

STRATEGIC FLOOD RISK ASSESSMENT

Leixlip Draft Local Area Plan 2020-2026



MDW0751
SFRA
F01
01 April 2019

Document status

| Version | Purpose of document | Authored by | Reviewed by | Approved by | Review date |
|---------|---------------------|-------------|-------------|-------------|-------------|
| F01 | Final | BT / ROS | MD | PM | 25/03/2019 |

Approval for issue

Peter Maxwell



1 April 2019

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1 INTRODUCTION

1.1 Background

The Elected Members of KCC adopted a Leixlip Local Area Plan (LAP) 2017-2023 with material alterations on Monday 20th November 2017, however, a Ministerial Direction from the Minister for Housing, Planning and Local Government was issued to the council to prepare a revised Draft Leixlip LAP as it was deemed not to be compliant with the requirements of s.19(2) and s.31(1)(a), (b) and (c) of the Planning and Development Act 2000 (as amended).

In response to the Ministerial Direction Kildare County Council (KCC) has prepared a Draft LAP 2020 – 2026, in accordance with the requirements and provisions of the Planning and Development Act 2000, (as amended) (the ‘Act’). It sets out an overall strategy for the proper planning and sustainable development of Leixlip in the context of the Project Ireland 2040 – the National Planning Framework, Eastern & Midland Regional Spatial and Economic Strategy (RSES), the Regional Planning Guidelines for the Greater Dublin Area 2010-2022 and the Kildare County Development Plan 2017 – 2023. It is informed by Ministerial Guidelines issued pursuant to Section 28 of the Act together with EU requirements regarding Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA).

KCC commissioned RPS to carry out a Strategic Flood Risk Assessment (SFRA) to support the preparation of the LAP. 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 Leixlip Draft LAP in accordance with The Guidelines. The SFRA provides an assessment of all types of flood risk within the LAP 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 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 3.2.3**), 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 and claims of third parties, even if Kildare County Council has been advised of the possibility of such loss or damages, or such loss or damages were reasonably foreseeable.

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1.4 Report Structure

The Leixlip LAP 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**.

Section 4 outlines a broad overview of the requirements of Flood Risk Assessments (FRA) which should accompany planning applications.

The available flood risk information used to identify the flood risk zones is discussed in **Section 5**. Potential zoning areas at risk from flooding are examined and recommendations for Flood Risk Assessments are made in **Section 6**.

Section 7 details the flood risk management policies and objectives being brought forward to the LAP and lastly **Section 8** provides a summary.

2 STUDY AREA

2.1 Introduction

The extents for the Leixlip LAP area are shown in **Figure 2-1**. Leixlip is located 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 population of the Leixlip Census settlement boundary in 2016 was 15,504.

2.2 Watercourses

The Leixlip catchment encompasses the middle and lower reaches of the River Liffey. The total contributing catchment area upstream of Leixlip (excluding the catchment upstream of Golden Falls Dam and the Poulaphuca Reservoir) is approximately 730 km². Included within this catchment is the Rye River catchment of approximately 209km². The Leixlip catchment also consists of many tributaries including the Sion, Silleachain and Moor of Meath (River). The River Liffey is approximately 120km long from source to sea, rising at approximately 750mOD in the Wicklow Mountains. The Liffey is heavily influenced by three hydroelectric power stations and associated dams and reservoirs at Poulaphuca, Leixlip and Golden Falls. The Leixlip Dam is the furthest located dam downstream and the town is located just downstream of the Leixlip reservoir.

The Rye River rises in southern Co. Meath and enters the River Liffey at Leixlip. The catchment is relatively flat and flows in a south easterly direction passing Kilcock and Maynooth. The Silleachain stream enters the River Liffey in Leixlip downstream of the Rye River confluence at the eastern end of Mill Lane. The Silleachain drains a catchment of relatively small size in comparison to the previous Liffey tributaries mentioned with a catchment size of 6.2km².

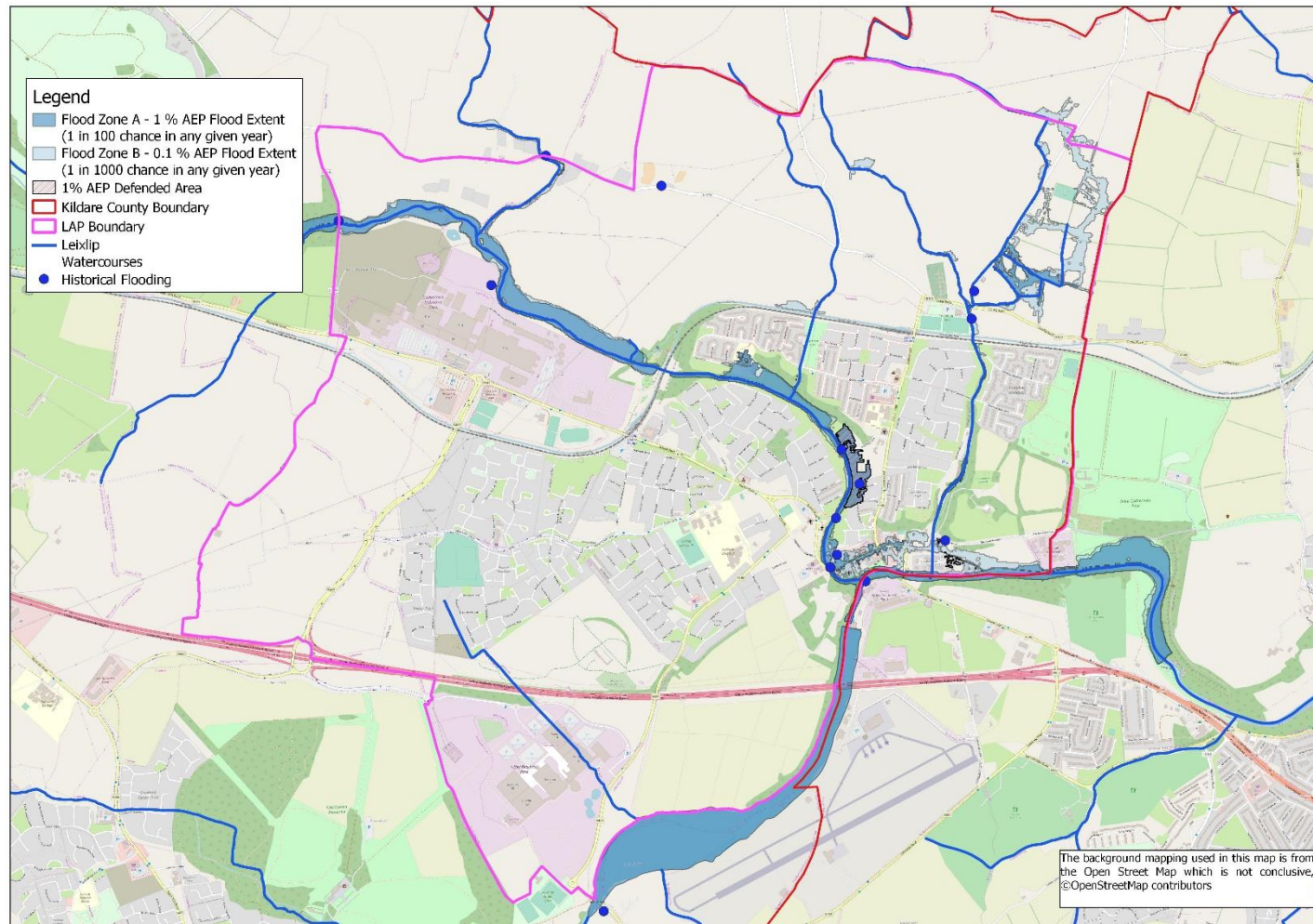


Figure 2-1 Leixlip LAP Boundary, Watercourses and Flood Risk Information

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.

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.

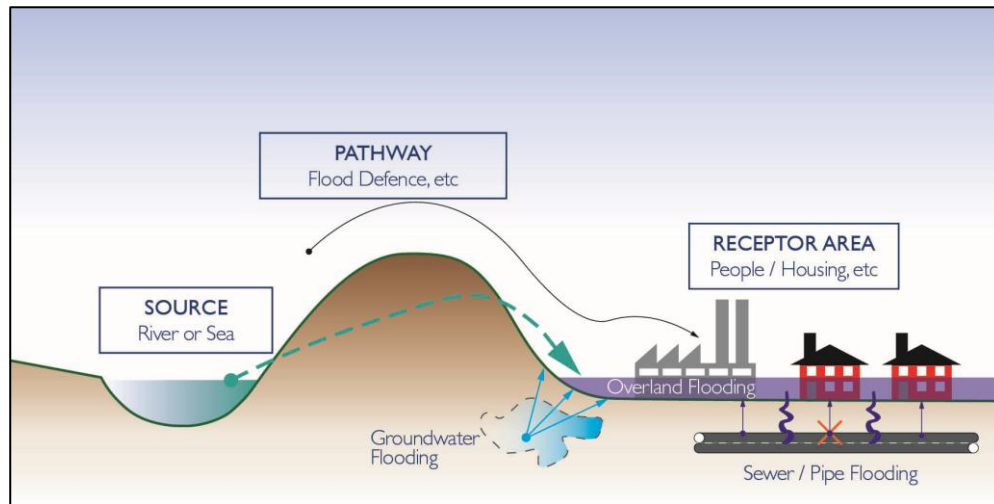


Figure 3-1 Flood Risk Assessment Source – Pathway – Receptor Model

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

- 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.

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 - Clarify

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 inland 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 Leixlip LAP.

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 town scale for the Leixlip LAP. 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 across the local authority area and in key development areas,
- 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 with regard to 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 in order 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.

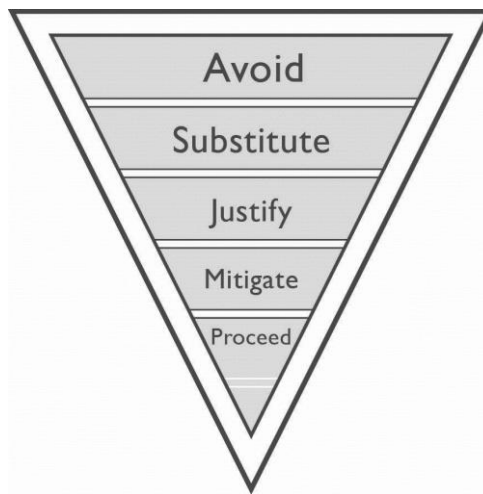


Figure 3-2 Sequential approach principles in Flood Risk Management

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 is comprised of 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.

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"> • Garda, ambulance and fire stations and command centres required to be operational during flooding, • Hospitals, • Emergency access and egress points, • Schools, • Dwelling houses, student halls of residence and hostels, • Residential institutions such as residential care homes, children’s homes and social services homes, • Caravans and mobile home parks, • Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility, and • Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding. |
| Less vulnerable development | <ul style="list-style-type: none"> • Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions, • Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans, • Land and buildings used for agriculture and forestry • Waste treatment (except landfill and hazardous waste), • Mineral working and processing, and • Local transport infrastructure. |
| Water-compatible development | <ul style="list-style-type: none"> • Flood control infrastructure, • Docks, marinas and wharves, • Navigation facilities, • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location, • Water-based recreation and tourism (excluding sleeping accommodation), • Lifeguard and coastguard stations, • Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms, and • Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan). |

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

3.7 Development Plan Justification Test

The Development Plan Justification Test (or Plan-making Justification Test) should be carried out as part of the SFRA using mapped flood zones. It applies where land zonings have been reviewed with respect to the need for development of areas at a high or moderate risk of flooding for uses which are vulnerable to flooding and which would generally be inappropriate and where avoidance or substitution is not appropriate. Where land use zoning objectives are being retained, they must satisfy all of the following criteria as per **Table 3-4**.

Table 3-4 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"> i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement, ii. Comprises significant previously developed and/or under-utilised lands, iii. Is within or adjoining the core of an established or designated urban settlement, iv. Will be essential in achieving compact and sustainable urban growth, and 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 settlement. |
| 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 |

In cases where existing zoned lands are discovered to be within flood zones, the Development Plan Justification Test has been applied, and it is demonstrated that it cannot meet the specified requirements it is recommend that planning authorities reconsider the zoning by implementing the following:

- Remove the existing zoning for all types of development on the basis of the unacceptable high level of flood risk,
- Reduce the zoned area and change or add zoning categories to reflect the flood risk, and/or
- Replace the existing zoning with a zoning or a specific objective for less vulnerable uses, and

If the criteria of the Justification Test have been met, design of structural or non-structural flood risk management measures as prerequisites to development in specific areas, ensuring that flood hazard and risk to other locations will not be increased or, if practicable, will be reduced. The mitigation measures are required prior to development taking place.

4 DEVELOPMENT MANAGEMENT AND FLOOD RISK

4.1 Overview

At the discretion of KCC regardless of which flood zone a proposed development is located within, KCC may request that a planning application should be supported by an appropriately detailed Flood Risk Assessment (FRA). The level of detail within the FRA will depend on the risks identified and the proposed land use. Applications should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal must demonstrate that appropriate mitigation and management measures are put in place. For any development in flood risk areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test as per **Table 4-1** below. This chapter provides a broad overview of the requirements of Flood Risk Assessments which should accompany planning applications.

Table 4-1 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:
 - i. The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk,
 - ii. The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible,
 - 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
 - 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.

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.

4.2 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 17](#). Where conflict exists between the LAP and the CDP, the CDP will take precedence. Chapter 17 of the CDP chapter 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 17 of the CDP outlines the following to be considered for the management of surface water run-off and flood risk in the assessment of planning applications:

- All applications for development shall include proposals for restricting the rate of surface water run-off in accordance with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS),
- Developments shall incorporate Sustainable urban Drainage Systems (SuDS) as appropriate in accordance with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS),
- Proposals for development shall be subject to site specific flood risk assessment in accordance with Chapter 7 of the County Development Plan,
- Applicants shall have regard to the strategies, objectives and policies contained within Chapter 7 of the County Development Plan at all stages of their development proposals, as well as the requirements of The Planning System and Flood Risk Management – Guidelines for Planning Authorities, DEHLG (2009),
- Proposals for surface water attenuation systems should include maintenance proposals and procedures,
- Proposals to construct new and replacement culverts and bridges on watercourses shall be subject to the approval of the Office of Public Works, in accordance with Section 50 of the Arterial Drainage Act 1945 and the Planning System and Flood Risk Management Guidelines, DEHLG, (2009). These applications will be made to the Office of Public Works by the developer post receipt of planning permission. Approval shall be obtained prior to commencement of the works. The minimum permissible diameter of any culvert shall be 900mm with access to be provided for maintenance as appropriate,
- Peak flood flows used in the design of culvert sizes, channel sizes and flood alleviation works to be undertaken as part of a development shall be calculated in accordance with a method approved by the Office of Public Works,
- Applicants are required to conduct a flood impact assessment in accordance with The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009) in all applications where a potential flood risk exists,
- All new developments shall be designed and constructed to meet the following minimum flood design standards:
 - For urban areas – the 1% AEP storm event + a 20% allowance for climate change, and
 - For rural areas - the 1% AEP storm event + a 20% allowance for climate change,
- Where streams, open drains or other watercourses are being culverted, the minimum permissible culvert diameter is 900mm. Access should be provided for maintenance as appropriate, and
- The appropriate Office of Public Works approved method for assessing flood flows, which will depend on catchment size, shall be used in all designs. These flood flows will be used to generate channel sizes, culvert sizes and any required flood alleviation works, which will be undertaken by the developer prior to the commencement of any development.

