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2025

Site-Specific Flood Risk Assessment (SSFRA) – Residential Development, Boreen Bradach, Kinnegad, Co. Westmeath

Site-Specific Flood Risk Assessment (SSFRA)

Residential Development, Boreen Bradach, Kinnegad, Co. Westmeath

Document Control Sheet

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P01	DRAFT	AN	JW		15/11/2024
P02	FINAL	AN	LM	JB	22/11/2024
P03	REVIEW	AN	NK	LM	21/03/2025
P04	FINAL	AN	NK	LM	28/03/2025

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ORS

LRD Opinion response

The below summarises opinions raised by Westmeath County Council (WMCC) after the LRD Stage 2 meeting and our response to these items

Opinion / Recommendation	ORS Response
7.EIA and AA	
An EIAR Screening Report and Appropriate Assessment Screening Report with Natura Impact Statement, if required, to accompany any future planning application.	Both documents have been prepared and are submitted with this planning application as: • EIA Screening Report.pdf (Ref: 241139-ORS-XX-XX-RP-EN-13d-001), and • AA Screening Assessment.pdf (Ref: 241139-ORS-XX-XX-RP-EN-13d-008.pdf).
8.Other Matters	
Applicant to submit details in respect of the following:	
(i) All survey reports as noted in the Ecological impact Assessment such as the Bat Survey, Invasive Species, etc.	The Ecological Impact Assessment (EcIA.pdf - Ref: 241139-ORS-XX-XX-RP-EN-13d-007) addresses the detailed surveys conducted on the site as presented in Section 4 - Results. Invasive Species Suvey can be found in the Section 4.3.1, page 23 of the EcIA, and the Preliminary Bat Roost Potential survey had it results included in Appendix B of the EcIA report.
(ii) A Construction and Environmental Management Plan (CEMP) to include a full tabled list of mitigation measures. Mitigation measures identified in the Ecological Impact Assessment, Invasive Species Report and any other reports submitted with any future application should be included in the CEMP.	The Construction and Environmental Management Plan (CEMP.pdf) has been prepared by ORS, 2025 (Ref: 241139-ORS-XX-XX-RP-EN-13d-002) for the construction phase of the development. Section 4 - Environmental Management Plan summarises the mitigation measures and incorporates the proposed measures contained in the following reports: • Arboricultural Impact Assessment, by John Morris Arboricultural Consultancy Ltd, 2025 (Ref: 24-398-04) • Invasive Species Survey Report, by ORS - 2025 (Ref: 241139-ORS-XX-XX-RP-EN-13d-005) • Noise Impact Assessment, by Amplitude Acoustics, 2025 (Ref: D240912RP1) • Ecological Impact Assessment, by ORS - 2025 (EcIA.pdf - Ref: 241139-ORS-XX-XX-RP-EN-13d-007) • Archaeological Assessment Report, by IAC, 2025 (Ref: IAC Project J4402.pdf) Appendix B of the CEMP presents the Schedule of Mitigation Measures
(iii) A Noise Impact Assessment Report which assess the existing noise impact (mainly traffic) on the proposed residential development. Reference should be made to the	Amplitude Acoustics were commissioned to undertake a Noise Impact Assessment for the proposed development, resulting in a report NIA.pdf (Ref: D240912RP1) which accompanies this planning application. The report takes into account the Westmeath Noise Action Plan 2024-2028 and the WHO Guidelines for noise impacts at construction stage.

Westmeath County Council Noise Action Plan 2024-2028 and the World Health Organisation Guidelines.	
(iv) A Construction and Demolition Resource Waste Management Plan for the proposed development.	A RWMP was carried out by ORS, 2025 (Ref: 241139-ORS-XX-XX-RP-EN-13d-003) and accompanies this planning application
(v) An Operational Waste Management Plan for the proposed development .	An OWMP has been prepared by ORS - 2025 - for the operational phase of the proposed development - OWMP.pdf (ref: 241139-ORS-XX-XX-RP-EN-13d-004) and accompanies this planning application. It also includes details and drawings of a 3-bin waste/compost/recycling facility for the Creche site.
(vi) A Site-Specific Flood Risk Assessment.	ORS 2025 has produced a Site-Specific Flood Risk Assessment - SSFRA.pdf (Ref: 241139-ORS-XX-XX-RP-EN-13d-009) for the development and is presented within the documentation which accompanies this planning application. It concludes that the Site is classified as Flood Zone C, and, therefore no justification test is required and it is not expected that its construction will increase the area flood risk. The proposed development is not exposed to any flood risk.
(vii) An updated Ecological report which considers all boundaries, trees and hedgerows located on site.	An updated Ecological Impact Assessment (EcIA.pdf - Ref: 241139-ORS-XX-XX-RP-EN-13d-007) is submitted with the planning application documentation and takes into account all boundaries, trees and hedgerows on the site.

1 Introduction

1.1 Background

ORS has been commissioned to carry out a Site-Specific Flood Risk Assessment (SSFRA) report for a proposed residential development located at Boreen Bradach, Kinnegad, Co. Westmeath. This report has been prepared to assess the flood risk to the site and adjacent lands.

1.2 Scope of Report

This report outlines the findings of the SSFRA carried out for the proposed development and takes cognisance of the following relevant guidelines and legislation.

- Department of the Environment Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) (November 2009) Guidelines for Planning Authorities: The Planning system and Flood Risk Management Guidelines for Planning Authorities.
- The Planning and Development Act 2000.

The aforementioned guidelines introduce mechanisms for the incorporation of flood risk identification, assessment, and management into the planning process. This report has been prepared in accordance with these guidelines.

1.3 Proposed Development

The proposed development (herein "the Development") will comprise a Large-Scale Residential Development (LRD) on a site at Boreen Bradach, Kinnegad, Co. Westmeath. The development will comprise 129 no. houses (1 bed, 2 beds, 3 beds and 4 beds) and the provision of a crèche facility. Provision of car, cycle and motorbike parking. Provision of a new vehicular access and additional pedestrian/cyclist access from L-5014 (Boreen Bradach Road) and associated upgrades to the local road. All associated site development works and services provision, bin stores, residential private open space, public open space, substation, boundary treatments, landscaping and all associated site development works.

1.4 Proposed Site Location

The Proposed Development Site (hereafter "the Site") is located to the north of the urban area of Kinnegad, in a Consolidation Site zoned land. The Site is facing the L5014 (Boreen Bradach Road), which connects the Killucan Road to the Kinnegad's Main St (R161). The North side of the Site is occupied by Agricultural land and there are a number of dwellings adjacent to this side, in the Northeast limit of the Site. The Correllstown River. occurs *ca.* 1.0km NE of the site. Some housing estates occurs along the eastern site boundary. To the East, *ca.* 450m, there is a wastewater treatment plant adjacent to the Kinnegad River. The southern Side of the site is adjacent to urban lands and a variety of buildings including Church of the Assumption, a hotel, a commercial complex, some dwellings, and a primary school. All of these buildings face Main Street and the St Etchen's Court. In this direction, Kinnegad River is *ca.* 250m SE of the Development boundary. To the west there is the aforementioned primary school. A complex of football courts is *ca.* 300m NW from the Site. Additional housing estates occur after *ca.* 215m to the West.

The Site location can be seen in **Figure 1.1** below.

Figure 1.1 - Site location and environs (Map Data © Google, adapted by ORS, 2025)

2 Risk Assessment Process

2.1 Introduction

The Office of Public Works (OPW) and Department of Environment, Heritage, and Local Government (Dogleg) published 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' in 2009 (The Guidelines). The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment, and management into the planning process. This report has been prepared in accordance with these guidelines.

2.2 Definition of Flood Risk

Flood risk is determined by both the likelihood of a flood event occurring and the magnitude of its potential consequences. The likelihood of flooding refers to the probability of an event of a certain magnitude or severity occurring within a given year, and it is normally expressed as a percentage. In the other hand, the consequences of flooding will vary depending on the hazards of the flood (e.g. depth of water) and the vulnerability of the receptor (e.g. presence of mitigation structures). Flood risk can be expressed in terms of the following relationship:

- Flood Risk = Likelihood of Flooding x Consequences of Flooding

The likelihood of a flood event is dependent on the nature of the water body (Source) and the possible migratory routes from the water body (Pathways). The consequences of a flood event are dependent on the nature of people and assets impacted (Receptors). The Source – Pathway – Receptor linkage is illustrated in.

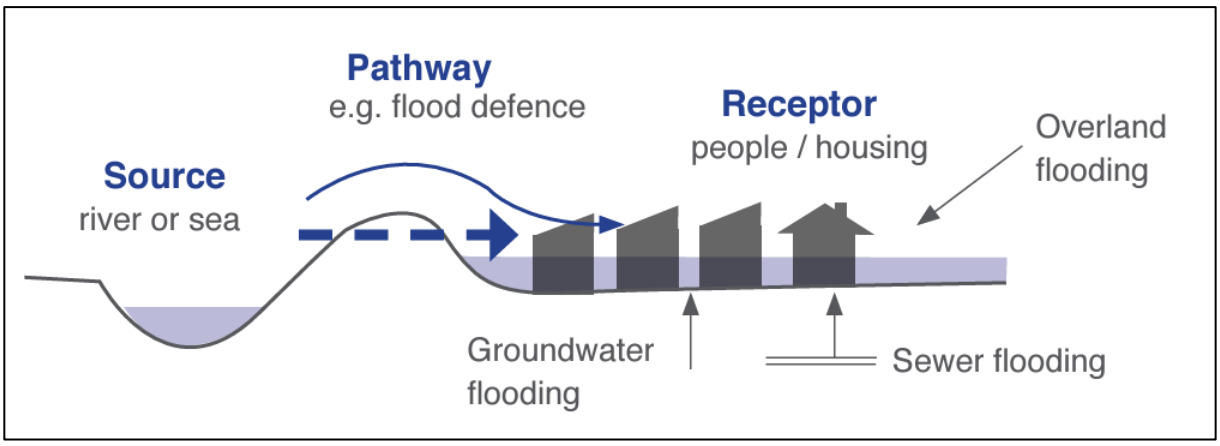


Figure 2.1 - Conceptual representation of Source - Pathway - Receptor model

According to OPW, the main sources of flooding are rainfall (Inland flooding) or higher sea levels (Coastal Flooding). The principal pathways include rivers, drains, sewers, overland flow and river and coastal floodplains. The receptors may include people, their property, and the environment. To accurately determine the potential consequences of flooding, it is essential to assess these three elements – sources, pathways, and receptors - alongside the vulnerability and exposure of receptors.

The Guidelines recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences. The stages of appraisal and assessment

are listed below.

- **Stage 1: Flood Risk Identification –** to identify whether there may be any flooding or surface water management issues.
- **Stage 2: Initial Flood Risk Assessment –** to confirm sources of flooding that may affect an area or proposed development, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.
- **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 or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

2.3 Likelihood of Flooding

As mentioned before, the likelihood of flooding is the probability or frequency of a flood of a specific magnitude or severity occurring or being exceeded in any given year. It is generally expressed as the chance of a particular flood level being exceeded in one year. This return period is described as the Annual Exceedance Probability (AEP). For example, a 1 in 100 or 1% flood is that which would, on average, be expected to occur once in 100 years, though it could happen at any time.

Annual Exceedance Probability is the inverse of return period as shown in **Table 2.1** below.

Table 2.1 - Return period and corresponding AEP

Return Period	Annual Exceedance Probability (%)
1	100
10	10
50	2
100	1
200	0.5
1000	0.1

2.4 Flood Zone

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types or levels of flood zones defined for the purposes of the Guidelines:

- **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); 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). Flood Zone C covers all areas of the plan which are not in zones A or B.

