

## Appendix 7-3 - Derryadd Wind Farm -Flood Risk Assessment



# BORD NA MÓNA

## DERRYADD WIND FARM

### FLOOD RISK ASSESSMENT

**Nicholas O'Dwyer Ltd  
Consulting Engineers  
Nutgrove Office Park  
Nutgrove Avenue  
Dublin 14**

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# **1 INTRODUCTION**

## **1.1 Background**

Nicholas O'Dwyer Ltd (NOD) were appointed by Bord na Móna in February 2021 to conduct drainage design, pumping station reviews and flood risk assessment for the redevelopment of no. 3 peatland bogs for Derryadd Wind Farm.

Bord na Móna plans to redevelop no.3 peatland bogs (Derryarogue Bog, Derryadd Bog, and Lough Bannow Bog) as Derryadd Wind Farm as a result of the company's transition to become a major supplier of renewable energy

## **1.2 Study Context**

The scope of this study is described as to:

- to complete a flood risk assessment at the locations where redevelopment is proposed and identify where flooding risks are present,
- to design a new drainage system for redevelopment
- to review the pumping stations

## **1.3 Location**

The study area for the project runs across three bogs in the Mount Dillon bog complex. From north to south, the bogs are the Derryarogue Bog, the Derryadd Bog, and the Lough Bannow Bog. The location is shown in Figure 1-1 and Figure 1-2 below.

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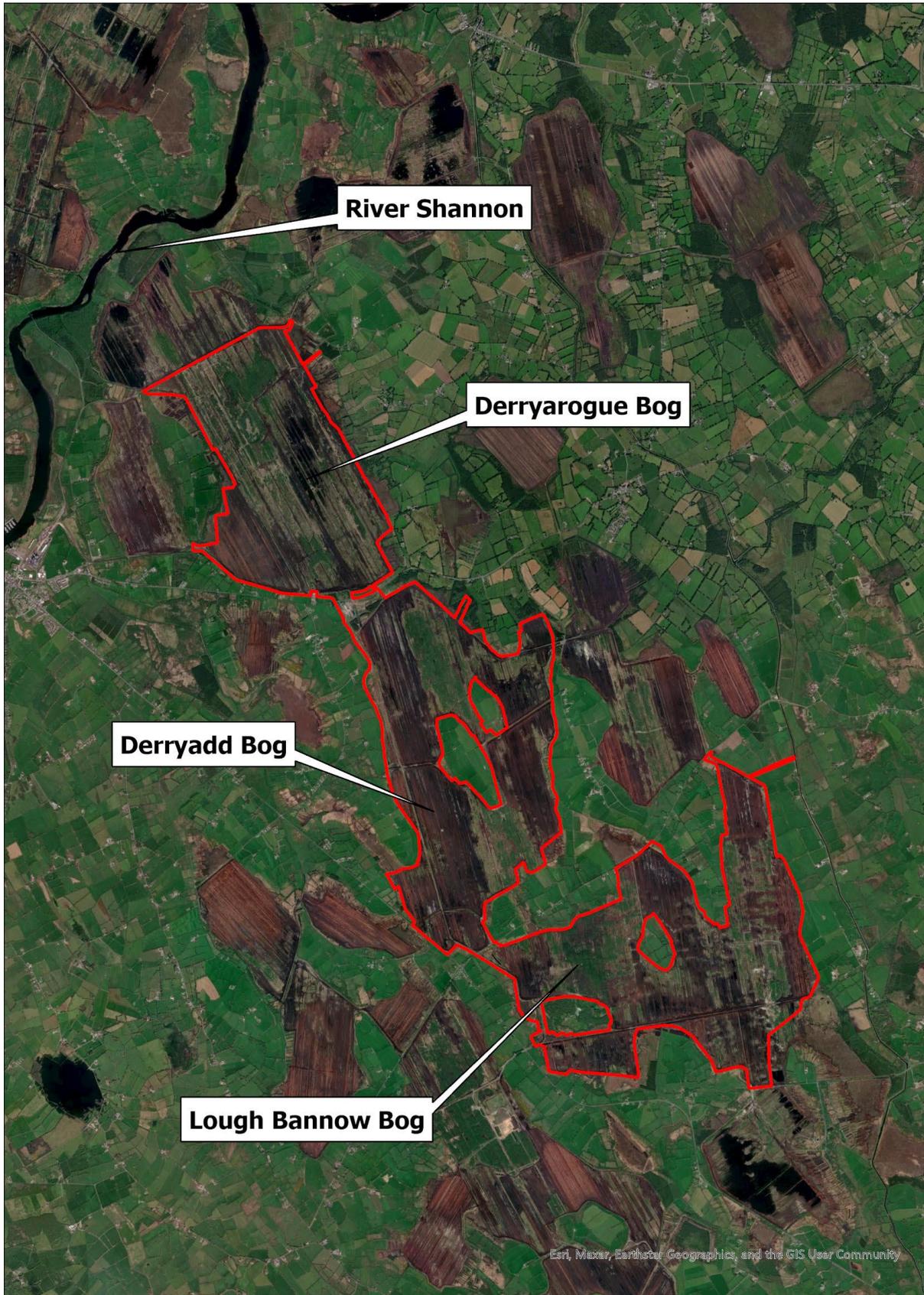


