



Strategic Flood Risk Assessment

**Ireland West Airport Knock Local
Area Plan 2012 – 2018**

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Table of Contents

Section 1:	Overview of the Guidelines	4
1.1	Introduction	4
1.2	Purpose of the Guidelines.....	4
1.3	Core Objectives of the Guidelines	5
1.4	The Flood Risk Assessment Process	5
1.4.1	Scales Used for Flood Risk	5
1.4.2	The Sequential Approach.....	6
1.4.3	The Plan Making Justification Test.....	8
1.4.4	The Stages of a Strategic Flood Risk Assessment.....	9
1.4.5	Key Outputs from the SFRA	10
Section 2:	Strategic Flood Risk Assessment.....	11
2.1	Introduction	11
2.2	Stage 1 Flood Risk Identification.....	11
2.2.1	Office of Public Works.....	11
2.2.2	6" (1:10560) Ordnance Survey Maps.....	12
2.2.3	Aerial Photography.....	12
2.2.4	Public Consultations / Local Authority Personnel.....	12
2.2.5	Other Sources of Information	13
2.3	Stage 2 Initial Flood Risk Assessment.....	13
2.3.1	Assessment of Flood Risks Identified for Ireland West Airport Knock .	13
2.3.2	Land Use Strategy for the Ireland West Airport Knock LAP.....	13
2.3.3	Flood Risk and Surface Water Management.....	15
2.3.4	Flooding Outside of the Ireland West Airport Knock LAP.....	16
2.4	Conclusion	16
Tables		
Table 1	Classification of vulnerability of different types of development	5
Table 2	Vulnerability vs Flood Zone	5
Table 3	Flood Risk Assessment Stages	7
Figures		
Fig. 1	Sequential approach principles in Flood Risk Management	4
Fig. 2	Sequential approach mechanism in the planning process	6
Maps		
Map 1	Showing Rivers, Lakes and Benefitting Lands	9
Map 2	Draft Preliminary Flood Risk Assessment Maps	10
Map 3	Land Use Zoning	11

Section 1: Overview of the Guidelines

1.1 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 and have a wide community impact.

The following documents have been used in the preparation of this assessment:

- The Planning System and Flood Risk Management, Guidelines for Planning Authorities, DoEHLG, 2009
- The Planning System and Flood Risk Management Guidelines for Planning Authorities; Technical Appendices; DoEHLG, 2009

The Planning System and Flood Risk Management Guidelines 2009 have been issued by the Minister of the Environment, Heritage and Local Government under Section 28 of the Planning and Development Act 2000, as amended. Planning Authorities and An Bord Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts. They are also required to make the guidelines available for inspection by members of the public. These Guidelines supersede previous interim guidance on flooding in Appendix E to the Development Plan Guidelines in 2007.

1.2 Purpose of the Guidelines

The Planning System and Flood Risk Management Guidelines 2009 introduce comprehensive mechanisms, such as Strategic Flood Risk Management (SFRA), for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is achieved through actions at the national, regional, local and site specific levels.

At City and County Level:

- Planning authorities will introduce flood risk assessment as an integral and leading element of their development planning functions under the Planning Code and at the earliest practicable opportunity in line with the requirements of these Guidelines.
- The new flood risk assessment system will be aligned with the existing Strategic Environmental Assessment (SEA) process introducing processes for identifying flood risk and determining what flood risk assessment is required and carrying out such assessments similar to the overall system for screening and scoping under the SEA process.
- City and county development plans will establish the flood risk assessment requirements for their functional areas including other planning authorities such as Town Councils and any local area plans (LAP) which may be supplemented by more detailed site-specific flood risk assessment required to comply with these Guidelines.
- Planning authorities will assess planning applications for development in accordance with the provisions of these Guidelines following the guidance of their own or any OPW Strategic Flood Risk Assessment and the application of the sequential approach and, if necessary, the Justification Test required by these Guidelines.
- Planning authorities will ensure that development is not permitted in areas of flood risk, particularly floodplains, except where there are no suitable alternative sites available in areas at lower risk that are consistent with the objectives of proper planning and sustainable development. Where such development has to take place, in the case of urban regeneration for example, the type of development has to be carefully considered and the risks should be mitigated and managed through location, layout and design of the development to reduce flood risk to an acceptable level.

