Flood Risk Assessment

Urlingford Town Centre Masterplan, Urlingford, Co. Kilkenny

Kilkenny County Council

July 2023 **HDC1293/01**

Hegsons Design Consultancy Limited

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Kilkenny County Council

Urlingford Town Centre Masterplan
Urlingford, Co Kilkenny

Master Plan Flood Risk Assessment

July 2023

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Contents

1 Background

1.1 Introduction

Hegsons Design Consultancy Limited were commissioned by Turley Planning Ireland to undertake a Flood Risk Assessment to inform the Urlingford Town Centre Masterplan, Urlingford, Co Kilkenny on behalf of Kilkenny County Council. Appendix A

The purpose of the Urlingford Town Centre Masterplan is to guide the development of Urlingford into the future and to influence and deliver on real change for the town in order to make it a more attractive destination in which to live, work, visit and do business.

The town of Urlingford is an important town in north-west Kilkenny, an area which is a predominantly rural in character. By virtue of its location proximate to various national and regional access roads, the town has the potential to fulfil a more significant role and it is envisaged that this Masterplan will guide development and re-imagine Urlingford so that it can ultimately realise its full potential.

A County Level Flood Risk Assessment for Urlingford is already contained in the Strategic Environmental Assessment that accompanied the Kilkenny City and County Development Plan 2021-2027. In order that the Masterplans areas aligned with best practice under “The Planning System and Flood Risk Management guidelines” an appropriately scaled flood risk assessment has been prepared.

1.2 Objectives

The purpose of this report is to establish the flood risk associated with the proposed development and, if appropriate, to recommend mitigation measures to prevent any increase in flood risk within the site or externally in the wider area.

This report has been prepared in the context of The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009, published by the Office of Public Works and the Department of Environment, Heritage and Local Government.

Flood Risk Assessment are carried out at different scales of different organisation. The hierarchy of assessment types are Regional (RFRA), Strategic (SFRA) and Site-specific (FRA) This report is a site-specific assessment.

1.3 Methodology

It is a requirement that development proposals in areas where there is a flood risk shall carry out a detailed study exercise to ensure that the proposed development will not be affected by flooding which includes an allowance for climate change and does not increase flood risk elsewhere, or if it does measures are in place to mitigate/manage the risks in accordance with “ The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009)”.

This report is prepared to satisfy this requirement as outlined in the following, as follows:

- 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 sum 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.

2 Existing Environment & Proposed Development

2.1 Site Location

Urlingford is located in the northwestern corner of Co. Kilkenny, close to the border with Co. Tipperary.

Urlingford is situated on the N8, the National Primary Route linking Dublin to Cork. Urlingford is approximately 18 miles from Kilkenny City and 11 miles from Thurles. It is well served by regional roads (R639, R689 and R693) and is in close proximity to Junction 4 of the M8 Dublin – Cork Motorway.

Figure 2.1: Site Location – Aerial Photography

The River Goul, a minor tributary of the River Nore, has its source in the Slieveardagh Hills, approximately 6 kilometres south of Urlingford. It enters the town from the south, passes under Main Street and then turns east to skirt the northern fringe of the town, passing under the bridge at the Castle.

2.2 Site Levels & Characteristics

While the immediate surrounding landscape is essentially flat, it rises gradually from the town to the west, up Fennor Hill, for about 2 kilometres. This gives a fine approach to the town along a straight road. In the opposite direction, approximately 6 kilometres distant northeast, the rise in the landscape is more pronounced – in the vicinity of Spahill – with the summit rising to approximately 350 metres.

Urlingford town is surrounded by greenfield sites and rural lands. Notwithstanding, the surrounding landscape is not utilised by the town, with the urban and natural environments being disconnected. There are no public parks within Urlingford. The open space within the town is primarily provided within the residential developments. While these open spaces are well maintained, they offer little in

terms of facilities or amenities for their residents. A green open space is also provided to the front of Emerald Tiles which provides welcome relief to the hard landscaping along Main Street.

The River Goul, a minor tributary of the River Nore, has its source in the Slieveardagh Hills, approximately 6 kilometres south of Urlingford. It enters the town from the south, passes under Main street and then turns east to skirt the northern fringe of the town, passing under the bridge at the Castle.

Urlingford is situated on the N8, the National Primary Route linking Dublin to Cork. Urlingford is approximately 18 miles from Kilkenny City and 11 miles from Thurles.

