STRATEGIC FLOOD RISK ASSESSMENT

FOR THE

DRAFT MASTERPLAN FOR ST. CANICE'S CAMPUS, DUBLIN ROAD, KILKENNY

for: **Kilkenny County Council**

by: **CAAS Ltd.**

MAY 2026

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1 Section 1 Introduction and Policy Background

1.1 Introduction

Kilkenny County Council has prepared a Draft Masterplan for St. Canice's Campus ("the Masterplan"). This Strategic Flood Risk Assessment (SFRA) document has been prepared alongside the Masterplan taking into account *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular PL 2/2014.

1.2 The Masterplan

The St. Canice's Masterplan relates to an area that is identified for future development under the existing Kilkenny City and County Development Plan. The area comprises some 64 acres of strategically located lands, which is a significant land bank within Kilkenny City. The St. Canice's Campus Masterplan is a non-statutory plan prepared by Kilkenny County Council, in consultation with the Health Service Executive, to address opportunities for the regeneration of the site. The Masterplan provides a vision and key development principles for an integrated, plan-led solution, but does not give planning consent for specific projects.

The Masterplan should be read in conjunction with the Kilkenny City and County Development Plan 2021-2027 (as varied), which sets out the overarching development strategy and land use zoning objectives for Kilkenny City, including the Masterplan area. Once the Masterplan is approved, a Variation process will be commenced to incorporate the Masterplan into the City and County Development Plan.

Proposals for development within the Masterplan area must comply with the general development management standards, policies and objectives in the City and County Development Plan (including relevant provisions relating to flood risk management and drainage).

1.3 Purpose and Scope

The purpose of this SFRA is to identify all potential sources of flooding within the Plan Area and assess their associated risk to people and property. The SFRA also aims to determine the suitability of the Plan Area for future development and set out appropriate flood protection and mitigation measures where appropriate.

This SFRA comprises stage 1 and 2 assessments, as defined in 'T*he Planning System and Flood Risk Management – Guidelines for Planning Authorities*' (i.e., the 'OPW Guidelines') and accompanying Technical Appendices published in 2009 by the Office of Public Works and Department of Environment, Heritage, and Local Government.

This report is intended to allow application of the Sequential Approach and, where necessary, Justification Test(s) to identify appropriate areas / sites within the Plan Area for development and identify how flood risk can be reduced as part of the Masterplan process. As such, it is an opportunity to refine the city-level SFRA that informs the current Development Plan and ensure that all relevant issues related to flood risk to the Plan Area are addressed. This SFRA is intended for 'plan making' only and not to assess the risk to specific development proposals. Risk to any future development within the Plan Area would be assessed separately by a site-specific Flood Risk Assessment (SSFRA) submitted in support of a planning application. While any future SSFRA may be informed by flood hazard information determined by this SFRA, it would need to be made specific to the proposed development.

1.4 Flood Risk Management Guidelines

1.4.1.1 Introduction

In 2009, the OPW and the then Department of the Environment and Local Government (DEHLG) published Guidelines on flood risk management for planning authorities entitled *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*. The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is intended to be achieved through actions at the national, regional, local authority and site-specific levels. Planning authorities and A n Coimisiún Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts.

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.

1.4.1.2 Principles of Flood Risk Management

The key principles of flood risk management set out in the Flood Guidelines are to:

- Avoid development that will be at risk of flooding or that will increase the flooding risk elsewhere, where possible;
- Substitute less vulnerable uses, where avoidance is not possible; and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

The Guidelines follow the principle that development should not be permitted in flood risk areas, particularly floodplains, except where there are no alternative and appropriate sites available in lower risk areas that are consistent with the objectives of proper planning and sustainable development.

Development in areas that have the highest flood risk should be avoided and/or only considered in exceptional circumstances (through a prescribed *Justification Test*) if adequate land or sites are not available in areas that have lower flood risk. Most types of development would be considered inappropriate in areas that have the highest flood risk. Only water-compatible development such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation and essential transport infrastructure that cannot be located elsewhere would be considered appropriate in these areas.

1.4.1.3 Stages of SFRA

The Flood Risk Management Guidelines recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences. The stages of appraisal and assessment are:

> **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 Spatial and Economic Strategies, 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 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 are scoped.

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.

1.4.1.4 Flood Zones

Flood risk is an expression of the combination of the flood probability or likelihood and the magnitude of the potential consequences of the flood event. It is normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding

Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. For example, a 1% Annual Exceedance Probability (AEP) 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.

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 and the presence and reliability of mitigation measures).

Flood zones are geographical areas within which the likelihood of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning.

There are three types of flood zones defined for the purposes of the Flood Guidelines:

- **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[21]);
- **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 other areas that are not in zones A or B.

