

**Kilkenny County Council**



# **Flood Risk Assessment**

**Appendix 1 to Strategic Environmental  
Assessment Screening of Amendment No.  
1 to the Callan Local Area Plan**

**20<sup>th</sup> March  
2012**

# 1 Introduction

As part of the Strategic Environmental Assessment Screening for Proposed Amendment No. 1 to the Callan Local Area Plan, in line with *The Planning System and Flood Risk Management – Guidelines for Planning Authorities*, a staged approach has been taken to the appraisal and assessment of flood risk.

## 1.1 Disclaimer

It is important to note that compliance with the requirements of *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*, and of the Floods Directive 2007 60/EC is a work in progress and is currently based on emerging and incomplete data as well as estimates of the locations and likelihood of flooding. In particular, the assessment and mapping of areas of flood risk awaits the publication both of the finalised Preliminary Flood Risk Assessments [PFRAs] and Catchment-based Flood Risk Assessment and Management Plans [CFRAMs]. As a result, this Flood Risk Assessment is based on available information.

Accordingly, all information in relation to flood risk is provided for general policy guidance only. It may be substantially altered in light of future data and analysis. As a result, all landowners and developers are advised that Kilkenny County Council and its agents can accept no responsibility 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 in which they have an interest prior to making planning or development decisions.

## 1.2 Structure of a Flood Risk Assessment (FRA)

The Guidelines recommend that a staged approach is adopted when undertaking a Flood Risk Assessment (FRA). The recommended stages are briefly described below:

- Stage 1 ~ Flood Risk Identification

To identify whether there may be any flooding or surface water management issues that may require further investigation. This stage mainly comprises a comprehensive desk study of available information to establish whether a flood risk issue exists or whether one may exist in the future. This stage also includes collation of relevant local information.

- Stage 2 ~ Initial Flood Risk Assessment

If a flood risk issue is deemed to exist arising from the Stage 1 Flood Risk Identification process, the assessment proceeds to Stage 2 which confirms the sources of flooding, appraises the adequacy of existing information and determines what surveys and modelling approach is appropriate. The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. The initial assessment may determine that sufficient quantitative information is available, appropriate to the scale and nature of the changed land use or development proposed for the necessary decision to be made.

- Stage 3 ~ Detailed Flood Risk Assessment

This is carried out 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.

## 1.3 Scales of Flood Risk Assessments

Flood Risk Assessments are undertaken at different scales by different organisations for many different purposes. The scales are as follows:

- Regional Flood Risk Appraisal (RFRA): A Regional Flood Risk Appraisal provides a broad overview of the source and significance of all types of flood risk across a region and highlights areas where more detailed study will be required. These appraisals are undertaken by regional authorities.
- Strategic Flood Risk Assessment (SFRA): A Strategic Flood Risk Assessment provides a broad (area-wide or county-wide) assessment of all types of flood risk to inform strategic land use planning decisions. The SFRA allows the Planning Authority to undertake the sequential approach (described below) and identify how flood risk can be reduced as part of the development plan process.
- Site Flood Risk Assessment (Site FRA): A Site FRA is undertaken to assess all types of flood risk for a new development. This requires identification of the sources of flood risk, the effects of climate change on the flood risk, the impact of the proposed development, the effectiveness of flood mitigation and management measures and the residual risks that then remain.

This assessment is for an amendment to a Local Area Plan and therefore is at the SFRA scale.

### 1.3.1 The Sequential Approach

The sequential approach in terms of flood risk management is based on the following principles: AVOID - SUBSTITUTE - JUSTIFY - MITIGATE – PROCEED.

The primary objective of the sequential approach is that development is primarily directed towards land that is at low risk of flooding (AVOID). The next stage is to ensure that the type of development proposed is not especially vulnerable to the adverse impacts of flooding (SUBSTITUTION).

The Justification Test is designed to rigorously assess the appropriateness, or otherwise, of particular developments that, for various reasons, are being considered in areas of moderate or high flood risk (JUSTIFICATION). The test is comprised of two processes, namely the Plan-Making Justification Test and the Development Management Justification Test. Only the former (Plan-Making Justification Test) is relevant to a Strategic Flood Risk Assessment for a Plan, and this is described as follows.

