

# Kildare County Library

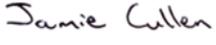
Part 8 Flood Risk Assessment

Kildare County Council

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## Table of Contents

1.	Introduction .....	5
1.1	Background .....	5
1.2	Existing Site .....	5
1.3	Topography .....	6
2.	The Planning System and Flood Risk Guidelines .....	7
2.1	The Planning System and Flood Risk Management .....	7
2.2	Strategic Flood Risk Assessment for the Kildare County Council Development Plan 2017 – 2023 .....	8
2.3	Newbridge Local Area Plan 2013 – 2019 .....	8
2.4	Strategic Flood Risk Assessment for the Newbridge Local Area Plan 2013 - 2019 .....	9
2.5	Eastern CFRAM Study Liffey Flood Controls & Flood Forecasting System Option .....	10
3.	Flood Risk Identification .....	12
3.1.1	OPW Flood Hazard Mapping .....	12
3.1.2	OPW PFRA Mapping .....	12
3.1.3	Eastern CFRAM Mapping .....	13
3.1.4	Pluvial Flooding .....	16
3.1.5	Geological Soil Conditions .....	16
4.	Conclusion .....	19
	Appendix A - SFRA Map from Newbridge LAP .....	20
	Appendix B - Flood Zones Established by Detailed FRA .....	21
	Appendix C - OPW Flood Records .....	22
	Appendix D – Eastern CFRAM Mapping .....	23

## Figures

Figure 1.	Existing Site Location & Works Boundary (Source: <a href="#">Google Maps</a> ) .....	5
Figure 2.	Indicative Flood Zone Map (Extract from the Guidelines) .....	7
Figure 3.	Areas Subject to a Site-Specific FRA (Source: <a href="#">Newbridge LAP</a> ) .....	9
Figure 4.	Flood Risk Zones Determined by Detailed FRA (Source: <a href="#">Draft SFRA</a> ) .....	10
Figure 5.	Historic Flood Events in the Vicinity of the Subject Site (Source: <a href="#">Floodinfo.ie</a> ) .....	12
Figure 6.	PFRA Mapping (Source: <a href="#">myplan.ie</a> ) .....	13
Figure 7.	Extract from CFRAM Fluvial Flood Extents (Source: Drawing No. E09NEW_EXFCD_F1_07) .....	14
Figure 8.	CFRAM River Flood Extents – Mid-Range Future Scenario (Source: <a href="#">floodinfo.ie</a> ) .....	15
Figure 9.	CFRAM River Flood Extents – High-Range Future Scenario (Source: <a href="#">floodinfo.ie</a> ) .....	15
Figure 10.	Pluvial Flood Zones as defined by the PFRA Mapping (Source: <a href="#">myplan.ie</a> ) .....	16
Figure 11.	Vulnerability Mapping Criteria (Source: DELG/EPA/GSI 1999) .....	17
Figure 12.	Groundwater Vulnerability Map for Proposed Site (Source: <a href="#">GSI Groundwater Data Viewer</a> ) .....	17
Figure 13.	Subsoil Permeability Map for Proposed Site (Source: <a href="#">GSI Groundwater Data Viewer</a> ) .....	18
Figure 14.	Groundwater Flooding Probability Map (Source: <a href="#">floodinfo.ie</a> ) .....	18

## Tables

Table 1.	Predicted Fluvial Flood Water Levels in the Vicinity of the Site .....	14
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# 1. Introduction

## 1.1 Background

AECOM have been appointed on behalf of Kildare County Council (KCC) to carry out a Flood Risk Assessment (FRA) as part of a Part 8 application to KCC for the redevelopment of Kildare County Library Archives and Cultural Centre at Main Street, Newbridge, Co. Kildare.

This FRA has been prepared to support a Planning Application for the proposed development and is in line with the requirements of “The Planning System & Flood Risk Management Guidelines of Planning Authorities” (Guidelines) as published in November 2009, and the particular requirements of a site-specific Flood Risk Assessment as outlined in Appendix A of the Technical Appendices to those Guidelines.

The following documents have been reviewed in support of this report:

- Newbridge Local Area Plan 2013 – 2019 (Newbridge LAP)
- Strategic Flood Risk Assessment (SFRA) for the Newbridge LAP 2013 – 2019
- Strategic Flood Risk Assessment for the Kildare County Development Plan (KCDP) 2017 – 2023
- Eastern CFRAM Study Liffey Flood Controls & Flood Forecasting System Option

## 1.2 Existing Site

The existing site is located at Main Street, Newbridge, Co. Kildare and is bounded to the east by Athgarvan Road (R416), to the north by Main Street (R445), to the west by the Riverbank Arts Centre and to the south by existing residential developments. Refer to Figure 1 for the site location and proposed works boundary for the development.

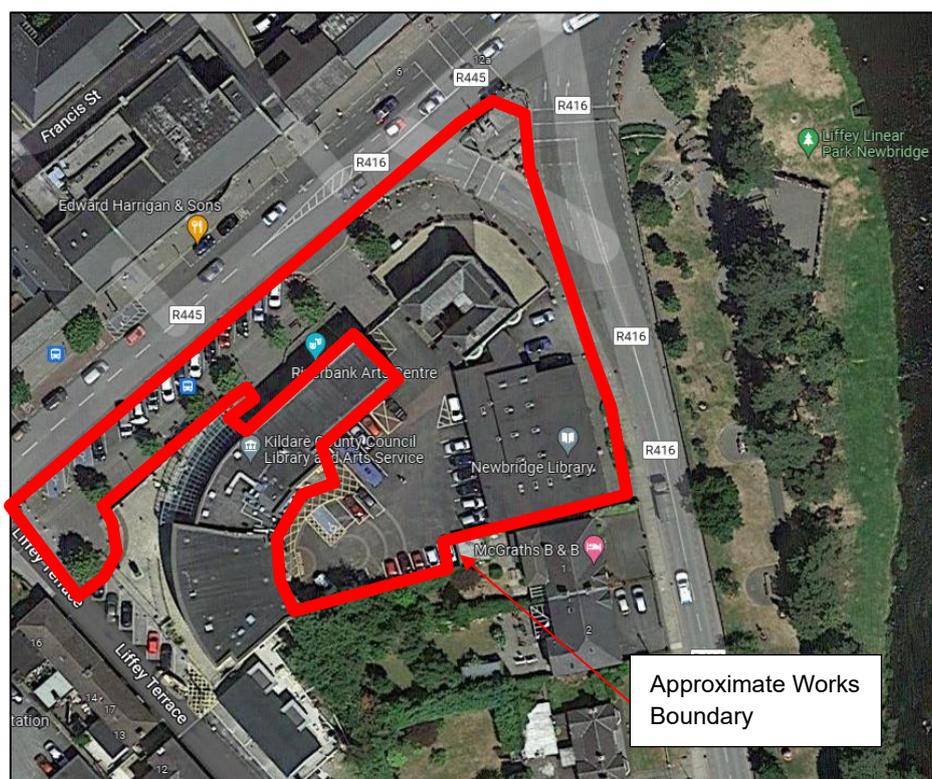


Figure 1. Existing Site Location & Works Boundary (Source: [Google Maps](#))

The existing site consists of the Newbridge Library and is predominately made up of a hardstanding area with some vegetation present around the site. The existing library site, including the rear car park amounts to 0.20ha.

### 1.3 Topography

The topographical survey prepared by Murphys Geospatial for the proposed site and surrounding area indicates that the existing levels within the site vary from a high point of 86.48 mOD west of the site to a low point of 85.79 mOD located at the east side of the site. The average gradient across the site was found to be approximately 1:92 which confirms that the topography is gently sloping.

## 2. The Planning System and Flood Risk Guidelines

### 2.1 The Planning System and Flood Risk Management

In September 2008 “The Planning System and Flood Risk Management” 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.

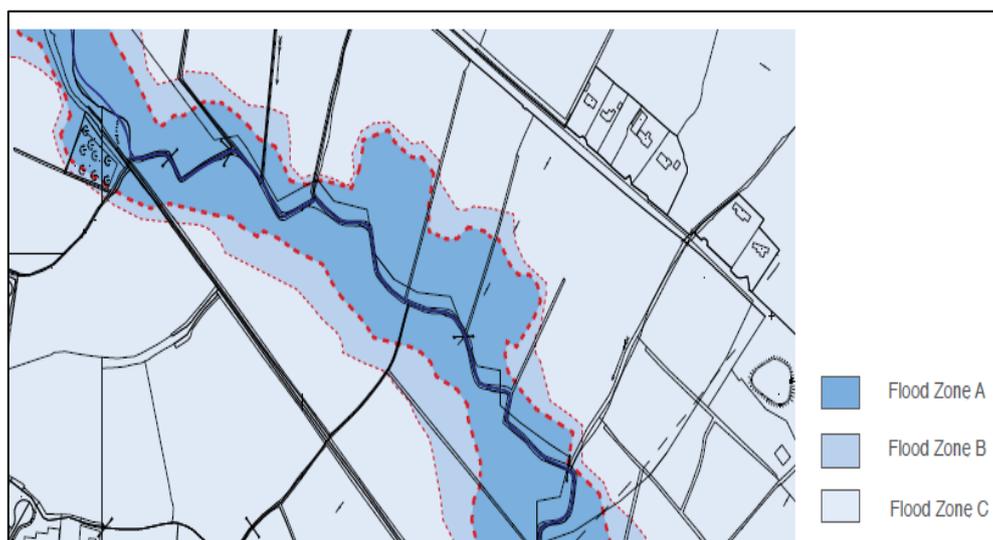
The objective of a site-specific Flood Risk Assessment (FRA) is to assess all types of flood risk to a development. The assessment should investigate potential sources of flood risk and include for the effects of climate change. The assessment is required to examine the impact of the development and 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 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 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 three staged approach to carrying out an FRA:

- **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 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
- Groundwater flooding

