

Carrigaline Urban Design Framework and Public Realm

Flood Risk Assessment

Cork County Council

February 2024



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This document has 26 pages including the cover.

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 0	For Planning	S. Kamuni	G. Hanratty	A. Corrigan	B. Janeczek	31/08/2023
Rev 1	For Planning	S. Kamuni	G. Hanratty	A. Corrigan	B. Janeczek	16/02/2024

Client signoff

Client	Cork County Council
Project	Carrigaline Urban Design Framework and Public Realm
Job number	5199585
Client signature / date	

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1. Introduction

Atkins has been commissioned to conduct a Flood Risk Assessment (FRA) on behalf of the Cork County Council for the Urban Design Framework (UDF) and Public Realm project in Carrigaline, Co. Cork.

This report presents the Flood Risk Assessment of the proposed development on the east side of Main Street (R611), Carrigaline, Co. Cork.

1.1. Relevant Guidance

This FRA has been undertaken in consideration with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG November 2009, which is the latest guidance document. The guidance has been issued to ensure that flood risk is a key consideration for developers, planning & regional authorities, and the public in preparing and submitting development proposals. The principles of the guidance are as follows:

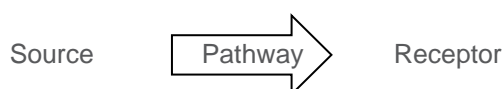
- Avoid the risk, where possible
- Substitute less vulnerable users, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

A staged approach is recommended within the guidance document in relation to identifying and assessing flood risk. The three stages of appraisal and assessment are as follows:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

1.2. Flood Risk

Flood risk can be quantified by relating the probability of the flood event occurring to the consequence of the flood. Probability, in flood event terms, is gauged by potential annual occurrence/return period and flood consequence is dependent on the nature of the flood hazard and the vulnerability of the inundated area. The source-pathway-receptor model considers the components of flood risk.



The source is the hazard with the potential to cause harm through flooding (e.g., rainfall, high sea levels). The pathway is the mechanism by which the source can affect the receptor (e.g., inadequate drainage, overtopping of coastal defences) and finally, the receptor is anything which is affected by the flood event (e.g., people, infrastructure, property).

1.3. Causes of Flooding

The Planning System and Flood Risk Management Guidelines requires a FRA to consider all potential causes of flooding including the following:

- Coastal flooding
- Inland flooding
 - Overland flow
 - River flooding
 - Flooding from artificial drainage systems
 - Groundwater flooding
 - Estuarial flooding

- Failure of infrastructure

1.4. Floodplains

A river flood plain is a low-lying area which receives excess flood water when the flow within the watercourse exceeds the capacity of the channel. A coastal flood plain is an area which, during high tide or increased sea levels, becomes inundated with sea water.

1.5. Assessing Flood Risk

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in the consideration of flood risk to a particular site. The three flood zones are described in **Table 1-1** below.

Table 1-1 - Flood Zones

Flood Zone	Description
Flood 'Zone A'	where the probability of flooding from watercourses is the highest (greater than 1% or 1 in 100 year for watercourse flooding or 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone B'	where the probability of flooding from watercourses is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 year for watercourse flooding, and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone C'	where the probability of flooding from watercourses and the sea is low or negligible (less than 0.1% or 1 in 1000 year for both watercourse and coastal flooding). Flood Zone 'C' covers all areas which are not in Zones 'A' or 'B'.

The planning implications for each of the flood zones are:

Zone A - High probability of flooding. Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone.

Zone B - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general, however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Zone C - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

2. Site Description

2.1. Site Location

Carrigaline is a town located within the limits of Cork County approx. 10km southeast of Cork City, at the intersection of R613 and R611. The proposed development is located immediately east of the existing R611 bridge on Main St and on the northern bank of the River Owenabue, see Figure 2-1.

The existing site is being used as an urban area with majority of the site being carpark. The existing trees along the southern bank of River Owenabue will be protected in place.

The site will include the following key developments:

1. River Front and Water Activities
2. Landscaping
3. River Owenabue Promenade and Public Connection Routes
4. Public Pavilion
5. Rain garden
6. Waterfront stepped seating
7. Public lighting

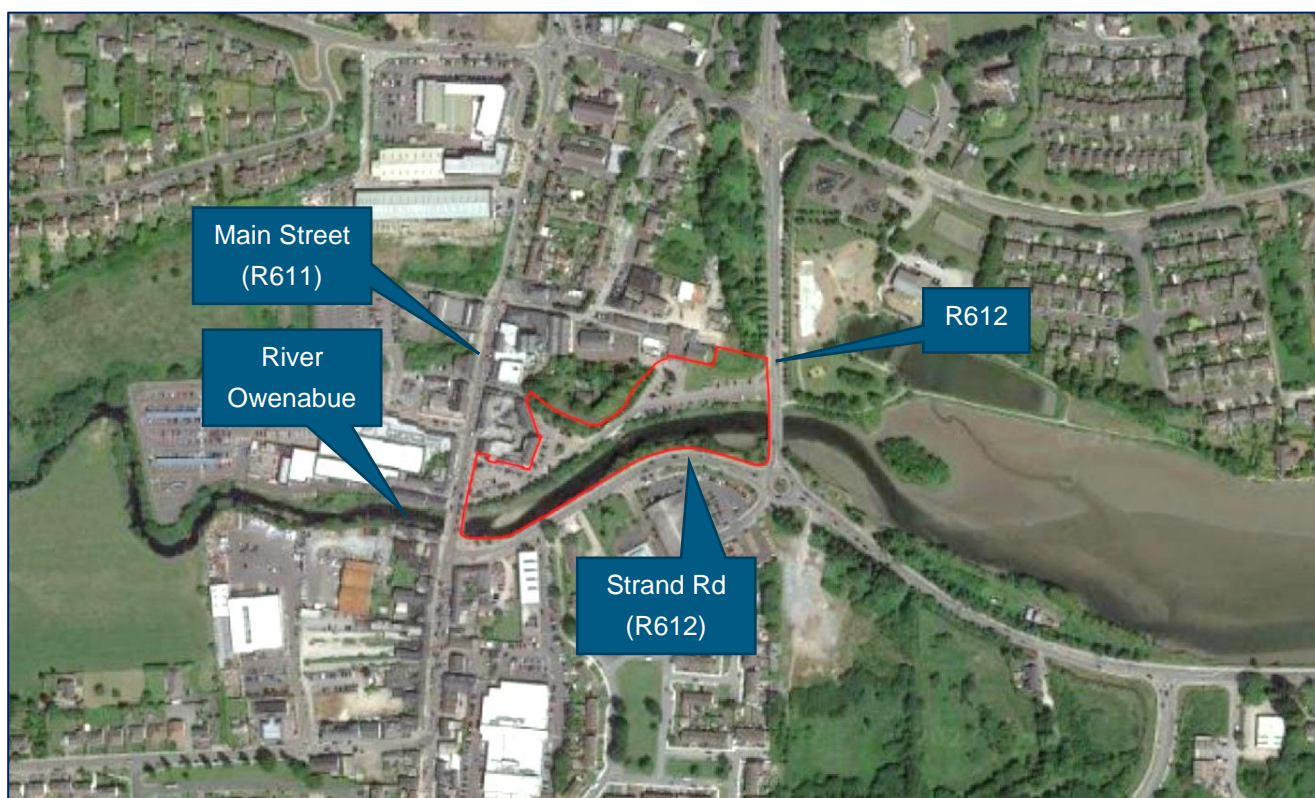


Figure 2-1 - Site Location

2.2. Topography

The proposed development is located east of the intersection of R611 (Main Street) and R612 (Strand Road) and west of R612. The existing topographical levels of the proposed development and surrounding locations range from 3.85mOD to 2.16mOD. The surrounding areas slope down from the south towards the north. The River Owenabue flows just south of the proposed site with top of bank level from 3.01mOD to 1.35mOD and bottom of the bank level ranging 0.15mOD to -0.5mOD.

2.3. Local Hydrology and Existing Drainage

The most immediate hydrological feature in the vicinity of the site is the River Owenabue to the south of the proposed site as shown in Figure 2-2 and Figure 2-3 below.

