



WESTAR INVESTMENTS LTD

PROPOSED DEVELOPMENT AT CAPDOO & ABBEYLANDS,

DUBLIN ROAD, CLANE, CO. KILDARE

SITE SPECIFIC FLOOD RISK ASSESSMENT



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IE Consulting - Carlow Office

**Innovation Centre
Green Road
Carlow**

**Tel: 059 91 33084
Fax: 059 91 40499
Email: info@iece.ie
Web: www.iece.ie**

IE Consulting - Newry Office

**1 RDC House
WIN Business Park
Newry
Co Down
BT35 6PH**

**Tel: 028 3025 7974
Email: info@iece.ie
Web: www.iece.ie**

**Client :-
Westar Investments Ltd
Dublin Road,
Clane
Co Kildare**

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Prepared By:	L McMillan BEng(Hons) MIEI 
Checked By:	P McShane BEng(Hons) MIEI 

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Appendix A

Drawing No. IE1835-001-A

Drawing No. IE1835-002-A

Drawing No. IE1835-003-A

1 Introduction

IE Consulting was requested by Westar Investments Ltd to undertake a Site Specific Flood Risk Assessment (SSFRA) for an area of lands at Capdoo & Abbeylands, Dublin Road, Clane Co. Kildare. It is proposed to construct 305 no. new dwellings, a childcare facility, associated car parking, surface water attenuation, site entrances and all associated site and development works.

The purpose of this SSFRA is to assess the potential flood risk to the proposed development site and to assess the impact that development of the site may or may not have on the hydrological regime of the area.

Quoted ground levels or estimated flood levels relate to ordnance datum Malin unless stated otherwise.

This flood risk assessment study has been undertaken in consideration of the following guidance document:-

'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG 2009.

2 Proposed Site Description

2.1 General

The proposed development site is located approximately 660m east of Clane town centre, Co Kildare.

The site is bounded to the north and north-west by agricultural lands, to the east by the River Liffey, to the south-east by a drainage channel and to south by an existing residential development. The total area of the proposed development site is approximately 10.32 hectares.

The location of the proposed development site is illustrated on *Figure 1* below and shown on *Drawing Number IE1835-001-A in Appendix A*.

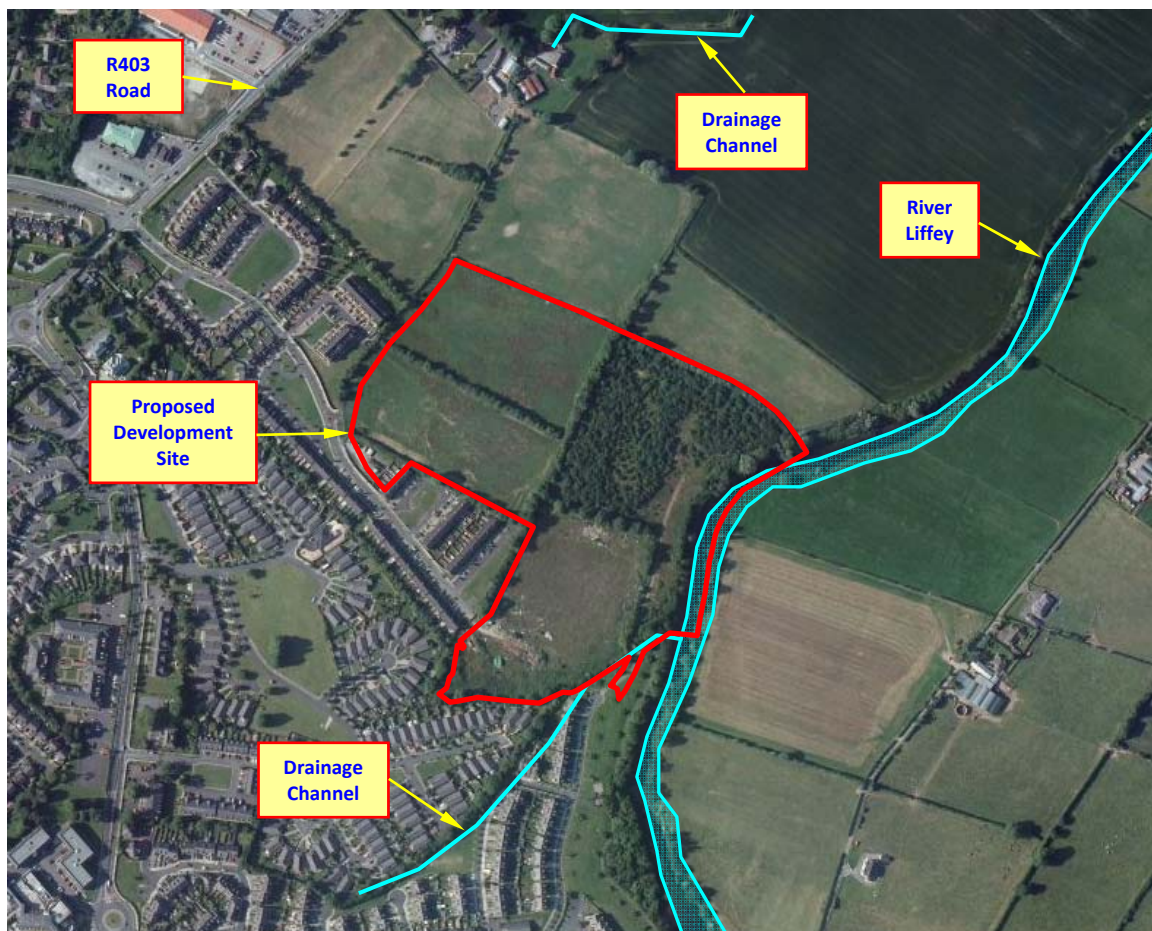


Figure 1 - Site Location

2.2 Existing Topography Levels at Site

The north-west part of the proposed site slopes moderately from a high point at the centre of the site towards the north, north-west and north-east site boundaries at an average gradient of approximately 1.23% (1 in 81). The southern half of the proposed site slopes moderately from a high point at the centre of the site towards the south, south-west and south-east site boundaries at an average gradient of approximately 0.81% (1 in 123). The north-east part of the proposed site slopes moderately from a high point at the centre of the site towards the north and east site boundaries at average gradients of approximately 0.77% (1 in 129) and 4.54% (1 in 22) respectively.

Existing ground elevations within the site boundary range from approximately 67.56 mOD (Malin) at the centre of the site to 63.408mOD (Malin) at the east boundary of the site.

2.3 Local Hydrology, Landuse & Existing Drainage

The most significant hydrological feature in the vicinity of the proposed development site is the River Liffey located adjacent to the eastern site boundary. The River Liffey is a controlled watercourse along the reach upstream and downstream of Clane. Discharge volumes in the River Liffey along this reach are controlled and monitored by the ESB and are dependent on inflows to Pollaphuca and Golden Falls dams. These dams have a significant beneficial effect in attenuating flood flows in the River Liffey.

At its closest position to the proposed development site the River Liffey generally flows in a south to north direction. Utilising the OPW Flood Studies Update (FSU) Portal software, the catchment area of the River Liffey was delineated. As illustrated in *Figure 2* below, the total catchment area of the River Liffey was found to be approximately **647.32 km²** to a point downstream of the site. Assessment of the River Liffey upstream catchment area indicates that the catchment is predominantly rural in nature with urban development accounting for approximately 3.03% of the total catchment area.

