



# CONFHEY MASTERPLAN

## Strategic Flood Risk Assessment

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Strategic Flood Risk Assessment

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## Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Report Objectives .....	1
1.3	Disclaimer .....	1
1.4	Report Structure .....	2
<b>2</b>	<b>STUDY AREA .....</b>	<b>3</b>
2.1	Introduction .....	3
2.2	Watercourses .....	3
<b>3</b>	<b>THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES FOR PLANNING AUTHORITIES .....</b>	<b>4</b>
3.1	Introduction .....	4
3.2	Flood Risk Assessment .....	4
3.2.1	Flood Risk Assessment Approach .....	4
3.2.2	Types of Flooding .....	5
3.2.3	Flood Risk .....	6
3.3	Flood Zones .....	6
3.4	Climate Change .....	7
3.5	Strategic Flood Risk Assessment .....	7
3.6	Sequential Approach And Justification Test .....	8
<b>4</b>	<b>STAGE 1 - FLOOD RISK IDENTIFICATION .....</b>	<b>10</b>
4.1	Historical Flooding .....	10
4.2	CFRAM Studies .....	11
4.2.1	Background .....	11
4.2.2	CFRAM Fluvial Flood Zone Mapping .....	11
4.3	Geological Survey Ireland Spatial Resources .....	11
4.3.1	Historic Groundwater Flood Map .....	11
4.3.2	Predictive Groundwater Flood Maps .....	12
4.3.3	Synthetic Aperture Radar (SAR) Seasonal Flood Maps .....	12
4.4	Sources of Flood Risk .....	13
4.4.1	Fluvial .....	13
4.4.2	Coastal .....	13
4.4.3	Groundwater .....	13
4.4.4	Pluvial .....	13
4.5	Climate Change Sensitive Areas .....	13
4.5.1	CFRAM Flood Extents .....	13
<b>5</b>	<b>STAGE 2 – INITIAL FLOOD RISK ASSESSMENT .....</b>	<b>14</b>
5.1	Confey Masterplan Zoning .....	14
5.1.1	Development Plan Justification Test .....	15
5.2	Confey Masterplan Layout .....	16
5.2.1	Proposed Surface Water .....	16
5.3	Planning Applications .....	17
5.3.1	Development Proposals in Flood Zones .....	17
5.3.2	Surface Water And Drainage .....	18
5.3.3	Ground Floor and Basement Protection .....	18
5.3.4	Residual Risk .....	19
5.3.5	Extension of Duration in Flood Risk Areas .....	19
<b>6</b>	<b>SUMMARY .....</b>	<b>20</b>

## Strategic Flood Risk Assessment

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### Tables

Table 3-1 Flood Event Probabilities.....	6
Table 3-2 Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test .....	8
Table 3-3 Classification of vulnerability of different types of development.....	9
Table 4-1 Previously recorded flooding within in Leixlip.....	10
Table 4-2 Areas sensitive to climate change flood risk .....	13
Table 5-2 Land Use Zoning and Vulnerabilities .....	14
Table 5-1 Justification Test for Development Plans .....	15
Table 5-3 Justification Test for Development Management.....	17

### Figures

Figure 2-1 Study Area and Watercourses .....	3
Figure 3-1 Flood Risk Assessment Source – Pathway – Receptor Model.....	5
Figure 3-2 Sequential approach principles in Flood Risk Management.....	8
Figure 4-1 Overview of the CFRAM flood zones and historical flood events in Leixlip .....	10
Figure 4-2 GSI Flood Mapping Extracts .....	12
Figure 5-1 Land Use Zones within the Masterplan.....	15
Figure 5-2 Confey Masterplan Layout .....	16

### Appendices

Appendix A Flood Zone Map

# 1 INTRODUCTION

## 1.1 Background

KCC commissioned RPS to carry out a Strategic Flood Risk Assessment (SFRA) to support the preparation of the Confey Masterplan. The SFRA is prepared in accordance with the requirements of *The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009)* and *Circular PL02/2014 (August 2014)* referred to hereafter as 'The Guidelines'. The SFRA therefore informs policy regarding inappropriate development in areas at risk of flooding and identifies areas where Site Specific Flood Risk Assessments (SSFRA) should be undertaken for development.

## 1.2 Report Objectives

The objective of this report is to prepare a SFRA for the Confey Masterplan in accordance with The Guidelines. The SFRA provides an assessment of all types of flood risk within the Masterplan boundary and has enabled KCC to make informed strategic land-use planning decisions and to formulate flood risk policies.

A review of available flood risk information was undertaken to identify any flooding or surface water management issues related to the town that may warrant further investigation. The best available data at the time of preparation was acquired from the Office of Public Works (OPW) Eastern Catchment Flood Risk Assessment Management (CFRAM) Studies. The CFRAM Studies have generated flood zone mapping that have enabled KCC to apply The Guidelines sequential approach, and where necessary the Justification Test, to appraise sites for suitable land zonings and identify how flood risk can be managed as part of the development plan.

## 1.3 Disclaimer

The SFRA has been prepared in compliance with The Guidelines. It should be noted that the SFRA remains a live document and is based on the best available data at the time of preparation. It is subject to change based on more up to date and relevant flood risk information becoming available during the lifetime of the Local Area Plan.

All information in relation to flood risk is provided for general policy guidance only. All landowners and developers are instructed that Kildare County Council and their consultants can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Furthermore owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands in which they have an interest prior to making planning or development decisions.

It should be noted that the CFRAM mapping used to define the flood zones for this SFRA are bound by the disclaimer and other terms and conditions set out by the OPW on the website <https://www.floodinfo.ie/map/floodplans/>. The website [www.floodinfo.ie](http://www.floodinfo.ie) provides access to the published Flood Plans along with the Flood Maps developed by the OPW as part of the CFRAM studies and information about flood risk management in Ireland. Further information on the CFRAM studies is available at [Eastern CFRAM](#). The flood maps are 'predictive' flood maps, as they provide predicted flood extent and other information for a flood event that has an estimated probability of occurrence (the 1% Annual Exceedance Probability (AEP) and 0.1% AEP events – refer to **Section 3.3**), rather than information on floods that have occurred in the past.

Kildare County Council makes no representations, warranties, or undertakings about any of the information provided on these maps including, without limitation, their accuracy, their completeness or their quality or fitness for any particular purpose. To the fullest extent permitted by applicable law, Kildare County Council nor any of its members, officers, associates, consultants, employees, affiliates, servants, agents or other representatives shall be liable for loss or damage arising out of, or in connection with, the use of, or the inability to use, the information provided on the flood maps including, but not limited to, indirect or consequential loss or damages, loss of data, income, profit, or opportunity, loss of, or damage to, property

## Strategic Flood Risk Assessment

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### 1.4 Report Structure

The Confey Masterplan area and its primary watercourses are identified in **Section 2**.