It is important to note that when determining flood zones, the presence of flood protection

structures should be ignored. This is because areas protected by flood defences still carry a residual risk from overtopping or breach of defences and there is no guarantee that the defences will be maintained in perpetuity.

2.5 Objectives and Principles of the Planning Guidelines

The principal actions when considering flood risk are set out in Section 3.1 of the planning guidelines and are summarised below:

1. Flood hazard and potential risk should be determined at the earliest stage of the planning process.
2. Development should preferentially be in areas with minimal flood hazard thereby avoiding or minimising the risk.
3. Development should only be permitted in areas at risk of flooding when there are no alternative or other reasonable sites available.
4. Where development is necessary in areas at risk of flooding an appropriate land use should be selected.
5. A precautionary approach should be applied to reflect uncertainties in flooding datasets and risk assessment techniques and the ability to predict the future climate and performance of existing flood defences.
6. Decisions on development locations may need to be made before development plans are fully reviewed according to the Guidelines and before appropriate flood risk mapping is available.
7. Land required for current and future flood management should be pro-actively identified.
8. Flood risk to, and arising from, new development should be managed through location, layout and design incorporating Sustainable Drainage Systems (SuDS) and compensation for any loss of floodplain.
9. Strategic environmental assessment (SEA) of regional planning guidelines, development plans and local area plans should include flood risk as one of the key environmental criteria.

2.6 The Sequential Approach and Justification Test

The sequential approach has been adopted to ensure that developments are directed towards land that is at low risk of flooding, considering flood zones of river and coastal flooding, the vulnerability of the development and the results of the flood risk assessment. However, this is not always possible, as many towns and city centres are located within flood plains.

The sequential approach is to be applied throughout the planning process as outlined in the Guidelines (**Figure 2.2**).

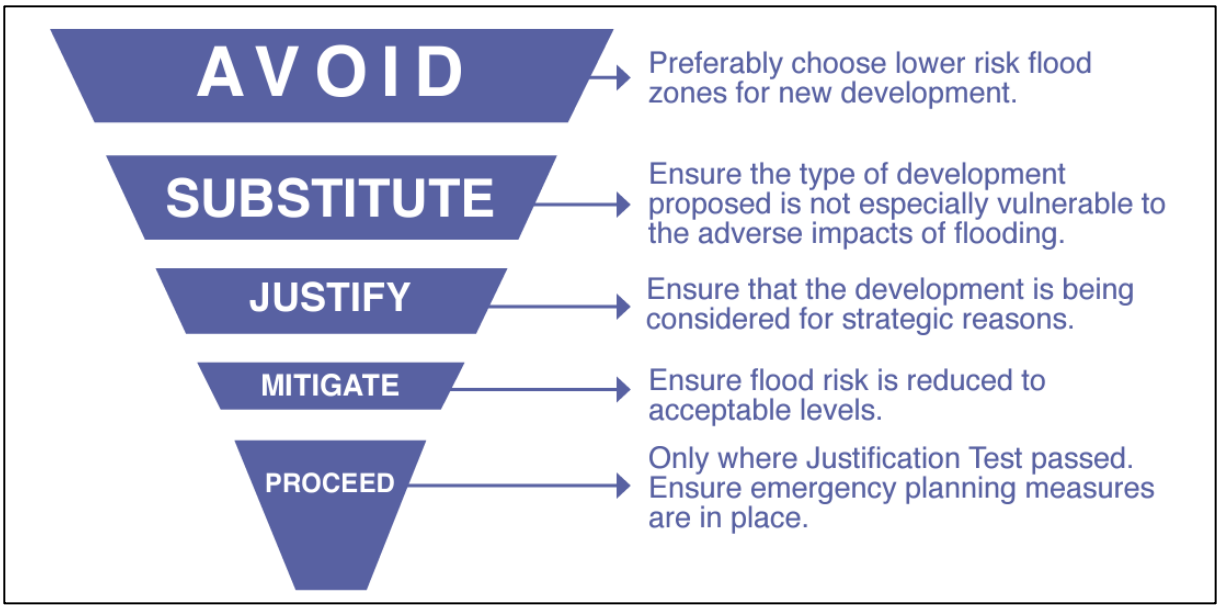


Figure 2.2 - Sequential Approach (Source: The Planning System and Flood Risk Management)

When a development planned within Flood Zones A and B and is considered as highly vulnerable, a strategic justification is necessary to proceed with the planning application. The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of developments that are being considered in areas of moderate or high flood risk. The test comprises the following two processes.

1. Plan-making Justification Test: used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.
2. Development Management Justification Test: used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

The types of development that would be required to meet the Justification Test are illustrated in **Table 2.2** below.

Table 2.2 - Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test

	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

3 Flood Risk Identification

3.1 General

This Flood Risk Identification report reviews existing information and identifies of any flooding or surface water management issues in the vicinity of the proposed site that may warrant further investigation.

Given that the Site is inland, the only flooding risks that can be considered are groundwater, fluvial and pluvial. The Site is located within the Boyne surface water catchment, part of Hydrometric Area 07 in the Eastern River Basin District (ERBD) as defined by the Water Framework Directive (WFD) 1st Cycle. As of the 3rd cycle, the WFD has merged this District with other four (South Eastern, South Western, Shannon and Western) and currently the Site is within the Ireland's River Basin District (IRBD).

The IRBD covers an area of 70,273 km2 and is broken down into 46 catchment management units. The 46 catchment management units are based on main river catchments and these catchments are further broken down into 583 sub-catchments. These 583 sub-catchments contain a total of 4,842 water bodies, ranging from 3 to 15 water bodies in each sub-catchment.

The so-called Eastern River Basin District (ERBD) is home to rich agricultural land, holiday coastline, the city of Dublin and the towns which form the Greater Dublin Area and its commuter belt. With land area of around 6,300 km^2, the Eastern River Basin District covers about one tenth of the entire country and has 350 km^2 of marine waters. The main river catchments in the ERBD are the Boyne, the Nanny/Delvin, the Liffey, and the Avoca/Vartry. The Avoca/Vartry includes many smaller catchments along the coastline. There are 365 river water bodies and 524 natural lakes in the ERBD. Of these lakes, six and two reservoirs, exceed 50 hectares in size, the biggest being Poulaphuca reservoir at around 1,950 hectares. There are eight artificial water bodies within the ERBD.

As with other basin districts, the water system below ground in the East is quite complex because of the wide range of rock types and soils within it. There are 75 groundwater bodies in the ERBD, some of which are restricted to urban areas.

The Boyne Catchment includes the area drained by the River Boyne and by all streams entering the tidal waters between The Haven and Mornington Point, Co. Meath, a total area of 2,694km². The largest urban centre in the catchment is Drogheda. The other main urban centres are Navan, Trim, Kells, Virginia, Bailieborough, Athboy, Kinnegad, Edenderry and Enfield. The Boyne Catchment is divided into 20 subcatchments and has 131 surface water bodies and 41 groundwaterbodies.

The site is specifically located into Boyne_SC_030 Sub Catchment. Key hydrological features within the vicinity of the site include the Kinnegad River (Kinnegad 07), *ca*. 250m South of the Site and downstream is the Correllstown Stream, ca. 950m northeast. Upstream there are the Rossan Stream (Rossam 07), *ca*. 1.5Km southwest of the Site and the Morganstown Stream, *ca*. 1.8 Km southwest of the Site, both flowing to the Kinnegad River. There's also the Aghnagillagh Stream, *ca.* 1.1 Km east of the Site, although this one is within another minor catchment.

See **Figure 3.1** overleaf for an illustration of the hydrological setting within the vicinity of the Site.

Figure 3.1 - Hydrological features in proximity to the Site. (Map Data © Google, adapted by ORS, 2025)

3.2 Data Sources

0overleaf contains all data sources consulted in the preparation of this report.

Table 3.1 - Information Sources Consulted

Source	Comment
OPW Preliminary Flood Risk Assessment (PFRA) maps	Fluvial, Pluvial, Costal and Groundwater flooding examined.
Catchment Flood Risk Assessment and Management (CFRAM) online mapping (Floodinfo.ie)	Fluvial, Pluvial, Costal and Groundwater flooding and OPW flood records examined.
EPA online mapping	GSI Teagasc subsoils map consulted to identify alluvial deposits on site that may indicate the presence of a watercourse and floodplain.
Historical Maps	OSI Geo Hive 6'' Cassini reviewed to look for areas of historic flooding.
EPA – 3rd Cycle Boyne Catchment Report (HA 07), May 2024	Review of the information relating to the Boyne Catchment Assessment (HA 07).
OPW Flood Risk Management Plan for Boyne (UoM 07)	Review flood risk assessment and modelled flood levels for the Boyne (UoM 07).
Eastern CFRAM Unit of Management 07 – Boyne Inception Report	Identification and review of CFRAM flood mapping and modelled flood levels for the Catchment.
Westmeath County Development Plan 2021-2027	To review objectives and policies in relation to flood risk management, strategic economic development, tourism and recreational development and land use zoning objectives
Strategic Flood Risk Assessment: Westmeath County Development Plan 2021-2027	Review flood related objectives and strategy for the County.
Site Drawings	Review site levels relative to estimated flood levels.

3.3 Previous Flood Risk Assessment and Predictive Flood Maps

3.3.1 OPW Flood Maps – Floodinfo.com

Historic Flooding

The OPW flood modelling provide a record of historic flood events. OPW modelling indicates that 1 no. past flood events have occurred within a 1.5km radius of the site, which was located at Corkhill *ca.* 1.2Km west of the site. The source of the flood waters was described as run off (and the cause was Infiltration of runoff into combined sewer). The flooding occurred in the Boyne catchment, on the Kinnegad river, this flooding event started on 18th August 2008 and 19th November 2009. More detailed information regarding the previous flood events within the site surrounding areas and maps are outlined in **Appendix B** – OPW - Previous Flood Events.

Groundwater Flooding

Geological Survey Ireland (GSI) have developed Groundwater Flood Maps for the Republic of Ireland, developed as part of the 2016-2019 'GWFlood' project in collaboration with Trinity College Dublin and the Institute of Technology Carlow. Groundwater is the water that soaks into the ground from rain and can be stored beneath the ground. Groundwater floods occur when the water stored beneath the ground rises above the land surface. The Historic Groundwater Flood Map layer on the OPW map viewer shows the observed peak flood extents caused by groundwater in Ireland.

Considering a 4km distance radius from the site, there are no groundwater flood extents observed on the OPW map viewer, thus, no groundwater flood events occurred within site boundary or immediate vicinity. The closest groundwater flood event observed is located ca. 4.8km North of the site, in the surroundings of the townlands of Derrymore, Brutonstown and Ballyhaw.

Surface Water Flooding

The GSI developed a Winter 2015/2016 Surface Water Flooding map which attempted to measure the surface water flood extents.

According to this map viewer, the closest surface water flood extents that occurred during the Winter of 2015/2016 is located *ca.* 1.12Km SW of the proposed site.

In more recent dates, the GSI developed the Synthetic Aperture Radar (SAR) Seasonal Flood Maps which shows observed peak flood extents which took place between Autumn 2015 and Summer 2021.