Figure 1-1: Study area

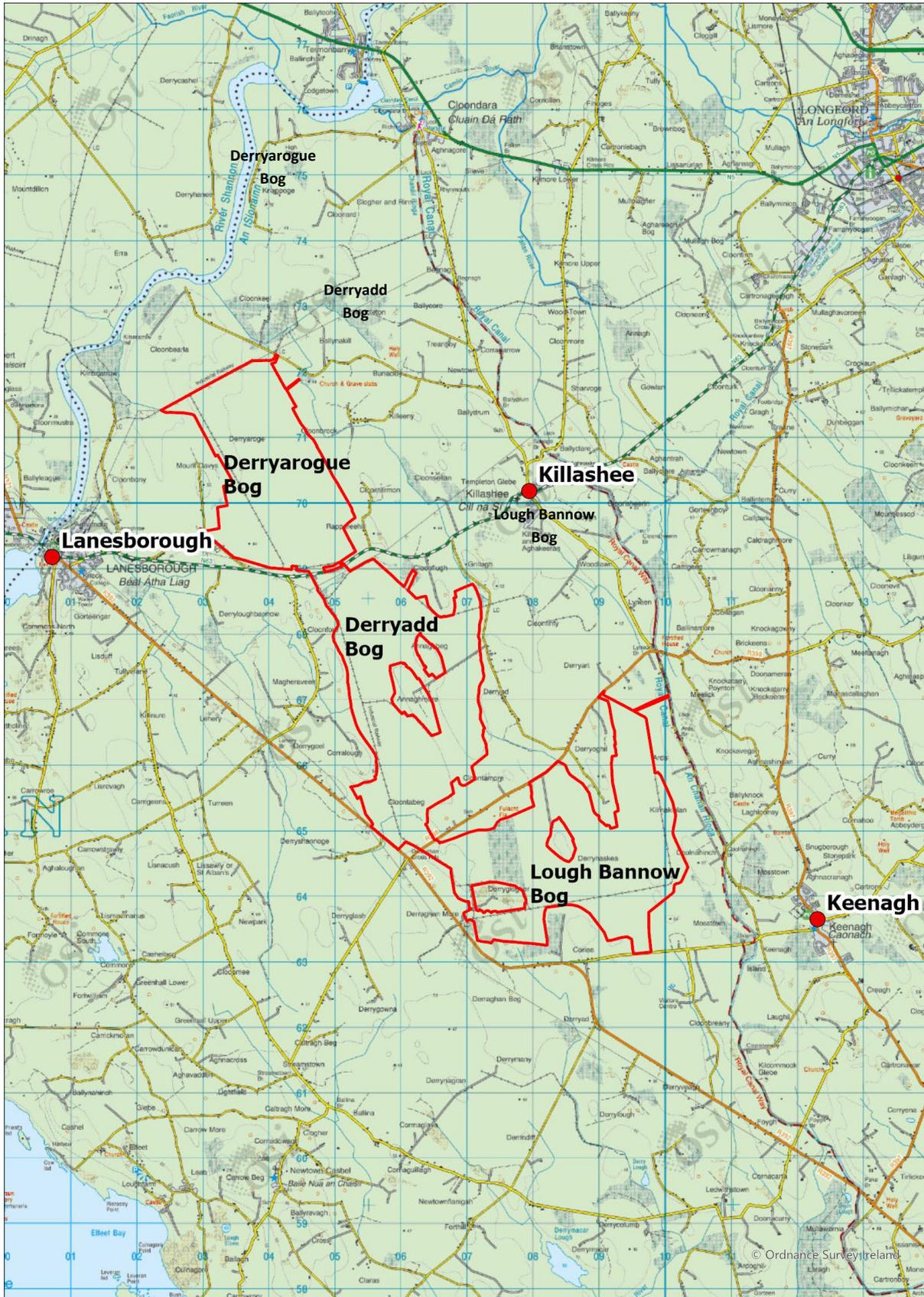


Figure 1-2: Site location (Source: BnM)

The bogs have previously been used for extraction of peat but this activity has now ceased. Parts of the bogs which have not been worked in recent years have become overgrown with grass and bushes.

### 1.3.1 Topography

The topography of the land generally falls from south east towards the Shannon in the north west. Lough Bannow is at highest elevation and Derryarogue is at the lowest elevation. The bogs are generally lower than the surrounding land as can be seen in Figure 1-3 below.