## 2.2 Strategic Flood Risk Assessment for the Kildare County Council Development Plan 2017 – 2023

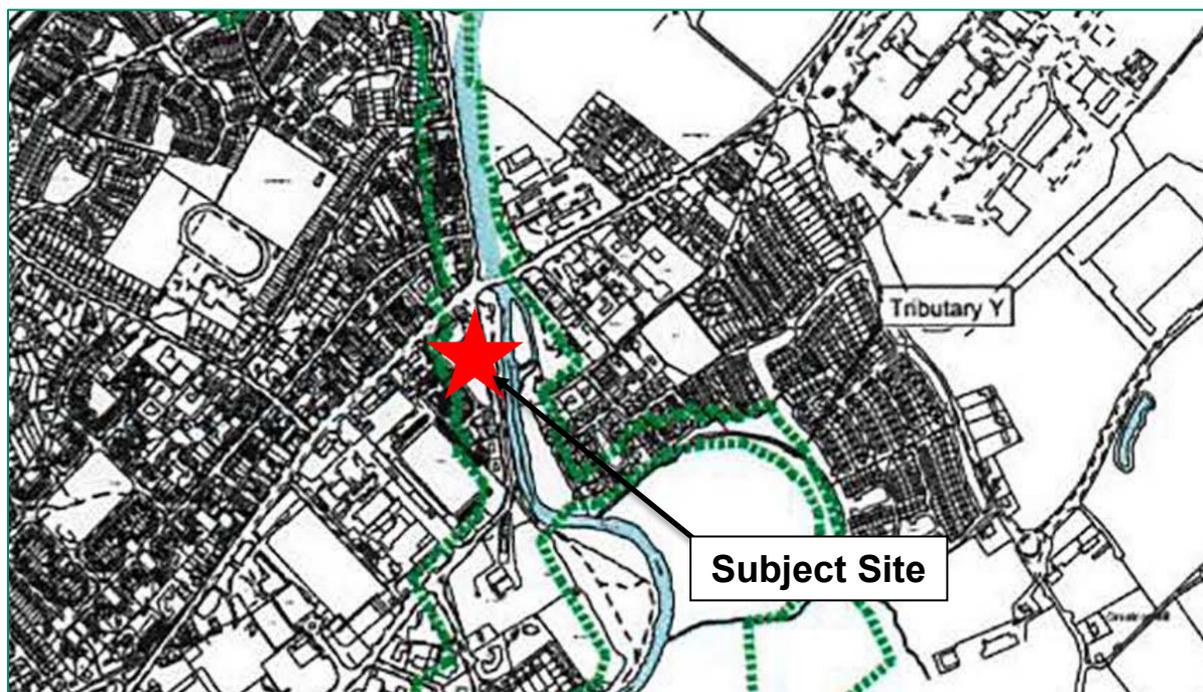
In preparing this Flood Risk Assessment, AECOM have taken cognisance of the SFRA of the Kildare County Development Plan (KCDP) 2017 – 2023. Of particular relevance to the production of this Flood Risk Assessment Report are the core objectives in relation to flood risk management contained in Section 3.1 of the SFRA of the KCDP. The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding
- Avoid new developments which may increase flood risk elsewhere, including that which may arise from surface water run-off
- Ensure effective management of residual risks for development permitted in floodplains
- Avoid unnecessary of national, regional, or local economic and social growth
- Improve the understanding of flood risk among relevant stakeholders
- Ensure that the requirements of the EU and national law in relation to the natural environment and natural conservation are complied with at all stages of flood risk management

Section 5.5 of the SFRA of the KCDP highlight the main flood control measures for the River Liffey. The flows are greatly influenced by the dams and reservoirs, most notably, Poulaphouca which due to its large storage capacity can store large volumes of runoff which acts as a flood relief reservoir for the River Liffey. Golden Falls also provides some storage capacity but still provide some attenuation effect in the middle and lower reaches of the River Liffey. Please refer to Section 2.5 of this document for more details on the Flood Control Measures of the River Liffey.

## 2.3 Newbridge Local Area Plan 2013 – 2019

As mentioned in the SFRA of the KCDP, the larger towns and population centres (above 5,000) in the County are subject to their own Local Area Plans (LAP's). The Newbridge LAP provides information on flood risk areas and assists in identifying flood prone areas within Newbridge. Map 3 within the LAP, refer to Figure 3 for an extract of this map and Appendix A for the full map, identifies the areas within Newbridge that will be subject to a site-specific flood risk assessment (FRA).



**Figure 3. Areas Subject to a Site-Specific FRA (Source: [Newbridge LAP](#))**

As shown in the figure above, the location of the proposed development requires a site-specific FRA. Section 7.8.5 of the LAP sets out the key flood risk management policies and can be summarized as follows:

- To apply the general policies, requirements and objectives contained in Chapter 7 of the KCDP.
- To implement the requirements of The Planning System and Flood Risk Management - Guidelines for Planning Authorities (2009) and the Newbridge SFRA in the carrying out of functions during the period of the Plan and to update the SFRA for Newbridge as appropriate.
- To ensure that any Flood Risk Assessments conducted in respect of development proposals on lands identified in the Newbridge SFRA as requiring site-specific Flood Risk Assessment are undertaken.
- To require that Persons/Companies undertaking site-specific Flood Risk Assessments are competent and will certify that the Flood Risk Assessment has been undertaken.
- To ensure that new developments incorporate appropriate SuDS facilities, designed, constructed and maintained.
- To ensure that the requirements of Inland Fisheries Ireland are adhered to in the construction of flood alleviation measures.

The key flood risk management objectives of the Newbridge LAP can be summarised as follows:

- To carry out a programme of dredging surface water drains and to continue to ensure that the drains are regularly maintained to minimise the risk of flooding.
- To fulfil its responsibilities under the Flood Risk Directive 2007/60/EC and cooperate with the Office of Public Works in the development of any Catchment-based Flood Risk Management Plans as necessary.
- To integrate into the Plan, relevant findings of the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study.

## 2.4 Strategic Flood Risk Assessment for the Newbridge Local Area Plan 2013 - 2019

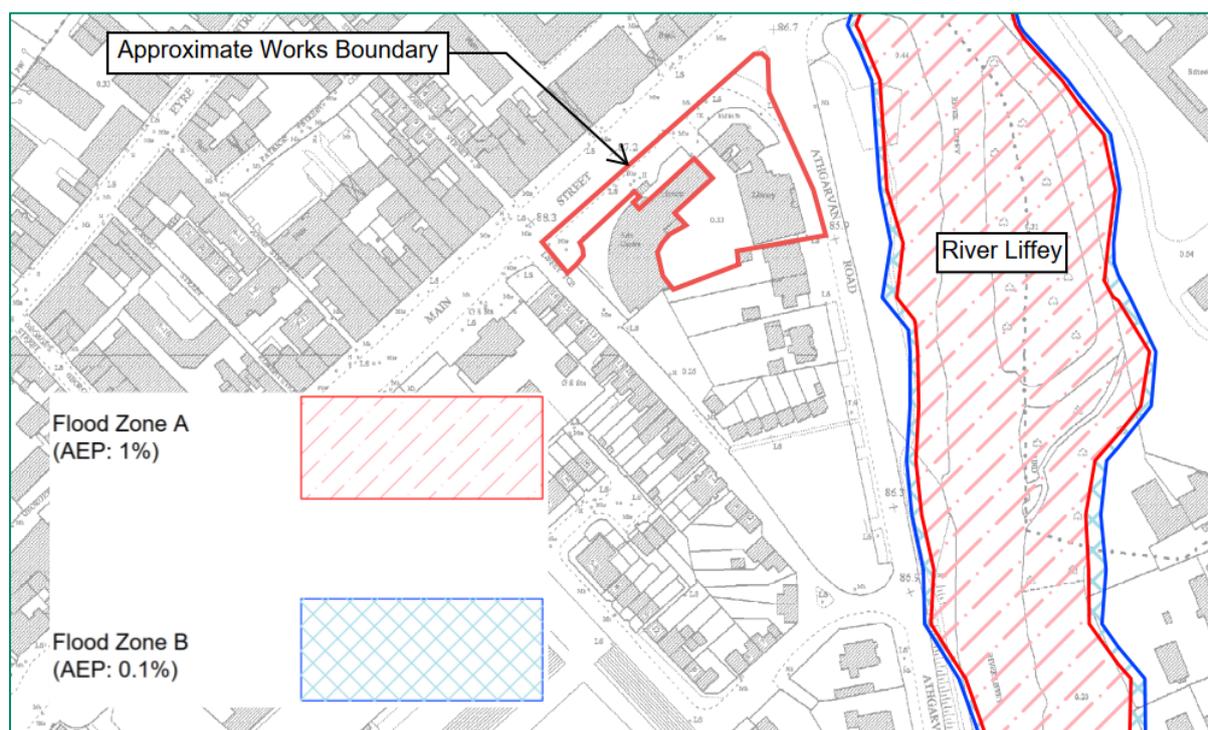
Section 3.3.3 of the SFRA for the Newbridge LAP which detail the strategic policies and recommendations for regional flood risk management. The principal strategic policy states:

- That flood risk be managed pro-actively at all stages in the planning process by avoiding development in flood risk areas where possible and by reducing the risks of flooding to and from existing and future development.

The strategic recommendations which accompany this policy can be summarized as follows:

- New development should be avoided in areas at risk of flooding.
- Development and Local Area Plans should include a Strategic Flood Risk Assessment and all future zoning of land for development in areas at risk of flooding should follow the sequential approach set out in the Departmental Guidance on Flood Risk Management.
- Local authorities should take the opportunities presented to optimise improvements in biodiversity and amenity when including policies and actions in development plans/local area plans (such as flood plain protection and SuDS) for existing and future developments.
- Plans and projects associated with flood risk management that have the potential to negatively impact on Natura 2000 sites will be subject to a Habitats Directive Assessment (HDA) according to Article 6 of the habitat's directive and in accordance with best practice and guidance.

The SFRA for the Newbridge LAP indicates that the full extent of the current proposed development is located outside any potential flood risk area (i.e; not located in either Flood Zone A or Flood Zone B) as seen in Figure 4 (refer to Appendix B - Flood Zones Established by Detailed FRA for full extent of map). The potential flood risk area is zoned as an area to “Strengthen” as seen in Figure 14 of the Newbridge LAP under the proposed urban design strategy. As outlined in the KCDP, the main potential source of fluvial flooding is the River Liffey which runs adjacent to the east of the proposed site boundary.



