

# Residential Site At Kilcarbery

## Site Specific Flood Risk Assessment

230026-X-94-X-XXX-RP-DBFL-CE-0004

INFRASTRUCTURE



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## 1 Introduction

### 1.1 Background

The proposal has been prepared on behalf of South Dublin County Council as a Part 8 application for a residential development, consisting of 88 residential units on undeveloped lands measuring c. 2.03 hectares adjoining the Upper Nangor Rd, Kilcarbery Grange, Dublin 22.

The proposed development consists of a mix of 88 units consisting of a variety of house and duplex types. The units proposed include 44 no. 3bed 2 storey houses, 8 no. 4 bed 2 storeys houses, 36 no. duplex units (varying from 1 to 3 beds) within 3 storey duplex blocks. The development includes 100 no. surface car park spaces and 110 no. bicycle parking spaces, above ground sustainable urban drainage measures, an ESB kiosk, Irish Water below-ground foul pumping station, proposed new roads, footpath and cycle-paths (including works to provide a cycle-path along a portion of the Upper Nangor Rd), public open space areas, landscape works, bin/bicycle stores and all associated ancillary site development works.

DBFL were commissioned by South Dublin County Council to undertake a "Site Specific Flood Risk Assessment" (SSFRA) to accompany a Part 8 Planning Application for the proposed Integrated Social Housing at Kilcarbery in County Dublin within the operational jurisdiction of South Dublin County Council.

This SSFRA should be read in conjunction with DBFL's Infrastructure Design Report (230026-X-94-X-XXX-RP-DBFL-CE-0001 IDR).



## 1.2 Objectives

The objectives of this report are to inform the planning authority in relation to flood risk associated with the development of the lands.

The report will assess the site in accordance with the requirements of “The Planning System and Flood Risk Management Guidelines for Planning Authorities” and its Technical Appendices (Office of public Works, November 2009).

The report will provide the following;

- The site’s flood zone category.
- Information to allow an informed decision of the planning application in the context of flood risk.
- Appropriate flood risk mitigation and management measures for any residual flood risk

## 1.3 Flood Risk Assessment Scope

This SSFRA relates only to the proposed development lands Kilcarbery undeveloped lands measuring c. 2.03 hectares adjoining the Upper Nangor Rd, Kilcarbery Grange, Dublin 22. (As described in Section 1.0 of this report) and its immediate surroundings.

This report uses information obtained from various sources, together with an assessment of flood risk for the existing land and proposed development.

The report follows the requirements of ‘The Planning System & Flood Risk Management – Guidelines for Planning Authorities’, (referred to as the Guidelines for the remainder of this report).

## 1.4 Approach

Section 2.0 of this report considers ‘The Planning System & Flood Risk Management – Guidelines for Planning Authorities’ as they relate to the subject site.

Flood risk identification is presented in Section 3.0 and initial flood risk assessment in Section 4.0. A more detailed assessment of specific flood risk and residual risk relating to the proposed development is presented in Section 5.0.

Conclusions and recommendations are presented in Section 6.0.



## 1.5 Existing Site

The site, which is currently greenfield, is approximately 12km southwest of Dublin City Centre, within the operational jurisdiction of South Dublin County Council. Refer to Figure 1.1 and Figure 1.2 below.

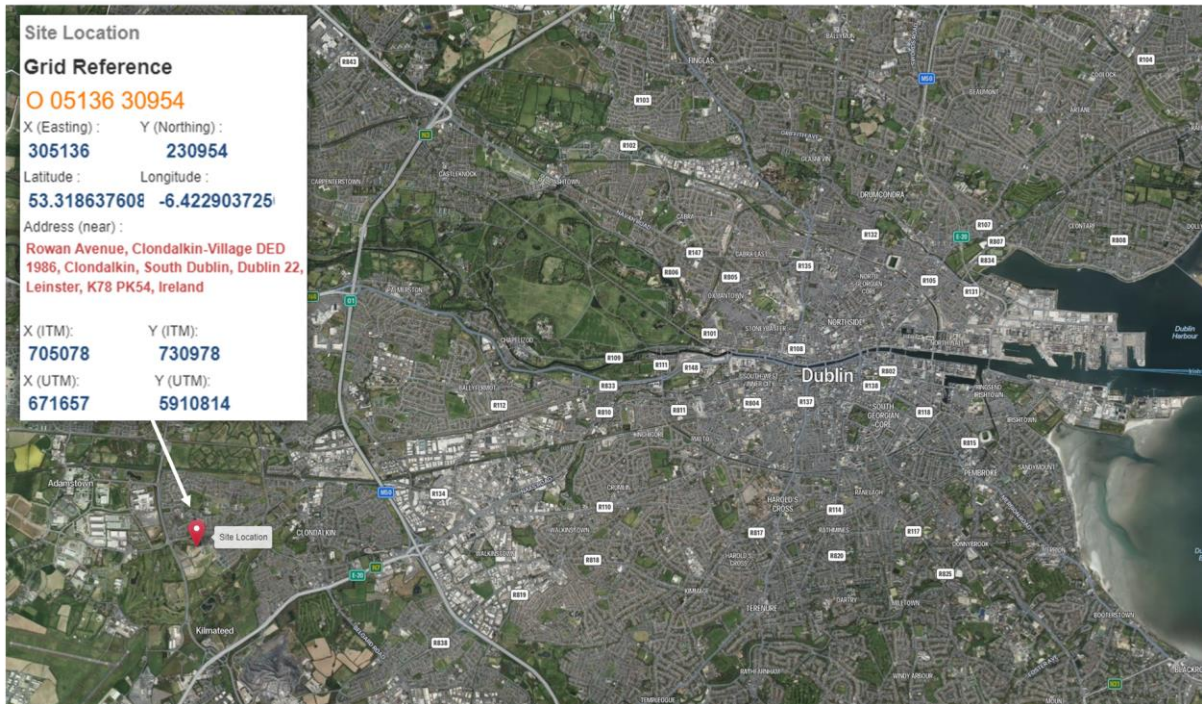


Figure 1-1 Site Location (Source: Irish Grid Reference Finder)

To the south the site is bounded by a residential development currently in construction referred to "Housing at Kilcarbery". The roads bounding the site to the north, West, South and East are Upper Nangor Rd, Rowan Green, Rowan Avenue and Grange Avenue respectively. To the Northeast the Old Nangor Road connects to New Nangor road (R134).



Figure 1-2 Site Location Plan (Source: Irish Grid Reference Finder)

The subject lands are located within zoning Objective RES-N, to provide for new residential communities in accordance with approved area plans. Please see snip below of the zoning for the area in Figure 1.3.

