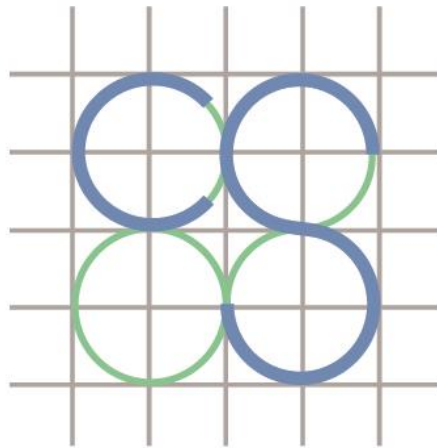




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LIMERICK

LONDON

DUBLIN

Site Specific Flood Risk Assessment

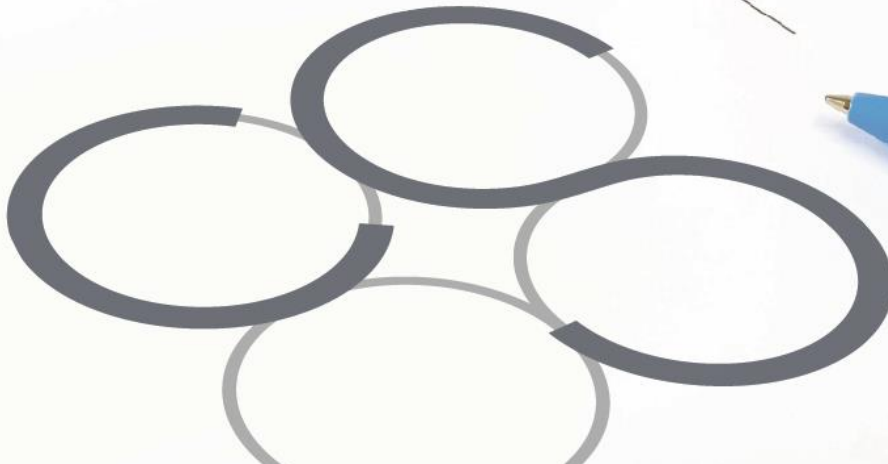
Former Teagasc Lands

Kinsealy, Co. Dublin

Client: Land Development Agency

Job No. C215

February 2025



SITE SPECIFIC FLOOD RISK ASSESSMENT

FORMER TEAGASC LANDS, KINSEALY, CO. DUBLIN

CONTENTS

1.0	INTRODUCTION	1
2.0	SITE LOCATION AND PROPOSED DEVELOPMENT	2
3.0	LEVEL OF SERVICE	6
4.0	FLOOD RISK AND MITIGATION MEASURES	10
5.0	CONCLUSION	14

Appendix A: Fingal County Council Flood Risk Map

Appendix B: OPW - Historical Flood Maps

Appendix C: GSI Maps

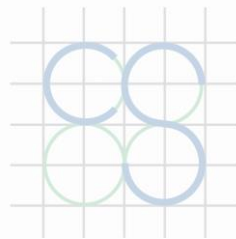
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File Location: Job-C215\B_DOCUMENTS\1.0 Planning\1.0 CIVIL ENGINEERING\02_SSFRA

BS 1192 FIELD

C215-CSC-ZZ-XX-RP-C-0002

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
C215	HY	GL	NB	05.02.2025	P1



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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Land Development Agency (LDA) to prepare a Site Specific Flood Risk Assessment in support of a planning application for a proposed residential development at Malahide Road, Kinsealy Village, Co. Dublin.

In preparing this report, CS Consulting has made reference to the following:

- Fingal County Council Development Plan 2023-2029
(including Strategic Flood Risk Assessment)
- Office of Public Works Flood Maps
- The Planning System and Flood Risk Management: Guidelines for Planning Authorities 2009 (Flood Risk Management Guidelines)
- Geological Survey of Ireland Maps
- Local Authority Drainage Records

The Flood Risk Assessment is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with the various additional information submitted by the other members of the design team.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The site of the proposed development is located immediately to the east of the Malahide Road (R107) in the village of Kinsealy, Co. Dublin. The site has a total area of 8.2ha and is in the administrative jurisdiction of Fingal County Council. It is bounded to the north and northeast by recently completed residential developments, to the southeast by greenfield lands, to the south by St. Nicholas of Myra National School and commercial premises, and to the west by the Malahide/Portmarnock Educate Together National School, 2no. dwellings, and the Malahide Road (along a road frontage of approx. 35m).