**Figure 4. Flood Risk Zones Determined by Detailed FRA (Source: [Draft SFRA](#))**

As can be seen in the figure above, the location of the proposed development is outside the identified flood risk area in the SFRA.

## 2.5 Eastern CFRAM Study Liffey Flood Controls & Flood Forecasting System Option

The Liffey Flood Controls & Flood Forecasting System Option was created to analyse the potential and to implement an effective Flood Forecasting System (FFS), focusing on identified Areas for Further Assessment within H09 of the Eastern CFRAM study area. This area included both the River Liffey Catchment and the wider Dublin

City area. One of the main objectives of the report is to create an FFS analysis that serves as one of the inputs of the potential flood risk management options for the Liffey catchments.

Section 5.1 details the preliminary assessment of the River Liffey. Poulaphouca and Golden Falls which are in the upper catchment provide substantial opportunity to contain floods as mentioned in Section 2.2 of this document. The middle and lower catchments are less controlled. The total lead-time is between 12 – 15 hours, with lead-time being defined as “the flood forecasting time horizon for which flood warning can be issued based on hydrometeorological conditions and flood travel times”. While there is limited infrastructure in place for monitoring rainfall and water levels there are several reservoirs and weirs that could assist in improving lead-times. Catchment size can also contribute to opportunities for new measures to be implemented to increase lead-times. Newbridge is located in the middle catchment with a total catchment area of 534 km<sup>2</sup>.

Section 6.3 of the report details the flood operations during a flood period on the Liffey Flood Controls. Within the Liffey catchment, Poulaphouca reservoir is the principal means of flood control through the storage and controlled discharge of upper catchment inflow. Should a storm occur in the catchment and there is an increase of flow into the reservoir the Regulations and Guidelines for the control of the River Liffey, Water Management Document, February 2006, ESB provide a clear flood operating regime to store this flow. Poulaphouca reservoir has a substantial flood storage capacity which approximates to 50% of the average annual inflow and it is designed to safely discharge floods having an expected annual probability of occurrence of 1:10,000.

In general, the upper Liffey catchment, upstream of Poulaphouca and Golden Falls Dams, is significantly controlled by the Poulaphouca Reservoir, which is substantial in relation to its inflows. During significant floods, the flood storage capacity of the reservoir is used to control and attenuate discharges to the catchment downstream of Golden Falls dam. The use of this storage capacity during floods provides major benefits to the areas downstream by significantly reducing flows in the River Liffey between Golden Falls and Leixlip dams, and also downstream of Leixlip Dam towards Dublin City. Therefore, the predicted fluvial flood levels of the ESB controls upstream of the river Liffey at Poulaphouca and Golden Falls are adequately addressed.



was carried out based on readily available 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 floods 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 departments 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, are where a more detailed assessment was then undertaken to assess the extent and degree of flood risk more accurately. Refer to Figure 6 below for a snip from myplan.ie showing the flood extents for the Newbridge area, note the site location is denoted by a red "star".



**Figure 6. PFRA Mapping (Source: [myplan.ie](http://myplan.ie))**

Based on the above image, the town of Newbridge was considered to be at a particular risk of flooding and therefore the OPW conducted detailed modelling on the River Liffey around the town of Newbridge as part of the national CFRAM programme.

### 3.1.3 Eastern CFRAM Mapping

Based on the modelling carried out as part of the CFRAM study in Newbridge, a number of flood extent maps were published by the OPW. 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 Eastern CFRAM study provides predictive flooding within areas of further assessment from Fluvial and Coastal/Tidal sources.

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent lands, whereas Coastal flooding is the result of sea levels which are higher than normal and result in sea water overflowing onto the land. It can also be influenced by high tide level, storm surges and wave action.

With regards to Fluvial flooding, the Liffey River, located east of the proposed site, is the closest river to the proposed site, and the most likely source of possible fluvial flooding. The CFRAM mapping for the Liffey River near the site, illustrates the location of the closest fluvial model node to the development site (09LIFF06334D).

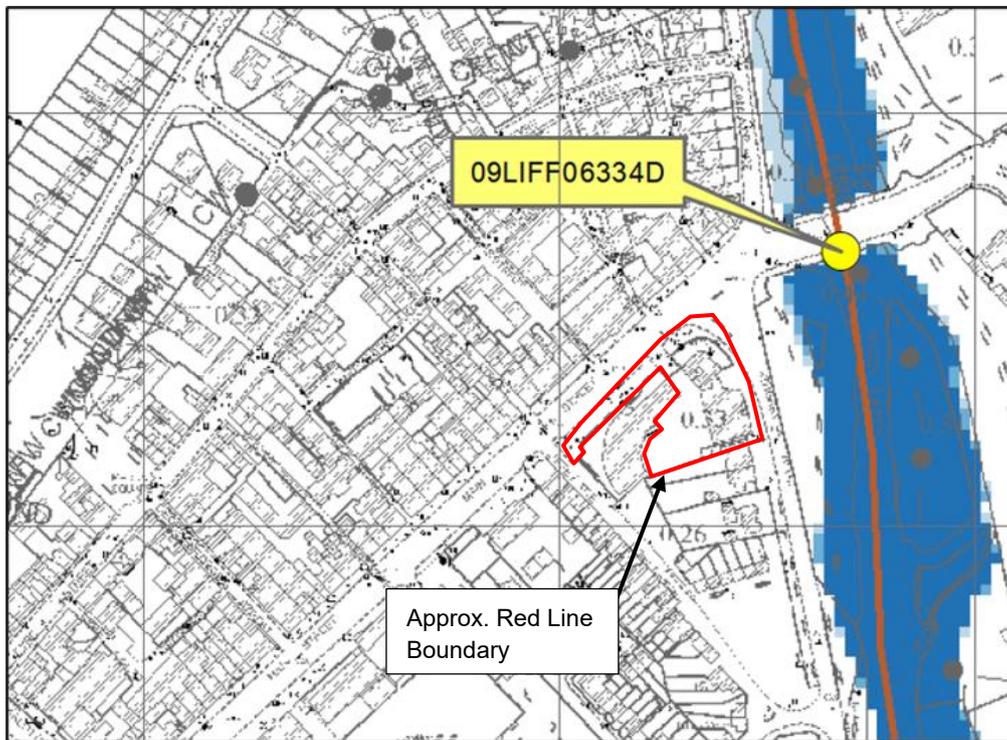
This map was published as part of the Eastern CFRAM project on the 8<sup>th</sup> May 2017. An extract from the Eastern CFRAM map Drawing No. E09NEW\_EXFCD\_F1\_07 is illustrated in Figure 7 below.

Table 1 includes the fluvial flood water levels for various Annual Exceedance Probabilities (AEP) at Node 09LIFF06334D on the Liffey River.

**Table 1. Predicted Fluvial Flood Water Levels in the Vicinity of the Site**

Node	Water level (m OD) for 10% AEP	Water Level (m OD) for 1% AEP	Water Level (m OD) for 0.1% AEP
09LIFF06334D	84.07	84.46	84.72

Source: floodmaps.ie



**Figure 7. Extract from CFRAM Fluvial Flood Extents (Source: Drawing No. E09NEW\_EXFCD\_F1\_07)**

Therefore, based on Present Day CFRAM Fluvial Flood Maps, there is no significant risk of fluvial flooding to the site of the proposed development. Refer to Appendix D for Eastern CFRAM Fluvial Mapping and Flood Depth mapping.

There are two potential future scenarios which consider the potential impacts of both climate change and other possible future changes. The flood extents for the mid-range (20% climate change & 500 mm increase in sea levels) and high-end (30% climate change and 1,000 mm increase in sea levels) future scenarios and are shown below in Figure 8 and Figure 9.

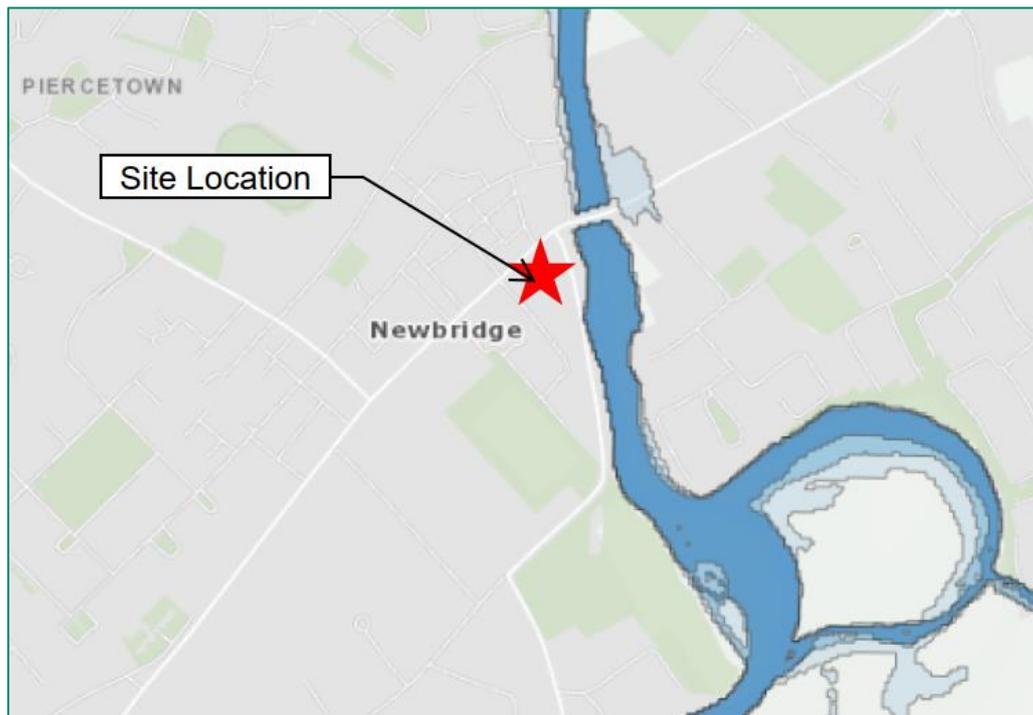


Figure 8. CFRAM River Flood Extents – Mid-Range Future Scenario (Source: [floodinfo.ie](http://floodinfo.ie))