3 Flood Zones & Flood Risk

3.1 Introduction

Identified Flood Zones need to be considered inconjunction with Flood Risk Management Identified Proposals for the proposed development.

With regards to the development opportunities identified, or usage and change of use in all cases a Flood Risk Assessment would need to be carried out in accordance with 'The Planning System and Flood Risk Management Plan'

The Flood Risk Assessments will need to assess the various sites usage or change of use in accordance with the requirements of "The Planning System and Flood Risk Management Guidelines for Planning Authorities".

Where potential, existing, future or contribution to overall flood risk may be an issue for any proposed development or use, then mitigating uses will need to be adopted and suitability of the development and its proposed uses be assessed.

Flood Risk Management measures to include, Sustainable Planning and Development Management, Sustainable Urban Drainage Systems (SUDS), Adaptation Planning, Land Use Management and Natural Flood Risk Management, Maintenance of Flow Channels not part of a Scheme, Flood Forecasting and Warning, Emergency Response Planning, Promotion of Individual and Community Resilience, Individual Property Protection.

Areas of floodplain and wetlands around the development should, be recognised and preserved as much as possible as natural defences against flood risk, and natural flow routes maintained.

Site Specific Flood Risk Assessment should quantify the risks to the proposals identified within the study and the effects of any necessary mitigation to be considered, together with the measures needed or proposed to manage residual risks, to existing and future development, properties, activities, and uses.

It is recommended on all development proposals or change of activities/use of areas identified, will need to adopt more natural drainage solutions and incorporate the provision of various SUD'S techniques. To reduce and manage run-off to surface water drainage systems and slow down the passage of surface water to the river outfalls, while maintaining flood flow routes and protection of properties and the community as a whole.

3.2 Sequential Approach

The sequential approach makes use of flood zones for river and coastal flooding, as described below:

Zone A – High Probability

This zone defines areas with the highest risk of flooding. For river flooding it is defined as more than 1% probability or more than 1 in 100 years, and for coastal flooding it is defined as 0.5% probability or more than 1 in 200 years.

Zone B – Moderate Probability

This zone defines areas with a moderate risk of flooding. For river flooding it is defined as 0.1% to 1% probability or between 1 in 100 and 1 in 1,000 years, and for coastal flooding 0.1% and 0.5% probability or between 1 in 200 and 1 in 1,000 years.

Zone C – Low Probability

This zone defines areas with a low risk of flooding less than 0.1% probability or less than 1 in 1,000 years.

3.3 Vulnerability

The flood zones were then to be looked at with the vulnerability of the buildings proposed.

Highly Vulnerable – Hospitals, Garda stations, homes, motorways etc.

Less Vulnerable – Commercial, retail, offices etc.

Water Compatible – Marina's, green areas

A sequential approach is then taken to assess the most favourable location for the development based on its vulnerability.

Zone A - Water Compatible or Justification Test

Zone B - Less Vulnerable if no other lands are available or highly vulnerable with Justification Test

Zone C - Any development

The Guidelines include a matrix (Table 3.1) that determines the appropriateness of different types of developments based on their vulnerability classification and the Flood Zones in which they are located.

Table 3.1 Vulnerability Matrix

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

Where the matrix indicates that a development is not appropriate it may still be justified based on a procedure described as a Justification Test.

3.4 Identification of Site Vulnerability

The overall Master Plan proposals be classified as falling between the various Zones of vulnerability with regards to the activities and proposed usages for the area plan

The various proposals within the Mater Plan are designated as mixed use as well as residential which is classified as “Highly Vulnerable Development” to “Low Vulnerability”as per the definition given in “The Planning System and Flood Risk Management: Guidelines for Planning Authorities”,

Areas of “High Vulnerability” residential development and Moderate to Low Vulnerability have been assessed in accordance with the National Indicative Fluvial Maps, in that there is ‘Medium Probability’ of Fluvial Flooding along the banks of the River Goul in Urlingford

The Master Plan proposed developments have been situated within Flood Zone C or within Zone B for suitable development. The Master Plan has been modified to take into account of the various Flood Zones and a strategic flood risk assessment has been undertaken on these areas for the proposed extent and proposed uses for these areas.

Where High Vulnerability classification of areas of the proposed developments that are identified areas lie within Flood Zone C but are in proximity to areas of Zone B & A should be subject to prior to development to a Stage 2 Risk Assessment.

To determine the detailed proposals in these are acceptable in this location from risk of flooding, maintain flood flow routes, do not contribute to flooding, and look to reduce contribution of water from developments by the use of SUD’s measures.

