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Z040: BLACKGLEN ROAD LRD

SITE SPECIFIC FLOOD RISK ASSESSMENT

For
Zolbury Ltd

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SITE-SPECIFIC FLOOD RISK ASSESSMENT

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1 INTRODUCTION

1.1 APPOINTMENT

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by Zolbury Ltd. to prepare this Site-Specific Flood Risk Assessment with respect to the proposed residential development comprising the design of 192 no. residential units, associated resident amenity facilities and a childcare facility at Blackglen Road, Sandyford, Dublin 18.

1.2 ADMINISTRATIVE JURISDICTION

The proposed development is located in the jurisdiction of Dun Laoghaire Rathdown County Council (DLRCC), and therefore this assessment has given due consideration to the relevant guidelines including:

- Dun Laoghaire Rathdown County Council Development Plan (2022 – 2028);
- Greater Dublin Strategic Drainage Study (GDSDS);
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and the Office of Public Works).

1.3 SITE LOCATION

The subject site is located at lands at Blackglen Road in Sandyford, Co. Dublin as shown in the figure overleaf. The proposed development site is immediately bound by:

- Residential properties to the east & west;
- Blackglen Road to the north;
- Woodside Road to the south



Figure 1: Site Location

1.4 INFORMATION CONSULTED

This flood risk assessment has been prepared on the information available from the following sources:

- OPW Flood Maps www.floodinfo.ie;
- DECLG website www.myplan.ie;
- OPW website www.floodmaps.ie;
- Geological Survey of Ireland Maps (GSI);
- Architectural drawings;
- Topographical survey.

2 SITE CONTEXT

2.1 EXISTING SITE OVERVIEW

The overall development site area is **c. 3.86 hectares,** and is currently greenfield in nature. It is generally graded towards north of the site with the highest point of the site being located at the south-west boundary and is approximately +160.12m AOD with lowest the point being located at the north-east boundary of the site and is approximately +138.72m AOD. This gives a typical gradient of approximately 8.2% across the site.

2.2 PROPOSED DEVELOPMENT CONTEXT

Zolbury Ltd., intend to apply to Dun Laoghaire Rathdown County Council for permission for development for a Large Scale Residential Development (LRD) on a site of approx. 3.86ha on lands at Blackglen Road, Sandyford, Dublin 18.

The development will consist of 192 no. residential units ranging from 2-5 storeys in height, associated resident amenity facilities, a childcare facility, all boundary treatment and landscaping works, site services connections and all site development works to include:

(a) Construction of 192 no. residential units, in the form of 6 no. new apartment buildings (A1 – B4), 40 duplexes (C1, C2, C2A) and 14 houses (D1 & D2), to include 33 no. 1-beds, 84 no. 2 -beds, 61 no. 3-beds and 14 no. 4-beds as follows:
- Block A1 (4 storeys) comprising 15 no. apartments (3 no. 1 bed units, 6 no. 2 bed units & 6 no. 3 bed units); a crèche facility of approx. 378.2 sq. m with associated outdoor play space of approx. 170 sq. m; and resident amenity facilities of approx. 31.6 sq. m.
- Block A2 (3-4 storeys) comprising 26 no. apartments (2 no. 1 bed units, 20 no. 2 bed units and 4 no. no. 3 bed units) and resident amenity facilities of approx. 353.6 sq. m.
- Blocks B1 and B2 (2-5 storeys) comprising 51 no. apartments (15 no. 1 bed units, 29 no. 2 bed units, 7 no. 3 bed units).
- Blocks B3 and B4 (2-5 storeys) comprising 46 no. apartments (13 no. 1 bed units, 23 no. 2 bed units and 10 no. 3 bed units).
- Duplex Units C1 (4 storeys), C2 and C2A (3 storeys) comprising 40 duplexes (6 no. 2 bed units, 20 no. 3 bed units and 14 no. 4 bed units).
- House Units D1 and D2 (2 storeys) comprising 14 houses (14 no. 3 bed units).

(b) Total Open space (approx. 10,854 sq. m) is proposed in the form of public open space (approx. 8, 686 sq. m), and residential communal open space (approx. 2,168 sq. m). Each residential unit is afforded with associated private open space in the form of a garden/terrace/balcony.

(c) The development will be served via a new vehicular access via Blackglen Road. This will be designed as a priority junction with pedestrian and cycle crossings where required to tie in with the Blackglen Road Improvement Scheme.

(d) A new toucan crossing is proposed across Blackglen Road just to the east of the new vehicular access. This toucan crossing has been designed as per TL607 of the Cycle Design Manual to allow crossing of pedestrians and cyclists to the northern side of Blackglen Road for improved public transport access.
(e) Emergency access only is proposed via Woodside Road.
(f) A dedicated wildlife corridor is proposed to the east/south-east side of the site and a public open space (approx. 307 m in length) tree trail to the west/north-west side of the site.
(g) Basement/Podium car park areas are proposed below Blocks B1, B2, B3 and B4. A total of 226 no. car parking spaces are proposed, which includes 2 no. car club spaces, 12 no. accessible spaces and 47 no. EV charging spaces (198 no. long-stay spaces, 18 no. visitor space & 10 no. car parking spaces for creche use), in addition to 9 no. motorcycle spaces.
(h) A total of 484 no. bicycle spaces are proposed in the form of 442 no. long stay bicycle spaces 42 short-term stay visitor parking.
(i) 2 no. ESB substations at surface level.
(j) Bin Storage areas for the Duplex blocks are proposed at ground level adjacent to the Duplex blocks.
(k) All associated site and infrastructural works to include provision for water services; foul and surface water drainage and connections; internal roads, attenuation proposal; permeable paving; all landscaping works including green infrastructure zones; green roofs; and general plant areas; photovoltaic panels; landscaped boundary treatment; footpaths; public lighting; and electrical services.



Figure 1.2 – Proposed site layout

2 RELEVANT GUIDANCE

2.1 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES

In September 2008, "The Planning System and Flood Risk Management" (PSFRM) Guidelines were published by the Department of the Environment, Heritage and Local Government in Draft Format. In November 2009, the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system.

The core principle of the guidelines is to adopt a flood risk sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding. The guidelines include definitions of Flood Zones A, B and C. It should be noted that these do not consider the presence of flood defences, as there remain risks of overtopping and breach of the defences.

Table 3-1: Flood Risk Zones

Zone A	**High Probability of Flooding** Where the annual probability of flooding is: greater than 1% for fluvial flooding or greater than 0.5% for coastal flooding
Zone B	**Moderate Probability of Flooding** Where the annual probability of flooding is: between 0.1% and 1% for fluvial flooding or between 0.1% and 0.5% for coastal flooding
Zone C	**Low Probability of Flooding** Where the annual probability of flooding is: less than 0.1% for fluvial flooding and less than 0.1% for coastal flooding

The guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for with the Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

2.2 DÚN LAOGHAIRE-RATHDOWN COUNTY DEVELOPMENT PLAN 2022 – 2028

The Dún Laoghaire-Rathdown County Development Plan 2022 – 2028 identifies a number of policies relating to flooding, some are outlined below:

- *EI21: Catchment Flood Risk Assessment and Management (CFRAM)*
- *EI22: Flood Risk Management*
- *EI24: Coastal Defence*

2.3 STRATEGIC FLOOD RISK ASSESSMENT FOR DÚN LAOGHAIRE-RATHDOWN CDP 2022-2028

A Strategic Flood Risk Assessment (SFRA) was prepared in conjunction with the Dún Laoghaire-Rathdown County development Plan 2022-2028 by JBA. The SFRA includes flood maps and a review of the flood risk to the 'Carrickmines/Shanganagh' river catchment.

2.4 CLIMATE CHANGE

Both the Greater Dublin Strategic Drainage Study (GDSDS) and PSFRM Guidelines require that account be taken of the effects of climate change over the design life of a development, typically 100 years. Design parameters to take account of climate change were established in the *GDSDS* and revised following later studies and Climate Change Sectorial Adaptation Plan Flood Risk Management (2015-2019) Development published by the OPW. These parameters are set out in Table 3-2, below.

Table 3-2: Climate Change - Impact on Design Parameters

Design Category	Impact of Climate Change
Drainage	20% increase in rainfall
Fluvial (River)	20% increase in flood flow
Tidal/Coastal	Sea level rise of 500 mm[1]

3 FLOOD RISK IDENTIFICATION

3.1 EXISTING HYDROLOGICAL ENVIRONMENT

The Carrickmines/Shanganagh Stream is located along the south-eastern boundary of the site (Figure 4.1). The development is set back approximately 25m from the Carrickmines Stream.



Figure 4-1: Existing Hydrological Environment

3.2 EXISTING SURFACE WATER DRAINAGE

There is no existing surface water network on the site.

As part of the proposed development, a new surface water network will be constructed to manage all surface water onsite. Please refer to OCSC Engineering Services Report for details.

The proposed gravity network for the development is to be discharged to the new surface water sewer on Blackglen Road, which bounds the site to the north.

3.3 TOPOGRAPHICAL SURVEY

The site is generally graded from south-west towards north-east, with the highest point of the site being located at the south-west boundary and is approximately +160.12m AOD with lowest the point being located at the north-east boundary of the site and is approximately +138.72m AOD. This gives a typical gradient of approximately 8.2% across the site.

3.4 HISTORICAL MAPS

The historical 6" (1837 – 1842) and the 25" (1888 – 1913) mapping have been examined. Historical mapping is often a very useful source of information for assessing the flood history of an area. The historical maps examined do not indicate flooding in the area proposed for this development.

3.5 HISTORICAL FLOODING

The Office of Public Works (OPW) gathers and collates data from reported flood events throughout the country. From a review of the OPW's National Flood Hazard Mapping database (www.floodinfo.ie), there are no reported incidents of flooding in the vicinity of the site.

Please see Past Flood Event Local Area Summary Report included in Appendix C which summarises all past flood events within 2.5 kilometres of the site.

Figure 4-2 shows the historical reported flood events in area surrounding the site. There are no reports of flooding occurring within the proposed site or in the vicinity of the proposed site.

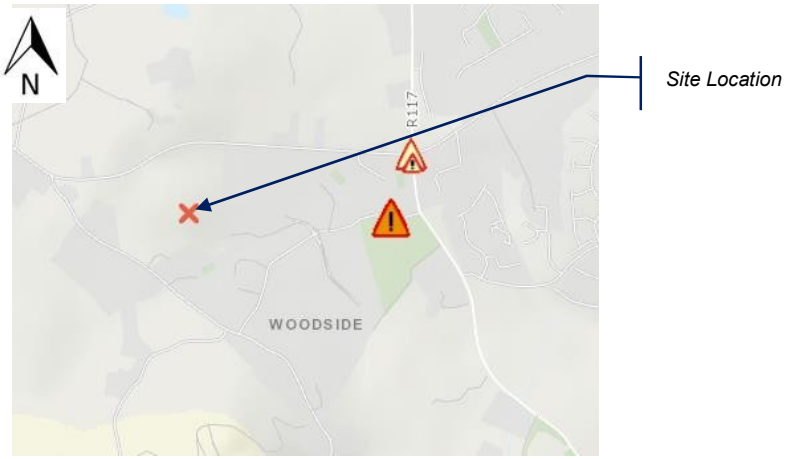

Figure 4-2: National Flood Hazard Mapping

3.6 GROUNDWATER FLOODING

An assessment of the flood risk posed by ground water is currently generated by Geological Survey Ireland (GSI) and will be openly available information when published. There are no reported incidents of ground water flooding in the vicinity of the site, see Figure 4-3.

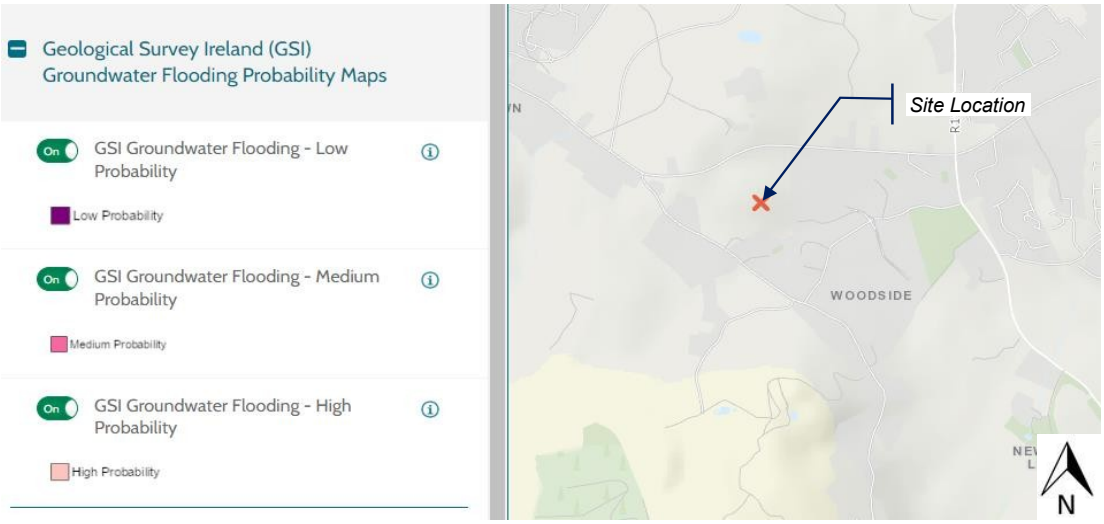

Figure 4-3: Extract from www.floodinfo.ie GSI Groundwater Flooding Probability Maps

According to data obtained from the GSI the subject site is located on Bedrock at or close to surface. Refer to Figure 4-6.

