Irish Water

Ringsend WWTP Upgrade Project

Regional Biosolids Storage Facility

Flood Risk Assessment Report

May 2018

BARRY & PARTNERS consulting engineers

CIVIL • STRUCTURAL • ENVIRONMENTAL • TRANSPORTATION

Document Control Sheet

Client:	Irish Water				
Project Title:	Ringsend WWTP Upgrade Project Regional Biosolids Storage Facility				
Document Title:	Flood Risk Assessment Report				
Document No. :	**TOC (incl.)**	**List of Tables (incl.)**	**List of Figures (incl.)**	**Pages of Text**	**Appendices**
Y17702 - DOC014	Y	N	Y	15 No.	3 No.

Document Info.		**Verification**	**Name**	**Verification**
Rev.	3.0	**Author(s)**	DMcG	
Status	Final	**Checked By**	RK	Email Verification
Issue Date	21/05/2018	**Approved By**	MH	Email Verification

Table of Contents

List of Figures

SECTION 1: Introduction

1.1 General

J. B. Barry and Partners Limited carried out a site specific Flood Risk Assessment (FRA) at Newtown, Dublin 11 for J.B. Barry & Partners Ltd, TJ O'Connor and Associates, and Royal Haskoning DHV consortium who are acting as consultant for Irish Water for a planning application for a new regional biosolids storage facility. The aim of the FRA is to identify, quantify and communicate to decision makers and other stakeholders the risk of flooding associated with the proposed development.

The FRA has been carried out in accordance with 'The Planning System and Flood Risk Management Guidelines' (hereafter referred to as the FRM Guidelines) published in November 2009 jointly by the then Department of the Environment, Heritage and Local Government, DEHLG, (now the Department of the Environment, Community and Local Government, DECLG) and the Office of Public Works (OPW).

The proposed development site is located along the R135 adjacent to the N2 national primary road and within the townland of Newtown, as shown in Figure 1-1: Location of Proposed Development *(Source: Google Maps, annotation by J.B. Barry & Partners)* below.

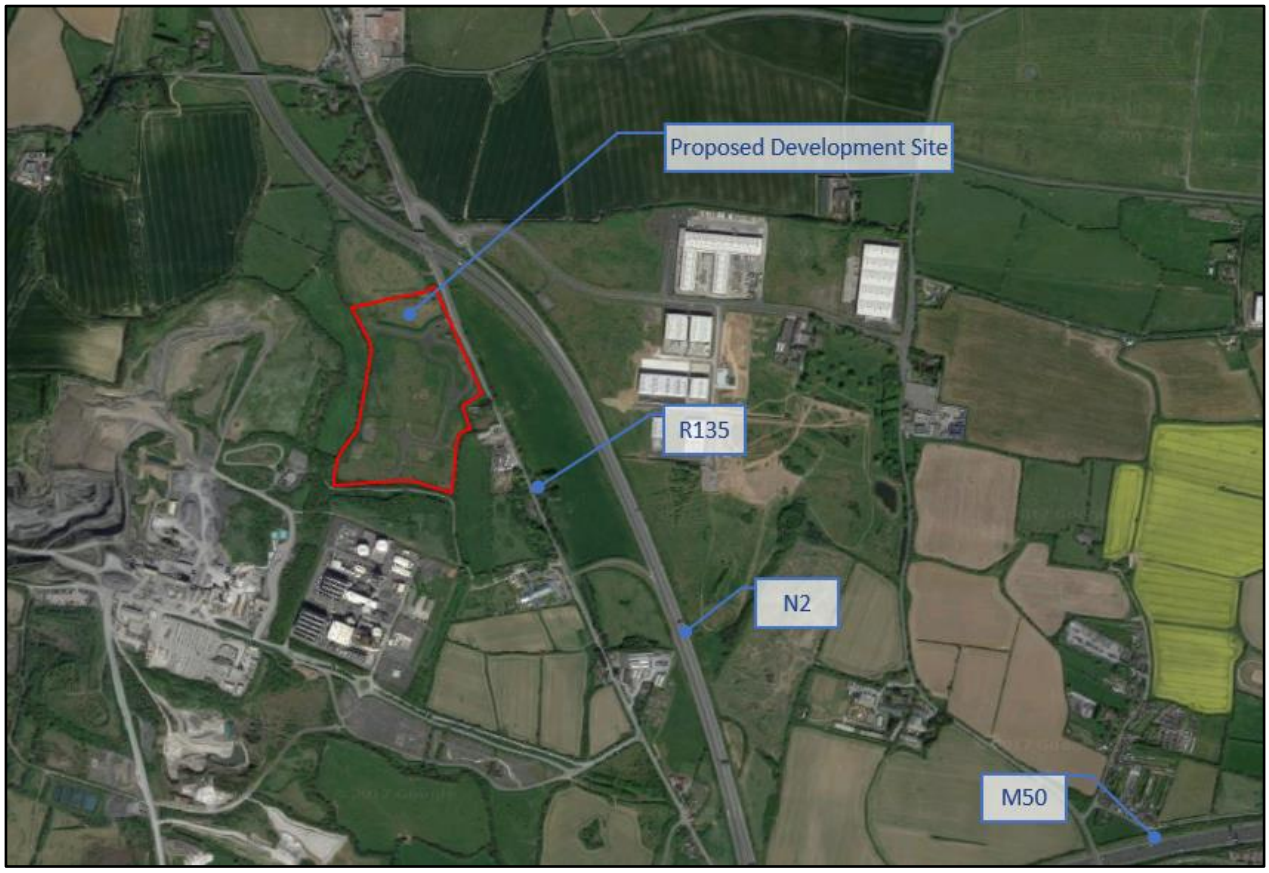


Figure 1-1: Location of Proposed Development *(Source: Google Maps, annotation by J.B. Barry & Partners)*

1.2 Proposed Development

The proposed development consists of the construction 2 no. portal frame warehouses for the storage of biosolids, a by-product of wastewater treatment which can be used on agricultural lands as a soil conditioner. Ancillary works on the site will also include access roads, weighbridges and administration buildings, as shown on Figure 1-2: Indicative layout of the proposed Regional Biosolids Storage Facility

overleaf. The site falls naturally from west to east with its lowest point along the channel on the western boundary of the site.

