ARUP

Monkstown Active Travel Link and Public Realm Enhancement

Part 8 Flood Risk Assessment

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Executive Summary

The site of the proposed cycleway is at significant risk of tidal flooding in the existing scenario. There is also a risk of fluvial flooding for a fixed length of the route from an unnamed minor watercourse that flows parallel to the Glen Road and enters Cork Harbour close to Sand Quay.

Existing ground levels along the route of the cycleway vary from circa 4.3mOD to circa 2.3mOD but are generally set between circa 2.58mOD to 2.82mOD. The proposed cycleway involves some minor localised ground regrading but are generally similar to the existing ground levels.

The design 1 in 200 year water level at the site is 2.85mOD. When this flood level is projected over the proposed ground levels, it is seen that a significant portion of the route of the cycleway is at risk of tidal inundation. The maximum flood depth along the route for this event is circa 0.41m.

It needs to be considered that the route of the cycleway is already at significant risk of flooding in the existing scenario and that the proposed cycleway development is not increasing the flood risk to any neighbouring properties along the route. The off-site impact of the cycleway is therefore negligible.

As the site is within the 1 in 200 year tidal flood extent, the site is classified as Flood Zone A. Ordinarily a Justification Test for the development would therefore be required. Section 5.28 of the OPW Planning Guidelines is however deemed to apply given that the development is very minor in the context of its impact on flood risk along the route. The Justification Test is therefore not deemed to be required as part of this FRA.

The cycleway could be protected from flooding by constructing a flood wall along its route to the design tidal water level plus a suitable freeboard allowance. The wall would also need to be extended sufficiently far upstream to avoid it being bypassed by the tide. This option however would involve very significant capital works and would be very expensive to implement. It would also need to be justified on economic grounds separate to the development of the cycleway as regards the benefitting area associated with the flood protection works.

It is therefore recommended that specific flood protection engineering works are not considered as part of the cycleway and that the risk of flooding is managed through reliance on the tidal flood forecasting system for Cork Harbour that is run and maintained by Cork City Council and other agencies. When a flood warning has been issued, users of the cycleway will be notified and it will be ensure that the cycleway is not in use for the duration of the flood event.

1. Introduction

1.1 Project Background

Arup has been commissioned by Cork County Council to undertake a Flood Risk Assessment as part of the Part 8 planning application for the redevelopment of the existing pedestrian/cycleway network in Monkstown, Co. Cork.

The Flood Risk Assessment (FRA) is being carried out as part of the planning application for the redevelopment. It has been undertaken in accordance with 'The Planning System and Flood Risk Management' guidelines for planning authorities published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG).

The purpose of the FRA is to identify and quantify the risk of flooding of the proposed cycleway.

1.2 Scope of Study

The scope of study includes the following:

- Review of all relevant information data from:
  - Any historic flooding information for the area and/ or any relevant studies;
  - The Lee CFRAM study;
  - The Irish Coastal Wave and Water Level Modelling Study (ICWWS) study from the OPW;
  - The available topographical information for the site.
- Review of the risk of fluvial, coastal, pluvial and groundwater flood risk;
- Preparation of a flood risk assessment report.

1.3 Summary of Data used

In preparing this report, the following data was collated and reviewed:

- Topographical data from the site;
- Development of Pedestrian and Cycle Greenway, Glenbrook to Raffeen, Co.Cork Stage 1 & 2 Flood Risk Assessment (Atkins & Cork County Council, 2016);
- Guidelines for Planning Authorities on 'The Planning System and Flood Risk Management' published in November 2009, jointly by the Office of Public Works (OPW) and the then Department of Environment, Heritage and Local Government (DEHLG);
- The Cork County Development Plan 2022-2028;
- Flood history of the site from the OPW National Flood Hazard Mapping website (www.floodinfo.ie);
- Flood maps from the Lee CFRAM Study available to download from www.floodinfo.ie;
- Aerial photography and mapping from Bing Maps and Google Maps;
- The Climate Change Sectoral Adaptation Plan (OPW) 2019.

1.4 Site Description

The site of the proposed cycleway is located in Monkstown, Co. Cork.

The route of the proposed cycleway starts at the existing pedestrian tunnel also known as 'Cut & Cover' Tunnel and runs for a distance of circa 400m to the intersection of Castle Road and Strand Road near Sand Quay. The alignment is indicated with the red line in Figure 1.

Figure 1 Site location (Source: Google Earth Pro and contributors)

The site fronts onto Cork Harbour and is bordered to the West by Strand Road and to the East by Sand Quay.

The existing ground profile across the site varies from 4.30mOD to 2.5mOD. These are considered further later in the report in Section 3.6.

An unnamed open channel watercourse runs parallel to Glen Road and is culverted underneath the route of the cycleway (and Strand Road) as indicated in Figure 2. The culvert discharges to the harbour immediately north of Sand Quay.

1.5 Proposed Development

The proposed cycleway is to be developed as a shared walking and cycling way with a width of 4.0m. This section of the pedestrian/ cycleway will serve as a vital connection within the larger pedestrian and cycling infrastructure in the southern region of Cork City and County. It will form part of a pedestrian cycle way that connects Glenbrook to Carrigaline.

The broader walking and cycling network will incorporate the following links:

- The existing Passage West to Rochestown Greenway
- The Cross River Ferry
- The cycle network in Carrigaline and onward to Crosshaven

- The proposed Greenway to Ringaskiddy

The scheme will serve as a high-quality amenity for walkers and cyclists of all ages and would act as a gateway for cycling tourists.

The scheme will be of particular benefit to local communities in terms of health benefits arising from usage of the scheme and social capital gain from increased civic engagement and community ownership of the Greenway.

