Clonburris Phase 01

Part 8
Flood Risk Assessment

South Dublin County Council

Project number: 60650394

April 2022

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Quality information

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	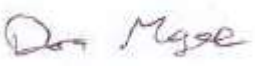	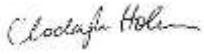	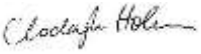
Neil Byrne Graduate Engineer	Dara Magee Consultant Engineer	Clodagh Holmes Principal Engineer	Clodagh Holmes Principal Engineer

Revision History

Revision	Revision date	Details	Authorized	Name	Position
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Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

South Dublin County Council

Prepared by:

Neil Byrne
Graduate Engineer
T: +353-1-696-6220
E: Neil.Byrne1@aecom.com

AECOM Ireland Limited
4th Floor
Adelphi Plaza
Georges Street Upper
Dun Laoghaire
Co. Dublin A96 T927
Ireland

T: +353 1 238 3100
aecom.com

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1. Introduction

1.1 Background

AECOM have been appointed by South Dublin County Council (SDCC) to undertake a Stage 1 & 2 site specific Flood Risk Assessment in support of a Part 8 Application for a development at Clonburris Phase 01, Co. Dublin.

The Clonburris Phase 01 site is a predominantly greenfield site with an existing traveller accommodation site located on the eastern section. This traveller accommodation site shall be incorporated within these Phase 01 plans.

The site forms part of the overall Clonburris Strategic Development Zone (SDZ) lands which encompassed 280 hectares located between Lucan, Liffey Valley Clondalkin and Adamstown, Co. Dublin. This was granted permission by An Bord Pleanala in May 2019 (Ref ABP-301962-18).

Clonburris Infrastructure Limited (CIL) was set up by all landowners within the overall SDZ (including South Dublin County Council) to examine the infrastructural works required to allow the development of individual land parcels in a cohesive manner. This includes the Link Road, running east/west and its associated services.

The CIL have produced a series of strategic infrastructural documents, to support the planning application of the infrastructure works and were granted planning permission by SDCC under Plan. Reg. Ref. SDZ20A/0021 in August 2021. The CIL are currently undertaking the detailed design stage of the Link Road, foul and surface water networks and associated services.

AECOM have met with SDCC, CIL and their consultant engineers, DBFL Ltd, during the development of the scheme to discuss the challenges and solutions required to service the Clonburris Phase 01 site and appropriately connect into the foul and surface water networks, within this Link Road. The existing traveller accommodation is to be retained and therefore site levels within the subject site need to take account of this retained accommodation at the appropriate access points.

1.2 Introduction to Flood Risk Assessment

The existing ground levels at the site range from 55.9 m (east) and 61.7 m (west). The Kilmahuddrick Stream traverses the west of the site and is to be retained, the invert level of this stream ranges from 55 – 56.7 within the site. It is noted regrading works to the stream are proposed as part of the masterplan. The ditches to the east of the site are to be removed and replaced with drainage networks at the time of development.

Figure 1.1: Site Location relative to water Bodies (Source: OSi.ie)

1.3 1.3 The Planning System and Flood Risk Management

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

The Guidelines provide guidance on flood risk and development. A precautionary approach is recommended when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a risk based sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding.

The objective of a site-specific Flood Risk Assessment (FRA) is to assess all types of flood risk to a development. The assessment should investigate potential sources of flood risk and include for the effects of climate change. The assessment is required to examine the impact of the development and the effectiveness of flood mitigation and management procedures proposed. It should also present the residual risks that remain after those measures are put in place.

This approach is based on the identification of flood zones for river and coastal flooding. "Flood Zones" are geographical areas used to identify areas at various levels of flood risk. It should be noted that these do not consider the presence of flood defences, as the risks remain of overtopping and breach of the defences. Similarly, flood

zones are based on current day scenarios and do not include allowance of climate change factors. There are three flood zones defined (refer to Figure 1.2).

Flood Zone A (high probability of flooding) is for lands where the probability of flooding is greatest (greater than 1% or 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding).

Flood Zone B (moderate probability of flooding) refers to lands where the probability of flooding is moderate (between 0.1% or 1 in 1,000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 and 0.5% or 1 in 200 for coastal flooding).

Flood Zone C (low probability of flooding) refers to lands where the probability of flooding is low (less than 0.1% or 1 in 1000 for both river and coastal flooding).

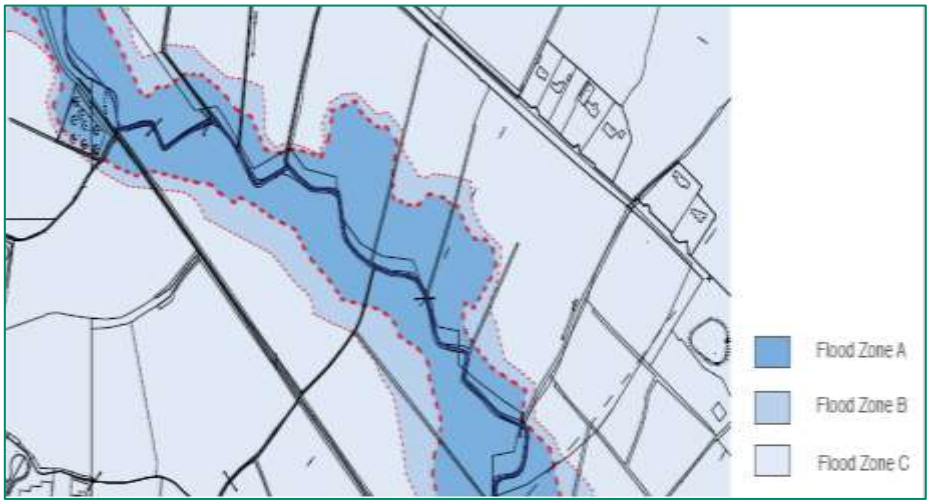


Figure 1.2: Indicative Flood Zone Map (Extract from the Guidelines)

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

The Guidelines set out a stage approach to assessment. The stages of assessment are:

Flood Risk Identification (Stage 1) – Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment.

Initial Flood Risk Assessment (Stage 2) – Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures.

Detailed Flood Risk Assessment (Stage 3) – Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk to the development, impacts on flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements of a Stage 1 and 2 Site Specific Flood Risk Assessment.

The potential risk to the proposed development associated with each of the following sources of flooding is investigated in this report;

- Fluvial flooding,
- Coastal/ Tidal flooding,
- Pluvial flooding.

2. Flood Risk Identification (Stage 1)

As part of Stage 1 of the FRA, a review of historical flooding records and other flood information sources was carried out to identify the potential sources of flooding to the development site.

2.1 History of Flooding

The Office of Public Works (OPW) collates available reports of flooding from all sources (e.g. fluvial, pluvial, coastal, etc.) on a nationwide basis. The OPW's website (www.floodinfo.ie) was consulted to obtain reports of recorded flooding within and surrounding the site. Figure 2.1 is an extract from the mapping available on the OPW database website, which indicates there is no historic records of flooding in the immediate vicinity of the site. Refer to Appendix A for the Past Flood Event Summary Report.

Figure 2.2 illustrates a flood extent marked with a blue polygon. In 2000, flooding of residential and commercial properties occurred in the lower catchment at Lucan Village, in the mid-catchment at the Old Forge, Grange Manor and Finnstown housing developments and in the upstream catchment at College Lane/Aylmer Road and at the Newcastle Treatment Works.