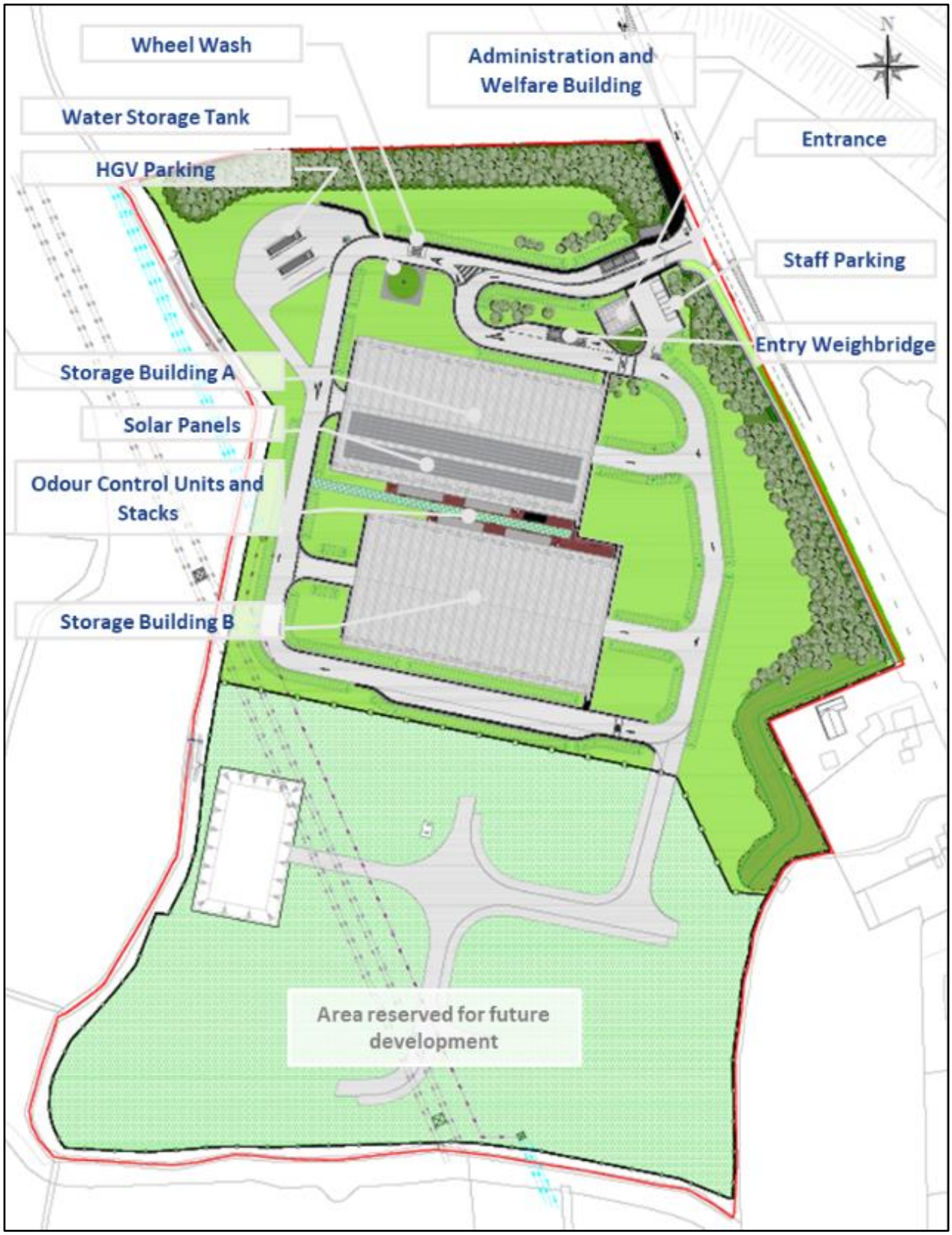


Figure 1-2: Indicative layout of the proposed Regional Biosolids Storage Facility

SECTION 2: Flood Risk Assessment Methodology

2.1 Methodology

The methodology used for the flood risk assessment for the proposed development is based on 'The Planning System and Flood Risk Management, Guidelines for Planning Authorities' (2009)'. The FRM Guidelines require the planning system at national, regional and local levels to:

- Avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify appropriate development;
- Adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and then mitigation of flood risk; and
- Incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

The sequential approach (see Figure 3.1 of the FRM Guidelines below) in flood risk management requires the following three steps to identify the necessity for the justification test for a development:

- Step 1: Identification of the Flood Zone at the proposed development site (Section 2.23 of the FRM Guidelines);
- Step 2: Identification of the vulnerability of the type of the proposed development (Table 3.1 of the FRM Guidelines); and
- Step 3: Using the matrix of vulnerability versus Flood Zone (Table 3.2 of the FRM Guidelines), identify the necessity for the justification test for the proposed development.

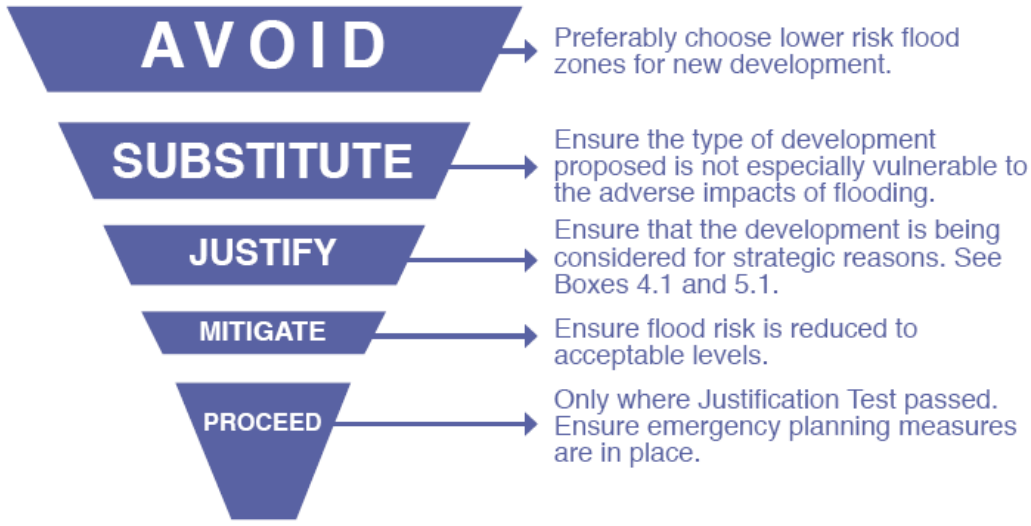


Fig. 3.1: Sequential approach principles in flood risk management

While Figure 3.1 of The FRM Guidelines sets out the broad philosophy underpinning the sequential approach in the flood risk management, Figure 3.2 of the Guidelines (shown below) describes the mechanism of the sequential approach for use in the planning process.

