



Strategic Flood Risk Assessment to the Mayo County Development Plan 2014 - 2020



Comhairle Contae Mhaigh Eo
Mayo County Council

Strategic Flood Risk Assessment
to the
Mayo County Development Plan 2014 - 2020

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1.0 INTRODUCTION

Flooding is a natural process that can happen at any time in a wide variety of locations. Flooding from the sea and rivers is probably best known but prolonged, intense and localised rainfall can also cause sewer flooding, overland flow and ground water flooding.

Flooding has significant impacts on human activities; it can threaten people's lives, their property and the environment. Assets at risk can include housing, transport and public service infrastructure, and commercial, industrial and agricultural enterprises. The health, social, economic and environmental impacts of flooding can cause significant impact on a community.

The aim of flood risk management in the County is to minimise the level of flood risk to people, business, infrastructure and the environment through the identification of existing and potential future flood risks. Flood risk management will be incorporated into the decision-making processes for future development in the County in an integrated, proactive and transparent manner and in line with evolving best practice.

2.0 LEGISLATION & POLICY FRAMEWORK

2.1 EU Floods Directive

European Directive 2007/60/EC on the assessment and management of flood risk aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU. The Directive requires Member States to:

- Carry out a preliminary assessment by December 2011 in order to identify the river basins and associated coastal areas where potential significant flood risk exists.
- Prepare flood hazard and risk maps for the identified areas by December 2013.
- Prepare flood risk management plans focused on prevention, protection and preparedness by December 2015. These plans are to include measures to reduce the probability of flooding and its potential consequences.

Implementation of the EU Floods Directive is required to be coordinated with the requirements of the EU Water Framework Directive and the current River Basin Management Plans.

2.2 National Flood Risk Management

Historically, flood risk management focused on land drainage for the benefit of agricultural improvement. With increasing urbanisation, the Arterial Drainage Act, 1945, was amended in 1995 to permit the OPW to implement localised flood relief schemes to provide flood protection for cities, towns and villages.

In line with changing national and international concepts on how to manage flood risk most effectively and efficiently, a review of national flood policy was undertaken in 2003/2004. The review was undertaken by an Inter-Departmental Review Group, led by the Minister of State at the Department of Finance with special responsibility for the OPW. The Review Group prepared a report that was put to Government, and subsequently approved and published in September 2004 (Report of the Flood Policy Review Group, OPW, 2004).

The scope of the review included an evaluation of the roles and responsibilities of the different bodies with responsibilities for managing flood risk, and to set a new policy for flood risk management in Ireland into the future. The adopted policy was accompanied by many specific recommendations, including:

- Focus on managing flood risk, rather than relying only on flood protection measures aimed at reducing flooding;
- Taking a catchment-based approach to assess and manage risks within the whole-catchment context; and

- Being proactive in assessing and managing flood risks, including the preparation of flood maps and flood risk management plans.

The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011 to deliver on core components of the National Flood Policy, and on the requirements of the EU Floods Directive. The Programme is being implemented through CFRAM studies which are being undertaken for each of the six river basin districts in Ireland.

The CFRAM programme includes three main stages;

- | | |
|---|------|
| - Stage 1 Preliminary Flood Risk Assessment | 2011 |
| - Stage 2 Flood Risk Hazard Mapping | 2013 |
| - Stage 3 Flood Risk Management Plans | 2015 |

Stage 1 identified areas where there might be a significant risk of flooding, highlighting communities, facilities and sites where the risk due to flooding might be potentially significant. These areas were identified as Areas for Further Assessment (AFA) which will be subject to more detailed assessment to establish the extent and degree of flood risk. The Preliminary Flood Risk Assessment (PRFA) for the Western CFRAM study has identified 11 AFAs in County Mayo.

- Ballyhaunis
- Ballina
- Castlebar
- Charlestown
- Crossmolina
- Foxford
- Louisburgh
- Newport
- Swinford
- Westport
- Westport Quay

2.3 Regional Flood Risk Management Policy

The Regional Planning Guidelines for the West Region 2010–2022 requires its constituents to take account of the issues raised in the Regional Risk Assessment. The Guidelines also require the Local Authorities to undertake Strategic Flood Risk Assessment (SFRA) of future plans in line with the Government guidance on the planning system and flood risk management to avoid risks where possible in preparing future plans.

2.4 Section 28 Flood Risk Management Guidelines

In 2009, the DEHLG and OPW published Guidelines on flood risk management for planning authorities entitled, “*The Planning System and Flood Risk Management -*

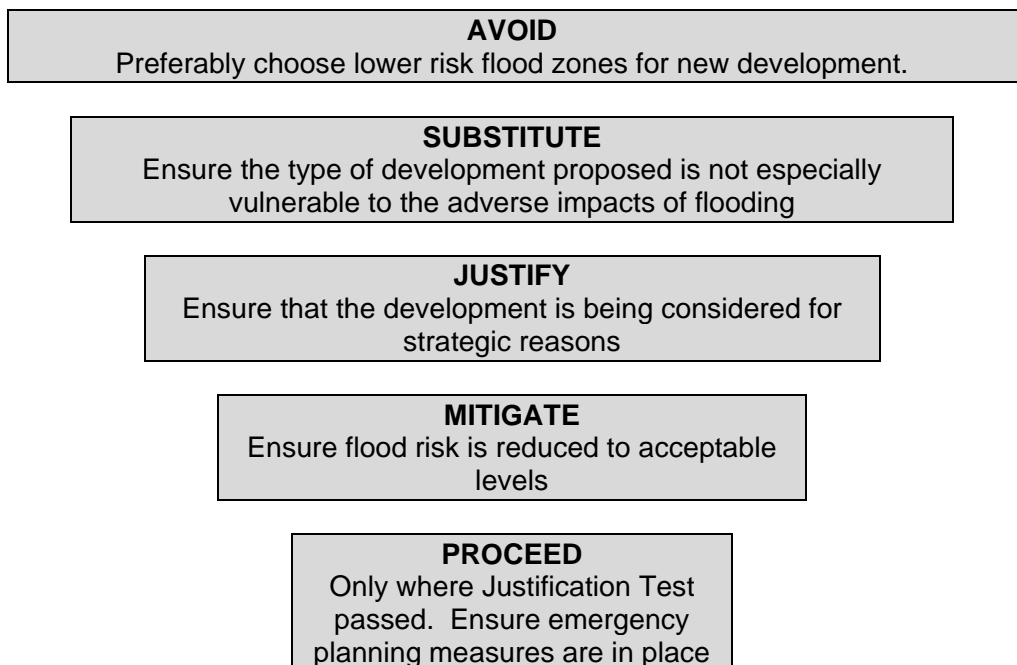
Guidelines for Planning Authorities". The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is intended to be achieved through actions at the national, regional, local authority and site-specific levels. Planning authorities and An Bord 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 which may increase 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.

2.4.1 The Sequential Approach

The Sequential Approach in terms of flood risk management is based on the following principles:



A sequential approach to planning is a key tool in ensuring that development, particularly new development, is first and foremost directed towards lands that are

at low risk of flooding. The sequential approach outlined above should be applied to all stages of the Planning process, particularly at the plan making stage. Flood zones are defined in the guidelines and form a crucial element in the sequential approach.

2.4.2 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:

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

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, presence and reliability of mitigation measures etc.).

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 or levels 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);

Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and

Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The Guidelines also categorise land uses and development types into three categories:

- Highly vulnerable development (including essential infrastructure)
- Less vulnerable development
- Water compatible development.

The land uses and types of development under each category are shown in Table 2.1 below:

Table 2.1: Classification of Vulnerability of Different Types of Development

Vulnerability Class	Land uses and types of development which include*:
Highly Vulnerable Development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	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	

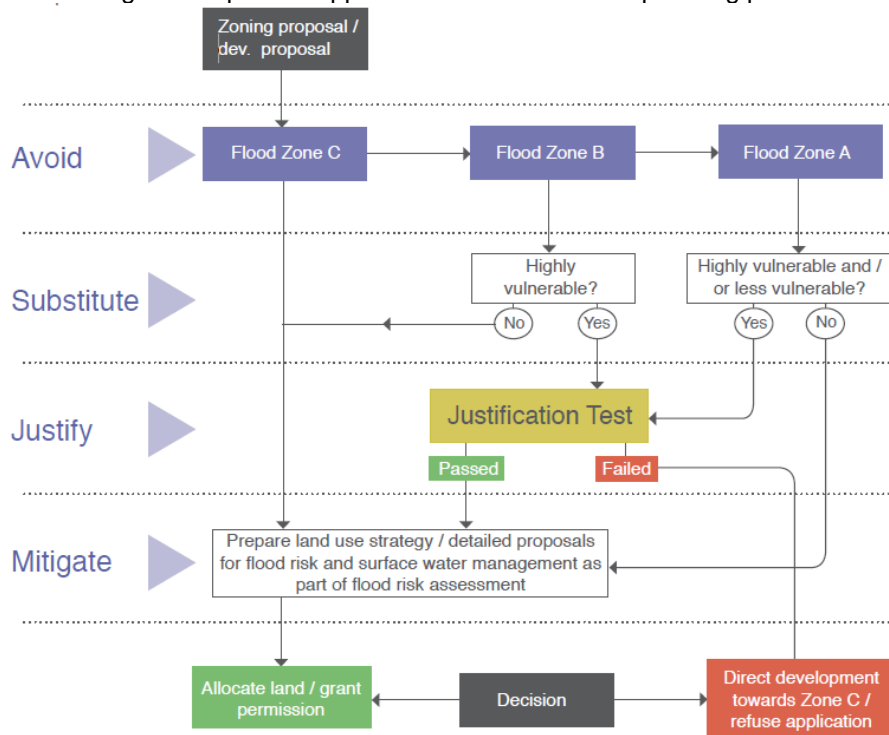
Table 2.2 below shows vulnerability versus flood zone to illustrate appropriate development and when to apply the Justification Test

Table 2.2 Vulnerability vs. Flood Zone

	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

Figure 2.1 describes the mechanism for using the sequential approach in the Planning process.

Fig 2.1 Sequential approach mechanism in the planning process



2.4.3 The Justification Test

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.

The Justification Test is relevant to a Strategic Flood Risk Assessment for plans and is described as follows.

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 2.2, all of the following criteria must be satisfied:

1. The urban settlement is targeted for growth under the National Spatial Strategy, Regional Planning Guidelines, and Statutory Plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:
 - Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;
 - Comprises significant previously developed and/or under-utilised lands;
 - Is within or adjoining the core of an established or designated urban settlement;
 - Will be essential in achieving compact and sustainable urban growth;
 - 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.

