

Flood Risk Assessment

Garristown Library, Garristown, Co.
Dublin

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1 INTRODUCTION

1.1 Terms of Reference

This Stage 1 Flood Risk Assessment report was commissioned by Fingal County Council to assess the potential risk of flooding at Garristown Library, Garristown, Co. Dublin (hereafter referred to as 'the site').

1.2 Statement of Authority

This report and assessment has been prepared and reviewed by qualified professionals with appropriate experience in the fields of flood risk, drainage, wastewater, and hydraulic modelling studies. The key staff members involved in this project are as follows:

- Duncan Hartwick *BEng (Hons) BSc (Hons) MIEI* – Project Engineer with experience in flood risk assessment, hydrogeology, and surface water drainage.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Chartered Civil / Environmental Engineer with particular experience in drainage, SuDS and flood risk assessment, and a recognised industry professional having given industry training in these fields in Ireland and the UK.
- Kyle Somerville *BEng (Hons) CEng MIEI* – Associate and Chartered Engineer specialising in the fields of flood risk assessment, flood modelling, drainage, and surface water management design for public and private sectors.

1.3 Purpose

This assessment is intended to produce a screening FRA to ensure that all relevant issues related to flooding are identified. This Stage 1 FRA will assess whether there are any flooding and / or surface water management issues at and surrounding the site.

The assessment will therefore determine potential sources of flooding at the site and outline recommended mitigation and further work where necessary / appropriate.

1.4 Approach to the Assessment

Consideration has been given to the sources and extent of all potential sources of flooding at the site, including fluvial, pluvial, urban drainage, and groundwater flooding.

The method of assessment applied complies with the Source-Pathway-Receptor model and provides a spatial assessment of flood risk to people, property, and the environment at the site. Existing runoff characteristics and the risk of flooding from surface water drainage are also considered.

1.4.1 Hydraulic Model Status

For the purposes of this assessment, the primary stakeholders are the Office of Public Works (OPW) and Fingal County Council (FCC). OPW and FCC data has been used to form the basis of this assessment and is presented in line with the relevant guidance and requirements.

The site and surrounding area are included in the Preliminary Flood Risk Assessment (PFRA), which was the first phase of the OPW's CFRAM Programme. The PFRA involved national-scale flood mapping based on available or readily derivable information and was undertaken to identify areas of potentially significant flood risk (referred to as Areas for Further Assessment). As such, the PFRA mapping is considered coarse and was designed to inform further phases in the CFRAM process.

1.4.2 Planning Guidelines

The requirements for Flood Risk Assessments are generally as set out in the OPW's The Planning System and Flood Risk Management – Guidelines for Planning Authorities, 2009 (hereafter referred to as the 'OPW Guidelines') and accompanying Technical Appendices. Further guidance is provided in the OPW's Climate Change Sectoral Adaptation Plan, 2019, and CIRIA Research Project 624 Development and Flood Risk – Guidance for the Construction Industry, 2004.

Planning guidelines applicable to the area of interest are implemented in the Fingal Development Plan 2017-2023, specifically through the Strategic Flood Risk Assessment for the Fingal Development Plan 2017-2023 (hereafter referred to as “the SFRA”).

The SFRA was prepared in accordance with the requirements of the OPW Guidelines and adopts an identical Flood Zone standard. Flood Zones are the extents of a design flood event that determine whether development is appropriate from a flood risk point of view. They are defined in both the OPW Guidelines and SFRA as follows:

- Flood Zone A - where the 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 - where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 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).
- Flood Zone C - where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding).

The SFRA clarifies that Flood Zones are to be used to determine suitability of proposed development and are to be derived from ‘present day’ hydrological estimates. The SFRA also states that Flood Zones are generated without the inclusion of climate change and that in addition to flood zoning, developments should be designed to be resilient to the effects of climate changes.

The OPW Guidelines state that the purpose of Stage 1: Flood Risk Identification is “*to identify whether there may be any flooding or surface water management issues relating to a plan area or proposed development site that may warrant further investigation*”. If a Stage 1 FRA identifies potential flood risk issues at the site, a Stage 2 and / or Stage 3 FRA is recommended and should be carried out. If no potential flood risk is identified, the process can end at Stage 1.

