

Document Title

Site Specific Flood Risk Assessment

Project

Amendment Application to Blocks A and D of GA01
lands at Baldoyle, Co. Dublin

Client

Land Development Agency



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SITE SPECIFIC FLOOD RISK ASSESSMENT

AMENDMENT APPLICATION TO BLOCKS A AND D OF GA01 LANDS AT BALDOYLE, CO. DUBLIN

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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by The Land Development Agency (LDA) to prepare a Site Specific Flood Risk Assessment to accompany an LRD Opinion Request in respect of proposed amendments to permitted development of GA01 Lands, as permitted under ABP Reg. Ref. 310418-21 / FCC Reg. Ref. SHD/011/20. The proposed amendments comprise of alterations to the permitted Blocks A and D and Stapolin Square only.

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

- Fingal County Council Development 2023-2029
(including Strategic Flood Risk Assessment)
- Baldoyle-Stapolin Local Area Plan
- Greater Dublin regional Code of Practice for Works;
- Office of Public Works Flood Maps;
- Department of the Environment Flooding Guidelines;
- Geological Survey of Ireland Maps;
- Local Authority Drainage Records.

The Site Specific Flood Risk Assessment has been carried out in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' and 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, which forms part of the Planning Submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed amendments relate to a site area of approx. 3.03 ha, which forms part of the wider c.9.1ha development permitted under ABP Reg. Ref. ABP-310418-21.

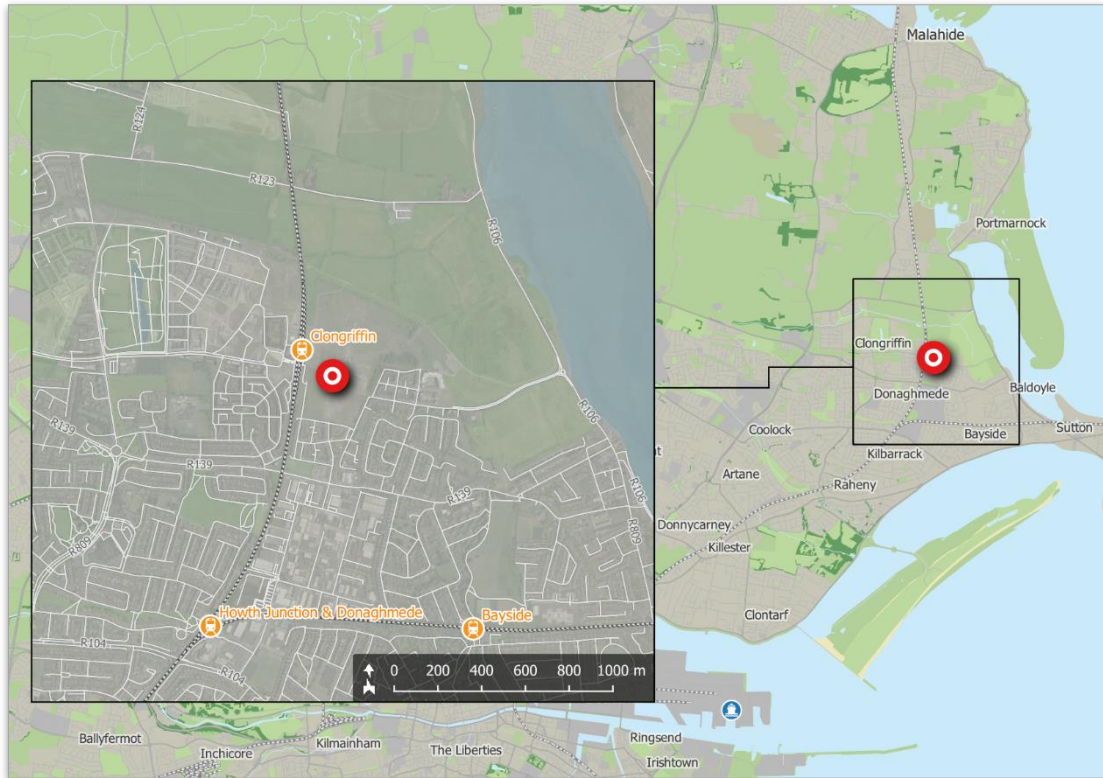


Figure 1 – Location of subject lands
(sources: EPA, OSi, OSM Contributors, Google)

The location of the subject lands is shown in **Figure 1**; their extents and environs are shown in more detail in **Figure 2**.

The site is bounded to the west by the Dublin-Belfast railway line, with Clongriffin DART Station located just to the northwest of the applicant lands, to the east and south by Blocks B and C which are currently under construction as permitted under FCC Reg. ref. SHD/011/20 and to the north by development lands known as Growth Area 3 (GA3).



Figure 2 – Subject lands extents and environs
(sources: NTA, OSi, OSM Contributors, Microsoft)

2.2 Existing Land Use

The subject lands are currently undeveloped and generates no traffic volumes.

2.3 Description of Permitted Development under FCC Reg. Ref. SHD/011/20

The development comprised of alterations to the permitted development, as permitted under FCC Reg. Ref. 16A/0412, ABP Reg. Ref. ABP-248970 (as amended by F20A/0258 and F21A/0046) of 544 no. residential units (385 no. apartments and 159 no. houses), retail and a crèche, to the development of 882 no. new residential dwellings (747 no. apartments, 135 no. houses), residential tenant amenity, retail, crèche, parking, and public realm, over a total site area of c. 9.1 ha, and site development area of c. 8.89 ha. Landscaping will include extensive communal amenity areas, and significant public open space provision.

2.4 Description of Amended Development

The proposed development will consist of the alteration of permitted development of Block A, Block D and Stapolin Square, as permitted under ABP Reg. Ref. ABP-310418-21 (and as amended under LRD/0015/S3 & LRD/0073/S3E). No amendments are proposed to any other permitted blocks. The permitted Block A and Block D are located to the south and north of

Stapolin Square and include for 528 units (277 in Block A1, A2 & A3 and 251 in Block D1, D2 & D3) and include residential tenant amenity, retail/café/restaurant, pharmacy, medical centre, crèche, gym, car and bicycle parking and public realm. The proposed alterations only relate to Block A, Block D and Stapolin Square, of the permitted development and for the most part are contained within the footprint and massing of the permitted development and relate to internal reconfiguration.

The proposed alterations result in an overall increase of 68 no. units in Block A and Block D, bringing the total units in Block A and Block D to 596, the total units permitted under ABP Reg. Ref. ABP-310418-21 (as amended) to 893 (760 apartments and 133 houses).

The proposed altered residential development of Block A and Block D will consist of a total of 596 no residential apartments, as follows:

1. Alteration of Blocks A1, A2 & A3 from permitted 4 to 7-storey buildings providing for 288 no. apartment units to a 4 to 7 storey building providing for 312 no. apartments.
2. Alteration of Blocks D1, D2 & D3 from permitted 5 to 10-storey buildings providing for 251 no. apartment units to a 5 to 10 storey building providing for 284 no apartments.
3. The reconfiguration of internal layouts of each of the blocks has resulted in the reduction of the blocks overall width and therefore increased width and area to the courtyards and increased distance between individual blocks.
4. Alteration of the permitted uses and facade at ground floor level and removal of permitted Residential Tenant Amenity Facilities located in Blocks A3 and D3 to provide for a ground floor level that includes in Blocks A1-A3, retail/restaurant/café/gym units and a creche including outdoor play space and in Blocks D1-D3, retail/restaurant/cafe units and residential units.
5. A revised central civic plaza at Stapolin Square centrally located between blocks A1-A3 and D1-D3, redesigned to address Condition 2 (a) of ABP-310418-21 which requires the removal of the two previously proposed public lifts. Stapolin Square is now designed to accommodate a gently sloped landscaped route from Longfield Road to Clongriffin Train Station.
6. Alterations to the permitted below podium areas under Block A, Stapolin Square & Block D to include for alterations to permitted layouts of car parking, cycle parking, plant, waste stores and substation locations. This includes the reduction in car parking as required under Condition 2 (b) of ABP-310418-21 which requires omission of car parking under the permitted ramped access road to the Train Station to the north of Block D. An increase in bicycle parking is proposed.

No amendments are proposed to the constructed Blocks within B3, B4, C4, C5, C6 or the permitted The Haggard Park which remains as permitted, or all other elements including surface water attenuation wetlands and associated upstream surface water network, demolition of existing temporary lift and stair enclosure and associated infrastructure to Clongriffin Train Station, road infrastructure (except where within the application boundary and requiring to be locally altered for proposed alterations), and utilities infrastructure (except where within the application boundary and requiring to be locally altered for proposed alterations), all of which remain as per permitted.

3.0 PROCESS FOR SITE SPECIFIC FLOOD RISK ASSESSMENT

The initial stage of the SSFRA comprises an assessment of available flood risk data in order to identify flood risk indicators in the Study Area. If the Site is identified to be at risk of flooding, the SSFRA shall proceed to a detailed assessment.

3.1 Potential Source of Flood Risk

The Study Area is subject to the three potential flood risk mechanisms described below (as an inland site, the Study Area is not subject to coastal flood risk).