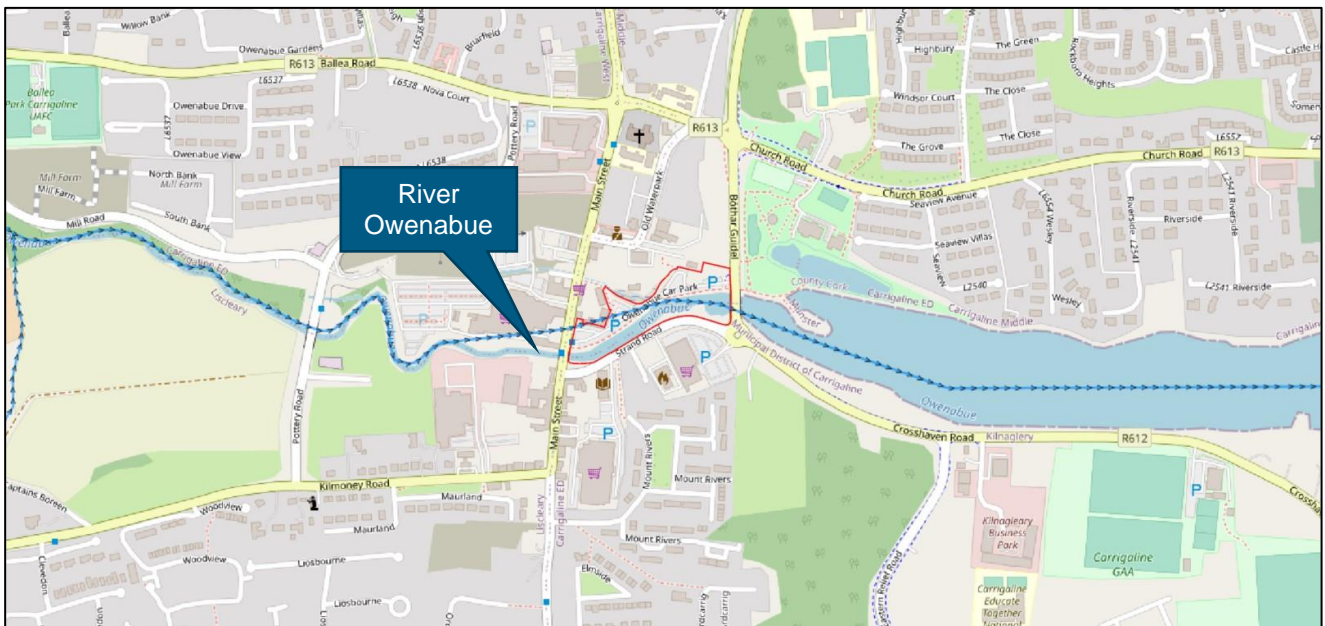


Figure 2-2 - Hydrological Features

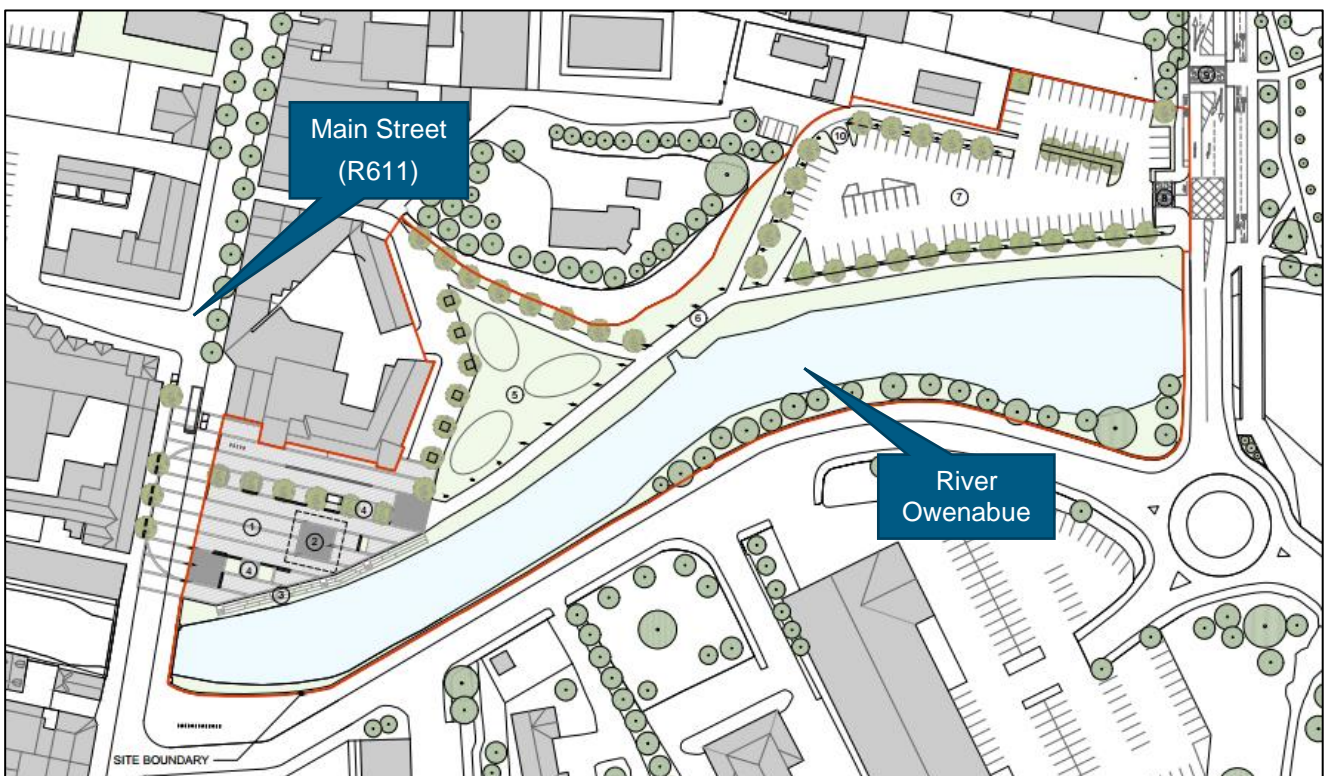


Figure 2-3 - Proposed Development

The other immediate hydrological feature in the vicinity of the site is the River Owenabue Estuary which start approximately 250m to the west of the project site and extends approximately 8.15km towards the east to the Cork harbour coastal waters.

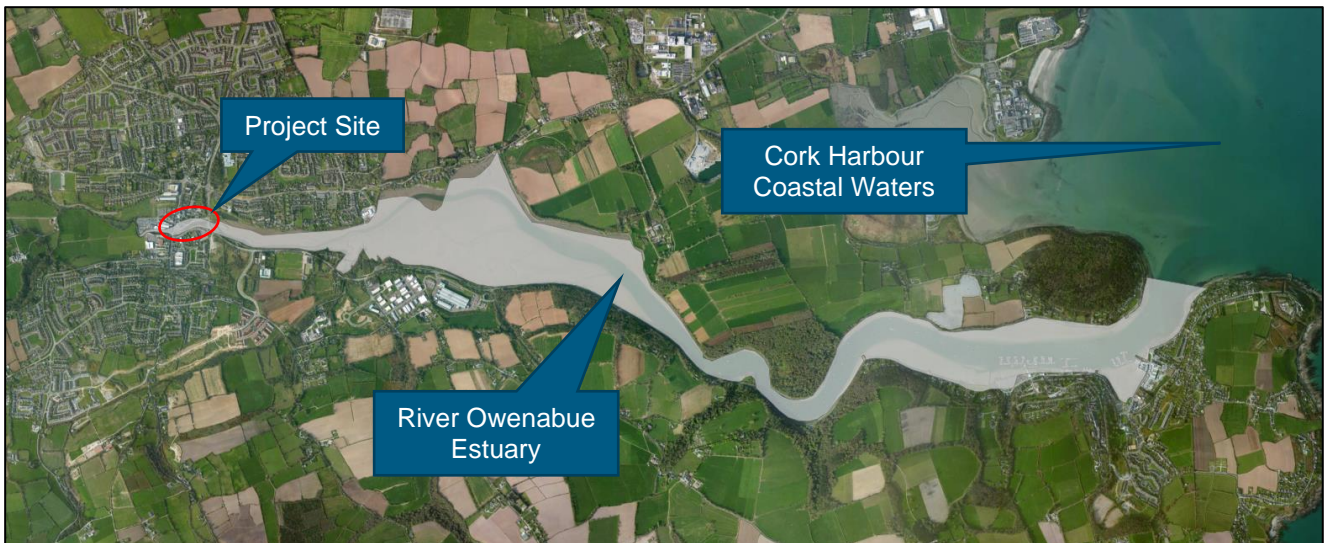


Figure 2-4 - River Owenabue Estuary

The River Owenabue flows in an easterly direction, just to the south of the proposed site. The River Owenabue discharges into the Cork harbour coastal water, travels through the Outer Cork harbour then into the Western Celtic Sea which is towards the east of the site.

3. Flood Risk Identification for the Site

In accordance with the planning guidelines, a *Stage 1 Flood risk identification* is required to be undertaken to identify if there are any flooding or surface water management issued related to the proposed development site that may warrant further investigation. Initially, the following possible flood mechanisms for the proposed Carrigaline UDF and Public Realm have been identified:

Table 3-1 - Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason
Coastal flooding	No	The site is not close to a coastal location.
Overland flow	No	The surrounding topography is relatively shallow.
River flooding	Yes	River Owenabue is just south of the proposed site.
Flooding from artificial drainage systems	No	There is no urban drainage infrastructure within the site and in the immediate vicinity of the site.
Groundwater flooding	No	There are no significant springs or groundwater discharges recorded in the immediate vicinity of the site.
Estuarial flooding	Yes	The site is at the River Owenabue estuary.
Failure of infrastructure	Yes	There is a pumping station north of the car park area.

Table 3-1 above demonstrates that the site is at risk of fluvial, estuarial flooding, and failure of infrastructure, however the report will continue to confirm the initial assumptions detailed above.

3.1. Flood Risk Investigation

3.1.1. OPW Flood Maps

The Office of Public Works (OPW) interactive map viewer (<http://www.floodinfo.ie/map/floodmaps/>) displays the predicted flood extents for both rivers and coastal areas over various return periods. The viewer was consulted in relation to the proposed site location. From review of the fluvial and tidal flood maps (M1/UA/EXT/CURS/004 and M9/UA/EXT/CURS/027), it is evident that the proposed site lies within the 1000-year fluvial flood zone (Zone B) and 200-year Tidal Flood zone (Zone A).

Detailed fluvial and tidal flood maps specific to this proposed site have been included in **Appendix A** and **Appendix B**.