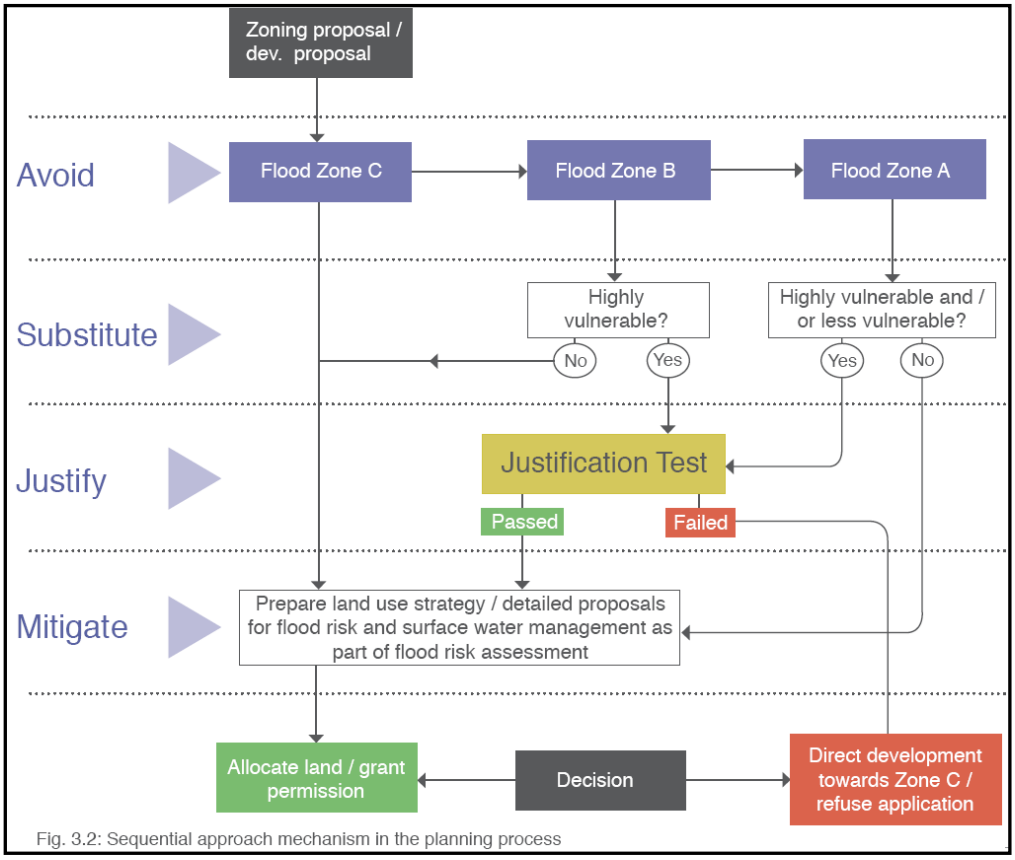


Fig. 3.2: Sequential approach mechanism in the planning process

According to the FRM Guidelines, Flood Zones are graphical areas within which the likelihood of flooding is in a particular range. They are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. There are three Flood Zones, namely,

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% AEP or 1 in 100 year 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% AEP or 1 in 1000 year and 1% AEP or 1 in 100 year for river flooding and between 0.1% AEP or 1 in 1000 year and 0.5% AEP or 1 in 200 year for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding).

Flood Zones A, B and C are based on the current assessment of the 1% AEP and the 0.1% AEP fluvial events and the 0.5% AEP and 0.1% AEP tidal events, without the inclusion of climate change factors. Table 3.1 of the FRM Guidelines (see below) shows the classification of the vulnerability to flooding of different types of development.

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

Table 3.1 Classification of vulnerability of different types of development

Table 3.2 of the FRM Guidelines (shown below) identifies the types of development that would be appropriate for each Flood Zone and those that would be required to meet the Justification Test. Since the RBSF is potentially a significant source of pollution it is classified as a highly vulnerable development. The section highlighted in Table 3.2 presents the required actions for each flood zone.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Table 3.2: Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test.

The FRM Guidelines (Chapter 2) outlines the following three stages of flood risk assessment:

Stage 1: Flood risk identification – to identify whether there may be any flooding or surface water management issues relating to the proposed development site that may warrant further investigations.

Stage 2: Initial flood risk assessment – to confirm sources of flooding that may affect the proposed development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. This stage involves the review of existing studies and hydraulic modelling to assess flood risk and to assist with the development of FRM measures.

Stage 3: Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impacts on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model across a wide enough area to appreciate the catchment wide impacts and hydrological process involved.

SECTION 3: Existing Hydrological Environment

3.1 Salient Hydrological Features

The main hydrological feature of the area is the Huntstown stream, a tributary to the River Ward, which flows north west of the site. The Huntstown Stream flows in a northerly direction, is culverted under the N2, and flows to the River Ward approximately 4.5km north east of the proposed site. A previous hydrological report at the proposed site identified that there are minor flows flowing along the western and southern boundaries of the proposed site. These flows are attributed to a tributary of the Huntstown Stream. The proposed site lies within the River Ward catchment area. Figure 3-1: Hydrological Features of the Area *(Source: EPA Map Viewer, annotation by J.B. Barry & Partners)* below illustrates the main hydrological features associated with the site.

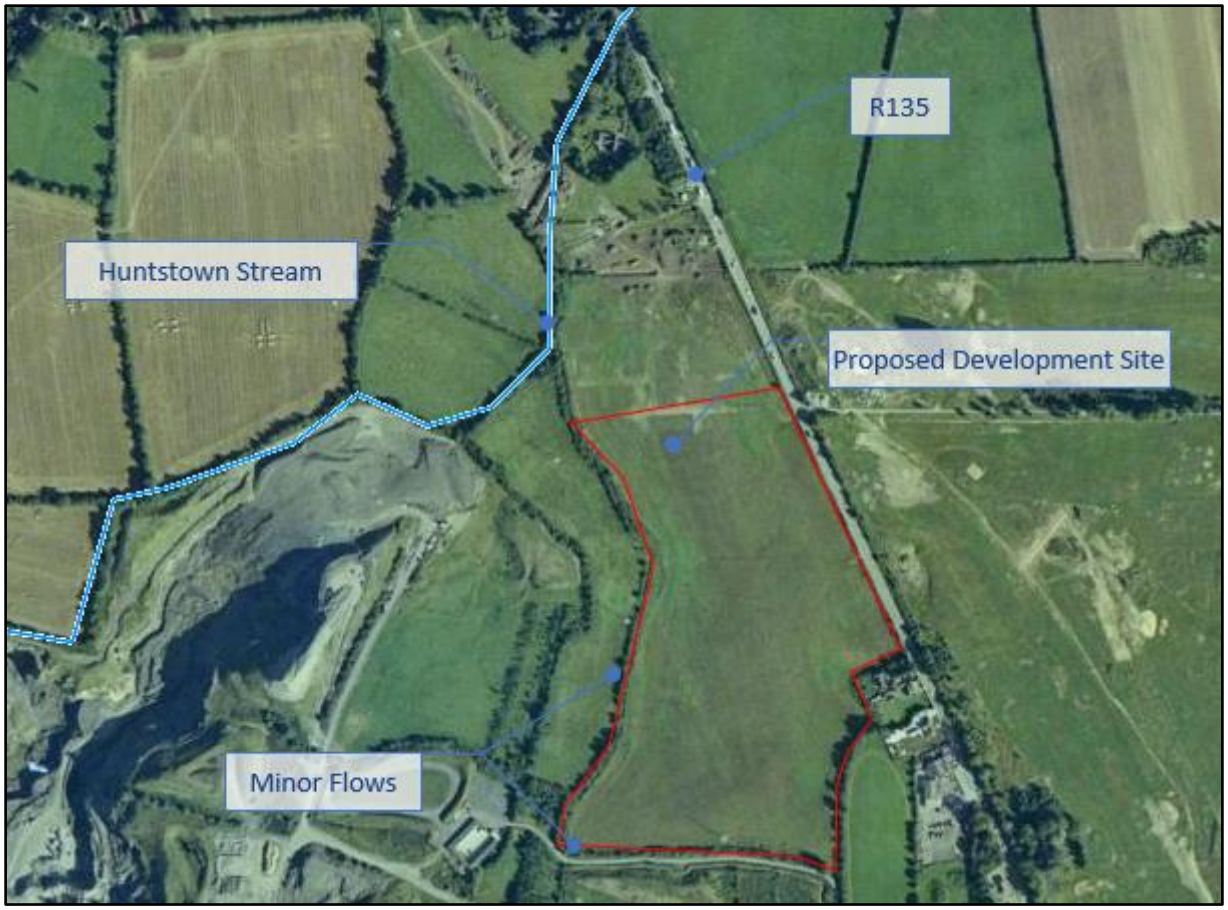


Figure 3-1: Hydrological Features of the Area *(Source: EPA Map Viewer, annotation by J.B. Barry & Partners)*

3.2 Existing Geology and Hydrogeology of the Area

The Geological Survey of Ireland (GSI) website provides information on their public online mapping service at www.gsi.ie on subsoil type. The map presented in Figure 3-2: GSI Subsoil Mapping (Source: www.gsi.ie, annotation by J.B. Barry & Partners) depicts the subsoil for the proposed development site. The GSI subsoil mapping indicates that tills derived from limestone and made ground are the dominant ground condition within the environs of the development site.

