PINNACLE
CONSULTING ENGINEERS

edgeconnex

2 No. 110Kv Transmission Lines Connecting Coolderrig Sub-Station to the Existing Grange Castle – Kilmahud Circuits

FLOOD RISK ASSESSMENT

March 2021

P200903

STRUCTURAL • CIVIL • DUE DILIGENCE • ENGINEERING MASTERPLANNING
FLOOD MANAGEMENT • INFRASTRUCTURE DESIGN
PRE-DEVELOPMENT ENGINEERING • BIM • TRANSPORTATION

PINNACLE
CONSULTING ENGINEERS

CONTACT DETAILS

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APPROVALS

	Name	Signature	Position	Date
Prepared by	S. O'Reilly		Associate	12/03/2021
Reviewed by	J. Mayer		Director	15/03/2021
Approved by	J. Mayer		Director	16/03/2021

REVISIONS

Revision By	Date	Context

VERSIONS

Number	By	Date	Context
1	S. O'Reilly	18/03/2021	Planning Submission

SOURCES OF DATA

Office of Public Works (OPW)	
Met Eireann	
BPM Surveys Ltd.	
Google	

REPORT CONTENTS

Executive Summary

This report was prepared for An Bord Pleanála and addresses the potential flood risk and mitigation measures pertaining to the proposed development as described below.

Edgeconnex Ireland Ltd., gives notice of its intention to make an application for permission/approval to An Bord Pleanála in relation to the proposed development described below.

The proposed development primarily comprises the provision of two no. 110kV transmission lines along with associated and ancillary works. The proposed transmission lines will connect the permitted and under construction Coolderrig 110kV Gas Insulated Switchgear (GIS) substation compound that was granted permission under SDCC Reg. Ref. SD18A/0298 with the existing Grange Castle – Kilmahud Circuits. The site of the proposed development has an area of c. 1.49 hectares.

The two proposed underground single circuit 110kV transmission lines will connect the permitted Coolderrig 110kV GIS Substation, within the existing Edgeconnex landholding, to the existing Grange Castle - Kilmahud Circuits to the east. The proposed transmission lines cover a distance of approximately 559m and 574m within the townland of Grange, Dublin 22. The route of the transmission lines will pass along and under the internal road infrastructure within the Edgeconnex site and Grange Castle Business Park; above the culverted Griffeen River and along a wayleave to the north of the Griffeen River to the joint bays where it will connect into the Grange Castle – Kilmahud Circuits.

The development includes the connections to the permitted Coolderrig substation as well as to the Grange Castle – Kilmahud Circuits, as well as changes to the landscaping within the Grange Castle Business Park and all associated construction and ancillary works.

The permitted and under construction Coolderrig 110kV Gas Insulated Switchgear (GIS) substation includes a two storey GIS Substation building (with a gross floor area of 556sqm) (known as the Coolderrig Substation), associated underground services; 2 no. transformers and single storey MV switch room (180sqm) within a 2.6m high fenced compound, and all associated construction and ancillary works.

The document should be read in conjunction with all associated Planning Drawings and Reports.

1 Introduction

The applicant proposes to construct two no. 110kV transmission lines along with associated and ancillary works, as described above. The purpose of this report is to address any potential flooding aspects of the proposed development, on lands situated both within the Grange Castle Business Park and the existing permitted Edgeconnex site, which is currently under construction.

The total subject development area extends to circa 3.68 acres (1.49 ha).

The location of the site is indicated on the map extract below - Figure 1.