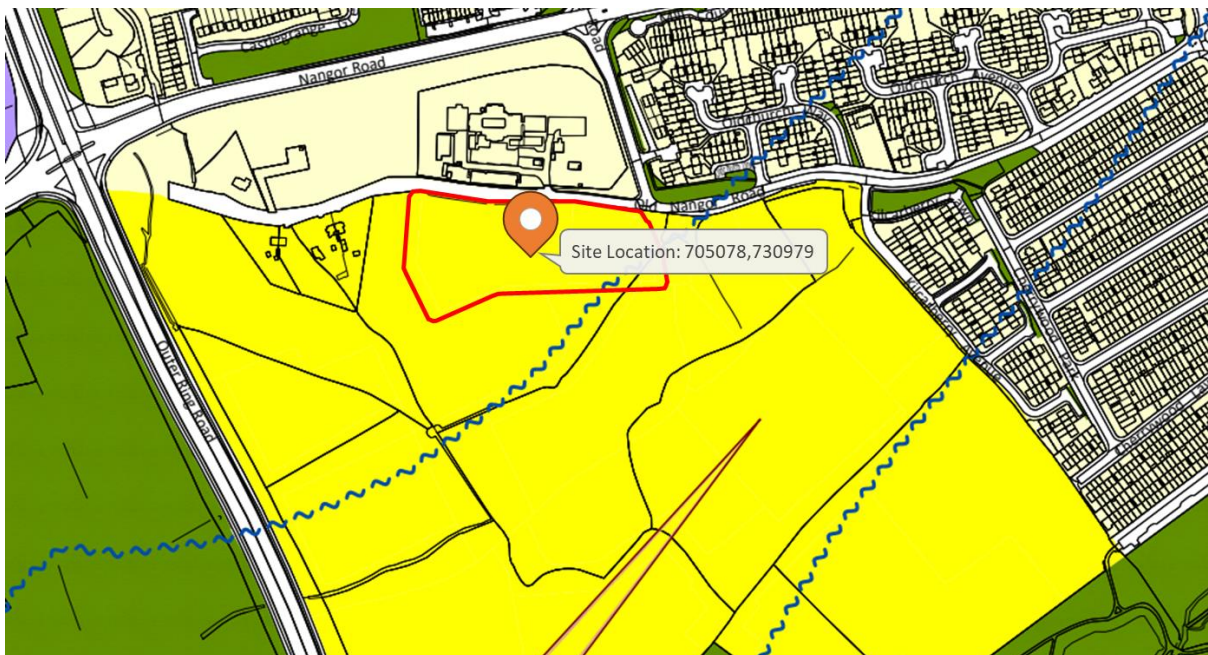


Figure 1-3 Land Use Zoning Map with Site Overlay (Source: South Dublin County Development Plan 2022-2028)



The site, which is generally flat, falling from Northwest boundary towards the southeast boundary at an average gradient of 1:96 (refer to Appendix A for Topographic Survey Plans prepared by Land Surveys). There are currently temporary topsoil heaps located on the proposed site at present that will be removed in the coming months associated with the neighbouring development in construction. The existing topographic survey information is also shown in the background of the Proposed Layout Plans, refer to DBFL Drawings. X-04-DTM-DR-DBFL-CE-1201 Roads Layout. There is an existing drainage ditch located outside the southeastern boundary of the subject site. Refer to Figure 1-4 below for details on existing surface water flow paths shown in blue arrows and for the location of the Camac waterbody.

## 1.6 Proposed Development

The proposal has been prepared on behalf of South Dublin County Council as a Part 8 application for a residential development, consisting of 88 residential units on undeveloped lands measuring c. 2.03 hectares adjoining the Upper Nangor Rd, Kilcarbery Grange, Dublin 22.

This SSFRA should be read in conjunction with DBFL's Infrastructure Design Report (230026-X-94-X-XXX-RP-DBFL-CE-0001 IDR).

The proposed discharge point from the site will be directed to an existing 375mm diameter storm sewer within the south bounding road, Rowan Avenue.

This sewer in the south bounding development is directed to an existing 450mm diameter drain within the Upper Nangor Road at the junction of Kilcarbery Avenue, which then ultimately discharges to the Camac River downstream.

Refer to figure 3-1 below for details on existing surface water flow paths shown in blue arrows and for the location of the Camac waterbody.

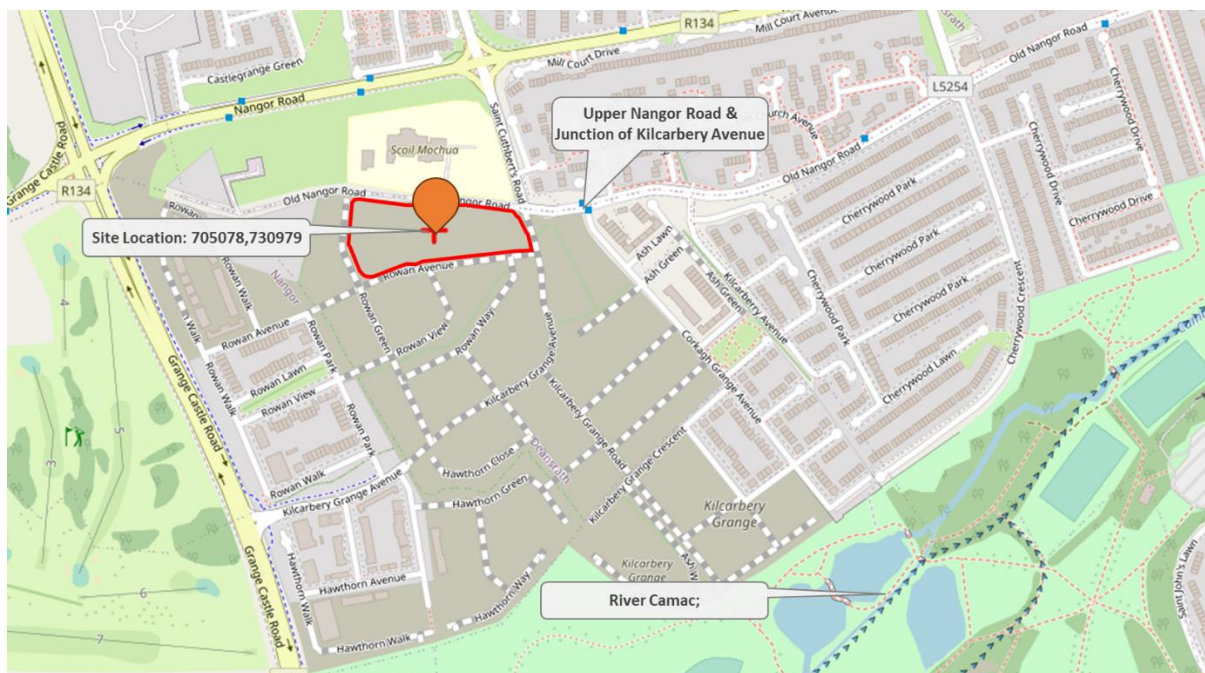
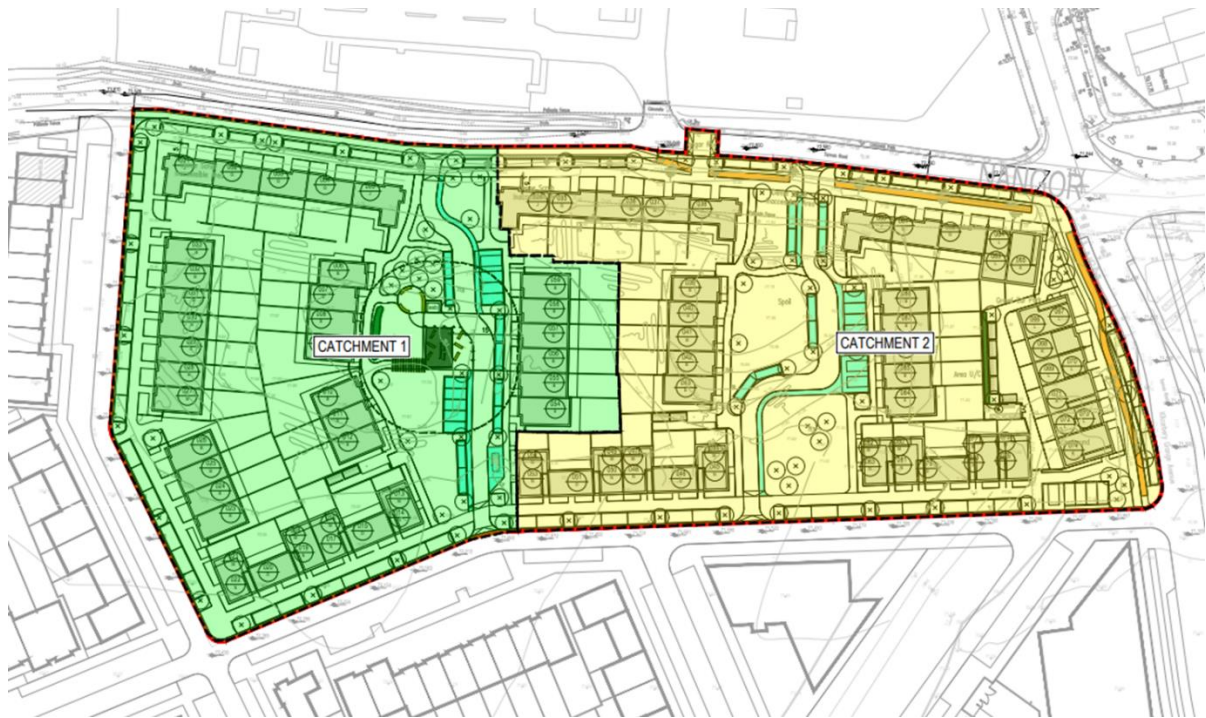


Figure 1-4 Site Plan & River Flow Direction (Source: <https://gis.epa.ie/EPAMaps/>)

The proposed development site consists of an area of 2.03 Hectares. Where a total of two catchments are used as part of the surface water strategy is presented on drawing X-05-DTM-DR-DBFL-CE-1301 Proposed Site Services & X-05-DTM-DR-DBFL-CE-1300 Proposed Catchment Areas which outlines each catchment and its corresponding SuDS and attenuation measures.



