

Gorey Town and Environs  
Local Area Plan 2017-2023

Appendix 4

## Strategic Flood Risk Assessment

April 2017

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## **Acronyms/Abbreviations**

|               |   |
|---------------|---|
| <b>AEP</b>    | Annual Exceedance Probability   |
| <b>AFA</b>    | Area for Further Assessment   |
| <b>CDP</b>    | Wexford County Development Plan 2013-2019                                   |
| <b>CFRAM</b>  | Catchment Flood Risk and Assessment Management                              |
| <b>EPA</b>    | Environmental Protection Agency   |
| <b>FRMP</b>   | Flood Risk Management Plan  |
| <b>JBA</b>    | JBA Consulting Engineers and Scientists Limited                             |
| <b>LAP</b>    | Local Area Plan   |
| <b>OPW</b>    | Office of Public Works  |
| <b>NSS</b>    | National Spatial Strategy   |
| <b>PFRA</b>   | Preliminary Flood Risk Assessment   |
| <b>RFRA</b>   | Regional Flood Risk Assessment  |
| <b>RPGs</b>   | Regional Planning Guidelines for the South-East Region 2010-2022            |
| <b>SEA</b>    | Strategic Environmental Assessment  |
| <b>SFRA</b>   | Strategic Flood Risk Assessment   |
| <b>STRIVE</b> | Science, Technology and Research & Innovation for the Environment Programme |
| <b>SUDS</b>   | Sustainable Urban Drainage Systems  |

# 1 Introduction and Context

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## 1.1 Introduction

Flooding is a natural process that can happen at any time in a wide variety of locations. Flooding from the sea and rivers is probably best known but prolonged, intense and localised rainfall can also cause sewer flooding, overland flow and groundwater flooding. Development can also exacerbate the problems of flooding by accelerating and increasing surface water run-off, altering watercourses and removing floodplain storage. Flooding has significant impacts on human activities. It can threaten people's lives and their property, and in addition to economic and social damage, floods can have severe environmental consequences.

## 1.2 Legislative and Planning context

### 1.2.1 National Flood Risk Management Guidelines

The Planning System and Flood Risk Management-Guidelines for Planning Authorities" (DEHLG and OPW, 2009) as amended by Circular PL2/2014 sets out government policy on development and flood risk management. The overall aim of the guidelines is to deliver sustainable development that minimises the risk of flooding to people and property by the avoidance of inappropriate development in areas at risk of flooding. Planning authorities are required to incorporate flood risk management as a key consideration in the preparation of local area plans and the assessment of planning applications.

The core objectives of the guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for developments permitted in floodplains;

- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

The guidelines outline three key principles that should be adopted by regional authorities, local authorities, developers and their agents when considering flood risk. These are:

- **Avoid** the risk, where possible.
- **Substitute** less vulnerable uses, where avoidance is not possible.
- **Mitigate** and manage the risk, where avoidance and substitution are not possible.

### **1.3 Purpose of Strategic Flood Risk Assessment**

The Flood Risk Assessment technique for local area plans is called a Strategic Flood Risk Assessment, hereon referred to as SFRA. The purpose of an SFRA is to provide an assessment of the types of flood risk in the plan area, which in turn will inform strategic land-use planning decisions therein. The SFRA will:

- Identify the degree to which flood risk is an issue;
- Identify flood zones within and adjoining the plan area;
- Apply the sequential approach to land use zoning by directing new development towards land that is at low risk of flooding;
- Apply the Justification Test where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding; and
- Outline the key requirements for the management of development in areas at risk of flooding.

### **1.4 Structure of the Strategic Flood Risk Assessment**

The Guidelines recommend a staged approach when carrying out a flood risk assessment. The recommended stages are:

- *Stage 1 Flood Risk Identification*

To identify whether there may be any flooding or surface water management issues related to the area that may warrant further investigation. This stage mainly comprises of a desk study of available information to establish whether potential flood risk issues exist. Local knowledge is also used at this stage.

- *Stage 2 Initial Flood Risk Assessment*

Following completion of Stage 1 if a flood risk is deemed to exist, the assessment proceeds to Stage 2. This stage confirms the sources of flooding that may affect the area, appraises the adequacy of existing information and scopes the extent of the risk of flooding which may involve preparing indicating flood zone maps.

- *Stage 3 Detailed Flood Risk Assessment*

This stage assesses the flood risk issues in sufficient detail to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

## **1.5 Advice Note**

Flood hazard and flood risk information is an emerging dataset of information. The flood hazard maps used by the Council may be altered in light of future data and analysis. Therefore, all landowners and developers are advised that Wexford County Council accept no responsibility for losses or damages arising due to assessments of vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding.





### **2.1.2 Regional Flood Risk Assessment**

A Regional Flood Risk Assessment (RFRA) was carried out during the preparation of the Regional Planning Guidelines for the South-East Region 2010-2022. While Gorey Town is not discussed specifically in the RFRA, it acknowledges that towns in hinterland areas have been identified as vulnerable to flooding, based on the current information available. It is stated that within these towns, (which is considered to include Gorey Town), implementation of the 2009 planning guidelines on flood risk establishes the mechanism to reconcile development and flood risk issues.

### **2.1.3 County Strategic Flood Risk Assessment**

A SFRA was carried out as part of the Wexford County Development Plan 2013-2019 (CDP). This was a broad scale assessment and examined the level of information available on flooding in the county. It did not specifically address Gorey Town. There is a suite of flood risk management objectives in the CDP which development proposals in the LAP area will be required to comply with.

### **2.1.4 CFRAM Programme**

The Catchment Flood Risk Assessment and Management (CFRAM) Programme was developed to meet the requirements of the EU Floods Directive. The CFRAM programme includes three main steps:

- Step 1 Preliminary Flood Risk Assessment 2011
- Step 2 Flood Risk and Hazard Mapping 2015
- Step 3 Flood Risk Management Plans 2016

The programme is being implemented through CFRAM studies under the direction of the OPW. The country has been divided in six river basin districts and a CFRAM study is being carried out for each district. Gorey Town is located within the South-Eastern CFRAM study area.

Stage 1, which was a national screening exercise known as the Preliminary Flood Risk Assessment (PFRA), identified areas where there might be a significant risk associated with flooding. Its intention was to identify communities (cities, towns, villages and townlands), facilities and sites (for example environmentally designated

areas) around the country where the risk due to flooding might be potentially significant. These areas were identified as Areas for Further Assessment (AFA) and would be subject to more detailed assessment to establish the extent and degree of flood risk. The PFRA identified Gorey Town as an AFA.

Stage 2 involved the carrying out of detailed survey work and hydrological modelling for each AFA to inform the development of flood risk maps and flood hazard maps. Draft CFRAM flood maps for Gorey Town were published in November 2015. These maps are discussed in further detail in Section 2.2.1.

Stage 3 involves the preparation of Flood Risk Management Plan for each AFA. The FRMP will include measures in relation to flood prevention, protection and preparedness. Emergency response to flooding, recovery from flooding and incorporating lessons learned will be important elements of the FRMP. Issues such as climate change, land use practices and future development will also be addressed in the FRMP.

## **2.2 Primary Sources of Flood Risk Information**

### **2.2.1 Draft CFRAMS Flood Maps**

The draft flood maps, which were published in November 2015, are 'predictive' flood maps, as they provide predicted river flood extent and river flood depth for a 'design' flood event that has an estimated probability of occurrence (e.g. the 1% AEP event – see Table 1). The draft flood maps also identify the number of inhabitants at risk, where relevant.

### **Flood Event Probabilities**

The draft flood maps refer to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'. This represents the probability of an event of this, or greater, severity occurring in any given year. These probabilities may also be expressed as odds (e.g., 100 to 1) of the event occurring in any given year. They are also commonly referred to in terms of a return period (e.g., the 100-year flood), although it should be understood that this does not mean the length of time that will

elapse between two such events occurring, as, although unlikely, two or more very severe events may occur within a very short space of time<sup>1</sup>.

Table 1 below sets out a range of flood event probabilities expressed in terms of AEP, and identifies their parallels under other forms of expression.

**Table 1: Flood Event Probabilities**

| <b>Annual Exceedence Probability (%)</b> | <b>Odds of Occurrence in any Given Year</b> | <b>Return Period (yrs)</b> |
|--|---|----------------------------|
| <b>50</b>                                | <b>2 : 1</b>                                | <b>2</b>                   |
| <b>20</b>                                | <b>5 : 1</b>                                | <b>5</b>                   |
| <b>10</b>                                | <b>10 : 1</b>                               | <b>10</b>                  |
| <b>4</b>                                 | <b>25 : 1</b>                               | <b>25</b>                  |
| <b>2</b>                                 | <b>50 : 1</b>                               | <b>50</b>                  |
| <b>1</b>                                 | <b>100 : 1</b>                              | <b>100</b>                 |
| <b>0.5</b>                               | <b>200 : 1</b>                              | <b>200</b>                 |
| <b>0.1</b>                               | <b>1000 : 1</b>                             | <b>1000</b>                |

The draft flood maps have been subject to extensive consultation and verification with local authority engineers. Notwithstanding, the OPW note that the draft maps are intended for the purpose of consultation only; they should not be used for any other purpose or decision-making process. They are likely to be updated, refined or changed before finalisation.

The draft flood maps identify 10%, 1% and 0.1% Fluvial AEP events in Gorey. There are flood extents along the rivers and streams in the LAP area with the most extensive areas around Ballytegan, the Arklow Road, Gorey Bridge, Millands, Raheenagureen, Garden City and around Creagh. The draft flood maps relating to the LAP area are contained in Appendix 1 of the SFRA.

<sup>1</sup> [http://southeastfram.irish-surge-forecast.ie/?page\\_id=327](http://southeastfram.irish-surge-forecast.ie/?page_id=327)

### **2.2.2 JBA Flood Mapping**

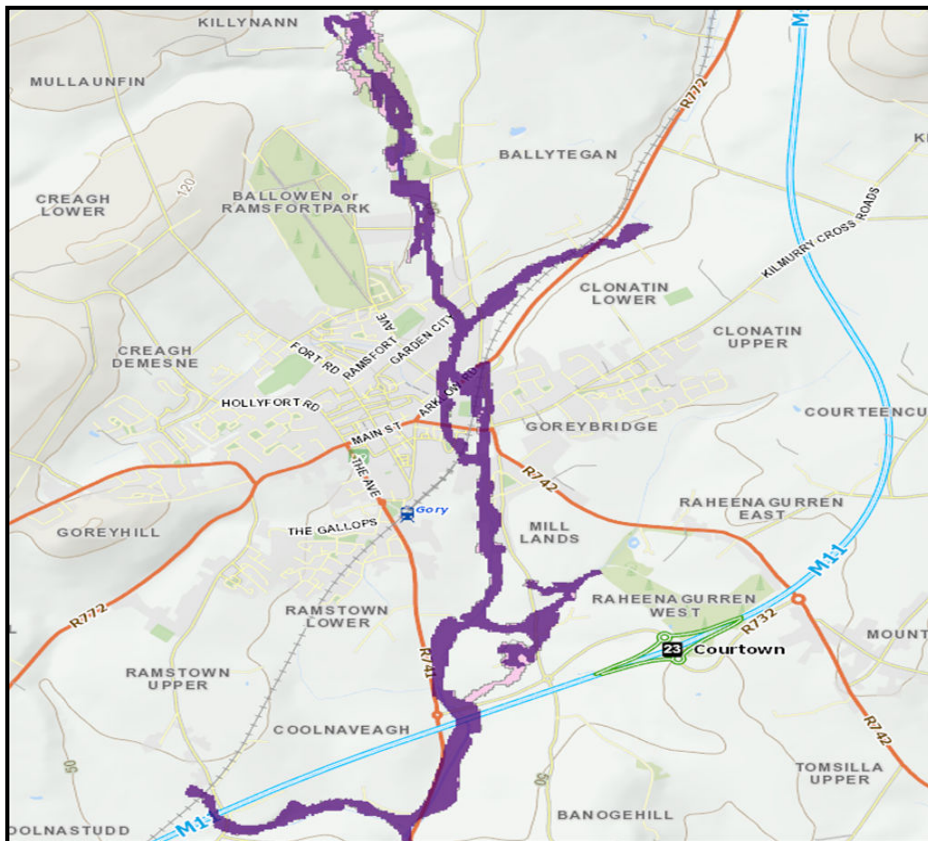
This flood mapping was prepared by JBA Consulting Engineers and Scientists Limited and has been used by Wexford County Council since 2010 for the purposes of screening for flood risk.

The fluvial (river) flood mapping methodology is based on broad scale hydraulic modelling. The model generated design flows which were inputted at 300 metre intervals along each river reach. The flows were then used to simulate overload flooding using a multi-scale two-dimensional hydraulic model, with the resulting flood outlines captured on flood maps. In accordance with the guidelines the sources of flooding are mapped without regard for any form of flood defence and do not specifically model interaction with anything other than the land surface, stripped of all man-made features. This approach is required by the guidelines to take into account the risk of defence failure or overtopping.

The flood zones are indicative of river and coastal flooding only. They should not be used to suggest that any areas are free from flood risk, since they do not include the effects of other forms of flooding such as from groundwater or artificial drainage systems.