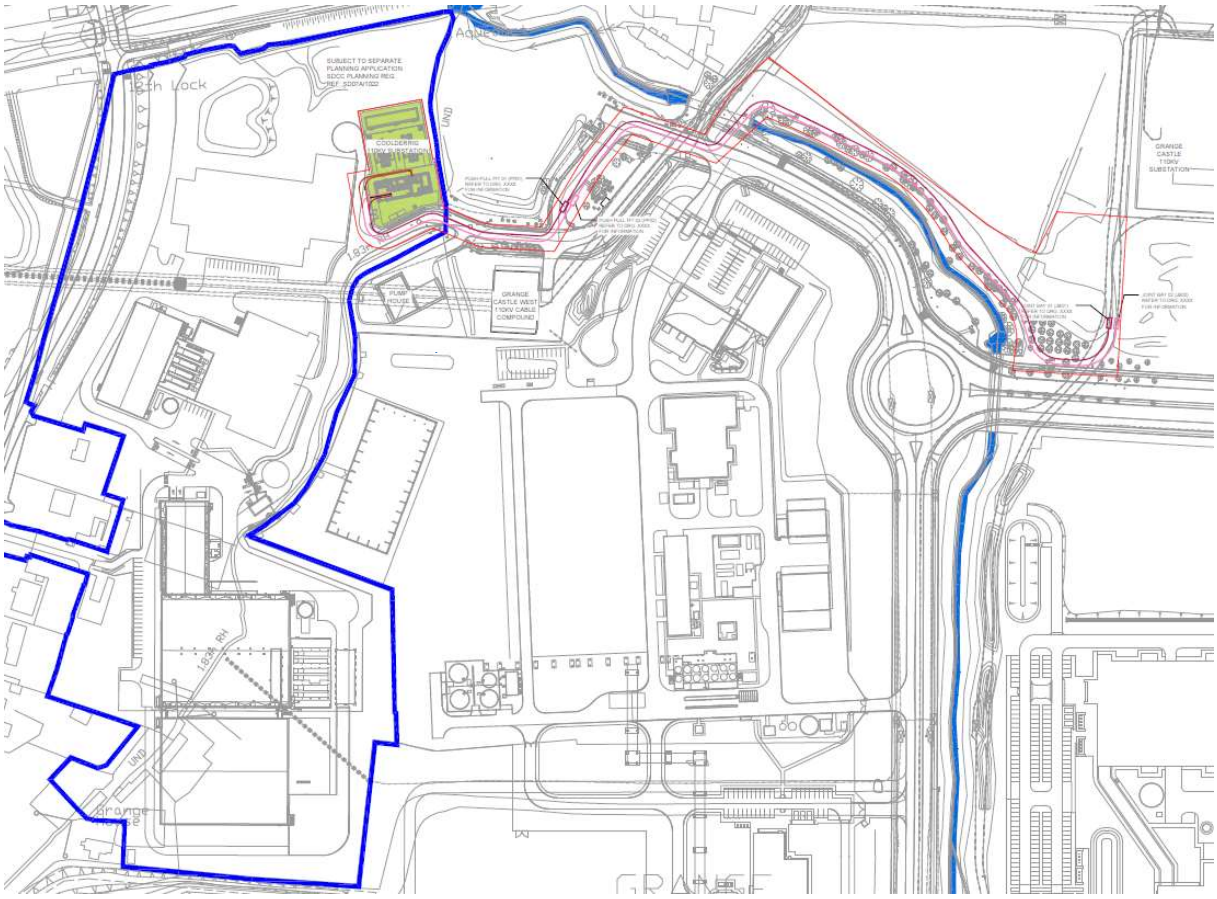


FIGURE 1 - Site Location (Source CSEA)

2 Flood Risk Assessment

The Planning System & Flood Risk Management Guidelines for Planning Authorities, dated November 2009, as published by the OPW, sets out the process to be followed in assessing proposed developments relating to flood risk.

These guidelines introduce comprehensive mechanisms incorporating flood risk identification, assessment and management into the planning process.

Planning authorities, in implementing these guidelines, are to ensure that where relevant, flood risk is a key consideration in the preparation of development and local area plans and also in the assessment of planning applications.

The guidelines will also serve to assist county and local authorities in preparing planning guidelines which should be utilised by developers and the general public in assessing flood risk when submitting development proposals / planning applications. Flood risk is summarised through various levels of the planning system in Figure 1.1. below.

Policy Documents / Instruments	Flood Risk Assessment Technique	Decision-making Tools	Key Chapters
National Spatial Strategy, National Planning Guidelines	Flood Risk Management Guidelines	n/a	1 2
Regional planning guidelines	Regional Flood Risk Appraisal, Catchment Flood Risk Management Plans	Sequential approach, Strategic Environmental Assessment	3 4
City / county development plan	Strategic Flood Risk Assessment, Catchment Flood Risk Management Plans	Sequential approach, dev. plan Justification Test, SEA	3 4
Local area plan	Strategic Flood Risk Assessment	Sequential approach, dev. plan Justification Test, SEA	3 4
Master plan, non-statutory plan, site brief	Site-specific Flood Risk Assessment	Sequential approach, dev. plan Justification Test, SEA / Env. Impact Assessment	3 5
Planning application	Site-specific Flood Risk Assessment	Sequential approach, dev. management Justification Test, EIA	3 5