The flood maps show flood extents which have been observed to occur. A lack of flooding in any part of the map only implies that a flood was not observed. It does not imply that a flood cannot occur in that location at present or in the future. Based on this, the closest surface water flood extents to the Site are shown in the **Table 3.2.**

Table 3.2 - SAR observed peak flood extents closest to the Site

SAR Seasonal Flood Maps [GSI]	Location	Confidence of the mapping	Flood ID
2015-2016 SAR	1.1 Km SW	Low	25627
2016-2017 SAR	1.45 Km SW	High	13134
2017-2018 SAR	3.3 Km WSW	Low	9129
2018 – 2019 SAR	1.1 Km SW	Low	21540
2019 – 2020 SAR	0.5 Km S	Low	12653
2020 – 2021 SAR	0.97 Km SW	Low	21845
	0.93 Km NE	Low	1149

3.3.2 Preliminary Flood Risk Assessment (PFRA)

The Preliminary Flood Risk Assessment (PFRA) involved a national screening exercise, based on available and readily derivable information, to identify areas where there may be a significant risk associated with flooding (referred to as Areas for Further Assessment, or AFA's). This report uses two concepts to interpret the areas which are likely to be flooded and the intensity of flooding: The Flood Risk and Flood Hazard.

Flood risk is a combination of the probability and degree of flooding (the 'hazard') and the damage caused by the flood (the 'consequences').

Flood hazard can arise from a range of sources of flooding, including:

- Natural Sources:
    - *Rivers (fluvial, including increased flow from snowmelt)*
    - *Sea (coastal and tidal)*
    - *Groundwater*
    - *Rainfall (pluvial)*
    - *Tsunami (due to earthquakes, seabed landslips)*
- Infrastructural Sources:
    - *Urban Storm-water Drainage Systems (due under capacity)*
    - *Reservoirs (due to breach of walls / embankments)*
    - *Water Supply Systems (due to burst water mains)*
    - *ESB Infrastructure (hydropower dams and embankments)*
    - *Waterways Ireland Infrastructure (embanked canals)*

Historic Flood Risk Assessment

The PFRA Report identified and assessed the areas that have flooded and suffered significant adverse consequences from flood events in the past may continue to be subject to significant flood risk. An assessment of historic flood events has therefore been undertaken to identify possible Areas for Further Assessment (AFA).

Based on the Flood Hazard Mapping Database, Towns, Townlands and other spatial areas where records were available for past flood events were assigned a historic hazard category based on the criteria set out in **0.**

Table 3.3 - Categorisation of Historic Hazard

Category	No. of Specific Past Floods (Dated / Undated)	No. of Locations of Reported Recurring Floods	No. of Properties Flooded[1]
4	10+	15+	50+
3	5 – 9	10 – 14	10 – 49
2	2 – 4	5 – 9	1 – 9
1	1	1 – 4	0
0	0	0	-

From the Appendix C.1 of the PFRA, summarized overleaf in the **Table 3.4**, can be seen the records of number of past flood events for Westmeath County and its Historic Hazard Category.

[1] In the case which information was available on the number of properties flooded during a past event were assigned a historic risk category in the Towns, Townlands and other spatial areas

Table 3.4 - Records of number of past flood events for Westmeath County

County	Name Of Location	No. of Past Floods	Historic Hazard Category
Westmeath	Athlone_&_Environs	29	4
Westmeath	Mullingar_&_Env	9	2
Westmeath	Kilgarvan Glebe	3	2
Westmeath	Cloonbonny	2	2
Westmeath	Ballaghkeeran Big	2	2
Westmeath	Ballagoeeran Little	2	2
Westmeath	Ballinlough (Kilkenny West By)	2	2
Westmeath	Ballygowlan	2	2
Westmeath	Ballynacliffy	2	2
Westmeath	Ballynahownwood	2	2
Westmeath	Bellaugh	2	2
Westmeath	Bethlehem	2	2
Westmeath	Bleanphuttoge	2	2
Westmeath	Bogganfin	2	2
Westmeath	Bunown	2	2
Westmeath	Canal And Banks	2	2
Westmeath	Cappankelly	2	2
Westmeath	Carrickobreen	2	2
Westmeath	Cartron (Kilkenny West By)	2	2
Westmeath	Clonbonny	2	2
Westmeath	Creaghduff	2	2
Westmeath	Creaghduff South	2	2
Westmeath	Creggan	2	2
Westmeath	Whinning	2	2
Westmeath	Doovoge	2	2
Westmeath	Friars Island	2	2
Westmeath	Garrynafela	2	2
Westmeath	Glassan	2	2
Westmeath	Golden Island	2	2
Westmeath	Hillquarter	2	2
Westmeath	Killeenmore	2	2
Westmeath	Killinure North	2	2
Westmeath	Killinure South	2	2
Westmeath	Kippinstown	2	2
Westmeath	Meehan	2	2
Westmeath	Muckanagh	2	2
Westmeath	Portaneena	2	2
Westmeath	Portlick	2	2
Westmeath	Ross	2	2
Westmeath	Srameen	2	2
Westmeath	Tonagh	2	2
Westmeath	Tullin	2	2

Based on the information summarised in the **Table 3.4** it can be noted that, except for Athlone and environs, Westmeath overall is classified as a category “2” for Historic Flooding Hazard, which can be interpreted as moderate risk level. no register was available for Kinnegad, the town where the Site is located.

Flood Risk Analysis

The flood risk was evaluated by determining a Flood Risk Index, present in **Table 3.5**, which integrates the probability of flooding and the vulnerability classification of the receptor. This numeric metric allowed the risk of different types of assets to be accurately compared. Additionally, as part of the PFRA study, maps of the country were produced showing the indicative fluvial, pluvial, coastal and groundwater flood extents.

Table 3.5 - Matrix for Determining the Flood Risk Index

Vulnerability Class	Vulnerability Class Factor	Probability of Flood Event (Annual Exceedance Probability)		
		10% - High	1% - Medium	0.1% - Low
Critical Vulnerability	**2500**	25000	2500	250
Extreme Vulnerability	**250**	2500	250	25
High Vulnerability	**25**	250	25	2.5
Moderate Vulnerability	**2.5**	25	2.5	0.25
Low Vulnerability	**1**	10	1	0.1

Summarised below is Appendix E.1 for Westmeath from the PFRA showing the locations where the predictive Flood Risk Index is greater than 150 based on fluvial and coastal flooding.

Table 3.6 - Predictive analysis outcomes for fluvial and coastal flood risk

County	ID No.	Location	Flood Risk Index	
Westmeath	70027	1SCH_Milltownpas	291	**Extreme Vulnerability**
Westmeath	260448	Athlone	8141	**Critical Vulnerability**
Westmeath	70034	Earlsmeadow	220	**High Vulnerability**
Westmeath	250425	Incacrone	152	**High Vulnerability**
Westmeath	250426	Kilbeggan	808	**Extreme Vulnerability**
Westmeath	250431	Mullingar	590	**Extreme Vulnerability**

The Preliminary Flood Risk Assessment (PFRA) has identified County Westmeath as being at high to extreme risk from fluvial and coastal flooding in certain locations, with some property and financial damage having been recorded in recent decades.

Some locations within the county are identified as facing elevated risks, with the Flood Risk Index ranging from 150 to 8,141 for fluvial and coastal flooding. Some of these locations are designated as probable or possible Areas for Further Assessment (AFA) by the PFRA in its Appendix F; however, none include the proposed site location. The closest probable AFA is Riverstown, *ca*. 5.4 km Northwest of the site. Therefore, no detailed flood modelling data is available for the proposed site.

There is no flood risk prediction for County Westmeath arising from groundwater flood risk as shown in Appendix E.2 of the main PFRA report. The same is true for pluvial flood risk, where nothing is found for the county in Appendix E.3 Predictive Analysis Outcomes for Pluvial Flood Risk. As the data for these two are only shown for those locations where the predictive flood risk index is greater than 150, it is not possible to admit that there is no risk for pluvial or

groundwater within the county, the risk can be assumed that some may exist with a threshold of 150 in the index, or a high vulnerability for these types.

Given that the PFRA report does not specifically mention the proposed site location, it can be concluded that the site is in **Flood Zone C**, where the likelihood of flooding is very low.

3.3.3 Catchment Flood Risk Assessment and Management (CFRAM)

The Catchment Flood Risk Assessment and Management (CFRAM) study was commissioned in each River Basin District to inform Ireland's medium to long-term strategy for the reduction and management of flood risk throughout the country. Data collection included historic flood event and rainfall records, high resolution floodplain surveying, and detailed channel/structure surveys of selected rivers. Hydraulic models determined flood hazard (where rivers or the sea is likely to flood in extreme events) and flood risk (the resultant impact on people, the economy, and the environment).

The Office of Public Works (OPW) is responsible for the management of the CFRAM programme and for reporting, coordination, and consultation under the Floods Directive. The CFRAM programme provides a detailed assessment of flooding in areas identified as AFAs during the PFRA study. Catchment wide Flood Risk Management Plans were also developed as part of the programme. As a result, a series of maps which indicate the low, medium, and high probability flood risk for areas throughout Ireland were produced.

The Site is part of the Eastern CFRAM study area and is located within the River Boyne catchment, which covers 2,694 km². The largest urban centre in the catchment is Drogheda. The other main urban centres are Navan, Trim, Kells, Virginia, Bailieborough, Athboy, Kinnegad, Edenderry and Enfield. The total population of the catchment is *ca*. 196,400 with a population density of 73 people per km². The catchment is underlain by metamorphic rocks in the north and limestone bedrock in the centre and south of the catchment. There are extensive sand and gravel areas in this catchment, particularly along the upper reaches of the Boyne. The Site is within Kinnegad and Aghnagillagh Streams sub-catchment (Boyne_SC_030), one of the 20 sub-catchments in the Boyne Catchment.

The Kinnegad River (EPA: Kinnegad_07) rises in Enniscoffey, *ca*. 10Km Northeast of the Site, and it runs towards the Boyne River. On its way to its mouth it is fed by 13 no. watercourses, the Pass of Kilbride, Hightown or Balloughter, Clonfad, Baltigeer, Coolcahan, Killaskillen, Monganstown, Rossan, Correllstown River, an unnamed one (Kinnegad_07), Aghamore, Ardnamullan, and Anneville or Clonard Old.

The Aghnagillagh is located *ca*. 1.0 Km to the East of the Site, and it begins in the surrounding of Hardwood and flows to the Boyne River, *ca*. 4.2 Km before the mouth of the Kinnegad. This river is within the Boyne_SC_030 sub-catchment, but the Site is not within Aghnagillagh's catchment.

In terms of flood modelling, CFRAM maps for three different scenarios are available on OPW website as follows:

1. Present Day / Current Scenario: generated using methodologies based on historic flood data, without taking account of potential changes due to climate change.
2. Mid -Range Future Scenario (MRFS): Likely future scenario – allowances for increased flow/sea level rise

3. High-End Future Scenario (HEFS): Extreme future scenario - allowances for significant increased flow/sea level rise.

The allowances which should typically be used for each of these scenarios, are set out on **Table 3.7**.

Table 3.7 - Allowances in Flood Parameters for the Mid-Range and High-End Future Scenarios

	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Peak Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year1	- 0.5 mm / year1
Urbanisation	No General Allowance – Reviewed on Case-by-Case Basis	No General Allowance – Reviewed on Case-by-Case Basis
Forestation	- 1/6 Tp2	- 1/3 Tp2

However, the proposed site is not included in the CFRAM maps for any flooding scenarios or sources. As a result, no flood extents models are available for the surrounding areas.

3.3.4 Groundwater Flooding Probability Maps

Geological Survey Ireland (GSI) have developed Groundwater Flood Maps for the Republic of Ireland. The maps were developed in as part of the 2016-2019 GWFlood project in collaboration with Trinity College Dublin and the Institute of Technology Carlow. Groundwater is the water that soaks into the ground from rain and can be stored beneath the ground and it may flood when the water table rises above the land surface.

