Proposed Variation to the County Donegal Development Plan 2018-2014 in respect of the TEN-T Priority Route Improvement Project, Donegal

Strategic Flood Risk Assessment

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Mark Magee		11 January 2021

Prepared by:

RPS

Mark Magee
Senior Associate - Water Environment and Flood Risk Management

Enterprise Fund Business Centre, Business Park Road, Ballyraine, Letterkenny, Co. Donegal F92 AF43

T +44 28 9694 9952
E mark.magee@rpsgroup.com

Prepared for:

Donegal County Council

John Mc Feely
A/Executive Planner

TEN-T Priority Route Improvement Project
Central Planning Unit
Community Development & Planning Services
Donegal County Council
County House
Lifford
County Donegal
F93 Y622

T: 074 9153900
E: jmcfeely@donegalcoco.ie

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1 INTRODUCTION

1.1 Report Objectives

The objective of this report is to prepare a Strategic Flood Risk Assessment (SFRA) of the Proposed Variation to the County Donegal Development Plan 2018-2024 in respect of the TEN-T Priority Route Improvement Project, Donegal (TEN-T PRIPD). The Report was prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) Circular PL02/2014 (August 2014) (referred to hereafter as 'The Guidelines'). In line with Guidelines the SFRA must appraise the adequacy of the information available and scope the additional information, analysis and mapping to provide a full picture of flood risk. In this regard it will be required to undertake a full assessment of the existing information in relation to fluvial and coastal flood risk and appraise where this may need to be updated and/or additional detail added.

The SFRA provides an assessment of all types of flood risk surrounding the TEN-T PRIPD preferred route corridor regions and provides assistance to Donegal County Council (DCC) to make informed strategic land-use planning decisions and formulate flood risk policies. A Stage 1 Flood Risk Identification was undertaken to identify any flooding or surface water management issues related to the TEN-T PRIPD preferred route corridors that may warrant further investigation. As part of this stage the best available data at the time of preparation was acquired from the Office of Public Works (OPW) North Western Catchment Flood Risk Assessment Management (CFRAM) Study. The North Western CFRAM has generated flood zone mapping which has been deemed suitable as a Stage 2 Initial Flood Risk Assessment. The SFRA examines the Flood Zones A, B and C identified in the North Western/Neagh Bann CFRAMs study. This flood risk information has enabled the application of 'The Guidelines' sequential approach, and where necessary the Justification Test, to appraise locations where the preferred corridor traverses the flood zones and identify how flood risk can be managed as part of the development plan. The preferred TEN-T PRIPD route corridors are to be included as a variation in the County Development Plan.

1.2 Disclaimer

The SFRA has been prepared in compliance with the Guidelines but the SFRA remains a live document and is based on the best available data at the time of preparation. It is subject to change based on more up to date and relevant flood risk information becoming available during the lifetime of the Development Plan. All information in relation to flood risk is provided for general policy guidance only. All landowners and developers are instructed that Donegal County Council and their consultants can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Furthermore 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.

It should be noted that the North Western CFRAM mapping used to define the flood zones for this SFRA is the most comprehensive flood zone mapping available for the county and is considered appropriate for use as a strategic overview of flood risk within the proposed TEN-T PRIPD corridors. Further information on the North Western CFRAM study is available at www.cfram.ie. The flood maps are 'predictive' flood maps, as they provide predicted flood extent and other information for a flood event that has an estimated probability of occurrence (the 1% AEP and 0.1% AEP events – see section 3.2.3 below), rather than information for floods that have occurred in the past.

Donegal County Council makes no representations, warranties or undertakings about any of the information provided on these maps including, without limitation, their accuracy, their completeness or their quality or fitness for any particular purpose. To the fullest extent permitted by applicable law, Donegal County Council nor any of its members, officers, associates, consultants, employees, affiliates, servants, agents or other representatives shall be liable for loss or damage arising out of, or in connection with, the use of, or the inability to use, the information provided on the draft flood maps including, but not limited to, indirect or consequential loss or damages, loss of data, income, profit, or

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1.3 Report Structure

The Proposed Variation identifies and protects 3 preferred route corridors to facilitate the TEN-T PRIPD. The primary watercourses associated within the preferred route corridors are identified in Section 2. A summary of the Planning System and Flood Risk Management Guidelines and the procedure for undertaking a SFRA is presented in Section 3. Section 4 outlines a broad overview of the requirements of Flood Risk Assessments (FRA) which should accompany planning applications. The available flood risk information used to identify the flood risk zones is discussed in Section 5. Locations of flood risk along the preferred corridor are examined and recommendations for Flood Risk Assessments are made in Section 7. Section 7 details the flood risk management policies, and identifies how flood risk can be managed as part of the variation to the development plan. Appendix A outlines the approach undertaken in application of the sequential approach and details the Justification Tests where necessary.

2 STUDY AREA

2.1 Introduction

The Trans-European Transport Network (TEN-T) is a selection of strategic transport corridors throughout the European Union (EU) that have been identified to play a key role in the mobility of goods and passengers through the EU. Three sections of the TEN-T network in Donegal have been prioritised for improvement and together they form the TEN-T Priority Route Improvement Project, Donegal. These sections are also prioritised within the National Planning Framework, Project Ireland 2040, and the National Development Plan 2018-2027. The three route corridors which make up the TEN-T PRIPD project are outlined as follows:

- Section 1 - N15/N13 Ballybofey / Stranorlar Urban Region
- Section 2 - N56/N13 Letterkenny to Manorcunningham
- Section 3 - N14 Manorcunningham to Lifford / Strabane / A5 Link.

As outlined in the proposed variation to the County Development Plan the benefits of the TEN-T Priority Route Improvement Project, Donegal are significant and wide ranging including:

- Economic: Facilitating economic growth and allowing Donegal to successfully compete for inward investment by improving the efficiency and capacity of the road network including improving journey time and journey time reliability at a local, regional and national level.
- Safety: Reducing the frequency and severity of collisions/improving safety on our national roads and enhancing road safety in towns, villages and rural areas by segregating strategic traffic from local traffic.
- Environmental: Reducing air pollution caused by congestive queuing and reducing noise levels near noise sensitive receptors.
- Quality of life: Reducing journey times, reducing traffic and thus freeing up road space in our towns and villages for sustainable transport modes (i.e. walking, cycling and public transport), providing new walking and cycling infrastructure as part of the scheme and improving access to health and education services.
- Enhancing Regional Accessibility: Improving accessibility to/from Donegal for employers, exporters, tourists and the general public.
- Strategic/Cross border: Improving cross border connectivity, unlocking the potential of the North West City Region and the Atlantic Economic Corridor

The National Planning Framework recognises the importance of the Northern and Western Region and justifies a particular focus in the Framework. This is due to the lower level of urbanisation compared to other regions, proximity to the border and the risk posed by Brexit. Specifically in relation to Donegal the Framework acknowledges that the region is spatially unique due to its extensive coastline but also the relationship to Northern Ireland. In addition to enhancing the connectivity for the regional area the framework supports the enabling of growth and competitiveness to support the strong links that existing between Letterkenny and environs and Northern Ireland.

As highlighted in the proposed variation to the County Development Plan, the strategic importance of the project to the County is highlighted by the fact that:

- Enhanced Regional accessibility, including upgrading access to the North West utilising routes such as the N14 and progressive development of the Atlantic Economic Corridor Northwards by

upgrading the N15/N13 link, is a National Strategic Outcome of the National Planning Framework Project Ireland 2040.

- The "N15 Ballybofey Bypass", "N13/N14/N56 Letterkenny Bypass and Dual Carriageway to Manorcunningham" and the "N14 Manorcunningham to Lifford" are all listed as priorities for investment within the National Development Plan 2018-2027.

- It is an objective of the Regional Spatial and Economic Strategy for the Northern and Western Regional Assembly Area to deliver the project by 2028. (Objective RPO 3.7.30 of said document refers).

- The project is fundamental to both the success of the North West City Region and enhanced transport connectivity between Ireland and Northern Ireland, each of which in turn are National Policy Objectives of the National Planning Framework (NPO 45 and 46 of said document refers).

The three prioritised sections of the TEN-T route network in Donegal is shown in Figure 2.1, with more detailed mapping for each individual corridor illustrated in Figures 2.2 to 2.4

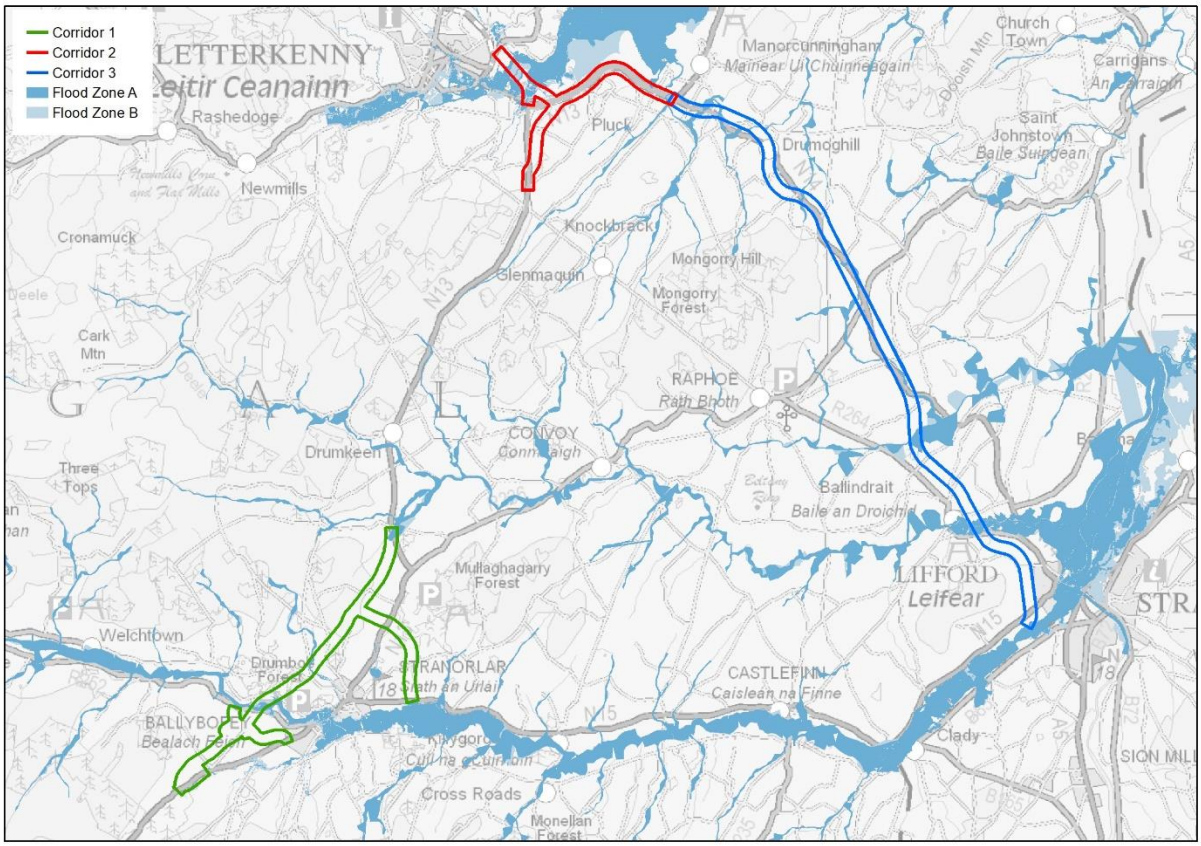


Figure 2-1: Study Area for TEN-T PRIPD Priority Route Improvement Project, Donegal

2.2 Watercourses

The three preferred route corridor routes for the TEN-T PRIPD Priority Route Improvement identified in the Proposed Variation cross multiple watercourses which present a requirement for a SFRA to be carried out.

2.2.1 Section 1 – N15/N13 Ballybofey/Stranorlar Urban Region Preferred Route Corridor

This corridor traverses the River Finn at Ballybofey/Stranolar and the River Cloghroe/Deele at the intersection with the N13. The Ballybofey & Stranorlar AFA is located in east Donegal and is affected by the middle reaches of the River Finn and its adjoining tributaries, including the Daurentt Burn. The Finn catchment to the downstream HEP of the model is a medium to large sized catchment (384km^2) with a mixture of peat (43%), pasture (26%) and forest (24%) coverage. The route option selection report for corridor 1 established that the portion of the preferred route option that traverses soft soils (peat and alluvium is only 5%. The watercourses in Ballybofey & Stranorlar are, for the most part, in private lands and are not the responsibility of Donegal County Council. The Ballybofey and Stranorlar model is one of four CFRAM Study models previously conducted covering the Finn catchment from upstream of Ballybofey to the Foyle at Lifford. Figure 2.2 illustrates the preferred corridor in this location.

2.2.2 Section 2 – N56/N13 Letterkenny to Manorcunningham Preferred Route Corridor

Corridor 2, Manor to Letterkenny/Lurgybrack traverses the River Swilly/Lough Swilly and its tributaries at Letterkenny. The Letterkenny Area Further Assessment (AFA) in the North Western CFRAMs is located at the top of Lough Swilly and is made up of the lower reaches of the River Swilly and a number of tributaries that flow into River / Lough Swilly through the Letterkenny AFA including the Sprack and Coravaddy Burns and the Knocknamona watercourse. The Swilly River catchment is fairly mixed in land coverage with forested land (23%), pasture (38%), peat bog (35%) and urban area (4%) due to Letterkenny. Areas of peat traversed by the preferred route corridor are relatively low with the main soft soils encountered consisting of alluvial soils associated with the Swilly Estuary. The modelled tributaries which enter the Swilly emanate from the hills surrounding Letterkenny to the north and south and some pick up a significant amount of urban drainage along the way to their discharge points into the Swilly.

2.2.3 Section 3 – N14 Manorcunningham to Lifford/Strabane/A5 Link Preferred Route Corridor

Corridor 3, Manor to Lifford traverses the Swilly Burn to the East of Raphoe and the River Deele to the West of Lifford. The Lifford AFA is affected by the lower reaches of the Rivers Finn, Mourne and Deele and the upper reaches of the River Foyle. The previous conducted CFRAM model represents the lower reaches of the River Finn (catchment of 502km^2), the lower reaches of the Deele River (catchment of 134km^2), and the inflow from the River Mourne catchment (1860km2) and from the AFA to the top of Lough Foyle at Lisahally, represents the entire length of the River Foyle (32km). Lifford AFA is located near Strabane, in Northern Ireland, which is an APSR (Area of Potential Significant Risk), so this model has considered the interaction of flooding between the rivers Finn, Mourne and Foyle to address the international flooding context enshrined in the EU Floods Directive.