1.5 Emerging Information and Disclaimer

It is important to note that compliance with the requirements of the Flood Risk Management Guidelines is currently based on emerging and best available data at the time of preparing the assessment.

Following adoption of the Masterplan, information in relation to flood risk may be altered in light of future data and analysis, by, for example, the OPW, or future flood events. As a result, all landowners and developers are advised that Kilkenny County Council and their agents can accept no responsibility

[1] Coastal flooding is not relevant to the Masterplan

for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands and buildings (including basements) in which they have an interest prior to making planning or development decisions.

Any future SFRAs will integrate other new and emerging data.

2 Stage 1 - Flood Risk Identification

2.1 Plan area

Stage 1 SFRA (flood risk identification) has been undertaken in order to identify whether there may be any flooding or surface water management issues within or adjacent to zoned lands and consequently whether Stage 2 SFRA (flood risk assessment) should be proceeded to. Stage 1 SFRA is based on existing information on flood risk indicators based on historical evidence and computational models.

St. Canice's Campus is located within Kilkenny City. The area of the masterplan is bounded to the south by the River Nore, and to the west by the N10. The land is currently covered by three zones; Open Space/Amenity, Agriculture and Community Facilities. The existing land uses include health facilities, office accommodation and a pitch and putt club.

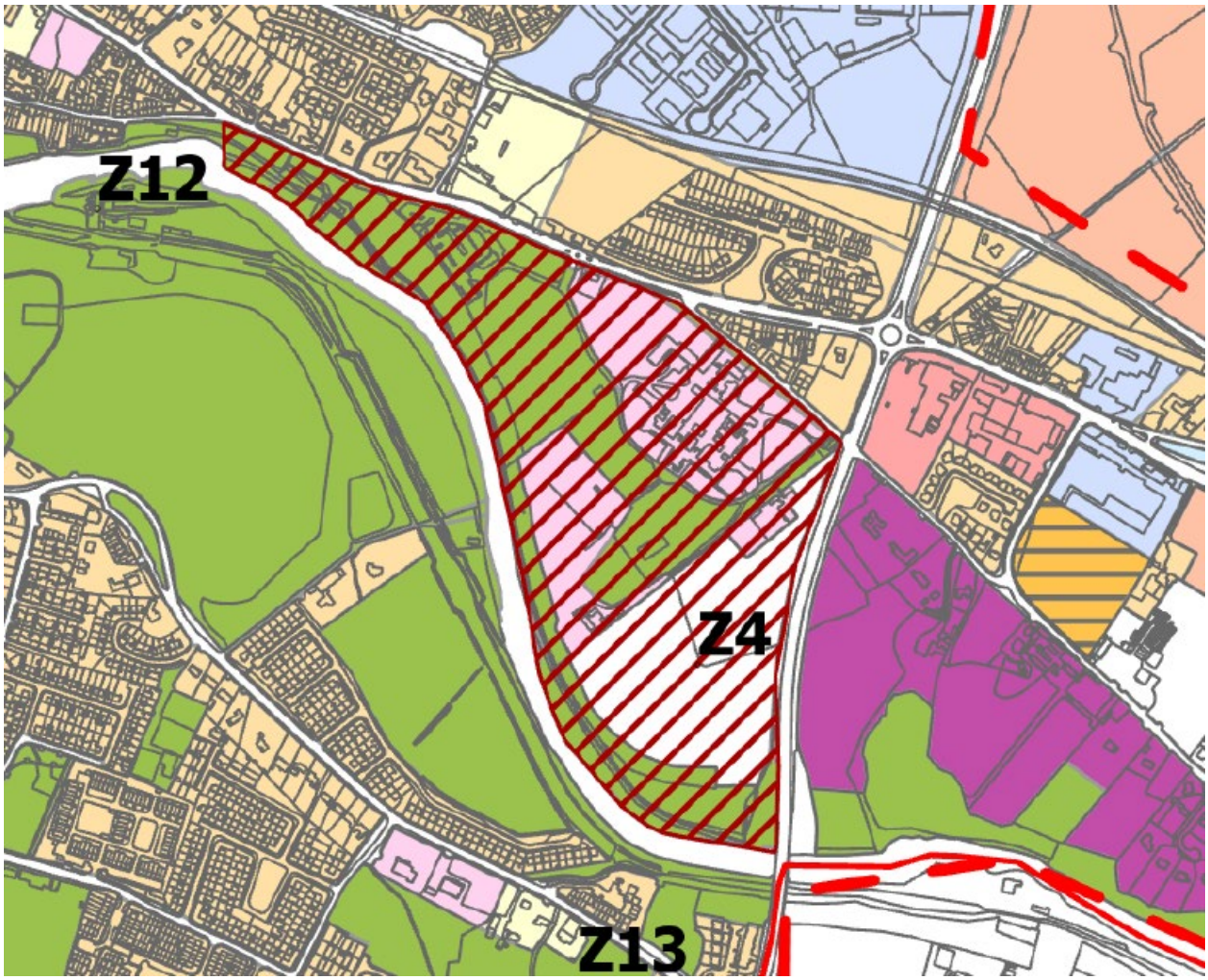


Figure 2.1: St. Canice's Masterplan area, extract from the Kilkenny City and County Development Plan 2021