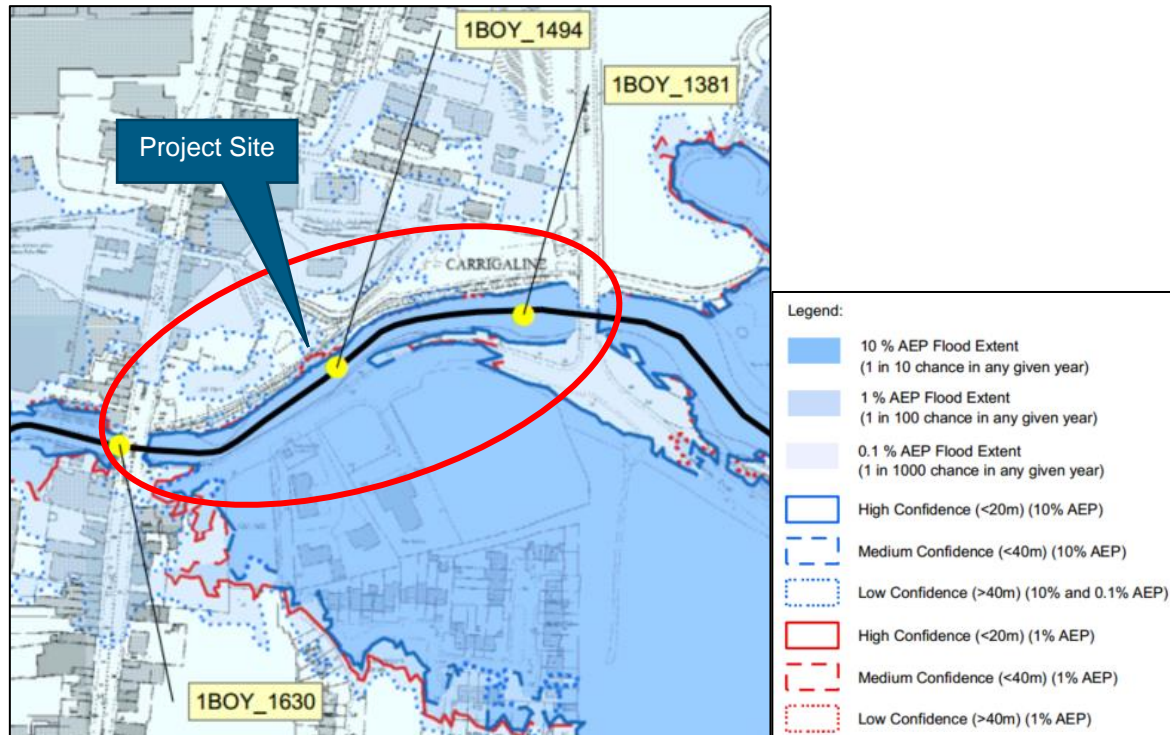


Figure 3-1 - OPW Fluvial Flood Map Extract

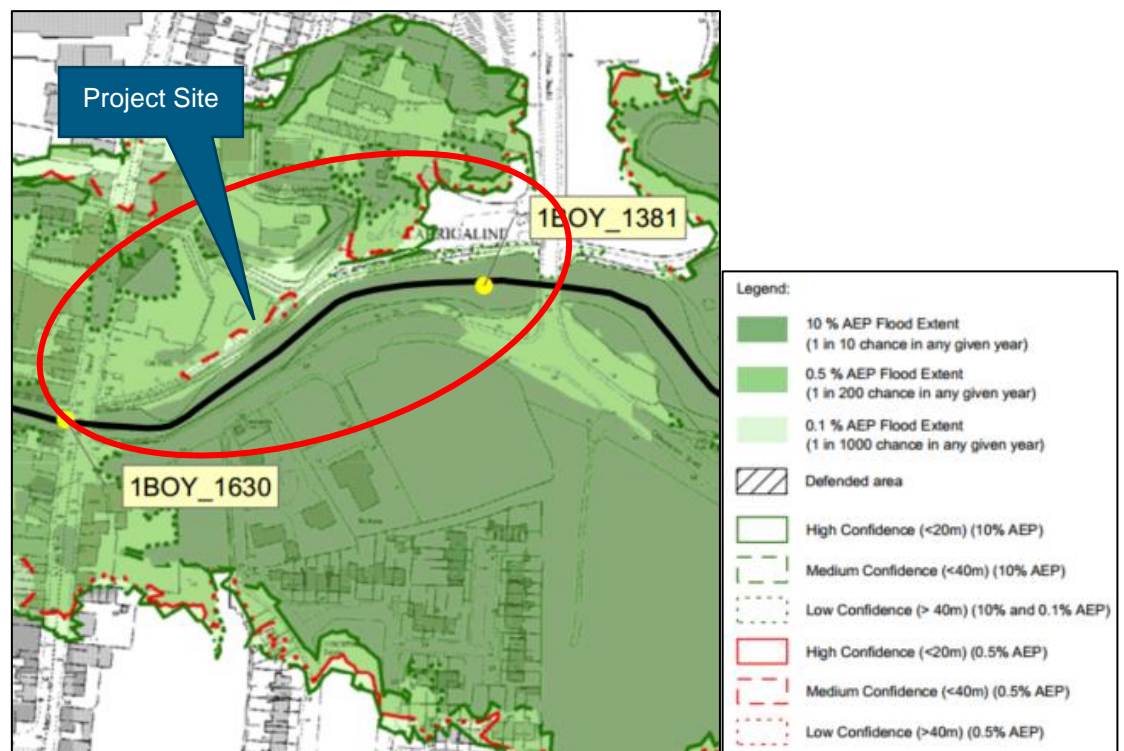


Figure 3-2 - OPW Tidal Flood Map Extract

3.1.2. Historical Flood Records

The OPW Flood Hazard Mapping website (www.floodmaps.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the site.

The Flood Hazard Mapping does indicate flood points within the vicinity of the site.

Figure 3-3 and Figure 3-4 below illustrate the historic map for the site Environs.

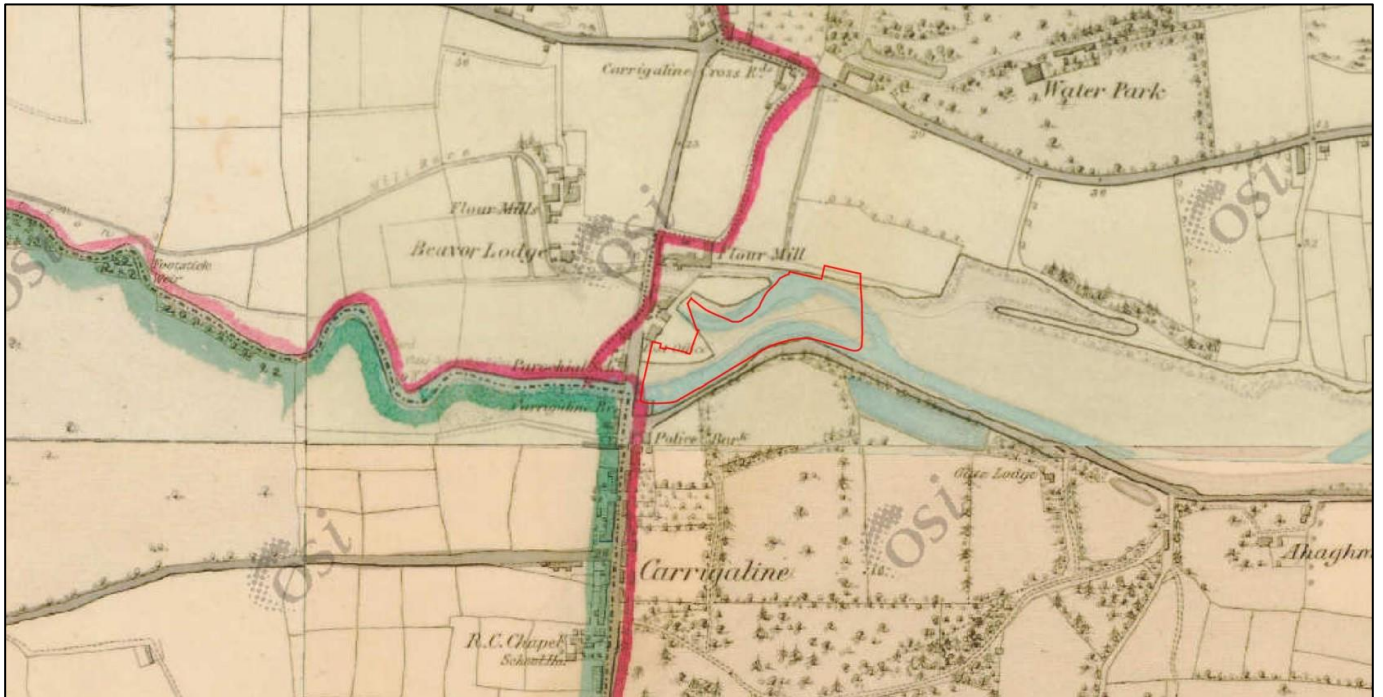


Figure 3-3 - OSI 6 Inch Colour Map

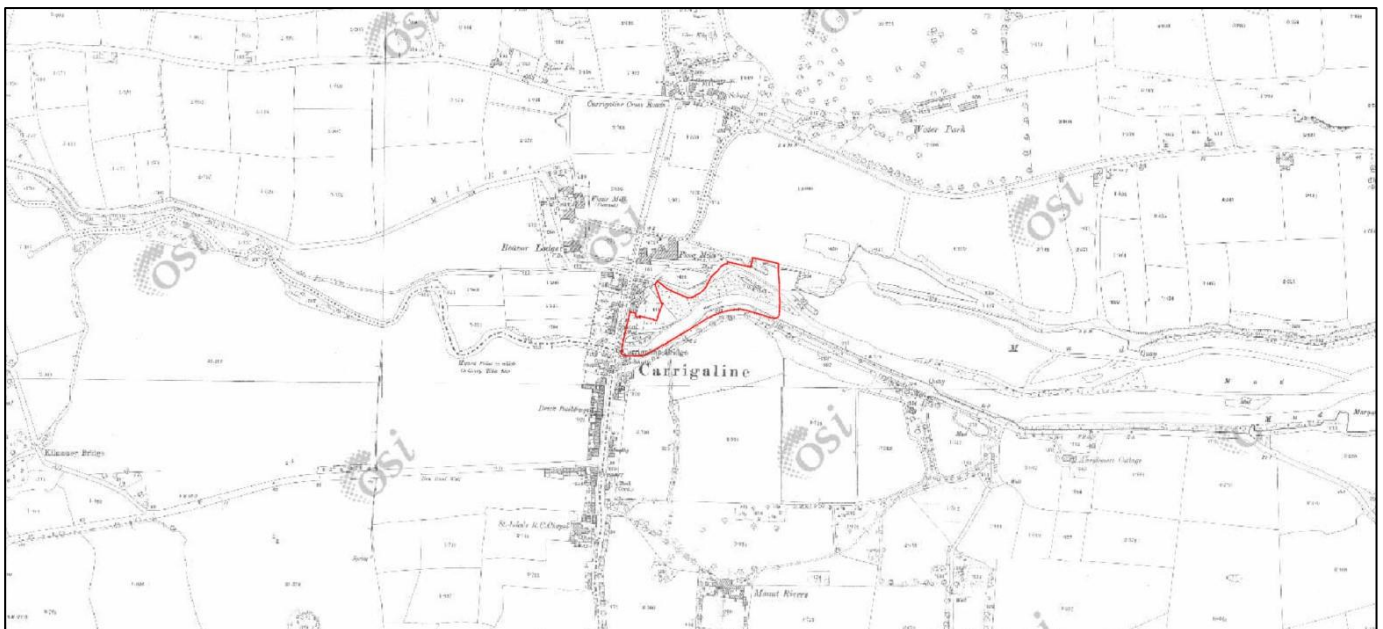


Figure 3-4 - OSI 25 Inch Map

3.1.3. Historical Flooding

The Office of Public Works (OPW) interactive map viewer <http://www.floodinfo.ie/map/floodmaps> was consulted to view any historic flood events located within the proposed site. Flood events identified are close to the proposed development site. Refer to extract in Figure 3-5 which shows the flood events close to the proposed site environs.