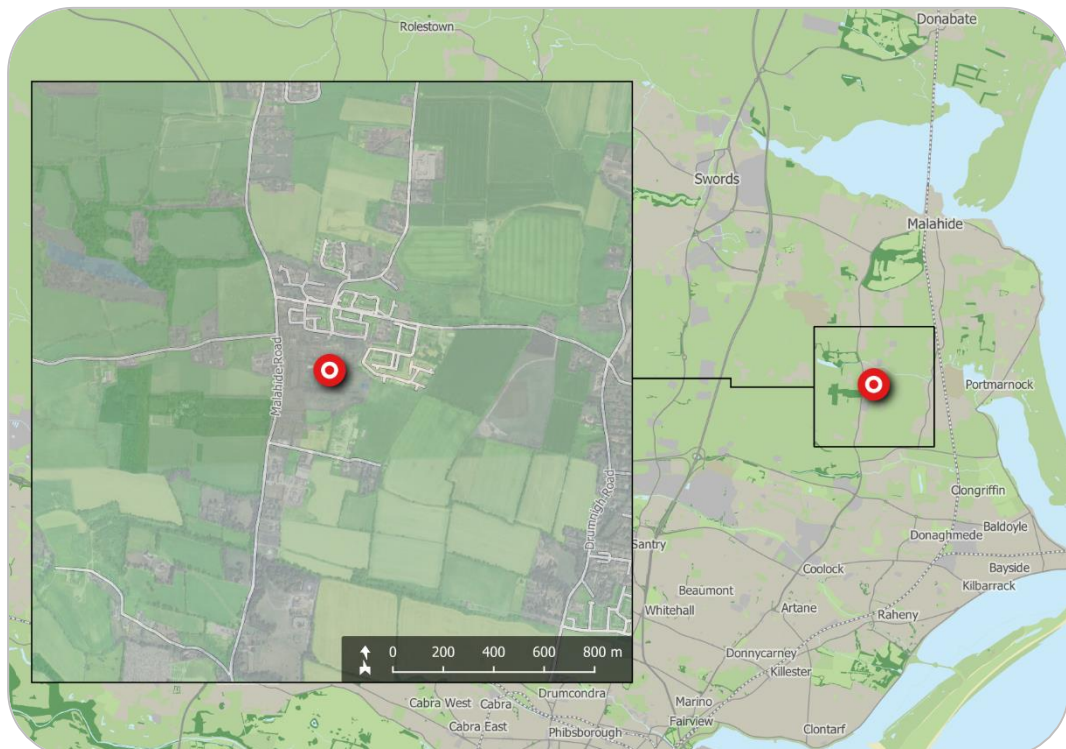


Figure 1 – Location of proposed development site
(map data & imagery: EPA, OSi, OSM Contributors, Google)

The location of the proposed development site is shown in **Figure 1** above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in **Figure 2**.



Figure 2 – Site extents and environs
(map data & imagery: OSM Contributors, Google)

The lands are bounded to the south by greenfield lands, to the north by an existing residential estate and properties (Beechwood), to the east by a new development constructed recently and now operational (Newpark) and to the west by the Malahide Road. The site is situated in the close proximity of Sluice River to the north, circa 200-225m.

2.2 Existing Site Condition

The subject development site is brownfield, having previously accommodated the majority of a Teagasc agricultural research facility. A number of existing structures are present on the site, as well as a network of

internal roads and other hardstanding elements. The subject site has a slope falling away from the southwest corner 21.50m AOD to the northeast to a level of 18.75m AOD before making a sharp drop to a low point on the site of 12.6m AOD at the top northeast corner only.

2.3 Description of the Proposed Development

The proposed development consists of the demolition of existing buildings and structures on a site associated with the former Teagasc Research Centre, and the construction of 193 no. residential dwellings comprising 153 no. two storey houses (consisting of 30 no. two-bed; and 123 no. three-bed terraced houses) and 40 no. duplex units (comprising 20 no. two-bed ground floor apartments with 20 no. three-bed duplexes above) arranged in three storey blocks.

The proposed development includes a single storey childcare facility (approx. 283 sqm gross floor area) with the capacity for approximately 50 children.

The proposed development incorporates approximately 1.65 ha of dedicated public open space comprising a series of open spaces and a central east-west green route linear park and parklands along the east boundary. In addition, 2.2 ha of green belt lands are included to the south and south-east of the residential development area to accommodate a playing pitch.

Vehicular access to the site will be via a new vehicular entrance at Gandon Lane to the north (providing access to the northern part of the site) and a new vehicular access from the Malahide Road, located to the south of the existing Malahide Portmarnock Educate Together National School (providing access to the southern part of the site).

The proposed development includes 229 no. car parking spaces (comprising 193 no. residential spaces, 4 no. childcare drop off spaces, 3 no. childcare staff spaces, and 29 no. visitor spaces), and 345 no. bicycle parking spaces (201 no. private secure on-curtilage spaces for houses without independent garden access, 100 no. private secure spaces and 20. no. visitor spaces for duplex units, 20 no. childcare drop-off spaces, and 4 no. childcare staff spaces).

The proposed development facilitates pedestrian and cycle links to existing and proposed adjoining developments, including the provision of an east-west greenway connecting residential lands to the east of the site at Newpark to the Malahide Road and the provision of a north-south link connecting Beechwood in the north to the green belt lands in the south, with provision for a future link to the St Nicholas of Myra national school.

The proposed development has an overall site area of 8.2 ha, and includes bin storage, internal roads, boundary treatments, public lighting, 3 no. ESB unit substations, water supply, surface water drainage and foul water drainage infrastructure, and all associated and ancillary site and development works.

Please refer to CS Consulting Drawings **C215-CSC-00-XX-DR-C-0004/0005** for the layout of the proposed development.

3.0 LEVEL OF SERVICE

There is an existing inherent risk of any flood event occurring during any given year. Typically, this likelihood of occurrence was traditionally expressed as a 1-in-100 chance of a 100-year storm event happening in any given year.

A less ambiguous expression of probability is the Annual Exceedance Probability (AEP), which may be defined as the probability of a flood event being exceeded in any given year. Therefore a 1-in-100-year event has a return period of 1% AEP flood event, similarly a 100% AEP can be expressed as a 1-in-1-year event.

The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Flood Risk Management Guidelines), published in 2009 set out the best practice standards for flood risk assessment in Ireland. These are summarised in **Table 1** below (Table 8.1 from Flood Risk Management Guidelines document).

Table 1 – Summary of Level of Service: Flooding Source

Development Category	Flooding Source		
	Drainage	River	Tidal/Coastal
Residential	1% AEP	0.1% AEP	0.1% AEP
Commercial	1% AEP	1% AEP	0.5% AEP
Water-compatible (docks, marinas)	-	>1% AEP	>0.5% AEP

Under these guidelines a proposed development site has first to be assessed to determine the flood zone category it falls under.

It is a requirement of Fingal County Council, the *Greater Dublin Strategic Drainage Study* (DCC 2005), and the Flood Risk Management Guidelines

that the predicted effects of climate change are incorporated into any proposed design. **Table 2** below indicates the predicted climate change variations that must be accounted for. These have been determined through strategic modelling conducted on behalf of the Office of Public Works (OPW) as part of its Catchment Flood Risk Assessment and Management (CFRAM) programme and are applicable nationwide.

Table 2 – Predicted climate change variations

Flood Source Parameter	Predicted Impact of Climate Change
Drainage	20% increase in rainfall
Fluvial (river flows)	20% increase in peak river flood flows
Tidal / Coastal	0.5m mean sea level rise

The flooding guidelines categorise the risks associated with flooding into three areas, Zone A, B & C. This categorisation is indicated below.