*Figure 1-5 Catchment Plan (Source: X-05-DTM-DR-DBFL-CE-1301 Proposed Site Services)*

Each catchment has various SuDS elements, controls, final treatment and attenuation measures provided on route and in advance of ultimate discharge to the proposed outfall location.



## 2 Planning System & Flood Risk Management Guidelines

### 2.1 General

“The Planning System and Flood Risk Management Guidelines for Planning Authorities” and its Technical Appendices outline the requirements for a Site-Specific Flood Risk Assessment.

In Table 3.1, the Guidelines classifies “dwelling houses” as “highly vulnerable development”.

In Table 3.2, the Guidelines indicates that this type of developments requires to be in Flood Zone C i.e., where probability of flooding from rivers is low (less than 0.1% AEP (Annual Exceedance Probability)).

In Table 3.2, If a “highly vulnerable development” is to be located in Flood Zone A or Flood Zone B a Justification Test is required.

### 2.2 Sequential Approach

This site-specific flood risk assessment (SSFRA) will initially use existing flood risk information to determine the flood zone category of the Site i.e., to determine whether the development is considered appropriate or whether a justification test is required, see Figure 2-1 below for details.

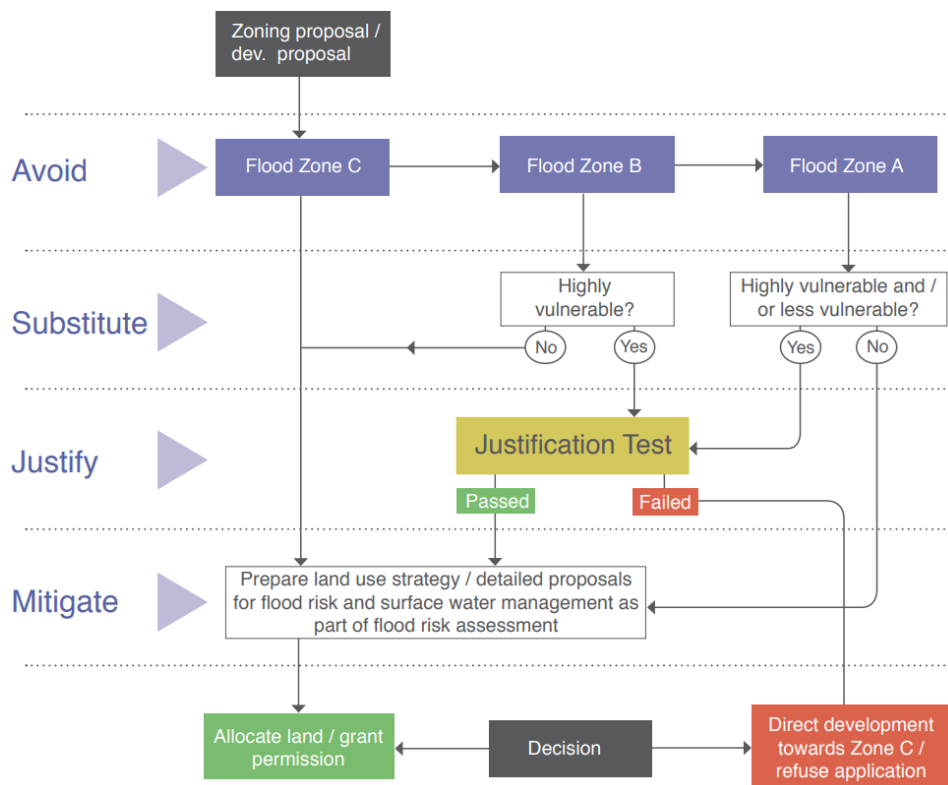


Figure 2-1: Sequential Approach mechanism in the Planning Process (Figure 3.2 of The Planning System and Flood Risk Management Guidelines)



## 2.3 Flood Risk Assessment Stages

Flood risk is normally assessed by a flood risk identification (Stage 1) stage followed by an initial flood risk assessment (Stage 2). A more detailed flood risk assessment (Stage 3) then follows which includes an assessment of surface water management, flood risk and mitigation measures to be applied.

The following report sections outline the flood risk assessment stages for the proposed development which follow the requirements of the Guidelines' Technical Appendices.



## 3 Stage 1 – Flood Risk Identification Stage

### 3.1 General

The initial flood risk identification stage uses existing information to identify and confirm whether there may be flooding or surface water management issues for the lands that may require further investigation.

### 3.2 Information Sources Consulted

Information Source	Comments
Predictive and historic flood maps, and Benefiting Lands Maps, such as those at: <a href="https://www.floodinfo.ie/">https://www.floodinfo.ie/</a>	Information obtained (and reviewed) from: <a href="https://www.floodinfo.ie/map/floodmaps/">https://www.floodinfo.ie/map/floodmaps/</a> (OPW website).
Expert advice from OPW who may be able to provide reports containing the results of detailed modelling and flood-mapping studies, including critical drainage areas, and information on historic flood events, including flooding from all sources;	Information obtained (and reviewed) from: <a href="https://www.floodinfo.ie/map/floodmaps/">https://www.floodinfo.ie/map/floodmaps/</a> (OPW website).
Predictive fluvial flood maps produced under CFRAM Studies;	CFRAM flood extents map consulted.  <a href="https://www.floodinfo.ie/map/floodmaps/">https://www.floodinfo.ie/map/floodmaps/</a> Providing access to Eastern CFRAM study Flood Maps – Fluvial Flood Extents and Fluvial Flood Depth Maps consulted.
Previous Strategic Flood Risk Assessments;	Eastern CFRAM Study consulted.
Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques;	OSI Maps consulted & Site topographic survey undertaken. Site topographic survey undertaken (refer to Appendix A).





Information on flood defence condition and performance;	No flood defences identified in the Eastern CFRAM Study in the immediate vicinity of the site.
Maps of the Geological Survey of Ireland (which would allow the potential for the implementation of source control and infiltration techniques, groundwater and overland flood risk to be assessed). These maps, while not providing full coverage, can indicate areas that have flooded in the past (the source of the alluvium) and may be particularly useful at the early stages of the FRA process where no other information is available;	GSI maps consulted.  No groundwater was noted during the investigation. An Infiltration rate of $f=8.264 \times 10^{-6}$ m/s was calculated for the soakaway location SA-01. At the locations of SA-02 and SA-03 the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate.
Walkover survey to assess potential sources of flooding, likely routes for flood waters and the site's key features, including flood defences;	Walkover survey conducted. No flooding or groundwater observed
National, regional & local spatial plans, such as the National Spatial Strategy, regional planning guidelines, development plans & local area plans provide key information on existing and potential future receptors.	South Dublin County Development Plan 2022-2028
'Liable to flood' markings on the old '6 Inch' maps;	Historic OSI maps consulted.

*Table 3-1 Information sources consulted*

### 3.2.1 OPW Predictive, Historic & Benefiting Lands Maps & Flood Hazard Information

OPW's Summary Local Area Report is included in Appendix C (Flood Hazard Information). This report is sourced from the OPW website (<https://www.floodinfo.ie/map/floodmaps/>) and summarises all flood events within 2.5 km of the site.



No flood events are noted in the immediate vicinity of the site in the OPW Summary Local Area Report. However, the report does show flooding downstream of the Camac River in Cherrywood and Clondalkin most notable in June 1993.