2 DEVELOPMENT AND SITE DETAILS

2.1 Site Location

Figure 2.1 Location Context



Figure 2.2: Site Location



2.2 Site Description

The area under consideration is situated on the R130 public road in Garristown, Co. Dublin. Existing site characteristics are as follows:

- Open amenity space adjacent to the Garristown Library
- Pedestrian access is via the R130 at the west of the site
- Site levels fall from north-west to south-east across the site and range from approximately 126.4 to 124.6 metres Ordnance Datum (mOD).

2.3 Development Proposals

The proposed development that this assessment is intended to support is described as follows:

- Landscape Development Project for a Garden incorporating a Public Play Space at Garristown Library, Garristown, Co. Dublin

2.4 Vulnerability Classification

The proposed development comprises open amenity space with vulnerability classification (per the classification criteria provided in Table 2.1 of the OPW Guidelines) as follows:

Table 2.1: Vulnerability Classification

Part	Use	Classification
Proposed Development	Open Amenity Space	Water-Compatible Development

3 BACKGROUND INFORMATION REVIEW

As part of the data collection phase for this assessment, several available sources of information generally as set out in the OPW Guidelines were investigated to build an understanding of the potential risk of flooding to the site. The following review highlights the key findings of the background information review.

3.1 Fingal Development Plan 2017-2023

The Fingal Development Plan 2017-2023 has been reviewed as part of this assessment and the following objectives are considered pertinent to this Stage 1 FRA:

- Objective GI30 – Ensure the provision of new green infrastructure addresses the requirements of functional flood storage, the sustainable management of coastal erosion, and links with provision for biodiversity, Sustainable Drainage Systems (SuDS) and provision for parks and open space wherever possible and appropriate.
- Objective GI31 – Seek the creation of new wetlands and/or enhancement of existing wetlands through provision for Sustainable Drainage Systems (SuDS).
- Objective GI32 – Seek the provision of green roofs and green walls as an integrated part of SuDS and which provide benefits for biodiversity, wherever possible.

3.1.1 [Strategic Flood Risk Assessment for the Fingal Development Plan 2017-2023](#)

The SFRA for the Fingal Development Plan 2017-2023 outlines the following relevant guidance:

- Existing flood mapping, including OPW PFRA maps, are considered appropriate for use as a strategic overview of flood risk within the county (i.e., in most cases, not suitable for site-specific applications).
- Flood Zones (as outlined in Section 1.4.2) are generated without the inclusion of climate change factors and should ignore flood defences.
- A precautionary approach to climate change includes recommendations to ensure that levels of structures designed to protect against flooding (such as flood defences or raised floor levels) are sufficient to cope with the effects of climate change over the lifetime of the development.
- The minimum finished floor level (FFL) for highly vulnerable development should be above the Flood Zone B level plus suitable freeboard, whereby the recommended level of freeboard is 500 mm over and above the adjacent Flood Zone B fluvial flood level.
- The minimum FFL for less vulnerable development should be above the Flood Zone A level plus suitable freeboard, whereby the recommended level of freeboard is 500 mm over and above the adjacent Flood Zone A fluvial flood level.

3.2 Published Office of Public Works Information

3.2.1 [Preliminary Flood Risk Assessment Maps](#)

