proposed works are as follows:</p> <ul style="list-style-type: none"> West Embankment north of Gearagh Rd (typ. 2m high) East Embankment north of Gearagh Rd (typ. 1.3m high) Flow Control Structure Realignment of channel at Kearney's Cross <p>Estimated Project Cost for Area 5: €1-1.5million</p>	<p>Biodiversity/Water Quality Construction works have the potential to result in:</p> <ul style="list-style-type: none"> Tree Removal where bankside works proposed Impact on Bat and Bird Habitat where tree/scrub removal proposed Impact on Water Quality of river where instream works proposed Impact on Fisheries Habitat where instream works proposed <p>Visual Potential for visual impacts/change in character of landscape to nearby residents due to Tree Removal and location of Flood Defences</p> <p>Archaeological/Architectural Heritage Construction works have the potential to impact:</p> <ul style="list-style-type: none"> Fulacht Fia listed in the RMP (CO076-064) adjacent to a proposed embankment (2m high). Additional subsurface fulachta fia/features may be present in this low-lying area close to the stream. Burial which is listed in the RMP (CO076-052) within proposed upstream storage area. Tower house listed in the RMP (CO076-051) situated to the north of a proposed embankment (1.3m high). Potential visual impact by embankment. <p>Access/Amenity Temporary disruption to farmland use within the storage area during a flood event.</p>

Area 6: Water Rock (including Dwyer's Road) Option



Option 6A- Flood Diversion Channel and Direct Defences

Description

This option involves the construction of flood diversion channel/culvert to divert the watercourse during a flood event, and direct defences downstream.

In this area, the main proposed works are as follows:

- Flood Diversion Channel and Culvert from Water Rock stream to Owenacurra
- Upgrade of existing Embankment at Dwyer's Rd., (typ. 0.8m high)

Estimated Project Cost for Area 6:

€14-15 million

Constraints

Biodiversity/Water Quality

Construction works have the potential to result in:

- Tree Removal where bankside works proposed
- Impact on Bat and Bird Habitat where tree/scrub removal proposed
- Impact on Water Quality of river where instream works proposed
- Impact on Fisheries Habitat where instream works proposed
- Impact on the **Cork Harbour SPA** and **Great Island Channel SAC** due to construction works for upgrade of existing embankment at Dwyer's Rd.

Visual

Potential for visual impacts to nearby residents due to Tree Removal and location of Flood Defences

Archaeological/Architectural Heritage

Proposed works will not impact on any known/recorded archaeological or architectural sites in this area.