Figure 2 identifies the JBA Flood Zones within and adjoining the plan area. These correlate with draft CFRAMs flood maps, albeit the extents identified on the JBA maps are more extensive than the Draft CFRAM mapping. This difference is attributed to the fact that the JBA mapping being based on broad scale modelling compared to the detailed modelling, site survey, investigation and verification work undertaken as part of the CFRAM programme.

**Figure 2 JBA Flood Zone Mapping**



**Source:** Wexford County Council iMAPs.

### **2.2.3 Pluvial Flood Risk**

According to the Guidelines pluvial flooding is usually associated with convective summer thunderstorms or high intensity rainfall cells within longer duration events. Pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.

Rainfall (pluvial) flood risk was considered during Stage 1 of the CFRAMs programme. A pluvial map dataset forms part of the Preliminary Flood Risk Assessment maps (PFRA) and this has been used to identify development areas at particular risk of surface water and pluvial flooding.

## **Pluvial Flood Extent Maps**

The PFRA pluvial flood extents for the plan area are shown on Figure 3. The following methodology is set out in the National Preliminary Flood Risk Assessment.<sup>2</sup> The process for developing the pluvial flood extent maps was based on ‘dropping’ various depths and intensities of rainfall over a range of durations and modelling how that rainfall would flow over land and, in particular, pond in low-lying areas. The amount of rainfall that was absorbed by the ground or, in urban area, drained by the urban storm-water drainage system, and hence deducted from the water that would flow overland and pond, was estimated using the Flood Studies Update methodologies and from analysis against mapped events based on more detailed modelling (in Dublin) respectively. The process produced maps of areas likely to flood from intense rainfall events for three flood event probabilities (3.33%, 1% and 0.1% AEP events).

The maps were adapted to show only the extents where the flood depths were greater than 200mm (on the basis that depths lower than this would not cause significant damage given door-step levels above ground level). It is noted that the process assumed a constant capacity of urban storm-water drainage systems, and, due to the scale of analysis, has not taken into account local drainage structures such as culverts through embankments or other local drainage that would not be resolved in the DTM at national scale.

There are sporadic small scale pockets of land throughout the plan area at a risk of pluvial flooding, both developed and undeveloped areas. With regard to the latter, these areas include Open Space and Amenity zoned lands at Ramstown, small pockets of residential land at Creagh, Ballytegan and Millands and small pockets of the Business and Technology lands on the Courtown Road. More extensive pluvial flood risk is identified at Ballyloughan. Much of the identified area coincides with the identified fluvial flood risk in this area which is addressed in further detail in Section 2.6. Some of the lands are already developed. In the case of the undeveloped lands, most of the identified areas are either zoned for Leisure and Amenity(water

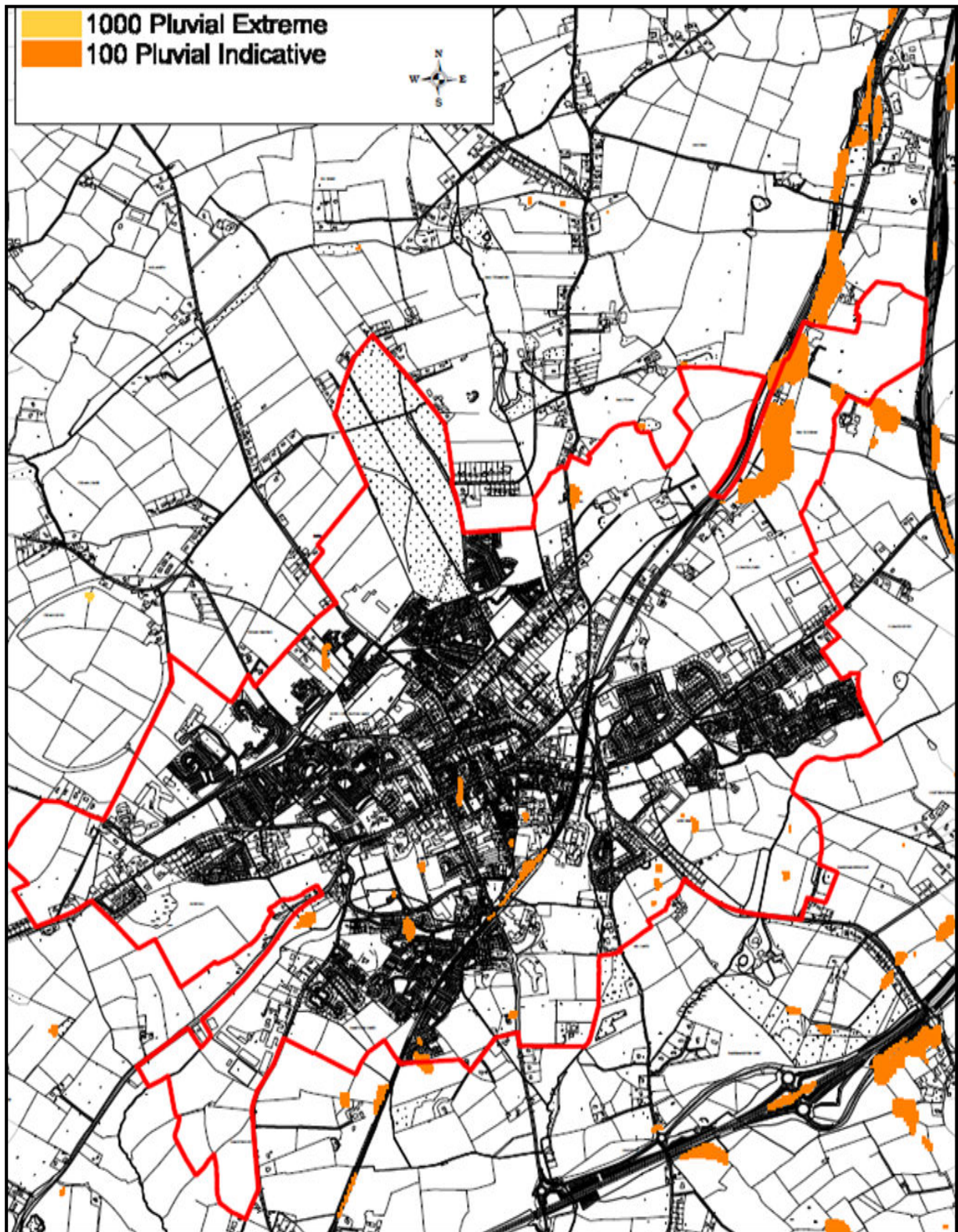
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<sup>2</sup> Office of Public Works, The National Preliminary Flood Risk (PFRA), Overview Report-Draft for Public Consultation, Dublin, August 2011, pp15-16.

compatible) or Strategic Reserve (no identified land use). There is a small pocket west of Ballyloughan House which straddles part of the public road and a small section of Industrial zoned land.

Site-specific flood risk assessments should be carried out to an appropriate level of detail for lands with an identified pluvial flood to assess the potential for these lands to contribute to, or be vulnerable to pluvial flooding. Such assessments and future developments should consider drainage thoroughly, in particular, whether there are any surface water flow paths or ponding on the lands. Any development proposals must demonstrate that it will not impact negatively on flood risk elsewhere.

Figure 3 OPW PFRA Pluvial Extents



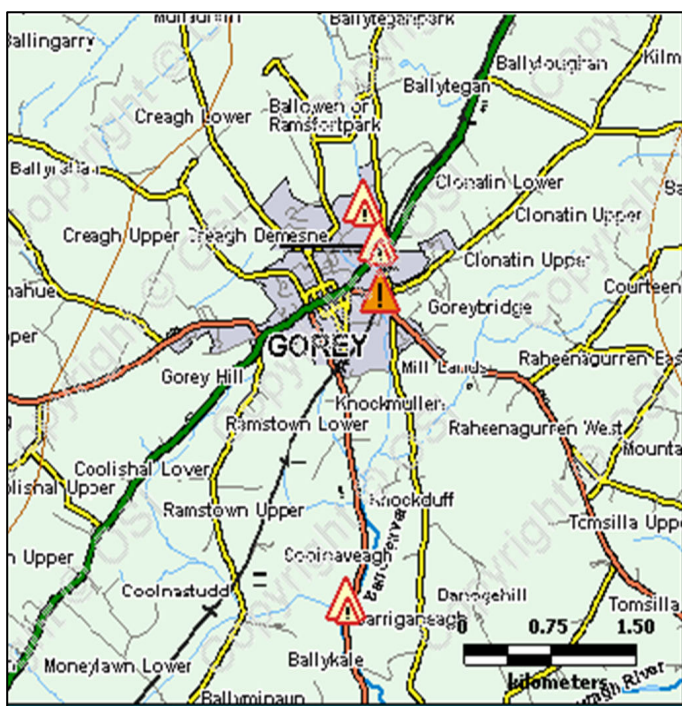


## 2.3 Secondary Sources of Flood Risk Information

### 2.3.1 OPW Flood Database

The National Flood Hazard mapping website, operated by the Office of Public Works, provides information on flood vulnerable locations in the town. This website [www.floodmaps.ie](http://www.floodmaps.ie) has recorded past flood events at Gorey Bridge, the Arklow Road and Garden City. These areas are shown on Figure 4. Local remedial works have been carried out in these areas by Wexford County Council

**Figure 4 Flood Events in Gorey Town and Environs**



Source: [www.floodmaps.ie](http://www.floodmaps.ie)

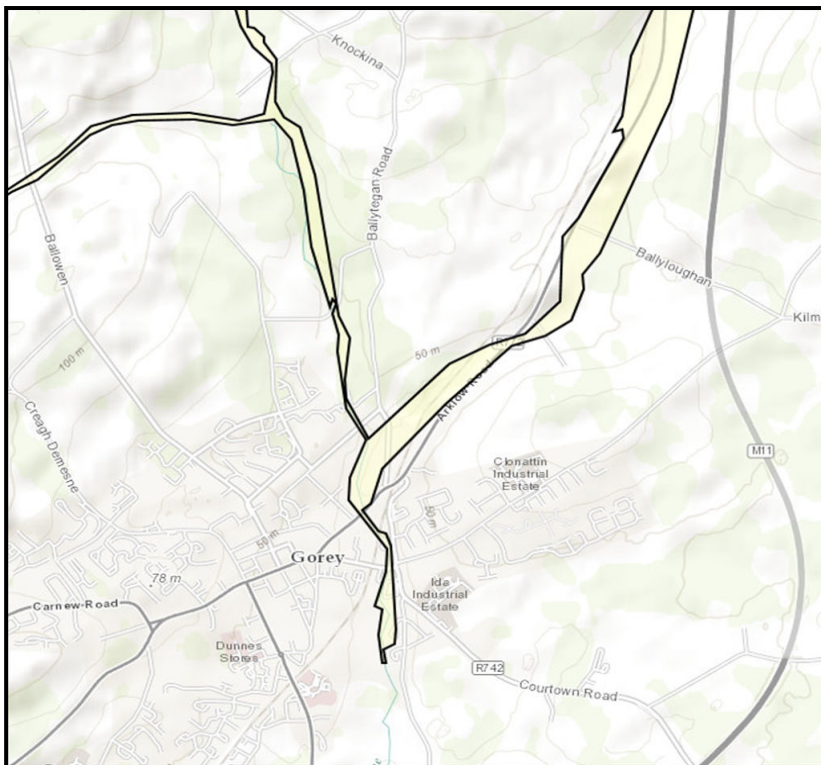
### 2.3.2 OPW Benefitting Land Maps

These maps, which are available to view on [www.floodmaps.ie](http://www.floodmaps.ie), were prepared by OPW to identify areas that would benefit from land drainage schemes. The identified low-lying lands near rivers and streams might be expected to be prone to flooding. The maps were reviewed and there were no such lands identified in the plan area.

### 2.3.3 Alluvial Soils

The presence of alluvial soils can indicate areas that have flooded in the past. The Irish Soil Information System project (co-funded by Teagasc and the EPA STRIVE Programme) has developed a national association soil map and associated digital soil system providing both spatial and quantitative information on soil types across the county. Figure 5 is extracted from this map and indicates the location of alluvial soils in the LAP area (yellow area).

**Figure 5 Alluvial Soils in the LAP Area.**



Source: [www.teagasc.ie/soils/maps](http://www.teagasc.ie/soils/maps)

### 2.3.4 Ordnance Survey (6" OS Maps)

These maps have been reviewed to see if any of the lands in the plan area are marked as 'Liable to Floods'. The 1888-1913 and '1837-1842' were reviewed and no lands were marked as so.

## 2.4 Conclusion Stage 1

Having regard to all of the information sources outlined above, it is considered that the plan area could be subject to potential flood risk issues and therefore the assessment should proceed to Stage 2.

## 2.5 Stage 2 Initial Flood Risk Assessment

The purpose of this stage is to ensure that all relevant flood risk issues are assessed and that potential conflicts between flood risk and development are addressed to an appropriate level of detail. The extent of the flood risk should be assessed and this may involve preparing indicative flood zone maps. Having identified flood zones, the sequential approach is used to direct, where possible, new development to areas at low risk of flooding.