All development proposals shall carry out a surface water and drainage assessment and shall be compliant with the Greater Dublin Strategic Drainage Study (GSDSDS) (2005) and the Greater Dublin Regional Code of Practice for Drainage Works (2012) to ensure that drainage from the site is managed sustainably.

4.3 Residual Risk

As well as assessing the 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 Flood Zones A and B. These residual risk factors should influence the potential mitigation measures for a site which could include setting the finished floor levels.

4.4 Development Proposals In Flood Zones

4.4.1 Overview

It is recommended that any planning applications in flood risk areas are accompanied by a supporting appropriately detailed 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 GSDSDS and the Code of Practice. The FRA should also consider the impacts of climate change, residual risk associated with culvert blockages and freeboard in setting the finished floor levels (FFLs) of new development.

4.4.2 Assessment of Proposals for Minor Development

The Justification Test does not apply to applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use. However, a flood risk assessment of appropriate detail should accompany such applications to demonstrate that they would not have adverse flood risk impacts. These proposals should follow best practice in the management of health and safety for users and residents of the proposal. FRAs should consider placing bedrooms upstairs, sockets above the 1% AEP water level and other individual property protection measures e.g. flood doors, non-return valves. They must also ensure that modifications do not block significant flow paths or cause flood risk impacts to the surrounding areas.

4.4.3 Assessment of Proposals for Highly Vulnerable Development

Highly vulnerable development proposals should not be considered in flood risk areas unless supplemented by an appropriately detailed FRA and meet the criteria of the Development Management Justification Test. The following considerations should be addressed in applications for highly vulnerable development in flood risk areas:

- The minimum finished floor level for highly vulnerable development should be above the Flood Zone B (0.1% AEP) level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels,
- Applications should outline the emergency procedures that will be applied in the event of a flood. Evacuation routes should be identified but if this is not possible then containment may be considered if it is considered safe and practical to do so. If either safe evacuation or containment is not possible, then the development proposal should be refused,
- The site layout should follow the sequential approach to allocate land within a development based on the vulnerability class of the development i.e. more vulnerable development should be placed on higher ground while water compatible development e.g. car parking, greenfield space can be placed in the flood zones, and
- Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis, the lands should be in close proximity to the area that storage is being lost from, the land must be within the ownership of the developer and the land given to storage must be land which does not flood in the 1% AEP event. Also the compensatory storage area should be constructed before land is raised to facilitate development.

4.4.4 Assessment of Proposals for Less Vulnerable Development

Less vulnerable development proposals should not be considered in Flood Zone A area unless supplemented by an appropriately detailed FRA and meets the criteria of the Development Management Justification Test. The minimum finished floor level for less vulnerable development should be above the Flood Zone A (1% AEP) level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels.

4.4.5 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.

4.4.6 Potential Flood Mitigation Measures

To address flood risk for a new development or regeneration of an existing development, a sequential approach should be taken to minimise potential impact of flooding to more vulnerable land use. However, if necessary due to site constraints, potential flood mitigation measures could be incorporated into a site layout. Examples of potential measures are listed below:

- Compensatory storage,
- Raised defences, and
- Ground floor & basement protection.

Compensatory Storage

Compensatory Storage can be implemented by modifying existing ground levels within the site in order to relocate the flood extents to accommodate a proposed development. However, if not managed appropriately, this measure could have an adverse effect on flood risk for the surrounding areas. There are a number of steps to be taken before this measure can be considered as a viable option:

- An FRA to establish the extents of the existing flood risk, and also a hydraulic model to demonstrate the potential impacts of compensatory storage on site and also for the surrounding areas,
- Compensatory Storage to be implemented on a level for level basis to manage the flood volume reduced by infilling where the floodplain provides storage,
- Compensatory Storage is required to be provided at close proximity to the existing floodplain,
- The lands proposed for compensatory storage are required to be in control of the owner of the proposed development,
- The lands proposed for compensatory storage are required to be outside the existing Flood Zones A and B,
- Compensatory storage area should be constructed prior to the land being raised for the proposed development, and
- Any potential loss of storage for the 0.1% AEP year return period within urban areas as a result of compensatory storage should be compensated through additional storage.

Raised Defences

Raised defences such as flood walls or embankments are a traditional response to managing flood risk. However, if this measure were to be considered, a SSFRA should be required to establish the extent of the existing flood risk and the potential implications of raised defences on flood risk for a proposed development site and the surrounding areas.

Ground Floor and Basement Protection

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

- 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
- 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 FLOOD RISK INFORMATION

5.1 Introduction

There are several sources of relevant flood risk information available for County Kildare and the Leixlip area. **Figure 5-1** below shows an overview of the CFRAM flood zones and historical flooding areas for the town extents. Fluvial flood zone mapping and Justification Tests where applicable are shown in Appendix A and Appendix B respectively.

5.2 Historical Flooding

A review of historical flood data was carried out for the Eastern CFRAM Studies using information provided on www.floodmaps.ie and in consultation with KCC. Consultation with the area engineer for Leixlip was also carried out as part of the SFRA to confirm sources of flooding. The main sources of flooding in the town are fluvial and pluvial flooding.

Figure 5-1 and **Table 5-1** show the locations of previous flood events within Leixlip. There have been no significant fluvial flood events since 2008 and since the flood defence works were completed along the Rye River at the Rye River Estate and the Ryevale Nursing Home, and along the Silleachain at Mill Lane. There is some recurring pluvial flooding along Main Street due to the capacity of the storm water network in heavy rainfall events.

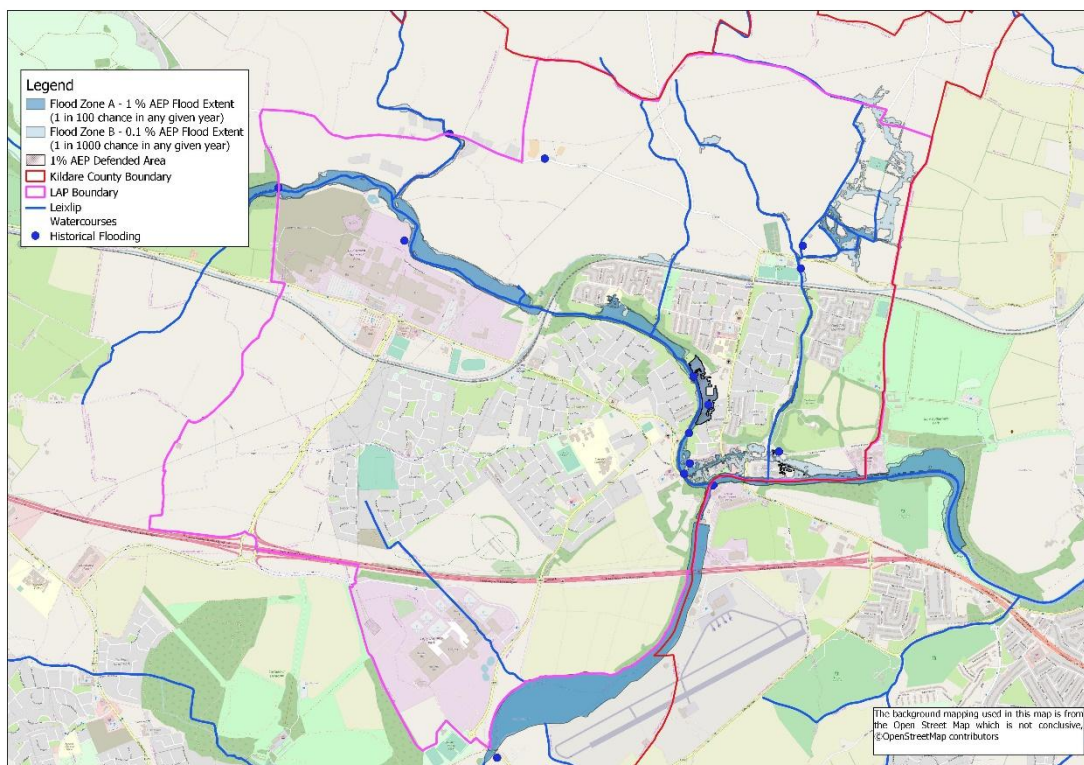


Figure 5-1 Overview of the CFRAM flood zones and historical flood events in Leixlip

Table 5-1 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. |

5.3 CFRAM Studies

5.3.1 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 have been developed to meet the requirements of the EU Directive on the assessment and management of flood risks (the Floods Directive). The CFRAM Studies have 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 has been identified as an Area for Further Assessment (AFA) within the Eastern CFRAM Study.

The Eastern CFRAM FRMP was published in February 2018 and outlined a series of proposed flood risk policy measures. These include regional measures, but also identify further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye Water, including Confey Community College and Buckley’s Lane / Main Street. The list of measures applicable to Leixlip is outlined in **Table 5-2** below. A Disclaimer and Conditions of Use for flood maps and flood risk management plans are available at the following website <https://www.floodinfo.ie/>. KCC have committed to implementing any recommendations from the FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation schemes that are deemed appropriate and viable.

Table 5-2 Eastern CFRAM FRMP proposed Flood Risk Management measures

| CFRAM Recommendation Code | Regional & Policy Measures |
|---------------------------|--|
| IE09-UoM-9011-M22 | Application of the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW, 2009) |
| IE09-UoM-9012-M34 | Implementation of Sustainable Urban Drainage Systems (SuDS) |
| IE09-UoM-9013-M24 | Consideration of Flood Risk in local adaptation planning. |
| IE09-UoM-9023-M33 | Ongoing Maintenance of Drainage Districts |
| IE09-UoM-9031-M41 | Establishment of a National Flood Forecasting and Warning Service |
| IE09-UoM-9032-M42 | Ongoing Appraisal of Flood Event Emergency Response Plans and Management Activities |
| IE09-UoM-9033-M51 | Individual Action to Build Resilience |
| IE09-UoM-9041-M61 | Flood-Related Data Collection |
| IE09-UoM-9051-M61 | Minor Works Scheme |
| | Leixlip AFA Measures |
| IE09-090089-0609-M33 | Leixlip Flood Relief Scheme: Option 1 - Hard defences - Progression of the Leixlip Flood Relief Scheme, comprising hard defences (flood walls and embankments) to project-level development and assessment for refinement and preparation for planning / exhibition and, as appropriate, implementation. |

5.3.2 CFRAM Fluvial Flood Zone Mapping

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 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 3.2.3**), rather than information on floods that have occurred in the past.

5.4 Flood Defence Works

5.4.1 Flood Defence Schemes

To counteract the known flood risk at Leixlip, river/stream improvement works were carried out between 2007 and 2010. The improvement works were designed to provide protection for 50 properties against a 1% Annual Exceedance Probability flood event from the Rye River and Silleachain rivers. Works included:

- Channel and culvert upgrades along the Silleachain Stream at Mill Lane, and
- Construction of flood walls, flood embankments, upgraded bridges and the regrading of the river channel along the Rye Water.

5.4.2 Proposed Flood Relief Works

As noted in **Table 5-2** the Eastern CFRAM Flood Risk Management Plan (FRMP) identified further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye Water, including Confey Community College and Buckley's Lane / Main Street. KCC have committed to implementing any recommendations from the FRMPs and will work in conjunction with the OPW to deliver any proposed flood alleviation schemes that are deemed appropriate and viable.

5.4.3 Flood Zone Mapping for Flood Defence Schemes

The Guidelines state that the effect of flood defences should be ignored when determining flood zones, as defended areas still carry a residual risk from overtopping and failure of the defences. Because this residual risk of flooding remains, the sequential approach and the Justification Test apply to such defended locations. Under The Guidelines, from a planning perspective, to be considered a defended area the design standard of the scheme must protect that area for a 1% AEP flood event.

In the CFRAM Studies flood defences are defined as structures or features that were constructed to provide a formal flood defence function ('formal flood defences'), including those that may be in poor condition, and also those that may have been built for other purposes but that, in the opinion of a Consultant/ Expert/suitably qualified Engineer, would provide a flood defence function ('informal effective flood defences'). They do NOT include structures that were not constructed to provide a formal flood defence function and that, in the opinion of a Consultant/ Expert/suitably qualified Engineer, would fail to provide a flood defence function due to structural weakness, porosity or other such reasons ('informal ineffective flood defences'), such as garden walls or embankments perforated by uncontrolled culverts.

The Leixlip Flood Relief scheme includes formal flood defences along the Silleachain Stream and the Rye Water. Defended areas for these locations are shown on the Flood Zone Mapping in Appendix A. These areas are protected against the 1% AEP flood event and the defences in place were reviewed. The probability of failure of these defences is low but they still carry a residual risk of failure.

5.5 Liffey Flood Controls

The river flows along the Liffey are greatly influenced by the dams and reservoirs operated by ESB at Poulaphuca, Golden Falls and Leixlip. In particular the Poulaphuca reservoir is capable of storing large volumes of runoff and acts a flood relief reservoir for the Liffey. The dams at Golden Falls and at Leixlip are significantly smaller and have limited storage capacity but they still have some attenuating effect on the middle and lower reaches of the Liffey. The ESB operates the three reservoirs and hydro-electric plants based on: 'Regulations and Guidelines for the control of the River Liffey, Water Management Document, February 2006, ESBI'. The three main considerations for the operation of the dams are Dam safety (designed to safely store a 1 in 10,000 year or 0.01% AEP rainfall event), Efficiency of electric power generation and Flood management.

Flood management procedures for the three dams begin when thresholds for water levels or inflows are reached or predicted to occur. These operation procedures ensure that the Liffey dams are capable of dealing safely with floods having an expected annual probability of occurrence of 1:10,000. The CFRAM hydrology and hydraulic modelling has accounted for the discharges from the Liffey reservoirs within the generation of the flood maps within the limits of the ESB operation guidelines. They also account for discharges downstream of the Leixlip reservoir where levels in the Liffey can cause backing up of the Rye River raising water levels upstream.

