

# FLOOD RISK STATEMENT

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FOR THE

**DRAFT**

**WIND ENERGY**

**DEVELOPMENT GUIDELINES 2019**

**for: Department of Housing, Planning and Local Government**

Custom House  
Dublin 1



**An Roinn Tithíochta,  
Pleanála agus Rialtais Áitiúil**  
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# Table of Contents

<b>Section 1</b>	<b>Introduction and Policy Background.....</b>	<b>1</b>
1.1	Introduction .....	1
1.2	Draft Wind Energy Development Guidelines 2018 .....	1
1.3	Flood Risk Management Policy .....	2
<b>Section 2</b>	<b>Relevance of Flood Risk to the Draft Guidelines.....</b>	<b>4</b>
2.1	Effects that can occur as a result of flooding .....	4
2.2	Effects of the Draft Guidelines on flood risk.....	4
<b>Section 3</b>	<b>Approach to Flood Risk Management .....</b>	<b>5</b>
3.1	Overview .....	5
3.2	Stages of Flood Risk Assessment.....	5
3.3	Sources of Information.....	5
3.4	Flood Zones .....	6
3.5	Climate Change .....	6
3.6	Avoidance, Substitution and Justification.....	7
3.7	Mitigation and Management of Flood Risk.....	9
<b>Section 4</b>	<b>Conclusion .....</b>	<b>11</b>

# Section 1 Introduction and Policy Background

## 1.1 Introduction

The Department of Housing, Planning and Local Government is currently conducting a review of its Wind Energy Development Guidelines 2006 with the intention to produce revised Wind Energy Development Guidelines 2019. This work is being carried out in association with the Department of Communications, Climate Action and the Environment, which is responsible for renewable energy policy.

Flooding is the overflowing of water onto land that is normally dry. It can arise from rivers, the sea and estuaries, heavy rain, groundwater and the failure/overwhelming of infrastructure. It is an environmental phenomenon which, as well as causing economic and social impacts, could in certain circumstances pose a risk to human health.

This Flood Risk Statement outlines the need for development proposals to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and associated *Circular PL 2/2014* (Department of the Environment, Community and Local Government) and includes details on the approach to flood risk management that should be followed by prospective applicants.

## 1.2 Draft Wind Energy Development Guidelines 2019

The 2019 Guidelines will apply to future planning applications, including the repowering and renewal of existing developments, for onshore wind energy developments.

The 2006 Guidelines offer advice to planning authorities on planning for onshore wind energy through the development plan process and in determining applications for planning permission. The Guidelines are also intended to ensure a consistency of approach throughout the country in the identification of suitable locations for wind energy development and the treatment of planning applications for wind energy developments. They should also be of assistance to developers and the wider public in considering wind energy development proposals.

The review of the Guidelines is being undertaken to reflect technological developments in the wind energy sector and to strike a balance between the concerns of local communities and the need to invest in indigenous energy projects which support Ireland's renewable energy targets. The draft Guidelines have had regard to best international practice and seek to be consistent with World Health Organisation (WHO) Guidance in relation to noise emanating from wind turbines.

This review builds upon the public consultation on the targeted review of the Guidelines that commenced in late 2013. The draft revisions at that time focused on noise, proximity, and shadow flicker. The present review has been expanded to consider the strengthening of provisions relating to community consultation, community dividend, grid connections, as well as addressing a separate issue relating to the application of the Environmental Impact Assessment Directive on projects.

It is intended that once the review is complete, the 2019 Guidelines will be issued by the Minister for Housing, Planning and Local Government under Section 28 of the Planning and Development Act 2000, as amended (the Act). The Guidelines will contain some 'specific planning policy requirements' under Section 28(1C) of the Act. Planning authorities and An Bord Pleanála will be required to have regard to these Guidelines and to apply any 'specific planning policy requirements' of the Guidelines in carrying out their functions. The Guidelines include two technical appendices to assist planning authorities in relation to noise assessment, monitoring and the setting of planning conditions. The Guidelines will apply to all future wind energy development proposals.