Consideration of Climate Change



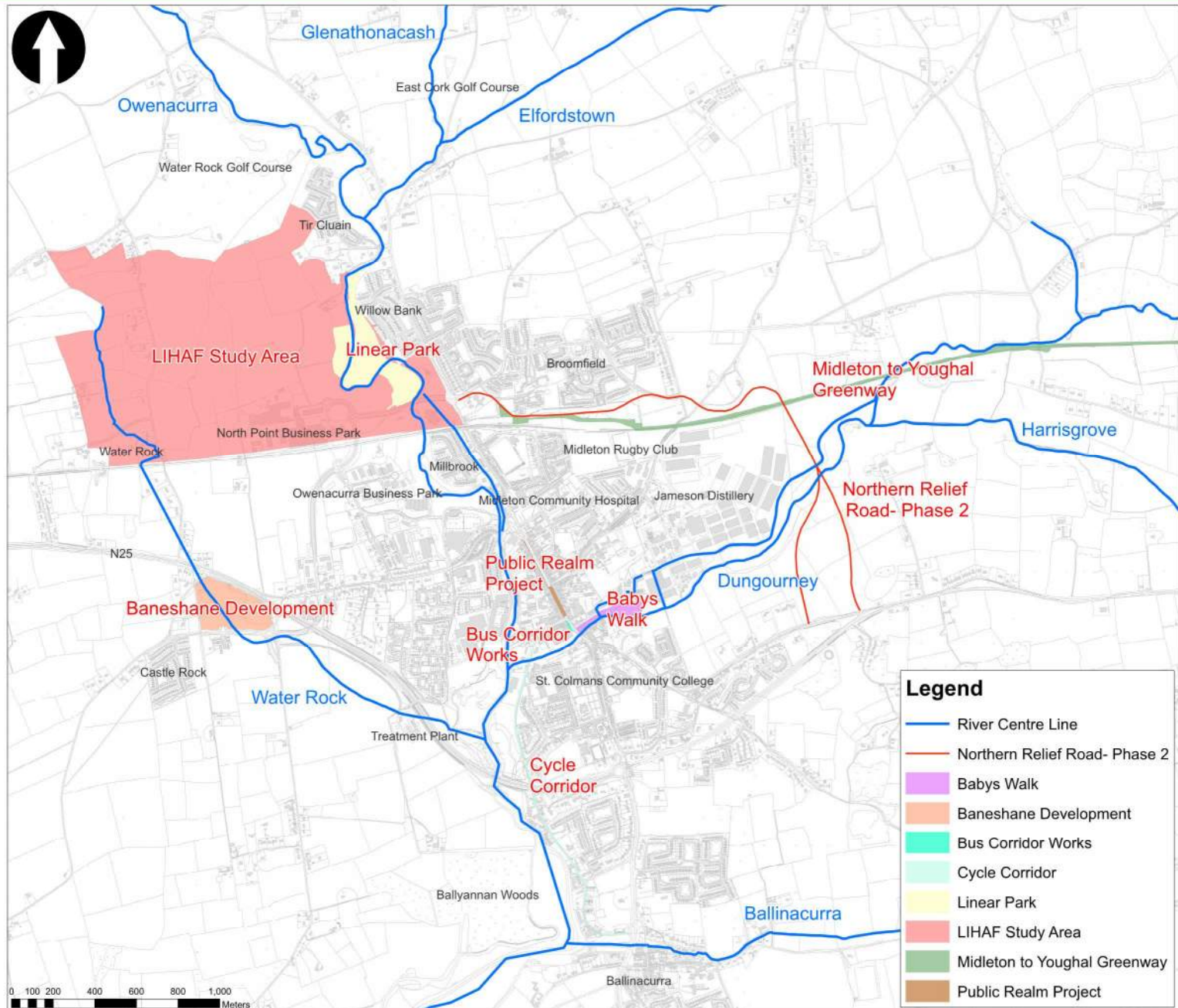
Climate change adaptation strategy

It is important that the Present Day scheme options are considered in the context of a longer term strategy which is flexible and adaptive to changes in the climate and its potential impact on flood risk.

The following presents the Climate Change Adaption Strategy options associated with the options considered for the present day scheme in each area.



Potential Future Developments in Midleton



Potential Future Developments

This poster shows potential future developments in Midleton, which are being progressed by other CCC departments. We will continue to engage with these projects to integrate the Flood Relief Scheme into the overall development of Midleton; with a particular emphasis on improvements in the areas of Amenity, Environment and Biodiversity.

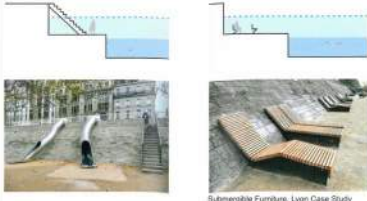
ARCHITECTURAL DETAILS AND PUBLIC REALM DESIGN APPROACH TO FLOOD RELIEF SCHEMES

LOOKING AT PUBLIC INFRASTRUCTURE TO DELIVER SOCIAL AND ENVIRONMENTAL AMENITY FOR THE COMMUNITY

This flood relief scheme comprises of a holistic design approach where infrastructure is created to protect Middleton from flooding while also offering soft landscaping and overall placemaking.

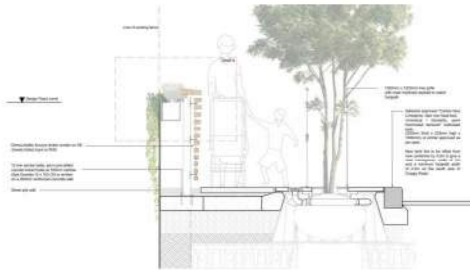


Kerr Street Flood Wall Proposal, Clonsilla



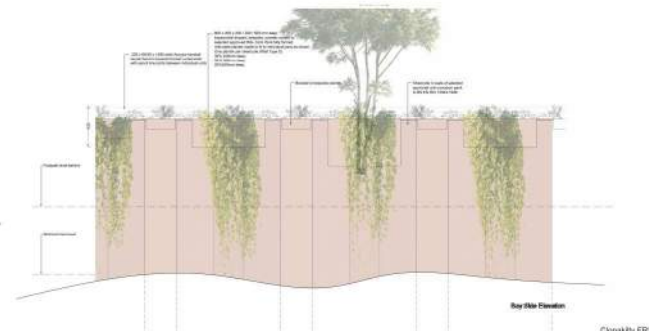
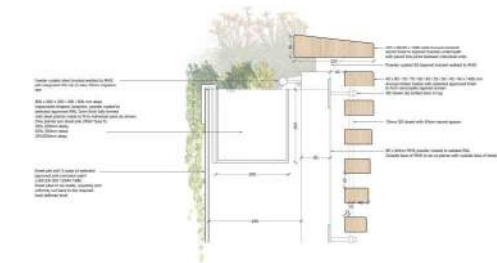
Submergeable Furniture, Lyon Case Study

DID YOU KNOW?
A flood relief barrier can integrate planting infrastructure to implement a green agenda to help mitigate the effects of climate change.