A summary of the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009) and the procedure for undertaking a SFRA is presented in **Section 3**.

Identification of flood risk to the Confey Masterplan area is provided in **Section 4**.

**Section 5** completes the initial flood risk assessment for the Masterplan and **Section 6** the overall summary of the Strategic Flood Risk Assessment.

## 2 STUDY AREA

### 2.1 Introduction

Leixlip is in north County Kildare at the confluence of the Rye River and River Liffey. It is approximately 15km west from Dublin City Centre situated adjacent to the M4 motorway. The Confey lands north of Leixlip which relate to this Masterplan currently comprises approximately 73 hectares. The growth of Leixlip to date has been restricted by the boundary that is the canal and thus Confey has not yet been developed. However, the Leixlip LAP recognises that “the future strategic direction for the expansion of Leixlip will be focused around the rail based site at Confey...”. The extents for the Confey Masterplan area are shown Figure 2-1.

### 2.2 Watercourses

There are three identified watercourses flowing through the Confey Masterplan Area. The Rathleek Stream flows just inside the western boundary of the Masterplan area and has a catchment area upstream of the Royal Canal of approximately 1km<sup>2</sup>. The of the Moor of Meath and Oranstown streams flow more centrally through the Masterplan area and merge at Confey Road. The combined catchment area of the two watercourses is approximately 5km<sup>2</sup>. The three streams all flow from north to south, passing underneath the Royal Canal before discharging into the Rye Water River, a tributary to the River Liffey.

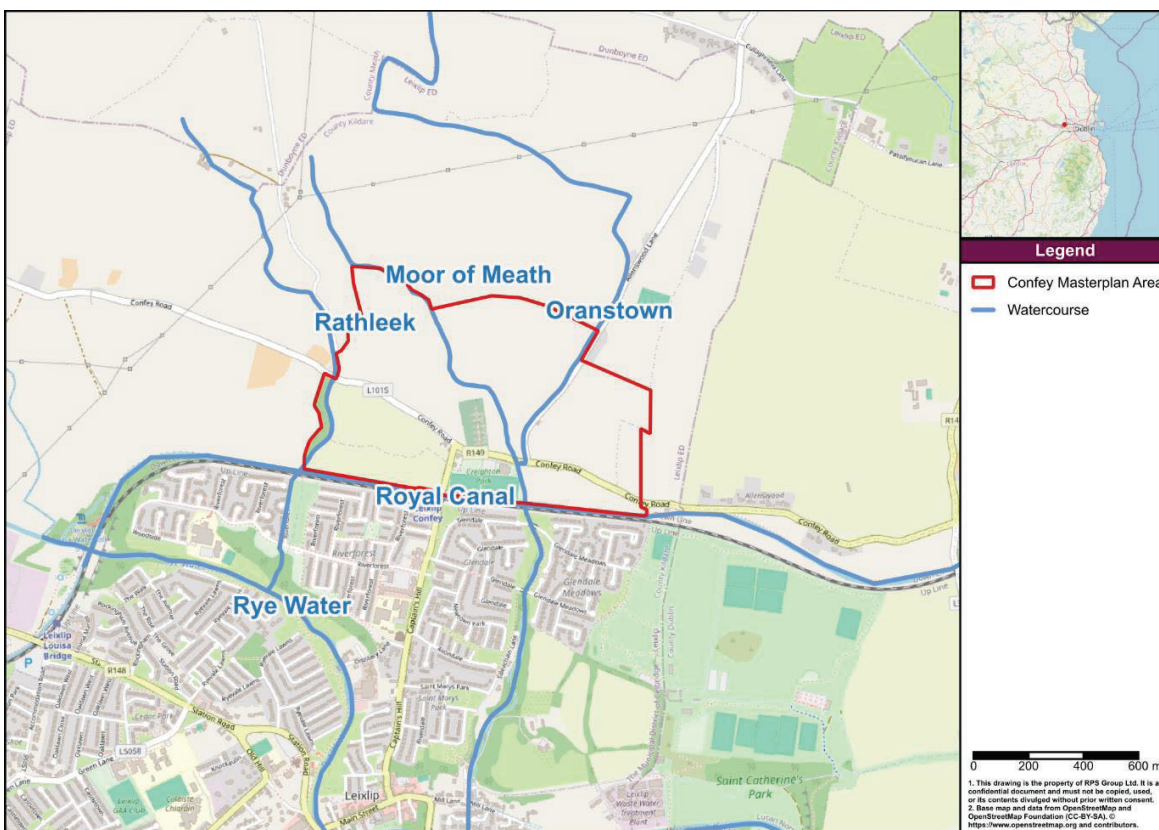


Figure 2-1 Study Area and Watercourses

## 3 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES FOR PLANNING AUTHORITIES

### 3.1 Introduction

In 2009 the Department of Environment, Heritage and Local Government in conjunction with the Office of Public Works published The Planning System and Flood Risk Management: Guidelines for Planning Authorities ('The Guidelines'). The purpose of The Guidelines is to ensure that flood risk is considered by all levels of government when preparing development plans and planning guidelines. They should also be used by developers when addressing flood risk in development proposals. The Guidelines should be implemented in conjunction with the relevant flooding and water quality EU Directives including the Water Framework Directive (River Basin Management Plans (RBMPs)) and the Floods Directive (Catchment Flood Risk Assessment and Management (CFRAM) Studies).

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 development permitted in floodplains,
- Avoid unnecessary restriction of national, regional or local economic and social growth,
- Improve the 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 recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should be carried out at different scales by government organisations, local authorities and for proposed developments appropriate to the level of information required to implement the core objectives of The Guidelines. The FRA scales are Regional Flood Risk Appraisal (RFRA), Strategic Flood Risk Assessment (SFRA) and Site-Specific Flood Risk Assessment (SSFRA).

This section presents a brief summary of The Guidelines, for more detail refer to The Guidelines and the accompanying Technical Appendices at [www.opw.ie](http://www.opw.ie).