5.6 Fluvial Flood Zone Mapping Review

The flood zones are derived from the Final Eastern CFRAM outputs. These maps are the most comprehensive flood maps produced for Kildare since the introduction of The Guidelines and the Floods Directive. The flood zones only account for inland flooding. Confidence in the accuracy of the maps is considered to be high due to the robust nature of the CFRAM flood mapping process. The flood zone maps are shown in Appendix A. As described in **Section 5.3.2** 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/>.

5.7 Other Sources of Flooding

5.7.1 Overview

The flood zones only account for inland flooding. However, they should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from other sources. Hence a review of other sources of flooding was carried out to identify potential areas of risk.

5.7.2 Groundwater Flooding

The OPW PFRA carried out a national scale a Groundwater Flooding Report which concludes that ground water flooding is largely confined to the West Coast of Ireland due to the hydrogeology of the area. Therefore ground water flooding is not a significant risk for County Kildare but should still be examined at detailed FRA level particularly if the development includes proposals for basements.

5.7.3 Pluvial Flooding

The OPW PFRA study provides a national level screening of areas that are at potential risk of pluvial flooding. For a thorough assessment of pluvial risk in Kildare a more detailed assessment at a countywide scale (taking into consideration of local factors and parameters) would need to be carried out. Nonetheless, the national PFRA maps can be used to identify areas that may be at risk and that may require a pluvial flooding assessment to be carried out for planning applications. **Table 5-3** and **Error! Reference source not found.** below highlights areas where a more detailed FRA maybe required addressing pluvial flood risk. Recommendations and guidelines from the GSDSDS should be implemented in these areas to reduce the risk of pluvial flooding.

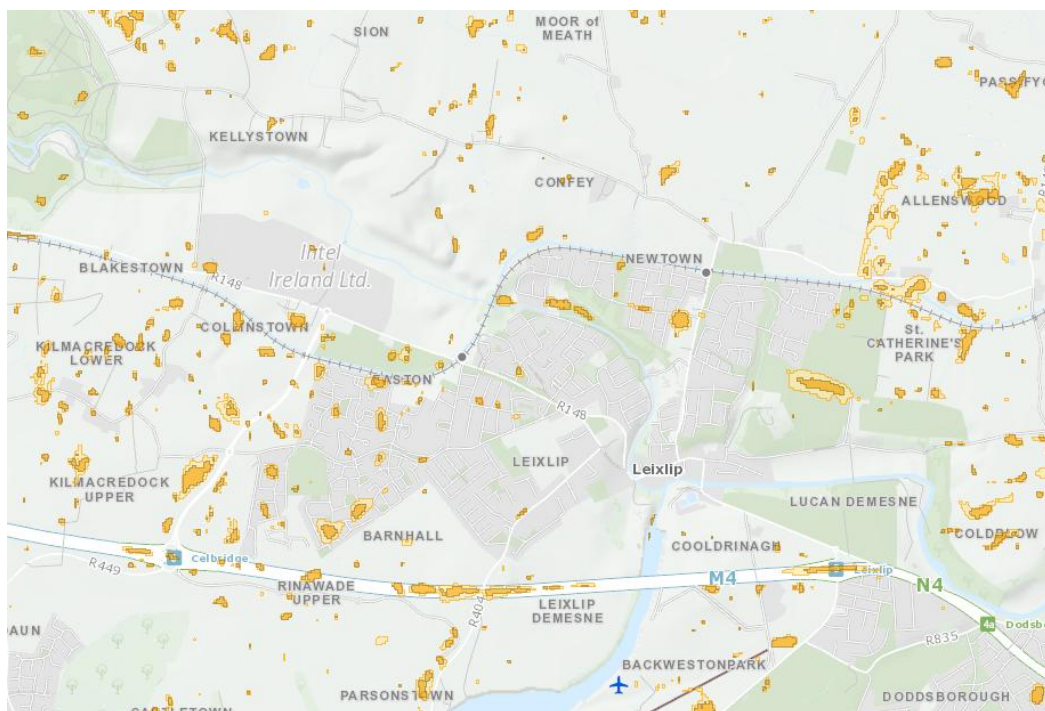


Figure 5-2 PFRA indicative pluvial flood extents (source myplan.ie)

Table 5-3 Locations with an indication of Pluvial Risk

| Townland / Estate | Indicative Pluvial Risk Assessment |
|--------------------------|---|
| River Forest | Pluvial Extents shown in the car park area of the River Forest Shopping Centre |
| Confey Community College | Pluvial Extents shown in low-lying areas adjacent to the River Rye Water. |
| St. Catherine’s Park | Pluvial Extents shown in low-lying areas at the base of the raised ground leading from Leixlip Manor to St. |

| | |
|----------------------------------|--|
| | Catherine's Park. |
| Easton & Barnhall | Clusters of pluvial risk on low-lying areas of the Easton and Barnhall housing estates. |
| Collinstown & Kilmacredock Upper | Clusters of pluvial risk on low-lying areas in Collinstown and Large pluvial extent adjacent to the R449 as it joins junction 6 on the M4. |
| Confey | Pluvial Extents shown in low-lying areas adjacent to the Moor of Meath (River) and large clusters to the east of the design framework lands. |

5.8 Climate Change Sensitive Areas

5.8.1 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 5-4** 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 5-4 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 Silleachain Stream in Confey / Allenswood. |
| Grand Canal | There is a large increase in flood extents for both Flood Zones where culverts for the Moor of Meath (River) and Silleachain stream go under the Grand Canal. The flood zones for both streams merge in lands to the north of the Grand Canal. |
| Main Street / Buckley's Lane | There is an increase in flood extents for both Flood Zones along Main Street as the Rye River overtops its banks and flows from Buckley's Lane on Main Street and flows downhill towards Mill Lane. |
| Mill Lane / Wastewater Treatment Plant | There is an increase in Flood Zone B along Mill Lane and on undeveloped land adjacent to the plant site. The CFRAM hydraulic modelling shows that the Silleachain Stream is not the cause of this potential flooding. The 0.1% AEP flood extent from the River Rye flows downhill towards Mill Lane from Main Street and overland to combine with the River Liffey flood extent on the plant site. |

6 DEVELOPMENT PLAN ZONING

6.1 Introduction

The zonings in the following areas 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 (other zoning categories not listed here should be considered on their own merit) and an assessment of their vulnerability and the requirements of application of the Justification Test are shown in **Table 6-1**.

KCC reviewed the flood zones during the LAP 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, Justification Tests have been carried out as applicable and are shown in Appendix B. Climate Change flood extents have also been used to influence the development of zoning proposals within the Confey Urban Design Framework as the flood extents substantially increase in this area in the MRFS flooding scenario.

Table 6-1 Land Use Zoning and Vulnerabilities

| Objective | Vulnerability | Justification Test Required |
|-----------------------------------|-------------------------|---|
| A - Town Centre / Mixed Use | High / Less | For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A |
| 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 |
| F2 – Strategic Open Space | Less / Water Compatible | For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A |
| G - Neighbourhood Centre | High / Less | For highly vulnerable development in Flood Zone A or B |

| Objective | Vulnerability | Justification Test Required |
|-----------------------------|---------------|---|
| | | For less vulnerable development in Flood Zone A |
| H – Industry & Warehousing | Less | For Development in Flood Zone A |
| I – Agriculture | Less | For Development in Flood Zone A |
| Q – Business and Technology | Less | For Development in Flood Zone A |
| T – Tourism | High / Less | 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 |
| U – Transport & Utilities | High | For Development in Flood Zone A or B |

6.2 Pre-existing Zoned Areas

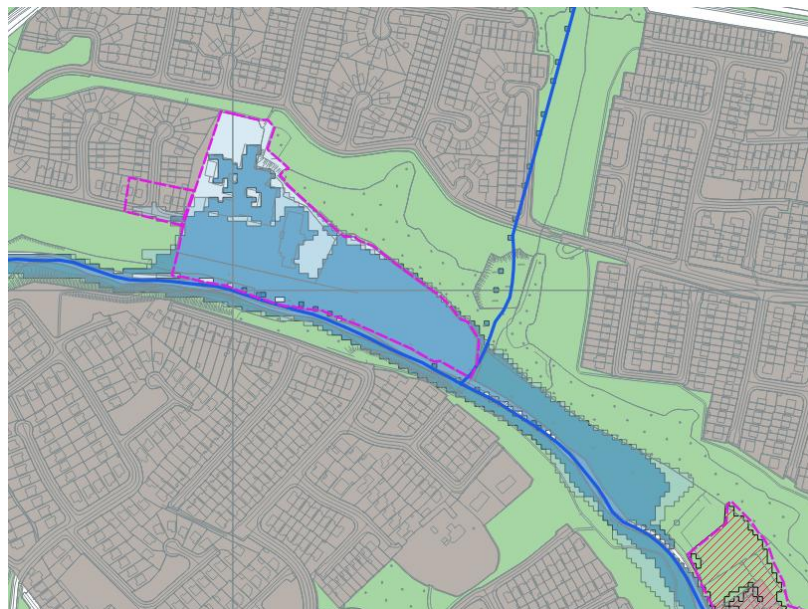
Table 6-2 below surmises the applicability of the Justification Test to pre-existing zoned areas in Leixlip by overlaying the CFRAM flood mapping on the pre-existing land use zonings. Justification Tests where applicable for areas are shown in Appendix B.

Table 6-2 Pre-existing zoned areas vulnerable to potential flooding

| Site Location No. | Land Use Zoning | Land Use Vulnerability | Justification Test Requirement |
|--|--------------------------------|------------------------|--|
| 1 Confey Community College, Captain's Hill, Leixlip | Educational | Highly Vulnerable | Required as the grounds of the school are located in Flood Zones A and B. |
| 2 Rye River Apartments and Rye Vale Nursing Home, Rye Vale, Leixlip | Existing Residential/Community | Highly Vulnerable | Required as residential properties are located in Flood Zones A and B but they are located in a defended area. |

| Site Location No. | Land Use Zoning | Land Use Vulnerability | Justification Test Requirement | |
|-------------------|--|--|--------------------------------|---|
| 3 | Rye River Grove and Rye River Park, Leixlip | Existing Residential | Highly Vulnerable | Required as residential properties are located in Flood Zones A and B but they are located in a defended area. |
| 4 | Main Street / Town Centre Regeneration | Town Centre | Highly and Less Vulnerable | Required as the Town Centre zoning has mixed uses including residential and commercial. Parts of Main Street are located in Flood Zones A and B. Justification Test is not applicable to commercial development uses in Flood Zone B. |
| 5 | Mill Lane | Existing Residential / Transport & Utilities | Highly Vulnerable | Required as residential properties and the fire station are located in Flood Zone B. |
| 6 | Leixlip Wastewater Treatment Plant, St. Catherine's Park | Transport & Utilities | Highly Vulnerable | Required as a portion of the treatment plant lands are located in Flood Zones A and B. |

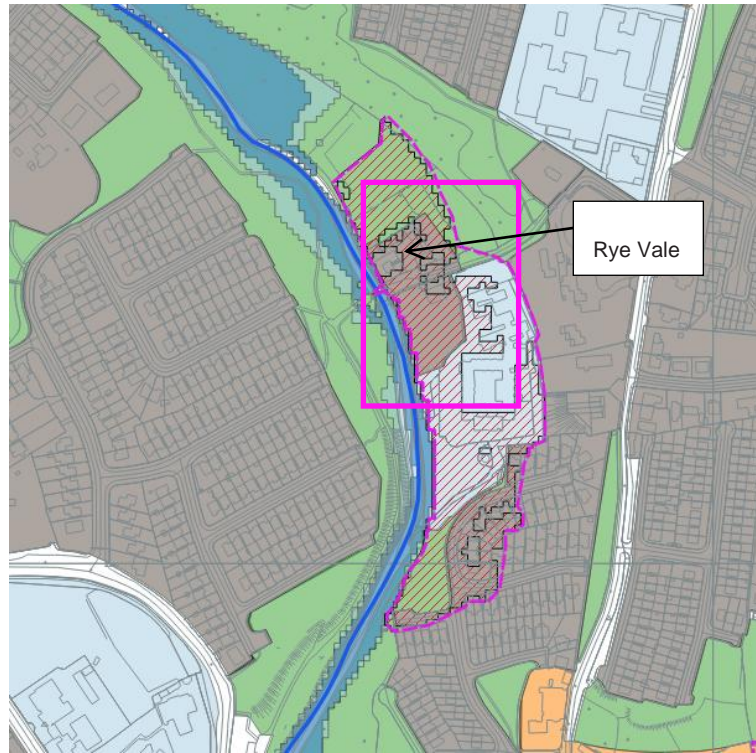
6.2.1 Confey Community College



| | |
|----------------------------|--|
| Historical Flooding | Some historical evidence to suggest the school grounds flooded during the November 2000 event. |
| Flood Zone | CFRAM mapping |

| | |
|-------------------|---|
| Mapping | |
| Comment | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones show that the grounds of Confey College are inundated with Flood Zone A and B extents. Flood Zone A is largely confined to the open space and car park of the school with depths close to the school buildings less than 0.25m. However, the extent and depths increase for Flood Zone B closer to the school buildings.</p> <p><u>Pluvial Flooding</u></p> <p>Pluvial Extents shown in low-lying areas adjacent to the River Rye Water. The site slopes towards the River Rye with the playing pitches on the lowest lying land.</p> <p><u>Climate Change</u></p> <p>The CFRAM MRFS mapping indicates an increase in flood extents near the school buildings.</p> <p><u>Justification Test</u></p> <p>It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p> |
| Conclusion | <p>KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zoning. The Justification Test is included in Appendix B. Any future expansion of the school should be subject to a SSFRA.</p> <p>The SSFRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. SSFRAs should also examine climate change scenarios.</p> <p>Any SSFRA should be cognisant of the Eastern CFRAM FRMP which identified proposed flood defences along the Rye River walls to protect against the 1% AEP event at Confey Community College.</p> |

6.2.2 Rye River Apartments & Rye Vale



| | |
|----------------------------|--|
| Historical Flooding | Historical flooding in this area where the River Rye burst its banks. No flooding in this area has occurred since flood alleviation works were completed. |
| Flood Zone Mapping | CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area show residential properties and a nursing home which overlap with Flood Zones A and B. These lands lie within a defended area, however, in accordance to The Guidelines they must be treated as having a residual risk of flooding due to potential flood defence failure. However, this is extremely unlikely as the defences in this area have been designed and constructed to a very high standard. The defences included an overflow bypass and flood walls.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. The lands slope towards the River Rye Water.</p> <p><u>Climate Change</u></p> <p>The CFRAM MRFS mapping does not indicate any significant changes in flood extents.</p> |

There is an increase in flood extents for the Rye Water Apartments.