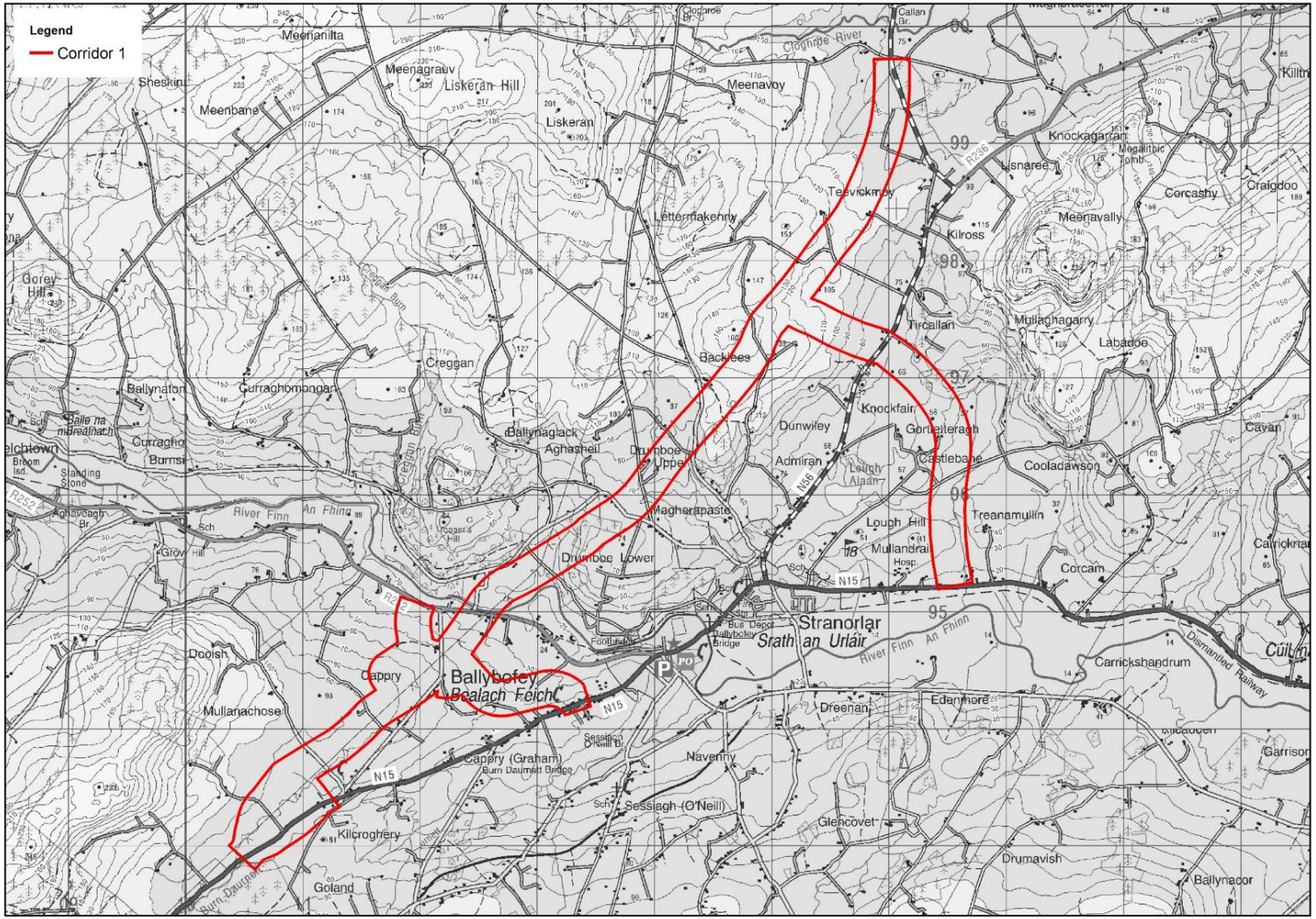


Figure 2-2: Section 1 – N15/N13 Ballybofey/Stranorlar Urban Region Preferred Route Corridor

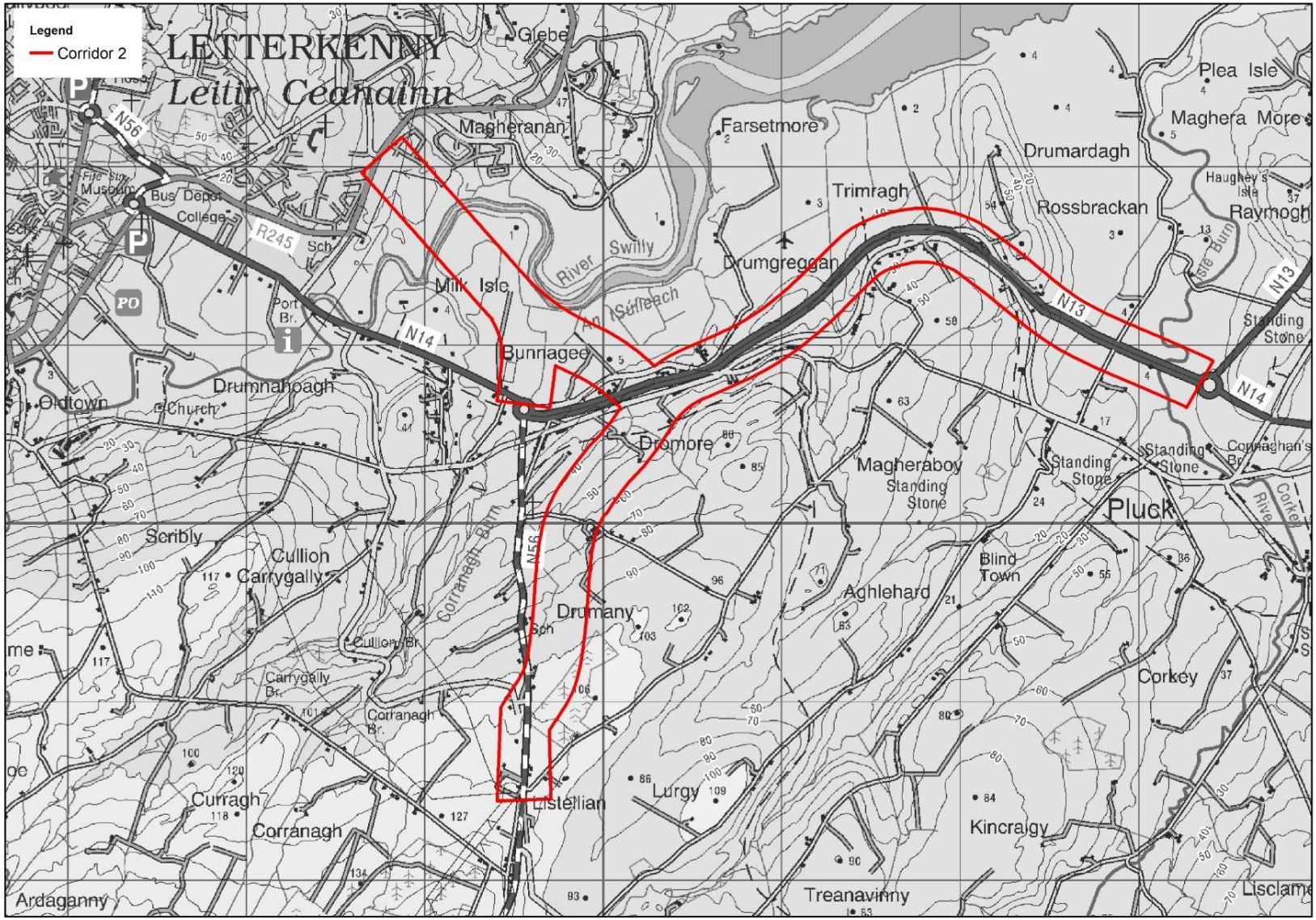
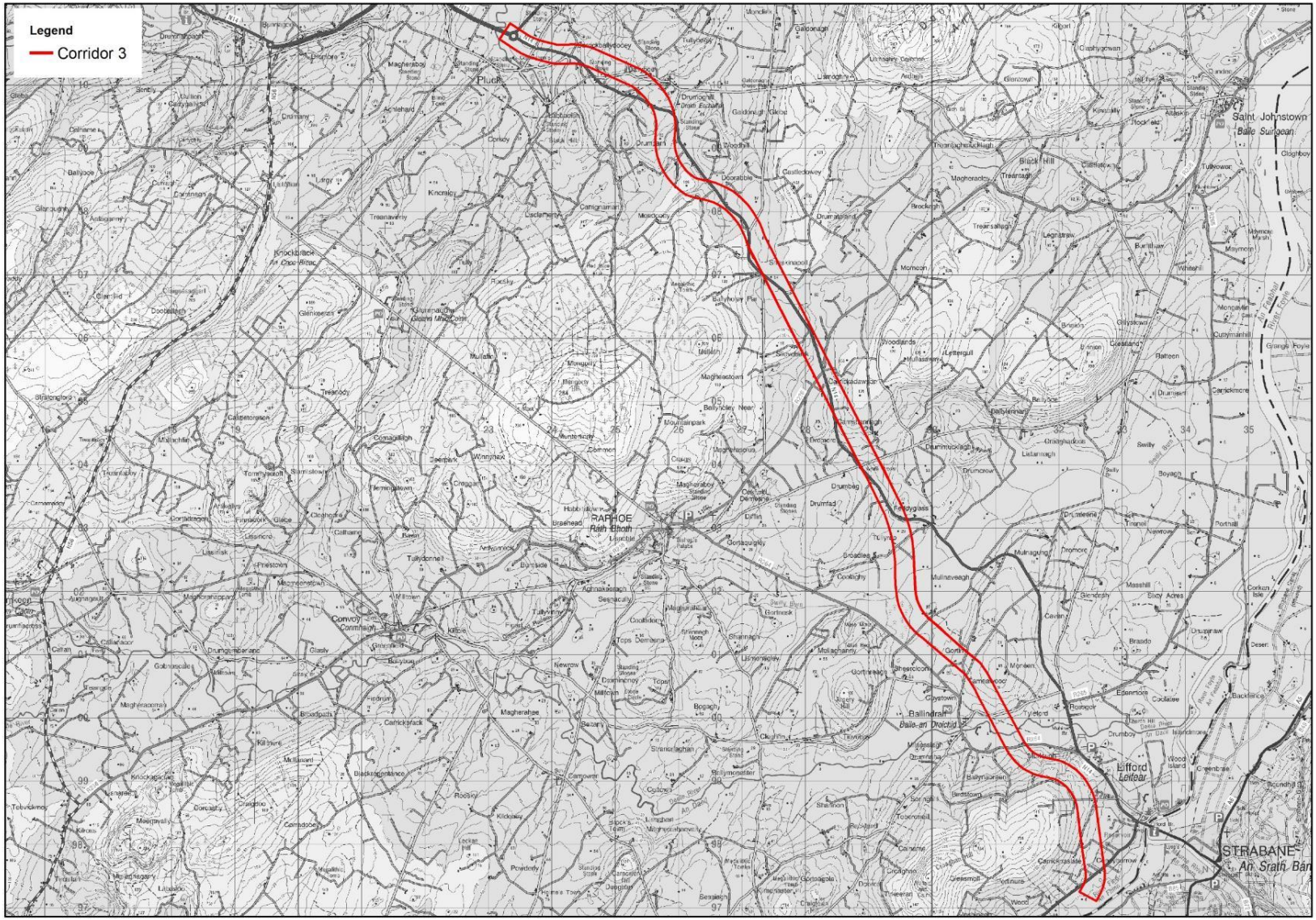


Figure 2-3: Section 2 – N56/N13 Letterkenny to Manorcunningham Preferred Route Corridor



Section 3 – N14 Manorcunningham to Lifford/Strabane/A5 Link Preferred Route Corridor.

3 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES FOR PLANNING AUTHORITIES

3.1 Introduction

In 2009 the Department of Environment, Heritage and Local Government in conjunction with the Office of Public Works published The Planning System and Flood Risk Management: Guidelines for Planning Authorities. The purpose of the Guidelines is to ensure that flood risk is considered by all levels of government when preparing development plans and planning guidelines. They should also be used by developers when addressing flood risk in development proposals. The Guidelines should be implemented in conjunction with the relevant flooding and water quality EU Directives including the Water Framework Directive (River Basin Management Plans (RBMPs)) and the Floods Directive (Catchment Flood Risk Assessment and Management Studies (CFRAMS)).

The core objectives of the Guidelines are to:

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

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should be carried out at different scales by government organisations, local authorities and for proposed developments appropriate to the level of information required to implement the core objectives of the Guidelines. The FRA scales are:

- **Regional Flood Risk Appraisal (RFRA)** – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment as well as to identify where flood risk management measures may be required at a regional level to support the proposed growth. Undertaken by the OPW through the CFRAMs process.
- **Strategic Flood Risk Assessment (SFRA)** – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will revisit and develop the flood risk identification undertaken in the RFRA, and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas, which will be zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then further assessment to an appropriate level of detail may be require, which may necessitate a more detailed flood risk assessment.
- **Site Specific Flood Risk Assessment (FRA)** – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk.

3.2 Flood Risk Assessment

3.2.1 Flood Risk Assessment Approach

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should use the Source-Pathway-Receptor (S-P-R) Model to identify the sources of flooding, the flow paths of the floodwaters and the people and assets impacted by the flooding. Figure 3.1 shows the SPR model that should be adopted in FRAs.

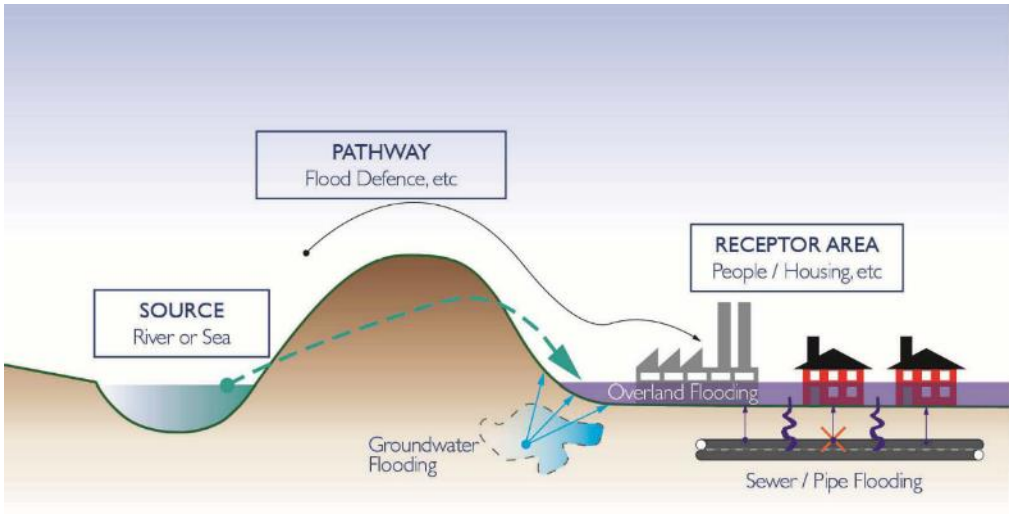


Figure 3-1: Flood Risk Assessment Source – Pathway- Receptor Model

FRAs should be carried out using the following staged approach;

- **Stage 1 Flood Risk Identification** – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels.

- **Stage 2 Initial Flood Risk Assessment** – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped.

- **Stage 3 Detailed Flood Risk Assessment** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

3.2.2 Types of Flooding

There are two main sources of flooding inland and coastal. Inland flooding is caused by prolonged and/or intense rainfall. This results in fluvial, pluvial, coastal or ground water flooding acting independently or in combination.

- Fluvial flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded. A combination of high flow in rivers and a high tide may prevent the river from discharging into the sea thus increasing water levels inland causing rivers to overtop their banks.

- Pluvial flooding occurs when overland flow cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when and when the water cannot discharge due to a high water level in the receiving watercourse.

- Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall to meet the ground surface and flows out over it.

- Coastal flooding occurs when sea levels along the coast or in estuaries exceed neighbouring land levels, or overcome coastal defences where these exist, or when waves overtop the coastline or coastal defences

3.2.3 Flood Risk

Guidelines state flood risk is a combination of the likelihood of flooding and the potential consequences arising. Flood risk is expressed as:

> Flood risk = Likelihood of flooding x Consequences of flooding

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude as occurring or being exceeded in any given year. A 1% probability 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. Table 3.1 shows flood event probabilities used in flood risk management.

Table 3.1: Flood Event Probabilities

Annual Exceedance Probability (%)	Return Period (Years)
50	2
10	10
1	100
0.1	1000

The 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.).

3.3 Flood Zones

The Guidelines recommend identifying flood zones which show the extent of flooding for a range flood event probabilities. The Guidelines identify three levels of flood zones:

- 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 flood zones are generated without the inclusion of climate change factors. The flood zones only account for inland and coastal flooding. They should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from pluvial and groundwater flooding. Similarly flood defences should be ignored in determining flood zones as defended areas are still carry a residual risk of flooding from overtopping, failure of the defences and deterioration due to lack of maintenance. Figure 3.2 shows a typical flood zone map.