3.0 STRATEGIC FLOOD RISK ASSESSMENT

The *Planning System and 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 Planning Guidelines, Development Plans and Local Area Plans, or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels;
- **Stage 2 Initial Flood Risk Assessment** – to confirm sources of flooding that may affect a Plan Area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped; and
- **Stage 3 Detailed Flood Risk Assessment** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

The Stage 1 Strategic Flood Risk Assessment for the draft Mayo County Development Plan 2014-2020 will:

- Identify the broad nature of flood risk in the County,
- Outline the flood risk management objectives to be included in the Plan
- Outline the development management standards to be included in the Plan

The Stage 2 Strategic Flood Risk Assessment for the various Area Plans will:

- Provide an improved understanding of flood risk issues within the area of the Plan.
- Identify where more detailed flood risk assessments may have to be carried out, for development that is planned within areas at risk of flooding. These more detailed assessments will be used to identify and evaluate the potential for the development of the lands and the associated environmental impact.

4.0 STAGE 1 STRATEGIC FLOOD RISK ASSESSMENT

The Stage 1 Strategic Flood Risk Assessment (SFRA) is prepared as part of the Mayo County Development Plan 2014 - 2020. It provides a broad, County-wide SFRA and reflects the broad and strategic nature of the Development Plan. It is similar in some respects to a Regional Flood Risk Appraisal as set out in *The Planning System and Flood Risk Management (and Technical Appendices) Guidelines* for Planning Authorities (DoEHLG, OPW, 2009). It includes a broad overview of the sources and significance of flooding across the County.

4.1 Sources of Information

The SFRA will use all available sources of information when screening for flood hazard and flood risk, including the following:

- Preliminary Flood Risk Assessment maps which delineate areas potentially prone to flooding from fluvial, coastal, pluvial, groundwater and lakes.
- Office of Public Works National Flood Hazard Mapping recorded on www.floodmaps.ie
- Office of Public Works Benefitting Land Maps
- Mineral Alluvial Soil mapping
- Ordnance Survey of Ireland "Lands liable to floods" mapping (6" OS maps)
- Working knowledge from Town Engineers and Area Engineers.

4.2 Sources of Flooding in County Mayo

Different types of flooding present different forms and degrees of danger to people, property, infrastructure and the environment. This is due to varying depth, velocity, duration, rate of onset and other hazards with flooding. With climate change the frequency, pattern and severity of flooding are expected to change, becoming more uncertain and more damaging. The SFRA looks at the risks from the following sources of flooding;

a) Fluvial Flooding

This type of flooding occurs when the capacity of a river is either exceeded or the flow of the river becomes blocked or restricted. The excess water spills out from the channel onto adjacent low-lying areas-the flood plain. Rivers have associated natural flood plains; the purpose of which is to hold this excess water until it can be released slowly back into the river or seep into the ground.

There is an extensive network of rivers and tributaries which traverse County Mayo, as listed in Table 4.1.

Table 4.1: Mayo River

Aille	Deel (Crossmolina)	Owenbrin
Ballindine	Erriff	Owenduff (Blacksod)
Ballinglen	Glenamoy	Owenmore (Mayo)
Behy (North Mayo)	Glencullin (North Mayo)	Pollagh (Kiltimagh)
Black (Shrule)	Glennamong	Robe (Ballinrobe)
Bundorragha	Glenree	Sheskin Stream
Bunowen (Louisburgh)	Glensaul	Slieveclaur
Carrowbeg (Westport)	Glennumera	Sonnagh (Moy)
Carrowkeribly Lough Stream	Glore (Kiltimagh)	Spaddagh
Castlebar	Gweestion	Srah Stream
Cloonaghmore	Loughnaminoe Stream	Srahnalong
Cloondaver Stream (North)	Manulla	Swinford
Clydagh (Castlebar)	Moy - MAYO	Trimoge
Cong Canal	Mullaghanoe - MAYO	Trimoge
Corroy	Munhin	Yellow (Knock)
Dalغان (Ballyhaunis)	Newport	

b) Coastal Flooding

Coastal flooding is caused by higher sea levels than normal, which in turn, results in the sea overflowing onto the land. There are many established uses along the Mayo coastline including ports, harbours, fishing and aquaculture, residential, leisure and amenity..

c) Pluvial Flooding

The PFRA provides a preliminary assessment of pluvial flooding the County. This type of flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.

For pluvial flooding, the PFRA mapping has generally not taken into account local drainage structures such as culverts through embankments or other local drainage that would not be resolved in the model used for the mapping at a national scale. In addition to the above limitations, there are further intrinsic uncertainties associated with these flooding types e.g. pluvial flooding can be influenced by drains blocked with farm plastic, for example, and groundwater flooding can be influenced by tidal interactions.

d) Groundwater Flooding

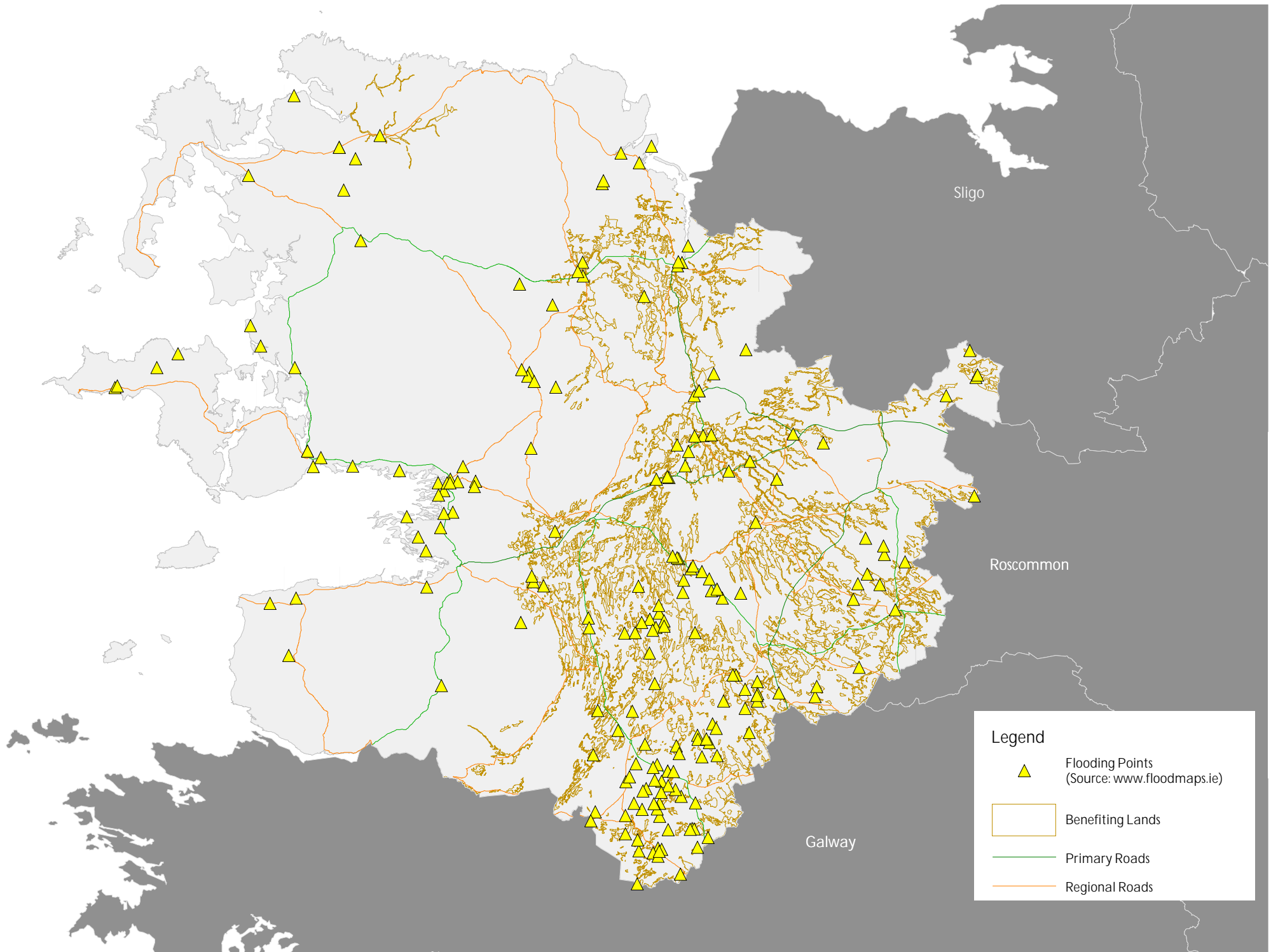
The PFRA also provides a preliminary assessment of groundwater flooding for the County. Groundwater flooding occurs where the level of water stored in the ground rises as a result of prolonged rainfall and flows out over the ground.

The methodology used to map areas potentially prone to groundwater flooding was evidence-based, with the vast majority of extensive, recurring groundwater floods originating at turloughs. A model-based approach to groundwater flooding was not possible due to the lack of data, so only one set of flood extents were generated, with no specific event probability (although where observed flood data was used, these are likely to represent quite extreme events). The indicative national groundwater flood maps are included in the PFRA maps.

Figure 4.1 shows flood points and benefitting lands in the County in relation to the settlements in the Settlement Strategy hierarchy outlined in the Core Strategy. Land Use Zoning maps for the Key Towns are provided in Section 5 of this Report which indicate the extent of Fluvial, Pluvial and Coastal Flooding as projected from the CFRAM Preliminary Flood Risk Assessment Maps.

Note

The above sources of information (SECTION 4.1) will be used for screening purposes only. Therefore, an applicant when preparing a detailed Flood Risk Assessment should seek professional advice from a suitably qualified person to verify the data/information. If during this process of independent verification it is submitted that the subject lands are not located within an area vulnerable to flooding (either Flood Zone A and Flood Zone B), the onus will be on the applicant to objectively demonstrate this based on the best scientific information available at the time of the planning application.



5.0 STAGE 2 STRATEGIC FLOOD RISK ASSESSMENT

Area Plans have been prepared for the following Key Towns and form part of the County Development Plan 2014-2020; Ballinrobe, Ballyhaunis, Belmullet, Charlestown, Claremorris, Kiltimagh, Killala, Knock, Louisburgh, Newport and Swinford.

The area plans are consistent with the policies and objectives of the Development Plan. The Stage 2 review will comprise the preparation of more detailed Strategic Flood Risk Assessment for each of the Area Plans.

The Flood Risk Guidelines recommend that areas within Flood Zone A or Flood Zone B should be zoned appropriately, as outlined in Table 2.1. All other areas are considered Flood Zone C and do not limit any development potential. Where vulnerable developments are proposed in Zones A & B the next stage of the Sequential Approach recommends Justification and Mitigation.