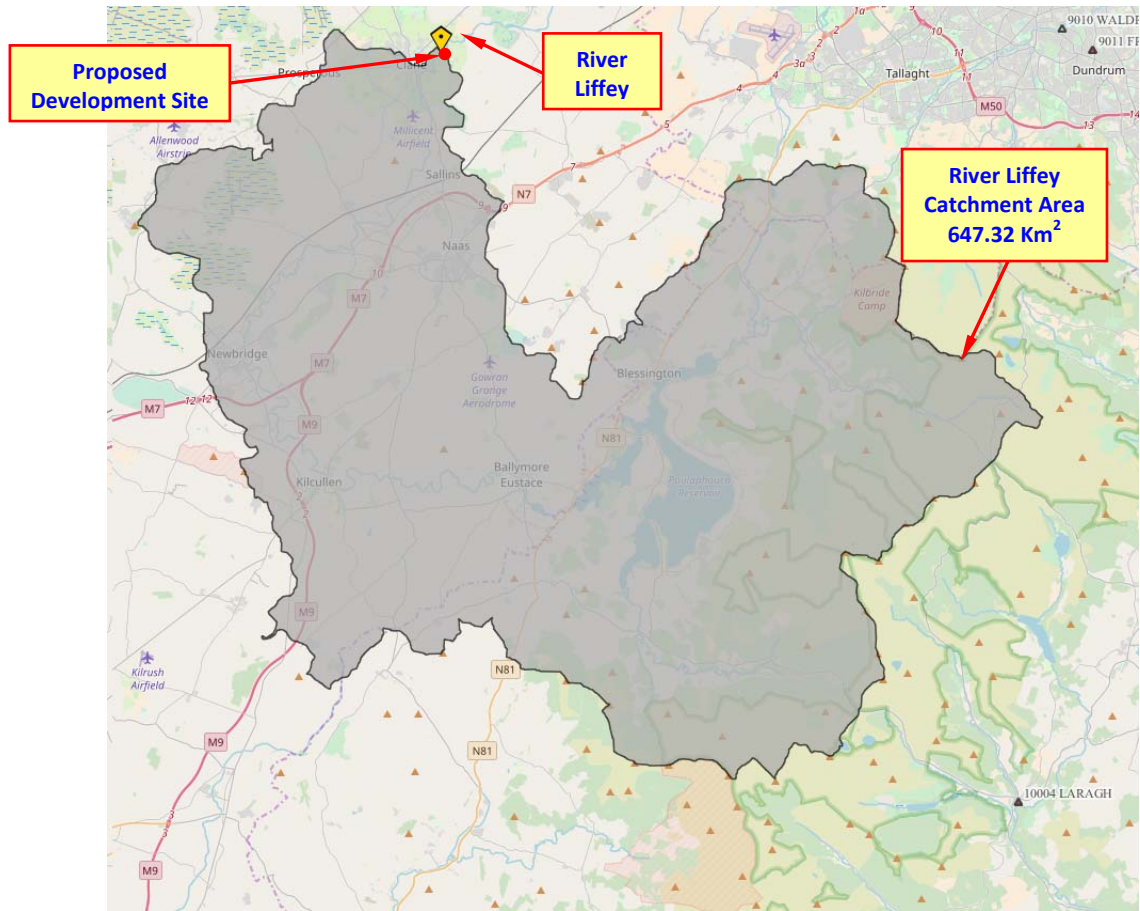


Figure 2 – River Liffey Upstream Catchment Area

3 Initial Flood Risk Assessment

The flood risk assessment for the proposed development site is undertaken in three principle stages, these being ‘Step 1 – Screening’, ‘Step 2 – Scoping’ and ‘Step 3 – Assessing’.

3.1 Possible Flooding Mechanisms

Table 1 below summarises the possible flooding mechanisms in consideration of the proposed development site:-

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not located in a coastal or tidally influenced region
Fluvial	Yes	The River Liffey is located adjacent to the eastern site boundary
Pluvial (urban drainage)	No	There is no significant urban drainage infrastructure in the vicinity of the site
Pluvial (overland flow)	No	There site is not surrounded by significantly elevated lands and does not provide an important discharge location to runoff from surrounding lands
Blockage	No	There are no significant hydraulic structures in the vicinity of the site
Groundwater	No	There are no significant springs or groundwater discharges recorded in the immediate vicinity of the site

Table 1

The primary potential flood risk to the proposed development site can be attributed to an extreme fluvial flood event in the River Liffey.

In accordance with ‘The Planning System and Flood Risk Management – Guidelines for Planning Authorities - DOEHLG 2009’ the potential flood risk to the proposed development site is analysed in the subsequent ‘Screening Assessment’ and “Scoping Assessment” section of this study report.

4 Screening Assessment

The purpose of the screening assessment is to establish the level of flooding risk that may or may not exist for a particular site and to collate and assess existing current or historical information and data which may indicate the level or extent of any flood risk.

If there is a potential flood risk issue then the flood risk assessment procedure should move to 'Step 2 – Scoping Assessment' or if no potential flood risk is identified from the screening stage then the overall flood risk assessment can end at 'Step 1'.

The following information and data was collated as part of the flood risk screening assessment for the proposed development site:-

4.1 OPW/EPA/Local Authority Hydrometric Data

Existing sources of OPW, EPA and local authority hydrometric data were investigated. As illustrated in *Figure 3* below, this assessment has determined that there are three hydrometric gauging stations located on the River Liffey in the general regional area of the proposed development site.

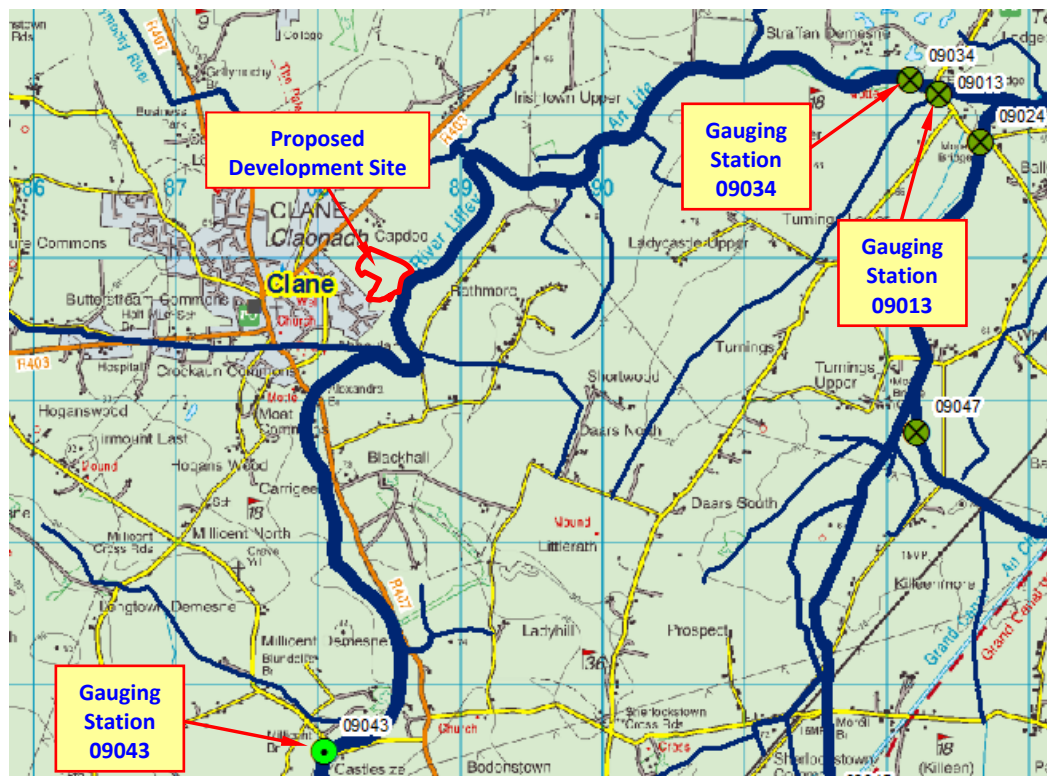


Figure 3 – Hydrometric Gauging Stations

Gauging Station 09043 (Millicent Bridge) is entered in the Register of Hydrometric Stations of Ireland as an inactive staff gauge station with flow measurements recorded for hydrometric years 2000 to 2003. Gauging Station 09034 (Straffan Upstream) is entered into the Register of Hydrometric Stations in Ireland as a data logger station. Gauging Station 09013 (Straffan Downstream) is entered in the Register of Hydrometric Stations of Ireland as an active recorder station.

4.2 OPW PFRA Indicative Flood Mapping

Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA flood map number 2019/MAP/236/A illustrates indicative flood zones within this area of County Kildare.

Figure 4 below illustrates an extract from the above predictive flood map in the vicinity of the proposed development site.

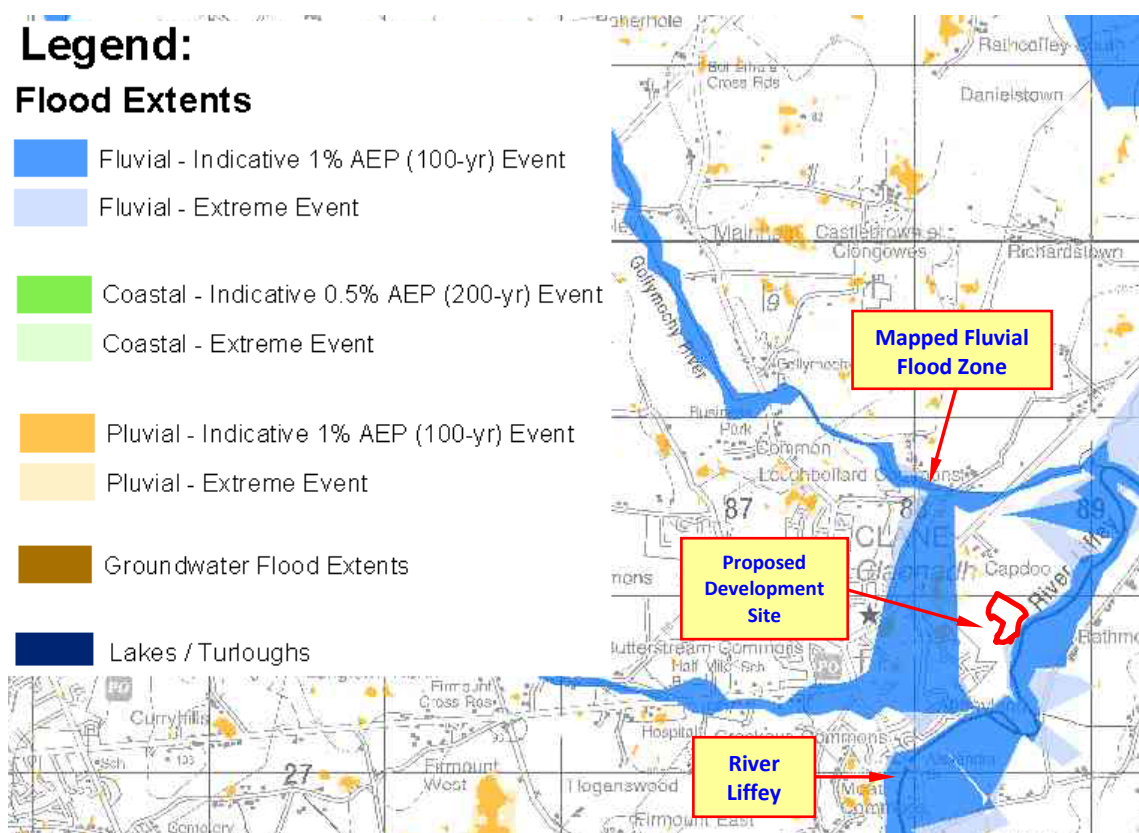


Figure 4 – PFRA Mapping

The PFRA flood mapping indicates mapped indicative fluvial flood zones adjacent to the east site boundary and within the south-east corner of the proposed development site.