One recurring historical flood event is recorded 2.2 km east of the site. Flooding is associated with the Liffey Catchment. Floods were recorded at this location in 1994 and 2000.

Two previous single (non-recurring) flood events, approximately 2.5 km south-east and 1.75 km south-west of the site marked 'x'.

The south-east event occurred in January 1983, when extremely heavy rainfall on the 5th, 6th and 7th of November 1982 of 55.1 mm. "Approximately three-quarters of the monthly average rainfall for the month of November fell over a 24-hour period". The south-west event occurred in November 2000 when "rainfall varied across the County from the 76 mm recorded at Baldonnell to 137 mm recorded at Boharnabreena".

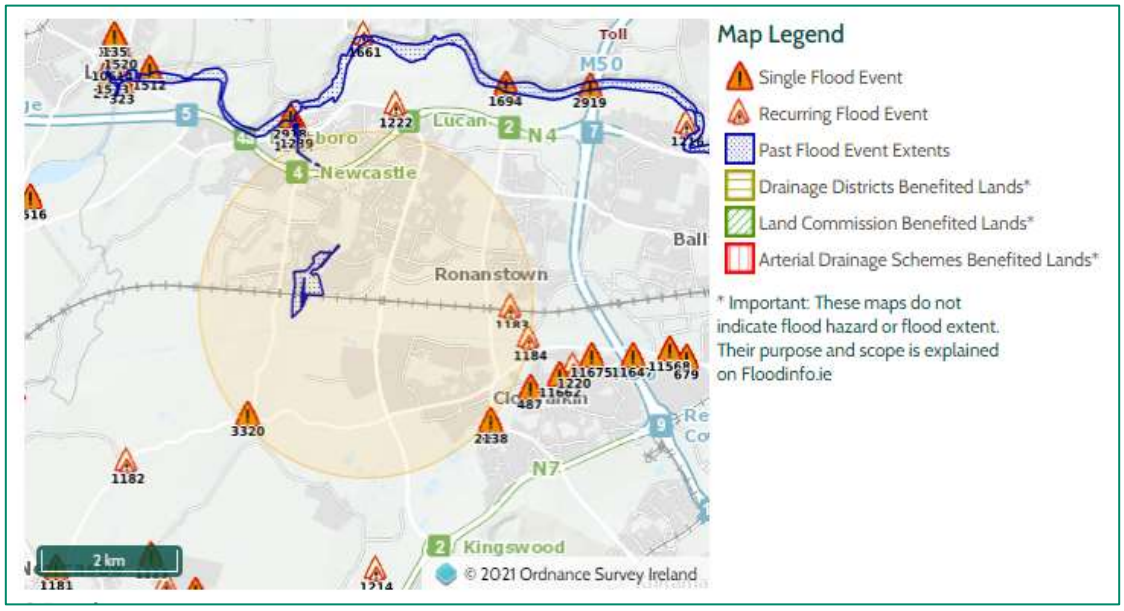


Figure 2.1: Floodinfo.ie map displaying recorded historical flood events

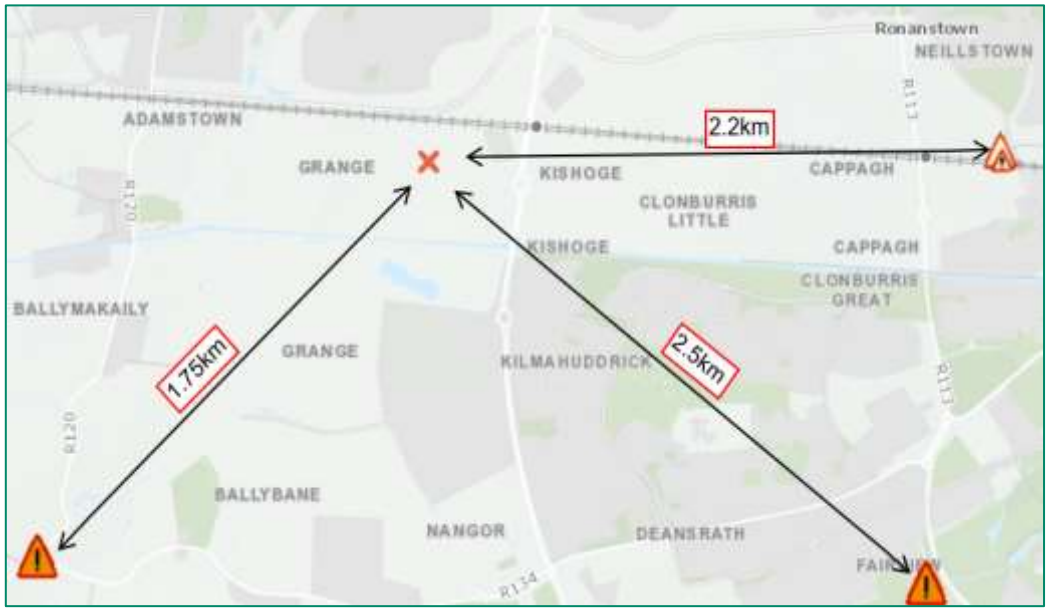


Figure 2.2: Recorded Historic Flood Events in the vicinity of the site (marked 'x')

2.2 CFRAM Predictive Flood Risk Mapping

The CFRAM (Catchment Flood Risk Assessment and Management) programme is a national programme which produced a series of Preliminary Flood Risk Assessment (PFRA) which cover the entire country. This assessment was carried out based on available and readily derivable information to identify areas where there may be a significant risk of flooding. The objective of the PFRA is to identify areas where the risks associated with flooding might be significant.

The PFRA was undertaken by:

- Reviewing records of flood that have happened in the past.
- Undertaking analysis to determine which areas might flood in the future, and what the impacts might be; and
- Consulting with Local Authorities and other Government department and agencies.

The objective of the PFRA was to identify areas where the risk associated with flooding might be significant. These areas, which are referred to as 'Areas for Further Assessment' or AFAs, were selected for a more detailed assessment in order to accurately define the extent and degree of flood risk.

The CFRAM predictive flood risk mapping was based on the output of hydraulic modelling carried out as part of the study.

The CFRAM predictive flood risk mapping was based on the output of hydraulic modelling carried out as part of the study. The hydraulic model predicts the water levels for three fluvial flood events at given nodes. Based on the predicted water levels at these nodes, fluvial flood extents associated with the 10% AEP event, 1% AEP event (Flood Zone A), and the 0.1% AEP event (Flood Zone B) are mapped.

The CFRAM mapping, available on floodinfo.ie, (refer to Figure 2.3 and corresponding Table 2.1) displays the flood extent of the Griffeen River for different fluvial events. The river is approx. 500 m west of the site boundary. The nearest portion of the floodplain is approximately 100 m metres west of the site boundary and therefore, the site is located in Flood Zone C as it is located outside the flood extent area of the 0.1% fluvial AEP (Annual Exceedance Probability) event.

For node 09GRIFB00009, which is nearest the site, Figure 2.3, the predicted Water Level (OD) 0.1% AEP is 56.88. The existing ground levels at the site range from 55.9 m (east) and 61.7 m (west).