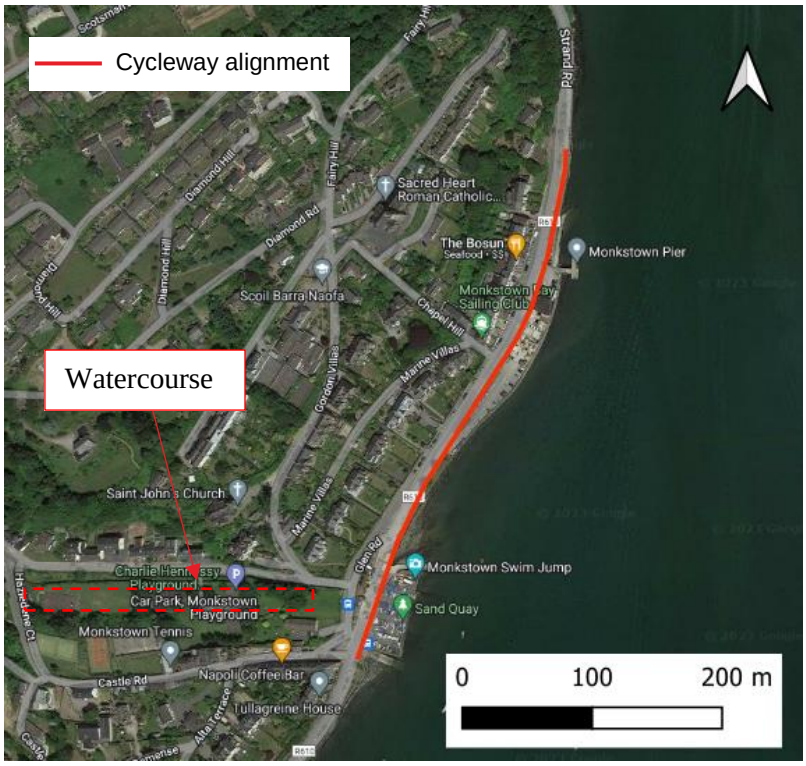


Figure 2 Aerial view of the site (Source: Google earth Pro and contributors)

2. Planning Context

The following planning policy documents are relevant to the flood risk assessment of the proposed development;

- The Planning System and Flood Risk Management Guidelines for Planning Authorities.
- The Cork County Development Plan 2022-2028.

2.1 The Planning System and Flood Risk Management Guidelines

2.1.1 Introduction

In November 2009, the Department of Environment, Heritage and Local Government and the Office of Public works jointly published a Guidance Document for Planning Authorities entitled “the Planning System and Flood Risk Management”.

The Guidelines are issued under Section 28 of the Planning and Development Act 2000 and Planning Authorities and An Bord Pleanála are therefore required to implement these Guidelines in carrying out their functions under the Planning Acts.

The aim of the guidelines is to ensure that flood risk is neither created nor increased by inappropriate development.

The Guidelines require the Planning system to avoid development in areas at risk of flooding unless the development can be justified on wider sustainability grounds and the risk can be reduced or managed to an acceptable level.

The guidelines require the adoption of a Sequential Approach (to Flood Risk Management) of Avoidance, Reduction, Justification and Mitigation and they require the incorporation of Flood Risk Assessment into the process of making decisions on Planning Applications and Planning Appeals.

Fundamental to the guidelines is the introduction of flood risk zoning and the classifications of different types of development having regard to their vulnerability.

The management of flood risk is now a key element of any development proposal in an area of potential flood risk and should therefore be addressed as early as possible in the site master planning stage.

2.1.2 Definition of Flood Zones

Flood Zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of flood zones defined in the Guidelines as shown in Table 1:

Table 1 Definition of flood zones

Zone	Description
Flood Zone A	Probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding).
Flood Zone B	Probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
Flood Zone C	Probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

2.1.3 Definition of Vulnerability Classes

Table 2 summarises the Vulnerability Classes defined in the Guidelines and provides a sample of the most common type of development applicable to each.

Table 2 Definition of vulnerability classes

Type of Vulnerability	Definition
Highly Vulnerable Development	Includes Garda, ambulance and fire stations, Healthcares, schools, residential dwellings, residential institutions, essential infrastructure, such as primary transport and utilities distribution and SEVESO and IPPC sites, etc.
Less Vulnerable Development	Includes retail, leisure, warehousing, commercial, industrial and non-residential institutions, etc.
Water Compatible Development	Includes Flood Control Infrastructure, docks, marinas, wharves, navigation facilities, water based recreation facilities, amenity open spaces and outdoor sport and recreation facilities

2.1.4 Types of Vulnerability Classes Appropriate to Each Zone

Table 3 illustrates the different types of Vulnerability Class appropriate to each Zone and indicates where a Justification Test will be required.

Table 3 Vulnerability class and zones

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable	Justification Test	Justification Test	Appropriate
Less Vulnerable	Justification Test	Appropriate	Appropriate
Water Compatible	Appropriate	Appropriate	Appropriate

2.2 Cork County Development Plan 2022 - 2028

2.2.1 Introduction

The Cork County Development Plan 2022-2028 contains the policies and objectives to guide development and land use in Cork County. The plan has effect from 6th June 2022 and is to be used for the determination of all planning applications from this date. The plan puts forward a vision of the future growth of the County over a six-year period and beyond.

Both the existing development plan and the draft plan are considered as part of this FRA.

2.2.2 Strategic Flood Risk Assessment for CCC Development Plan

The SFRA provides an assessment of all types of flood risk within the County to inform strategic land-use planning decisions for the County. It outlines the primary watercourses in the county and identifies the flood risk zones as per the OPW's Planning Guidelines. It also proposes where required improvements to flood risk policies in the Draft Development Plan. A Stage 1 Flood Risk Identification was undertaken to identify any flooding or surface water management issues related to the County that may warrant further investigation.