5.1 SFRA for Ballinrobe Area Plan

The main flood risks identified for lands which are the subject of the Ballinrobe Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

The River Robe runs through the town of Ballinrobe and is joined by Rathkelly river tributary from the east. The PFRA flood mapping for Ballinrobe shows extensive flooding of lands in and around the town centre from the River Robe. Much of this is within the 10% AEP flood outline. However, from discussions with the Area Office there has been no flood history of note so the 10% AEP seems too extensive. Floodmaps.ie only gives some locations of nearby turloughs, and nothing in relation to risk in the town. The OPW regional engineers also do not consider there to be any significant risk in Ballinrobe.

The river water levels in the town are generally controlled by the weir and footbridge structure by the derelict flour mill. This structure used to control the water flow into the mill but is no longer used in that manner. The structure no longer holds water at a high level upstream, but during high flows it will create significant afflux. It also has a high blockage risk as it is made up of several small openings. However the structure will be overtopped before existing property levels are reached.

The Bridge St bridge is a large structure at which the road and properties are raised high above the river. It seems unlikely there would be any significant risk in this area.

Zoning in Flood Risk Areas

The main flood risks identified for lands which are the subject of the Area Plan are from Fluvial flooding. Recent planning applications north of the Claremorris Rd have had to consider flood risk in their developments. This area is zoned "Enterprise & Employment" and "Residential". A Site Specific FRA would be required for any development in these areas, with the Sequential Approach recommending justification and mitigation.

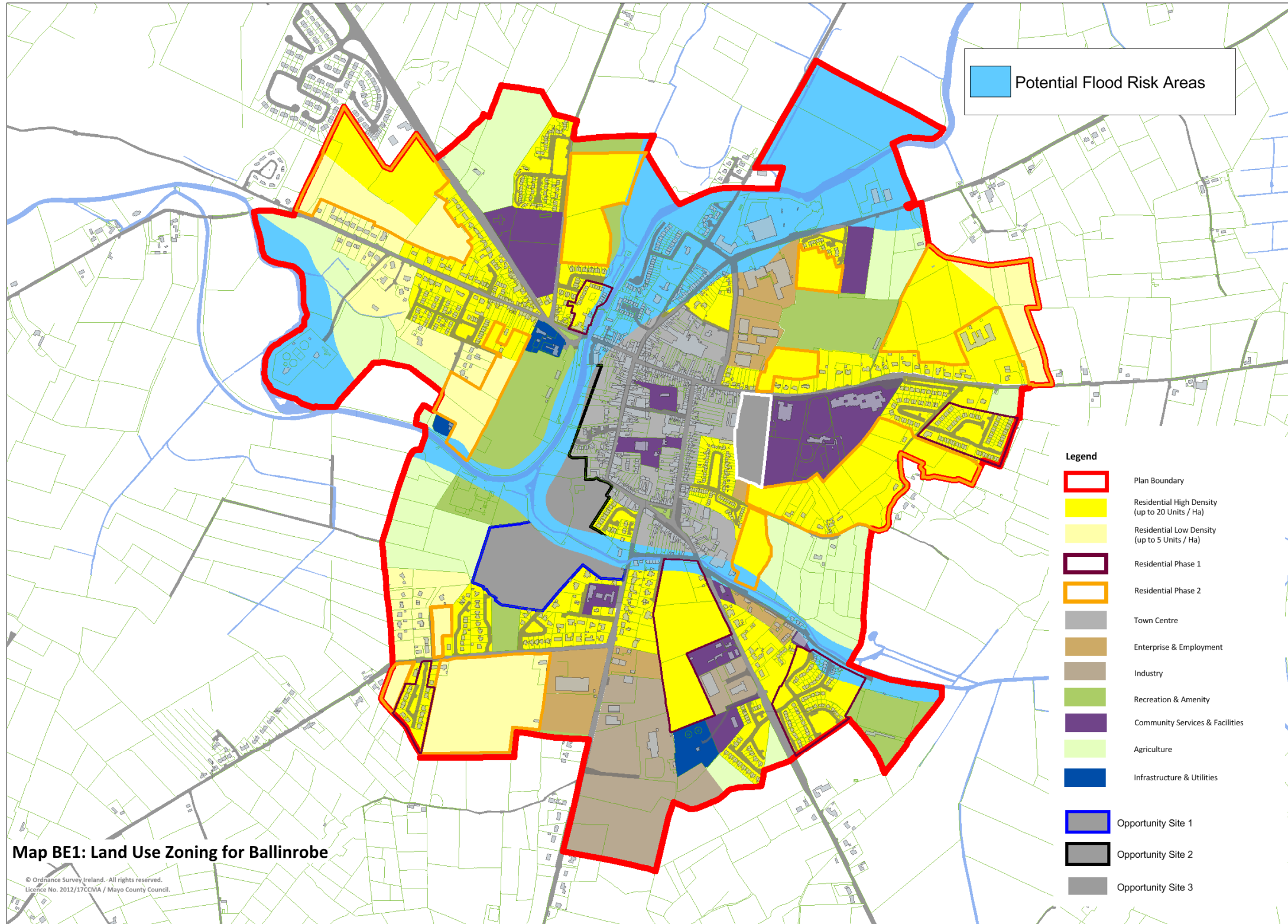
The land around the existing wastewater treatment works at the downstream extent of Ballinrobe is marked as being at risk in a 10% AEP event. This seems too frequent given the local topography but would likely be at risk in a 1% AEP event. These lands have been zoned "Agriculture", which is appropriate for this risk.

The Rathkelly River flows through the southern part of Ballinrobe before joining the River Robe. It flows through two key culverts under main roads. Both these culverts will restrict flows and may exacerbate water levels and flooding in these areas. Land in this area would be impacted, but without a flood history, the 10% PFRA flood outline in this area appears too extensive. The 1% AEP outline is however probably realistic. This area has various zonings and a Site Specific FRA would be required for any development in this area, with the Sequential Approach recommending justification and mitigation.

The areas zoned as "Recreation & Amenity" and "Agriculture" south of the town is appropriate.

Some Pluvial flooding has also been identified in various locations within the plan area. The Sequential Approach recommends mitigation in these instances.

DRAWING - PFRA MAPPING FOR BALLINROBE



5.2 SFRA for Ballyhaunis Area Plan

The main flood risks identified for lands which are the subject of the Ballyhaunis Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

The River Dalgan flows through Ballyhaunis town and is the main source of flood risk. This river flows from north to the south. The Friarsground watercourse is a tributary of the River Dalgan and enters it to the north east of Ballyhaunis town. The third watercourse in Ballyhaunis is the Abbeyquarter watercourse. This small watercourse flows to the east of Ballyhaunis and is a tributary of the Friarsground Watercourse. There is little published information on flood history in Ballyhaunis.

The PFRA mapping indicates that the area between the River Dalgan and Clare St./Clare Rd is at risk of flooding. It is noted that there is little difference between the 10% and 1% AEP outlines and based on (lack of) historic evidence it is likely that this outline over estimates flood risk at this location. However this area is considered to be at potential risk in a more extreme event as reflected in the 1% PFRA outline.

The PFRA mapping also shows an area at risk just upstream of Ballyhaunis Bridge. The main N83 road here forms a ridge of higher ground; out of bank river flow will flood lower ground on the right bank just upstream of the bridge.

Zoning in Flood Risk Areas

The areas around Clare St/Clare Rd have been zoned "Town Centre" and a Site Specific FRA would be required for any development in this area, with the Sequential Approach recommending justification and mitigation.

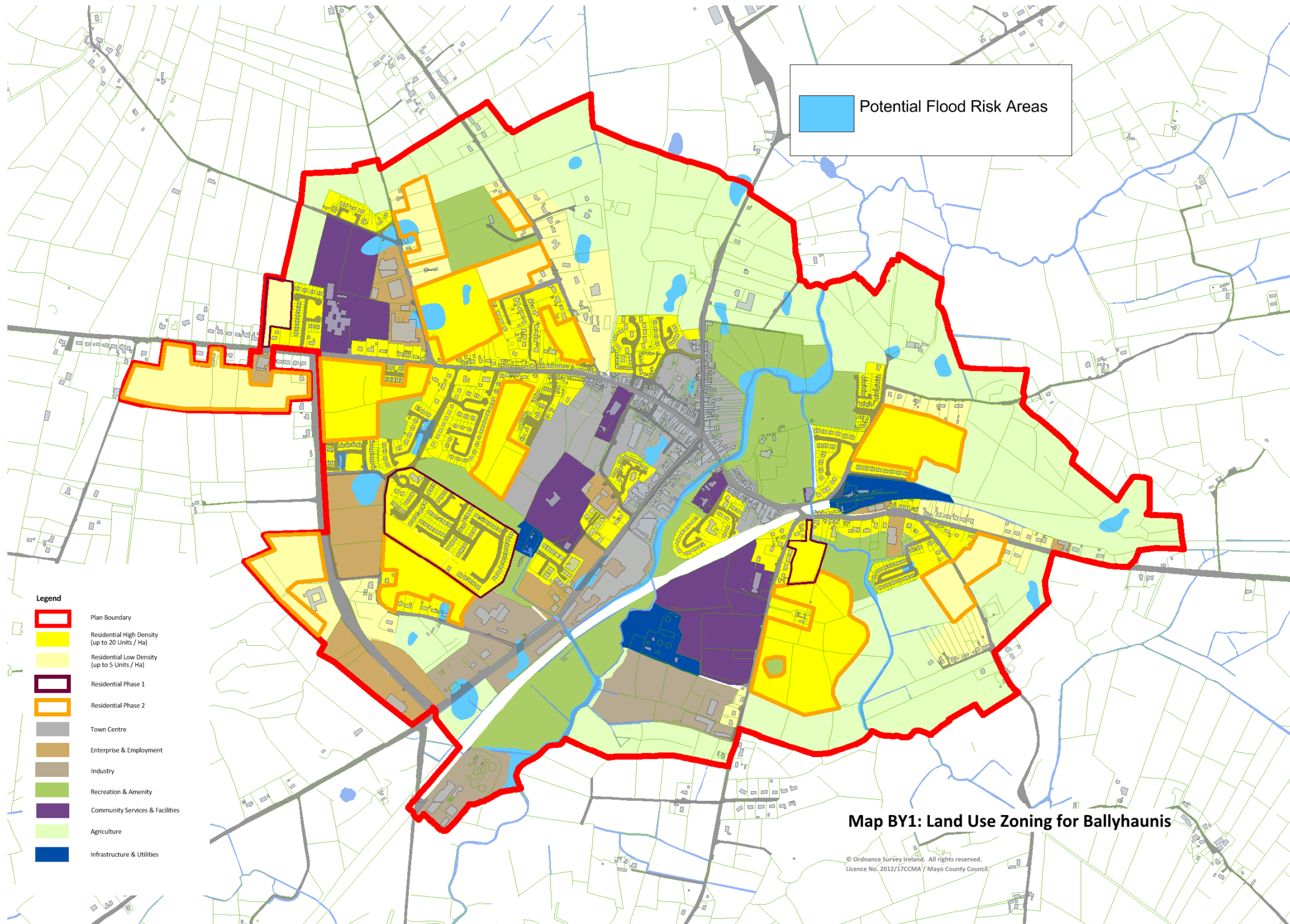
The initial results of the CFRAM flood study would suggest that the greatest risk of fluvial flooding is to the lands west of the Town Centre. These lands are zoned "Recreation & Amenity", which is appropriate. Any proposed development in the areas zoned "Town Centre", which are subject to flood risk, would require a specific Flood Risk Assessment, with the Sequential Approach recommending justification and mitigation.