No pluvial or groundwater flood zones are mapped within the boundary of the proposed development site.

Figure 5 below illustrates the PFRA predictive flood zones from Figure 4 overlaid onto higher resolution background mapping.

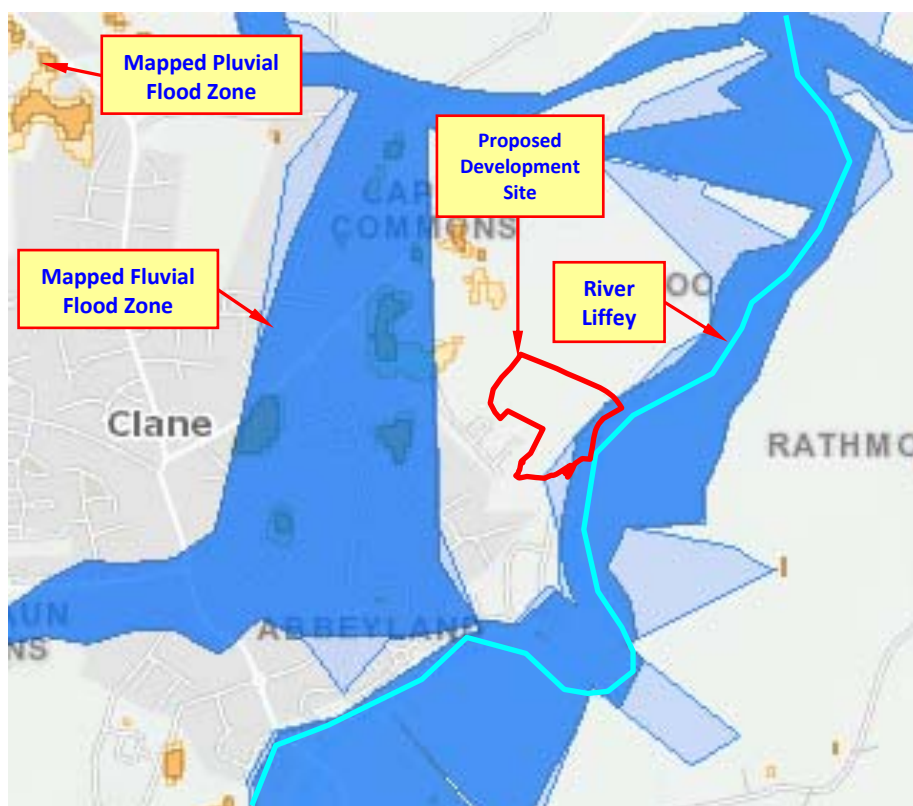


Figure 5 – PFRA Indicative Fluvial Flood Mapping

It should be noted that the predicted extent of flooding illustrated on these maps was developed using a low resolution digital terrain model (DTM) and illustrated flood extents are intended to be indicative only. The flood extents mapped on the PFRA maps are not intended to be used on a site specific basis.

4.3 OPW Flood Maps Website

The OPW Flood Maps Website (www.floodmaps.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. *Figure 6* below illustrates mapping from the Flood Maps website in the vicinity of the site.

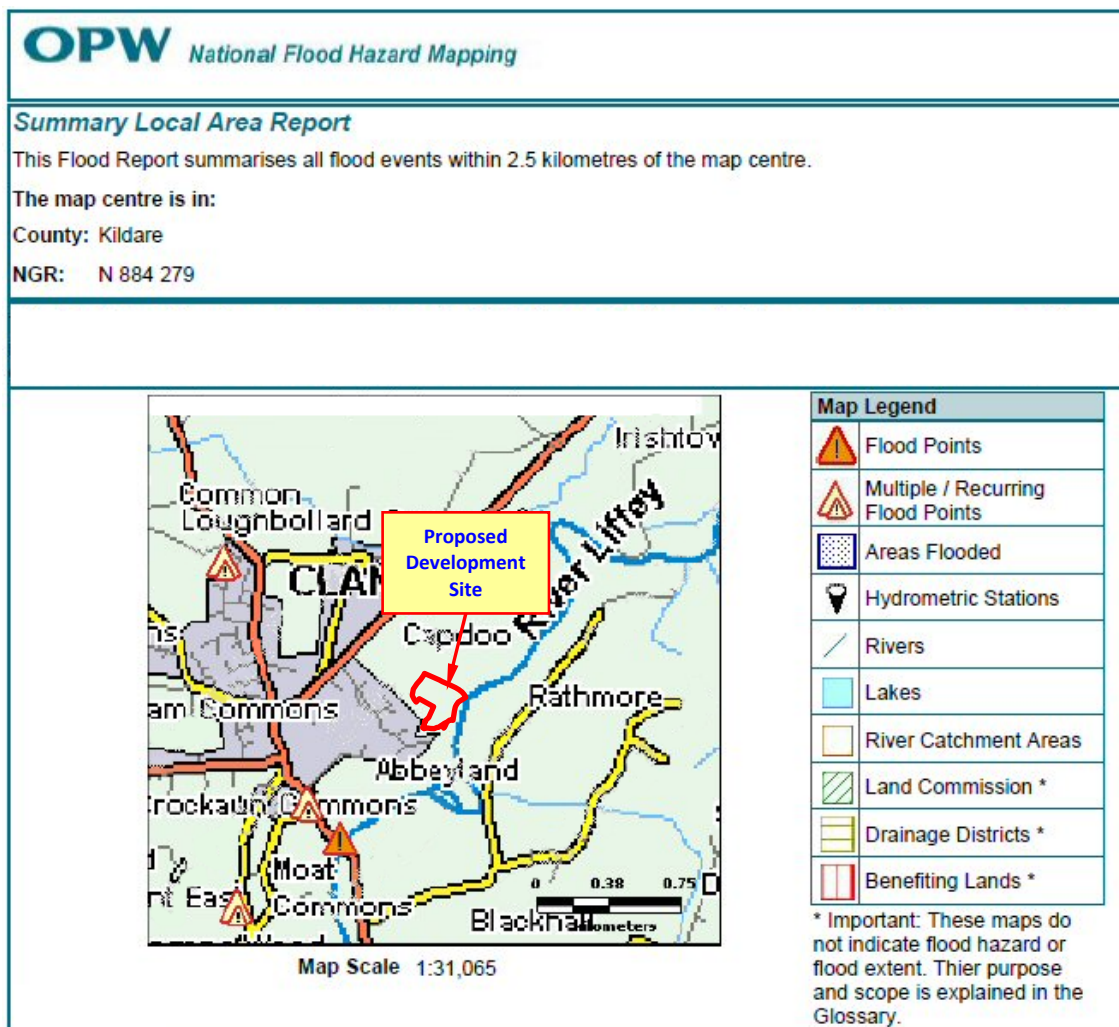


Figure 6 – OPW Flood Maps

Figure 6 above indicates no historic instances of flooding recorded within or adjacent to the proposed development site. A number of historical or anecdotal instances of flooding which have occurred in Clane are indicated however, most notably at Loughbollard, in the vicinity of Alexander Bridge, Millicent Road and Commons.

The OPW Flood Maps website also contains a number of ESB maps that illustrate recorded flood levels during the flood of 1954. This has been documented as a significant flood event in the middle catchment of the River Liffey. *Figure 6A* below illustrates an extract of recorded flood levels at Alexandra Bridge, Clane, which is approximately 1360m upstream of the proposed development site.