- **Zone A** – High Probability of Flooding. Where the average probability of flooding from rivers and sea is highest (greater than 1% annually or 1 in 100 for river flooding or 0.5% annually or 1 in 200 for coastal flooding).
- **Zone B** – Moderate Probability of Flooding. Where the average probability of flooding from rivers and sea is moderate (risk between 0.1% annually or 1 in 1000 years and 1% annually or 1 in 100 years for river flooding, and between 0.1% or 1 in 1000 years and 0.5% annually or 1 in 200 for coastal flooding).
- **Zone C** – Low Probability of Flooding. Where the probability of flooding from rivers and sea is moderate (risk is less than 0.1% annually or 1 in 1000 years for both rivers and coastal flooding).

In accordance with the Flood Risk Management Guidelines, residential developments are classified as 'highly vulnerable developments'. The proposed development is within the **Zone C** designation. See **Appendix A**.

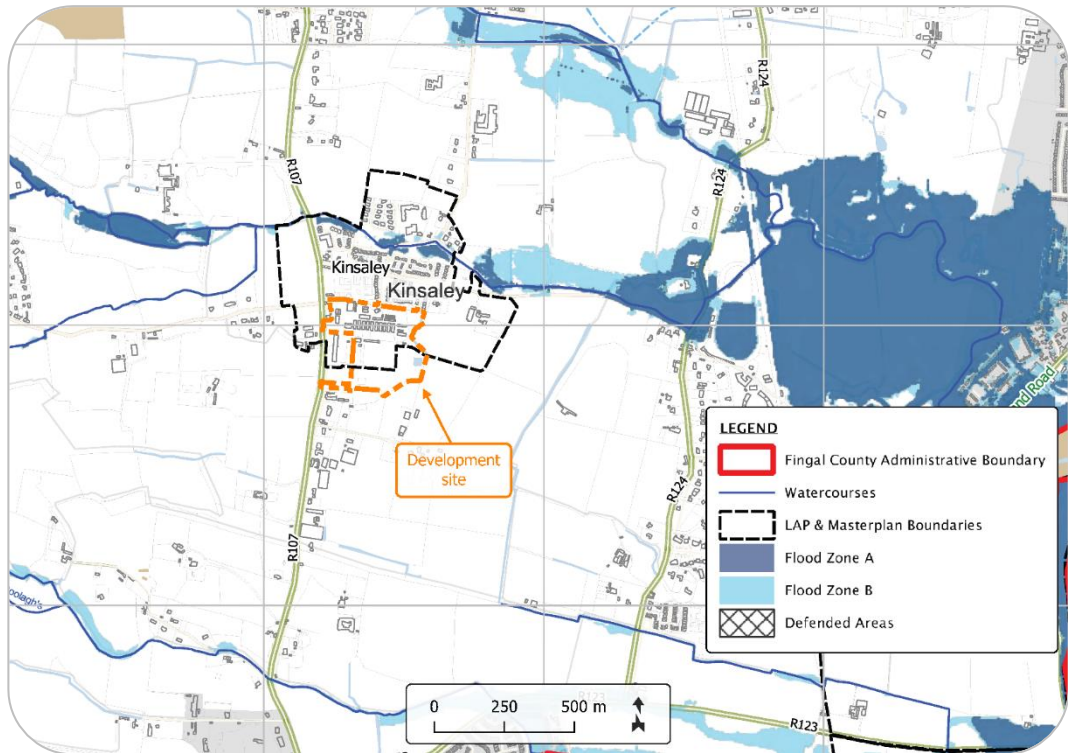


Figure 3 – Extract of Fingal County Council composite flood risk mapping
(map data & imagery: Fingal County Council, OSM Contributors)

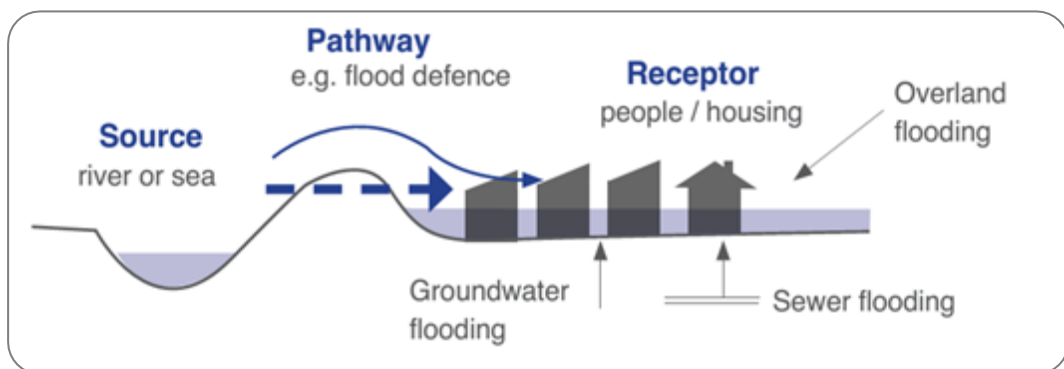


Figure 4 – Source-pathway-receptor model
(The Planning System and Food Risk Management Guidelines)

The Flood Risk Management Guidelines have developed an 'appropriateness' matrix for various developments and their potential risk factor. This matrix indicates whether further analysis is required in the form of a justification test. **Table 3** below outlines the conditions that require a justification test.

Table 3 – Flood Zone vs. Justification Test Matrix

Development Category	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	<i>Justification Test Required</i>	<i>Justification Test Required</i>	Appropriate
Less Vulnerable Development	<i>Justification Test Required</i>	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

As noted above, the subject site is located within **Flood Zone C**.

4.0 FLOOD RISK AND MITIGATION MEASURES

4.1 Historic Flooding

A review of the Office of Public Works flood maps database, www.floodmaps.ie, for the area does not indicate historical flooding at the site. See the OPW map report in **Appendix B**.