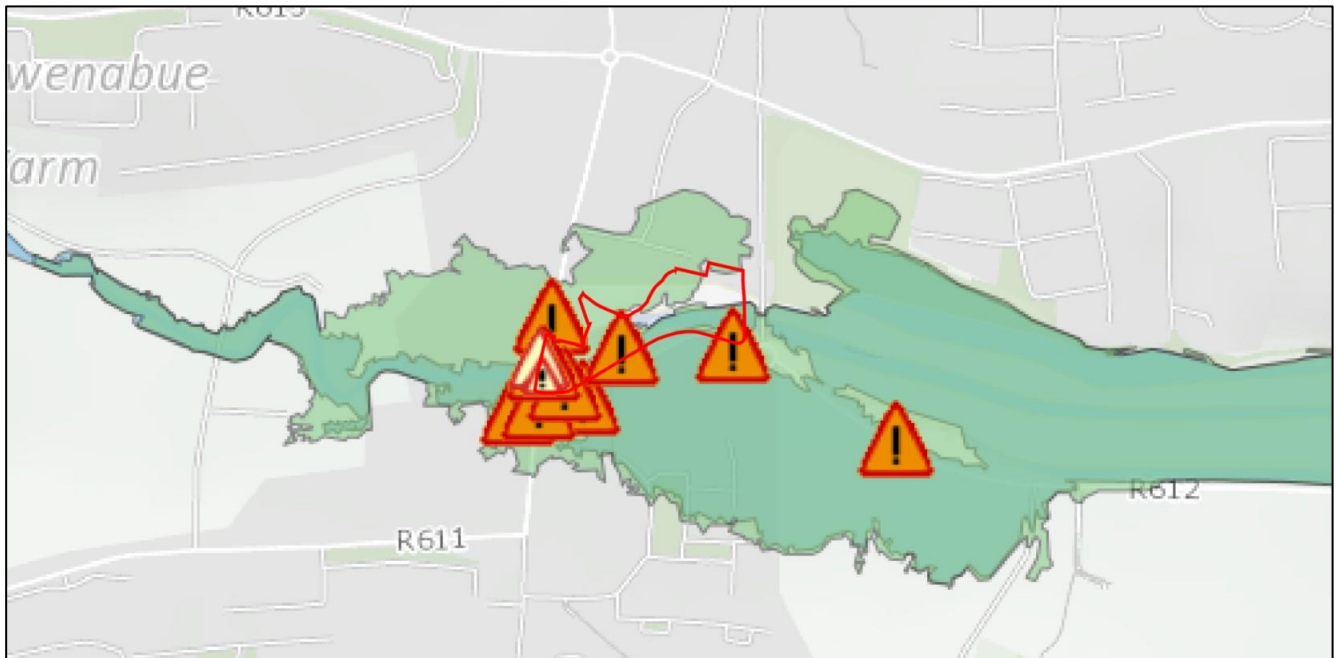


Figure 3-5 - Historic Flood Events

From the identified flooding sources available at the project site, it is observed that the main source of flooding is tidal. However, the recurring flooding event along the route R612 has a fluvial source from the River Owenabue. It is important to note that due to the project location near the River Owenabue estuary, both fluvial and tidal flooding events are possible.

According to a flood report dated 3rd February 2014, included as **Appendix C**, the cause of the flooding was due to tidal water and strong winds in the Lee Catchment on the River Owenabue. The Main Street and Strand Road (R612) are few of the various flooded locations mentioned, which stand outside the proposed development site. Figure 3-6 is an extract from the 2014 flood report showing the flooded locations mentioned above.

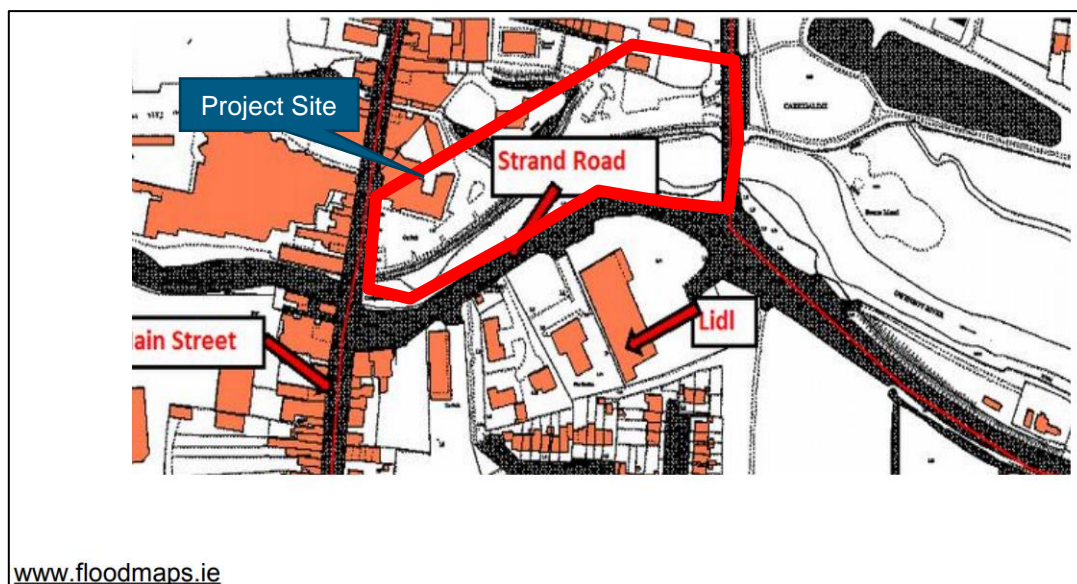


Figure 3-6 - February 2014 Flood Report Extract

3.1.4. Geological Survey of Ireland Mapping

The soils maps of Geological Survey of Ireland (GSI) were consulted to determine the presence of alluvium deposits in the vicinity of the site. Deposition of Alluvium deposits can be an indicator of areas which have flooded in the recent geological past.

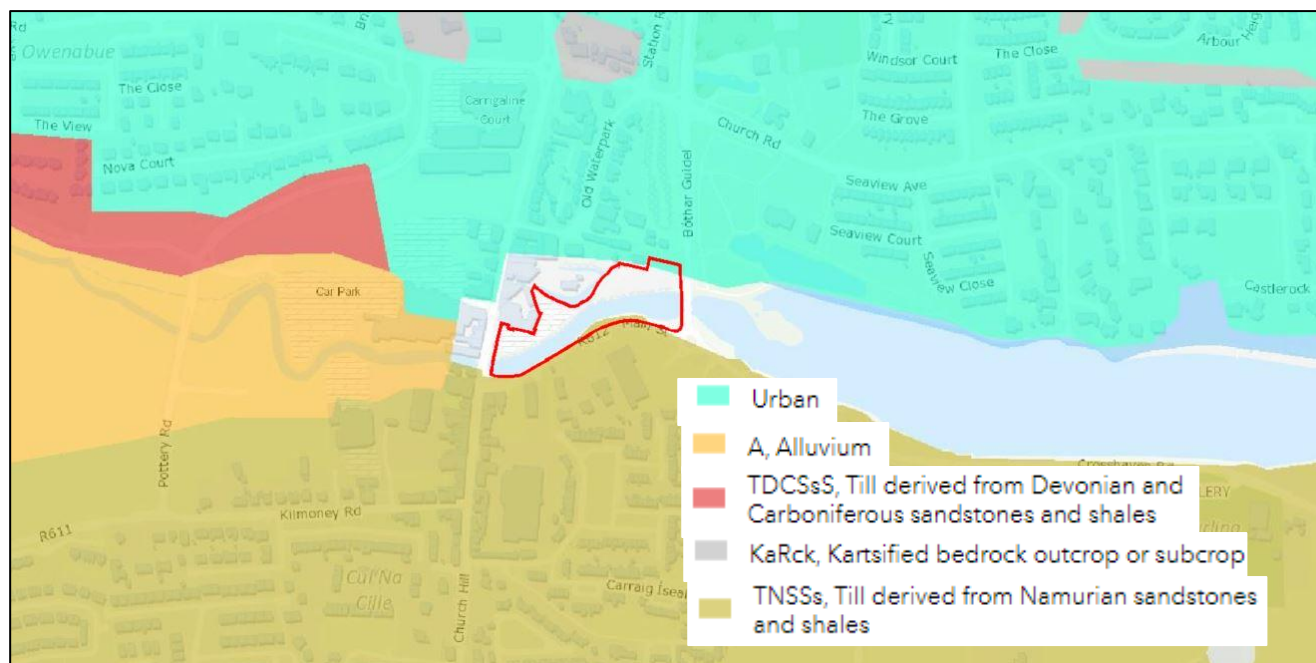


Figure 3-7 - GSI Soils Map

Figure 3-7 above shows the soils mapping for the proposed development site contains Till derived from Namurian sandstones and shales, Alluvium, Till derived from Devonian and Carboniferous sandstones and shales, and Urban area which does not indicate alluvium deposits within the proposed development site.

3.1.5. Ballincollig Carrigaline Municipal District Local Area Plan 2017

The Ballincollig Carrigaline Municipal District Local Area Plan (LAP) 2017 includes Flood Zones which cover the proposed development site. Figure 3-8, an extract from the LAP indicates the proposed development site to be inside Flood Zone A (1% Annual Exceedance Probability). This map was developed by taking the CFRAM programme and other Flood Schemes undertaken by OPW into account.

