Luxcare Limited

Site Specific Flood Risk Assessment

Taylor's Lane, Rathfarnham, Dublin 16, Co Dublin

July 2021

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WATER-ENVIRONMENTAL-CIVIL

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Site Specific Flood Risk Assessment

Client: Luxcare Limited

Location: Taylor's Lane, Rathfarnham, Dublin 16, Co. Dublin

Date: 30th July 2021

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1. Introduction

IE Consulting was requested by Luxcare Limited to undertake a Site Specific Flood Risk Assessment (SSFRA) in support of a planning application for a proposed development at Taylor's Lane, Rathfarnham, Dublin 16, Co. Dublin. The development as proposed comprises the construction of a 3 storey care home and all associated site works.

The purpose of this SSFRA is to assess the potential flood risk to the proposed development site and to assess the impact that the development as proposed 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 at Taylor's Lane, Rathfarnham, Dublin 16. The site is bounded to the north by Taylor's Lane, to the west and south by existing residential properties and to the north-east and east commercial premises. The total area of the proposed development site is approximately 0.65 hectares.

The location of the proposed development site is illustrated on *Figure* 1 below and shown on *Drawing Number IE2337-001-A* in *Appendix A.*

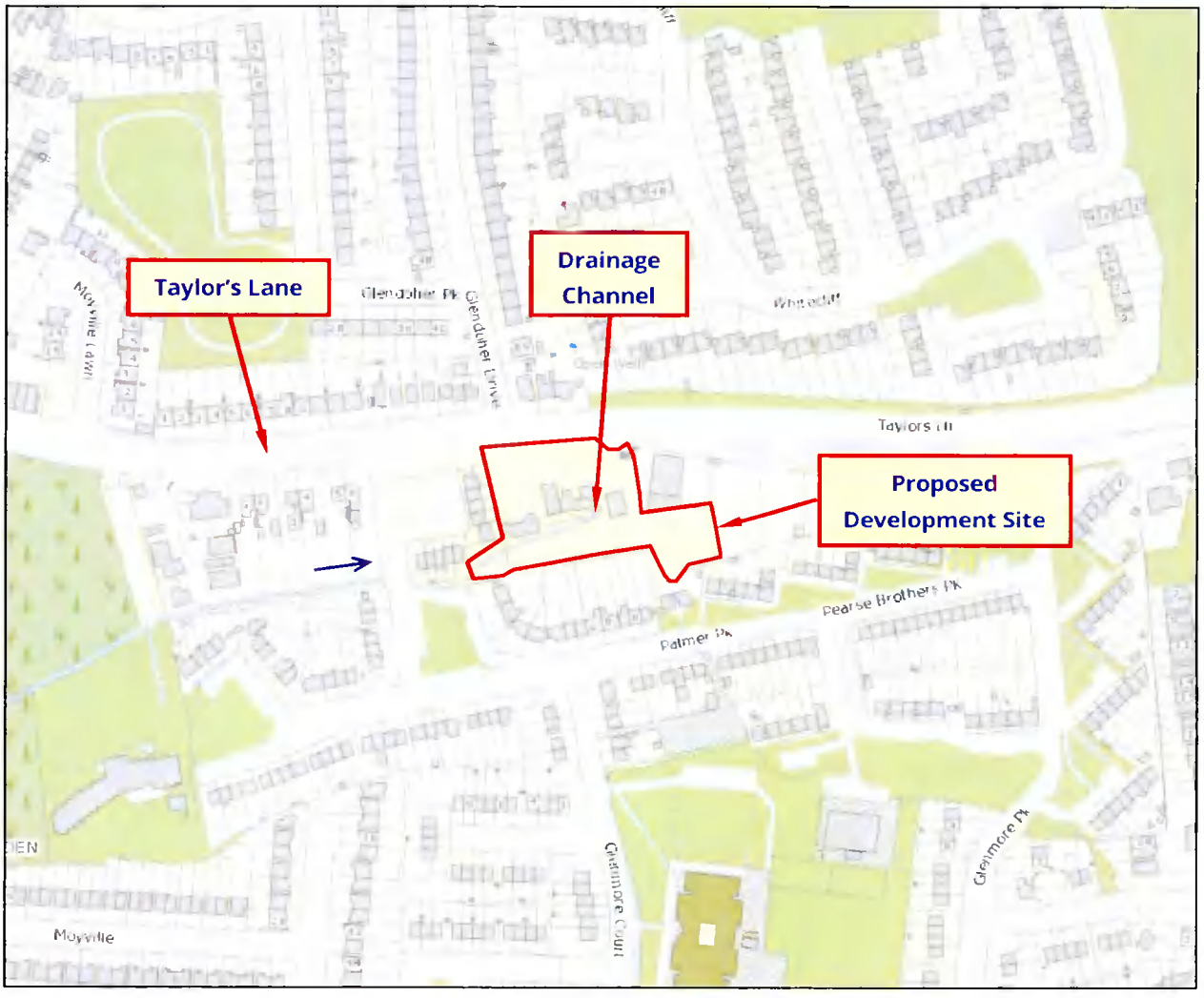


Figure 1 – Site Location

2.2. Existing Topography Levels at Site

The proposed development site slopes moderately in a south to north direction at an average gradient of approximately 5.57% (1 in 17.94).

Existing ground elevations range from approximately 79.947m OD (Malin) at the southern boundary of the site to 76.304m OD (Malin) at the northern boundary of the site.

2.3. Local Hydrology, Landuse & Existing Drainage

The most immediate and significant hydrological features at and in the vicinity of the proposed development site are the Owenadoher River that flows in a south to north direction approximately 451m beyond the western boundary of the site, the Kilmashogue Stream that flows in a north to south direction approximately 332m beyond the eastern boundary of the site and a drainage channel that flows in a west to east direction within the boundary of the site.

Utilising the OPW Flood Studies Update (FSU) Portal software, the catchment area of the Owenadoher River was delineated and found to be approximately 12.679km^2 to a point downstream of the proposed development site. An assessment of the Owenadoher River upstream catchment area indicates a predominately rural catchment with a significant urban fraction of 10.42% in the upstream catchment area. The catchment area of the Kilmashogue Stream was delineated and found to be approximately 7.086km^2 to a point downstream of the proposed development site. An assessment of the Kilmashogue Stream upstream catchment area indicates a predominately rural catchment with a significant urban fraction of 6.97% in the upstream catchment area.

The drainage channel within the boundary of the site appears to be part of a former mill race channel that was originally supplied with water via a weir on the Owenadoher River located approximately 625m south-west of the proposed development site. An inspection of the former mill race channel undertaken by a hydrological engineer from IE Consulting indicates that this channel is no longer supplied with water via the Owenadoher River and there is currently no mechanism where waters in the Owenadoher River can discharge to this channel. The drainage channel is not a natural fluvial watercourse channel and appears to have a limited upstream catchment area.

3. Initial Flood Risk Assessment

The flood risk assessment for the proposed development site is undertaken in three principal 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 site:

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not located within a coastal or tidally influenced region.
Fluvial	Possible	The Owenadoher River and Kilmashogue Stream are located 451m and 332m beyond the western and eastern boundaries of the site respectively. A drainage channel flows in a west to east direction through the site.
Pluvial (urban drainage)	No	There is no significant drainage or water supply infrastructure located at or in the immediate vicinity of the site.
Pluvial (overland flow)	No	The site is not surrounded by significantly elevated lands and does not provide an important surface water discharge point to adjacent lands.
Blockage	No	There is no significant or restrictive hydraulic structures located at or in the immediate vicinity of the site.
Groundwater	No	There are no significant springs or groundwater discharges mapped or recorded in the immediate vicinity of the site.