- Fluvial: flooding caused by overtopping of Rivers and Streams;
- Tidal: flooding caused by coastal sea level rises
- Pluvial: flooding caused when the intensity of rainfall events is such that the ground cannot absorb rainfall run-off effectively or urban drainage systems cannot carry the run off generated;
- Groundwater: flooding caused by a rise in the level of the water table.

3.2 Flood Risk Indicators

Indicators of flood risk are identified using available data, most of which is historically derived. Typically, this data is not prescriptive in relation to flood return periods and neither predictive nor inclusive of climate change analysis.

Flood risk indicators include:

- Records available on the OPW's National Flood Risk Website. As part of the National Flood Risk Management Policy, the OPW developed the www.floodmaps.ie web-based data set, which contains information concerning historical flood data and displays related mapped information and provides tools to search for and display information about selected flood events;
- PFRA & CFRAM mapping produced under the OPW CFRAM programme;
- Geological Survey of Ireland (GSI) mapping - Hydrogeological mapping maintained by the GSI and made available through its website www.gsi.ie;
- Ordnance Survey mapping - Ordnance Survey maps include areas which are marked as being "Liable to Floods". Generally, these areas are only shown identified indicatively and suggest historical flooding, usually recurrent. In addition, the maps indicate areas of wet or hummocky ground, bog, marsh, springs, rises and wells as well as surface water features including rivers, streams, bridges, weirs and dams. Figure 4.1 shows the historic 6" OS mapping for the Study Area;
- Topographical survey information;

- Ground Investigation information;

4.0 ASSESSMENT PROCEDURE AND FLOOD RISK ZONING

4.1 Source-Pathway-Receptor Model

As described in the Flood Risk Management Guidelines:

"The assessment of flood risk requires an understanding of where the water comes from (i.e. the source), how and where it flows (i.e. the pathways) and the people and assets affected by it (i.e. the receptors)."

The Source-Pathway-Receptor (S-P-R) model has become widely used to assess and inform the management of environmental risks. This is illustrated in **Figure 3**¹.

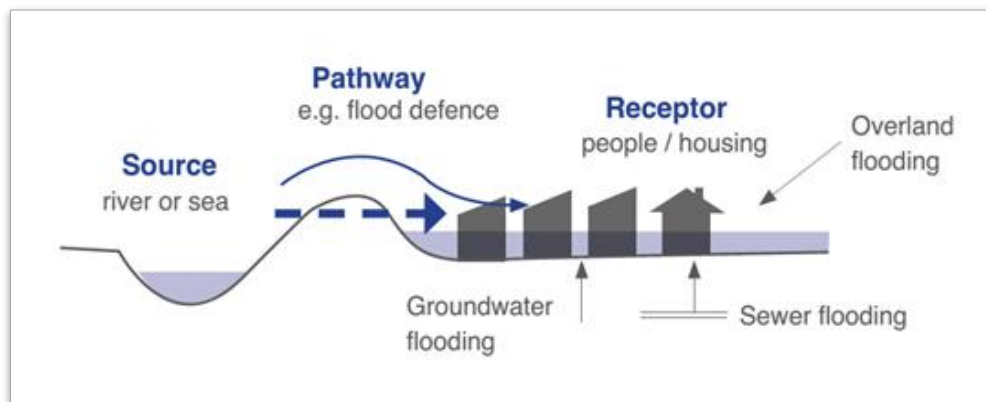


Figure 3 – Sources, pathways and receptors of flooding
(source: The Planning System and Flood Risk Management Guidelines)

The Flood Risk Management Guidelines further note that:

- The principal sources are rainfall or higher than normal sea levels.
- The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets.
- The receptors can include people, their property and the environment.
- All three elements must be examined as part of the flood risk assessment including the vulnerability and exposure of receptors to determine its potential consequences.
- Mitigation measures typically used in development management can reduce the impact on people and communities, for example, by blocking or impeding pathways but they have little or no effect on the sources of flooding.

¹ Figure 2.2 from the Flood Risk Management Guidelines

- The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk.
- Risks to people, property and the environment should be assessed over the full range of probabilities, including extreme events.
- The flood risk assessment should cover all sources of flooding, including the effects of run-off from a development on flood risk both locally and beyond the development site.
- A staged approach should be adopted, carrying out only such appraisal and or assessment as is needed for the purposes of decision-making at the [relevant] level.

4.2 Expression of Flood Risk

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 1% AEP; similarly, a 100% AEP can be expressed as a 1-in-1-year event.

4.3 Flood Risk Zoning

Under the Flood Risk Management Guidelines, a proposed development site has first to be assessed to determine the flood zone category it falls under. The guidelines define three distinct areas of combined flood risk: Zones A, B, and C. These are described below.

- **Zone A** – High Probability of Flooding.
Where the average probability of flooding from rivers and sea is highest (greater than 1% AEP for fluvial flooding or 0.5% AEP for tidal flooding).
- **Zone B** – Moderate Probability of Flooding.
Where the average probability of flooding from rivers and sea is moderate (between 0.1% AEP and 1% AEP for fluvial flooding, and between 0.1% AEP and 0.5% AEP for tidal flooding).
- **Zone C** – Low Probability of Flooding.
All areas outside Zones A and B. Where the probability of flooding from rivers and sea is lowest (less than 0.1% AEP for both fluvial and coastal flooding).

Combined flood risk zone extents across the Fingal County Council administrative area have been established through detailed hydrological and hydraulic modelling undertaken by McCloy as part of the *Fingal Development Plan 2023–2029 Strategic Flood Risk Assessment*.

A review of the flood risk mapping contained within this SFRA (an extract of which is presented in **Figure 4**) indicates that the subject site is located within **Flood Zone C**.

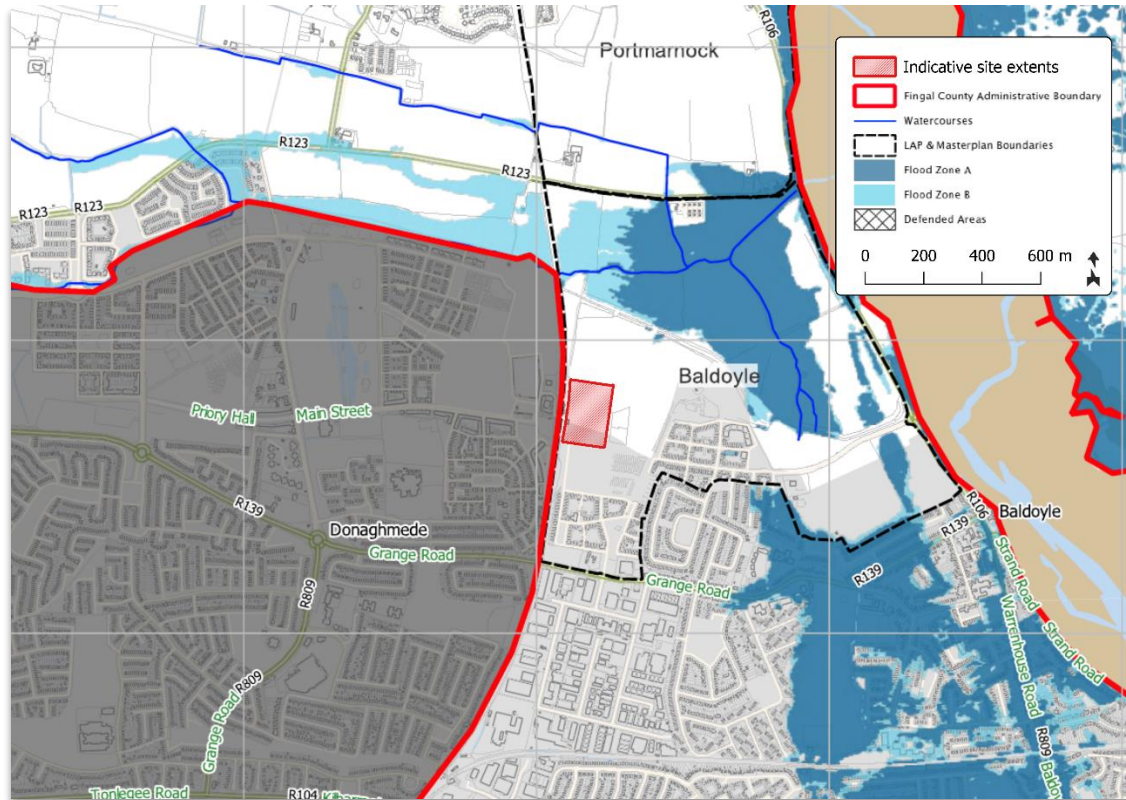


Figure 4 – Extract of Fingal Development Plan SSFRA Flood Risk Mapping
(sources: Fingal County Council)

4.4 Development Suitability and Justification

The Flood Risk Management Guidelines provide an 'appropriateness' matrix for various developments and their potential risk factors. This matrix, reproduced in **Table 1** below, indicates whether a proposed development requires further analysis in the form of a justification test.