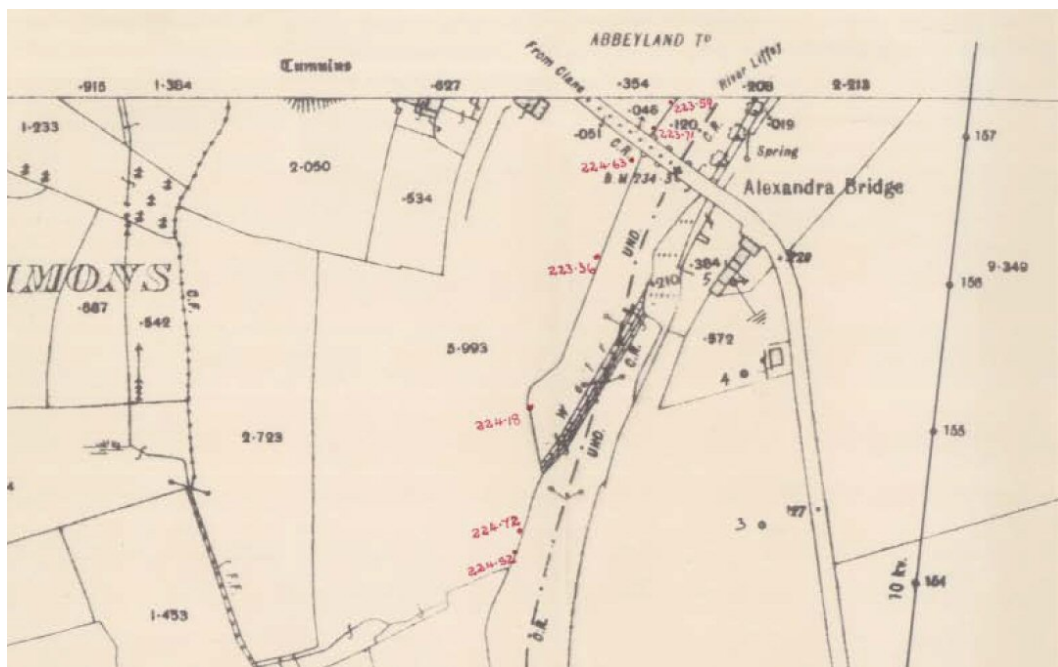


Figure 6A

The levels illustrated in *Figure 6A* above are in feet and reduced to Poolbeg datum. Converting to metres and reducing to Malin datum the recorded flood levels range from 65.49m (OD) to 65.38m (OD) in the vicinity of Alexandra Bridge. The flood event of 1954 has an estimated return period of 1 in 75 years.

4.4 Ordnance Survey Historic Mapping

Available historic mapping for the area was consulted, as this can provide evidence of historical flooding incidences or occurrences. The maps that were consulted were the historical 6-inch maps (pre-1900), and the historic 25-inch map series.

Figures 7 and 8 below show the historic mapping for the area of the proposed development site.

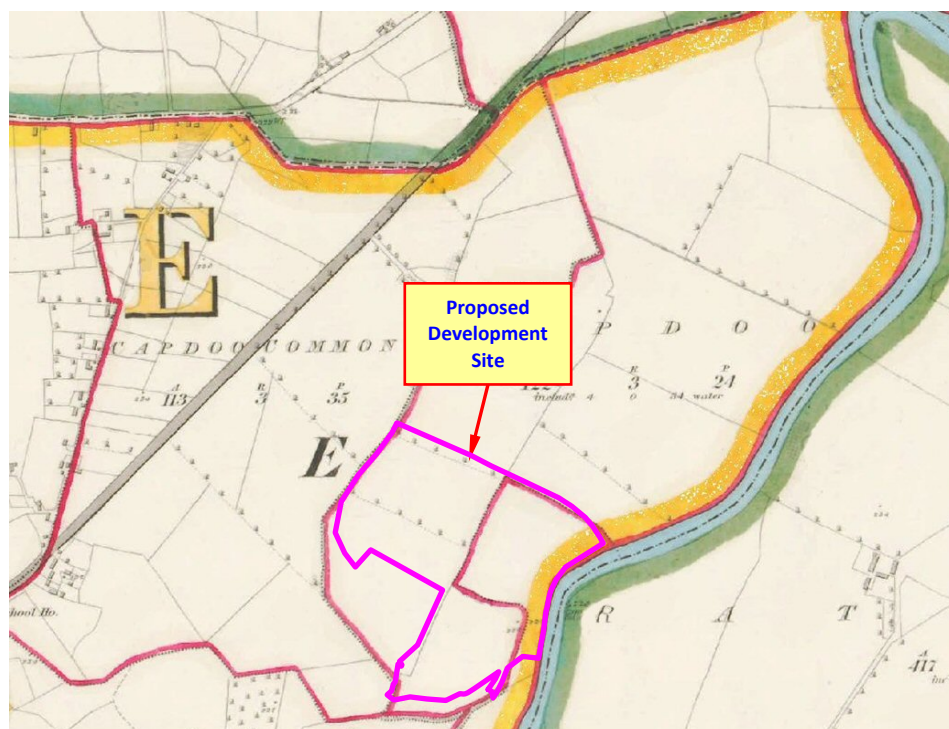


Figure 7 – Historic 6-Inch Mapping

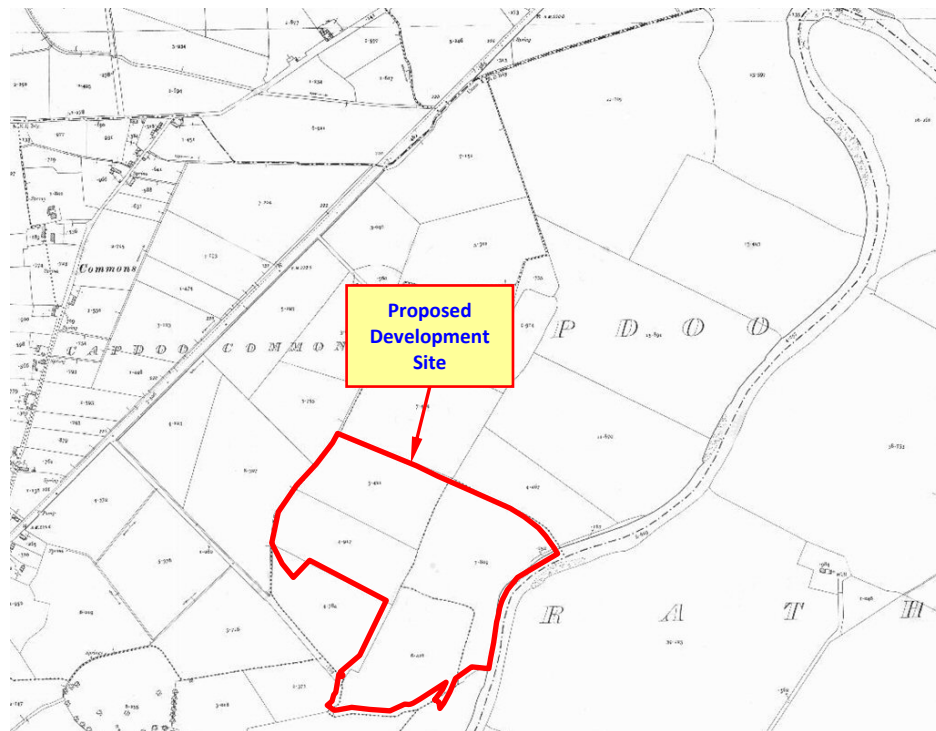


Figure 8 – Historic 25-Inch Mapping

The historic 6 inch and 25 inch mapping does not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the proposed development site.

4.5 Geological Survey of Ireland Mapping

The alluvial deposit maps of the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the proposed development site. Alluvium deposits can be indicative of areas that have flooded in the recent geological past.

Figure 9 below illustrates the sub-soils mapping for the general area of the proposed development site.

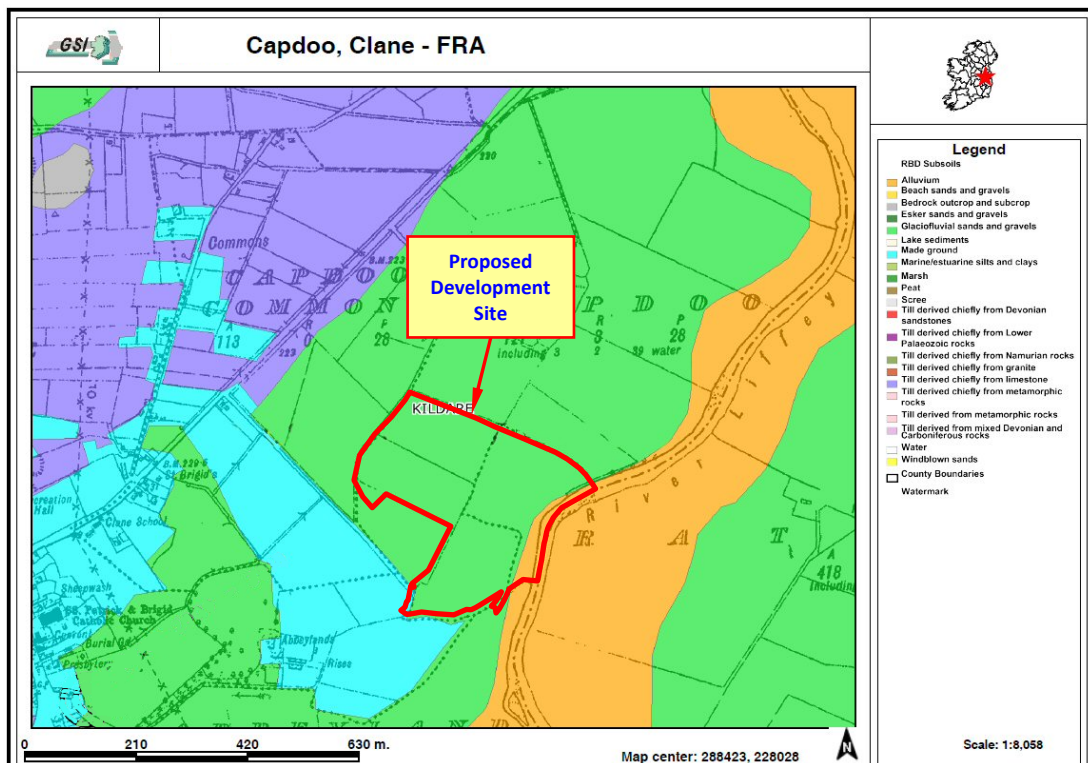


Figure 9 – GSI Subsoil Mapping

Figure 9 above indicates that the sub-soil conditions at the proposed development site consist mostly of Glaciofluvial sands and gravel. An area of Alluvium deposits is mapped within the eastern boundary of the site and adjacent to the River Liffey.