2.2 Water Features in the Plan area

The River Nore flows to the south of the Masterplan area. There are no other waterbodies within the Masterplan boundary.

Figure 2.2 Water features in the Plan area
Source: EPA mapviewer website accessed 2026

2.2.1 OPW Publications

Various iterations of flood mapping are carried out by the OPW, and these are set out below chronologically.

The South Eastern CFRAM mapping extract for the plan area, published in 2016, is available below.

Kilkenny is located within the Nore River Basin for which the *Flood Risk Management Plan for the Nore River Basin (UOM15)* was prepared in 2018.

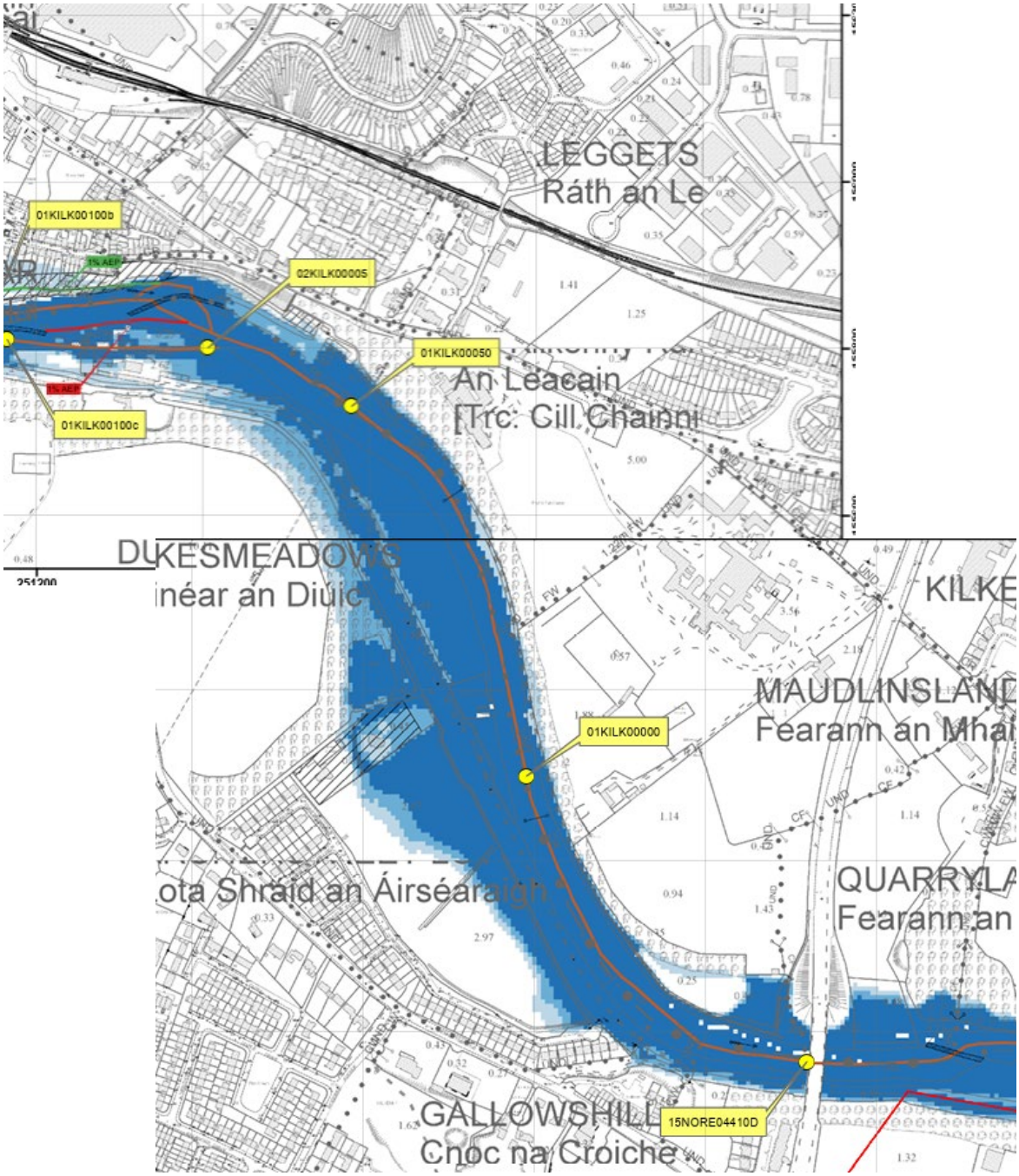


Figure 2.3: Extract from OPW South Eastern CFRAM Study map, dated 25th July 2016

This FRMP identifies various general measures applicable to Kilkenny City as part of the wider Nore catchment under "Measures Applicable for all Areas"[2].