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

Table 1: Flood Zone vs. Justification Test Matrix

As previously noted, the subject development site is located within **Flood Zone C**. The Flood Risk Management Guidelines classify residential development as 'highly vulnerable

development', which is appropriate to this flood zone. As such, a justification test is not required.

4.5 Allowance for Climate Change

The flood risk modelling underpinning the combined flood risk zones described in sub-section 4.3 and the source-specific CFRAMS mapping described sub-sections 5.1 and 5.2 a default scenario (the Current Scenario) predicated on existing and historical meteorological conditions. The Office of Public Works (OPW) CFRAM guidance notes outline two additional potential future scenarios, which apply varying increases in flood parameters to account for the potential effects of climate change:

- Mid-Range Future Scenario (MRFS)
- High-End Future Scenario (HEFS)

The increases in the most influential flood parameters under these scenarios are given below in **Table 2**.

Flood Parameter	Applicable Increase by Scenario	
	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Peak Flood Flows	+20%	+30%
Mean Sea Level	+0.5m	+1.0m

Table 2: Allowances in Flood Parameters for the Mid-Range and High-End Future Scenarios

The Fingal Development Plan 2023 – 2029 Strategic Flood Risk Assessment stipulates that flood risk assessment must take into account climate change and associated impacts. It notes that:

"Due to the uncertainty of the potential effects of climate change, the Fingal SFRA sets out recommendations in line with the precautionary approach adopted by the Guidelines in terms of managing the effects of climate change. These include:

- *Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and, accordingly, adopt a cautious approach to zoning land in transitional areas.*
- *Ensuring that the finished levels of structures are designed to protect against flooding such that flood defences, land raising, and ground floor levels are sufficient to cope with the effects of climate change over the lifetime of the development.*
- *Ensuring that both the structures designed to protect against flooding and the protected development are capable of adaptation to the effects of climate change*

when there is more certainty about the effects and when there is still time for such adaptation to be effective."

5.0 FLOOD RISKS & MITIGATION MEASURES

5.1 Fluvial Flooding

5.1.1 Flood Risk Indicators

The following were interrogated for indicators of fluvial flood risk:

- The OPW maintains the National Flood Hazard Mapping website which contains information about locations that may be at risk from flooding. The source of this information includes Local Authorities and other historic records such as newspaper articles and other documentation about reported floods. There is no evidence of any recorded flood events at the subject Site (a copy of the summary report is included in **Appendix B**, an extract of it is shown on **Figure 5** below).

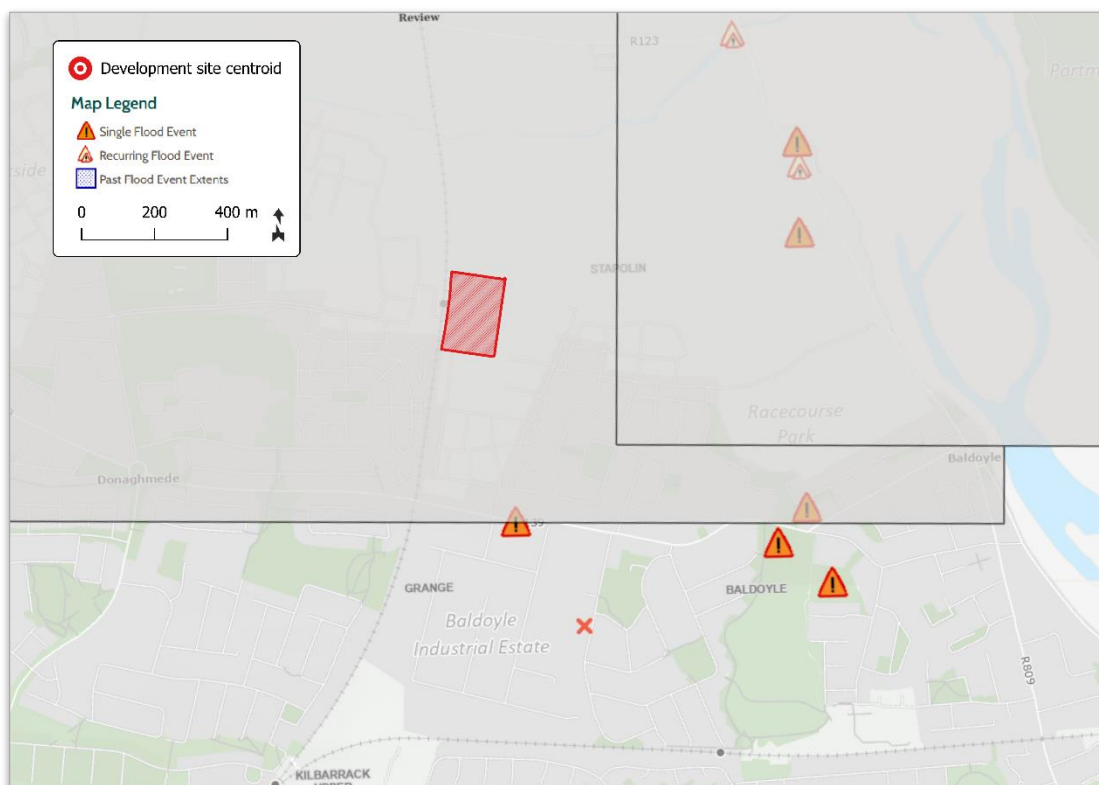


Figure 5 – OPW Mapping of Past Flood Events
(sources: www.floodinfo.ie)

- The River Mayne is located to the north of the subject site. The Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS) 2017, conducted by the OPW, indicates that the subject site is deemed to be located outside of the 0.1% AEP fluvial floodplain, based on the currently available maps, see **Appendix C**. The nearest node indicates a flood level of 3.46m AOD for the 1000-year flood level. The proposed levels of the development are in excess of 5.0m AOD and therefore the site's location is such that it is not affected by fluvial flooding from the River Mayne.

From the above referenced maps, the flood plain of the River Mayne currently only reaches further north of the proposed development where the existing North Fringe Sewer is located. The existing levels around the North Fringe Sewer are in excess of 4.0m AOD.
- It is noted that the FEM FRAMS flood mapping has been under review by the OPW since 04/02/2020, due to an identified error in the flood map source data. At the time of writing, no updated flood mapping has been published.
- Historical Ordnance Survey OS maps for the subject site do not show any indicators of flood risk.

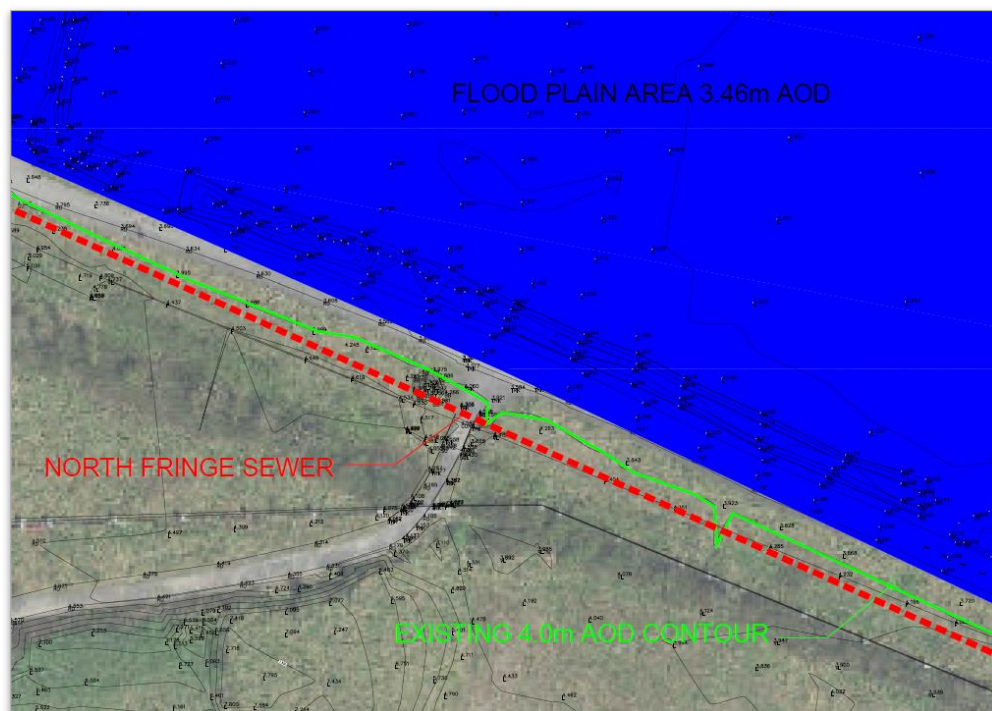


Figure 6 – Floodplain adjacent to North Fringe Sewer

5.1.2 Impact of Proposed Development on Fluvial Flood Regime

The proposed development shall change rainfall run-off patterns within the subject site. This has the potential to alter the existing flow regime in watercourses to which run-off from the undeveloped site discharges. In particular, it has the potential to increase the rate of run-off during more extreme rainfall events.