No benefiting lands are identified in the vicinity of the site.

Note: Benefiting lands are lands that might benefit from implementation of a major drainage scheme or lands subject to flooding or poor drainage.

### **3.2.2 Eastern CFRAMS Study**

Extracts from OPW's Eastern CFRAM Study (Fluvial Flood Extent and Fluvial Flood Depth Maps) are included in Appendix C (Flood Hazard Information) which indicates the extent of fluvial flooding in the Kilcarbery area.

No fluvial flooding is indicated in the vicinity of the site.

### **3.2.3 Tidal Flood Maps**

Tidal flooding is not relevant to the Site as Kilcarbery is approximately 14km from the coast and more than 70m above sea level.

### **3.2.4 Other Sources**

- Other information sources were consulted to determine if there was any additional flood risk to the subject site, these included.
  - Topographical Survey – The site is elevated above the predicated 1% AEP and 0.1% AEP fluvial flood level (based on the closest modelled nodes to the site as shown on the CFRAM Mapping included in Appendix C).
  - Soils and Groundwater Data from the GSI – no alluvium deposits or groundwater wells / springs are shown within the site on the GSI online mapping system. However, it does indicate it could be vulnerable to water logging during high rainfall events due to low permeability.
  - Site Investigation Report – No evidence of flooding within the development lands.
  - Walkover survey – No evidence of flooding within the development lands.
  - Development Plan lands are located within zoning Objective RES-N, to provide for new residential communities in accordance with approved area plans
  - Existing Local Authority Drainage Records – an existing ditch located just outside the southern boundary of the site and under the South bounding



construction sites main spine road (Grange Avenue) to an existing culvert and pipe network that which ultimately discharges to the Camac River downstream.

- Irish Water Records – No Existing surface water and foul drainage network are located to the north boundary of the site.
- 6-inch OSI Map – no evidence of flooding or marsh areas within the Site.

From a review of the 'other sources' above there does not appear to be evidence of flood risk to the residential development lands.



### 3.3 Source-Pathway-Receptor Model

A Source-Pathway-Receptor model was produced to summarize the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water for a 0.1%AEP (Annual Exceedance Probability) and 10%AEP storms could reach the receptors, see Table 3-2. It outlines effects of various potential sources, the performance and response of pathways and the consequences to the receptors in the context of the proposed development. These sources, pathways and receptors will be assessed further by the initial flood risk assessment stage.

Source	Pathway	Receptor	Likelihood	Consequence	Risk
<b>Fluvial</b>	From the ditch / stream to the south-east	People and Property (the proposed development).	Remote	Medium	Low
<b>Surface Water Drainage (Pluvial)</b>	Blockage and / or surcharging of the proposed surface water drainage network.	People and Property (the proposed development).	Possible	Medium	Medium
<b>Human or Mechanical Error (Pluvial)</b>	Failure of proposed SUDs measures (e.g., Hydrobrake failure)	Areas of development draining to the surface water network	Possible	Medium	Medium
<b>Groundwater flooding</b>	Rising GWL on the site	People and Property (the proposed development).	Possible	Medium	Medium

*Table 3-2 Source-pathway-receptor analysis*

## 4 Stage 2 – Initial Flood Risk Assessment Stage

Flood risks identified during Stage 1 – Flood Risk Identification, are outlined in Table 3-2 (Source Pathway Receptor Analysis) and noted below. These risks are assessed further in this section of the SSFRA.

- Low risk of fluvial flooding from the existing ditch.
- Medium risk of pluvial flooding (surface water and human / mechanical error)
- Medium risk of groundwater flooding

The information sources identified in Section 3.3 are considered adequate for the purpose of an Initial Flood Risk Assessment for the site and no further technical studies are proposed.

### 4.1 Initial Fluvial Flood Risk Assessment

The Eastern CFRAM flood extents mapping identifies the location of the predicated 1% AEP and 0.1% AEP fluvial flood events associated with watercourses in the Kilcarbery area (refer to Appendix C).

No fluvial flooding is indicated in the vicinity of the site. The closest modelled node is to the south of the site and is located on the Camac River (Node: 09CAMM01089X as shown on CFRAM Drawing E09CAM\_EXFCD\_F1\_12 in Appendix C). 1% AEP Flood Level (Node 09CAMM01089X): 70.17m. Lowest FFL (see DBFL Drawing: X-05-DTM-DR-DBFL-CE-1301 Proposed Site Services): 71.40m. Note: Min. freeboard from 1% AEP required by GDSDS – 500mm.

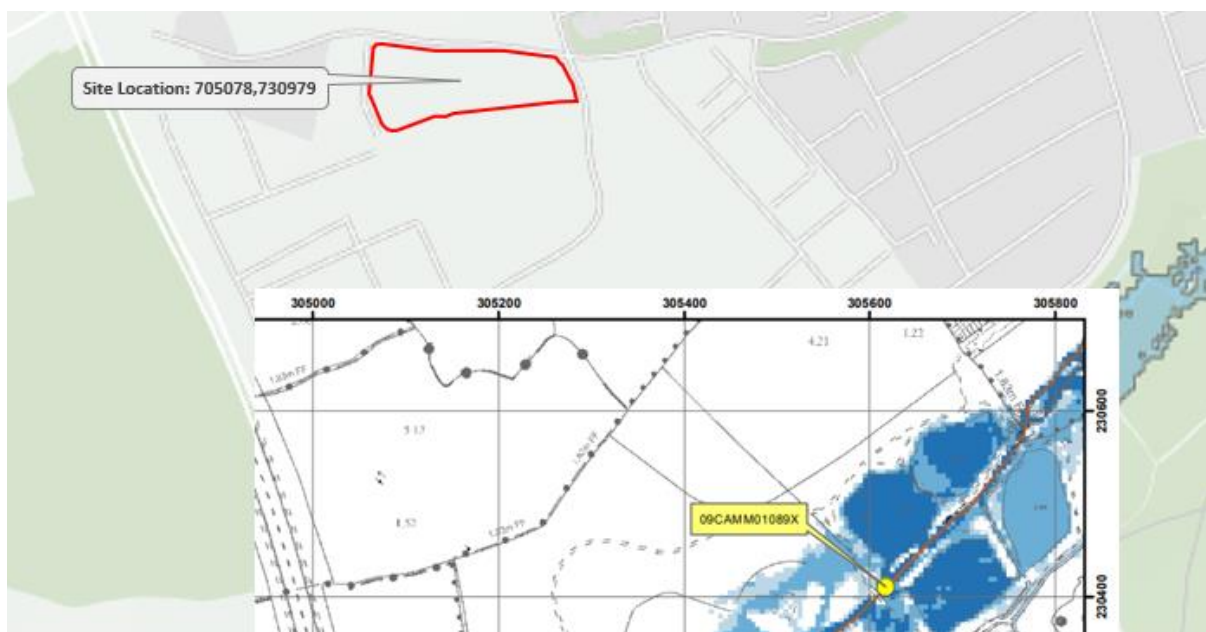


Figure 4-1 CFRAM Maps (Source: e09cam\_exfcd\_f1\_12, Appendix C)



## 4.2 Initial Pluvial Flood Risk Assessment

The Source-Pathway-Receptor model identified a medium risk of pluvial flooding relating to the proposed surface water drainage network and human / mechanical error. This risk can be mitigated by designing the surface water network in accordance with the Greater Dublin Strategic Drainage Study (GSDSDS) including management and attenuation of the 1:100-year storm event and implementation of SuDS methodologies.

Proper operation and maintenance of the drainage system should also be implemented to reduce the risk of human or mechanical error causing pluvial flood risk from blockages, fuel / oil interceptor operation problems, flow control failure etc.

## 4.3 Initial Groundwater Flood Risk Assessment

IGSL carried out a preliminary intrusive ground investigation at the site in October 2007 and undertook further detailed investigation at the site in early 2019 (refer to Report 230026-X-94-X-XXX-RP-DBFL-CE-0001 IDR for extracts from IGSL's Investigation Report).

The recorded subsoil material comprises of sandy gravelly clays over a limestone bedrock. This was later confirmed as part of a detailed intrusive investigation undertaken in 2019.