A flood relief scheme has been implemented for Kilkenny (Nore) AFA, and is maintained by the OPW. No additional measures specific to the Kilkenny (Nore) AFA are proposed. Existing Nore catchment measures include Maintenance of Existing Arterial Drainage Schemes.

The Nore channel has benefitted from inclusion as an Arterial Drainage Scheme. Arterial Drainage

[2] Under the headings of: Sustainable Planning and Development Management; Sustainable Urban Drainage Systems (SUDS) Adaptation Planning; Land Use Management and Natural Flood Risk Management; Maintenance of Channels not part of a Scheme; Flood Forecasting and Warning; Emergency Response Planning; Promotion of Individual and Community Resilience; Individual Property Protection; Flood-Related Data Collection; and Voluntary Home Relocation.

Schemes are schemes the OPW has a statutory duty to maintain. Arterial Drainage Schemes were carried out under the Arterial Drainage Act, 1945 to improve land for agriculture and to mitigate flooding.

The provision of flood protection measures can significantly reduce flood risk. However, the Ministerial Guidelines require that the presence of flood protection structures should be ignored in determining flood zones. This is because of risks relating to failure and severe flood events that exceed design capacity (the risk of severe events is exacerbated with climate change). Notwithstanding this, new development can proceed in areas that are at elevated levels of flood risk subject to the Justification Test provided for by the Guidelines being passed, which takes into account proposals to manage flood risk, such as the development of defences.

Met Éireann currently issues flood warnings for County Kilkenny. Met Éireann operates a National Flood Forecasting and Warning Service to forecast for fluvial and coastal flood events.

2.2.2 Other Flood Studies

Other Flood Studies considered in the preparation of this assessment include:

- Regional Flood Risk Assessment for the Southern Regional Spatial and Economic Strategy, 2020, and,
- the SFRA for Kilkenny City and County Development Plan, 2021

2.1 Flood Risk Indicators

Indicators of flood risk that are based on historical flooding events are identified and described on Table 2.1. Indicators of flood risk that are based on computational models – predictive flood risk indicators – are identified and described on Table 2.2.

A selection of the historical and predictive flood risk indicators that were considered by the SFRA are mapped at Masterplan level in Appendix I.

Table 2.1 Historical Flood Risk Indicators

Information Source	Description	Strategic Limitations
Recurring Flood Events	A flood event is the occurrence of recorded flooding at a given location on a given date. The flood event is derived from different types of information (reports, photographs etc.). A flood event that has occurred more than once at a certain area is named a recurring flood event. One recurring flood event at Altmount Park is identified to the north of the Masterplan area – flooding at this location was likely to be pluvial in origin/as a result of limited drainage capacity.	This dataset only provides a spot location
Alluvium Soils	Mineral alluvial soil mapping is indicative of recurrent or significant fluvial flooding at some point in the past and was generated by Teagasc with co-operation of the Forest Service, EPA and GSI. This project was completed May 2006.	Drainage may have changed significantly since these soils were deposited.
Benefitting lands (OPW)	Benefitting lands mapping is a dataset identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land estimated or reported to be subject to flooding or poor drainage.	Identifies broad areas - low resolution for flood risk management
Drainage Districts (OPW)	This drainage scheme mapping dataset was prepared on behalf of the Drainage Districts (Local Authorities with statutory responsibility for maintenance under the Arterial Drainage Act, 1925). These maps identify land that might benefit from the implementation of Arterial (Major) Drainage Schemes and indicate areas of land subject to flooding or poor drainage.	Identifies large broad areas - very low resolution for flood risk management

Table 2.2 Predictive Flood Risk Indicators

Information Source	Description	Strategic Limitations
South East CFRAM Study, Flood Extent Mapping, 2016	Following the undertaking of the PFRA, the OPW, through its engineering consultants and working with local authorities and other stakeholders, conducted extensive engineering assessments to better understand and detail the actual risk from flooding for areas that were at highest levels of risk. This was the subject of public consultation. The outcome of that work includes Predicted Flood Extent maps that were finalised in 2016. For fluvial flood levels, calibration and verification of the models make use of the best available data including hydrometric records, photographs, videos, press articles and anecdotal information.	Spatial spread is limited, including to the areas that are considered to be at most risk of flooding.