Fig. 1.1: Flood risk management and the planning system

Using the sequential approach as described in Chapter 3 of the aforementioned guideline document, including confirmation that the site is classified as “Less Vulnerable” and therefore classified as appropriate and in conjunction with assessing available flood data, i.e. OPW, PFRA & CFRAMS mapping etc., it has been determined that the site has been categorised as falling into Zone C, (see Flood Zone definitions below), from a flooding perspective. It is proposed to apply the Source-Pathway-Receptor Model in providing the necessary mitigating measures.

Flood zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. There are three types or levels of flood zones defined for the purposes of these Guidelines:

Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);

Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and

Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

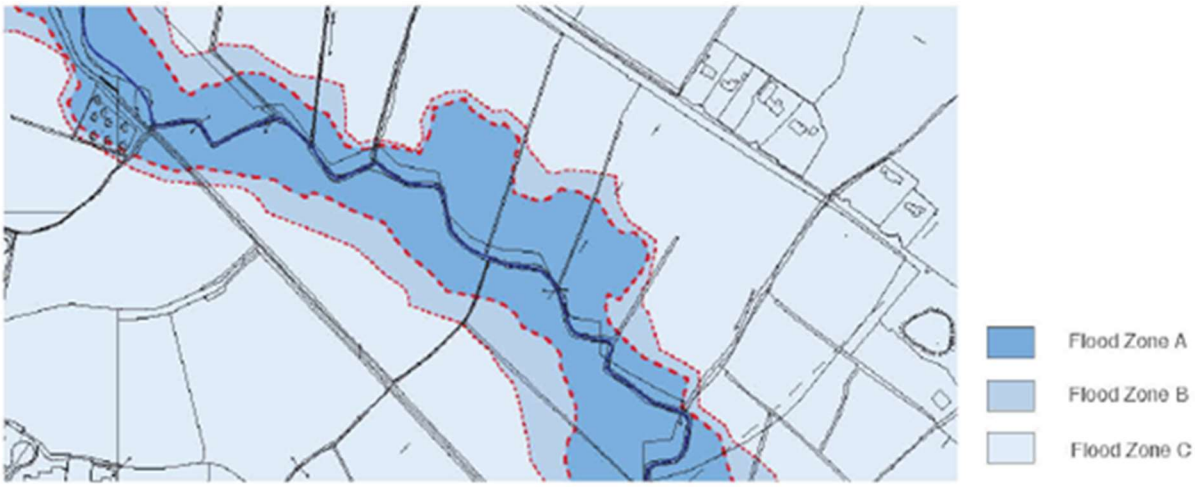


Fig. 2.3: Indicative flood zone map extract

3 Source-Pathway-Receptor Model

In assessing the potential flood risk to the site, the above model, as described in The Planning System & Flood Risk Management Guidelines for Planning Authorities, was used. The following flood sources were considered and necessary mitigating measures proposed, where required:-

- Coastal Flooding
- Fluvial Flooding
- Pluvial Flooding
- Ground Water Flooding

3.1 Coastal Flooding

In considering the risk from coastal flooding, it is necessary to relate the location of the development relative to the coast and the associated height above sea level. The subject site is located circa 16km from the nearest point on the Irish coast (Dublin Bay) and the average elevation of the site above sea level is circa 62m O.D. Malin Head.

Further to the above, coastal flooding is not considered a risk to the subject site.

3.2 Fluvial Flooding

Fluvial flooding is defined as flooding from a river or other watercourse. Further to site inspections and topographical surveys, there are no rivers flowing through the site. The nearest stream in the proximity of the site, is the Griffeen River, which crosses beneath the Grand Canal to the north of the site.

Further to the above, the records of fluvial flooding on the permitted Edgeconnex campus or environs, i.e. 0.1% AEP Extreme Event (1:1000yr), indicate that a portion of this flood zone area encroaches in to a small area of the 20Kv MV switch room, to the northern end of the site, which forms part of the Coolderrig 110kV Gas Insulated Switchgear (GIS) substation compound.