At node 09GRIF00376aJ, which is approx. 300 m upstream of the aforementioned node, predicts a 0.1% AEP Water Level (OD) of 59.34 m. While this predicted water level is higher than levels on site, the flood extent for the

1:1000 year event (0.1% AEP) is not precited to extend as far as the subject site. The predicted flood extent is based on topographical information obtained at the time of the CFRAM study.

Based on the CFRAM flood extent map, it is concluded that the subject site is located within Flood Zone C.

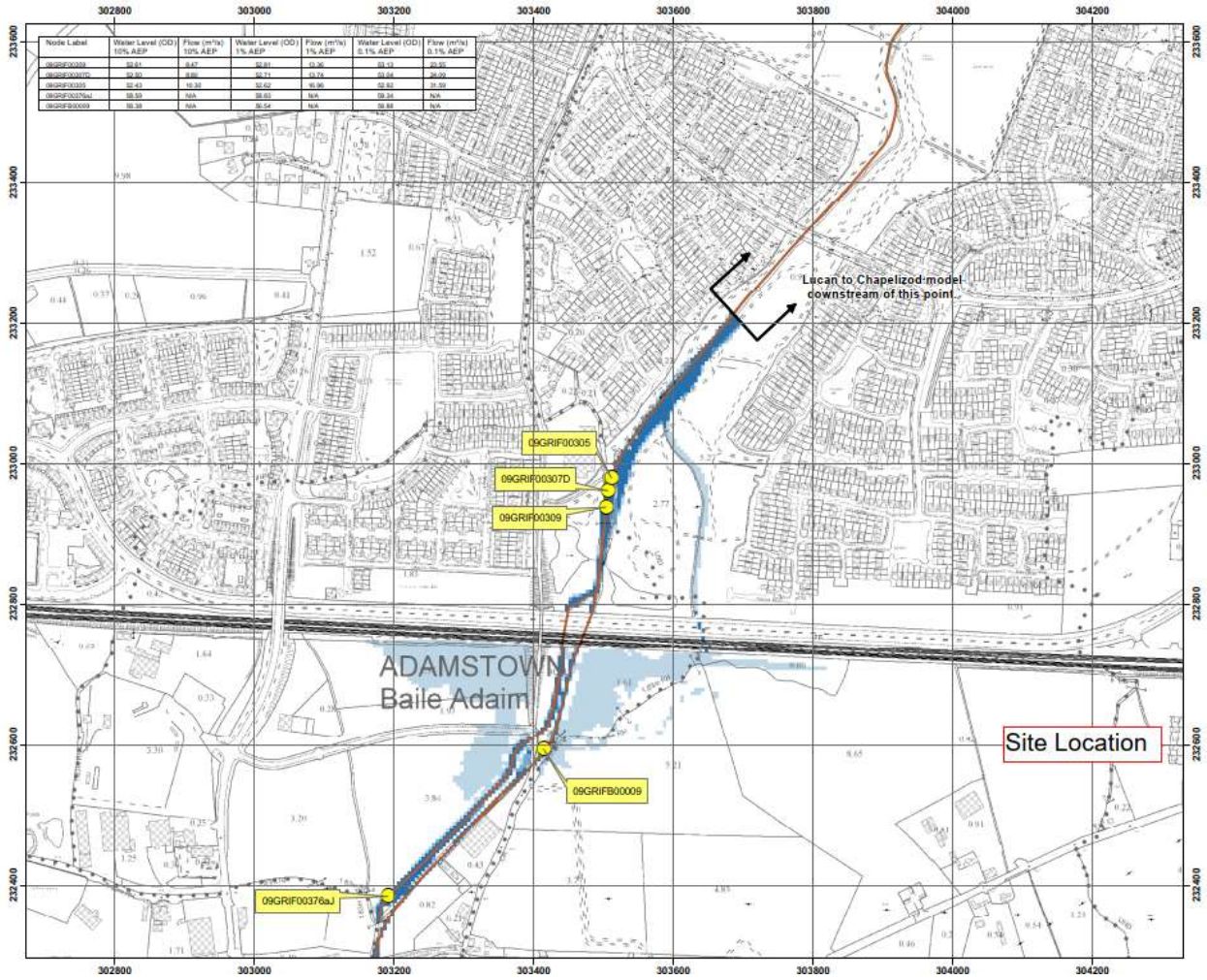


Figure 2.3: Fluvial CFRAM Flood Extensive Map (Full Map available in Appendix B)

Table 2.1: Nodes for Tile 11 on Floodinfo.ie maps

Node Label	Water Level (OD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m^3/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
09GRIF00309	52.61	8.47	52.81	13.36	53.13	23.55
09GRIF00307D	52.50	8.80	52.71	13.74	53.04	24.09
09GRIF00305	52.43	10.30	52.62	16.96	52.92	31.59
09GRIF00376aJ	58.59	N/A	58.83	N/A	59.34	N/A
09GRIFB00009	56.38	N/A	56.54	N/A	56.88	N/A

3. Initial Flood Risk Assessment (Stage 2)

3.1 Potential Sources of Flooding

Based on the review of the historical data and existing flood studies, the potential sources of flooding at the proposed development site are the following:

- Fluvial.
- Pluvial/Surface Water.

Fluvial Flooding

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out on to the adjacent floodplain. Mapping published as part of the OPW CFRAM Study is used to evaluate the fluvial flood risk to the proposed development. From a review of this mapping, it is concluded that the site is located within Flood Zone C, as it is approx. 300 metres from the flood extent of the Griffeen River for the 1:1000 year flood event.

Pluvial Flooding

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall. Flood risk from pluvial sources exists in all areas.

The proposed development will include a separate surface water drainage network to collect run-off generated within the site. This system will collect rainfall generated run-off within the site and convey flows through the proposed network.

It is proposed to attenuate the site within the regional pond, ATN-02, which is within sub-catchment 5 of the Clonburris Surface Water Management Plan (SWMP).

By ensuring compliance with the requirements of the Clonburris SWMP and sub-catchment 5, there will no increase in flood risk as a result of discharged from the site.

3.2 Climate Change

The CFRAM map outputs, discussed in Section 2.2, are a ‘present day scenario’ as allowances for climate change are not included.

Advice on the expected impacts of climate change and the allowances to provide for future flood risk management in Ireland is given in the “OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance”, 2009. Two climate change scenarios are considered, the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS).

The MRFS is intended to represent a ‘likely’ future scenario based on the wide range of future predictions available. The HEFS represents a more ‘conservative’ future scenario at the upper boundaries of future projections. Based on these two scenarios, the OPW recommended allowances for climate change are given in Table 3.1.

Table 3.1: Recommended allowances for climate change

Parameter	MRFS	HEFS
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500 mm	+1000 mm
Land Movement	-0.5 mm/year *	-0.5 mm/year *
Forestation	-1/6 Tp**	-1/3 Tp** +10% SPR ***

Notes:

* Applicable to the southern part of the country (Dublin – Galway and south of this).
** Reduce the time to peak (Tp) by a third; this allows for potential accelerated run-off that may arise as a result of drainage of afforested land.
*** Add 10% to the Standard Percentage Run-off (SPR) rate; this allows for increased run-off rates that may arise following felling of forestry.