Table 1: Flooding Mechanisms

The primary potential flood risk to the proposed development site can be attributed to an extreme fluvial flood event in the Owenadoher River, located 451m beyond the western boundary of the site and/or the Kilmashogue Stream located 332m beyond the eastern boundary of the site.

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* 2 below, this assessment has determined that there are no hydrometric gauging stations located on any watercourses in the general vicinity of the proposed development site.

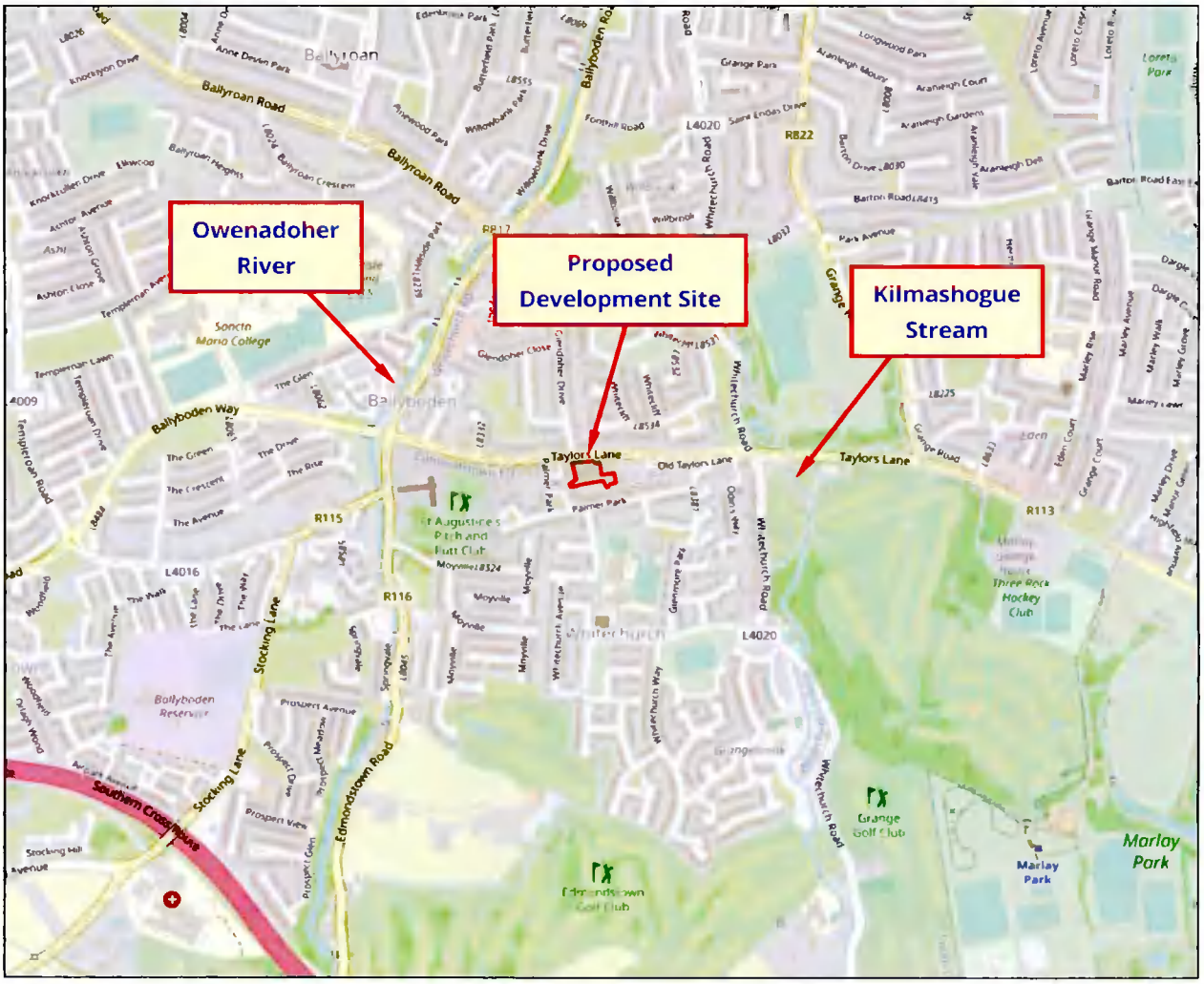


Figure 2 - Hydrometric Gauging Stations

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/238/A illustrates indicative flood zones within this area of County Dublin.

Figure 3 below illustrates an extract from the above indicative flood map in the vicinity of the proposed development site.