This has necessitated that flood compensatory storage be provided, in order to displace this area of flood volume, i.e. 28.11m^3. This has been achieved by a) proposing an identical volume in an area of open space along the western edge of the existing flooded area and b) by providing a retaining structure between the existing flooded area and the proposed 20Kv MV switch room – Refer Appendix A.

The above retaining structure is proposed as being circa 4m high, however, the height of this wall has not been designed purely for flood defence purposes. The proposed wall is required to be this height due to the need for screening and other ecological benefits – refer to the landscape architects, KFLA, for further information in this regard.

In addition, the 1:1000yr flood level at the above location, is indicated as being at 59.81m OD, which is 1.39m lower than the Finished Floor Level of the nearest building, i.e. the 20Kv MV switch room and transformer compound, currently under construction, which is located within the Edgeconnex campus on the western boundary of Grange Castle Business Park.

The lowest level of the nearest proposed data hall facility, has been set at 61.75m, which is circa 1.94m higher than the 1:1000yr flood level of 59.81m OD.

The extent of the flooding on-site has been transposed on to the proposed layout in relation to the sub-station compound, refer Dwg. No. P200903-300 and it is clear that the flooded area, i.e. the 1:1000yr storm event, has been adequately dealt with by the introduction of the flood compensatory storage area.

3.3 Pluvial Flooding

This type of flooding is applicable to all sites and is caused by summer thunderstorms or high intensity rainfall during longer duration events. This flooding is then generated by overland flows prior to the run-off entering watercourses / sewers (pipe networks).

As indicated on the attached PFRA Mapping, i.e. 2019 / MAP / 237 / A (refer Appendix C), there are no locations of Pluvial Flooding indicated on the subject site.

Further to the above, any future occurrence of this form of flooding taking place, will be mitigated by the fact that the permitted Edgeconnex development, which contains the Coolderrig 110kV Gas Insulated Switchgear (GIS) substation (currently under construction), has been designed in accordance with the relevant guidelines and specifications of the time, with a surface water attenuation pond / wetland area and below ground attenuation structures being provided, together with a hydrobrake flow control mechanism limiting the outflow to the Q-bar run-off rate of 4.6l/s, all as per the granted permission under SDCC Reg. Ref. SD18A/0298. These measures have been utilised in the sites overall network drainage system in order to mitigate pluvial flooding and provide for a wholly sustainable development.

3.4 Ground Water Flooding

This form of flooding is not considered to be of any risk to the site. This is borne out by the fact that on-site construction investigative works have revealed that minimal groundwater has been encountered, except for excessively deep excavations.

Additionally, the OPW Preliminary Flood Risk Assessments Groundwater Flooding Report concludes that ground water flooding is largely confined to the West Coast of Ireland, due to the hydrogeology of the area.

Refer Appendix D for the Groundwater Flood Hazard map, clearly indicating that ground water flooding is not considered a risk in this area of County Dublin.

4 Impact on Downstream Network

There are no impacts on the downstream network based on the following information pertaining to the permitted Edgeconnex campus:-

- The site has been sustainably managed in accordance with the relevant guidelines and specifications of the time
- SuDS measures have been incorporated in the form of a surface water attenuation pond / wetland area and below ground attenuation structures
- Surface water attenuation has been provided and sized based on a Q-bar run-off rate of 4.6l/s
- A Hydrobrake mechanism has been installed to restrict the outflow into the existing network accordingly, i.e. 4.6l/s
- Water quality is maintained as the outflow passes through approved Petrol / Oil Interceptors

The above methods will ensure that all surface water on-site will be sustainably managed and discharged off-site via approved run-off rates into the Local Authority sewer network.

All lands within the Grange Castle Business Park, pertaining to this application, have been sustainably managed by South Dublin County Council, in collaboration with their consultants, Clifton Scannell Emerson.

5 Conclusion

In conclusion, the proposed development will be carried out in a wholly sustainable manner, as described and will not pose any flooding issues. This holds true for the developable area itself or for any lands / properties downstream of the proposed development.