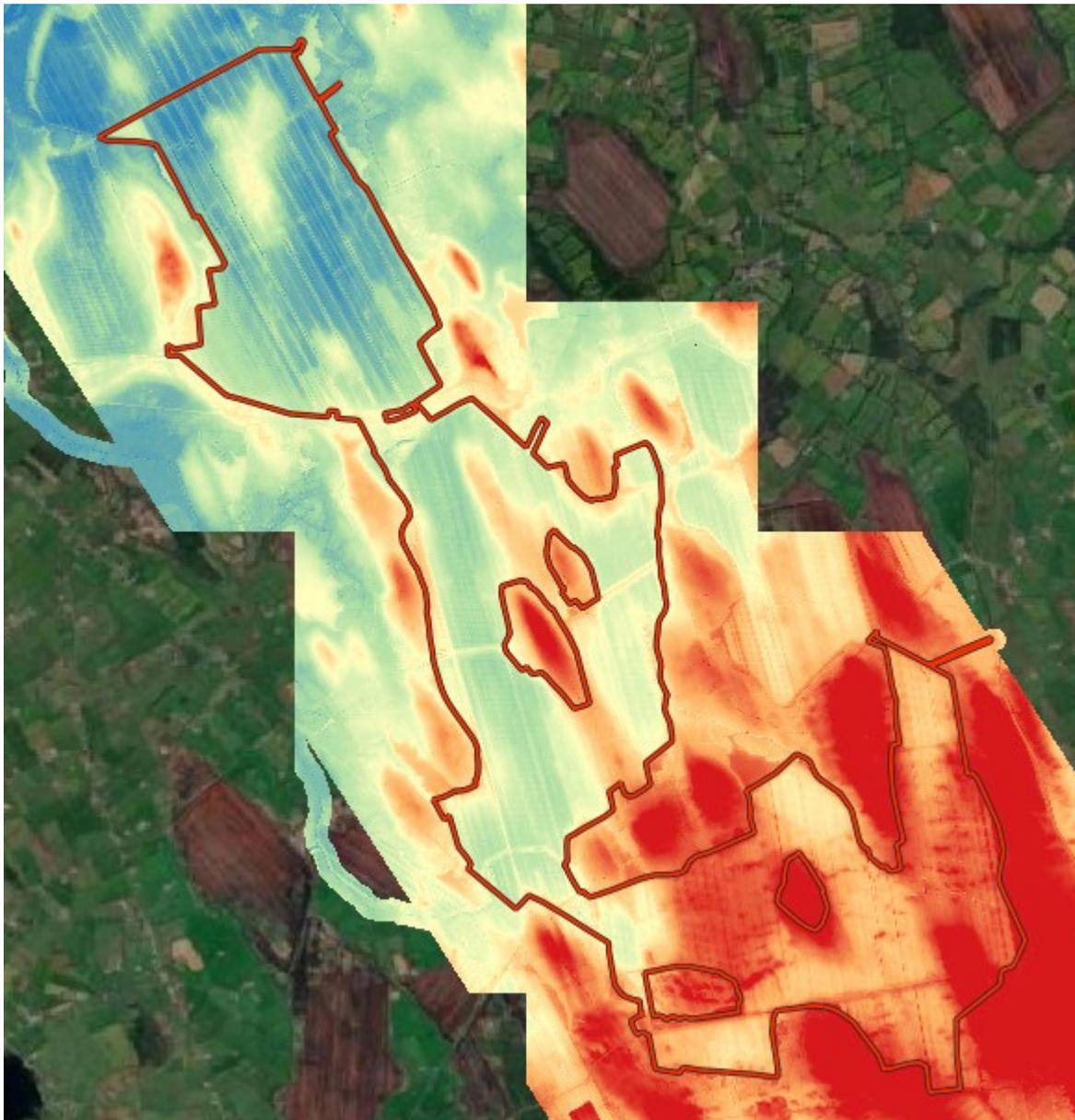


Figure 1-3: Topography based on LiDAR and Satellite DEMs. (Source: BnM)

### **1.3.2 Land Use**

The satellite photography as shown in Figure 1-4 shows bare earth areas of worked bog, together with agricultural land surrounding the bogs and some green areas on the bogs where vegetation has become re-established.