Under the Strategic Flood Risk Assessment undertaken for the Clonburris SDZ, individual plots within the SSZ must have an allowance for a 20% climate change.

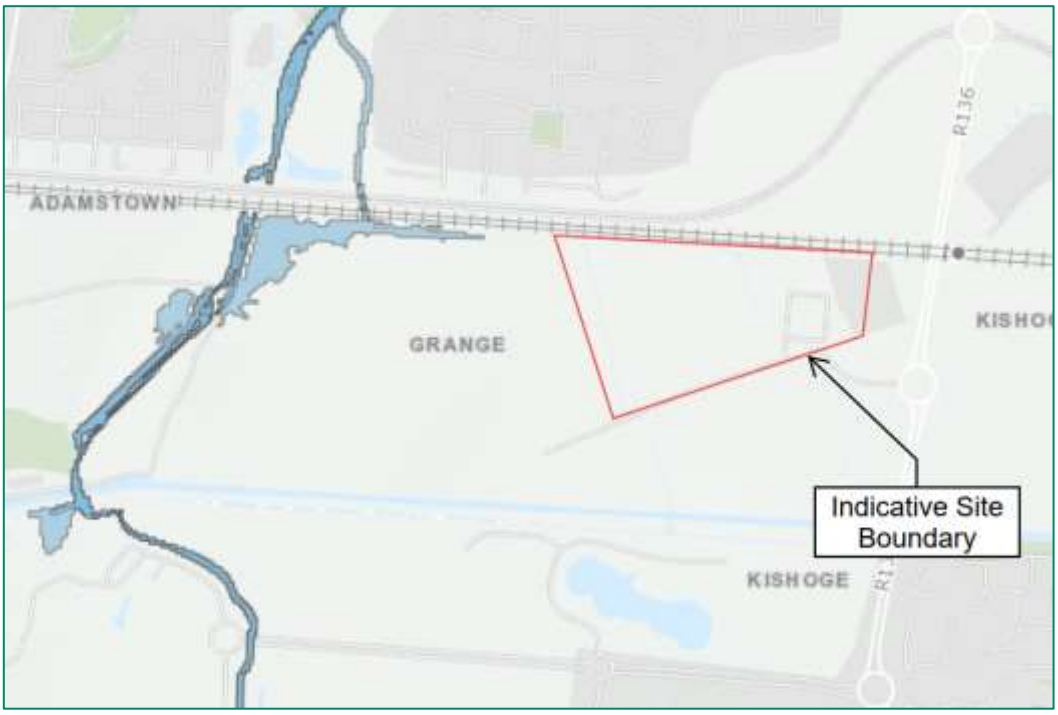


Figure 3.1: River Flood Extents - Mid-Range Future Scenario (Source: floodinfo.ie)

Please refer to DBFL drawing no. 190113-DBFL-SW-SP-DR-C-5204 P01 in Appendix C of this report, which shows the proposed flood compensation, including a 20% allowance for climate change.

Given the MRFS will be contained within the compensatory storage, the proposed site is not be within the floodplain.

3.3 Flood Risk Management

Chapter 3 of the Planning System and Flood Risk Management Guidelines (DEHLG/ OPW, 2009) describes the key principles of a risk based sequential approach to managing flood risk. The sequential approach is aimed at directing development toward land that is at low risk of flooding. Figure 3.2 is extracted from the Guidelines and

illustrates the sequence in which a site must be assessed from a flood risk standpoint. Specifically, the order in which the planning authority must be satisfied from a flood risk perspective is to *Avoid* (locate in an area that is not flood prone), then *Substitute* (if in a flood prone zone, then substitute the type of development), *Justify* (if substitution does not reduce flood risk sufficiently, then perform Justification Test) and *Mitigate*. This section discusses the sequential approach recommended in the Guidelines with regard to the proposed development.

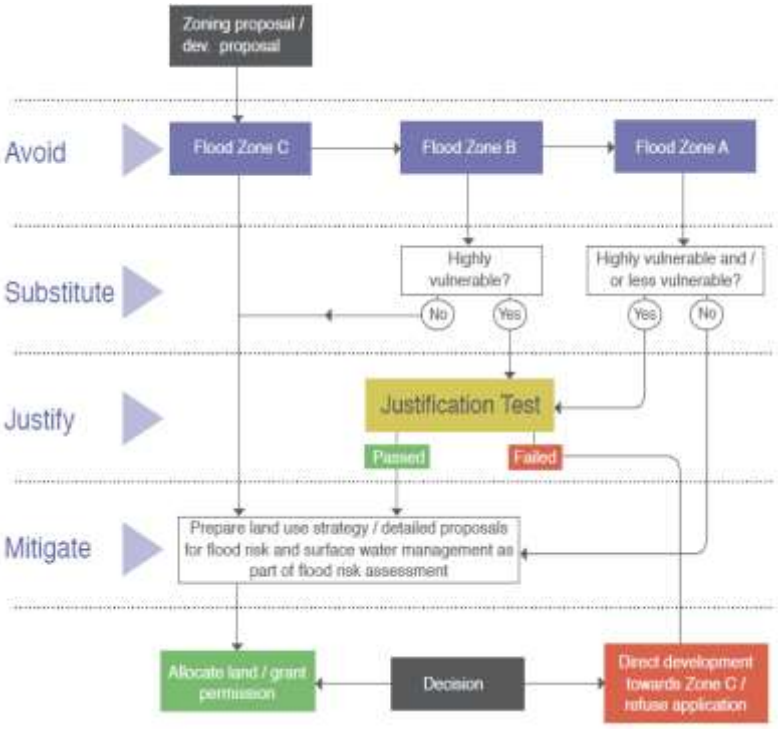


Figure 3.2: Sequential Approach Mechanism in the Planning Process

3.3.1 Sequential Approach

The first stage of the sequential approach is to avoid development in areas at risk of flooding. Flood Zones associated with river and coastal flooding are identified as Flood Zones A, B and C (Please refer to Section 2 for definitions). The planning implications for each of the flood zones include:

Flood Zone A – High probability of flooding: most types of development would be considered inappropriate in this zone. Development in this zone should be avoided or only considered in exceptional circumstances, such as in city and town centres where the Justification Test has been applied. Water compatible development such as docks or marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation would be considered appropriate in this zone.

Flood Zone B – Moderate probability of flooding: highly vulnerable development would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development and water compatible development would be considered appropriate in this zone. In general, less vulnerable development should only be considered in this zone if adequate lands or sites are not available within Flood Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will be adequately managed.

Flood Zone C – Low probability of flooding: Development in this zone is considered appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

The second stage of the sequential approach is to substitute the type of development to one less vulnerable to flooding.

3.3.2 Vulnerability

Table 3.1 of The Planning System and Flood Risk Management Guidelines for Planning Authorities provides a classification of vulnerability of different types of development. Figure 3.3 is taken from the Guidelines (Table 3.1) and sets out the Vulnerability Classifications of different types of land uses. Figure 3.4 (Table 3.2 of the Guidelines) describes the vulnerability of developments relative to the identified Flood Zone and when the requirements of the Justification Test must be satisfied.

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

*Uses not listed here should be considered on their own merits

Table 3.1 Classification of vulnerability of different types of development

Figure 3.3: Classification of Vulnerability (Table 3.1 taken from Guidelines)

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Table 3.2: Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test.