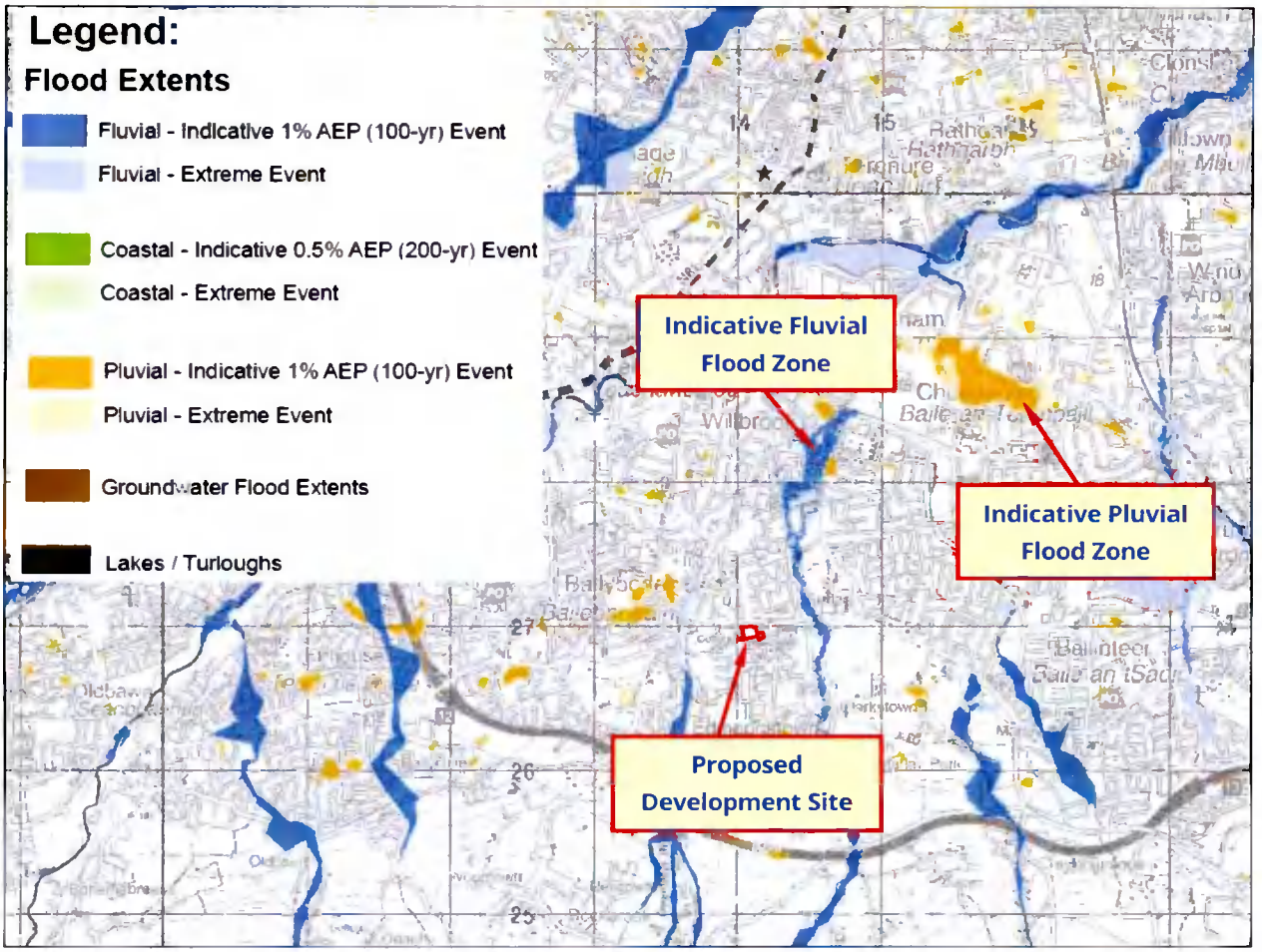


Figure 3 - OPW PFRA Mapping

The PFRA flood mapping indicates that the site does not fall within an indicative fluvial, pluvial or groundwater flood zone.

It should also be noted that the indicated 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.floodinfo.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 4* below illustrates mapping from the Flood Maps website in the vicinity of the site.

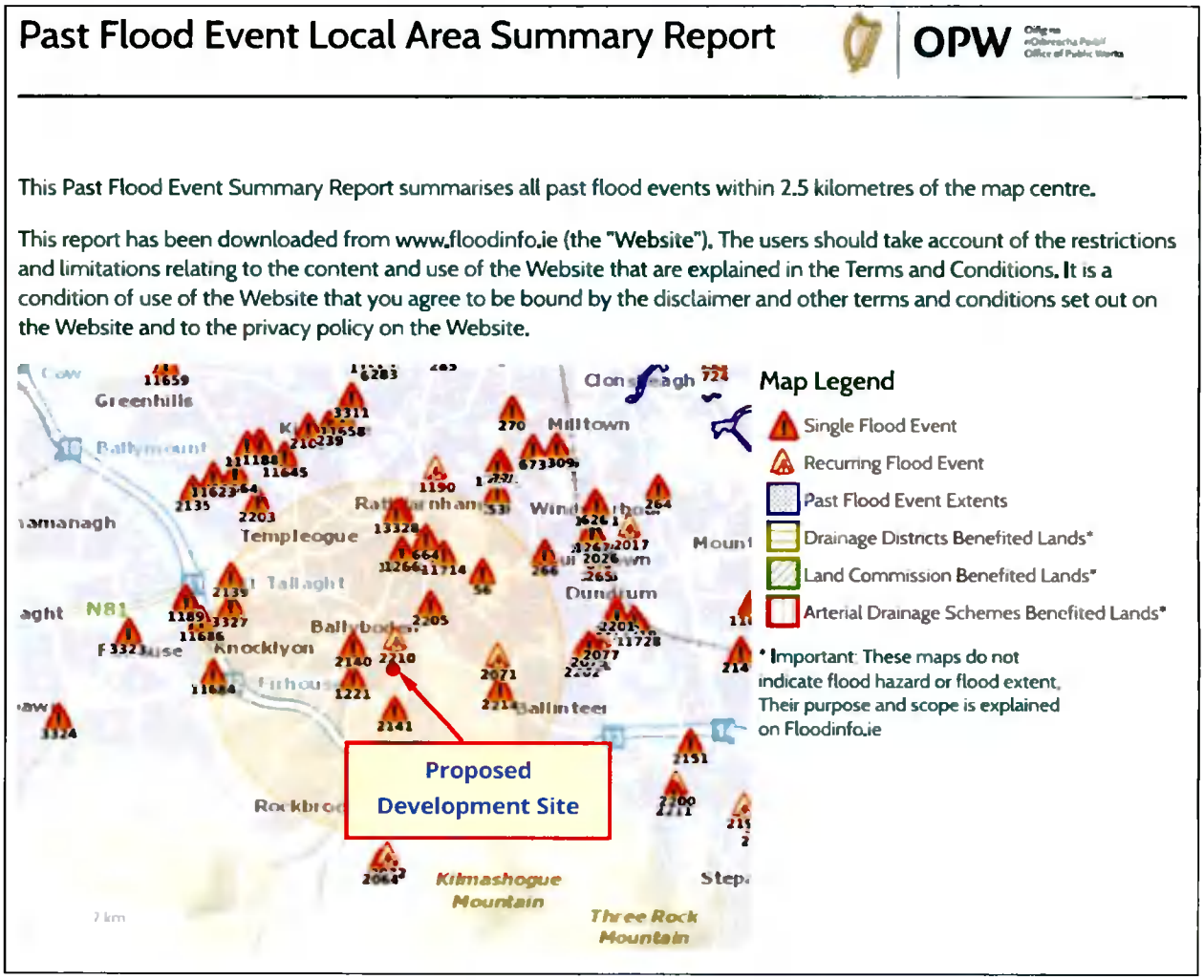


Figure 4 - OPW Flood Maps

Figure 4 above indicates three flood points mapped in the general locality of the proposed development site, which relate to the following flood events:

- Recurring flooding at Ballyboden Road and Whitecliff due to high flows in the Owenadoher River surcharging the Ballyboden Road sewer.
- 03rd February 1994 – Rear garden flooded due to stream overflow.
- 05th November 2000 – 3 properties on Edmondstown Road flooded after overflow from Owenadoher River after to heavy rainfall.

There is no recorded or anecdotal information or data available to indicate that any of the above fluvial flood events impacted the area of the proposed development site.

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. *Figure 5* and *Figure 6* below show the historic mapping for the area of the proposed development site.