To inform the Cork County Development Plan 2022-2028, an updated version of the Strategic Flood Risk Assessment (SFRA) report has been developed in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) and Circular PL2/2014 (August 2014). It aims to support the adoption of policies in relation to the zoning of lands in flood prone areas.

The report outlines a broad overview of the requirements for a Flood Risk Assessment which should accompany planning applications of lands that have passed the Justification Test for Development Plans and Part 1 of the Justification Test for Development Management, including:

- Flood risk from sources other than fluvial and tidal should be reviewed, as should the impacts of climate change
- All developments, including in Flood Zone C, must consider the impacts of surface water flood risks on drainage design
- Use of the sequential approach and a justification test if necessary, as per The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009)
- "For sites within Flood Zone A or B, a site specific "Stage 2 - Initial FRA" will be required and may need to be developed into a "Stage 3 - Detailed FRA". The extents of Flood Zone A and B are delineated through this SFRA. However, future studies may refine the extents (either to reduce or enlarge them) so a comprehensive review of available data should be undertaken once a Site Specific Flood Risk Assessment (SSFRA) has been triggered." (source: SFRA)
- "Within the SSFRA the impacts of climate change and residual risk (including culvert/structure blockage) and more extreme scenarios (such as the 0.1% AEP fluvial and tidal event) should be considered and modelled or remodelled where necessary" (source: SFRA)
- "Any proposal that is considered acceptable in principle shall demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required) the proposal will demonstrate that appropriate mitigation and management measures are put in place." (source: SFRA)

- “Although there are many locations where development may, in the future, benefit from a flood relief scheme, the assessment must progress on the basis of the current level of protection and any risks to the development itself or third party land must be managed as part of the development design.” (source: SFRA)

2.2.3 Recommendations for FRAs

It is recommended that any planning applications in flood risk areas are accompanied by a supporting appropriately detailed flood risk assessment. This is to ensure a conservative approach and that consideration is given to new development within Flood Zones where mitigation measures may still be required to ensure an appropriate level of flood protection and/or resilience. The detailed assessment should include at a minimum Stage 1 - Identification of Flood Risk. Where flood risk is identified a Stage 2 - Initial FRA will be required, and depending on the scale and nature of the risk a Stage 3, detailed FRA may be required.

The SFRA report highlights several sources of relevant flood risk information available for Cork County including:

- Office of Public Works (OPW) Catchment Flood Risk Assessment and Management Studies (CFRAMS), which include maps of the fluvial and coastal flood risk including the benefits provided by the flood defences.
- The Draft Lower Lee FRS from the OPW which superseded the Lee FRAM data.
- "Still water tidal extents for 200 year and 1000 year events” from the Irish Coastal Protection Strategy Study (ICPSS)
- Historical flood events in the County from www.floodinfo.ie

2.2.4 Flood risk at the site of the development in Monkstown

The SFRA identifies several areas of existing development and undeveloped lands which are at risk of flooding. The subject site at Monkstown, due to its coastal location is identified as susceptible to tidal flooding and coastal erosion.

An extract for the Development Plan Zoning maps in the vicinity of the subject site is shown in Figure 3. It can be seen from the figure that the site is seen to be in Flood Zone A.