The Groundwater Flooding Probability maps show the expected flood extent of groundwater flooding in limestone regions for annual exceedance probabilities (AEP's) of 10%, 1% and 0.1% which correspond with a return period of every 10, 100 and 1000 years, respectively. Groundwater flood extents in low to high probabilities are noted *ca.* 21 km northwest of the proposed site and the maps can be seen in **Appendix C** – GSI Groundwater Flooding Probability Maps.

3.3.5 National Indicative Fluvial Maps (NIFM)

The National Indicative Fluvial Maps (NIFM) have been created to identify areas where further assessment would be required if development is being considered within or adjacent to the flood extents shown on the maps. These maps are 'predictive' flood maps showing indicative areas predicted to be inundated during a theoretical fluvial flood event with an estimated probability of occurrence.

The NIFM maps refer to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'. This represents the probability of an event of this severity occurring in any given year. They are also commonly referred to in terms of a return period (e.g. the 100-year flood), although this period is not the length of time that will elapse between two such events

occurring, as, while unlikely, two very severe events may occur within a short space of time.

The NFIM maps were also developed for Mid-Range and High-End future scenarios, following the same specifications presented in **Table 3.7.**

The NIFM fluvial flood extents for the Present-Day scenario, covering 0.1% and 1% annual exceedance probabilities, show flood-prone areas *ca.* 590m northeast of the site. The mid-range and high-end future scenario maps do not indicate a significant extension of these flood extents towards the site. The NIFM maps, as available on Floodinfo.ie, are included in **Appendix D** – National Indicative Fluvial Mapping.

3.3.6 OPW Drainage Maps – Floodinfo.ie

Arterial Drainage Schemes are schemes the OPW has a statutory duty to maintain under Part II of the Arterial Drainage Act, 1945. These schemes were carried out under the Arterial Drainage Act, 1945 to improve land for agriculture and to mitigate flooding. Rivers, lakes, weirs and bridges were modified to enhance conveyance, embankments were built to control the movement of flood water. Arterial Drainage Scheme (ADS) maps of the area indicate that the closest ADS Channel, labelled as C1/44 and respective Benefited Lands, which are part of the Boyne Scheme are located *ca*. 200m South of the site. The ADS Channel C1/44/12/1 is *ca.* 600m North of the Site, although its Benefited Land is *ca.* 230m North of the Site and it overlays the northernmost part of the Folio no. WH6007 within which the site is located. The published Arterial Drainage Scheme (ADS) maps have been included in **Appendix E** – Arterial Drainage Map of this report.

Likewise, local authorities are charged with responsibility to maintain Drainage Districts. The Arterial Drainage Act, 1945 contains a number of provisions for the management of Drainage Districts in Part III and Part VIII of the act. As per Drainage District (DD) maps of the area, the proposed site is not located in the vicinity of any Direct Drainage (DD) Schemes and neither on its benefitted lands.

3.3.7 OPW Flood Risk Management Plan – Boyne River Basin (UOM07)

In 2018, the Office of Public Works (OPW) carried out the Flood Risk Management Plan for the River Boyne Basin. The overall objective of the Plan is to manage and reduce the potential consequences of flooding, recognising other benefits and effects across a broad range of sectors including human health, the environment, cultural heritage and economic activity, through viable flood protection schemes and other measures informed by a sound understanding of the flood risk established through the preparation of flood maps.

Although the Boyne catchment is subdivided into 20 other sub-catchments, for the purposes of this study only the one in which the site is located, sub-catchment Boyne_SC_030, was considered and no Areas for Further Assessment (AFAs) were identified. As a result, there is no specific flood management measures for the proposed site location. As general measures that should be applied for all areas within the catchment, the following can be highlighted:

- ***Sustainable Planning and Development Management -*** The Planning Authorities will ensure proper application of the Guidelines on the Planning System and Flood Risk Management (DHPLG/OPW, 2009) in all planning and development management processes and decisions, including where appropriate a review of existing land use zoning and the potential for blue/green infrastructure, in order to support sustainable development,

taking account of the flood maps produced through the CFRAM Programme and parallel projects.

- ***Sustainable Urban Drainage Systems (SUDS) -*** In accordance with the Guidelines on the Planning System and Flood Risk Management (DHPLG/OPW, 2009), planning authorities should seek to reduce the extent of hard surfacing and paving and require the use of sustainable drainage techniques.
- ***Voluntary Home Relocation Scheme -*** Implementation of the once-off Voluntary Homeowner Relocation Scheme that has been put in place by Government in 2017. The Interdepartmental Flood Policy Co-ordination Group is considering the policy options around voluntary home relocation for consideration by Government
- ***Consideration of Flood Risk in local adaptation planning -*** Local authorities should take into account the potential impacts of climate change on flooding and flood risk in their planning for local adaptation, in particular in the areas of spatial planning and the planning and design of infrastructure.
- ***Assessment of Land Use and Natural Flood Risk Management Measures -*** The OPW will work with the EPA, local authorities and other agencies during the project-level assessments of physical works and more broadly at a catchment-level to identify, where possible, measures that will have benefits for both WFD and flood risk management objectives, such as natural water retention measures, and also for biodiversity and potentially other objectives, including the use of pilot studies and applications, where possible.
- ***Minor Works Scheme -*** The OPW will continue the Minor Works Scheme subject to the availability of funding and will keep its operation under review to assess its continued effectiveness and relevance.
- ***Maintenance of Arterial Drainage Schemes and Existing Flood Relief Schemes*** -such as the Boyne (C1/44) Catchment Drainage Scheme. There is one Arterial Drainage Scheme and one existing flood relief scheme within the Boyne River Basin, namely the Boyne Arterial Drainage Scheme and the Mornington Flood Relief Scheme respectively.
- ***Protection: Maintenance of Drainage Districts -*** There are six Drainage Districts within the Boyne River Basin, namely the Owenroe & Moynalty DD, Lough Crew DD, Ballycowan DD, Carbury Hill Stream DD, Foranwell DD and Garr DD. None of them is pertinent to the Site.
- ***Maintenance of Channels Not Part of a Scheme -*** Outside of the Arterial Drainage and Drainage District Schemes, landowners who have watercourses on their lands have a responsibility for their maintenance. There are none of this type mapped next to the Site.

3.3.8 Westmeath County Development Plan (WMCDP) (2021-2027)

The Westmeath County Development Plan 2021 - 2027 sets out a series of proposed policy objectives with supporting rationale for development up to 2027. The overall objective of the Plan, in accordance with the requirements of the Planning & Development Act 2000 (as amended), is to promote the zoning of land for the exclusive or predominant use of particular areas for particular purposes; to provide or facilitate the provision of infrastructure including transport, energy and communications facilities, water supply and sewerage services; to conserve and protect the environment including, in particular, the archaeological and natural heritage; to promote the management of landscape features, integrating the planning and sustainable development of the area with the social, community and cultural needs of the area and its population, preserving the character of the landscape, protecting buildings or parts of buildings which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, preserving the character of architectural conservation areas, and

developing and renewing areas identified in the Core Strategy as being in need of regeneration.

In addition, the promotion of sustainable settlement and transport strategies in urban and rural areas, including the promotion of measures to reduce energy demand and anthropogenic greenhouse gas emissions and to address the need to adapt to climate change, in particular having regard to the location, layout and design of new development.

The plan highlights that climate change will bring flooding issues to the County. As a result, addressing flood risk in spatial planning has become more crucial than ever. **Chapters 10 - Transport, Infrastructure and Energy, 11 – Climate Action** and **16 - Development Management Standards** detail the county's policies and objectives for Flood, Flood Risk and Flood Risk Management, which include:

- ***TRANSPORT, INFRASTRUCTURE AND ENERGY – Flood Risk Policy Objectives:***
    - ***CPO 10.96*** *- Implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Westmeath County Development Plan 2021- 2027.*
    - ***CPO 10.97*** *- Have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management (DoEHLG/OPW 2009) and Circular PL2/2014, through the use of the sequential approach and application of the Justification Tests in Development Management.*
    - ***CPO 10.98*** *- Ensure that a flood risk assessment is carried out for any development proposal, within 200m of a watercourse and at risk of flooding, in accordance with the Planning System and Flood Risk Management (DoEHLG/OPW 2009). This assessment shall be appropriate to the scale and nature of risk to the potential development.*
    - ***CPO 10.99*** *- Support the implementation of recommendations in the CFRAM Programme to ensure that flood risk management policies and infrastructure are progressively implemented.*
    - ***CPO 10.100*** *- Support the implementation of recommendations in the Flood Risk Management Plans (FRMP's), including planned investment measures for managing and reducing flood risk.*
    - ***CPO 10.101*** *- Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate maintenance access thereto.*
    - ***CPO 10.102*** *- Assist the OPW in developing catchment-based Flood Risk Management Plans for rivers in County Westmeath and have regard to their provisions/recommendations.*
    - ***CPO 10.103*** *- Protect and enhance the County's floodplains and wetlands as 'green infrastructure' which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defenses in the future, subject to normal planning and environmental criteria.*
    - ***CPO 10.104*** *– Implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Westmeath County Development Plan 2021-2027.*
    - ***CPO 10.105*** *- Have regard to the "Guidelines for Planning Authorities on the Planning System and Flood Risk Management" (DoEHLG/OPW 2009) and Circular PL2/2014,*

through the use of the sequential approach and application of the Justification Tests in Development Management.

- ***CPO 10.106*** *- Ensure that a flood risk assessment is carried out for any development proposal within 200m of a watercourse and at risk of flooding, in accordance with the "Guidelines for Planning Authorities on the Planning System and Flood Risk Management" (DoEHLG/OPW 2009). This assessment shall be appropriate to the scale and nature of risk to the potential development.*
- ***CPO 10.107*** *- Support the implementation of recommendations in the CFRAM Programme to ensure that flood risk management policies and infrastructure are progressively implemented.*
- ***CPO 10.108*** *- Support the implementation of recommendations in the Flood Risk Management Plans (FRMP's), including planned investment measures for managing and reducing flood risk.*
- ***CPO 10.109*** *- Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate maintenance access thereto.*
- ***CPO 10.110*** *- Assist the OPW in developing catchment-based Flood Risk Management Plans for rivers in County Westmeath and have regard to their provisions/recommendations.*
- ***CPO 10.111*** *- Protect and enhance the County's floodplains and wetlands as 'green infrastructure' which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defenses in the future, subject to normal planning and environmental criteria.*
- ***CPO 10.112*** *- Protect the integrity of any formal (OPW or Westmeath County Council) flood risk management infrastructure, thereby ensuring that any new development does not negatively impact any existing defense infrastructure or compromise any proposed new infrastructure.*
- ***CPO 10.113*** *- Ensure that where flood risk management works take place that the natural and cultural heritage, rivers, streams and watercourses are protected and enhanced.*
- ***CPO 10.114*** *- Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.*
- ***CPO 10.115*** *- Consult, where necessary, with Inland Fisheries Ireland, the National Parks and Wildlife Service and other relevant agencies in the provision of flood alleviation measures in the County.*

- ***TRANSPORT, INFRASTRUCTURE AND ENERGY – Stormwater Management Policy Objectives:***