## **1.3 Flood Risk Management Policy**

### **1.3.1 EU Floods Directive**

European Directive 2007/60/EC on the assessment and management of flood risk aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to:

- Carry out a preliminary assessment in order to identify the river basins and associated coastal areas where potential significant flood risk exists;
- Prepare flood hazard and risk maps for the identified areas; and
- Prepare flood risk management plans focused on prevention, protection and preparedness. These plans are required to include measures to reduce the probability of flooding and its potential consequences. Draft Plans have been prepared and subjected to public consultation.

In Ireland, these tasks have been undertaken with Flood Risk Management Plans subject to consultation in 2017 and adopted in 2018.

### **1.3.2 National Flood Policy**

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

In line with changing national and international paradigms on how to manage flood risk most effectively and efficiently, a review of national flood policy was undertaken in 2003-2004. The review resulted in the preparation of a report that was approved by Government and published in September 2004 (Report of the Flood Policy Review Group, OPW, 2004). The adopted policy was accompanied by recommendations, including the following:

- Focus on managing flood risk, rather than relying only on flood protection measures aimed at reducing flooding;
- Take a catchment-based approach to assess and manage risks within the whole-catchment context; and
- Be proactive in assessing and managing flood risks, including the preparation of flood maps and flood risk management plans.

### **1.3.3 National CFRAM Programme**

The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011. The CFRAM Programme is intended to deliver on core components of the National Flood Policy, adopted in 2004, and on the requirements of the EU Floods Directive (see Section 1.3.1 above). The Programme is being implemented through CFRAM Studies (CFRAMS) that are being undertaken at river basin district level in Ireland.

The OPW is the lead agency for flood risk management in Ireland. The coordination and implementation of Government policy on the management of flood risk in Ireland is part of its responsibility. The OPW is the principal agency involved in the preparation of CFRAMS.

### **1.3.4 Flood Risk Management Guidelines**

In 2009, the OPW and the then Department of the Environment and Local Government published Guidelines on flood risk management for planning authorities entitled *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*. These Flood Risk Management (FRM) Guidelines introduced mechanisms for the incorporation of flood risk identification, assessment and

management into the planning process. Implementation of the FRM Guidelines is intended to be achieved through actions at national, regional, local authority and site-specific levels. Planning authorities and An Bord Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts.

The FRM Guidelines were amended by Circular PL 2/2014 (Department of the Environment, Community and Local Government) that provides advice on the use of OPW flood mapping in assessing planning applications and clarifies some advice from the 2009 FRM Guidelines.

## Section 2 Relevance of Flood Risk to the Draft Guidelines

### 2.1 Effects that can occur as a result of flooding

Wind energy developments, as with other development types, have the potential to increase the risk of flooding. Some of the effects of flooding are identified in Table 1.

**Table 1 Potential effects that may occur as a result of flooding**

Tangible Effects	Intangible Human and Other Effects
Damage to buildings (houses)	Loss of life
Damage to contents of buildings	Physical injury
Damage to new infrastructure e.g. roads	Increased stress
Loss of income	Physical and psychological trauma
Disruption of flow of employees to work causing knock on effects	Increase in flood related suicide
Enhanced rate of property deterioration and decay	Increase in ill health
Long term rot and damp	Homelessness
	Loss of uninsured possessions

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.).

### 2.2 Effects of the Draft Guidelines on flood risk

As identified by the accompanying Strategic Environmental Assessment (SEA) Environmental Report, implementation of the Draft Wind Energy Development Guidelines:

- Has the potential to result in significant adverse environmental effects (if unmitigated) with regard to increasing the risk of flooding as a result of developing wind farms and ancillary infrastructure;
- Would be likely to positively impact upon flood risk management, arising from the advice that has been integrated into the Guidelines including that relating to drainage and flooding.
- Would have an uncertain residual potential to interact with flood risk due to uncertainty with regard to extreme weather events<sup>1</sup>.