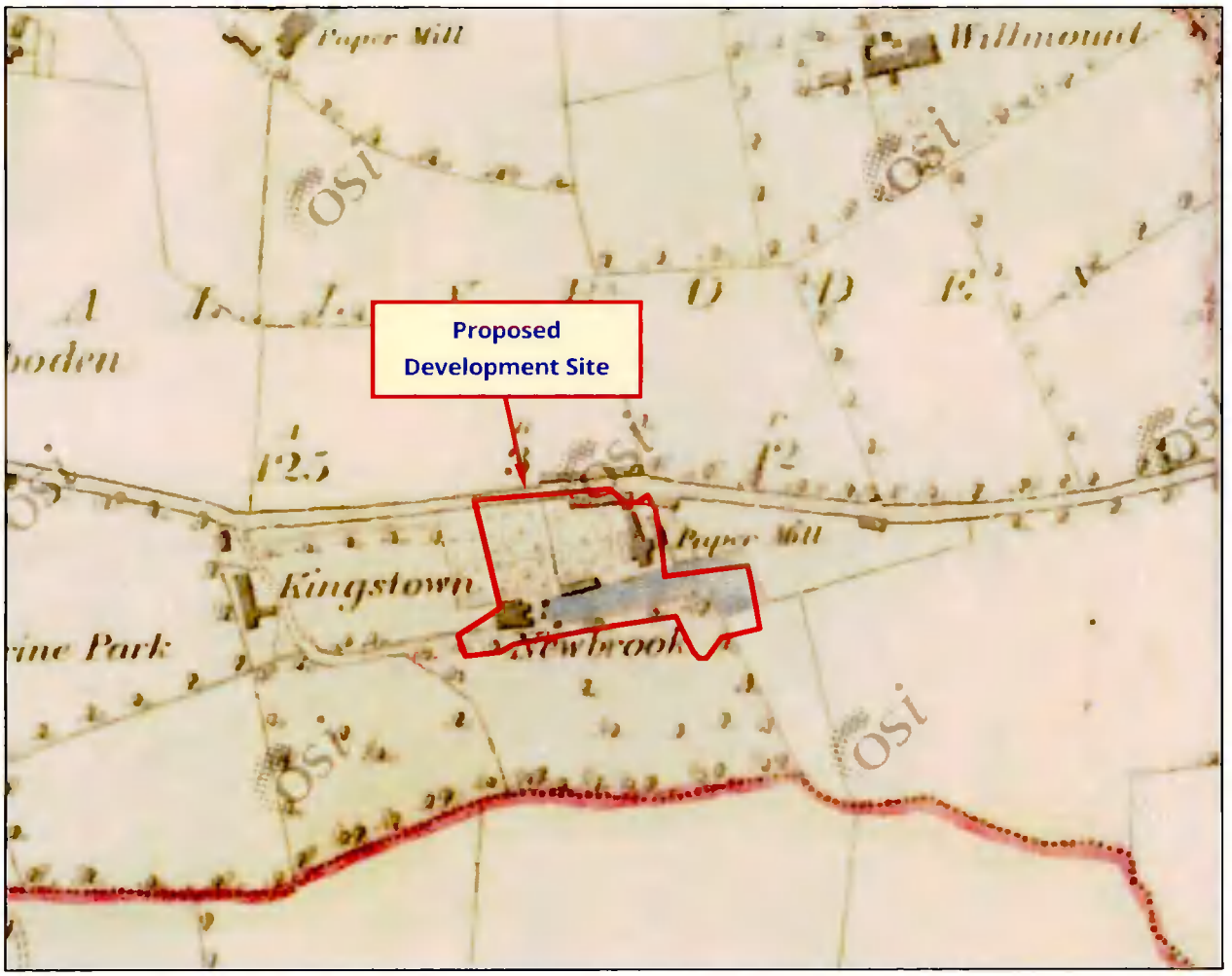


Figure 5 - Historic 6 Inch Mapping

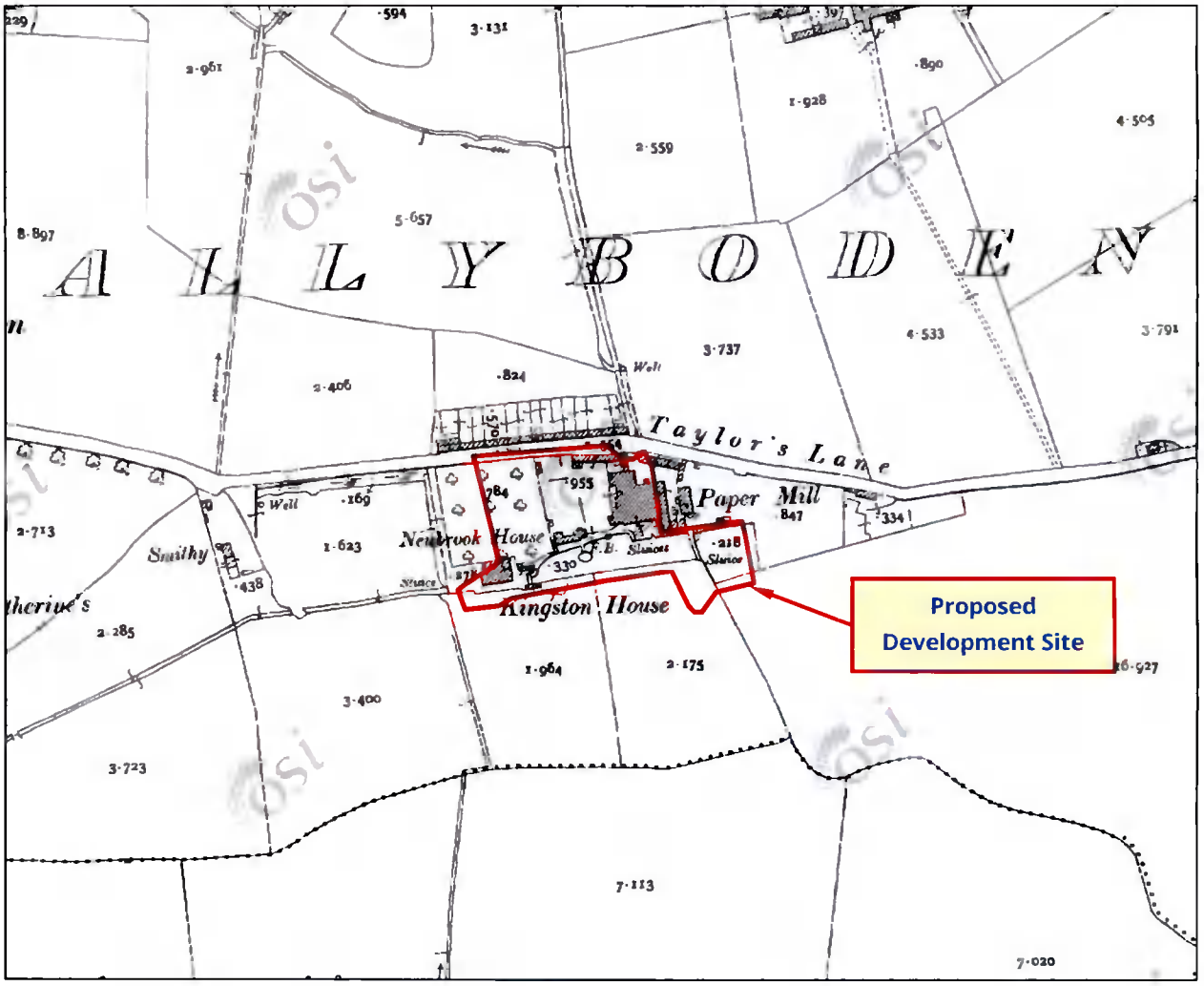


Figure 6 - Historic 25 Inch Mapping

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. Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past.

Figure 7 below illustrates the sub-soils mapping for the general area of the site.