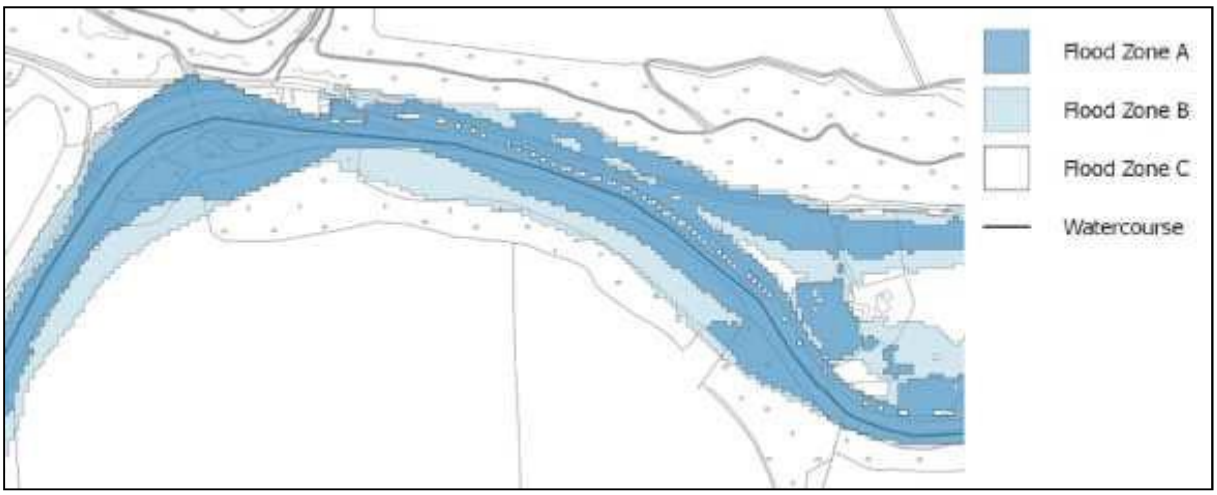


Figure 3-2: Typical Flood Zone map

3.4 Climate Change

Climate Change is expected to increase flood risk. It could lead to more frequent flooding and increase the depth and extent of flooding. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended in the Guidelines:

- Recognise that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopt a cautious approach to zoning lands in these potential transitional areas.

- Ensure that the levels of structures designed to protect against flooding, such as flood defences, land-raising, bridge deck levels, or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect.

- Ensure that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

3.5 Strategic Flood Risk Assessment

The purpose of this report is to carry out a SFRA at a scale that is suitable for the proposed variation of the County Development Plan. The Guidelines recommend a series of outputs for a SFRA. These outputs in board terms include:

- Identify principal rivers, sources of flooding and produce flood zone maps for across the local authority area and in key development areas.
- An appraisal of the availability and adequacy of the existing information.
- Assess potential impacts of climate change to demonstrate the sensitivity of an area to increased flows or sea levels. Where mathematical models are not available climate change flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change.
- Identify the location of any flood risk management infrastructure and the areas protected by it and the coverage of flood-warning systems.
- Consider, where additional development in Flood Zone A and B is planned within or adjacent to an existing community at risk, the implications of flood risk on critical infrastructure and services across a wider community-based area and how the emergency planning needs of existing and new development will be managed.
- Identify areas of natural floodplain, which could merit protection to maintain their flood risk management function as well as for reasons of amenity and biodiversity.
- Assess the current condition of flood-defence infrastructure and of likely future policy with regard to its maintenance and upgrade.
- Assess the probability and consequences of overtopping or failure of flood risk management infrastructure, including an appropriate allowance for climate change.
- Assess, in broad terms, the potential impact of additional development on flood risk elsewhere and how any loss of floodplain could be compensated for.
- Assess the risks to the proposed development and its occupants using a range of extreme flood or tidal events.
- Identify areas where site-specific FRA will be required for new development or redevelopment.
- Identify drainage catchments where surface water or pluvial flooding could be exacerbated by new development and develop strategies for its management in areas of significant change.
- Provide guidance on the likely applicability of different Sustainable Drainage Systems (SUDS) techniques for managing surface water run-off at key development sites as determined by surface water and drainage strategies developed within the SFRA.
- Identify where integrated and area based provision of SuDS and green infrastructure are appropriate in order to avoid reliance on individual site by site solutions; and,
- Provide guidance on appropriate development management criteria for zones and sites.

3.6 Sequential Approach and Justification Test

The Guidelines recommend using a sequential approach to planning to ensure the core objectives (as described in Section 3.1) are implemented. Development should be avoided in areas at risk of flooding, where this is not possible, a land use that is less vulnerable to flooding should be considered. If the proposed land use cannot be avoided or substituted a Justification Test must be applied and appropriate sustainable flood risk management proposals should be incorporated into the development proposal. Figure 3.3 shows the sequential approach principles in flood risk management as identified in the Guidelines. Table 3.2 and Table 3.3 outline recommendations from the Guidelines for the types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

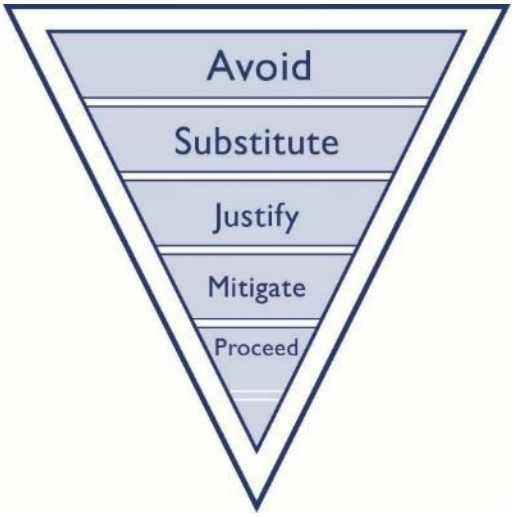


Figure 3-3: Sequential approach principles in flood risk management

Table 3.2: Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test.

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

The Justification Test is used to assess the appropriateness of developments in flood risk areas. The test is comprised of two processes. The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding. The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

Table 3.3: 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;

Vulnerability Class	Land uses and types of development which include*:
	• 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 merit

3.7 Development Plan Justification Test

The Development Plan Justification Test (or Plan–making Justification Test) should be carried out as part of the SFRA using mapped flood zones. It applies where land zonings have been reviewed with respect to the need for development of areas at a high or moderate risk of flooding for uses which are vulnerable to flooding and which would generally be inappropriate, as set out in Table 3.2, and where avoidance or substitution is not appropriate. Where land use zoning objectives are being retained, they must satisfy all of the following criteria as per Table 3.4.

Table 3.4: Justification Test for Development Plans

Justification Test for Development Plans
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: i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement; ii. Comprises significant previously developed and/or under-utilised lands; iii. Is within or adjoining the core3 of an established or designated urban settlement; iv. Will be essential in achieving compact and sustainable urban growth; and v. 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.

In cases where existing zoned lands are discovered to be within flood zones, the Development Plan Justification Test has been applied, and it is demonstrated that it cannot meet the specified requirements it is recommend that planning authorities reconsider the zoning by implementing the following:

- Remove the existing zoning for all types of development on the basis of the unacceptable high level of flood risk;
- Reduce the zoned area and change or add zoning categories to reflect the flood risk; and/or
- Replace the existing zoning with a zoning or a specific objective for less vulnerable uses;
- Prepare a local area plan informed by a detailed flood risk assessment to address zoning and development issues in more detail and prior to any development; and/or
- If the criteria of the Justification Test have been met, design of structural or non-structural flood risk management measures as prerequisites to development in specific areas, ensuring that flood hazard and risk to other locations will not be increased or, if practicable, will be reduced. The mitigation measures are required prior to development taking place.

The application of the sequential approach in the preparation of the Development Plan is shown in Appendix A. The TEN-T PRIPD corridors as contained in the proposed variation to the County Donegal Development Plan 2018-2024 overlaid with Flood Zones A and B are shown in Chapter 5.

4 DEVELOPMENT MANAGEMENT AND FLOOD RISK

4.1 Overview

All development in flood risk areas should be supported by an appropriately detailed Flood Risk Assessment (FRA). The level of detail within the FRA will depend on the risks identified and the proposed land use.

The guidelines require that applications demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place. For any development areas that meet the Development Plan Justification Test, a Development Management Justification Test must then be applied. Development must satisfy all of the criteria of the Development Management Justification Test as per Table 4.1 below.

This chapter provides a broad overview of the requirements of Flood Risk Assessments which should accompany planning applications. Section 5.10 outlines more specific requirements for areas identified at risk from flooding.

Table 4.1: Justification Test for Development Management

Justification Test for Development Management
• The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
• The proposal has been subject to an appropriate flood risk assessment that demonstrates: i. The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk; ii. The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible; iii. The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and iv. The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes. The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

4.2 Surface Water and Drainage

All development proposals for the TEN-T Priority Route Improvement Project shall carry out a surface water and drainage assessment and shall to ensure that drainage from the site is managed sustainably. The requirements below provide an overview of drainage requirements for development in DCC.

4.2.1 Drainage

The proposed development shall be drained on a completely separate system. All new developments must incorporate Sustainable Drainage Systems (SuDS). In the unlikely event of this not being feasible the Developer must provide alternative means of dealing with pollutants. Rainwater should be infiltrated to the ground and/or discharged via a SuDS system to a surface water drain or watercourse.

- In general, watercourses are not to be culverted or piped. They should remain open in their natural valley, which should be incorporated into the public open space. Culverting should be confined to road crossings and should be sufficiently large to prevent blockage, allow runoff from a one in a hundred rain event and to allow for man entry for maintenance purposes. Permission must be obtained from the OPW (under a section 50 licence) to construct any culvert or bridge.

- All proposed structures must be set back from the edge of any watercourse to allow access for channel cleaning/maintenance. A 15 meters wide riparian buffer strip each side of the watercourse is recommended and in the case of the TEN-T PRIPD preferred corridor this may need to be increased to ensure the impact on the floodplain is minimised.

- The preferred route must allow for the impacts of climate change.

  - River flows 20% increase in flows for all return periods up to 100 years

  - Rainfall 10% increase in depth (factor all intensities by 1.1)

- Surface water outfalls to streams, rivers, etc. should be unobtrusive and not cause erosion of the bed and banks. A suitable non-return device should be fitted on the outfall pipeline. OPW/DCC must approve all design details.

- Further guidance on the use of SuDS for national road schemes is given in the TII publication Drainage Design for National Road Schemes, Sustainable Drainage Options (TII, 2014).

4.2.2 Storm water management

The maximum permitted surface water outflow from any new development is to be restricted to that of a Greenfield site before any development took place.

- All new development must allow for climate change as set out Section 5.8.

- In general, all new developments must incorporate Sustainable Drainage Systems (SuDS).

- Sustainable Drainage Systems include devices such as: Swales, Permeable Pavements, Filter Drains, Storage Ponds, Constructed Wetlands, Soakaways, etc.

- In some exceptional cases it may not be feasible to use the above devices and at the discretion of the DCC, approval may be given to install underground attenuation tanks or enlarged pipes in conjunction with other devices to achieve the required water quality. These should only be considered as a last resort where it can be shown that SuDS measures are not achievable

- Attenuation tanks shall normally be located in green areas; any other location requires the approval from DCC.

- Where a tank is to be constructed in a trafficked area, a standard minimum depth of cover from road level to top of the roof of the tank should be 1.2m.

- All enlarged pipes and associated manholes must comply with TII design guidelines.

- In order to isolate and carry out maintenance of the flow control device a penstock valve (or similar approved) shall be installed within the outfall manhole, on the upstream end of the manhole.
- For gravity systems a Hydrobrake (or similar approved flow control device) shall be installed in the last manhole.
- The opening to be large enough to facilitate the extraction of the flow control device.
- An overflow from the flow control manhole to the public drainage network is not allowed.

The key design criteria for sustainable drainage of national road schemes are outlined in Technical Document RE-CPI-07001 a Drainage Design for National Road Schemes - Sustainable Drainage Options. The key recommendations form this report are outlined below

1. It is important to undertake consultation with the relevant government agencies during the planning process (phases 1 to 4 of the NRA Project Management Guidelines) so that any necessary land-take to accommodate specific requirements for the drainage design can be facilitated
2. A risk assessment for determining the impacts of road runoff on groundwater and surface water should be undertaken when preparing drainage designs.
3. A more sustainable drainage design should incorporate treatment during conveyance and should promote infiltration of the treated runoff to groundwater. This will reduce the volumetric attenuation requirements and mimic greenfield site conditions maintaining the catchment balance of groundwater and surface water flow. Grassed channels and wetlands can replace the more conventional systems such as concrete channels and detention basins.
4. The attenuation objectives will depend specifically on the nature of the receiving environment. In some cases a simple detention basin will be sufficient to meet environmental objectives. In other cases a higher level of treatment will be required such as a sedimentation pond or a wetland. In the case of a detention basin, the objective should be to attenuate the 1 in 100 year critical storm and storage systems should be sized to cater for this event, if feasible. Discharge rates should be limited to greenfield site rates.
5. When designing a drainage system, cognisance should be taken of the nature and sensitivity of the receiving environment. The design needs to conform to the environmental quality standards and threshold values outlined in the Water Framework Directive, the Groundwater Directive. This will normally require at least two stages of treatment i.e. during conveyance and prior to discharge. A type of tertiary treatment through the use of petrol inceptors on all discharge is often adopted on national road projects.
6. The procedure for selecting the most appropriate drainage design is based on a risk assessment protocol which examines the risk of road runoff to surface water and groundwater. Account and guidance is also given of the possibility of an accidental spill.
7. Guidance on the design and use of the various sustainable drainage components such as grassed channels, swales, wetlands, attenuation ponds and combined filter drains is provided in the guidance.

4.3 Residual Risk

As well as assessing the surface water management risk for the project, all development including that in Flood Zone C, should consider residual risk factors such as culvert / bridge blockages and the effects of climate change which may expand the extents of Flood Zones A and B. These residual risk factors should influence the potential mitigation measures for the road scheme which could include setting of minimum road levels.

4.4 Development Proposals in Flood Zones

4.4.1 Overview

It is recommended that the design of the road scheme in flood risk areas is accompanied by a supporting appropriately detailed flood risk assessment. This is to ensure a conservative approach and that consideration is given to the new development within Flood Zones where mitigation measures may still be required to ensure an appropriate level of flood protection and/or resilience. The detailed assessment should include at a minimum Stage 1 - Identification of Flood Risk. Where flood risk is identified a Stage 2 - Initial FRA will be required, and depending on the scale and nature of the risk a Stage 3 - Detailed FRA may be required.

Detailed FRAs should be carried out in accordance with the Guidelines and should present in sufficient detail the potential flood risk to the proposed road design, the potential increase in flood risk elsewhere, any proposed mitigation measures and proposals for sustainable surface water management. The FRA should also consider the impacts of climate change, residual risk associated with culvert blockages and freeboard in setting the minimum level of the road.

4.4.2 Assessment of Proposals for Highly Vulnerable Development

Highly vulnerable development, such as strategic road proposals should not normally be considered in flood risk areas. Any applications for Highly Vulnerable Development shall be supplemented by an appropriately detailed FRA and meets the criteria of the Development Management Justification Test. The following considerations should be addressed in applications for consent for highly vulnerable development in flood risk areas:

1. The minimum road level should be above the Flood Zone B (0.1% AEP) level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels.

2. Applications should outline the emergency procedures that will be applied in the event of a flood. Evacuation routes should be identified but if this is not possible then containment may be considered if is considered safe and practical to do so. If either safe evacuation or containment is not possible, then the development proposal should be refused.