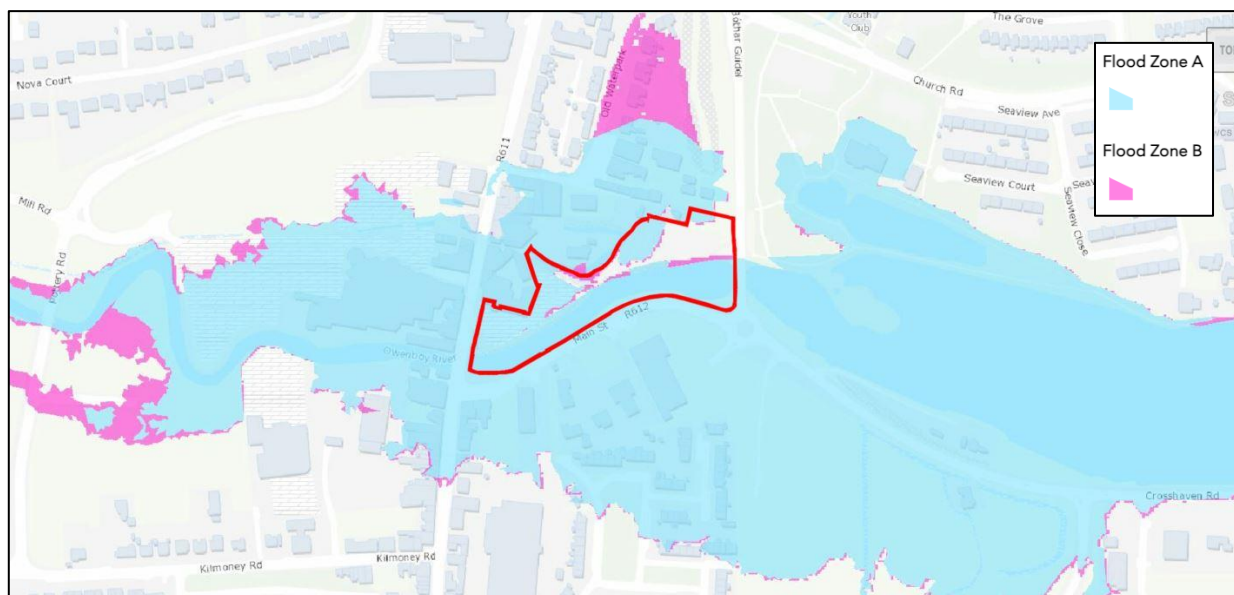


Figure 3-8 - LAP 2017 Flood Zones

3.1.6. Carrigaline Flood Relief Scheme

According to the latest OPW Flood Risk Management County Summary for Cork, the Carrigaline Flood Relief Scheme is under review to confirm the technical aspects and viability of the scheme.

3.2. Conclusion of Flood Risk Identification

The purpose of the Stage 1 Flood Risk Identification process is to establish whether a flood risk issue currently exists or may exist in the future. If a potential flood risk issue is identified the risk will be investigated in further detail by undertaking a Stage 2 – Initial Flood Risk Assessment. However, if no potential flood risk is identified then the overall assessment can conclude at this point.

In relation to the proposed development site, the basis of this Stage 1 – Flood Risk Identification findings discussed above in this report have identified that the proposed site location is within Flood Zone A according to the OPW Tidal Flood Map and the Ballincollig Carrigaline Municipal District LAP.

3.3. Recommendations


The possible displacement of water due to the raised levels and associated embankments of the proposed development site will require Stage 2 – Flood Risk Assessment to be carried out to determine any potential flood impact on the surrounding area.

4. Initial Flood Risk Assessment

In accordance with the planning guidelines, a *Stage 2 - Initial Flood Risk Assessment* is required to be undertaken to confirm the sources of flooding to the development site, to review the adequacy of existing information and to estimate the extents of possible flooding. The potential source identified to the proposed development at the initial flood risk stage is tidal flooding from the River Owenabue.


4.1. Assessment of Flood Levels

The maps from the OPW, Lee Catchment Flood Risk Assessment and Management Study, attached as **Appendix A** and **Appendix B**, have been examined further to ascertain the potential depth of flooding that may occur during a storm event. Figure 4-1 and Figure 4-2 are extracts from fluvial flood map and tidal flood map respectively.



Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 1%	WL 0.1%
1BOY_2550	4.10	4.25	4.41
1BOY_2376	3.39	3.63	3.77
1BOY_2248	3.03	3.23	3.43
1BOY_2020	2.67	2.88	3.13
1BOY_1823	2.42	2.59	2.85
1BOY_1630	2.31	2.43	2.73
1BOY_1494	2.29	2.41	2.66
1BOY_1381	2.29	2.41	2.65
1BOY_1213	2.28	2.40	2.64

Figure 4-1 - OPW Fluvial Flood Level Nodes



Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 0.5%	WL 0.1%
1BOY_2248	2.88	3.17	3.33
1BOY_2020	2.65	2.98	3.16
1BOY_1823	2.53	2.86	3.05
1BOY_1630	2.48	2.82	3.02
1BOY_1381	2.48	2.78	2.94
1BOY_1213	2.47	2.78	2.93

Figure 4-2 - OPW Tidal Flood Level Nodes

The nodes 1BOY_1494, 1BOY_1381, and 1BOY_1630 are the closest nodes, just south and west of the proposed development site. The water level for the 1% AEP current day scenario event is indicated as 2.43mOD in the fluvial flood map and 2.82mOD for 0.5% AEP in the tidal flood map.

Based on the topographical survey, the ground level across the site extents ranges from 3.85mOD to 2.16mOD. The ground level around River Owenabue is surrounded with railing on the north and east side and with wall on the west and south side. The ground levels on south side of the proposed development site are higher than the ground levels on the northern end. The higher levels close to River Owenabue restrict the flow of river water onto the proposed site and as the finished levels of the proposed site will remain as they are, it is therefore concluded that the proposed development is not at-risk flooding from the 1% AEP. However, the water level for the tidal flood is 2.82mOD which is 27mm higher than the footpath level 2.793mOD on the southern end of the proposed development which can be seen in Figure 4-3 below.

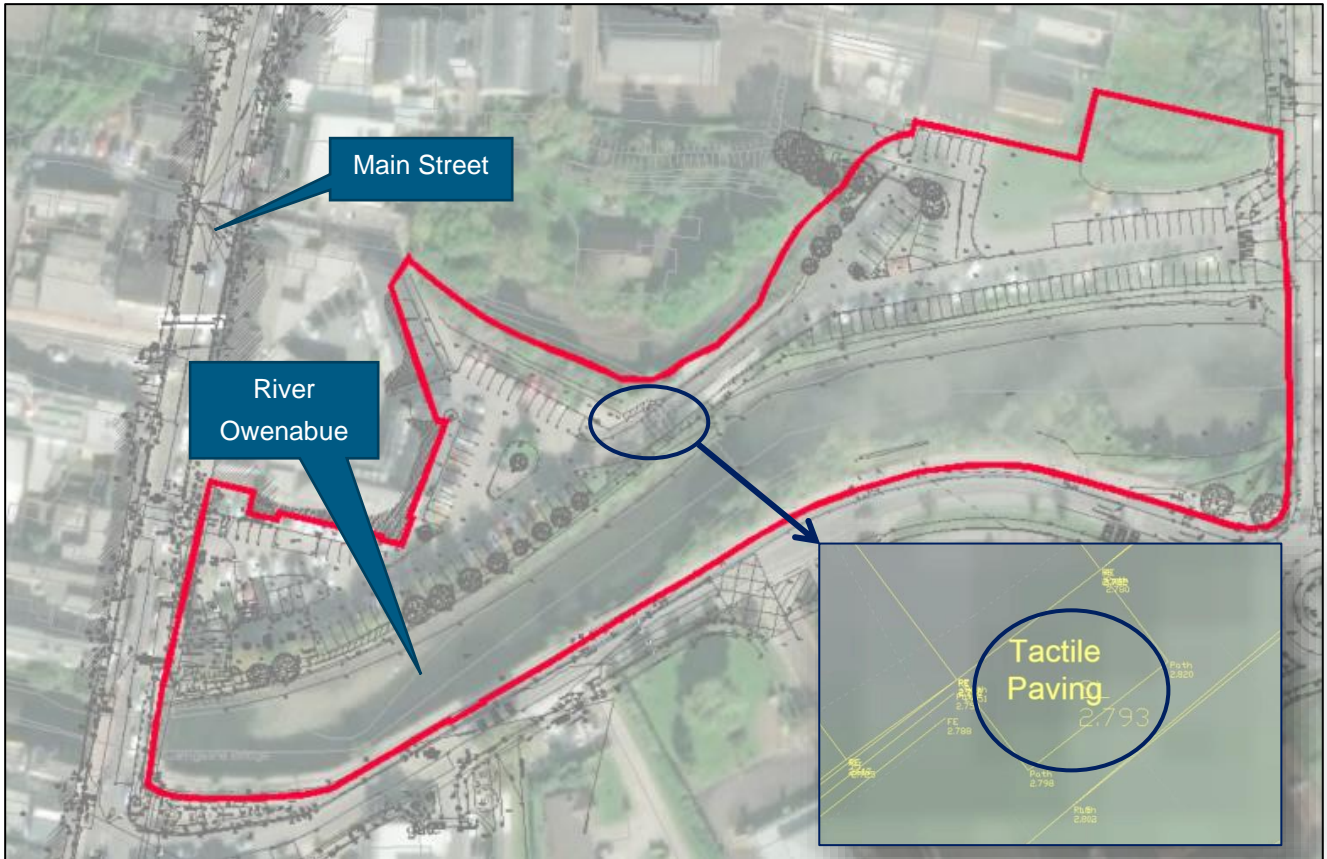


Figure 4-3 - Existing Topographical Level

The proposed development will have stepped bank on the northern side of River Owenabue which can be seen in Figure 4-4. The levels of the proposed Stepped Bank will be starting at the existing ground level (2.9mOD) and raised above, which can be seen in Figure 4-5 and Figure 4-6.