Surface water drainage from the development shall be disposed of using two mechanisms:

- i) infiltrate run-off to the ground using SuDS measures such as Wetlands, swales, permeable paving, bio-retention areas, green roof etc;
- ii) discharge run-off to a receiving floodplain; it is proposed to utilise the existing floodplain to the north to provide flood storage for the site, and this strategy is in accordance with the requirements of the LAP (Appendix 1, section 4.3). After entering the proposed wetland, this volume shall overspill the weir/spillway into the existing floodplain resulting in a nominal increase across the 40 Ha floodplain of the order of 10mm. The greenfield runoff from the current undeveloped site would result in an approximate contribution of 5mm to the floodplain, hence the increase in depth to the floodplain as a result of the development is of the order of 15mm. This increase is negligible and would not result in any impact on development as it is not permitted within the floodplain. There are also no existing properties or structures at risk within the floodplain.

These mechanisms are consistent with best practice for the sustainable urban drainage and the design has been carried out in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). Compliance with GDSDS ensures surface water run-off from the proposed development shall not affect the flood regime in the receiving watercourse. On this basis, the surface water drainage system shall not cause an increase in fluvial flood risk.

5.1.3 Results of Initial Assessment

The available data described above does not provide any indication of fluvial flood risk in the Study Area. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' a detailed assessment of this flooding mechanism is not required.

5.2 Tidal Flooding

5.2.1 Flood Risk Indicators

- The OPW maintains the National Flood Hazard Mapping website which contains information about locations that may be at risk from flooding. The source of this information includes Local Authorities and other historic records such as newspaper articles and other documentation about reported floods. There is no evidence of any recorded flood events at the subject Site (a copy of the summary report is included in **Appendix B**).
- The subject site proximity to the coast indicates that the potential for on-site flooding due to tidal action needs to be considered. Recent modelling of the area as part of the FEM FRAMS 2017, indicates that the subject site is deemed to be located outside the 0.5% AEP tidal floodplain based on the currently available maps, see **Appendix D**.
- The coast of Ireland has also been modelled by the OPW as part of the Irish Coastal Protection Strategy Study – Phase 3. This study looked at the potential future flooding should climate change have a dramatic effect on sea levels. The study took a 'mid-range' level for sea level rise of 500mm above current levels and a 'high end' level of 1000mm above existing levels and then re-modelled the effects. The effects indicate that the site would be outside of the flooded area. See **Appendix E** for ICPSS Maps.
- Historical Ordnance Survey OS maps for the subject site do not show any indicators of flood risk.

The nearest node point to the development site indicates a flood level of 3.35m AOD. The proposed levels of the development are in excess of 5.0m AOD and therefore the sites location is such that it is not affected by tidal water flooding.

5.2.2 Results of Initial Assessment

The available data described above does not indicate the risk of tidal flooding on the development site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' a detailed assessment of this flooding mechanism is not required.

5.3 Pluvial Flooding

5.3.1 Flood Risk Indicators

- The OPW maintains the National Flood Hazard Mapping website which contains information about locations that may be at risk from flooding. The source of this information includes Local Authorities and other historic records such as newspaper articles and other documentation about reported floods. There is no evidence of any recorded flood events at the subject Site (a copy of the summary report is included in **Appendix B**).

Pluvial flooding is flooding which has originated from overland flow resulting from high intensity rain fall. The historical and predicted flooding information does not indicate that the subject lands are at risk from pluvial flood events.

5.4 Surface Water Drainage for the Proposed Development

The proposed surface water strategy and drainage design for the development are outlined within the Engineering Services Report, that accompanies this planning application. In summary, road drainage is collected by bio-retention areas, swales or gullies and roofs are drained to filter drains located in rear gardens. All surface water then discharges into the new surface water sewer network which outfalls to proposed wetland (providing water quality treatment) before over-spilling a weir/spillway to the Mayne River Floodplain, note Wetland area granted planning under F16A/0412.

As per the above referenced grant of permission, it is proposed to utilise the existing floodplain to the north to provide flood storage for the site, and this strategy is in accordance with the requirements of the LAP (Appendix 1, section 4.3). The total volume of runoff for the critical 1 in 100-year (6-hour) storm has been calculated as 3600m³. After entering the proposed wetland, this volume shall overspill the weir/spillway into the existing floodplain resulting in a nominal increase across the 40 Ha floodplain of the order of 10mm. The greenfield runoff from the current undeveloped site would result in an approximate contribution of 5mm to the floodplain, hence the increase in depth to the floodplain as a result of the development is of the order of 15mm. This increase is negligible and would not result in any impact on development as it is not permitted within the floodplain. There are also no existing properties or structures at risk within the floodplain. After the tide recedes, this water shall then flow back into the sea on its existing natural path.

The permitted surface water network discharging to the flood plain has an invert level of 3.7m AOD as it crosses into the floodplain backdrops to a level of 2.95m AOD and falls gently to an invert level of circa 2.7m AOD before discharging to the constructed wetland. The maximum

flood level of the floodplain is circa 3.46m AOD, therefore an overflow pipe shall be installed at an invert of 3.5m AOD to the floodplain, meaning that in the event of the floodplain is flooded the development shall continue to discharge and not surcharge the upstream network and cause flooding to the proposed residential development.

In regard to flood exceedance, storms less than the 1 in 100-year pluvial event, shall be catered for within the development's drainage network. However, in the rare occurrence of a higher storm (or a blockage within the system) capacity in the drainage network shall be exceeded and areas with lower road levels shall begin to flood. Proposed road levels are designed to low spots within the proposed site, which are located away from the proposed development structures, any above ground flooding shall therefore gather at these locations. Overland flows generated by any potential flooding of manholes and gullies or from high intensity, short duration storms which might fail to enter the drainage system, shall be routed away from buildings and towards open spaces within the site. Drop kerbs shall be provided at road edges at low spots in order to allow overland flow to enter these areas. (Please note. the drainage network of the development is designed to include for a 20% increase in flows due to climate change)

Please refer to the CS Consulting Engineering Services Report for more details.

5.5 Results of Initial Assessment

Based on the above, there is no indication of pluvial flood risk to the subject site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' a detailed assessment of this flooding mechanism is not required.

5.6 Groundwater Flooding

5.6.1 Flood Risk Indicators

According to the Geological Survey of Ireland (GSI) interactive maps, the subject site indicates no karst features are in the area, that groundwater vulnerability is low, and the aquifer is poor. The proposed alteration to the existing site shall not increase the potential for groundwater flooding as such the risk is deemed acceptable. See **Appendix F** for GSI mapping information for background groundwater & geology data for the subject site.

5.6.2 Results of Initial Assessment

Based on the above, there is no indication of groundwater flood risk to the subject site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' a detailed assessment of this flooding mechanism is not required.

6.0 CONCLUSION

6.1.1 Fluvial Flood Risk

There were no indicators of fluvial flood risk associated with the development site and therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' [the 'FRM Guidelines'] detailed assessment of this flooding mechanism is not required.

6.1.2 Tidal Flood Risk

The available data described above does not indicate the risk of tidal flooding on the development site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' a detailed assessment of this flooding mechanism is not required.

6.1.3 Pluvial Flood Risk

The pluvial flood-risk indicators described in Section 5.3 do not provide any indication of pluvial flooding at the subject site and therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' [the 'FRM Guidelines'] detailed assessment of this flooding mechanism is not required.

6.1.4 Flood Risk from Ground Water

Geological Survey of Ireland (GSI) interactive maps do not provide any indication of flood risk from groundwater at the subject site and therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' [the 'FRM Guidelines'] detailed assessment of this flooding mechanism is not required.