2.2 Conclusion

The information detailed above indicates elevated levels of flood risk on the fringes of the Masterplan area; therefore, a Stage 2 SFRA was proceeded to.

3 Stage 2 - Flood Risk Assessment

3.1 Introduction

Stage 2 SFRA (flood risk assessment) has been undertaken in order to:

- Confirm the sources of flooding that may affect zoned and adjacent areas;
- Appraise the adequacy of existing information as identified by the Stage 1 SFRA; and
- Scope the extent of the risk of flooding through the preparation of flood zone maps.

3.2 Findings and Adequacy of Existing Information and Delineation of Flood Zones

Desk and in-field studies were undertaken in order to take into account the following factors as relevant and appropriate:

- OPW's SE CFRAMS fluvial flood extent mapping (2016);
- Historical indicators of flood risk;
- Documented Council knowledge of lands that have previously flooded;
- The potential source and direction of flood paths from rivers and streams;
- Vegetation indicative of flood risk; and
- The locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey[3].

Within the annual exceedance probabilities specified by the Flood Guidelines for Flood Zones A and B, there are elevated levels of flood risk at certain areas in Kilkenny, as shown in Appendix I.

3.3 Flood Risk Zone Mapping

Flood Risk Zone maps have been produced taking into account the findings of the Stage 1 and Stage 2 SFRA desk and in field studies as identified above[4]. The Flood Risk Zone map for Kilkenny is provided in Appendix II and identifies Flood Zone A (darker blue) and Flood Zone B[5] (lighter blue). All other areas fall within Flood Zone C. As per the Guidelines, the flood zones are as follows:

- Flood Zone A – where the probability of flooding from rivers is highest (greater than 1% or 1 in 100 for river flooding);
- Flood Zone B – where the probability of flooding from rivers is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding); and
- Flood Zone C – where the probability of flooding from rivers is low (less than 0.1% or 1 in 1000 for river flooding).

[3] A Topographical Survey was carried out by South East Surveys Ltd in 2007

[4] Including taking into account predictive and historical indicators of flood risk, documented Council knowledge of lands that have previously flooded, the potential source and direction of flood paths from rivers and streams, vegetation indicative of flood risk and the locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

[5] As identified by the Guidelines, in rivers with a well-defined floodplain or where the coastal plain is well defined at its rear, the limits of Zones A and B will virtually coincide. Zone B will only be significantly different in spatial extent from Zone A where there is extensive land with a gentle gradient away from the river or the sea.

3.4 Sensitivity to Climate Change

'*The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices*, 2009' recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. In this regard, the Guidelines recommends:

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopting a cautious approach to zoning land in these potential transitional areas;
- Ensuring that the levels of structures designed to protect against flooding such as flood defences[6], 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 (normally 85-100 years); and
- Ensuring 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.

The CFRAM Programme include maps for two potential future scenarios taking account of different degrees of climate impact, the Mid-Range Future Scenario (more likely to occur over the coming decades) and the High-Range Future Scenario (less likely to occur over the coming decades).

The Guidelines recommend that the Flood Zones identified by the SFRA are defined on the basis of current flood risk. However, adopting the precautionary approach, the potential future scenarios mapping (Community-Scale River Flood Extents – Medium and High-End Future Scenarios) were taken into account in defining the Flood Zones for this Masterplan.

3.5 Guidance on Surface Water Drainage

As provided for by measures in the Kilkenny City and County Development Plan, new developments will be required to incorporate the requirement for Nature Based Solutions (NBS) where appropriate[7]. Because of the range of land use types/associated developments and designs that could occur on sites within the Masterplan, the guidance from this SFRA is to consider the full range of NBS available.

As set out in Section 2 of the Masterplan, the Guidance document entitled "*Implementation of Urban Nature-Based Solutions: Guidance Document for Planners, Developers and Developer Agents*"[8], has strongly influenced the masterplan's approach to surface water management, green-blue infrastructure and climate adaptation. Section 5.6 of the Masterplan outlines the approach for a Nature-based urban drainage system.

Key features include:

- Integration of SuDS features such as rain gardens, swales, tree pits, bioretention areas, wetlands and green roofs.
- Delivery of multi-functional open spaces that combine biodiversity, amenity, water management and placemaking functions.
- Nature-based surface water management replacing conventional piped drainage systems, reducing flood risk, improving water quality and enhancing the ecological network.
- Long-term management strategies to secure the performance of NbS assets over the life of the development.

[6] Defended areas are highly sensitive to climate change as the likelihood of defence failure and resulting flooding increases.

