



COMMUNITY CENTRE AT BALDOYLE RACECOURSE PARK IN FINGAL

Site-Specific Flood Risk Assessment P03



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Community Centre at Baldoyle Racecourse Park in Fingal Site-Specific Flood Risk Assessment

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1. INTRODUCTION

Roughan & O'Donovan Consulting Engineers has carried out a Flood Risk Assessment for a brownfield site regarding the development of a new Community Centre at in Baldoyle Racecourse Park, Fingal. This report has been prepared to assess the flood risk to the subject sites and adjacent lands as a result of the proposed development.

1.1 Description of Proposed Development and Study Area

The proposed development includes the delivery of a new community centre including sports hall, studies, changing rooms and toilet facilities. The proposed finished floor level is set at 4.8mOD The development includes the reconstruction of existing parking located to the north of the site, landscaping of the surrounding area within the development site and associated utilities & drainage work.

The site is located off Red Arches Road adjacent to Baldoyle Racecourse Park, Baldoyle, Fingal. The site is bound by the park on three sides, to the south, east and west and Red Arches Road to the north. Access to the Coast Road is gained approximately 400m to the east, and high-density residential developments less than 100m to the west. A minor tributary of the Mayne is culverted/piped through racecourse park and the development site.



Figure 1.1 Site Location (map underlay source: Google Maps)

2. FLOOD RISK

2.1 Introduction

This report has been prepared in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' herein referred to as 'The Guidelines' as published by the Office of Public Works (OPW) and Department of Environment, Heritage and Local Government (DoHLE) in 2009.

2.2 Identification of Flood Risk

Flood risk is a combination of the likelihood of a flood event occurring and the potential consequences arising from that flood event and is then normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding.

To fully assess flood risk 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) is required. Figure 2.1 below shows a source-pathway-receptor model reproduced from 'The Guidelines' (DEHLE-OPW, 2009).

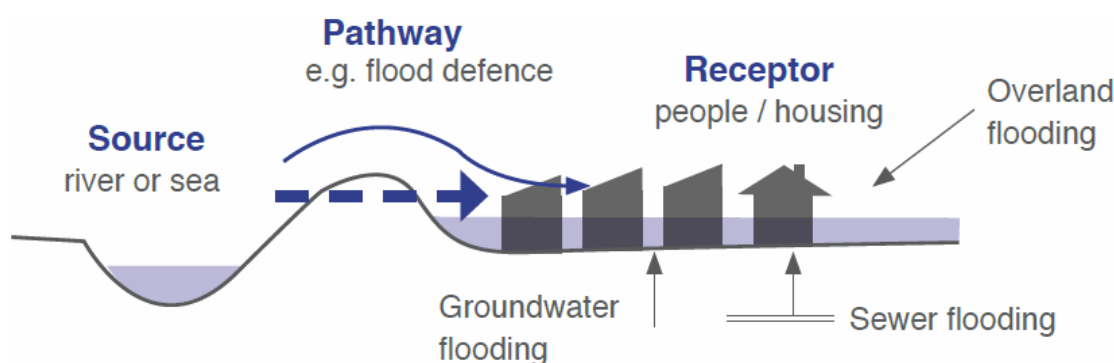


Figure 2.1 Sources, Pathways and Receptors of Flooding

The principal sources of flooding generally are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains. The receptors can include people, their property and the environment. All three elements as well as the vulnerability and exposure of receptors must be examined to determine the potential consequences.

The Guidelines set out a staged approach to the assessment of flood risk with each stage carried out only as needed. The stages are listed below:

- ***Stage I Flood Risk Identification*** – to identify whether there may be any flooding or surface water management issues.
- ***Stage II 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 III 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

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as a return period or annual exceedance probability (AEP). A 1% AEP flood indicates a flood event that will be equalled or exceeded on average once every hundred years and has a return period of 1 in 100 years. Annual Exceedance probability is the inverse of return period as shown Table 2.1 below.

Table 2.1 Correlation Between Return Period and AEP

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

2.4 Definition of Flood Zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. These are split into three categories in The Guidelines:

Flood Zone A

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/tidal flooding);

Flood Zone B

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 or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone C

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/tidal flooding. Flood Zone C covers all plan areas 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 the fact that there is no guarantee that the defences will be maintained in perpetuity.

2.5 Sequential Approach & Justification Test

The Guidelines outline the sequential approach that is to be applied to all levels of the planning process. This approach should also be used in the design and layout of a development and the broad philosophy is shown in Figure 2.2 below. In general, development in areas with a high risk of flooding should be avoided as per the sequential approach. However, this is not always possible as many town and city centres are within flood zones and are targeted for development.

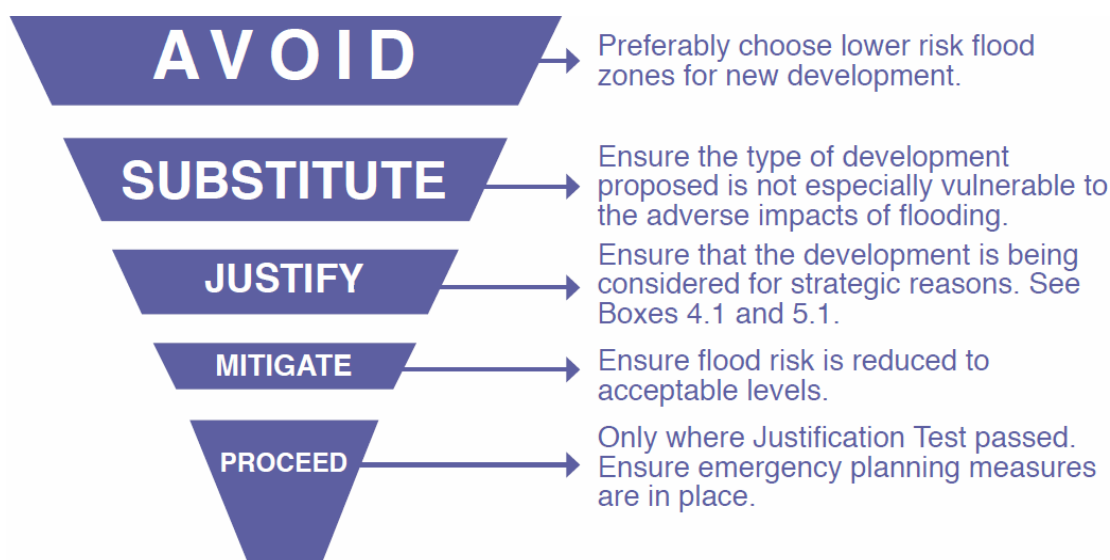


Figure 2.2 Sequential Approach (Source: The Planning System and Flood Risk Management)

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.

- The first is the Plan-making Justification Test and is 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.
- The second is the Development Management Justification Test and is 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.

Table 2.2 Matrix of Vulnerability Versus Flood Zone to Illustrate Appropriate Development that is Required to Meet the Justification Test (Source: The Planning System and Flood Risk Management)

	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. STAGE 1: FLOOD RISK IDENTIFICATION

3.1 General

This Stage 1 Flood Risk Identification includes a review of the existing information and the identification of any flooding or surface water management issues in the study area that may warrant further investigation.

3.2 Vulnerability

As per the OPW Guidelines, the proposed development is classified as “less vulnerable” development as it comprises leisure and non-residential institutions. The guidelines stipulate that typically less vulnerable developments are appropriate within Flood Zone B & C (medium and low risk areas).

3.3 Information Sources Consulted

The following information sources were consulted as part of the Stage 1 Flood Risk Identification:

Table 3.1 Information Sources Consulted

Source	Data Gathered
Primary Sources of Baseline Data	
Catchment Flood Risk Assessment and Management Study (CFRAM): www.floodinfo.ie	Fluvial, Pluvial, Coastal flooding examined
National Indicative Fluvial Maps: www.floodinfo.ie	National Indicative Fluvial Maps examined
OPW Past Flood Events Mapping: www.floodinfo.ie	OPW Records of Fluvial, Pluvial, Coastal flooding examined
Irish Coastal Wave and Water Level Modelling Study and National Coastal Flood Hazard Mapping www.floodinfo.ie	Coastal flooding, update to the ICPSS
Irish Coastal Protection Strategy Study (ICPSS)	Coastal flooding nationally
Secondary Sources of Baseline Data	
Strategic Flood Risk Assessment (SFRA) of the Fingal County Development Plan 2023-2029	Fluvial, Coastal and Pluvial flooding examined
Geological Survey of Ireland (GSI) Maps	GSI Teagasc subsoils map consulted to identify if alluvial sediments are shown to be present at development site that may indicate historic flooding.
Historical Maps	OSI 25” mapping assessed
News Reports	News reports published in newspapers or digital news websites.

3.4 Primary Sources of Baseline Data

(i) Catchment Flood Risk Assessment and Management Study (CFRAM)

The CFRAM programme led by the OPW, provides a detailed assessment of flooding in areas identified as AFA's during the OPW's Preliminary Flood Risk Assessment (PFRA) study.

From the consultation of the CFRAM River Flood Extents and Coastal Flood Extents maps, it has been found that no flooding is indicated on the site in the 1 in 1000 year fluvial or coastal event.

It is noted that at the time of reviewing CFRAM maps, the area of the development site is indicated to be “Under Review: information in this area is under review following an objection, submission and/or further information received.” on the Floodinfo.ie website. Maps are still available for consultation.

CFRAM Coastal and fluvial Flood Extents Maps are reproduced in Appendix B.

(ii) National Indicative Fluvial Maps (NIFM)

The indicative fluvial flood maps were finalised in December 2020. The mapping presents flood extents for river reaches that were not previously modelled as part of the CFRAMS and have catchments larger than 5 km². As per the OPW the use of these maps is to “provide an indication of areas that may be prone to flooding. They are not necessarily locally accurate and should not be used as the sole basis for defining the Flood Zones nor for making decisions on planning applications.” As the site was considered as part of the CFRAMS study the NIFM maps are not applicable.

(iii) OPW past flood Events (Floodinfo.ie)

The OPW National Flood Hazard Mapping was examined to identify any recorded flood events within the vicinity of the site. No flood events have been recorded on the site, however, a number of flood events have been recorded within 2.5 km from the site.

An overview of the OPW National Flood Hazard Mapping is reproduced in appendix B.

(iv) Irish Coastal Protection Strategy Study (ICPSS) – NORTH EAST .

The Irish Coastal Protection Strategy Study (ICPSS) Phase 3, undertaken by the OPW, covers coastal flooding throughout Ireland. The aims of the ICPSS were to establish extreme coastal flood levels and extents, produce coastal flood extent and flood depth maps and assess and quantify the hazard and potential risk associated with coastal erosion.

Water levels at the Node Label Point 17 located around 2 km east of the site are stated in Table 3.2.

Table 3.2 ICPSS Flood Levels

Return Period	Current climate (mOD)	Climate Change - Mid Range Future Scenario (mOD)	Climate Change - High-End Future Scenario (mOD)
10% AEP Event	2.75	3.25	3.75
0.5% AEP Event	3.18	3.68	4.18
0.1% AEP Event	3.41	3.91	4.41

The published ICPSS flood maps are reproduced in Appendix B.

(v) Irish Coastal Wave and Water Level Modelling Study and National Coastal Flood Hazard Mapping

The Irish Coastal Wave and Water Level Modelling Study (ICWWS) provides an update to the Estimated Extreme Coastal Boundary Water Levels, associated with astronomical tide, storm surge and seiche/local wind set-up allowance, for the coast of Ireland, originally presented as output from the ICPSS. The ICWWS levels were used to generate National Coastal Flood Hazard Mapping. These flood maps indicate that there is flooding in the vicinity of the site for the current scenario maps. The mapping for the medium range future scenario and High-end future scenario indicate flooding on the site.