Some Pluvial flooding has also been identified at various locations within the plan area. ~~on a small plot of land to the north west of the plan area.~~ The Sequential Approach recommends mitigation in these instances.

Note

Ballyhaunis is an Area for Further Assessment under the CFRAM Programme and Stage 2 Flood Risk Hazard Mapping and Stage 3 Flood Risk Management Plans will become available in 2014 towards the end of 2013 and 2015 respectively. This additional information will be used in assessing proposed development in areas of flood risk.

DRAWING - PFRA MAPPING FOR BALLYHAUNIS



5.3 SFRA for Belmullet Area Plan

The main flood risks identified for lands which are the subject of the Belmullet Area Plan were screened based on the available information detailed in Section 4.1.

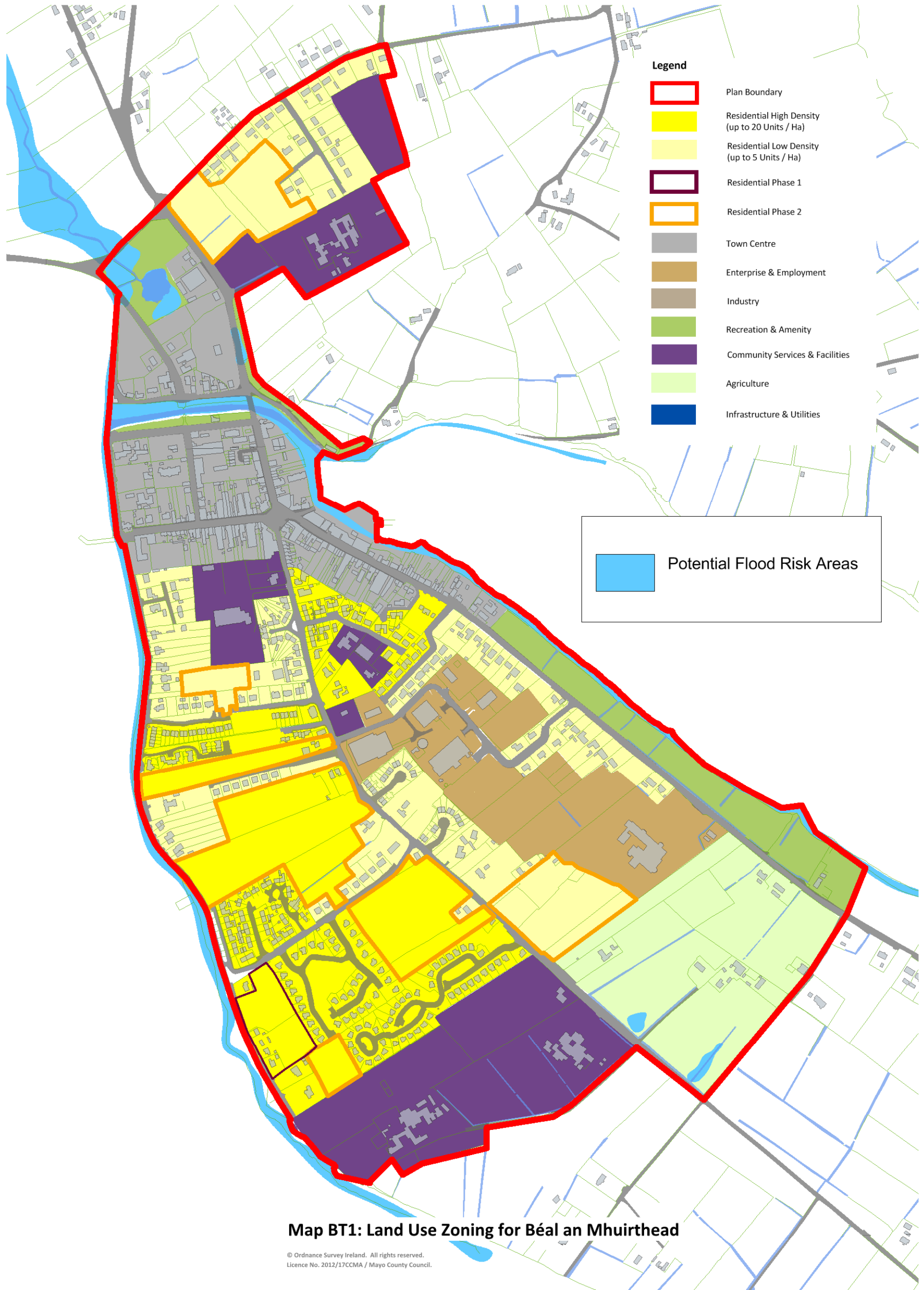
Sources of Flooding

The main flood risks identified for lands which are the subject of the Belmullet Area Plan relates to coastal flooding. The PFRA mapping indicates that the western and eastern boundaries of the plan are at risk of some coastal flooding. These areas have various zonings and a Site Specific FRA would be required for any development in this area, with the Sequential Approach recommending justification and mitigation.

Zoning in Flood Risk Areas

The more significant risk of coastal flooding is indicated either side of the canal linking Trawmore Bay and Broadhaven Bay. This area has been zoned as "Recreation & Amenity", which is appropriate.

DRAWING - PFRA MAPPING FOR BELMULLET



5.4 Stage 2 SFRA for Charlestown Area Plan

The main flood risks identified for lands which are the subject of the Charlestown Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

The main river and source of fluvial flooding in the town is the Mullaghanoe River which flows from the south to the north through the town. There are two tributaries of the Mullaghanoe River which are also sources of fluvial flood risk to lands within the plan area.

There is no documented historical flooding for Charlestown and it is difficult to make judgement on the PRFA mapping. There is no relevant fluvial historical flooding data, with local information indicating that it has been over 30 years since the last time the main watercourse caused any flooding. While the drainage works carried out on the Moy River, which the Mullaghanoe flows into, may have alleviated the risk of flooding for the higher frequency events, this does not mean that the areas identified as a risk of flooding are no longer at risk. The 10% AEP outlines are likely to be overly conservative considering the lack of records of flooding. The 1% AEP outlines differ from the 10% AEP outlines where the tributary north of the town flows near the Mullaghanoe River. It is suggested that areas initially identified in the 10% AEP could be considered at risk at somewhere between a 5% and 1% AEP event.

Zoning in Flood Risk Areas

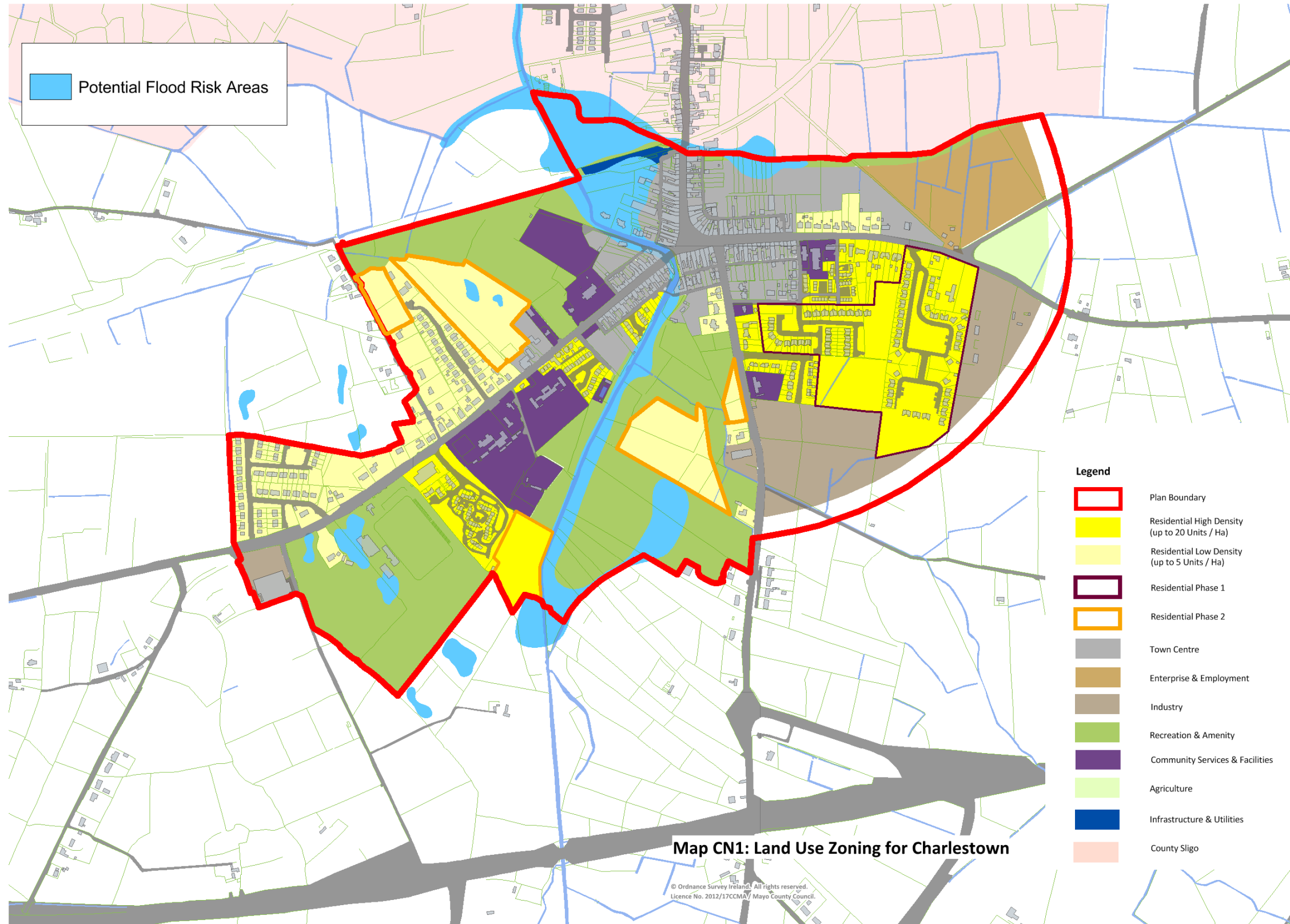
Areas zoned as "Town Centre" and "Light Industrial/Commercial", to the north east of the town centre, that are within the flood zones identified above, would require a site specific FRA for any proposed development, with the Sequential Approach recommending justification and mitigation.