The overall Master Plan proposals for the Urlingford Town area should incorporate the need for the reduction of wastewater from paved areas etc by use of SUD’s measure to prevent future contribution to any future flooding events are surcharging of the sewer networks.

4 Flood Risk Assessment

4.1 Introduction

This section of the report describes the various sources of flood and the risk identification and assessment of the potential flooding of the subject site.

4.2 Flood Risk Identification (Stage 1)

The following data sources indicate if a flood risk in the area of interest exists:

- OSi Historical Flood Maps;
- OPW Flood Hazard Mapping (www.floodinfo.ie);
- CFRAM Indicative Flood Zone Maps; and
- GIS Groundwater Flooding Viewer.

In addition, a review of the possible sources of flood risk were identified through the follow methods:

- Examination of the Kilkenny City & County Development Plan 2021-2027;
- A walkover survey of the subject site and surrounding terrain.

4.2.1 Flood Mapping

The website www.floodinfo.ie identified flooding within Urlingford Town and district area, with a record of various types of events indicated within the records of flooding.

Figure 4.1: Illustration of the Various Types of Flood Events in the Area

The OPW Flood Hazard Mapping Website is a record of historic flood events. This database indicates that there is no record of flooding incidents in the area of the proposed areas identified within the Master Plan other than areas where Low Vulnerability usages are identified.

4.2.2 Kilkenny City & County Development Plan 2021 – 2027

The Kilkenny City & County Development Plan 2021-2027 shows that the Town and District of Urlingford, is already contained in the Strategic Environmental Assessment that accompanied the Kilkenny City and County Development Plan 2021-2027. In order that the plans areas aligned with best practice under "The Planning System and Flood Risk Management guidelines" an appropriately scaled flood risk assessment will be required for future developments/proposals prior to development taking place.

The Kilkenny City and County Development Plan 2021-2027 identifies in Table 1 the various aspects to flooding in Urlingford. Details are provided in Tabe 4.2 below.

Urlingford	No flood incident points recorded in village	Alluvial soils mapped along River Goul to north of town	Benefitting lands mapped along River Goul to north, along stream through centre and on lands to southwest of town.	Large area of lands to west described as "Liable to Floods"	No flooding issues in town.	Indicative pluvial & fluvial flooding shown

Figure 4.2: Urlingford Aspects to Flooding
(Kilkenny City and County Development Plan 2021-2027: Table 1)

4.2.3 Desktop Survey

The Master Plan proposed buildings, car parking and are at a higher plateau level generally and are outside the areas of flooding events. The proposed Town wide cycle/walkways/amenity areas are either within the flood event areas or are in the vicinity of embankments adjoining areas of flood potential and should be treated accordingly in their design and usage.

4.2.4 Walkover Survey

In the walkover survey of the Masterplan proposal, areas of flood risk concern were identified, and amendments made to adhere to the findings of the study and the Kilkenny City & County Development Plan 2021-2027 in relation to the flood risk.

4.3 Initial Flood Risk Assessment

The purpose of the Initial Flood Risk Assessment is to ensure that all the relevant flood risk sources have been identified so that they can be addresses appropriately in any future Detailed Risk Assessment required for the Master Plan proposals.

The potential sources of flooding and their relevance to the flood risk to the proposals are outlined in the following sections of this report.

4.3.1 Fluvial Flood Risk

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain.

The OSi online viewer was accessed to establish if historical flop plains were marked on the assessed area.

An assessment of the Office of Public Works flood hazard maps was conducted to establish if any documented flood events occurred within or in the vicinity of the study area.

Flooding and flood plains are observed within the study area, in and around the river, floodplains and surrounding land drainage areas.

Flood Zone C is land which has less than 0.1% chance of flooding in a given year. These flood zones are a product of the modelling and mapping undertaken during the CFRAM Study and are considered the most accurate available source of fluvial flood risk information. The risk of fluvial flooding at the proposed Master Plan sites identified can be considered low. Except for the proposed Town wide Walkway and amenity Areas which are in Zone A & B.

4.3.2 Pluvial Flood Risk

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall and typically occurs in the summer months.

Pluvial flood risk has been identified by the Preliminary Flood Risk Assessment (PFRA) mapping as being a moderate risk to this Master Plan proposals. Therefore, SUD's measures should be adopted for all proposed future proposals and their drainage networks to alleviate any concerns of pluvial flooding. It is advised by catering for the 100-year return period plus 20% climate change allowance in conjunction with SUD's measure should be adopted.