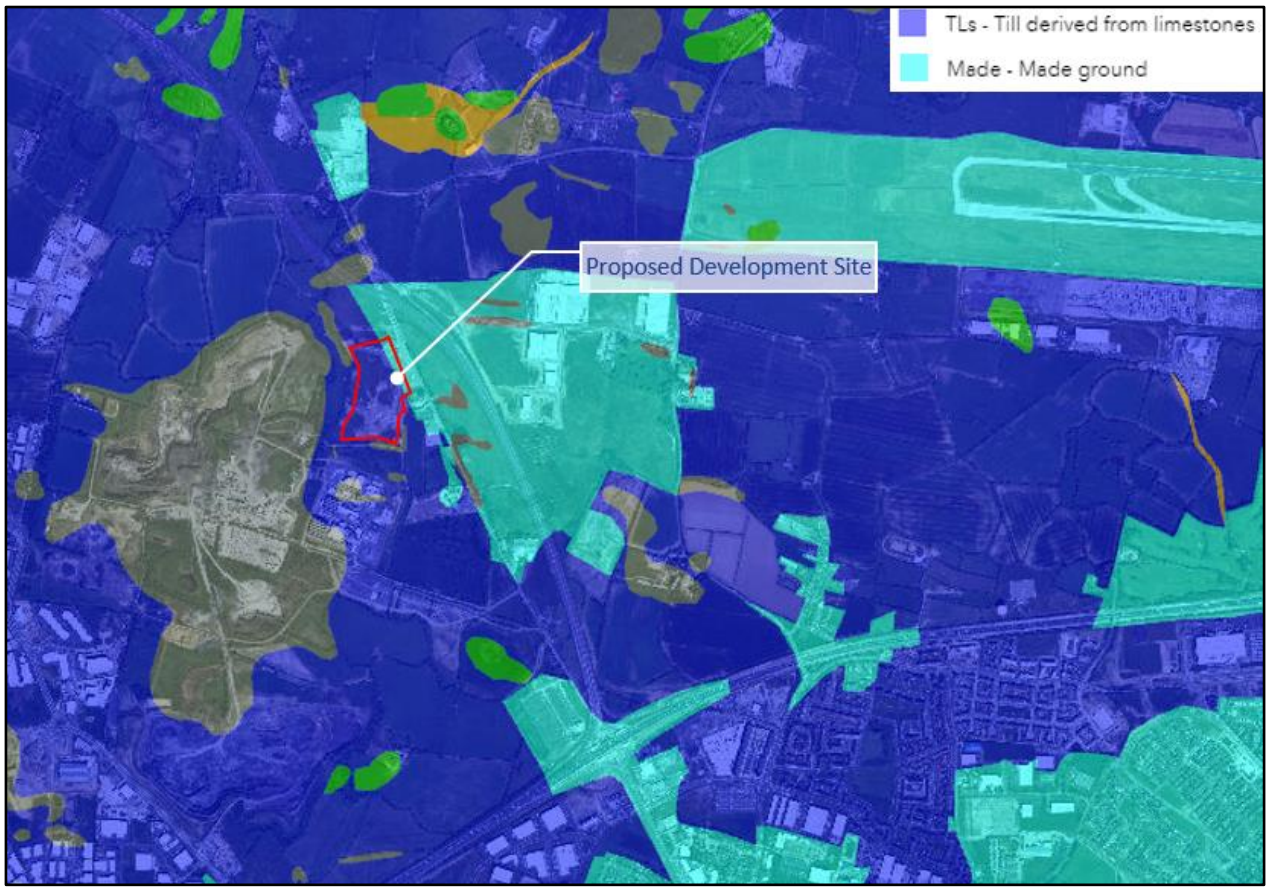


Figure 3-2: GSI Subsoil Mapping (Source: www.gsi.ie, annotation by J.B. Barry & Partners)

3.3 Flood Regime of the Area

The National Flood Hazard Mapping Website www.floodmaps.ie does not show any records of historic floods occurring at the proposed development site, however it does show records of a flood at Kilshane Cross in November 2002 which is within the vicinity of the proposed development site (Figure 3-3: Location of historic flooding in the vicinity of the proposed site *(Source: www.floodmaps.ie annotation by J.B. Barry & Partners)*). A report on the flood prepared by Fingal County Council, identifies that flooding occurred on the N2 at Kilshane Cross as a result of surface water runoff accumulating from adjacent grasslands. A 2005 report from Fingal Co Co has identified that drainage works have taken place to alleviate any flooding issues as part of road development works.

A Summary Local Area Report (SLAR) was generated for the site, which identifies all flooding events, which occurred within the vicinity of the proposed development site (included in Appendix 1).