Lands to the south of the town centre zoned "Recreation & Amenity" are appropriate. Those lands to the south zoned "Residential" and "Industry" would require a site specific FRA and the application of the Sequential Approach to any proposed developments.

Note

Charlestown is an Area for Further Assessment under the CFRAM Programme and Stage 2 Flood Risk Hazard Mapping and Stage 3 Flood Risk Management Plans will become available in 2014 towards the end of 2013 and 2015 respectively. This additional information will be used in assessing proposed development in areas of flood risk.

DRAWING - PFRA MAPPING FOR CHARLESTOWN



5.5 SFRA for Claremorris Area Plan

The main flood risks identified for lands which are the subject of the Claremorris Area Plan were screened based on the available information detailed in Section 4.1.

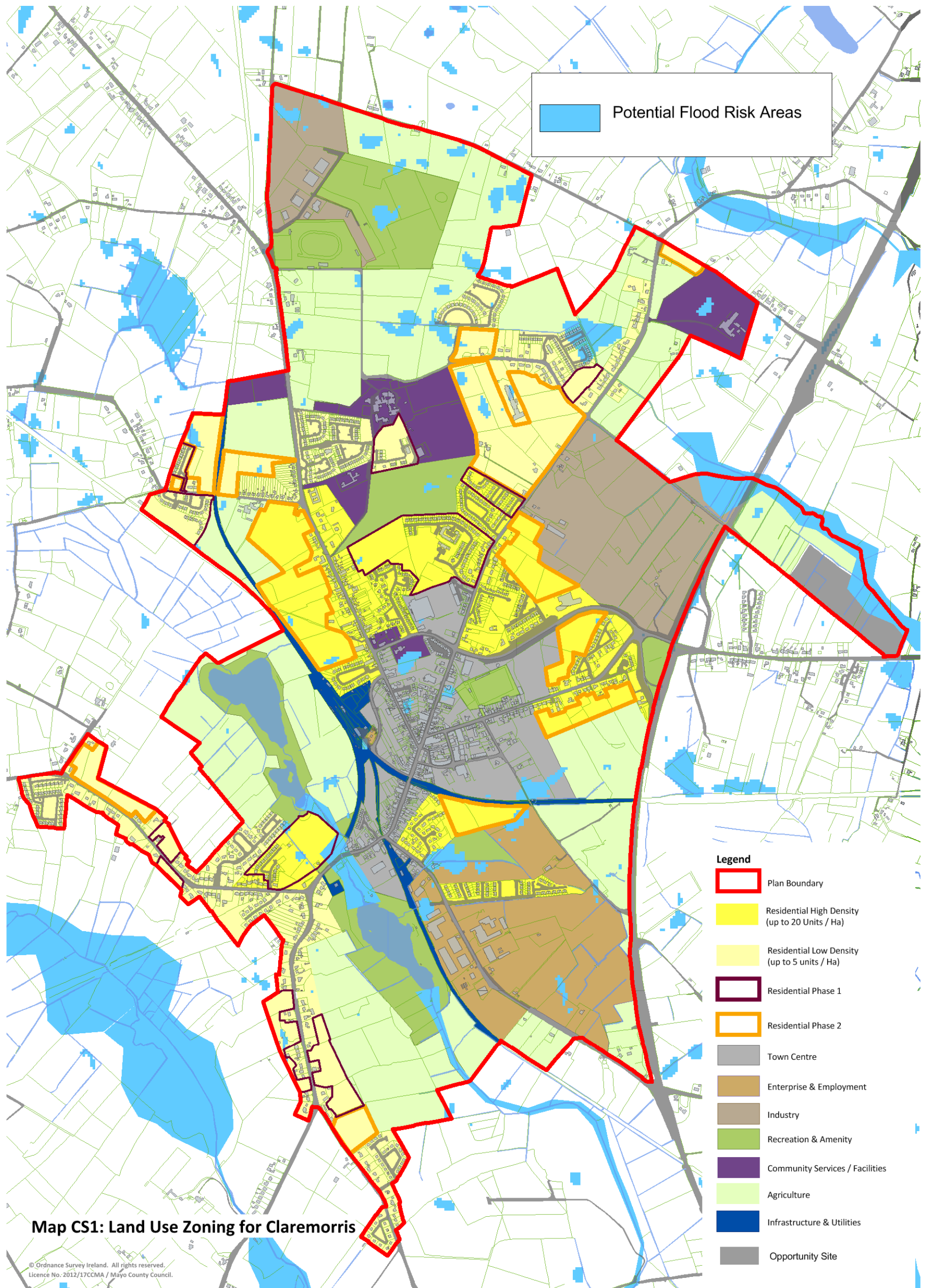
Sources of Flooding

The main risk is from Fluvial Flooding around the Mayfield and Clara Lakes. Other sources of flooding in the Plan area are generally from the Pluvial – Extreme category.

Zoning in Flood Risk Areas

The area around the Mayfield and Clara Lakes, in general has been zoned as “Recreation & Amenity”, which is appropriate. The area zoned “Residential High Density” to the south of Mayfield Lake, would require a site specific FRA for any proposed development, with the Sequential Approach recommending justification and mitigation.

The northern part of the plan area, where pluvial flooding is a risk, has been zoned “Agriculture” and “Recreation & amenity”, which is appropriate. In the areas zoned as “Town Centre”, and at risk of pluvial flooding, a site specific FRA is required for any proposed development, and the application of the Sequential Approach to the proposal.



5.6 Stage 2 SFRA for Kiltimagh Area Plan

The main flood risks identified for lands which are the subject of the Kiltimagh Area Plan were screened based on the available information detailed in Section 4.1.

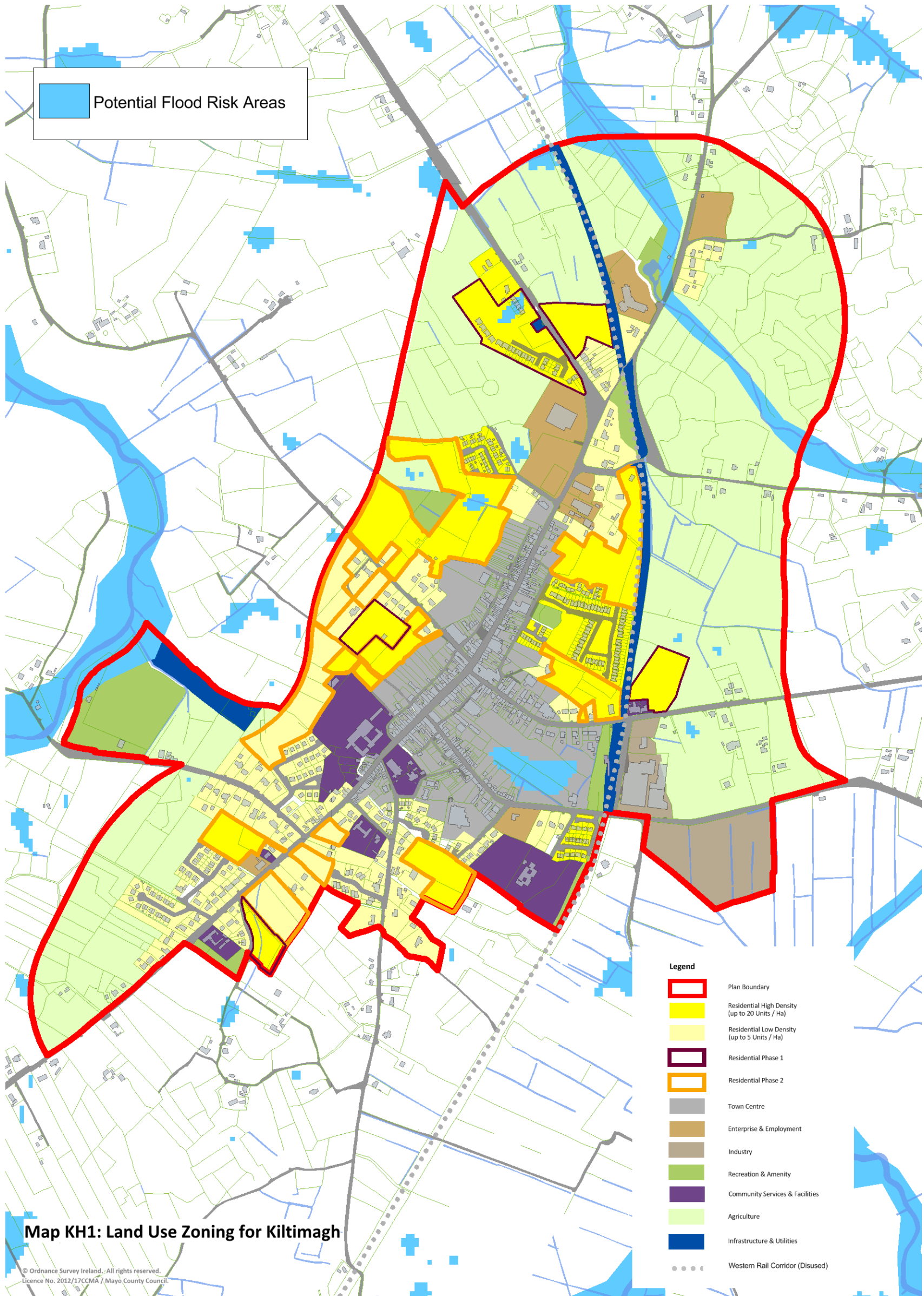
Sources of Flooding

Kiltimagh is surrounded by the Pollagh River to the west, the Yellow River to the south-east and the Glore River to the north-east. The PRFA map shows Fluvial flooding along each of these rivers. Some Pluvial flooding has also been identified on a small plot of undeveloped land between Thomas St. and James St., and is zoned Town Centre.

A proportion of benefiting lands have also been identified within the northern and western areas of the plan. The OS maps did not give any indication of flooding within or adjoining the boundary of the plan.