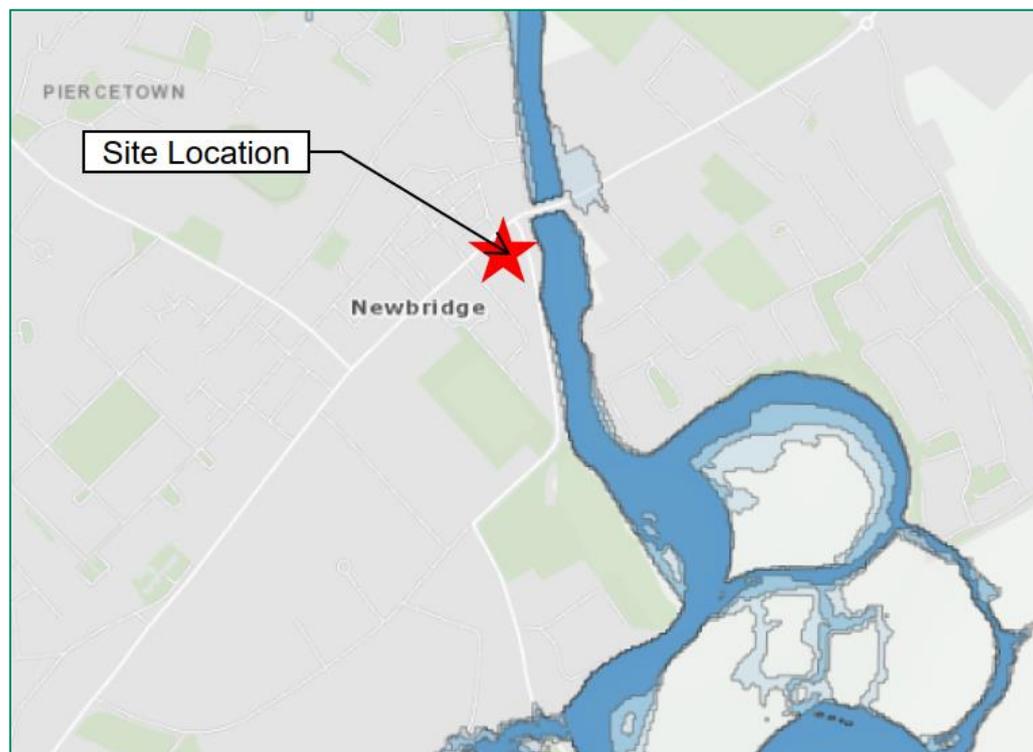


Figure 9. CFRAM River Flood Extents – High-Range Future Scenario (Source: [floodinfo.ie](http://floodinfo.ie))

Under both scenarios the subject site is located outside of these flood zones, which indicates that there will be no impact to the proposed site. Allowances will be factored in to ensure that the proposed finished flood levels (FFL) of any proposed structures will be kept above the flood level for both scenarios.



Depth to rock	Hydrogeological Requirements for Vulnerability Categories				
	Diffuse recharge			Point Recharge	Unsaturated Zone
	high permeability (sand/gravel)	Moderate permeability (sandy subsoil)	low permeability (clayey subsoil, clay, peat)	(swallow holes, losing streams)	(sand & gravel aquifers only)
0–3 m	Extreme	Extreme	Extreme	Extreme (30 m radius)	Extreme
3–5 m	High	High	High	N/A	High
5–10 m	High	High	Moderate	N/A	High
>10 m	High	Moderate	Low	N/A	High

i N/A = not applicable.  
 ii Release point of contaminants is assumed to be 1–2 m below ground surface.  
 iii Permeability classifications relate to the engineering behaviour as described by BS5930.  
 iv Outcrop and shallow subsoil (i.e. generally <1.0 m) areas are shown as a sub-category of extreme vulnerability.  
 (amended from Deakin and Daly (1999) and DELG/EPA/GSI (1999))

Figure 11. Vulnerability Mapping Criteria (Source: DELG/EPA/GSI 1999)

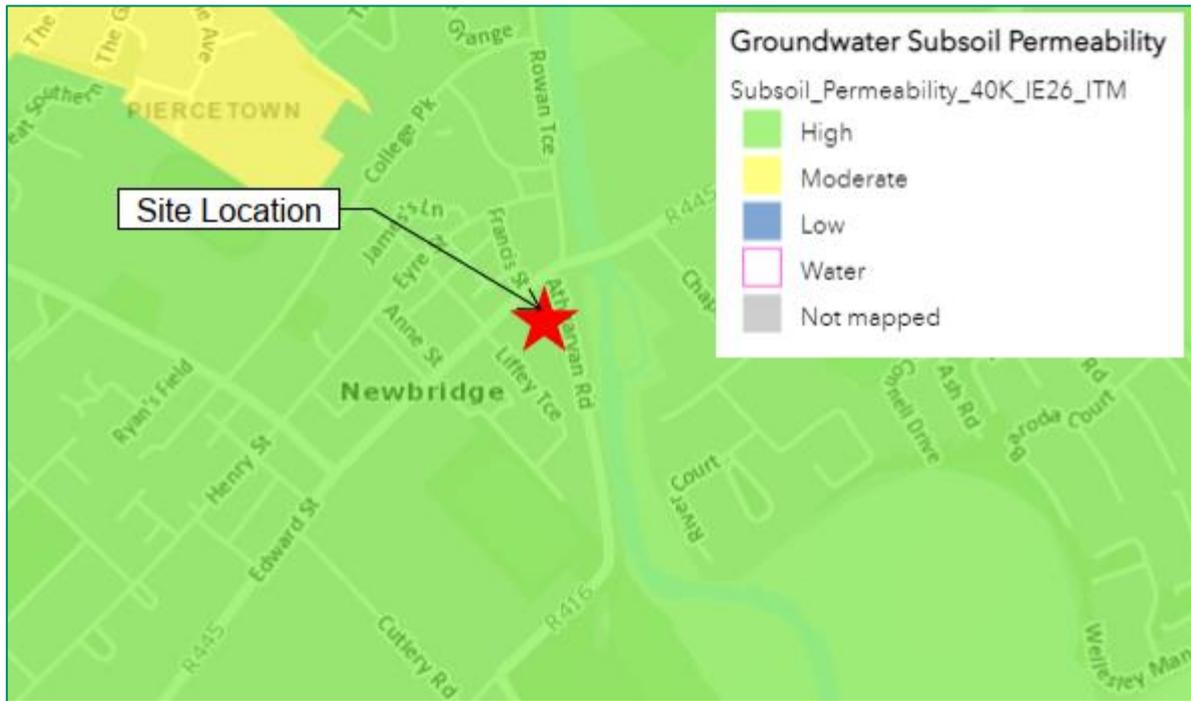
The available data on groundwater vulnerability shows the subject site and adjacent areas to be highly vulnerable to groundwater flooding. Refer to Figure 12 below for details.



Figure 12. Groundwater Vulnerability Map for Proposed Site (Source: GSI Groundwater Data Viewer)

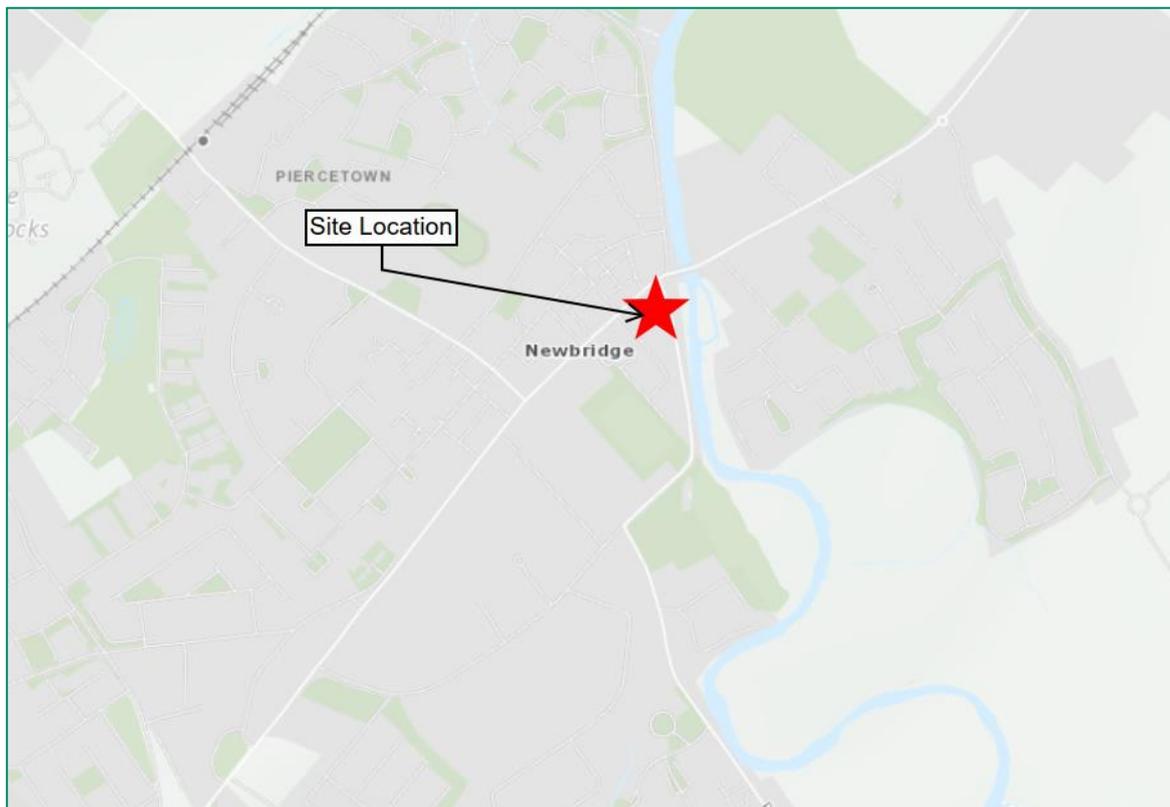
Groundwater monitoring is not planned to be carried out at this stage, but boreholes and trial pits undertaken as part of the ground investigation will be reviewed for any water strikes.

The available data shows the subsoil permeability to be high across the full extent of the subject site as well as the immediate surrounding area. Figure 13 illustrates this below, with the site location marked by the red star.