Justification Test for Development Plans (See p.37 of the Guidelines)

"Where, as part of the preparation and adoption or variation and amendment of a development/local area plan, a planning authority is considering the future development of areas in an urban settlement that are at moderate or high risk of flooding, for uses or development vulnerable to flooding that would generally be inappropriate as set out in Table 3.2 of the Guidelines, all of the following criteria must be satisfied:

- 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 and sustainable planning of the urban settlement and in particular:
  - a. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement
  - b. Comprises significant previously developed and/or under-utilised lands;
  - c. Is within or adjoining the core of an established or designated urban settlement;
  - d. Will be essential in achieving compact or sustainable urban growth;
  - e. 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.”

MITIGATION is the process where the flood risk is reduced to acceptable levels by means of land use strategies or by means of detailed proposals for the management of flood risk and surface water, all as addressed in the Flood Risk Assessment. The decision to PROCEED should only be taken after the Justification Test has been passed.

## **2 Flood Risk Assessment**

### **2.1 Stage 1 Flood Risk Identification**

This purpose of this stage is to identify whether there are any flooding or surface water management issues relating to the plan area that may warrant further investigation. Sources which were consulted are outlined below.

#### **2.1.1 Regional Flood Risk Appraisal**

A Regional FRA was carried out and published as Appendix 3 to the Strategic Environmental Assessment of the South East Regional Planning Guidelines, 2010. This document provided guidance on the issues to be addressed in any Strategic Flood Risk Assessment.

The Regional FRA referred to flooding that occurred in August 2008 and stated that “Graignemanagh and Callan, two of the worst-hit parts of the county, along with Thomastown will benefit from a Flood Risk Management Study which will be undertaken by Kilkenny County Council”.

#### **2.1.2 Strategic Flood Risk Appraisal**

A Strategic Flood Risk Assessment for the County was published in 2011 as part of Variation No. 2 to the County Development Plan. This examined the level of information available on flooding in the county and assessed all settlements affected by the variation for the presence of flood risk indicators. This did not cover the Callan LAP as the Variation did not propose any change to the zoning therein.

#### **2.1.3 OPW Publications in development**

##### **2.1.3.1 Preliminary Flood Risk Management**

The ‘Floods’ Directive<sup>1</sup> requires Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. Member States are also required to prepare catchment-based Flood Risk Management Plans (FRMPs) by 2015 that will set out flood risk management objectives, actions and measures. In August 2011, the OPW published the *National Preliminary Flood Risk Assessment, Draft for Public Consultation* which comprised a Report

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<sup>1</sup> Directive 2007/ 60/ EC of the European Parliament and of the Council of 23<sup>rd</sup> October 2007 on the assessment and management of flood risk: Official Journal L288/ 27-34.

and a set of maps. This national screening exercise identified where there may be a significant risk associated with flooding, based on available and easily derivable information. The objective of the PFRA is to identify Areas for Further Assessment (AFA's) and this further assessment will take place through Catchment Flood Risk Assessment and Management Studies (CFRAMS). Callan has been identified as a 'Possible Area for Further Assessment'.

Maps of the County have been published as part of the Draft PFRA. These maps indicate flood extents – for fluvial flooding they indicate the 100 year event and also the extreme event, which could be taken as 1 in 1000 year event. They also indicate pluvial, coastal and groundwater flooding extents. This mapping is now an important and primary input into flood risk assessment studies.

#### **2.1.3.2 Catchment Based Management Plans**

The OPW in co-operation with various Local Authorities are producing Catchment Flood Risk Assessment and Management Studies. These CFRAMS aim to map out current and possible future flood risk areas and develop risk assessment plans. They will also identify possible structural and non-structural measures to improve the flood risk of the area. A few studies are being piloted around the country, and one of these is for the Suir catchment area.

The South Eastern River Basin District (SERBD) CFRAMS will cover the rest of County Kilkenny, and this study was due to commence in summer 2011. The flood mapping from the CFRAMS studies will be provided by the end of 2013.