4.2 Fluvial Flooding

Recent modelling of the area, carried out between 2021 and 2023 as part of Fingal County Council's Strategic Flood Risk Assessment, indicates that the subject lands are deemed to be located outside of the 0.1% AEP fluvial floodplain, based on the currently available maps. Therefore, the risk of fluvial flooding is not deemed to be significant. Refer to **Appendix A** for Flood Maps.

4.3 Tidal Flooding

The site's location is such that it is not affected by tidal water bodies and as such tidal flooding is negligible.

4.4 Pluvial Flooding

Pluvial flooding originates from overland flow as a result of high intensity rain fall that cannot be absorbed by the landscape at an equivalent rate. The Fingal County Council Development Plan 2023-2029 Strategic Flood Risk Assessment does not include modelling of pluvial flood risk. However, OPW records of past flooding events do not include any instances of pluvial flooding in the area. Assessing the local topography, we consider the risk of pluvial flooding at the development site to be negligible.

4.5 Groundwater Flooding

According to the Geological Survey of Ireland (GSI) interactive maps, the western section of the subject site is underlain with Calcareous shale, limestone conglomerate (Tober Colleen Formation) and the eastern section of the subject site is underlain with Massive unbedded lime-mudstone (Waulsortian Limestones).

The western section of the subject site is listed as area overlaying poor Aquifer which has bedrock which is generally unproductive except for Local Zones and the eastern section of the subject site is listed as area overlaying a locally important aquifer which has bedrock which is moderately productive only in local zones.

GSI records indicate that groundwater vulnerability in this area is moderate. Refer to **Appendix C** for GSI mapping information and Groundwater Flooding Map.

4.6 Failure of Existing Off-Site Drainage Infrastructure

During high-intensity rainfall events, elements of surface water drainage infrastructure may be unable to effectively accommodate the volume of stormwater received in a short period, becoming surcharged (i.e. pressurised). This can lead to overflowing at manholes or sewer junctions that are downstream of pressurised pipe sections, particularly if these are close to the surface.

Uisce Éireann records do not include all storm water drainage infrastructure, as this remains under the control of Local Authorities (with the exception of combined foul and storm sewers). From a topographic survey of the surrounding area and through consultation with Donnachadh O'Brien & Associates (the consulting engineers commissioned to undertake design works for the adjacent Kinsealy Manor and Beechwood estates), it has

been established that the following existing storm water drainage infrastructure is in place in the immediate vicinity of the development site:

- A 450mm diameter storm sewer in Beechwood, originating at the development site's northeast corner, which provides a storm water drainage connection from the development site to public storm water drainage infrastructure in Chapel Road.
- 225mm diameter storm sewers in Kinsealy Manor, Gandon Lane, and Beechwood, close to the development site's northern boundary; these form part of the surface water drainage network serving the adjacent Kinsealy Manor and Beechwood estates, which discharges to public storm water drainage infrastructure in Chapel Road.

The development site is at a consistently higher elevation than all recorded drainage infrastructure to its north, in which direction all nearby foul and storm sewers flow. OPW records of past flooding events do not include any nearby instances of flooding due to drainage infrastructure failure. Given the local topography and drainage network structure, were any surcharging to occur in the surrounding public storm water drainage network in future, this would be expected to occur along Chapel Road, which is generally between 2m and 4m lower than the development site. It is also noted that no combined sewers – which are the type generally most susceptible to surcharging during extreme rainfall events – are present nearby, and that the recently constructed residential developments to the north and east of the development site incorporate SuDS measures to control the discharge of storm water to the public drainage network.

As such, the proposed development is not deemed to be at risk from flooding due to off-site drainage infrastructure failure.

4.7 Potential for Proposed Development to Contribute to Off-Site Flooding

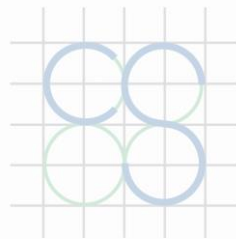
The site is currently brownfield but does not have any existing surface water or attenuation systems in place. As such the proposed development of the site will require attenuation to be provided. A retention pond will be sized for a 1-in-100-year storm event and will release the storm water in a controlled manner after the peak storm duration has passed. By restricting the flow, the risk of the proposed development adversely affecting the public drainage system or contributing to downstream flooding is reduced. For further details of the development's attenuation storage systems, refer to the Engineering Services Report submitted under separate cover.