3. The road layout should follow the sequential approach to allocate land within a development based on the vulnerability class of the development i.e. more vulnerable development should be placed on higher ground while water compatible development e.g. car parking, greenfield space can placed in the flood zones.

4. Where compensatory storage for development that results in a loss of floodplain within Flood Zone A is required it must be provided on a level for level basis, the lands should be in close proximity to the area that storage is being lost from, the land must be within the ownership of the developer and the land given to storage must be land which does not flood in the 1% AEP event. Also where compensatory storage is required the compensatory storage area should be constructed before land is raised to facilitate the road development.

4.4.3 Assessment of Proposals for Less Vulnerable Development

Less vulnerable development proposals, e.g. any local transport infrastructure that is proposed to subsequent to the completion of the TEN-T, should not be considered in Flood Zone A area unless supplemented by an appropriately detailed FRA and meets the criteria of the Development Management Justification Test. The minimum finished road level for local transport infrastructure should be above Flood Zone A (1% AEP) level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels.

5 FLOOD RISK INFORMATION

5.1 Introduction

There are several sources of relevant flood risk information available for the study area. This information was used to generate the fluvial flood zone maps. Figure 5.1 –Figure 5.3 below provide an overview of the flood zones.

5.2 Historical Flooding

A review of historical flood data was carried out for the North Western CFRAMs using information provided on floodmaps.ie and in consultation with DCC. Where flood extents were provided they were validated and incorporated into the flood zone maps illustrated in Figures 5.1 – Figure 5.3 below. The main sources of flooding in the study area are fluvial and coastal.

5.3 CFRAM Studies

5.3.1 Background

The OPW lead the development of Catchment Flood Risk Assessment and Management Studies (CFRAMS) for river basin districts in Ireland. The aim of these studies is to assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding. The flood hazard areas have been identified as being potentially at risk from significant flooding, including areas that have experienced significant flooding in the past. They also take account of issues such as climate change, land use practices and future development. These studies have been developed to meet the requirements of the EU Directive on the assessment and management of flood risks (the Floods Directive). The Floods Directive was transposed into Irish law by SI 122 of 2010 “European Communities (Assessment and Management of Flood Risks) Regulations 2010”.

CFRAMS has resulted in the publication of long-term Flood Risk Management Plans (FRMP) to manage flood risk within the relevant river catchment. Flood maps are one of the main outputs of the studies. The maps indicate modelled flood extents for flood events of a range of annual exceedance probability (AEP).

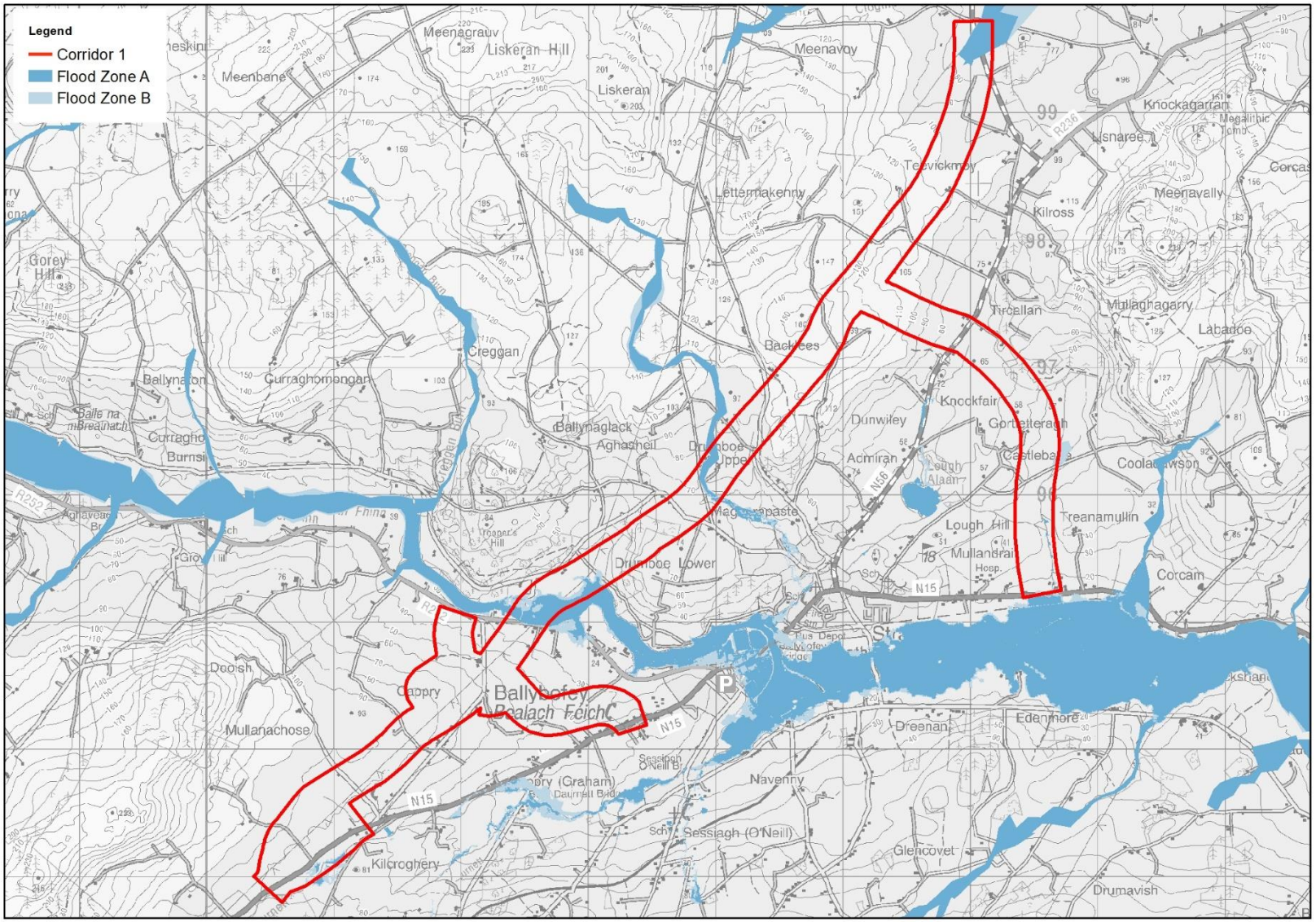


Figure 5-1: Flood Zone A and Flood Zone B that impact on Section 1 – N15/N13 Ballybofey/Stranorlar Urban Region Preferred Route Corridor

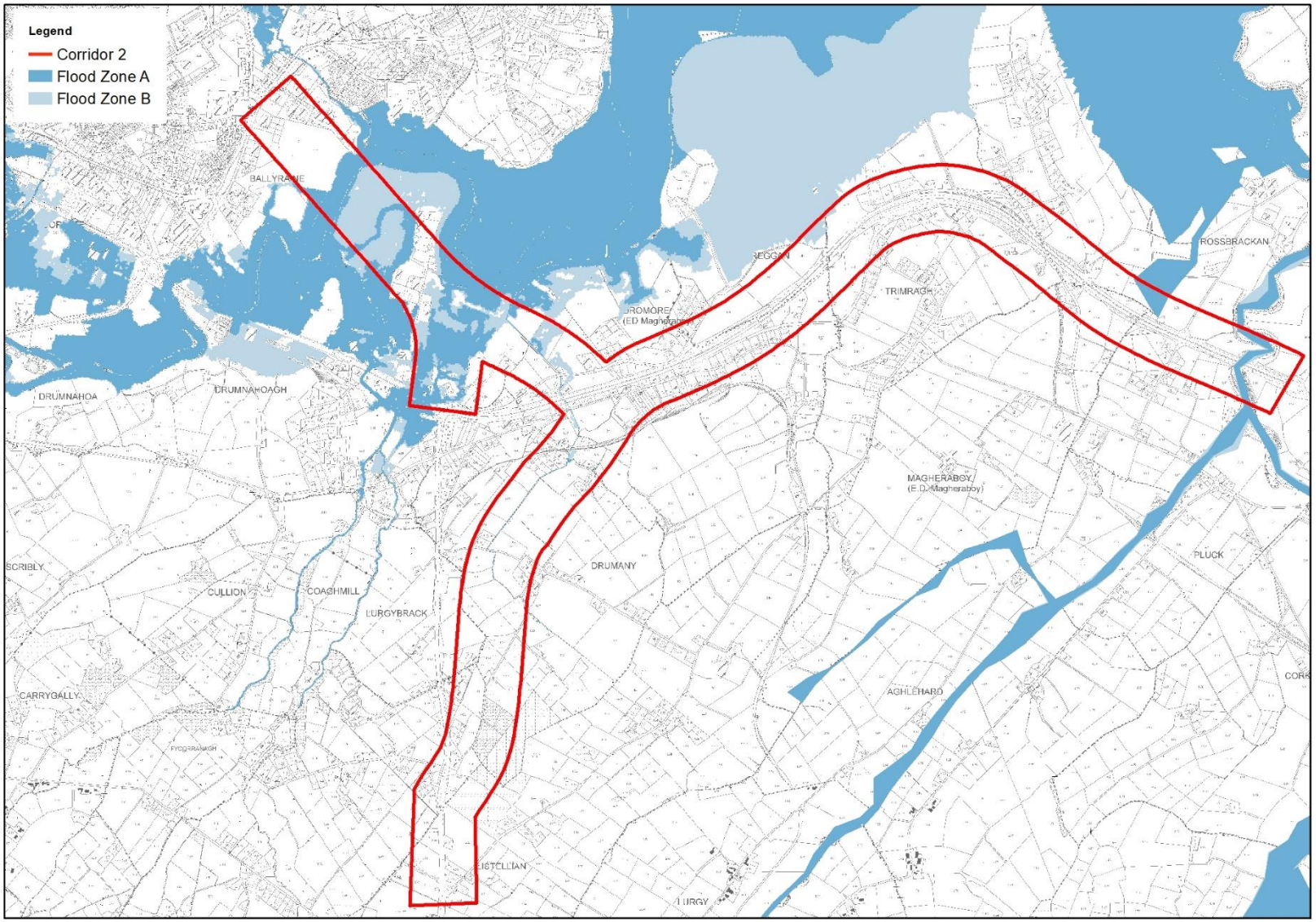


Figure 5-2: Flood Zone A and Flood Zone B that impact on Section 2 – N56/N13 Letterkenny to Manorcunningham Preferred Route Corridor

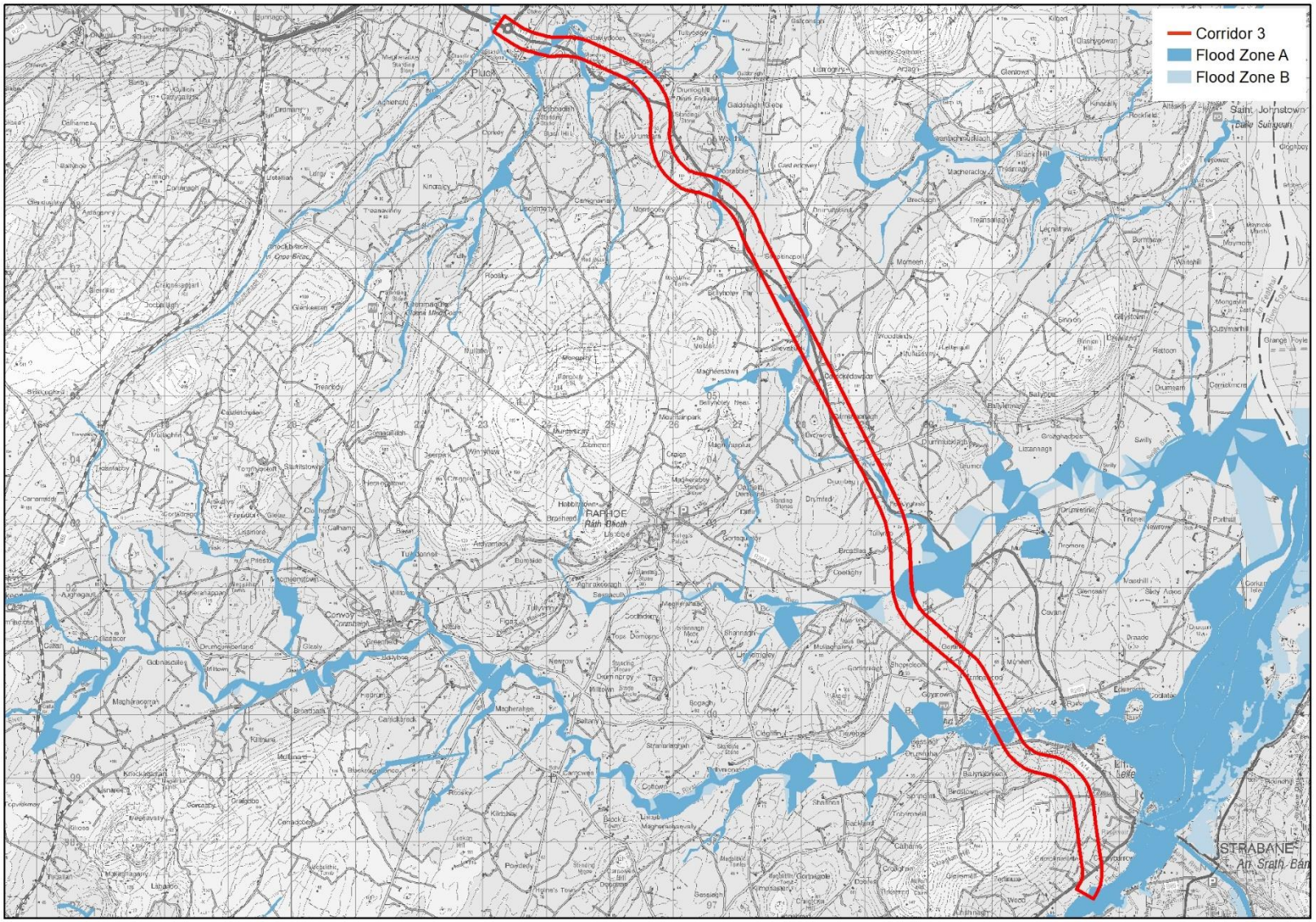


Figure 5-3: Flood Zone A and Flood Zone B that impact on Section 3 – N14 Manorcunningham to Lifford/Strabane/A5 Link Preferred Route Corridor.

5.3.2 Flood Risk Management Plans

The North Western (UoM01) Flood Risk Management Plan (2017-2021), which includes the areas of Letterkenny, Lifford, Ballybofey and Stranorlar for further Assessment (AFA) is complete and its recommendations are discussed in Section 7.3.

5.3.3 CFRAM Flood Zone Mapping

The watercourses and notable streams in the Letterkenny, Lifford, Ballybofey and Stranorlar area are accounted for within The North Western (UoM01) Flood Risk Management Plan (2017-2021) and associated flood extent mapping has been produced. The mapping takes into account historical flood risk information (Section 5.2).

The CFRAM mapping is the most comprehensive flood zone mapping available for the county and is considered appropriate for use as a strategic overview of flood risk within the CDP where it is available.

5.4 Flood Defence Works

5.4.1 Flood Zone Mapping for Flood Defence Schemes

The Guidelines state that the effect of formal flood defences should be ignored when determining flood zones as defended areas still carry a residual risk from overtopping and failure of the defences. Because this residual risk of flooding remains, the sequential approach and the Justification Test apply to such defended locations.

In the CFRAM Studies flood defences are defined as structures or features that were constructed to provide a formal flood defence function ('formal flood defences'), including those that may be in poor condition, and also those that may have been built for other purposes but that, in the opinion of a Consultant, would provide a flood defence function ('informal effective flood defences'). They do NOT include structures that were not constructed to provide a formal flood defence function and that, in the opinion a Consultant, would fail to provide a flood defence function due to structural weakness, porosity or other such reasons ('informal ineffective flood defences'), such as garden walls or embankments perforated by uncontrolled culverts.