Zoning in Flood Risk Areas

In line with the Flood Guidelines, the flood risk areas identified in the PFRA maps have been zoned "Agriculture" and "Recreation & Amenity" respectively. Where lands are zoned "Town Centre" and are at risk of pluvial flooding, a site specific FRA is required for any proposed development, and the application of the Sequential Approach to the proposal.



5.7 Stage 2 SFRA for Killala Area Plan

The main flood risks identified for lands which are the subject of the Killala Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

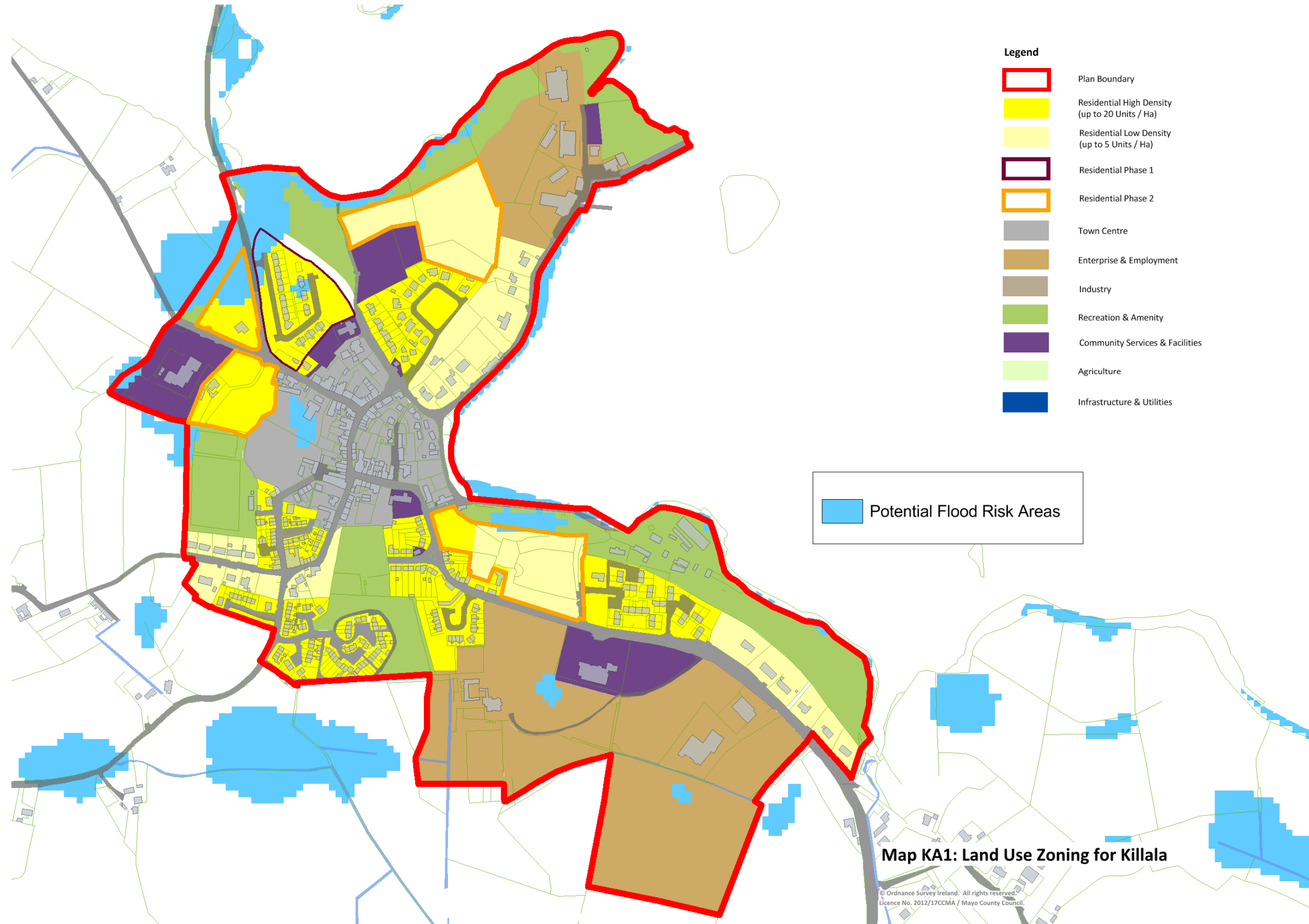
The PRFA map shows coastal and pluvial flooding within the area of the Killala Plan.

Zoning in Flood Risk Areas

Areas at risk of coastal flooding have been zoned "Recreation & Amenity", which is appropriate under the Flood Guidelines.

Some Pluvial flooding has also been identified on lands zoned as "Residential Low Density" to the north west of the plan. Any proposed development in this area would require a site specific FRA and the application of the Sequential Approach to the proposal.

DRAWING - PFRA MAPPING FOR KILALLA



5.8 Stage 2 SFRA for Knock Area Plan

The main flood risks identified for lands which are the subject of the Knock Area Plan were screened based on the available information detailed in Section 4.1.

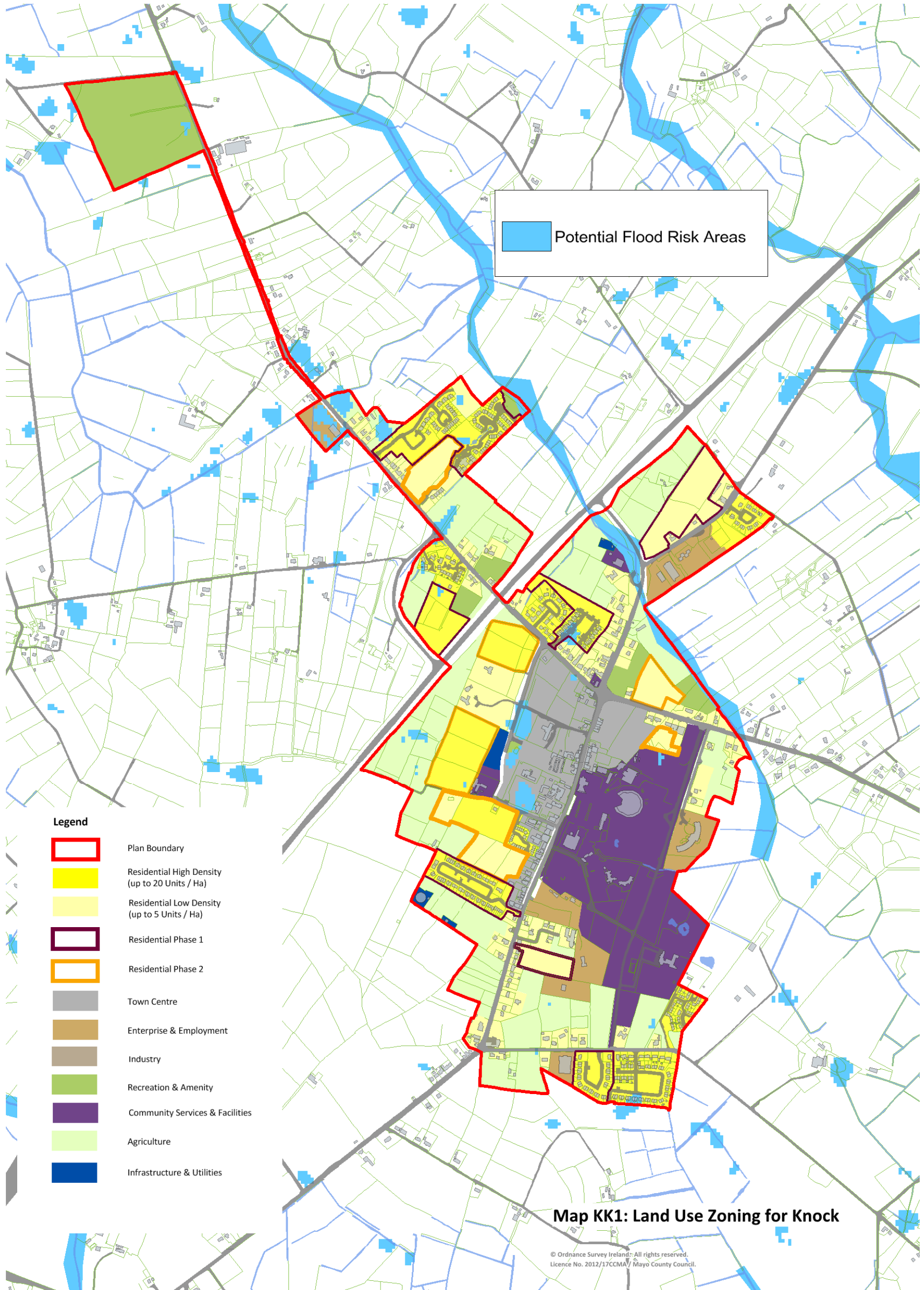
Sources of Flooding

The Yellow River is the main watercourse at Knock, and flows in a north westerly direction. The PRFA map shows that the principal flood risk in Knock is from flooding from this river. The Benefiting Lands map would indicate the same.

Zoning in Flood Risk Areas

In line with the Flood Guidelines, the areas at risk of fluvial flooding from the river have been zoned "Agriculture" and "Recreation & Amenity".

Some Pluvial flooding has also been identified on a small plot of undeveloped land and is zoned "Town Centre". Any proposed development in this area would require a site specific FRA and the application of the Sequential Approach to the proposal.



5.9 Stage 2 SFRA for Louisburgh Area Plan

The main flood risks identified for lands which are the subject of the Louisburgh Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

The Bunowen River is the main watercourse at Louisburgh, and flows in a north westerly direction, discharging into Clew Bay at Turlin Strand. The principal flood risk in Louisburgh is from flooding from this tidal river. Coastal flooding is also a risk with a potential risk of waves overtopping the sand dunes and contributing to the flood outline. However, these dunes are broad and high (generally higher than 8m).

Local knowledge confirms the general extent of the PFRA maps in the vicinity of the Louisburgh bridge and Louisburgh pier. Local shops located on Bridge Street have not been flooded, whereas premises at Louisburgh weir reported historical flooding. Flooding was reported to be due to a combination of high tide and high river flows.

The extent of the flood areas in the PFRA maps maybe slightly overestimated given the modest flood history, but sea level rise will result increasing flood frequency in future years.