- Planning authorities will ensure that only developments consistent with the overall policy and technical approaches of these Guidelines will be approved and permission will be refused where flood issues have not been, or cannot be, addressed successfully and where the presence of unacceptable residual flood risks to the development, its occupants or users and adjoining property remains. Under the Planning and Development Act 2000, planning permission refused for the reason that the proposed development is in an area which is at risk of flooding excludes compensation.

1.3 Core Objectives of the Guidelines

The Core Objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding
- Avoid new development increasing flood risk elsewhere, including that which may arise from surface water run-off
- Ensure effective management of residual risks for development permitted in flood plains
- Avoid unnecessary restriction of national, regional or local economic and social growth
- Improve the understanding of flood risk among relevant stakeholders
- Ensure that the requirements of EU and national law in relation to all natural environment and nature conservation are complied with at all stages of flood risk management.

These Guidelines outline methodologies for the transparent consideration of flood risk at all levels of the Planning Process, ensuring consistency of approach throughout the country. The Guidelines will contribute to the avoidance of minimisation of potential flood risk through a more systematic approach within a river catchment process.

The Key Principles are to:

- Avoid risk, where possible
- Substitute less vulnerable uses, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

1.4 The Flood Risk Assessment Process

1.4.1 Scales Used for Flood Risk

Flood Risk Assessments (FRA) is required at different scales by different organisations for many different purposes. A hierarchy of assessments is necessary to ensure a proportionate response to the needs of organisations by avoiding the need for detailed and costly assessments prior to making strategic decisions.

Regional Flood Risk Appraisal (RFRA)

RFRA provides a broad overview of the source and significance of all types of flood risk across a region and also highlights areas where further more detailed study will be required. At this level, they are an appraisal and not an assessment.

Strategic Flood Risk Assessment (SFRA)

SFRAs are necessary for Development Plans and Local Area Plans and provide a broad (area-wide) assessment of all types of flood risk to inform strategic land use planning decisions. SFRAs enable the local authority to undertake a sequential approach, including the Justification Test, allocate appropriate sites for development and identify how flood risk can be reduced as part of the development plan process. The level of detail will differ between plans.

Site-specific Flood Risk Assessment (Site FRA)

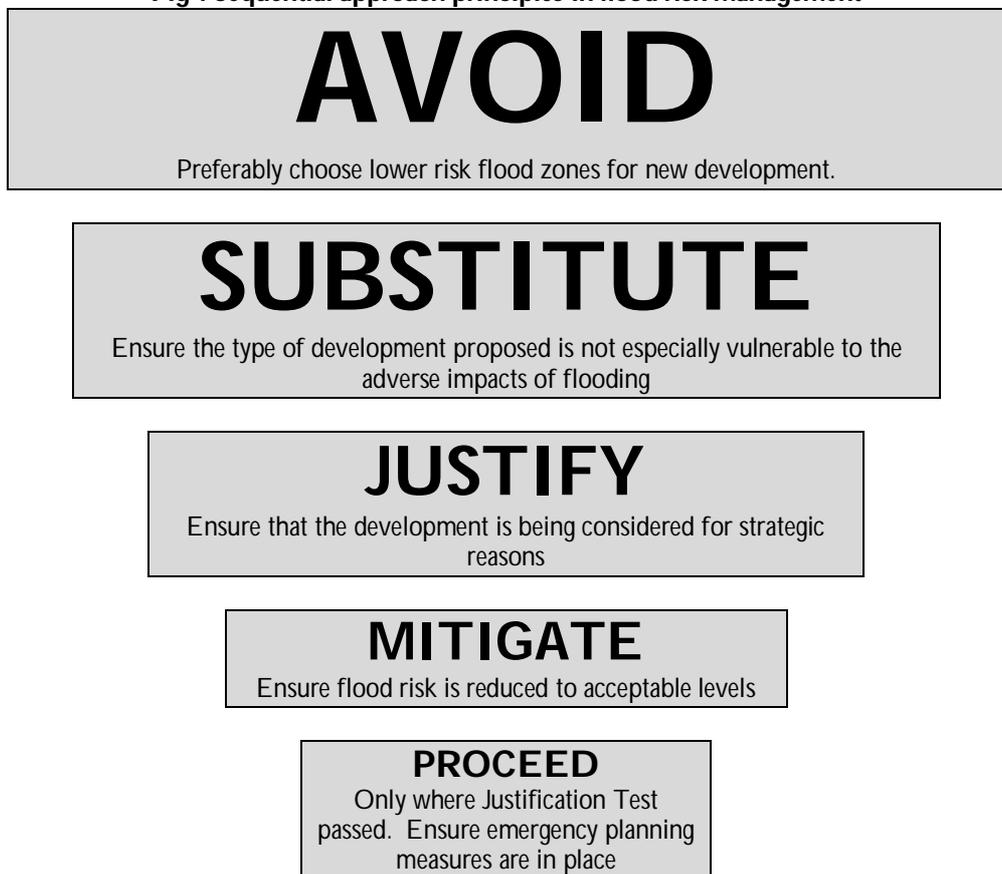
To assess all types of flood risk for a new development. FRAs identify the sources of flood risk, the effects of climate change on this, the impact of the development, the effectiveness of flood mitigation and management measures and the residual risks that remain after those measures are put in place. Must be carried out in all areas where flood risk has been identified but level of detail will differ if SFRA at development plan level has been carried out.