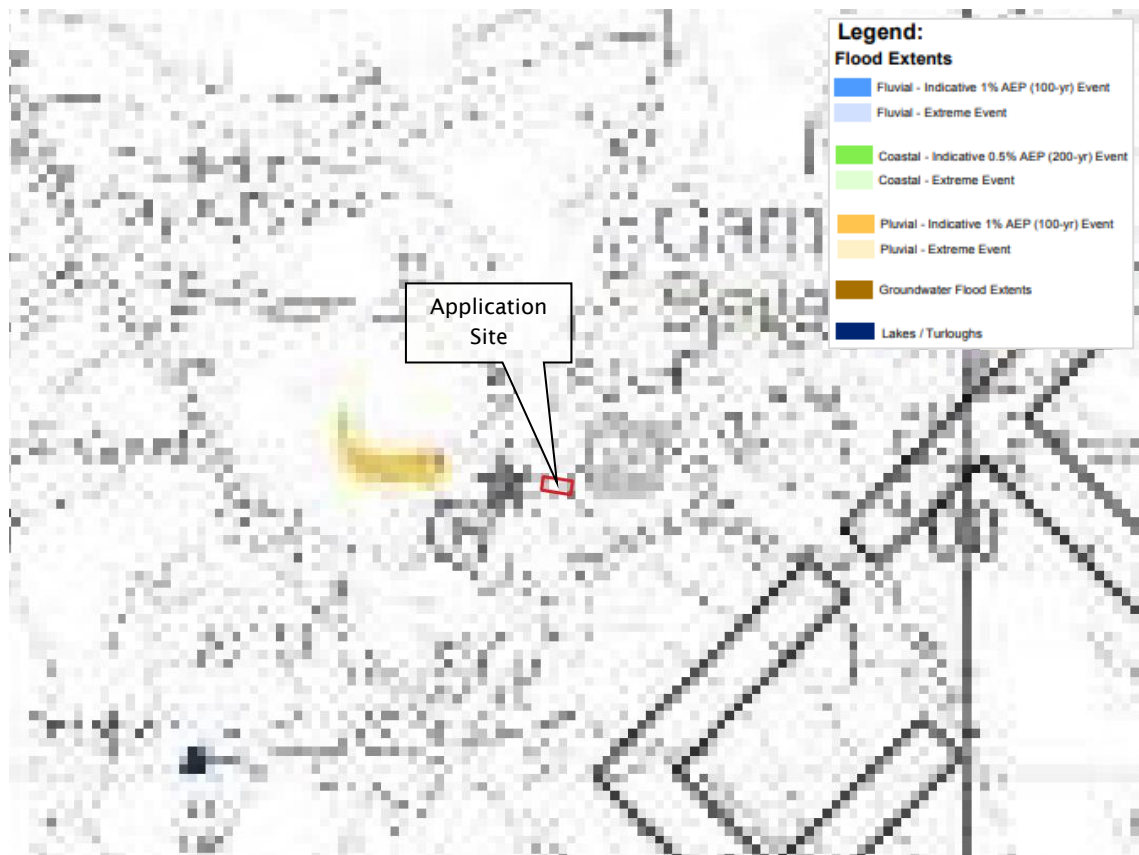
The OPW have developed flood maps as part of the Catchment Flood Risk Assessment and Management (CFRAM) Programme.

The first stage of the CFRAM process involved a Preliminary Flood Risk Assessment (PFRA) that included flood mapping for the entire country. The PFRA is only a preliminary assessment based on available or readily derivable information. The analysis was undertaken to identify areas prone to flooding to inform further stages in the CFRAM process.

The PFRA indicative flood mapping indicates that the site is not at risk of flooding from any source. It should however be noted that the PFRA mapping is considered coarse and the analysis purely indicative.

An extract from the above referenced flood mapping is shown in Figure 3.1. A copy of the original PFRA map is included in Appendix A.

Figure 3.1: OPW PFRA Flood Map



3.2.2 Past Flood Events

OPW 'Past Flood Event' mapping (available through floodmaps.ie) indicates no records of historic flooding in the vicinity of the site.

3.3 Internet / Media Background Search

An internet / media search found no evidence of flooding at or in the vicinity of the site.

4 ASSESSMENT OF FLOOD MECHANISMS

4.1 Preamble

Development control procedures advise against inappropriate development in areas at risk of flooding and aim to avoid new development that increases flood risk elsewhere, in accordance with the OPW Guidelines.

The following assessment determines the flood hazards to life and property at the site in order to subsequently assess the site relative to the OPW Guidelines.

4.2 Initial Assessment

Table 4.1 presents a screening assessment of the site for potential flooding mechanisms requiring further detailed assessment. It is based on the background information review and consultations.