4.6 Eastern CFRAM Study

The Eastern Region Catchment Flood Risk & Management Study (CFRAMS) has been undertaken by the OPW and the Final version of the flood maps were issued in June 2016. Flood risk extent and depth maps for further assessment areas within Co Kildare have also been produced. OPW CFRAMS predictive flood map number E09LA_EXFCD_F1_10 illustrates predictive extreme fluvial flood extent zones associated with the River Liffey in the vicinity of the proposed development site.

Figure 10 below (extracted from CFRAMS flood map E09CAM_EXFCD_F1_24), illustrates the predicted extreme 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) or 0.1% AEP (1 in 1000 year) fluvial flood extents in the vicinity of the proposed development site.

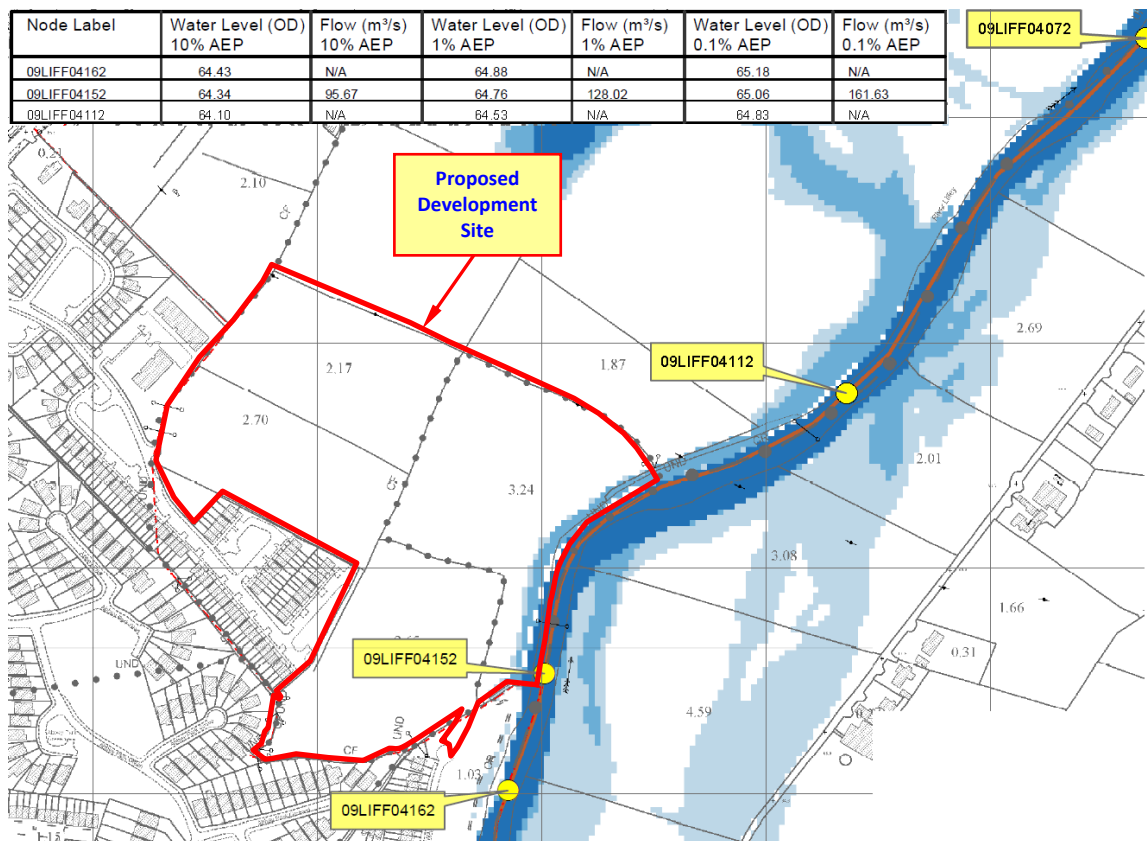


Figure 10 – Eastern CFRAMS Fluvial Flood Maps

Figure 10 above indicates that an area of the proposed development site falls within a 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood event in the River Liffey.

The CFRAMS flood map also provides information on predicted water levels & flows for 10% AEP, 1% AEP and 0.1% AEP fluvial flood events at various node points along the River Liffey.

The node points closest to the proposed development site are referenced as node point *09LIFF04162* located at the upstream boundary of the proposed site, node point *09LIFF04152* located adjacent to the proposed site and *node point 09LIFF04112* located at the downstream boundary of the proposed site. Details of the predicted extreme fluvial flood levels & flood volumes for the CFRAMS node points in the general vicinity of the proposed development site are listed in *Table 2* below, which has been extracted from CFRAMS flood map reference *E09CAM_EXFCD_F1_24*.

Node Label	Water Level (mOD) 10% AEP	Flow (m3/s) 10% AEP	Water Level (mOD) 1% AEP	Flow (m3/s) 1% AEP	Water Level (mOD) 0.1% AEP	Flow (m3/s) 0.1% AEP
09LIFF04162	64.43	-	64.88	-	65.18	-
09LIFF04152	64.34	95.67	64.76	128.02	65.06	161.63
09LIFF04112	64.10	-	64.53	-	64.83	-

Table 2 –CFRAMS Fluvial Map - Predicted Flood Volumes & Levels

Predictive fluvial flood depth maps have also been produced as part of the Eastern CFRAM Study for this area of Clane. *Figure 11* and *Figure 12* below, duplicated from the Eastern CFRAM Study, illustrate the predictive flood depths for the area of the proposed development for the 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events respectively.