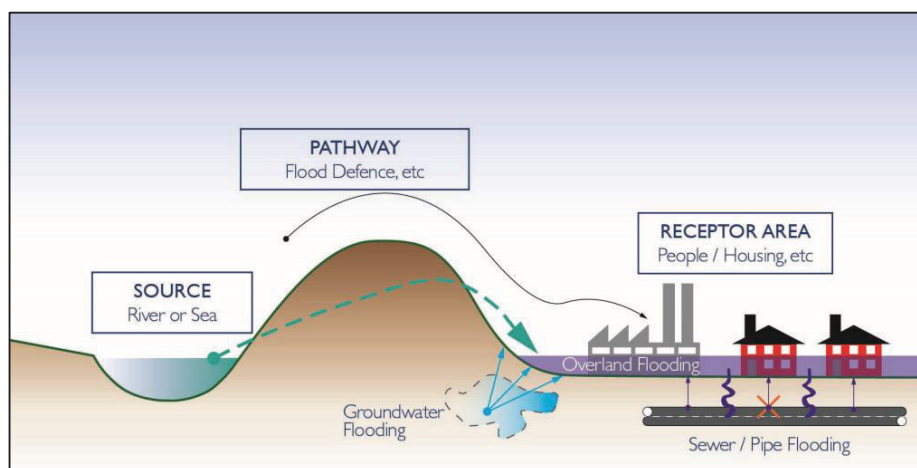
### 3.2 Flood Risk Assessment

#### 3.2.1 Flood Risk Assessment Approach

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should use the Source-Pathway-Receptor (S-P-R) Model to identify the sources of flooding, the flow paths of the floodwaters and the people and assets impacted by the flooding. Figure 3-1 shows the SPR model that should be adopted in FRAs.



## Strategic Flood Risk Assessment



**Figure 3-1 Flood Risk Assessment Source – Pathway – Receptor Model**

FRAs should be carried out using the following staged approach:

- **Stage 1 Flood Risk Identification** – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels,
- **Stage 2 Initial Flood Risk Assessment** – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped, and
- **Stage 3 Detailed Flood Risk Assessment** – to assess flood risk issues in sufficient detail and 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.

### 3.2.2 Types of Flooding

There are two main sources of flooding: inland and coastal.

Inland flooding is caused by prolonged and/or intense rainfall. This results in fluvial, pluvial or ground water flooding acting independently or in combination. These are described as follows:

- Fluvial flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded.
- Pluvial flooding occurs when overland flow cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when the water cannot discharge due to a high water level in the receiving watercourse.
- Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall to meet the ground surface and flows out over it.

Coastal flooding is not a concern for the Confey area as the watercourses within Kildare County do not experience any tidal influence from the Irish Sea.

## Strategic Flood Risk Assessment

### 3.2.3 Flood Risk

The Guidelines state flood risk is a combination of the likelihood of flooding and the potential consequences arising. Flood risk is expressed as:

$$\text{Flood risk} = \text{Likelihood of flooding} \times \text{Consequences of flooding}$$

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude as occurring or being exceeded in any given year. A 1% probability indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e. it has a 1 in 100 (1%) chance of occurring in any one year. Table 3-1 shows flood event probabilities used in flood risk management.

**Table 3-1 Flood Event Probabilities**

Annual Exceedance Probability (%)	Return Period (Years)
50	2
10	10
1	100
0.1	1000

The consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave action effects, water quality), and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development, presence and reliability of mitigation measures etc.).

### 3.3 Flood Zones

The Guidelines recommend identifying flood zones which show the extent of flooding for a range of flood event probabilities. The Guidelines identify three 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 or 0.5% or 1 in 200 for coastal flooding),
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding), and
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The flood zones are generated without the inclusion of climate change factors. The flood zones only account for fluvial and coastal flooding. They should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from pluvial and groundwater flooding. Similarly flood defences should be ignored in determining flood zones as defended areas still carry a residual risk of flooding from overtopping, failure of the defences and deterioration due to lack of maintenance. **Appendix A** shows the Flood Zone Map for the Confey Masterplan area.

### 3.4 Climate Change

Climate Change is expected to increase flood risk. It could lead to more frequent flooding and increase the depth and extent of flooding. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended in The Guidelines:

- Recognise that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopt a cautious approach to zoning land in these potential transitional areas,
- Ensure that the levels of structures designed to protect against flooding, such as flood defences, land-raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect, and
- Ensure that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

### 3.5 Strategic Flood Risk Assessment

The purpose of this report is to carry out a SFRA at the local scale for the Confey Masterplan. The Guidelines recommend a series of outputs for a SFRA. These outputs in broad terms include:

- Identify principal rivers, sources of flooding and produce flood zone maps for Masterplan area,
- An appraisal of the availability and adequacy of the existing information,
- Assess potential impacts of climate change to demonstrate the sensitivity of an area to increased flows or sea levels. Where mathematical models are not available climate change flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change,
- Identify the location of any flood risk management infrastructure and the areas protected by it and the coverage of flood-warning systems,
- Consider, where additional development in Flood Zone A and B is planned within or adjacent to an existing community at risk, the implications of flood risk on critical infrastructure and services across a wider community-based area and how the emergency planning needs of existing and new development will be managed,
- Identify areas of natural floodplain, which could merit protection to maintain their flood risk management function as well as for reasons of amenity and biodiversity,
- Assess the current condition of flood-defence infrastructure and of likely future policy about its maintenance and upgrade,
- Assess the probability and consequences of overtopping or failure of flood risk management infrastructure, including an appropriate allowance for climate change,
- Assess, in broad terms, the potential impact of additional development on flood risk elsewhere and how any loss of floodplain could be compensated for,
- Assess the risks to the proposed development and its occupants using a range of extreme flood or tidal events,
- Identify areas where site-specific FRA will be required for new development or redevelopment,
- Identify drainage catchments where surface water or pluvial flooding could be exacerbated by new development and develop strategies for its management in areas of significant change,
- Identify where integrated and area-based provision of SuDS and green infrastructure are appropriate to avoid reliance on individual site by site solutions, and
- Provide guidance on appropriate development management criteria for zones and sites.