Table 4.1: Possible Flooding Mechanisms

Source/Pathway	Significant?	Reason
Fluvial Flooding	No	OPW PFRA flood mapping indicates that the site is not in an area at risk of fluvial flooding. No watercourses considered as part of OPW flood mapping exist in the vicinity of the site.
Coastal / Tidal Flooding	No	OPW PFRA flood mapping indicates that the site is not in an area at risk of coastal flooding.
Urban Drainage	Possible	No indication of urban drainage flooding / sewer incapacity was identified in an initial evidence search, although there is drainage infrastructure serving existing developments is located in the vicinity of the site.
Surface Water Flooding	Possible	OPW PFRA flood mapping indicates that the site is not in an area at risk of surface water flooding. The site is at a lower elevation than adjacent developments.
Groundwater	No	OPW PFRA mapping indicates that the site is not in an area at risk of groundwater flooding. Due to the site topography, there are no areas that would cause impoundment of groundwater.
Reservoirs / Canals / Artificial Sources	No	There are no impoundments or reservoirs in close proximity to or that drain towards the site.

Flooding mechanisms screened as being significant or possibly significant and requiring further assessment have been assessed further in the following sections.

Mitigation of flood hazards, where required, is detailed in Section 5.2.

4.3 Urban Drainage

Sewer infrastructure is known to serve existing commercial and residential developments in the vicinity of the site. No records of local drainage have been provided as part of this assessment.

Lands to the north and east of the site are at a similar or lower elevation. Surcharging / flooding from urban drainage in those areas would therefore not flow towards the site.

Out-of-sewer flooding originating from lands to the south and west of the site would cause water to flow in the direction of the site. However, limited flows originating from these areas would be likely to follow the lower-lying, preferential flow path of the adjacent R130 Main Street and not impact the site.

Therefore, in the context of the proposed 'water-compatible' development, the risk of urban drainage flooding is considered to be low.

4.4 Surface Water (Pluvial) Flooding

4.4.1 Pluvial Flooding onto the Site

As stated in Section 4.3, lands to the north and east of the site are at a similar or lower elevation. Surface water runoff from these areas would therefore not be directed towards the site.

While available flood mapping does not show the site at risk from pluvial flooding, surface water originating from the south and west of the site, if not intercepted by local drainage, would flow in the direction of the site. However, as with urban drainage failure, flows would be likely to follow the lower-lying, preferential flow path of the adjacent R130 Main Street and not impact the site.

Therefore, the site is not considered to be at risk of pluvial flooding originating from surrounding lands.

4.4.2 Pluvial Flooding from the Site

The site is unlikely to be subject to any increase in impermeable areas, meaning it will not cause an increase in flood risk elsewhere.

However, any change in impermeable area at the site would require mitigation by means of an effective surface water drainage network and surface water management, as discussed in Section 5.2.

5 SUMMARY OF FINDINGS AND RECOMMENDATIONS

5.1 Summary of Findings

The site is not considered to be at significant risk of flooding from any source.

In relation to Flood Zones as defined by the OPW Guidelines, the initial assessment suggests that the site is within Flood Zone C. As such, proposed development at the site will not cause an increase in flood risk elsewhere.

5.2 Design Requirements

The following section details measures incorporated within the proposal submitted in support of the planning application and to be further developed in any detailed design or variation post-determination of the planning application.

5.2.1 [Land Use](#)

This assessment demonstrates that the site is not at risk of flooding from any source and will not cause an increase flood risk elsewhere. All proposed development is sited in Flood Zone C, so there is no policy-based restriction on land use within the site boundary.

Notwithstanding, it is noted that the proposed development is considered 'water compatible' and is therefore appropriate in Flood Zone A.

5.2.2 [Design Levels](#)

The SFRA and OPW Guidelines require freeboard to be applied to relevant design flood levels when setting Finished Floor Levels (FFLs) and Finished Ground Levels (FGLs). Generally, freeboard is applied to Flood Zone A and Flood Zone B levels, although this does not apply to this site. Therefore, the following are to be considered during development of detailed design for the site:

- FGLs should be designed such that ground falls away from built development.
- Where adjacent ground unavoidably falls towards a building, drainage design should ensure that water is diverted away from the structures.