Further ground investigations were carried out by (GII) ground investigations Ireland in September 2023 (refer to Report 230026-X-94-X-XXX-RP-DBFL-CE-0001 IDR for extracts from GII's Investigation Report)

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following, visit project site to observe existing conditions, carry out 3 No. Soakaways to determine a soil infiltration value to BRE digest 365

No groundwater wells or marsh areas are located within the site (based on review of information available on the GSI and OSI websites).

Boreholes and Rotary Coring were carried out by IGSL at the site in October 2007 and Early 2019. In several locations, water ingress was rapid, rising as high as 200mm below present ground level.

No groundwater was noted during the investigation. An Infiltration rate of  $f=8.264 \times 10^{-6}$  m/s was calculated for the soakaway location SA-01. At the locations of SA-02 and SA-03 the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate.



#### **4.4 Flood Zone Category**

Based on the Initial Flood Risk Assessment, the site is considered to be located in Flood Zone C as defined by the requirements of “The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices.

No proposed dwellings are located in Flood Zone A or B.

The residential type of development proposed is therefore appropriate for this flood zone category. The Guidelines Sequential Approach is therefore met and the ‘Avoid’ principal achieved.



## 5 Stage 3 – Detailed Flood Risk Assessment Stage

### 5.1 General

Since the type of development proposed is appropriate for the flood zone of the Site, the detailed flood risk assessment stage will only consider pluvial flood risk in relation to the following:

- Proposed Surface Water Management measures and SuDS
- Flood Exceedance.
- Impact of proposals on flood risk to adjacent areas.
- Effects of climate change.
- Access and Egress for Emergency Services during Flood Events.
- Residual risks.
- Effectiveness of any flood mitigation measures.

### 5.2 Surface Water Management

The overall surface water drainage strategy has been developed by DBFL Consulting Engineers in consultation with South Dublin County Council (SDCC). The Surface water runoff from the development will be limited to greenfield runoff rates (Qbar) in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). The proposed development site consists of an area of 2.03 Hectares. This strategy is presented on drawing *230026-X-05-DTM-DR-DBFL-CE-1301 Proposed Site Services & X-05-DTM-DR-DBFL-CE-1300 Proposed Catchment Areas* which outlines each catchment and its corresponding SuDS and attenuation measures.

Each catchment has various SuDS elements, controls, final treatment and attenuation measures provided on route and in advance of ultimate discharge to the proposed outfall location. The proposed discharge point from the site will be directed to an existing 375mm diameter storm sewer within the south bounding road, Rowan Avenue. Further detail is provided subsequently.

The proposed surface water drainage network will collect surface water runoff from the site via conveyance progressive infiltration trenches network (subject to employed SuDs infrastructure outlined below) prior to discharging off site through swales, depressions and bioretention areas, flow control devices and light liquid separators.

Surface water discharge will be controlled using a mixture of infiltration and flow control manholes and vortex flow control devices (hydrobrake or equivalent) with the resulting attenuated volumes





retained in progressive underground conveyance infiltration trenches and underground bioretention areas as well as above ground detention basins.

SuDS features will allow rainfall to be attenuated in all rainfall events and will be used together with the attenuating facilities to manage all critical events up to 1% AEP at strategic locations. All swales, detention ponds and bioretention areas will form part of the landscaping strategy for the site. Surface water discharge will also pass through fuel / oil separators (sized in accordance with permitted discharge from the site).

Attenuation volumes have been calculated based on an allowable outflow / greenfield runoff rate of 4.1 l/sec/ha. Further detail is provided in the Infrastructure Design Report submitted with this application.

### **5.2.1 Sustainable Urban Drainage System Proposals**

The SUDS proposals for the development include.

- Back garden rain gardens, Infiltration trenches, 4 Nr Bioretention areas and 2 Nr infiltration/detention basins to provide approximately 666 m<sup>3</sup> storage for the proposed residential development
- Permeable paving for public on-street parking.
- Flow control device (Hydrobrake optimum or similar) provided to limit discharge to greenfield runoff rates.
- Petrol interceptors provided before discharging to the outfall drainage network to remove oils and silts.
- Pedestrian/green links to drain to surrounding landscape for reduction and treatment of run-off
- Tree pits, Raingardens, permeable paving and Swales providing additional treatment and storage.

Further detail is provided in the Infrastructure Design Report submitted with this application.

### **5.2.2 Surface Water Attenuation and Storage**

Surface water runoff volumes from the development is attenuated to flow rates equal to the greenfield runoff (Qbar), in accordance with the recommendations of the GDSDS. Surface water run-off from catchment areas will be attenuated using a vortex flow control device (Hydrobrake or equivalent).

The calculated allowable outflow rate of 4.1 l/s is applied to the overall surface water catchment, with the storage volume calculated using the Source Control of MicroDrainage and modelled in the Network module of MicroDrainage.

In total of 641m<sup>3</sup> of storm-water storage is required, a total of 666m<sup>3</sup> of storm-water storage is provided within the attenuation facilities for the subject site.

Further detail is provided in the Infrastructure Design Report submitted with this application.

### 5.3 Flood Exceedance

For storms greater than the 1%AEP pluvial event, the development's drainage network design will be exceeded and areas with low ground levels will begin to flood. Proposed road levels all fall towards the south towards the surface water drainage outfalls. This will ensure that the proposed residential units are protected from flooding when the drainage network may be exceeded.

Lowest house floor levels are set a minimum of 0.5m above the top water level in the corresponding attenuation facility in accordance with recommended minimum freeboards.

### 5.4 Impact on Adjacent Areas

Adjacent areas will not be impacted by the development for up to the 1%AEP flood event, however if larger storms >1%AEP exceed the capacity of the development's drainage system then overland flood routes may be directed towards the surface water drainage outfall to the south of the site.

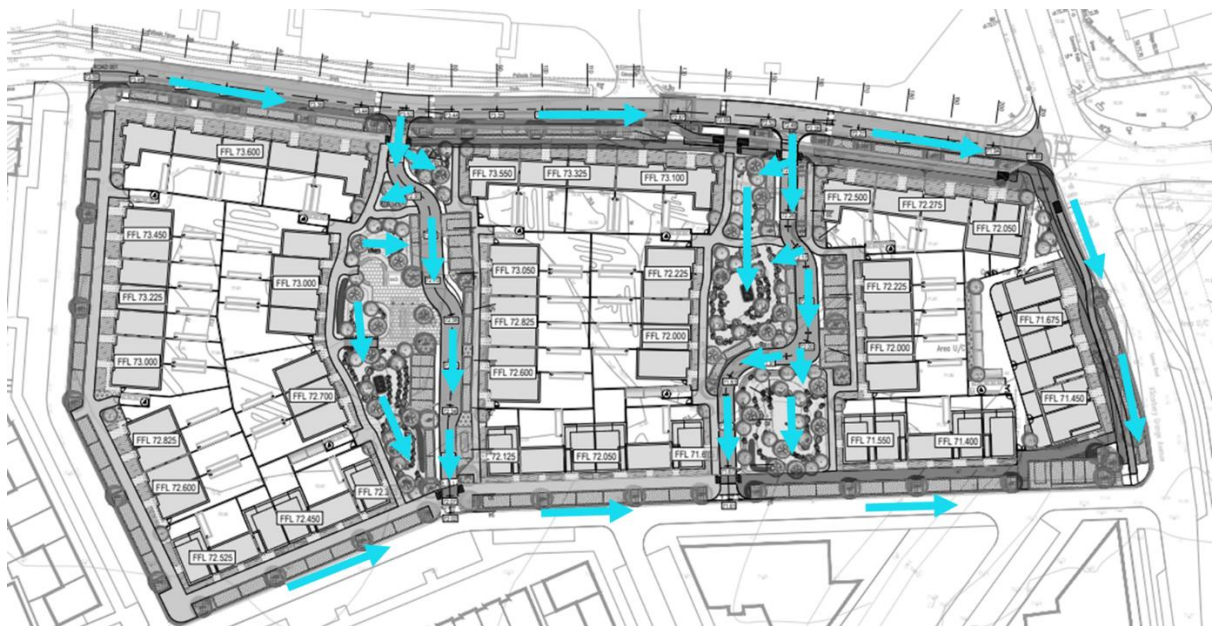


Figure 5-1 Overland Flow Path



## 5.5 Climate Change

The potential impact of climate change has been allowed for as follows:

- Pluvial flood risk - drainage system and attenuation storage design allow for a 20% increase in rainfall intensities, as recommended by the GSDS.