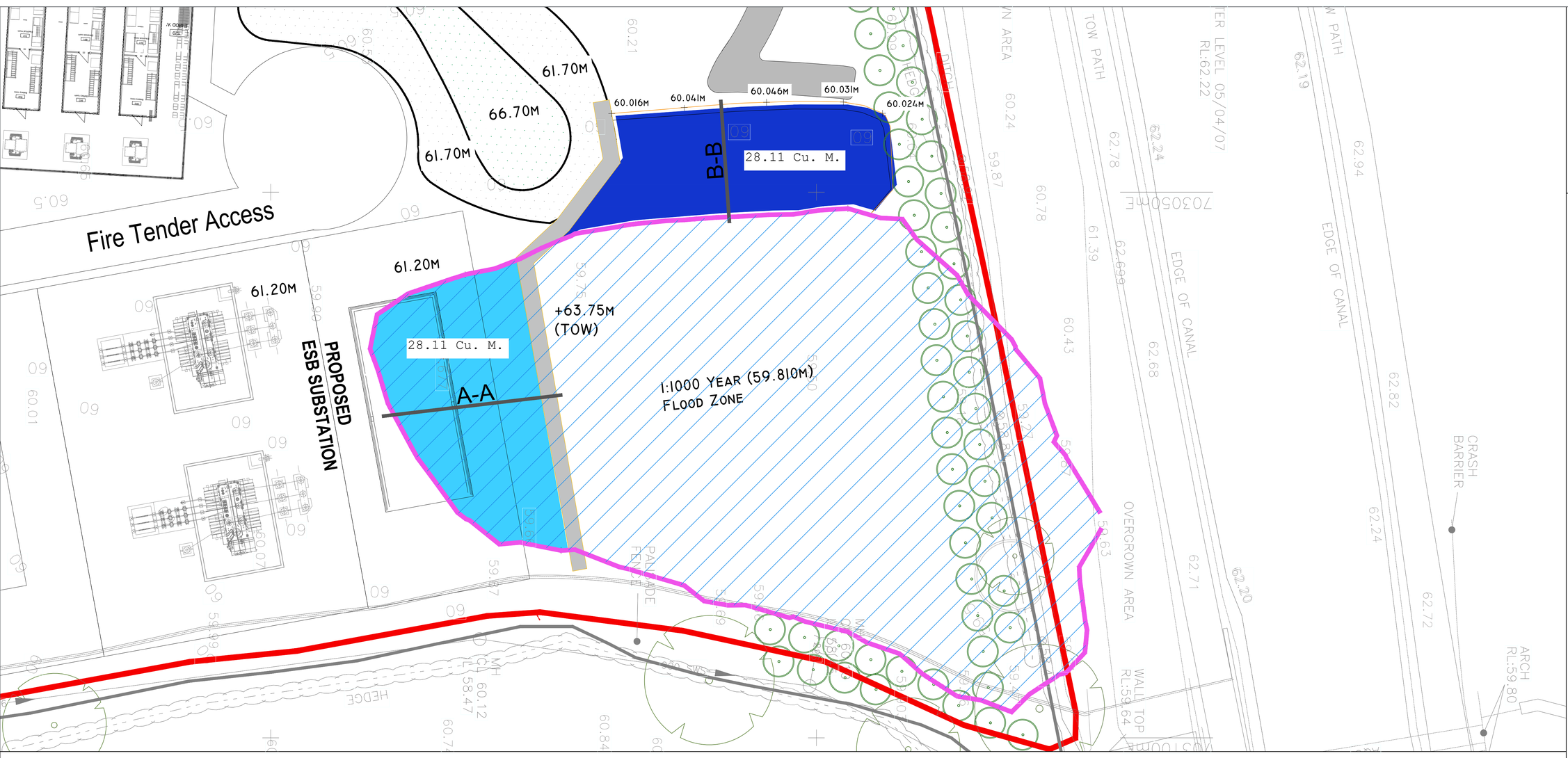
The fluvial flooding which occurred on a section of the northern end of the permitted Edgeconnex campus site, is considered to be of an extreme nature, i.e. 1:1000 year storm event and would not jeopardise the proposed sub-station compound development of the site, due to the fact that compensatory storage has been adequately provided and that the site will be positively drained and surface water will be contained within the overall sites drainage network and managed in a sustainable manner, in accordance with all relevant guidelines and specifications.

Further to the above, based on the indicative flood mapping, a small portion of the northern end of the Edgeconnex campus is located within Flood Zone C “Low Probability”. Additionally, as mentioned, the site is classified as “Less Vulnerable” and therefore the development is classified as appropriate.