### 2.5.1 The Sequential Approach

The Guidelines require a sequential approach to planning and flood risk management as it is considered a key tool in ensuring that development, particularly new development, is directed towards land that is at low risk of flooding. The philosophy underpinning the sequential approach in flood risk management is:

**Avoid** Preferably chose lower risk flood zone for new development.

**Substitute** Ensure the type of development proposed is not especially vulnerable to the adverse impacts of flooding.

**Justify** Ensure that the development is being considered for strategic reasons.

**Mitigate** Ensure flood risk is reduced to acceptable levels.

## 2.5.2 Flood Zone Mapping

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. The Guidelines define three types/levels of flood zones:

- 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.
- 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.
- Flood Zone C-where the probability of flooding from rivers and the sea is low (less than 0.1% of 1 in 1000 year and 1% or 1 in 100) for river flooding.

The Draft CFRAMS mapping for Gorey Town is the most up to date and technically reliable data in terms of identifying flood risk in the plan area. As such it is considered appropriate to use this data to determine the flood zones for the plan area. These flood zones are identified on Map 2.

## 2.5.3 Application of the Sequential Approach

Having identified the flood zones within the plan area, the next step is to apply the sequential approach to land use planning. The Guidelines have categorised land uses into three vulnerability classes. These are set out in Table 2. The Guidelines also match this vulnerability to an appropriate flood zone. This is set out in Table 3.

**Table 2: Vulnerability and Type of Development**

| Vulnerability Class  | Land uses and types of development which include: *   |
|--|---|
| Highly vulnerable development (including essential infrastructure) | <ul style="list-style-type: none"> <li>• Garda, ambulance and fire stations and command centres required to be operational during flooding;</li> <li>• Hospitals;</li> <li>• Emergency access and egress points;</li> <li>• Schools;</li> <li>• Dwelling houses, student halls of residence and hostels;</li> <li>• Residential Institutions such as residential care homes, children's homes and social services homes;</li> <li>• Caravans and mobile home parks;</li> <li>• Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</li> <li>• Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-</li> </ul> |

|                                     |  |
|-------------------------------------|--|
|                                     | stations, water and sewage treatment, and potential significant sources of pollution (SEVESO and IPPC sites etc) in the event of flooding.   |
| <b>Less Vulnerable Development</b>  | <ul style="list-style-type: none"> <li>• Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;</li> <li>• Land and buildings used for holiday or short-let caravans and camping subject to specific warning and evacuation plans;</li> <li>• Land and buildings used for agriculture and forestry;</li> <li>• Waste treatment (except landfill and hazardous waste);</li> <li>• Mineral working and processing; and</li> <li>• Local transport infrastructure</li> <li>•</li> </ul>   |
| <b>Water-compatible development</b> | <ul style="list-style-type: none"> <li>• Flood control infrastructure;</li> <li>• Docks, marinas and wharves;</li> <li>• Navigation facilities;</li> <li>• Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;</li> <li>• Water-based recreation and tourism (excluding sleeping accommodation);</li> <li>• Lifeguard and coastguard stations;</li> <li>• Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</li> <li>• Essential ancillary sleeping or residential accommodation for staff required by uses in this category(subject to specific warning and evacuation plan)</li> </ul> |

\* Uses not listed in this table should considered on their own merits

**Table 3 Matrix of Vulnerability v Flood Zone**

|                                      | <b>Flood Zone A</b> | <b>Flood Zone B</b> | <b>Flood Zone C</b> |
|--------------------------------------|---------------------|---------------------|---------------------|
| <b>Highly vulnerable development</b> | Justification Test  | Justification Test  | Appropriate         |
| <b>Less vulnerable development</b>   | Justification Test  | Appropriate         | Appropriate         |
| <b>Water-compatible development</b>  | Appropriate         | Appropriate         | Appropriate         |

## **2.6 Application of the Sequential Approach**

The flood zone map was overlaid on the plan area and reviewed in the context of both existing and proposed land uses. This identified areas where vulnerable developments, both existing and proposed, were at risk of flooding.

### **2.6.1 Undeveloped Lands**

In the case of undeveloped lands in Flood Zone A and B the **‘Avoid’** approach is used. These lands are zoned either ‘Open Space and Amenity’ or ‘Leisure and Amenity’. This approach has removed vulnerable uses from Flood Zone A and B. The additional benefit of these zonings is to contribute to the provision of a green buffer zone along the watercourses which will assist in protecting the integrity of the watercourses and their associated habitats. The subject lands are located at Ballytegan, Ballyloughan, Raheenagureen, Millands, Knockmullen, lands to the west of Gorey Town Park, Garden City, lands in the vicinity of Willow Park and Ashwood Grove and along the Inner Relief Road at Creagh.

#### **2.6.1.1 Lands on the old N11 (Arklow Road) at Ballyloughan**

These lands, which are identified as Area 4 on the Map 1, are zoned for Strategic Reserve. The purpose of this zoning is “*to provide lands for the future development of the area over the period of the next plan*”. The inclusion of these lands does not in any way infer a prior commitment regarding the nature of zoning. Such a decision will be considered within the framework of national and regional population targets

applicable at the time, the need for additional zoned lands and the proper planning and sustainable development of the area. The development of these lands is considered a key to the completion of the Inner Relief Route, which if delivered at this location, includes a section of the road and a bridge over the railway line and the R772. The future zoning of this land will be subject to a SFRA at that time.

### **2.6.2 Developed Lands**

While already developed, the continuation of the existing land use zoning of some lands presented issues as the lands would not pass the Justification Test. This refers to residential zoned lands in areas including Cois Doire and Sean Doire, Ramsfort Avenue, Garden City, Ballytegan and Creagh. These lands, which are identified as Areas 1, 2 and 3 on Map 1 are rezoned to zoned Leisure and Amenity.

There are other developed lands where the 'Substitute' approach was applied. The land use zoning on the lands was adjusted with Flood Zone A zoned for 'Leisure and Amenity' while the remainder of the site retains its existing zoning. This applies to the following lands:

#### **(a) Lands on the old N11 (Arklow Road) at Ballyloughnan**

The subject lands, which are identified as Area 5 on Map 1, are zoned for Commercial use and a small element was zoned for Residential. The Flood Zone map identifies Flood Zone A on the outer extremities of the lands with an area of Flood Zone B within the Commercial parcel. Given the location of the site relative to the urban core, the subject lands would not pass the Justification Test. Accordingly, the land use zoning was adjusted so that lands in Flood Zone A are rezoned Leisure and Amenity and the remainder of the site retains its Commercial zoning (as less vulnerable developments including commercial are appropriate in Flood Zone B).

#### **(b) Lands at Millands (currently occupied by an Agricultural Merchants)**

The subject lands, which are identified as Area 6 on Map 1, are zoned for Commercial use. The Banoge River runs through the site. Given the location of the site relative to the urban core, the subject lands would not pass the Justification Test. Accordingly, the land use zoning was adjusted so that the lands in Flood Zone A are rezoned Leisure and Amenity and the remainder of

the site retains its commercial zoning (as less vulnerable developments, including commercial, are appropriate in Flood Zone B).

Notwithstanding this, future development proposals on the above lands will be required to be accompanied by a site specific flood risk assessment appropriate to the nature and scale of the development.

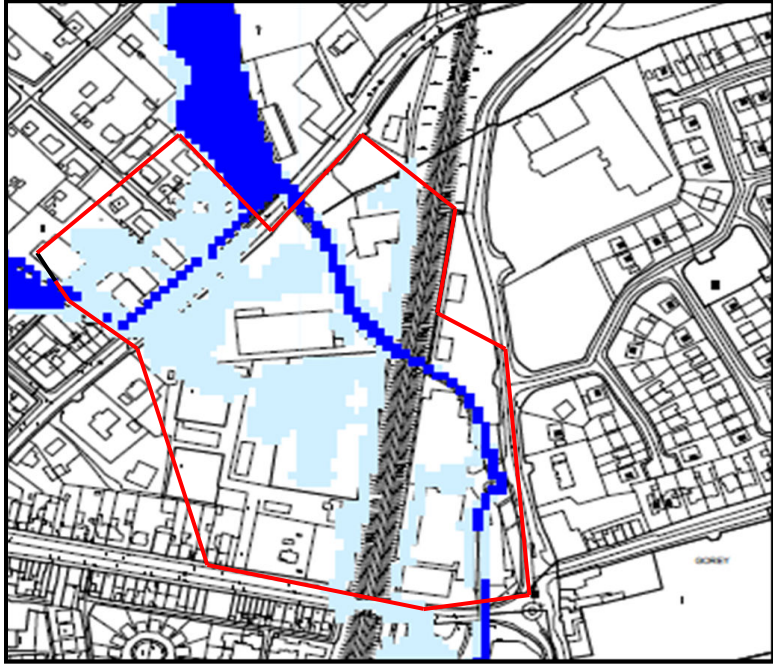
## **2.7 Development Plan Justification Test**

Flood risk management has played a key role in informing decisions regarding land use zoning objectives in the plan area. The 'Avoid' and 'Substitute' approaches have been used so far with lands rezoned to either Open Space and Amenity or Leisure and Amenity.

There are areas within the town centre which are within Flood Zone A and B. The land use zoning for this area is Central Business Area (Town Centre) and it allows for highly vulnerable uses (residential, schools) and less vulnerable (retail and commercial). In accordance with Table 3 Matrix of Vulnerability, it is necessary to carry out the Justification Test for these uses in this area.



**2.7.1 Lands in the vicinity of Esmonde Street, Gorey Bridge & the Arklow Road Road**

|                                |  |
|--------------------------------|--|
| <p><b>Location</b></p>         | <p>These lands, which are identified as Area 7 of Map 1, are located in the vicinity of Esmonde Street, the Arklow Road and Gorey Bridge. A lot of this area is developed-LIDL, Aldi, Boggan’s Car Garage, vacant commercial unit at Aldi, sports and amenity, including Gorey Tennis Club and a private commercial car park. The railway dissects the area.</p>  |
| <p><b>Land Use Zonings</b></p> | <p>Central Business Area (Town Centre). This land use zoning includes highly vulnerable (residential) and less vulnerable developments (retail, commercial).</p>   |
| <p><b>Flood Zone</b></p>       | <p>Mainly Flood Zone B (light blue), Flood Zone A (dark blue) along the River Banoge. Less vulnerable developments are compatible in Flood Zone B. As such the Justification Test relates to highly vulnerable developments in Flood Zone A and B.</p>   |

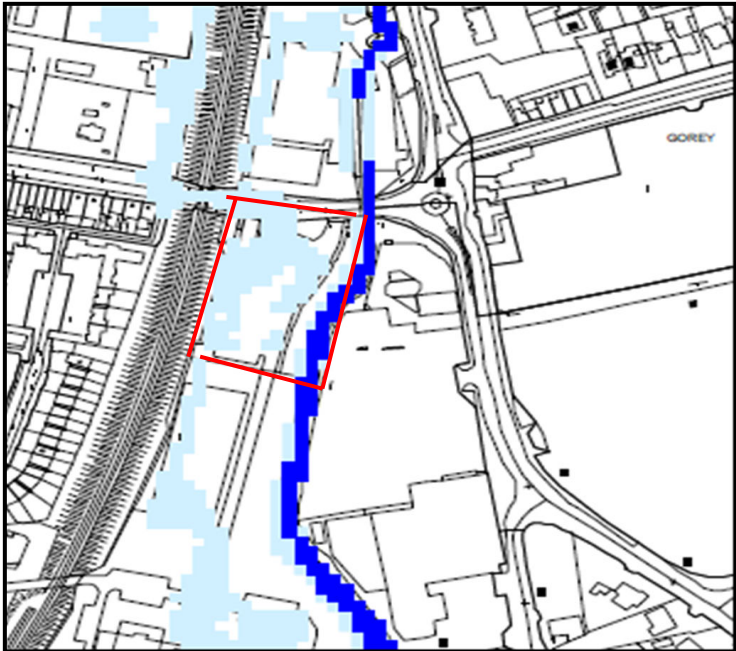
| <b>Justification Test</b>   |  |
|---|--|
| <p>The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans (development plan/local area plan) or under the Planning Guidelines or Planning Directive provisions of the Planning and Development Acts 2000, as amended.</p> | <p>Gorey Town is designated under the National Spatial Strategy (NSS) and the Regional Planning Guidelines for the South-East Region 2010-2022 (SERPG) as a Larger Town with urban strengthening opportunities. It has been targeted for measured growth having regard to its strategic location, capacity for growth and potential to deliver on the core objectives of critical mass and balanced regional development. The Settlement Strategy and associated Core Strategy in the CDP reinforces the role of Gorey as a Larger Town.</p> |
| <p>The zoning or designation of the lands for the particular use or development type is required to achieve proper planning and sustainable development of the urban settlement and, in particular:</p>   | <p>This land is zoned as Central Business Area.</p>  |
| <p>(2) (i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement</p>   | <p>These lands are located within the town centre and within easy walking and cycling distance of the main streets, the train station, bus stops and residential areas. The redevelopment of these lands would facilitate regeneration/expansion of the town centre and it would allow for</p>   |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>- Allow for higher densities in the town centre to build the critical mass necessary to create a self-sufficient town and fulfil the town's role as a Larger Town;</li> <li>- Allow for, and achieve, an efficient use of infrastructure and resources;</li> <li>- Contribute to enhanced vibrancy and vitality in the town centre;</li> <li>- Encourage a reduction in the number and length of car journeys and associated greenhouse gas emissions;</li> <li>- Allow for enhance permeability in this area through the delivery of pedestrian link through the lands.</li> </ul> |
| (2) (ii) Comprises significant previous development and/or under-utilised lands;           | While a lot of the land is developed, there are underutilised sections such as the lands between Esmonde Street and LIDL which offer redevelopment potential.  |
| (2) (iii) Is within or adjoining the core of an established or designated urban settlement | This area is within the core of Gorey Town.  |
| (2) (iv) Will be essential in achieving compact and sustainable urban growth; and          | These lands are in located in the heart of the town centre. The zoning of these lands is considered consistent with the Urban Consolidations Priorities for Large Towns outlined in the SERPG, which states that under-utilised, derelict or undeveloped lands within the built-up area should be identified and opportunities realised. The Urban Design Strategy (Section 3 of the LA) identified the lands as a key opportunity site for redevelopment in the town centre.  |
| (2) (v) There are no suitable alternative lands for the particular use or                  | These lands are within the urban centre and the proposed zoning is considered integral to consolidating and strengthening the urban core.  |