Water levels at the North East Point NE17 located around 2 km east of the site are stated in Table 3.3.

Table 3.3 ICWWS Flood Levels

Return Period	Current climate (mOD)	Climate Change - Mid Range Future Scenario (mOD)	Climate Change - High-End Future Scenario (mOD)
10% AEP Event	2.84	3.34	3.84
0.5% AEP Event	3.13	3.63	4.13
0.1% AEP Event	3.28	3.78	4.28

National Coastal Flood Hazard Mapping and National Coastal Extreme Levels Estimation Points have been reproduced in appendix B

3.5 Secondary Sources of Baseline data

The following sources were also examined to identify areas that may be liable to flooding:

(i) Strategic Flood Risk Assessment (SFRA) of the Fingal County Development Plan 2023-2029

The site area is covered as part of the Fingal County Development Plan 2023-2029. There are no indicators of flood risks on current climate scenario maps, however, maps for medium range scenario Flood Extents and High End future scenario Flood Extents indicate that there is a probability of flooding on the site. An overview of the Strategic Flood Risk Assessment Flood Extents Mapping is reproduced in appendix B.

(ii) Geological Survey of Ireland Maps

According to the Geological Survey Ireland (GSI), the underlying subsoil Estuarine silt and clay, and there are no known karst features (swallow holes, enclosed depressions, wells or springs) within the footprint of the site.

(iii) Historical Maps

Historical Maps were studied. No areas of the site have been identified as liable to flooding.

(iv) News reports

No News report of flooding have been found in relation to the site.

3.6 Source – Pathway – Receptor Model

The following source-pathway-receptor model has been developed using the information examined in the Stage I Flood Risk Identification to categorise the sources of flooding, where it flows to (pathway) and the people and infrastructure affected by it (receptors). The likelihood and consequences of each type of flooding have also been assessed to determine the risk. These are summarised in Table 3.4 (taken from Appendix A of the Guidelines).

Table 3.4 Source-Pathway-Receptor Model

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Fluvial flooding	Overbank flow from the Mayne River	Leisure and non-residential institutions	<i>Low</i>	<i>Medium</i>	<i>Medium</i>
Pluvial / Surface Water flooding	Extreme rainfall events and inadequate surface water drainage	Leisure and non-residential institutions	<i>Low</i>	<i>Medium</i>	<i>Low</i>
Coastal flooding	Extreme tides, storm surges or wave overtopping	Leisure and non-residential institutions	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>
Groundwater Flooding	Rising groundwater levels	Leisure and non-residential institutions	<i>Low</i> (No reports or geological indicators)	<i>Medium</i>	<i>Low</i>

3.7 Stage 1 Conclusions

3.7.1 Fluvial Flooding

Fingal Strategic Flood Risk Assessment Flood Extents maps indicates flooding in the vicinity of the site. Therefore, the risk of fluvial flooding at the site is classified as medium and a Stage 2 – Initial Fluvial Flood Risk Assessment is required for the development.

3.7.2 Coastal Flooding

The Irish Coastal Wave and Water Level Modelling Study indicates that Coastal flooding is identified as a source of flooding affecting lands in the vicinity of the site. Therefore, the risk of coastal flooding at the site is classified as medium and a Stage 2 – Initial Fluvial Flood Risk Assessment is required for the development.

3.7.3 Pluvial Flooding

Pluvial flooding was not identified as a source of flooding affecting the site. Therefore, the risk of pluvial flooding is classified as low and no further assessment is required.

3.7.4 Groundwater Flooding

Groundwater flooding was not identified as a source of flooding affecting the site. Therefore, the risk of groundwater flooding is classified as Low and no further assessment is required.

4. STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

4.1 General

The Stage 2 Initial Flood Risk Assessment will confirm the sources of flooding that may affect the proposed development site, appraise the adequacy of existing information and scope the requirements of the Stage 3 Detailed Flood Risk Assessment.

4.2 Sources of Flooding

Flooding from Fluvial & Sea Level Rises / Coastal Flooding

A minor tributary of the River Mayne is culverted through the site. This emerges into open channel approximately 150m north of Red Arches Rd. This culvert appears to be inoperable due to the significant build-up of silt that was observed during an abandoned manhole/CCTV survey. The small streams and watercourses adjacent to the site (approximately 150m from the site) are tidally dominated at this location. As such flooding derived from coastal sources is the primary source of flood risk to the proposed development. The flood levels derived as part of the ICWWS are considered the most representative for the site and are proposed as the basis for the design flood levels (presented in Table 4.1). The predicted flood levels (in conjunction with associated mapping) indicate that the proposed development site is not liable to flood in the 1 in 1000 year current climate scenario either from fluvial or coastal sources. As such the proposed development is within Flood Zone C and is appropriate for the associated flood risk as per The Guidelines. The site is not considered to require a stage 3 detailed flood risk assessment with respect to flooding derived from Fluvial or Coastal Flooding.

Nonetheless, the proposed development is to include measures to ensure that it is protected to the 1 in 200 year flood level + MRFS climate change factor and appropriate freeboard as per the OPW Guidelines and Fingal County Development Plan SFRA. The proposed design flood level is derived below. As per the Fingal SFRA Freeboard for Less Vulnerable developments is the greater of:

- 500mm freeboard above current scenario; or
- 250mm above the MRFS (for less vulnerable developments).

Levels are given in table below. The design flood level is therefore 3.88mOD.

Table 4.1 Design Flood Level

	Current	MRFS
ICWWS (North East Point NE17)	3.13	3.63
Freeboard (as per Fingal SFRA)	0.5	0.250
Total	3.63	3.88

As the proposed finished floor level is set at 4.8mOD, the highest water level anticipated from coastal or fluvial flooding is 0.92m below the proposed finished floor level.

Surface Water Flooding

Surface water flooding occurs when the local drainage system cannot convey stormwater flows from extreme rainfall events. The rainwater does not drain away through the normal drainage pathways or infiltrate into the ground but instead ponds on or flows over the ground instead. Surface water flooding is unpredictable as it

depends on a number of factors including ground levels, rainfall and the local drainage network. Appropriate measures in the form of Sustainable Drainage Systems (SuDS) for the purpose for managing surface water in terms of both flow and quality, have been adopted as part of the development design in line with Fingal Country Council requirements and the GSDS.

Groundwater Flooding

Groundwater flooding is a result of upwelling in occurrences where the water table or confined aquifers rises above the ground surface. This tends to occur after long periods of sustained rainfall and/or very high tides. High volumes of rainfall and subsequent infiltration to ground will result in a rising of the water table. Groundwater flooding tends to occur in low-lying areas, where with additional groundwater flowing towards these areas, the water table can rise to the surface causing groundwater flooding. The sources consulted such as the CFRAM mapping and GSI records show no indication that the site is subject to Groundwater derived flooding.

Pluvial Flood Risk

Pluvial flooding results from heavy rainfall that exceeds ground infiltration capacity or more commonly in Ireland where the ground is already saturated from previous rainfall events. This causes ponding and flooding at localized depressions. Pluvial flooding is commonly a result of changes to the natural flow regime such as the implementation of hard surfacing and improper drainage design. The sources consulted such as the CFRAM mapping and PFRA mapping show no indication that the site is subject to pluvial derived flooding. Pluvial flooding will be considered in the design of drainage systems as part of planned development.

4.3 Conclusion of Stage 2 SFRA

The available sources consulted above indicate that the proposed development site is not liable to flood in the 1 in 1000 year current climate scenario either from fluvial or coastal sources. As such the proposed development is within Flood Zone C and is therefore appropriate for the associated flood risk as per The Guidelines.

A small proportion of the site is indicated to flood in extreme events when climate change is considered. However, the primary source of such flooding is tidal. Any potential displaced volumes will be insignificant in comparison to the volumes within the Irish Sea. Any effects on flood levels and flow paths will be imperceptible.

As the proposed finished floor level is set at 4.8mOD, the highest water level anticipated from coastal and fluvial flooding (when considering climate change) is 0.92m below the proposed finished floor level. The site is not considered to require a stage 3 detailed flood risk assessment with respect to flooding derived from Fluvial or Coastal Flooding.

5. FLOOD RISK ASSESSMENT CONCLUSIONS

This Site-Specific Flood Risk Assessment has considered the local hydrological conditions pertaining to the proposed development and identified flood risk the vicinity of the development lands. All sources indicate that the proposed development is within Flood Zone C. Suitable flood risk management measures have been adopted to mitigate the likely impacts of climate change. Appropriate measures in the form of Sustainable Drainage Systems (SuDS) for the purpose for managing surface water in terms of both flow and quality, have been adopted as part of the development design in line with Fingal Country Council requirements and the GDSDS. The findings of this SSFRA indicate that flood risk to the scheme can be managed with negligible effect on flood risk elsewhere. The proposed development satisfies the requirements of the sequential approach (as described in the OPW's "The Planning System and Flood Risk Management Guidelines for Planning Authorities") and is therefore deemed appropriate for the associated flood risk.

APPENDIX A

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Catchment: The area that is drained by a river or artificial drainage system.

Catchment Flood Risk Assessment and Management Studies (CFRAMS): A catchment-based study involving an assessment of the risk of flooding in a catchment and the development of a strategy for managing that risk in order to reduce adverse effects on people, property and the environment. CFRAMS precede the preparation of Flood Risk Management Plans (see entry for FRMP).

Climate change: Long-term variations in global temperature and weather patterns, which occur both naturally and as a result of human activity, primarily through greenhouse gas emissions.

Core of an urban settlement: The core area of a city, town or village which acts as a centre for a broad range of employment, retail, community, residential and transport functions.

Detailed flood risk assessment: A methodology to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of flood hazard and potential risk to an existing or proposed development, of its potential impact on flood elsewhere and of the effectiveness of any proposed measures.

Estuarial (or tidal) flooding: Flooding from an estuary, where water level may be influenced by both river flows and tidal conditions, with the latter usually being dominant.

Flooding (or inundation): Flooding is the overflowing of water onto land that is normally dry. It may be caused by overtopping or breach of banks or defences, inadequate or slow drainage of rainfall, underlying groundwater levels or blocked drains and sewers. It presents a risk only when people, human assets and ecosystems are present in the areas that flood.

Flood Relief Schemes (FRS): A scheme designed to reduce the risk of flooding at a specific location.

Flood Defence: A man-made structure (e.g. embankment, bund, sluice gate, reservoir or barrier) designed to prevent flooding of areas adjacent to the defence.

Flood Risk Assessment (FRA): FRA can be undertaken at any scale from the national down to the individual site and comprises 3 stages: Flood risk identification, initial flood risk assessment and detailed flood risk assessment.

Flood Risk Identification: A desk-based study to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation.

Flood Hazard: The features of flooding which have harmful impacts on people, property or the environment (such as the depth of water, speed of flow, rate of onset, duration, water quality, etc.).

Floodplain: A flood plain is any low-lying area of land next to a river or stream, which is susceptible to partial or complete inundation by water during a flood event.

Flood Risk: An expression of the combination of the flood probability, or likelihood and the magnitude of the potential consequences of the flood event.

Flood Storage: The temporary storage of excess run-off, or river flow in ponds, basins, reservoirs or on the flood plain.

Flood Zones: A geographic area for which the probability of flooding from rivers, estuaries or the sea is within a particular range.

Fluvial flooding: Flooding from a river or other watercourse.

Groundwater flooding: Flooding caused by groundwater escaping from the ground when the water table rises to or above ground level.