The best available information regarding flood zones is the CFRAM flood mapping. The flood mapping has incorporated the effect of formal flood defences within the flood zones.

Letterkenny has existing defences which are part of the Lough Swilly embankments which extend for a distance of over 45 kms as identified in the North Western CFRAM. These assets are considered as non- Area Potential Significant Risk (APSR) defence assets as their primary function is not for formal flood defence.

Ballybofey and Stranorlar AFA contains a series of Hard Defences made up mainly of earthen embankments which surround Ballybofey to the north, east and south, along the right bank of the River Finn and on the left bank provide some protection to properties in Stranorlar. There is approximately 1330m of earthen embankment providing protection within the Ballybofey & Stranorlar AFA. No organisation is currently responsible for the overall management and maintenance of the defences however their effectiveness into the future will be dependent on ongoing inspection and maintenance. The existing Hard Defences do afford protection to a large number of properties in the centre of Ballybofey.

5.5 OPW PRELIMINARY FLOOD RISK ASSESSMENT INDICATIVE FLUVIAL FLOOD MAPS

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise completed by the OPW in 2012 based on available and readily-derivable information. The PFRA aimed to identify areas where there may be a significant risk associated with flooding. Indicative fluvial flood maps where produced to help identify these areas. The mapping did not account for flood defences, channel structures or channel works. Areas where the risks associated with flooding might be significant were identified and are referred to as Areas for Further Assessment, or 'AFAs'. More detailed assessment of the AFA's is being undertaken through the CFRAM Studies to more accurately assess the extent and degree of flood risk, and, where the risk is significant, to develop where possible measures to manage and reduce the risk.

The North Western CFRAM study includes Letterkenny, Lifford and Ballybofey/Stranorlar as AFAs and therefore the CFRAMs flood mapping provided for in the FRMP is adequate to accurately assess the extent and degree of flood risk for the areas within the extents of the AFAs that may be affected by the TEN-T PRIPD.

For those areas of the preferred route corridor that are outside the above AFAs the PFRA flood mapping was used.

5.6 SFRA FLUVIAL FLOOD ZONE MAPPING SUMMARY

The flood zones are mainly derived from the Final North Western CFRAM maps. These maps are the most comprehensive flood maps produced for TEN-T PRIPD corridor regions since the introduction of the Guidelines and the Floods Directive. In addition there are some areas within the corridor regions that lie outside of the existing CFRAM mapping and therefore there is a requirement to supplement mapping from the earlier OPW Preliminary Flood Risk Assessment (PFRA) Report. The flood zones account for inland and coastal flooding.

5.7 OTHER SOURCES OF FLOODING

5.7.1 Overview

The flood zones only account for inland flooding. However, they should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from other sources. Hence a review of other sources of flooding was carried out to identify potential areas of risk.

5.7.2 Ground Water Flooding

The OPW Preliminary Flood Risk Assessments Groundwater Flooding Report concludes that ground water flooding is largely confined to the West Coast of Ireland due to the hydrogeology of the area. Figure 5.4 below shows that ground water flooding is not a risk for County Donegal.

Figure 5-4: OPW Preliminary Flood Risk Assessments Groundwater Flooding Hazard Map

5.7.3 Pluvial Flooding

5.7.3.1 Pluvial Modelling

The draft SFRA for the Letterkenny Local Area Plan developed a pluvial model which required definition of the flood risk to Letterkenny from rainfall, using the best available information and methodologies as far as is reasonably practicable. However, for other parts of the study area the National OPW Flood Mapping was required to assess their flood risk.

5.7.3.2 Model Representation

The 2D model is comprised of a mesh zone created using the 2m DTM, with a minimum element area set to 5m^2 and a maximum triangle area set to 200m^2. Terrain-sensitive meshing was switched on to allow the model to calculate area as required depending on terrain therefore providing highly detailed outputs. Defined urban and rural zones were incorporated into the model, created using national Corine datasets, with manual updates made to reflect recent developments and boundaries were simplified in GIS to aid model effectiveness. These urban and rural zones were used to generate rainfall boundaries and the boundaries defined two separate zones for the application of separate rainfall profiles. An infiltration zone was applied to the rural area, with a value of 0.9 for 10% infiltration, to represent permeable ground materials. Figure 5.5 below shows a representation of the ICM model set-up.

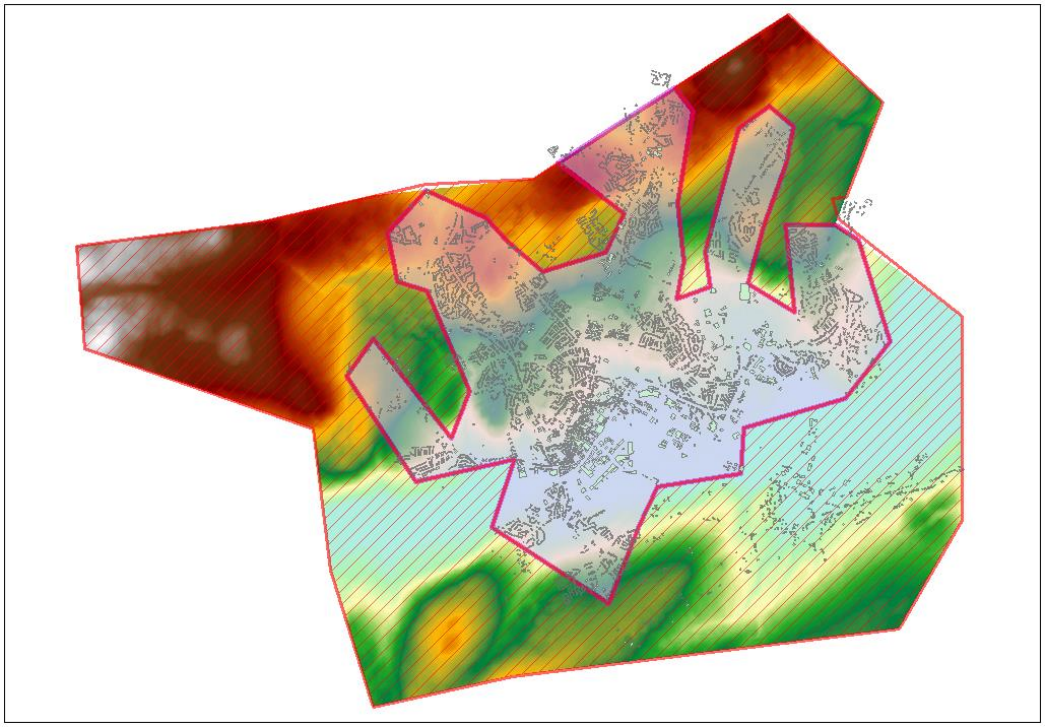


Figure 5-5 Representation of the ICM model

Figure 5.6 illustrates the pluvial extent map for a 120 minute duration storm over a range of return periods.

The maps can be used to identify areas that may be at risk and that may require a pluvial flooding assessment to be carried out for the road schemes during detailed design. Recommendations and guidelines in relation to SuDs should be implemented in these areas to reduce the risk of pluvial flooding.

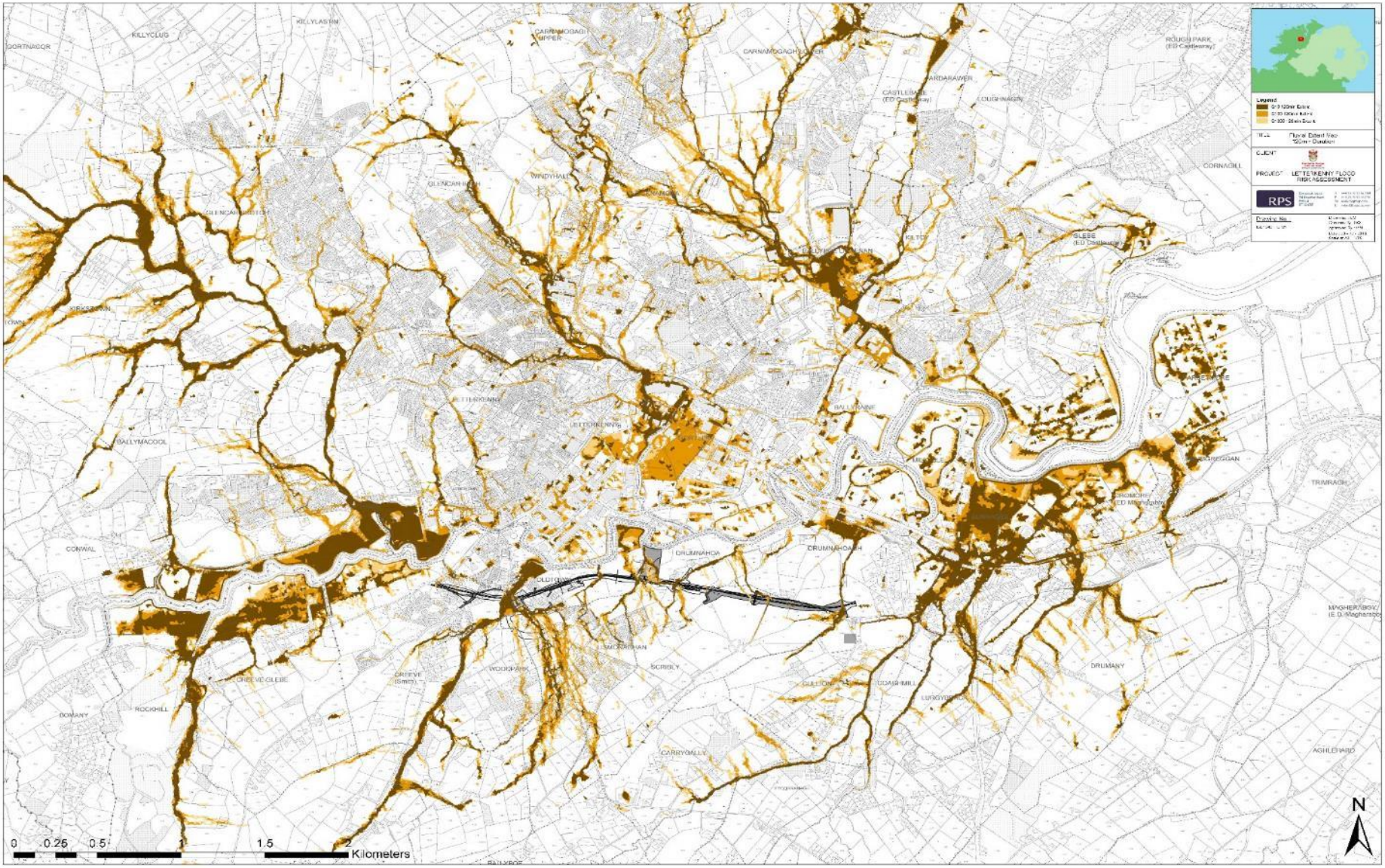


Figure 5-6: Pluvial extent map for a 120 minute duration storm over a range of return periods

5.7.3.3 OPW PLUVIAL FLOOD RISK ASSESSMENT

The OPW Pluvial Flooding Risk Assessment study provides a national level pluvial screening of areas that are at potential risk of pluvial flooding. It is important to note that the pluvial flooding risk assessment was not a detailed assessment of flood risk. It was rather a broad assessment, based on available and readily derivable information to identify areas where there was a genuine cause for concern about a risk and impact of flooding that may require further assessment. For a thorough assessment of pluvial risk in the regions of the TEN-T PRIPD Corridors, a more detailed assessment at a countywide scale (taking into consideration of local factors and parameters) would need to be carried out. Nonetheless, the national pluvial flood risk assessment maps can be used to identify areas that may be at risk and that may require a pluvial flooding assessment to be carried out for the development stage FRA. These include:

- Ballybofey and Stranorlar
- Convoy
- Killygordon
- Castlefinn
- Lifford

5.8 CLIMATE CHANGE SENSITIVE AREAS

The flood zones are generated without the inclusion of climate change factors. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended. Areas that are potentially sensitive to climate change were reviewed from the North western CFRAMs and the mapping available on floodinfo.ie. Letterkenny AFA is considered to be at high vulnerability from the mid-range future scenario (MRFS) and high vulnerability from the high end future scenario (HEFS). Ballybofey and Stranorlar AFA would also be considered to be at high vulnerability from the MRFS and HEFS, with an additional 80 and 145 properties estimated to be at flood risk compared to the present day scenario, respectively. Similarly, Lifford AFA is considered to be at high vulnerability from the MRFS and HEFS, with an additional 21 and 28 properties estimated to be at flood risk compared to the present day scenario, respectively. Detailed flood risk assessment and adaptation of the flood risk mitigation measures would require consideration of the impacts from climate change at the planning and design stages of the development.

6 PROPOSED VARIATION TO THE CDP 2018-2024 IN RESPECT OF THE TEN-T PRIPD AND ASSOCIATED PREFERED ROUTE CORRIDORS

6.1 Introduction

The initial SFRA reviewed areas of interest in terms of fluvial and coastal flood zones, historical flooding spots and indicative pluvial flooding mapping.

The flood zones are mainly derived from the Final North Western CFRAM maps within which Letterkenny, Lifford and Ballybofey/Stranorlar were identified as AFAs and therefore had detailed assessment of the flood risk undertaken. As described in Section 5 the CFRAM mapping is the most comprehensive flood zone mapping available for the TEN-T PRIPD variation to the County Development Plan and is considered appropriate for use as a strategic overview of flood risk. In addition there are some areas within the corridor regions that lie outside of the existing CFRAM mapping and therefore there is a requirement to supplement mapping from the earlier OPW Preliminary Flood Risk Assessment (PFRA) Report. The flood zones account for inland and coastal flooding.

This flood risk information has enabled DCC to apply 'The Guidelines' sequential approach to the TEN-T PRIPD preferred route corridors to be included as a variation in the County Development Plan and where necessary the Justification Test, to appraise preferred corridor zonings and identify how flood risk can be managed as part of the variation to the development plan. Appendix A outlines the approach undertaken in application of the sequential approach and details the Justification Test where necessary. The proposed variation in the County Development Plan for the TEN-T PRIPD route corridors have been overlaid with Flood Zones A and B are shown in Figures 5.1 – 5.3.

6.2 Proposed Variation to the CDP 2018-2024 in Respect of the TEN-T PRIPD - Areas at Risk of Flooding

This SFRA identifies five locations where the TEN-T PRIPD Preferred Route Corridors coincide with areas which are at significant risk of flooding which are detailed below and shown on the maps in Figure 6.1 to 6.3:

Section 1 Ballybofey/Stranolar Bypass (Figure 6.1)

1. Reference 1 - River Finn at Ballybofey/Stranolar.
2. Reference 2 - River Cloghroe/Deele at intersection with N13.

Section 2 Manor to Letterkenny/Lurgybrack (Figure 6.2)

3. Reference 3 - River Swilly/Lough Swilly and tributaries at Letterkenny.

Section 3 Manor to Lifford (Figure 6.3)

4. Reference 4 - Swilly Burn to East of Raphoe.
5. Reference 5 - River Deele to West of Lifford.

In accordance with guidelines the sequential approach has been adopted and where avoidance or substitution of land use is not possible a justification test should be carried out to assess the appropriateness of the zoning for the TEN-T PRIPD at risk of flooding. If still deemed appropriate the Justification Test should outline flood risk management measures to ensure that flood risk is not increased in the areas and to other adjoining areas. These include existing highly vulnerable development in Flood Zones A and B and existing less vulnerable development in Flood Zone A.