The proposed flood mitigation measures outlined in this report shall help reduce the risk of flooding from surface water to the Master Pan proposals.

On the implementation of the proposed development within the Master Plan proposed finished floor levels shall be sufficiently raised to mitigate the risk of flooding from surface water as well as a suitable surface water drainage system and the use of SUDs be implemented.

4.3.3 Coastal Flood Risk

Coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination: high tide level, storm surges and wave action.

The area is also situated over 70km approximately from the nearest coast. There is no risk associated with coastal flooding for this site as general ground levels for the site are much higher than expected extreme coastal flood levels.

4.3.4 Groundwater Flooding

The Geological Survey Ireland Groundwater Viewer provides predictive and historic groundwater flood maps for Ireland. Within the area, no groundwater flooding events have been recorded.

The study area is not located within an area of high, medium or low probability of groundwater flooding. The risk of groundwater flooding to the development site can be considered low.

4.3.5 Conclusion & Flood Zoning

The Master Plan proposals have been assessed in accordance with the “The Planning System and Flood Risk Management” Guidelines. As part of the sequential test, the OPW flood hazard maps have been consulted, as have the Catchment Flood Risk Assessment Maps produced by the OPW.

The Masterplan proposed developments have been situated within Flood Zone C or within Zone B for suitable development. The Masterplan has been modified to take into account of the various Flood Zones and a strategic flood risk assessment has been undertaken on these areas for the proposed extent and proposed uses for these areas.

Where High Vulnerability classification of areas of the proposed developments that are identified areas lie within Flood Zone C but are in proximity to areas of Zone B & A should be subject to prior to development to a Stage 2 Risk Assessment.

4.4 Detailed Flood Risk Assessment

The Masterplan proposal areas and the nature of the proposed usage there is a need to maintain land flow routes and prevent any increase flooding to the river to adjoining land owners. The proposed developments are subject to a Detailed Flood Risk assessment will be required at the detailed planning stage.

Mitigation measures using SUDs and sympathetic use of the areas in and around the Masterplan proposals need to be incorporated within the proposed development design process, construction, operation, and future maintenance of these measures.

5 Flood Risk Assessment

5.1 Introduction

A County Level Flood Risk Assessment for Urlingford is already contained in the Strategic Environmental Assessment that accompanied the Kilkenny City and County Development Plan 2021-2027. In order that the plans areas aligned with best practice under "The Planning System and Flood Risk Management guidelines" an appropriately scaled flood risk assessment will be required.

Flooding is a natural phenomenon of the hydrological cycle. There are many factors that influence flood behaviour and the degrees of risk that it possesses. Like other natural processes, flooding cannot be completely eliminated, but its impacts can be minimised with proactive and environmentally sustainable management. The accepted national policy response to flood protection is now to manage the risk to life and property as sustainably as possible and to consider flood risk and its related impacts on development on a catchment basis, rather than on an individual location basis. This will facilitate sustainable development through the reduction of future flood damage, and hence reduce the associated potential economic and social costs.

The Office of Public Works (OPW) is the lead agency for flood risk management in Ireland. The Planning System and Flood Risk Management – Guidelines for Planning Authorities were published in 2009.

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

- Avoid the risk, where possible,
- Substitute less vulnerable uses, where avoidance is not possible, and
- Avoidance of development in flood risk areas
- Mitigate and manage the risk, where avoidance and substitution are not possible.

As part of the Masterplan proposals there is a need to adopt a comprehensive risk-based planning approach to flood management to prevent or minimise future flood risk. In accordance with the Planning System and Flood Risk Management – Guidelines for Planning Authorities, the avoidance of development in areas where flood risk has been identified should be the primary response.

The Masterplan will ensure that new developments do not reduce the effectiveness or integrity of any existing or new flood defence infrastructure, and will facilitate the provision of new, or the reinforcement of existing, flood defences and protection measures where necessary.

Where flood risk may be an issue for any proposed development, a detailed flood risk assessment should be carried out appropriate to the scale and nature of the development and the risks arising. Any area within or adjoining flood zone A or B, or flood risk area, shall be the subject of a site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed.

This shall be undertaken in accordance with the Planning System and Flood Risk Management – Guidelines and the Strategic Flood Risk Assessment accompanying this Master Plan proposals.

Surface water drainage systems are designed to channel stormwater (rainwater) to the nearest suitable river. Rain falling on impervious surfaces is usually directed into surface water drainage systems.