[7] See Section 10.2.7 and 10.2.8 of the the City and County Development Plan 2021, Refer also to the City and County Development Plan 2021-2027 SFRA, available at https://kilkennycoco.ie/eng/services/planning/development-plans/city-and-county-development-plan/city-and-county-development-plan-2021-sfra.pdf

[8] *Implementation of Urban Nature-Based Solutions: Guidance Document for Planners, Developers and Developer Agents,* LAWPRO, 2024

Some sites, such as those for which guidance is provided for below, will pose particular challenges for SuDS. The best practice manuals as referenced in the Development Plan, should be considered in determining solutions at these and other development sites.

At sites with high groundwater levels:

- Infiltration techniques may be particularly challenging and shallow infiltration basins or permeable pavements, may be most appropriate.
- Storage and conveyance systems need to be kept above maximum groundwater levels and membranes of appropriate robustness should be used to line any tanks
- Locating storage tanks or lined sub-base systems below the maximum likely groundwater level can cause result in flotation and structural risks

On steeply sloping parts of the Masterplan area:

- Effective utilisation of SuDS storage capacity should be considered, which can benefit from aligning with contours of roads and other structures, where these sites are terraced. Terraced car-parking areas can allow for storage of water through pervious pavements. Basins on terraces can provide open space. The runoff catchment on these sites can also be divided into smaller sub catchments.
- Velocities in swales and basins due to the steep slope can be managed by using check dams in swales or in storage layers, such as below permeable pavements.
- The possibility of infiltrating water resurfacing downslope or to increase pressure on downslope structures, such as walls, causing them to fail should be considered.

On flat parts of the Masterplan area:

- On very flat sites, it is often not possible to construct piped drainage systems with sufficient falls to achieve minimum self-cleansing velocities. The solution can involve the use of shallow SuDS components such as swales, pervious pavements or high-capacity linear drainage channels, often dividing the site into small sub-catchments and providing local combined storage and conveyance components.
- A slight fall on any subgrade exposed to water is preferred in order to avoid ponding of water and reduction in strength in the soil due to waterlogging. If this is not possible then reduction in strength should be taken into account in the structural design of tanks or pervious pavements.
- Pumping should be a last resort and only allowable in situations where guaranteed maintenance of the pumps can be ensured.

On the fringes of the Masterplan area, at the floodplain:

- Notwithstanding that all storage volume should normally be provided within the development footprint, outside of the floodplain, SuDs on floodplains can be effective in managing routine rainfall/treatment for frequent events.
- SuDs should be selected and designed taking account of the likely high groundwater table and vulnerability to erosion during periods of high flows/water levels and SuDS should not reduce floodplain storage or conveyance.
- Conveyance routes should limit grading and the creation of surface features that could either reduce floodplain capacity or be washed out in a flood.
- Surface discharge from SuDS should be dispersed with point discharges minimised or eliminated.
- All SuDS within or crossing a floodplain should take full consideration of the likely influence of river water levels on the design performance. Combined probability assessments may be required.
- Siltation and subsequent clearance after a flood event has subsided should also be taken into account in the design.

Pluvial flood risk is likely to be present in local areas, however; it is not taken into account in the

delineation of flood zones. Furthermore, PFRA indicative pluvial maps (2012) are not considered to be reliable for the purposes of zoning or decision-making. Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of run-off. The drainage design should ensure no increase in flood risk to the site, or the downstream catchment. Where possible, and particularly in areas of new development, floor levels should at an appropriate height above adjacent roads and hard standing areas to reduce the consequences of any localised flooding. Where this is not possible, an alternative design appropriate to the location may be prepared.

4 Flood and Drainage Provisions

4.1 Introduction

The Masterplan should be read in conjunction with the Kilkenny City and County Development Plan 2021-2027 (as varied), which sets out the overarching development strategy and land use zoning objectives for Kilkenny City, including the Masterplan area. The land use zoning contained within the Kilkenny City and County Development Plan has been informed by an SFRA process and associated delineation of flood risk zones. The detailed Plan preparation process undertaken by the Planning Department combined with specialist input from the SFRA process facilitated zoning that helps to avoid inappropriate uses being provided for in areas of elevated flood risk.

In line with the land use zoning objective of "Amenity/ Green Links/ Biodiversity Conservation/ Open Space/ Recreation" identified for lands of highest and moderate flood risk (Flood Zones A and B) at St. Canice's in the Kilkenny City and County Development Plan (Figure CS4 "Kilkenny City Zoning"), the Masterplan identifies "Parkland" at these lands (See Figure 4.1 "Superblocks").

Parkland includes for active and passive recreation, some of which could fall into the Less Vulnerable category of the Vulnerability Classes of the Guidelines[9]. A plan-making Justification Test is required where a Less Vulnerable use is permissible within Flood Zone A.