A Strategic Flood Risk Assessment is the level of assessment required for the Local Area Plan Level.

1.4.2 The Sequential Approach

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

Fig 1 Sequential approach principles in flood risk management



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.

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 these 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);

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 1 below:

Table 1: Classification of vulnerability of different types of development

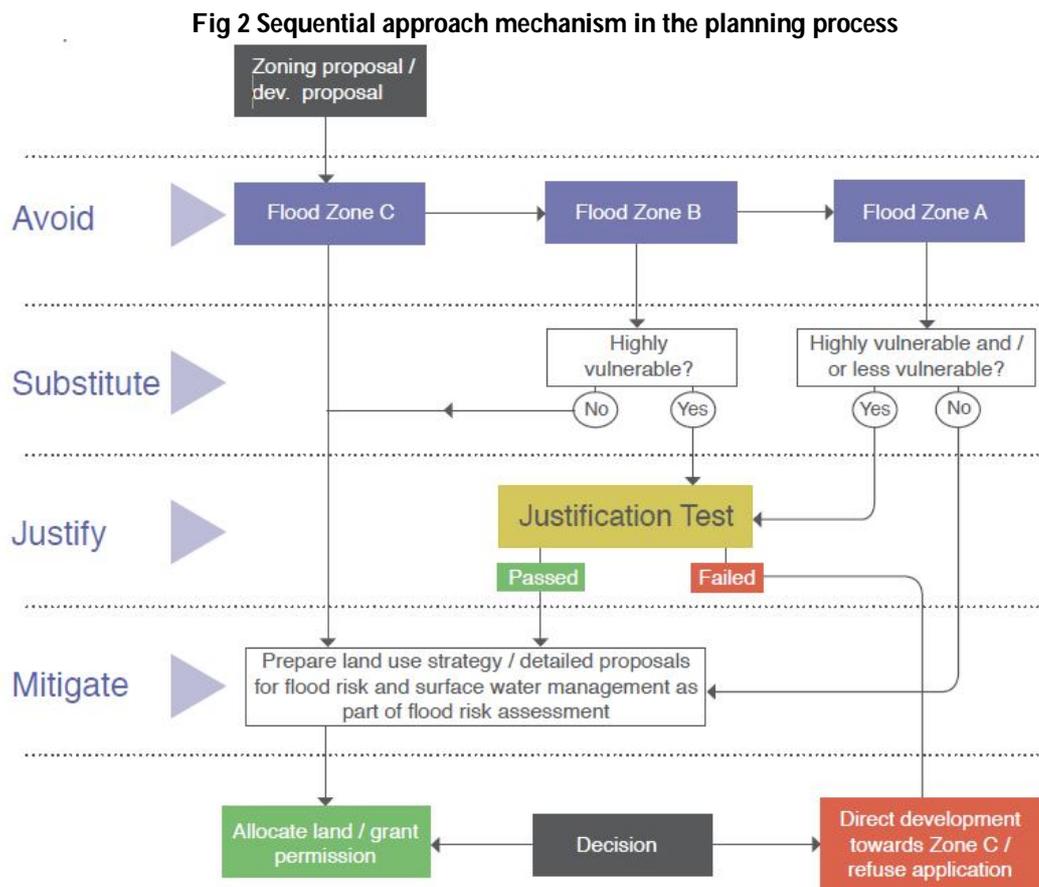
Vulnerability Class	Land uses and types of development which include*:
Highly Vulnerable Development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling 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 below shows vulnerability versus flood zone to illustrate appropriate development and when to apply the Justification Test

Table 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 describes the mechanism for using the sequential approach in the Planning process.