**Figure 13. Subsoil Permeability Map for Proposed Site (Source: [GSI Groundwater Data Viewer](#))**

Figure 14 below shows an extract from floodinfo.ie showing the groundwater flooding probability in the Newbridge area. As shown below, there is no groundwater flooding within or around the vicinity of the subject site.



**Figure 14. Groundwater Flooding Probability Map (Source: [floodinfo.ie](#))**

## 4. Conclusion

The flood risk assessment was prepared for the purposes of assessing the flood risk to the proposed development at Kildare County Library

AECOM have reviewed the CFRAM Flood Maps available and noted that no maps were developed for the Coastal Flood Risk. This is due to the inland nature of the proposed site which is located approx. 47 km from the nearest coastline and is therefore not subject to risk of coastal flooding.

With regard to Fluvial Flooding, the Present-Day CFRAM maps show the River Liffey located to the east of the site provides the estimated flood water levels for the 0.1%AEP Flood Event. Given the predicted water level (for the 0.1% AEP) of 84.72 m and the lowest proposed level on site (85.79 m, which is 1.07 m higher than the predicted water levels), it is concluded that the subject site is not at risk from fluvial flooding in this scenario.

As part of investigating the risk of Fluvial Flooding to the site 2no. predicted future scenarios, the Mid-Range and High-End scenarios, were reviewed to ensure they would not impact on the proposed development. From the maps that are available the proposed development does not appear to be impacted upon by either of these scenarios. It should also be noted that the existing finished floor level (FFL) of the buildings are 86.47 m which is at least 1.75 m higher than this flood level. The proposed FFL for the redevelopment works is 86.80 m which is over 2.08 m higher than the Present-Day 0.1% AEP Flood Level.

The CFRAM maps did not develop a study for the subject area for pluvial flooding, only showing the Dublin City area, with the available information showing the site is not at risk to pluvial flooding. Pluvial flooding data taken from myplan.ie show the nearest flooding zones to be 2.98 km and 3.58 km from the subject site which have no impact on the site itself. In accordance with GSDSDS and The Planning System & Flood Risk Guidelines, the proposed drainage network has been designed to cater for suitable surface water runoff during significant rainfall events. To further mitigate against pluvial flood risk, an effective surface water and SuDS strategy will be developed for the site which includes a 30% increase for Climate Change and 10% urban creep allowance.

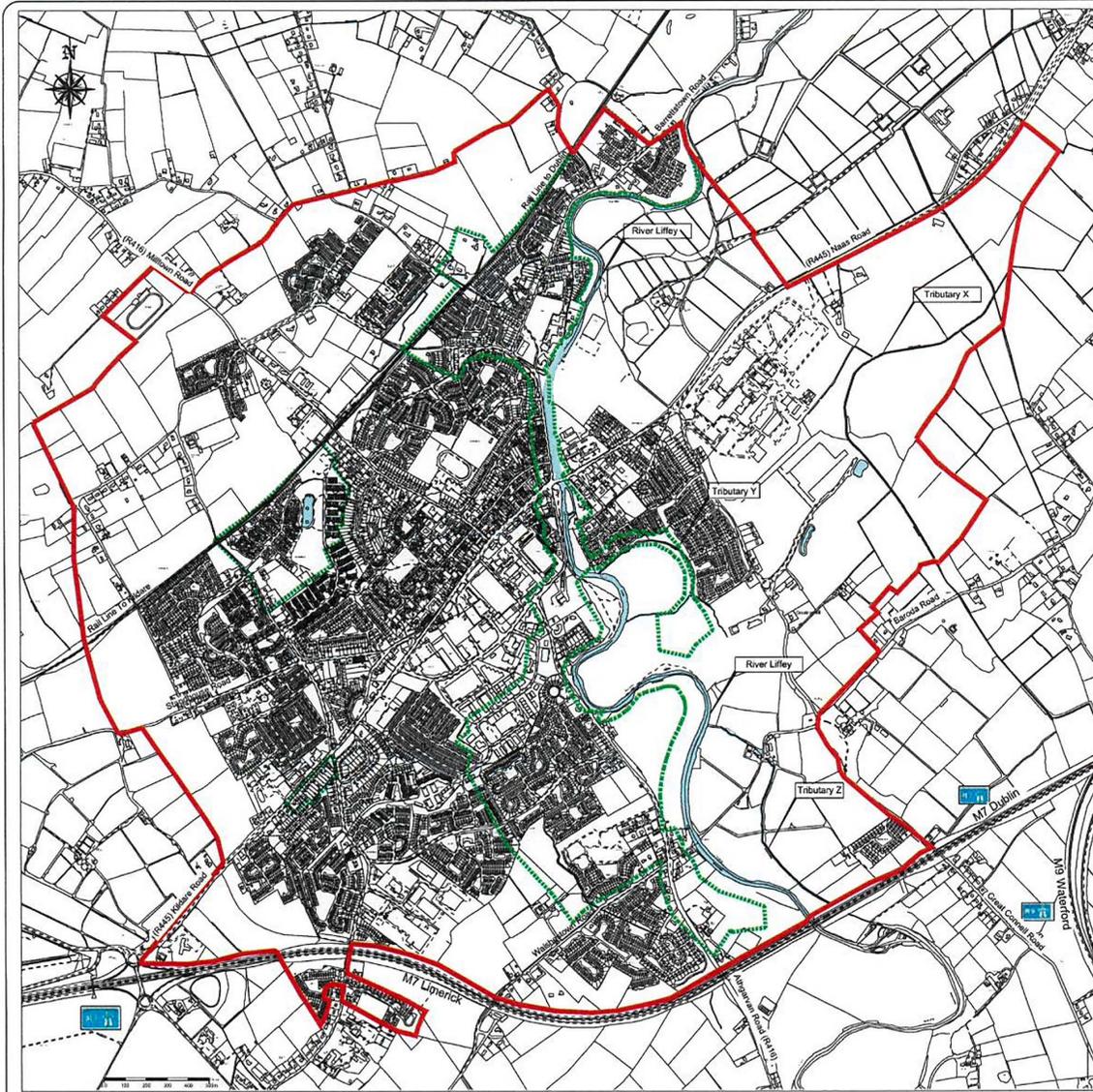
In relation to groundwater vulnerability, the site is classified in class 'H' for high, showing a high possibility that the site's groundwater can be contaminated. Groundwater monitoring is not planned at this stage, but boreholes and trial pits undertaken as part of the ground investigation will be reviewed for any water strikes.

A review was also undertaken for any potential impact from the ESB flood control levels at Poulaphouca and Golden Falls. It was found that the reservoir has been sized to cater for the 1 in 10,000-year flood event and therefore would have no impact on the site.

The objectives set out in the LAP 2013-2019 SFRA have been met. Therefore, it is concluded that the subject site is located entirely within Flood Zone C, negating the requirement of a Justification Test.

## Appendix A - SFRA Map from Newbridge LAP

Map 3: Strategic Flood Risk Assessment



Kildare County Council  
Planning & Economic  
Development Department

Newbridge Local Area Plan  
2013-2019

Legend :

-  Local Area Plan Boundary
-  Rivers & Lakes
-  Development proposals for lands outlined thus are to be the subject of site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed

Strategic Flood Risk Assessment

Date: January 2014  
(Adopted December 2013)

Map Ref: 3

Scale: N.T.S.