### 3.6 Sequential Approach And Justification Test

The Guidelines recommend using a sequential approach to planning to ensure the core objectives (as described in **Section 3.1**) are implemented. Development should be avoided in areas at risk of flooding, where this is not possible, a land use that is less vulnerable to flooding should be considered. If the proposed land use cannot be avoided or substituted a Justification Test must be applied and appropriate sustainable flood risk management proposals should be incorporated into the development proposal. Figure 3-2 shows the sequential approach principles in flood risk management. Table 3-2 and Table 3-3 outline recommendations from The Guidelines for the types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

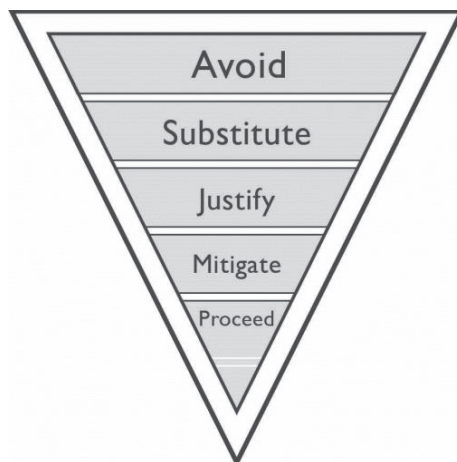


Figure 3-2 Sequential approach principles in Flood Risk Management

Table 3-2 Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water compatible development	Appropriate	Appropriate	Appropriate

The Justification Test is used to assess the appropriateness of developments in flood risk areas. The test comprises two processes. The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding. The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

## Strategic Flood Risk Assessment

**Table 3-3 Classification of vulnerability of different types 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-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.</li> </ul>
Less vulnerable development	<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> </ul>
Water-compatible development	<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 a specific warning and evacuation plan).</li> </ul>

\*Uses not listed here should be considered on their own merit

## 4 STAGE 1 - FLOOD RISK IDENTIFICATION

Stage 1 of a Flood Risk Assessment identifies whether there may be any flooding or surface water management issues related to the Confey Masterplan area which may warrant further investigation in a Stage 2 – Initial Flood Risk Assessment.

### 4.1 Historical Flooding

A review of historical flood data was carried out for the Eastern CFRAM Studies using information provided on [www.floodmaps.ie](http://www.floodmaps.ie) and in consultation with KCC. The main sources of flooding in the Leixlip area are fluvial and pluvial flooding. **Figure 4-1** and **Table 4-1** show the locations of previous flood events within Leixlip. Relevant to the masterplan area, historical flooding of lands in Confey and Allenswood Road is noted.

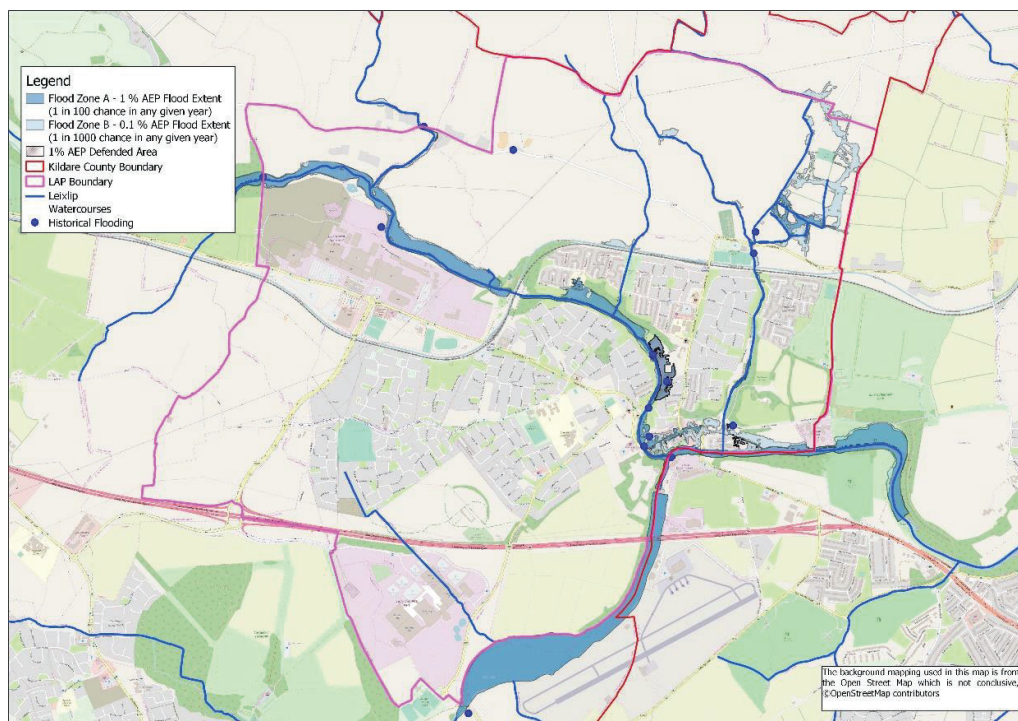


Figure 4-1 Overview of the CFRAM flood zones and historical flood events in Leixlip

Table 4-1 Previously recorded flooding within in Leixlip

Flood Location and Date
Flood Event Dec 1954 – River Rye Water: Flooded areas near the Leixlip Bridge and Leixlip Distillery
Flood Event Nov 1965 – Liffey: Lands adjacent to the Liffey
Flood Event Nov 1968 – Liffey: Lands adjacent to the Liffey
Flood Event Nov 2000- Silleachain Stream: Flooded areas along Mill Lane and
Flood Event Nov 2002- Rye River and Silleachain Stream: Flooded areas along Mill Lane, the Rye River Apartments, Lands in Confey, Buckley’s Lane, Kellystown Lane, Allenswood Road, Barnhall Road, Duncarrig and Shaughlins Glen.
Flood Event Aug 2008 – Rye Water: Lands adjacent to the Rye Water
Recurring pluvial flooding along Main Street due to under capacity of the existing storm water network.



## 4.2 CFRAM Studies

### 4.2.1 Background

The OPW led the development of Catchment Flood Risk Assessment and Management (CFRAM) Studies. The aim of these studies was to assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding. The flood hazard areas have been identified as being potentially at risk from significant flooding, including areas that have experienced significant flooding in the past. They also take account of issues such as climate change, land use practices and future development. These studies were developed to meet the requirements of the EU Directive on the assessment and management of flood risks (the Floods Directive). The CFRAM Studies produced Flood Risk Management Plans (FRMP) to manage flood risk within river catchments. Flood maps are one of the main outputs of the studies. The maps indicate modelled flood extents for flood events of a range of annual exceedance probabilities (AEP). Leixlip was identified as an Area for Further Assessment (AFA) within the Eastern CFRAM Study.

It should be noted that the CFRAM mapping used to define the flood zones for this SFRA are bound by the disclaimer and other terms and conditions set out by the OPW on the website <https://www.floodinfo.ie/map/floodmaps/>. The website [www.floodinfo.ie](http://www.floodinfo.ie) provides access to the published Flood Plans along with the Flood Maps developed by the OPW as part of the CFRAM studies and information about flood risk management in Ireland. Further information on the CFRAM studies is available at [Eastern CFRAM](#).

There are no identified existing flood risk mitigation measures for the Confey Masterplan area within the Liffey & Dublin Bay FRMP.

### 4.2.2 CFRAM Fluvial Flood Zone Mapping

The flood maps are 'predictive' flood maps, as they provide predicted flood extent and other information for a flood event that has an estimated probability of occurrence (the 1% Annual Exceedance Probability (AEP) and 0.1% AEP events – refer to **Section 3.2.3**), rather than information on floods that have occurred in the past.