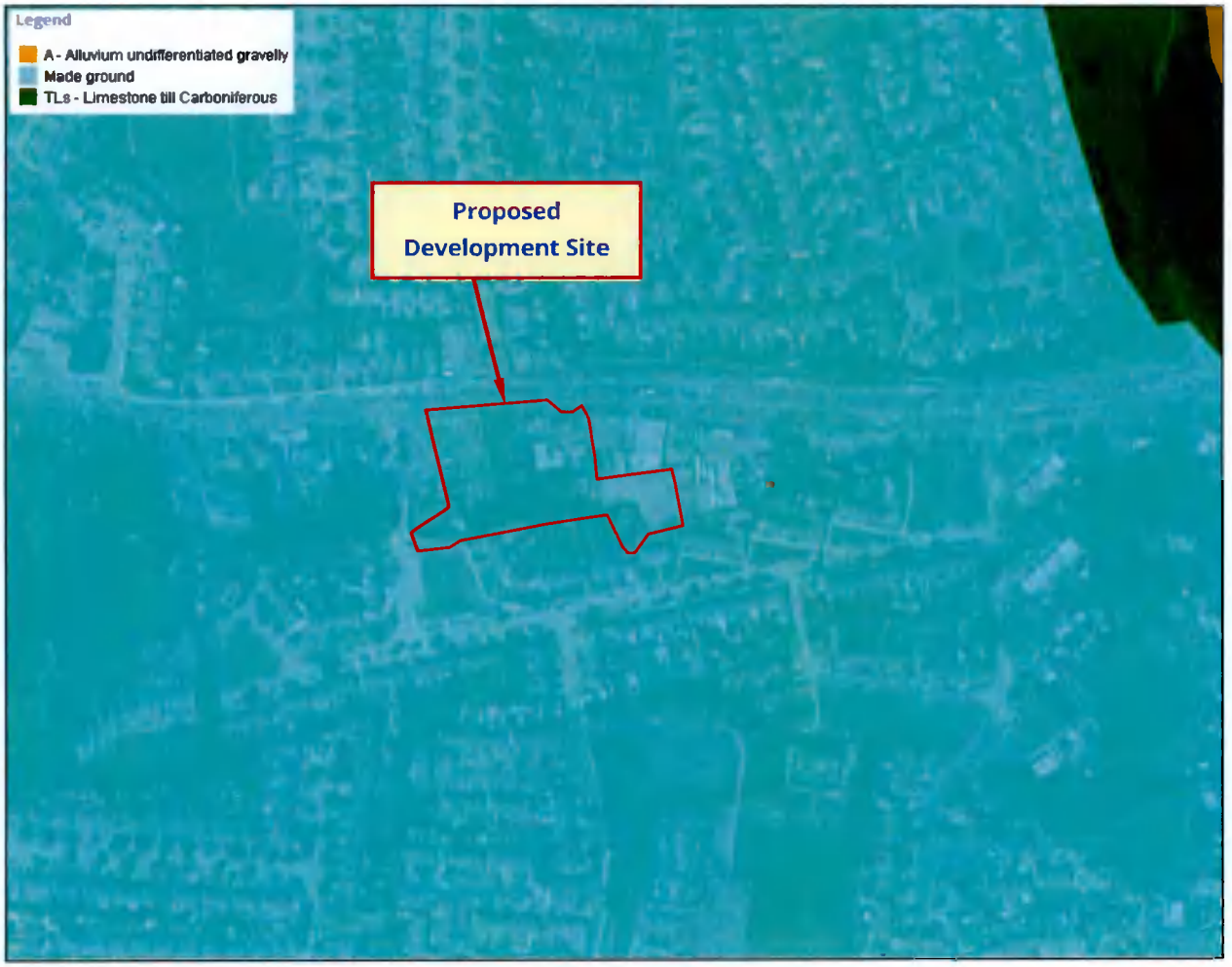


Figure 7 - GSI Subsoil Mapping

Figure 7 above indicates that the proposed development site is entirely underlain by Made Ground. There are no Alluvium deposits mapped within or in the vicinity of the site.

4.6. Geological Survey of Ireland Groundwater Flood Mapping

Historic and Predictive Groundwater Mapping for Ireland was prepared by the GSi Department of Communication, Climate Action and Environment in collaboration with Trinity College Dublin and the Institute of Technology Carlow.

Figure 8 below illustrates an extract from the above groundwater flood mapping in the vicinity of the proposed development site.