Justification Test

It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.

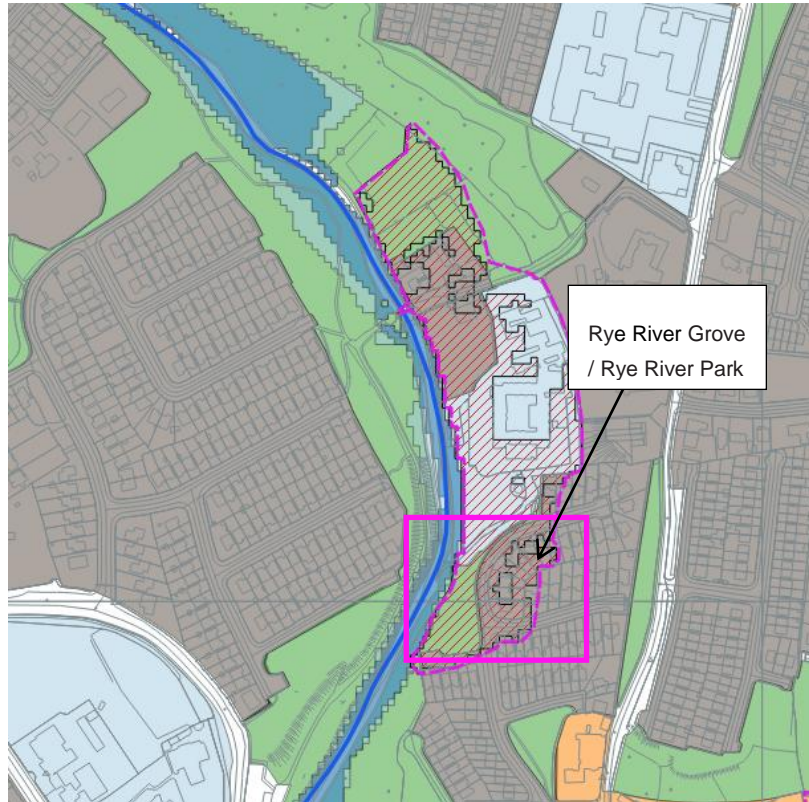
Conclusion

KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zoning. The flood defences constructed in this area have a very low chance of failure due to the robust design and construction. Further development in this area is unlikely but any proposals shall be subject to a SSFRA. The Justification Test is included in Appendix B

The SSFRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level (however the requirement for freeboard may be relaxed following consultation with KCC and the OPW), flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events in the event of defence failure.

Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.

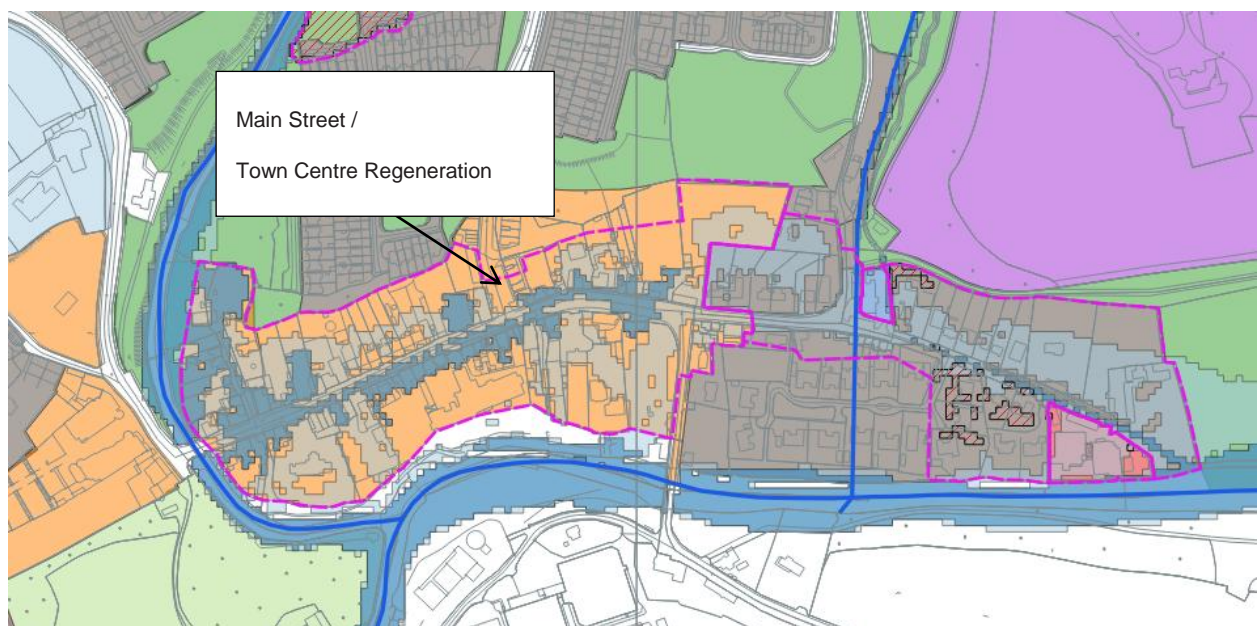
6.2.3 Rye River Grove & Rye River Park



| | |
|----------------------------|---|
| Historical Flooding | Historical flooding in this area where the River Rye burst its banks. No flooding in this area has occurred since flood alleviation works were completed. |
| Flood Zone Mapping | CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area show residential properties which overlap with Flood Zones A and B. These lands lie within a defended area, however, in accordance with the Guidelines they must be treated as having a residual risk of flooding due to potential flood defence failure. However, this is extremely unlikely as the defences in this area have been designed and constructed to a very high standard. The defences included an overflow bypass and flood embankments.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. The lands slope towards the River Rye Water.</p> <p><u>Climate Change</u></p> <p>The CFRAM MRFS mapping does not indicate any changes in flood extents.</p> |

| | |
|--------------------------|--|
| | <p><u>Justification Test</u></p> <p>It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p> |
| <p>Conclusion</p> | <p>KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zoning. The flood defences constructed in this area have a very low chance of failure due the robust design and construction. Further development in this area is unlikely but any proposals shall be subject to a SSFRA. The Justification Test is included in Appendix B</p> <p>The SSFRA should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 1% AEP level (however the requirement for freeboard may be relaxed following consultation with KCC and the OPW), flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events in the event of defence failure.</p> <p>Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.</p> |

6.2.4 Main Street / Town Centre Regeneration

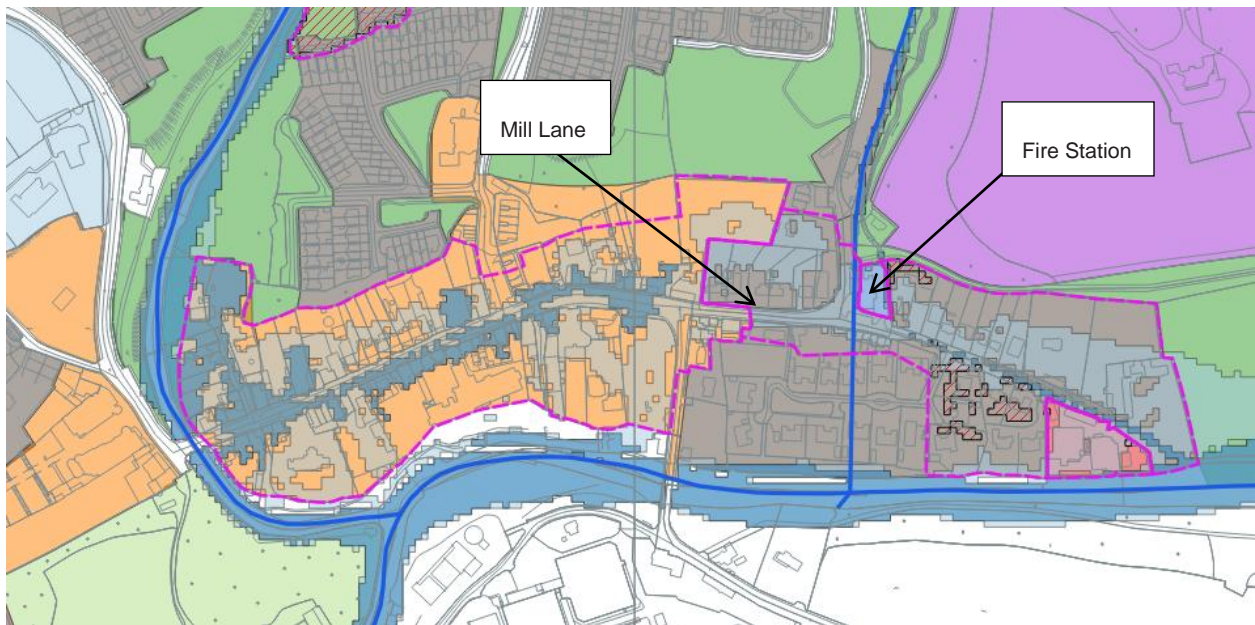


| | |
|----------------------------|---|
| Historical Flooding | Historical flooding in this area where the River Rye burst its banks. |
| Flood Zone Mapping | CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area highlighted lands which overlap with residential and commercial properties. Flood Zone A is largely confined to Buckley’s Lane and Main Street. Flood Zone B extends to side streets and further east towards Mill Lane.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. Main Street generally slopes east towards Mill Lane.</p> <p><u>Climate Change</u></p> <p>The CFRAM MRFS flood extents show a large increase in extents along Main Street and in the town centre. The Rye River overtops its banks and flows from Buckley’s Lane on Main Street and flows downhill towards Mill Lane.</p> <p><u>Justification Test</u></p> <p>It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable. Commercial properties without an additional residential use in Flood Zone B are exempt from the Justification Test. The SFRA identifies several areas of existing development which are at risk of flooding. In accordance with Circular PL2/2014 a Justification Test should be carried out to assess the appropriateness of the pre-existing zoning and proposed areas of regeneration at risk of flooding.</p> |
| Conclusion | <p>KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zoning. The Justification Test is included in Appendix B. Any future development or regeneration in the town centre should be subject to a SSFRA.</p> <p>The SSFRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% or 1% AEP level where appropriate, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. SSFRAs should also examine climate change scenarios.</p> <p>Any SSFRA should be cognisant of the Eastern CFRAM FRMP which identified proposed flood defences along the Rye River walls to protect against the 1% AEP event at Buckley’s Lane and Main Street. It should also be noted that the town</p> |

centre is susceptible to increases in flood extents during climate change scenarios. Any significant regeneration of the town centre should include an assessment of the impacts of climate change and the proposed flood defences from the FRMP.

Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.

6.2.5 Mill Lane



| | |
|----------------------------|---|
| Historical Flooding | Historical flooding in this area where the Silleachain Stream burst its banks. |
| Flood Zone Mapping | CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area highlighted residential properties and the Leixlip fire station overlapping with Flood Zone B.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. Mill Lane generally slopes south east towards the River Liffey.</p> |

Climate Change

The CFRAM MRFS flood extents show a large increase in extents along Mill Lane.

Justification Test

It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.

Conclusion

KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zonings. The Justification Test is included in Appendix B. Any future development along Mill Lane should be subject to a SSFRA.

The SSFRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. An emergency evacuation plan and defined access / egress routes should be developed for extreme flood events. SSFRAs should also examine climate change scenarios. The fire station should develop an emergency contingency plan to ensure that emergency operations are not impeded and access is maintained to the station during the 0.1% flood event

Applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use must include a flood risk assessment of appropriate detail to demonstrate that they would not have adverse flood risk impacts and employ flood resilient construction materials and fittings.

6.2.6 Wastewater Treatment Plant



| | |
|----------------------------|---|
| Historical Flooding | No historical flooding reported in the area. |
| Flood Zone Mapping | CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood zones in this area highlighted a portion of undeveloped land on the existing wastewater treatment plant site which overlaps with Flood Zone A and Flood Zone B.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area. The treatment plant site generally slopes south towards the River Liffey.</p> <p><u>Climate Change</u></p> <p>The CFRAM Mid-Range Future Scenario flood extents show a large increase in extents in the greenfield site next to the plant. The flood extents from the River Rye flow downhill towards Mill Lane from Main Street and overland to combine with the River Liffey flood extents.</p> |

| | |
|--------------------------|---|
| | <p><u>Justification Test</u></p> <p>It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zoning in this area is still suitable.</p> |
| <p>Conclusion</p> | <p>KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zoning. The Justification Test is included in Appendix B. Any future expansion of the treatment plant should be subject to a SSFRA. SSFRAs should also examine climate change scenarios.</p> <p>The SSFRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% AEP level, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. SSFRAs should also examine climate change scenarios.</p> |

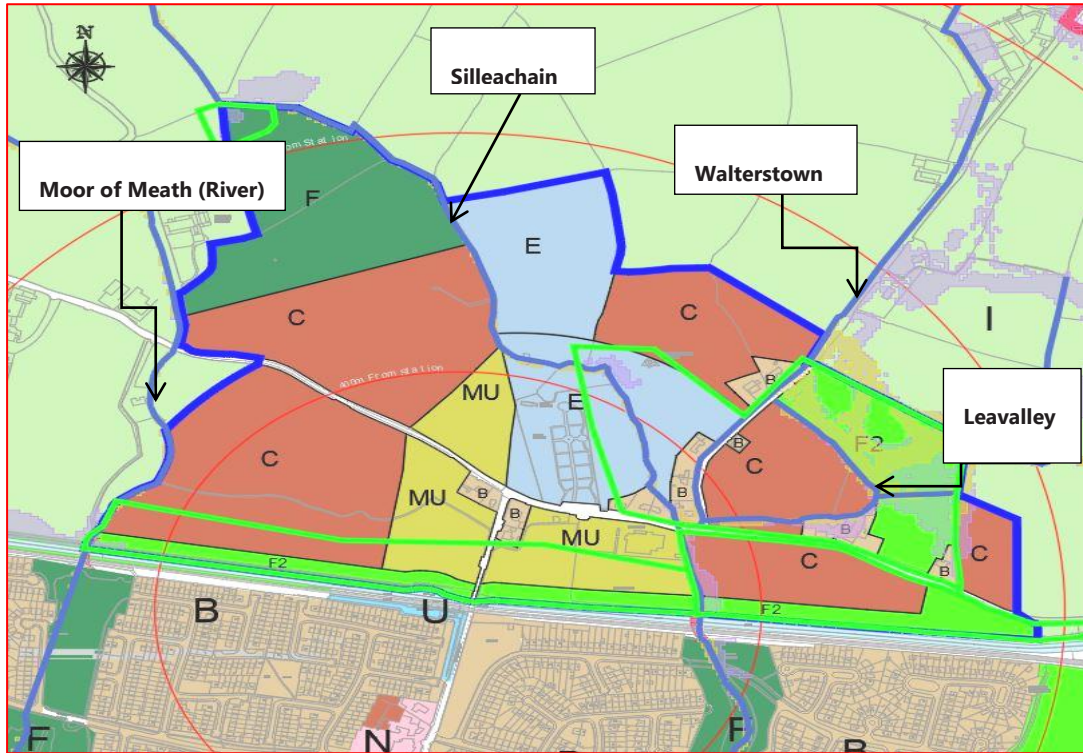
6.3 Proposed Zonings

Table 6-3 below summarises the applicability of the Justification Test and flood risk management proposals for proposed zonings in Leixlip. The zonings were compared against the CFRAM flood mapping. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk outside the scope of the CFRAM mapping. Therefore, no further flood zone mapping was deemed to be necessary. Note site numbers below in table 6-3 relate to the site reference numbers set out in the Leixlip Sustainable Planning and Infrastructural Assessment carried out as part of the plan making process.