The town of Lanesboro is located approximately 2.5km to the west of the Derryarogue bog. The N63 road between Lanesboro and Longford Town runs across the windfarm site south of Derryarogue bog and North of Derryadd bog.

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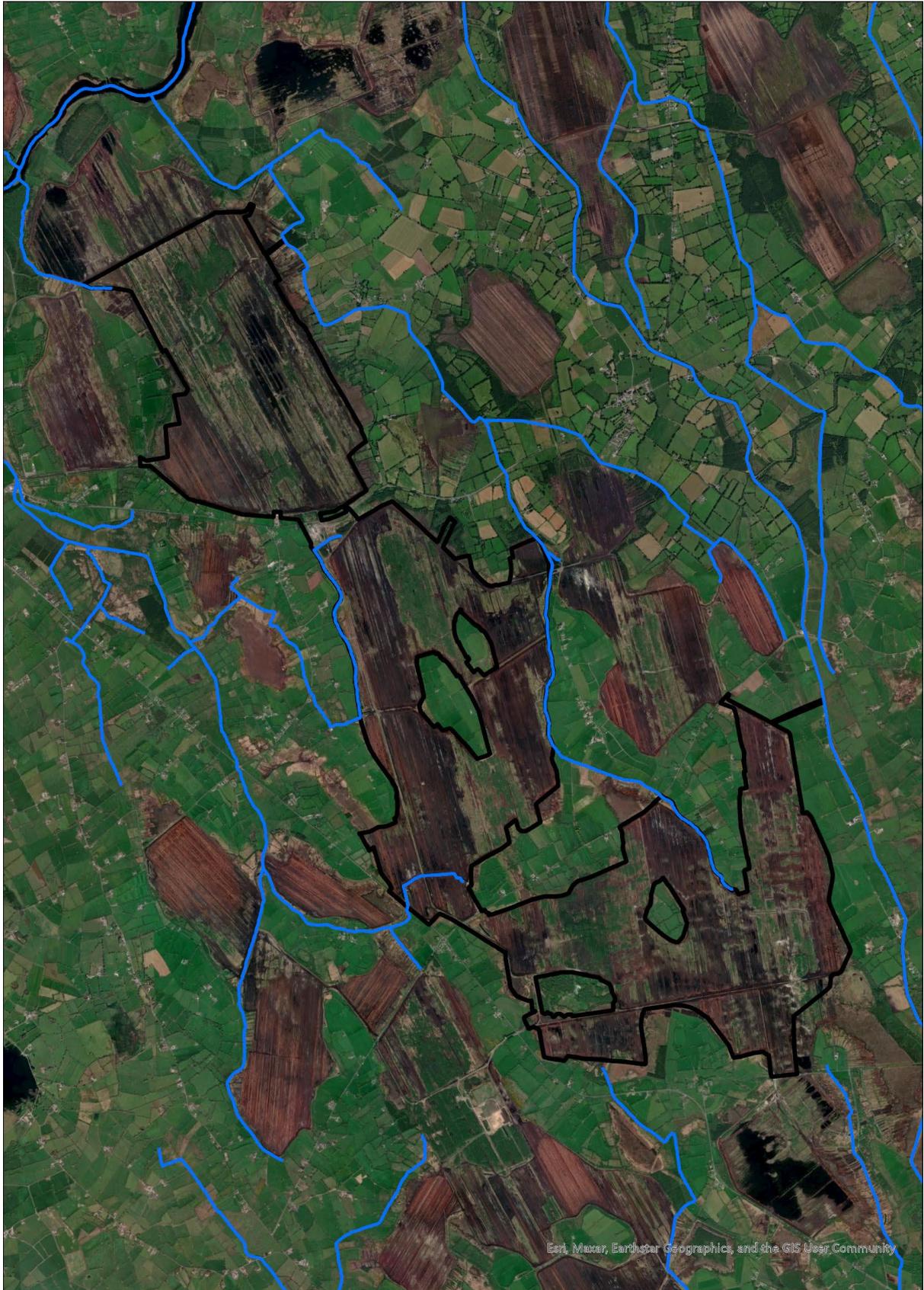