The watercourses which the TEN-T PRIPD preferred corridor will cross have been identified and are illustrated in Figure 5.1 – 5.3 within Flood Zone A and Flood Zone B. Many of these are minor and managing the flow of water by culverting beneath the proposed road or small span bridges will be readily achieved, acknowledging that a section 50 application under the Arterial Drainage Act will be prepared

to ensure these structures are adequate to convey flow and ensure that there is no increased risk in flooding.

The 5 identified locations where the proposed road TEN-T PRIPD preferred corridor must cross a larger section of flood plain are listed above and shown on the maps in Figure 6.1 to 6.3. The mitigation to prevent increasing flood risk either upstream or downstream could be expensive and/or difficult to achieve. A justification test is required where avoidance or substitution is not possible to review the appropriateness of the land use following 'The Guidelines' sequential approach. Detailed modelling will be necessary during the development stage FRA.

6.2.1 Avoidance

Given the linear nature of the TEN-T PRIPD road scheme and the need to cross what are predominantly linear natural features (i.e. rivers and their associated flood plains) the absolute avoidance of flood risk areas when identifying the preferred route corridors was not possible. Nevertheless the preferred route corridors were only identified following a detailed route selection process including the assessment of alternative route options through a multi-criteria analysis, including flood risk. During this process unsuitable alternative routes, including routes at higher risk of flooding, were avoided (detailed information in relation to same is provided in Appendix A). Furthermore avoidance within the identified preferred route corridors, which are 300m wide, will be investigated during detailed design where possible. Many of the watercourses within said corridors are minor and managing the flow of water by culverting beneath the proposed road or small span bridges will be readily achieved and will avoid an increase in flood risk. However in certain locations avoidance of larger water courses and associated areas of flood risk within said corridors will not be possible given the linear nature of the scheme and the need to cross such watercourses and their associated flood plains.

Where avoidance is not possible the development of the TEN-T PRIPD will still consider flood risk and therefore the development of the TEN-T PRIPD should be supported by an appropriately detailed Flood Risk Assessment (FRA) at the detailed design stage. The level of detail within the FRA will depend on the risks identified.

A surface water and drainage assessment to ensure that drainage from the road is managed sustainably will also be undertaken demonstrating consideration of CDP 2018-2024 policies on SuDs and Technical Document RE-CPI-07001 a Drainage Design for National Road Schemes - Sustainable Drainage Options and incorporation of SuDS into the design.

6.2.2 Substitute

The objective of the project is to deliver the strategic TEN-T PRIPD so substitution for less vulnerable development is not possible.

6.2.3 Highly Vulnerable Development – Justification

The overall purpose of the proposed variation and the associated Preferred Route Corridors, Policies, Objectives and Zonings are to provide for a Strategic Road Development which is considered Essential Infrastructure and therefore Highly Vulnerable Development in accordance with Table 3.1 of the guidelines.

The Planning Authority had regard to Section 4.26 and 4.27 of the Guidelines in considering the zoning for the preferred route corridors for the TEN-T PRIPD, and where the criteria of the Justification Test have been met for the five locations identified below, the zoning for TEN-T will be retained.

In order to ensure the compliance of the proposed TEN-T PRIPD preferred route corridors with the Guidelines it will be necessary to undertake detailed flood risk modelling and propose suitable mitigation measures at the detailed design stage to ensure the development stage FRA satisfies the requirement of the Guidelines.

The proposed variation to the County Donegal Development Plan 2018 -2024 under an amendment to policy T-P-1 states

a) It is a policy of the Council to support and facilitate the appropriate development, extension and improvement of the TEN-T network (Map 5.1.1 refers) within Donegal in accordance with the Core Strategy and subject to environmental, safety and other planning considerations. In this regard it is a specific policy of the Council to: a) Progress and ultimately carry out/implement the TEN-T Priority Route Improvement Project, Donegal as one of critical strategic importance to Donegal subject to the granting of the required statutory approvals for same and the terms and conditions of any such approvals (if granted).

b) Reserve the preferred route corridors of the TEN-T Priority Route Improvement Project, Donegal as shown on maps 5.1.4, 5.1.5, and 5.1.6 for the purposes of the project and the ancillary facilities to service the same and not to permit other development within those corridors where such development may prejudice the carrying out/implementation of the said project.

c) Facilitate any development related to the TEN-T Priority Route Improvement Project, Donegal within lands zoned:

    - TEN-T PRIPD/Established Development.
    - TEN-T PRIPD/Strategic Residential Reserve.
    - TEN-T PRIPD/General Employment.
    - TEN-T PRIPD/Open Space.
    - TEN-T PRIPD/Amenity.

The locations where a justification test has been undertaken for the proposed variation and where detailed modelling will be necessary during the development stage FRA are listed above and shown on the maps in Figure 6.1 to 6.3.

6.3 Summary

A Justification Test for these five locations is included in Appendix A. All the areas are being retained with a zoning objective which includes strategic road development. Applying the Guidelines to the formulation of detailed FRA at the Development Management stage means such development will be appropriately assessed and designed to ensure that there is limited impacted on flood risk provided the mitigation to span the flood risk areas or compensate for displaced flood storage is achieved. Part 3 of the justification test in appendix A outlines the mitigation measures that will be considered and necessary to ensure flood risk to the TEN-T PRIPD corridors can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.

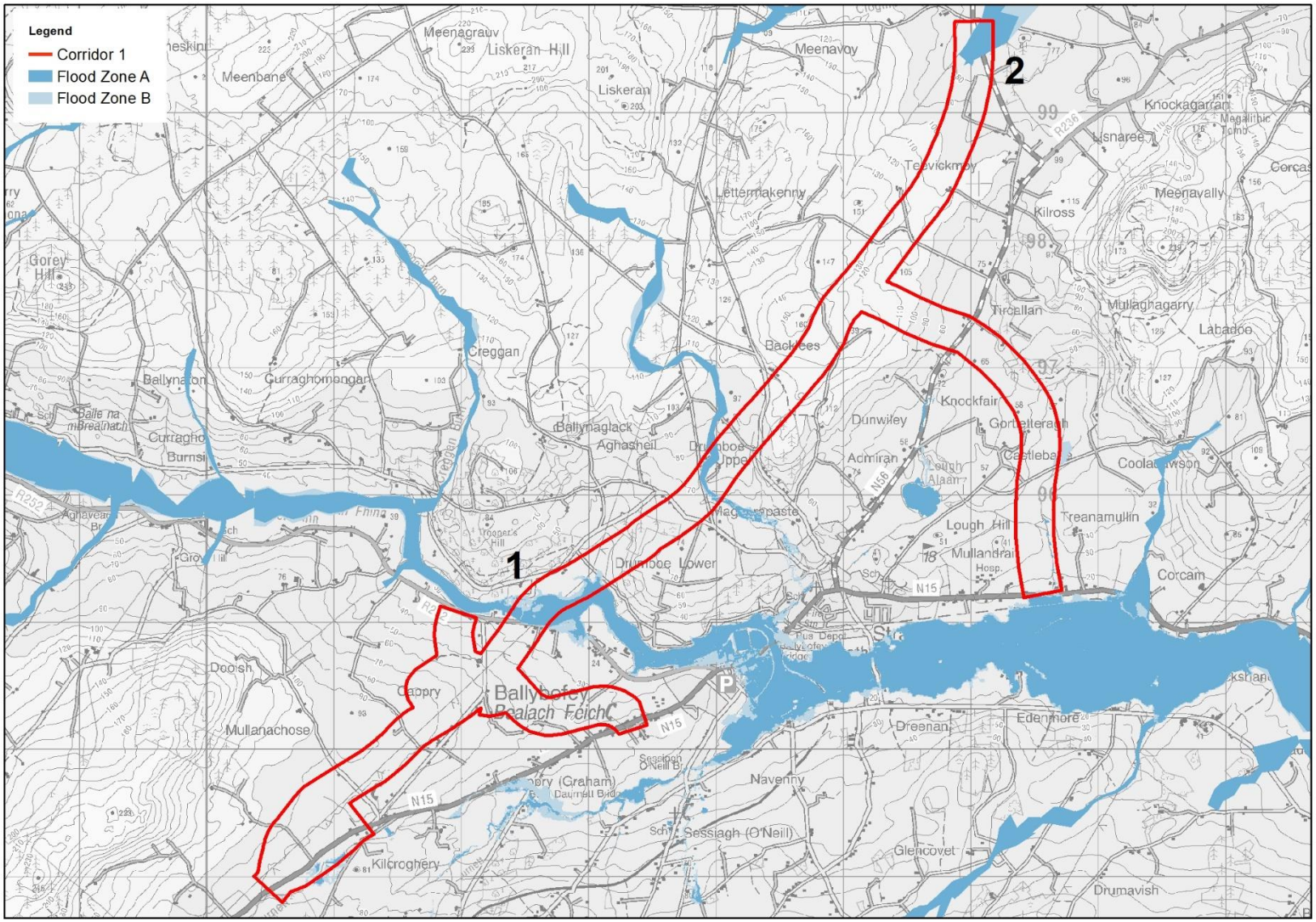
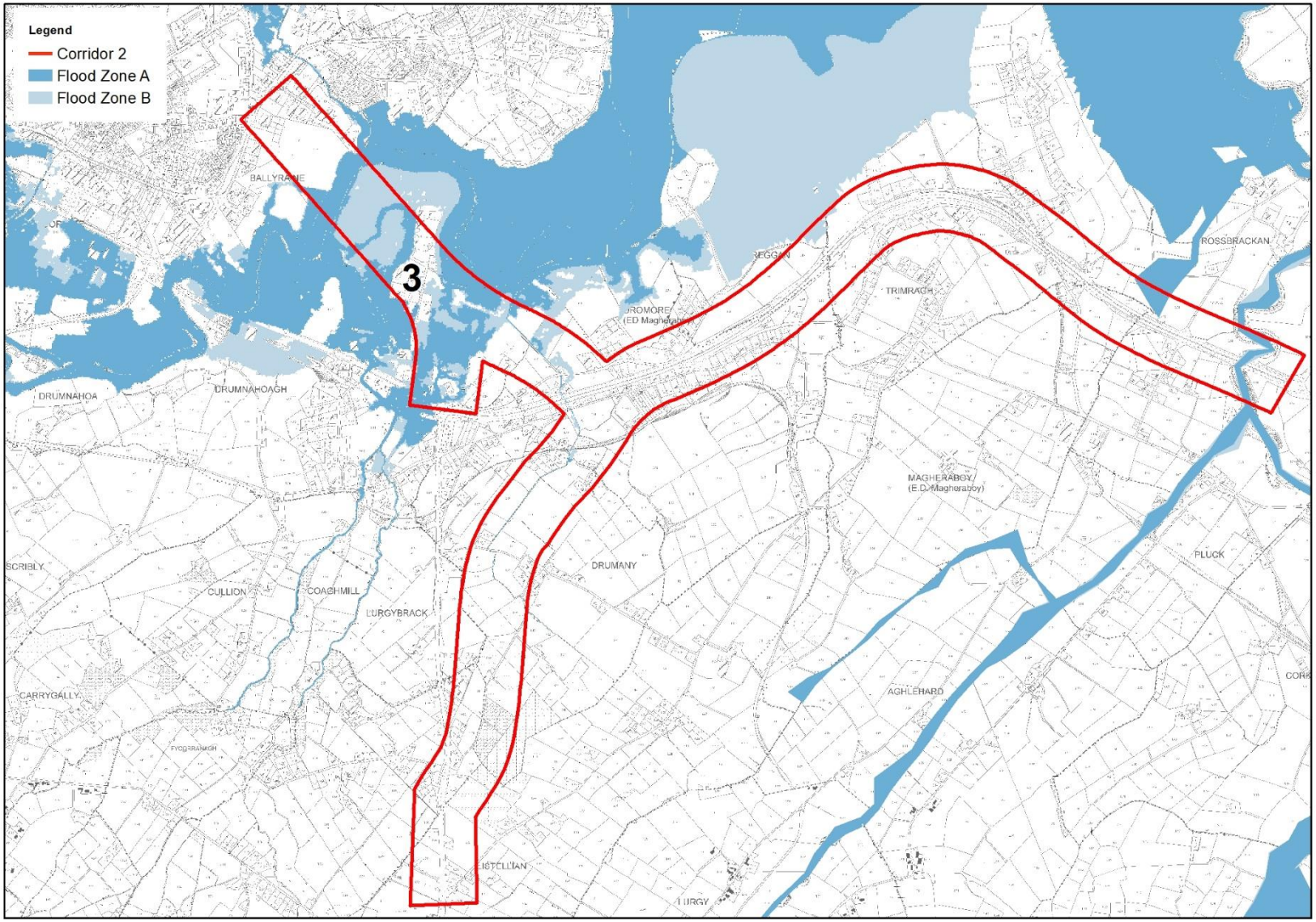
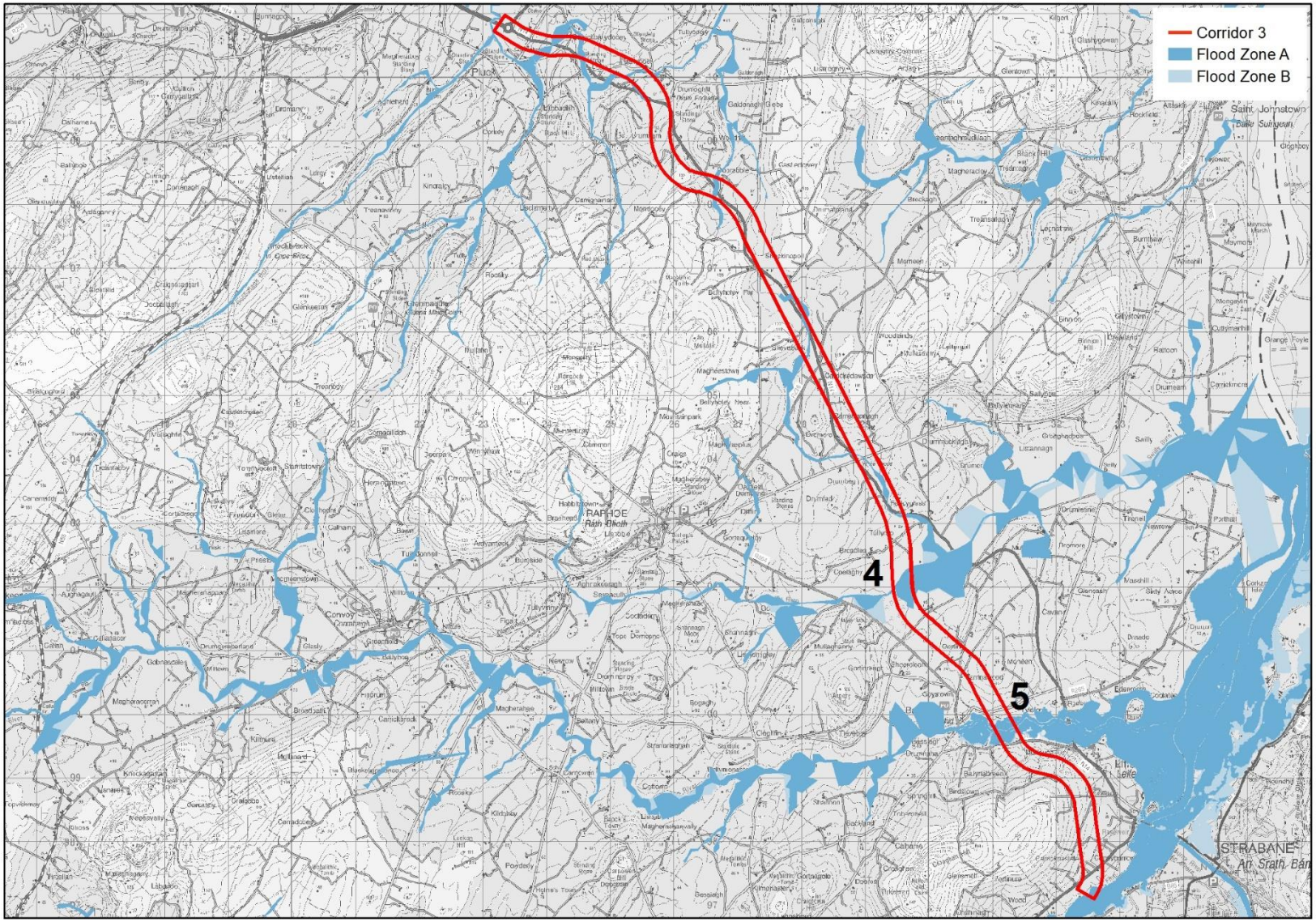


Figure 6-1: Section 1 – N15/N13 Ballybofey/Stranorlar Urban Region Preferred Route Corridor– Locations requiring Justification Test



Section 2 – N56/N13 Letterkenny to Manorcunningham Preferred Route Corridor – Locations requiring Justification Test



Section 3 – N14 Manorcunningham to Lifford/Strabane/A5 Link – Locations requiring Justification Test

7 FLOOD RISK MANAGEMENT POLICIES AND OBJECTIVES

7.1 General Development Plan Strategies

The County Donegal Development Plan 2018-2024 outlines flood risk management strategies for the management of development, which will be applicable to the implementation of the TEN-T PRIPD, these include:

7.1.1 Flood Risk Assessment

Flood risk management will be carried out in accordance with the Flood Risk Management Guidelines for Planning Authorities, DOECLG (2009) and Circular PL2/2014. The North Western CFRAMS FRMP provides information in relation to known flood risk in several areas of Donegal. Development proposals on lands that may be at risk of flooding should be subject to a flood risk assessment, prepared by an appropriately qualified Chartered Engineer, in accordance with the Flood Risk Management Guidelines. Detailed flood risk assessments should be cognisant of possible pluvial flood risk and appropriate drainage proposals should be implemented to reduce the risk of pluvial flooding. Proposals for minor development to existing buildings in areas of flood risk (e.g. extensions or change of use) should include a flood risk assessment of appropriate detail.