Table 6-3 Proposed Zoned areas vulnerable to potential flooding

| Site No. | Location | Land Use Zoning | Land Use Vulnerability | Justification Test Requirement |
|----------|-------------------------------|---|--------------------------|--|
| 21/22 | Confey Urban Design Framework | Mixed Use, New Residential and Education. | Highly / Less Vulnerable | Required for the proposed land uses in Allenswood. Lands to the east of the Silleachain Stream are located in Flood Zones A and B. |
| 1 | Wonderful Barn | New Residential | Highly Vulnerable | Not applicable as the lands are located in Flood Zone C. |
| 1E | Collinstown | Business & Technology | Less Vulnerable | Not applicable as the lands are located in Flood Zone C. |
| 6 | Leixlip Gate | New Residential | Highly Vulnerable | Not applicable as the lands are located in Flood Zone C. |
| 19 | Black Avenue | New Residential | Highly Vulnerable | Not applicable as the lands are located in Flood Zone C. |
| 17 | Celbridge Rd East | New Residential | Highly Vulnerable | Not applicable as the lands are located in Flood Zone C. |

6.3.1 Confey Urban Design Framework



| | |
|-----------------------------------|---|
| <p>Historical Flooding</p> | <p>Historical flooding occurred in this area in 2002 with approximate locations shown in the figure above. The Silleasechain and Walterstown Streams burst their banks flooding part of Allenswood Road, two properties and the Confey Junction with Allenswood Road. Analysis undertaken as part of CFRAM reports indicate that the approximate return period for the 2002 event was the 1% AEP / 1 in 100 year event.</p> |
| <p>Flood Zone Mapping</p> | <p>CFRAM mapping</p> |
| <p>Comment</p> | <p><u>Fluvial Flooding</u></p> <p>The CFRAM flood extent mapping highlighted in the figure above shows out of bank flooding along the four streams running through the Confey Urban Design Framework lands. A small number of properties appear to be located within the 0.1% AEP flood extent from the Walterstown and Leavalley watercourses. The primary impacted areas are agricultural lands.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping highlights significant pluvial extents to the east of the zoned lands but there are pluvial extents shown in low-lying areas adjacent to the Moor of Meath (River).</p> |

Climate Change

There is a large increase in Flood Zones on the eastern side of the Silleachain Stream in the Allenswood area. There is also a large increase in flood extents for Both Flood Zones where culverts for the Moor of Meath (River) and Silleachain stream go under the Grand Canal. The flood zones for both streams merge in lands to the north of the Grand Canal.

Justification Test

It was recommended that the planning authority carry out the Development Plan Justification Test to assess if the zonings in the urban design framework lands are suitable.

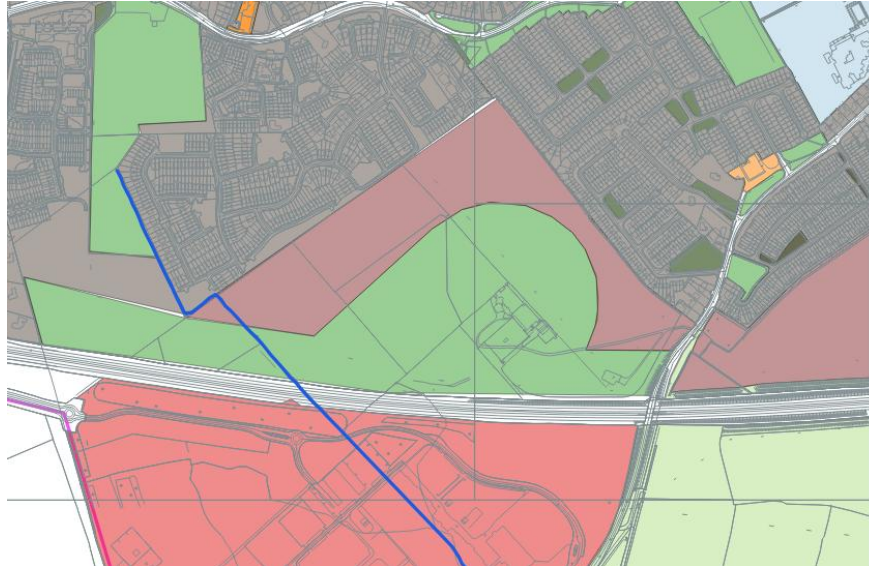
Conclusion

KCC reviewed the CFRAM flood zones during the development plan 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 Justification Tests have been carried out as applicable, see Appendix B. Climate Change flood extents have also been used to influence the zoning in the Confey UFD as the flood extents substantially increase in this area in the MRFS flooding scenario.

Any future developments in the Confey areas will be subject to SSRAs. The SSFRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% or 1% AEP levels where appropriate, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. SSFRAs should also examine climate change scenarios.

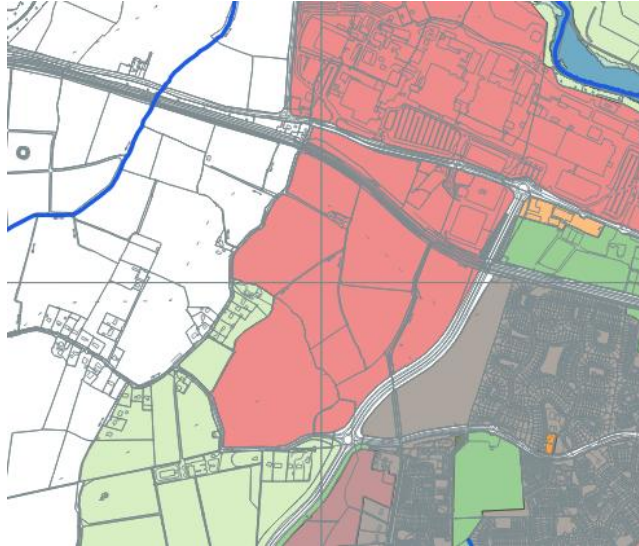
All developments will be required to be built in accordance with SuDS principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.

6.3.2 Wonderful Barn



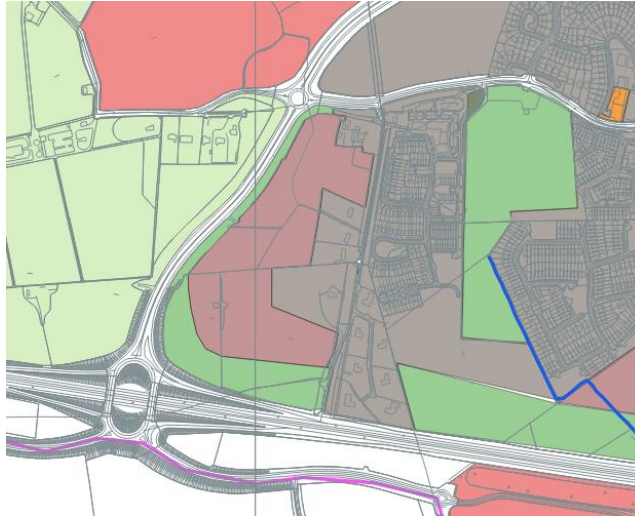
| | |
|----------------------------|--|
| Historical Flooding | No historical flooding reported in the area. |
| Flood Zone Mapping | No fluvial risk indicated on CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. A site visit also did not locate significant drainage ditches or watercourses. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight significant pluvial extents in this area.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p> |
| Conclusion | There is very little flood risk identified in this area. However, 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. |

6.3.3 Collinstown



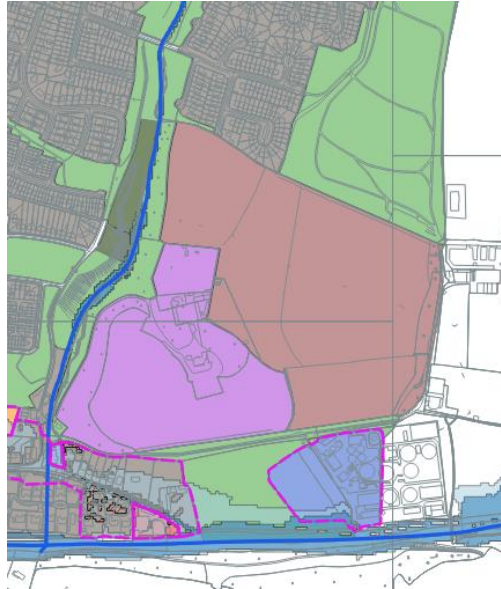
| | |
|----------------------------|---|
| Historical Flooding | No historical flooding reported in the area. |
| Flood Zone Mapping | No fluvial risk indicated on CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. A site visit also did not locate significant drainage ditches or watercourses. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping shows clusters of pluvial risk on low-lying areas in Collinstown.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p> |
| Conclusion | There is very little flood risk identified in this area. However, 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. |

6.3.4 Leixlip Gate



| | |
|----------------------------|--|
| Historical Flooding | No historical flooding reported in the area. |
| Flood Zone Mapping | No fluvial risk indicated on CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping shows a large pluvial extent adjacent to the R449 as it joins junction 6 on the M4. Development in this area should include an SSFRA investigating this risk.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p> |
| Conclusion | There is very little flood risk identified in this area. However, 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. Development adjacent to the R449 as it should undertake an SSFRA to investigate a potential pluvial risk. |

6.3.5 Black Avenue



| | |
|----------------------------|---|
| Historical Flooding | No historical flooding reported in the area. |
| Flood Zone Mapping | No fluvial risk indicated on CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> Pluvial Extents shown in low-lying areas at the base of the raised ground leading from Leixlip Manor to St. Catherine’s Park. Development in this area should include an SSFRA investigating this risk.</p> <p><u>Climate Change</u> The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B.</p> <p><u>Justification Test</u> Not applicable to this site.</p> |
| Conclusion | There is very little flood risk identified in this area. However, 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.

Development in low-lying areas at the base of the raised ground leading from Leixlip Manor to St. Catherine's Park should undertake an SSFRA to investigate a potential pluvial risk.

6.3.6 Celbridge Rd East



| | |
|----------------------------|--|
| Historical Flooding | No historical flooding reported in the area. |
| Flood Zone Mapping | No fluvial risk indicated on CFRAM mapping |
| Comment | <p><u>Fluvial Flooding</u> The CFRAM mapping does not indicate any fluvial risk in this area. A review of historical flooding, significant watercourses and historical mapping did not indicate any further fluvial flood risk. Therefore, no further flood zone mapping was deemed to be necessary.</p> <p><u>Pluvial Flooding</u> The PFRA mapping does not highlight significant pluvial extents in this area.</p> <p><u>Climate Change</u></p> |

| | |
|-------------------|---|
| | The CFRAM mapping does not indicate any significant changes in flood extent from Flood Zone A to Flood Zone B. |
| | <u>Justification Test</u> |
| | Not applicable to this site. |
| Conclusion | There is very little flood risk identified in this area. However, 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. |

6.4 Zoning Flood Risk Summary and Proposals

Table 6-4 outlines the SFRA proposals and the planning decisions undertaken to address flood risk in the zoning review areas. Justification Tests where applicable are shown in Appendix B. Flood mapping for the Leixlip LAP is shown in Appendix A.

Table 6-4 Areas at risk of flood within the Leixlip area

| Site Location No. | Flood Risk Management Proposals for the Site |
|----------------------------|--|
| 1 Confey Community College | <p>A SSFRA should be undertaken to ensure that any future expansion of the school is cognisant of flood risk. The site should be developed in an appropriate manner to reduce the flood risk to students and staff.</p> <p>The SSFRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. The development shall also 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. SSFRAs should also examine climate change scenarios.</p> <p>Any SSFRA should be cognisant of the Eastern CFRAM FRMP which identified proposed flood defences along the Rye River walls to protect against the 1% AEP event at Confey Community College.</p> |
| 2 Rye vale | <p>The area is defended but carries a residual risk of flooding. SSFRs should be undertaken to ensure that current and future residents are not exposed to undue flood risk in the event that the flood defences fail. A SSFRA should be undertaken to ensure that any future expansion or modifications of the nursing home or to the Rye River apartments is cognisant of flood risk.</p> <p>The sites should be developed in an appropriate manner to reduce the flood risk to residents and staff. The SSFRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also be required to be built in accordance with SuDS</p> |

| Site Location No. | Flood Risk Management Proposals for the Site |
|---|--|
| | <p>principles and in compliance with the surface water and drainage policies of the Leixlip LAP and Kildare County Development Plan.</p> |
| <p>3 Rye River Grove / Rye River Park</p> | <p>The area is defended but carries a residual risk of flooding. SSFRAs should be undertaken to ensure that current and future residents are not exposed to undue flood risk in the event that the flood defences fail. SSFRAs should be undertaken to ensure that any future redevelopment of residential properties is cognisant of flood risk.</p> <p>Sites should be developed in an appropriate manner to reduce the flood risk to residents. SSFRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also 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.</p> |
| <p>4 Main Street / Town Centre Regeneration</p> | <p>Commercial buildings and residential properties should undertake SSFRAs to ensure that future development or material alterations to sites expansion are cognisant of flood risk. The sites should be developed in an appropriate manner to reduce the flood risk to residents and buildings</p> <p>SSFRAs should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also 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. SSFRAs should also examine climate change scenarios.</p> <p>Any SSFRA should be cognisant of the Eastern CFRAM FRMP which identified proposed flood defences along the Rye River walls to protect against the 1% AEP event at Buckley’s Lane and Main Street. It should also be noted that the town centre is susceptible to increase in flood extents during climate change scenarios. Any significant regeneration of the town centre should include an assessment of the impacts of climate change and the proposed flood defences from the FRMP.</p> |
| <p>5 Mill Street</p> | <p>Residential properties should undertake SSFRAs to ensure that future development or material alterations to sites expansion are cognisant of flood risk. The sites should be developed in an appropriate manner to reduce the flood risk to residents and buildings.</p> <p>SSFRAs should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas. Development shall also 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. SSFRAs should also examine climate change scenarios.</p> |

| Site Location No. | Flood Risk Management Proposals for the Site |
|--|---|
| | <p>The fire station should develop an emergency contingency plan to ensure that emergency operations are not impeded and access is maintained to the station during the 0.1% flood event.</p> |
| <p>6 Wastewater Treatment Plant</p> | <p>A SSFRA should be undertaken for any future expansion of the wastewater treatment plant at this site. This will ensure that critical elements of the plant will not be at risk of failure and foul services will be maintained during a flood event.</p> <p>The SSFRA should address the sequential approach in terms of site layout, finished floor levels, flood resilient construction materials and fittings, existing flow paths and flood risk impacts to the surrounding areas SSFRAs should also examine climate change scenarios.</p> |
| <p>7 Confey Urban Design Framework</p> | <p>Any future developments in the Confey areas will be subject to SSFRAs. The SSFRAs should address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% or 1% AEP levels where appropriate, flood resilient construction materials and fittings should be considered and the site should not impede existing flow paths or cause flood risk impacts to the surrounding areas. SSFRAs should also examine climate change scenarios. 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.</p> |
| <p>8 Wonderful Barn</p> | <p>All development shall also 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</p> |
| <p>9 Collinstown</p> | <p>All development shall also 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</p> |
| <p>10 Leixlip Gate</p> | <p>A SSFRA should be carried out to investigate a potential pluvial risk on the low lying areas adjacent to the R449. All development shall also 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.</p> |
| <p>11 Black Avenue</p> | <p>A SSFRA should be carried out to investigate a potential pluvial risk on the in low-lying areas at the base of the raised ground leading from Leixlip Manor to St. Catherine’s Park. All development shall also 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</p> |
| <p>12 Celbridge Rd East</p> | <p>All development shall also 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</p> |