Figure 3.4: Matrix of Vulnerability (Table 3.2 taken from Guidelines)

The proposed land use for the proposed development is residential which falls within the ‘Highly Vulnerable Development’ classification, as shown in Figure 3.3 (Table 3.1 from the Guidelines). The lands are within Flood Zone C, therefore the development is deemed appropriate in terms of flood risk.

4. Proposed FFL levels

As part of the ongoing engagement with SDCC, and as CIL/DBFL develop the detailed design stage of the Link Road and associated infrastructure under Plan. Reg. Ref. SDZ20A/002, AECOM and the wider design team have been required to raise the ground level at a number of locations, within the subject site, to allow the discharge of foul and surface water, via gravity into the Link Road Network.

Having reviewed the recent information provided by CIL/DBFL, the Top Water Level (TWL), within the regional pond, 'ATN-02', is 55.724, refer to DBFL drawing no. 190113-DBFL-SW-SP-DR-C-5204 P01, Appendix C. In accordance with best practice the proposed Finished Floor Levels (FFL) associated with this regional attenuation pond should have a 500 mm freeboard above this TWL, i.e., 56.224.

It should also be noted that the closest node as shown in Figure 2.3, 09GRIFB00009, has a predicted Water Level (OD) 0.1% AEP of 56.88.

The proposed FFL within the site ranging from 58.0 to 59.5. these levels are in excess of 1 m above both potential flood levels described above.

5. Drainage Impact Assessment

As stated above, AECOM and the wider design team were required to examine various options to allow to ensure that the surface water could be discharged, via the propose network within the Link Road, as required under the Clonburris SDZ. As set out in the Stage 1B report, the Clonburris Phase 01 site is within sub-catchment 5 of the Surface Water Management Plan (SWMP) for the overall Clonburris SDZ, which allow the majority of the site, which is not identified as urban centre, to be attenuated in the regional pond, 'ATN-02', without any flow controls.

The proposed SuDS measures, as shown in AECOM drawing no. 0520 (refer to AECOM's accompanying Infrastructure Report for further detail), will help to reduce the rate of run-off from the site by allowing longer retention times on site and reducing the amount of run-off overall by providing interception through evapotranspiration from the green roofs, raingardens and permeable paving. The proposed SuDS measures also provide a better water quality discharging from the site as the proposed SuDS measures remove pollutants and suspended solids at source.

DBFL have confirmed that flood water can back up the pipe, however it was not confirmed how far upstream the water will back up based on the DBFL model or what the maximum water level in the manholes would be.

A flood exceedance route has also been developed as part of the overall pack, which directs large flows towards the green areas. Refer to AECOM drawing no. CLON-ACM-00-XX-DR-C-10-0550 - Proposed Flood Exceedance Route.

6. Queries Raised by SDCC

As stated above, AECOM and the design team have engaged with SDCC over the past few months in order to address the potential issues regarding the raising of the exiting ground levels, connection into the surface water network along the Link Road and the potential impacts on architecture, landscape and cost.

The Infrastructure Report and drawings provide backup in relation self-cleansing velocities, invert levels and flood exceedance routes. Please refer to Section 2.9 of the Infrastructure Report.

Section 5 above addressed the proposed site FFL and their relationship to the Top Water Level within the regional pond.

7. Conclusion

This site-specific Stage 1 & 2 Flood Risk Assessment has been carried out to accompany the Part 8 application for a site which forms part of the overall Clonburris Strategic Development Zone (SDZ)

This report was written with The Planning System and Flood Risk Management Guidelines for Planning Authorities in mind and follows the requirements of a Stage 1&2 Flood Risk Assessment.

All existing information has been reviewed regarding the flood risk in the area, there is no recorded history of flood events in the immediate vicinity of the site. The CFRAM fluvial flood risk mapping is considered to have the most up to date and reliable estimates of extreme water levels. This mapping provides estimated water levels associated with a 1:10 year event (Flood Zone A), 1:100 year event (also Flood Zone A) and 1:1000 year event (Flood Zone B). This mapping confirms that the site is not currently at risk of fluvial flooding.

Based off this CFRAM mapping, the site is situated in Flood Zone C, as it is located outside the extent of the 1:1000 year fluvial floodplain. It is noted that;

- the CFRAM mapping is based on topographical information obtained at the time of the study,
- the Flood Zone definition does not take account of potential changes due to climate change. The CFRAM mapping available

DBFL drawing no. 190113-DBFL-SW-SP-DR-C-5204 P01 (refer to Appendix C) shows the proposed flood compensation, which includes a 20% allowance for climate change and confirms that the site is outside the floodplain of the Griffeen River.

Appendix A – Past Flood Event Summary Report

Past Flood Event Local Area Summary Report

Report Produced: **15/3/2021 14:40**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

Map Legend

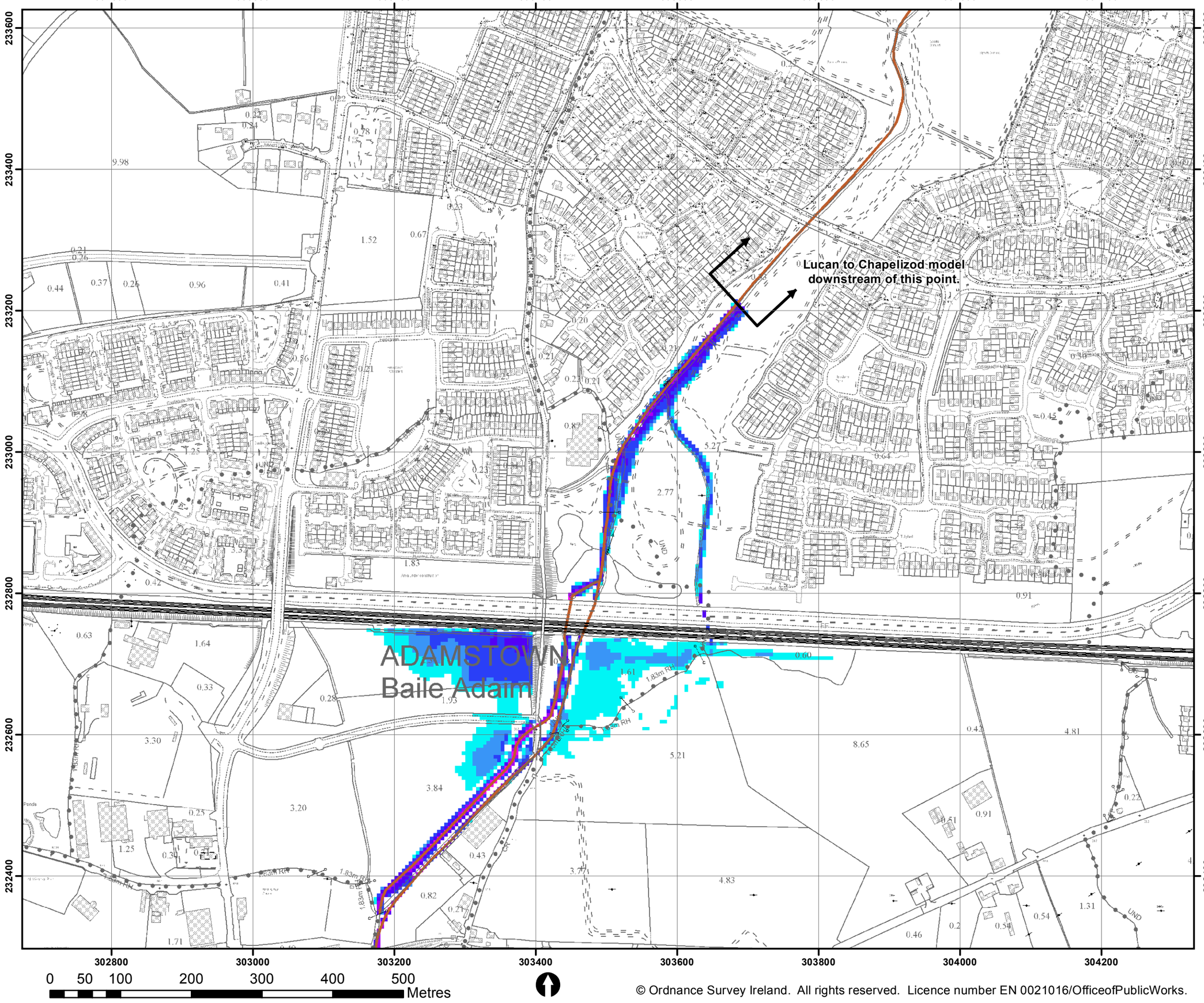
- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