## 5.6 Access and Egress for Emergency Services During Flood Events

The proposed development and its essential infrastructure such as road and housing, is in flood zone C. Based on relevant fluvial flood levels from CFRAM mapping, it is anticipated that for a 0.1% AEP flood event the development can be safely accessed and exited through the proposed vehicular entrances at both the distributor road and the local roads.

## 5.7 Residual Risks

Remaining residual flood risks, following the detailed assessment include the following:

1. Pluvial flooding from the private drainage system related to pipe blockage, flood exceedance or mechanical failure.
2. Pluvial flooding from the development's drainage system for storms in excess of the 1% AEP storm event.

## 5.8 Mitigation Measures

Proposed mitigation measures to address residual flood risks are summarized below;

- M1: Proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.
- M2: In the event of storms exceeding the 100-year design capacity of the drainage system, then possible flood routing for overland flows towards the drainage outfalls to the south should not be blocked.
- M3: Floor levels are set a minimum of 500mm above the predicted 100-year flood levels.

### 5.8.1 Effectiveness of Mitigation Measures

It is considered that the flood risk mitigation measures if implemented are sufficient to provide a suitable level of protection to the proposed development. A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.



Should extreme pluvial flooding occur that is in excess of the development's drainage capacity i.e. probability less than 1%AEP, then overland flood routes to the drainage outfall could protect the development and houses with lower floor levels.



## 6 Conclusions

The Site-Specific Flood Risk Assessment for the proposed development at Kilcarbery was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities”, November 2009.

Following the Flood Risk Assessment, it has been determined that all proposed dwellings are located in Flood Zone C as defined by the Guidelines.

It is therefore concluded that:

- The proposed residential development is appropriate for the site’s flood zone category.
- The sequential approach outlined in Planning System and Flood Risk Management Guidelines has been adhered to and that the ‘Avoid’ principal has been achieved.

In conclusion, the proposed development is considered to have the required level of flood protection up to and including the 100 year return event. Overland flow paths have been identified for pluvial flooding exceeding the capacity of the surface water drainage network.



## Appendix A : Topographical Survey



N. 731100

N. 731000

N. 731100

N. 731000

Tank

School

Car Park

Upper Nangor Road

OLDCHURCH GROVE

OLDCHURCH WAY

OLDCHURCH DRIVE

OLD NANGOR ROAD

Dense Scrub Inaccessible Area

Dense Scrub Inaccessible Area

Dense Scrub Inaccessible Area

Spoil

Spoil

Gravel Car Park

Area U/C

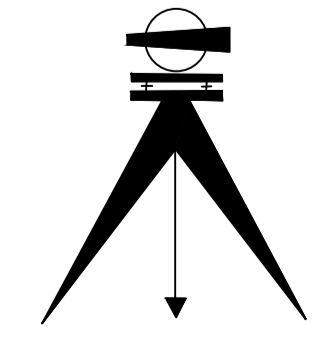
Area U/C

Compound

Kilcarbery Avenue

**NOTE:**

Portion of Ordnance Survey Detail Shown Grey Digitally Reproduced under Ordnance Survey Ireland Licence : CYAL50251205 © Government of Ireland.



LAND SURVEYS  
22 Mellifont Avenue, Dun Laoghaire, Co. Dublin.  
Ph: 2805212 Fax: 2302535 info@landsurveys.ie

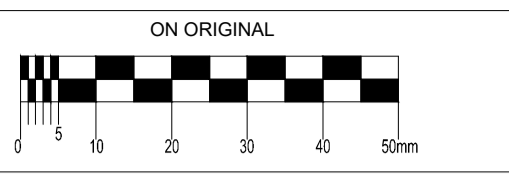
Site at: Upper Nangor Road,  
Kilcarbery

Client: South Dublin  
County Council  
Scale: 1:500 (A1)  
Contour: 0.5m Interval  
Datum: OSI Malin Head  
Issued: 12.09.2023  
Ref: D17501-F2D



## Appendix B : Proposed Site Layout





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NO CHANGES OF WHATSOEVER NATURE ARE TO BE MADE TO ANY DETAILS SET OUT OR CONTAINED IN ANY DBFL SPECIFICATIONS OR DRAWINGS UNLESS THE EXPRESS CONSENT HAS BEEN OBTAINED IN ADVANCE, IN WRITING, FROM DBFL.

- NOTES:
- ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH THE TII SPECIFICATION FOR ROAD WORKS UNLESS OVERRIDDEN BY LOCAL OVERSEEING AUTHORITY'S STANDARDS
  - ALL ROAD MARKINGS & SIGNS SHALL COMPLY FULLY WITH THE TRAFFIC SIGNS MANUAL PUBLISHED BY THE DEPARTMENT OF TRANSPORT, NOVEMBER 2015.
  - SIGNS & MARKINGS: CONTRACTOR TO CONFIRM PRECISE SETTING OUT WITH EMPLOYERS REPRESENTATIVE PRIOR TO COMPLETION. ALL SIGNS TO BE MOUNTED ON 15mm GALVANISED STEEL POSTS WITH COLOURED SLEEVES U.N.O. TO SPECIFICATION AND IN ACCORDANCE WITH THE TRAFFIC SIGNS MANUAL. MOUNTING HEIGHT TO BOTTOM OF SIGN = 2.5m U.N.O.
  - ALL TRAFFIC MANAGEMENT TO COMPLY FULLY WITH THE PROVISIONS OF CHAPTER 8 OF THE TRAFFIC SIGNS MANUAL.
  - ALL CO-ORDINATES ARE TO IRISH TRANSVERSE MERCATOR. ALL LEVELS ARE TO ORDNANCE DATUM AND ARE IN METRES.
  - ALL STREET FURNITURE TO BE TAKEN UP AND SET ASIDE FOR RE-USE. PROPOSED STREET FURNITURE TO BE RETROFITTED BY OTHERS.
  - ALL EXISTING SIGNS (INCLUDING POLES) AND MARKINGS TO BE TAKEN UP OR COVERED AND TEMPORARY MEASURES APPLIED IN ACCORDANCE WITH CONTRACTORS TRAFFIC MANAGEMENT PLAN. THE CONTRACTOR MAY USE EXISTING SIGNAGE AS PART OF THEIR TRAFFIC MANAGEMENT PLAN.
  - ALL EXISTING CHAMBERS AND ACCESS POINTS TO REMAIN CLEAR OF OBSTRUCTION THROUGHOUT WORKS. CHAMBERS SHALL BE REBUILT/RETAINED IN POSITION IDENTIFIED ON FINISHING WORKS DRAWING.
  - ALL PEDESTRIAN, CYCLE AND VEHICULAR ROUTES MUST BE RETAINED IN ACCORDANCE WITH APPROVED TRAFFIC MANAGEMENT PLAN.
  - ALL MATERIALS TO BE DISPOSED OFF SITE SHALL BE TAKEN TO A LICENSED FACILITY APPROVED BY THE LOCAL OVERSEEING AUTHORITY.
  - THE CONTRACTOR MUST LIAISE DIRECTLY WITH LOCAL AUTHORITY DEPARTMENTS AS DIRECTED IN THE WORKS REQUIREMENTS.
  - ALL VEHICULAR & PEDESTRIAN, CYCLE & PRIVATE ACCESS ROUTES WITHIN AND SURROUNDING THE WORKS EXTENTS MUST BE MAINTAINED THROUGHOUT THE WORKS IN ACCORDANCE WITH THE CONTRACTORS APPROVED TEMPORARY TRAFFIC & OPERATIONS MANAGEMENT PLAN.