1.4.3 The Plan Making 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 (JUSTIFICATION) The Plan-Making 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, 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.

1.4.4 The Stages of a Strategic Flood Risk Assessment

A staged approach should be adopted, carrying out only such appraisal and or assessment as is needed for the purposes of decision-making at the regional, development and local area plan levels, and also at the site specific level. 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 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 determine what surveys and modeling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river or coastal models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures;

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, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of hydraulic model of the river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

Table 3 Flood Risk Assessment Stages

	Flood Risk Identification	Initial Flood Risk Assessment	Detailed Flood Risk Assessment
Regional Flood Risk Appraisal	✓	U	U
Strategic Flood Risk Assessment County Plan	✓	P	U
Strategic Flood Risk Assessment Town Plan or LAP	✓	✓	P
Site-specific Flood Risk Assessment	✓	✓	✓

- P** Probably needed to meet the requirements of the Justification Tests
U Unlikely to be needed
 ✓ Required to be undertaken

1.4.5 Key Outputs from the SFRA

The Key outputs are:

- To provide for an improved understanding of flood risk issues within the Development Plan and development management process, and to communicate this to a wide range of stakeholders;
- To produce an assessment of existing flood defence infrastructure and the consequences of failure of that infrastructure and to identify areas of natural floodplain to be safeguarded;
- To produce a suitably detailed flood risk assessment that supports the application of a sequential approach in key areas where there may be tension between development pressures and avoidance of flood risk;
- To inform, where necessary, the application of the Justification Test;
- To conclude whether measures to deal with flood risks to the area proposed for development can satisfactorily reduce the risks to an acceptable level while not increasing flood risk elsewhere;
- To produce guidance on mitigation measures, how surface water should be managed and appropriate criteria.

Section 2: Strategic Flood Risk Assessment

2.1 Introduction

This Strategic Flood Risk Assessment has been carried out for the Ireland West Airport Knock Local Area Plan 2012-2018. It provides an appraisal and assessment of available flood risk data for the land use proposals within the boundary of the Ireland West Airport Knock LAP. The process identifies flood risk indicators in each area and where it is demonstrated that lands may be at risk of flooding, recommends modifications to land-use proposals or the carrying out of more detailed flood risk assessment as appropriate.

2.2 Stage 1 Flood Risk Identification

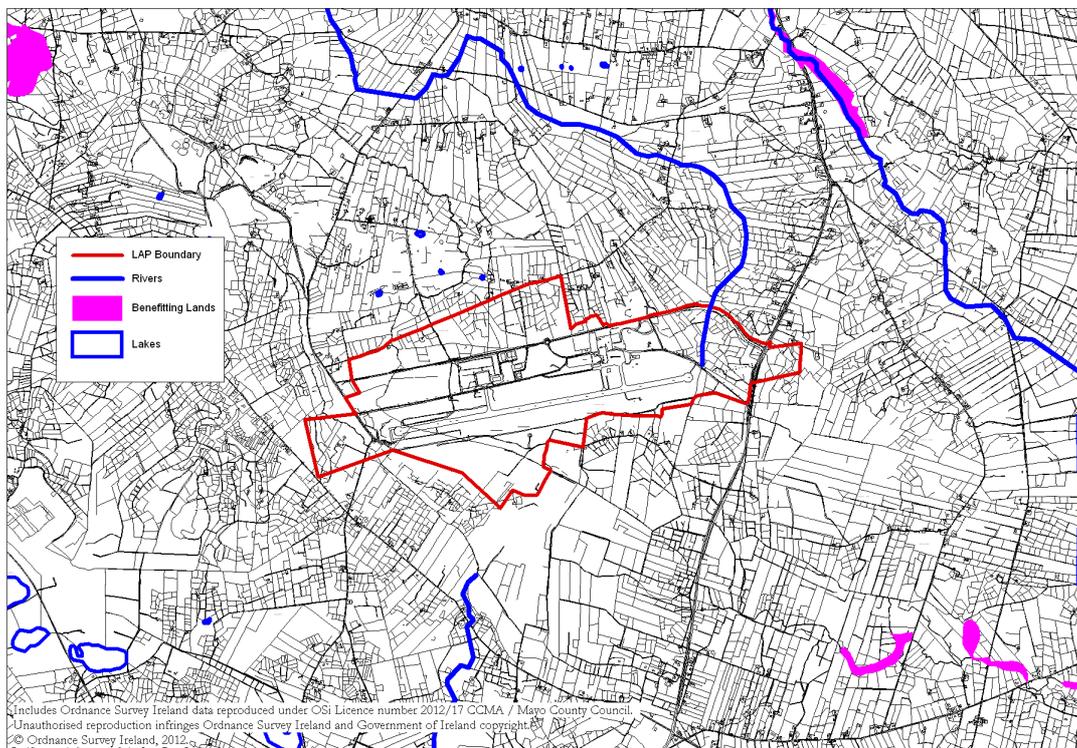
This Section identifies whether there may be any flooding or surface water management issues related to the plan area that may warrant further investigation. The following sources of information were used to identify possible flood risk for the Ireland West Airport Knock LAP.