Appendix A

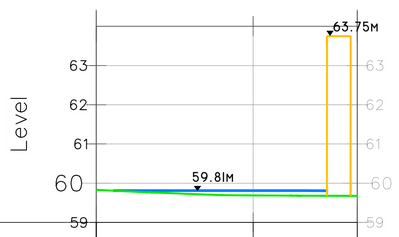
Flood Compensatory Storage

Dwg. No. P200903-300



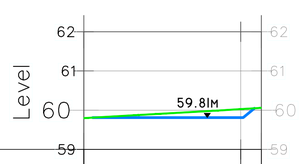
KEY:

- EXISTING FLOOD ZONE AREA
- FLOOD ZONE AREA TO BE DISPLACED - VOLUME = 28.11 CU. M
- COMPENSATORY FLOOD ZONE AREA - VOLUME = 28.11 CU. M
- SITE BOUNDARY
- 59.81M CONTOUR (EXISTING)
- PROPOSED 4M HIGH RETAINING STRUCTURE
- 60.50M PROPOSED LEVEL



CHAINAGES	0.00	10.00	16.64
EXISTING GROUND LEVEL	59.83	59.69	59.68

SECTION A-A



CHAINAGES	0.00	10.00	11.32
EXISTING GROUND LEVEL	59.80	60.03	60.06

SECTION B-B

KEY:

- FLOOD ZONE 59.81M
- EXISTING GROUND LEVEL
- PROPOSED RETAINING WALL

REV	DESCRIPTION	BY	CHK	DATE
-	-	-	-	-

CLIENT

edgeconnex

PROJECT

COOLDERRIG
GRANGE CASTLE
DUBLIN

DRAWING TITLE

EXISTING FLOOD ZONE AND PROPOSED FLOOD COMPENSATORY AREA

PINNACLE CONSULTING ENGINEERS

GROSVENOR COURT,
67A PATRICK STREET,
DUN LAOGHAIRE,
COUNTY DUBLIN,
IRELAND. TELEPHONE: +353 1231 1041

NORWICH | WELWYN GARDEN CITY | LONDON | BRISTOL

DRAWING STATUS			
PLANNING			
SCALE	DATE	DRAWN BY	CHECKED
1:200	MARCH '21	KR	SO'R
DRG NO.		REVISION	SHEET SIZE
300		–	A1

REF. P200903

Appendix B

OPW - National Flood Hazard Mapping

OPW National Flood Hazard Mapping

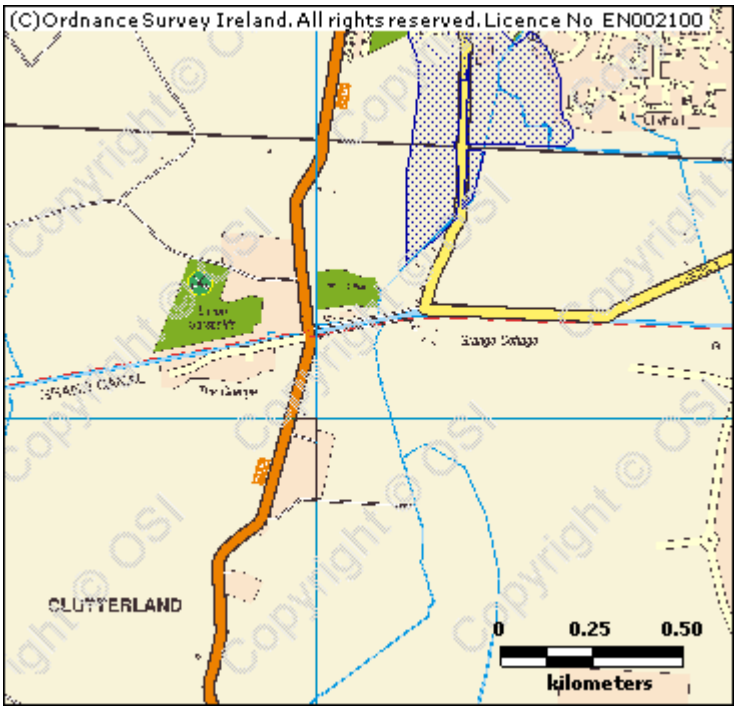
Summary Local Area Report

This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Dublin

NGR: O 031 321



Map Scale 1:20,917

Map Legend	
	Flood Points
	Multiple / Recurring Flood Points
	Areas Flooded
	Hydrometric Stations
	Rivers
	Lakes
	River Catchment Areas
	Land Commission *
	Drainage Districts *
	Benefiting Lands *

* Important: These maps do not indicate flood hazard or flood extent. Thier purpose and scope is explained in the Glossary.