5.0 CONCLUSION

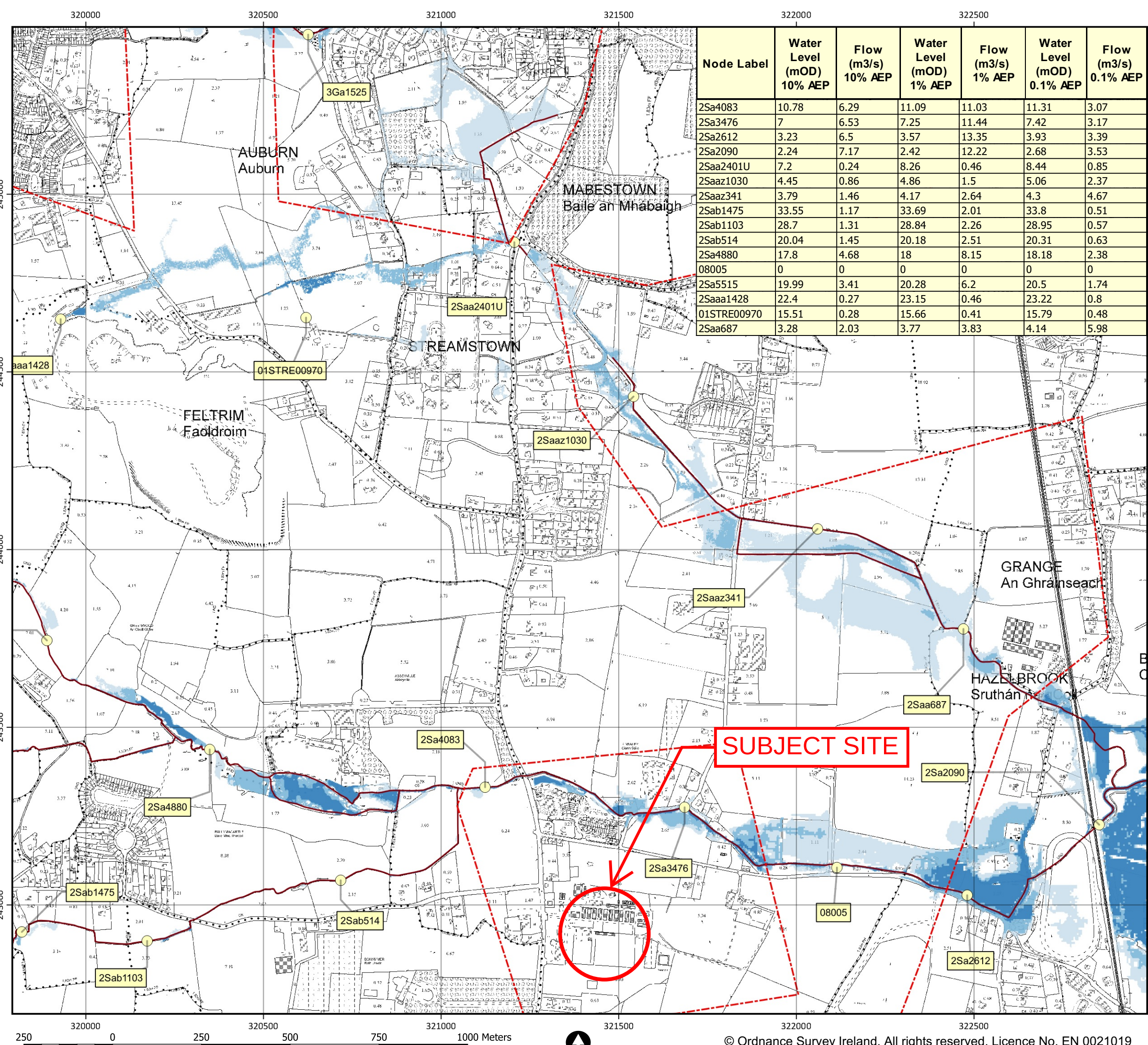
- The site is deemed to be located in **Flood Zone C**.
- The subject lands have no history of historical flooding based on the Office of Public Works historical flood map database.
- The mapping of predicted flooding extents for the area does not indicate that the site is vulnerable to flooding from pluvial or fluvial events.
- The site's location and elevation would also indicate that the site is not vulnerable to flooding from tidal or groundwater events.
- The proposed development's storm water attenuation system will reduce the rate of runoff from the development site during high-intensity storm events, thereby reducing the risk of the proposed development adversely affecting the public storm water drainage system or contributing to downstream flooding.
- The development site is not considered to be at risk from flooding due to off-site drainage infrastructure failure, and the proposed development's storm water attenuation system will ensure that the development does not result in any increased risk of public storm water sewer surcharging.

Appendix A

Fingal County Council Flood Risk Map



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Location Plan:



LEGEND

- AFA Boundary
- Defended Area
- Modelled River Centreline
- Node Point
- 10% AEP Fluvial Extent (High Risk)
- 1% AEP Fluvial Extent (Medium Risk)
- 0.1% AEP Fluvial Extent (Low Risk)
- Flood Defence - Embankment
- Flood Defence - Wall
- Gate
- Node Label
- Standard of Protection of Flood Defence

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE
DISCLAIMER, GUIDANCE NOTES AND CONDITIONS
OF USE THAT ACCOMPANY THIS MAP.



The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
FINGAL EAST MEATH FRAM STUDY

Map:
KINSALEY
FLUVIAL EXTENT MAP

Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT

Drawn by: IH Date: Mar - 2019
Checked by: TC Date: Mar - 2019
Approved by: GP Date: Mar - 2019

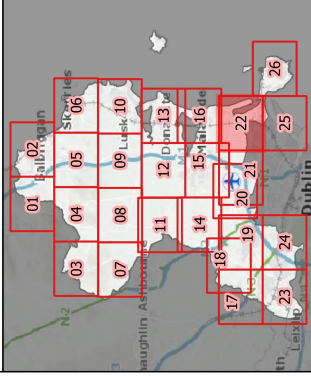
Map No.:
E09KNS_EXFCD_F1_38

Revision: F1
Map Scale: 1:10000 Plot Scale: 1:1 @ A3

MAP SERIES

22 OF 26

KEY PLAN



Fingal County Administrative Boundary

Watercourses

LAP & Masterplan Boundaries

Flood Zone A

Flood Zone B

Defended Areas

LEGEND

REV: 05

NOTE: FOR INFORMATION

05/04/2023

Comhairle Contae
Fine Gall
Fingal County
Council



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Consulting



Unit 12, The Beat Centre,
Stephentown Industrial
Estate,
Sallagh, Co. Dublin
T: +353 (0)1 5138963
E: info@mcclayconsulting.ie
W: www.mcclayconsulting.ie