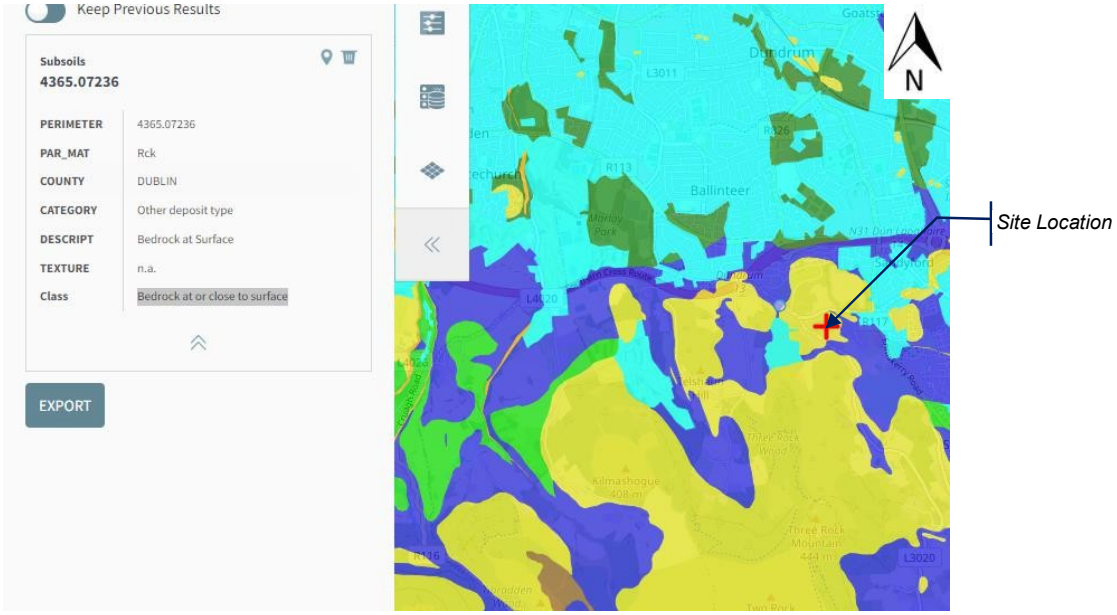

Figure 4-6: Extract from the EPA maps - subsoils

The site is located on a Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones (refer to Figure 4-7).

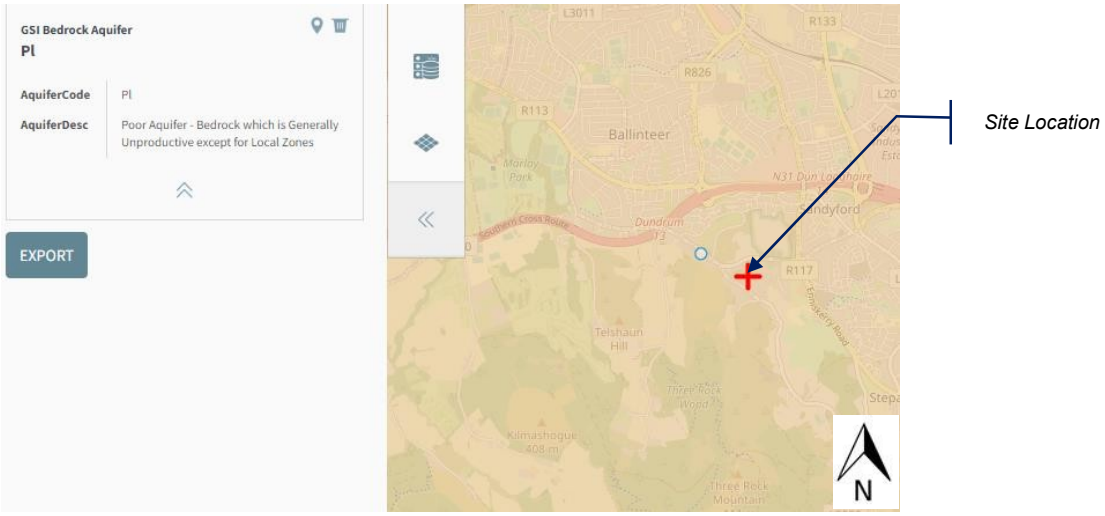

Figure 4-7: Extract from the EPA maps – GSI Bedrock Aquifer

The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is High (refer to Figure 4-8).

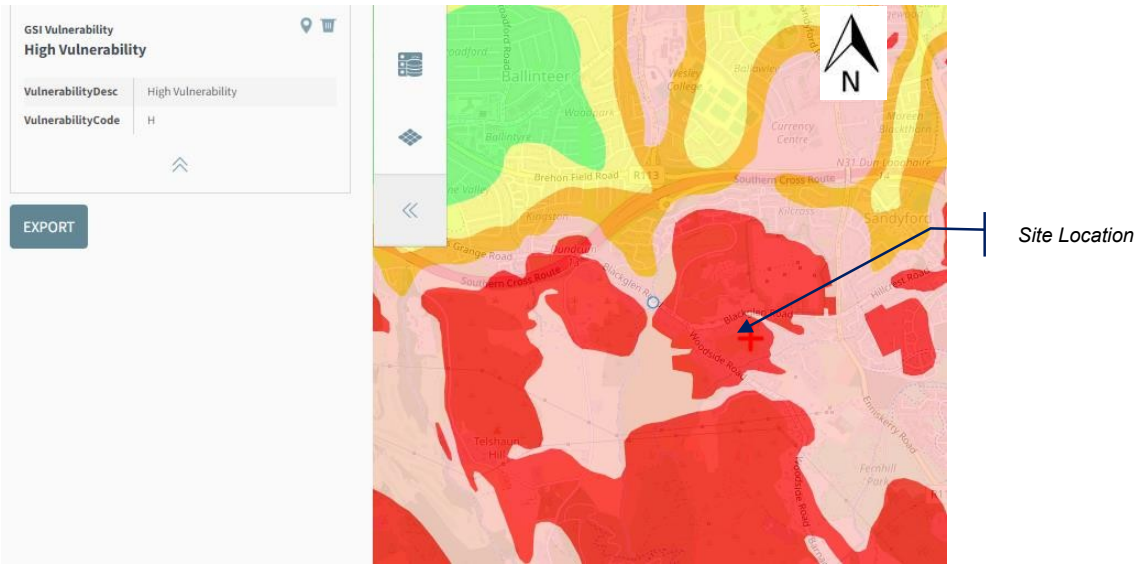

Figure 4-8: Extract from the EPA maps – GSI Vulnerability

3.7 PRELIMINARY FLOOD RISK ASSESSMENT

The Catchment Flood Risk Assessment and Management Study (CFRAMS) is a national programme which to date has produced both a series of Preliminary Flood Risk Assessments (PFRA) which cover the entire country, as well as more detailed flood maps in certain catchments across the country.

Prior to the publication of the detailed CFRAMS flood mapping, a series of Preliminary Flood Risk Assessment (PFRA) maps were published. These maps indicated preliminary tidal and fluvial flood zones along with pluvial and groundwater risks.

These maps have been superseded by the more detailed CFRAMS maps in the area surrounding the site for tidal and fluvial flood risk.

Refer to Figure 4.9 for details of the predicted pluvial flood extent. The extent of the area modelled to show pluvial flooding does not extend to the area of the proposed development.

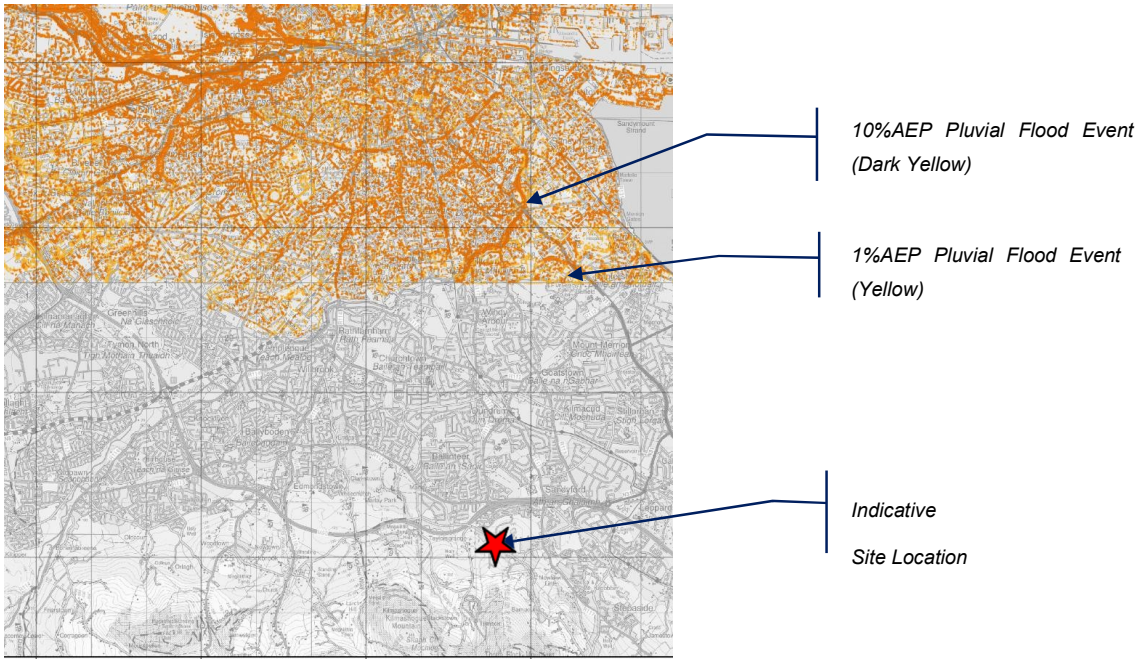

Figure 4-9: Preliminary Flood Risk Assessment Pluvial Flooding

The proposed development includes the construction of a new surface water network which will manage surface water runoff onsite and mitigate the risk of pluvial flooding onsite.

3.8 CATCHMENT FLOOD ASSESSMENT AND MANAGEMENT

The OPW in conjunction with Dublin City Council have developed the Flood Risk and Hazard maps as part of the CFRAMS programme. The site of the proposed development has been included in the CFRAMS model.

Figure 4-10 below is an extract from the CFRAM fluvial flood map for the area surrounding the proposed development site. Full CFRAMS maps for the area are included in Appendix E of this report. The flood map indicate that the site lies outside the 1 in 100 and 1 in 1000-year fluvial flood extents.

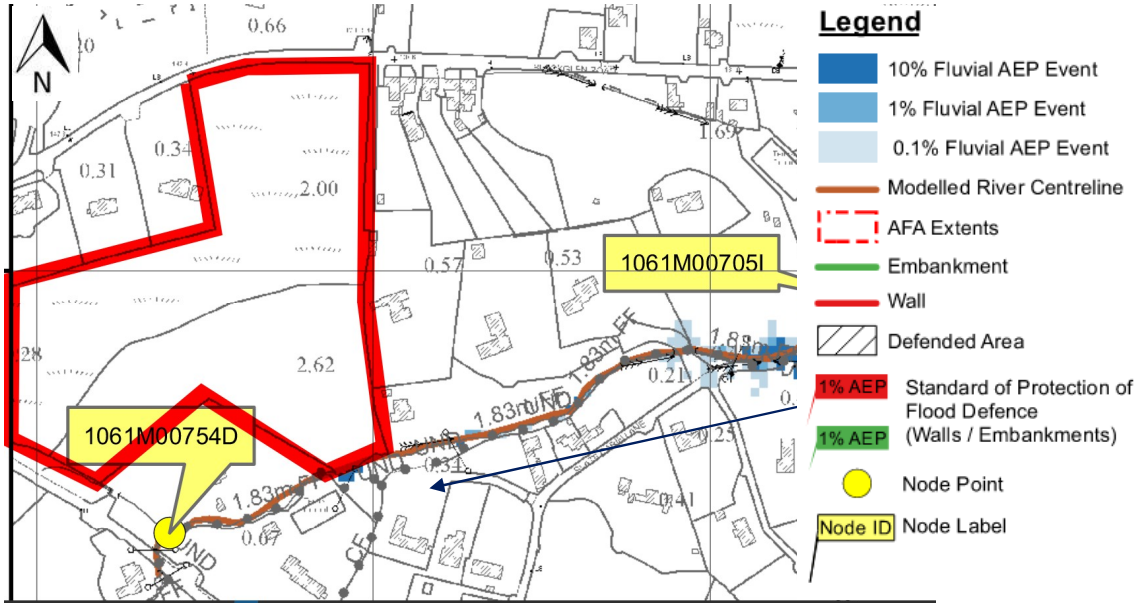

Figure 4-10: Extract from CFRAM maps

The site is not identified as being within a defended area.

3.9 DÚN LAOGHAIRE-RATHDOWN COUNTY DEVELOPMENT PLAN STRATEGIC FLOOD RISK ASSESSMENT

The Dun Laoghaire Rathdown Council Development Plan 2022-2028 Strategic Flood Risk Assessment outlines the flood risk in the area associated with the "Carrickmines/Shanganagh" catchment. The flood extents shown in Figure 4-11 are taken from CFRAMS mapping.

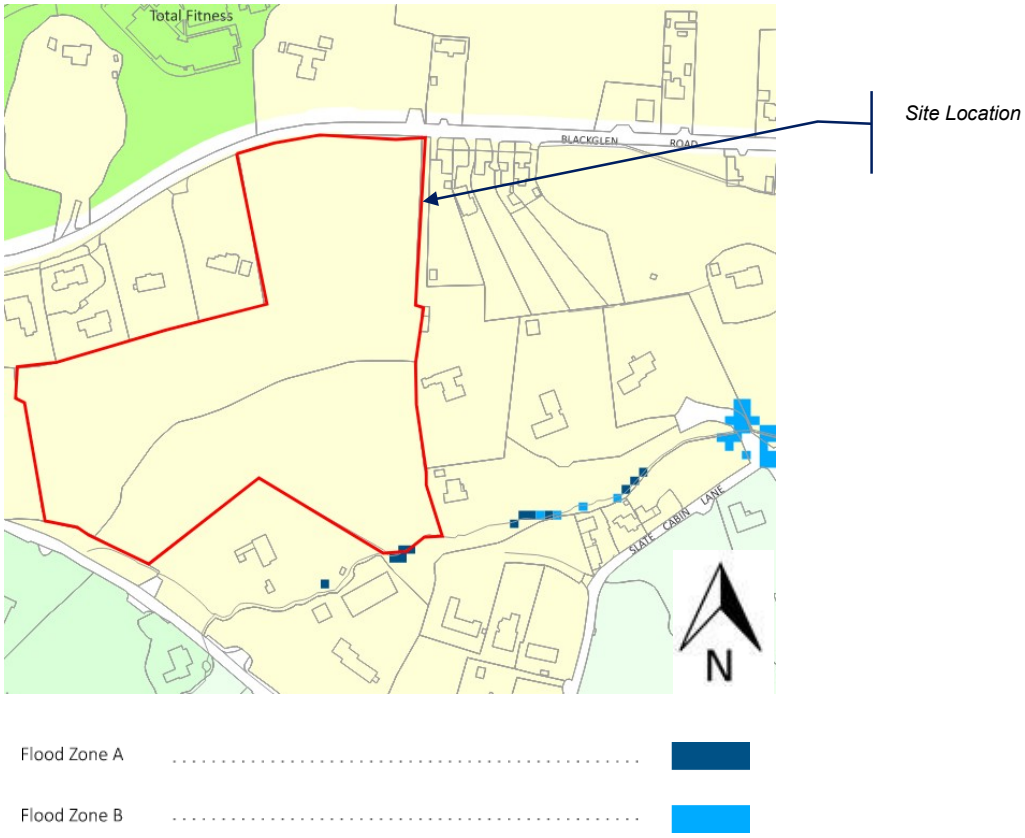

Figure 4-11: Extract from the Strategic Flood Risk Assessment for DLR CDP 2022-2028

This review identifies the majority of the site is in Flood zone C. It notes that development in the area should be accompanied with a detailed FRA, which must include for the design of finished floor levels in excess of the 100-year flood level plus climate change and freeboard.