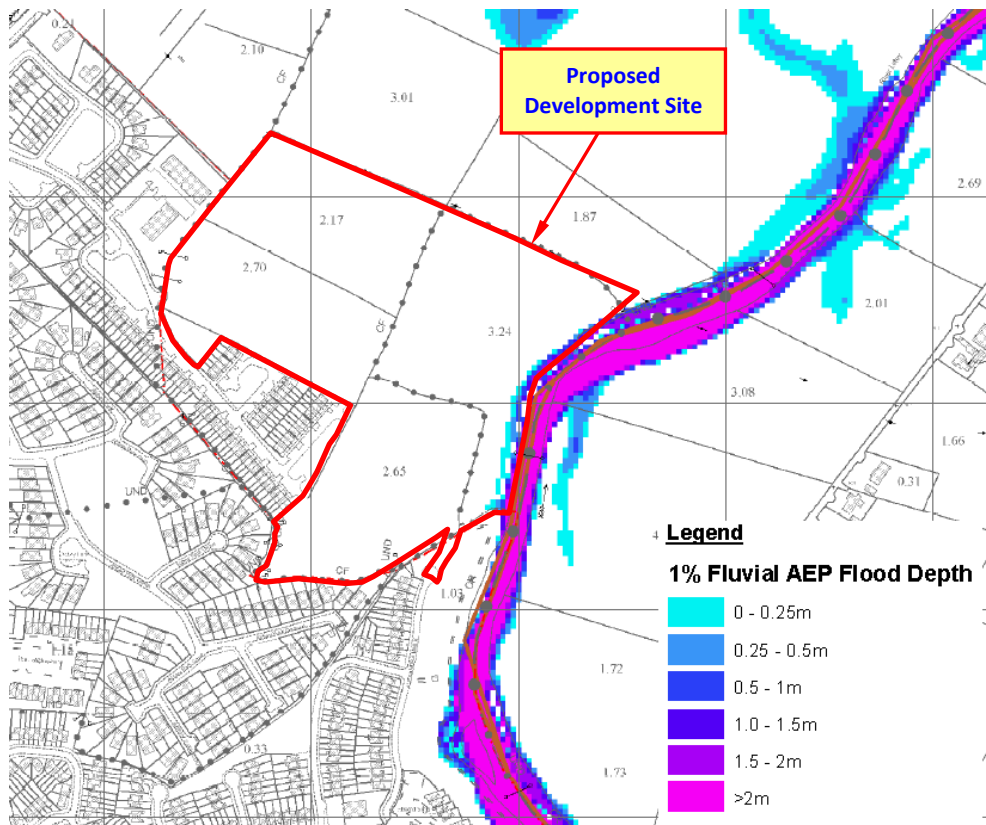


Figure 11 – Eastern CFRAMS 1% AEP Fluvial Flood Depth Map

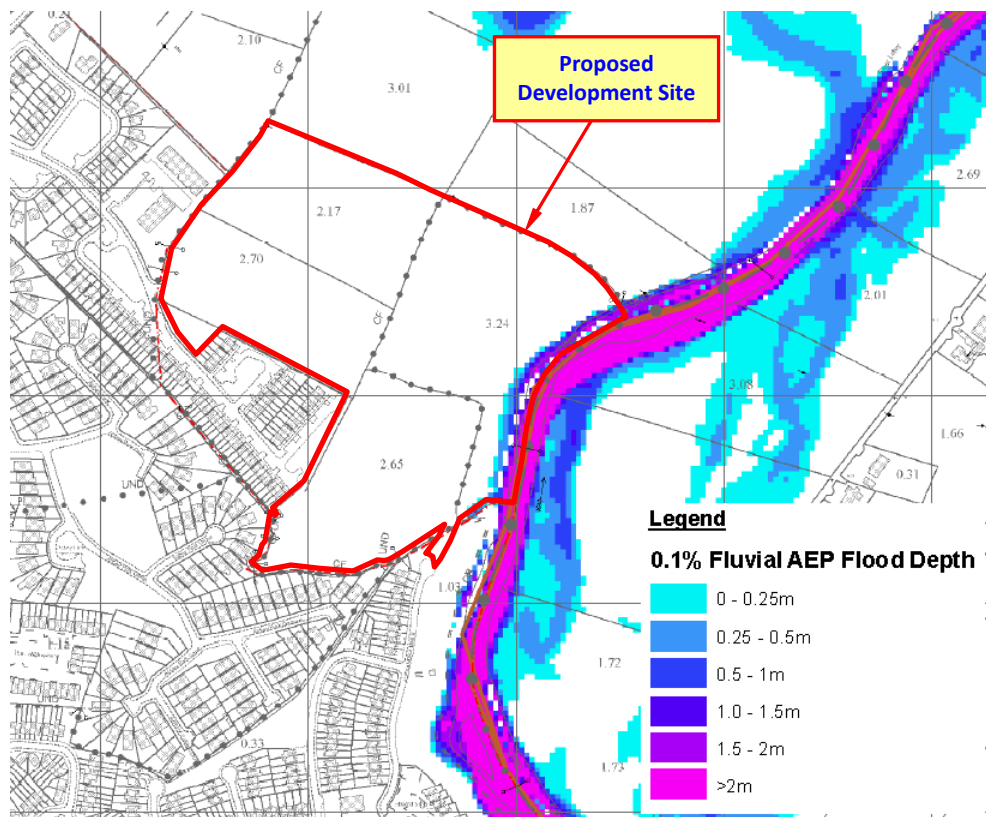


Figure 12 – Eastern CFRAMS 0.1% AEP Fluvial Flood Depth Map

Figure 11 and Figure 12 above indicate predicted 1% AEP and 0.1% AEP fluvial flood depths of 0.25m-1.0m along the eastern boundary of the proposed development site.

The Eastern CFRAM flood maps are predictive flood maps, in that they provide predicted flood extent and depth information for a ‘design’ flood event that has an estimated probability of occurrence (e.g., the 1% AEP event), rather than information for floods that have occurred in the past.

4.7 Kildare County Development Plan

Reference to Map 9.1 (Drawing Number 200/16/1000) of the Kildare County Development Plan 2017-2023 indicates that a mapped fluvial ‘Flood Zone B’ is located close to the east site boundary. An extract from the above map is illustrated in Figure 13 below:-

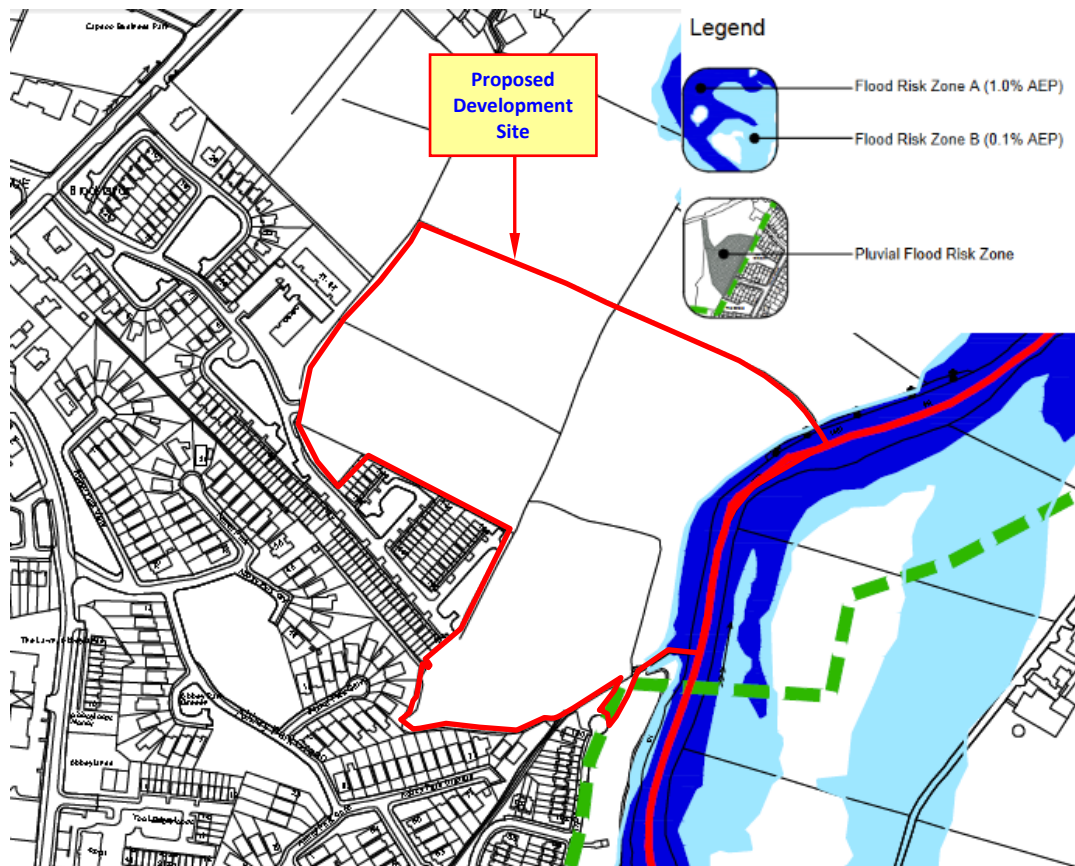


Figure 13 – Kildare County Development Plan Map

Figure 13 above indicates that the proposed development site would not be significantly impacted by a 1% AEP (1 in 100 year) or 0.1% AEP (1 in 1000 year) fluvial flood event.

5 Scoping Assessment

The purpose of the scoping stage is to identify possible flood risks and to implement the necessary level of detail and assessment to assess these possible risks, and to ensure these can be adequately addressed in the flood risk assessment. The scoping exercise should also identify that sufficient quantitative information is already available to complete a flood risk assessment appropriate to the scale and nature of the development proposed.

The above screening assessment indicates that an area of proposed development site may be at risk from fluvial flooding but that the area of the site is not at significant risk from pluvial or groundwater flooding.

In consideration of the information collated as part of the screening exercise, and the availability of other information and data specific to the area of the proposed development site, it is considered that sufficient quantitative information to complete an appropriate flood risk assessment for the proposed development site cannot be derived from the information collated as part of the screening exercise alone.

While the current flood extent maps for the area produced as part of the Eastern CFRAM study are based on the results of detailed hydraulic modelling undertaken along the River Liffey and do provide a reasonably accurate delineation of flood zones and prediction of flood depths in the general vicinity of the proposed development site, this mapping is based on a localised digital terrain model (DTM) of the general Clane area and can be subject to local DTM errors or variations. It is therefore necessary to undertake a more accurate site specific delineation of the predictive 1% AEP and 0.1% AEP fluvial flood extents at the location of the proposed development site.

The potential or possible flood risk to the proposed development site is assessed in the subsequent 'Assessing Flood Risk' stage of this study report.

6 Assessment of Flood Risk

Flood risk from a particular watercourse is normally assessed for a 1 in 100 year (1% AEP) and 1 in 1000 year (0.1% AEP) flood event, in accordance with Kildare County Council development plans and with the DOEHLG guidelines '*The Planning System and Flood Risk Management Guidelines*'.

The following sections present an analysis and assessment of the estimated 1 in 100 year (1% AEP) and 1 in 1000 year (0.1% AEP) extreme flood events in the River Liffey adjacent to the proposed development site.

6.1 Estimation of Extreme Flood Levels in the River Liffey

Extreme flood levels at the location of the proposed development site have been derived as part of the Eastern CFRAM Study. The most relevant node points in respect of the proposed development site are Node Point 09LIFF04162, 09LIFF04152 and 09LIFF04112 that are located just upstream, adjacent to the east site boundary and 185m downstream of the site respectively. Predicted 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood levels at these node points are applicable for the purpose of assessing fluvial flood risk to the proposed development site.

Table 2 above lists the predicted extreme flood levels for these node points.

6.2 Climate Change

In general, it is a requirement of Kildare County Council that the required Design Flow to be used for flood extent delineation is the 1 in 100 year flood flow event plus 20% in order to allow for climate change'.

'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG 2009 Technical Appendix A, Section 1.6 recommends that, where mathematical models are not available climate change flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change. Therefore, the predicted 0.1% AEP flood levels listed in Table 2 above are considered to be representative of the 1% AEP plus climate change food levels.

6.3 Topographical Survey & Contour Mapping

In order to assist in the assessment of any potential flood inundation in the general location of the proposed development site, topographical survey information was used to develop a Digital Terrain Model (DTM) of the existing site area. Development of a DTM allows the predicted extreme flood levels listed in *Table 2* above to be analysed in more detail at the specific location of the proposed development site.