#### **2.1.4 Available sources**

The data listed below is available and provides information on the historical occurrence of flooding. Flooding and surface water issues in the county were also identified through consultation with the Area Engineer and from any other relevant sources.

i) Office of Public Works OPW Flood Events Mapping

As part of the National Flood Risk Management Policy, the OPW developed the [www.floodmaps.ie](http://www.floodmaps.ie) web based data set, which contains information concerning historical flood data, displays related mapped information and provides tools to search for and display information about selected flood events.

ii) OPW Benefitting Lands mapping

These maps were prepared to identify areas that would benefit from land drainage schemes, and typically indicate low-lying land near rivers and streams that might be expected to be prone to flooding.

iii) Mineral Alluvial Soil Mapping

The soils and subsoils maps were created by the Spatial Analysis Unit, Teagasc. The project was completed in May 2006 and was a collaboration between Teagasc, Geological Survey of Ireland, Forest Service and the EPA. The presence of alluvial soils can indicate areas that have flooded in the past (the source of the alluvium).

iv) Ordnance Survey "Lands liable to floods" mapping (6" OS maps)

These maps have been studied to see if there are any areas marked as being "Liable to Floods" in or in the vicinity of the zoned areas. It is noted that the OS maps simply show the text "Liable to Floods" without delineating the extent of these areas.

It should be noted that some of this data is historically derived, not prescriptive in relation to flood return periods and not yet predictive or inclusive for climate change analysis. Many of these maps were based on survey work carried out from 1833-1844 with many updated in the 1930s and 1940s. Therefore they do not show or take account of recent changes in surface drainage, such as development in floodplains, road realignments or drainage works for

forestry or agriculture. So there is significant potential that flood risk in some areas may have increased or been reduced since they were prepared.

#### **2.1.4.1 Flood Studies, Reports and Flood Relief Schemes**

Kilkenny County Council commissioned Hyder Consulting to carry out a Flood Relief Report for Callan, Thomastown and Graiguenamanagh in 2010. The Callan Report included detail on historical flood events and mapped the 100 year flood extent around the River Nore. This report recommended two measures for mitigation of flood risk in Callan:

- Flood Cell 1 (the left bank) - Flood defence wall around the car park at KCAT
- Flood Cell 2 (the right bank) Flood proofing and awareness

These measures were incorporated into the flood alleviation scheme which has just been completed in Callan (September 2011). This scheme is to address flooding in the central core of the town around Bridge Street/KCAT car park/Cloheen Lane area. Its focus is the protection of residences and businesses. It has done this by a combination of earthen bunds, structural walls, flood gates and flap valves on existing outflows.

#### **2.1.4.2 Local Authority Personnel**

The Area Engineer was also consulted regarding historical flooding and flood relief works in the area.

#### **2.1.5 Flood Risk Indicators**

Having regard to all of the information sources as outlined above, the occurrence of flood risk indicators in the plan area is identified in a Flood Risk Indicator Matrix. As the area could be subject to a potential flood risk issue, the assessment proceeds to Stage 2.

### **2.2 Stage 2 Initial Flood Risk Assessment**

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

#### **2.2.1 Flood zone mapping**

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of flood zones defined:

- Flood zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding)
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (greater than 1% or 1 in 1000 for river flooding)
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 1% or 1 in 1000 for river flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

For Callan there are now two sources of flood mapping – the Flood Relief Report (which produced a map of the 100 year flood extent and a Flood Extent Uncertainty Area) and the OPW PFRA map. Using a combination of the PRFA mapping and the results of the Flood Relief study, Flood Zone A has been mapped in the town, see Map 1. Flood Zone B has not been identified, but using a combination of all the sources of information as outlined above, an area of flood risk has been mapped. The map will include an objective stating that any development proposal within Flood Zone A or within the area identified will be subject to a site

specific Flood Risk Assessment appropriate to the type and scale of the development being proposed.

### 2.2.2 Application of the Sequential Approach

Having identified the flood risk zones within the plan area the next step is to apply the sequential approach to land use planning. The flood zone map was overlaid on the existing plan zoning (2009). This identified where flood risk management and future development may cause a conflict. The Guidelines have categorised land uses into three vulnerability classes and have also specified which vulnerability class would be appropriate in each flood zone, or where the Justification Test would be required.

The table of vulnerability classes (Table 3.1 of the Guidelines) is as follows:

<b>Table 1 Classification of vulnerability of different types of development</b>	
<b>Vulnerability Class</b>	Land uses and types of development which include*:
<b>Highly vulnerable development (including essential infrastructure)</b>	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.
<b>Less vulnerable development</b>	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.
<b>Water-compatible development</b>	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 merits	

Table 3.2 of the Guidelines sets out how the vulnerability classes interact with the flood zones and when the Justification Test is required.