|   |  |
|---|--|
| <p>development type in areas at lower risk of flooding within or adjoining the core of the urban centre.</p>  |  |
| <p>3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the preparation of the plan which demonstrates that flood risk to the development can be adequately management and the use or development of the lands will not cause unacceptable or adverse impacts elsewhere.</p> | <p>The SEA Environmental Report has integrated the findings of the SFRA.</p> <p>The CDP contains a suite of flood risk management objectives in relation to flooding and mitigation of flooding. These objectives are relevant to the LAP. Flood Risk Management is discussed in further detail in Section 3.</p> <p>Planning applications for development proposals within Flood Zone A and B will be required to be accompanied by a site specific flood risk assessment appropriate to the nature and scale of the development and will be required to pass the Development Management Justification Test, where relevant. This site specific flood risk assessment must comply with the requirements of the Guidelines in particular with regard to a detailing the flood risk, proposing suitable and effective mitigation measures and addressing the residual risk.</p> <p>Mitigation measures would include:</p> <ul style="list-style-type: none"> <li>(a) Complying with recommendations, including the structural and non structural recommendations, set out in the CFRAM FRMP for the town.</li> <li>(b) Avoid a net reduction in the volume of floodplain storage within the lands being developed. This should include provision of compensatory storage preferably located within the site.</li> <li>(c) Proposals to include an appropriately designed</li> </ul> |

|  |  |
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|  | <p>freeboard. This should be designed to the 1 in 100 and 1 in 1000 year flood events.</p> <p>(d) Existing flow paths are not disrupted or compromised.</p> <p>(e) Surface water management to comply with SUDS.</p> |
|--|--|

### 2.7.2 Lands to the north of Gorey Community School

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|--|--|
| Location   | <p>These lands, which are identified as Area 9 on Map 1, are accessed from Esmonde Street. Access to Gorey Community School is through part of the site, the remainder is used for car parking.</p>                     |
| Land Use Zoning  | Central Business Area (Town Centre)  |
| Flood Zone   | Mainly Flood Zone B (light blue), Flood Zone A (dark blue) along the River Banoge.   |
| <b>Justification Test</b>  |  |
| The urban settlement is targeted for growth under the National Spatial Strategy, regional planning | Gorey Town is designated under the NSS and the SERPG as a Larger Town with urban strengthening opportunities. It has been targeted for measured growth having regard to its strategic location, capacity for growth and potential to deliver on the core objectives of critical mass and balanced regional |

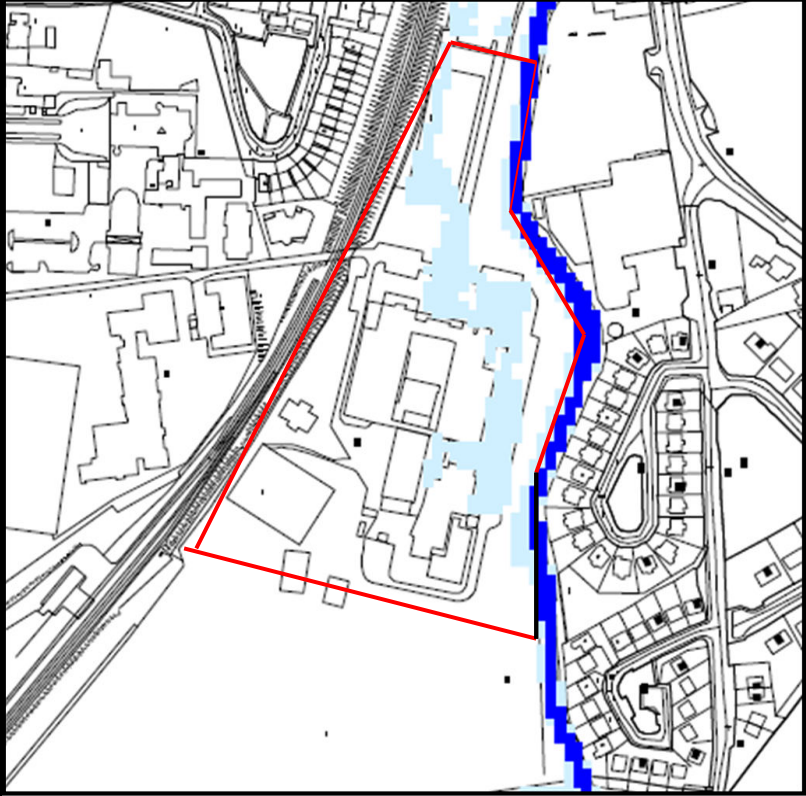
|   |  |
|---|--|
| <p>guidelines, statutory plans (development plan/local area plan) or under the Planning Guidelines or Planning Directive provisions of the Planning and Development Acts 2000, as amended.</p>          | <p>development. The Settlement Strategy and associated Core Strategy in the CDP reinforces the role of Gorey as a Larger Town.</p>   |
| <p>The zoning or designation of the lands for the particular use or development type is required to achieve proper planning and sustainable development of the urban settlement and, in particular:</p> | <p>The subject lands are zoned Central Business Area (Town Centre).</p>  |
| <p>(2) (i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement</p>   | <p>This is an under-utilised site within easy walking and cycling distance of the main streets in the town centre. The site offers urban consolidation opportunities by the use of brownfield land in the town centre.</p> |
| <p>(2) (ii) Comprises significant previous development and/or under-utilised lands;</p>   | <p>These lands are under-utilised and both the Urban Design Strategy (Section 3 of the LAP) and the Retail Strategy identify the lands as a key opportunity site for redevelopment in the town centre.</p>                 |

|  |  |
|--|--|
| <p>(2) (iii) Is within or adjoining the core of an established or designated urban settlement</p>  | <p>This area is within the core of Gorey Town.</p>   |
| <p>(2) (iv) Will be essential in achieving compact and sustainable urban growth; and</p>   | <p>The site is in the town centre. The promotion of a variety of uses, including new residential, commercial, cultural and community, in and around the town centre is important as it supports the creation of sustainable patterns of development.</p>   |
| <p>(2) (v) There are no suitable alternative lands for the particular use or development type in areas at lower risk of flooding within or adjoining the core of the urban centre.</p>                                     | <p>These lands are within the urban centre and the proposed zoning is considered integral to consolidating and strengthening the urban core.</p>   |
| <p>3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the preparation of the plan which demonstrates that flood risk to the</p> | <p>The SEA Environmental Report has integrated the findings of the SFRA.</p> <p>The CDP contains a suite of flood risk management objectives in relation to flooding and mitigation of flooding. These objectives are relevant to the LAP. Flood Risk Management is discussed in further detail in Section 3.</p> <p>Planning applications for development proposals within Flood Zone A and B will be required to be accompanied by a site specific flood risk assessment appropriate to the nature and scale of the development and will be required to pass</p> |

|   |   |
|---|---|
| <p>development can be adequately management and the use or development of the lands will not cause unacceptable or adverse impacts elsewhere.</p> | <p>the Development Management Justification Test, where relevant. This site specific flood risk assessment must comply with the requirements of the Guidelines in particular with regard to a detailing the flood risk, proposing suitable and effective mitigation measures and addressing the residual risk.</p> <p>Mitigation measures would include:</p> <ul style="list-style-type: none"> <li>(a) Complying with recommendations, including the structural and non structural recommendations, set out in the CFRAM FRMP for the town.</li> <li>(b) Avoid a net reduction in the volume of floodplain storage within the lands being developed. This should include provision of compensatory storage preferably located within the site.</li> <li>(c) Proposals to include an appropriately designed freeboard. This should be designed to the 1 in 100 and 1 in 1000 year flood events.</li> <li>(d) Existing flow paths are not disrupted or compromised.</li> <li>(e) Surface water management to comply with SUDS</li> </ul> |
|---|---|



### 2.7.3 The site of Gorey Community School

|  |  |
|--|--|
| <p>Location</p>  | <p>These lands, which are identified as Area 8 on Map 1, are accessed from Esmonde Street and are the home of Gorey Community School, one of the largest secondary school in the country.</p>   |
| <p>Land Use Zoning</p>   | <p>Community and Education</p>   |
| <p>Flood Zone</p>  | <p>Mainly Flood Zone B (light blue), Flood Zone A (dark blue) along the River Banoge.</p>  |
| <p><b>Justification Test</b></p>   |  |
| <p>The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans (development plan/local area plan) or under the Planning Guidelines or</p> | <p>Gorey Town designated under the NSS and the SERPG as a Larger Town with urban strengthening opportunities. It has been targeted for growth having regard to its strategic location, capacity for growth and potential to deliver on the core objectives of critical mass and balanced regional development. The Settlement Strategy and associated Core Strategy in the CDP reinforces this role.</p> |

|   |   |
|---|---|
| <p>Planning Directive provisions of the Planning and Development Acts 2000, as amended.</p>   |   |
| <p>The zoning or designation of the lands for the particular use or development type is required to achieve proper planning and sustainable development of the urban settlement and, in particular:</p> | <p>The subject lands are zoned Community and Education to reflect the existing use of the land.</p>   |
| <p>(2) (i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement</p>   | <p>This secondary school is located in the Town Centre where schools ideally should be located. The site is within a short walking and cycling distance of the main streets and adjoining residential areas.</p>                      |
| <p>(2) (ii) Comprises significant previous development and/or under-utilised lands;</p>   | <p>The site of Gorey Community School is substantially developed.</p>   |
| <p>(2) (iii) Is within or adjoining the core of an established or designated urban settlement</p>   | <p>This area is within the core of Gorey Town.</p>  |
| <p>(2) (iv) Will be essential in achieving compact and sustainable urban growth; and</p>  | <p>The location of a school in the town centre is proper planning and sustainable development. As outlined above the site is within an easy walk and cycle of many adjoining residential areas, allowing students ease of access.</p> |

|   |   |
|---|---|
| <p>(2) (v) There are no suitable alternative lands for the particular use or development type in areas at lower risk of flooding within or adjoining the core of the urban centre.</p>  | <p>These lands are within the urban centre and the proposed zoning is considered integral to consolidating and strengthening the urban core. It will also allow for the appropriate expansion of the existing school.</p>   |
| <p>3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the preparation of the plan which demonstrates that flood risk to the development can be adequately management and the use or development of the lands will not cause unacceptable or adverse impacts elsewhere.</p> | <p>The SEA Environmental Report has integrated the findings of the SFRA.</p> <p>The CDP contains a suite of flood risk management objectives in relation to flooding and mitigation of flooding. These objectives are relevant to the LAP. The LAP also includes specific objectives relating to flood risk management. Flood Risk Management is discussed in further detail in Section 3.</p> <p>Planning applications for development proposals within Flood Zone A and B will be required to be accompanied by a site specific flood risk assessment appropriate to the nature and scale of the development and will be required to pass the Development Management Justification Test, where relevant. This site specific flood risk assessment must comply with the requirements of the Guidelines in particular with regard to a detailing the flood risk, proposing suitable and effective mitigation measures and addressing the residual risk.</p> <p>Mitigation measures would include:</p> <p>(a) Complying with recommendations, including the structural and non structural recommendations, set out in the CFRAM FRMP for the town.</p> |

|  |   |
|--|---|
|  | <p>(b) Avoid a net reduction in the volume of floodplain storage within the lands being developed. This should include provision of compensatory storage preferably located within the site.</p> <p>(c) Proposals to include an appropriately designed freeboard. This should be designed to the 1 in 100 and 1 in 1000 year flood events.</p> <p>(d) Existing flow paths are not disrupted or compromised.</p> <p>(e) Surface water management to comply with SUDS</p> |
|--|---|

## 2.8 Stage 2 Conclusions

The Stage 2 Flood Risk Assessment has been prepared in accordance with the Guidelines and the land use zoning and objectives in the LAP have been applied in line with the recommendations set out in the Guidelines. It is considered that a fair balance has been struck between avoiding flood risk and facilitating necessary development and this in conjunction with the Flood Risk Management objectives in the CDP and Section 3 of this SFRA, will enable future development to avoid areas of highest risk.

## **3 Flood Risk Management**

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### **3.1 Flood Risk Management Measures**

#### **3.1.1 South-Eastern Catchment Flood Risk and Management Plan**

As previously outlined, the OPW are currently preparing a Flood Risk Management Plan (FRMP) for Gorey Town. The Planning Authority will have regard to the FRMP when considering proposals for development in the plan area, in particular, the flood hazard and flood zone mapping and associated flood risk management recommendations.