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No CYAL50276885  
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GOVERNMENT OF IRELAND

rev	date	description	GMC	PLY
0	17-11-23	For Planning		

STATUS CODES  
purpose acceptance  
P3 - PLANNING PERMISSION S - ISSUED

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PHONE: +353 91 20 20 00

**SCHOOL SITE AT KILCARRBERRY**

drawing title  
**ROADS LAYOUT**

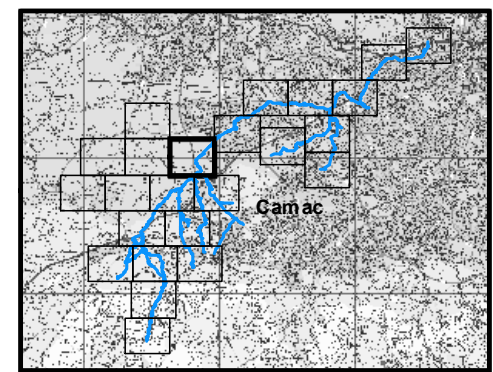
client  
**SOUTH DUBLIN COUNTY COUNCIL (SDCC)**

designed by PLY author GMC scale 1:500 sheet size A1  
drawing no. 230026-X-04-DTM-DR-DBFL-CE-1201 revision 0



## Appendix C : Flood Hazard Information

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
09CAMM01198	77.95	7.61	77.99	11.32	78.04	17.92
09CAMM01161	75.15	N/A	75.31	N/A	75.56	N/A
09CAMM01137W	74.19	7.50	74.52	14.60	74.78	18.00
09CAMM01089X	70.03	N/A	70.17	N/A	70.26	N/A
09CAMM01223J	81.22	6.42	81.45	9.52	81.61	14.12
09TALL00006	82.18	2.37	82.37	4.40	82.01	7.80



**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 Standard of Protection of Flood Defence (Walls / Embankments)
  - Node Point
  - Node ID

FINAL

REV: 01	NOTE: SOP label updated (Pg 21) Removal of Def. Area (Pg 21)	DATE: 13/11/2017
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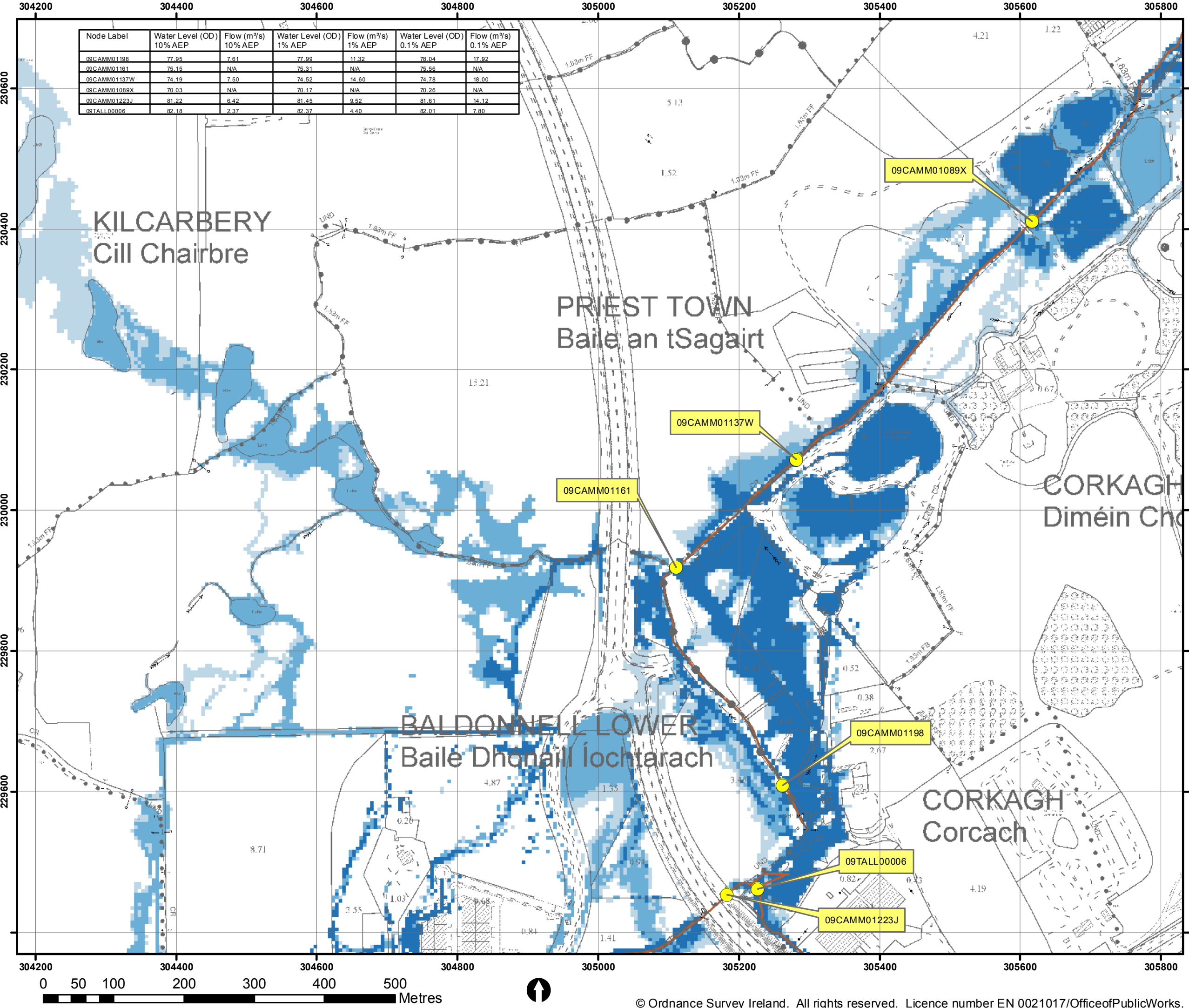