2 Results

1. Griffeen November 2000 — Start Date: 05/Nov/2000
County: Dublin — Flood Quality Code:1

Additional Information: Photos (6) Reports (9) Press Archive (6) More Mapped Information

2. Peamount R134 R120 junction Nov 2000 — Start Date: 05/Nov/2000
County: Dublin — Flood Quality Code:3

Additional Information: Reports (1) Press Archive (1) More Mapped Information

Appendix C

OPW - PFRA & CFRAM Mapping

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
09GRIF00557I	66.15	N/A	66.45	N/A	67.41	N/A
09GRIF00500E	64.09	N/A	64.33	N/A	65.03	N/A
09GRIF00442	62.56	N/A	62.76	N/A	63.42	N/A
09GRIF00383	59.04	N/A	59.30	N/A	59.81	N/A

09GRIF00383

09GRIF00442

09GRIF00500E

09GRIF00557I

BALLYMAKAILY
Baile Mhic Caollaí

GRANGE
An Ghráinseach

CLUTTERLAND

MILLTOWN
Baile an Mhuilinn

CLUTTERLAND
Talamh Chlutair

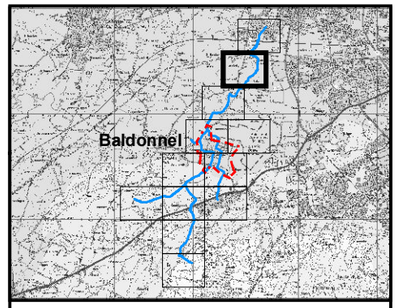
BALLYBANE
An Baile Bán

Please refer to Camac flood maps E09CAM_EXFCD_C2.

302200 302400 302600 302800 303000 303200 303400 303600

232200 232000 231800 231600 231400 231200

0 50 100 200 300 400 500 Metres



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
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW Oifig na nOibreacha Poiblí The Office of Public Works
RPS

The Office of Public Works
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T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map: Baldonnel Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 21 July 2016
Checked By : D.I.	Date : 21 July 2016
Approved By : G.G.	Date : 21 July 2016
Drawing No. :	E09BAL_EXFCD_F0_10
Map Series :	Page 10 of 12
Drawing Scale :	1:5,000 @ A3

No Fluvial Data Available For Area

No Fluvial Data Available For Area

MAYNOOTH

LEIXLIP

LUCAN TO CHAPELIZOD

FINNSTOWN

ADAMSTOWN

ESKER SOUTH

CELBRIDGE

HAZELHATCH

STRAFFAN

TURNINGS

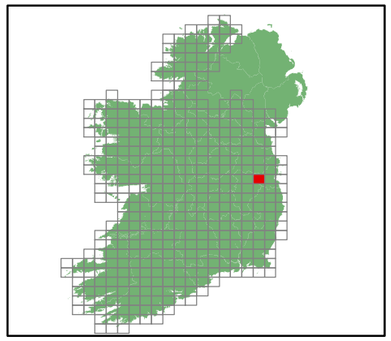
No Fluvial Data Available For Area

RATHCOOLE, SAGGART & BALD

No Fluvial Data Available For Area

0.5 0.25 0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 Kilometers

Location Plan :



Legend:

Flood Extents

- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents
- Lakes / Turloughs

PFRA Outcomes

- Probable Area for Further Assesment
- Possible Area for Further Assesment

Important User Note:

The flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location. Information on the purpose, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or 'Have Your Say' on www.cfram.ie).