Zoning in Flood Risk Areas

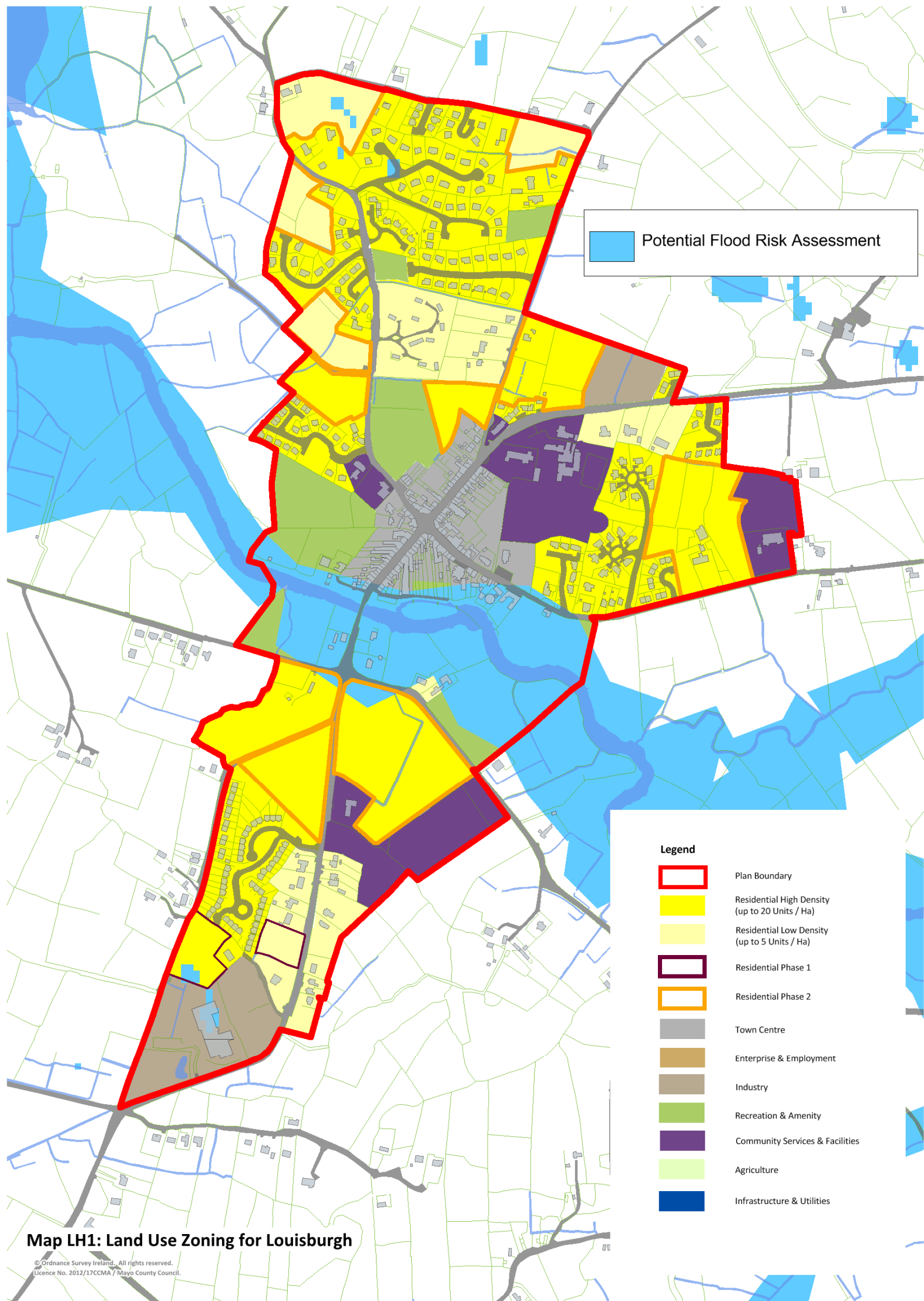
The lands adjacent to the Bunowen River are zoned "Recreation & Amenity", which is appropriate for the flood risk in this area. To the south of the River, part of the land zoned "Residential Low Density" is within the PRFA predicted 1% and 0.1% flood events, and a site specific FRA is required for any proposed development, with the Sequential Approach recommending justification and mitigation. Similarly, a small portion of the southern area of the lands zoned "Town Centre" are within the predicted 0.1% flood event, and would also be subject to a site specific FRA.

Two areas have been zoned "Residential" on the north-western boundary of the plan, which are potentially at risk of coastal flooding. The Sequential Approach should be applied to any proposed development in these areas.

Note

Louisburgh is an Area for Further Assessment under the CFRAM Programme and Stage 2 Flood Risk Hazard Mapping and Stage 3 Flood Risk Management Plans will become available in 2014 towards the end of 2013 and 2015 respectively. This additional information will be used in assessing proposed development in areas of flood risk.

DRAWING - PFRA MAPPING FOR LOUISBURGH



5.10 Stage 2 SFRA for Newport Area Plan

The main flood risks identified for lands which are the subject of the Newport Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

The fluvial flood extent from the PRFA maps covers the Newport River and extends up to the east of Newport Town. The river is under tidal influence and poses potential flood risk to lands within the Newport Area Plan. Local knowledge suggests that the fluvial flood extent is realistic.

The Collated information from Floodmaps indicates 5 incidents of flooding in the Newport area.

- Quays Road flooding and some property flooding due to high tides combined with storm conditions frequency 2/3 times a year.
- Road flooding on R311 just upstream of the N59 bridge and some property flooding due to high tides combined with storm conditions.
- Land flooding south of the R311 in vicinity of Drumlong area due to river overtopping its banks combined with high tide conditions.
- Roads, N59 and R317 and land flooding from a combination of high tides and heavy rain when the runoff cannot discharge through existing sluice to sea because of the tides.
- Road flooding west of the N59 in Carrowbeg South area as a result of high tides.

The review of the historical data and discussions with the OPW, Area Office and residents indicate that there is a strong historical evidence of frequent flooding at Newport. This flooding has affected a limited number of properties. However, there is potential for an increase in flood risk due to sea level rise and climate change effects.

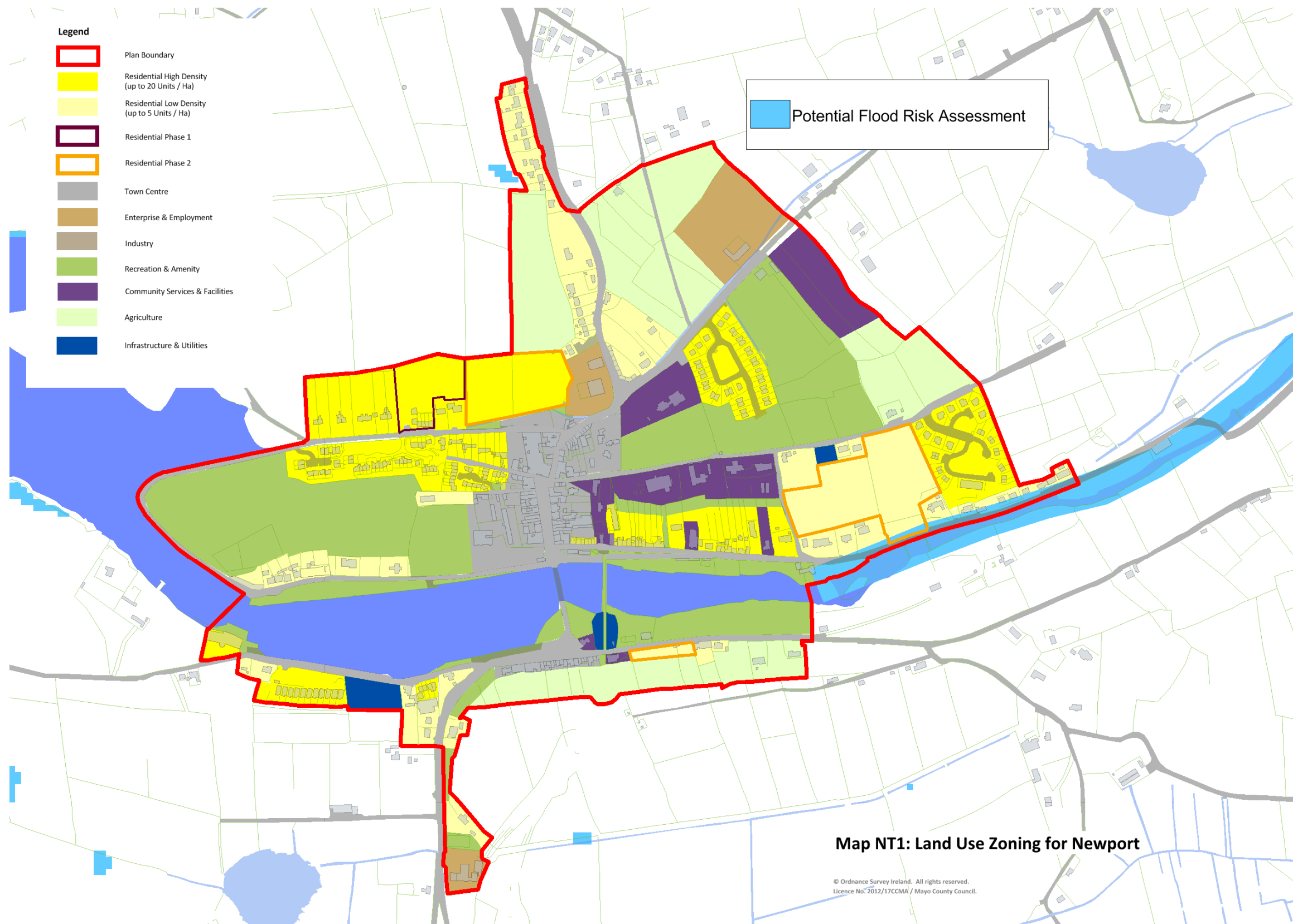
Zoning in Flood Risk Areas

The area north of George St. and along the Quay Rd is particularly at risk of flooding. The area zoned "Enterprise & Employment" and "Industry" within the PRFA predicted 1% and 0.1% flood events, would require a site specific FRA for any proposed development, with the Sequential Approach recommending justification and mitigation. Other areas along Quay Rd which are at risk of flooding are zoned "Recreation & Amenity", which is appropriate.

Note

Newport is an Area for Further Assessment under the CFRAM Programme and Stage 2 Flood Risk Hazard Mapping and Stage 3 Flood Risk Management Plans will become available in 2014 towards the end of 2013 and 2015 respectively. This additional information will be used in assessing proposed development in areas of flood risk.

DRAWING - PFRA MAPPING FOR NEWPORT



5.11 Stage 2 SFRA for Swinford Area Plan

The main flood risks identified for lands which are the subject of the Swinford Area Plan were screened based on the available information detailed in Section 4.1.

Sources of Flooding

Swinford Town is located in the River Moy Catchment. There are two watercourses at Swinford namely the Swinford River and an unnamed tributary. The Swinford River flows in a westerly direction and the unnamed tributary flows in a northerly direction and joins the Swinford River north of Swinford Town.