7 FLOOD RISK MANAGEMENT POLICIES AND OBJECTIVES

7.1 General Development Plans and Strategies

The Kildare County Development Plan 2017-2023 outlines surface water and flooding flood risk management policies and objectives for the entire county. The Leixlip Local Area will implement these policies to ensure flood risk and surface water management is considered during the planning process for development within the LAP boundary. The Leixlip LAP will also implement specific local policies and objectives which have also been adopted from the existing LAP and updated based on the information provided in the SFRA process and are shown in **Table 7-1**.

Table 7-1 LAP Flood Risk Management policies

| Planning Policy / Objective | Policy Description |
|---|---|
| I2.1 | Carry out surface water infrastructure improvement works as required. |
| I2.2 | To incorporate Sustainable Urban Drainage Systems (SuDS) as part of all plans and development proposals in Leixlip. Proposals for development in KDAs and Regenerations Sites areas should address the potential for SuDS at a local and district level to control surface water outfall and protect water quality. |
| Surface Water and Groundwater Action | Encourage 'daylighting'/de-culverting and the restoration of culverted water bodies within the town as a natural method of flood management. |
| Policy I3 – Flood Risk Management | It is the policy of the Council to manage flood risk in Leixlip in conjunction with the OPW and in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009) and circular PL02/2014 (August 2014). |
| I3.1 | To manage flood risk in Leixlip in accordance with the requirements of The Planning System and Flood Risk Management Guidelines for Planning Authorities, DECLG and OPW (2009) and Circular PL02/2014 (August 2014). |
| I3.2 | To ensure development proposals within the areas outlined on the Flood Risk Map are the subject of Site-Specific Flood Risk Assessment, appropriate to the nature and scale of the development being proposed. |
| I3.3 | To support and co-operate with the OPW in delivering the Eastern CFRAM Programme applicable to Leixlip. |

| Planning Policy / Objective | Policy Description |
|-----------------------------|--|
| OS1 | It is the policy of the Council to provide for a hierarchy of high quality multi- functional public open spaces within Leixlip, and to preserve and protect such spaces through the appropriate zoning of lands. |
| I5 | It is the policy of the Council to protect environmental quality in Leixlip through the implementation of European, national and regional policy and legislation relating to air quality, greenhouse gases, climate change, light pollution, noise pollution and waste management. |

7.2 Flood Risk Management Plans

KCC have committed to implementing the recommendations from the Eastern CFRAM FRMP for Leixlip. These include regional measures to address surface water management, flood risk considerations during the planning process, flood forecasting and also identified further flood defence works in Leixlip to protect against the 1% AEP event at locations along the Rye River including Confey Community College and Buckley’s Lane / Main Street. They will work in conjunction with the OPW to deliver any proposed flood alleviation works that are deemed appropriate and viable.

7.3 Flood Risk Management Objectives

KCC will implement the proposed flood risk management objectives for specific areas, ensuring planning applications, where applicable, will require an FRA of appropriate detail. The level of detail within the FRA will depend on the risks identified and the proposed land use. Applications should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required). The proposal must demonstrate that appropriate mitigation and management measures are put in place. For any development in flood risk areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test.

8 SUMMARY

8.1 Overview

The SFRA Report has been 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). The SFRA has provided an assessment of all types of flood risk within Leixlip to assist KCC to make informed strategic land-use planning decisions. The flood risk information has enabled KCC to apply The Guidelines sequential approach, and where necessary the Justification Test, to appraise sites for development and identify how flood risk can be reduced as part of the development plan.

8.2 Flood Zones and Flood Risk

Leixlip is susceptible to several types of flood risk, including:

- 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.

These types of flood risk act independently or in combination to cause flooding within the town LAP boundary.

The flood zones extents have been prepared in accordance the Planning System and Flood Risk Assessment Guidelines identifying Flood Zones A, B and C. The flood zone maps are derived from the Eastern CFRAM Study. The Flood Zone mapping is based on the best currently available data and a more detailed, SSFRA may generate localised flood extents. Confidence in the accuracy of the maps is considered to be high due to the robust nature of the CFRAM flood mapping process. The flood zones only account for inland flooding and are generated without the inclusion of climate change factors. 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. The flood zone maps are shown in Appendix A.

The primary pre-existing zoned areas at risk from flooding are the Confey Community College, the Town centre and Mill Lane. Any future developments in these areas should be subject to a SSFRA. The SSFRAs should in general address the site layout with respect to vulnerability of the proposed development type, finished floor levels should be above the 0.1% or 1% AEP level where appropriate, flood resilient construction materials and fittings may be considered and the developments should not impede existing flow paths or cause flood risk impacts to the surrounding areas. It also may be necessary to develop emergency evacuation plans and defined access / egress routes for extreme flood events. SSFRAs should also examine climate change impacts as parts of the town are susceptible to increases in flood extents for climate change scenarios. Any SSFRAs should also be cognisant of the Eastern CFRAM FRMP which identified proposed flood defences along the Rye River to protect against the 1% AEP event at Buckley's Lane, Main Street and the Community College. Any significant regeneration of the town centre should include an assessment of the impacts of the proposed flood defences from the FRMP.

With regards to Confey Urban Design Framework lands KCC reviewed the CFRAM flood zones during the development plan 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 Justification Tests have been carried out as applicable. Climate Change flood extents have also been used to influence the zoning in the Confey UFD as the flood extents substantially increase in this area in the MRFS flooding scenario. Any future developments in the Confey areas will be subject to SSFRAs.

8.3 Flood Management Policies and Objectives

The Kildare County Development Plan 2017-2023 outlines surface water and flooding flood risk management policies and objectives for the entire county. The Leixlip Local Area Plan will implement these policies to ensure flood risk and surface water management is considered during the planning process for development within the LAP boundary. The Leixlip LAP will also implement specific local policies and objectives which have also been adopted from the existing LAP and updated based on the information provided in the SFRA process and are shown in **Table 7-1**. The council has committed to supporting and co-operating with the OPW in delivering the recommendations from the Eastern CFRAM FRMP. KCC have committed to implementing the recommendations from the FRMP and will work in conjunction with the OPW to deliver any proposed flood alleviation works that are deemed appropriate and viable.

KCC will implement the proposed flood risk management objectives for specific areas, ensuring planning applications, where applicable, will require an FRA of appropriate detail. The level of detail within the FRA will depend on the risks identified and the proposed land use. Applications should demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal must demonstrate that appropriate mitigation and management measures are put in place. For any development in flood risk areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test.

8.4 SFRA Review and Monitoring

The Leixlip SFRA will be reviewed and updated every six years in line with the Kildare Planning Authority's review process. Additionally, outputs from future studies and datasets may trigger a review and update of the SFRA during the lifetime of the LAP and also the Kildare County Development Plan. These include the outputs from the updated hydraulic study that is required to progress a proposed flood scheme for Leixlip as outlined the Eastern CFRAM FRMP. Other sources of information may not lead to an update of the SFRA during the lifetime of the Plan but they should be retained and collected to supplement the future SFRAs.

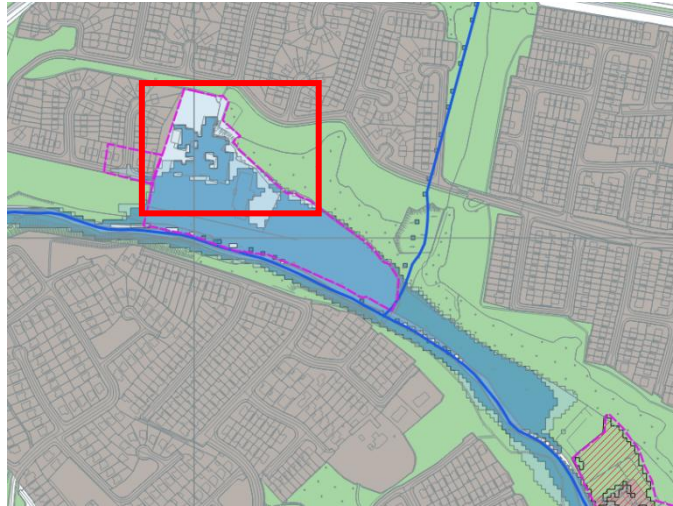
Appendix A

Fluvial Flood Zone Mapping

Appendix B

Justification Tests

1 Leixlip Local Area Plan 2020-2026 Confey Community College



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| <p>1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).</p> | <p>The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.</p> <p>Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> <p>The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.</p> <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
| <p>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:</p> | <p>The zoning of this area for 'Community and Educational' use is intended to reflect the existing use. i.e., Confey Community College. The main building complex to the north is located just outside the flood risk area. One building, car parking and a sports field are located within the flood risk</p> |

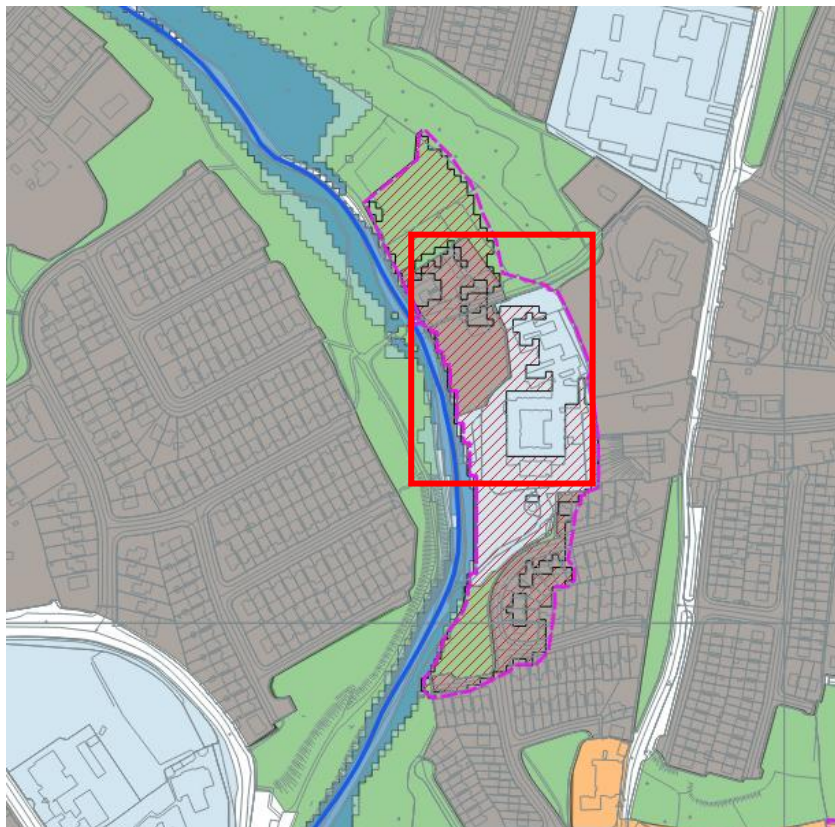
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| | area. |
| (i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement, | This land is currently in use for educational and ancillary purposes. The continued zoning of the land will facilitate future growth of the existing school facilities. |
| (ii) Comprises significant previously developed and / or underutilized lands, | This land is currently in use for educational and ancillary purposes. |
| (iii) Is within or adjoining the core of an established or designated urban settlement, | The site is not located within or adjoining the core, however, it is located adjacent to significant residential development and is currently in use for educational and ancillary purposes. |
| (iv) Will be essential in achieving compact and sustainable urban growth, and | The continued development of this land is essential in achieving compact and sustainable urban growth as it provides community and education services to Leixlip. |
| (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 settlement. | The zoning of this land reflects the existing uses on the site, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose. |
| 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 | <p>The CFRAM flood mapping indicates that the majority of the school site falls within Flood Zone A and Flood Zone B. The CFRAM mapping indicates that the water depths for the 1% AEP event immediately adjacent to the school buildings are less than 0.25m and the worst flooding occurs in the car park and the playing pitches. The 0.1% AEP water depths adjacent to the school buildings are 0.5m – 1.0m depth. This indicates the school has a significant flood risk.</p> <p>The existing educational zoning at risk of flooding will be retained but any further development shall be subject to a SSFRA.</p> <p>SSFRA should address the following:</p> <ul style="list-style-type: none"> • Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain, • Highly Vulnerable Development shall not be permitted in Flood Zone A or B, • Should address climate change scenarios in relation to FFLs and potential mitigation measures, • Finished floor levels should be above the 0.1% or 1% AEP level where appropriate, • Flood resilient construction materials and fittings should be considered, • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, |

- Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events, and
- Should address climate change scenarios in relation to FFLs and potential mitigation measures.

The Eastern CFRAM FRMP has proposed flood defence works which would protect the school against the 1% AEP event. Any SSFRA should be cognisant of the identified proposed flood defences on the school site. Any development shall also 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.