This site specific flood risk assessment report addresses any such concerns, and confirms that all proposed development is clearly located in Flood Zone C, with all FFLs having sufficient freeboard to the 100-year flood level.

4 FLOOD RISK ASSESSMENT

4.1 SOURCES OF FLOODING FLUVIAL FLOODING

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain. The proposed site is located close to the Carrickmines/Shanganagh Stream. The CFRAM maps indicate that thesite is located in Flood Zone C except of the southern site boundary which aligns with flood zone A but as indicated by the pixelated flood extent on the maps, this appears to be confined to the stream channel. No alteration of existing levels occurs within 15m of the stream, where the potential for flooding occurs. See Appendix F which shows a cross section through the area in question alongside the CFRAM mapping of all events for this area.

PLUVIAL FLOODING

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high-intensity rainfall.

The proposed development includes the construction of a new surface water network which will manage surface water runoff onsite and mitigate the risk of pluvial flooding onsite.

COASTAL FLOODING

Coastal flooding is the result of sea levels which are higher than normal and result in sea water overflowing onto the land during high tides or storm surges. Given the location of the site of the proposed development, we consider that tidal flooding does not pose a flood risk in the area.

GROUNDWATER FLOODING

Groundwater flooding occurs when the level of the water stored in the ground rises as a result of prolonged rainfall. There are number basements proposed as part of this development; therefore, the risk of groundwater must be considered.

4.2 DEVELOPMENT VULNERABILITY

The *PSFRM Guidelines* classify potential development in terms of its vulnerability to flooding. The types of development falling within each vulnerability class are described in *Table 3.1* of the *PSFRM Guidelines*, which is reproduced in Table 5-1.

Table 5-1: Development Vulnerability Class

Vulnerability Class	Land uses and types of development which include:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; **Dwelling houses**, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding
Less vulnerable development	Buildings used for: retail, leisure, warehousing, **commercial**, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

The proposed development comprises of residential units and therefore, is considered to be ***Highly Vulnerable Development***.

The *PSFRM Guidelines* define the zones in which each class of development is appropriate – this is summarised in Table 5-2. The *PSFRM Guidelines* recognises that flood risks should not be the only deciding factor in zoning for development. They also recognise that circumstances will exist where development of a site within a floodplain is desirable; in order to achieve compact and sustainable development of the core of urban settlements. In order to allow consideration of such development, the *PSFRM Guidelines* provide a **Justification Test**, which establishes the criteria under which desirable development of a site in a floodplain may be warranted.

Table 5-2: "Appropriateness" Matrix

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

AS the proposed development is considered highly vulnerable and no residential buildings are within Flood Zone A as per the DLR CDP, a Justification Test **is not required**.

4.3 MITIGATION MEASURES

With reference to the above, a review of flood maps obtained from the OPW indicate that the site falls outside the 1 in 1000-year flood extent.

While there is no flooding shown onsite, mitigation measures in line with the Strategic Flood Risk Assessment for DLR CDP 2022-2028 are considered below.

4.3.1 INFRASTRUCTURE

The proposed development includes the construction of a surface water network which consists of SuDS measures which will minimize the impact to the receiving environment and manage the pluvial flood risk at the site. Please refer to OCSC Engineering Services Report for details.

The proposed surface water network has been designed with an allowance for climate change and also for urban creep, as per the Dun Laoghaire-Rathdown CDP 2022-2028.

4.3.2 INFRASTRUCTURE BLOCKAGE

The proposed development includes the construction of a surface water network which consists of SuDS measures which will minimize the impact to the receiving environment and manage the pluvial flood risk at the site. Please refer to OCSC Engineering Services Report for details.

The proposed network has been designed with an allowance for climate change, and also for urban creep as per the Dun Laoghaire-Rathdown CDP 2022-2028. This drainage system is to be maintained on a regular basis to reduce the risk of a blockage (please refer to the SuDS Operation and Maintenance Manual – Appendix J in the Engineering Services Report).

4.3.3 EXCEEDANCE FLOW PLAN

The proposed storm water drainage systems have been designed for all events up to and including the 1% AEP, with a 20% increase for climate change and a 10% increase for urban creep. Should these levels be exceeded, or should the system become blocked at one or multiple locations, then overflow exiting the system will take the planned flow paths shown on drawing C-0508 (Appendix G).

Generally speaking, for catchment 1 (as shown on drawing C-0505), exceedance flow will follow the path of the access road, exiting eventually onto Blackglen Road and flowing east. A small area to the south west will fall northward towards the site boundary, where it will then follow a depression eastwards along the boundary line until it joins back in with a recession over the filter drain west of Block B1/B2. From there it will follow a path back along the access road to join the primary exceedance flow path.

In catchment 2 (as shown on drawing C-0505), exceedance flow will follow the depression above the filter drain parallel to the access road leading down towards Block B3/B4. It will then traverse across the soakaway area before making its way southwards along the property line via a depression in the ground leading back to the existing Carrickmines Stream.

4.3.4 EMERGENCY ACCESS & EGRESS

It is necessary to ensure that access and egress will remain possible to the development in the event of an emergency during an extreme flood event.

In the event of storms exceeding the 100-year design capacity of the drainage system, then possible flood routing for overland flows towards open green space to the east should not be blocked.

4.4 FLOOD RISK MANAGEMENT

Flood risk management under the EU Floods Directive aims to minimise the risks arising from flooding to people, property and the environment. Minimising risk can be achieved through structural measures that block or restrict the pathways of floodwaters, such as river defences or non-structural measures that are often aimed at reducing the vulnerability of people and communities such as flood warning, effective emergency response, or resilience measures for communities or individual properties.

As noted above, emergency access can be maintained to and from the site in the event of a flood. The proposed development is located outside the 1 in 1000-year flood extent.

5 CONCLUSIONS AND RECOMMENDATIONS

The assessment has been carried out in full compliance with the requirements of "The Planning System & Flood Risk Management Guidelines" published by the Department of the Environment, Heritage and Local Government in November 2009.

As detailed within the previous sections of this report, the proposed buildings for this development are located within Flood Zone C, except for the southern site boundary which aligns with flood zone A. This however, appears to be confined to the Carrickmines stream channel. It should be noted there will be no alterations of existing levels within 15m of the channel in that area (as shown in the area cross section in Appendix F). In addition, there is also a 4m rise in elevation from the stream bed to where the existing grades will be altered.

Therefore, in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities, there is no significant risk for flooding in the proposed development.

5.1 RECOMMENDATIONS

It has been demonstrated in the earlier sections that the site is not at risk of flooding from external sources, or as result of the proposed development.

In order to minimise the risk of flooding within the development, it is recommended that all drainage infrastructure is designed and installed in accordance with the relevant standards.

The proposed units are located outside the 1 in 1000-year flood extents, and above the 1 in 1000-year flood level.

Appendix A PROPOSED SITE LAYOUT



Proposed Ground Floor Site Layout Plan

- APPLICATION SITE 3.70 Ha OUTLINED IN RED
- LANDS IN OWNERSHIP OF APPLICANT (Circa 4.022 Ha OUTLINED IN BLUE
- CPO LANDS PERMANENT LAND TAKE (HATCHED IN YELLOW)
- CPO LANDS PERMANENT LAND TAKE (HATCHED IN ORANGE)
- LANDS TAKEN IN CHARGE BY DLRCC SUBJECT TO LETTER OF CONSENT (Circa 0.128 Ha HATCHED IN GREEN)
- PART OCCUPIED BY THIRD PARTY (HATCHED IN PURPLE)

Revision Description	Date	Rev. No.	Issued by
Stage 3 LRD Application	09.12.2024	P01	LB

Any reference to fire safety design or performance is presented for coordination purposes only. Refer only to the granted Fire Safety Certificate, and fire consultant's information for fire safety design, specification and performance.

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Dublin: The Chapel, Mount St. Anne's, Milltown, Dublin 6, D06 XNS2 Ireland
Cork: One South Mall, Cork City, Co. Cork, T12 CCN3 Ireland

Project Code:	20006A	**Scale @ A0:**	1:500
Project Lead:	DM	**Date Printed:**	09/12/2024
Drawn By:	LB/CPI	**Current Rev.:**	
Job No.:	20006A	**Status:**	-
Purpose:	PLANNING		

Project: Blackglen Road LRD
Location: Blackglen Road, Sandyford, Dublin 18
Client: Zolbury Ltd

Drawing Title: Proposed Ground Floor Site Layout Plan
Drawing No.: 20006A-OMP-01-00-DR-A-1000

Source File: 20006A-OMP-01-00-DR-A-1000.DWG

Appendix B TOPOGRAPHICAL SURVEY



Site Location Map

OS MAP SERIES: 1:1000, 1:2500
OS MAP REF: 3455-02, 3455-03, 3455-08, 3455-A (1:2500)
ITM Centre Point Co-ordinate: X,Y = 717585.3081,725197.508
Copyright Ordnance Survey Ireland and Government of Ireland
Ordnance Survey Ireland License No. CYAL50165736

All levels (in meters) are related to Malin Head levelling datum. All dimensions in millimetres. figured dimensions only are to be taken from this drawing. All work to be carried out in accordance with the current building regulations. All dimensions to be checked on site before work is carried out. All consultants are to be notified of any discrepancies.

0 25 50 100
meters

- APPLICATION SITE 3.70 Ha OUTLINED IN RED
- LANDS IN OWNERSHIP OF APPLICANT (Circa 4.022 Ha OUTLINED IN BLUE)
- CPO LANDS PERMANENT LAND TAKE
- CPO LANDS TEMPORARY LAND TAKE
- PART OCCUPIED BY THIRD PARTY

Revision Description	Date	Rev. No.	Issued by
Stage 2 - LRD Meeting	03.05.2024	P01	LB

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D06 XN52 Ireland

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Cork City
Co. Cork
T12 CCN3 Ireland

Project Code: 20006A
Project Lead: DM
Drawn By: LB
Job No.: 20006A
Purpose: PLANNING

Scale @ A1: 1:1000
Date Printed: 03/05/2024
Current Rev.: 01
Status: -

Project: Blackglen Road
Location: Blackglen Road, Lambs Cross, Sandyford, Dublin 18
Client: Zolbury Ltd