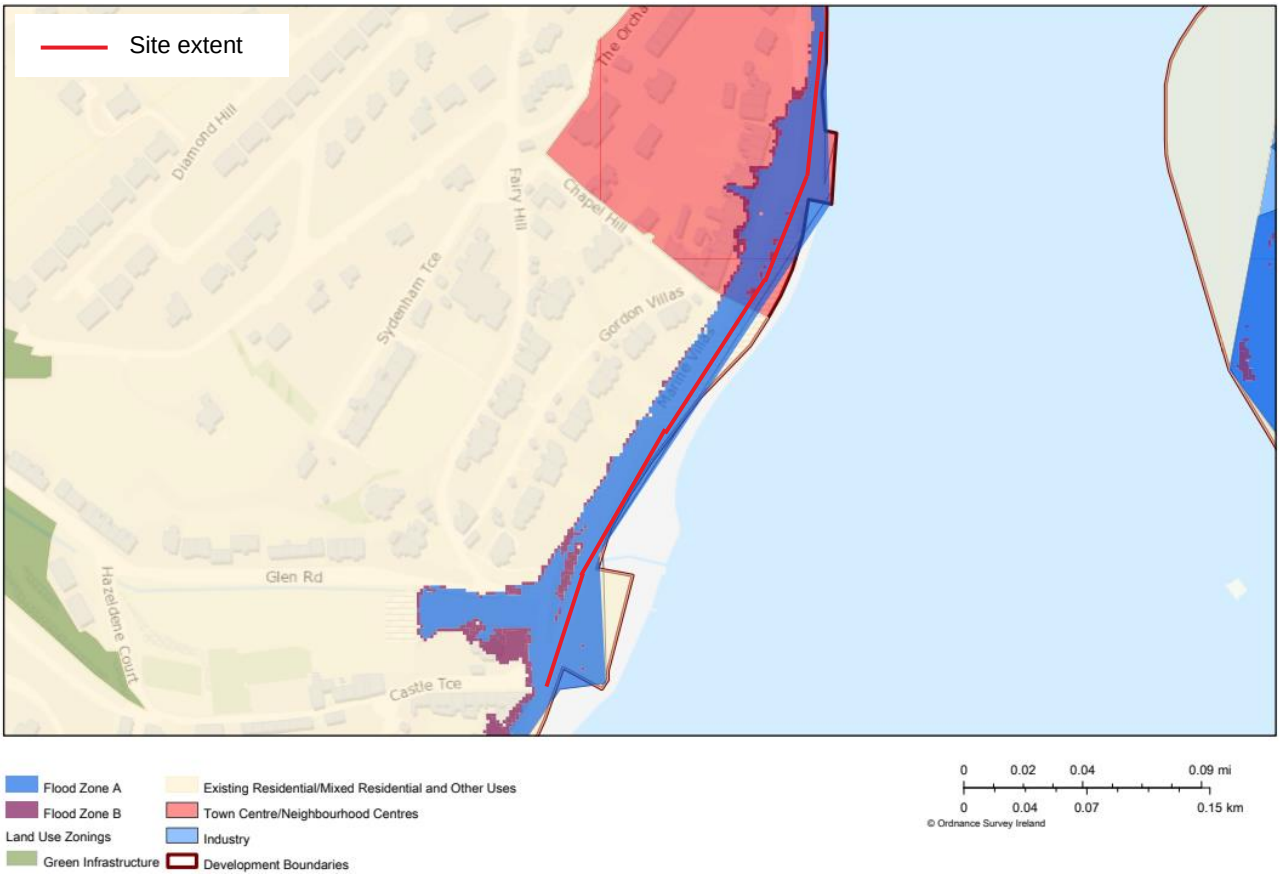


Figure 3 Development Plan 2022-2028 land and flood zones at the site location

3. Overview of Flood Mechanisms and Historical Flooding at the Site

3.1 Flooding Mechanisms

In broad terms, the potential sources of flooding at the site can be categorised as:

- Fluvial (River) Flooding - Fluvial flooding occur when rivers overflow their banks. The closest stream to the site is the unnamed watercourse that runs parallel to Glen Road.
- Coastal and tidal flooding – Coastal/tidal flooding can occur when high winds and storm conditions combine with high tides resulting in elevated water levels. Wave Overtopping can also occur as part of coastal flood events.
- Pluvial Flooding - Pluvial flooding occurs when the capacity of the local urban drainage network is exceeded during periods of intense rainfall. At these times, water can collect at low points in the topography and cause flooding.
- Groundwater Flooding - Groundwater Flooding can occur during lengthy periods of heavy rainfall, typically during late winter/early spring when the groundwater table is already high. If the groundwater level rises above ground level, it can pond at local low points and cause periods of flooding.

Each of the applicable potential sources of flooding are considered in this FRA.

3.2 Historic Flooding at the Site

3.2.1 OPW National Flood Hazard Mapping Website

The OPW National Flood Hazard Mapping summarises all recorded flood events within 2.5 km of a chosen location. Figure 4 presents the data for the site of the interest and it can be seen that three historic events have been recorded at or nearby the site location. Information on these three events is presented in Table 4.

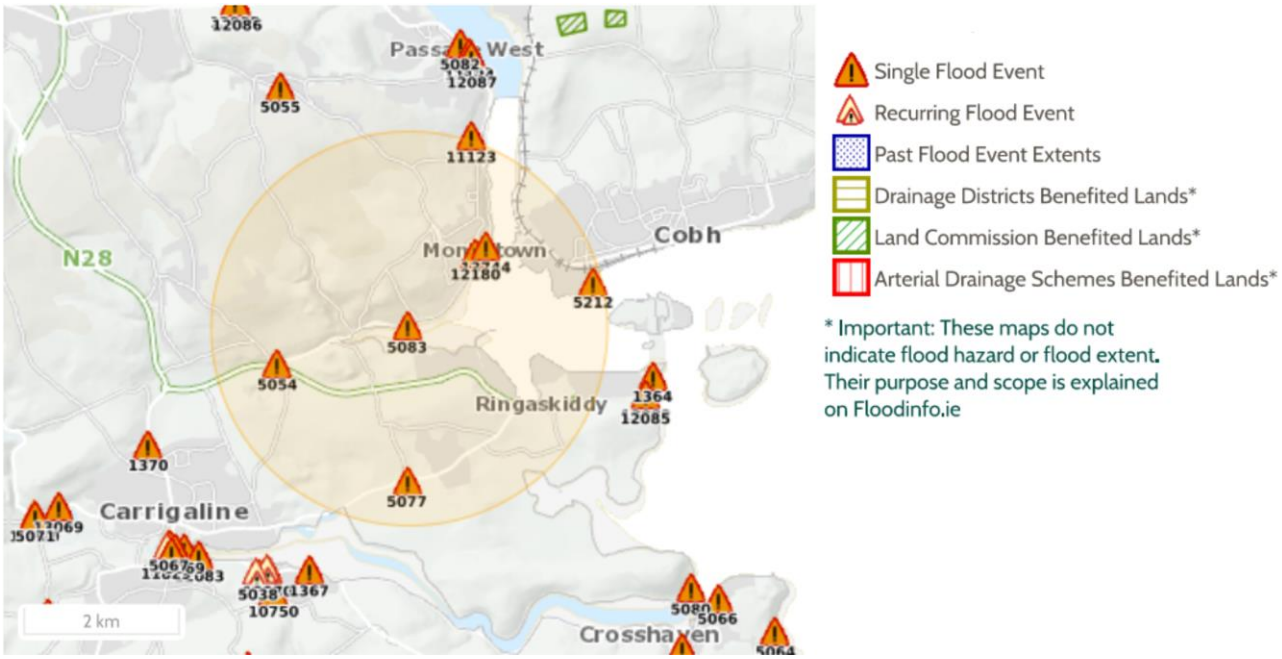


Figure 4 Historical flood record in the vicinity of the site (Source: www.floodinfo.ie)

Table 4 Information on recorded flood events (source: www.floodinfo.ie)