Initial flood risk assessment: A qualitative or semi-quantitative study to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information, to provide a qualitative appraisal of the risk of flooding to development, including the scope of possible mitigation measures, and the potential impact of development on flooding elsewhere, and to determine the need for further detailed assessment.

Freeboard: Factor of safety applied for water surfaces. Defines the distance between normal water level and the top of a structure, such as a dam, that impounds or restrains water.

Justification Test: An assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The justification test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk-based approach adopted by this guidance.

Likelihood (probability) of flooding: A general concept relating to the chance of an event occurring. Likelihood is generally expressed as a probability or a frequency of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is based on the average frequency estimated, measured or extrapolated from records over a large number of years and is usually expressed as the chance of a particular flood level being exceeded in any one year. 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.

Ordnance Datum (or OD) Malin: is a vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD for "above ordnance datum". Usually mean sea level (MSL) is used for the datum. In the Republic of Ireland, OD for the Ordnance Survey of Ireland is Malin Ordnance Datum: the MSL at Portmoor Pier, Malin Head, County Donegal, between 1960 and 1969. Prior to 1970, Poolbeg Ordnance Datum was used: the low water of spring tide at Poolbeg lighthouse, Dublin, on 8 April 1837. Poolbeg OD was about 2.7 metres lower than Malin OD.

Management Train/Treatment Train: the sequence of drainage components that collect, convey, store and treat runoff as it drains through the site.

Mitigation: The term is used to describe an action that helps to lessen the impacts of a process or development on the receiving environment. It is used most often in association with measures that would seek to reduce negative impacts of a process or development.

Pathways: These provide the connection between a particular source (e.g. high river or tide level) and the receptor that may be harmed (e.g. property). In flood risk management, pathways are often 'blocked' by barriers, such as flood defence structures, or otherwise modified to reduce the incidence of flooding.

Pluvial flooding: Usually associated with convective summer thunderstorms or high intensity rainfall cells within longer duration events, pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.

Regional Planning Guidelines (RPG): These provide the regional context and priorities for applying national planning strategy to each NUTS III region and encourage greater co-ordination of planning policies at the city/county level. RPGs are an important part of the flood policy hierarchy as they can assist in co-ordinating flood risk management policies at the regional level.

Resilience: Sometimes known as “wet-proofing”, resilience relates to how a building is constructed in such a way that, although flood water may enter the building, its impact is minimised, structural integrity is maintained, and repair, drying and cleaning and subsequent reoccupation are facilitated.

Receptors: Things that may be harmed by flooding (e.g. people, houses, buildings or the environment).

Residual risk: The risk which remains after all risk avoidance, substitution and mitigation measures have been implemented, on the basis that such measures can only reduce risk, not eliminate it.

Sequential Approach: The sequential approach is a risk-based method to guide development away from areas that have been identified through a flood risk assessment as being at risk from flooding. Sequential approaches are already established and working effectively in the plan-making and development management processes.

Sustainable Drainage System (SuDS): Drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental impact.

Site-specific Flood Risk Assessment: An examination of the risks from all sources of flooding of the risks to and potentially arising from development on a specific site, including an examination of the effectiveness and impacts of any control or mitigation measures to be incorporated in that development.

Source: Refers to a source of hazard (e.g. the sea, heavy rainfall).

Strategic Flood Risk Assessment: The assessment of flood risk on a wide geographical area against which to assess development proposed in an area (Region, County, Town).

Vulnerability: The resilience of a particular group of people or types of property or habitats, ecosystems or species to flood risk, and their ability to respond to a hazardous condition and the damage or degree of impact they are likely to suffer in the event of a flood. For example, elderly people may be more likely to suffer injury, and be less able to evacuate, in the event of a rapid flood than younger people.

Source: *The definitions above are sourced from the DoEHLG Guidelines for Planning Authorities on ‘The Planning System and Flood Risk Management, 2009’ and Ciria 753 “the SuDS Manual”.*

APPENDIX B

INDICATIVE FLOOD SOURCES

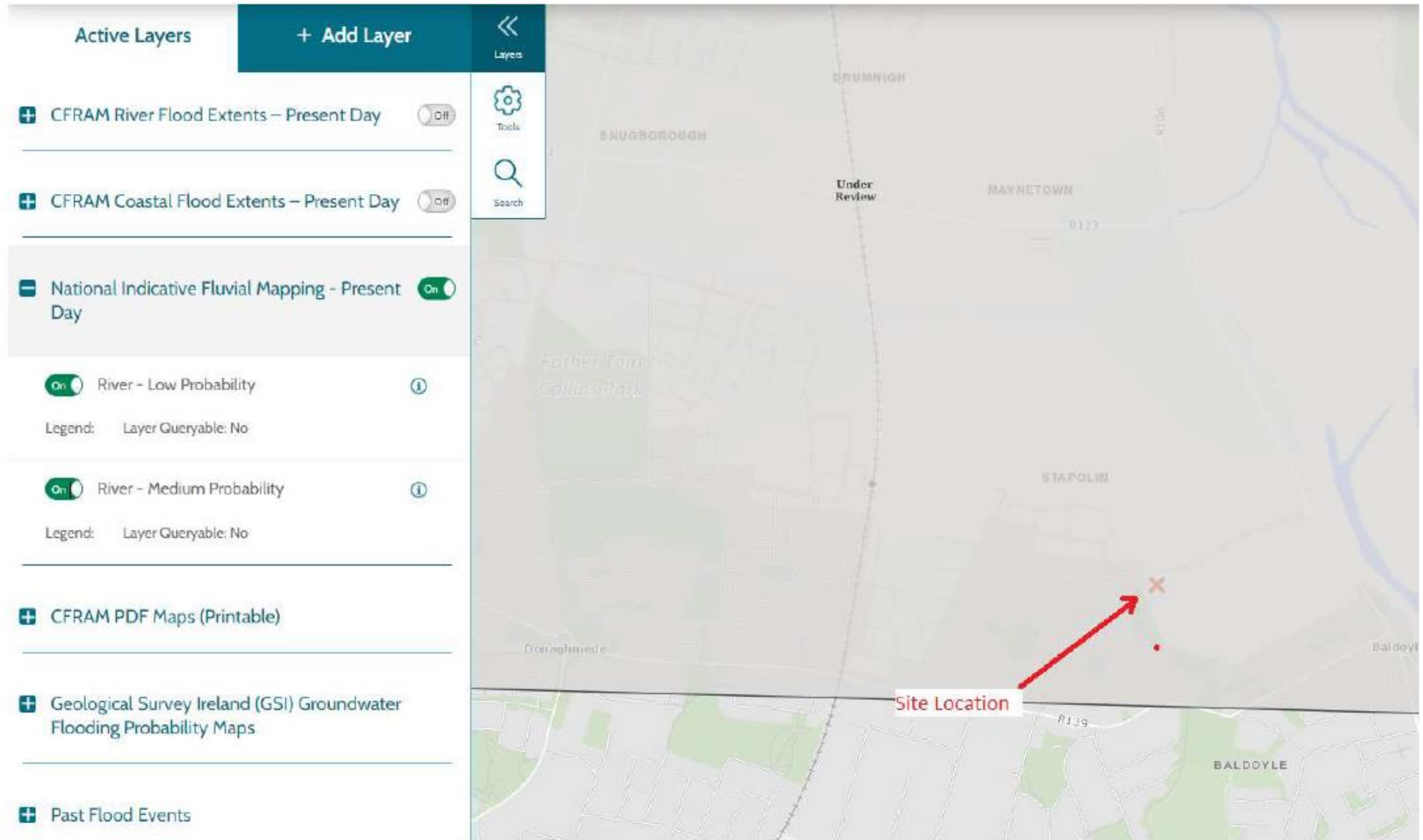
CFRAM River Flood Extents

The screenshot displays a web-based interface for flood risk assessment. At the top, a navigation bar includes links for HOME, ABOUT, PUBLICATIONS, RESOURCES, REPORT PAST FLOOD, FEEDBACK, HELP, and DISCLAIMER. Below this, a 'Flood Maps' header is visible. On the left, an 'Active Layers' panel lists several map layers with toggle switches: 'CFRAM River Flood Extents – Present Day' (On), 'CFRAM Coastal Flood Extents – Present Day' (Off), 'National Indicative Fluvial Mapping - Present Day' (Off), 'CFRAM PDF Maps (Printable)', 'Geological Survey Ireland (GSI) Groundwater Flooding Probability Maps', and 'Past Flood Events'. The main map area shows a satellite view of a residential area with a semi-transparent grey overlay representing flood extents. A red pin is visible on the map. On the right side of the map, there are circular icons for 'B&W', 'Dark', 'Satellite', and 'OSI'. At the bottom right, there are zoom controls (home, in, out, full screen) and a scale bar indicating 200m.