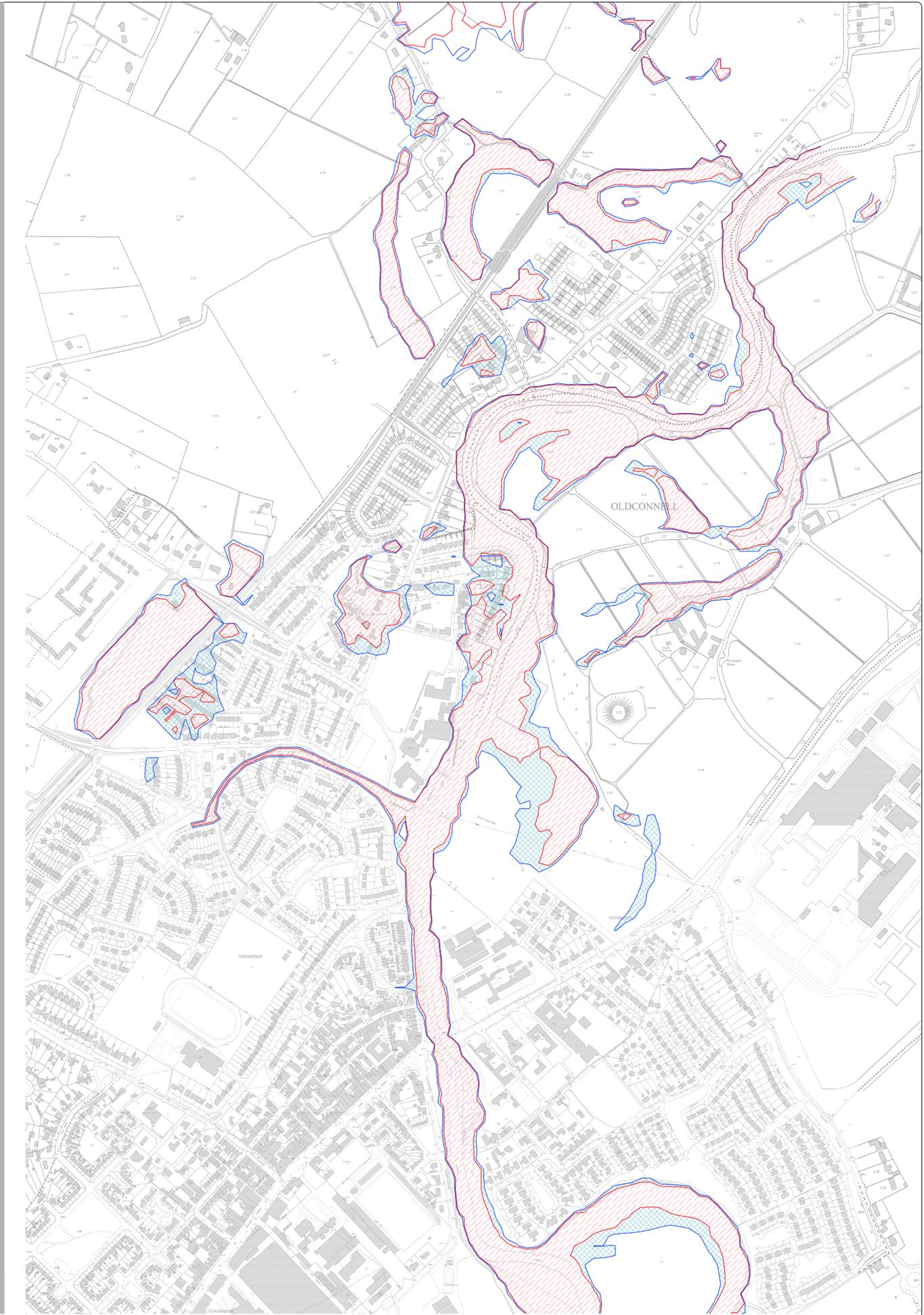
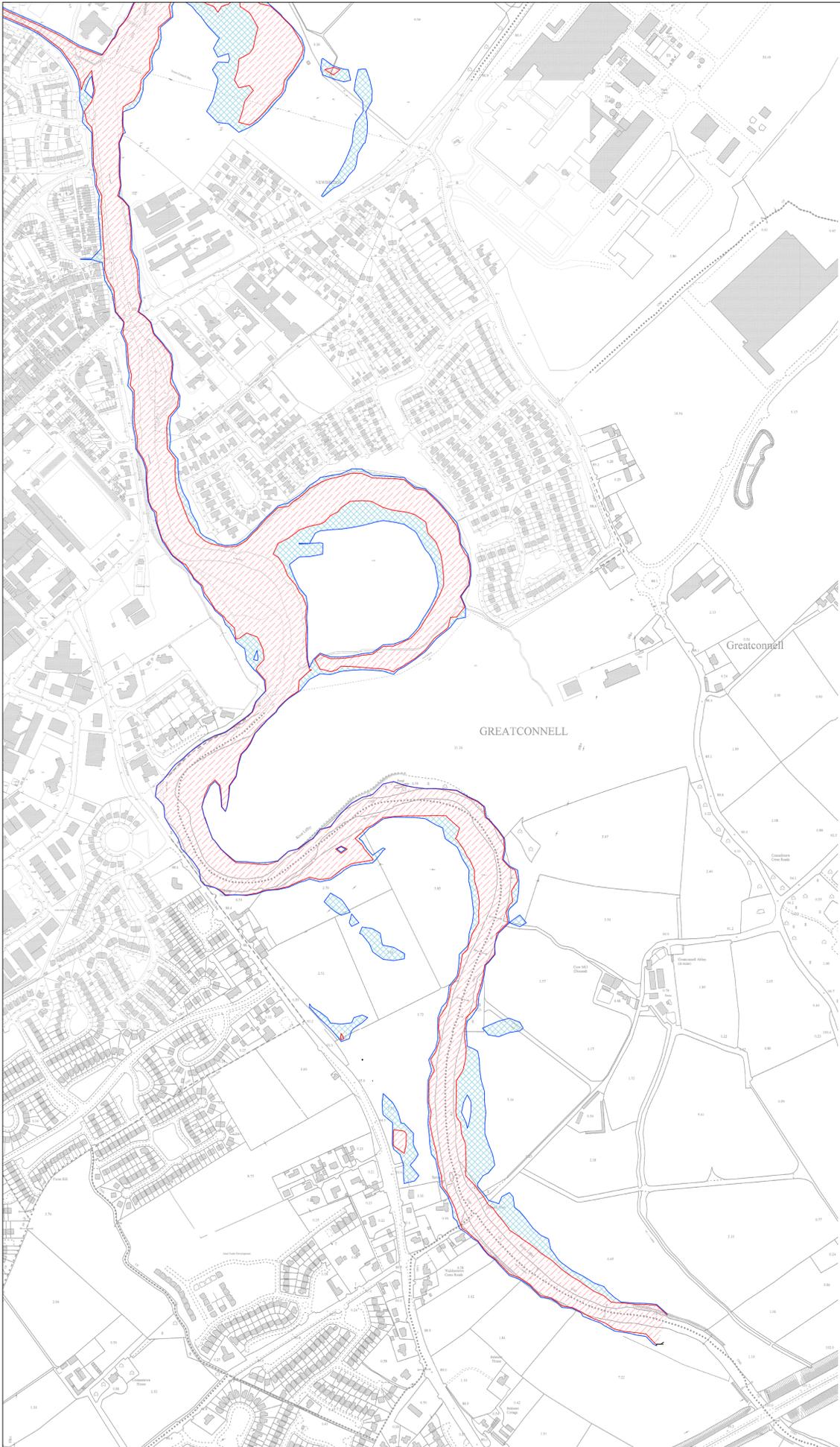
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Drawn By: DMcN

This drawing is to be read in conjunction with the written statement, objectives and relevant maps

## Appendix B - Flood Zones Established by Detailed FRA



NOTES A1

- Flood Zone A  
(AEP: 1%)
  
- Flood Zone B  
(AEP: 0.1%)



REV	DATE	BY	DETAILS

**KILDARE COUNTY COUNCIL**  
Comhairle Chontae Chill Dara

STATUS  
**FOR DISCUSSION**

CLIENT  
KILDARE COUNTY COUNCIL

PROJECT  
STRATEGIC FLOOD RISK ASSESSMENT  
VARIATION TO KILDARE COUNTY DEVELOPMENT  
PLAN 2011 - 2017

TITLE  
NEWBRIDGE  
FLOOD RISK ZONES AS DETERMINED BY  
DETAILED FRA

**KILGALLEN & PARTNERS**  
CONSULTING ENGINEERS  
KYLEKIPROE, WELL ROAD, PORTLAOISE, CO. LAOIS  
Tel: +353 57 86 62860, Fax: +353 57 86 62861  
E-mail: [Info@Kilgallen.ie](mailto:Info@Kilgallen.ie), Web: [www.kilgallen.ie](http://www.kilgallen.ie)

DRN: MOC	SCALE: 1:5000 @ A1	DRAWING NO.:	REV.:
CHKD: PB	DATE: 09.02.2012	<b>11049-NEWB-02</b>	<b>P2</b>

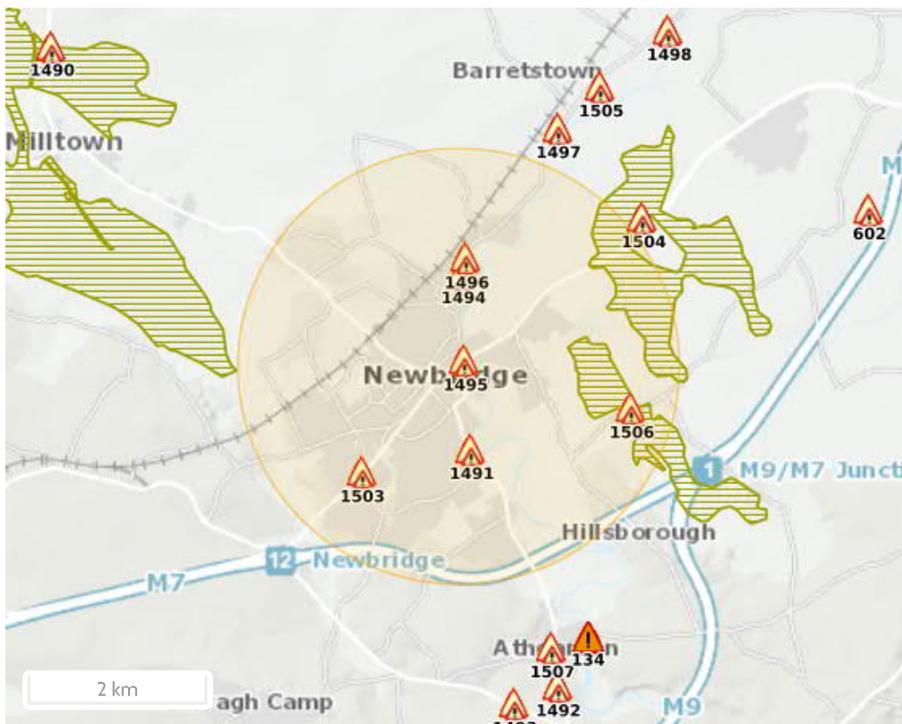
## Appendix C - OPW Flood Records



Report Produced: 2/12/2021 10:10

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

This report has been downloaded from [www.floodinfo.ie](http://www.floodinfo.ie) (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