Examples of issues relating to wind energy developments that have the potential to interact with flood risk include:

- Any development of wind energy related components (including turbine towers and associated stands, transmission lines (on site of the wind farm development and not outside of the site boundary), sub-stations (on site of the wind farm development and not outside of the site boundary), operation/ maintenance access roads/ tracks and construction access roads/ tracks);
- The location of wind energy related components within, or partially within the floodplain; and
- The presence of personnel on site during an extreme flood event.

Examples of corresponding measures that would mitigate against increases in flood risk arising from such issues are identified under Section 3.7 "Mitigation and Management of Flood Risk".

<sup>1</sup> The vulnerability of lands to flooding could be exacerbated by changes in both sea level rise and the severity and frequency of extreme weather events. See also Section 3.5 "Climate Change".

## Section 3 Approach to Flood Risk Management

### 3.1 Overview

The approach to flood risk management by proposals for wind energy development should be guided by demonstrating compliance with the requirements contained in the FRM Guidelines and associated Circular PL2/14. This includes submitting, as part of any proposal for development, an appropriately detailed Flood Risk Assessment (FRA); the scope of the FRA and the stages of FRA required (please refer to Section 3.2 below) will depend on the type and scale of development and the sensitivity of the area. This section of the Flood Risk Statement summarises the requirements involved and provides high-level advice on how to fulfil these requirements.

### 3.2 Stages of Flood Risk Assessment

The FRM Guidelines recommend a staged approach to FRA that covers both the likelihood of flooding and the potential consequences. The stages of appraisal and assessment are:

- **Stage 1: Flood Risk Identification** – to identify whether there may be any flooding or surface water management issues related to the site of a proposed development that may warrant further investigation;
- **Stage 2: Initial FRA** – to confirm sources of flooding that may affect a 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, where required, should be scoped; and
- **Stage 3: Detailed FRA** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

### 3.3 Sources of Information

The existence of flood risk across the country is illustrated by various sources of information on historical flooding events – including those available from the OPW, the lead Authority on flooding in the country. In addition to this mapping of historic flood risk indicators, there is predictive, modelled mapping available, including mapping from the OPW. Compliance with the requirements of the Flood Risk Management Guidelines is currently based on emerging data.

Sources of information that may be used by FRAs include the following (as identified in the Technical Appendices to the FRM Guidelines):

- OPW National CFRAM Programme Flood Hazard and Risk Mapping (fluvial and coastal) and Flood Risk Management Plans;
- OPW Preliminary Flood Risk Assessment (fluvial, pluvial and groundwater) maps;
- National Coastal Protection Strategy Study flood and coastal erosion risk maps;
- Predictive and historic flood maps, and Benefiting Lands Maps, such as those at [www.floodmaps.ie](http://www.floodmaps.ie);
- River Basin Management Plans and reports;
- Previous Strategic Flood Risk Assessments;
- Consultation with Local Authorities who may be able to provide knowledge on historic flood events and local studies etc.;

- Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques;
- Information on flood defence condition and performance;
- Local libraries and newspaper reports;
- Interviews with local people, local history/ natural history societies etc.;
- Walkover survey to assess potential sources of flooding, likely routes for flood waters and the site's key features, including flood defences, and their condition; and
- National, regional and local spatial plans, such as the National Planning Framework, Regional Spatial and Economic Strategies, development plans and local area plans provide key information on existing and potential future receptors.

### 3.4 Flood Zones

Implementation of the FRM Guidelines is facilitated by the delineation of flood zones, through the CFRAMS programme or through individual FRAs undertaken to inform land use plans and development proposals.

There are three types or levels of flood zones defined for the purposes of the FRM Guidelines:

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% Annual Exceedance Probability (AEP) or 1 in 100 for river flooding or 0.5% AEP 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% AEP or 1 in 1000 and 1% AEP or 1 in 100 for river flooding and between 0.1% AEP or 1 in 1000 year and 0.5% AEP or 1 in 200 for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all other areas that are not in zones A or B.