The DTM and contour mapping was developed utilising digital survey information of the proposed development site and the Autodesk Civil 3D 2015 software package. The DTM and contour mapping developed for the proposed development site is illustrated in *Figure 14* and *Figure 15* below.



Figure 14 – Contour Mapping

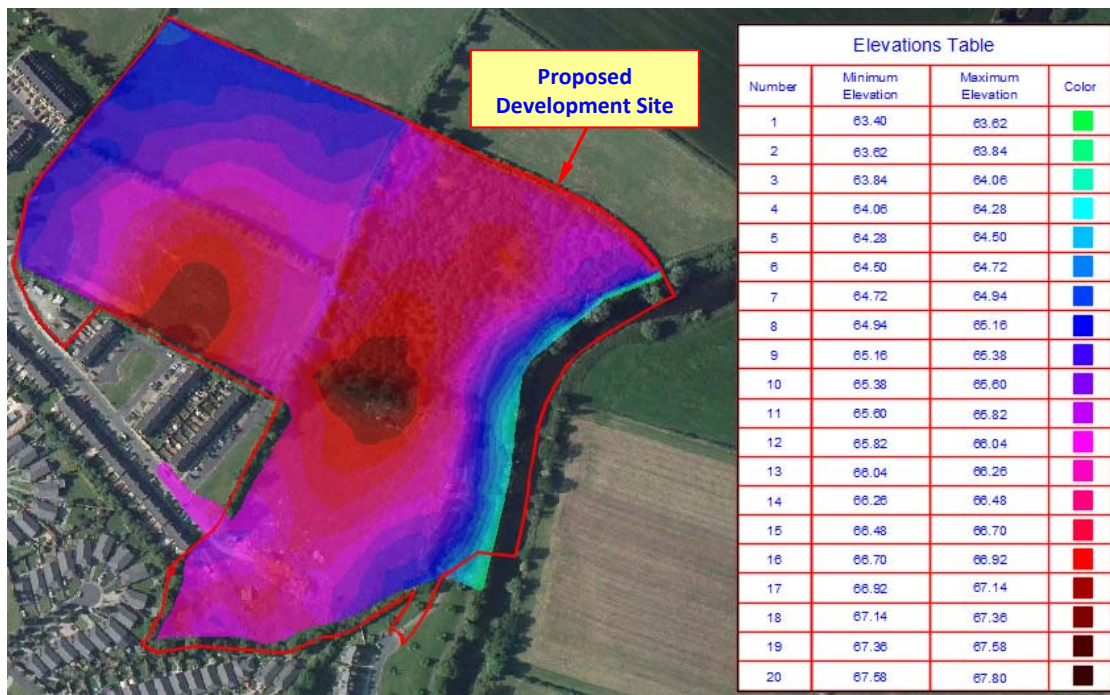


Figure 15 – Topographical Survey Derived DTM

6.4 Flood Zone Mapping & Delineation

Utilising the DTM illustrated in *Figure 14* and *Figure 15* above, and the 1 in 100 year (1% AEP) and 1 in 1000 year (0.1% AEP) extreme flood levels for the River Liffey for the reach adjacent to the proposed development site, the Site Specific 1% AEP and 0.1% AEP flood zones were delineated using the hydrology module of the Autodesk Civil 3D 2015 software package. The software enables a user defined flood level to be mapped and modelled onto a DTM over the full extent of the area being assessed.

Drawing Number IE1835-002-A, Appendix A illustrates the delineated 1 in 100 year flood extent (Flood Zone ‘A’) and 1 in 1000 year flood extent (Flood Zone ‘B’) over the full area of the proposed development site.

Drawing Number IE1835-003-A, Appendix A illustrates representative cross-sectional elevations through the site, illustrating existing and proposed ground levels and finished floor levels relative to predictive 1% AEP and 0.1% AEP flood levels in the River Liffey.

The above analysis and flood zone delineation undertaken as part of this Site Specific Flood Risk Assessment (SSFRA) indicates that no works are proposed within a delineated flood zone. The area of the proposed development site works is therefore not susceptible to flood inundation during an extreme fluvial event in the River Liffey.

However, in order to ensure sustainable development of this particular site the following is recommended:-

- *Proposed finished ground levels (road levels, etc) should be constructed to a minimum level of 0.15m above the maximum predicted 0.1% AEP flood level – i.e. $65.18m + 0.15m = \mathbf{65.33m OD}$.*
- *Proposed finished floor levels should be constructed to a minimum level of 0.30m above the maximum predicted 0.1% AEP flood level – i.e. $65.18m + 0.30m = \mathbf{65.48m OD}$.*
- *The proposed development site should incorporate an appropriately designed stormwater management system that should limited stormwater runoff from the site to existing pre-development runoff rates.*

In consideration of the assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment, and the recommendations above, development of the site as proposed would not result in an adverse impact to the existing hydrological regime of the area and would not result in an increased flood risk elsewhere.

7 Proposed Development in the Context of the Guidelines

In the context of the *'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009'* three flood zones are designated in consideration of flood risk to a particular development site.

Flood Zone 'A' – where the probability of flooding from rivers and watercourses is the highest (greater than 1% or 1 in 100 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

Flood Zone 'B' – where the probability of flooding from rivers and watercourses is moderate (between 0.1% or 1 in 1000 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

Flood Zone 'C' – where the probability of flooding from rivers and watercourses is low or negligible (less than 0.1% of 1 in 1000 year for both river and watercourse and coastal flooding). *Flood Zone 'C'* covers all areas that are not in *Zones 'A' or 'B'*.

The *'Planning System and Flood Risk Management Guidelines'* list the planning implications for each flood zone, as summarised below:-

Zone A – High Probability of Flooding. Most types of development would not be considered in this zone. Development in this zone should be only be considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the *'Planning System and Flood Risk Management Guidelines'* justification test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space and outdoor sports and reaction would be considered appropriate in this zone.

Zone B – Moderate Probability of Flooding. Highly vulnerable development such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses, strategic transport and essential utilities infrastructure would generally be considered inappropriate in this zone, unless the requirements of the justification test can be met. Less vulnerable development such as retail, commercial and industrial uses and recreational facilities might be considered appropriate in this zone.

In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in *Zone 'C'* and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to the development can be adequately managed and that development in this zone will not adversely affect adjacent lands and properties.

Zone C – Low to Negligible Probability of Flooding. Development in this zone is appropriate from a flood risk perspective. Developments in this zone are generally not considered at risk of fluvial flooding and would not adversely affect adjacent lands and properties from a flood risk perspective.

In the context of the *'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009'* this flood risk assessment has determined that the area of the proposed development site works is not at significant risk of fluvial, coastal or direct pluvial flooding and therefore falls within Flood Zone 'C'.

Development of the site as proposed is therefore not subject to the requirements of The Justification Test.

8 Summary Conclusions

In consideration of the findings of this site specific flood risk assessment and analysis the following conclusions and recommendations are made in respect of the proposed development site:-

- *A Site Specific Flood Risk (SSFRA) assessment, appropriate to the type and scale of development proposed, and in accordance with 'The Planning System and Flood Risk Management Guidelines – DoEHLG-2009' has been undertaken.*
- *The area of the proposed development site has been screened, scoped and assessed for flood risk in accordance with the above guidelines.*
- *The primary flood risk to the proposed development site can be attributed to potential fluvial flooding from the River Liffey.*
- *The proposed development site is not at risk from pluvial or groundwater flooding.*
- *Utilising the Eastern CFRAM study estimated extreme flood water levels and a detailed DTM, constructed using topographical survey data of the existing site, the 1 in 100 year and 1 in 100 year plus climate change flood extents were delineated.*
- *This analysis has determined that the area of the proposed site falls within Flood Zone 'C'. This is in agreement with the predictive 1% AEP and 0.1% AEP fluvial flood extents illustrated on the OPW CFRAMS flood maps.*
- *Development proposals for the site are therefore not subject to the requirements of the Justification Test.*
- *In summary, and in consideration of the findings and recommendations of this Site Specific Flood Risk Assessment, development of the site as proposed would not result in an adverse impact to the existing hydrological regime of the area and would not result in an increased flood risk elsewhere.*
- *The development as proposed is therefore considered to be appropriate from a flood risk perspective.*