## Map Legend

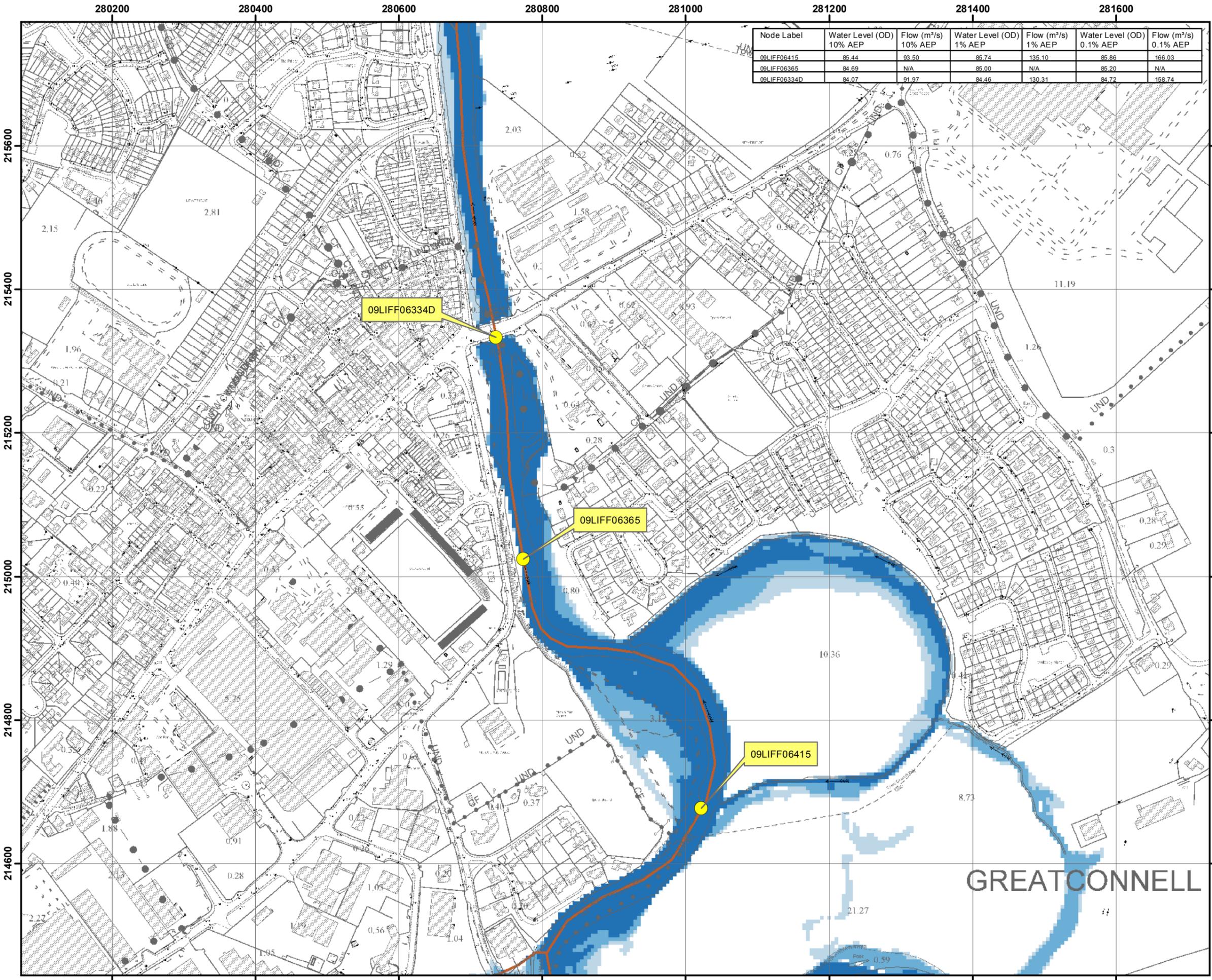
- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands\*
- Land Commission Benefited Lands\*
- Arterial Drainage Schemes Benefited Lands\*

\* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on [Floodinfo.ie](http://Floodinfo.ie)

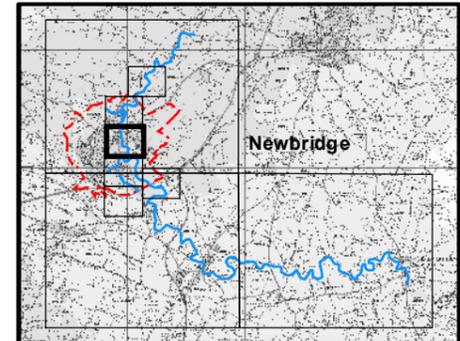
## 6 Results

Name (Flood_ID)	Start Date	Event Location
1.  Kilbelin, Newbridge Recurring (ID-1491) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point
2.  Miltown Road, Newbridge Recurring (ID-1494) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point
3.  Newbridge College, Newbridge Recurring (ID-1495) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point
4.  Hosbery, Newbridge Recurring (ID-1496) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point
5.  Moorfield, Newbridge Recurring (ID-1503) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point
6.  Greatconnel to Clownings Recurring (ID-1506) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point

## Appendix D – Eastern CFRAM Mapping



Node Label	Water Level (OD) 10% AEP	Flow (m <sup>3</sup> /s) 10% AEP	Water Level (OD) 1% AEP	Flow (m <sup>3</sup> /s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m <sup>3</sup> /s) 0.1% AEP
09LIFF06415	85.44	93.50	85.74	135.10	85.86	166.03
09LIFF06365	84.89	N/A	85.00	N/A	85.20	N/A
09LIFF06334D	84.07	91.97	84.46	130.31	84.72	158.74



**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:
01	Amendments to Flood Extents.	05/12/16

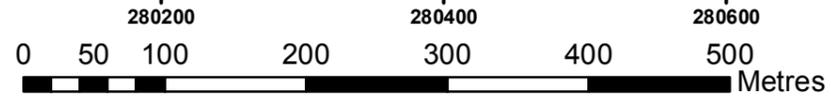


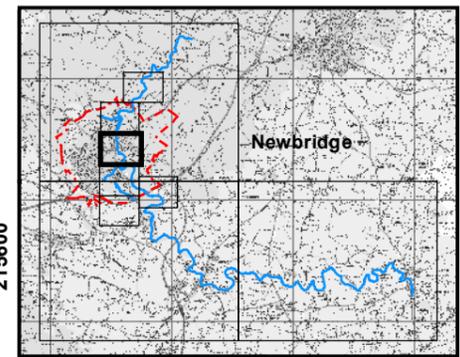
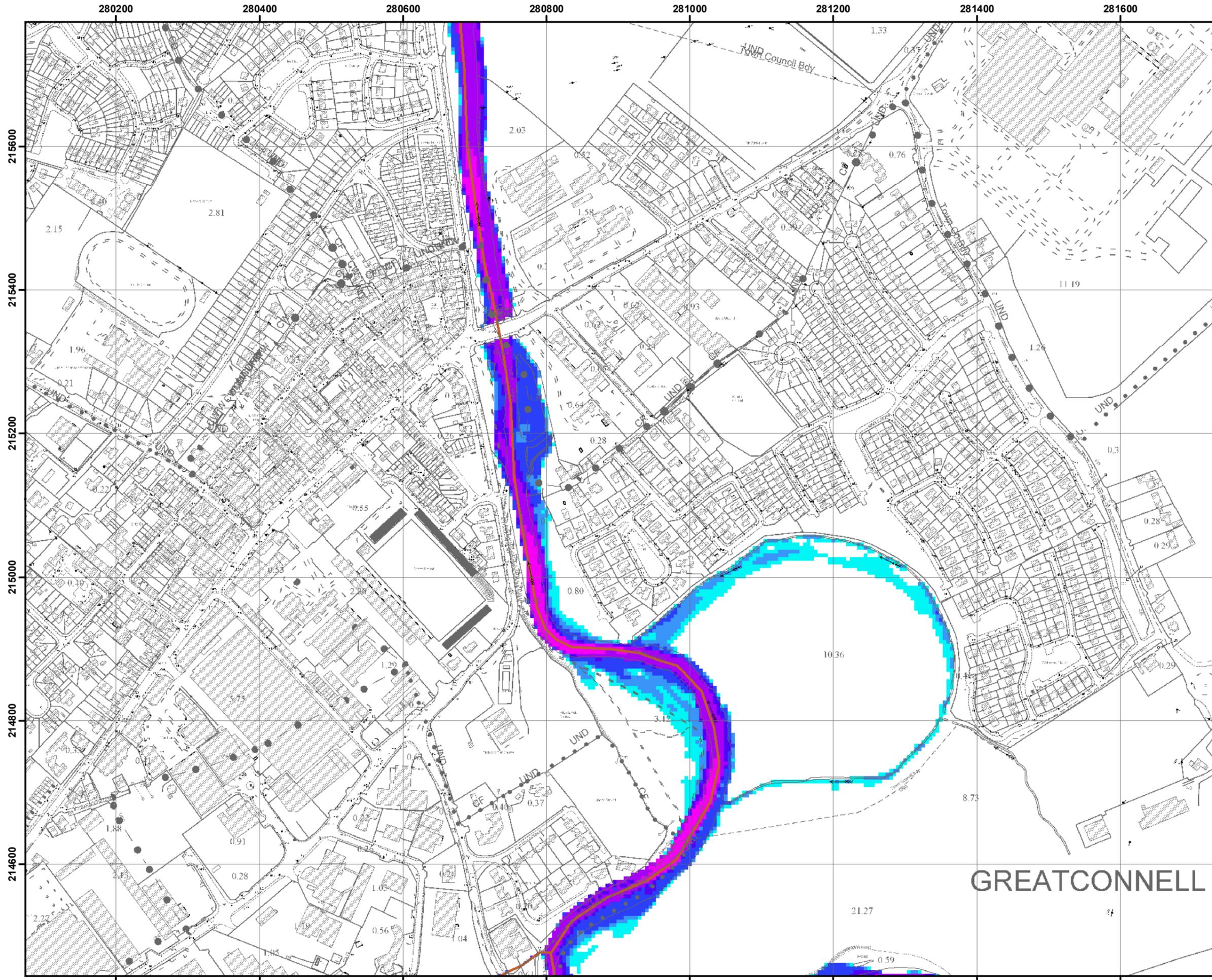
The Office of Public Works  
Jonathan Swift Street  
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W www.rpsgroup.com  
E ireland@rpsgroup.com

<b>Map:</b> Newbridge Fluvial Flood Extents	
<b>Map Type:</b> EXTENT	
<b>Source:</b> FLUVIAL	
<b>Map Area:</b> HPW	
<b>Scenario:</b> CURRENT	
<b>Drawn By :</b> F.M.C.	<b>Date :</b> 8 May 2017
<b>Checked By :</b> D.I.	<b>Date :</b> 8 May 2017
<b>Approved By :</b> G.G.	<b>Date :</b> 8 May 2017
<b>Drawing No. :</b> E09NEW_EXFCD_F1_07	
<b>Map Series :</b> Page 7 of 9	
<b>Drawing Scale :</b> 1:5,000 @ A3	





**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 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:
01	Amendments to Flood Extents.	05/12/16





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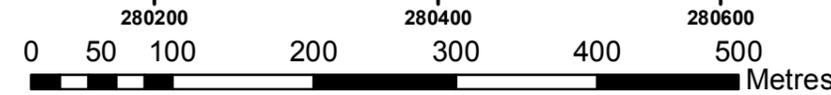