5.2.3 [Access Levels](#)

In accordance with the OPW Guidelines, access to and egress from the development should be within Flood Zone C (i.e., outside the 0.1% AEP fluvial flood extents).

It has been determined that the site is wholly in Flood Zone C, so safe access to and egress from the proposed development will be possible during an extreme flood event.

5.2.4 [Drainage Design](#)

Surface water drainage design should be per the requirements of the Fingal Development Plan 2017-2023 and to the standards of the Fingal County Council Water Services Department.

The Fingal Development Plan 2017-2023 states that it is an objective to incorporate and promote the use of Sustainable Urban Drainage Systems (SuDS), and that these are to be designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

SuDS components, including but not limited to green roofs, rain harvesting, permeable pavement, infiltration trenches, and soakaways, should be considered in relation to the nature and character of the site. The type of SuDS deemed suitable for the site will be subject to outline and detailed design. The SuDS design should demonstrate how water quantity and quality are dealt with as well as make provision for amenity and biodiversity, where practicable.

Drainage design is to be carried out by others and submitted separately at a later stage.

5.3 Maintenance Requirements

5.3.1 Drainage System Maintenance

The owner / occupier(s) shall be responsible for maintenance of drainage networks at the site and ensure that maintenance of the drainage system is provided for. The detailed drainage layout for the site shall ensure that key SuDS features requiring maintenance are situated in accessible public locations.

Maintenance plans for drainage assets should include (where applicable):

- Cyclical (min. annual) check of all surface water drainage features – in particular, clearing of debris.
- Cyclical (min. annual) visual inspection of any surface or underground features – blockages and obstructions to be removed by jetting, as required.

5.4 Summary of Flood Risk and Mitigation

Table 5.1 summarises the mechanisms of flooding identified by this study and their associated hazards / consequence (per the OPW Guidelines) as well as proposed measures to mitigate the predicted risk.

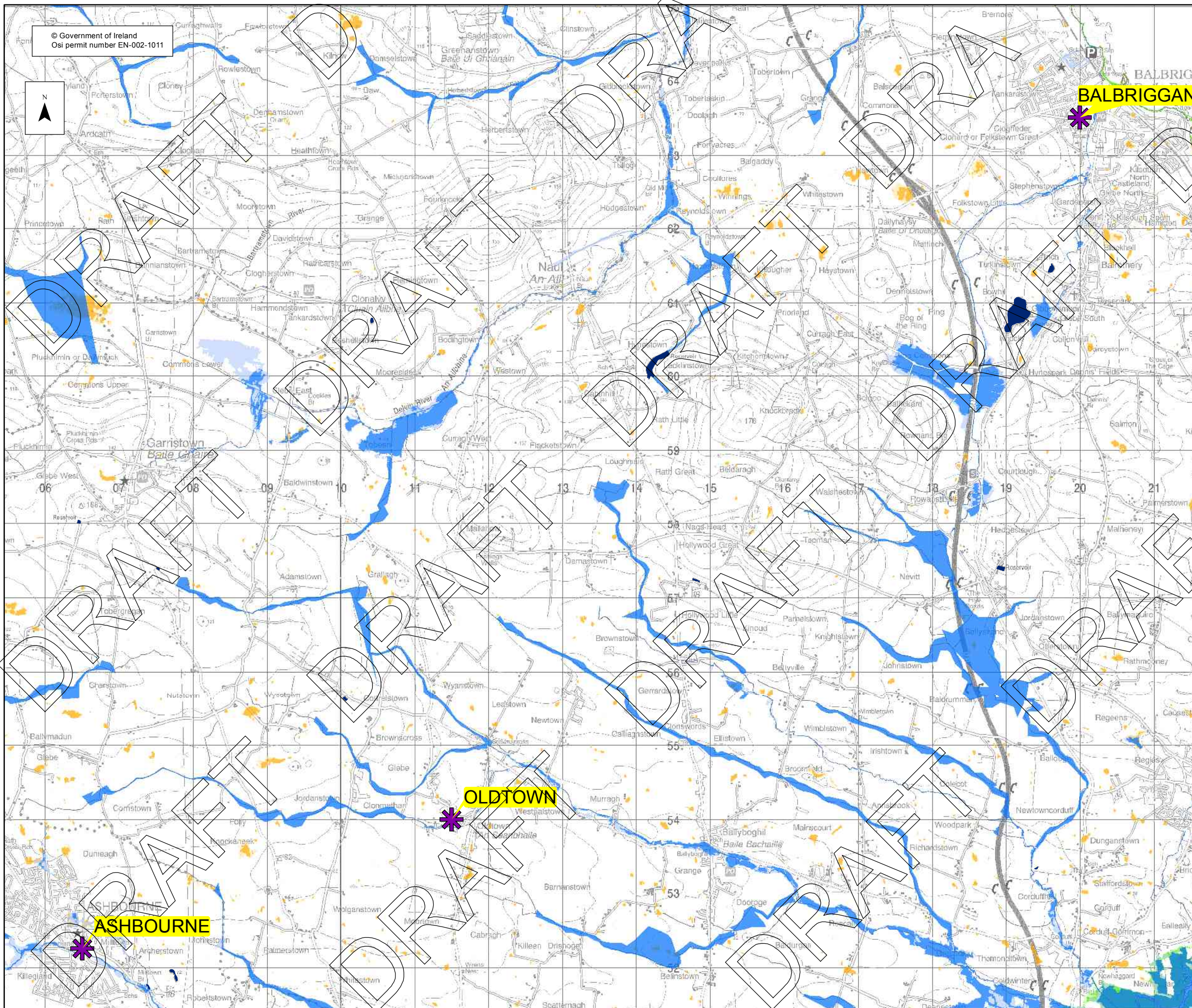
Table 5.1: Summary of Risks and Mitigation