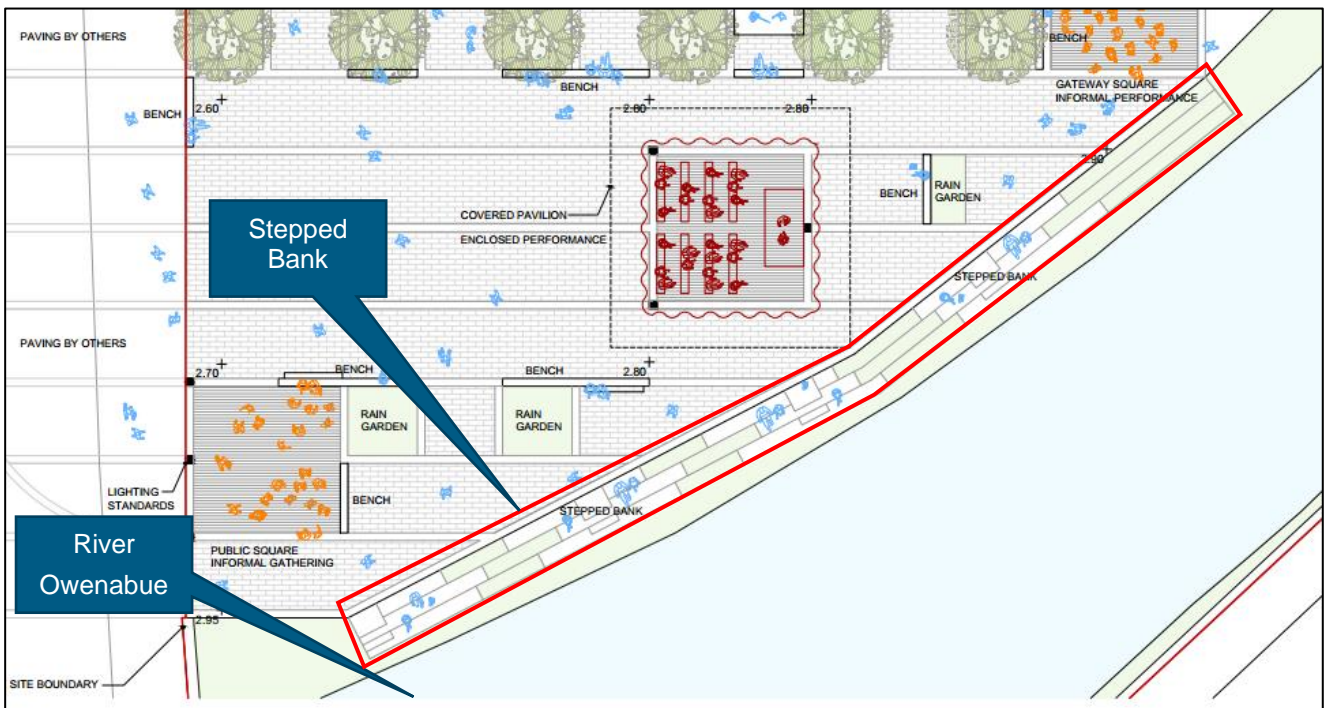


Figure 4-4 - Location of Stepped Bank

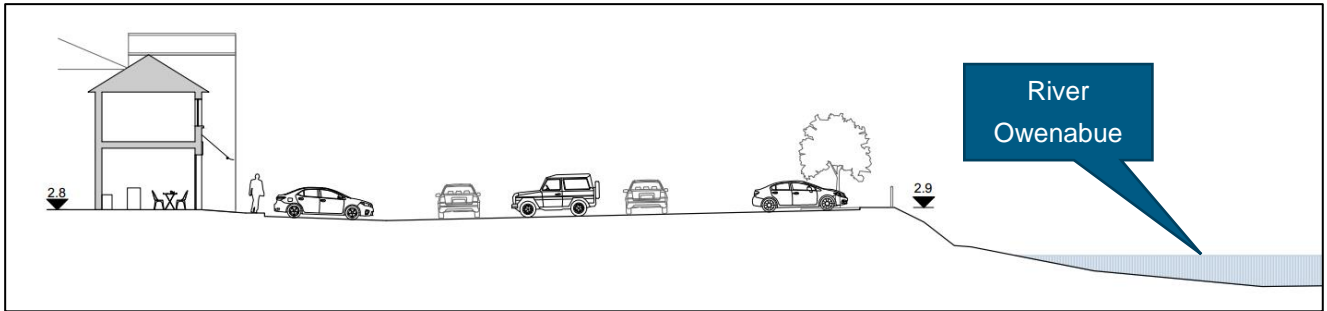


Figure 4-5 - Existing Ground Cross-Section

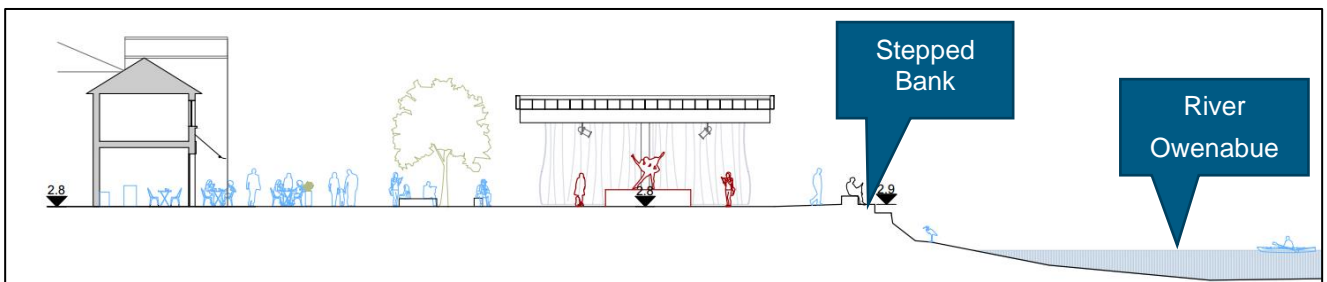


Figure 4-6 - Proposed Ground Cross-Section

The existing ground level (2.9mOD) around the proposed Stepped Bank is higher than the fluvial and tidal flood levels. The proposed Stepped Bank is located at higher level than the existing ground level, making it risk free zone from the fluvial and tidal flood events. The proposed location of the stepped bank will not have an increase in the hardstanding areas. Also, there will be no loss in flood plain due to the proposed stepped bank, as a result, there will no increase of flood risk to the surrounding environs.

4.2. Application for Flood Risk Management Guidelines

4.2.1. Classification of proposed Development

The proposed development is used for transportation for vehicles, cyclist, and pedestrians. As a result, this development land use shall be categorised under ‘amenity open space’ which is classified as a ‘water compatible development’ as per the vulnerability classification in the planning guidelines in Figure 4-7.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children’s homes and social services 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 generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO 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 short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste 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, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside 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).
*Uses not listed here should be considered on their own merits	

Figure 4-7 - Vulnerability Classification

Table 4-1 illustrates the types of development that would be appropriate to each flood zone and those that would be required to meet the justification test.

Table 4-1 - Matrix of Development Vulnerability and Flood Zones

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

4.3. Conclusion of Initial Flood Risk Assessment

In relation to the River Owenabue and the proposed development, the proposed levels for the development were compared against the 1 in 100-year fluvial flood event and the 1 in 200-year tidal flood event, it was observed that the levels on the proposed development are higher than the fluvial flood level and 27mm lower than the tidal flood level.

Based on the Stage 2-*Initial Flood Risk Assessment* findings discussed above (section 4.2), as the proposed development falls under the category of amenity open space and it is classified as a water-compatible development under the vulnerability class. Therefore, the flood risk study shall not require a justification test as per Table 4-1.

5. Conclusion and Recommendation

5.1. Conclusion

Atkins were commissioned by Cork County Council to prepare a Flood Risk Assessment (FRA) as part of providing Engineering-led Multi-disciplinary Consultancy and Design services for the associated works in the Carrigaline UDF and Public Realm.

The Carrigaline UDF and Public Realm is classified as a “water compatible development” as per the planning guidelines.

Based on the Stage 1-*Flood risk identification* findings, the proposed site was identified as being potentially at risk of tidal flooding from the River Owenabue, and therefore a Stage 2-*Initial Flood Risk Assessment* was required.

In relation to the proposed development, the levels of proposed development are higher than the 1 in 100-year fluvial flood event (1% AEP) and 27mm lower than the 1 in 200-year tidal flood event (0.5% AEP). Also, as the proposed development is a water compatible development, no justification test is required.

It is deemed that all criteria of the Stage 2 have been addressed and satisfied and therefore a Stage 3-Flood Risk Assessment is not required.