Office of Public Works
Jonathon Swift Street
Trim
Co Meath
Ireland

Project :
PRELIMINARY FLOOD RISK ASSESMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By : PJW Date : July2011

Checked By : MA Date : July 2011

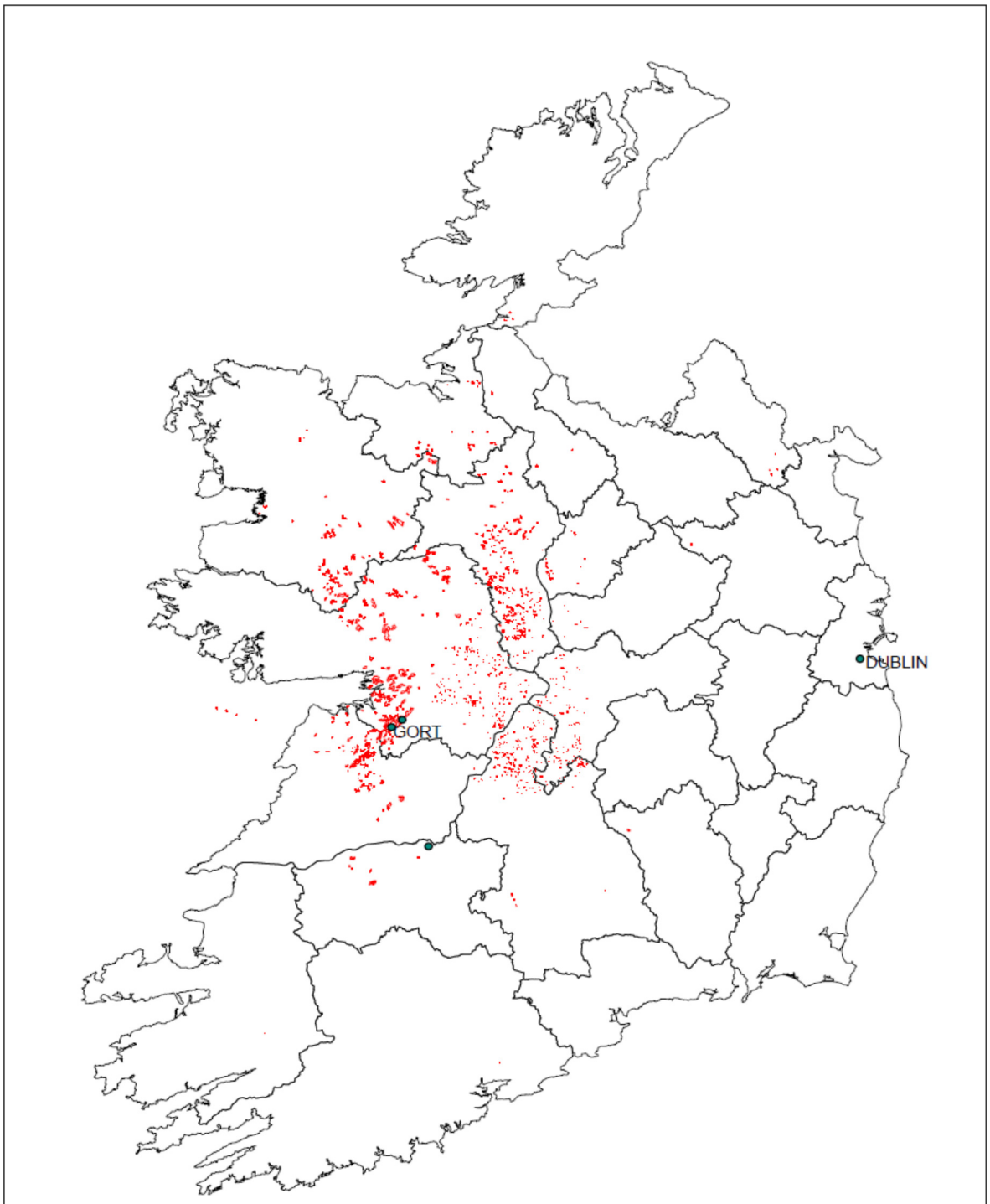
Figure No. : 2019 / MAP / 237 / A

Revision 0

Drawing Scale : 1:50,000 Plot Scale : 1:1 @ A3

Appendix D

OPW – Preliminary Groundwater Flood Hazard Map



Title	Preliminary Groundwater Flood Hazard Map		
Figure 6.6	Size A4	Drawn	RAH
		Checked	SB
Drawing No:	262128BA/2.1	Approved	SB
Date:	24/06/2010	Rev No	01

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Cambridge CB1 2RS
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Fax +44 (0) 1223 461007
www.mottmac.com

Legend

- County boundary
- Location
- Area at risk of groundwater flooding

NORWICH
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3 Meridian Way
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