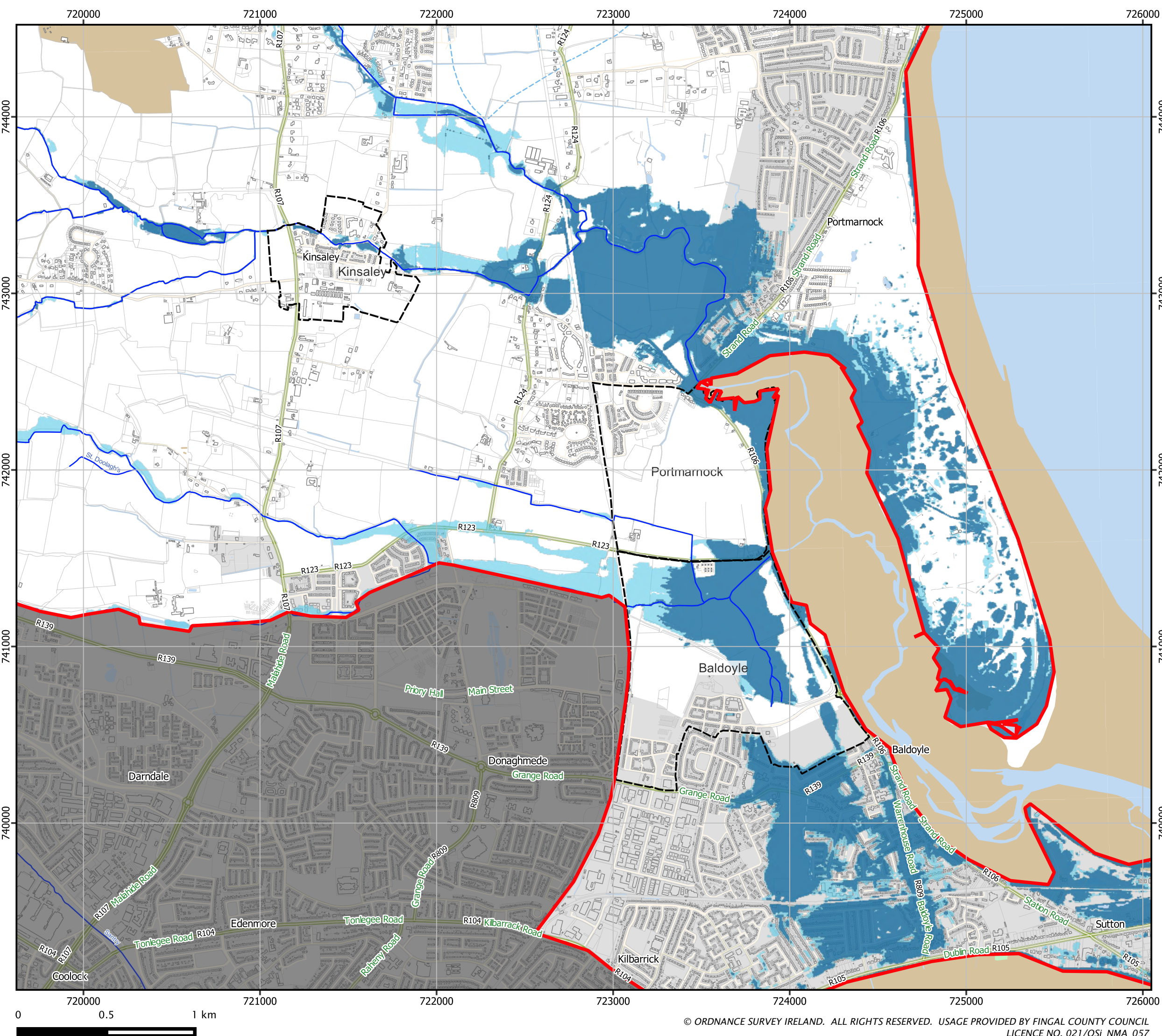
7.0 SUMMARY AND RECOMMENDATIONS

The proposed development was subject to SSFRA in accordance with OPW Flood Risk Management Guidelines. This SSFRA did not find any indicators of the proposed development being at risk from fluvial, pluvial or groundwater flooding; also, the SSFRA did not find any indicators that the proposed development shall give rise to flood risk elsewhere.

APPENDIX A
FINGAL COUNTY COUNCIL FLOOD ZONE MAPPING



CS CONSULTING
Civil, Structural & Traffic Engineering



MAP SERIES		22 OF 26
KEY PLAN		
LEGEND		
	Fingal County Administrative Boundary	
	Watercourses	
	LAP & Masterplan Boundaries	
	Flood Zone A	
	Flood Zone B	
	Defended Areas	
REV: 05	NOTE: FOR INFORMATION	05/04/2023
Comhairle Contae Fhine Gall Fingal County Council		
Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin		
T: +353 (0)1 5138963 E: info@mccloyconsulting.ie W: www.mccloyconsulting.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		
DRAWING SCALE:		1:20000 @ A3

APPENDIX B
OFFICE OF PUBLIC WORKS HISTORIC FLOOD REPORT



CS CONSULTING
Civil, Structural & Traffic Engineering

Past Flood Event Local Area Summary Report

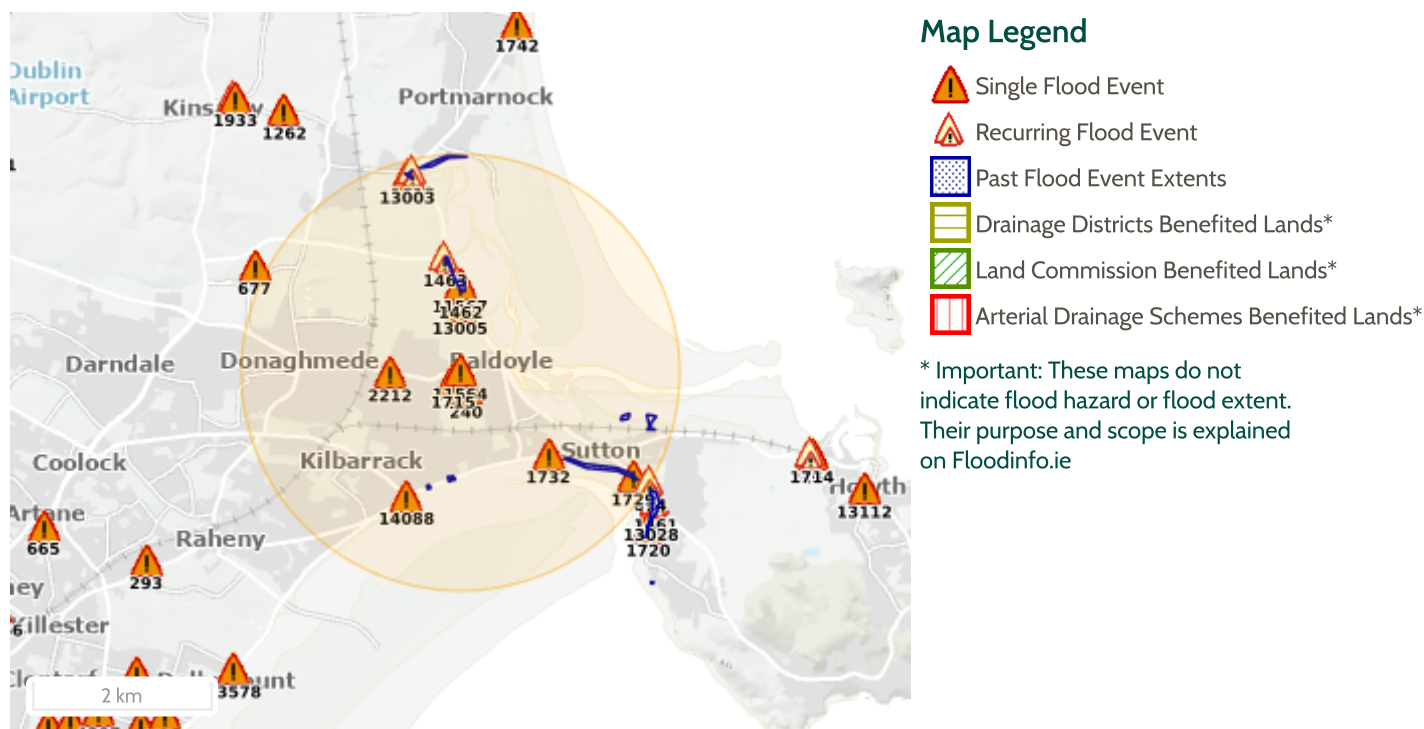


OPW Oifig na nOibreacha Poiblí
Office of Public Works

Report Produced: 17/7/2026 15:17

This Past Flood Event Summary Report summarises 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.



15 Results

Name (Flood_ID)	Start Date	Event Location
1. Flooding at Portmarnock on 03/01/2014 (ID-13003) Additional Information: Reports (0) , Press Archive (0)	03/01/2014	Approximate Point
2. Flooding at Baldoy on 03/01/2014 (ID-13005) Additional Information: Reports (0) , Press Archive (0)	03/01/2014	Approximate Point
3. The Grange Road Baldoy Oct 2002 (ID-1715) Additional Information: Reports (1) , Press Archive (0)	19/10/2002	Exact Point
4. Greenfield Road Sutton Feb 2002 (ID-1729) Additional Information: Reports (5) , Press Archive (0)	01/02/2002	Exact Point
5. Dublin Road Sutton Feb 2002 (ID-1732) Additional Information: Reports (1) , Press Archive (0)	01/02/2002	Approximate Point
6. Grange Road Donaghmede Nov 1982 (ID-2212) Additional Information: Reports (1) , Press Archive (0)	07/11/1982	Approximate Point