The flood zones are derived from the Final Eastern CFRAM outputs. These maps are the most comprehensive flood maps produced for Confey since the introduction of The Guidelines and the Floods Directive. As described in **Section 4.2.2** the that the CFRAM mapping used to define the flood zones for this SFRA are bound by the disclaimer and other terms and conditions set out by the OPW on the website <https://www.floodinfo.ie/map/floodmaps/>.

Fluvial flood zone mapping for the Confey Masterplan area is shown in **Appendix A**.

## 4.3 Geological Survey Ireland Spatial Resources<sup>1</sup>

Groundwater Flood maps were prepared by Geological Survey Ireland (GSI), Department of Environment Climate and Communications. The maps were initially developed in collaboration with Trinity College Dublin and the Institute of Technology Carlow as part of the 2016-2019 GWFlood Project and have since continued to be developed through the 2020-2022 GWClimate Project.

### 4.3.1 Historic Groundwater Flood Map

The Historic Groundwater Flood Map shows the observed peak flood extents caused by groundwater in Ireland. This map was made using satellite images (Copernicus Programme Sentinel-1), field data, aerial photos, as well as flood records from the past. Most of the data was collected during the flood events of winter 2015 / 2016, as in most areas this data showed the largest floods on record.

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<sup>1</sup> <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aac3c228>

## Strategic Flood Risk Assessment

In addition to the historic groundwater flood map, the flood mapping methodology was also adapted to produce a surface water flood map of the 2015/2016 flood event. This flood map encompasses fluvial and pluvial flooding in non-urban areas and has been developed as a separate product. It should be noted that this flood map is only represents the 2015/2016 flood event and should not be considered maximum historic flood surface water flood extent map<sup>2</sup>. No historic groundwater flooding is noted within the Confey Masterplan area.

### 4.3.2 Predictive Groundwater Flood Maps

The predictive groundwater flood maps present the probabilistic flood extents for locations of recurrent karst groundwater flooding, with flood extents predicted for a range of theoretical or 'design' flood events with estimated probabilities of occurrence. The maps refer to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'. No predictive groundwater flooding is noted within the Confey Masterplan area.

### 4.3.3 Synthetic Aperture Radar (SAR) Seasonal Flood Maps

The Synthetic Aperture Radar (SAR) Seasonal Flood Maps shows observed peak flood extents which took place between Autumn 2015 and Summer 2021. The maps were made using Synthetic Aperture Radar (SAR) images from the Copernicus Programme Sentinel-1 satellites. The SAR Seasonal flood maps are a series of SAR-only based flood maps which outline the peak observed flood extents of groundwater and surface water over each winter season since 2015. The maps do not distinguish between surface water and groundwater floods.

Surface water flooding identified in the SAR Seasonal Flood Maps is noted within the Confey Masterplan area with a low-medium confidence as shown in **Figure 4-2**. Due to the absence of any identified Groundwater flooding in the GSI Historic Groundwater Flood Map or the GSI Predictive Groundwater Flood Maps, this surface flooding is likely attributed to pluvial/fluvial sources.

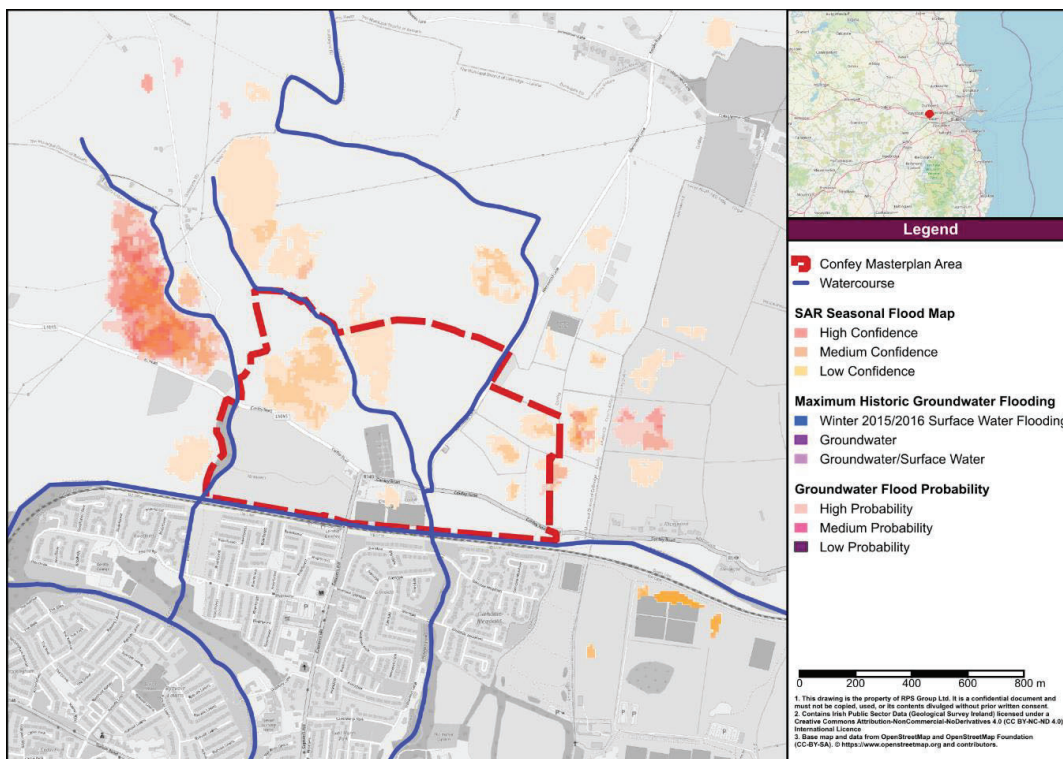


Figure 4-2 GSI Flood Mapping Extracts

<sup>2</sup> [https://gsi.geodata.gov.ie/downloads/Groundwater/Reports/GSI\\_Guidance\\_Notes\\_GW\\_Flood\\_Maps.pdf](https://gsi.geodata.gov.ie/downloads/Groundwater/Reports/GSI_Guidance_Notes_GW_Flood_Maps.pdf)



## 4.4 Sources of Flood Risk

### 4.4.1 Fluvial

Historic flooding is noted within the November 2002 flood event for lands in Confey and along Allenswood Road. CFRAM flood mapping identifies fluvial flooding from to spilling to the east from the Oranstown watercourse, resulting in overland flow pathways and flooding of land drains before the water returns to the watercourse downstream of the junction with the Moor of Meath and upstream of the Royal Canal.