The delineation of flood zones can be informed by:

- Available historic and predictive (modelled) indicators of flood risk (see Section 3.3);
- Site walkovers and inspections by experienced professionals, which can help to identify: the potential source and direction of flood paths from fluvial and coastal sources; locations of topographic and built features that coincide with the flood indicator related boundaries; and vegetation associated with a high frequency of inundation; and
- New predictive (modelled) flood risk information generated for the purposes of the development proposal.

### 3.5 Climate Change

Vulnerability to flooding can be exacerbated by changes in both sea level rise and the severity and frequency of extreme weather events. The FRM Guidelines recommend that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects.

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW's (2015) "Climate Change Sectoral Adaptation Plan for Flood Risk Management 2015-2019".



### **3.6 Avoidance, Substitution and Justification**

The key principles of flood risk management set out in the FRM Guidelines are illustrated on Figure 1. These are to:

- Avoid highly and less vulnerable development in Flood Zones A and B (the zones with the highest levels of flood risk) or that will increase the flooding risk elsewhere, where possible;
- Substitute with less vulnerable or water compatible development in Flood Zones A and B, where avoidance is not possible; and
- Mitigate and manage flood risk where avoidance and substitution are not possible and highly/less vulnerable development is justified in Flood Zones A and B.

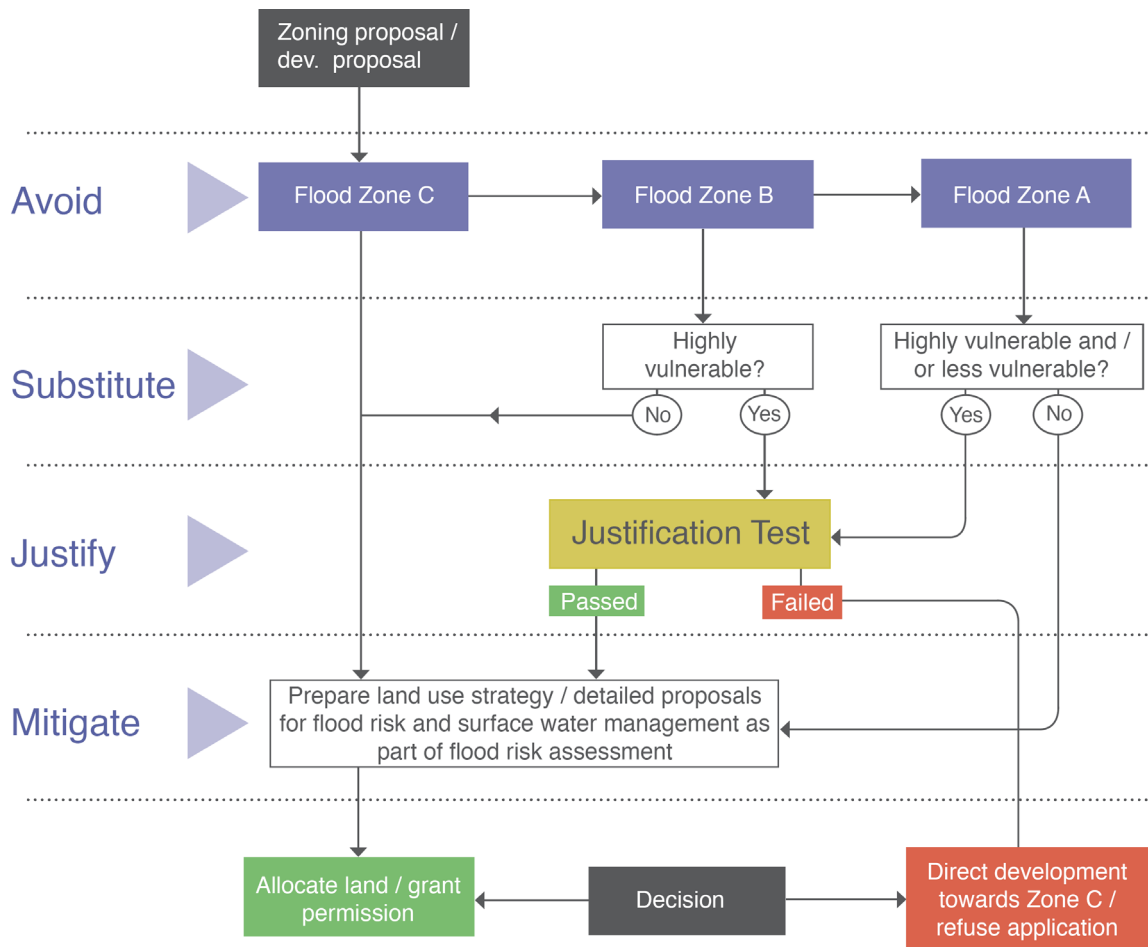
These principles ensure that highly and less vulnerable development is not permitted in areas that are at elevated levels of flood risk, except where a Justification Test is passed demonstrating, inter alia, how flood risk will be mitigated and managed. The Justification Test, including the criteria that must be satisfied for the Test to be passed<sup>2</sup>, is outlined in Chapter 5 of the FRM Guidelines "Flooding and Development Management".