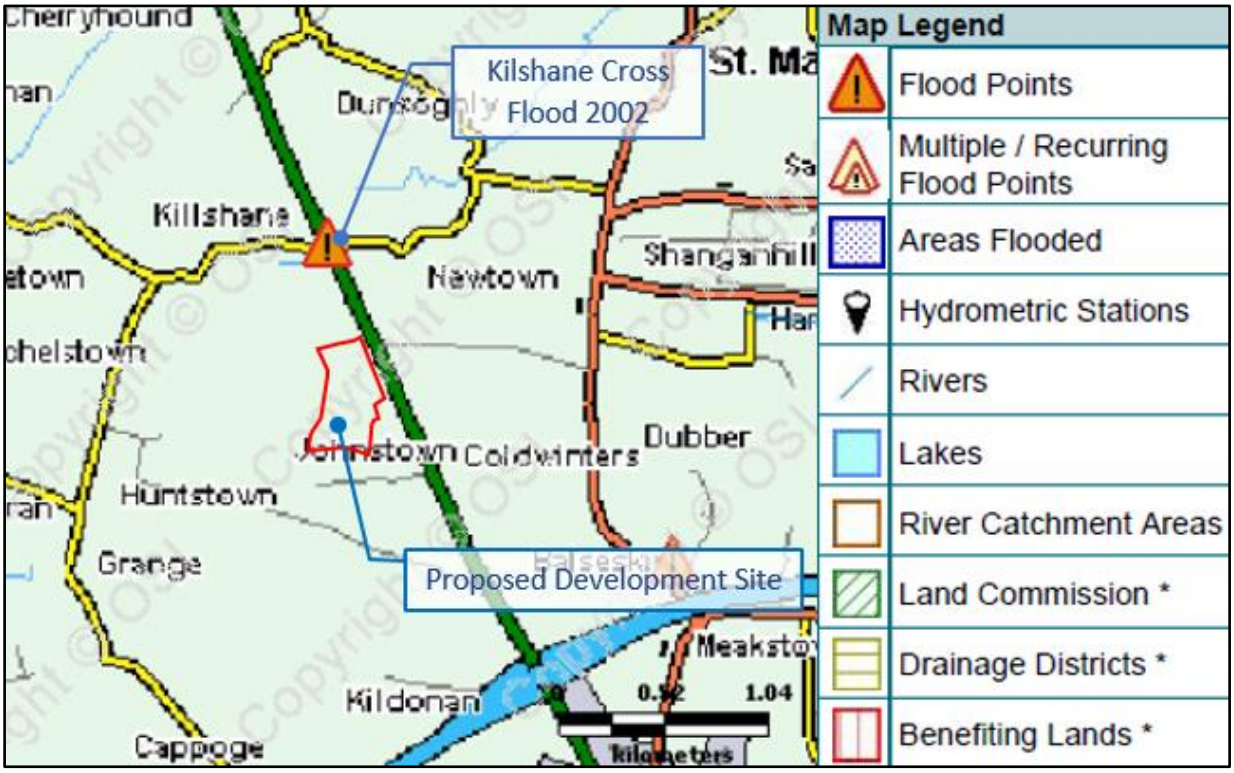


Figure 3-3: Location of historic flooding in the vicinity of the proposed site *(Source: www.floodmaps.ie annotation by J.B. Barry & Partners)*

3.4 Existing Flood Studies

3.4.1 Preliminary Flood Risk Assessment (PFRA) Maps

The proposed development is located within the Eastern River Basin District (ERBD) of Ireland. The OPW is working in partnership with their consultants, Local Authorities and other stakeholders to deliver the Catchment Flood Risk Assessment and Management (CFRAM) study for the RBD. In the meantime, the OPW had published the Preliminary Flood Risk Assessment (PFRA) maps, in the form of 420 maps covering the country. According to the explanatory leaflet published for public consultation on PFRA stage, the PFRA is only a preliminary assessment, based on available or readily derivable information. It also states that areas where an on-site inspection is required to investigate the issues more closely, then those inspections will be carried out as part of the CFRAM Studies.

The PFRA map (extract) is shown in Figure 3-4: Extract of the PFRA map in the vicinity of proposed development site (Source: www.cfam.ie, annotation by J.B. Barry & Partners)4 below and in Appendix 2 indicating the fluvial flood extent for the proposed development site location. Observation of the PFRA flood map extract indicates that the proposed development site is located outside the extent of the fluvial – indicative 1% Annual Exceedance Probability (100-yr) event and fluvial extreme events. Consequently, the proposed development site is situated outside of Flood Zone A where the probability of fluvial flooding is highest, as stipulated by the FRM Guidelines. The PFRA map indicates that no groundwater flood risk exists near the proposed development site. The PFRA map does, however, identify a risk of pluvial related flooding at the site.

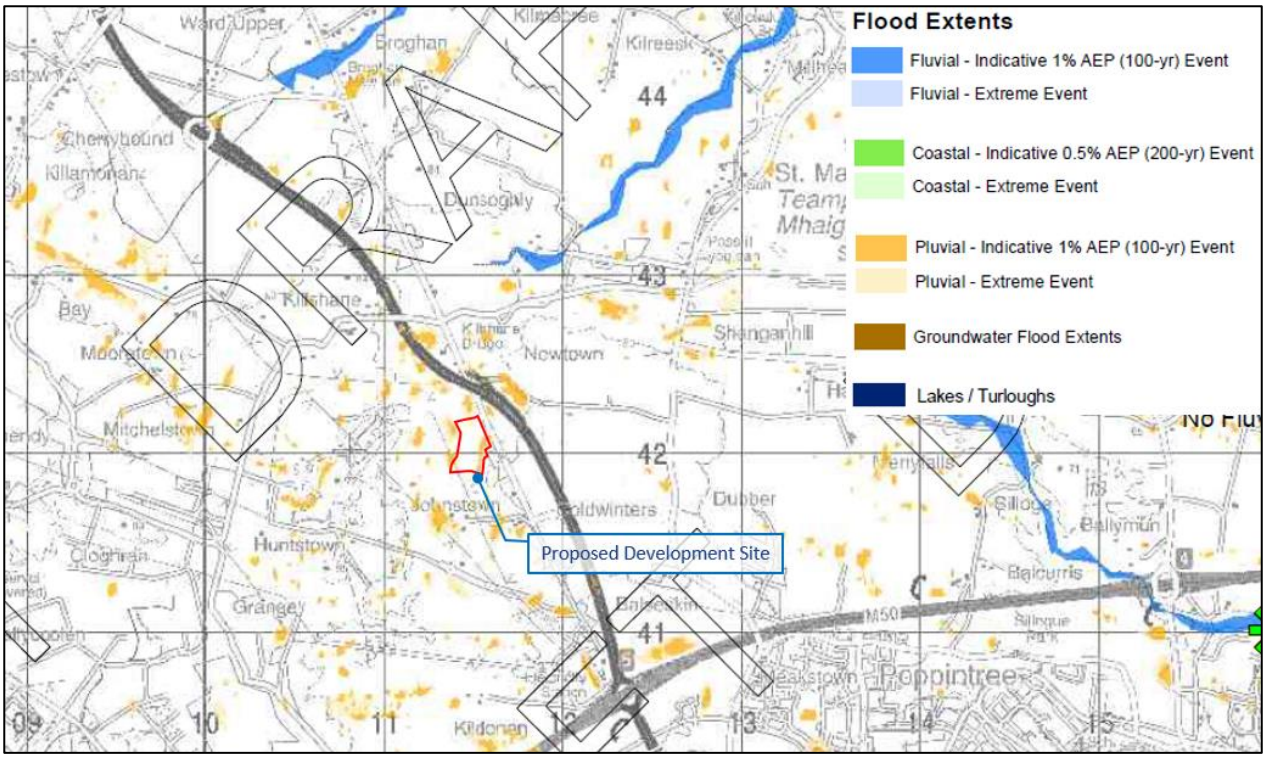


Figure 3-4: **Extract of the PFRA map in the vicinity of proposed development site (Source: www.cfam.ie, annotation by J.B. Barry & Partners)**

3.4.2 Fingal Strategic Flood Risk Assessment

The Fingal County Strategic Flood Risk Assessment (SFRA) was prepared by RPS in February for the Draft Fingal County Development Plan 2017-2023. The SFRA provides an assessment of all types of flood risk within the County with the aim to assist Fingal County Council to make informed strategic land-use planning decisions and formulate flood risk policies.

As part of the SFRA predictive flood maps were prepared in order to identify sources of flooding and produce flood zone maps for across the local authority area and in key development areas. The flood zones are largely derived from the Fingal East Meath Flood Risk Assessment and Management Study (FEMFRAMS) and the Tolka Flooding Study mapping as these are the most comprehensive flood maps produced for Fingal. An extract of the flood map within the vicinity of the proposed development site is shown in Figure 3-5: Extract from the Fingal County SFRA Flood Zone Map5 below and included in Appendix 3. This map indicates that the proposed development site lies outside of the 1% and 0.1% AEP fluvial flood extents, and can therefore be considered to be located within Flood Zone C, where the probability of flooding is lowest.