#### **3.1.2 Flood Risk Assessments**

Screening for flood risk will be carried out for all development proposals in accordance with the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DEHLG and OPW, 2009) as amended by Circular PL2/2014 and any other future update to the Guidelines.

Pre-application discussions will be important in identifying the broad range of issues affecting a site and present an opportunity for the Planning Authority to make clear to the applicant that an appropriate flood risk assessment should be carried out as part of the application preparation process and to highlight the objectives of the Local Area Plan and the parent Wexford County Development Plan in relation to flood risk and the available information on flood zones.

Planning applications for development proposals within, incorporating and adjoining areas at moderate (Flood Zone B) to high (Flood Zone A) risk of flooding will be required to be accompanied by a site specific and appropriately detailed flood risk assessment. In Flood Zone C the need for an appropriately detailed site specific flood risk assessment will be assessed based on a number of factors including, inter alia, the proximity to Flood Zone A or B, the topography of the subject lands and adjoining lands and the nature and vulnerability of the development proposal. The required site-specific flood risk assessment shall be carried out by a suitable qualified and indemnified professional and in accordance with the requirements of

the Planning System and Flood Risk Management Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government and Office of Public Works, 2009), as amended by Circular PL2/2014 and any other future update to the Guidelines.

The detailed site-specific flood risk assessment should quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks. A site-specific flood risk assessment should provide the information detailed in The Planning System and Flood Risk Management (and Technical Appendices) Guidelines for Planning Authorities (DEHLG and OPW, 2009) but in general should include:

- Plans showing the site, the development proposal and its relationship with watercourses and structures which may influence local hydraulics;
- Surveys of site levels and cross-sections relating relevant development levels to sources of flooding and likely flood water levels;
- Assessments of:
  - All potential sources of flooding;
  - Flood alleviation measures already in place;
  - The potential impact of flooding on the site and elsewhere;
  - How the layout and form of the development can reduce those impacts, including arrangements for safe access and egress;
  - Proposals for surface water management according to sustainable drainage principles;
  - The effectiveness and impacts of any necessary mitigation measures;
  - The residual risks to the site after the construction of any necessary measures and the means of managing those risks; and
  - A summary sheet which describes how the flood risks have been managed for occupants of the site and its infrastructure.

### **3.1.3 Application of the Justification Test in Development Management**

Where the Planning Authority is considering proposals for new development in areas at high or moderate risk of flooding that include types of development that are vulnerable to flooding and that would generally be inappropriate as set out in Table

3.2 of the Guidelines, the Authority must be satisfied that the development satisfies all of the criteria of the Justification Test as it applies to development management. Section 5.15 of the Guidelines outlines all of the criteria that must be satisfied in the Justification Test. This is shown in Table 4.

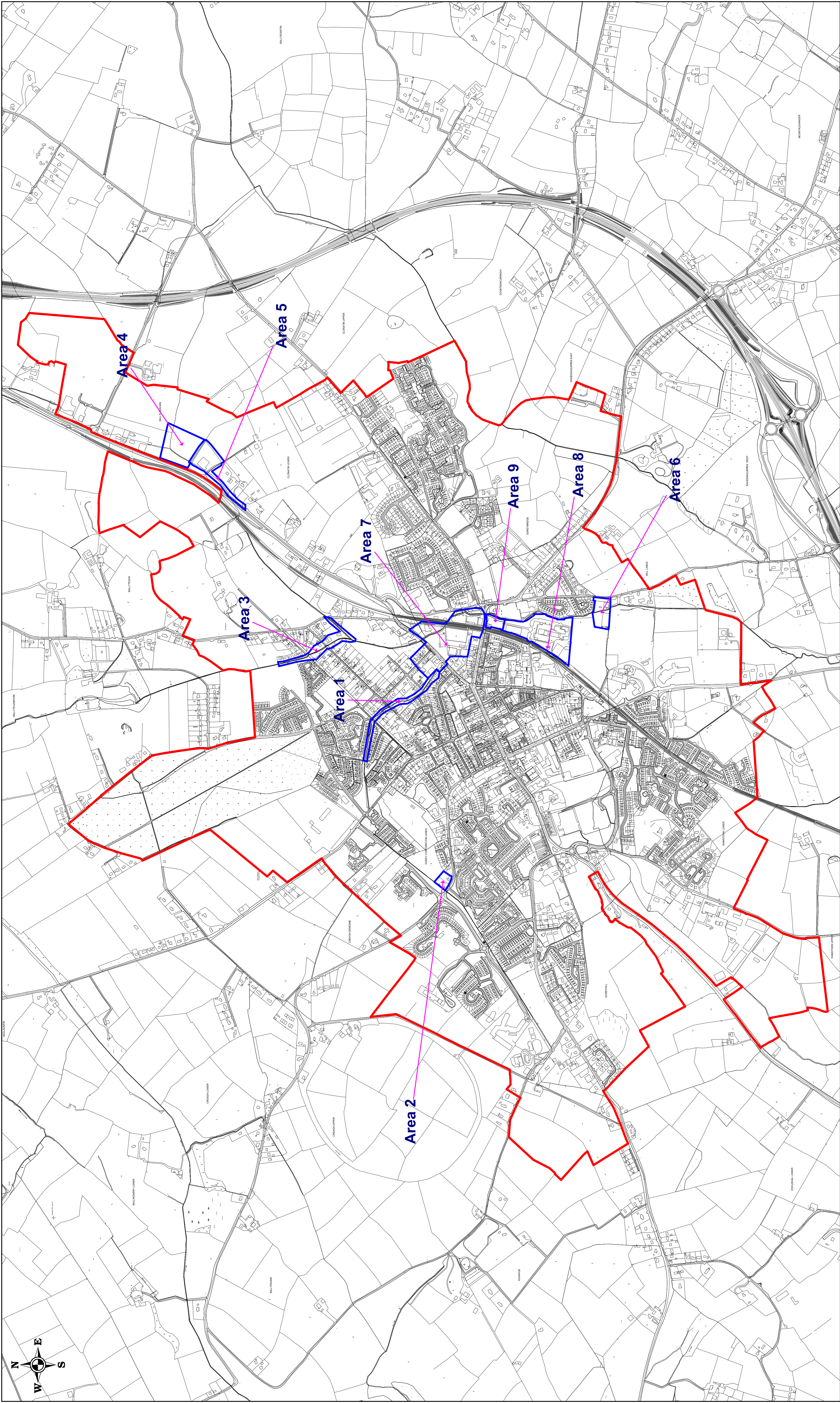
**Table 4 Development Management Justification Test**

| <b>Justification Test for Development Management</b>   |
|--|
| <p>When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:</p> <ol style="list-style-type: none"><li>1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of the guidelines.</li><li>2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:<ol style="list-style-type: none"><li>(i) the development proposed will not increase flood risk elsewhere, and if practicable, will reduce overall flood risk,</li><li>(ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;</li><li>(iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services; and</li><li>(iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.</li></ol></li></ol> <p>The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.</p> |

### **3.1.4 Applications for Minor Proposals in Areas of Flood Risk**

In accordance with Section 5.28 of the Guidelines (as amended by Circular PL2/2014, applications for minor development, such as small scale infill, small extensions to houses or the rebuilding of houses, and most changes of use of existing buildings and or extensions and additions to existing commercial and industrial enterprises, are unlikely to raise significant flooding issues, unless they obstruct important flow paths, introduce a significant additional number of people into flood risk areas or entail the storage of hazardous substances. Since such applications concern existing buildings or developed areas, the sequential approach cannot be used to locate them in lower-risk areas and the Justification Test will not apply. However, a commensurate assessment of the risk of flooding should accompany such applications to demonstrate that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities. These proposals should follow best practice in the management of health and safety for users and residents of the proposal.





# Gorey Town & Environs Local Area Plan 2017-2023

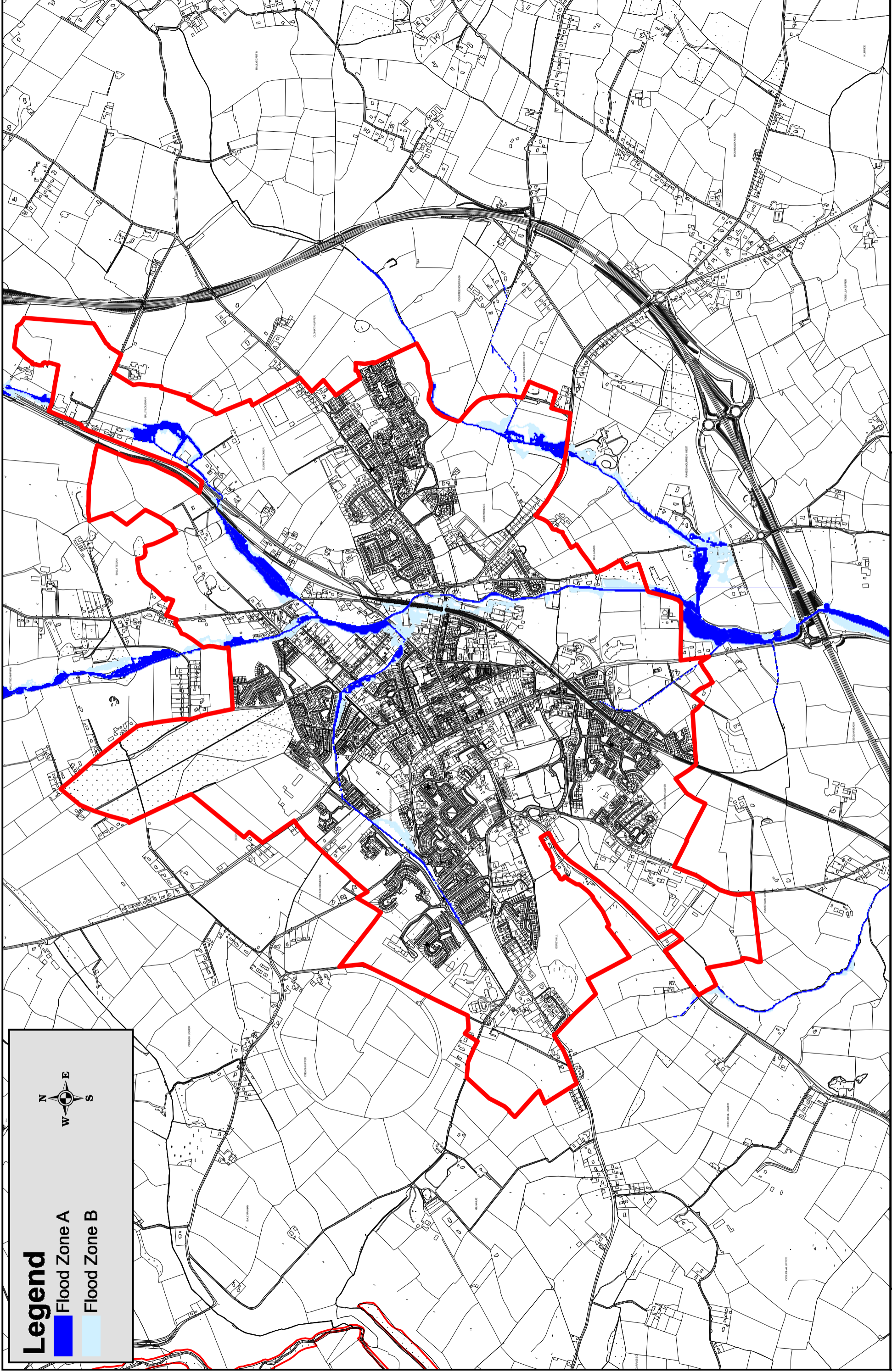
Title: Key Areas

Drawn by: NK

Checked by: PD

Date: 11.04.2017

Map No: 1



**Legend**

Flood Zone A

Flood Zone B



**Gorey Town & Environs Local Area Plan 2017-2023**

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Title: Flood Zones

Drawn by: NK

Date: 11.04.2017

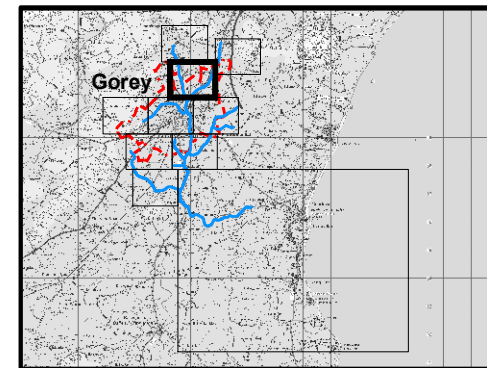
Checked by: PD

Map No: 2

Appendix 1

Draft CFRAMS

Flood Maps

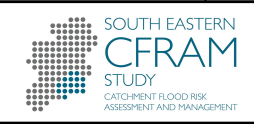


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- Legend**
- 10% Fluvial AEP Event
  - 1% Fluvial AEP Event
  - 0.1% Fluvial AEP Event
  - Modelled River Centreline
  - AFA Extents
  - Node Point
  - Node ID
  - Node Label