Figure 1-4: Satellite photograph of the area

### 1.3.3 Soils

The GSI map viewer shows the area to be predominantly cut over peat and glacial till

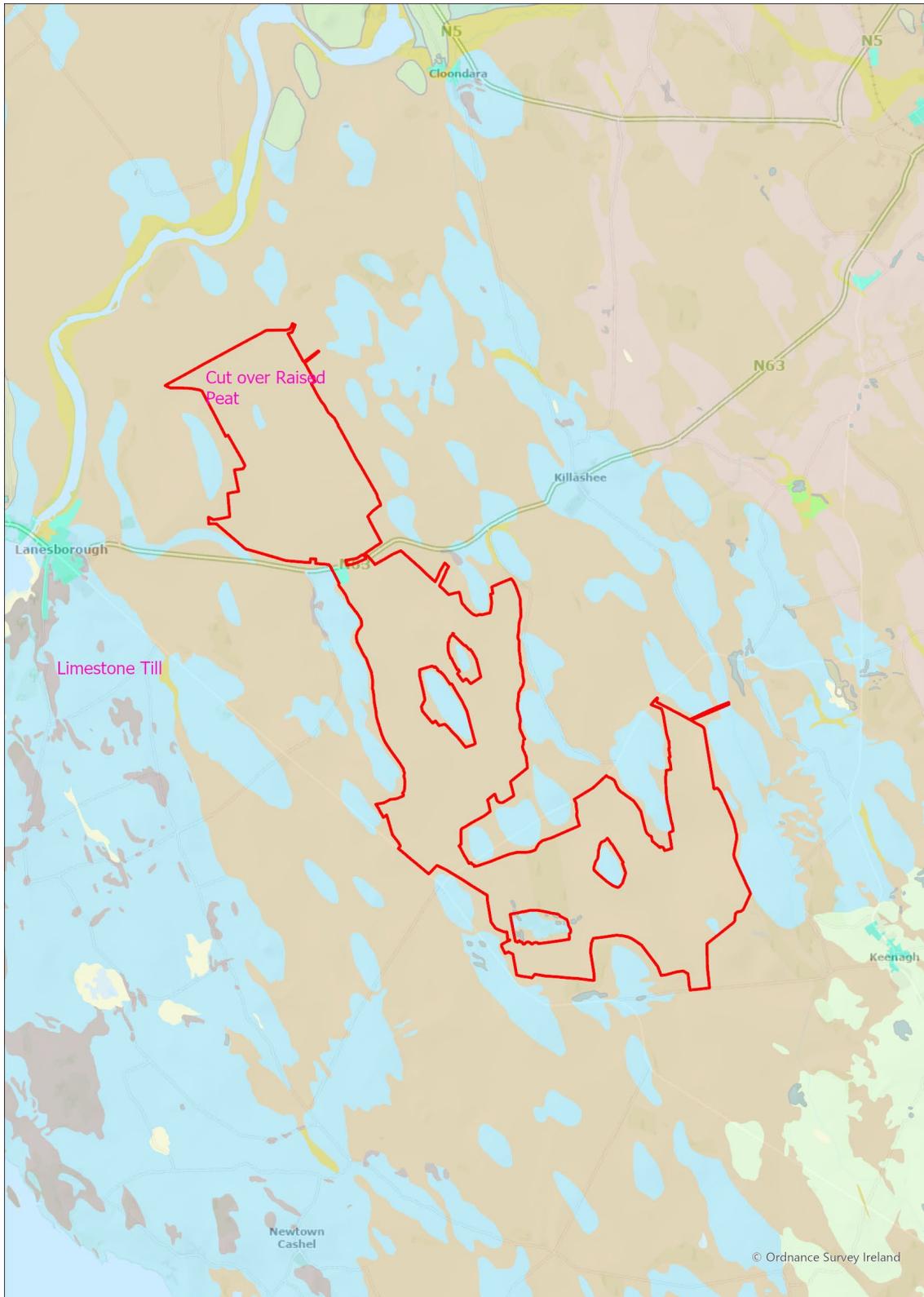


Figure 1-5: GSI Subsoil Map (source: <https://dcenr.maps.arcgis.com/>)

## 2 THE PLANNING SYSTEM AND FLOOD RISK MANAGEMENT GUIDELINES

### 2.1 Flood risk assessment

As set out in “*The Planning System and Flood Risk Management Guidelines for Planning Authorities*”, it is a requirement for development proposals in areas where there is a flood risk to carry out a detailed study exercise to ensure that the development will not be affected by flooding (including an allowance for climate