The PRFA map also shows Pluvial flooding – indicative and extreme events within the plan boundary. A large proportion of benefiting lands have also been identified in the plan area, however, the drainage works carried out on the Moy River may have alleviated the risk of flooding in these areas.

Historical flooding associated with the unnamed tributary occurred along Park Road and Riverside due to a blocked culvert in December 1999, which resulted in flood waters overspilling onto Park Road and flowing downhill along Riverside and towards the town centre.

Local knowledge suggests that no historical flooding has occurred in the last 10 years along the Swinford River in the Dun Na Ri Estate. However, the general area is relatively low lying and there are a number of river crossings with potential risk of blockage suggesting that the area is potentially at flood risk.

Zoning in Flood Risk Areas

Lands adjacent to the Swinford River south of the town centre and that are zoned “Residential” are within an area of flood risk. A site specific FRA would be required for any proposed development on these lands, with the Sequential Approach recommending justification and mitigation. Some of the land in this area is zoned “Recreation & Amenity”, which is appropriate.

Similarly, lands zoned “Town Centre” and within the PRFA predicted 1% and 0.1% flood events, would be subject to a site specific FRA and the application of the Sequential Approach. Lands zoned “Recreation & Amenity” along the unnamed tributary are appropriate.

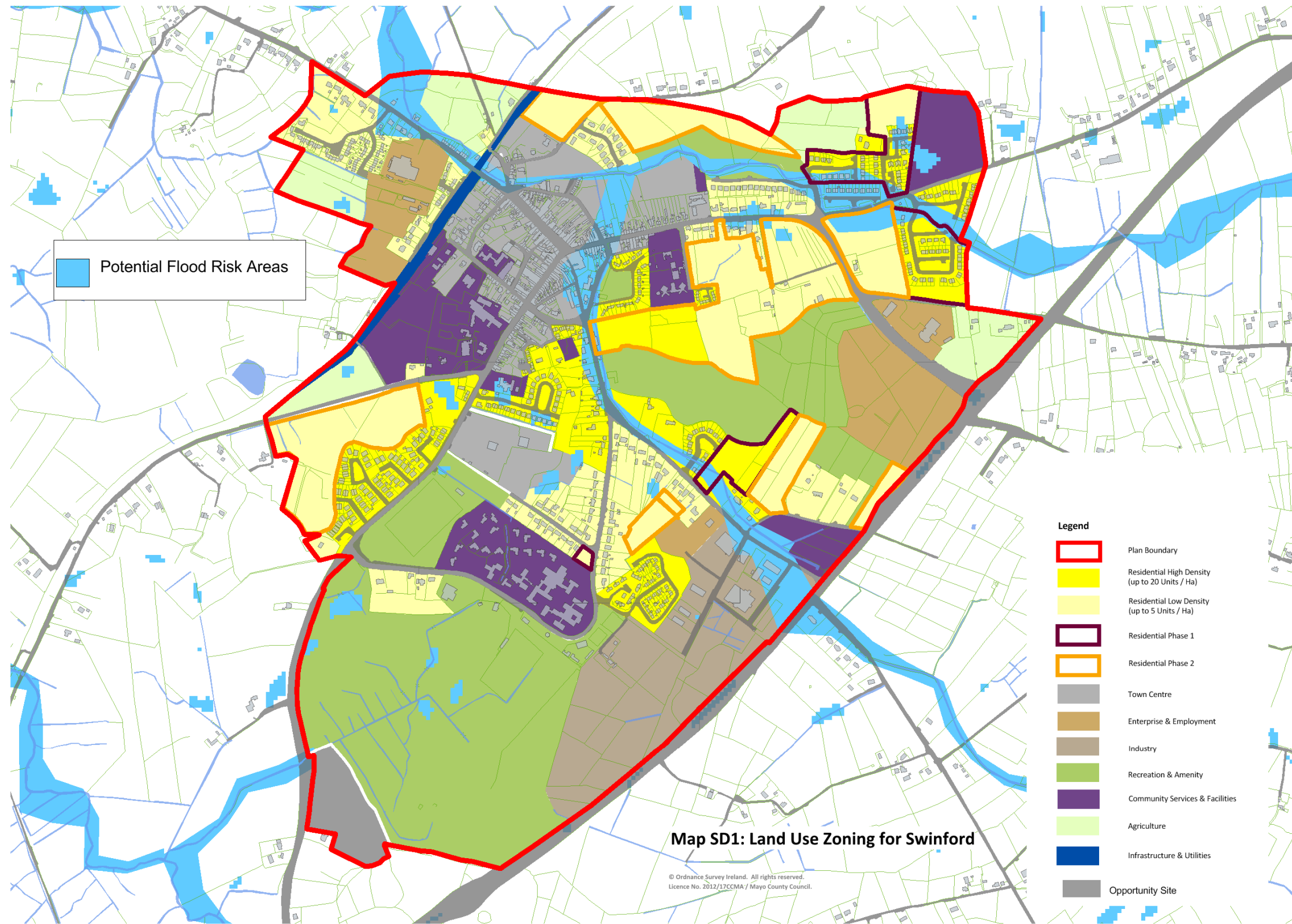
Lands to the north west of the town along the Swinford River have various zonings. Lands zoned “Agriculture” are appropriate, while those lands zoned “Enterprise & Employment” and “Residential – Low Density” would be subject to a site specific FRA and the application of the Sequential Approach for any new developments.

Note

Swinford is an Area for Further Assessment under the CFRAM Programme and Stage 2 Flood Risk Hazard Mapping and Stage 3 Flood Risk Management Plans will become available in 2014 towards the end of 2013 and 2015 respectively. This

additional information will be used in assessing proposed development in areas of flood risk.

DRAWING - PFRA MAPPING FOR SWINFORD



6.0 FLOOD RISK MANAGEMENT IN COUNTY MAYO

The draft Mayo County Development Plan 2014 – 2020 sets out policies and Development Management Guidance relating to flood risk management including restricting inappropriate development in areas at risk of flooding or development that would cause or exacerbate such a risk.

The Council will adhere to the Guidelines for Planning Authorities '*The Planning System and Flood Risk Management*' (DoEHLG/OPW) both at the strategic level in informing land use; and in the assessment of planning proposals for development through such measures as:

- Avoidance of development in areas at risk of flooding, unless there are proven sustainability grounds that justify an appropriate land use and where flood risk can be reduced or managed to an acceptable level without impacting elsewhere
- Adopting a sequential approach to flood risk management based on avoidance, reduction of flood risk and mitigation of flood risk
- Incorporating flood risk assessment into the development management process in accordance with the Guidelines.

The policy of the draft Mayo County Development Plan 2014 – 2020 relating to flood risk management including restricting inappropriate development in areas at risk of flooding or development that would cause or exacerbate such a risk, include a requirement for a Site Specific Flood Risk Assessment to be required for all planning applications that are:

- In or within 50m of Flood Zone A and Flood Zone B
- In or within 10m of both the Pluvial Indicative and Extreme events
- In or within 25 of Benefitting Land

A Site Specific Flood Risk Assessment may, as appropriate, be required in other situations as the need arises.

6.2 The Role of the Applicant and their Agent

The applicant and their agent is primarily responsible for assessing whether there is a flood risk issue and how it will be addressed in the development they propose. In accordance with the recommendations of the *Planning System and Flood Risk Management-Guidelines for Planning Authorities* (DEHLG and OPW, 2009), the applicant and their agents will be required to:

- Carefully examine their development proposals to ensure consistency with the requirements of the Guidelines, including researching whether there have been instances of flooding or there is the potential for flooding on the site and declare any known flood history on the planning application form as required by the Planning and Development Regulations 2001 (as amended).

- Engage with the Council at the earliest stage through the pre-planning consultation process with regard to any flood risk assessment issues that may arise.
- Carry out a site-specific flood risk assessment, as appropriate, and comply with the terms and conditions of any grant of planning permission with regard to the minimisation of flood risk.

a) Pre-Application Discussions

Pre-application discussions will be important in identifying the broad range of issues affecting a site and present an opportunity for the Council to make clear to the applicant that an appropriate flood risk assessment should be carried out as part of the application preparation process. It is recommended that where flood issues are present, the Council should highlight the objectives of the Development Plan in relation to flood risk and the available information on flood zones.

b) Site-Specific Flood Risk Assessment

Flood risk assessment at site-specific level in areas at risk of flooding is required. The detail required in the assessment will depend on the level of flood risk and scale of development.

The detailed site-specific flood risk assessment should quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks. Information in relation to, and the requirements of site-specific flood risk assessment and potential sources of information, is contained in the Technical Appendices of the *Planning System and Flood Risk Management Guidelines for Planning Authorities* (DEHLG, OPW, 2009).

c) Development Management Justification Test

Where the Council is considering proposals for new development in areas at high or moderate risk of flooding that include types of development that are vulnerable to flooding and that would generally be inappropriate, the Council must be satisfied that the development satisfies all of the criteria of the Development Management Justification Test as set out in Section 5.15 of the *Planning System and Flood Risk Management-Guidelines for Planning Authorities* (DEHLG and OPW, 2009).

d) Mitigation and Management

Any proposal in an area at moderate or high risk of flooding that is considered acceptable in principle must demonstrate that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels. Addressing flood risk in the design of new development should consider the following:

- Locating development away from areas at risk of flooding, where possible.

- Substituting more vulnerable land uses with less vulnerable uses.
- Identifying and protecting land required for current and future flood risk management, such as conveyance routes, flood storage areas and flood protection schemes etc.
- Addressing the need for effective emergency response planning for flood events in areas of new development.

Site layout, landscape planning and drainage of new development must be closely integrated to play an effective role in flood-reduction. As such, proposals should clearly indicate:

- The use of Sustainable Drainage Systems (SuDS) to manage surface water run-off.
- Water conveyancing routes free of barriers such as walls or buildings.
- The signing of floodplain areas to indicate the shared use of the land and to identify safe access routes.

To ensure that adequate measures are put in place to deal with residual risks, proposals should demonstrate the use of flood-resistant construction measures that are aimed at preventing water from entering a building and that mitigate the damage floodwater causes to buildings. Alternatively, designs for flood resilient construction may be adopted where it can be demonstrated that entry of floodwater into buildings is preferable to limit damage caused by floodwater and allow relatively quick recovery. Such measures include the design and specification of internal building services and finishes. Further detail on flood resilience and flood resistance are included in the Technical Appendices of the *Planning System and Flood Risk Management-Guidelines for Planning Authorities* (DEHLG and OPW, 2009).