The FRM Guidelines specify the vulnerability of a number of different types of developments, such as "sub-stations", which are classified as highly vulnerable development. As sub-stations fall under this heading, the Justification Test would have to be passed for any proposal to locate a sub-station (on site of the wind farm development and not outside of the site boundary) within, or partially within, Flood Zones A or B.

With respect to types of development that are not classified by the Guidelines (such as wind turbines and their stands and temporary access tracks), the Guidelines require that such developments are considered on their own merits. Vulnerability for such developments can be best assessed by those undertaking the FRA for the relevant proposed development - in consultation with the project planners and designers - taking into account: the potential susceptibility to damage to the development and/or the service being provided, in the event of the development being flooded; and the potential significance of the damage and/or service.

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<sup>2</sup> Box 5.1, page 48, FRM Guidelines.



**Figure 1 Sequential approach mechanism in the planning process<sup>3</sup>**

Table 2 identifies the appropriateness of development belonging to each vulnerability class within each of the flood zones. This table also identifies the instances in which the Justification Test should be undertaken. Where the criteria of the Justification Test are not satisfied, development cannot be proceeded with.

**Table 2 Appropriateness of development within Flood Zones**

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

<sup>3</sup> Fig. 3.2, page 23, FRM Guidelines.

## 3.7 Mitigation and Management of Flood Risk

### 3.7.1 Submission of Flood Risk Assessment

As part of any proposal for development, an appropriately detailed Flood Risk Assessment (FRA) should be submitted demonstrating compliance with the requirements contained in the FRM Guidelines and associated Circular PL2/14. The summary of these requirements and the high-level advice on how to fulfil these requirements provided throughout this section may be used by prospective applicants in this regard.

### 3.7.2 Examples of issues that have the potential to interact with flood risk and associated mitigation

Examples of issues relating to wind energy developments that have the potential to impact upon flood risk are listed under Section 2.2 of this Flood Risk Statement and reproduced on Table 3 below. Table 3 also provides examples of corresponding measures that would mitigate against increases in flood risk.