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

Zoning proposals in each area:

A total of seven main areas of fluvial flood risk have been identified through Stage 1 and are shown on Map 1: Areas of Flood Risk. These will now be assessed individually, considering the development proposed under this amendment for each site.

- I. A greenfield parcel of land to the north of West Street, adjacent to the Bypass, was zoned for General Business. Under this amendment this site is proposed for Phase 2 zoning, i.e. development cannot take place during the lifetime of this LAP.
- II. A greenfield parcel to the north of Mill Street, to the rear of residences along Mill Street was zoned for Residential. Under this amendment this site is proposed for Phase 2 zoning, i.e. development cannot take place during the lifetime of this LAP.
- III. Two parcels of land to the east of the plan area are zoned for Agriculture. According to Table 3.1 of the Guidelines, the uses allowed in this zone are less vulnerable, which are appropriate uses in Flood Zone B. This FRA identifies Flood Zone A but does not identify Flood Zone B. A very small portion of the Agriculture zone is located within Flood Zone A. Any development proposed in this area will have to satisfy the development management justification test, which will ensure that only appropriate uses are permitted in an area of flood risk.
- IV. The majority of the land within the area of flood risk is zoned for Open space. The uses allowed in this zone are all water compatible.
- V. To the north of the plan area, green field land was zoned for residential use along the stream in Clashacollare. Under this amendment this site is proposed for Phase 2 zoning, i.e. development cannot take place during the lifetime of this LAP. To the west of this green field land is a developed residential area, zoned for residential uses. This area is already completely developed, and the zoning objective is "To create a sustainable community and protect and enhance amenities in existing residential areas", therefore this area will not be subject to incompatible future development.
- VI. Land in the town centre is zoned for a variety of uses (General Business, community facilities, residential and open space). This land comprises previously developed, brownfield and underutilised sites in the town centre. No change is proposed to this zoning under this Amendment.
- VII. Some parcels of land to the east of the plan area are zoned for industrial use and comprise developed sites. No change is proposed to this zoning under this Amendment.

As outlined above, there are two main areas with a potential conflict between development and flood risk; the town centre area and the industrial area to the east. No change is proposed to the zoning here, however in accordance with the Guidelines, a Justification test will be carried out for this land. In order for this land to continue to be zoned, the zoning must satisfy the Justification test. The criteria are outlined in Section 1.3.1 and the test is set out below.

1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.

Callan is identified as a District Town in the Regional Planning Guidelines 2010-2022. District towns are "targeted for growth as centres that can perform an important role in driving the



development of a particular spatial component of the overall region". Callan is also a District Town in the County Development Plan spatial hierarchy.

2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement and in particular:
  - a. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement
  - b. Comprises significant previously developed and/or under-utilised lands;
  - c. Is within or adjoining the core of an established or designated urban settlement;
  - d. Will be essential in achieving compact or sustainable urban growth;
  - e. 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 the town centre area for a number of uses (General business, Community facilities and residential) is intended mainly to reflect the existing uses operating in the town. The continued zoning of the land will facilitate the regeneration and/or expansion of the centre. This area is in the core of Callan. Its continued development is essential to achieving compact and sustainable urban growth. There are no suitable alternative lands in areas at lower risk of flooding within or adjoining the core.

The zoning of the industrial area to the east also reflects the existing uses on this previously developed land. It adjoins the core, comprising the closest industrial zoned land to the centre, and will be essential in achieving compact and sustainable urban growth. There are no suitable alternative lands in areas at lower risk of flooding within or adjoining the core.

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.

In the main, this land is built out and the opportunities for future development are limited. In this context, this Flood Risk Assessment contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures will be included in the amended plan to state that any development proposal within Flood Zone A or within the area identified will be subject to a site specific Flood Risk Assessment appropriate to the type and scale of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue.

In this context, this Flood Risk Assessment contains sufficient information appropriate to the scale and nature of the development potential. Mitigation measures will be included in the amended plan to state that any development proposal within the area of flood risk will be subject to a site specific Flood Risk Assessment appropriate to the type and scale of the development being proposed. This mitigation measure will ensure that any development taking place will not exacerbate any flooding issue. Any development within Flood Zone A will have to satisfy the development management Justification Test.

There are also some areas of pluvial flood risk indicated on the PFRA maps for Callan. These areas have been included on the FRA map, and the same mitigation measure will be applied to these areas.