2.2.1 Office of Public Works

The OPW is currently undertaking flood risk assessment mapping showing areas of significant Flood Risk in collaboration with the Local Authorities.

As part of the National Flood Risk Management Policy, the OPW developed the www.floodmaps.ie web based data set which contains information concerning historical flood data and displays related mapped information and provides tools to search for and display information about selected flood events. The nearest flooding event recorded on www.floodmaps.ie is located 4 km away to the North West of Ireland West Airport Knock LAP at Killaturly Lough. No other flooding event is identified within the 4km radius of the Ireland West Airport Knock boundary. Map 1 below shows the locations of river, lakes and benefitting lands.

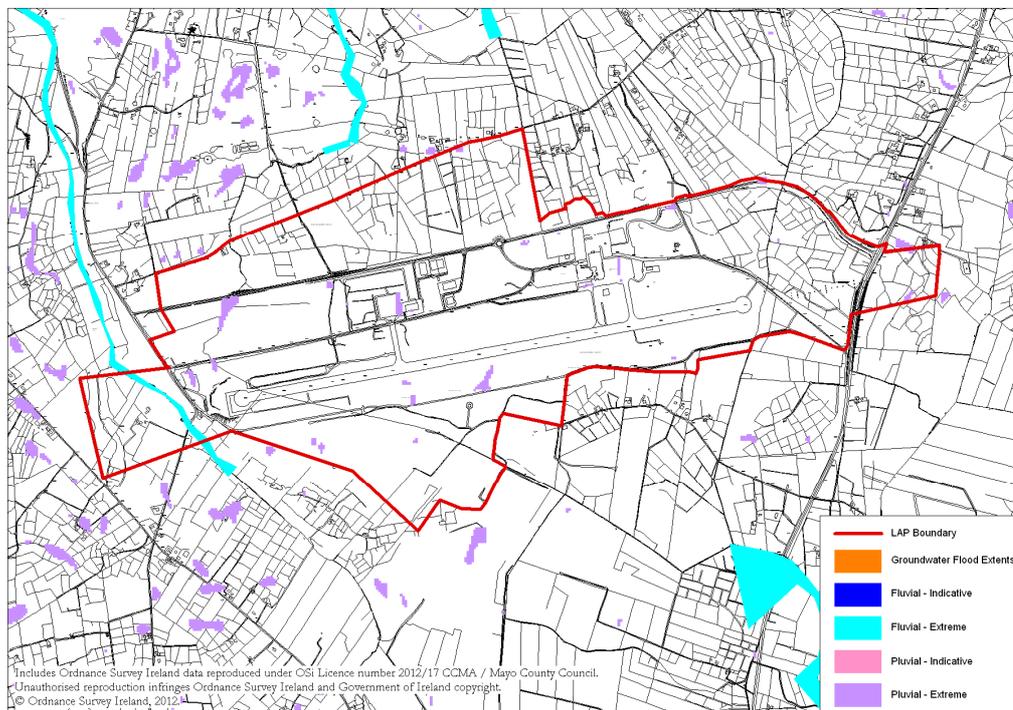
Map 1: showing rivers, lakes and benefitting lands



Map 1 shows that there is one river that starts within the LAP boundary to the East of the existing runway; this is classified as a second order stream that is a tributary of the Sonnagh River to the North of the LAP boundary. There are no benefitting lands located within or near the LAP boundary.