  - ***CPO 10.116*** *- Support in conjunction with Irish Water the improvement of storm water infrastructure to improve sustainable drainage and reduce the risk of flooding in urban environments.*
  - ***CPO 10.117*** *- Implement policies contained in the Greater Dublin Strategic Drainage Study (GDSDS) in relation to SUDS and climate change.*
  - ***CPO 10.118*** *- Ensure new development is adequately serviced with surface water drainage infrastructure which meets the requirements of the Water Framework Directive, associated River Basin Management Plans and CFRAM Management Plans.*

- ***CPO 10.119*** *- Require that planning applications are accompanied by a comprehensive SUDs assessment that addresses run-off quantity, run-off quality and its impact on the existing habitat and water quality.*
- ***CPO 10.120*** *- Ensure that in public and private developments in urban areas, both within developments and within the public realm, seek to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.*
- ***CPO 10.121*** *- Ensure appropriate maintenance of surface water drainage infrastructure to avoid flood risk*

- ***CLIMATE ACTION – Climate Action Policy Objectives:***

  - ***CPO 11.1 -*** *Support the implementation and achievement of European, National, Regional and Local objectives for climate adaptation and mitigation as detailed in the following documents, taking into account other provisions of the Plan (including those relating to land use planning, energy, sustainable mobility, flood risk management and drainage) and having regard to the Climate mitigation and adaptation measures which have been outlined through the policy objectives in this Development Plan:*

    - *National Mitigation Plan (2017 and any subsequent versions);*
    - *National Climate Change Adaptation Framework (2018 and any subsequent versions);*
    - *Climate Action Plan (2019 and any subsequent versions);*
    - *Any Regional Decarbonisation Plan prepared on foot of commitments included in the emerging Regional Spatial and Economic Strategy for the Eastern and Midland Region;*
    - *Relevant provisions of any Sectoral Adaptation Plans prepared to comply the requirements of the Climate Action and Low Carbon Development Act 2015, including those seeking to contribute towards the National Transition Objective, to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050; and*
    - *Westmeath County Council Climate Change Adaptation Strategy 2019-2024.*

- ***DEVELOPMENT MANAGEMENT - Standards Policy Objectives - Climate:***

  - ***CPO 16.61*** *Assess applications for development, having consideration to any national guidelines and criteria set out under the sub-headings below in respect of sustainable building practices and renewable energy that serve to reduce energy demand, reduce greenhouse gas emissions and address the necessity of adaptation to climate change in accordance with national and regional policy. All new development proposals will be required to include measures that incorporate sustainable building practices in accordance with the following criteria:*

    - *Manages flood risk, including through sustainable drainage systems (SUDS) and flood resilient design for infrastructure and property;*
    - *Enhance flood resilience of buildings, e.g. elevated work surfaces and storage facilities, raised sockets and electrical infrastructure, enhanced flood boards;*

Given that the proposed development is a Large-Scale Residential Development (LRD) located

within the CS – Consolidation Site zoning next to the town centre, **Chapters 09 – Rural Westmeath,** and **12 – Natural Heritage and Green Infrastructure** should also be emphasized. These chapters aim to promote a balanced urban and rural environment, ensuring future growth adheres to sustainable development principles and the preservation of the Natural Heritage. Key objectives for settlement and housing development in the County include:

- ***RURAL WESTMEATH – Environmental Capacity - Rural Housing Criteria Policy Objectives:***

    - ***CPO 9.9*** *– Protect the natural assets of the county including ground and surface water and ensure that physical standards are met including soil conditions suitable for effluent disposal and the avoidance of flood areas.*

- ***NATURAL HERITAGE AND GREEN INFRASTRUCTURE - Wetlands Policy Objectives:***

    - ***CPO 12.51*** *- Protect floodplains, wetlands and watercourses, for their biodiversity and flood protection value.*

- ***NATURAL HERITAGE AND GREEN INFRASTRUCTURE - Waterways Policy Objectives:***

    - ***CPO 12.58*** *Ensure that the County's watercourses are retained for their biodiversity and flood protection values and to conserve and enhance where possible, the wildlife habitats of the County's rivers and riparian zones, lakes, canals and streams which occur outside of designated areas to provide a network of habitats and biodiversity corridors throughout the county.*

The WMCDP has designated Kinnegad as a Self-sustaining Growth Town (SSGT) once the Town has a moderate level of jobs and services – including sub-county market towns and commuter towns with good transport links and capacity for continued commensurate growth to become more self-sustaining. Kinnegad, due to its proximity to Dublin experienced high levels of population growth in the 1990s. The provision of future economic opportunities has a key role to play in reversing commuting trends through increasing the ratio of jobs to resident workers.

Detailed information about Kinnegad, including its flood risk map, is available in the Plan. The Kinnegad Flood Map indicates that the proposed site is classified as Flood Zone C. A copy of this map can be found in **Appendix F** – Westmeath County Development Plan Maps.

In **Chapter 08 – Settlement Plans,** the document highlights specific zoning objectives for the Town. The most relevant ones for the purpose of this assessment are as follows:

- ***SETTLEMENT PLANS- Kinnegad - Sustainable Communities Policy Objectives:***

    - ***CPO 8.110*** *- Development proposals on identified lands shall be accompanied by a site-specific Flood Risk Assessment (FRA) carried out in accordance with the methodology set out in 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities, 2009'.*

Moreover, WMCDP indicates that the Site is zoned as CS – Consolidation Site. The primary objective of this zone is to promote the sustainable consolidation of town centres with a focus on the regeneration of infill and brownfield sites through the establishment of a mix of uses, including residential to encourage greater vibrancy outside of business hours. The applicable zoning map for the proposed site location is included in **Appendix F** – Westmeath County Development Plan Maps.

3.3.9 Strategic Flood Risk Assessment as part of WMCDP (2021-2027)

A Strategic Flood Risk Assessment (SFRA) was developed as part of the WMCDP, with its findings and recommendations integrated into the Plan, particularly in the zoning plan. Consequently, the SFRA policies and objectives align with those in the WMCDP, as summarized in **Section 3.3.8**.

According to the SFRA, Kinnegad has as principal risk, which is the Kinnegad River, however this is subject to an OPW Arterial Drainage scheme, and the channel here is widened and deepened. It is highly likely that the actual flood extents are much less conservative than the Benefitting Lands and to some extent the PFRA extents as well. The undeveloped commercial land north of the Kinnegad River is at potential risk of flooding, as mapped by the PFRA flood extents. Based on the completion of a site-based assessment it is highly likely that the actual flood extents are much less conservative than existing mapped flood risk. In other areas, there is minor overlap with existing developed land only and there are no significant undeveloped lands at potential risk. A New Proposed Residential zoning next to the disused quarry lake to the northwest of the town is not a significant risk to the site, but an appropriately detailed FRA should be submitted at development management stage to screen risk further. A more detailed assessment of flood risk from the Kinnegad River would potentially be able to reduce the Flood Zone extent and release further land zoned OS for future zoning and development.

Climate change may increase the sensitivity to pluvial events and expose the city to fluvial flooding events for which its sensitivity is low to moderate.

The Justification Test has been applied to the undeveloped commercial lands and this is presented in Section 9 of the Plan, a Stage 3 detailed FRA must be undertaken at Development Management stage to confirm the extent of Flood Zones A and B. Any proposed development within the site should then apply the Sequential Approach, preferentially avoiding any less vulnerable development within Flood Zone A and setting appropriate development levels within Flood Zone C after having assessed the future impacts of climate change as part of a residual risk analysis. Lands to the north of the Kinnegad River will also require a detailed FRA but since the land use is of a lower vulnerability the Justification Test does not apply. Any proposed development within the site should then apply the Sequential Approach, preferentially avoiding any less vulnerable development within Flood Zone A and setting appropriate development levels within Flood Zone C. Any FRA should be in accordance with approved WMCDP Policy and the guidance provided within the SFRA section on Development Management & Flood Risk.

The assessment has gathered and analysed all historical and modelled flooding data for the area, presenting the findings in a series of maps. The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Based on the maps, there was indicated that the proposed site is in Flood Zone C, with no historical flooding or significant flood risk identified. A copy of the summary of the

Settlement Zoning Review for Kinnegad can be found in **Appendix G** – Strategic Flood Risk Assessment WMCDP Maps.

3.3.10 Site Survey & Drawings

The Site is characterised as being a "Very gently sloping", as per the Slope Gradient Classes from the Food and Agriculture Organization of The United Nations (FAO, 2006). A peak in the site topography, *ca.* 77.5 m AOD, is situated at the westernmost corner of the Site, at the boundary next to the area of the retail business (Eurospar) with a gradual gradient northeastward, to a low of *ca.* 73.04m AOD at the northern boundary next to an adjoining existing housing estate, where there is an existing drain also.

Based on this survey, the terrain has an overall gradient of *ca.*3.35 m over a distance of *ca.* 170m, resulting in a slope of *ca.* 2.0%, towards to the existing drain, the nearest receptor.

The GL on which the development is to be located has a minimum level of 73.004m AOD.

Figure 3.2 below shows the topography of the Site and its water run-off.

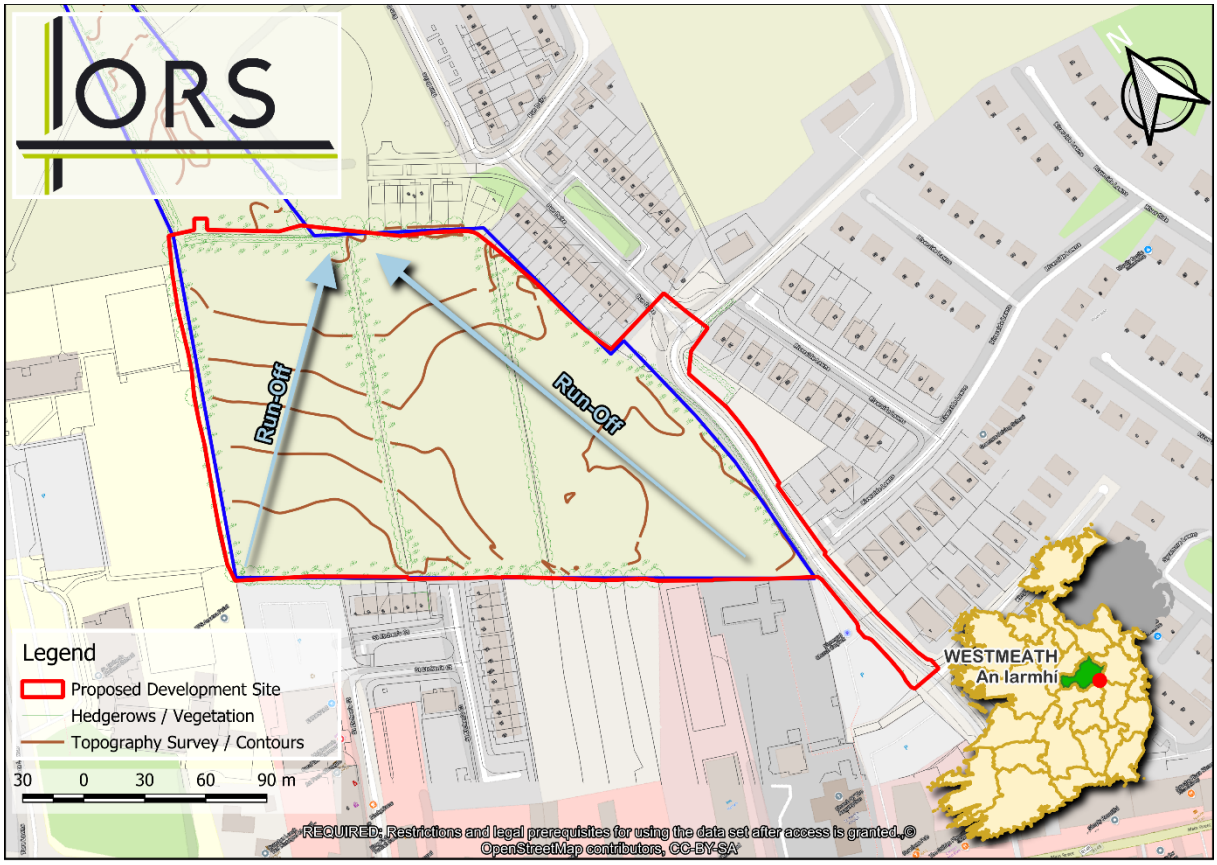


Figure 3.2 - Slope and indication of the Site water run-of

The area is not subject to flooding with 10%, 1% or 0.1% AEPs. Therefore, the proposed development site can be considered low risk and can be classified as Flood Zone C.