MAP: FLOOD ZONE MAP

FLOOD PROBABILITY:
FLUVIAL: 1% / 0.1% COASTAL: 0.5% / 0.1%

SOURCE CRS: ITM EPSG:2157

DRAWN BY: DL

DATE: 05/04/2023

CHECKED BY: PS

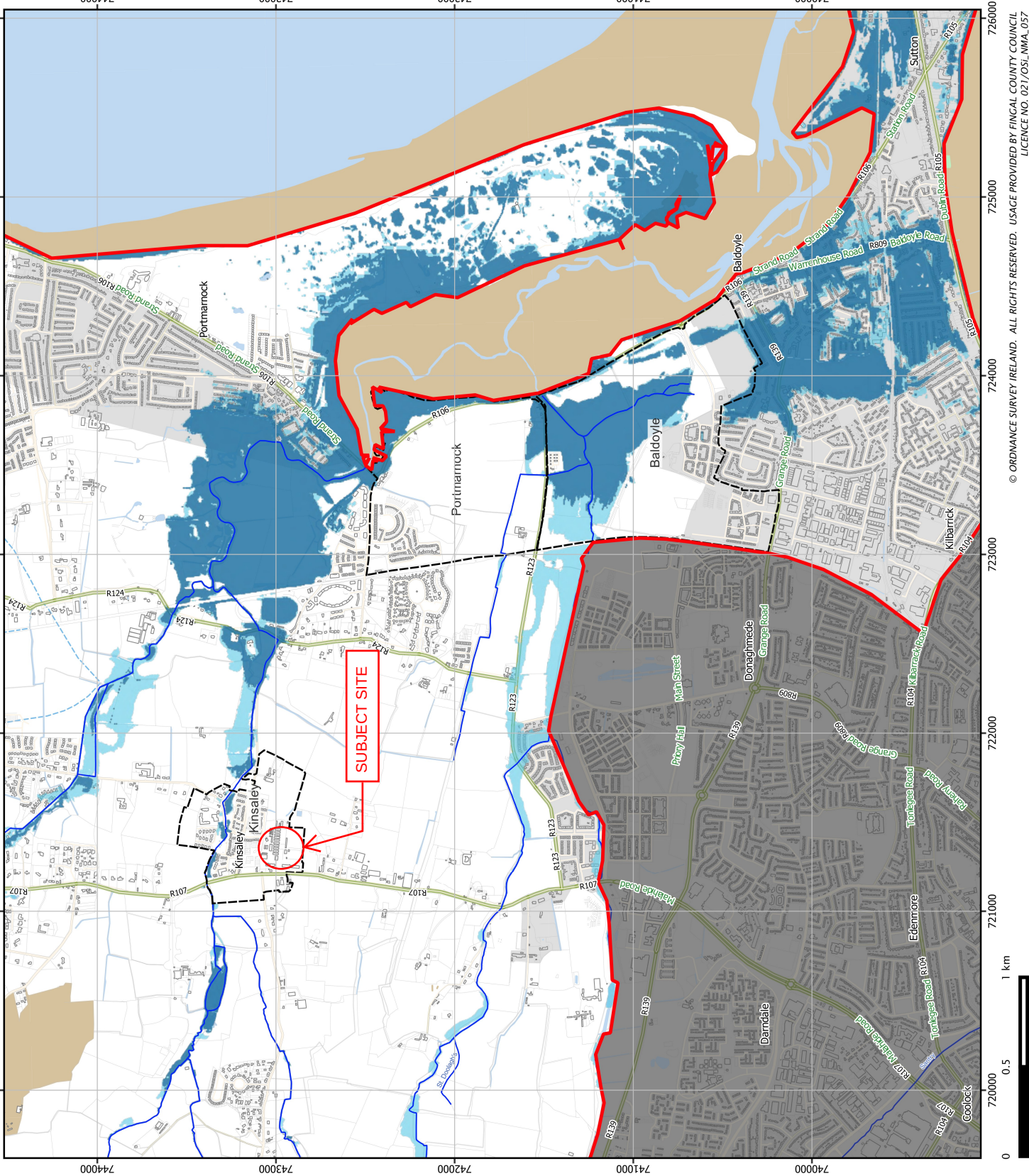
DATE: 05/04/2023

APPROVED BY: DKS

DATE: 05/04/2023

DRAWING NUMBER: M02127-06_FIG-FL122

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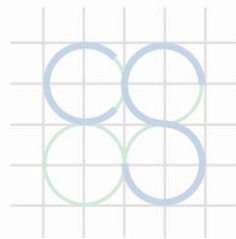


The main map displays a detailed view of the flood zones in the Kinsale area. The subject site is circled in red and labeled 'SUBJECT SITE'. The map shows various flood zones, including Flood Zone A (light blue) and Flood Zone B (dark blue). Watercourses are shown in light blue, and defended areas are shown in grey. The map includes a grid with coordinates ranging from 720000 to 726000 on the y-axis and 740000 to 744000 on the x-axis. A scale bar at the bottom right indicates distances of 0, 0.5, and 1 km. The map also shows surrounding roads and landmarks, including Portmarnock, Baldoye, and Kinsale.

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LICENCE NO. 021/OSI_NMA_057

Appendix B

OPW - Historical Flood Maps



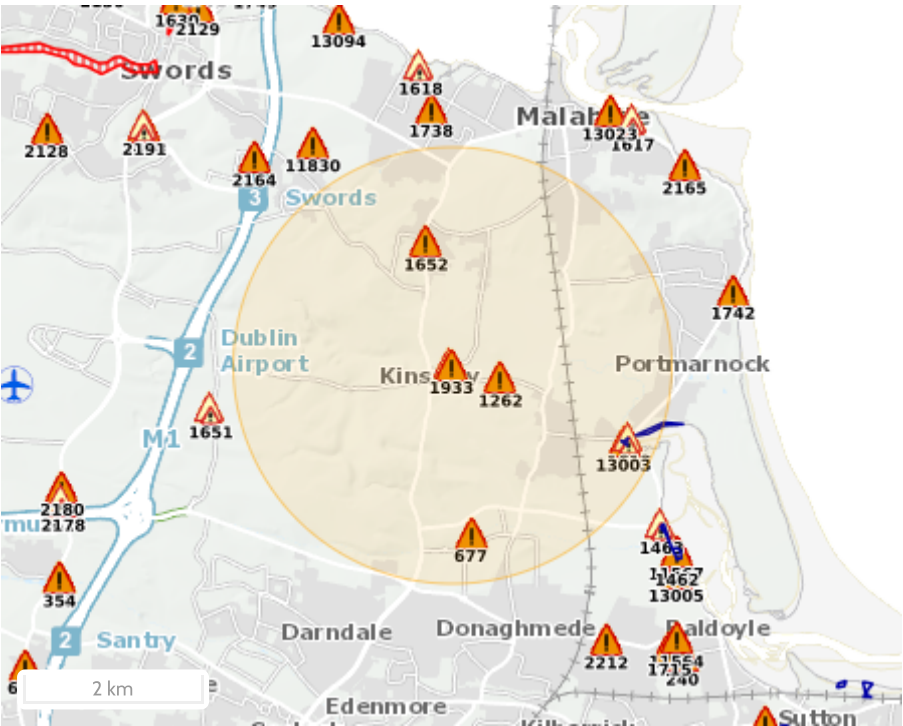
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Report Produced: 1/3/2024 9:24