Draft Preliminary Flood Risk Assessment Maps are now available from the OPW. Map 2 shows the PFRA data for the area around the airport.

Map 2: Draft Preliminary Flood Risk Assessment Map



The PFRA maps indicate that there are both Fluvial (river flooding) and Pluvial (surface Water) events in and adjoining the LAP boundary.

The OPW will have flood hazard mapping by the end of 2013 and Flood Risk Management Plans by the end of 2015.

2.2.2 6" (1:10560) Ordnance Survey Maps

6" Ordnance Survey maps include areas which are marked as being "Liable to Floods" the exact areas are not delineated but give an indicative indication of areas which have undergone flooding in the past. The OS maps associated with the Ireland West Airport Knock LAP did not give any indication of flooding within or adjoining the LAP boundary.

2.2.3 Aerial Photography

Aerial photography from the Ordnance Survey does not give any indications of flooding events at this location.

2.2.4 Public Consultations / Local Authority Personnel

As part of the Plan making process, a public consultation day was held for members of the public to highlight any relevant issues. Written submissions were also invited as part of the process. The Public consultation process highlighted three areas where flooding occurred that are not recorded on any mapping. The first is to the North of the Plan boundary where a local road floods, caused by the adjoining drain to overflow, during heavy rainfall, prior to discharging to a nearby stream. The second location identified is to the West of the Runway where ponding occurs, again just after heavy rainfall. The third relates to lands across from the N17 which floods, again after heavy rain.

The first and second flooding events have been confirmed by local authority personnel and the third would appear to be indicated as a location on the PFRA map.

2.2.5 Other Sources of Information

The guidelines give a list of other possible sources of information that may be available for the indication of flood risk events for the LAP area. This is not an exclusive list and other sources may be available. There are no other sources of information to indicate flood events for the Ireland West Airport Knock LAP.

2.3 Stage 2 Initial Flood Risk Assessment

Following Stage 1 Flood Risk Identification, if the planning authority considers that there is a potential flood risk issue, it should move onto Stage 2. The purpose of the initial FRA 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.

2.3.1 Assessment of Flood Risks Identified for Ireland West Airport Knock

The main flood risks identified for Ireland West Airport Knock are determined in Section 2.2 above. The main risk is from the Pluvial – Extreme category. Pluvial flooding can be defined as flooding which results from rainfall generated overland flow and / or ponding which may occur during or immediately after intense rainfall events, before the runoff enters any water course or sewer.

The PRFA map shows a fluvial extreme event along the western boundary of the LAP. Using the sequential approach outlined above, Ireland West Airport Knock would be categorised in Flood Zone C as there are no areas of the plan where zones A or B apply.

Table 2 above indicates that all land use and development type categories identified in the Vulnerability Classes in Table 1 are appropriate at Ireland West Airport Knock and there is no requirement to apply a justification test for lands zoned within the proposed LAP area.

Under the sequential approach (Fig 2), Flood Zone C does not limit any development potential. The next stage under the sequential approach is the mitigation stage which is to prepare the land use strategy for flood risk and surface water management as part of the flood risk assessment.

2.3.2 Land Use Strategy for the Ireland West Airport Knock LAP

Map 3 below indicates the proposed land use zoning that will be included in the Ireland West Airport Knock Local Area Plan. The Zoning objectives are as follows:

Airside Zone

Objective: To protect, improve and develop the Airport Zone of Ireland West Airport Knock to its full potential and to provide for all facilities necessary, incidental or ancillary to Airport Operations.