2 Leixlip Local Area Plan 2020-2026 Rye River Apartments & Ryevale



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| <p>1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).</p> | <p>The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.</p> <p>Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> <p>The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.</p> <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
| <p>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:</p> | <p>Land Zoned: B - Existing Residential & Infill and E - Community & Educational. The zoning of this area for 'Residential' and 'Community and Educational' use reflects existing uses. i.e., a nursing home and residential properties. All lands and buildings are identified as being located in a 1% AEP 'defended area'.</p> |
| <p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement,</p> | <p>This land is currently in use for residential and community use. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.</p> |
| <p>(ii) Comprises significant previously developed and / or underutilized lands,</p> | <p>This land is currently in use for residential and community and educational use.</p> |
| <p>(iii) Is within or adjoining the core of an established or designated urban settlement,</p> | <p>The site is not located within or adjoining the core, however, it is located adjacent to significant residential development and is currently in use for residential and community use.</p> |
| <p>(iv) Will be essential in achieving compact and sustainable urban growth, and</p> | <p>The continued development of this land is essential in achieving compact and sustainable urban growth as it acknowledges existing residential use and provides community services to Leixlip.</p> |
| <p>(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 settlement.</p> | <p>The zonings of this land reflects the existing uses on the site, and are intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose.</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 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</p> | <p>The CFRAM flood mapping indicates that the zoned areas lie within a 1% AEP defended area. Therefore the sites still carry a residual risk of flooding if the flood defences adjacent to the Rye River fail during a flood event.</p> <p>The existing zonings will be retained but development in this area should be limited to alterations to existing buildings and no further</p> |

made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment

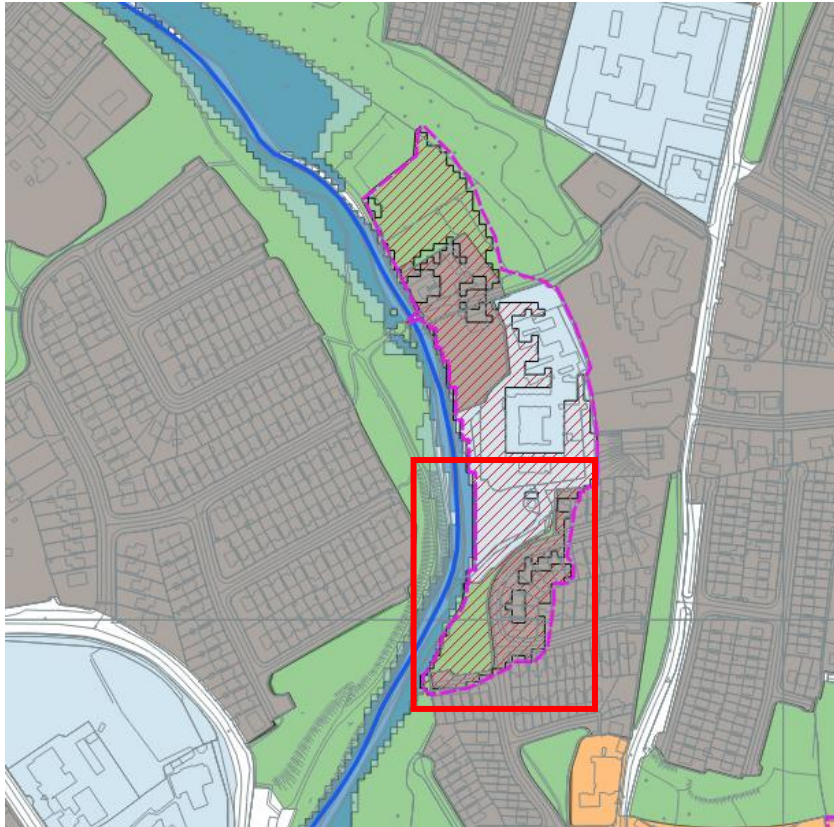
highly vulnerable zonings should be provided for in the areas in

Future development shall be subject to a SSFRA. SSFRAs should address the following:

- Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain,
- Highly Vulnerable Development shall not be permitted in Flood Zone A or B,
- Should address climate change scenarios in relation to FFLs and potential mitigation measures,
- Finished floor levels should be above the 0.1% or 1% AEP level where appropriate (Freeboard may be relaxed following consultation with KCC and the OPW),
- Bedrooms should be located in the upstairs of two story buildings,
- Flood resilient construction materials and fittings should be considered,
- Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and
- Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.

Any development shall also 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.

3 Leixlip Local Area Plan 2020-2026 Rye River Grove and Rye River Park



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| <p>1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).</p> | <p>The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.</p> <p>Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> <p>The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.</p> <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
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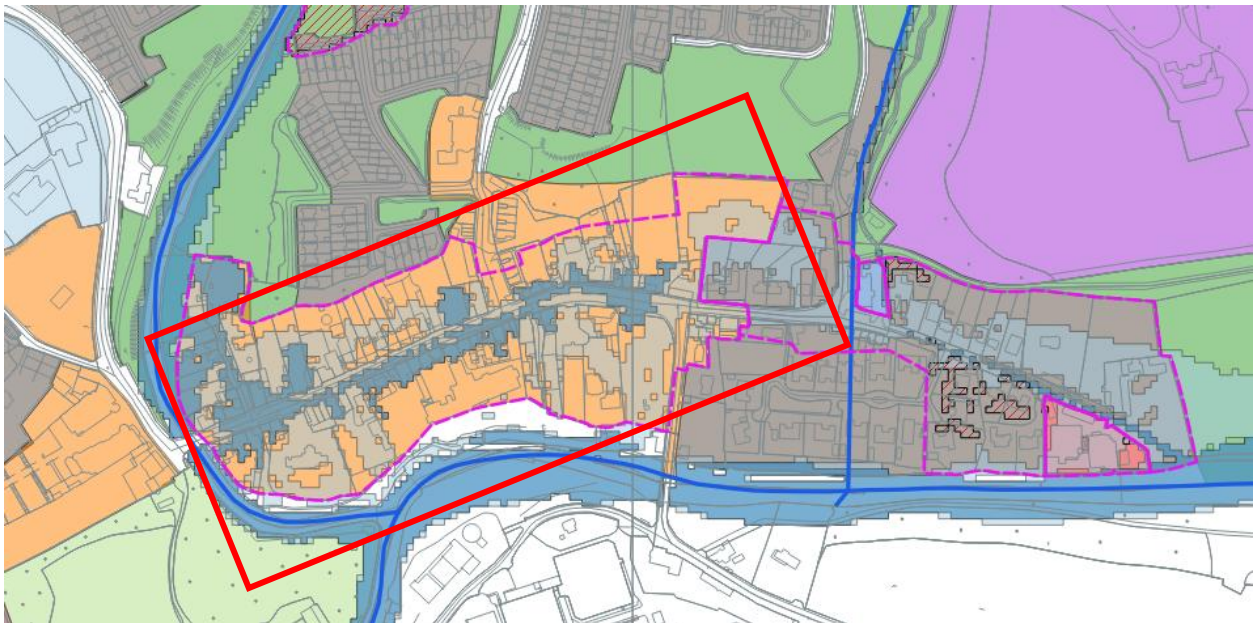
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| <p>2 The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:</p> | <p>Land Zoned: B - Existing Residential & Infill. The zoning of this area for 'Residential' use reflects existing uses. All lands and buildings are identified as being located in a 1% AEP 'defended area'.</p> |
| <p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement,</p> | <p>This land is currently in use for residential use. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre.</p> |
| <p>(ii) Comprises significant previously developed and / or underutilized lands,</p> | <p>This land is currently in use for residential use</p> |
| <p>(iii) Is within or adjoining the core of an established or designated urban settlement,</p> | <p>The site is not located within or adjoining the core, however, it is located adjacent to significant residential development and is currently in use for residential use.</p> |
| <p>(iv) Will be essential in achieving compact and sustainable urban growth, and</p> | <p>The continued development of this land is essential in achieving compact and sustainable urban growth as it acknowledges existing residential use</p> |
| <p>(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 settlement.</p> | <p>The zonings of this land reflect the existing uses on the site, and are intended to facilitate the appropriate expansion.</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 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</p> | <p>The CFRAM flood mapping indicates that the zoned areas lie within a 1% AEP defended area. Therefore the sites still carry a residual risk of flooding if the flood defences adjacent to the Rye River fail during a flood event.</p> <p>The existing zonings will be retained but development in this area should be limited to alterations to existing buildings and no further highly vulnerable zonings should be provided for in the areas in</p> <p>Future development shall be subject to a SSFRA. SSFRAs should address the following:</p> <ul style="list-style-type: none"> • Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain, • Highly Vulnerable Development shall not be permitted in Flood Zone A or B, • Should address climate change scenarios in relation to FFLs and potential mitigation measures, • Finished floor levels should be above the 0.1% or 1% AEP level where appropriate (Freeboard may be relaxed following consultation with KCC and the OPW), • Bedrooms should be located in the upstairs of two story buildings, • Flood resilient construction materials and fittings should be |

considered, and

- Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas.

Any development shall also 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.

4 Leixlip Local Area Plan 2020-2026 Main Street / Town Centre Regeneration



1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).

The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.

Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.

The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.

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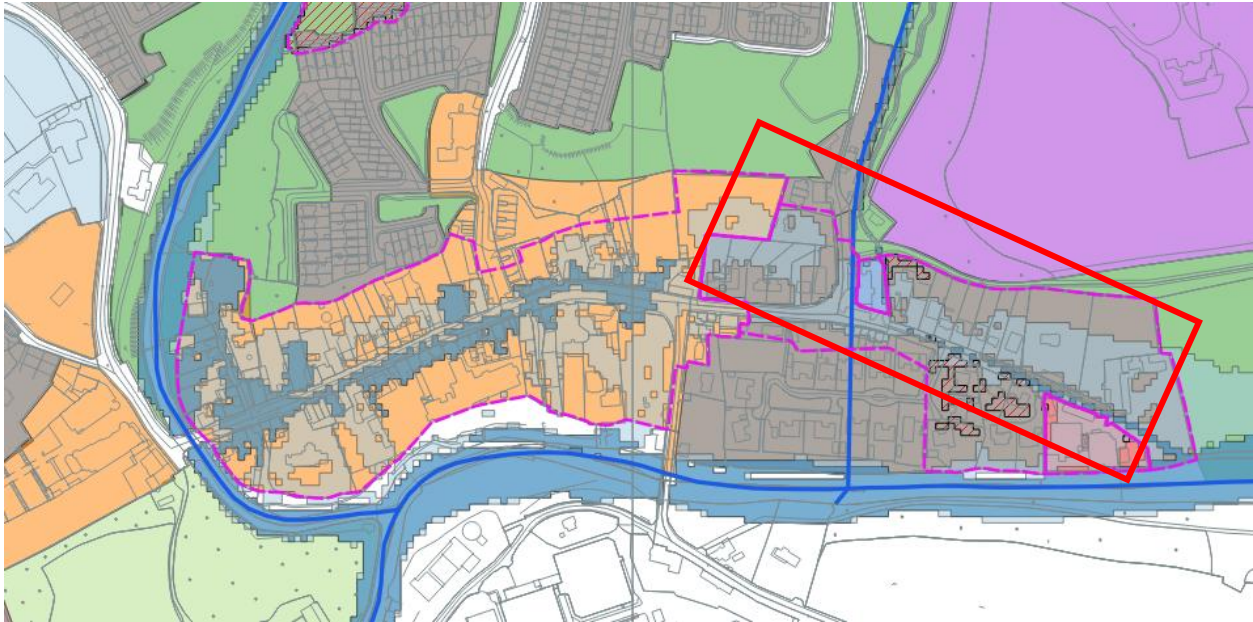
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| | | <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
| 2 | <p>The zoning or designation 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:</p> | <p>Land Zoned: A - Town Centre / Mixed Use and identified for regeneration. Some existing properties to the west of Main Street (near the River Rye Bridge), and along Main Street itself are located within the flood risk zone.</p> <p>Some of the area is identified as being located in a 'defended area'. The zoning of this area for 'Town Centre' development reflects the existing uses in operation. The identification of the lands north of the main street as a 'Regeneration Site' reflect the provisions set out in the National Planning Framework where an emphasis is placed on facilitating compact growth and urban regeneration.</p> |
| | (i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement, | The continued zoning of the subject lands will facilitate the regeneration of the town centre and compact growth. |
| | (ii) Comprises significant previously developed and / or underutilized lands, | All lands within the town centre zoning are currently in some form of use with the exception of vacant units. The continued zoning of the subject lands will facilitate the regeneration of the town centre and compact growth. |
| | (iii) Is within or adjoining the core of an established or designated urban settlement, | The subject lands are within the established town centre for the Leixlip Plan Area |
| | (iv) Will be essential in achieving compact and sustainable urban growth, and | The continued development of these lands is essential in achieving compact growth and sustainable urban growth as it provides employment and a range of services to Leixlip. |
| | (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 settlement. | The zoning of these lands reflects the existing uses in Leixlip town centre, and is intended to facilitate their appropriate expansion. Therefore this land is the most suitable for this purpose. |
| 3 | <p>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</p> | <p>The CFRAM flood mapping indicates that parts of the commercial town centre fall within Flood Zone A and Flood Zone B. The CFRAM mapping indicates that the water depths for the 1% AEP event immediately adjacent to commercial properties on Main Street are less than 0.25m. Flood Zone A is largely confined to Buckley's Lane and Main Street. Flood Zone B extends to side streets and further east towards Mill Lane residential properties and the Leixlip fire station.</p> <p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zonings. And any future development in the town centre should be subject to a SSFRA. SSFRAs should address the following:</p> <ul style="list-style-type: none"> Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the |

flood plain,

- Highly Vulnerable Development shall not be permitted in Flood Zone A or B,
- Should address climate change scenarios in relation to FFLs and potential mitigation measures,
- Finished floor levels should be above the 0.1% or 1% AEP level where appropriate,
- Bedrooms should be located in the upstairs of two story buildings,
- Flood resilient construction materials and fittings should be considered,
- Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and
- Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.

The Eastern CFRAM FRMP has proposed flood defence works which would protect the Buckley's Lane and Main Street against the 1% AEP event. Any SSFRAs should be cognisant of the identified proposed flood defences. Any development shall also 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.