**Table 3 Examples of issues relating to wind energy developments that have the potential to interact with flood risk and associated mitigation**

Issues	Mitigation may include
Location of turbine towers and stands within, or partially within the floodplain	<p>Development should be designed so that: the drainage properties of development are similar to those of the existing natural/semi-natural land cover; there is no appreciable obstruction to flood flows in any floodplain area as a result of the development; and there are no significant effects on flood risk elsewhere. This is likely to influence the selection of materials and may involve the use of sustainable drainage systems.</p> <p>Seals on turbine towers should be designed and built to ensure no water ingress to the tower.</p> <p>Ducts in the foundation should be sealed to ensure no ingress of water and the foundation should be designed and constructed to take into account that the foundations could be exposed to water.</p>
Location of transmission lines within, or partially within the floodplain	<p>Development should be designed so that: the drainage properties of development are similar to those of the existing natural/semi-natural land cover; there is no appreciable obstruction to flood flows in any floodplain area as a result of the development; and there are no significant effects on flood risk elsewhere. This is likely to influence the selection of materials and may involve the use of sustainable drainage systems.</p> <p>Where undergrounding is being pursued:</p> <ul style="list-style-type: none"> <li>• Materials should be water proofed; and</li> <li>• Proposals should demonstrate that impacts on soil structure, upstream impoundment and drainage properties are minimised.</li> </ul>
Location of sub-stations (on site of the wind farm development and not outside of the site boundary) within, or partially within the floodplain	<p>Development should be designed so that: the drainage properties of development are similar to those of the existing natural/semi-natural land cover; there is no appreciable obstruction to flood flows in any floodplain area as a result of the development; and there are no significant effects on flood risk elsewhere. This is likely to influence the selection of materials and may involve the use of sustainable drainage systems.</p> <p>All relevant materials should be waterproofed.</p>

Issues	Mitigation may include
Location of operation/ maintenance access roads/ tracks within, or partially within the floodplain	<p>Development should be designed so that: the drainage properties of development are similar to those of the existing natural/semi-natural land cover; there is no appreciable obstruction to flood flows in any floodplain area as a result of the development; and there are no significant effects on flood risk elsewhere. This is likely to influence the selection of materials and may involve the use of sustainable drainage systems.</p> <p>Where watercourse crossings are required, the design of culverts and bridges should take account of predicted extreme flood flows and, when constructed, appropriate maintenance should be undertaken in order to ensure that blockages do not occur.</p>
Location of construction access roads/ tracks within, or partially within the floodplain	<p>Development should be designed so that: the drainage properties of development are similar to those of the existing natural/semi-natural land cover; there is no appreciable obstruction to flood flows in any floodplain area as a result of the development; and there are no significant effects on flood risk elsewhere. This is likely to influence the selection of materials and may involve the use of sustainable drainage systems.</p> <p>Where culverts or bridges are required, their design should take account of predicted extreme flood flows/rainfall events (including allowance for climate change – please refer to Section 3.7.3) and, when constructed, appropriate maintenance should be undertaken in order to ensure that blockages do not occur.</p>
Any development of wind energy related components (including turbine towers and associated stands, transmission lines (on site of the wind farm development and not outside of the site boundary), sub-stations (on site of the wind farm development and not outside of the site boundary), operation/ maintenance access roads/ tracks and construction access roads/ tracks)	<p>Drainage properties should be similar to those of the existing natural/semi-natural land cover, there should be no appreciable obstruction to flood flows and there should be no significant effects on flood risk elsewhere.</p> <p>All relevant materials should be waterproofed.</p>
Presence of personnel on site during an extreme flood event	No construction personnel, operator or maintenance personnel should be permitted on site during extreme flood events.

### 3.7.3 Climate change

A precautionary approach to climate change should be adopted due to the level of uncertainty involved in the potential effects, as recommended by the FRM Guidelines.

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland provided in the OPW's (2015) "Climate Change Sectoral Adaptation Plan for Flood Risk Management 2015-2019" should be taken into account.

## Section 4 Conclusion

This Flood Risk Statement outlines the need for development proposals to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and OPW, 2009) and associated *Circular PL 2/2014* (Department of the Environment, Community and Local Government, 2014) and includes details on the approach to flood risk management that should be followed by prospective applicants.

As outlined in this Flood Risk Statement, by including advice relating to flood risk management, the Guidelines would be likely to positively impact upon flood risk management.