Flood Location and ID	Date	Source and Cause	Flood Depth	Impact
ID-5083 Cork coastal areas	27-10-2004 to 29-10-2004	A severe gale event with heavy rainfalls in the south coast of Ireland coincided with the autumnal equinox resulting in spring tides.	No Infomation	The concomitance of events led to tidal flooding in the low-lying coastal areas. Most of the sea wall along the waterfront between Raffeen and Monkstown was damaged and washed away at one location.
ID-12180 Glen / Strand Road	25-01-2013	Heavy rainfalls lead to the back up of a property masonry culvert which causes the watercourse feeding the culvert to spill over its bank. This occurs during periods of high tides, south easterly winds and intense rainfall. Castle Road has a steep incline down to Strand Road and the Harbour where water pools during period of intense rainfall.	0.3 m	One culvert is in the northeast corner of a property garden and another one located to the west of the property near a car park. The car park and the property house being at a higher level than the garden level of the property, it results in its flooding (without internal flooding of the property). Flood water discharged down the centres of the roadway near Strand Road and the Harbour.
ID-13744 Strand Road	19-10-2020	No Information	No Information	No Information

As outlined in Table 4, the site of the cycleway has, historically, been at risk from both coastal and fluvial flooding. A section of the sea wall in the area was also severely damaged in 2004 from a storm event which suggests that surface waves are also a risk to the site both in terms of flood risk (i.e. causing wave overtopping) and also by causing structural damage to infrastructure.

3.3 Coastal/tidal Flood Risk

3.3.1 CFRAM data

The 0.1%, 0.5% and 10% AEP Flood extents maps produced as part of the Lee CFRAM studies are presented in Figure 5, Figure 6 & Figure 7. It can be seen that the site of the proposed cycle way is within the 0.1 and 0.5% AEP flood extents while parts of the site are also within the 10% AEP flood extent.

It is noted that the design tidal water levels used to generate the Lee CFRAM tidal flood extents were derived as part of the Lee CFRAM. These levels have subsequently been updated by the OPW as part of a national study (the ICWWS) which is considered in the following section of the report.

Figure 5 CFRAM Coastal flooding extent map 10% AEP (Source: www.floodinfo.ie)

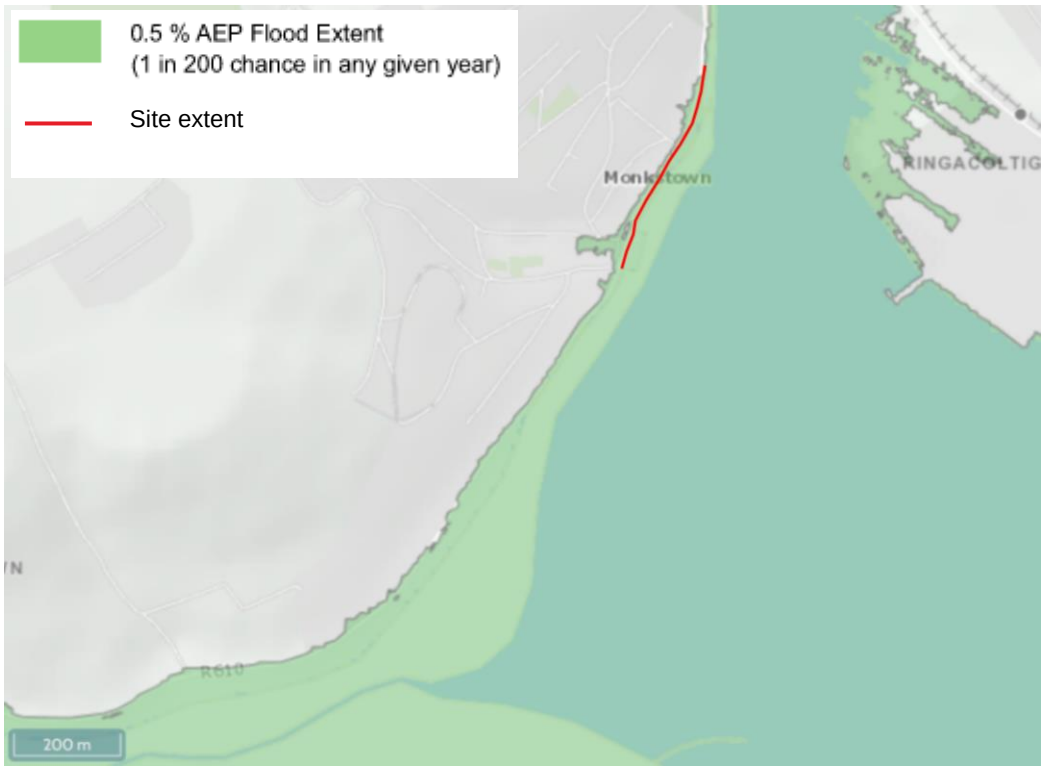


Figure 6 CFRAM Coastal flooding extent map 0.5% AEP (Source: www.floodinfo.ie)