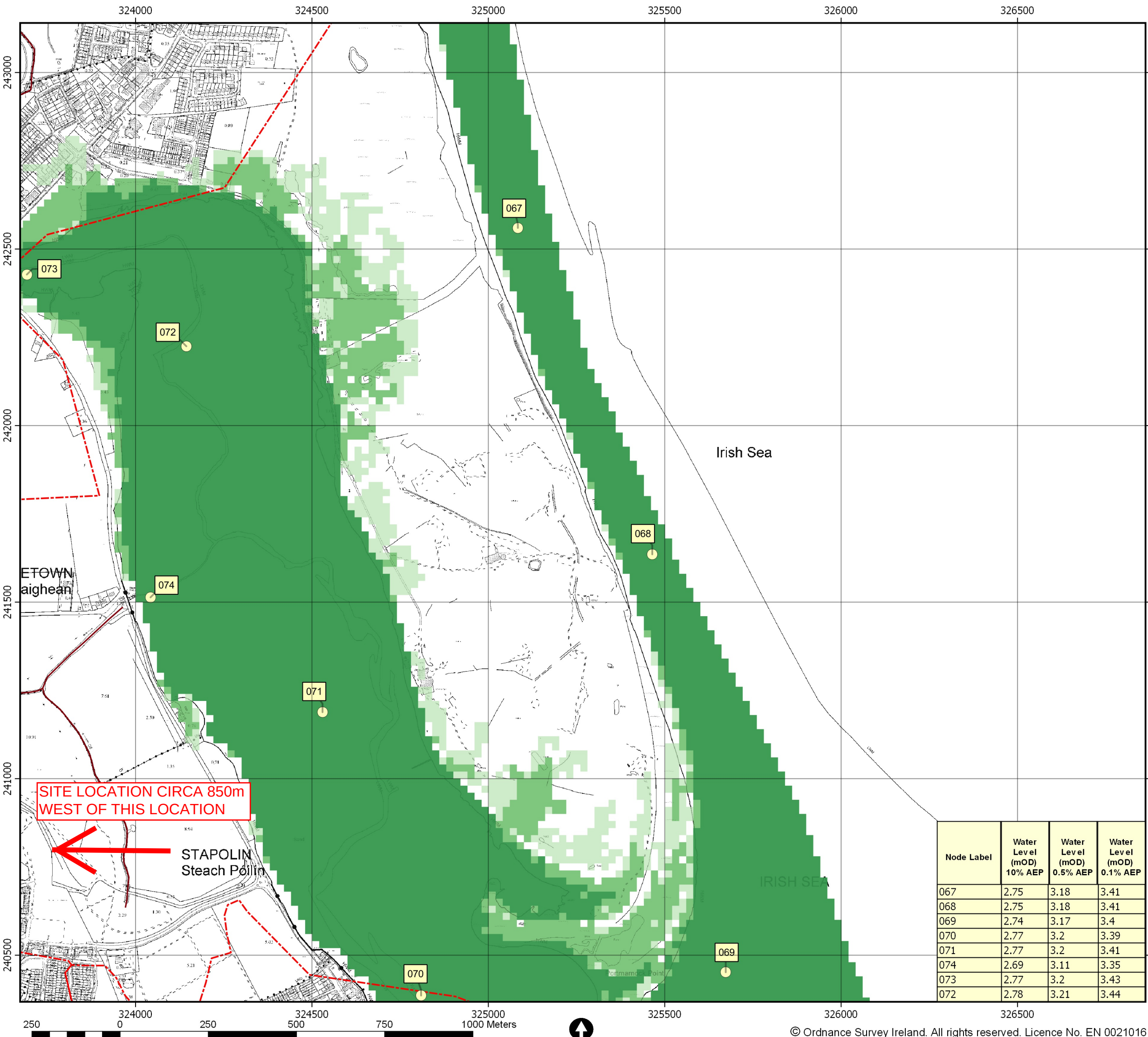
	Name (Flood_ID)	Start Date	Event Location
7.	 Grange Stream Baldoyle Dec 1954 (ID-240) Additional Information: Reports (1) , Press Archive (0)	08/12/1954	Exact Point
8.	 Sluice River Strand Road Portmarnock Recurring (ID-1613) Additional Information: Reports (5) , Press Archive (0)	n/a	Exact Point
9.	 Carrickbrack Road Sutton recurring (ID-674) Additional Information: Reports (1) , Press Archive (0)	n/a	Approximate Point
10.	 Baldoyle Coastal Recurring (ID-1462) Additional Information: Reports (5) , Press Archive (0)	n/a	Approximate Point
11.	 Mayne River Bridge Baldoyle Recurring (ID-1463) Additional Information: Reports (4) , Press Archive (0)	n/a	Exact Point
12.	 Flooding at Kilbarrack on 02/12/2021 (ID-14088) Additional Information: Reports (0) , Press Archive (0)	02/12/2021	Approximate Point
13.	 Dublin City Tidal Feb 2002 (ID-456) Additional Information: Reports (45) , Press Archive (27)	01/02/2002	Area
14.	 Flooding at Brookstone Road, Baldoyle, Dublin 13 on 24th Oct 2011 (ID-11564) Additional Information: Reports (1) , Press Archive (0)	23/10/2011	Approximate Point
15.	 Flooding at Coast Road, Baldoyle, Dublin 13 on 24th Oct 2011 (ID-11567) Additional Information: Reports (1) , Press Archive (0)	23/10/2011	Approximate Point

APPENDIX C

**FINGAL EAST MEATH FLOOD RISK ASSESSMENT AND MANAGEMENT MAPPING –
FLUVIAL FLOOD EXTENT MAP**



CS CONSULTING
Civil, Structural & Traffic Engineering



Node Label	Water Level (mOD) 10% AEP	Water Level (mOD) 0.5% AEP	Water Level (mOD) 0.1% AEP
067	2.75	3.18	3.41
068	2.75	3.18	3.41
069	2.74	3.17	3.4
070	2.77	3.2	3.39
071	2.77	3.2	3.41
074	2.69	3.11	3.35
073	2.77	3.2	3.43
072	2.78	3.21	3.44

Location Plan:



LEGEND

- AFA Boundary
- Defended Area
- Modelled River Centreline
- Node Point
- 10% AEP Tidal Extent (High Risk)
- 0.5% AEP Tidal Extent (Medium Risk)
- 0.1% AEP Tidal Extent (Low Risk)
- Flood Defence - Embankment
- Flood Defence - Wall
- Gate
- NODE123 Node Label
- x.x% AEP 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: **MALAHIDE
TIDAL FLOOD EXTENT MAP**

Map Type: EXTENT

Source: TIDAL

Map Area: HPW

Scenario: CURRENT

Drawn by: IH Date: Sep - 2016

Checked by: MC Date: Sep - 2016

Approved by: JM Date: Sep - 2016

Map No.:
E09MAL_EXCCD_F0_44

Revision: F0

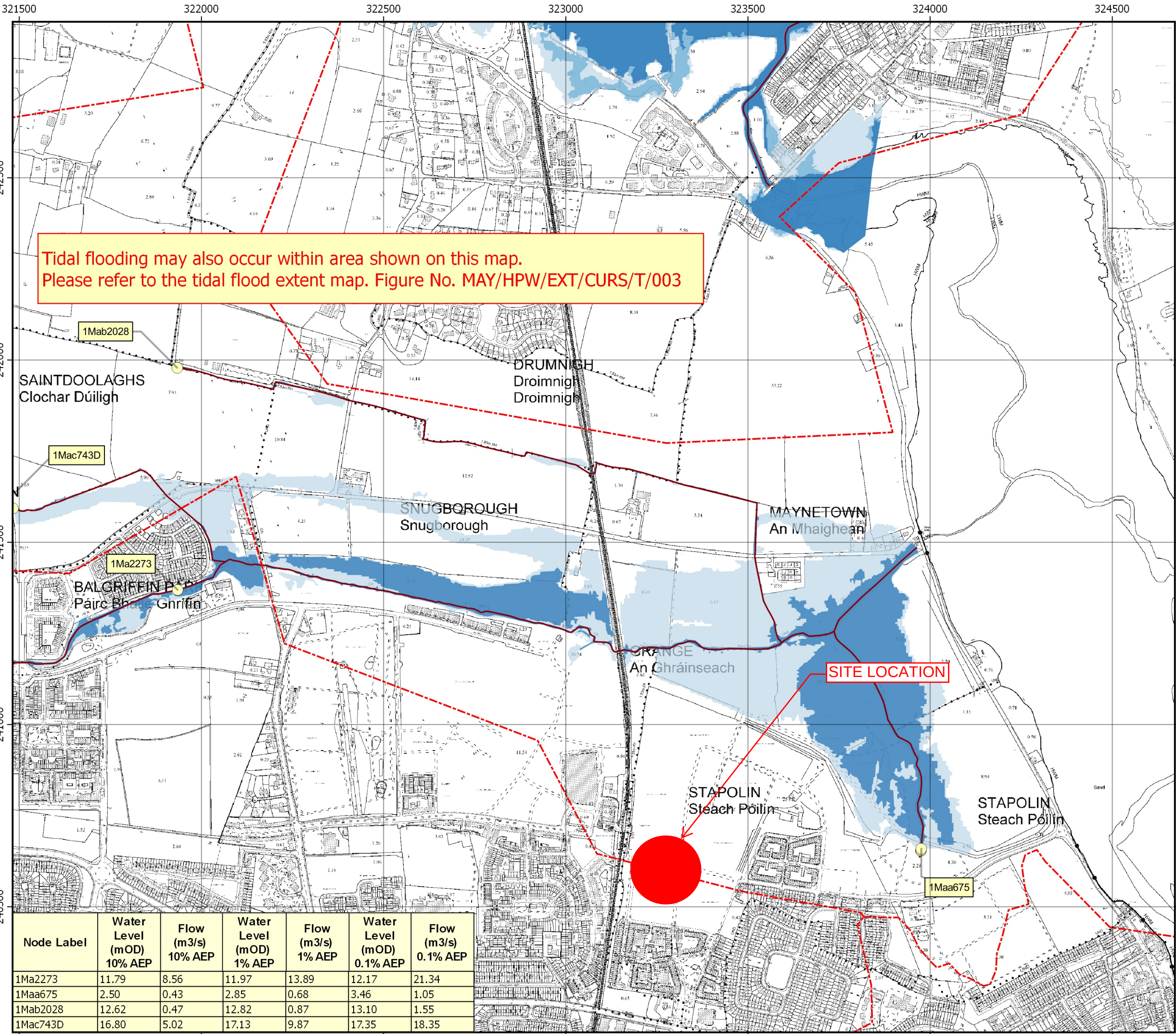
Map Scale: 1:10,000 Plot Scale: 1:1 @ A3