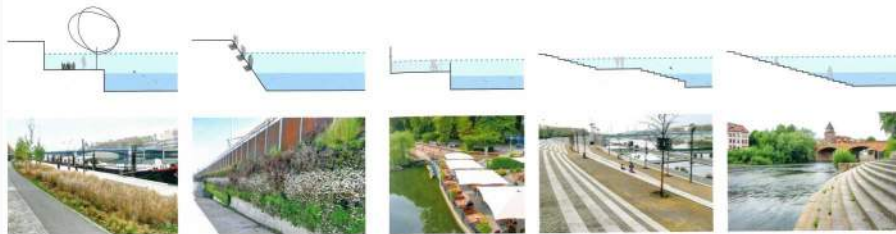


Clonsilla Detail

DID YOU KNOW?
Flood relief barriers can be designed to look lightweight and transparent and create new places to frame views and areas of historical significance.



Clonsilla FRS



Submergeable Planting

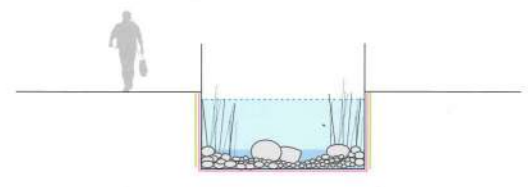
New Embankment Walls

Intermediate Levels

Terraces

Broad Riverbank Steps

Reference: River Space Design



Saarbach, Germany



Waterford FRS



Place making Opportunity to Frame Views



Timber screen and glazing to maximise on the bay view



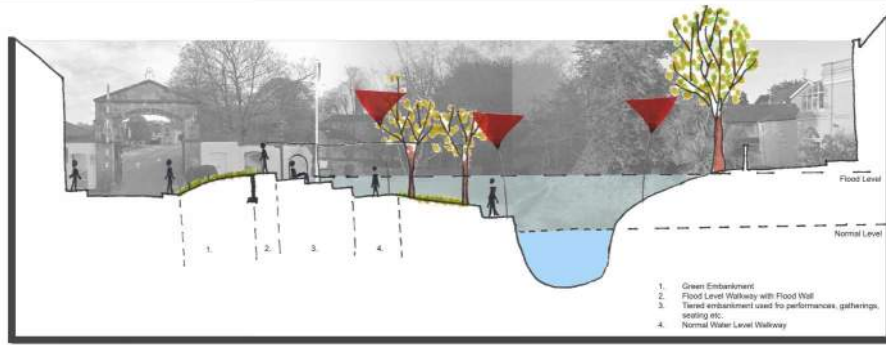
Clonsilla FRS

ARCHITECTURAL DETAILS AND PUBLIC REALM DESIGN APPROACH TO FLOOD RELIEF SCHEMES

LOOKING AT PUBLIC INFRASTRUCTURE TO DELIVER SOCIAL AND ENVIRONMENTAL AMENITY FOR THE COMMUNITY

WHAT IF...

We could create flood protection infrastructure that serves the town? Instead of creating a wall between the town and the water, the scheme could form a string of pearls of social infrastructure and enhance the existing heritage and environmental elements of Middleton.



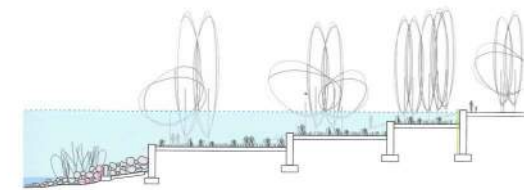
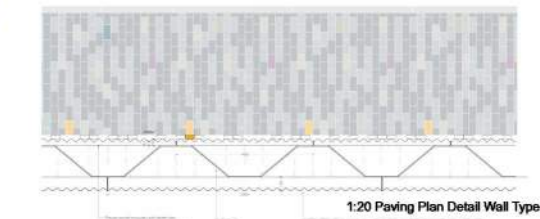
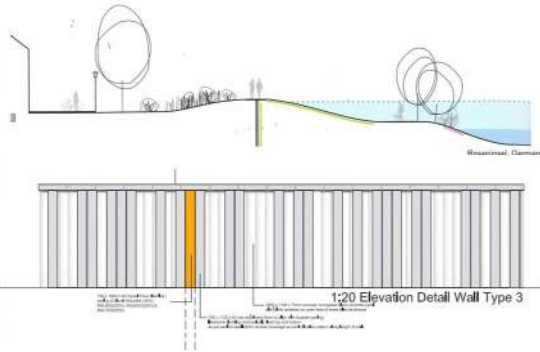
Puppy Flower lights in Italy



Ljubljana Riverbank, Slovenia



Ljubljana Riverbank, Slovenia



Yau and Wuyi Rivers, China



Rio Park, Madrid



Rio Park, Madrid



Rio Park, Madrid



Terraced Stone Revetment

Masonry Riverbank Revetment

Masonry Riverbank Revetment

Building over existing (hardwood)

Terraced gabion revetment

Reference: River Space, Design.



Flood Protection, Leipzig



Rio Park, Madrid