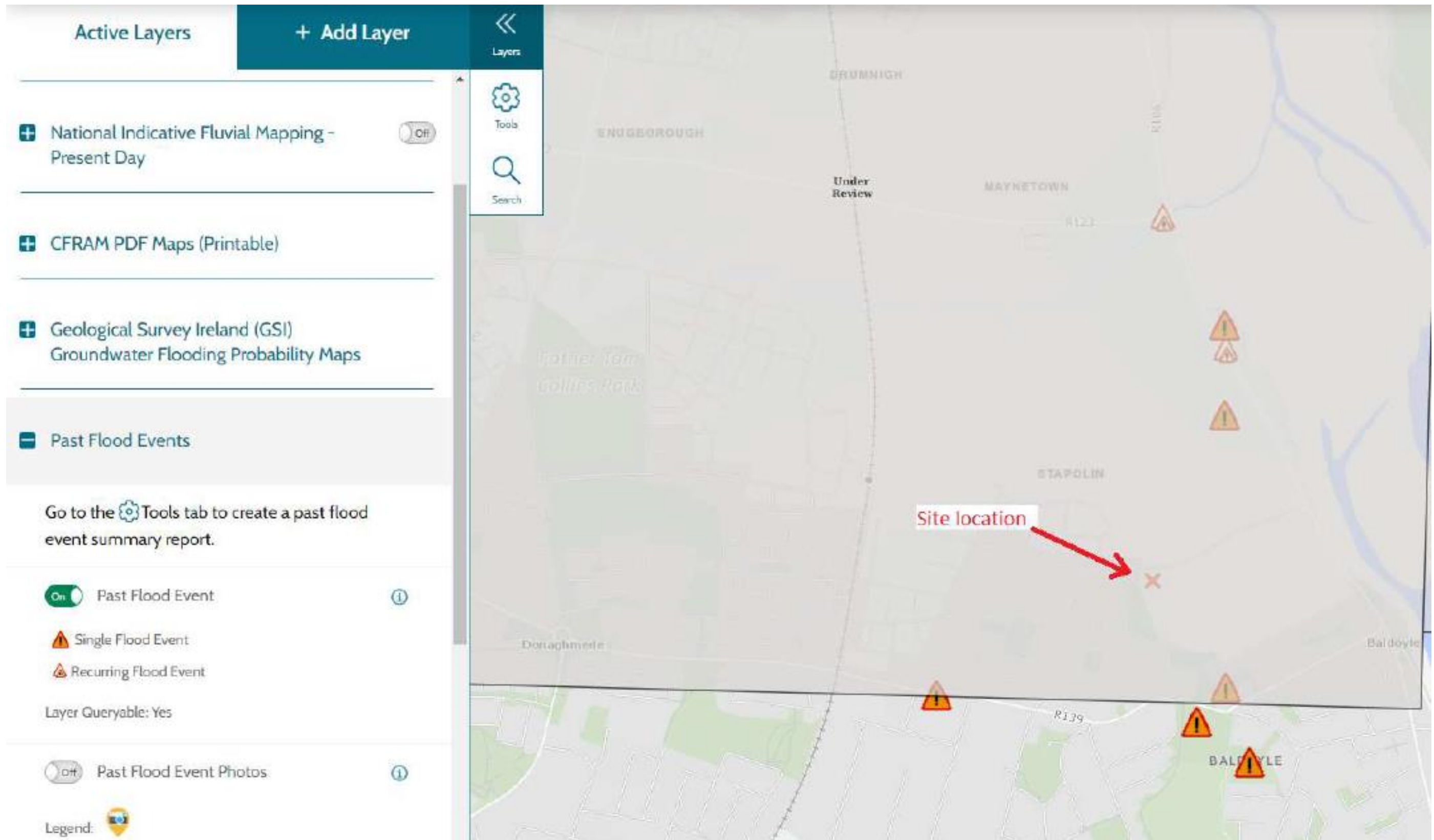
CFRAM Coastal Flood Extents



National Indicative Fluvial Mapping



OPW – PAST FLOOD EVENTS



OPW – PAST FLOOD EVENTS LOCAL AREA SUMMARY REPORT

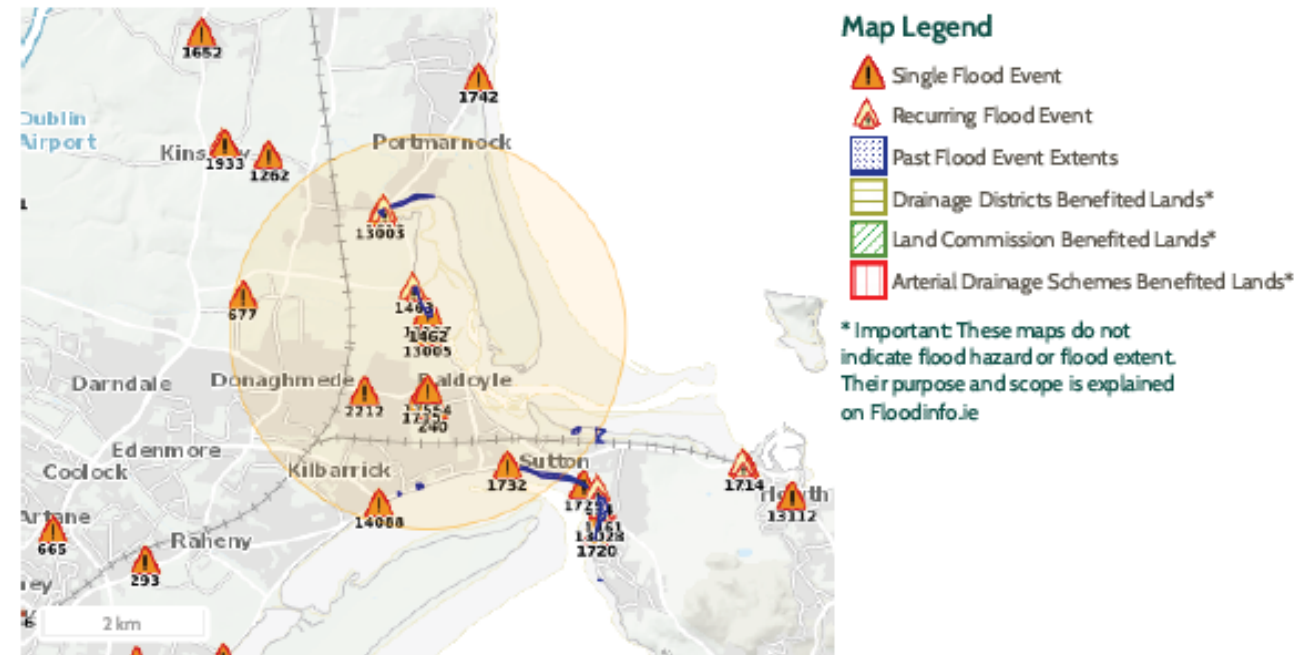
Past Flood Event Local Area Summary Report



Report Produced: 18/7/2023 18:35

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.

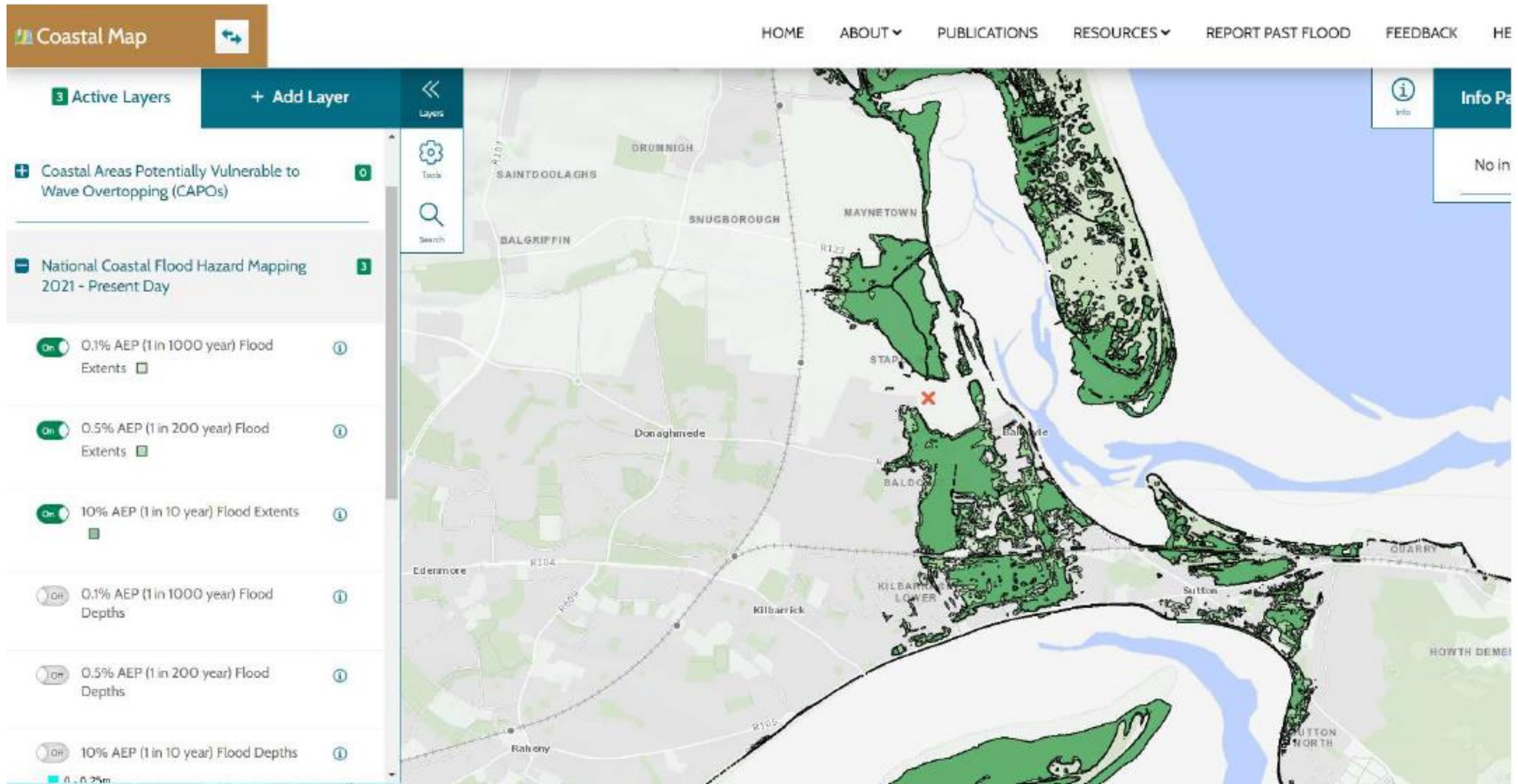


14 Results

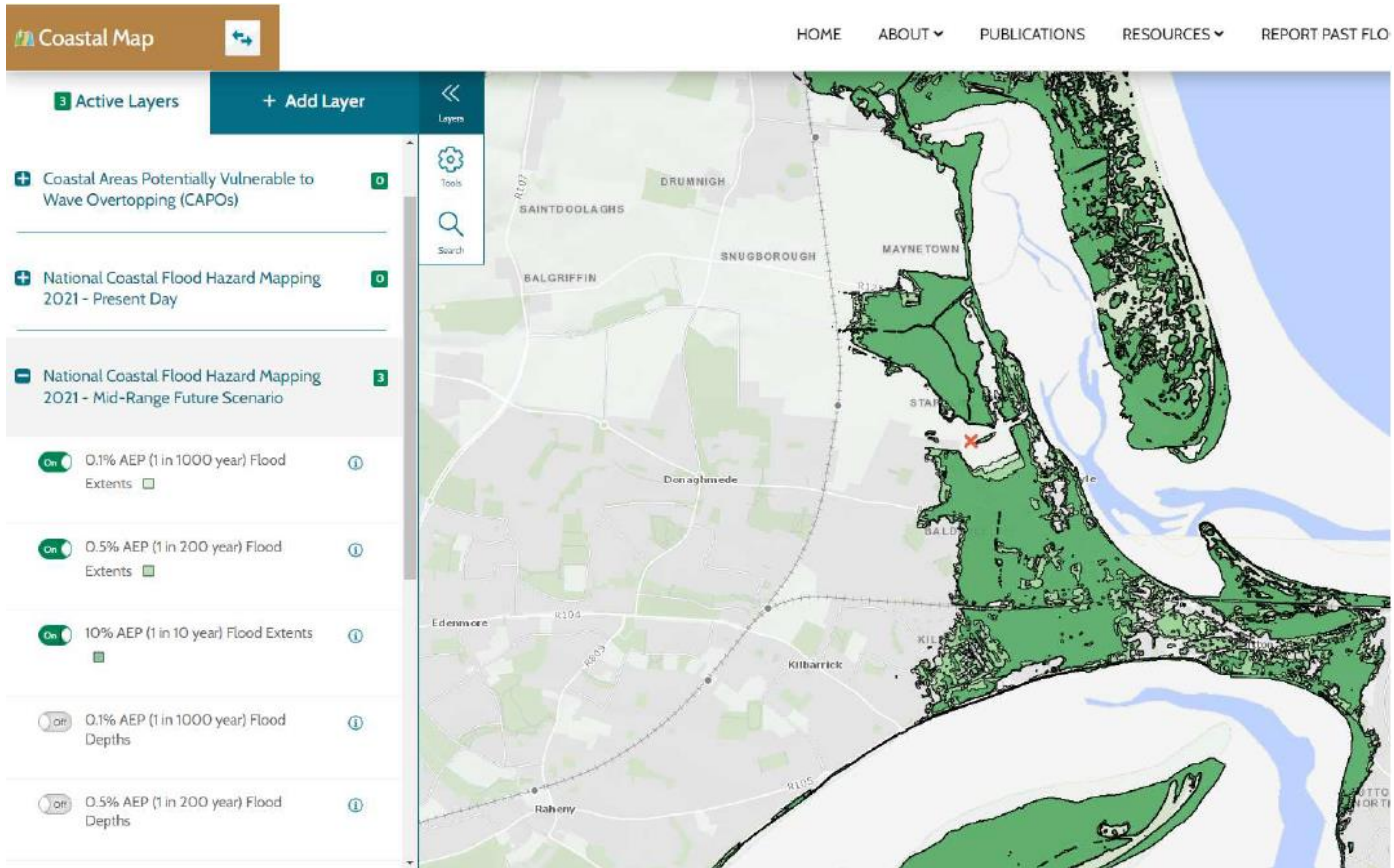
Name (Flood_ID)	Start Date	Event Location
1. The Grange Road Baldoyle Oct 2002 (ID-1715) Additional Information: Reports (1) , Press Archive (0)	19/10/2002	Exact Point
2. Dublin Road Sutton Feb 2002 (ID-1732) Additional Information: Reports (1) , Press Archive (0)	01/02/2002	Approximate Point
3. Grange Road Donaghmede Nov 1982 (ID-2212) Additional Information: Reports (1) , Press Archive (0)	07/11/1982	Approximate Point
4. Flooding at Portmarnock on 03/01/2014 (ID-13003) Additional Information: Reports (0) , Press Archive (0)	03/01/2014	Approximate Point
5. Flooding at Baldoyle on 03/01/2014 (ID-13005) Additional Information: Reports (0) , Press Archive (0)	03/01/2014	Approximate Point
6. Grange Stream Baldoyle Dec 1954 (ID-240) Additional Information: Reports (1) , Press Archive (0)	08/12/1954	Exact Point