Identified Flood Mechanism	Consequence	Summary and Mitigation Measures
Fluvial / Coastal Flooding	Risk to life and property	All proposed development is situated in Flood Zone C.
Effect of the Development	Increased risk to adjacent lands and developments	All proposed development is situated in Flood Zone C and can therefore have no impact on flooding elsewhere.
Pluvial / Surface Water Flooding	Risk to property on the site, and risk to adjacent lands and property	On-site surface water flooding shall be mitigated, if required, by a site drainage system that complies with local authority drainage standards. There will be no off-site surface water effects if impermeable area on the site is not increased. Any increase in hardstanding area shall be mitigated by provision of SuDS components to ensure no increase in the rate and volume of surface water runoff from the site as a result of the development.

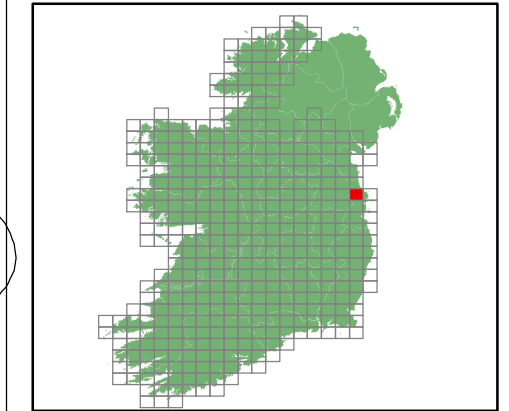
Appendix A

OPW Flood Maps

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Location Plan :



Legend:

Flood Extents

- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents

- Lakes / Turloughs

PFRA Outcomes

- Probable Area for Further Assessment
- Possible Area for Further Assessment

Important User Note:

The flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location. Information on the purpose, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or 'Have Your Say' on www.cfram.ie).

Office of Public Works
Jonathon Swift Street
Trim
Co Meath
Ireland



Project :
PRELIMINARY FLOOD RISK ASSESSMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By : PJW Date : July 2011
Checked By : MA Date : July 2011

Figure No. :
2019 / MAP / 274 / A Revision
0

Drawing Scale : 1:50,000 Plot Scale : 1:1 @ A3