Drawing Title: Site Location Map
Drawing No.: 20006A-OMP-00-ZZ-DR-A-1000

Source File: 20006A-OMP-01-ZZ-DR-A-1000 SITE LOCATION PLAN.DWG

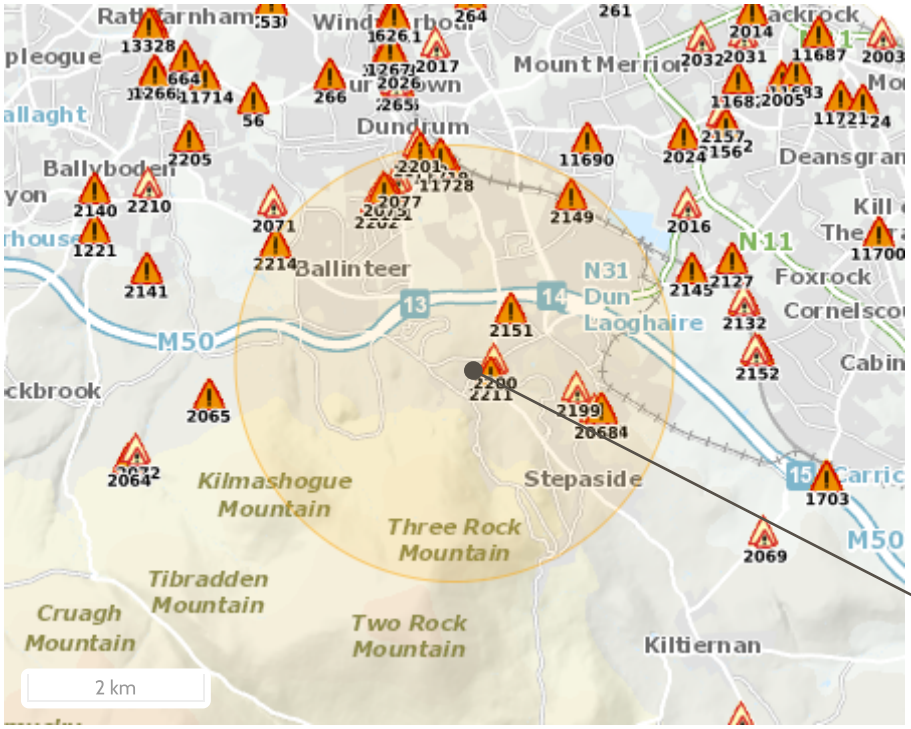
Appendix C PAST FLOOD SUMMARY REPORT

Past Flood Event Local Area Summary Report

Report Produced: **3/6/2022 12:36**

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

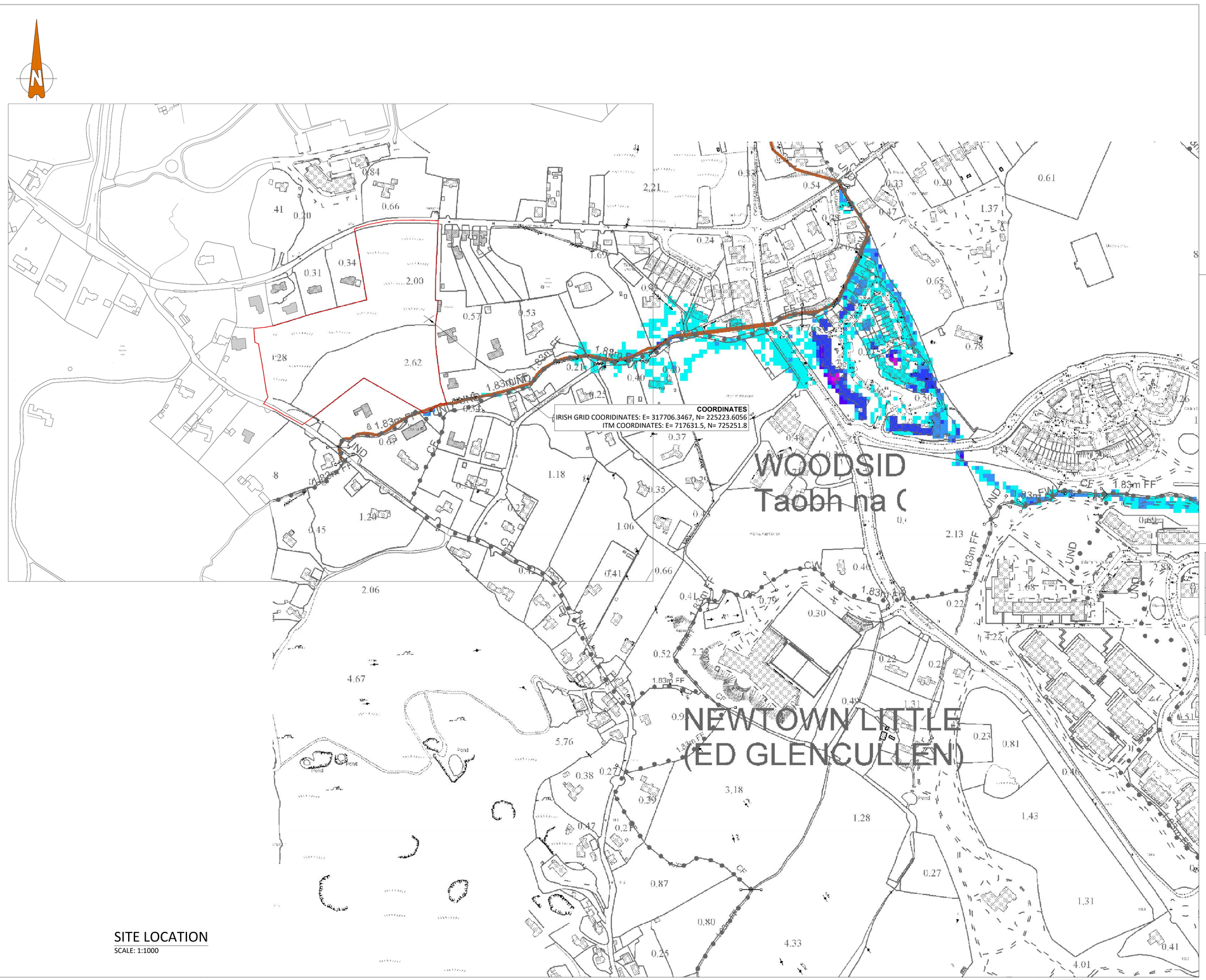
Site Location

17 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Slang Old Ballinteer Road Recurring (ID-2077)	n/a	Exact Point
	Additional Information: Reports (4) Press Archive (0)		
2.	Kilgobbin Road Recurring (ID-2068)	n/a	Exact Point
	Additional Information: Reports (2) Press Archive (0)		
3.	Pine Copse Willow Road Recurring (ID-2075)	n/a	Exact Point
	Additional Information: Reports (2) Press Archive (0)		
4.	Ashlawn Ballinteer Road June 1993 (ID-2111)	11/06/1993	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
5.	Lakelands Close Stillorgan Jan 1980 (ID-2149)	21/01/1980	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
6.	Sandyford Church Jan 1980 (ID-2151)	21/01/1980	Exact Point
	Additional Information: Reports (1) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Carrickmines River Sandyford Hall Recurring (ID-2199) **Additional Information:** Reports (1) Press Archive (0)	n/a	Exact Point
8.	Ballyogan Stream Lambs Cross Recurring (ID-2200) **Additional Information:** Reports (1) Press Archive (0)	n/a	Exact Point
9.	Ludford Area Ballinteer Recurring (ID-2202) **Additional Information:** Reports (1) Press Archive (0)	n/a	Approximate Point
10.	School House Lane Sandyford Nov 1982 (ID-2211) **Additional Information:** Reports (1) Press Archive (0)	26/11/1982	Approximate Point
11.	Little Dargle Grange Road Nov 1982 (ID-2214) **Additional Information:** Reports (1) Press Archive (0)	07/11/1982	Approximate Point
12.	Flooding at Willow Bank Apartments, Sandyford Rd, Dublin 14 on 24th Oct 2011 (ID-11728) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point
13.	Flooding at Riverdale, Dundrum, Dublin 14 on 24th Oct 2011 (ID-11719) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point
14.	Flooding at Dundrum Shopping Centre and Taney Cross, Co. Dublin on 24th Oct 2011 (ID-11720) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point
15.	Pine Copse Road Ballinteer Nov 1982 (ID-2137) **Additional Information:** Reports (1) Press Archive (0)	05/11/1982	Exact Point
16.	Flooding at Clonskeagh Road, Dublin 6 on 24th Oct 2011 (ID-11704) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point
17.	Flooding at Kilgobbin Road, Stepaside, Co. Dublin on 24th Oct 2011 (ID-11712) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point

Appendix D OPW CFRAM MAPS



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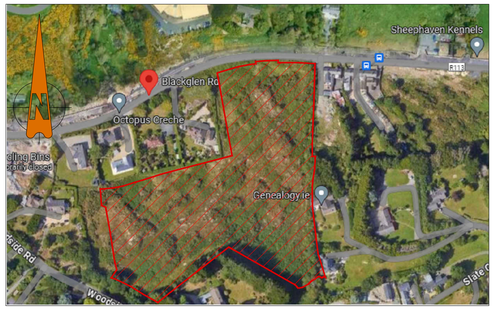
SCALE: 1:1000



SITE LOCATION MAP
SCALE: NTS

Legend

0.1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

MAP:	CARYSFORT MARETIMO FLUVIAL FLOOD DEPTHS
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW

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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	29.04.24	ISSUED FOR PLANNING	AD	RM

Rev No.	Date	Revision Note	Drn by	Chkd by

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Client: ZOLBURY LIMITED
Project: BLACKGLEN ROAD

Title: EXISTING SITE LOCATION - 0.1% FLUVIAL AEP FLOOD DEPTH MAP

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
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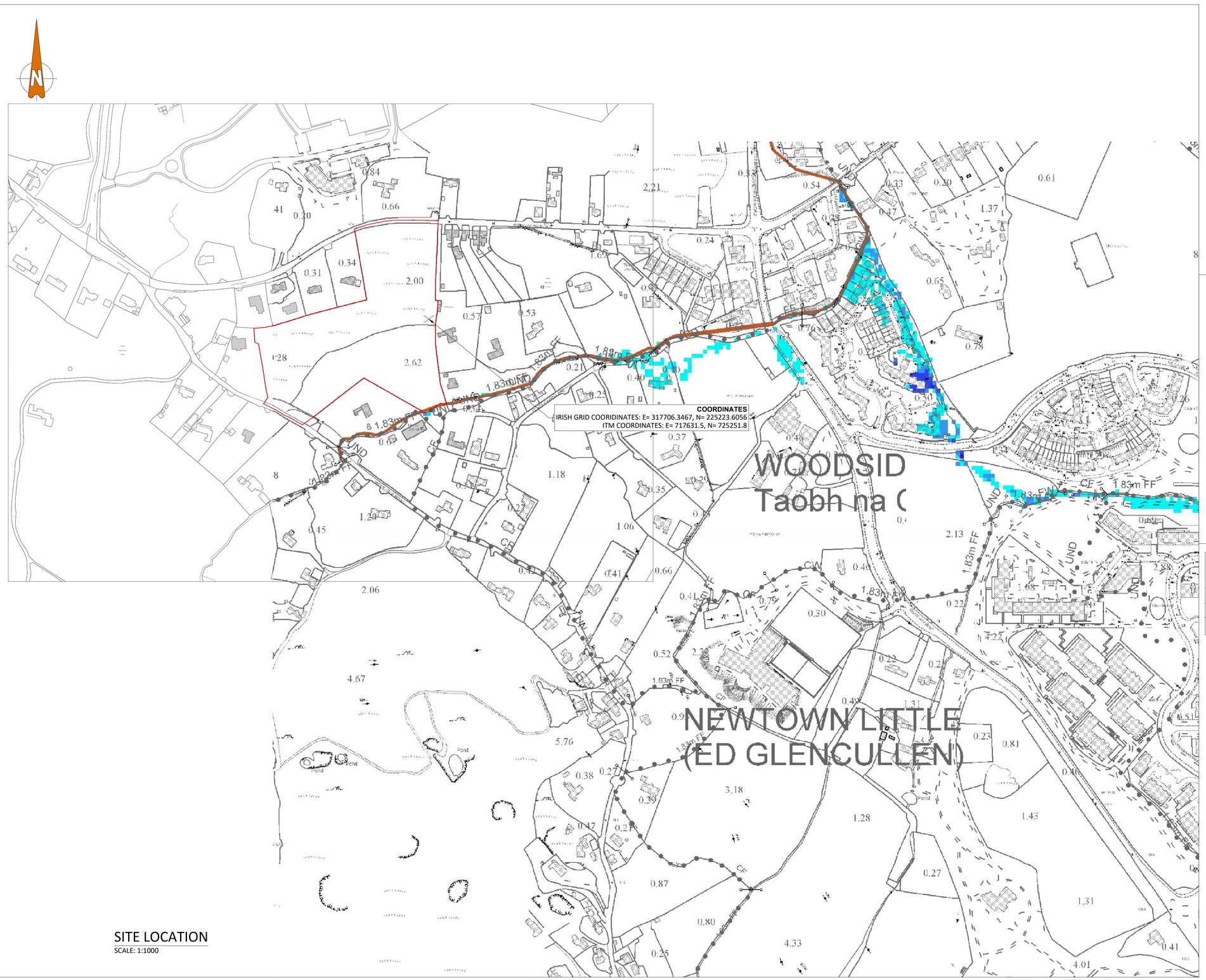
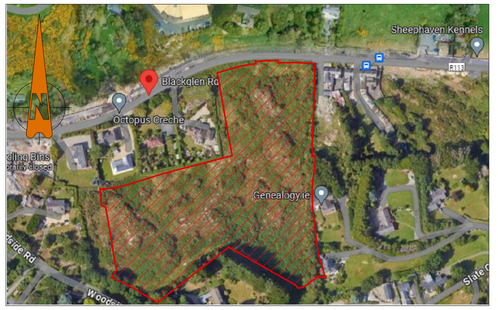
Date: MAY '24 Scale @ A1: AS SHWN Drn by: AD Chkd by: RM Aprvd by:



SITE LOCATION
SCALE: 1:1000



SITE LOCATION MAP
SCALE: NTS

Legend

1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

MAP:	
CARYSFORT MARETIMO FLUVIAL FLOOD DEPTHS	
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW

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Client: ZOLBURY LIMITED
Project: BLACKGLEN ROAD

Title: EXISTING SITE LOCATION - 1% FLUVIAL AEP FLOOD DEPTH MAP

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
Z040	OCSC	XX	XX	DR	C	0571	S4	P01

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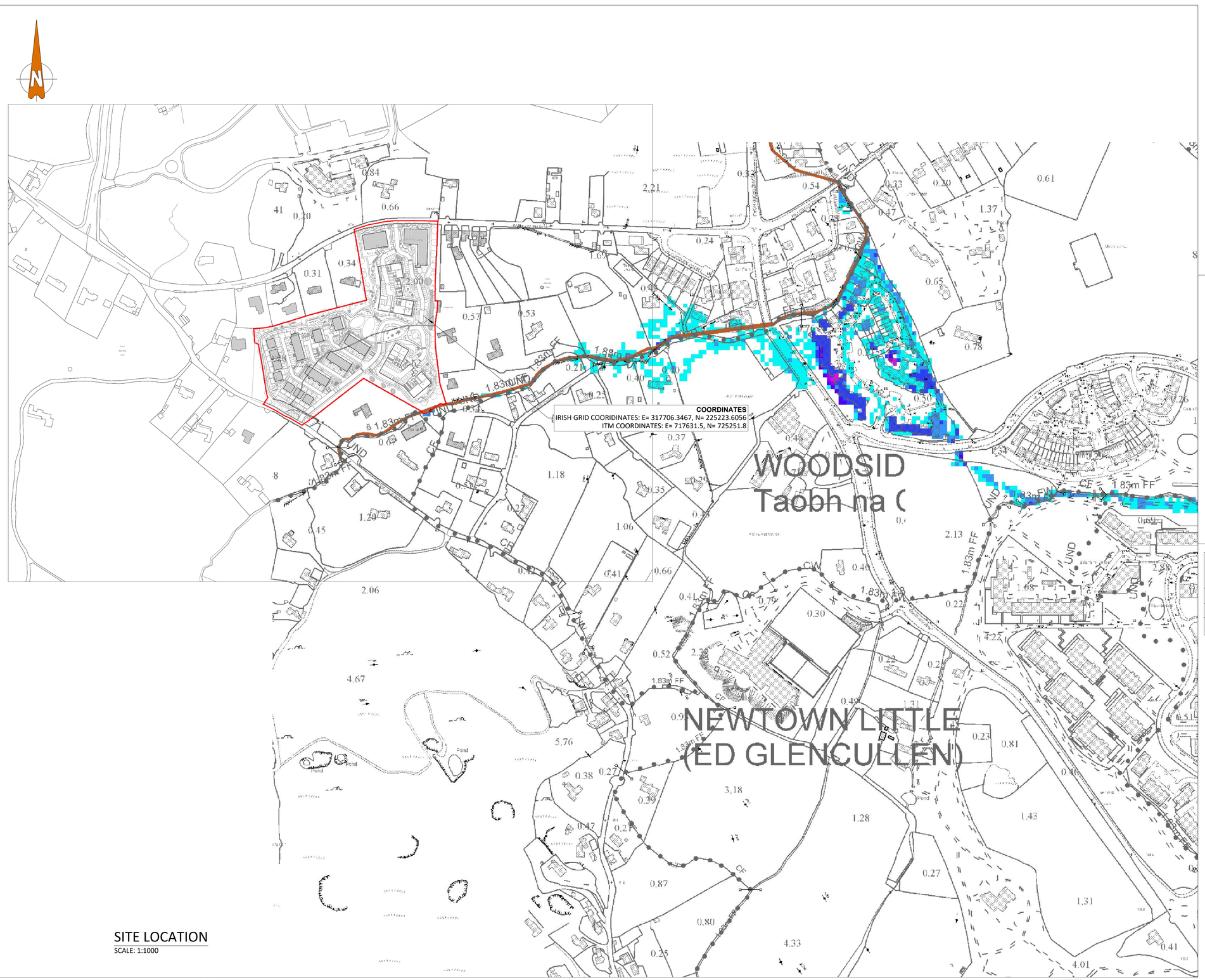
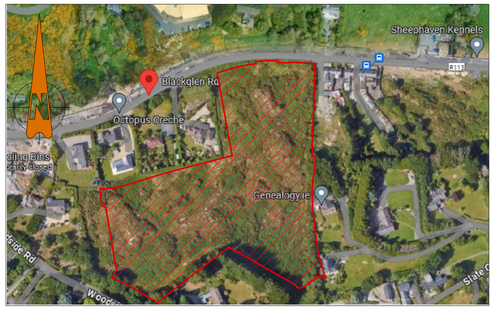