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

This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



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

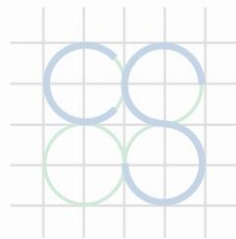
8 Results

Name (Flood_ID)		Start Date	Event Location
1.	Flooding at Portmarnock on 03/01/2014 (ID-13003)	03/01/2014	Approximate Point
Additional Information: Reports (0) Press Archive (0)			
2.	Sluice River Strand Road Portmarnock Recurring (ID-1613)	n/a	Exact Point
Additional Information: Reports (5) Press Archive (0)			
3.	Streamstown to Malahide Road Dublin Undated (ID-1652)	n/a	Exact Point
Additional Information: Reports (2) Press Archive (0)			
4.	Mayne Balgriffin Park June 1993 (ID-677)	10/06/1993	Approximate Point
Additional Information: Reports (1) Press Archive (0)			
5.	Sluice River Kinsealy Lane Recurring (ID-1933)	n/a	Exact Point
Additional Information: Reports (2) Press Archive (0)			
6.	Kinsealy Lane Area Oct 2002 (ID-1616)	19/10/2002	Exact Point
Additional Information: Reports (4) Press Archive (0)			

	Name (Flood_ID)	Start Date	Event Location
7.	 Dublin City Tidal Feb 2002 (ID-456)	01/02/2002	Area
	Additional Information: Reports (45) , Press Archive (27) .		
8.	 Sluice Kinsaley Hall August 1986 (ID-1262)	24/08/1986	Approximate Point
	Additional Information: Reports (1) , Press Archive (0) .		

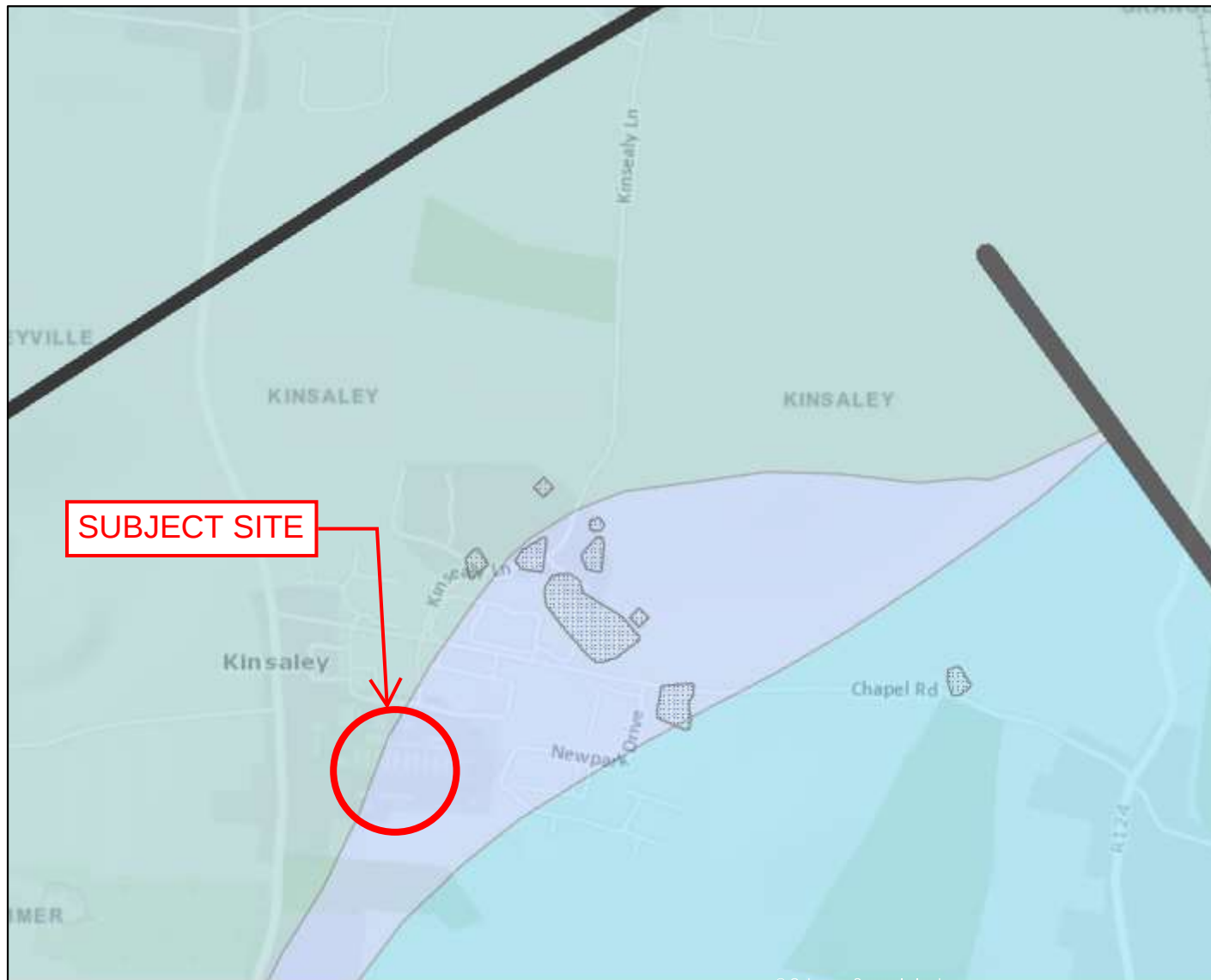
Appendix C

GSI – Hydrogeological, Geology, and Groundwater Flooding Maps



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GSI Bedrock Geology

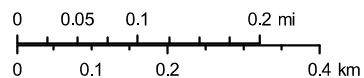


Scale: 1:10,000

Geological Survey Ireland

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Map Centre Coordinates (ITM) 721,725 743,407
01/03/2024, 08:46:47