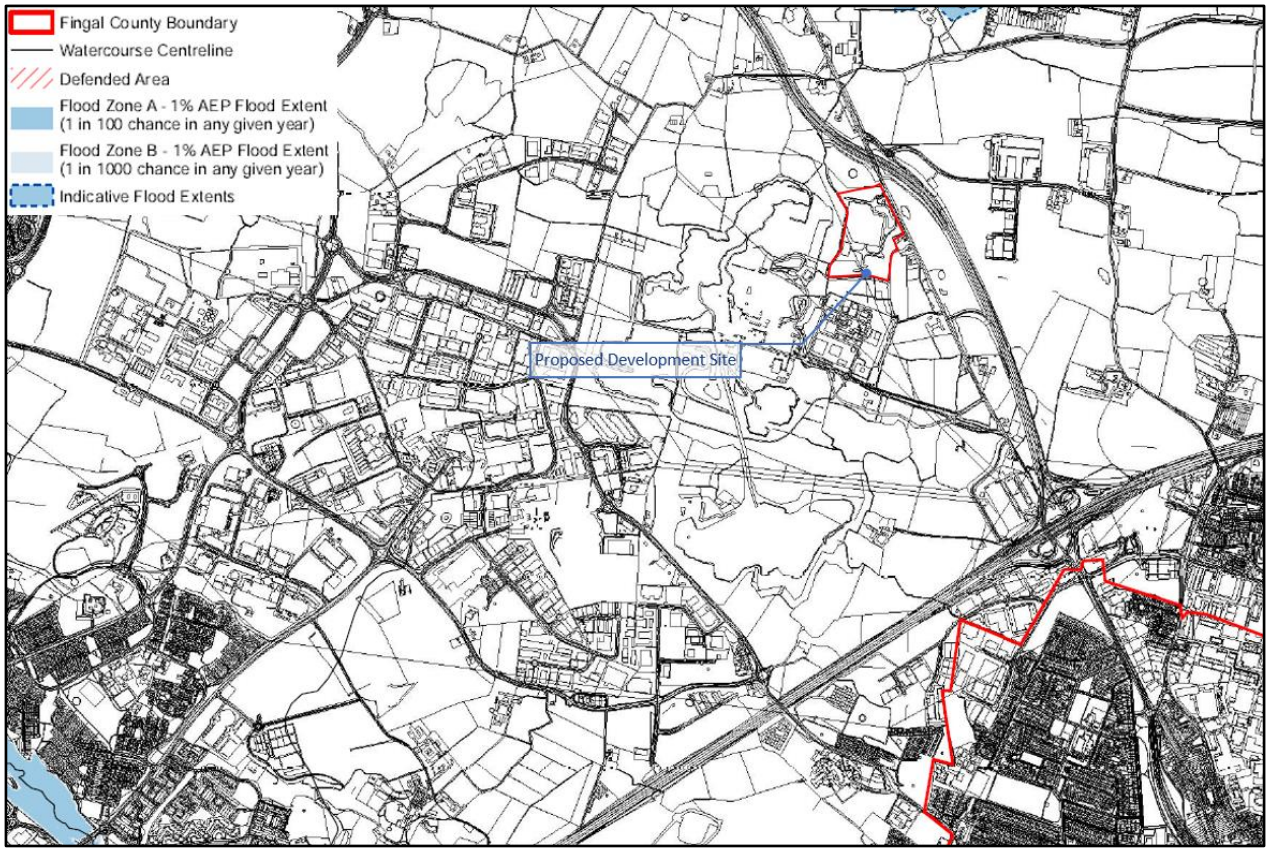


Figure 3-5: Extract from the Fingal County SFRA Flood Zone Map

SECTION 4: Flood Risk Assessment

4.1 Introduction

As outlined in Section 2 of this report the FRM guidelines identifies three stages of Flood Risk Assessment namely;

- Stage 1: Flood Risk Identification
- Stage 2: Initial Flood Risk Assessment
- Stage 3: Detailed Flood Risk Assessment

4.2 Flood Risk Identification

According to the FRM Guidelines, flood risk identification is the process for deciding whether a plan or project requires further investigation. This is a desk based exercise based on existing information. All the existing information is described in Section 3 and the identification of flood risk from each of the five sources of flooding (coastal, fluvial (river), groundwater, pluvial (rainfall) and from artificial drainage systems) is considered.

Coastal Flood Risk

The PFRA map in Appendix 2 indicates that the proposed development site lies outside of the 0.1% AEP coastal flood event and hence is located within Flood Zone C for coastal flood risk, where the risk of flooding is low.

Fluvial Flood Risk

The PFRA map in Appendix 2 and Fingal SFRA Flood Map in Appendix 3 both indicate that the proposed development site lies outside of the 1% and 0.1% AEP fluvial flood extents and thus is deemed to be in **Flood Zone C.** The OPW Summary Local Area Report shows no indication of previous fluvial related flooding at the proposed site.

Groundwater Flood Risk

There is no historical evidence of groundwater flooding at the site and the PFRA Map (Appendix 2) indicates a low risk of groundwater related flooding. There is no indication on the maps of any springs or wells on this site. Groundwater risk is therefore not considered to be significant.

Pluvial Flood Risk

The PFRA Map (Appendix 2) of the area indicates a pluvial flood risk at the site. Despite this the OPW Summary Local Area Report shows no indication of previous pluvial related flooding at the site. Notwithstanding this, it is important to consider appropriate mitigation measures. During extreme rainfall events the application of SuDS principles will ensure surface water is managed sufficiently and sustainably discharged to the drainage network. This is in accordance with the Greater Dublin Strategic Drainage Study, 2005 which requires all new developments to incorporate SuDS unless it can be demonstrated that such facilities are not feasible. With these mitigation measures in place, pluvial related flooding is not considered to be significant following the completion of the development.

Artificial Drainage Systems Flood Risk

An attenuation pond has been identified within the site boundary. There is no historical evidence of this artificial drainage system contributing to any flood risk at the site, and consequently artificial drainage systems flood risk is not relevant.

4.3 Initial Flood Risk Assessment

The Stage 1 – Flood Risk Identification has identified that there is insignificant flood risks to the site. Under the sequential approach identified in the FRM Guidelines a three step approach is required to confirm the appropriateness of the development in terms of flood risk.

Step 1: Identification of the Flood Zone at the proposed development site

Using the Flood Zone criteria from the FRM Guidelines and as defined in Section 2 previously, the flood zones for the site was determined.

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 year 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 100 year and 1% or 1 in 1000 year for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 year for coastal flooding); and
- **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).

As previously noted in the above sections, the proposed development site is located outside of Flood Zones A and B and can be classified as being located within **Flood Zone C.**

Step 2: Identification of the vulnerability of the type of the proposed development (Table 3.1 of the FRM Guidelines)

The different types of proposed infrastructure are then assigned a vulnerability classification according to the definitions in 'Table 3.1 – Classification of vulnerability of different types of development' of the FRM Guidelines.

As described in Section 1.2 above, the proposed development has potential sources of pollution and as such is classified as 'highly vulnerable development'.

Step 3: Using the matrix of vulnerability versus Flood Zone (Table 3.2 of the FRM Guidelines), identify the necessity for the justification test for the proposed development

The proposed development site is located in Flood Zone C is categorised as 'highly vulnerable development'. Table 3.2 of the FRM Guidelines and Figure 3.2 – Sequential approach mechanism in the planning process (FRM Guidelines) stipulate that a justification test is not required for such a development and that it is deemed appropriate development for that flood zone category.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Table 3.2: Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test.