The proposed finished floor level (FFL) of the development at its lower level is to be 74.20m

AOD at the eastern portion of the Site, adjacent to the Boreen Bradach Road (L5014). The FFL of the development were compared against the closest 0.1% AEP located at the embankments of the Kinnegad River (ITM X 659942, Y 745139), at ca. 71m AOD, located ca 360m Southern of the lowest FFL (ITM X 659879, Y 745498). The minimum freeboard of the development would therefore be 3.2 m.

The **Figure 3.3** compares the aforementioned 0.1% AEP to the site and contours around the area created based on the IE GSI LiDAR Coverage Transport Infrastructure Ireland (TID Ireland (ROD ITM)-TIL 1833).

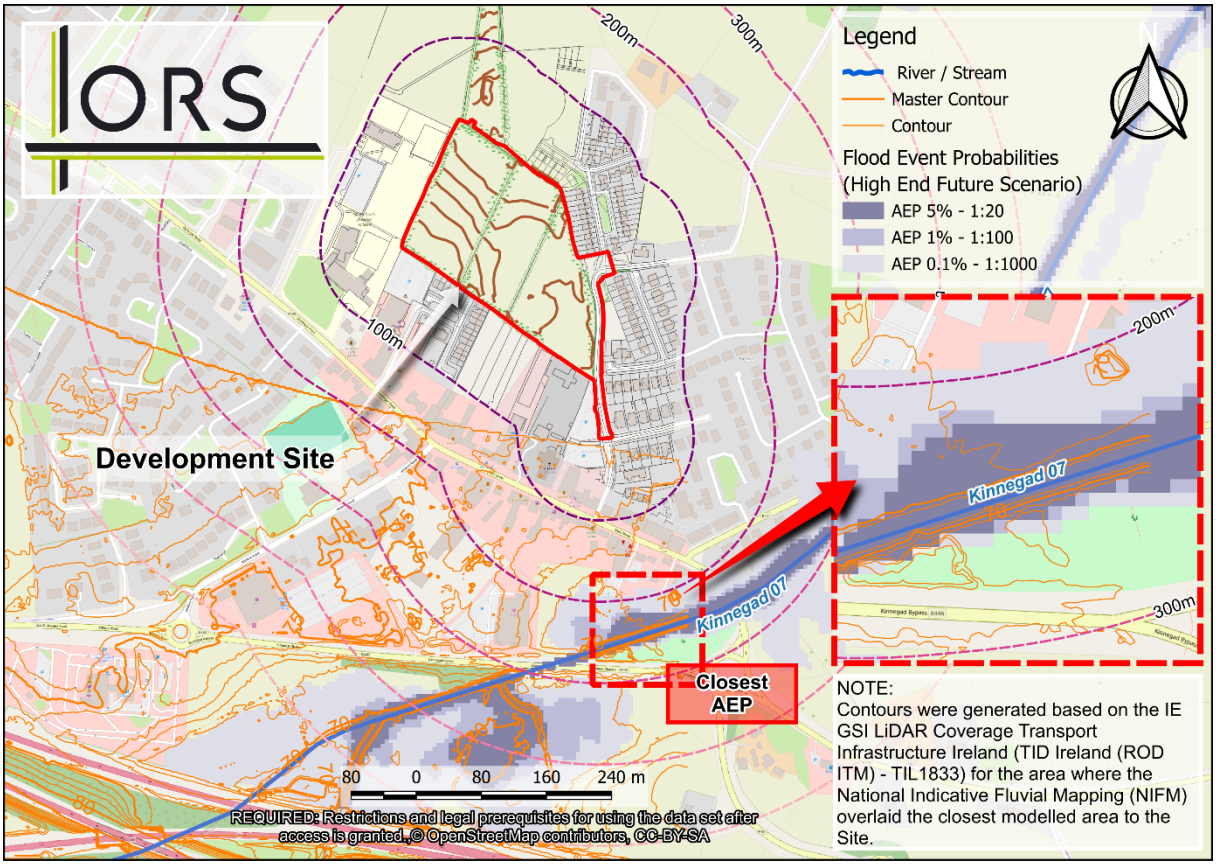


Figure 3.3 - Contours and AEP closest to the site

The site survey is included in **Appendix A** – Topographical Survey and Site Layout of this report.

3.3.11 GSI Maps

The current surface of the site is covered of Agricultura Areas, Pastures (Corine 2018). Teagasc soil mapping indicates that the surface / quaternary sediments at the site are classified as derived from mainly calcareous parent materials, as the Geological Survey of Ireland (GSI) defines it as a Till derived from limestones (TLs) and according to the latest soil classification, the site presents the soil type known as Elton (1000a), constituted by a fine loamy drift with limestones.

The GSI bedrock database indicates that soils of the proposed site are underlain at depth by

the Lucan Formation, which consists of beds of dark grey-black, fine-grained limestone with interbedded calcareous shale.

According to GSI groundwater maps, the site overlies a regionally important aquifer. The groundwater vulnerability index of the site is described as moderate to high. The hydrogeological setting at the site is described as a moderate permeability subsoil overlain by well-drained soil.

Refer to **Appendix H** – GSI Soils & Geology Mapping for GSI soils and bedrock maps.

3.3.12 Historic Maps

Historical maps were consulted to indicate areas of flooding documented previously to records being kept by the current responsible authorities. The enclosed historical map has been prepared using GeoHive, which includes web-based access to authoritative Irish spatial data from multiple providers, including Ordnance Survey Ireland. No areas of flooding were indicated on the 6" Cassini or 25" maps within site boundaries. All historic maps indicate that the land was always covered by pastures. In addition, the Historic Flood Plains and Points maps dating back to *ca*.1830 make no reference to any past flood events occurring within site boundary. Refer to **Appendix I** – Historic Maps for Historical Maps.

The SFRA reiterates that the Site has no Historic Flooding recorded.

4 Justification Test

4.1 Background

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of developments that are being considered in areas of moderate or high flood risk. The Strategic Flood Risk Assessment (SFRA) which was carried out as part of the preparation of the Westmeath County Development Plan (2021-2027) has highlighted the comparison of flood zones with existing or proposed zoning may reveal conflicts between flood risk areas and areas zoned for development. In such cases, the Planning Authority must subject each site to the Justification Test.

The Strategic Flood Risk Assessment (SFRA) also recommends that a Justification Test is carried out for any development proposed for lands in Flood Risk Zone A or B. No part of the proposed development works is scheduled within an area which has been declared as Flood Zone A in or Zone B, as such the Justification Test is not required to be applied to the Site.

5 Conclusions

In reviewing existing information in relation to the flood risk posed to the proposed development site the following sources were consulted:

- OPW Preliminary Flood Risk Assessment (PFRA) maps
- Catchment Flood Risk Assessment and Management (CFRAM) online mapping (Floodinfo.ie)
- EPA online mapping
- Historical Maps
- EPA – 3rd Cycle Boyne Catchment Report (HA 07), May 2024
- OPW Flood Risk Management Plan for Boyne (UoM 07)
- Eastern CFRAM Unit of Management 07 – Boyne Inception Report
- Westmeath County Development Plan 2021-2027
- Strategic Flood Risk Assessment: Westmeath County Development Plan 2021-2027
- Site Drawings

There have been no recorded historic flooding incidents within the Site, being the closest one located *ca*. 1.12 Km Southeast of the Site.

The Site does not overlap with an Area of Further Assessment (AFA) hence there is no specific flood modelling data for the area. However, based on information provided by the Westmeath County Development Plan, the Site can be classified as Flood Zone C, and, therefore, it is not expected that its construction will increase the area flood risk, as such the Justification Test **is not** required to be applied to the Site

The Site is located within the CS – Consolidation Site zoning next to the town centre in the Westmeath County Development Plan 2021-2027. The housing nature of the proposed development aligns with the objectives of this zoning, covering a total area of *ca*. 4.279ha (gross), where the development occupies *ca*. 3.774ha (Net). The primary objective of this zone is to promote the sustainable consolidation of town centres with a focus on the regeneration of infill and brownfield sites through the establishment of a mix of uses, including residential to encourage greater vibrancy outside of business hours. So, the development is designated as acceptable under the WMCDP for this zoning objective.

Additionally, the proposed design measures are considered to be sufficient to prevent on-site flooding. The proposed finished floor level (FFL) of the development at its lower level is to be 74.20m AOD at the eastern portion of the Site, adjacent to the Boreen Bradach Road (L5014). The FFL of the development were compared against the closest 0.1% AEP located at the embankments of the Kinnegad River (ITM X 659942, Y 745139), at ca. 71m AOD, located ca 360m Southern of the lowest FFL (ITM X 659879, Y 745498). The minimum freeboard of the development would therefore be 3.2 m.

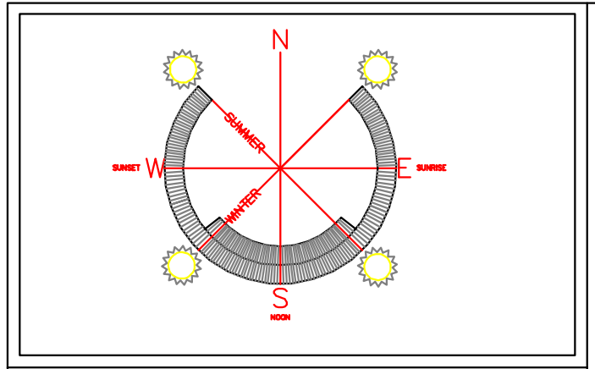
Considering the information discussed in this report, can be concluded that the development **is not** exposed to any flood risk, no flood modelling has indicated that the area is under any risk, so no further assessment is necessary, with the development being in due compliance with the requirements to be developed as proposed regarding flood risk assessment.