In accordance with the Guidelines, the strategy is to avoid flood risk. Therefore, "*uses within the Masterplan area shall be limited to water-compatible uses in Flood Zone A, and less vulnerable or water compatible uses in Flood Zone B (as per the Flood Risk Management Guidelines), and detailed site-specific Flood Risk Assessment will be required in these areas*."

This statement is included in Section 3.3 GBI, landscape and urban space of the Masterplan.

[9] Table 3.1 of the Flood Risk Management Guidelines

5 Conclusion

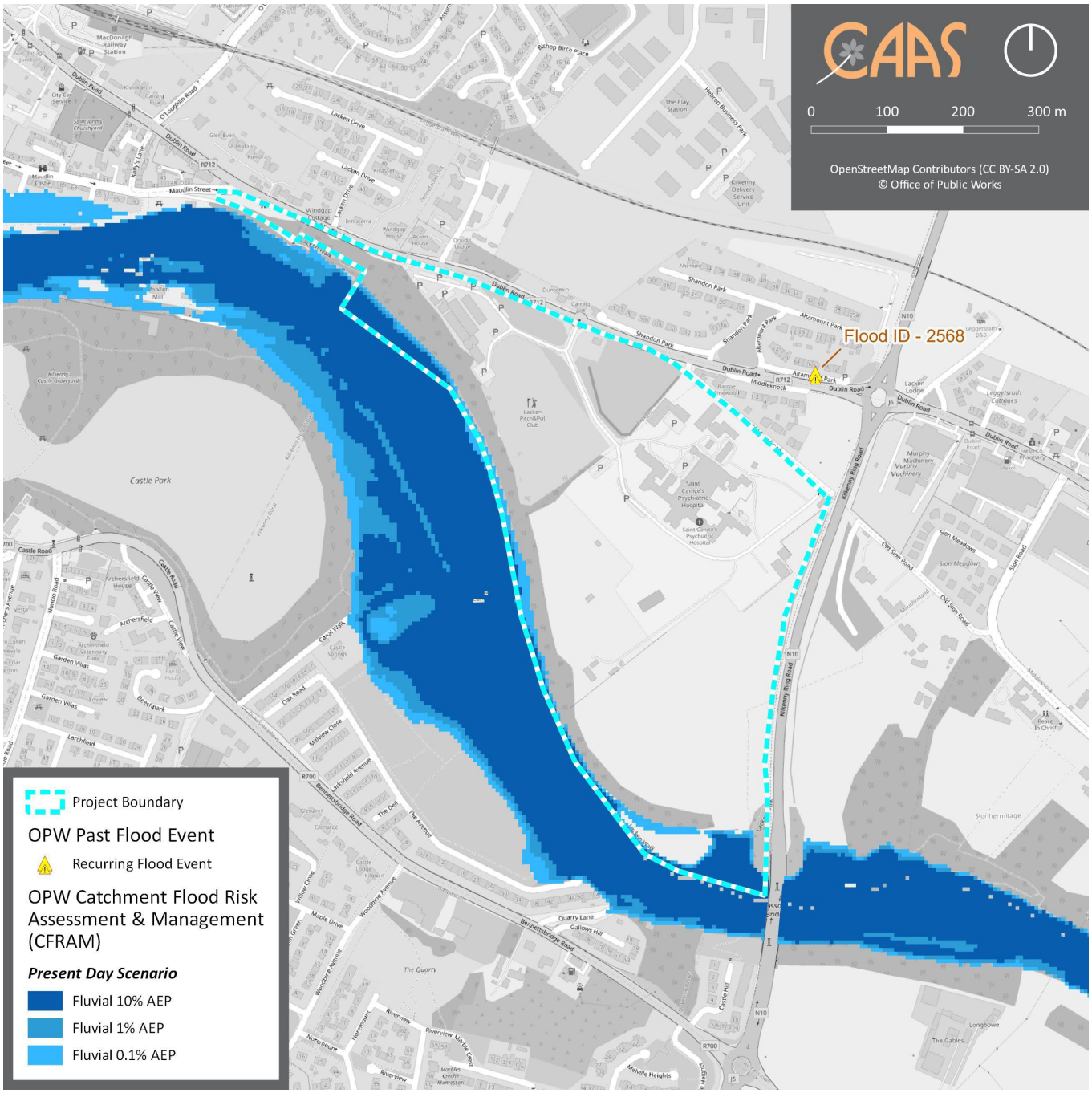
Stage 2 SFRA has been undertaken as part of the Masterplan preparation process and the SFRA has informed the preparation of the Masterplan.