Fluvial flooding is the primary source of flooding to the Confey Masterplan area and will require this assessment to continue to a Stage 2 - Initial Flood Risk Assessment.

### 4.4.2 Coastal

Due to the inland location, there is no source of coastal flood risk to the Confey Masterplan

### 4.4.3 Groundwater

Groundwater flood mapping data prepared by the Geological Survey Ireland does not identify any historic or predictive groundwater flooding within the Confey Masterplan area, and as there are no karst formations within the area, there is a low risk of groundwater flooding. An assessment of potential flooding from groundwater should still be carried for development if proposals include basements or deep excavations.

### 4.4.4 Pluvial

Surface water flooding is identified with a low-medium confidence with the GSI SAR Seasonal Flood Maps. As such, all development proposals within the Confey Masterplan Area should include an assessment of pluvial flood risk, and an adequately designed drainage system in accordance with the SuDS and NBS requirements of the Leixlip LAP and Kildare County Development Plan.

## 4.5 Climate Change Sensitive Areas

### 4.5.1 CFRAM Flood Extents

The CFRAM current scenario and mid-range future scenario flood extents were compared as part of the SFRA to establish an indication of future risk in areas using the difference between the flood extents with/without climate change. **Table 4-2** outlines areas that are potentially sensitive to climate change impacts. SSFRAs should address climate change scenarios in relation to FFLs and potential mitigation measures in these areas.

**Table 4-2 Areas sensitive to climate change flood risk**

Townland / Estate	Indicative Pluvial Risk Assessment
Confey / Allenswood	There is a large increase in Flood Zones on the eastern side of the Moor of Meath Stream in Confey / Allenswood.
Grand Canal	There is a large increase in flood extents for both Flood Zones where culverts for the Rathleek Stream and Moor of Meath Stream go under the Grand Canal. The flood zones for both streams merge in lands to the north of the Grand Canal.

## 5 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

This section confirms the sources of flooding identified in Stage 1 which affect the Confey Masterplan area. The information and mapping produced within the CFRAM studies and by GSI are sufficient to inform development of the Confey Masterplan with the appropriate consideration of flood risk. In addition, this section provides scoping for the requirements of Site-Specific Flood Risk Assessments in support of any development proposals within the masterplan area.

### 5.1 Confey Masterplan Zoning

The land use zonings in the Confey Masterplan area have been reviewed against the available flood zone mapping, the indicative pluvial risk, the sensitivity of flood extents to climate change and previous SFRA reports. A summary of the zonings and an assessment of their vulnerability and the requirements of application of the Justification Test are shown in **Table 5-1**.

Kildare County Council reviewed the flood zones during the Leixlip LAP development process and followed the sequential approach to zone land appropriate to their flood risk vulnerability. Open Space and amenity areas have been zoned to coincide with flood risk areas in so far as possible. Where less vulnerable and highly vulnerable zonings coincide with flood zones, the Development Plan Justification Test was undertaken as applicable within the Leixlip LAP. Land use zones within the Confey Masterplan are shown in **Figure 5-1**.

**Table 5-1 Land Use Zoning and Vulnerabilities**

Objective	Vulnerability	Justification Test Required
B - Existing Residential & Infill	High	For Development in Flood Zone A or B
C – New Residential	High	For Development in Flood Zone A or B
E - Community & Educational	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
F - Open Space & Amenity	Less / Water Compatible	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
MU – Mixed Use	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A

Strategic Flood Risk Assessment

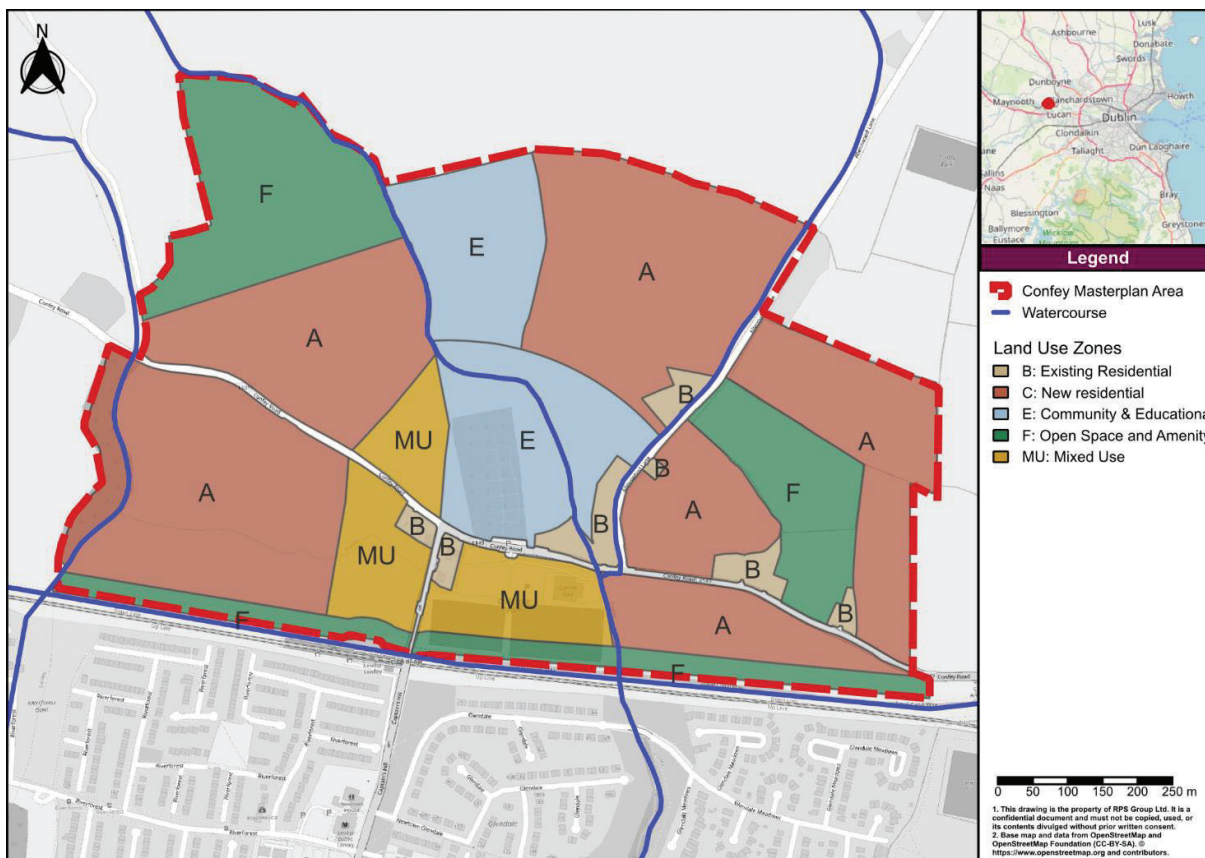


Figure 5-1 Land Use Zones within the Masterplan

### 5.1.1 Development Plan Justification Test

The Development Plan Justification Test (or Plan-making Justification Test) for the Confey Masterplan area was carried out as part of the Leixlip LAP SFRA using mapped flood zones. It was applied where land use zones which would generally be inappropriate, with a high or moderate risk of flooding for uses which are vulnerable to flooding, and where avoidance or substitution was not appropriate.