Name (Flood_ID)	Start Date	Event Location
7. Sluice River Strand Road Portmarnock Recurring (ID-1613) Additional Information: Reports (5) , Press Archive (0)	n/a	Exact Point
8. Mayne Balgriffin Park June 1993 (ID-677) Additional Information: Reports (1) , Press Archive (0)	10/06/1993	Approximate Point
9. Baldoyle Coastal Recurring (ID-1462) Additional Information: Reports (5) , Press Archive (0)	n/a	Approximate Point
10. Mayne River Bridge Baldoyle Recurring (ID-1463) Additional Information: Reports (4) , Press Archive (0)	n/a	Exact Point
11. Flooding at Kilbarrack on 02/12/2021 (ID-14088) Additional Information: Reports (0) , Press Archive (0)	02/12/2021	Approximate Point
12. Dublin City Tidal Feb 2002 (ID-456) Additional Information: Reports (45) , Press Archive (27)	01/02/2002	Area
13. 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
14. 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

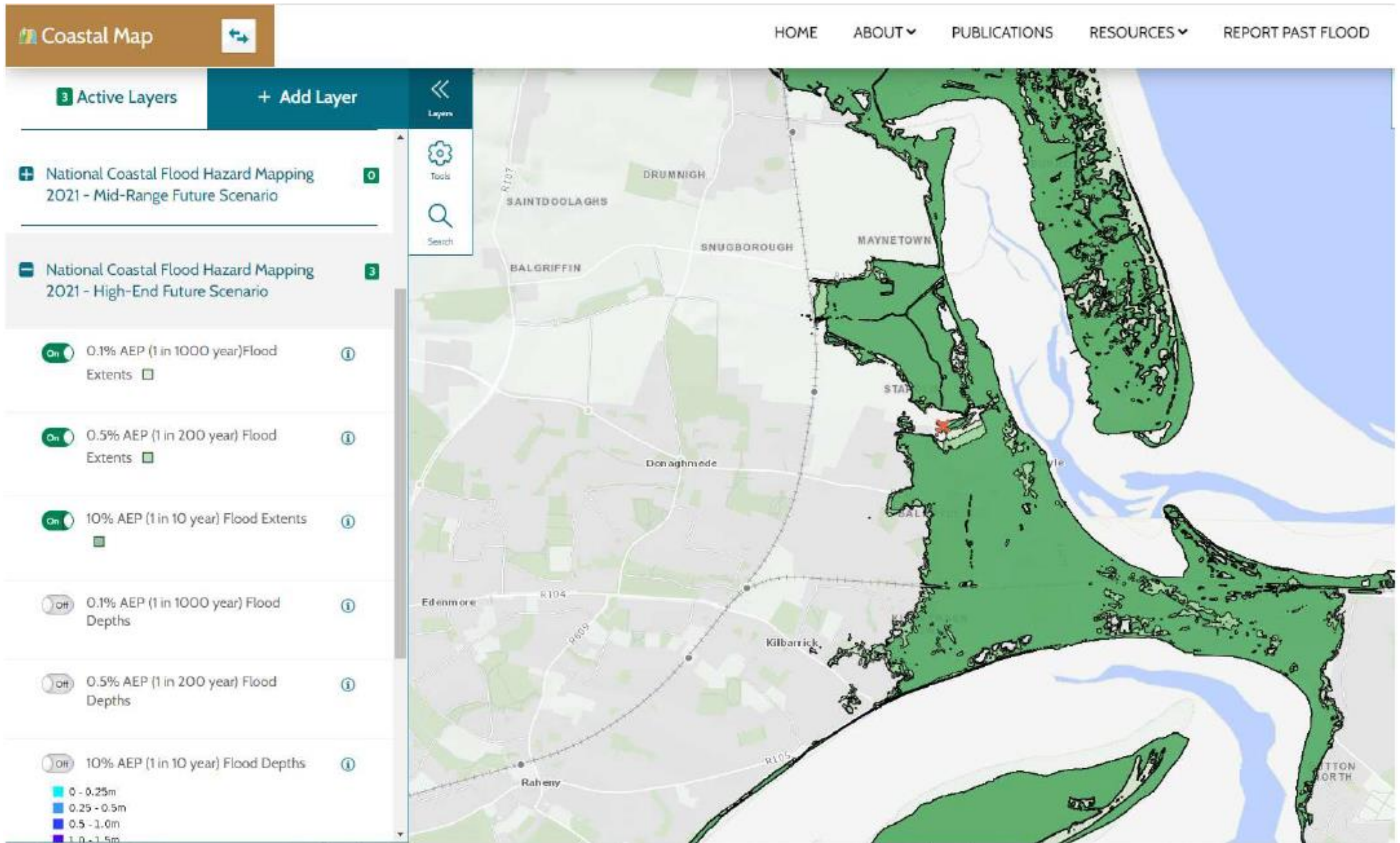
National Coastal Flood Hazard Mapping 2021 - Present Day



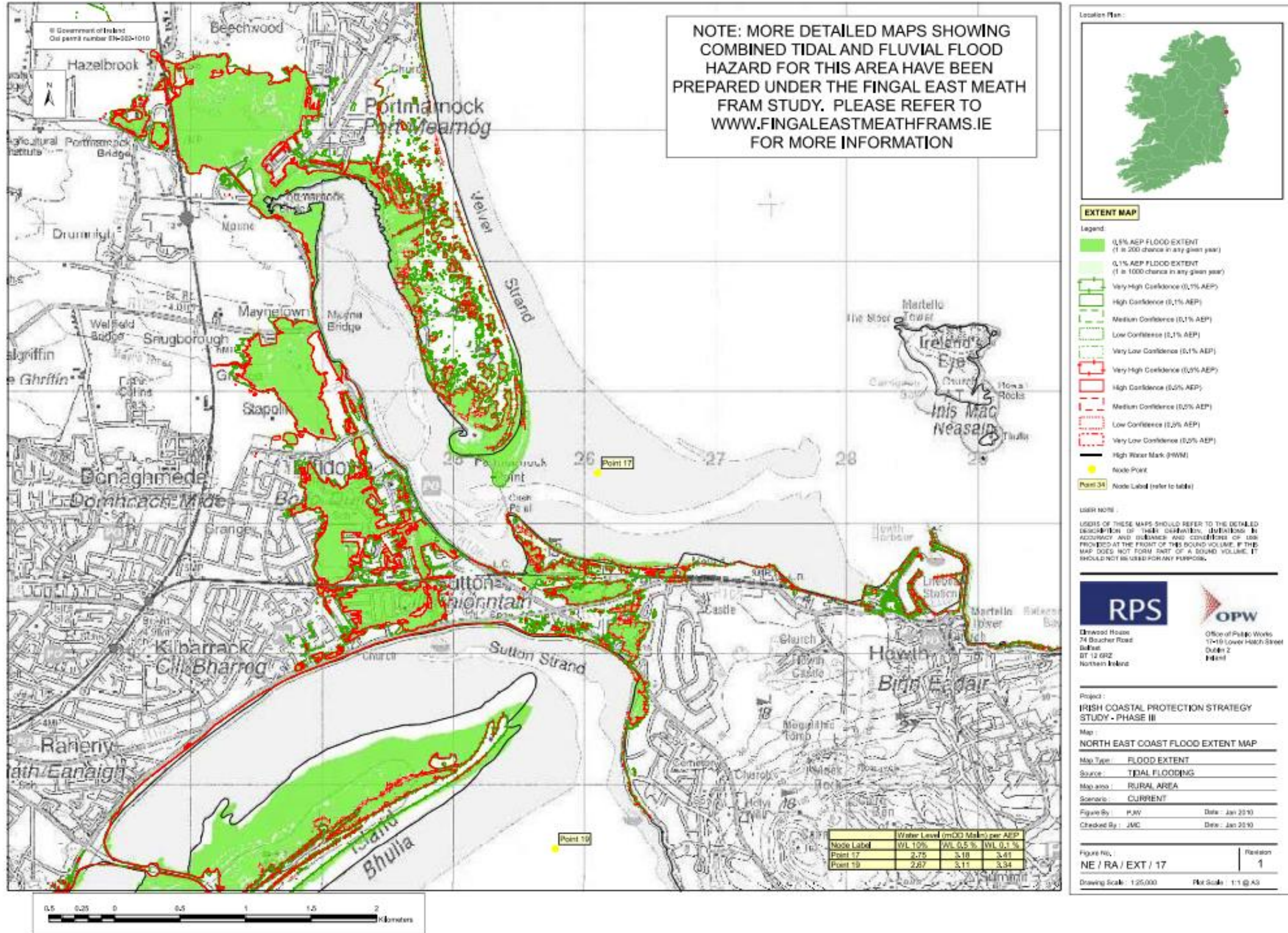
National Coastal Flood Hazard Mapping 2021 - Mid-Range Future Scenario



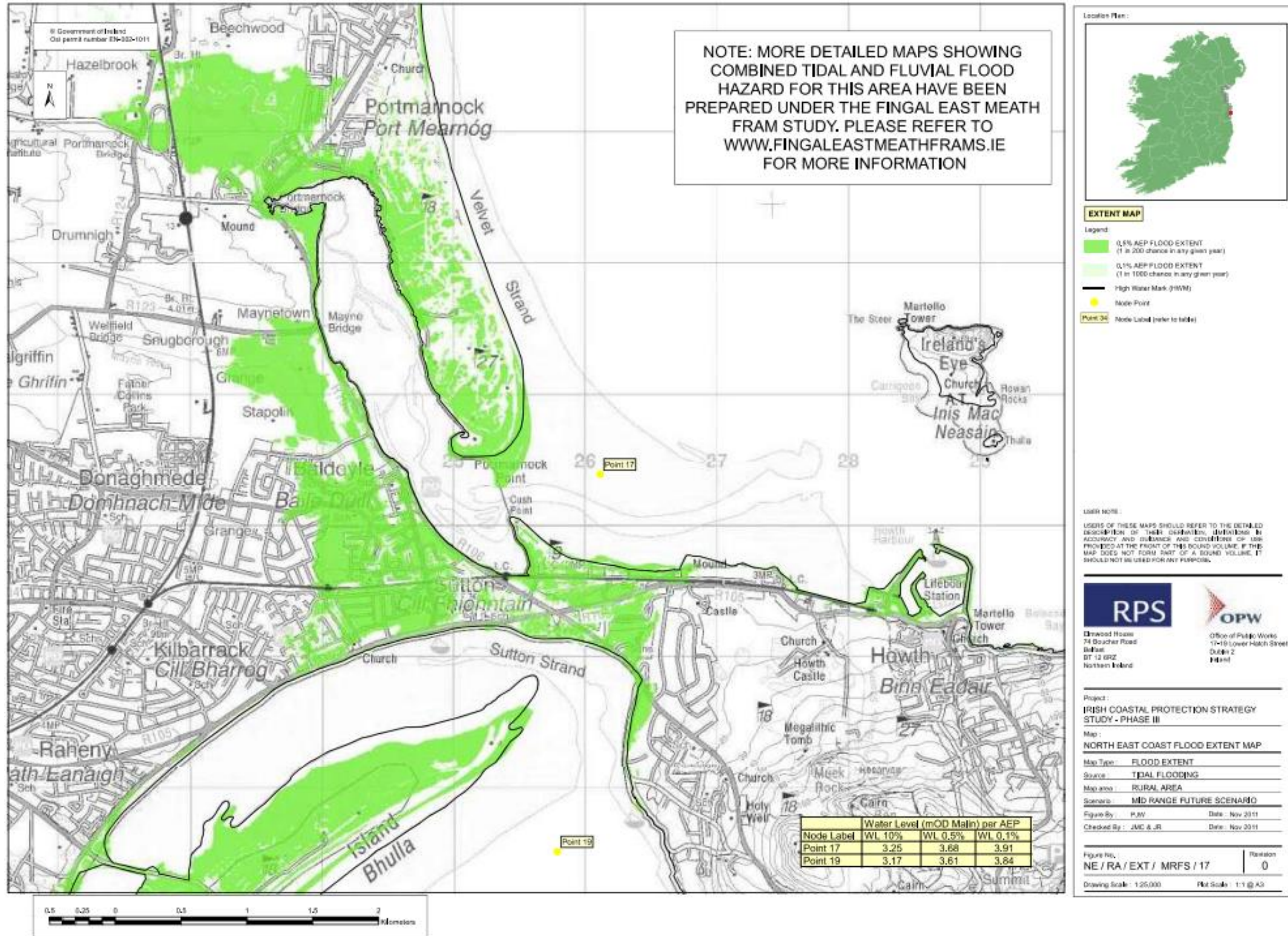
National Coastal Flood Hazard Mapping 2021 - High-End Future Scenario