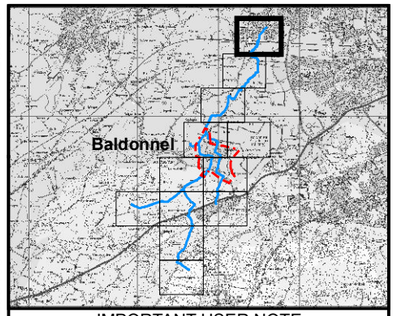
* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

3 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Griffeen November 2000 (ID-1237)	05/11/2000	Area
	Additional Information: Reports (16) Press Archive (6)		
2.	Beech Row Ronanstown Recurring (ID-1183)	n/a	Approximate Point
	Additional Information: Reports (3) Press Archive (0)		
3.	Peamount R134 R120 junction Nov 2000 (ID-3320)	05/11/2000	Approximate Point
	Additional Information: Reports (1) Press Archive (1)		

Appendix B – CFRAM Mapping





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

Legend

0.1% Fluvial AEP Flood Depth

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

FINAL

REV:	NOTE:	DATE:

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
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:
Baldonnel Fluvial Flood Depths

Map Type:	**DEPTH**	
Source:	**FLUVIAL**	
Map Area:	**HPW**	
Scenario:	**CURRENT**	
Drawn By :	**C.C.**	**Date : 29 July 2016**
Checked By :	**D.I.**	**Date : 29 July 2016**
Approved By :	**S.P.**	**Date : 29 July 2016**

Drawing No. :
E09BAL_DPFCD001_F0_11

Map Series : Page 11 of 12

Drawing Scale : 1:5,000 @ A3

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
09GRIF00309	52.61	8.47	52.81	13.36	53.13	23.55
09GRIF00307D	52.50	8.80	52.71	13.74	53.04	24.09
09GRIF00305	52.43	10.30	52.62	16.96	52.92	31.59
09GRIF00376aJ	58.59	N/A	58.83	N/A	59.34	N/A
09GRIFB00009	56.38	N/A	56.54	N/A	56.88	N/A

302800 303000 303200 303400 303600 303800 304000 304200

233600 233400 233200 233000 232800 232600 232400

09GRIF00305

09GRIF00307D

09GRIF00309

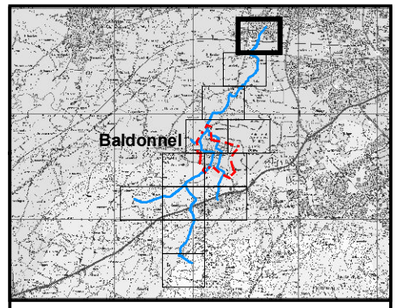
09GRIFB00009

09GRIF00376aJ

Lucan to Chapelizod model downstream of this point.

ADAMSTOWN
Baile Adaim

0 50 100 200 300 400 500 Metres



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
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW
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Jonathan Swift Street
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Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