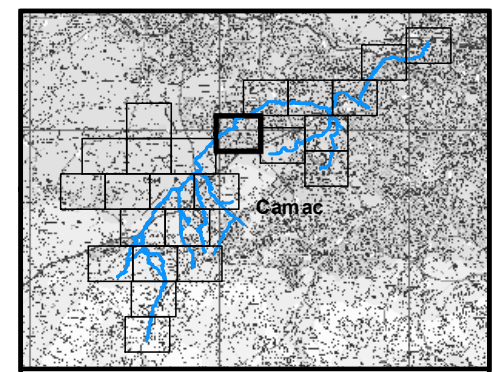
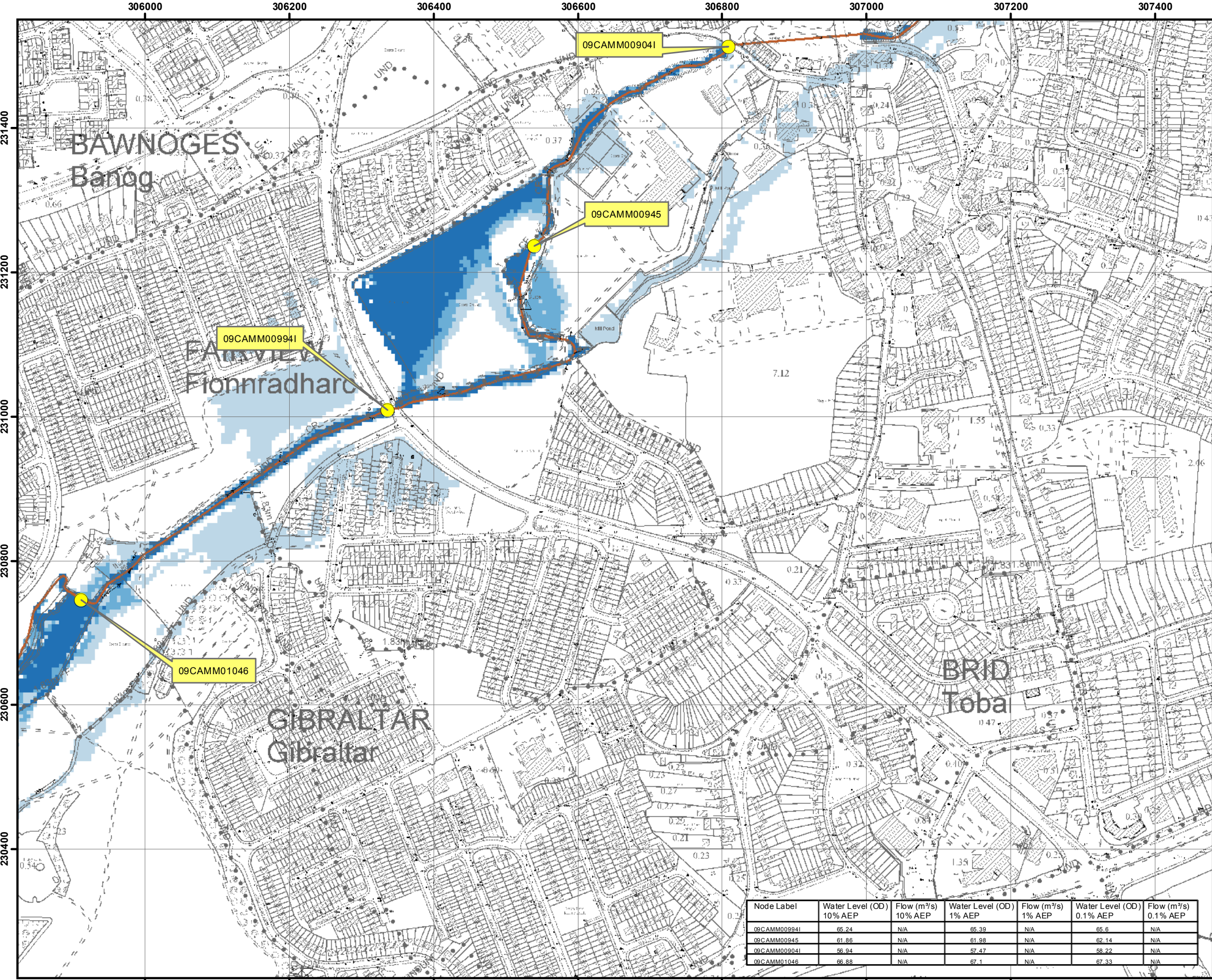
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<b>Map:</b>	
Camac Fluvial Flood Extents	
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.McG. Date: 13 November 2017
Checked By:	A.S. Date: 13 November 2017
Approved By:	S.P. Date: 13 November 2017
Drawing No.:	E09CAM_EXFCD_F1_12
Map Series:	Page 12 of 24
Drawing Scale:	1:5,000 @A3





**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 Standard of Protection of Flood Defence (Walls / Embankments)
  - 0.1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
  - Node Point
  - Node ID Node Label

FINAL

REV: 01	NOTE: SOP label updated (Pg 21) Removal of Def. Area (Pg 21)	DATE: 13/11/2017
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<b>Map:</b>	
Camac Fluvial Flood Extents	
Map Type: EXTENT	
Source: FLUVIAL	
Map Area: HPW	
Scenario: CURRENT	
Drawn By: C.McG.	Date: 13 November 2017
Checked By: A.S.	Date: 13 November 2017
Approved By: S.P.	Date: 13 November 2017
Drawing No.: E09CAM_EXFCD_F1_16	
Map Series: Page 16 of 24	
Drawing Scale: 1:5,000 @A3	

Node Label	Water Level (OD) 10% AEP	Flow (m <sup>3</sup> /s) 10% AEP	Water Level (OD) 1% AEP	Flow (m <sup>3</sup> /s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m <sup>3</sup> /s) 0.1% AEP
09Camm009941	65.24	N/A	65.39	N/A	65.6	N/A
09Camm00945	61.86	N/A	61.98	N/A	62.14	N/A
09Camm009041	58.94	N/A	57.47	N/A	58.22	N/A
09Camm01046	66.88	N/A	67.1	N/A	67.33	N/A

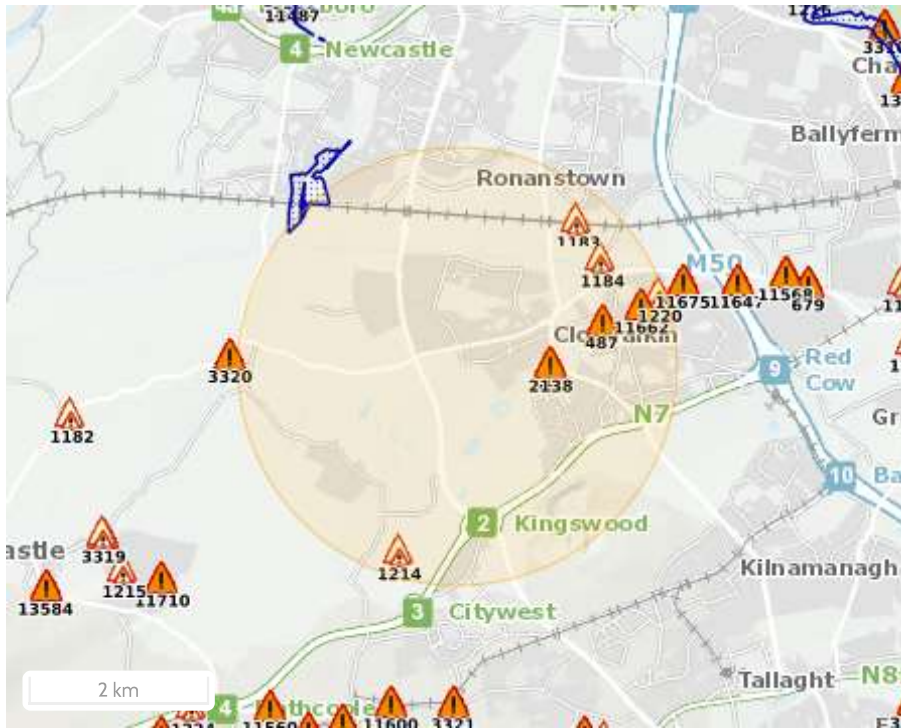




Report Produced: 13/11/2023 11:02

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](http://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](http://Floodinfo.ie)

## 10 Results

Name (Flood_ID)	Start Date	Event Location
1.  Camac Cherrywood Nov 1982 (ID-2138) Additional Information: <a href="#">Reports (1)</a> , <a href="#">Press Archive (0)</a>	05/11/1982	Exact Point
2.  Griffeen November 2000 (ID-1237) Additional Information: <a href="#">Reports (16)</a> , <a href="#">Press Archive (6)</a>	05/11/2000	Area
3.  Camac Clondalkin June 1993 (ID-487) Additional Information: <a href="#">Reports (1)</a> , <a href="#">Press Archive (0)</a>	10/06/1993	Exact Point
4.  Camac Cherrywood June 1993 (ID-488) Additional Information: <a href="#">Reports (1)</a> , <a href="#">Press Archive (0)</a>	10/06/1993	Exact Point
5.  Beech Row Ronanstown Recurring (ID-1183) Additional Information: <a href="#">Reports (3)</a> , <a href="#">Press Archive (0)</a>	n/a	Approximate Point
6.  Cappaghmore Ronanstown Recurring (ID-1184) Additional Information: <a href="#">Reports (2)</a> , <a href="#">Press Archive (0)</a>	n/a	Approximate Point

	Name (Flood_ID)	Start Date	Event Location
7.	 Baldonnell Barneys Lane Recurring (ID-1214)	n/a	Approximate Point
Additional Information: <a href="#">Reports (2)</a> <a href="#">Press Archive (0)</a>			
8.	 Camac Watery Lane Clondalkin Recurring (ID-1220)	n/a	Approximate Point
Additional Information: <a href="#">Reports (2)</a> <a href="#">Press Archive (1)</a>			
9.	 Camac Cherrywood Feb 1994 (ID-1271)	04/02/1994	Approximate Point
Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>			
10.	 Flooding at Junction of Watery Lane and Riversdale Road, Clondalkin, Dublin 22 on 24th Oct 2011 (ID-11662)	23/10/2011	Exact Point
Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>			





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