APPENDIX D

**FINGAL EAST MEATH FLOOD RISK ASSESSMENT AND MANAGEMENT MAPPING –
PLUVIAL FLOOD EXTENT MAP**



CS CONSULTING
Civil, Structural & Traffic Engineering



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
- NODE123 Node Label
- x.x% AEP 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:	Mayne Model FLUVIAL FLOOD EXTENT MAP		
Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Nov - 2017
Checked by:	JM	Date:	Nov - 2017
Approved by:	JM	Date:	Nov - 2017
Map No.: MAY/HPW/EXT/CURS/003			
Revision: F1			
Map Scale: 1:10,000		Plot Scale: 1:1 @ A3	

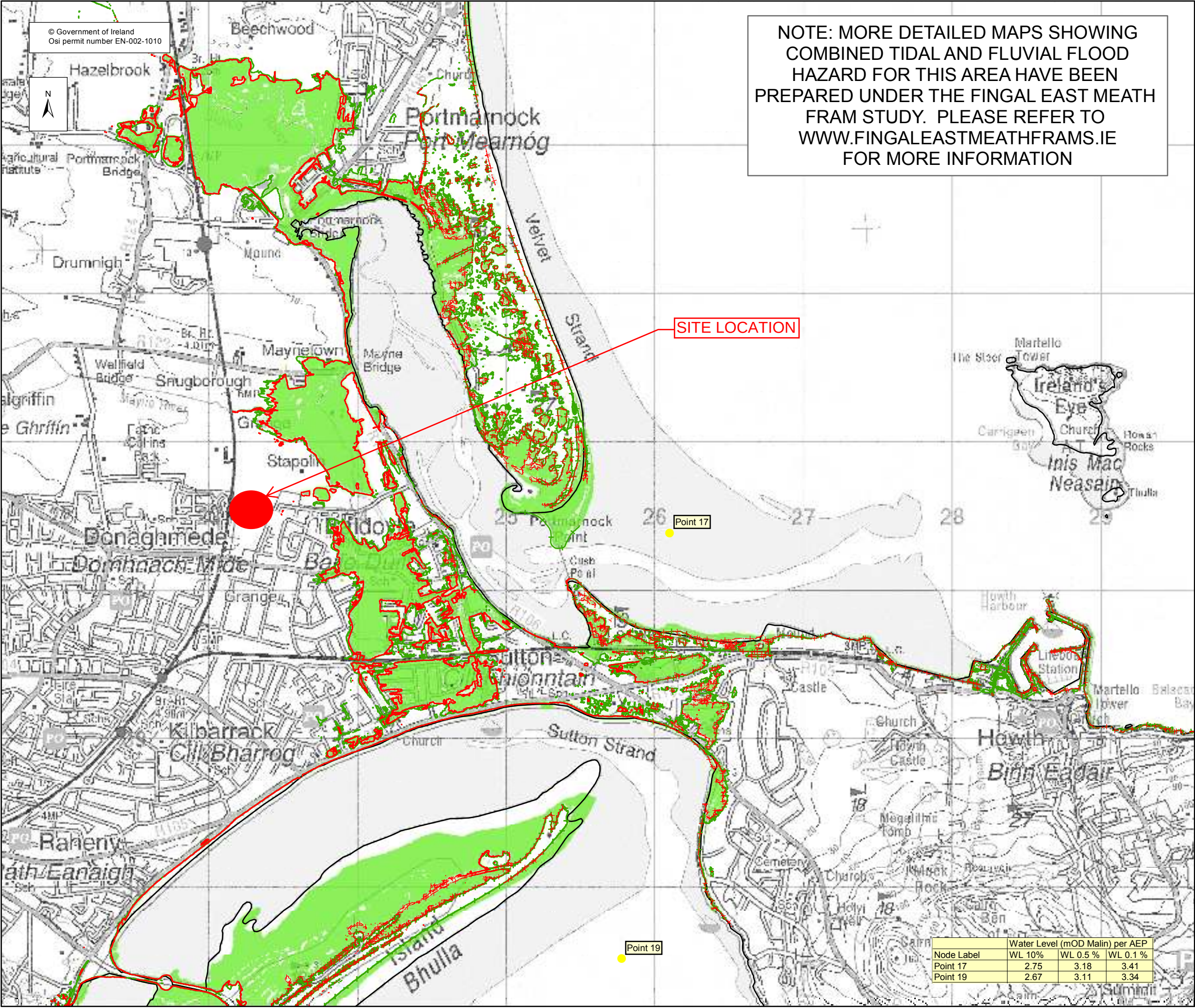
APPENDIX E

IRISH COASTAL PROTECTION STRATEGY STUDY – NORTH EAST COAST FLOOD EXTENT

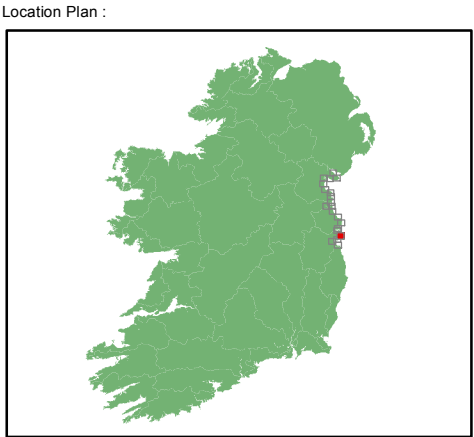
MAP



CS CONSULTING
Civil, Structural & Traffic Engineering



NOTE: MORE DETAILED MAPS SHOWING COMBINED TIDAL AND FLUVIAL FLOOD HAZARD FOR THIS AREA HAVE BEEN PREPARED UNDER THE FINGAL EAST MEATH FRAM STUDY. PLEASE REFER TO WWW.FINGALEASTMEATHFRAMS.IE FOR MORE INFORMATION



EXTENT MAP

Legend:

- 0.5% AEP FLOOD EXTENT (1 in 200 chance in any given year)
- 0.1% AEP FLOOD EXTENT (1 in 1000 chance in any given year)
- Very High Confidence (0.1% AEP)
- High Confidence (0.1% AEP)
- Medium Confidence (0.1% AEP)
- Low Confidence (0.1% AEP)
- Very Low Confidence (0.1% AEP)
- Very High Confidence (0.5% AEP)
- High Confidence (0.5% AEP)
- Medium Confidence (0.5% AEP)
- Low Confidence (0.5% AEP)
- Very Low Confidence (0.5% AEP)
- High Water Mark (HWM)
- Node Point
- Node Label (refer to table)

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

Elmwood House
74 Boucher Road
Belfast
BT 12 6RZ
Northern Ireland

Office of Public Works
17-19 Lower Hatch Street
Dublin 2
Ireland

Project :
IRISH COASTAL PROTECTION STRATEGY
STUDY - PHASE III

Map :
NORTH EAST COAST FLOOD EXTENT MAP

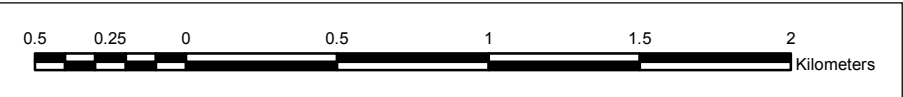
Map Type :	FLOOD EXTENT		
Source :	TIDAL FLOODING		
Map area :	RURAL AREA		
Scenario :	CURRENT		
Figure By :	PJW	Date :	Jan 2010
Checked By :	JMC	Date :	Jan 2010

Figure No. :
NE / RA / EXT / 17

Revision
1

Drawing Scale : 1:25,000 Plot Scale : 1:1 @ A3

Node Label	Water Level (mOD Malin) per AEP		
	WL 10%	WL 0.5%	WL 0.1%
Point 17	2.75	3.18	3.41
Point 19	2.67	3.11	3.34