7.1.2 Surface Water

Development proposals should provide suitable drainage measures in compliance with the principals of SuDs. The maximum permitted surface water outflow from any new development should not exceed the existing situation. On Greenfield lands the permitted outflow of a development should be the equivalent to a Greenfield Site. All new development must allow for climate change. Development proposals should not give rise to the pollution of ground or surface waters either during construction phases or subsequent operation. This will be achieved through the adherence to best practice in the design, installation and management of systems for the interception, collection and appropriate disposal or treatment of all surface water and effluents.

7.1.3 Sustainable Urban Drainage System (SUDS)

In general all new developments will be required to incorporate Sustainable Urban Drainage Systems (SuDS). Sustainable Drainage Systems include devices such as swales, permeable pavements, filter drains, storage ponds, constructed wetlands, and soakways. In some exceptional cases and at the discretion of the Planning Authority, where it is demonstrated that SuDS devices are not feasible, approval may be given to install underground attenuation tanks or enlarged pipes in conjunction with other devices to achieve the required water quality. Such alternative measures will only be considered as a last resort. Watercourses should remain open in their natural valley and culverting shall be confined to road crossings. In exceptional circumstances and at the discretion of the Planning Authority, approval may be given to install a culvert within a development where it is demonstrated that this is the most appropriate design response based on site specific constraints/circumstances.

7.2 Flood Risk Management Objectives

The County Development Plan outlines core flood risk management policies which have been strengthened and improved upon since the previous Development Plan.

Table 7.1: DCC Existing Flood Risk Management Policies

Planning Policy ID No.	Policy Description
F-P-1	It is a policy of the Council to ensure that all development proposals comply with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities', November 2009, DoEHLG. In doing so the planning authority shall: • Assess developments in accordance with the Sequential approach and precautionary principle set out the in the Planning System and Flood Risk Management – Guidelines for Planning Authorities'; and • Utilise the Draft Flood Risk Management Plans (and any associated flood risk mapping) prepared as part of the CFRAMS programme, or any other flood risk datasets or mapping it considers appropriate, in assessing flood risk.
F-P-2	It is a policy of the Council to require applicants/developers to submit, where appropriate, an independent 'Flood Risk Assessment' in accordance with the Flood Risk Management Guidelines, DEHLG, 2009 or any subsequent related publication and/or 'Surface Water Drainage Calculations', from suitably qualified persons.
F-P-3	It is a policy of the Council to require applicants/developers to submit, where appropriate, evidence of compliance with the Justification test set out in S5.15 of The Planning System and Flood Risk Management - Guidelines for Planning Authorities' (DoEHLG 2009) or any subsequent related publication.
F-P-4	It is a policy of the Council not to permit development where flood or surface water management issues have not been, or cannot be, addressed successfully and/or where the presence of unacceptable residual flood risks remain for the development, its occupants and/or property or public infrastructure elsewhere including, inter alia, up or downstream.
F-P-5	It is a policy of the Council to promote the use of Sustainable Urban Drainage Systems (SUDs), flood attenuation areas, the controlled release of surface waters and use of open spaces and semi permeable hard surfaces for appropriate development proposals.
F-P-6	It is a policy of the Council to consider the development of long and short-term flood remediation works, including embankments, sea defences, drainage channels, and attenuation ponds to alleviate flood risk and damage to livelihoods, property and business subject to environmental considerations including potential impact on designated shellfish water and, fresh water pearl mussel catchment areas, compliance with Article 6 of the Habitats Directive, best practice in Coastal Zone Management and the Marine Resource and Coastal Management policies of this Plan.
F-P-7	It is a policy of the Council not to permit developments which would hinder the maintenance of river or drainage channels.

7.3 Flood Risk Management Plans

The Development Plan already has a commitment to assist with the implementation of the relevant CFRAMs. The North Western CFRAM has been completed since the previous development plan and the following recommendations for flood risk management should be supported:

- Implement the Guidelines to avoid inappropriate development in flood plains, or development that can increase runoff rates and volumes, can create flood risk to the properties being built and potentially increase the risk to other areas.
- Implement the Guidelines to prevent loss of floodplain storage and conveyance.
- SuDS should be applied to all new developments.

8 CONCLUSION

8.1 Overview

The SFRA Report has been prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines for Planning Authorities (2009) and Circular PL02/2014 (August 2014). The SFRA has provided an assessment of all types of flood risk within the study area to assist DCC in making informed strategic land-use planning decisions in relation to the Proposed Variation to the County Donegal Development Plan 2018-2024 in respect of the TEN-T PRIPD. The flood risk information has enabled DCC to apply the sequential approach detailed in said guidelines, and where necessary the Justification Test, in order to appraise the preferred route corridors for the TEN-T PRIPD in the context of flood risk and identify how it will be managed as part of the variation to the development plan.

8.2 Flood Zones and Flood Risk

The regions surrounding the three proposed TEN-T PRIPD preferred route corridors are susceptible to several types of flood risk, including:

- Fluvial - Flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded.

- Coastal - Coastal flooding occurs when sea levels along the coast or in estuaries exceed neighbouring land levels, or overcome coastal defences where these exist, or when waves overtop the coastline or coastal defences

- Pluvial - Flooding occurs when overland flow cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when the water cannot discharge due to a high water level in the receiving watercourse.

The flood zones extents have been prepared in accordance the Planning System and Flood Risk Assessment Guidelines identifying Flood Zones A, B and C. The flood zone maps are derived mainly from the North Western CFRAM mapping and also from PFRA mapping (for areas outside of the AFAs identified in the CFRAMs study). Collectively these maps are the most comprehensive flood maps produced for the areas under study since the introduction of the Guidelines and the Floods Directive.

The Flood Zone mapping is based on the best currently available data and a more detailed, site specific FRA may generate localised flood extents. The flood zones only account for inland and coastal flooding and are generated without the inclusion of climate change factors. They should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from pluvial and groundwater flooding.

The watercourses which the TEN-T PRIPD preferred route corridors will cross within Flood Zone A and Flood Zone B have been identified. Many of these are minor and managing the flow of water by culverting beneath the proposed road or small span bridges will be readily achieved, acknowledging that section 50 of the Arterial Drainage Act will still need to be complied with.

The 5 identified locations where the proposed road TEN-T PRIPD preferred corridor must cross a larger section of flood plain are:

1. River Finn at Ballybofey/Stranolar;
2. River Cloghroe/Deele at intersection with N13;
3. River Swilly/Lough Swilly and tributaries at Letterkenny;
4. Swilly Burn to East of Raphoe.
5. River Deele to West of Lifford

Avoidance of these flood risk areas is not possible due to the linear nature of the TEN-T PRIPD and the linear nature of the rivers and associated flood zones the project has to traverse.

Substitution is also not possible as the Proposed Variation only concerns, and provides for, the TEN-T PRIPD, which is a strategic road project and considered as highly vulnerable development.

A justification test is therefore required as avoidance or substitution is not possible and detailed modelling will be necessary during the development stage FRA. The justification test is included in Appendix A. This justification test demonstrates that the Proposed Variation (and the associated Preferred Route Corridors) satisfies the criteria for such tests outlined in Section 4.23 of the Flood Risk Management Guidelines including that:

- The Proposed Variation is required to achieve the Proper Planning and Sustainable Development of the area.
- There are no suitable alternative lands for this specific development in areas at lower risk of flooding.
- Flood Risk to the development can be adequately managed and the development will not cause unacceptable adverse impacts elsewhere subject to the implementation of project level Flood Risk Assessment, design and mitigation measures.

Consequently it can be concluded that the SFRA of the Proposed Variation follows the detailed guidance and sequential approach outlined in the Flood Risk Management Guidelines and it is therefore appropriate to designate the associated Preferred Route Corridors for development as detailed in the variation.

8.3 Flood Management Policies & Objectives

The County Development Plan outlines flood risk management strategies and objectives that incorporate Flood Risk Management into the spatial planning of the County, to meet the requirements of the EU Floods Directive and the EU Water Framework Directive. The Appropriate Flood Risk Management strategies and objectives are detailed in Section 6.1 and Section 6.2 respectively.

Flood risk management will be carried out in accordance with the Flood Risk Management Guidelines for Planning Authorities, DOECLG (2009) and Circular PL2/2014. The North Western CFRAMS and PFRA mapping provide information in relation to known flood risk in the surrounding areas of the TEN-T PRIPD corridors. This SFRA and the justification test included in Appendix A ensures that the variation of the County Development Plan 2018-2024 is complaint with the Flood Risk Management Guidelines.

The detailed development proposals for the TEN-T PRIPD corridors on lands that may be at risk of flooding will be subject to detailed flood risk assessment, prepared by an appropriately qualified Chartered Engineer, in accordance with the Flood Risk Management Guidelines for development stage flood risk assessment. Detailed flood risk assessments should be cognisant of possible pluvial flood risk and appropriate drainage proposals should be implemented to reduce the risk of pluvial flooding. Therefore project level mitigation measure will in turn ensure that the flood risk to the TEN-T PRIPD can be adequately managed and it will not cause unacceptable adverse impact elsewhere.

8.4 SFRA Review and Monitoring

Outputs from future studies and datasets may trigger a review and update of the SFRA during the lifetime of the 2018-2024 Development Plan. These include the outputs from the Flood Relief Schemes which are currently being progressed in Lifford and Ballybofey. Other sources of information may not lead to an update of the SFRA during the lifetime of the plan but they should be retained and collected to supplement the future County SFRAs.

Appendix A
Justification Test

Appendix A - Justification Test

In the case of the proposed variation to the CDP 2018 -2024 in respect of the TEN-T Priority Route Improvement Project, Donegal the SFRA identifies five locations where the TEN-T PRIPD coincides with areas which are at risk of flooding. In accordance with guidelines the sequential approach has been adopted and where avoidance or substitution of land use is not possible a justification test should be carried out to assess the appropriateness of the zoning for the TEN-T PRIPD at risk of flooding. If still deemed appropriate the Justification Test should outline flood risk management measures to ensure that flood risk is not increased in the areas and to other adjoining areas. These include existing highly vulnerable development in Flood Zones A and B and existing less vulnerable development in Flood Zone A.

The watercourses which the TEN-T PRIPD preferred corridor will cross have been identified and are illustrated in Figure 5.1 – 5.3 within Flood Zone A and Flood Zone B.

The 5 identified locations where the proposed road TEN-T PRIPD preferred corridor must cross a larger section of flood plain are shown on the maps in Figure 6.1 to 6.3. The mitigation to prevent increasing flood risk either upstream or downstream could be expensive and/or difficult to achieve. A justification test is required where avoidance or substitution is not possible to review the appropriateness of the land use following 'The Guidelines' sequential approach as outlined in the table below. Detailed modelling will be necessary during the development stage FRA.

In addition to the 5 locations where the TEN-T PRIPD Preferred Route Corridors traverse areas which are at significant risk of flooding all the corridors contain minor watercourses which must be traversed. Given the linear nature of the TEN-T PRIPD road scheme and the linear nature of these water courses there were no suitable alternatives to crossing these minor watercourses. For these minor water courses managing the flow of water by culverting beneath the proposed road or small span bridges will be readily achieved and will not represent a significant flood risk, acknowledging that section 50 of the Arterial Drainage Act will still need to be complied with.

The justification test has been undertaken on the basis of the variation to the CDP 2018 – 2024 and on the assumption that the zonings of lands for the TEN-T PRIPD are considered to be highly vulnerable due to the primary purpose of facilitating the development of the TEN-T network. The justification Test is therefore necessary due to the strategic nature of the project and the potential flood risk in these areas of Letterkenny, Ballybofey, Lifford and areas outside of settlement limits where the route corridors traversed undeveloped lands at risk of flooding.

In applying the Justification Test Part 3, consideration has been given to structural and non- structural measures identified in the SFRA which may be required prior to further development taking place. As such, in most of these built up areas, flood risk can be addressed through requiring a site specific flood risk assessment which will identify appropriate mitigation measures such as retaining flow paths, flood resilient construction and emergency planning.