5.2. Recommendations

The following recommendations should be considered;

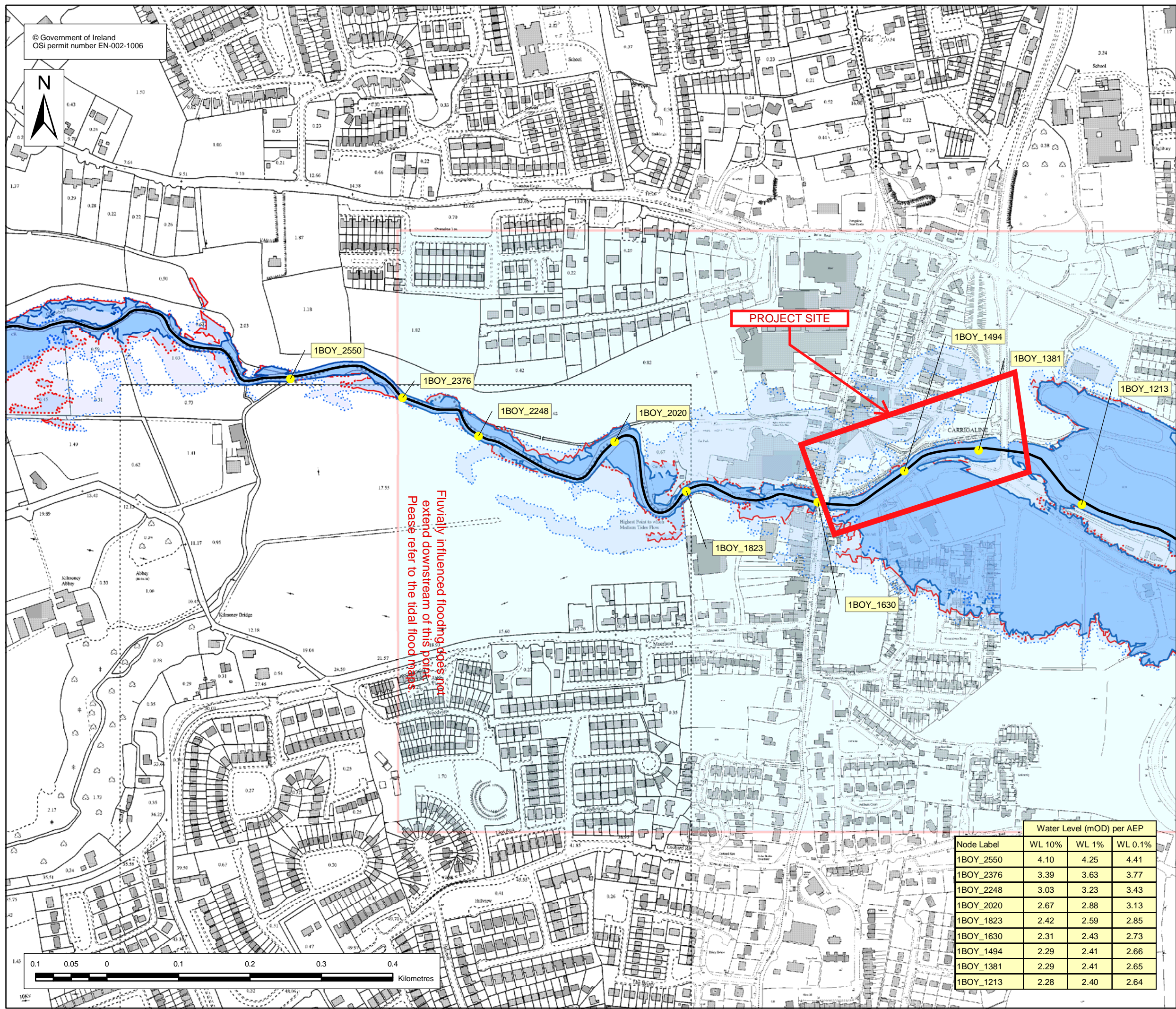
- The design for the proposed storm-water drainage is to take into consideration all other standards for drainage design, from the ‘*Greater Dublin Strategic Drainage Study Volume 2 – New Developments.*’
- The final detail design of the proposed development is to ensure that the proposed ground levels should remain as a minimum at the same level of the existing ground levels in order to avoid any impact on the surrounding areas.

Appendices

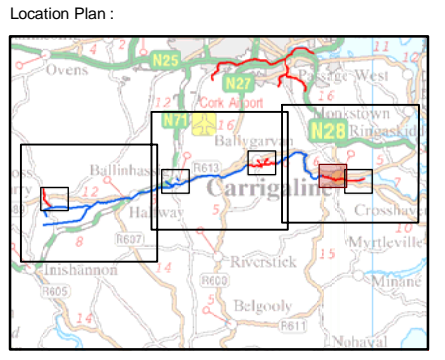


Appendix A. OPW Fluvial Flood Map

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OSi permit number EN-002-1006



Fluvially influenced flooding does not extend downstream of this point. Please refer to the tidal flood maps.



EXTENT MAP

- Legend:
- 10 % AEP Flood Extent (1 in 10 chance in any given year)
 - 1 % AEP Flood Extent (1 in 100 chance in any given year)
 - 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
 - High Confidence (<20m) (10% AEP)
 - Medium Confidence (<40m) (10% AEP)
 - Low Confidence (>40m) (10% and 0.1% AEP)
 - High Confidence (<20m) (1% AEP)
 - Medium Confidence (<40m) (1% AEP)
 - Low Confidence (>40m) (1% AEP)
 - River Centreline
 - Node Point
 - 1BOY_1630 Node Label (refer to table)

USER NOTE :
USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

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Ireland

Project :
LEE CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Map :
CARRIGALINE

Map Type : FLOOD EXTENT

Source : FLUVIAL FLOODING

Map area : URBAN AREA

Scenario : CURRENT

Figure By : Valeria Medina Date : 21 June 2012

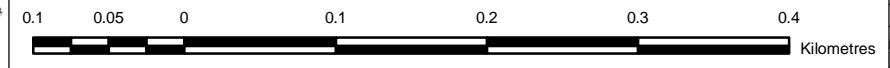
Checked By : Paul Dunne Date : 21 June 2012

Approved By : Clare Dewar Date : 21 June 2012

Figure No. : M1/UA/EXT/CURS/004 Revision : 1

Drawing Scale : 1:5,000 Plot Scale : 1:1 @ A3

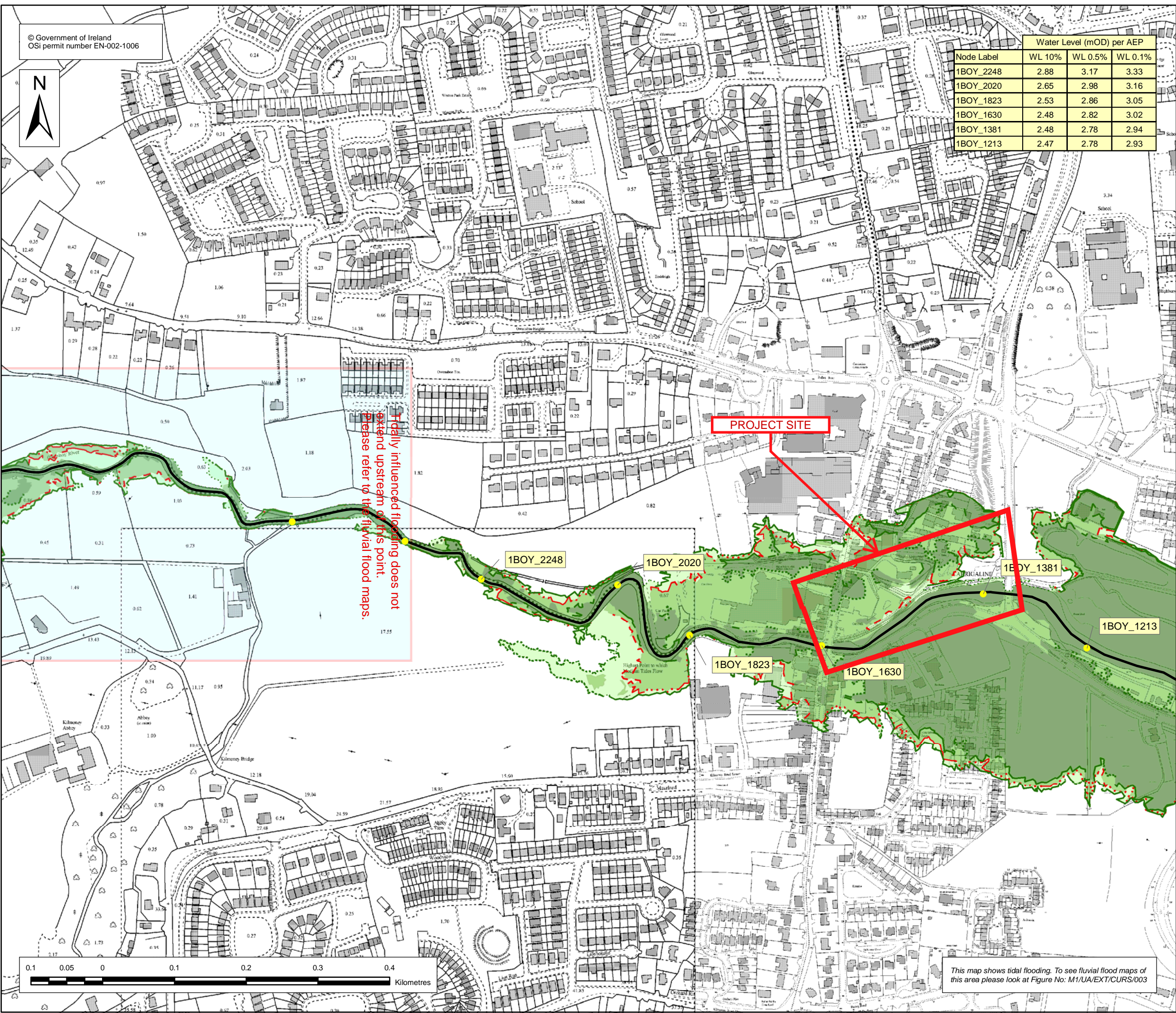
Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 1%	WL 0.1%
1BOY_2550	4.10	4.25	4.41
1BOY_2376	3.39	3.63	3.77
1BOY_2248	3.03	3.23	3.43
1BOY_2020	2.67	2.88	3.13
1BOY_1823	2.42	2.59	2.85
1BOY_1630	2.31	2.43	2.73
1BOY_1494	2.29	2.41	2.66
1BOY_1381	2.29	2.41	2.65
1BOY_1213	2.28	2.40	2.64



Appendix B. OPW Tidal Flood Map

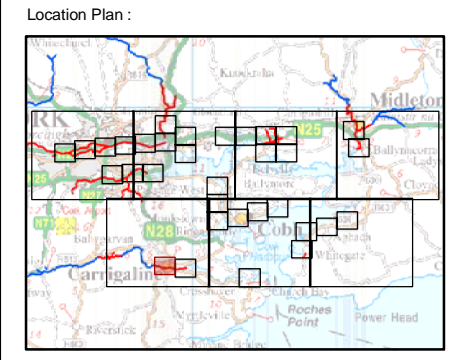


Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 0.5%	WL 0.1%
1BOY_2248	2.88	3.17	3.33
1BOY_2020	2.65	2.98	3.16
1BOY_1823	2.53	2.86	3.05
1BOY_1630	2.48	2.82	3.02
1BOY_1381	2.48	2.78	2.94
1BOY_1213	2.47	2.78	2.93



Tidally influenced flooding does not extend upstream of this point. Please refer to the fluvial flood maps.