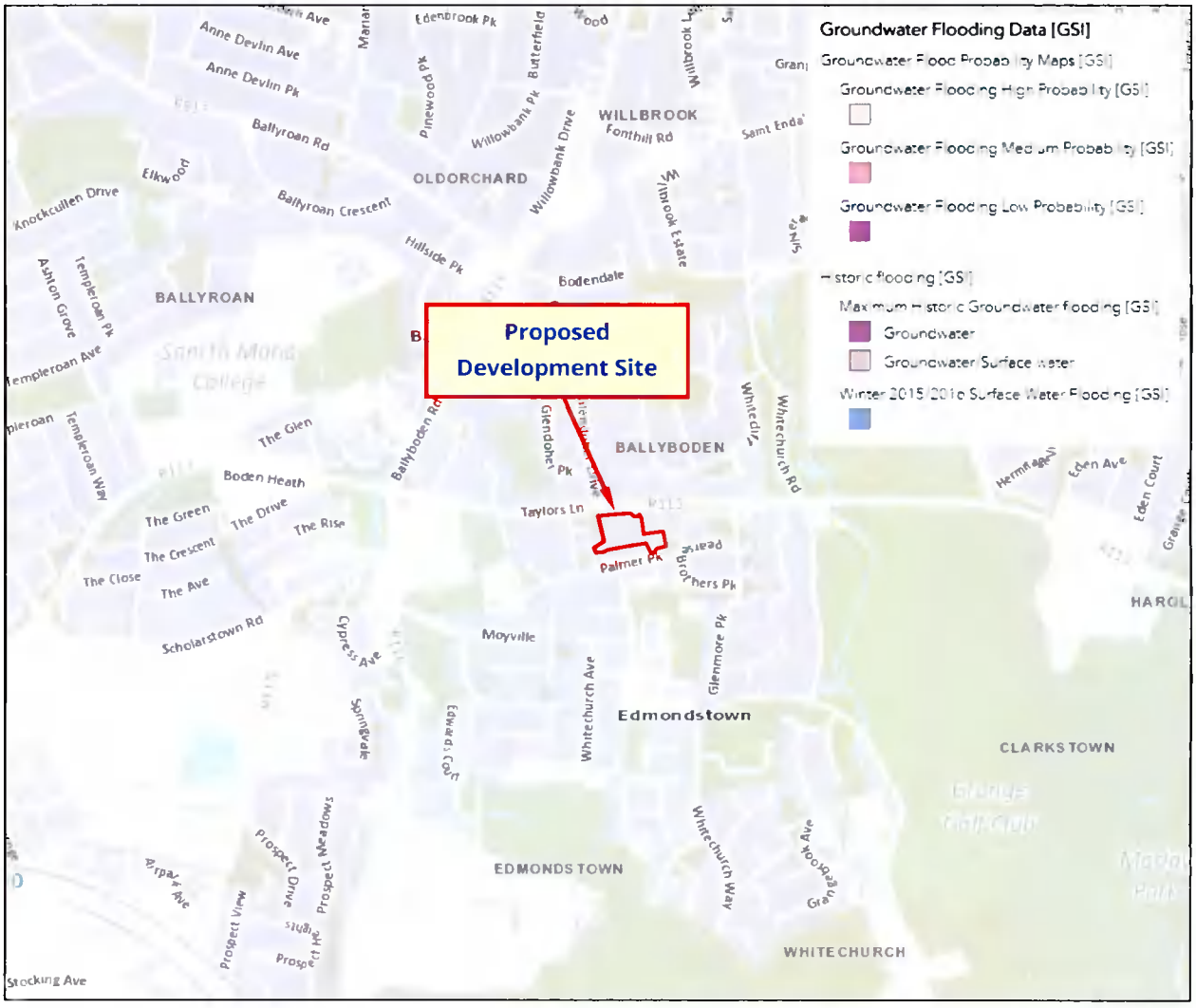


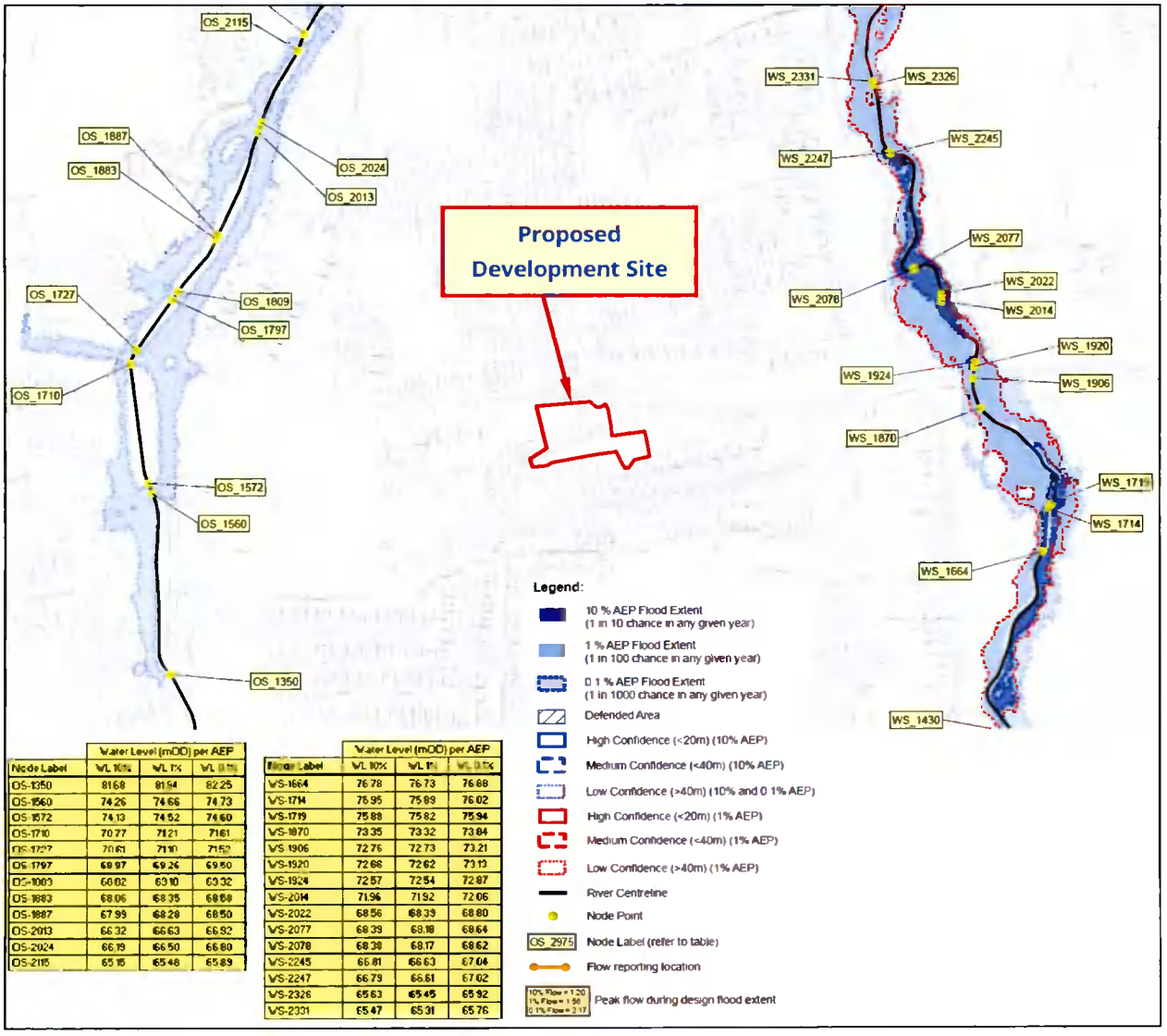
Figure 8 - GSI Groundwater Flood Mapping

The above GSi Groundwater Mapping indicates no areas of predictive or historical groundwater or surface water flooding located within or in the vicinity of the proposed development site.

4.7. Dodder CFRAM Study

The Dodder Catchment Flood Risk & Management Study (CFRAMS) has been undertaken by the OPW and the final version of the flood maps were issued in November 2010. Flood risk extent and depth maps for further assessment areas within County Dublin have also been produced. OPW CFRAMS flood map number *OSW/EXT/UA/CURS/103* illustrates predictive extreme fluvial flood extent zones associated with the Owenadoher River and Kilmashogue Stream in the general vicinity of the proposed development site.

Figure 9 below (extracted from CFRAMS flood map *OSW/EXT/UA/CURS/103*) illustrates the predicted extreme 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood extents in the vicinity of the proposed development site.



	Water Level (mOD) per AEP		
Node Label	WL 10%	WL 1%	WL 0.1%
OS-1350	81.68	81.94	82.25
OS-1560	74.26	74.66	74.73
OS-1572	74.13	74.52	74.60
OS-1710	70.77	71.21	71.61
OS-1727	70.61	71.10	71.52
OS-1797	69.97	69.26	69.50
OS-1809	69.02	69.10	69.32
OS-1883	68.06	68.35	68.68
OS-1887	67.99	68.28	68.50
OS-2013	66.32	66.63	66.92
OS-2024	66.19	66.50	66.80
OS-2115	65.15	65.48	65.89

	Water Level (mOD) per AEP		
Node Label	WL 10%	WL 1%	WL 0.1%
WS-1664	76.78	76.73	76.88
WS-1714	76.95	76.89	76.02
WS-1719	75.88	75.82	75.94
WS-1870	73.35	73.32	73.84
WS-1906	72.76	72.73	73.21
WS-1920	72.66	72.62	73.13
WS-1924	72.57	72.54	72.97
WS-2014	71.96	71.92	72.06
WS-2022	68.56	68.39	68.80
WS-2077	68.39	68.18	68.64
WS-2078	68.38	68.17	68.62
WS-2245	66.81	66.63	67.04
WS-2247	66.79	66.61	67.02
WS-2326	65.63	65.45	65.92
WS-2331	65.47	65.31	65.76

Figure 9 – CFRAMS Flood Extent Mapping

Figure 9 above indicates that the proposed development site does not fall within a predictive current scenario fluvial flood zone.

The Dodder CFRAMS flood map also provides information on predicted water levels and flows the for 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events at various node points along the Owenadoher River and Kilmashogue Stream.

The node points most applicable to the proposed development site are referenced as node point *OS_1572 & WS_1870,* both located adjacent to the upstream boundary of the site as illustrated in *Figure 9* above. Details of the predicted fluvial flood levels for the Dodder CFRAMS node points in the general vicinity of the proposed development site are listed in *Table 2* below, which has been extracted from the Dodder CFRAMS flood map reference *OSW/EXT/UA/CURS/103*.

Node Label	Water Level (mOD) 10% AEP	Water Level (mOD) 1% AEP	Water Level (mOD) 0.1% AEP
OS_1572	74.13	74.52	74.60
WS_1870	73.35	73.32	73.84

Table 2 –CFRAMS Fluvial Map - Predicted Flood Levels

It is noted that the highest predicted water level of 74.60 mOD in the Owenadoher River for the 0.1% AEP (1 in 1000 year) flood event is approximately 1.704m lower that the lowest topographical level within the proposed development site.

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 the site is not at direct risk of fluvial, 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 proposed development site, it is considered that sufficient quantitative information to complete an appropriate flood risk assessment can be derived from the information collated as part of the screening exercise alone.

In particular, the final flood extent maps produced as part of the Dodder CFRAM study are based on the results of detailed hydraulic modelling undertaken along the Owenadoher River and Kilmashogue Stream, and therefore provide a reasonably accurate delineation of flood zones and information on extreme flood levels at and in the general vicinity of the proposed development site.