Figure 4-1: Matrix of Vulnerability versus Flood Zone to illustrate appropriate development

4.4 Detailed Flood Risk Assessment

Following from Stage 2 – Initial Flood Risk Assessment, it was determined that there is no requirement to undertake a detailed flood risk assessment on the proposed development. The sequential approach as shown in Figure 4-1: Matrix of Vulnerability versus Flood Zone to illustrate appropriate development identifies that there is no need for a Justification Test to be undertaken.

SECTION 5: Conclusion

5.1 Summary of Results

A flood risk assessment for the proposed Regional Biosolids Storage Facility at Newtown, Dublin 11 has been undertaken following the methodology recommended in the FRM Guidelines. The following is the summary of the flood risk assessment:

- The proposed development consists of the construction 2 no. warehouses for the storage of biosolids and ancillary works at Newton, Dublin 11.
- The Huntstown Stream, a tributary to the River Ward, flows near the north western boundary of the site.
- The national flooding website www.floodmaps.ie does not have any record of historic flooding at the site.
- The PFRA flood extent map and Fingal Co Co SFRA flood zone map both indicate that the existing site lies within Flood Zone C.
- The PFRA map identified a risk of flooding to the existing site due to pluvial flooding. In order to mitigate this risk it is proposed to incorporate appropriate SuDS measures to ensure all surface water is managed sufficiently and sustainably discharged to the drainage network.
- The type of development is defined as 'Highly Vulnerable Development (including essential infrastructure)'. Using the sequential approach mechanism it is assessed that a justification test is not required for the proposed development.

Appendix 1:

OPW Summary Local Area Reports

OPW National Flood Hazard Mapping

Summary Local Area Report

This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Dublin

NGR: O 117 420

Map Scale 1:42,948

Map Legend	
	Flood Points
	Multiple / Recurring Flood Points
	Areas Flooded
	Hydrometric Stations
	Rivers
	Lakes
	River Catchment Areas
	Land Commission *
	Drainage Districts *
	Benefiting Lands *

* Important: These maps do not indicate flood hazard or flood extent. Thier purpose and scope is explained in the Glossary.

2 Results

1. Dubber Cross Meakstown Swords Area Nov 2002
Start Date: 14/Nov/2002
County: Dublin
Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information

2. Kilshane Cross Nov 2002
Start Date: 13/Nov/2002
County: Dublin
Flood Quality Code:4
Additional Information: Reports (2) More Mapped Information

MEETING OF COUNTY COUNCIL 9/12/2002

Item No. 22

Report on Flooding in Fingal Area

In 2000 and 2002

A report was presented to the Council meeting on 29th January 2001 on flooding which occurred in the Fingal area over the period 5th - 7th November 2000 and 7 - 8th November 2000. The report identified 12 key areas for attention and the up to date position is set out hereunder:-

1. N1 at Blakes Cross and Turvey Avenue - both flooded

2. N2 at Coolquay/Ward Road - road and property flooding

3. Balbriggan/Boranstown - property flooding.

   Note: remedial work has been carried out at all three locations and flooding did not re-occur over the period 13th - 15th November 2002.

4. Newcourt, Swords - property flooded. Work on the new treatment works in Swords has now solved this issue and no flooding occurred over the period 13th - 15th November 2002.

5. Bremore Court - property flooded. A contract to construct new surface water culvert under the N1 is to commence in early 2003. Some flooding occurred at this location over the period 13th - 15th November 2002 but it is not considered as extensive as that which occurred in 2000.

6. R132 - Cloghran, Old Airport Road. This road flooded at 2 locations within 300 metres of the M50 in 2000. At the first location close to the M50 the section of culvert underneath the Old Airport Road was fully cleared out by Fingal County Council after events in 2000 however it is considered that additional work is necessary on sections of this culvert downstream of the location on land in private ownership.

   The other section of road 300m approximately to the North of the M50 contains 300mm diameter culvert which requires regular maintenance. Replacement of this culvert at the larger size is severely hampered by the extent of services for other utilities already present in the road. Both locations referred to flooded over the period 13th - 15th November 2002.

7. Portersgate, Clonsilla - (property) houses and gardens. The problem at this location is being considered as part of the Greater Dublin Strategic Drainage Study being undertaken at present. The results of this study are expected in May 2003. Fingal County Council in consultation with the Consultant on this study are proposing a series of interim measures to alleviate the situation. These measures are expected to be installed early in 2003 and address the issue of the possible effects of surcharging in the foul sewerage system in the area on low lying properties in the Portersgate area.

No properties were flooded 13th - 15th November 2002 as a result of the prompt action of Drainage Maintenance, Fingal County Council.

The estate has been threatened with flooding on a previous occasion since the events in 2000.

8. Pinebrook/Hartstown - flooding (property) houses and gardens.

Flooding occurred again at this location in 2000 and again in the period 13th - 15th November 2002. Action has been taken to clean the culvert since and a detailed assessment of the capacity of the culvert is underway at present.

9. R109 - Lucan (Strawberry Beds) - road and houses flooded. This problem relates to the Liffey. The Greater Drainage Strategic Study is considering issues in relation to the Liffey at present and the Consultants will be asked to address specifically the problems of flooding which are occurring in this location with a view to identifying interim measures which can be undertaken to alleviate the issue. The road was flooded at this location over the period 13th - 15th November 2002.

10. N3 - Near Blanchardstown Town Centre - road flooding. Flooding related directly to the level of flows in the Tolka. Consultants on the Greater Dublin Drainage Study have been asked to consider this issue specifically with a view to recommending interim measures that may be provided pending completion of their report in May 2003. Road flooded again at this location over the period 13th - 15th November 2002.

11. R128 - Lusk/Rush - road flooding. A full cleaning of the downstream channel was undertaken in early 2000 in addition to full cleaning of the road culverts at the location. The road was subject to severe flooding at this location over the period 13th - 15th November 2002 and was impassable to cars. A nearby location at Whitestown was also flooded but remained passable to vehicular traffic. Fingal County Council as an urgent interim measure are arranging for the replacement of the existing culverts at the Spout Road location with a larger capacity culvert. This work is expected to commence in early January 2003 and more careful consideration will be given to the possibility of phasing the levels of the road to help avoid extreme ponding at that location.

12. Rush/Loughshinny - road flooded. The problem here relates to the capacity of the existing culvert under the road where flooding has taken place. It is exacerbated by the presence of a foul sewer on the down stream outlet of the culvert which further constricts flows. Measures to relocate the foul sewer and improve the road crossing at that location are identified as an objective in the Area Action Plan for Rush which is presently before the members for consideration.

Areas flooded in November 2002 (not previously flooded)

A total rainfall of 86.8mm fell in the 3 day period 13th - 15th November 2002. An interim report on these events has been presented to the members of each Area Committee and a report is attached - Appendix A.

The principal areas affected severely which had not been flooded in 2002 were:

Littlepace, Castaheany	-	Houses flooded
Castlecurragh	-	Houses flooded

The Consultants on the Greater Dublin Drainage Study, MC O'Sullivan Consulting Engineers have been requested to examine these locations specifically to identify interim measures that may be possible to alleviate the risk of future flooding.