PROJECT SITE



EXTENT MAP

- Legend:
- 10 % AEP Flood Extent (1 in 10 chance in any given year)
 - 0.5 % AEP Flood Extent (1 in 200 chance in any given year)
 - 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
 - Defended area
 - High Confidence (<20m) (10% AEP)
 - Medium Confidence (<40m) (10% AEP)
 - Low Confidence (> 40m) (10% and 0.1% AEP)
 - High Confidence (<20m) (0.5% AEP)
 - Medium Confidence (<40m) (0.5% AEP)
 - Low Confidence (>40m) (0.5% AEP)
 - River Centreline
 - Node Point
 - Node Label (refer to table)

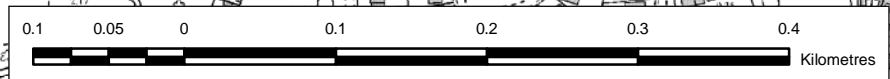
USER NOTE :
USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

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Map area : URBAN AREA	Scenario : CURRENT
Figure By : Valeria Medina	Date : 21 June 2012
Checked By : Paul Dunne	Date : 21 June 2012
Approved By : Clare Dewar	Date : 21 June 2012
Figure No. : M9/UA/EXT/CURS/027	Revision 1
Drawing Scale : 1:5,000	Plot Scale : 1:1 @ A3

This map shows tidal flooding. To see fluvial flood maps of this area please look at Figure No: M1/UA/EXT/CURS/003



Appendix C. 2014 Flood Event Report

Flooding at Carrigaline Co. Cork on 3rd. February 2014

The information contained in this report has been extracted from 4 Flood Data Collection Forms submitted to The Office Of Public Works (OPW) by Cork County Council.

- **Location and date of flood event:**

Locations: Main Street, Strand Road, Ballea Road and the Crosshaven Road, Carrigaline Co. Cork.

National Grid Reference:

Irish Grid Co-ordinates – 173,390 62,270

This flooding event started on 3rd. February 2014 and ended on 5th. February 2014.

- **Source and cause:**

Flooding was caused by High Tidal Water and strong winds in the Lee Catchment on the Owenboy River.

Flooding was caused by a combination of south-easterly winds and high tides. Flooding occurred from Monday morning 03rd February to Tuesday evening 04th February. Flooding occurred at various locations along the Ballea Road (R613), the worst location being at the Ballea Bridge (Lower) (see map)

Flooding was at various locations along the Crosshaven Road. The worst affected areas were between Lidl and the new Kilnagleary Road (L7300) and from Frenchfurze Cross Roads (R612) heading east (towards Crosshaven) for approximately 1.5km (see map). There were depths of 13 to 15 inches.

- **Flood data:**

The following flood information was provided:

Flood Parameter	Max Value	Typical Value	Comments
Flood Level (metres OD Malin)			
Flood Depth (metres)			
Main Street	0.2m		Approx. 8 inches deep in places on Main Street. 12inches at deepest at Ballea Bridge (Lower) Approx. 12 inches at deepest (outside Lidl)
Ballea Road	0.3m		
Strand Road	0.3m		

Crosshaven Road	0.375m		Approx. 13 to 15 inches deep at various locations along Crosshaven Road
Flood Flow (m ³ /s)			
Flood Velocity (m/s)			

Flooding has occurred at these locations before.
Flood frequency is occasional depending on tides and winds

- **Impacts of flooding event:**

It was recorded that this flooding event had the following impacts.

Impacts to people: There was no loss of life or no serious injuries were incurred.

Impacts to property:

No properties were affected by the flooding on Ballea Road.

No properties were affected by the flooding on Strand Road.

1 Commercial Premises on Main Street was affected – Rosie's Pub – approx 6 to 8 inches inside.

No properties were affected by the flooding on the Crosshaven Road,

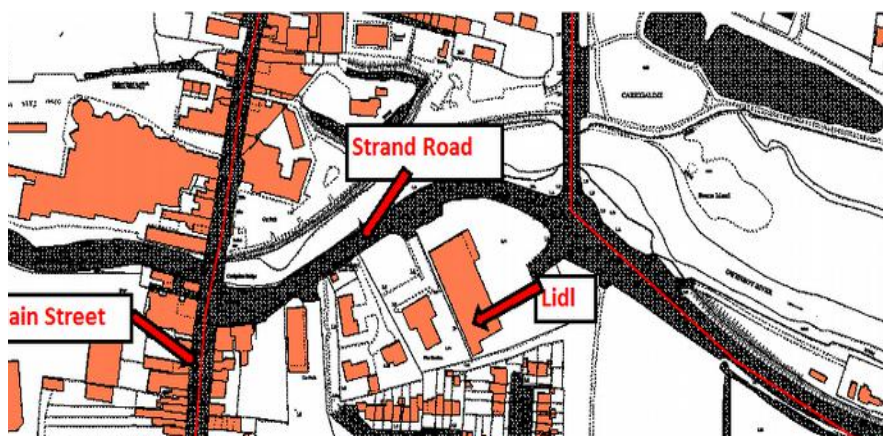
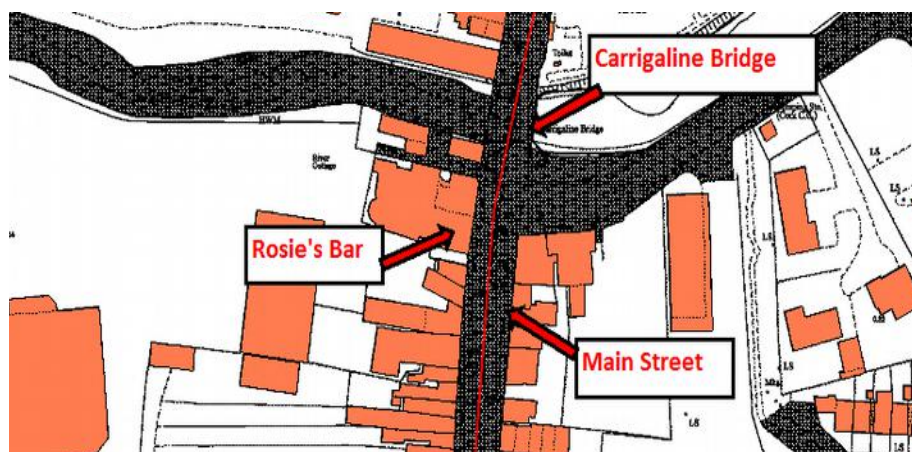
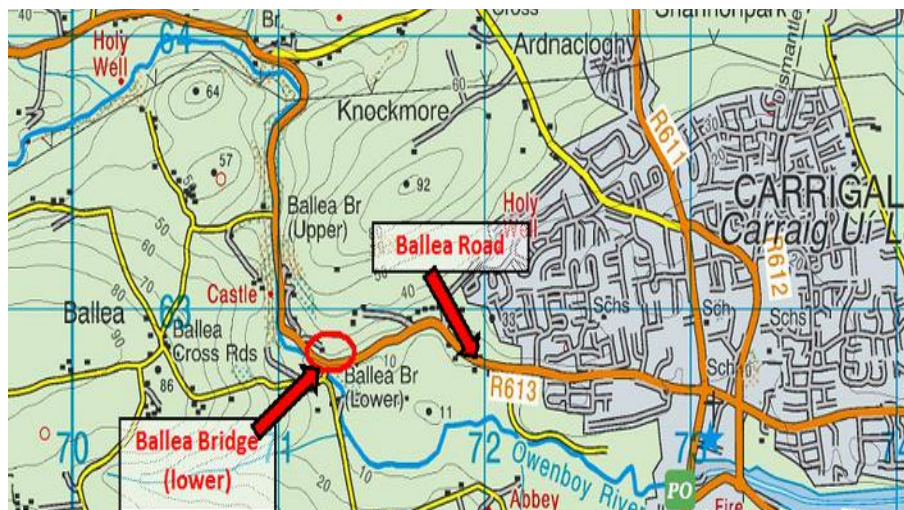
Impacts to transport infrastructure:

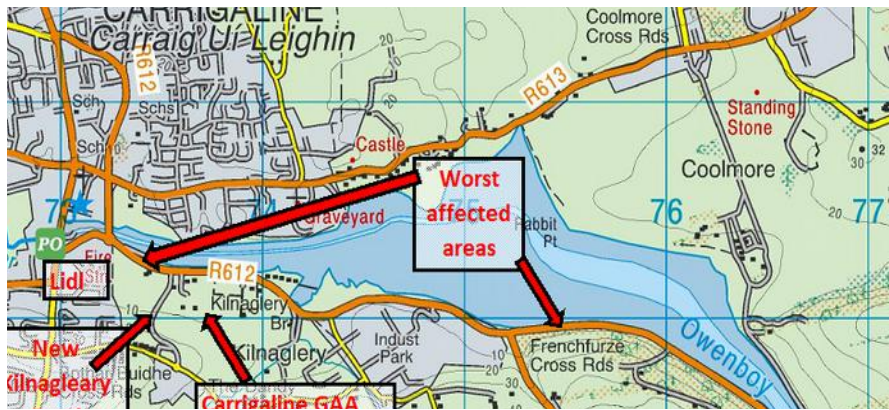
Roads – 200ms of the R613 was affected. Approx 12 inches deep at lowest point in road at Ballea Bridge (lower)

100ms of the L2547 – Flooding occurred at various places along the Strand Road.

50ms of the R611 was affected outside Rosie's Pub near Carrigaline Bridge.

2 Kms. Of the R612 was affected. Lidl to new Kilnagleary Road and GAA pitch. Frenchfurze Cross Roads heading east (towards Crosshaven) for approx. 1.5km. Also flooding at other various locations along R612.





Crosshaven Road

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