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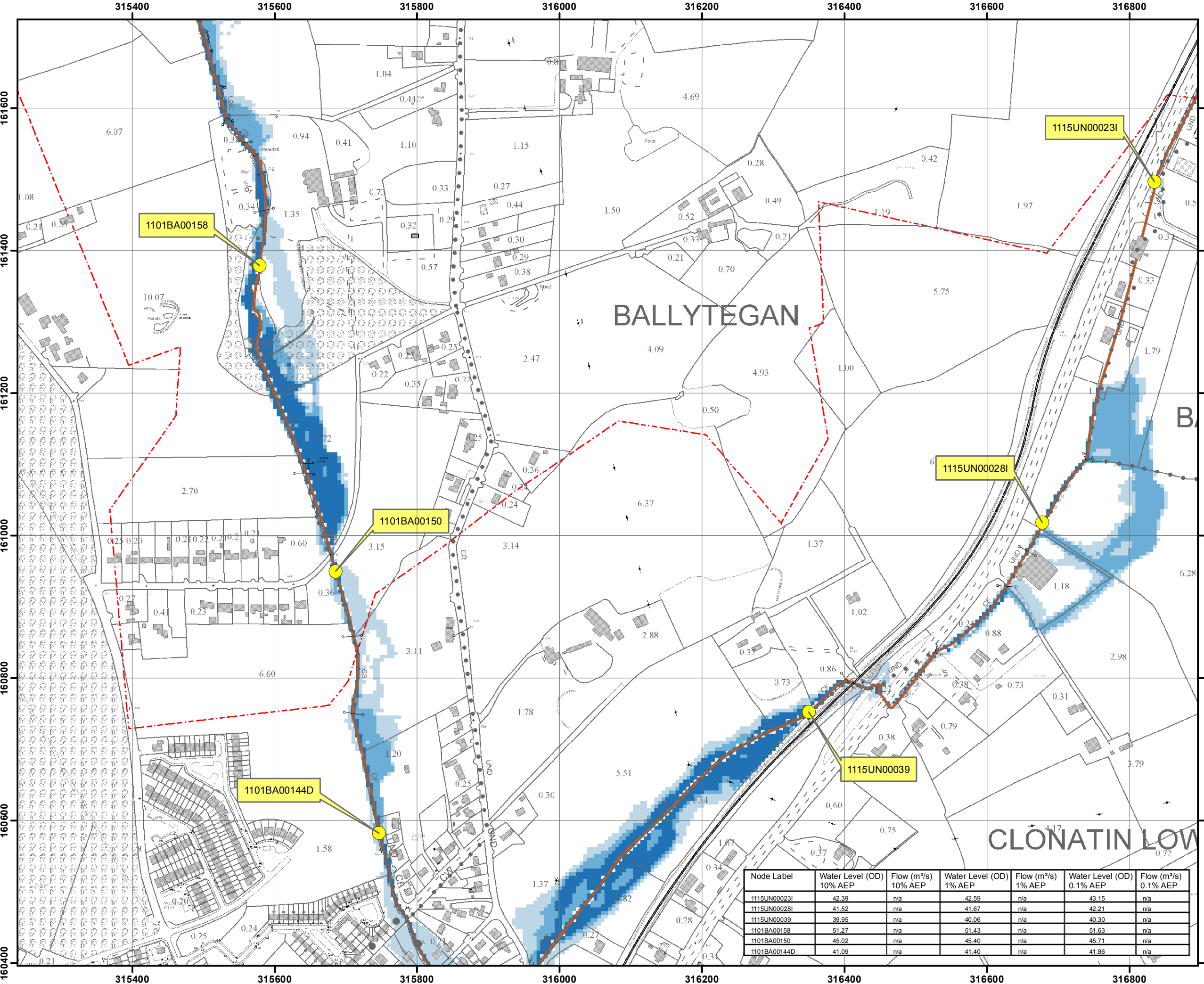


The Office of Public Works  
 Jonathan Swift Street  
 Trim  
 Co Meath

Elmwood House  
 74 Boucher Road  
 Belfast  
 BT12 6RZ

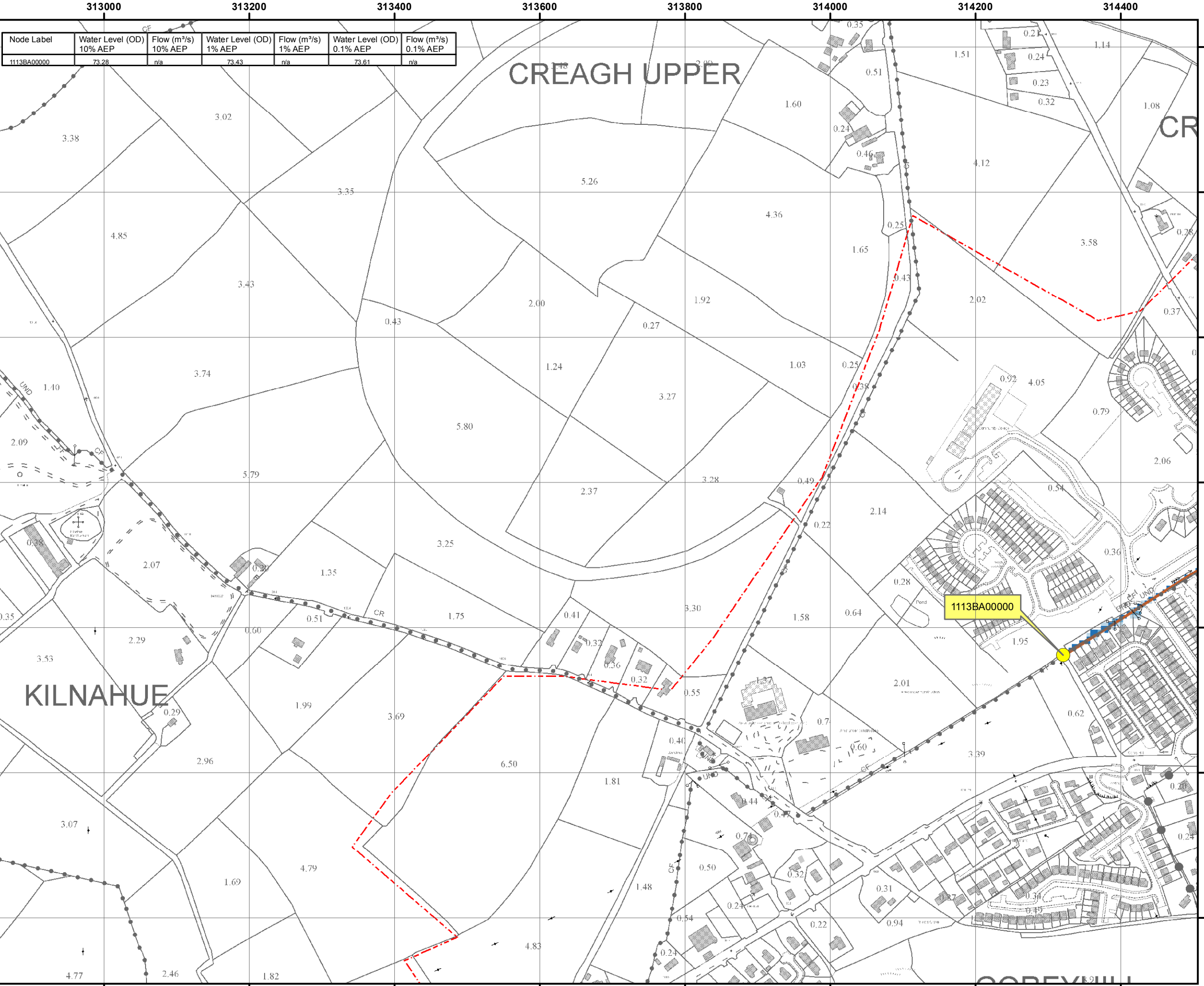
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|                                   |                                |
|-----------------------------------|--------------------------------|
| <b>Map:</b>                       |                                |
| Gorey Fluvial Flood Extent        |                                |
| <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> 26th January 2015 |
| <b>Checked By:</b> E.H.           | <b>Date:</b> 26th January 2015 |
| <b>Approved By:</b> S.P.          | <b>Date:</b> 26th January 2015 |
| <b>Drawing No.:</b>               |                                |
| O11GOR_EXFCD_C0_SH02              |                                |
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| <b>Drawing Scale:</b> 1:5,000 @A3 |                                |

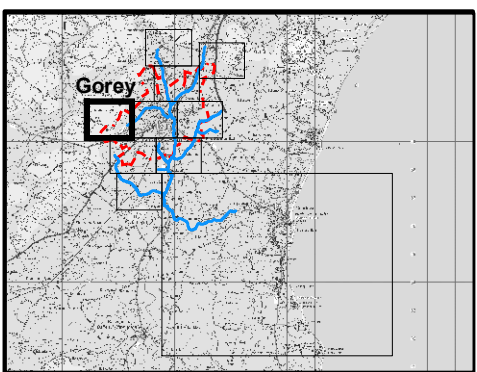


| Node Label   | Water Level (OD)<br>10% AEP | Flow (m³/s)<br>10% AEP | Water Level (OD)<br>1% AEP | Flow (m³/s)<br>1% AEP | Water Level (OD)<br>0.1% AEP | Flow (m³/s)<br>0.1% AEP |
|--------------|-----------------------------|------------------------|----------------------------|-----------------------|------------------------------|-------------------------|
| 1115UN00023I | 42.39                       | n/a                    | 42.59                      | n/a                   | 43.15                        | n/a                     |
| 1115UN00028I | 41.52                       | n/a                    | 41.67                      | n/a                   | 42.21                        | n/a                     |
| 1115UN00039  | 39.95                       | n/a                    | 40.06                      | n/a                   | 40.30                        | n/a                     |
| 1101BA00158  | 51.27                       | n/a                    | 51.43                      | n/a                   | 51.63                        | n/a                     |
| 1101BA00150  | 45.02                       | n/a                    | 45.40                      | n/a                   | 45.71                        | n/a                     |
| 1101BA00144D | 41.09                       | n/a                    | 41.40                      | n/a                   | 41.86                        | n/a                     |





| Node Label  | Water Level (OD)<br>10% AEP | Flow (m³/s)<br>10% AEP | Water Level (OD)<br>1% AEP | Flow (m³/s)<br>1% AEP | Water Level (OD)<br>0.1% AEP | Flow (m³/s)<br>0.1% AEP |
|-------------|-----------------------------|------------------------|----------------------------|-----------------------|------------------------------|-------------------------|
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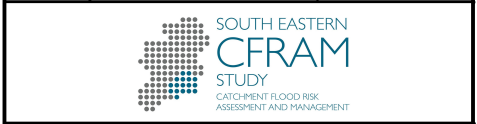


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- Legend**
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| REV: | NOTE: | DATE: |
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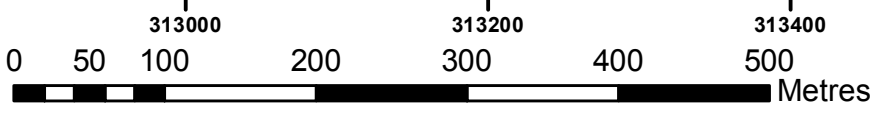