SITE LOCATION
SCALE: 1:1000



SITE LOCATION MAP
SCALE: NTS

Legend

0.1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

MAP:	CARYSFORT MARETIMO FLUVIAL FLOOD DEPTHS
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW

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Client: ZOLBURY LIMITED
Project: BLACKGLEN ROAD

Title: PROPOSED SITE LAYOUT - 0.1% FLUVIAL AEP FLOOD DEPTH MAP

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
Z040	OCSC	XX	XX	DR	C	0572	S4	P01

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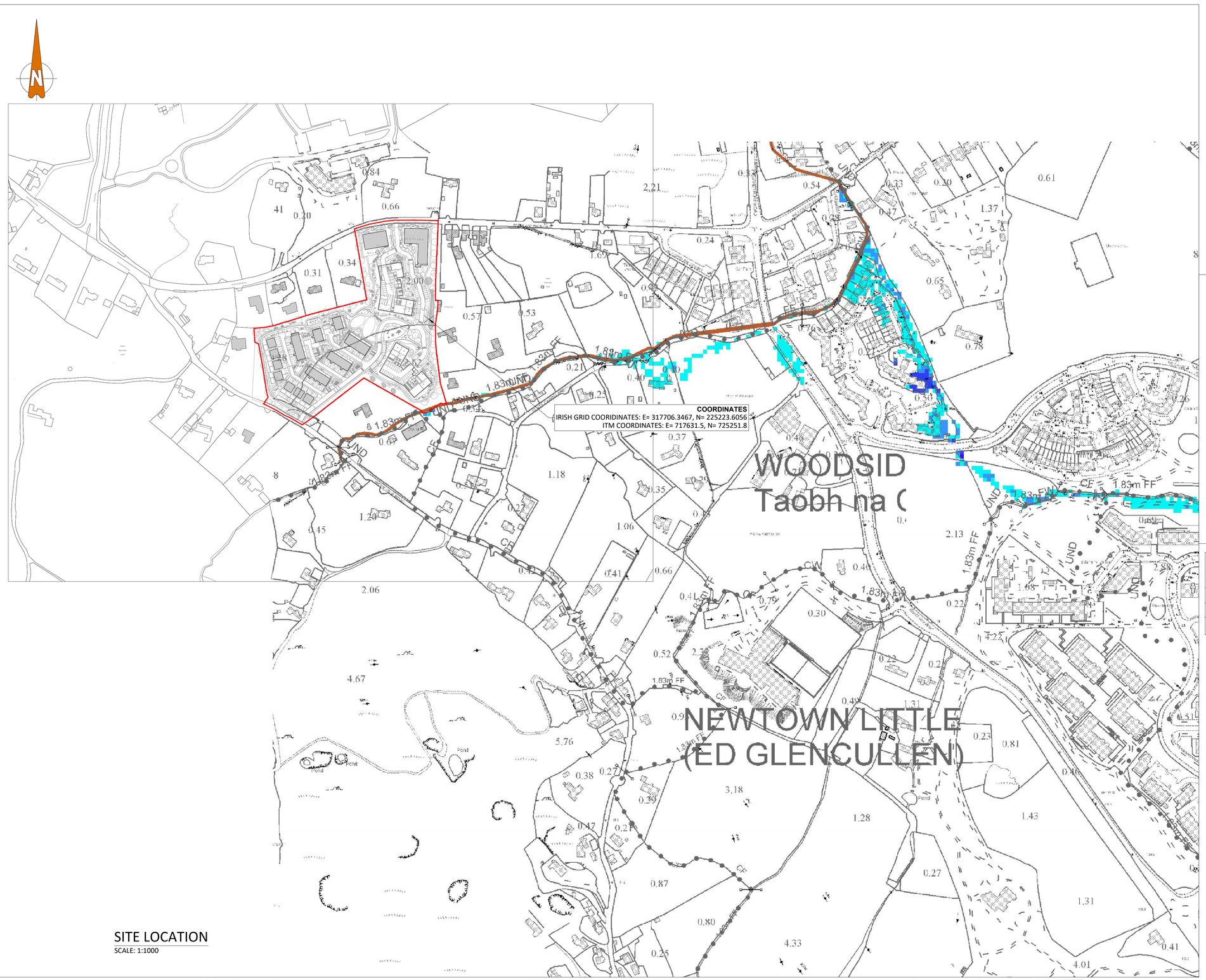
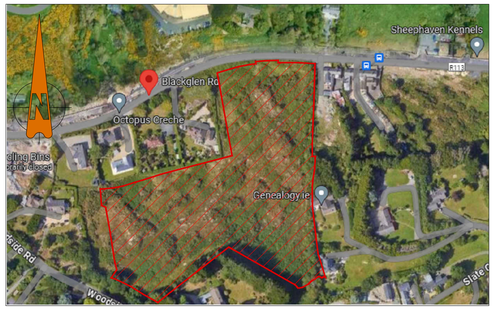


SITE LOCATION
SCALE: 1:1000



SITE LOCATION MAP
SCALE: NTS

Legend

1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

MAP:	
CARYSFORT MARETIMO FLUVIAL FLOOD DEPTHS	
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW

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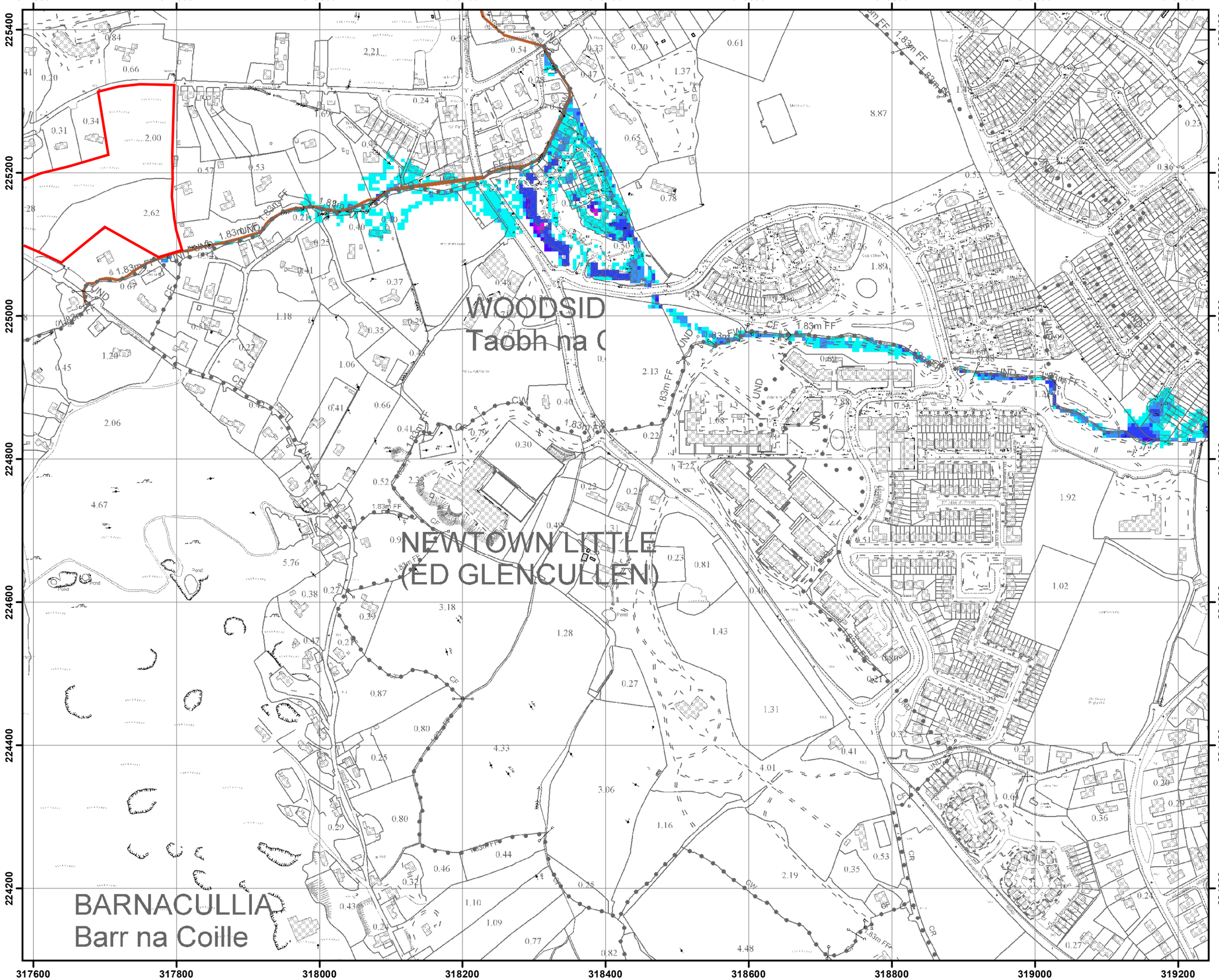
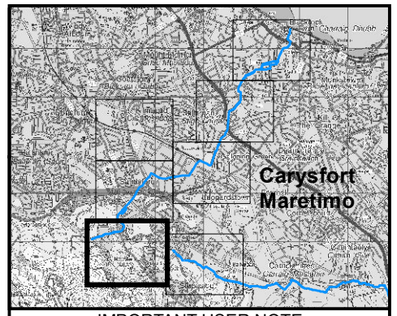
Client: ZOLBURY LIMITED
Project: BLACKGLEN ROAD

Title: PROPOSED SITE LAYOUT - 1% FLUVIAL AEP FLOOD DEPTH MAP

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
Z040	OCSC	XX	XX	DR	C	0573	S4	P01

Date: MAY '24 Scale @ A1: AS SHWN Drn by: AD Chkd by: RM Aprvd by:





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Legend

0.1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:
01	Amendment to Label.	08/12/16

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Oifig na nOibreacha Poiblí
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RPS

The Office of Public Works
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F +44(0) 28 90 668286
W www.rpsgroup.com
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Map:
Carysfort Maretimo Fluvial Flood Depths

Map Type:	**DEPTH**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By :	**C.McG.**	**Date : 27 October 2017**
Checked By :	**A.S.**	**Date : 27 October 2017**
Approved By :	**G.G**	**Date : 27 October 2017**

Drawing No. :
E09CAR_DPFCD001_F2_02

Map Series : Page 2 of 7

Drawing Scale : 1:5,000 @A3

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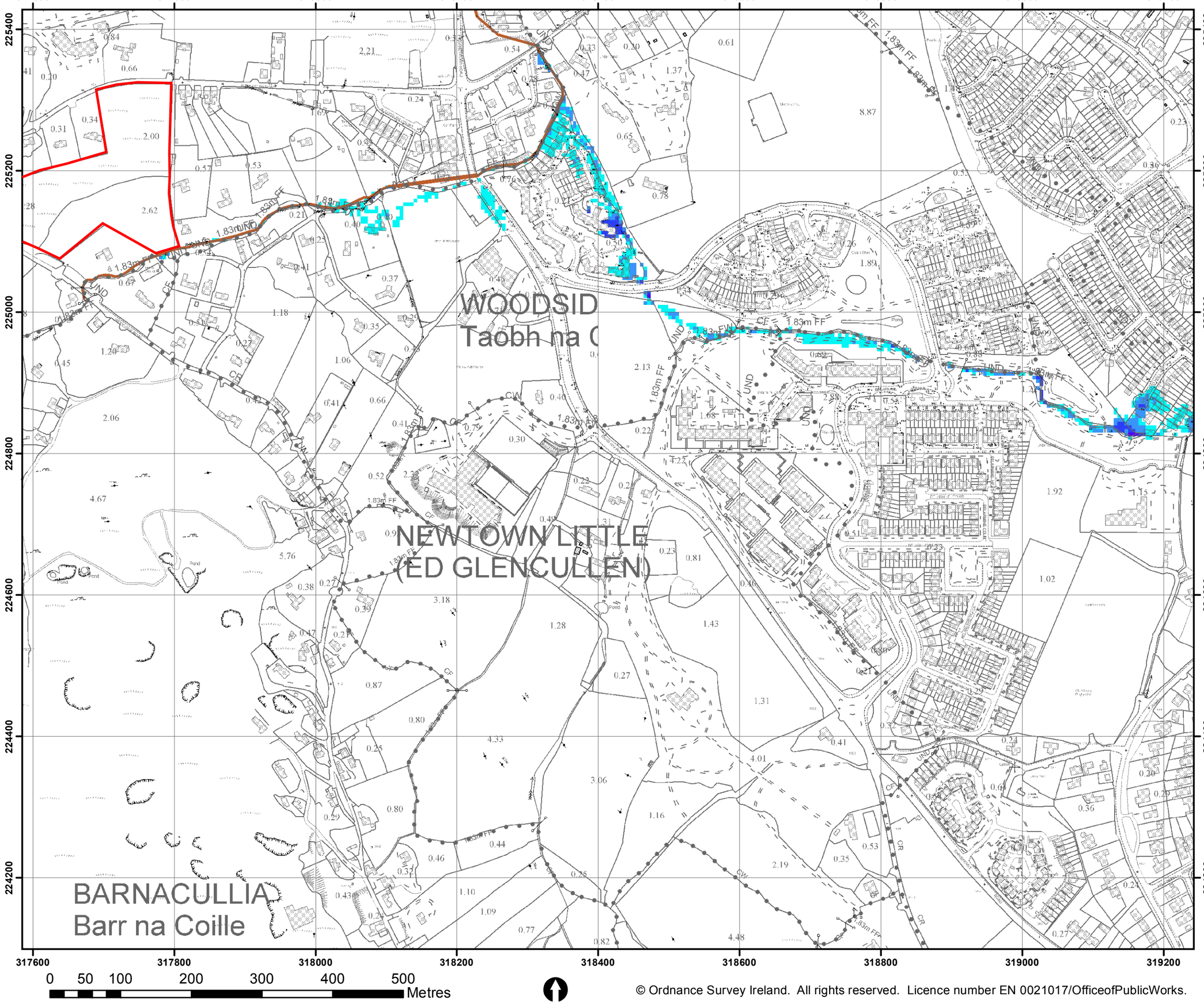