6. Discussion

The screening assessment undertaken as part of this Site Specific Flood Risk Assessment, in conjunction within on-site inspection and assessment work, indicates no primary or direct fluvial or pluvial flood risk to the area of the proposed development site.

The drainage channel within the boundary of the site appears to be part of a former mill race channel that was originally supplied with water via a weir on the Owenadoher River located approximately 625m south-west of the proposed development site. An inspection of the former mill race channel undertaken by a hydrological engineer from IE Consulting indicates that this channel is no longer supplied with water via the Owenadoher River and there is currently no mechanism where waters in the Owenadoher River can discharge to this channel. The drainage channel is not a natural fluvial watercourse channel and has a limited upstream catchment area. A detailed inspection of this drainage channel undertaken by a hydrological engineer from IE Consulting indicates that the channel is significantly overgrown and no discernible flow conveyance was observed within the channel. There was no evidence to suggest any more significant flow conveyance has occurred within the channel in the past.

As part of the drainage and stormwater management strategy for the development it is proposed to part divert and part culvert the drainage channel within the boundary of the site, the details of which are illustrated on *Drawing Number J3406-C-01-Rev D, Appendix A,* prepared by Cowal Design Consultants.

As illustrated on the above drawing the existing drainage channel shall be part diverted via a 1m x 1m open precast concrete channel and part culverted via a 1200mm diameter pipe. The maximum hydraulic conveyance capacity of the proposed open channel and 1200mm diameter pipe exceeds the maximum hydraulic capacity of the existing drainage channel through the site. Therefore the proposed part diverted and part culverted drainage channel is not expected to result in an adverse impact to the existing hydrological regime of the area.

Drawing Number J3406-C-01-Rev D, Appendix A, prepared by Cowal Design Consultants also provides details of the stormwater management strategy for the proposed development site, which is in accordance with the requirements of the Greater Dublin Strategic Drainage Study. In this regard the development as proposed is not expected to result in an increased pluvial flood risk elsewhere.

7. 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.

The assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment indicates that the area of the proposed development site falls within Flood Zone 'C'.

In accordance with the *'Planning System & Flood Risk Management Guidelines, DOEGLG, 2009'* the development 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 are made in respect of the proposed development site:-

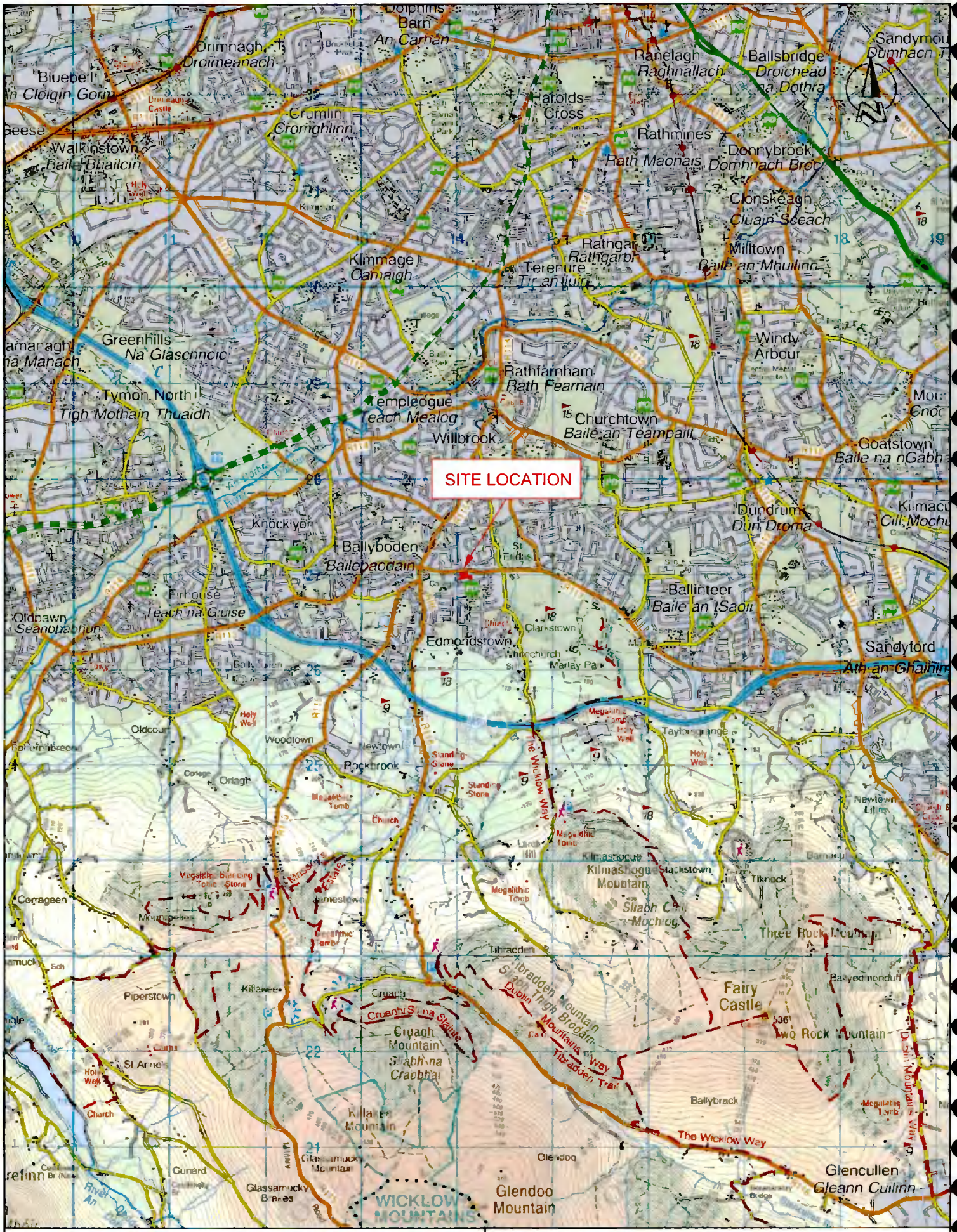
- *A Site Specific Flood Risk (SSFRA) assessment, appropriate to the type and scale of development proposed and in accordance with 'The Planning System and Flood Risk Management Guidelines – DoEHLG-2009' has been undertaken.*
- *The area of the proposed development site has been screened, scoped and assessed for flood risk in accordance with the above guidelines.*
- *The screening assessment undertaken as part of this SSFRA indicates that the site is not at risk of fluvial, pluvial or groundwater flooding.*
- *In accordance with the above guidelines, the area of the proposed development site falls within Flood Zone 'C'.*
- *The development as proposed includes for a stormwater management system in accordance with the requirements of the Greater Dublin Strategic Drainage Study.*
- *In consideration of the assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment, overall, the development as proposed is not expected to result in an adverse impact to the existing hydrological regime of the area or increase flood risk elsewhere. In this regard the development as proposed is considered to be appropriate from a flood risk perspective.*