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Legend

Structural Symbols 100K ITM 2018

- Dip of bedding or main foliation, old GSI data
- ↖ First foliation parallel to bedding
- | Foliation trend, Thor and Rosses Granites
- ⊕ Horizontal Bedding
- ↗ Strike and dip of bedding, right way up
- ↖ Strike and dip of bedding, way up
- ↖ Strike and dip of bedding, unknown
- ↖ Strike and dip of first foliation
- ↖ Strike and dip of overturned bedding
- ↖ Strike and dip of second foliation
- ↖ Strike and dip of third foliation
- ↖ Strike and plunge of first generation fold axis
- ↖ Strike and plunge of second generation fold axis
- ↖ Strike and plunge of third generation fold axis
- ↖ Strike of vertical bedding/foliation
- ↖ Strike of vertical first foliation
- <all other values>

Bedrock Outcrops
100 ITM 2018

Bedrock Linework 100k ITM 2018

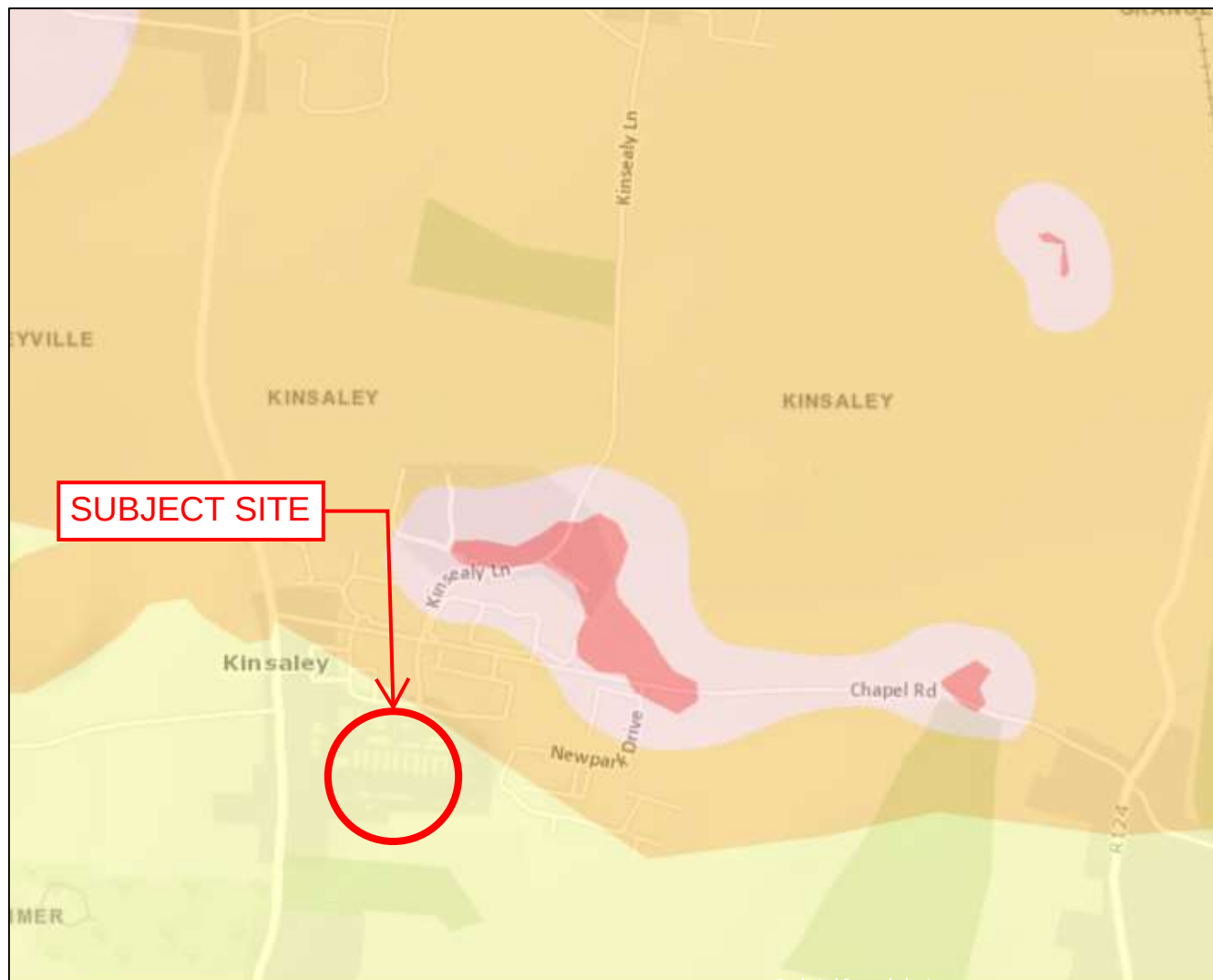
- ↖ Anticlinal Axis
- ↖ Antiformal axis
- Aquifer Boundary
- - - Area
- Coal seam
- Dyke
- Fault

- Ghost Line
- Goniatite marl band (R1-R4)
- Lithological boundary
- offshore
- Metadolerite sills
- mainly sills
- Paleogene/Tertiary
- Dyke
- Synclinal Axis
- Synformal axis
- Tectonic Slide
- on hanging-wall
- Thin stratigraphic unit, diagrammatic
- Thrust, barbs
- hanging-wall sills
- Tuff band
- Unconformity, on younger sills
- X-Section

GSI Groundwater Vulnerability

Legend IE_GSI_Groundwater_...

- Rock at or near
- Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water



Scale: 1:10,000

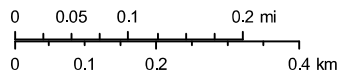
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