5 Leixlip Local Area Plan 2020-2026 Mill Lane



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| <p>1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).</p> | <p>The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.</p> <p>Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> <p>The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.</p> <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
| <p>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:</p> | <p>Land Zoned: B - Existing Residential & Industrial/Warehousing. The zoning of this area for 'Existing Residential' and 'Industrial/warehousing' is intended to reflect the existing uses in operation i.e., existing residential and industrial buildings</p> |

REPORT

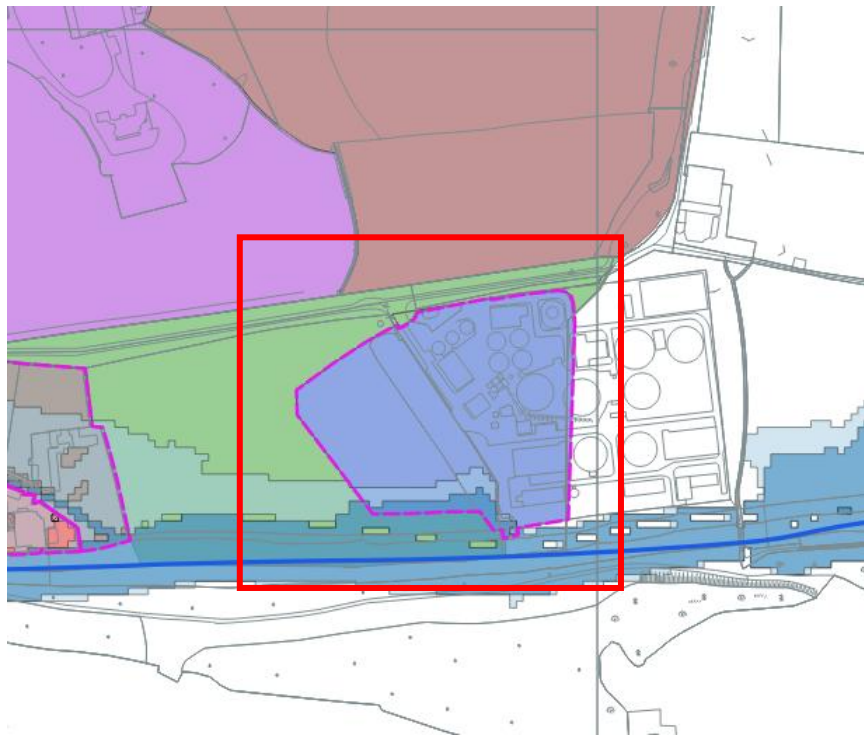
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| <p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement,</p> | <p>The continued zoning of the land will facilitate the regeneration and/or expansion of the town centre including employment provision.</p> |
| <p>(ii) Comprises significant previously developed and / or underutilized lands,</p> | <p>Residential lands are currently in use with potential for infill and/or development. The industrial/warehousing lands provide for employment uses in close proximity to the town centre.</p> |
| <p>(iii) Is within or adjoining the core of an established or designated urban settlement,</p> | <p>The residential lands adjoin the town core area while the Industrial/Warehousing lands are located to the east of this residential zoning.</p> |
| <p>(iv) Will be essential in achieving compact and sustainable urban growth, and</p> | <p>The continued development of the existing residential lands is essential in achieving compact and sustainable urban growth as it acknowledges existing residential use. In the case of the existing Industrial/Warehousing, the location of these lands for light industry facilitates future growth in close proximity to the town centre.</p> |
| <p>(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 settlement.</p> | <p>The zonings of these lands reflect the existing uses on the site, and are intended to facilitate their appropriate expansion.</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 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</p> | <p>The CFRAM flood mapping indicates that part of the existing residential areas fall within Flood Zone A and Flood Zone B. The majority of Mill Lane including the Leixlip fire station is in Flood Zone B.</p> <p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zonings. And any future development along Mill Lane should be subject to a SSFRA. SSFRAs should address the following:</p> <ul style="list-style-type: none"> • Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain, • Highly Vulnerable Development shall not be permitted in Flood Zone A or B, • Should address climate change scenarios in relation to FFLs and potential mitigation measures, • Finished floor levels should be above the 0.1% or 1% AEP level where appropriate, • Bedrooms should be located in the upstairs of two story buildings, • Flood resilient construction materials and fittings should be considered, • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and |

- Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.

The Eastern CFRAM FRMP has proposed flood defence works which would protect the Buckley's Lane and Main Street against the 1% AEP event. Any SSFRAs should be cognisant of the identified proposed flood defences. Any development shall also 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.

The fire station should develop an emergency contingency plan to ensure that emergency operations are not impeded and access is maintained to the station during the 0.1% flood event

6 Leixlip Local Area Plan 2020-2026 Wastewater Treatment Plant



1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).

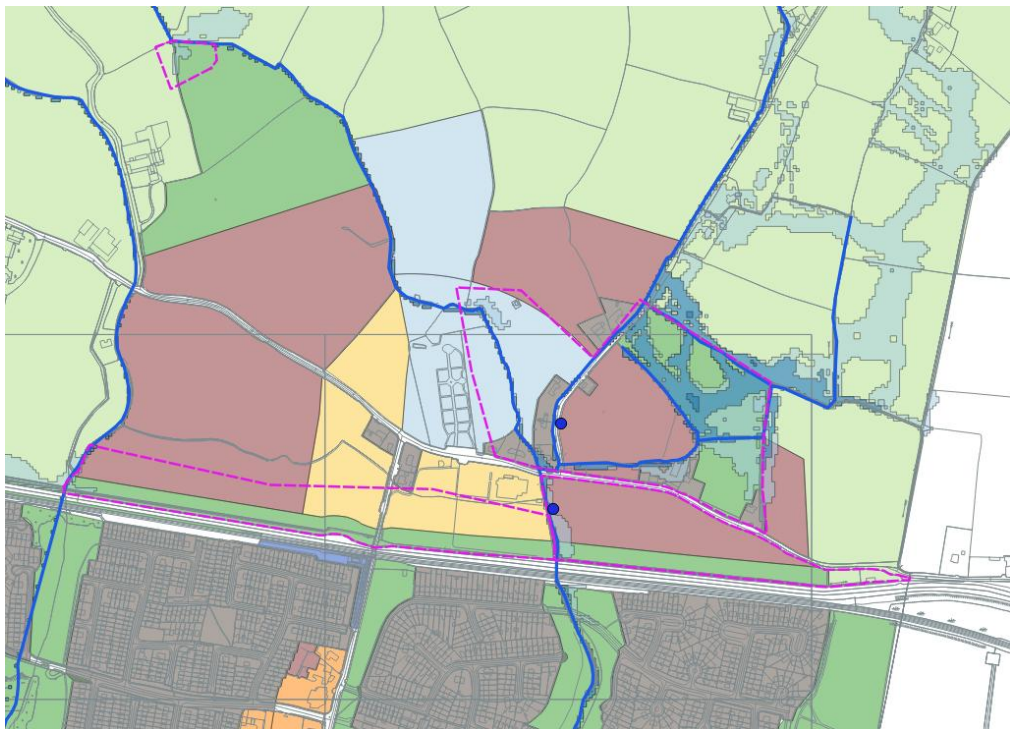
The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.

Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The

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| | | <p>requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> <p>The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.</p> <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
| 2 | <p>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:</p> | <p>Land Zoned: U – Transport & Utilities. The zoning of this area for 'Transport and Utilities' is intended to reflect the existing uses in operation i.e., Leixlip Waste Water Treatment Plant. Only part of the area (south-west corner) is located within the flood risk zone.</p> |
| | (i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement, | This land is currently in use as a waste water treatment plant. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre. |
| | (ii) Comprises significant previously developed and / or underutilized lands, | All of the land is currently in use. |
| | (iii) Is within or adjoining the core of an established or designated urban settlement, | The land is slightly removed from the core. |
| | (iv) Will be essential in achieving compact and sustainable urban growth, and | The continued development of these lands is essential in achieving compact and sustainable urban growth as it provides water services to Leixlip. |
| | (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 settlement. | The zoning of these lands reflects the existing use and will facilitate its appropriate expansion. Therefore this land is the most suitable for this purpose. |
| 3 | <p>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</p> | <p>The CFRAM flood mapping indicates that the western part of the zoning falls within Flood Zone A and Flood Zone B. The existing site for the treatment plant does not have any fluvial flood risk but any expansion of the western part of the site plant should be cognisant of flood risk</p> <p>KCC carried out Justification Test and found that it is considered appropriate to retain the existing zoning but any future expansion of the plant should be subject to a SSFRA. SSFRAs should address the following:</p> <ul style="list-style-type: none"> Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain, Highly Vulnerable Development or elements critical to the operational capacity of the treatment plant shall not be permitted in Flood Zone A or B, |

- Should address climate change scenarios in relation to FFLs and potential mitigation measures,
- Finished floor levels should be above the 0.1% or 1% AEP level where appropriate,
- Flood resilient construction materials and fittings should be considered,
- Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, and
- Emergency evacuation plan and defined access / egress routes should be developed for extreme flood events.

Any development shall also 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.



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| <p>1 The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS).</p> | <p>The Draft Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region was published in November 2018 and is expected to be adopted in the first half of 2019. The RSES will replace the Regional Planning Guidelines for the Greater Dublin Area. The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF (National Planning Framework) and provides a greater level of focus around the National Policy Objectives and National Strategic Outcomes of the NPF.</p> <p>Leixlip is identified as being located within the Metropolitan area forming part of the Metropolitan Area Strategic Plan (MASP). The requirement for a MASP is set out in NPF and provides a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> <p>The MASP identifies a number of strategic development areas including Leixlip/Confey given its location and proximity to the Dublin Maynooth Rail line forming part of the north west transport corridor.</p> <p>This designation of Leixlip is reflective of its role within the Kildare County Development Plan 2017-2023 where a growth target of 3,315 units, 10.2% of the Counties growth is set out for the Leixlip area.</p> |
| <p>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:</p> | <p>Land Zoned: B Existing Residential, C – New Residential & E - Community & Educational, T - Mixed Use (bordering flood zone).</p> <p>The Urban Design Framework for Confey sets out to:</p> <ul style="list-style-type: none"> • Identify and provide an analysis of existing opportunities and constraints facing the future development of the identified lands from both a local and wider context; • Clearly detail the process undertaken to analyse the context of potential development and how the layout and design of the overall scheme has taken this context into account; • Present the overarching vision which will guide the future development of the subject lands; • Provide general and focused design principles which have informed the design and development of the framework; • Develop concept plans to illustrate the indicative approaches that have been considered and informed by the above analysis and principles; • Provide an Urban Design Strategy which places a focus on placemaking, the creation/enhancement of green infrastructure, built heritage and ecological features and sustainable transport modes in a manner which maximises the potential of the subject lands while also complementing and respecting the pattern of development to the south within the built up area of Leixlip; and • Provide a phasing/sequencing programme for the overall development of the Confey lands in order to ensure adequate |

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| | <p>infrastructure is provided for serve the future population.</p> <p>The framework will act as a preliminary design guide for the future development of the lands at Confey and is in accordance with the strategies and objectives of the National Planning Framework and the Draft Regional and Spatial Economic Strategy for the Eastern and Midland Region. The Confey lands are identified as being strategic development lands located along the North West Corridor within the Metropolitan Area Strategic Plan (MASP). The requirements of the MASP is set out in NPF and provides for a 12 year strategic planning and investment framework for the Dublin metropolitan area.</p> |
| <p>(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement,</p> | <p>The future development of lands at Confey have been identified as strategic development lands within the Dublin Metropolitan Area Strategic Plan. The development of the subject lands will ensure Leixlip can achieve its allocated growth as set out in the Core Strategy of the Kildare County Development Plan 2017-2023.</p> |
| <p>(ii) Comprises significant previously developed and / or underutilized lands,</p> | <p>The lands in the main comprise of underutilised agricultural lands, a GAA field, cemetery and sporadic rural housing.</p> <p>The Community zoning comprises of an existing Cemetery and includes new community lands to cater for community uses including a community building, playground, civic space and a primary school.</p> <p>The new residential zoning within Character Area R4 provides for new residential development on lands which adjoin the opens space and amenity zonings within which the low-medium flood risk is identified.</p> |
| <p>(iii) Is within or adjoining the core of an established or designated urban settlement,</p> | <p>The lands are strategically located north of the established urban area of Leixlip and the Dublin – Maynooth Rail line.</p> |
| <p>(iv) Will be essential in achieving compact and sustainable urban growth, and</p> | <p>The development of the Confey lands are essential in order for Leixlip to meets it core strategy growth allocation. The development of the subject lands will also ensure a sustainable pattern of development is achieved.</p> |
| <p>(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 settlement.</p> | <p>The Kildare County Development Plan 2017-2023 identifies a number of key challenges facing the County for the Plan period including directing population growth, facilitating housing, unlocking infrastructural constraints, facilitating economic development and delivering community and recreational facilities in tandem with significant population change.</p> <p>Such challenges are of particular relevance to the future development of the Leixlip area in particular the sustainable development of significant new housing and employment lands. The requirements for such measures have been further emphasised through the National Planning Framework and Draft Regional Spatial and Economic Strategy, given the areas:</p> <ul style="list-style-type: none"> - Strategic location within the identified Metropolitan Area Strategic Plan; - Proximity adjoining two existing train stations and forming part |

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| | <ul style="list-style-type: none"> - of the proposed DART expansion programme; - Ability to promote sustainable transport modes and connections both within the existing urban footprint, new neighbourhood and the wider north Kildare region; - Potential to deliver a long term strategy for the future phased growth of the area with the ability to cater for residential and employment growth; and - Ability to stimulate place based change in a phased manner commensurate with the enhancement of existing and provision of new community, education, sports and recreational facilities, maximising existing amenity assets such as the Royal Canal Greenway, Leixlip Spa proposed Natural Heritage Area, Leixlip Castle and St. Catherine's Park. <p>While a significant level of growth can be accommodated within the defined CSO boundary for the Leixlip area, the level of housing and employment growth required in the County Development Plan Core Strategy creates the need to identify suitable green field lands which are capable of accommodating further residential growth units.</p> <p>Taking into consideration the existing physical constraints in the area, the necessity for the development of a sustainable long term vision, direction and a defined achievable future for the Leixlip area is required which is consistent with the sequential approach to planning, focuses development to locations proximate to high quality public transport, protects the integrity of strategic employment lands while also ensuring the phased delivery of new housing alongside physical and social infrastructure.</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 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</p> | <p>KCC reviewed the CFRAM flood zones during the development plan 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 this Justification Tests applies.</p> <p>Any future developments in the Confey areas will be subject to SSFRAs and should address the following:</p> <ul style="list-style-type: none"> • Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain, • Highly Vulnerable Development shall not be permitted in Flood Zone A or B, • Lands in flood zones should primarily be open space, • Should address climate change scenarios in relation to FFLs and potential mitigation measures and site layout in particular adjacent to the Grand Canal, • Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas, • Finished floor levels should be above the 0.1% or 1% AEP level where appropriate, and |

- Flood resilient construction materials and fittings should be considered.

Any development shall also 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.