Appendix A – Topographical Survey and Site Layout

SURVEY LEGEND

Code		Description
AJ		ARMSTRONG JUNCTION
AV		AIR VALVE
BB		BOTTOM OF BANK
BLD		BOLLARD
CATV		CABLE TV
CL		COVER LEVEL
EIR		EIR MANHOLE
EP		ELECTRICITY POLE
ESB		ELECTRICITY SERVICE COVER
FCE		FENCE
FL		FLOOR LEVEL
FH		FIRE HYDRANT
FWAJ		FOUL WATER AJ
FW		FOUL WATER
GAS		GAS SERVICE COVER
GY		GULLY
HYD		HYDRANT
HGE		HEDGE
IC		INSPECTION CHAMBER
IL		INVERT LEVEL
KB		KERB
KBBOT		KERB BOTTOM
KBTOP		KERB TOP
LS		LAMP STANDARD
LVL		LEVEL
MH		MANHOLE
RD		ROAD EDGE
SB		SLOPE BOTTOM
SC		STOP COCK
SP		SIGNPOST
ST		SLOPE TOP
SV		SLUICE VALVE
SWAJ		SURFACE WATER AJ
SW		SURFACE WATER
TB		TOP OF BANK
TL		TRAFFIC LIGHT
		TREE
TOW		TOP OF WALL
TP		TELEGRAPH POLE
UTO		UNABLE TO OPEN
UTS		UNABLE TO SURVEY
V		VALVE
WLVL		WATER LEVEL
WM		WATER METRE
WV		WATER VALVE

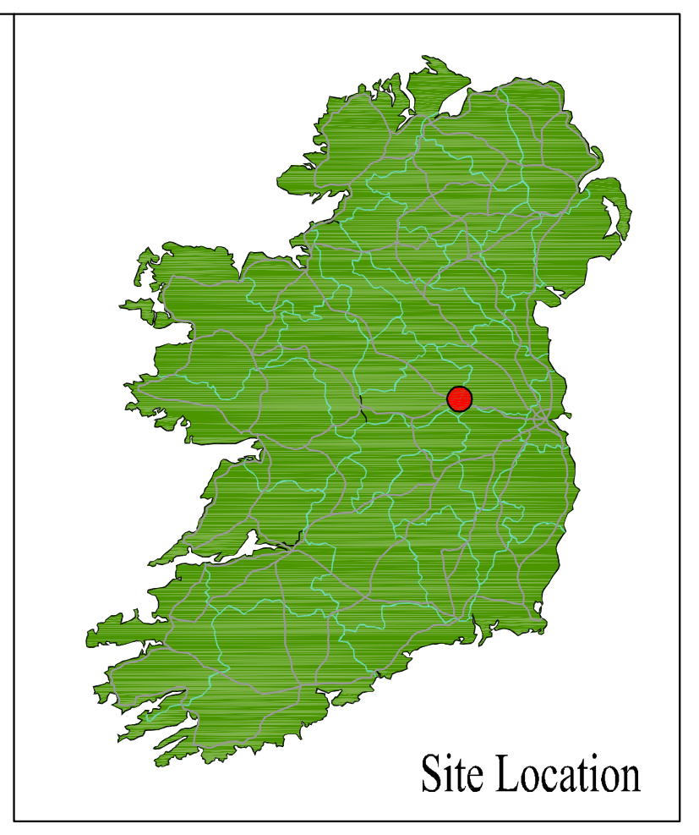
Note:
Significant care has been exercised with all reasonable steps taken in surveying & identifying drainage features.
Survey points are obtained by GPS with underground pipe sizes & identification of service lines estimated by eye.
All surface and foul water layouts & drainage levels should be verified with a GPR Survey and/or Irish Water mapping where available.
No liability shall attach to the surveyor.



Datum
OSi

Grid System
ITM

Ordnance Survey map ref:
N/A


Site Location

J Weir Land Surveying Ltd.

Ballyclare, Longwood, Co. Meath.
Tel: (046) 9555068 Web: jweirlandsurveying.com
Mobile: (086) 172 8780 Email: info@jweirlandsurveying.com

Topographical surveys ● Measured Building surveys
Setting out ● Digital Ground modelling ● As-built surveys
Volumetric reports ● Legal Mapping ● Autocad facilities

Rev.	Date	Description
Rev A	03/10/24	Updated Drainage Detail
Rev B	10/10/24	Additional Survey Information Added

Drawing Title
Topographical Survey

Project
Boreen Bradach, Kinnegad, Co. Westmeath

Client
Corcom Development Partners

Survey Date
22-07-24

Drawing No.
2408-005-01

Sheet No.
N/A

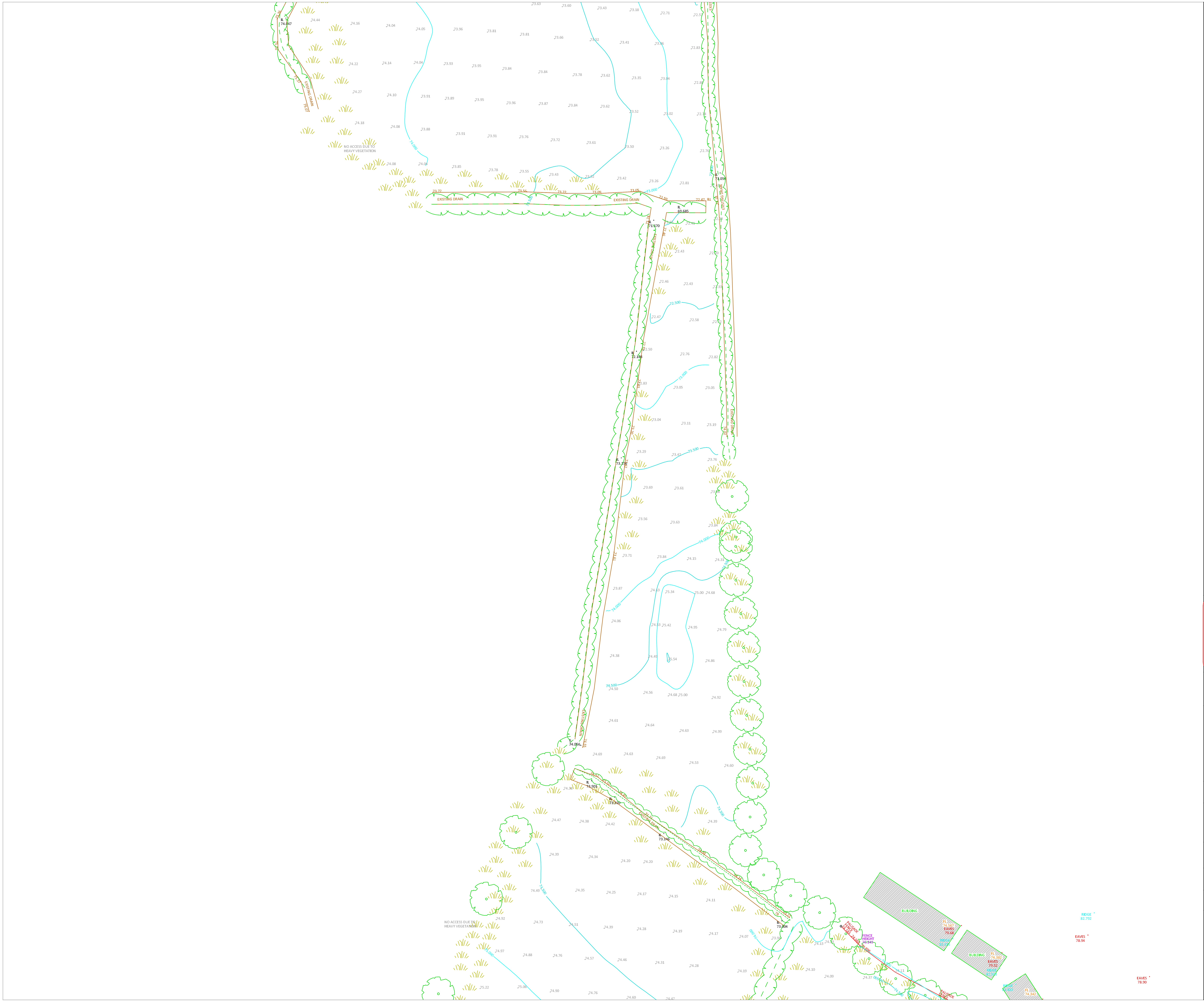
Drawing Date
01-08-24

Scale.
1:500 at A0

Drawn by
CR

Issue Date
02-08-24

The recipient of all survey data acknowledges this data may be inaccurate, contain errors or omissions and the user assumes full responsibility for any risks or damages resulting from any use or reliance of data herein. Although significant care has been excercised and all reasonable steps taken to produce surveys that satisfy survey accuracy standards, surveys are only as accurate as the source data in which they were compiled.
The Company shall not be liable for any inaccuracy of the data provided beyond the specified scale or accuracy, or for any matters resulting from their use for purposes other than stated in the contract. No liability shall attach to the Surveyor in respect of any consequential loss or damages suffered by the Client.
If misleading, inaccurate or otherwise inappropriate information is brought to the Company's attention in a survey or the Company itself identifies any such imprecision or error in a survey, it shall use its reasonable endeavours to fix or remove it and if deemed necessary, will re-conduct the survey within the specified scale, accuracy and specification.



SURVEY LEGEND

□	AJ	ARMSTRONG JUNCTION
⊗	AV	AIR VALVE
—+	BB	BOTTOM OF BANK
○	BLD	BOLLARD
□	CATV	CABLE TV
	CL	COVER LEVEL
▭	EIR	EIR MANHOLE
⊗	EP	ELECTRICITY POLE
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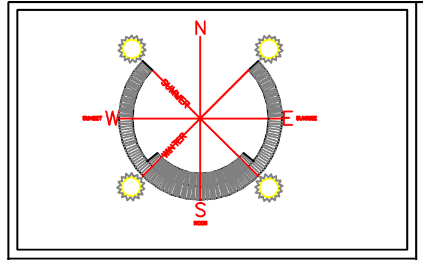

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Grid System
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Ordnance Survey map ref:
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Rev.	Date	Description
Rev A	03/10/24	Updated Drainage Detail
Rev B	10/10/24	Additional Survey Information Added

Drawing Title
Topographical Survey

Project
Boreen Bradach, Kinnegad, Co. Westmeath

Client
Corcom Development Partners

Survey Date
22-07-24

Drawing No.
2408-005-02

Sheet No.
N/A

Drawing Date
01-08-24

Scale.
1:500 at A1

Drawn by
CR

Issue Date
02-08-24

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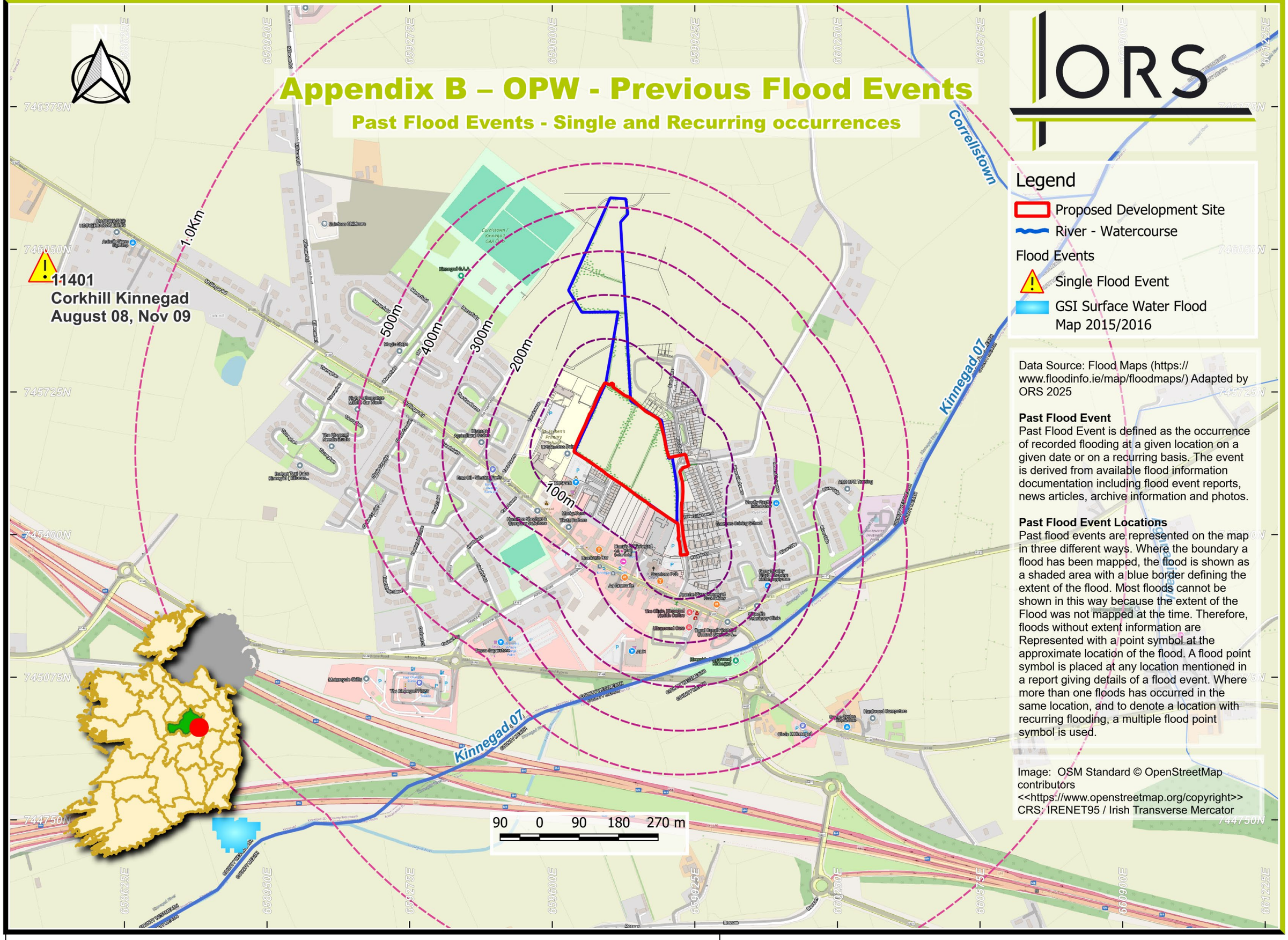
Appendix B – OPW - Previous Flood Events