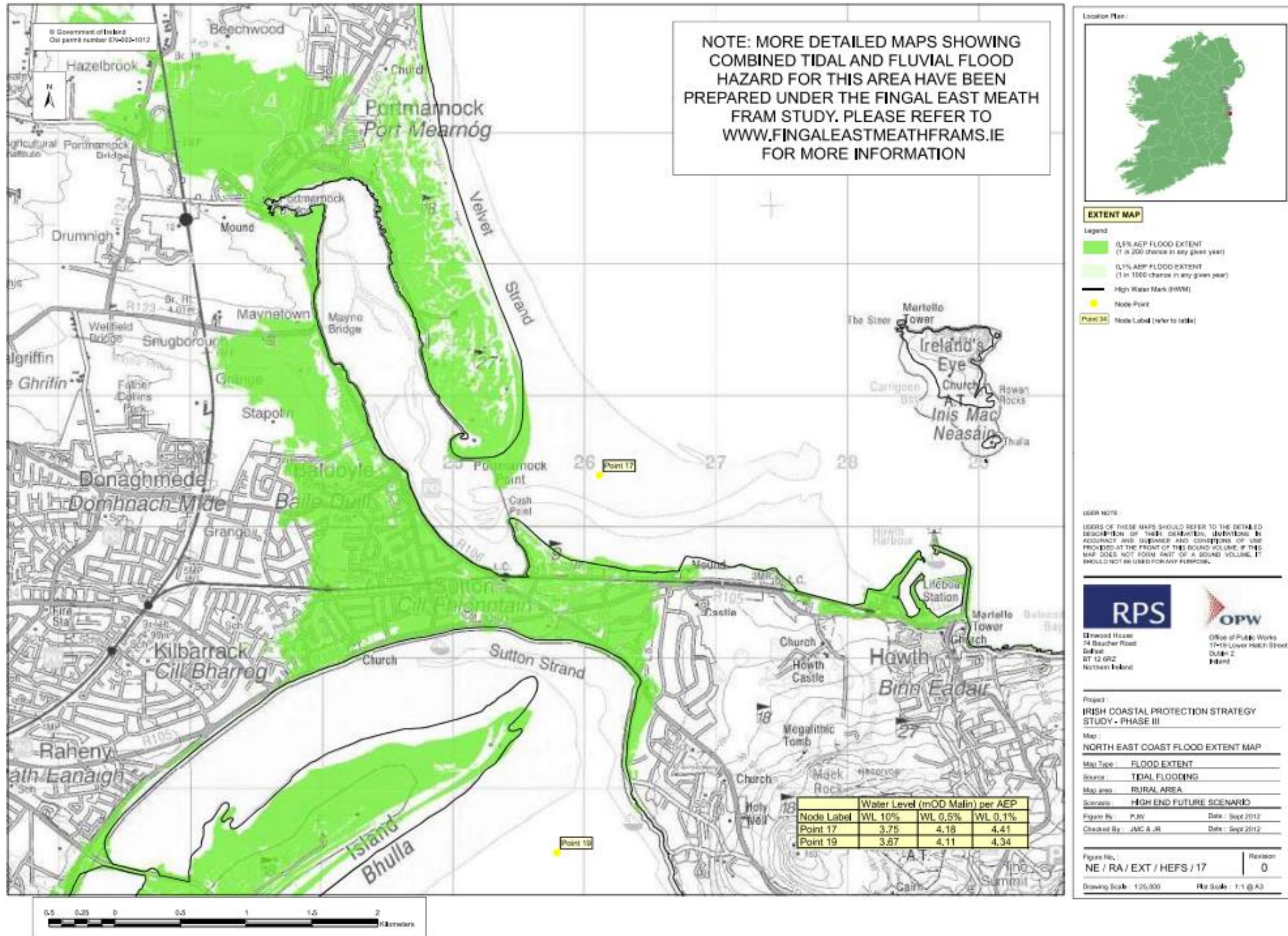
IRISH COASTAL PROTECTION STRATEGY ICPS – FLOOD MAPPING FOR CURRENT SCENARIO



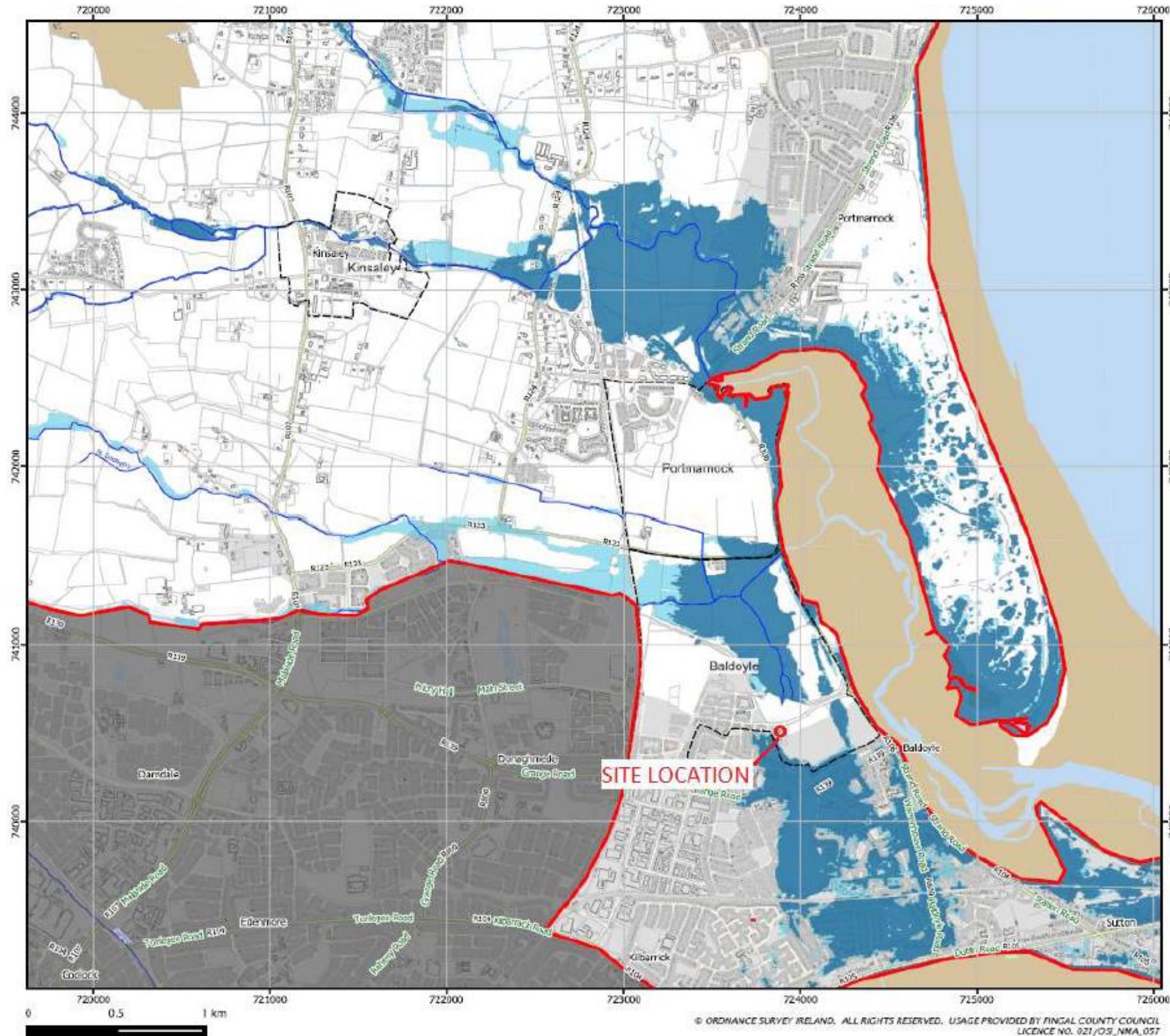
IRISH COASTAL PROTECTION STRATEGY ICPSS – FLOOD MAPPING FOR MID RANGE FUTURE SCENARIO