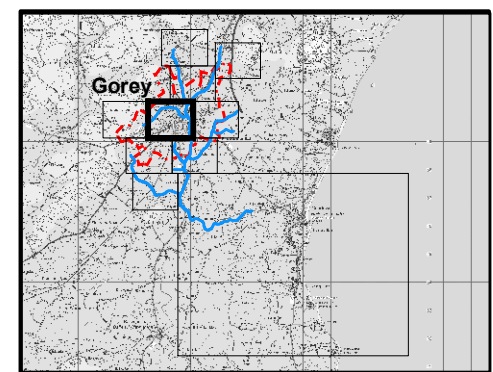
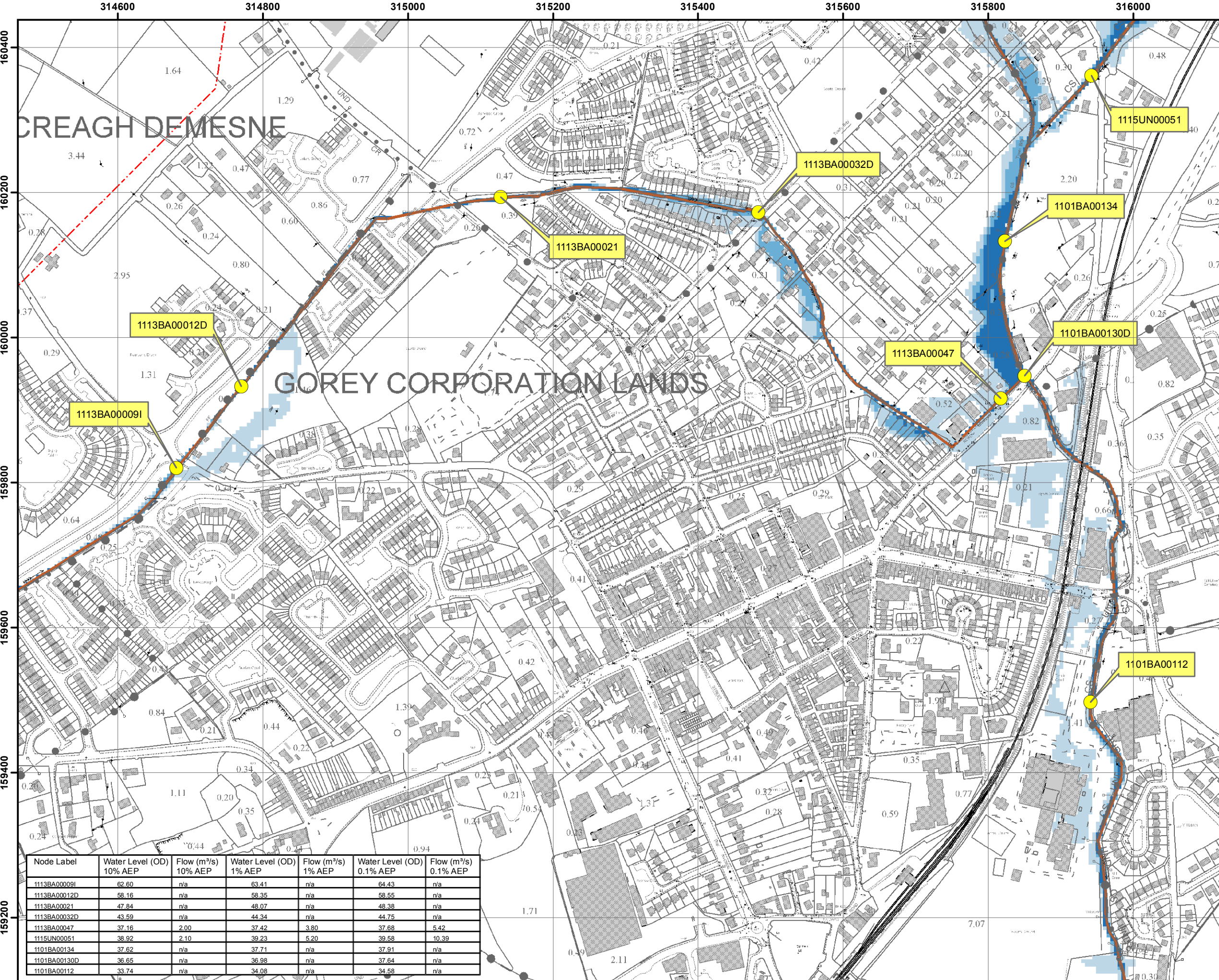
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|                             |                          |
|-----------------------------|--------------------------|
| <b>Map:</b>                 |                          |
| Gorey Fluvial Flood Extent  |                          |
| Map Type: EXTENT            |                          |
| Source: FLUVIAL             |                          |
| Map Area: HPW               |                          |
| Scenario: CURRENT           |                          |
| Drawn By : F.M.C.           | Date : 26th January 2015 |
| Checked By : E.H.           | Date : 26th January 2015 |
| Approved By : S.P.          | Date : 26th January 2015 |
| Drawing No. :               |                          |
| O11GOR_EXFCD_C0_SH04        |                          |
| Map Series : 4 of 10        |                          |
| Drawing Scale : 1:5,000 @A3 |                          |





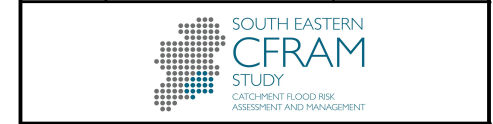
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**Legend**

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID
- Node Label

DRAFT

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| REV: | NOTE: | DATE: |
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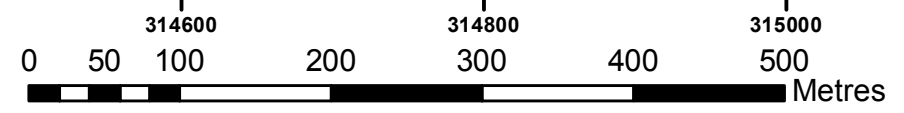


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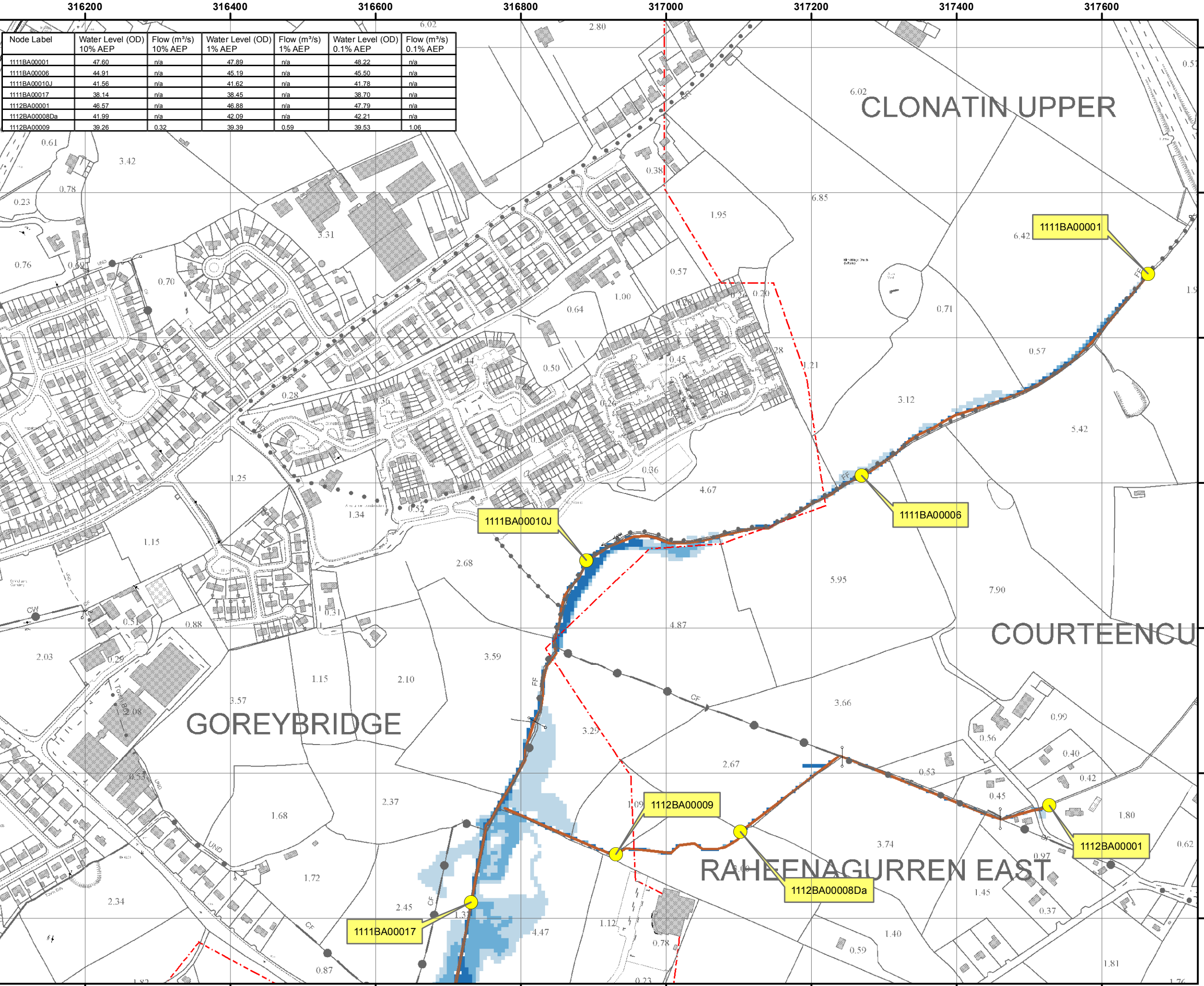
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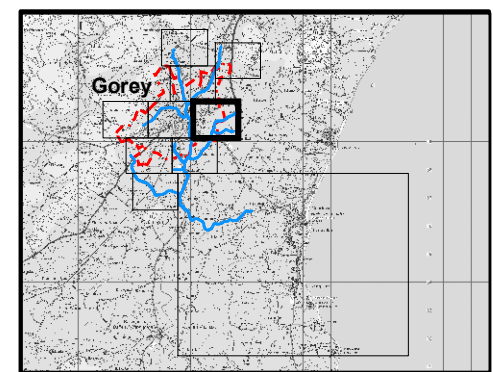
| Node Label   | Water Level (OD) |        | Flow (m <sup>3</sup> /s) |        | Water Level (OD) |          |
|--------------|------------------|--------|--------------------------|--------|------------------|----------|
|              | 10% AEP          | 1% AEP | 10% AEP                  | 1% AEP | 0.1% AEP         | 0.1% AEP |
| 1113BA000091 | 62.60            | n/a    | 63.41                    | n/a    | 64.43            | n/a      |
| 1113BA00012D | 58.16            | n/a    | 58.35                    | n/a    | 58.55            | n/a      |
| 1113BA00021  | 47.84            | n/a    | 48.07                    | n/a    | 48.38            | n/a      |
| 1113BA00032D | 43.59            | n/a    | 44.34                    | n/a    | 44.75            | n/a      |
| 1113BA00047  | 37.16            | 2.00   | 37.42                    | 3.80   | 37.68            | 5.42     |
| 1115UN00051  | 38.92            | 2.10   | 39.23                    | 5.20   | 39.58            | 10.39    |
| 1101BA00134  | 37.62            | n/a    | 37.71                    | n/a    | 37.91            | n/a      |
| 1101BA00130D | 36.65            | n/a    | 36.98                    | n/a    | 37.64            | n/a      |
| 1101BA00112  | 33.74            | n/a    | 34.08                    | n/a    | 34.58            | n/a      |



|                            |                         |
|----------------------------|-------------------------|
| <b>Map:</b>                |                         |
| Gorey Fluvial Flood Extent |                         |
| Map Type: EXTENT           |                         |
| Source: FLUVIAL            |                         |
| Map Area: HPW              |                         |
| Scenario: CURRENT          |                         |
| Drawn By: F.M.C.           | Date: 26th January 2015 |
| Checked By: E.H.           | Date: 26th January 2015 |
| Approved By: S.P.          | Date: 26th January 2015 |
| Drawing No.:               |                         |
| O11GOR_EXFCD_C0_SH05       |                         |
| Map Series: 5 of 10        |                         |
| 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 |
|---------------|--------------------------|---------------------|-------------------------|--------------------|---------------------------|----------------------|
| 1111BA00001   | 47.60                    | n/a                 | 47.89                   | n/a                | 48.22                     | n/a                  |
| 1111BA00006   | 44.91                    | n/a                 | 45.19                   | n/a                | 45.50                     | n/a                  |
| 1111BA00010J  | 41.56                    | n/a                 | 41.62                   | n/a                | 41.78                     | n/a                  |
| 1111BA00017   | 38.14                    | n/a                 | 38.45                   | n/a                | 38.70                     | n/a                  |
| 1112BA00001   | 46.57                    | n/a                 | 46.88                   | n/a                | 47.79                     | n/a                  |
| 1112BA00008Da | 41.99                    | n/a                 | 42.09                   | n/a                | 42.21                     | n/a                  |
| 1112BA00009   | 39.26                    | 0.32                | 39.39                   | 0.59               | 39.53                     | 1.06                 |



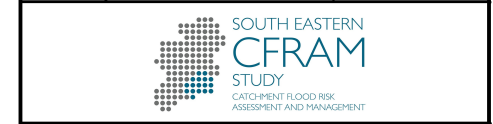
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**Legend**

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

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| REV: | NOTE: | DATE: |
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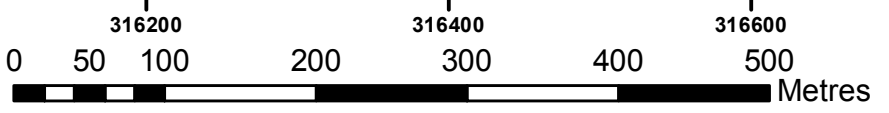