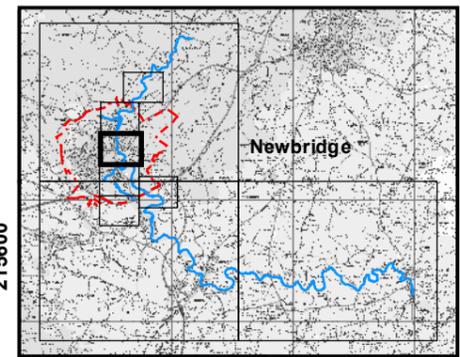
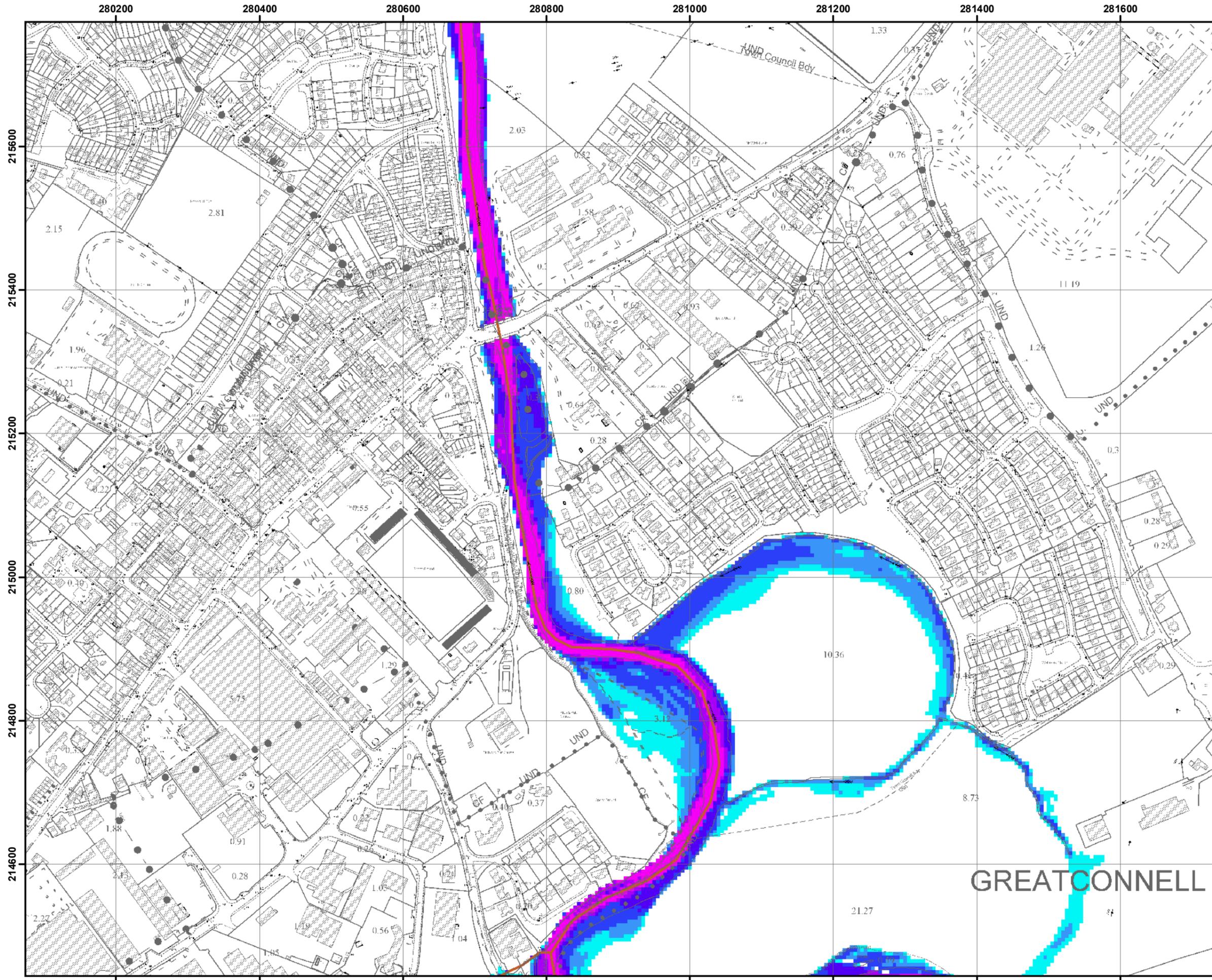
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 W www.rpsgroup.com  
 E ireland@rpsgroup.com

**Map:**  
**Newbridge Fluvial Flood Depths**

Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 8 May 2017
Checked By :	D.I. Date : 8 May 2017
Approved By :	G.G. Date : 8 May 2017
Drawing No. :	E09NEW_DPFCD100_F1_07
Map Series :	Page 7 of 9
Drawing Scale :	1:5,000 @ A3





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

**Legend**

**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: 01	NOTE: Amendments to Flood Extents.	DATE: 05/12/16
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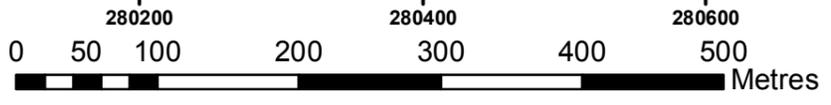


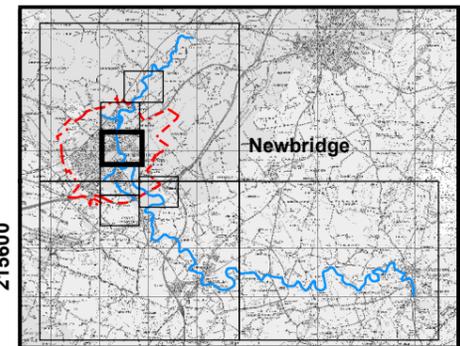
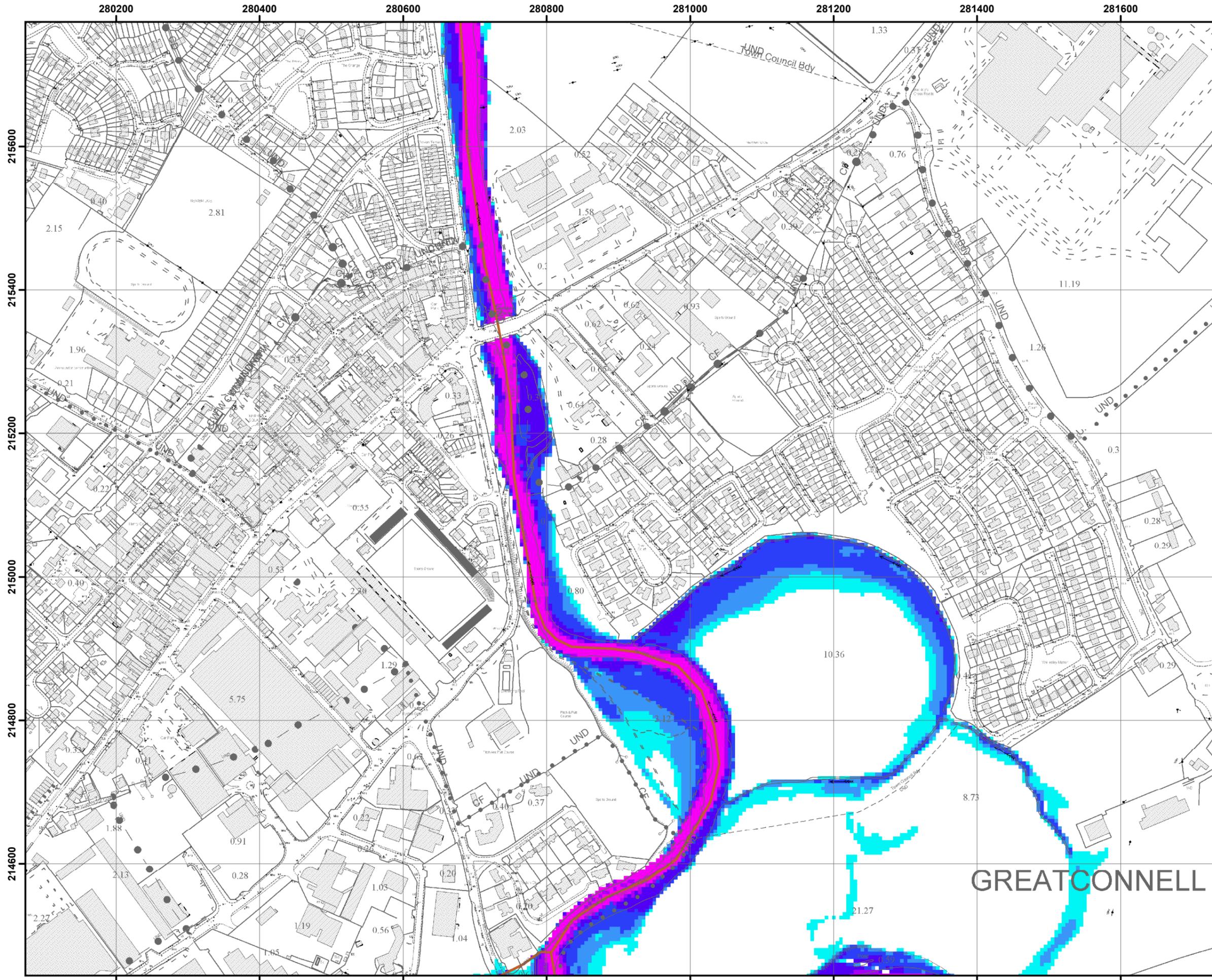
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 W www.rpsgroup.com  
 E ireland@rpsgroup.com

**Map:**  
**Newbridge Fluvial Flood Depths**

Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 8 May 2017
Checked By :	D.I. Date : 8 May 2017
Approved By :	G.G. Date : 8 May 2017
Drawing No. :	E09NEW_DPFCD010_F1_07
Map Series :	Page 7 of 9
Drawing Scale :	1:5,000 @ A3





**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: 01	NOTE: Amendments to Flood Extents.	DATE: 05/12/16
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E ireland@rpsgroup.com

<b>Map:</b> Newbridge Fluvial Flood Depths	
<b>Map Type:</b>	DEPTH
<b>Source:</b>	FLUVIAL
<b>Map Area:</b>	HPW
<b>Scenario:</b>	CURRENT
<b>Drawn By :</b>	C.McG. Date : 5 May 2017
<b>Checked By :</b>	D.I. Date : 5 May 2017
<b>Approved By :</b>	G.G. Date : 5 May 2017
<b>Drawing No. :</b>	E09NEW_DPFCD001_F1_07
<b>Map Series :</b>	Page 7 of 9
<b>Drawing Scale :</b>	1:5,000 @ A3