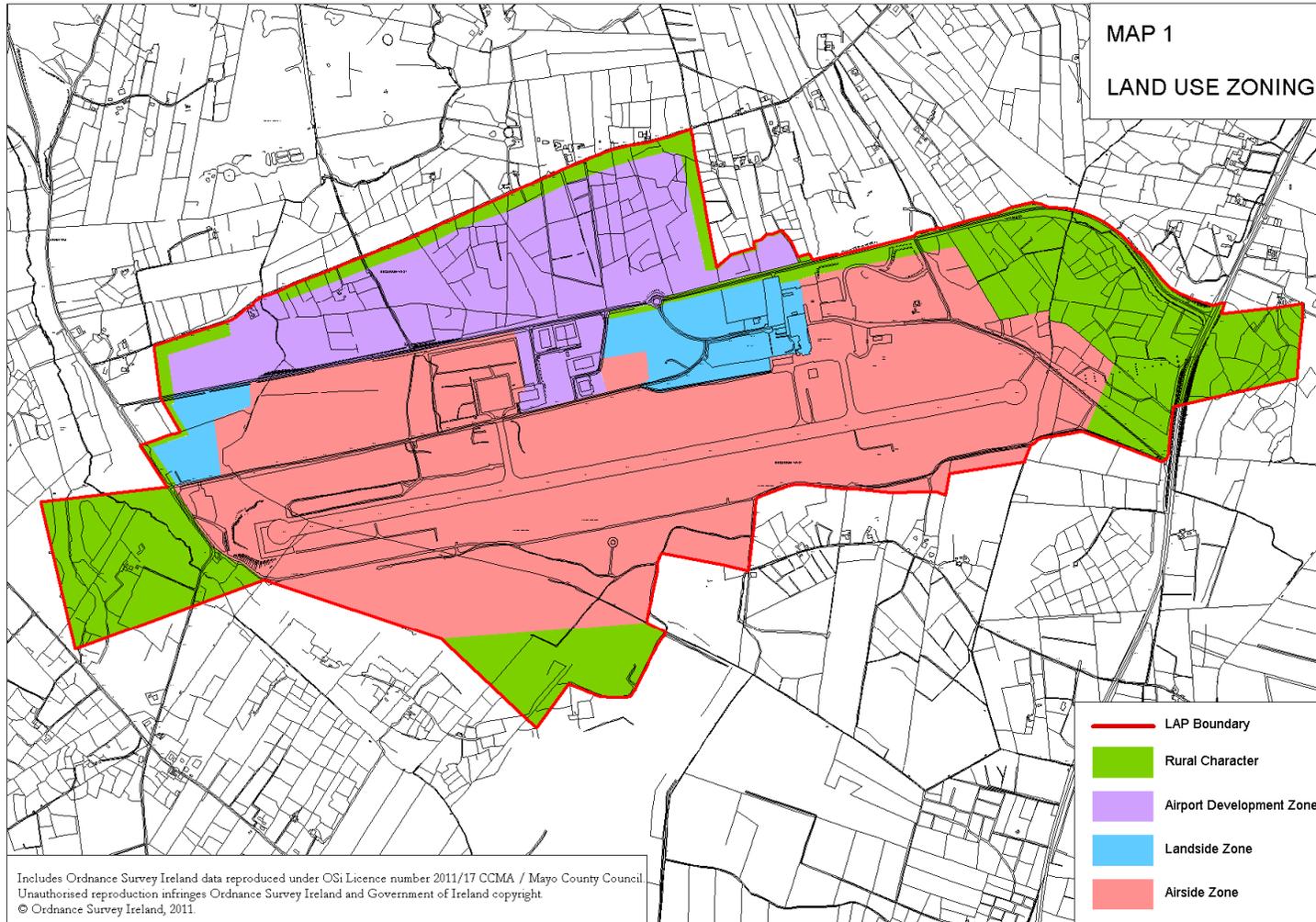
The area covered by this zoning objective has experienced Pluvial – Extreme flooding events. The sequential approach, outlined above, allows for all development proposals considered appropriate for this zoning objective (as outlined in the Ireland West Airport Knock LAP). Mitigation measures are proposed in the LAP and are outlined in Section 2.3.3

Landside Zone

Objective: To protect, improve and develop the Landside Zone of Ireland West Airport Knock to its full potential and to provide for all facilities necessary, incidental or ancillary to Airport Operations and to facilitate accessibility to the Airport Campus.

The area covered by this zoning objective has experienced Pluvial – Extreme flooding events. The sequential approach, outlined above, allows for all development proposals considered appropriate for this zoning objective (as outlined in the Ireland West Airport Knock LAP). Mitigation measures are proposed in the LAP and will be outlined in Section 2.3.3.