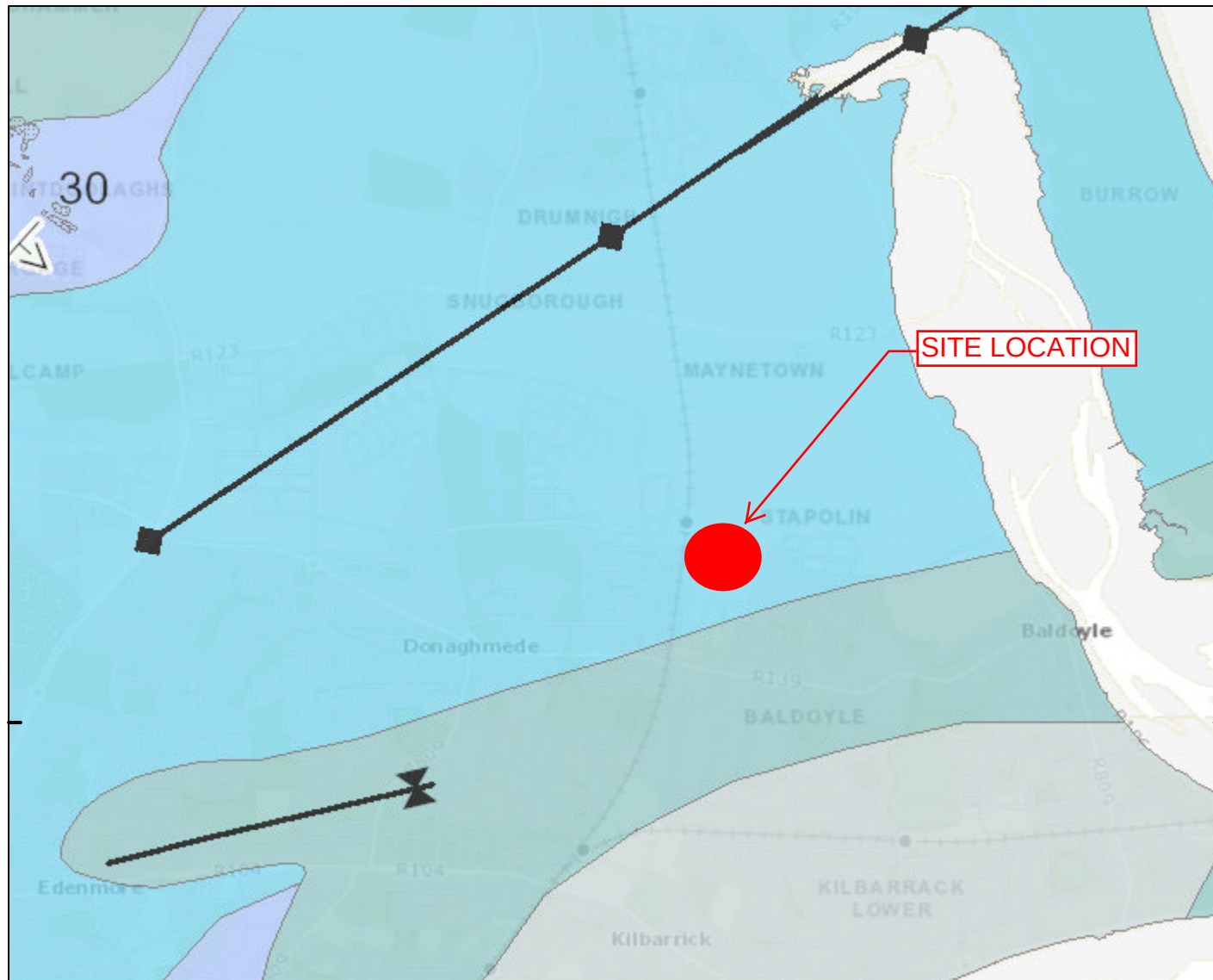


APPENDIX F

GEOLOGICAL SURVEY OF IRELAND – HYDROGEOLOGY & BEDROCK GEOLOGY MAPS



Geological Survey Ireland Public Data



Scale: 1:25,000

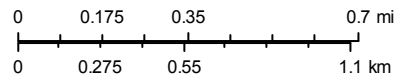
Geological Survey Ireland

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Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.



Map Centre Coordinates (ITM) 722,822 740,872

4/8/2020, 5:09:16 PM

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© Geological Survey Ireland/Government of Ireland

Legend

Structural Symbols 100K ITM 2018

- <all other values>
- ↑ 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 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

Bedrock Outcrops
100 ITM 2018

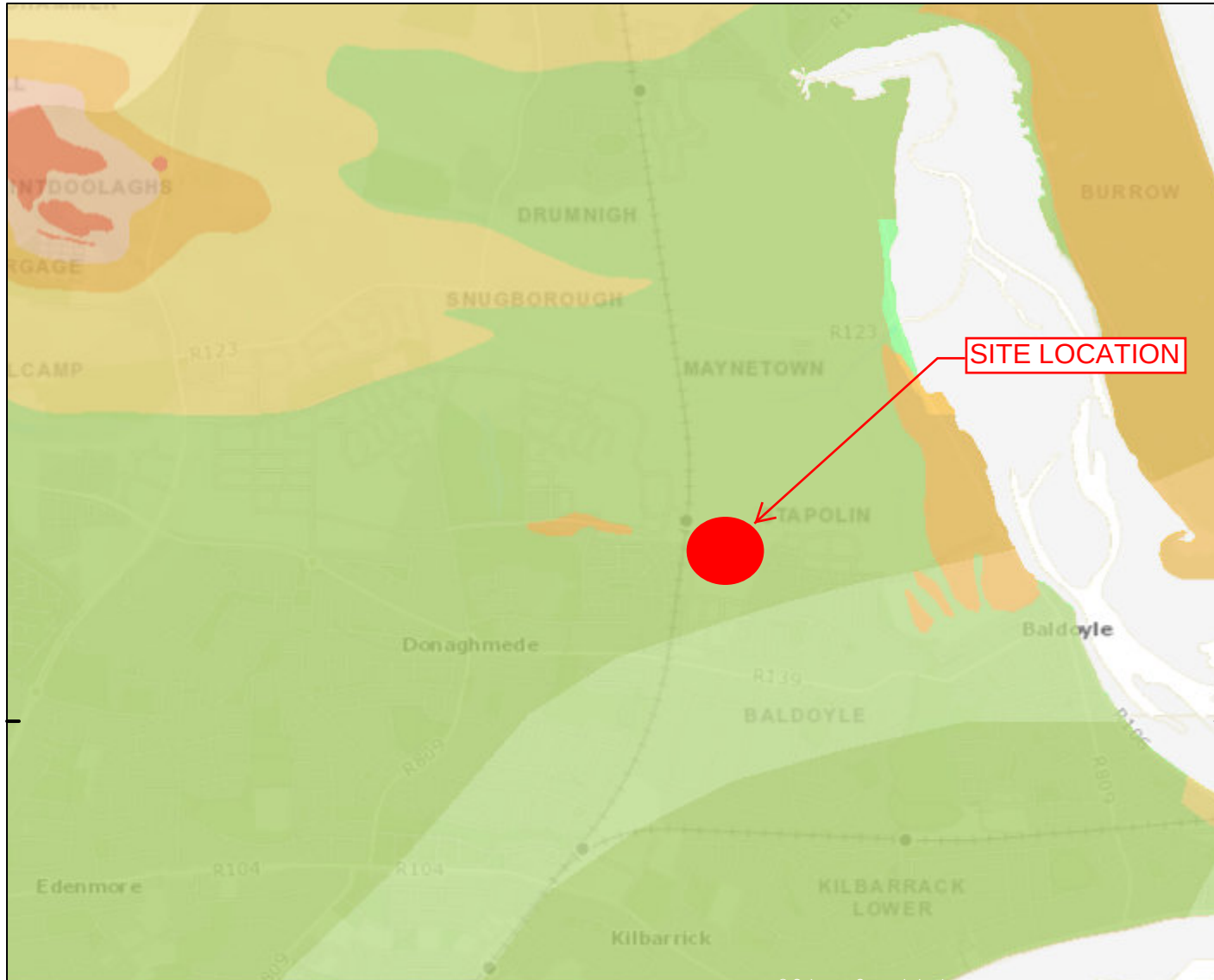
Bedrock Linework 100k ITM 2018

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

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



Geological Survey Ireland Public Data

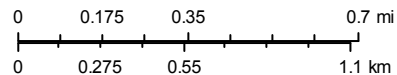


Scale: 1:25,000

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Map Centre Coordinates (ITM) 722,822 740,872
4/8/2020, 5:08:29 PM

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Legend

Gravel Aquifer

- Locally important gravel aquifer
- Regionally important gravel aquifer
- Bedrock Aquifer
- Faults

- Extreme
- High
- Moderate
- Low
- Water

Bedrock Aquifer

- Rkc - Regionally Important Aquifer - Karstified (conduit)
- Rkd - Regionally Important Aquifer - Karstified (diffuse)
- RK - Regionally Important Aquifer - Karstified
- Rf - Regionally Important Aquifer - Fissured bedrock
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive

- Lk - Locally Important Aquifer - Karstified

- LI - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones

- PI - Poor Aquifer - Bedrock which is Generally

- Unproductive except for Local Zones

- Pu - Poor Aquifer - Bedrock which is Generally

- Unproductive

- Lake

National Groundwater Vulnerability Ireland

- Rock at or near Surface or Karst



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