Justification Test for zoning and objectives in the proposed variation of the Donegal County Development Plan 2018-2024 in respect of the TEN-T PRIPD in areas of flood risk in Zone A and /or B

	Criteria	Response
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.	The urban settlements related to the TEN-T PRIPD are targeted for growth under the National Planning Framework, the Regional Spatial and Economic Strategy for the Northern and Western Regional Assembly Area 2020-2032 and the County Donegal Development Plan 2018-2024. In particular: • Letterkenny is identified as a Regional Centre in the National Planning Framework and the Regional Spatial and Economic Strategy. Such centres are identified in the NPF to lead the development of their regions. • Both Ballybofey/Stranorlar and Lifford are identified as Layer 2 Strategic Towns in the County Donegal Development Plan 2018-2024. The TEN-T PRIPD is supported by a number of policies across international, national and regional strategic planning documents and its strategic importance to the County is highlighted by the fact that • Article 4 of EU Regulation 1315/2013 highlights that the TEN-T network "shall strengthen the social, economic and territorial cohesion of the Union" and shall support "inclusive growth". It shall demonstrate European added value by contributing to objectives set out in the Regulations • Enhanced Regional accessibility, including upgrading access to the North West utilising routes such as the N14 and progressive development of the Atlantic Economic Corridor Northwards by upgrading the N15/N13 link, is a National Strategic Outcome of the National Planning Framework Project Ireland 2040. • The "N15 Ballybofey Bypass", "N13/N14/N56 Letterkenny Bypass and Dual Carriageway to Manorcunningham" and the "N14 Manorcunningham to Lifford" are all listed as priorities for investment within the NDP 2018-2027. • It is an objective of the Regional Spatial and Economic Strategy for the Northern and Western Regional Assembly Area to deliver the project by 2028. (Objective RPO 3.7.30 of said document refers). • The project is fundamental to both the success of the North West City Region and enhanced transport connectivity between Ireland and Northern Ireland, each of which in turn are National Policy Objectives of the National Planning Framework (NPO 45 and 46 of said document refers).
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:	
2(i)	Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:	The purpose of the proposed variation is to facilitate the TEN-T PRIPD a strategic roads project whose geographical scope covers both urban and rural areas in east Donegal. As such the project is not specifically designed to facilitate the regeneration

	Criteria	Response
		and/or expansion of the centre of a specific urban settlement. Nevertheless the project will facilitate the regeneration and expansion of the urban areas of Ballybofey/Stranorlar, Letterkenny and Lifford by: • Alleviating traffic congestion and associated air and noise pollution and thus enhancing the overall viability and quality of life in core of said urban settlements. • Removing strategic traffic from said urban settlements thus freeing up space for sustainable transport modes and urban improvements in said urban settlements. • Supporting the expansion of said urban settlements by facilitating economic growth and allowing Donegal to successfully compete for inward investment by improving the efficiency and capacity of the road network including improving journey time and journey time reliability at a local, regional and national level.
2(ii)	Comprises significant previously developed and/or under-utilised lands:	As stated the TEN-T PRIPD is a strategic roads project whose geographical scope covers both urban and rural land in east Donegal as such is it not specifically intended to re-develop previously developed and/or utilized lands. However some of the Section 2 – N56/N13 Letterkenny to Manorcunningham Preferred Route Corridor does incorporate underutilized lands.
2(iii)	Is within or adjoining the core of an established or designated urban settlement:	The TEN-T PRIPD is a strategic roads projects aimed at upgrading and improving parts of the TEN-T strategic road network in Donegal and the associated Preferred Route Corridors have been chosen to on the basis, inter alia, that they would enhance the functionality and carrying capacity of the road network. Accordingly the corridors are not within, and do not adjoin, the cores of designated urban settlements.
2(iv)	Will be essential in achieving compact and sustainable urban growth;	As a strategic roads project the TEN-T PRIPD is not specifically aimed at achieving compact and sustainable urban growth. However by removing strategic traffic from the urban settlements of Ballybofey/Strannorlar, Letterkenny and Lifford the project will promote sustainable urban growth by: • Alleviating traffic congestion, and associated air and noise pollution and thus enhancing the overall viability and quality of life in these urban settlements. • Removing strategic road traffic from these urban settlements thus freeing up space for sustainable transport modes and urban improvements.
2(v)	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.	**Section 1: N15/N13 Ballybofey/Stranorlar Urban Region Preferred Route Corridor.** This section contains the following locations identified in Section 6.2 and Figure 6-1 where the corridor traverses flood risk areas: 1. River Finn at Ballybofey/Stranorlar. 2. River Cloghroe/Deele at intersection with N13. In total there were 36 different options or variations of the same option considered in the Stage 1 Preliminary Options Assessment process of the TEN-T PRIPD as illustrated in the Stage 1 preliminary options drawing below (Figure 1).

Criteria	Response

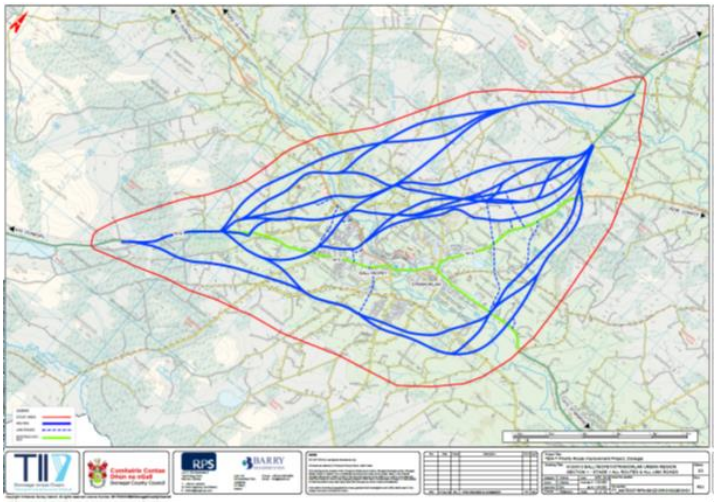


Figure 1: Stage 1 preliminary options considered for Section 1

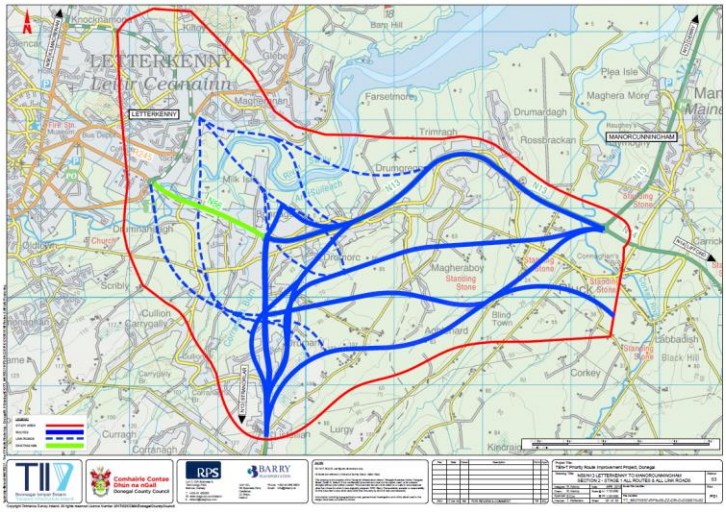
A number of preliminary route options which traversed a wider section of the flood plain to the east of Ballybofey/Stranorlar which were eliminated due to an unacceptable impact on the floodplain, some traversing over 1,000 m of floodplain.

The Stage 2 Options Assessment process considered 13 options for Section 1 and identified the preferred corridor (option 1G, Link E) as having an 'intermediate' impact on areas with the potential for flooding and the number and length of river crossings. The option selection for the main line recommends clear spanning the River Finn and floodplain ensuring the road level is above the 0.1 % AEP to ensure minimal impact.

There were other options that had a better alignment in terms of the potential for flooding and the number and length of river crossings, Options 1B, 1B1, 1C, however these options were not as suitable for a number of other criteria considered in the multi criteria analysis including: landscape and visual, soils, geology and hydrogeology, material assets (non-agriculture) and accessibility and social inclusion where they were considered 'least favourable' or 'intermediate'.. Therefore, for the main line, there were no other suitable alternatives that achieved the objectives of the Project in areas of lower flood risk.

The option selected for the Ballybofey link road was Option E and whilst this corridor option does include flood extents from the CFRAM mapping the flood zones are very limited in their extent and the corridor for the link road will not significantly impact areas of flood risk. It was therefore assessed as the most favourable option in terms of hydrology in the Stage 2 Option selection report and was deemed to be a more suitable route with regard to a range other planning criteria (e.g. safety, economy and integration).

Consequently there were no other suitable alternative routes in areas at lower risk of flooding that could have been selected for the Section 1 Preferred Route Corridor.

Criteria	Response
	Section 2: N56/N13 Letterkenny to Manorcunningham Preferred Route Corridor This section contains the following locations identified in Section 6.2 and Figure 6-2 at which said corridor traverses flood risk areas: 1. River Swilly/Lough Swilly and tributaries at Letterkenny; The section of the preferred route corridor that is in an area of flood risk is predominantly the 2.5km strategic link connecting to the existing N56/R245 junction northeast of the Polestar roundabout in Letterkenny. This is a key link to achieving the objectives of the project. In total there were 39 different options or variations of the same option considered in Stage 1 Preliminary Options Assessment process as illustrated in the preliminary options drawing below (Figure 2 taken form the Phase 2 option selection report).  **Figure 2: Stage 1 preliminary options considered for Section 2** Eleven of these options were discounted immediately as they did not achieve one of the key objectives for the TEN-T PRIPD which was to provide a link road into Letterkenny. Of the remaining 28 options there were varying lengths of road within the flood plain (1% AEP) ranging from 55m to 220m. The Stage 1 assessment using the criteria of Environment, Engineering and Economy, resulted in seven shortlisted options, shown in Figure 3 below, which were brought forward to the Stage 2 assessment process. In addition, three Letterkenny link options were carried forward for continued assessment. As outlined above all options considered for the link road that were taken forward from the stage 1 preliminary option assessment into the Stage 2 route corridor appraisal traversed the areas of flood risks (Figure 3). The preferred route corridor identified though the Stage 2 Options Assessment process (Option 2D) traversed 90m of floodplain which in terms of flood risk was only bettered by 2 other options (2 variations of the yellow option in the preliminary option assessment report).

Criteria	Response

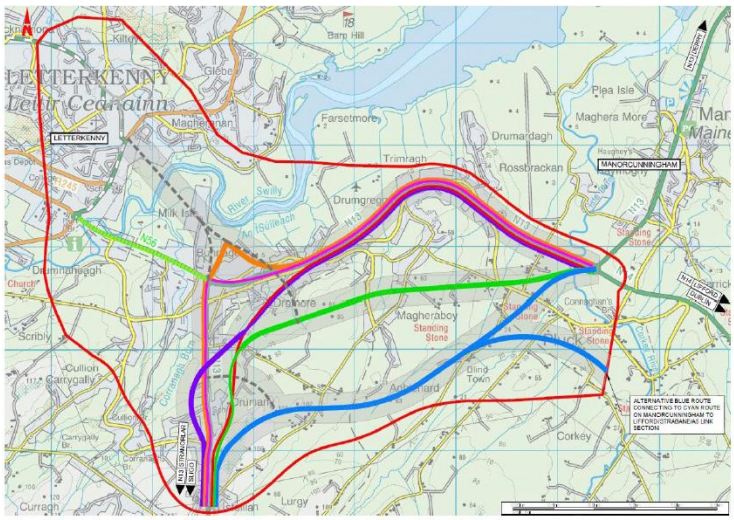


Figure 3: Stage 2 options considered for Section 2

However these other options were considered unsuitable for the following reasons and were eliminated during the Stage 1 preliminary option assessment:

1. The number of roads and strategic services crossed,
2. A less favourable alignment with almost double the volume of earthworks (cut and fill balance) required,
3. Landscape and Visual impacts
4. Archaeology /Cultural Heritage.
5. Agriculture.
6. The number of Residential Properties affected

Consequently there were no other suitable alternative routes in areas at lower risk of flooding that could have been selected for the Section 2 Preferred Route Corridor.

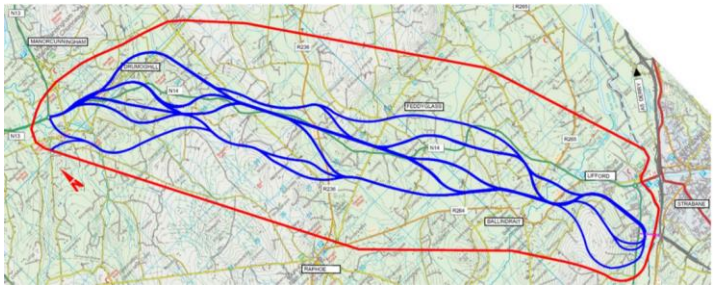
Section 3: N14 Manorcunningham to Lifford Preferred Route Corridor

This section contains the following locations identified in Section 6.2 and Figure 6-3 where the corridor traverses flood risk areas:

1. Swilly Burn to East of Raphoe.
2. River Deele to West of Lifford.

A total of 42 route options were assessed as part of the Stage 1 Preliminary Options Assessment, including permutations of parts of options and previous study options (Figure 4 below). Some of the preliminary options which were eliminated at this stage had a shorter length of road in the flood plain than those options shortlisted for Stage 2 Options Assessment. However these options were deemed unsuitable for a number of reasons including impacts on:

- archaeology,
- community facilities, and
- residential properties.

	Criteria	Response
		 **Figure 4: Stage 2 options considered for Section 3** Option 3B2 was the preferred route option selected for Section 3 as a result of the Stage 2 Options Assessment process. Only Options 3C2 and 3D had a similar ranking in terms of hydrology and flood risk to Option 3B2. However the multi criteria analysis found these other options to be less suitable in relation to other criteria including: • landscape and visual, • material assets, • transport efficiency, and • land use integration. Consequently there were no other suitable alternative routes in areas at lower risk of flooding that could have been selected for the Section 3 Preferred Route Corridor. *Note: Full details of the option selection process can be found in the Stage 2 option selection report and associated supporting information (http://www.donegal-ten-t.ie/pages/documentsbrdownloads/options-selection-report.php)*
3.	A flood risk assessment to an appropriate level of detail has been carried out as part of the SFRA for the proposed variation to the CDP 2018-2024 in respect of the TEN-T PRIPD, which demonstrates that flood risk to the strategic road corridors 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 detailed flood risk assessment.	
	A SFRA has been carried out as part of the assessment of the proposed variation to the CDP 2018-2024 in respect of the TEN-T PRIPD. The SFRA outlines how the zoning of these development can be adequately managed. In particular this SFRA has noted that: 1. Section 1 of the TEN-T PRIPD traverses the River Finn floodplain to the west of Ballybofey; 2. The proposed Bunnagee link road for Letterkenny town in Section 2 crosses the River Swilly Channel. The Swilly river channel is approximately 55m wide at this location. Furthermore, much of this link road passes through the floodplains of the Swilly River; 3. The Section 3 preferred corridor traverses the floodplain of the Swilly Burn and the River Deele. It has been demonstrated that there are no other suitable alternatives in areas of lesser flood risk in these areas. Construction of these sections of the TEN-T PRIPD could pose significant flooding	

Criteria	Response
	risk to the adjacent lands and properties, both during the construction and post construction stages of the works. However it is recommended that the following measures be implemented to ensure that the Proposed Variation does not give rise to unacceptable adverse impacts elsewhere: ▪ A detailed hydraulic model for the associated river channel and floodplains should be carried out to assess this impact and an appropriate mitigation measure should be implemented. A Section 50 application will also be required for the subject river crossing. ▪ Existing open spaces and water compatible uses in Flood Zones A and B should be retained to maintain flood storage areas. ▪ The detailed FRAs for the preferred option should demonstrate that road level is designed for the 0.1% AEP level plus suitable freeboard. The recommended level of freeboard is 500 mm for fluvial flood levels. ▪ Detailed FRAs should also examine residual risk associated with culvert blockages, defence failure and climate change to set final road levels where appropriate. The FRAs should ensure development of the TEN-T PRIPD does not block flow paths, does increase flood risk elsewhere, is designed to appropriate standard of flood resilient construction and demonstrates emergency evacuation procedures during flood events. ▪ The infilling of floodplains for construction of any kind should be avoided at all times where possible. Where this is not possible and the criteria for the justification test is met, the mitigation for the TEN-T PRIPD will include – Spanning the flood plains may be an option so long as adequate freeboard is provided and it can be proven that any supports required in the flood plain have a negligible effect on the displacement of flood waters. – Flood relief culverts through road embankments may also be an option to allow flood waters to reach their natural flood extents. ▪ FRAs and project level mitigation should also address surface water management for the development of the preferred routes, demonstrating consideration of CDP 2018-2024 policies, Technical Document RE-CPI-07001 a Drainage Design for National Road Schemes - Sustainable Drainage Options, incorporation of SuDS into the design and the potential transfer of surface water runoff between subcatchments. ▪ Ancillary development associated with the TEN-T PRIPD in the zoned areas can generally be considered appropriate but an appropriately detailed flood risk assessment will be required in support of the development consent process. The level of detail will vary depending on the risks identified and the proposed land use. The FRA should be aimed at setting road levels and demonstrating no increase in flood risk elsewhere. The County Donegal Development Plan 2018-2024 already incorporates policy requirements to consider such measures outlined above, as summarised in Table 7.1 of this SFRA.