Surface water drainage systems are effective at transferring surface water quickly, but they can cause the volume of water in the receiving watercourse to increase more rapidly thereby increasing potential for future flood events and risk to existing properties or amenity areas. Sustainable Drainage Systems (SuDS) can play a role in reducing and managing run-off to surface water drainage systems as well as improving water quality for future Masterplan proposals.

The identification of proposed mitigation measures to be adopted, including effectiveness to prevent development from significant risks to flooding or increase the flood risk to the site or negative impacts on associated waterbodies should be applied on the implementation of the Masterplan proposals for Urlingford.

5.2 SUD's Mitigation Measures

The Master Plan proposals for Urlingford must, so far as is reasonably practicable, incorporate the maximum provision to reduce the rate and quantity of runoff of hard surface areas (car parks, etc.), should be constructed in permeable or semipermeable materials. On site storm water ponds to store and/or attenuate additional runoff from the development should be provided, where possible Soakaways or french drains should be provided to increase infiltration and minimise additional runoff.

The proposed new developments should include for rainwater harvesting and/or grey water recycling in their design. except where not practical or feasible, individual developments shall be obliged, in all cases where surface water drainage measures are required, to provide a surface water drainage system separated from the foul drainage system.

In all cases surface water to avoid run-off from the proposed developments to the adjoining public road.

For all other green-field developments in general the limitation of surface water run-off to pre-development levels will be required.

In the case of brown-field development, while existing surface water drainage measures can be taken into account, some attenuation measures for surface water may be required at the discretion of the planning authority in the interests of balanced and sustainable development.

The Masterplan proposals have been considered to be consistent with Kilkenny County Council requirements for SUD's. For developments adjacent to watercourses of a significant conveyance capacity any structures (including hard landscaping etc) will be set back a minimum of 5-10m from the edge of the watercourse to allow access for channel clearing/maintenance. Any setback will be increased to provide for habitat protection.

For the proposed developments identified in the Masterplan a report will be required specifying the SUDS measures to be considered in principle.

Swales are to be adopted within the subject developments as a SuDS device to reduce stormwater run-off and to help filter run-off. Overflows will need to connect to the proposed internal surface water sewer network system or outfalls.

In addition, it is proposed to implement rain gardens within the development's managed areas to collect and manage rainfall from the development's roof. These are to be installed to ensure that any excess water which cannot infiltrate can be taken away from the rain garden to avoid permanent wetness. Rain gardens provide benefits in relation to amenity and biodiversity.

Permeable grasscrete surface should be utilised within the proposals for car parking and car parking bays thereby allowing the rainfall to permeate through the surface layer. A perforated collector drain will need to be installed at a low level to collect any overflow from the proposed permeable paving areas into the main stormwater drainage system to cater for a 1 in 100 year rainfall event plus 20% allowance for climate change.

Porous Surfacing should be adopted for the roadways and footways/cycleways identified within the master plan where possible. The porous surfacing will allow rainfall to permeate through the surface material and provide opportunity for filtration while providing an overflow into the main drainage system etc in case of a high rainfall event occurrence.

6 Conclusions

Hegsons Design Consultancy Limited were commissioned by Turley Planning Ireland to undertake a Flood Risk Assessment to inform the Urlingford Town Centre Masterplan, Urlingford, Co Kilkenny on behalf of Kilkenny County Council.

Urlingford is located in the northwestern corner of Co. Kilkenny, close to the border with Co. Tipperary. Urlingford is situated on the N8, the National Primary Route linking Dublin to Cork. Urlingford is approximately 18 miles from Kilkenny City and 11 miles from Thurles. It is well served by regional roads (R639, R689 and R693) and is in close proximity to Junction 4 of the M8 Dublin – Cork Motorway.

While the immediate surrounding landscape is essentially flat, it rises gradually from the town to the west, up Fennor Hill, for about 2 kilometres. This gives a fine approach to the town along a straight road. In the opposite direction, approximately 6 kilometres distant northeast, the rise in the landscape is more pronounced – in the vicinity of Spahill – with the summit rising to approximately 350 metres.

The River Goul, a minor tributary of the River Nore, has its source in the Slieveardagh Hills, approximately 6 kilometres south of Urlingford. It enters the town from the south, passes under Main Street and then turns east to skirt the northern fringe of the town, passing under the bridge at the Castle.