The Masterplan should be read in conjunction with the Kilkenny City and County Development Plan 2021-2027 (as varied), which sets out the overarching development strategy and land use zoning objectives for Kilkenny City, including the Masterplan area.

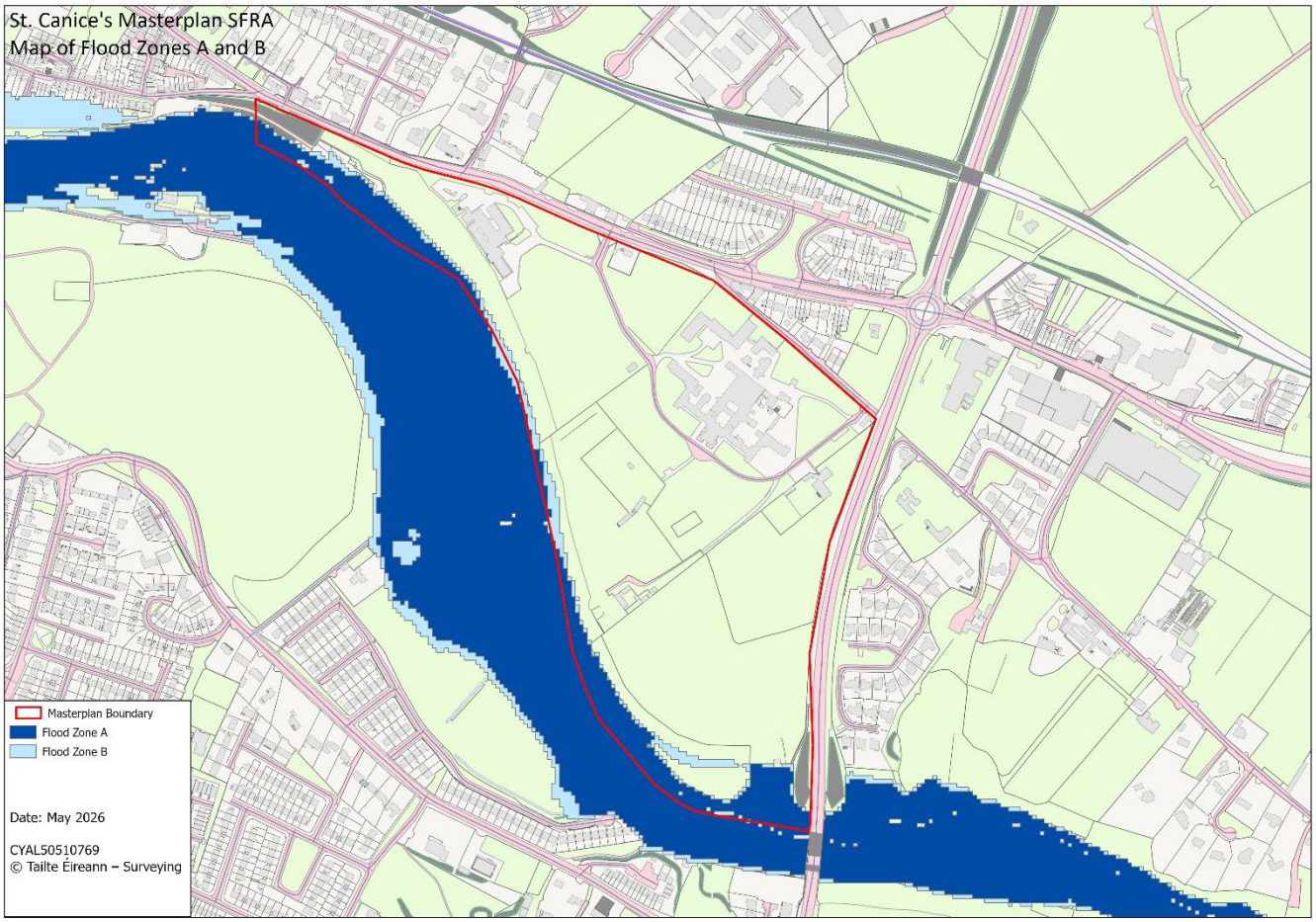
As detailed in Section 3.3 of the Masterplan, "uses within the Masterplan area shall be limited to water-compatible uses in Flood Zone A, and less vulnerable or water compatible uses in Flood Zone B (as per the Flood Risk Management Guidelines), and a detailed site-specific Flood Risk Assessment will be required in these areas."

Proposals for development within the Masterplan area must comply with the general development management standards, policies and objectives in the City and County Development Plan (including relevant provisions relating to flood risk management and drainage).

6 Appendix I: Flood Zone Mapping



Selection of Indicators – Past Flood Event (Recurring) and CFRAMS Present Day



Flood Zones A and B