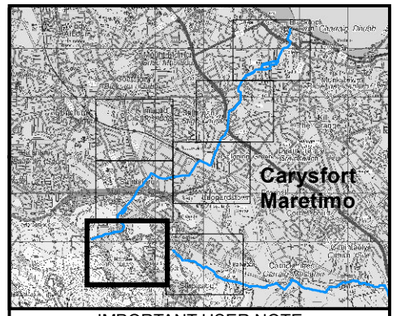

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Legend

1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:
01	Amendment to Label.	08/12/16

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Oifig na nOibreacha Poiblí
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F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:
Carysfort Maretimo Fluvial Flood Depths

Map Type:	**DEPTH**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By :	**C.McG.**	**Date : 27 October 2017**
Checked By :	**A.S.**	**Date : 27 October 2017**
Approved By :	**G.G**	**Date : 27 October 2017**

Drawing No. :
E09CAR_DPFCD010_F2_02

Map Series : Page 2 of 7

Drawing Scale : 1:5,000 @A3

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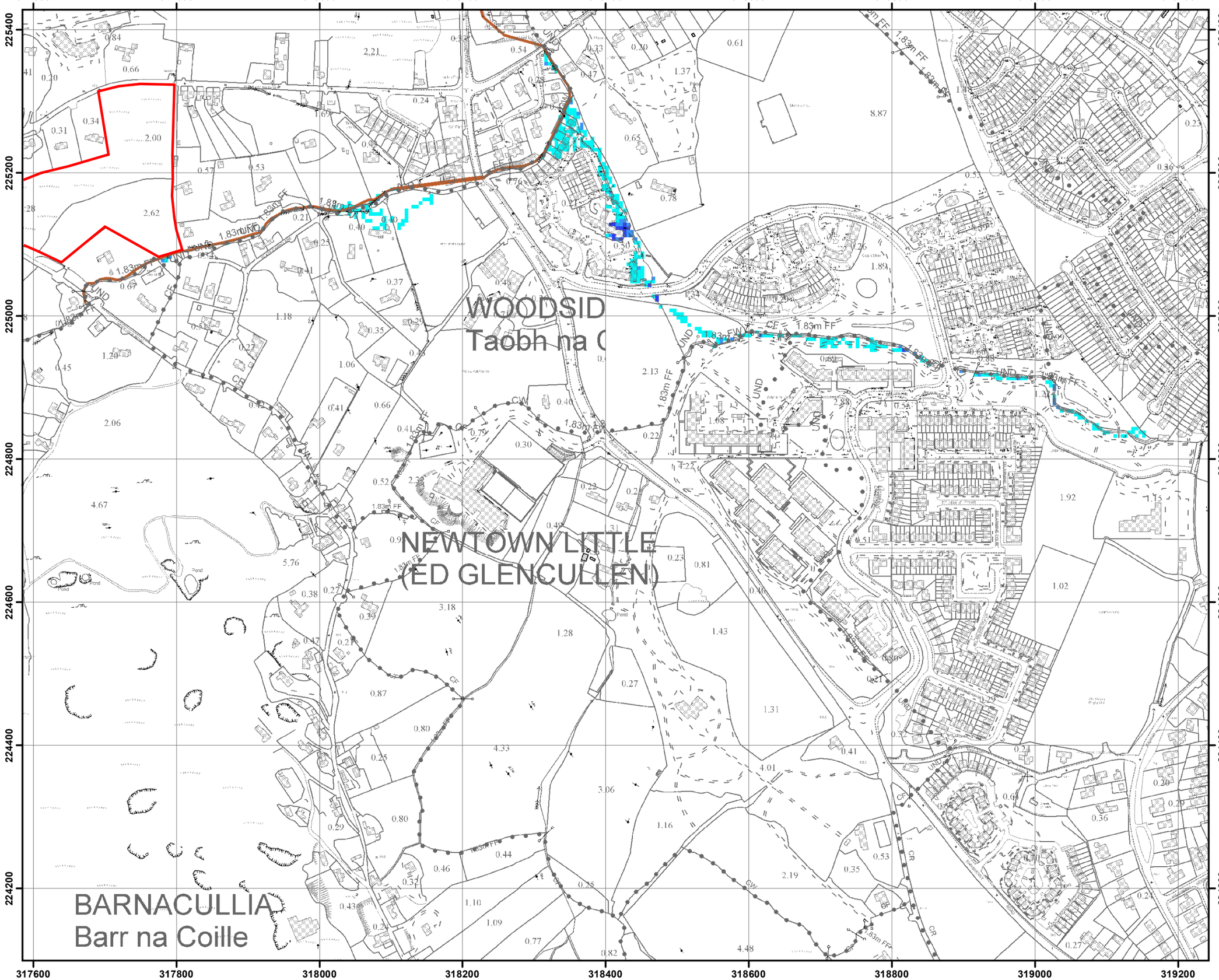

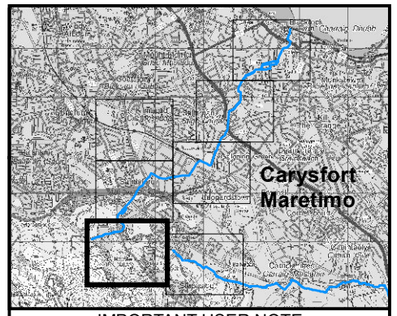

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Legend

10% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:
01	Amendment to Label.	08/12/16

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW Oifig na nOibreacha Poiblí The Office of Public Works

RPS

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Map:
Carysfort Maretimo Fluvial Flood Depths

Map Type:	**DEPTH**
Source:	**FLUVIAL**
Map Area:	**HPW**
Scenario:	**CURRENT**
Drawn By :	**C.McG. Date : 27 October 2017**
Checked By :	**A.S. Date : 27 October 2017**
Approved By :	**G.G Date : 27 October 2017**
Drawing No. :	**E09CAR_DPFCD100_F2_02**
Map Series :	**Page 2 of 7**
Drawing Scale :	**1:5,000 @A3**

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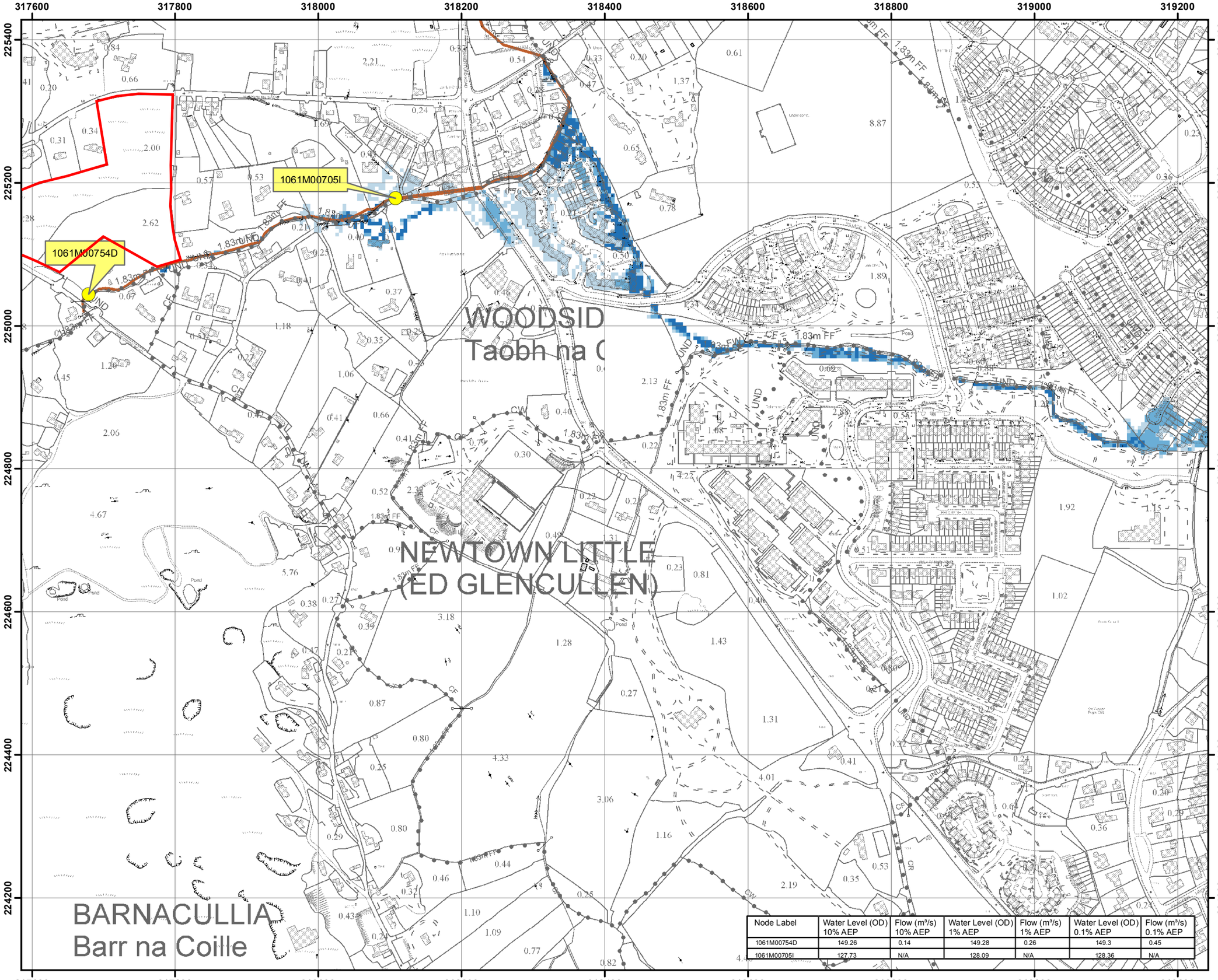

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
1061M00754D	149.26	0.14	149.28	0.26	149.3	0.45
1061M00705I	127.73	N/A	128.09	N/A	128.36	N/A

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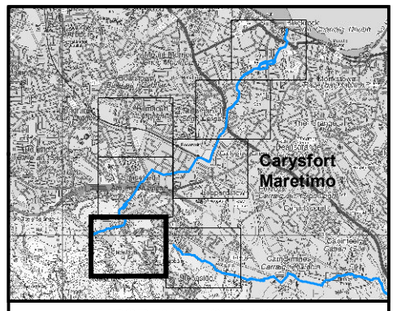

IMPORTANT USER NOTE:
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Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- 1% AEP / 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- Node Point
- Node ID — Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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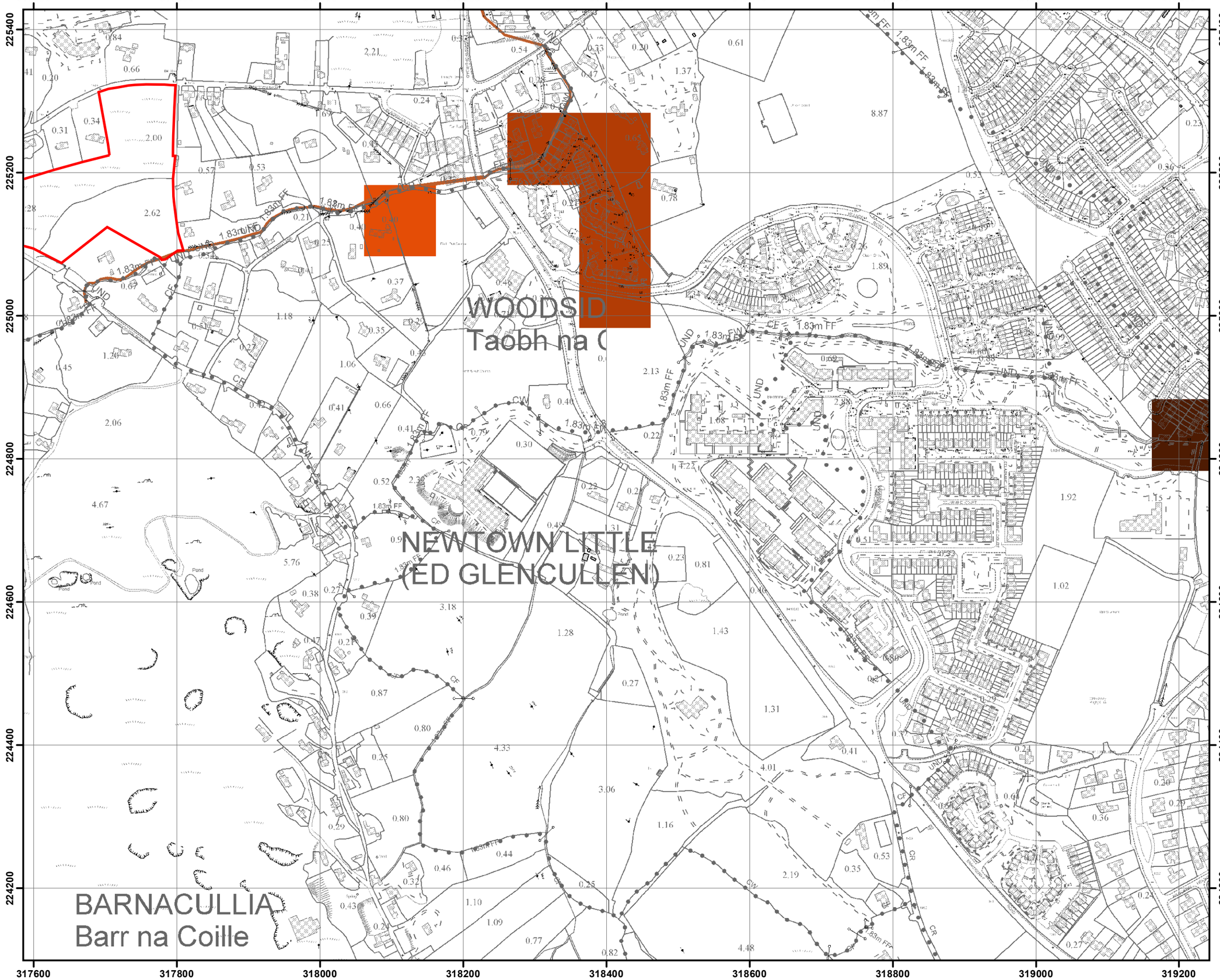
Map: Carysfort Maretimo Fluvial Flood Extents

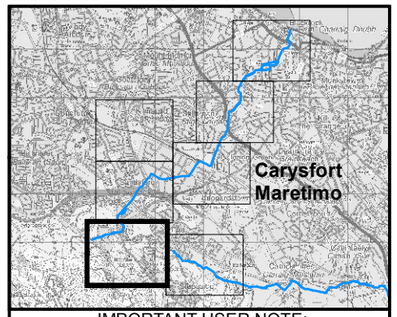
Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn By :	C.C.	Date :	27 October 2017
Checked By :	A.S.	Date :	27 October 2017
Approved By :	S.P.	Date :	27 October 2017