Severe flooding also occurred on this occasion on

(i) M50 at the N3 Interchange
(ii) M50 at Ballymun Exit

Remedial measures to road drainage have been undertaken at these locations.

(iii) N2 at Kilshane Cross

Preliminary investigations indicate that flooding on the N2 arose from surface water run off from adjacent grasslands.

Landowners are required to undertake necessary steps to prevent run off onto roads. In this instance the matter is being taken up with the landowners concerned.

(iv) N1 at Roundabout at Fingallions

Flooding occurred due to the high water level in the Ward River. A temporary contraflow emergency measure operated successfully and ensured that the N1 remained open to traffic.

(v) Swords/Ashbourne Road

Flooding occurred at Rathbeale Cross and Rowlestown. A new culvert is being installed at present at Rathbeale Cross and drainage alleviation works are underway at Rowlestown.

(vi) Santry Close

Flooding occurred on the Old Airport Road at this location arising from high water levels in the Santry River. Interim alleviation measures are being undertaken by the developer at Santry Demesne to prevent a recurrence.

Other locations where flooding occurred are listed in Appendix B.

MINUTES OF MEETING

Reference:	**P4D403A – F140 – 014- 004**	**Page 1 of 2**
Project No.:	**P4D403A**	
Project Title:	**OPW Flood Hazard Mapping – Phase 1**	
Purpose of Meeting:	**Data Collection No. 4 – Fingal County Council**	
Participating:	**Roads Engineering Staff – West (3 No)** **Search Manager**	**Roads Fingal CC** **ESBI**
Venue:	**Fingal Road Depot, Coolmine**	
Date of Meeting:	**18/04/05**	
Copies to:	**File**	
Compiled by:	**Search Manager**	
Status:	**Approved**	
Approved for ESBI:	**Search Manager**	
Approved for Fingal County Council	**Local Project Co-ordinator**	
Date:	**December 2005**	

ESB INTERNATIONAL LTD.
Stephen Court, 18/21 St. Stephen's Green, Dublin 2, Ireland.
Telephone: +353-1-7038000 Fax: +353-1-6764400
Website: www.esbi.ie

Copies of the following documents were received.

F. Meeting of County Council 9/12/2002, Item No. 22. Report on Flooding in Fingal Area in 2000 and 2002. (4 pages)

G. Flooding Reports 26th to 28th October 2004. (1 page)

- Printed A4 colour pictures (7 No.) showing flooding on Blanchardstown Bypass/Navan Road (N3) in November 2002

The Area Engineer's district of responsibility is approximately that area west of the N2. Those locations, identified previously by Fingal Drainage Section as prone to flooding, were reviewed and a number of additional locations highlighted.

41 Navan Road – Tolka River upstream of Mulhuddart (Flood ID No 1655)
Tolka River overflows its banks regularly just upstream of confluence with Pinkeen River. A protective berm was built around factory buildings in 2004.

42. Navan Road – adj. Tolka Valley Park (Flood ID No 1658)
A protective berm, between Tolka River and Navan Road, was constructed in 2004. Severe flooding of road along Blanchardstown Bypass at this location in November 2002 (not 2000) due to high river levels and surface water drainage backup. Road impassable and cars submerged (see photos) under Snugborough Road flyover. A protective berm, between Tolka River and Navan Road, was constructed in 2004. (See document F)

43. Herbert Road, Blanchardstown (Flood ID No 1659)
Gardens of houses along this cul-de-sac were flooded. Also sub floor of 1 house. Protective berm constructed in 2004.

44. Pinebrook, Hartstown. (Flood ID No 1660)
Surface water ditches in Hartstown surcharged in 2000 turning park into a lake and flooding houses in Pinebrook. Subsequent remedial works (including piping drains) have been carried out. (See document F)

45. Lower Lucan Road/Strawberry Beds
a. near Tinkers Hill. Road level low and impacted when Liffey in flood. (Flood ID No 1661)

b. between Sommerton Road & Luttrellstown GC. Road level impacted when Liffey in flood. Usually passable. Impassable in 2004 due to surface water from Porterstown/Luttrelstown Golf Club unable to exit due to blockage of drainage pipe by local landowner. (Flood ID No 1694, 2190)

(See document F.)

46. Kilshane Cross on N2
Flooded in November 2002. Drainage works (2005) being carried out as part of road development. (See document F) (Flood ID No 1663)

Appendix 2:

PFRA Map

STAFFORDSTOWN TURVEY

No Fluvial Data Available For Area

SWORDS

SWORDS (SOUTH)

1SCH_KILBRIDE

No Fluvial Data Available For Area

BELCAMP PARK

SANTRY DEMESNE

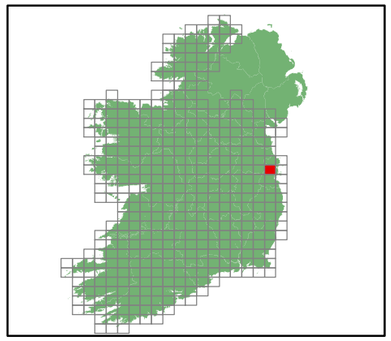
SANTRY

MULHUDDART

FINGLAS, GLASNEVIN

0.5 0.25 0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 Kilometers

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 Assesment
- Possible Area for Further Assesment

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 ASSESMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By :	PJW	Date :	July2011
Checked By :	MA	Date :	July 2011

Figure No. : 2019 / MAP / 256 / A

Revision 0

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

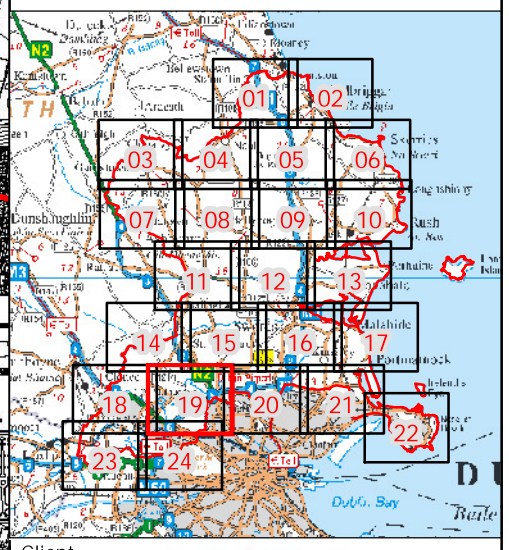
Appendix 3:

Fingal Co Co SFRA Flood Zone Map

N

Legend

- Fingal County Boundary
- Watercourse Centreline
- Defended Area
- Flood Zone A - 1% AEP Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 1% AEP Flood Extent (1 in 1000 chance in any given year)
- Indicative Flood Extents



Client

Comhairle Contae Fhine Gall
Fingal County Council

Project

Strategic Flood Risk Assessment

Title

Fluvial Flood Zone Mapping

Figure Map 19 of 24

RPS

West Pier Business Campus,
Dun Laoghaire,
Co Dublin,
Ireland.

Tel: +353 (0) 1 4882900
Fax: +353 (0) 1 2835676
Email: ireland@rpsgroup.com
Web Page: rpsgroup.com/ireland

Issue Details

Drawn By: HF	Project No. MDW0716
Checked By: BT	File Ref: MDW0716arc0001D02
Approved By: SK	
Scale: 1: 20,000 @ A3	Drawing No. Rev:
Date: 02/12/2015	Arc0001 D01