Appendix B – OPW - Previous Flood Events

Past Flood Events - Single and Recurring occurrences



Legend

- Proposed Development Site
- River - Watercourse

Flood Events

- Single Flood Event
- GSI Surface Water Flood Map 2015/2016

Data Source: Flood Maps (https://www.floodinfo.ie/map/floodmaps/) Adapted by ORS 2025

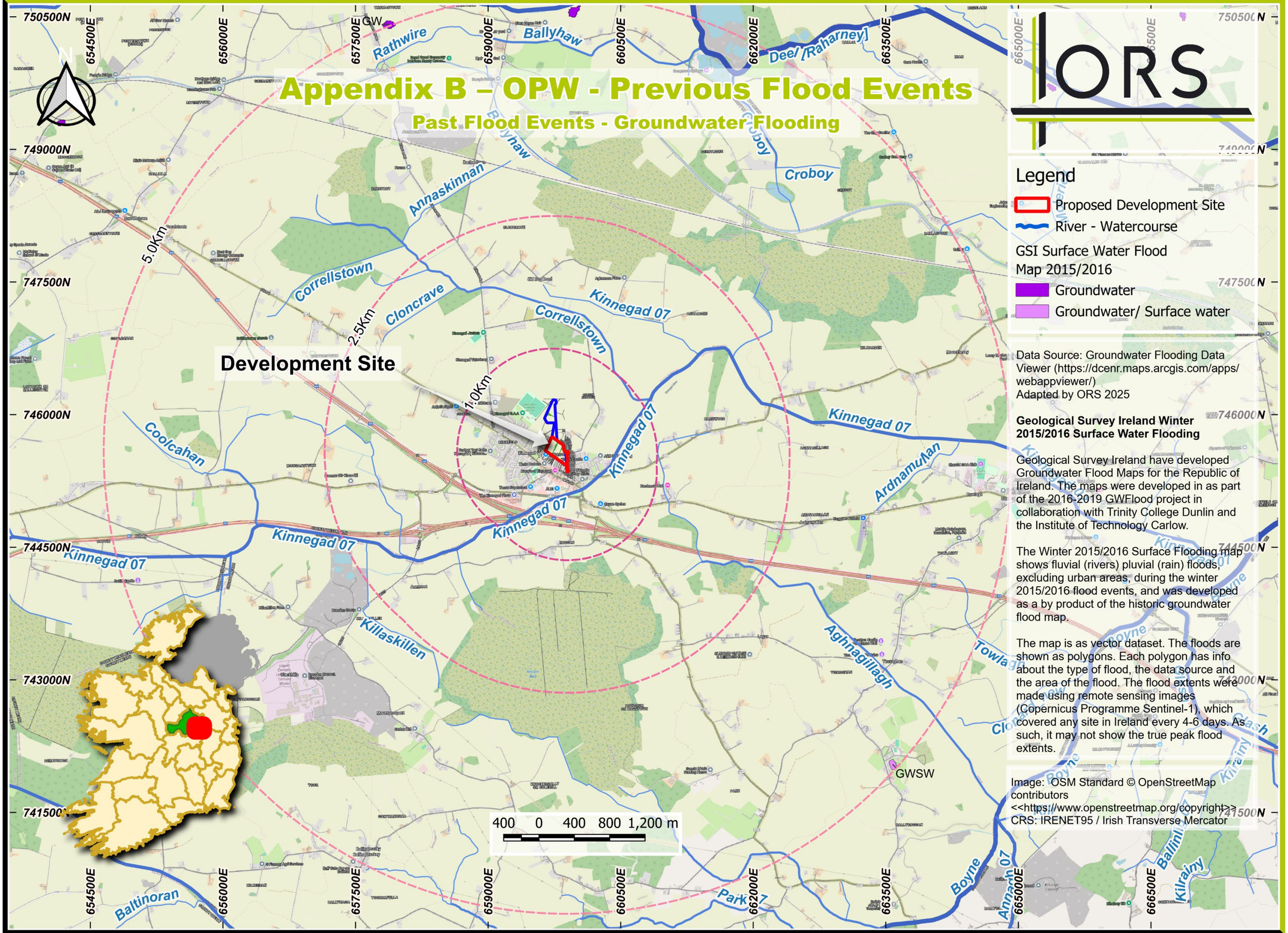
Past Flood Event
Past Flood Event is defined as the occurrence of recorded flooding at a given location on a given date or on a recurring basis. The event is derived from available flood information documentation including flood event reports, news articles, archive information and photos.

Past Flood Event Locations
Past flood events are represented on the map in three different ways. Where the boundary a flood has been mapped, the flood is shown as a shaded area with a blue border defining the extent of the flood. Most floods cannot be shown in this way because the extent of the Flood was not mapped at the time. Therefore, floods without extent information are Represented with a point symbol at the approximate location of the flood. A flood point symbol is placed at any location mentioned in a report giving details of a flood event. Where more than one floods has occurred in the same location, and to denote a location with recurring flooding, a multiple flood point symbol is used.

CRS: IRENET95 / Irish Transverse Mercator

Appendix B – OPW - Previous Flood Events

Past Flood Events - Groundwater Flooding



ORS

Legend

- Proposed Development Site
- River - Watercourse

GSI Surface Water Flood Map 2015/2016

- Groundwater
- Groundwater/ Surface water

Data Source: Groundwater Flooding Data Viewer (https://dcenr.maps.arcgis.com/apps/webappviewer/)
Adapted by ORS 2025

Geological Survey Ireland Winter 2015/2016 Surface Water Flooding

Geological Survey Ireland have developed Groundwater Flood Maps for the Republic of Ireland. The maps were developed in as part of the 2016-2019 GWFlood project in collaboration with Trinity College Dunlin and the Institute of Technology Carlow.

The Winter 2015/2016 Surface Flooding map shows fluvial (rivers) pluvial (rain) floods, excluding urban areas, during the winter 2015/2016 flood events, and was developed as a by product of the historic groundwater flood map.

The map is as vector dataset. The floods are shown as polygons. Each polygon has info about the type of flood, the data source and the area of the flood. The flood extents were made using remote sensing images (Copernicus Programme Sentinel-1), which covered any site in Ireland every 4-6 days. As such, it may not show the true peak flood extents.

CRS: IRENET95 / Irish Transverse Mercator

Appendix B – OPW - Previous Flood Events

Past Flood Events - Winter 2015/2016 Surface Water Flooding

Development Site

5.0Km
2.5Km
1.0Km

Rathwire
Ballyhaw
Dee/ [Raharney]
Rylyhaw
Annaskinnan
Croboy
Correllstown
Cloncrave
Kinnegad 07
Coolcahan
Killaskillen
Aghnagillagh
Ardnamulan
Baltinoran
Park 07
Kilr
Ballinlig 07
Kilrainy
Boyne

750500N
749000N
747500N
746000N
744500N
743000N
741500N

654500E
656000E
657500E
659000E
660500E
662000E
663500E
665000E
666500E

400 0 400 800 1,200 m

ORS

Legend

- Proposed Development Site
- River - Watercourse
- GSI Surface Water Flood Map 2015/2016

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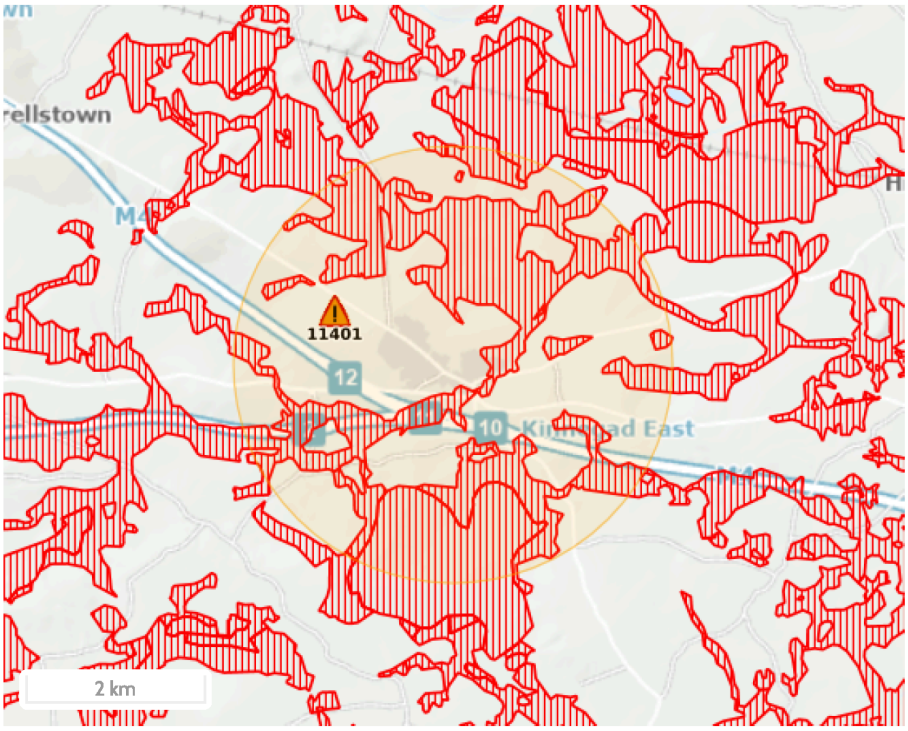
CRS: IRENET95 / Irish Transverse Mercator

Past Flood Event Local Area Summary Report

OPW Oifig na nOibreacha Poiblí Office of Public Works

Report Produced: **22/10/2024 16:27**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

1 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Corkhill Kinnegad August 08, Nov 09 (ID-11401)	n/a	Approximate Point

Additional Information: Reports (1) Press Archive (0)