9 Summary Recommendations

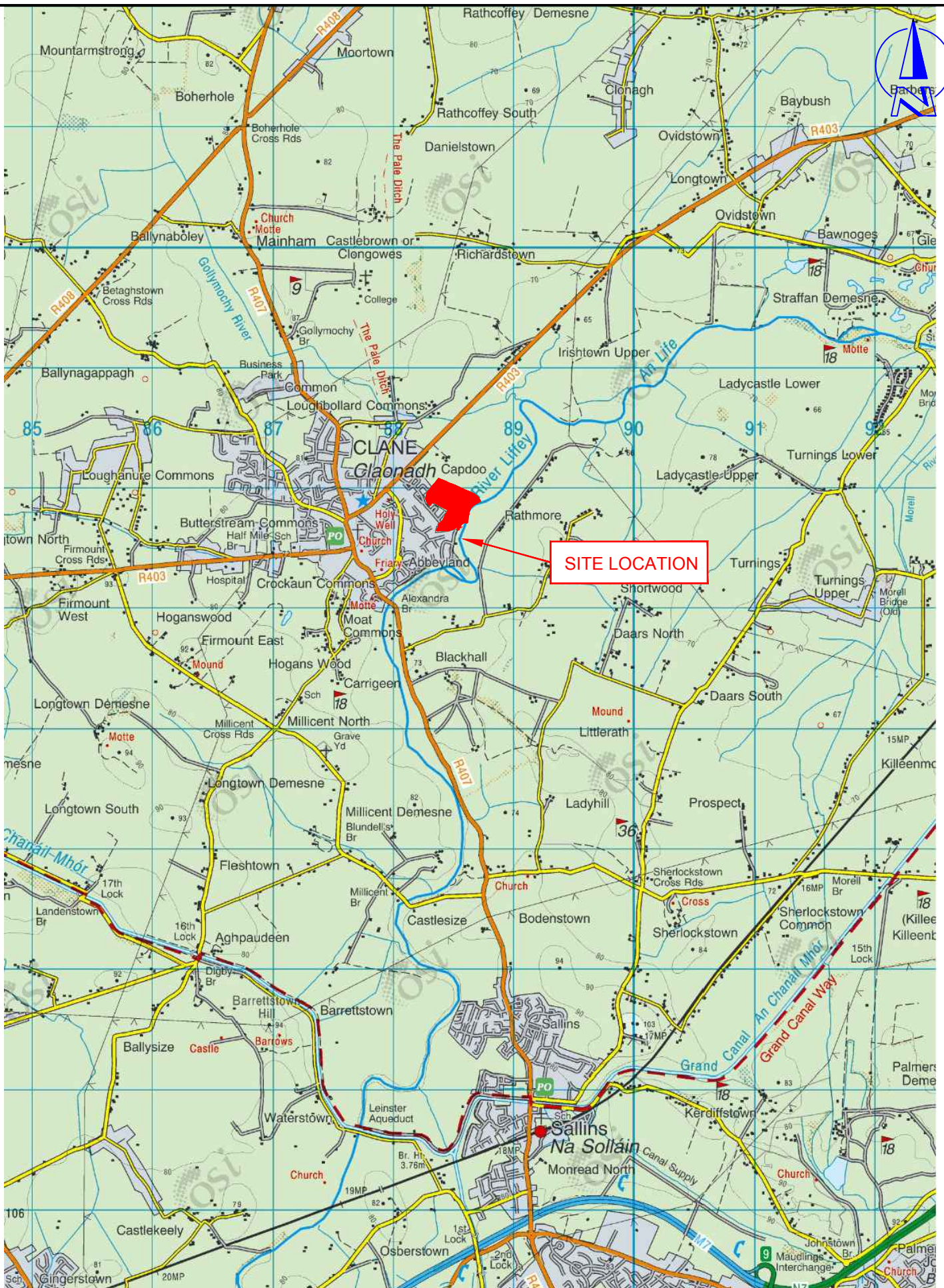
- *It is recommended that proposed finished ground levels (road levels, etc) should be constructed to a minimum level of 0.15m above the maximum predicted 0.1% AEP flood level upstream of the site – i.e. $65.18m + 0.15m = \underline{65.33m OD}$.*
- *It is recommended that proposed finished floor levels should be constructed to a minimum level of 0.30m above the maximum predicted 0.1% AEP flood level upstream of the site – i.e. $65.18m + 0.30m = \underline{65.48m OD}$.*

APPENDIX A

Drawing Number IE1835-001-A

Drawing Number IE1835-002-A

Drawing Number IE1835-003-A







IE Consulting
 Innovation Centre,
 Green Rd.,
 Carlow.
 Ph: 059-9133084
 Fax: 059-9140499
 E-mail: info@iece.ie



Project Title:		FLOOD RISK ASSESSMENT			
Project Address:		Capdoo & Abbeylands, Dublin Road, Clane Co. Kildare			
Client:		WEST STAR GROUP LTD.			
Drg. Title:		SITE LOCATION MAP			
Dwg. Scale:	Date:	Dwg.No:	Job No:	Revision:	Dwg.By:
NTS	14-03-19	IE1835-001	IE1835	A	LMC

LEGEND

-  SITE BOUNDARY
-  100 YEAR FLOOD EXTENT (1% AEP)
FLOOD ZONE 'A'
-  1000 YEARS FLOOD EXTENT (0.1% AEP)
FLOOD ZONE 'B'
-  FLOOD ZONE 'C'




rev.	date	description	by	chkd	date
A	15.03.19	PLANNING amendment	Ute	PMS	

PROPOSED DEVELOPMENT AT
 CAPDOO & ABBEYLANDS, DUBLIN ROAD,
 CLANE, CO. KILDARE.

SITE SPECIFIC FLOOD
 RISK ASSESSMENT

1 IN 100 YEAR (1% AEP) &
 1 IN 1000 YEAR (0.1% AEP)
 FLUVIAL FLOOD EXTENTS



ie CONSULTING
 WATER-ENVIRONMENTAL-CIVIL

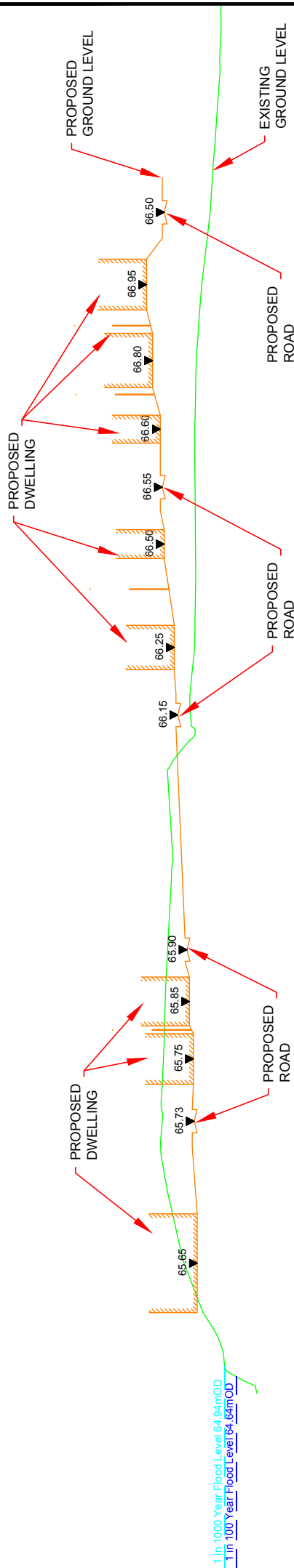
INNOVATION CENTRE TELEPHONE: 059 91 33084
 GREEN ROAD FAX: 059 91 40499
 CARLOW EMAIL: info@ie.ie

REVISED DATES		SCALE	DATE
drawing status:	PLANNING		
drawing no.:	IE1835-002	rev:	A
checked:	Ute	approved:	PMS
date:	15.03.2019		

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LEGEND

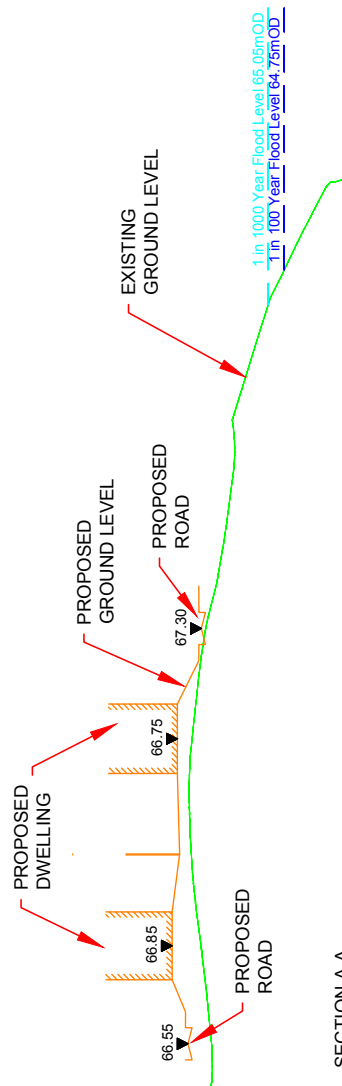
SITE BOUNDARY



1 in 1000 Year Flood Level 64.94mOD
 1 in 100 Year Flood Level 64.64mOD

SECTION B-B

SCALE: H 1/1000 ; V 1/100



SECTION A-A

SCALE: H 1/1000 ; V 1/100

rev.	date	description	Utd	PMS
A	21.03.19	PLANNING amendment	Utd	PMS

PROPOSED DEVELOPMENT AT

CAPDOO&ABBIEYLANDS, DUBLIN ROAD,
 CLANE,
 CO. KILDARE.

SITE SPECIFIC FLOOD
 RISK ASSESSMENT

PROPOSED & EXISTING
 CROSS SECTIONS



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 INNOVATION CENTRE TELEPHONE: 059 91 33084
 GREEN ROAD FAX: 059 91 40499
 CARLOW EMAIL: info@ie.ie

REV	DATE	DESCRIPTION	SCALE	AS SHOWN	DATE
PLANNING					

drawing no.	IE1835-003	rev	A
checked	KON	approved	PMS
date	21.03.19	scale	21.03.19

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