IRISH COASTAL PROTECTION STRATEGY ICPSS – FLOOD MAPPING FOR HIGH END FUTURE SCENARIO

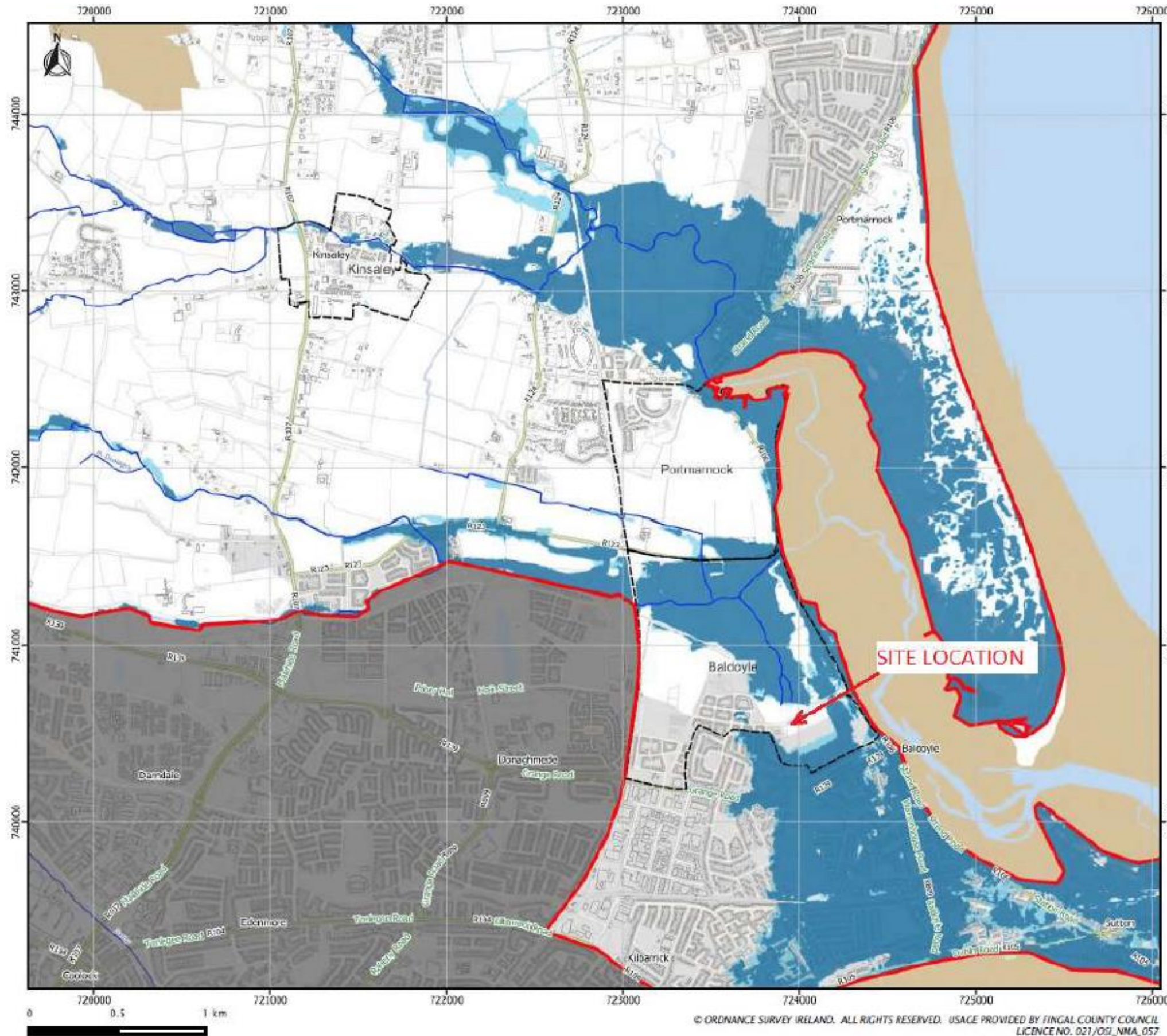


FINGAL SFRA – FLOOD ZONE MAP



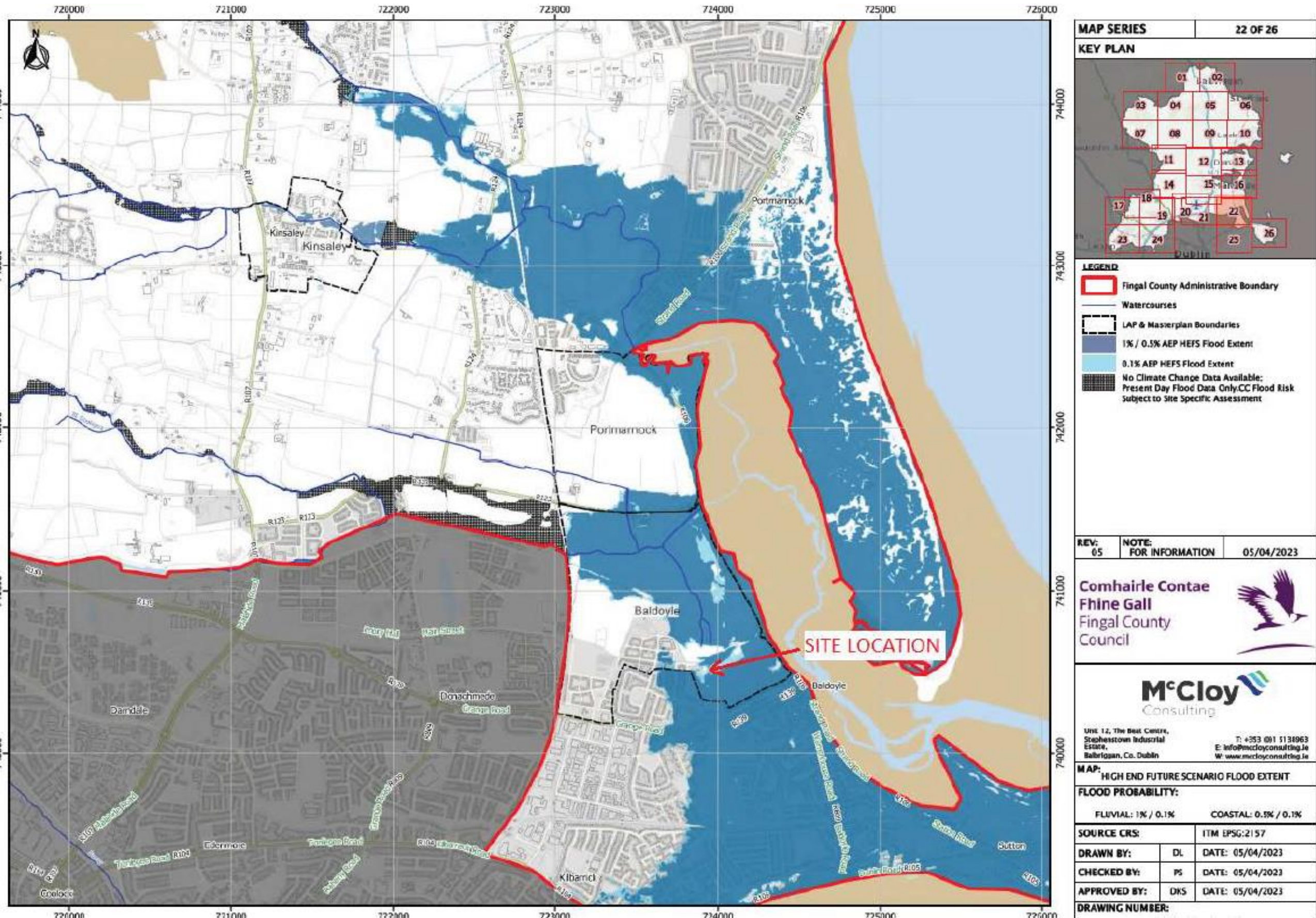
MAP SERIES		22 OF 26
KEY PLAN		
LEGEND		
	Fingal County Administrative Boundary	
	Watercourses	
	LAP & Masterplan Boundaries	
	Flood Zone A	
	Flood Zone B	
	Defended Areas	
REV: 05	NOTE: FOR INFORMATION	05/04/2023
Unit 12, The Bear Centre, Stephenstown Industrial Estate, Ballygigan, Co. Dublin T: +353 (0)1 5138063 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		
DRAWING SCALE:	1:20000 @ A3	

FINGAL SFRA – MID RANGE FUTURE SCENARIO FLOOD EXTENTS

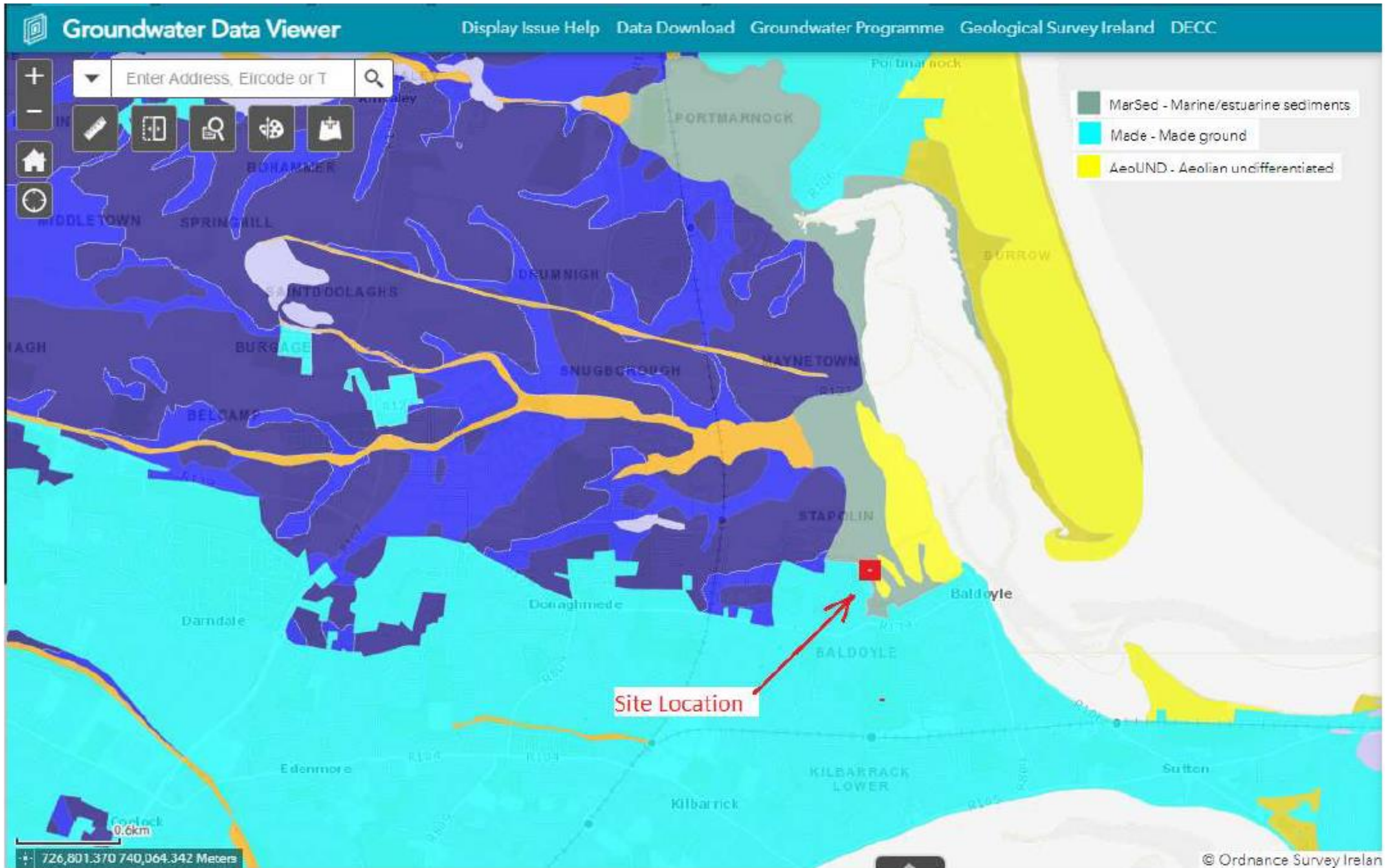


MAP SERIES	22 OF 26	
KEY PLAN		
LEGEND		
	Fingal County Administrative Boundary	
	Watercourses	
	LAP & Masterplan Boundaries	
	1% / 0.5% AEP MRFS Flood Extent	
	0.1% AEP MRFS Flood Extent	
	No Climate Change Data Available; Present Day Flood Data Only. CC Flood Risk Subject to Site Specific Assessment	
REV: 05	NOTE: FOR INFORMATION	DATE: 05/04/2023
Comhairle Contae Fhine Gall Fingal County Council		
<small>Unit 12, The Boat Centre, Droghda Industrial Estate, Balbriggan, Co. Dublin</small>		
<small>T: +353 (0)1 5136943 E: info@mcclayconsulting.ie W: www.mcclayconsulting.ie</small>		
MAP: MID RANGE FUTURE SCENARIO FLOOD EXTENT		
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:		
M 02127-05_FIG_FL222		
DRAWING SCALE:		1:20000 @ A3