The land use zones within the Confey Masterplan area were found to satisfy all of the criteria of Development Plan Justification Test as per **Table 5-2**.

Table 5-2 Justification Test for Development Plans

Justification Test for Development Plans	
1.	The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.
2.	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular: <ol style="list-style-type: none"> <li>Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement,</li> <li>Comprises significant previously developed and/or under-utilised lands,</li> <li>Is within or adjoining the core of an established or designated urban settlement,</li> <li>Will be essential in achieving compact and sustainable urban growth, and</li> <li>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 settlement.</li> </ol>

Strategic Flood Risk Assessment

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 development plan preparation process, which demonstrates that flood risk to the development can be adequately managed, and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment

## 5.2 Confey Masterplan Layout

The masterplan follows the Sequential approach to avoid flood risk primarily through promoting development in Flood Zone C with a low risk of flooding. Areas zoned for Open Space and Amenity are utilised to maintain existing floodplain without impeding overland flow pathways. In addition to areas zoned for water compatible land use, the masterplan also seeks to utilise the open space provision required within other development zones for the purposes of managing flood risk.



Figure 5-2 Confey Masterplan Layout

### 5.2.1 Proposed Surface Water

The Confey Masterplan demonstrates a commitment to incorporating a Nature-based approach to SuDS where possible, utilising the existing water courses and natural characteristics of the site to retain the existing drainage pathways, improve the quality of water leaving the site and maintain the discharges in line with the greenfield run off rate. Storage and treatment at source will be prioritised, with green/blue/comboination roofs incorporated on commercial and community buildings, and rain gardens and bio-retention planters incorporated at the domestic scale. Natural attenuation features such as dry-detention basins and swales, along with filter trenches and perforated drains under porous surface treatments, will be incorporated at the community scale, providing amenity while encouraging infiltration where the ground conditions permit or



## Strategic Flood Risk Assessment

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conveying water back to the existing natural water features downstream. In the spirit of retaining existing drainage pathways, there is no proposed hydrological connection to the Royal Canal. Any surface water discharging from the site will be directed under the Royal Canal, via the existing culverts, to ultimately discharge to the River Liffey.

### 5.3 Planning Applications

Planning applications within the Confey Masterplan area should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Development Management Justification Test (where required), the proposal must demonstrate that appropriate mitigation and management measures are put in place. Development must satisfy all of the criteria of the Development Management Justification Test as per **Table 5-3**.

**Table 5-3 Justification Test for Development Management**

Justification Test for Development Management	
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 these Guidelines.
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 access, 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>

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.

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#### 5.3.1 Development Proposals in Flood Zones

Highly vulnerable development proposals should not be considered in flood risk areas identified as Flood Zone A or Flood Zone B. Less vulnerable development proposals should also not be considered in Flood Zone A area.

Any planning applications in flood risk areas are required to be accompanied by a supporting appropriately detailed Site-Specific Flood Risk Assessment. This is to ensure a conservative approach and that consideration is given to new development within Flood Zones where mitigation measures may still be required to ensure an appropriate level of flood protection and/or resilience. The detailed assessment should include at a minimum Stage 1 - Identification of Flood Risk. Where flood risk is identified a Stage 2 - Initial FRA will be required and depending on the scale and nature of the risk a Stage 3 - Detailed FRA may be required.

Detailed FRAs should be carried out in accordance with The Guidelines and should present in sufficient detail the potential flood risk to a proposed development, the potential increase in flood risk elsewhere, any proposed mitigation measures and proposals for sustainable surface water management. The surface water drainage must be compliant with the GSDS and the Code of Practice. Flood resilient construction materials and fittings should also be considered. The FRA must consider the impacts of climate change, residual risk associated with culvert blockages and freeboard in setting the finished floor levels (FFLs) of new development. The FRA should demonstrate the requirement of the Flood Guidelines and the Leixlip LAP SFRA that existing overland flow paths shall not be impeded.

### 5.3.2 Surface Water And Drainage

There is an obligation on KCC to ensure that permissions granted under the Planning Acts are consistent with the policies and objectives set out in their Development Plans. The Leixlip LAP specifies policies and objectives of the Council with regard to developing Leixlip. The overarching policies and objectives of the Kildare County Development Plan (CDP) also apply, specifically the Development Management Standards as set out in [Chapter 15](#). Where conflict exists between the Confey Masterplan, Leixlip LAP and the CDP, the CDP will take precedence. Chapter 15 of the CDP focuses on the general planning standards and design criteria that will be applied by the council to ensure that future development is in accordance with these policies and objectives.

Chapter 15 of the CDP outlines the following to be considered for the management of surface water run-off in the assessment of planning applications:

- Detailed proposals for the management of surface water, where Nature Based Surface Water Management solutions are considered and prioritised in the first instance. Groundwater monitoring, if required, should last at least 6 months, and include at least one winter season.
- A Surface Water Management Plan shall be submitted which includes details inter alia the location, design and any future maintenance proposals / procedures required to maintain the surface water management system. - Proposals for surface water management shall be in compliance with the Greater Dublin Drainage Strategy (GDSDS), in particular Volume 2 Chapter 6 Stormwater Drainage Design Criteria, and CIRIA SuDS Manual (C753) and with Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas Best Practice Interim Guidance Document (2021, DHLGH).
- In the event that a Nature Based Surface Water Management solution is not feasible, detailed information must be submitted to explain why it was not considered to be a practical solution. Traditional drainage systems will only be permitted where a demonstrable exceptional circumstance has been provided.
- Sustainable Drainage Systems should not form part of the public open space provision, except where they contribute in a significant and positive way to the design and quality of open space. In instances where the Council determines that SuDS make a significant and positive contribution to open space, a maximum 10% of the open space provision shall be taken up by SuDS.
- In the event that underground attenuation storage structures are required, they will not be accepted under areas of public open space, save in exceptional demonstrable situations.
- All existing site watercourses shall be retained, and existing site pipework should be “de-culverted” where feasible.