Drawing No. : E09CAR_EXFCD_F2_02

Map Series : Page 2 of 7

Drawing Scale : 1:5,000 @ A3





IMPORTANT USER NOTE:
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Legend

Modelled River Centreline

No. of Inhabitants at Risk/Ha

1% Fluvial AEP Event

- 1 - 5
- 5 - 20
- 20 - 40
- >40

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Map:	Carysfort Maretimo No. of Inhabitants at Risk Map
Map Type:	SPECIFIC RISK - NO. INHABITANTS
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 27 October 2017
Checked By :	A.S. Date : 27 October 2017
Approved By :	G.G. Date : 27 October 2017
Drawing No. :	E09CAR_RIFCD010_F2_02
Map Series :	Page 2 of 7
Drawing Scale :	1:5,000 @ A3

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309000 312000 315000 318000 321000

234000

231000

228000

225000

PHOENIX PARK
Páirc an Fhionnuisce

DUBLIN HARBO

Baile Átha

Sandymount Strand

South Bull

Merrion Strand

Clondalkin
Cluain Dolcáin

Ballyfermot
Baile Formaid

Palmerston
Baile Pháma

Drumcondra
Cluain Tarbh

Ballsbridge

Ringsend
Rinn

Irishtown

Donnybrook
Domhnach Mór

Rathfarnham
Ráth Fearnáin

Churchtown
Baile an Teampaill

Windy Arbour

Mount Merrion
Cnoc Mhuirfean

Goatstown
Baile na nGabhar

Dundrum
Dún Droma

Kilmacud
Cill Mochuda

Stillorgan
Stigh Lorgan

Ballinteer
Baile an tSaoir

Sandyford
Áth an Ghairmín

Leopardstown

Foxrock
Carraig an tSi

Stepaside

Carrickmines
Carraig Mhai

Ballyogan

Kilmashogue Mountain
Sliabh Cuilinn Mochoig

Three Rock Mountain

Tallaght
Tamhlacht

Templeogue
Teach Mealóg

Terenure

Greenhills
Na Glaschnoic

Kilnamanagh
Cill na Manach

Tymon North
Tigh Mothain Thuaidh

Willbrook

Rathfarnham

Ballyboden
Baile Bodáin

Firhouse
Teach na Giúise

Oldbawn
Scanbhabhán

Jobstown
Bóthar Montain

Edmondstown

Whitechurch

Marley Park

Clarkstown

Taylorsgrange

Newtown

Rockbrook

Orlagh

Oldcourt

Killinardan

Killipper

Ballymana

Ballymaice

Knockanvinidee

Ballinascorney Lower

Corragreen

Bolgard Door

Friarstown

Jamestown

Kingswood

Newlands Cross Rds

Newlands

Quarryvale

Fonthill

River Liffey

Belgard

Bull Wall

North Bank Lighthouse

Martello Tower

Merrion Gates

Blackrock

Carysfort

Deansgrange

Galloping Green

Race Course

Reservoir

Castle

Megalithic Tomb

Standing Stone

Holy Well

Megalithic Standing Stone

Megalithic Stone Circle

Larch Hill

Barnacullia

Timock

Slackstown

Mountpelier

Ballyroan

Ballycullen

Kiltalown

Grand Canal

Dublin Mountains Way

Wicklow Way

M50

N81

N4

N7

N11

N31

R112

R113

R114

R115

R116

R117

R118

R119

R120

R121

R131

R132

R133

R134

R136

R137

R138

R139

R811

R812

1000 0 1000 2000 3000 4000 Meters

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Location Plan:



LEGEND

- 10% AEP Pluvial
- 1% AEP Pluvial
- 0.5% AEP Pluvial

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OPW
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The Office Of Public Works
Jonathan Swift Street
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Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin City Council
Civic Offices
Wood Quay
Dublin 8

Project:

DUBLIN PLUVIAL STUDY (FloodResilienCity)

Map: **DUBLIN CITY - PLUVIAL FLOOD EXTENT MAP**

Map Type:	EXTENT - 180min Rainfall		
Source:	PLUVIAL		
Map Area:	URBAN		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Aug - 2016
Checked by:	MC	Date:	Aug - 2016
Approved by:	JM	Date:	Aug - 2016
Map No.:	E09DCC_EXPCD_F0_03		
Revision: F0			
Map Scale: 1:50,000		Plot Scale: 1:1 @ A3	

Appendix E DLRCC DEVELOPMENT PLAN STRATEGIC FLOOD RISK ASSESSMENT

3 Strategic Flood Risk Assessment of Dún Laoghaire-Rathdown

3.1 Description of Study Area

Dún Laoghaire-Rathdown covers an area of 125 km^2 to the south of Dublin City. Along the east of the County runs 17 kilometres of coastline which includes beaches cliffs and marshes. It is along the coast that the County town of Dún Laoghaire is located. In terms of settlement, approximately two thirds of the County is made up of the built-up area which forms part of suburban Dublin. This suburban area is made up of a network of smaller towns and villages which have been subsumed into the urban form. To the south and west the built-up area gives way to agricultural lands and then rises into the upland scenic area of the Dublin Mountains.

3.2 Identification of Flood Risk (Stage 1)

One of the first tasks within the SFRA is to undertake a data collection exercise which will allow Flood Zone maps to be developed. The Flood Zones relate to risk arising from fluvial (river) and coastal flooding. Other sources of flooding, such as surface water and groundwater, are also taken into account through the SFRA but are not part of the initial assessment process.

It is important to note that the Flood Zones do not take into account the benefits of flood defences. The sequential approach and Justification Test should be applied using the undefended outlines, but the benefits of the defences can be used to inform the requirements for detailed flood risk assessment and development design, if the Justification Test for Plan Making has been passed.

Due to the number of flood investigation and management studies that have focused on Dún Laoghaire-Rathdown, there are a number of datasets which record either historical or predicated flood extents. The aim of this phase of work is to identify flood risk based on the data available, including historical records, considering all sources of flooding, and to appraise the quality and usefulness of the data. Table 3-1 below summarises the data available and its quality, includes an assessment of confidence in its accuracy (when attempting to incorporate it into the Flood Zone map) and gives an indication of how it was used in the SFRA study.

The Office of Public Works (OPW) is the lead Authority on flooding in the Country. The OPW commissioned an Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study, which included Dún Laoghaire-Rathdown. The study was finalised in 2016, with flood maps and supporting reports available on-line[3]. The ECFRAM incorporated the earlier study of the Dodder River, which was completed in its own right in 2012. A study of the Dundrum Slang was completed in 2020 which provides up to date flood mapping for this area. These studies have been used to provide the majority of the baseline data for this Strategic Flood Risk Assessment.

The plan area of Dún Laoghaire-Rathdown has also been subject to a number of other flood assessments at both the County and local scales. These have looked at risks arising from sources such as coastal inundation and wave overtopping, surface water and manhole surcharge, culvert blockage and direct fluvial flooding. There have also been a number of recorded flood events. This information has been compiled to form the Flood Zone maps that are the basis for this SFRA.

The Flood Zone maps have been developed using the most appropriate data available to Dún Laoghaire-Rathdown at the time of preparing the Development Plan. The Flood Zone maps have been created specifically to inform the application of the Justification Test and to guide development policy within the County and have been through several iterations of review and are now considered to be fit for purpose. However, it should be borne in mind that the input data was developed at a point in time and there may be changes within the catchment that mean a future study, or more localised assessment of risk may result in a change in either flood extent or depth. This means a site-specific flood risk assessment may result in locally appropriate information which could show a greater or lesser level of risk than is included in the Flood Zone maps. This is to be expected and it will require discussion between the developer and the Dún Laoghaire-Rathdown Planning and Municipal Services sections to ensure the assessment is appropriate and relevant to the site in question.

[3] www.floodinfo.ie

The Flood Zone maps show Flood Zones A, B and C and also shows "areas of flood risk concern".

Flood Zone A refers to areas where the probability of flooding from rivers is greater than 1% AEP or 1 in 100 year for river flooding, or 0.5% AEP or 1 in 200 for coastal flooding. Flood Zone B refers to areas where the probability of flooding from rivers and seas is up to 0.1% AEP or 1 in 1000. The rest of the map shows Flood Zone C, where there is less than a 0.1% AEP or 1 in 1000 chance of flooding.

The "areas of flood risk concern" include historical flood locations (both fluvial and pluvial) and information from other modelling studies. Historical surface water locations are those where Dún Laoghaire-Rathdown County Council has a record of a flood occurring, although in some cases work has been carried out to remediate the issue. The predicted areas of concern are based on modelling and indicate where surface water has the potential to pond to depths of greater than 0.3m. More detail on these locations is available from the Municipal Services section.

The flood maps are shown in Section 6 of this document and are also reproduced at a larger size in Appendix A and B, and maps for the whole county are shown in the Mapping section of the County Development Plan.

Table 3-1: Flood Risk Datasets

Data	Description / Coverage	Quality	Data used in developing Flood Zones
Dodder CFRAM Flood Extents	Flood extents (defended) covering the Dodder River and its tributaries, the Dundrum Slang and the Little Dargle	Low. The data is old (study carried out between 2007 and 2014) and methods of assessment have progressed in the intervening years.	Superseded in the main by the Dundrum Slang ICM modelling study (see below).
Eastern CFRAM extents and defence layers, finalised in 2016	Flood extents covering the Crinken Stream, Shanganagh River, Loughlinstown River, Deansgrange Stream, Carrickmines River and Carysfort Maritimo, as well as the coastline of the County.	High in most locations, having been subject to several iterations of review through the CFRAM development process.	Flood extents, defence lines and defended area polygons have been used to develop Flood Zones.
Dundrum Slang ICM modelling study, completed in 2020	The Dundrum Slang catchment. Includes fluvial, pluvial and combined risk	High	Yes
Whitechurch Stream modelling study	Limited to the boundary of Dún Laoghaire-Rathdown (DLR)	Moderate	Yes
Coastal risk and wave overtopping Study, commissioned by DLR and completed as part of a Stage 3 assessment to this SFRA.	DLR coastline	Moderate	Still water flood zones reviewed against ICPSS, but not used as little difference. Overtopping extents indicate a screening area for site specific FRAs.
Irish Coastal Protection Strategy Study (ICPSS)	Tidal extents for 200 year and 1000 year events	High	Used to define the tidal risk within Flood Zone A and B.
JFLOW® (JBA's multi-scale two-dimensional hydraulic fluvial flood modelling software)	Covers full study area, including all watercourses with catchment greater than 3km^2.	Low - Moderate	Some minor watercourses, and the upstream reach of some CFRAM watercourses. Flood zones developed from this source will be treated as a guidance/flagging tool only and will not be relied upon by either

Data	Description / Coverage	Quality	Data used in developing Flood Zones
			the Planning Authority or applicant in the making of planning decisions.
OPW Preliminary Flood Risk Assessment (PFRA) flood maps	The PFRA was a national screening exercise that was undertaken by OPW to identify areas at potential risk of flooding.	Low	Some minor watercourses, and the upstream reach of some CFRAM watercourses. Flood zones developed from this source will be treated as a guidance/flagging tool only and will not be relied upon by either the Planning Authority or applicant in the making of planning decisions.
LiDAR	Digital terrain model covering the whole County	High, but not direct representation of flood zones.	Not used directly but has helped define the undefended floodplain.
Historical event outlines and point observations and reports	Various: 2011 event outlines received. OPW flood maps.ie also to be consulted. Surface water risk locations mapped	Various – based on anecdotal evidence and post flood survey	Indirectly used to validate flood zones and identify non-fluvial and tidal flooding
Deansgrange and Kilbogget Park flood extents	Localised studies as part of flood relief scheme appraisal	High	Indicates defended areas and guides requirements for site specific FRAs.
Wave overtopping from DART Drainage Impact Study	Merrion Gate to Monkstown. Indicates risks associated with wave overtopping	Moderate to high	Not used to create Flood Zones but mapped to indicate 'other' risk areas.
Culvert blockage	The impact of blockage was tested at 21 culverts across the County	Moderate to high (but based on an assumption of 100% blockage)	Not used to create Flood Zones but reviewed to indicate residual risk areas.
Site specific flood risk assessments	SSFRAs have been submitted in support of various planning applications across the county.	Variable, and depends on the site location and nature of the development proposed.	Not used as the coverage and quality of the assessments could be variable.

3.3 Areas of Flood Risk Concern shown on Flood Zone Maps

Non-specific address locations that may be subject to localised flooding from sources other than out-of-bank river flooding have been identified in the flood maps by triangles as follows:

- "P" (green triangle) - pluvial (rainfall) foul sewage overflow
- "P" (blue triangle)- pluvial (rainfall) surface water overflow
- "F" (blue triangle)- Fluvial - (river/watercourse) surface water overflow

The purpose of identifying these areas is to alert potential applicants of the necessity to consult with the Local Authority as to the nature, source, and possible extent(s) that may be impacted. Following such consultations a site specific flood risk assessment to factor in and mitigate against flood risk identified, if any, needs to be prepared, the details of such measures being set out in Section 5.

3.4 Summary of flood sources

Using the information detailed above, along with the knowledge of engineering staff, the following potential sources of flooding have been identified with the development plan area.

3.4.1 Fluvial Flooding

Flooding of watercourses is associated with the exceedance of channel capacity during higher flows. The process of flooding on watercourses depends on a number of characteristics associated with the catchment including; geographical location and variation in rainfall, steepness of the channel and surrounding floodplain and infiltration and rate of runoff associated with urban and rural catchments. Generally, there are two main types of catchments; large and relatively flat or small and steep, both giving two very different responses during large rainfall events.

In a large, relatively flat catchment, flood levels will rise relatively slowly, and natural floodplains may remain flooded for several days, acting as the natural regulator of the flow. In small, steep catchments, such as some of the tributaries, local intense rainfall can result in the rapid onset of deep and fast-flowing flooding with little warning. Such “flash” flooding, which may only last a few hours, can cause considerable damage and possible threat to life.

The form of the floodplain, either natural or urbanised, can influence flooding along watercourses. The location of buildings and roads can significantly influence flood depths and velocities by altering flow directions and reducing the volume of storage within the floodplain. Critical structures such as bridge and culverts can also significantly reduce capacity creating pinch points within the floodplain. These structures are also vulnerable to blockage by natural debris within the channel or by fly tipping and waste.

In Dún Laoghaire-Rathdown, flood risk arises from a number of different watercourses, each of which has its own specific characteristics. These have been taken into account when flood risk to specific potential development sites was reviewed. Where zoning for development is proposed within Flood Zones A or B, the Justification Test for development plans must be applied, and passed.