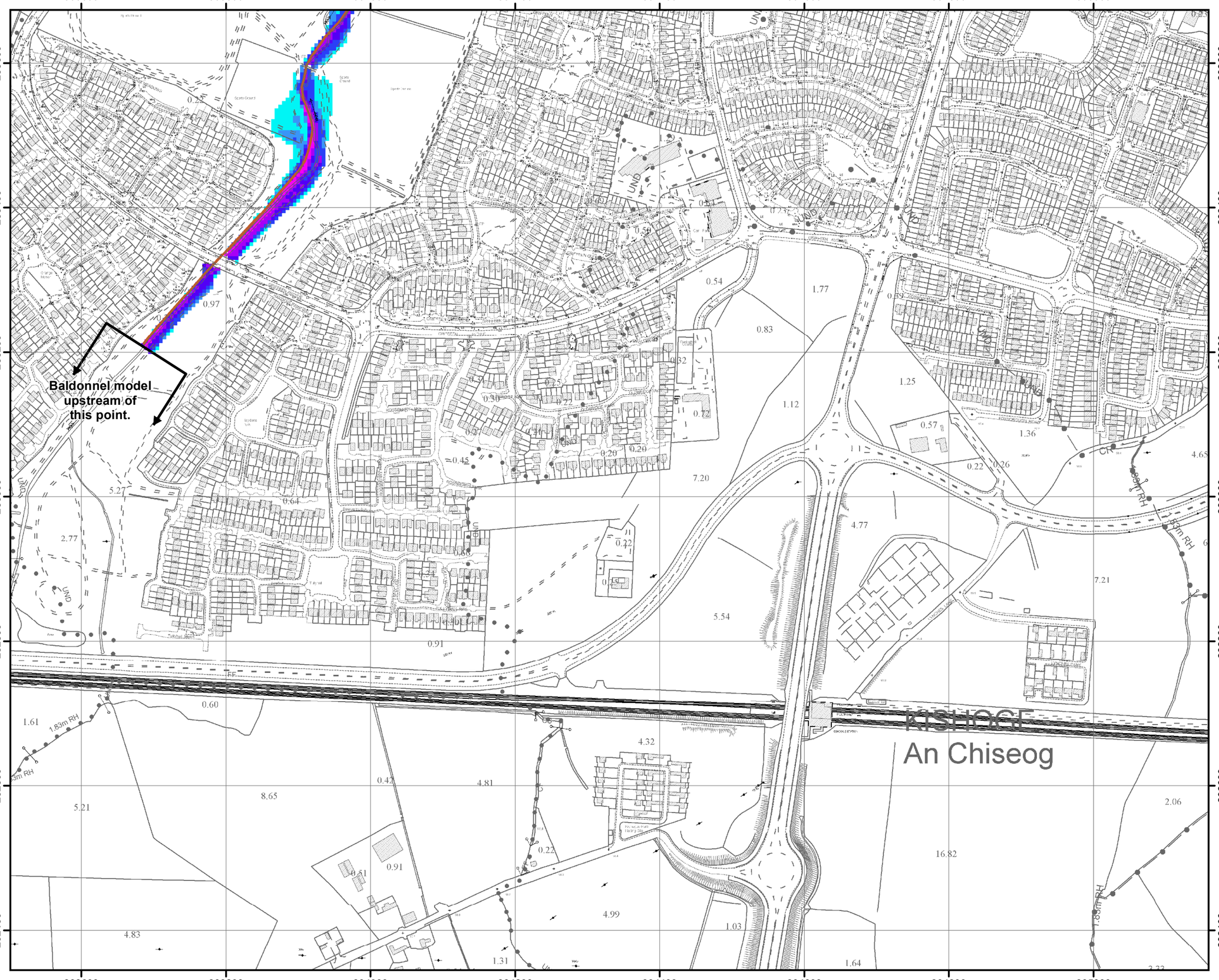
Map: Baldonnel Fluvial Flood Extents

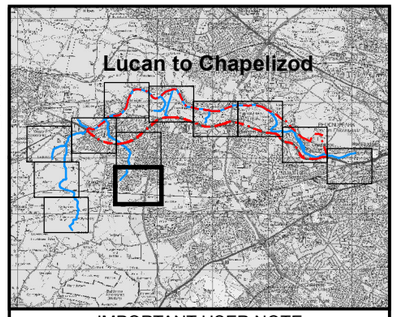
Map Type:	EXTENT	
Source:	FLUVIAL	
Map Area:	HPW	
Scenario:	CURRENT	
Drawn By :	C.C.	Date : 21 July 2016
Checked By :	D.I.	Date : 21 July 2016
Approved By :	G.G.	Date : 21 July 2016

Drawing No. : E09BAL_EXFCD_F0_11

Map Series : Page 11 of 12

Drawing Scale : 1:5,000 @ A3





IMPORTANT USER NOTE:
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Legend

0.1% Fluvial AEP Flood Depth

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

Modelled River Centreline

AFA Extents

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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RPS

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Trim
Co Meath

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74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

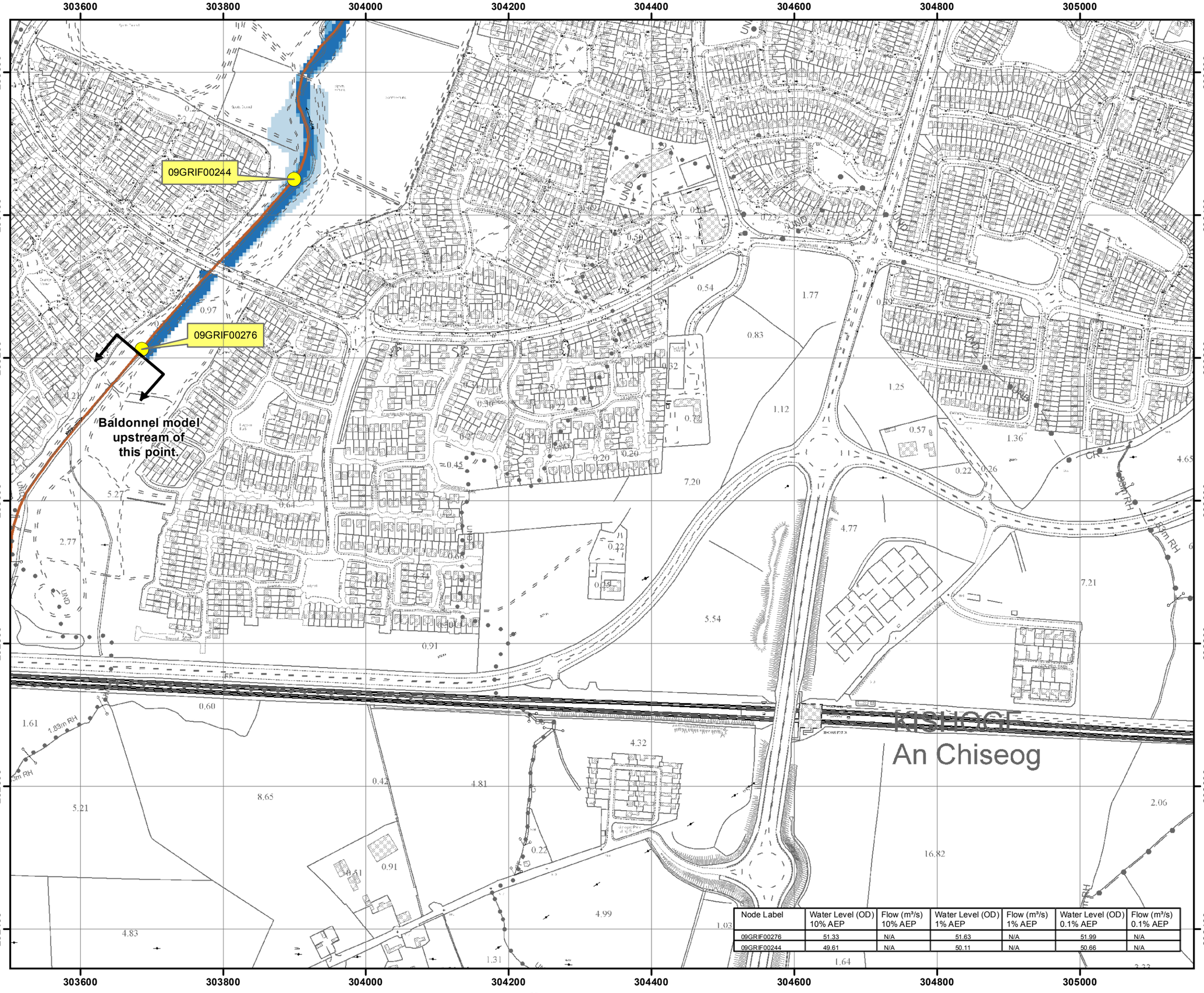
Map:
Lucan to Chapelizod Fluvial Flood Depths

Map Type:	**DEPTH**		
Source:	**FLUVIAL**		
Map Area:	**HPW**		
Scenario:	**CURRENT**		
Drawn By :	**C.McG.**	**Date :**	**28 July 2016**
Checked By :	**S.P.**	**Date :**	**28 July 2016**
Approved By :	**G.G.**	**Date :**	**28 July 2016**

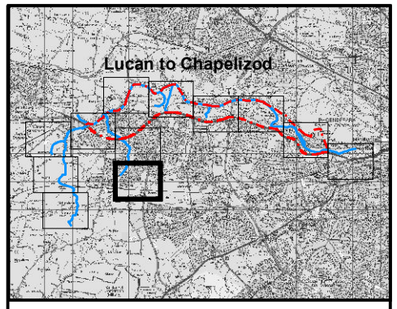
Drawing No. :
E09LUC_DPFCD001_F0_05

Map Series : Page 5 of 12

Drawing Scale : 1:5,000 @ A3



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
09GRIF00276	51.33	N/A	51.63	N/A	51.99	N/A
09GRIF00244	49.61	N/A	50.11	N/A	50.66	N/A



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

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Map:
Lucan to Chapelizod Fluvial Flood Extents

Map Type:	**EXTENT**		
Source:	**FLUVIAL**		
Map Area:	**HPW**		
Scenario:	**CURRENT**		
Drawn By :	**C.C.**	**Date :**	**27 July 2016**
Checked By :	**S.P.**	**Date :**	**27 July 2016**
Approved By :	**G.G.**	**Date :**	**27 July 2016**