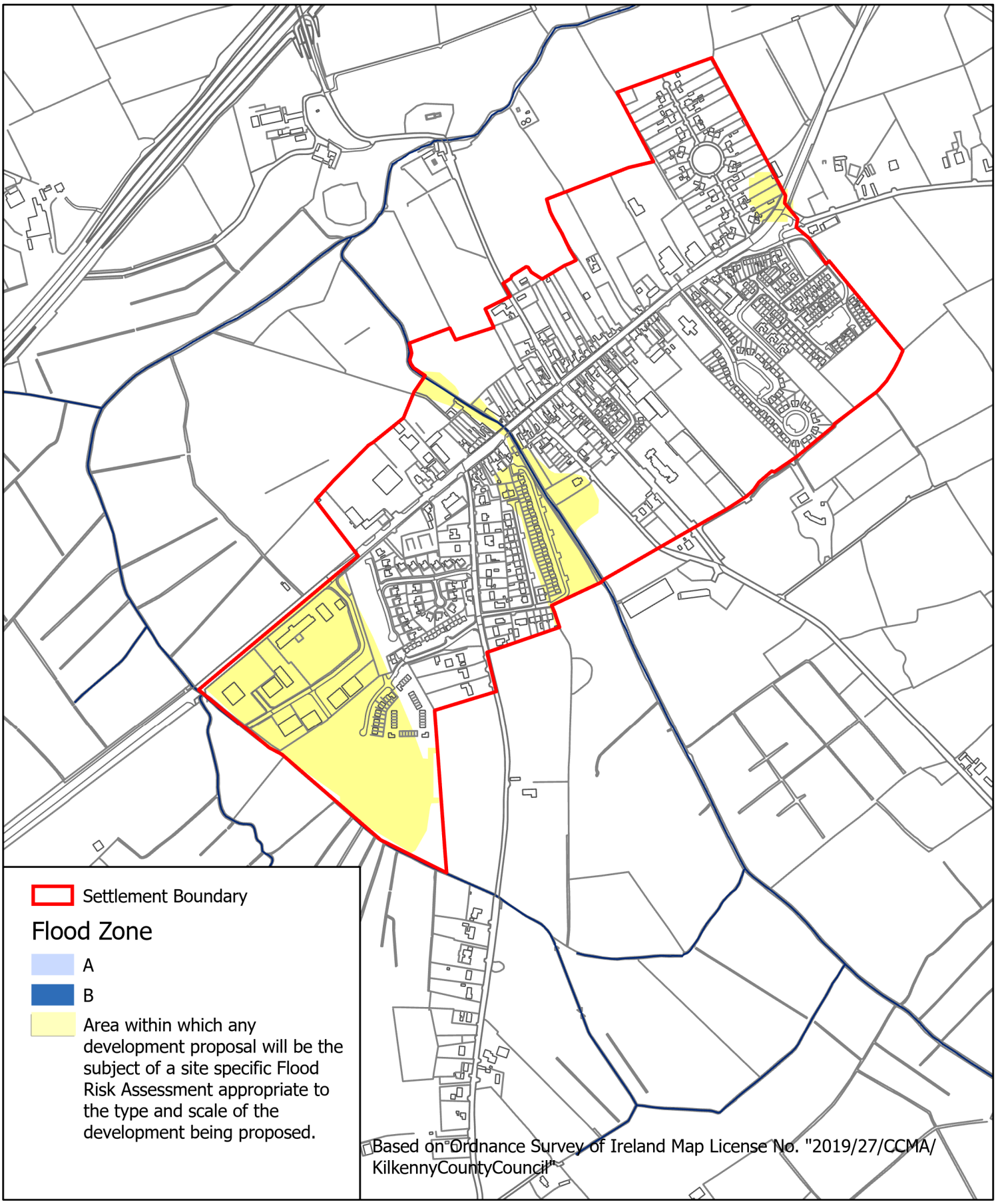
The Masterplan proposals has been assessed using exiting flood information and as such part of the site located in Zone A, be mainly vegetation and low vulnerability uses. The main developments proposed are in Zone C and therefore deemed acceptable for the development proposed.

Based on the drainage hierarchy assessment, the proposed drainage strategy will seek to dispose of surface water runoff from hardstanding areas primarily using SUD's mitigation measdures.

Appendix A : Masterplan Layout

Plan Framework

Appendix B: Flood Mapping



Strategic Flood Risk Assessment of Kilkenny City and County Development Plan 2021
Map 22: SFRA Urlingford Settlement Boundary
Date: September 2021

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