Map 3: Land Use Zoning



Rural Character Zone

Objective: to protect the setting, character and environmental quality of Ireland West Airport Knock.

The area covered by this zoning objective has experienced Pluvial – Extreme and Fluvial – Extreme flooding events. The sequential approach, outlined above, allows for all development proposals considered appropriate for this zoning objective (as outlined in the Ireland West Airport Knock LAP). The areas to the East and to the West, which includes the fluvial event are reserved and protected in the LAP for future navigational equipment. Any development that occurs will require surface water management mitigation measures outlined in Section 2.3.3 below.

Airport Development Zone

Objective: to facilitate appropriate development in order to strengthen the strategic role of Ireland West Airport Knock as a key economic/enterprise hub for the region, whilst protecting the future operations of the Airport.

There are no flood events indicated in the area zoned for Airport Development; as the LAP area is considered Flood Zone C all development proposals considered appropriate for this zoning objective (as outlined in the Ireland West Airport Knock LAP) are permitted. This area is undeveloped at present, therefore mitigation and surface water management will be necessary, and are outlined in Section 2.3.3 below.

2.3.3 Flood Risk and Surface Water Management.

The land use zoning strategy has been prepared to avoid and manage any flood risk that has been identified for the area. The LAP sets out policies, objectives and best practice approaches to militate against any further risk from flooding as a result of and arising from development of the area.

The Local Area Plan includes the following objectives in relation to surface water management:

SO2	It is an objective of the Council to support raising public awareness of the value of the water resources by encouraging conservation, reuse and protection of water, in addition to the elimination of wastage of water through waste-water detection and enforcement of repairs and to replace deficient sections of pipe work where necessary
IO6	It is an objective of the Council to ensure surface water systems are managed in a sustainable manner by encouraging the re-use of surface water where possible and to require that all new development proposals provide surface water drainage systems designed in accordance with Sustainable Urban Drainage Systems (Suds)
IO7	It is an objective of the Council to ensure that surface water is adequately and safely disposed of in a manner compatible with achieving and maintaining 'Salmonid water' quality in the receiving waters. (S.I. No. 293/1988: European Communities (Quality of Salmonid Waters) Regulations
HO9	It is an objective of the Council to comply with the EU Floods Directive 2007/60/EC and S.I. No. 122/2010: European Communities (Assessment and Management of Flood Risks) Regulations
HO10	It is an objective of the Council to protect areas prone to flooding within the LAP area from inappropriate development and to ensure that all new developments do not result in an increased risk of flooding within the site or on other lands. All new development proposals within or close to flood risk areas shall submit a flood risk assessment which should incorporate flood protection and mitigation measures, as appropriate

The Ireland West Airport Knock Local Area Plan includes a section in the Development Management Standards and Guidelines that requires all development proposals to be accompanied by an Environmental Management Report., which should include surface water management proposals at all stages of the development application process. The LAP gives guidance on mitigation measures appropriate to the level of detail required depending on the development proposal.

The Development Standards also requires that Surface Water Systems shall be designed in accordance with Suds (Sustainable Urban Drainage Systems) and Surface Water Attenuation provided in order to restrict flows from development to Greenfield run off rates.

2.3.4 Flooding Outside of the Ireland West Airport Knock LAP.

The Draft Preliminary Flood Risk Assessment map indicates flooding events outside the *Local Area Plan* boundary. These are mainly categorised as Pluvial – Extreme events relating to rainfall and pending. It has not been established if rainfall run-off from the existing airport campus is a contributing factor to these flooding events. It is considered that the implementation of the LAP will not contribute further to these events, and if the airport is a contributing factor, implementation of the surface water management mitigation measures of the LAP should either alleviate the flooding event or reduce any impact that the airport development may have on these flooding events.

2.4 Conclusion

As a result of the Flood Risk Identification; the Initial Flood Risk Assessment (Stages 1 & 2); the application of the sequential approach outlined in the Planning System and Flood Risk Management, Guidelines for Planning Authorities, DoEHLG, 2009 and The Planning System and Flood Risk Management Guidelines for Planning Authorities; Technical Appendices; DoEHLG, 2009; and the incorporation of mitigation measures into the LAP, it is not considered necessary to subject the Ireland West Airport Knock LAP to Stage 3 Detailed Flood Risk Assessment.