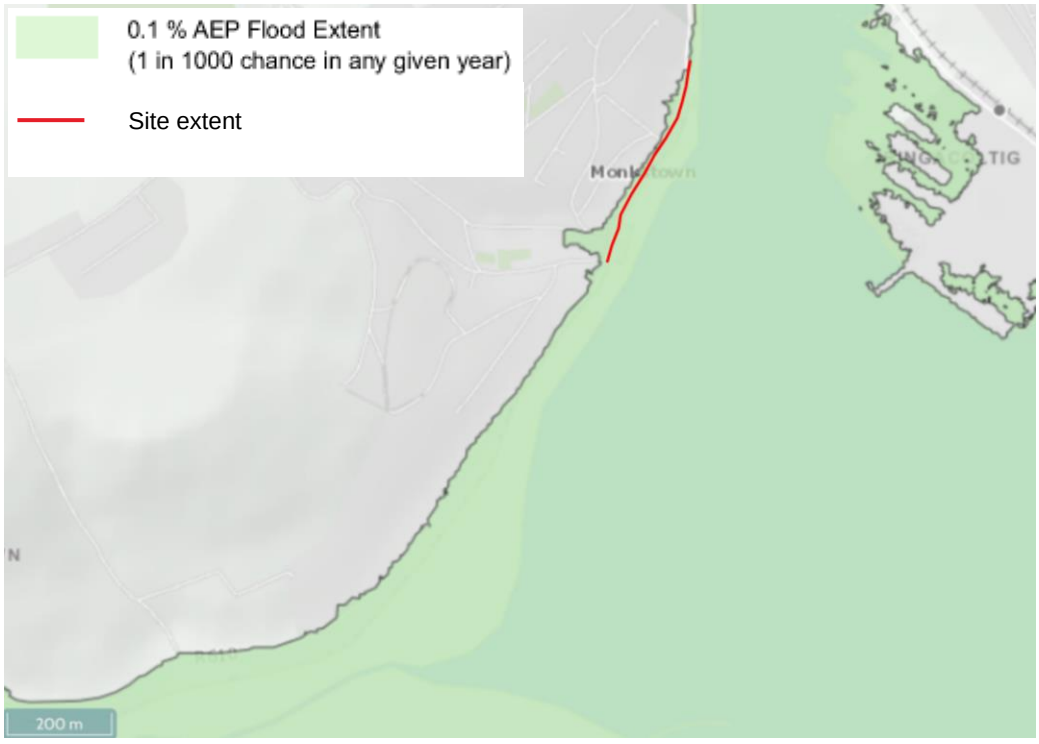


Figure 7 CFRAM Coastal flooding extent map 0.1% AEP (Source: www.floodinfo.ie)

3.3.2 ICWWS data

The ICWWS was undertaken by the OPW and published in 2019. The study provides an updated estimate of extreme coastal boundary water levels for the coast of Ireland. It therefore represents an update to the flood levels derived as part of the Lee CFRAM report. It is noted however that the ICWWS did not produce any flood extent maps.

The difference between the Lee CFRAM and ICWWS flood levels in the vicinity of the site location are presented in Table 5. It can be seen that the ICWWS is predicting higher 0.5% AEP water levels in the vicinity of the site such that the flood extents as presented on the Lee CFRAM flood maps are understated.

The ICWWS flood levels are considered further in Section 3.6 where flood depths along the route of the cycleway are assessed.

Table 5 Estimated extreme water levels from the ICWWS (relative to OD Malin OSGM02 and OD Malin OSGM15) and from the Lee CFRAM report (source: OPW)

	ICWWS	Lee CFRAM
Estimation Point	(with seiche)	
0.5% AEP water level – mODM OSGM02	2.85	2.71

3.3.3 Flood risk from Wave Overtopping

There is very likely to be a risk of Wave Overtopping along the route of the proposed cycleway. It is note however in the scope of this project to quantify this risk.

3.4 Fluvial and Pluvial Flood Risk

It has been established from the historic record of flooding (discussed in Section 3.2) that the unnamed minor watercourse in the vicinity of the site presents a risk of fluvial flooding to the site. This risk is very likely to be correlated to high tides when the culvert which discharges the stream underneath the Strand Road is tide locked such that the river flow is unable to discharge to the sea.

It is noted that a detailed quantification of the risk of fluvial flooding from the watercourse is not within the scope of this study.

The risk of pluvial flooding to the route of the cycle way is likely to be low. As noted in the historic record of flooding of the site however (Section 3.2), there are areas in the vicinity of the site which are prone to pluvial flooding due to water collecting at localised low points during periods of intense rainfall.

3.5 Groundwater Flood Risk

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during later winter/early spring when the groundwater table is already high. If the groundwater level rises above surface level, it can pond at local points and cause flooding.

The risk of ground water flooding is likely to be low at the site.

3.6 Flood depths along the route in the Current Climate Scenario

The existing ground levels and the proposed ground levels along the alignment of the proposed cycleway are plotted in **Figure 8**. It can be seen from the figure that the proposal involves minor and relatively localised road regrading with differences ranging from circa 65mm to circa 200mm.

The 0.5% AEP design flood levels from the IWCCS study are also plotted in **Figure** 8. By subtracting the proposed ground level from the flood level, the flood depth for this event along the route can be determined.

From this analysis it can be seen that a significant portion of the route of the cycleway is at risk of tidal inundation from the design event: the maximum flood depth along the route is circa 0.41m while the average depth of water is circa 0.18m.