Drawing No. :
E09LUC_EXFCD_F0_05

Map Series : Page 5 of 12

Drawing Scale : 1:5,000 @ A3

Appendix C – 190113-DBFL-SW-SP-DR-C-5204 Flood Compensation

ON ORIGINAL

0 5 10 15 20 25 30 40 50mm

NOTES:

GENERAL NOTES
1. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TII SPECIFICATION FOR ROADWORKS AND SOUTH DUBLIN COUNTY COUNCIL STANDARDS.
2. ALL DIMENSIONS IN METRES UNLESS SPECIFIED OTHERWISE.
3. ALL CO-ORDINATES ARE TO IRISH TRANSVERSE MERCATOR (ITM).
4. ALL LEVELS ARE TO ORDNANCE DATUM (MALIN HEAD).
5. ALL TEMPORARY TRAFFIC MANAGEMENT SHALL COMPLY WITH CHAPTER 8 OF THE TRAFFIC SIGNS MANUAL.
6. ALL MATERIAL TO BE DISPOSED OFF SITE SHALL BE TAKEN TO A LICENSED FACILITY APPROVED BY SOUTH DUBLIN COUNTY COUNCIL.
7. ALL AGGREGATES PROPOSED FOR USE ON THIS SCHEME SHALL MEET FULLY THE REQUIREMENTS OF THE CONTRACT SPECIFICATION AND IN ADDITION THE REQUIREMENTS STATED IN STANDARD RECOMMENDATION S.R. 21:2014 GUIDANCE ON THE USE OF I.S. EN 13242:2002 +A1:2007 – AGGREGATES FOR UNBOUND AND HYDRAULICALLY BOUND MATERIALS FOR USE IN CIVIL ENGINEERING WORK AND ROAD CONSTRUCTION. FURTHER DETAIL IS PROVIDED IN ADDITIONAL CLAUSE 144AR OF THE CONTRACT SPECIFICATION.

DRAWING SPECIFIC NOTES
1. ALL FOUL SEWERS, RISING MAINS, MANHOLES AND CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE AND IRISH WATER WASTEWATER INFRASTRUCTURE STANDARD DETAILS.
2. ALL SURFACE WATER SEWERS, CONNECTIONS, MANHOLES AND GULLIES TO BE CONSTRUCTED IN ACCORDANCE WITH GREATER DUBLIN REGIONAL CODE OF PRACTICE FOR DRAINAGE WORKS.
3. ALL COVER AND FRAMES SHALL BE CLASS D400, 150mm DEEP IN ROADS AND 100mm DEEP IN VERGES AND GRASSED AREAS.
4. ALL SEWERS SHALL BE PRESSURE TESTED PRIOR TO BACKFILLING.

LEGEND
- PROPOSED SURFACE WATER
- 375 EXISITNG SURFACE WATER
- DETENTION BASIN
- ATTENUATION / FLOOD COMPENSATION POND
- DRAINAGE DITCH
- PREDEVELOPMENT CFRAM FLOOD AREA 0.1% A.E.P.
- FLOODPLAIN REDUCTION AREA

ATN 01
Attenuation Area 1
Pond & Bioswale
Pond
Permanent water depth: 0.6m
Active storage depth: 1.0m
TWL:56.304
PWL:56.304
IL:55.304
Vol : 10,3m3

FLOW CONTROL MANHOLE (HYDROBRAKE OPTIMUM OR SIMILAR) MaxQ= 44.74 l/s

BYPASS INTERCEPTOR BY KARLGESTER (NSBE050) OR SIMILAR APPROVED

BOX CULVERT CROSSING OF GRIFEEN RIVER TO MAINTAIN INDIVIDUAL CHANNELS AS PER PREDEVELOPMENT SCENARIO

PIPE CULVERT AND DRAINAGE DITCH FOR FLOOD COMPENSATION BASIN

BYPASS INTERCEPTOR BY KARLGESTER (NSBE125) OR SIMILAR APPROVED

FLOW CONTROL MANHOLE (HYDROBRAKE OPTIMUM OR SIMILAR) MaxQ= 209.31 l/s

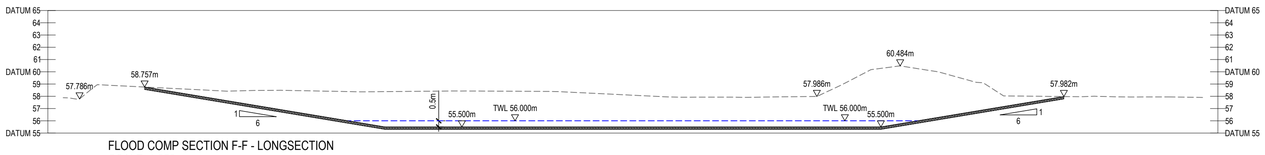
PIPE CULVERT TO MAINTAIN EXISTING AGRICULTURAL DRAINAGE

PIPE CULVERT TO MAINTAIN EXISTING AGRICULTURAL DRAINAGE

FLOOD COMP.
Flood Compensation Basin
Active storage depth: 0.50m
at 0.1% AEP + 20% (climate change)
TWL:56.00
IL:55.50
Vol : 1,200

ATN 02
Attenuation Area 2
Pond & Bioswale
Pond
Permanent water depth: 0.6m
Active storage depth: 1.1m
TWL:55.724
PWL:54.624
IL:54.024
Vol : 21,300

PLAN (SCALE 1:1000)



FLOOD COMP SECTION F-F - LONGSECTION
SCALE: 1:250

FLOOD COMP SECTION G-G - LONGSECTION
SCALE: 1:250

OS SHEET REFERENCE:
3260-14, 3260-15, 3260-19, 3260-20, 3260-24, 3260-25, 3261-11, 3261-12, 3261-13, 3261-14, 3261-16, 3261-17, 3261-18, 3261-19, 3261-21, 3261-22, 3261-23, 3261-24, 3325-04, 3325-05, 3325-09, 3325-10, 3326-01, 3326-02, 3326-03, 3326-04, 3326-06, 3326-07, 3326-08, 3326-09

rev	date	description	by	chkd.
P01	16-12-20	PLANNING APPLICATION SUBMISSION	OC	NCG

client approval: A - Approved; B - Approved with comments; C - Do not use

suitability: S2 - INFORMATION
issue purpose: PLANNING

DBFL Consulting Engineers
Civil, Structural & Transportation Engineering
www.dbfl.ie

DUBLIN OFFICE Ormond House, Upper Ormond Quay, Dublin 7, Ireland. PHONE +353 1 400 4000

CORK OFFICE: Phoenix House, Monahan Road, Cork. PHONE +353 (0) 21 2024538

WATERFORD OFFICE Unit 2, The Chandlery, 1-2 O' Connell Street, Waterford, Ireland. PHONE +353 51 309 500

project ref.
CLONBURRIS INFRASTRUCTURE DEVELOPMENT

drawing title
FLOOD COMPENSATION BASIN DETAILS

client
CLONBURRIS INFRASTRUCTURE LIMITED

designed by	author	scale	sheet size
OC	OC	AS SHOWN	A1

drawing no.: 190113-DBFL-SW-SP-DR-C-5204
revision: P01

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