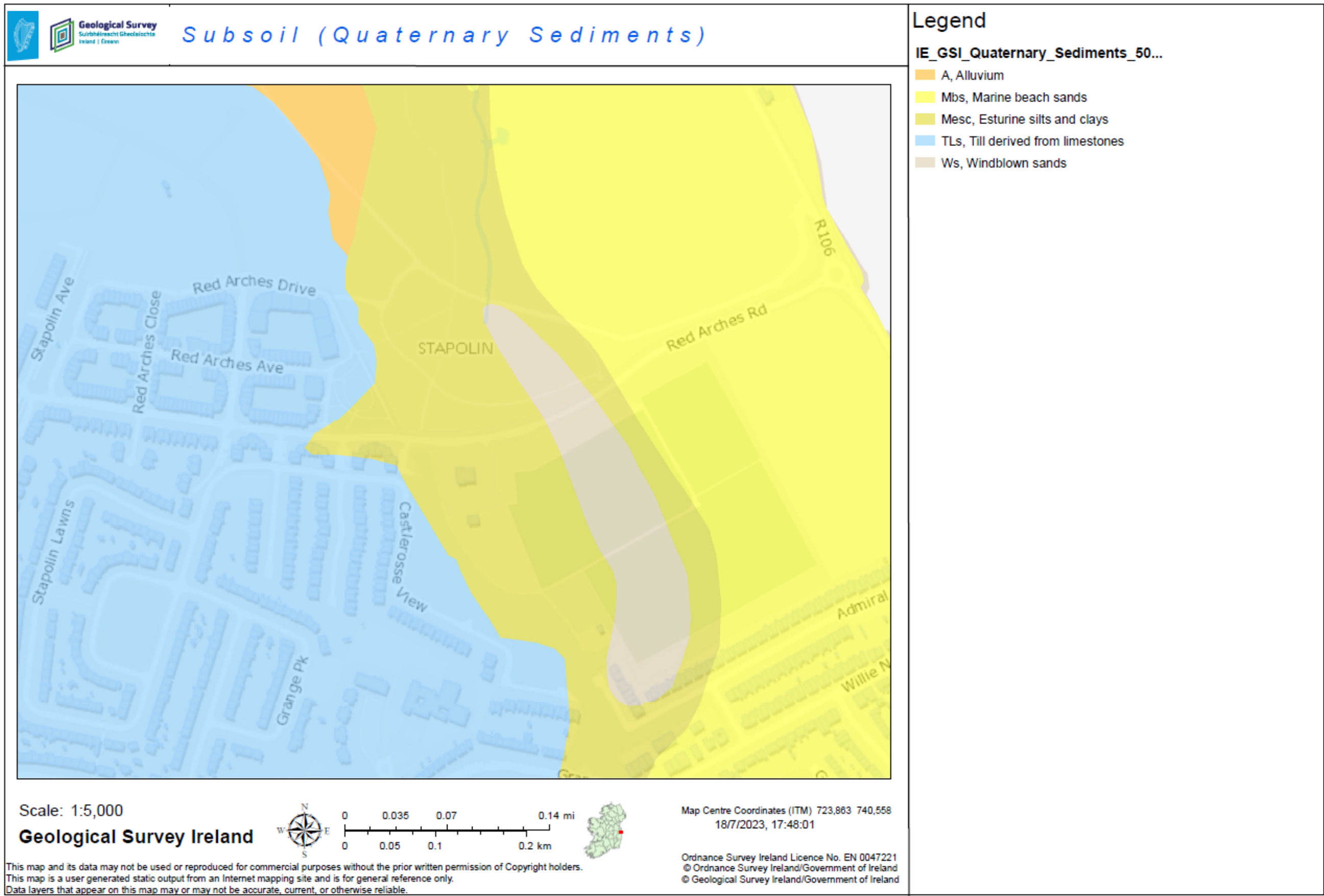
FINGAL SFRA – HIGH END FUTURE SCENARIO FLOOD EXTENTS



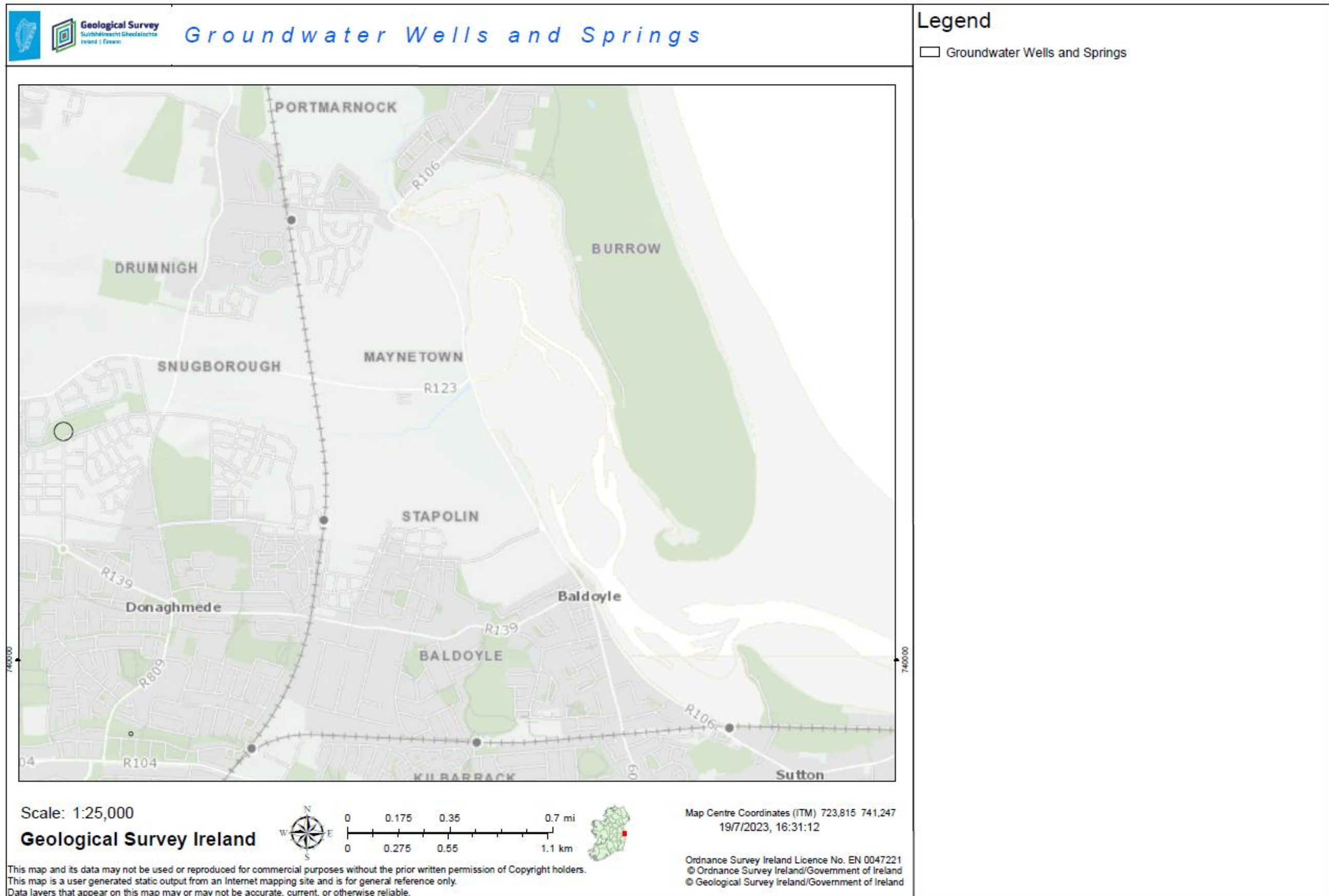
Geological Survey of Ireland: Teagasc Subsoil Mapping



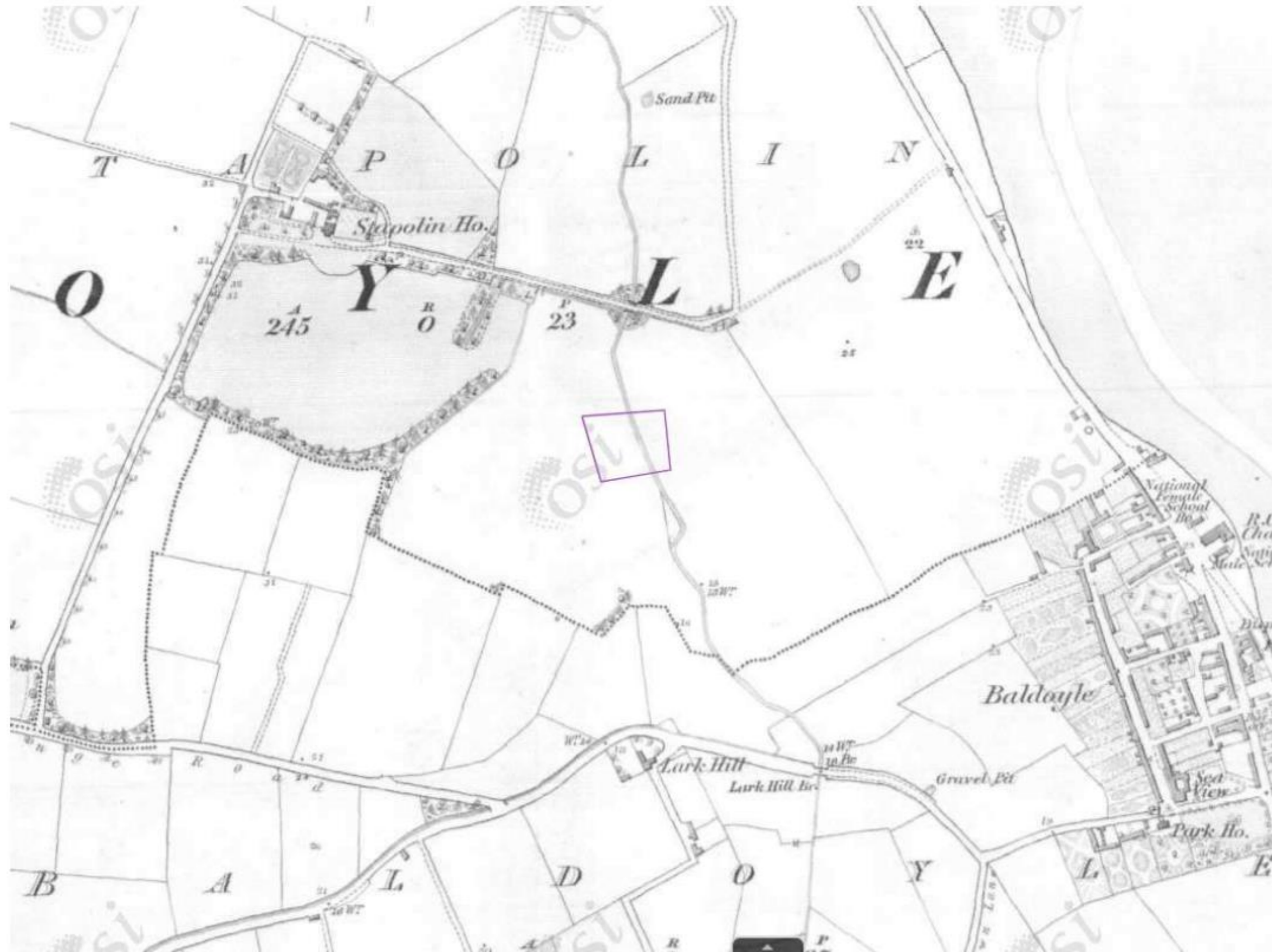
Geological Survey of Ireland: Subsoil (Quaternary Sediments)



Geological Survey of Ireland – Groundwater Wells and Springs



Historical Maps: 6" Genie Firs Ed.



Historical Maps: 6" Genie Last Ed.