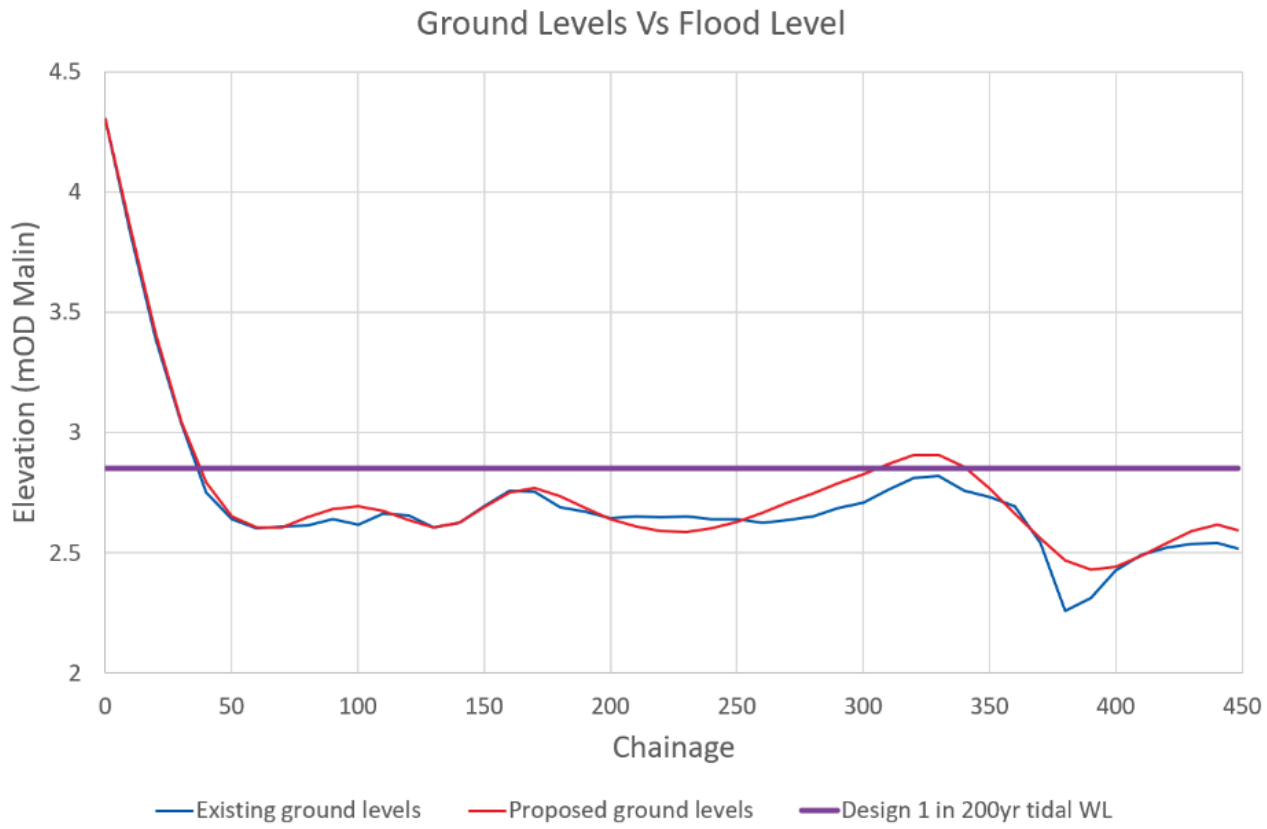


Figure 8 Ground levels versus design flood level at the site of the proposed cycleway

4. Management of Flood Risk at the site

4.1 Options Assessment

The cycleway could be protected from flooding by constructing a flood wall along its route to the design tidal water level plus a suitable freeboard allowance. The wall would also need to be extended sufficiently far upstream to avoid it being bypassed by the tide. This option however would involve very significant capital works and would be very expensive to implement. It would also need to be justified on economic grounds as regards the benefitting area of the area protected from flooding.

Raising the ground levels to above the design flood levels is not deemed practical or technically viable due to connectivity with existing properties and other infrastructure.

It is therefore recommended that flood protection measures are not considered as part of the cycleway and that the risk of flooding is managed through reliance on the tidal flood forecasting system for Cork Harbour that is run and maintained by Cork City Council and other agencies. When a flood warning has been issued, users of the cycleway can be notified. The route will therefore not be in use for the duration of the event.

4.2 Off-site impact

The route of the cycleway is already at significant risk of flooding in the existing scenario. The proposed cycleway development will not increase flood risk to any neighbouring properties along the route as the peak tidal water level and the frequency of tidal inundation is not impacted by the development.

The cycleway will not have any significant impact on the fluvial risk of flooding from the unnamed minor water course as the ground regrading works associated with its development are very minor.

The off-site impact of the cycleway is therefore negligible.

4.3 Storage and Conveyance

The proposed cycleway will not have any impact on floodplain storage and conveyance.

4.4 Access and Egress Routes

The route of the cycleway will be cut off during a flood event. A sufficient warning time will be available to ensure all users of the cycleway are notified in advance of any tidal events.

4.5 Drainage System for the development

The surface water from the proposed cycleway will be collected in the main carriageway drainage system.

4.6 Flood risk in a climate change scenario

Flood risk to the site of the proposed cycleway will increase due to climate change predominantly through an increase in the mean sea level. The OPW's Climate Change Sectoral Adaptation Plan (OPW) 2019 outlines two such climate change scenarios: the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS) which involve an increase of 0.5m and 1.0m in the mean sea level respectively. In the MFRS the maximum flood depth will therefore be circa 0.9m.

5. Application of "Flood Risk Management Guidelines"

5.1 Vulnerability Classification

The proposed cycleway is a local transport infrastructure and is therefore classified as a "Less Vulnerable Development" as per the vulnerability classification in Table 6. As indicated in Section 3, the site is within the 1 in 10, 1 in 200 and the 1 in 1000 year tidal floodplains. In accordance with the OPW's planning guidelines, this corresponds to Flood Zone A.

Table 6 Vulnerability classification as per the planning guidelines

Vulnerability class	Land uses and types of development which include*:
Highly Vulnerable development (include essential infrastructure)	Garda, ambulance and fire stations and command centres require to be operational during flooding; Healthcares; Emergency access and aggress points; Schools; Dwelling houses, student half of residence and hostels; Residential institutions such as residential care homes, children's homes and social service homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution including electricity generated power stations and sub-stations, water and sewage treatment,

Vulnerability class	Land uses and types of development which include*:
	and potential significant sources of pollution (SECESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or sort-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Water treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water- compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repair and dismantling, dockside fish processing and refrigeration and compatible activities requiring a water side location; Water based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

5.2 Sequential Approach

Figure 9 below illustrates the sequential approach to be adopted under the 'Planning Systems and Flood Risk Management' guidelines. As the development is in Flood Zone A, a Justification Test is typically required.