### 5.3.3 Ground Floor and Basement Protection

The following flood protection measures are recommended for basements and ground level access:

- Finished floor levels should provide a suitable freeboard above the 1% AEP levels with an allowance for climate change or the 0.1% AEP levels where appropriate.
- Raised doorway and access threshold levels can be incorporated into areas susceptible to floodwaters pooling. Temporary door-guards can be implemented where it is not practical to have a permanent raised threshold. However, these will require advance warning for installation,
- Shallow ramping can be considered for doorway or vehicular access at ground level if it can be facilitated,
- Particular care should be taken at closed spaces where it proposed to restrict the movement of floodwaters as the rapid inundation could pose a threat to life as well as causing major disruption or damage, and

## Strategic Flood Risk Assessment

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- Alarm systems are strongly recommended for properties with basements or semi-basements. Training of residents and building personnel in alarms and escape routes and escorting all visitors out of basement areas should be a requirement.

### 5.3.4 Residual Risk

As well as assessing the existing flood risk and surface water management risk for a site, all development including that in Flood Zone C, should consider residual risk factors such as culvert / bridge blockages and the effects of climate change which may expand the extents of flooding. These residual risk factors should influence the potential mitigation measures for a site which could include setting the finished floor levels.

To maintain resilient and sustainable development for future conditions, the Leixlip LAP objective GI1.4 requires a 10m greenspace buffer either side of a watercourse. There are 3 no. watercourse identified within the Confey Masterplan, Rathleek Stream, Moor of Meath Stream and Oranstown Stream. Each of these watercourses should retain an identified riparian buffer zone.

### 5.3.5 Extension of Duration in Flood Risk Areas

In areas where recent and more up to date flood risk information subsequently finds that a site has a flood risk, applications for extension of duration or new applications within the zoning will require appropriately detailed FRA at development management stage. If the permitted development is found not to conform to The Guidelines, then the application should be refused on flood risk grounds and a new application submitted, allowing for appropriate design and FRA.

## 6 SUMMARY

This SFRA was prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) and Circular PL02/2014 (August 2014).

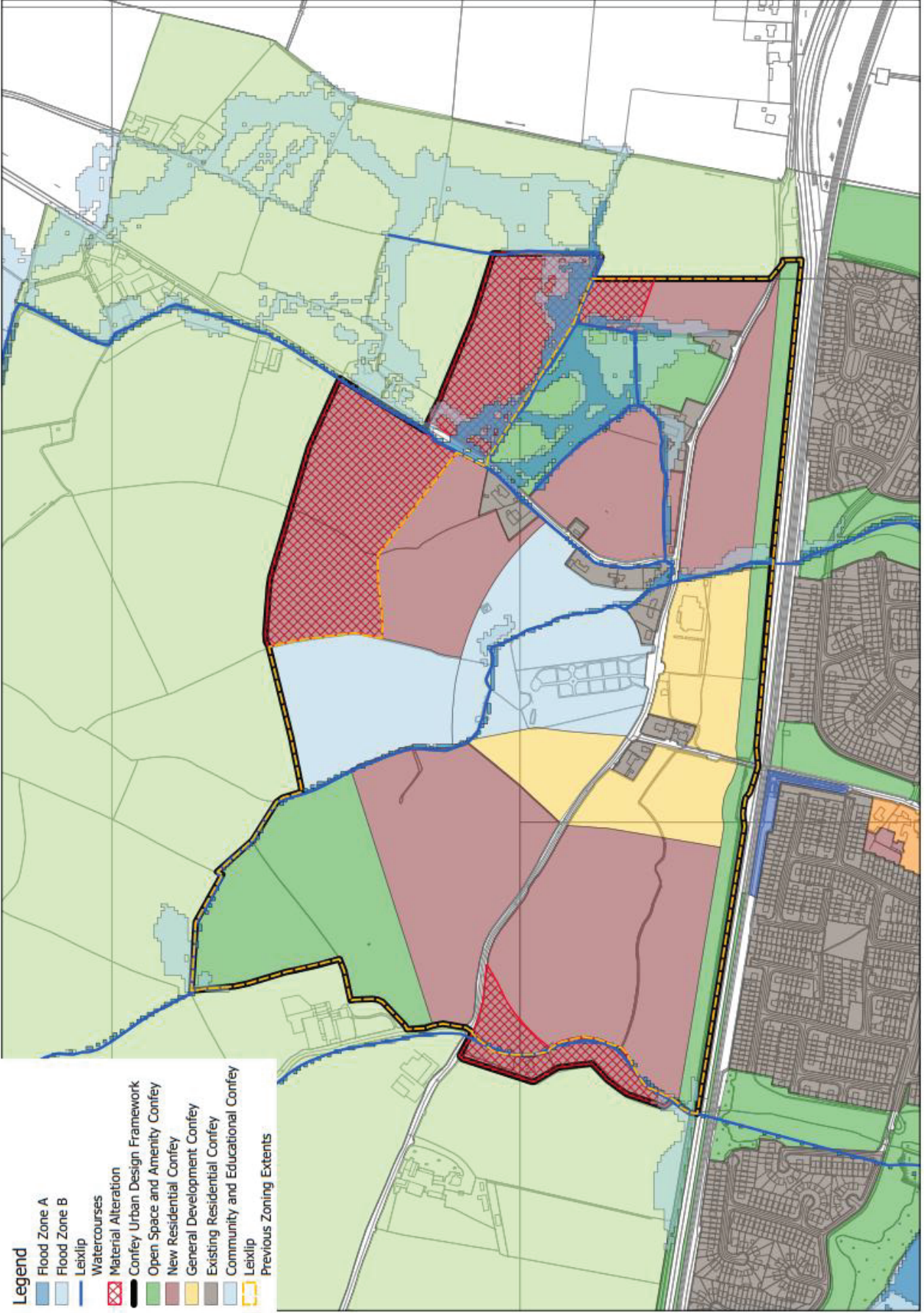
Some fluvial flood risk was identified with the Confey Masterplan area which is adequately addressed through application of the sequential approach and utilisation of Open Space and public amenity provision to retain existing floodplain and overland flow paths.

Any future developments within the Confey Masterplan area will be subject to a Site-Specific FRA. 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.

All developments will be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan



## Appendix A Flood Zone Map



- Legend**
- Flood Zone A
  - Flood Zone B
  - Leixlip
  - Watercourses
  - Material Alteration
  - Confey Urban Design Framework
  - Open Space and Amenity Confey
  - New Residential Confey
  - General Development Confey
  - Existing Residential Confey
  - Community and Educational Confey
  - Leixlip
  - Previous Zoning Extents