Appendices

Appendix A. Drawings

IE2337-001-A Site Location Map

J3406-C-01-Rev D Proposed Drainage Layout



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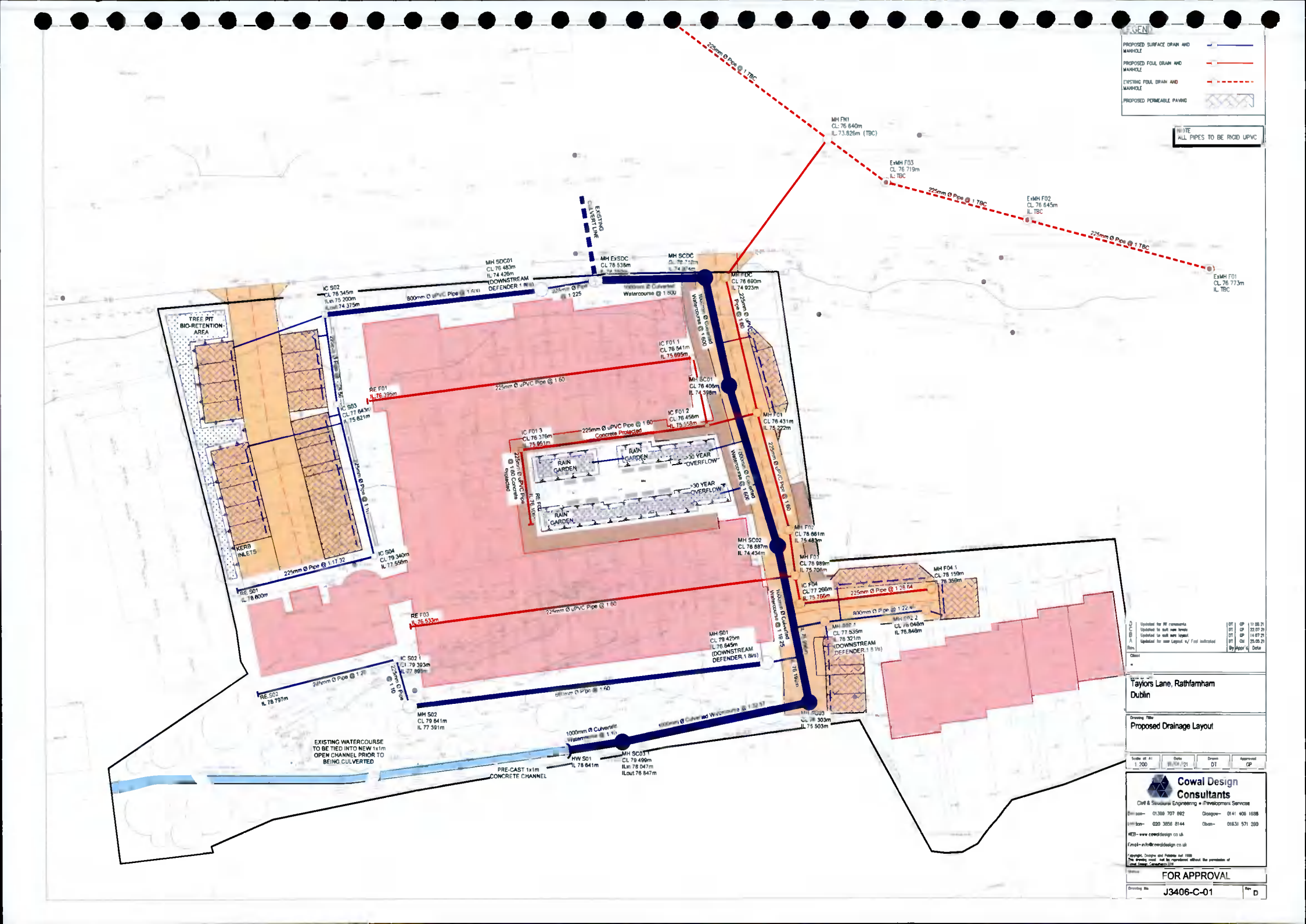
WATER-ENVIRONMENTAL-CIVIL

Project Title:	FLOOD RISK ASSESSMENT
Project Address:	TAYLOR'S LANE, RATHFARNHAM, DUBLIN 16
Client:	BEER AND ASSOCIATES
Drg. Title:	SITE LOCATION MAP

Dwg.Scale:	Date:	Dwg.No:	Job No:	Revision:	Dwg.By:
1:50,000	03/08/21	IE2337-001	IE2337	A	LMc


LEGEND
PROPOSED SURFACE DRAIN AND MANHOLE
PROPOSED FOUL DRAIN AND MANHOLE
EXISTING FOUL DRAIN AND MANHOLE
PROPOSED PERMEABLE PAVING
NOTE
ALL PIPES TO BE RIGID UPVC
MH FN1
CL 76.640m
IL 73.826m (TBC)
225mm Ø Pipe @ 1 TBC
ExMH F03
CL 76.719m
IL TBC
ExMH F02
CL 76.645m
IL TBC
ExMH F01
CL 76.773m
IL TBC
EXISTING CULVERT LINE
MH SDC01
CL 76.483m
IL 74.426m
(DOWNSTREAM DEFENDER 1.8l/s)
MH ExSDC
CL 76.536m
MH SDC
MH FDC
CL 76.690m
IL 74.923m
IC S02
CL 76.345m
ILin 75.200m
ILout 74.375m
800mm Ø uPVC Pipe @ 1.60
Watercourse @ 1.600
TREE PIT BIO-RETENTION AREA
KERB INLETS
IC S03
CL 77.643m
IL 75.821m
IC S04
CL 79.340m
IL 77.556m
225mm Ø Pipe @ 1.17.32
RE S01
IL 78.600m
IC F01.1
CL 76.541m
IL 75.695m
225mm Ø uPVC Pipe @ 1.60
RE F01
IL 76.399m
MH SC01
CL 76.406m
IL 74.398m
IC F01.2
CL 76.456m
IL 75.558m
MH F01
CL 76.431m
IL 75.222m
IC F01.3
CL 76.376m
IL 75.951m
225mm Ø uPVC Pipe @ 1.60
Concrete Protected
RAIN GARDEN
RAIN GARDEN
RAIN GARDEN
30 YEAR OVERFLOW
30 YEAR OVERFLOW
RE F02
IL 76.126m
MH F02
CL 76.661m
IL 75.483m
MH SC02
CL 76.887m
IL 74.434m
MH F03
CL 76.989m
IL 75.706m
IC F04
CL 77.266m
IL 75.766m
225mm Ø Pipe @ 1.28.64
MH F04.1
CL 78.159m
IL 76.359m
800mm Ø Pipe @ 1.22.40
MH SC02.1
CL 77.535m
IL 76.321m
(DOWNSTREAM DEFENDER 1.8 l/s)
MH SC02.2
CL 76.048m
IL 76.848m
225mm Ø uPVC Pipe @ 1.60
RE F03
IL 76.533m
MH S01
CL 79.425m
IL 76.645m
(DOWNSTREAM DEFENDER 1.8l/s)
IC S02.1
CL 79.393m
IL 77.809m
RE S02
IL 78.797m
MH S02
CL 79.841m
IL 77.591m
EXISTING WATERCOURSE TO BE TIED INTO NEW 1x1m OPEN CHANNEL PRIOR TO BEING CULVERTED
PRE-CAST 1x1m CONCRETE CHANNEL
HW S01
IL 78.641m
MH SC03.1
CL 79.499m
ILin 78.047m
ILout 76.847m
MH SC03
CL 78.303m
IL 75.503m
Taylors Lane, Rathfarnham
Dublin
Proposed Drainage Layout
Scale at A1 1:200
Date 05.04.21
Drawn DT
Approved GP
Cowal Design Consultants
Civil & Structural Engineering + Development Services
Dublin– 01 388 707 892
London– 020 3856 8144
Glasgow– 0141 406 1686
Oban– 01631 571 280
WEB– www.cowaldesign.co.uk
Email– info@cowaldesign.co.uk
FOR APPROVAL
J3406-C-01
Rev D