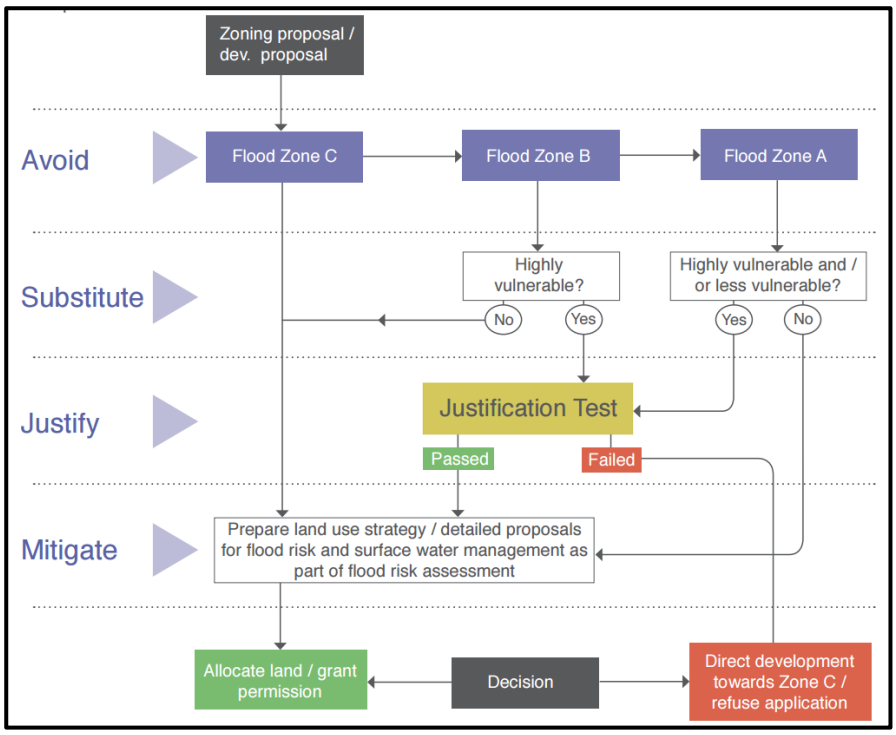
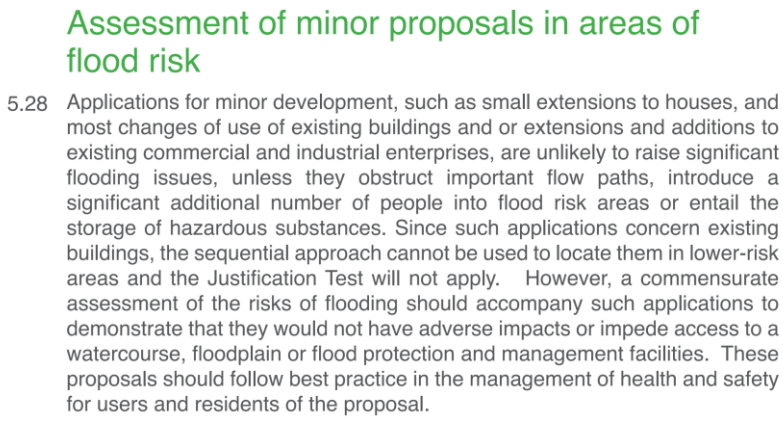


Figure 9 Sequential approach

As the development however is minor in the context of its impact on the floodplain and will not involve any significant impact on flood risk, it can be considered as a minor development in accordance with Section

5.28 of the of the Planning Guidelines which is reproduced in Figure 10 below. As this section of the guidelines is deemed to apply to the proposed cycleway, a Justification Test is not required.



Assessment of minor proposals in areas of flood risk

5.28 Applications for minor development, such as small extensions to houses, and most changes of use of existing buildings and or extensions and additions to existing commercial and industrial enterprises, are unlikely to raise significant flooding issues, unless they obstruct important flow paths, introduce a significant additional number of people into flood risk areas or entail the storage of hazardous substances. Since such applications concern existing buildings, the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test will not apply. However, a commensurate assessment of the risks of flooding should accompany such applications to demonstrate that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities. These proposals should follow best practice in the management of health and safety for users and residents of the proposal.

Figure 10 Section 5.28 of the OPW Planning System and Flood Risk Management report (source: OPW)

6. Discussion

The site of the proposed cycleway is at significant risk of tidal flooding in the existing scenario. There is also a risk of fluvial flooding for fixed length of the route from the unnamed minor watercourse that flows parallel to the Glen Road and enters Cork Harbour close to Sand Quay. It is not within the scope of this FRA to quantify the risk of flooding from the watercourse but we note that there is a historic record of flooding associated with it.

When flood levels are considered with the proposed ground levels, it is seen that a significant portion of the route of the cycleway is at risk of tidal inundation from the design event. The maximum flood depth along the route in the proposed scenario for this event is circa 0.41m.

As the site is within the 1 in 200 year tidal flood extent, the site is classified as Flood Zone A. Ordinarily a Justification Test for the development would therefore be required. The proposed cycleway development is not however increasing the flood risk to any neighbouring properties along the route. Section 5.28 of the OPW Planning Guidelines is therefore deemed to apply and the Justification Test is not deemed to be required.

The cycleway could be protected from flooding by constructing a flood wall along its route to the design tidal water level plus a suitable freeboard allowance. This option however would involve very significant capital works and would be very expensive to implement. It would also need to be justified on economic grounds as regards the benefitting area of the area protected from flooding.

It is therefore recommended that flood protection measures are not considered as part of the cycleway and that the risk of flooding is managed through reliance on the tidal flood forecasting system for Cork Harbour that is run and maintained by Cork City Council and other agencies. When a flood warning has been issued, users of the cycleway can be notified. The route will therefore not be in use for the duration of the event.