As no green field site, which is subject to flood risk, is now zoned for vulnerable uses (during the lifetime of this plan), and as a mitigation measure has now been included to ensure any development taking place will not exacerbate any flooding issue, it is not considered necessary at this stage to proceed to Stage 3, Detailed Flood Risk Assessment.

### 3 Recommendations

The CDP 2008-2014 as varied by Variation 2, contains text and policies on flooding in Section 9.12.5 (Policies IE89-94). For the areas identified through the SFRA that *are within Flood Zone A or contain flood risk indicators*, a policy is included to ensure that development proposals shall be the subject of a site-specific Flood Risk Assessment, appropriate to the type and scale of the development being proposed.

As outlined above, there are two areas of Callan with potential conflicts between development and flood risk. However, neither area is subject to a zoning change under this Amendment which deals primarily with greenfield land outside the town centre *and the Justification Test has been satisfied*.

*Flood Zone A and all flood risk areas are identified on a Flood Risk Map to accompany the plan. The area identified as containing flood risk indicators is not reliable as a flood extent, but it does provide an indication that further assessment of flood potential may be required. These areas are identified on the map as "Areas within which development proposals will be the subject of a site specific Flood Risk Assessment appropriate to the type and scale of the development being proposed"*.

The text of the LAP will be amended to reflect the revised text of Variation 2 in relation to flooding. Specifically, the LAP will contain the following policies in Section 5.13:

Policy: Applications for development on lands identified as being located in an area of flood risk on the FRA map, shall be the subject of a site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed, in line with the DoEHLG Guidelines "The Planning System and Flood Risk Management" November 2009. A site-specific FRA may be required for sites adjoining an area of flood risk.

Policy: For any development, where flood risk may be an issue, a flood risk assessment should be carried out that is appropriate to the scale and nature of the development and the risks arising. The applicant is primarily responsible in the first instance for assessing whether there is a flood risk issue and how it will be addressed in the development they propose.

Policy: Development that is vulnerable to flooding will not be permitted in an area identified as subject to flood risk, without a site specific flood risk assessment. Any development will not be permitted unless the criteria as set out in the Justification Test are satisfied.

#### 3.1 MONITORING AND REVIEW

As outlined in Section 2, additional information will be made available from the OPW later this year that will inform flood risk assessments in the County. The review of the County Development Plan (2008-2014) will commence in 2012, and at that stage a comprehensive Strategic Flood Risk Assessment will be carried out. The Callan LAP will be reviewed in 2015 (if the period of the plan is not extended under Section 19 (1)(d) of the Planning and Development Act as amended).

It is recommended that the OPW be consulted and that their progress in implementation of the requirements of the EU Flood Directive is reviewed prior to the preparation of the next County Development Plan and the next Callan LAP.