There may be situations where a watercourse is identified at Development Management stage which has not been assessed under the SFRA. In such circumstances, it should not be assumed that the Development Plan Justification Test has been passed.

3.4.2 Tidal Flooding

Ireland is affected by coastal flooding that can pose an extreme hazard to coastal infrastructure and communities. Coastal flooding events are associated with storm surge events, particularly those that occur in combination with spring tides. Local or remote storms produce large wind or swell waves, which can overtop coastal defences and cause flooding and erosion.

The eastern county boundary is subject to flood risk from the Irish Sea. As well as direct inundation associated with high tides and storm surge, which form part of the Flood Zones, wave overtopping is a significant risk in certain parts of the coast.

The 2018 Storm Emma impacts on the east coast, for example at Bullock Harbour, and the winter 2014 storms, when large numbers of properties were flooded along the east coast, are examples of the hazard posed by coastal processes.

The tide can also impact on flood risk from rivers, particularly at the downstream end of those which discharge directly into the sea. On such watercourses, if high river flows coincide with high tides, the rivers can’t discharge and may cause flooding locally.

Peak tide levels were calculated as part of ICPSS and the Eastern CFRAM Study and should be referred to in any site-specific FRA.

The Government has recently established an Inter-Departmental Group on Coastal Change Management to scope out an approach for the development of a national coordinated and integrated strategy to manage the projected impact of coastal change to our coastal communities, economies, heritage, culture and environment. The Inter-Departmental Group is jointly chaired by the Department of Housing, Planning and Local Government and the OPW and will bring forward options and recommendations for the Government to consider as soon as possible. Should these recommendations be available during the lifetime of the plan they will be given due consideration and assessed for impacts on the SFRA.

3.4.3 Residual Risks arising from Flood Defence Overtopping or Breach

Residual risk is the risk that remains after measures to control flood risk have been carried out. Residual risk can arise from overtopping of flood defences and / or from the breach from structural failure of the defences.

The concept of residual risk is explained in the Planning Guidelines as follows:

"Although flood defences may reduce the risk of flooding, they cannot eliminate it. A flood defence may be overtopped by a flood that is higher than that for which it was designed or be breached and allow flood water to rapidly inundate the area behind the defence. In addition, no guarantee can be given that flood defence will be maintained in perpetuity. As well as the actual risk, which may be reduced as a result of the flood defence, there will remain a residual risk that must be considered in determining the appropriateness of particular land uses and development. For these reasons, flooding will still remain a consideration behind flood defences and the flood zones deliberately ignore the presence of flood defences."

Owing to an extensive and frequent history of flooding in some parts of the County, there are a number of flood relief schemes in Dún Laoghaire-Rathdown. These include large scale OPW managed schemes on the River Dodder, and some smaller works which have been constructed, or are due for construction, on smaller watercourses. It should be noted that whilst existing development clearly benefits from the construction of defences, it is against sustainability objectives, and the general approach of the OPW, to construct defences with the intention of releasing land for development. It is also not appropriate to consider the benefits of schemes which have not been constructed, and which may only be at pre-feasibility or design stage. Overtopping of flood defences will occur during flood events greater than the design level of the defences. Overtopping is likely to cause more limited inundation of the floodplain than if defences had not been built, but the impact will depend on the duration, severity and volume of floodwater. However, and more critically, overtopping can destabilise a flood defence, cause erosion and make it more susceptible to breach or fail.

Overtopping may become more likely in future years due to the impacts of climate change and it is important that any assessment of defences includes an appraisal of climate change risks.

Breach or structural failure of flood defences is hard to predict and is largely related to the structural condition and type of flood defence. 'Hard' flood defences such as solid concrete walls are less likely to breach than 'soft' defence such as earth embankments. Breach will usually result in sudden flooding with little or no warning and presents a significant hazard and danger to life. There is likely to be deeper flooding in the event of a breach than due to overtopping.

Defence locations in Dún Laoghaire-Rathdown have been identified through the Eastern CFRAM Study, which has included an assessment of the defences' ability to provide an effective function, and to what standard of protection, and in discussion with council Engineers. Individual defence locations have been highlighted in the consideration of specific risks. Where walls and embankments are not discussed it is highly likely that they are informal or ineffective structures which should not be relied upon in a flood event. For the purposes of a site-specific flood risk assessment it should be assumed that the site is undefended.

3.4.4 Pluvial Flooding

Flooding of land from surface water runoff is usually caused by intense rainfall that may only last a few hours. The resulting water follows natural valley lines, creating flow paths along roads and through and around developments and ponding in low spots, which often coincide with fluvial floodplains. Any areas at risk from fluvial flooding will almost certainly be at risk from surface water flooding.

Although having potentially severe consequences, pluvial flooding can generally be managed through site design, layout and drainage. However, SFRAs require a strategic assessment of the likelihood of surface water flooding, which includes consideration of the following:

- Are there zoned lands which may need to accommodate and retain surface water flow routes?
- Are there zoned lands which might discharge upstream of an area vulnerable to surface water flooding?

A preliminary screening of areas of flood risk concern has been carried out for this SFRA, drawing on historical flood records and the OPW's PFRA mapping amongst other sources. For development within or near these areas, particular attention to surface water risk is required. Drainage impact assessments, with an emphasis on surface water risk and its management, are required for all development proposals, and are further detailed in Section 5.6.

3.4.5 Flooding from Drainage Systems

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its discharge capacity and becomes blocked or it cannot discharge due to a high-water level in the receiving watercourse.

Flooding in urban areas can also be attributed to sewers. Sewers have a finite capacity which, during certain load conditions, will be exceeded. In addition, design standards vary and changes within the catchment areas draining to the system, in particular planned growth and urban creep, will reduce the level of service provided by the asset. Sewer flooding problems will often be associated with regularly occurring storm events during which sewers and associated infrastructure can become blocked or fail. This problem is exacerbated in areas with under-capacity systems. In the larger events that are less frequent but have a higher consequence, surface water will exceed the sewer system and flow across the surface of the land, often following the same flow paths and ponding in the same areas as overland flow.

Foul sewers and surface water drainage systems are spread extensively across the urban areas with various interconnected systems discharging to treatment works and into local watercourses.

3.4.6 Groundwater Flooding

Groundwater flooding is caused by the emergence of water originating from underground and is particularly common in karst landscapes. This can emerge from either point or diffuse locations. The occurrence of groundwater flooding is usually very local and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, groundwater flooding can cause significant damage to property, especially in urban areas and pose further risks to the environment and ground stability. There are many underground streams within Dún Laoghaire-Rathdown, particularly in the Dalkey, Killiney, Dún Laoghaire, Glenageary and Glasthule areas. Some of these streams continue to give issues in private properties, and care should be taken to ensure high-water tables do not impact on basements, foundations, percolation areas or other sub-ground construction works. Data available on the Geological Survey Ireland map viewer[4] has been examined and found no particular karst or other ground water systems within the catchment, although one spring / well is noted to the west of Cherrywood. There are no recorded historic or predictive groundwater flood extents within the County. Groundwater risks should be assessed on a site by site basis through percolation testing and bore holes as appropriate.

[4] https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

Appendix F CROSS SECTION THROUGH AREA OF POTENTIAL FLOODING

EXTENTS OF SITE LOCATION

1061M00705I

1061M00754D

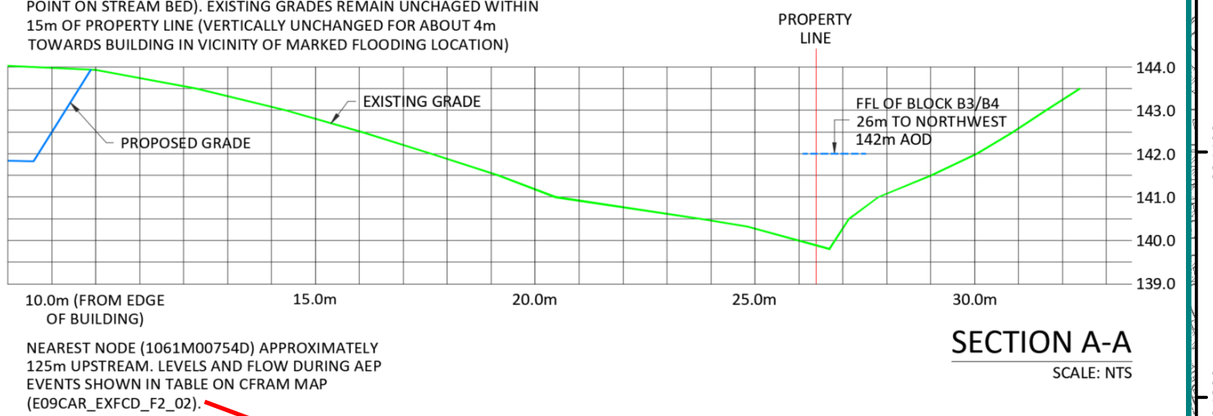
1061M00754D

B4

A

A

BUILDING APPROXIMATELY 26m NW OF PROPERTY LINE AT SECTION SHOWN. BUILDING FFL. IS 142.0m AOD (APPROX. 2.2m ABOVE NEAREST POINT ON STREAM BED). EXISTING GRADES REMAIN UNCHAGED WITHIN 15m OF PROPERTY LINE (VERTICALLY UNCHANGED FOR ABOUT 4m TOWARDS BUILDING IN VICINITY OF MARKED FLOODING LOCATION)



SECTION A-A
SCALE: NTS

NEAREST NODE (1061M00754D) APPROXIMATELY 125m UPSTREAM. LEVELS AND FLOW DURING AEP EVENTS SHOWN IN TABLE ON CFRAM MAP (E09CAR_EXFCD_F2_02).

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
1061M00754D	149.26	0.14	149.28	0.26	149.3	0.45
1061M00705I	127.73	N/A	128.09	N/A	128.36	N/A

317600 317800 318000 318200 318400 318600 318800 319000 319200

225400 225200 225000 224800 224600 224400 224200

0 50 100 200 300 400 500 Metres

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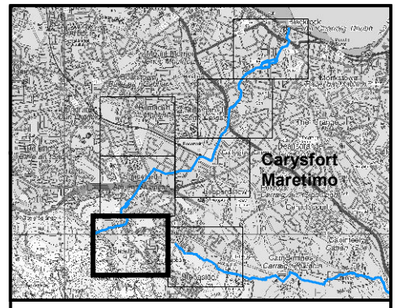

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node Point
- Node ID — Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Map: Carysfort Maretimo Fluvial Flood Extents

Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By : C.C. **Date :** 27 October 2017
Checked By : A.S. **Date :** 27 October 2017
Approved By : S.P. **Date :** 27 October 2017
Drawing No. : E09CAR_EXFCD_F2_02
Map Series : Page 2 of 7
Drawing Scale : 1:5,000 @ A3

Appendix G EXCEEDANCE FLOW PLAN

EXCEEDANCE FLOW FROM CATCHMENT 1 WILL EXIT ONTO BLACKGLEN ROAD

NOTE: CONTOURS SHOWN ON DRAWING ARE BASED ON PRE-DEVELOPMENT SURFACE LEVELS AND ARE INCLUDED TO GIVE GENERAL PERCEPTION OF GRADIENT ONLY. THEY MUST NOT BE ASSUMED TO EQUATE TO FINISHED SURFACE LEVELS

REFER TO DRAWING C-0505 FOR CATCHMENT AREA LOCATIONS

EXCEEDANCE FLOW FROM CATCHMENT 2 WILL EXIT ONTO EXISTING CARRICKMINES STREAM. GENERALLY FOLLOWING EXISTING CONDITIONS.

BLACKGLEN ROAD

SLATE CABIN LANE

Cottage Ruin

142 144 146 145 143

A1 A2 B1 PODIUM B2 B3 PODIUM B4

LEGEND:

- SITE BOUNDARY
- uPVC TWINWALL SURFACE WATER DRAINAGE OR SIMILAR APPROVED
- SURFACE WATER DRAINAGE PRECAST CONCRETE MANHOLE
- uPVC SN8 WASTEWATER DRAINAGE OR SIMILAR APPROVED
- WASTEWATER DRAINAGE PRECAST CONCRETE MANHOLE
- WASTEWATER RISING MAIN
- PROPOSED VENT STACK [IN ACCORDANCE WITH STD-WW-34]
- EXISTING WASTEWATER DRAINAGE (SOURCED FROM IW RECORDS)
- PROPOSED uPVC PERFORATED SURFACE WATER PIPE IN 900mm WIDE FILTER DRAIN (UNLESS NOTED OTHERWISE)
- PROPOSED uPVC PERFORATED SURFACE WATER PIPE IN 500mm WIDE FILTER DRAIN (UNLESS NOTED OTHERWISE)
- EXISTING STORM WATER LINE
- PROPOSED 150mmØ uPVC DRAINAGE CONNECTION
- SURFACE WATER ATTENUATION
- PERVIOUS PAVING
- GRASSCRETE PAVING
- SURFACE WATER SOAKAWAY
- BIORETENTION AREA FOR ATTENUATION
- GREEN ROOF EXTENT
- GREEN-BLUE ROOF EXTENT
- TREE PIT PER LANDSCAPE ARCHITECT'S SPECIFICATIONS - SEE SECTIONS ON DETAILS SHEET C-0520
- RAIN GARDEN PER LANDSCAPE ARCHITECT'S SPECIFICATIONS - SEE SECTIONS ON DETAILS SHEET C-0520
- CLASS I BYPASS FUEL SEPARATOR
- PROPOSED ORIFICE PLATE
- PROPOSED INSPECTION WELL
- HEADWALL
- TRAPPED ROAD GULLY & 150mmØ uPVC CONNECTION PIPE (G)
- DIRECTION OF EXCEEDANCE FLOW

NOTE:CONTOUR INTERVAL IS GIVEN AS 0.5 M

PLANNING DRAWING.
NOT FOR CONSTRUCTION.
ALL LEVELS GIVEN ARE RELATIVE TO ORDENANCE DATUM.
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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	16-12-24	SUITABLE FOR PLANNING	ARS	KG

Rev No.	Date	Revision Note	Drn by	Chkd by

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Client: ZOLBURY LIMITED
Project: BLACKGLEN ROAD

Title: EXCEEDANCE FLOW PLAN

Code	Originator	Zone	Level	Type	Role	Number	Status	Revision
Z040	OCSC	XX	XX	DR	C	0508	S4	P01

Date:DEC '24 Scale @ A1: 1/750 Drn by:ARS Chkd by:KG Aprvd by:AH

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