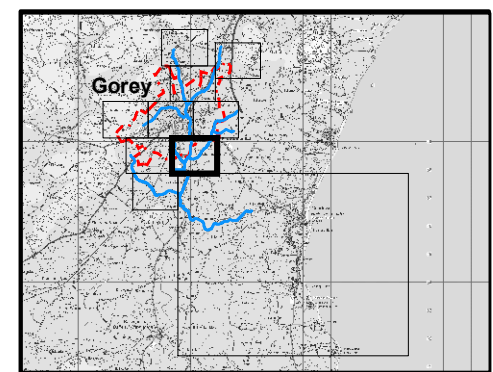
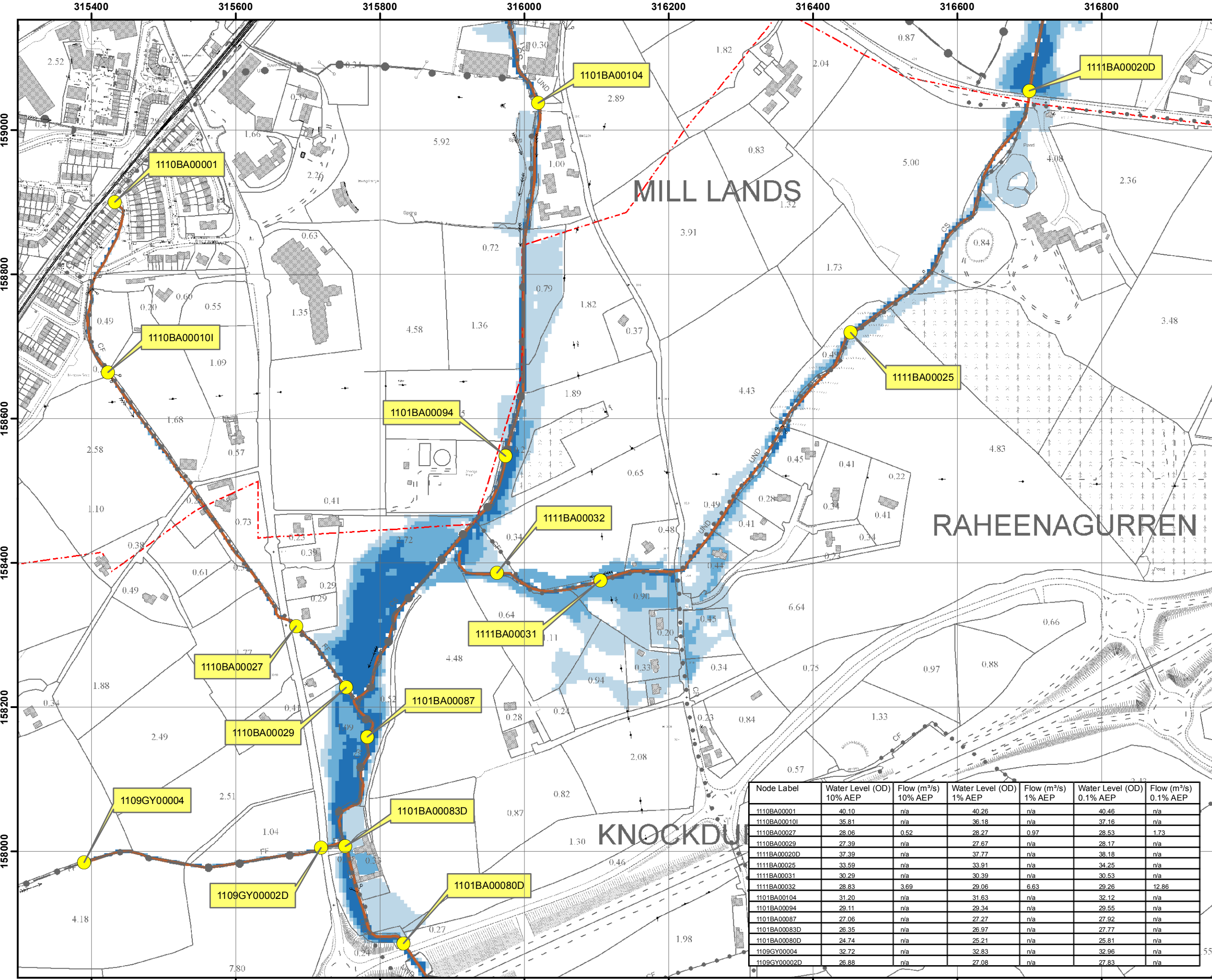
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| <b>Map:</b>           | Gorey Fluvial Flood Extent     |
| <b>Map Type:</b>      | EXTENT                         |
| <b>Source:</b>        | FLUVIAL                        |
| <b>Map Area:</b>      | HPW                            |
| <b>Scenario:</b>      | CURRENT                        |
| <b>Drawn By:</b>      | F.M.C. Date: 26th January 2015 |
| <b>Checked By:</b>    | E.H. Date: 26th January 2015   |
| <b>Approved By:</b>   | S.P. Date: 26th January 2015   |
| <b>Drawing No.:</b>   | O11GOR_EXFCD_C0_SH06           |
| <b>Map Series:</b>    | 6 of 10                        |
| <b>Drawing Scale:</b> | 1:5,000 @A3                    |



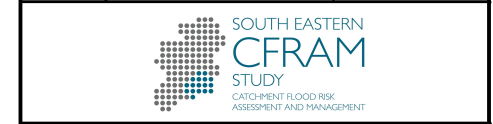


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- Legend**
- 10% Fluvial AEP Event
  - 1% Fluvial AEP Event
  - 0.1% Fluvial AEP Event
  - Modelled River Centreline
  - AFA Extents
  - Node Point
- Node ID    Node Label

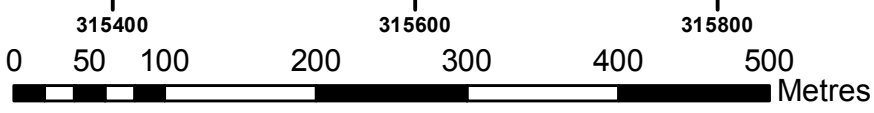
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| Node Label   | Water Level (OD)<br>10% AEP | Flow (m³/s)<br>10% AEP | Water Level (OD)<br>1% AEP | Flow (m³/s)<br>1% AEP | Water Level (OD)<br>0.1% AEP | Flow (m³/s)<br>0.1% AEP |
|--------------|-----------------------------|------------------------|----------------------------|-----------------------|------------------------------|-------------------------|
| 1110BA00001  | 40.10                       | n/a                    | 40.26                      | n/a                   | 40.46                        | n/a                     |
| 1110BA000101 | 35.81                       | n/a                    | 36.18                      | n/a                   | 37.16                        | n/a                     |
| 1110BA00027  | 28.06                       | 0.52                   | 28.27                      | 0.97                  | 28.53                        | 1.73                    |
| 1110BA00029  | 27.39                       | n/a                    | 27.67                      | n/a                   | 28.17                        | n/a                     |
| 1111BA00020D | 37.39                       | n/a                    | 37.77                      | n/a                   | 38.18                        | n/a                     |
| 1111BA00025  | 33.59                       | n/a                    | 33.91                      | n/a                   | 34.25                        | n/a                     |
| 1111BA00031  | 30.29                       | n/a                    | 30.39                      | n/a                   | 30.53                        | n/a                     |
| 1111BA00032  | 28.83                       | 3.69                   | 29.06                      | 6.63                  | 29.26                        | 12.86                   |
| 1101BA00104  | 31.20                       | n/a                    | 31.63                      | n/a                   | 32.12                        | n/a                     |
| 1101BA00094  | 29.11                       | n/a                    | 29.34                      | n/a                   | 29.55                        | n/a                     |
| 1101BA00087  | 27.06                       | n/a                    | 27.27                      | n/a                   | 27.92                        | n/a                     |
| 1101BA00083D | 26.35                       | n/a                    | 26.97                      | n/a                   | 27.77                        | n/a                     |
| 1101BA00080D | 24.74                       | n/a                    | 25.21                      | n/a                   | 25.81                        | n/a                     |
| 1109GY00004  | 32.72                       | n/a                    | 32.83                      | n/a                   | 32.96                        | n/a                     |
| 1109GY0002D  | 26.88                       | n/a                    | 27.08                      | n/a                   | 27.83                        | n/a                     |



**Map:**  
 Gorey Fluvial Flood Extent

**Map Type:** EXTENT

**Source:** FLUVIAL

**Map Area:** HPW

**Scenario:** CURRENT

**Drawn By:** F.M.C.    **Date:** 26th January 2015

**Checked By:** E.H.    **Date:** 26th January 2015

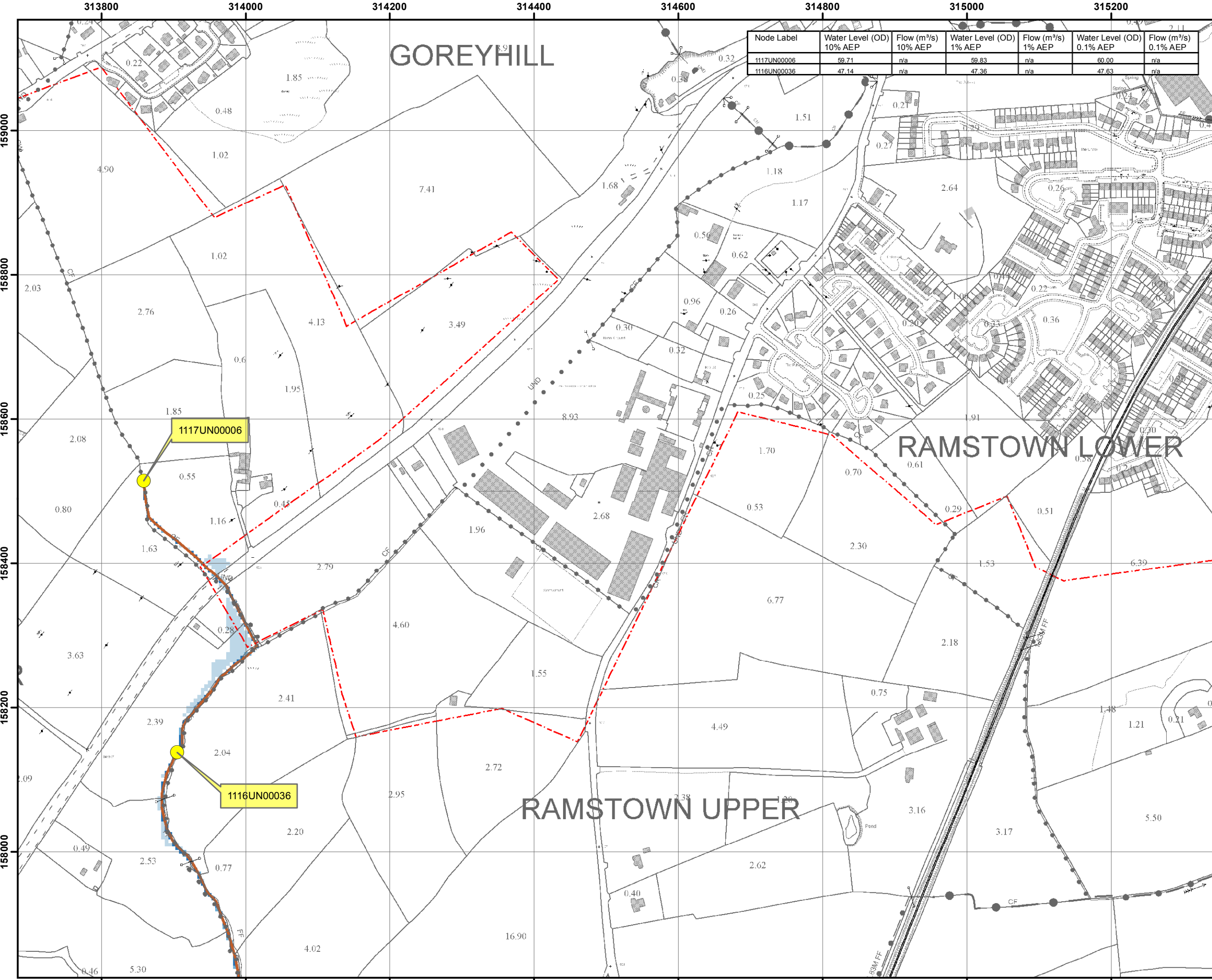
**Approved By:** S.P.    **Date:** 26th January 2015

**Drawing No.:**  
 O11GOR\_EXFCD\_C0\_SH07

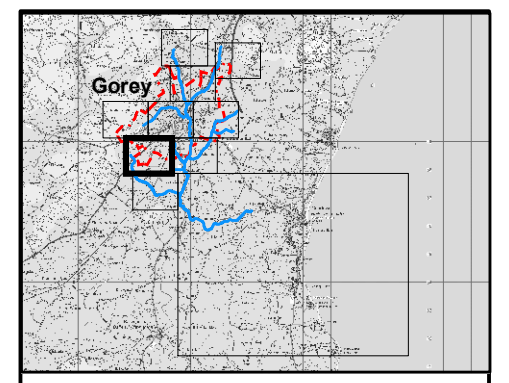
**Map Series:** 7 of 10

**Drawing Scale:** 1:5,000 @A3





| Node Label  | Water Level (OD)<br>10% AEP | Flow (m³/s)<br>10% AEP | Water Level (OD)<br>1% AEP | Flow (m³/s)<br>1% AEP | Water Level (OD)<br>0.1% AEP | Flow (m³/s)<br>0.1% AEP |
|-------------|-----------------------------|------------------------|----------------------------|-----------------------|------------------------------|-------------------------|
| 1117UN00006 | 59.71                       | n/a                    | 59.83                      | n/a                   | 60.00                        | n/a                     |
| 1116UN00036 | 47.14                       | n/a                    | 47.36                      | n/a                   | 47.63                        | n/a                     |

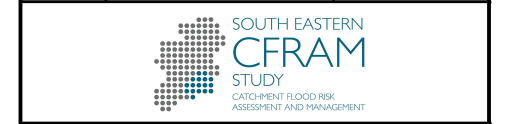


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- Legend**
- 10% Fluvial AEP Event
  - 1% Fluvial AEP Event
  - 0.1% Fluvial AEP Event
  - Modelled River Centreline
  - AFA Extents
  - Node Point
  - Node ID Node Label

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|      |       |       |
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| <b>Map:</b>                       |                                |
| Gorey Fluvial Flood Extent        |                                |
| <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> 26th January 2015 |
| <b>Checked By:</b> E.H.           | <b>Date:</b> 26th January 2015 |
| <b>Approved By:</b> S.P.          | <b>Date:</b> 26th January 2015 |
| <b>Drawing No.:</b>               |                                |
| O11GOR_EXFCD_C0_SH09              |                                |
| <b>Map Series:</b> 9 of 10        |                                |
| <b>Drawing Scale:</b> 1:5,000 @A3 |                                |