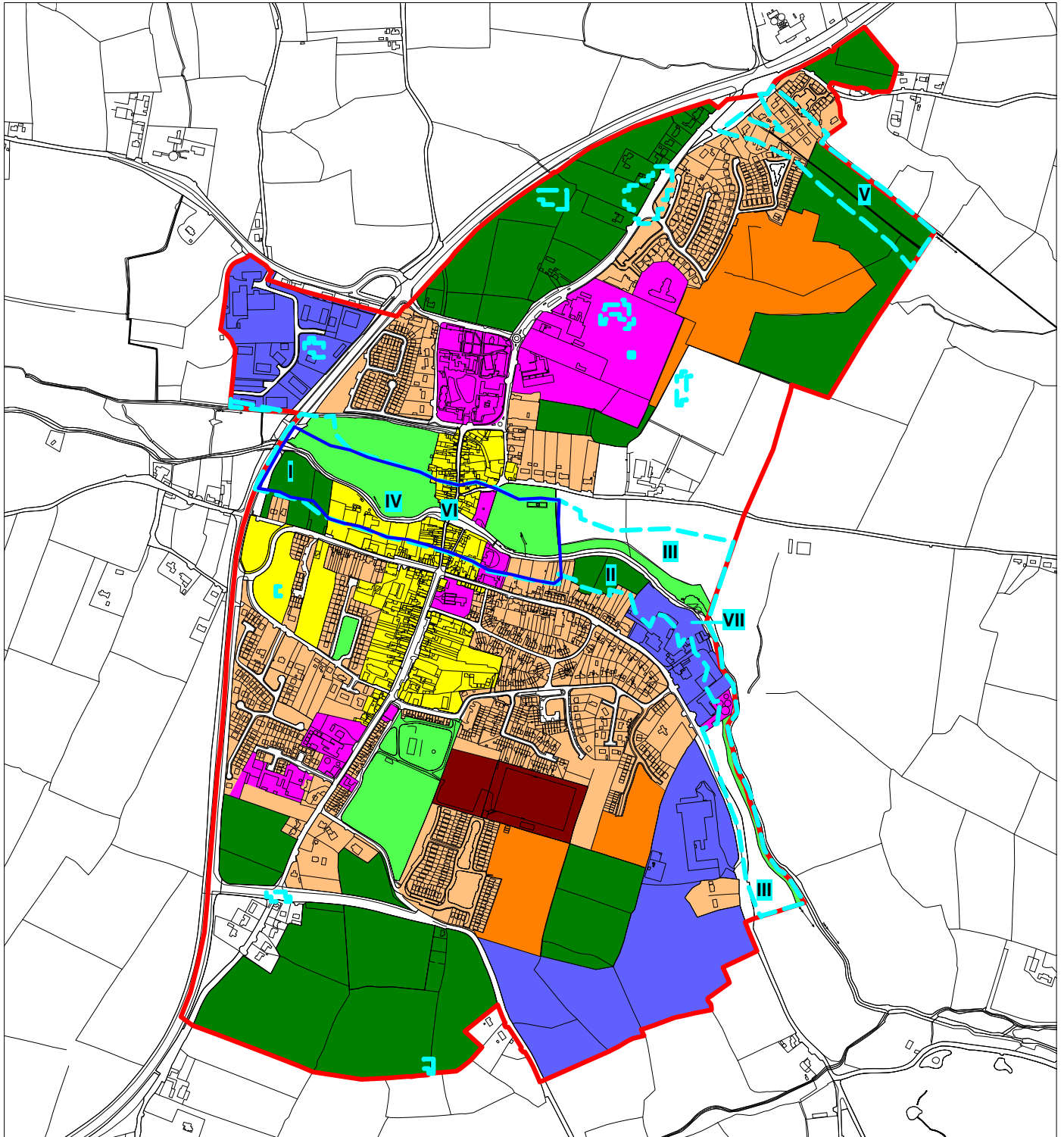
This FRA is based on currently available data and in accordance with its status as a "living document" it will be subject to modification by these emerging datasets of maps and plans as they become available. In the interim any development proposal in the areas identified in this FRA shall be subject to detailed flood risk assessment.

### Section 4: Map of Indicative Flood Extents in Callan

### Flood Risk Indicator Matrix for Callan

Available Data by source						
www.floodmaps.ie	Alluvial Soils	Benefitting lands	6" OS maps	Local Authority information	Other	PFRA maps 2010
Recurring flood incident points along Kings River at bridge, on Callan Bypass, along the Kings River Millrace and to west of Callan. Last recorded information was 2004.	Alluvial soils mapped along King's River in centre of town.	Benefitting lands mapped along King's River in centre of town and along stream flowing west-east to north of plan area.	No indication of flooding occurrences shown.	Additional – Flood Alleviation Scheme has been completed to address flooding in central core. The flows which may discharge into the Mill Race and ultimately discharge into the Kings River adjacent to the KCAT carpark have been limited at a point to the western side of the Callan By-Pass. This should alleviate the pressure on the surface drainage in the central core area which uses the Mill Race also. There are long term plans to restore the Mill Race in some form but further detailed assessments would be required to assess what flows would be allowable. This is a long term goal of interested stakeholders.	Hyder Consulting Flood Risk Management Study, 2010	PFRA maps 2010 indicate 'Possible area for further assessment'. Some areas of pluvial flooding indicated with the LAP boundary.

Strategic Flood Risk Assessment for Amendment 1 to Callan LAP  
 Map 1: Flood Risk Areas in Callan



**Legend**

- General Business
- New Residential
- Residential
- Industry
- Community facilities
- Mixed use
- Open space
- Agriculture

- Phase 2
- Plan Boundary
- Flood Zone A
- Area within which any development proposal will be the subject of a site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed

Date: March 2012  
 Scale: 1: 12,000 @ A4

Based on Ordnance Survey Ireland Map, Licence No. Kilkenny/CCMA/08/12