change) or does not increase flood risk elsewhere, or if it does measures are in place to mitigate/manage the risk.

The OPW uses the Source-pathway-receptor model to assess the flood risk. The sources are rainfall and normal sea levels. Pathways are rivers, drains, sewers and overland flow. Receptors are people, their property, and the environment.

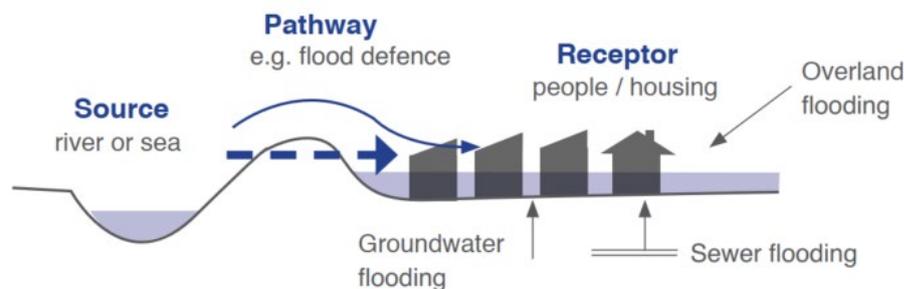


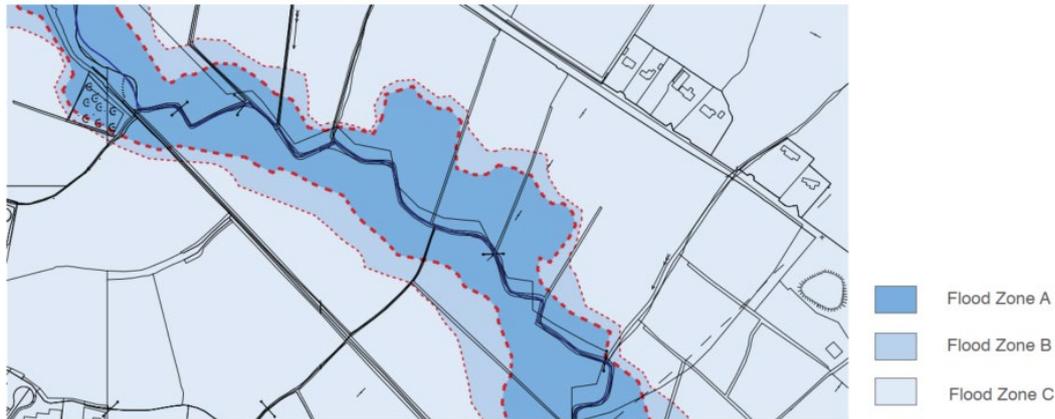
Figure 2-1: Source-pathway-receptor model for assessing flood risk by OPW

A staged approach should be adopted, carrying out the assessment to the level of detail needed for the purpose of decision making. Depending on the risk at a particular site not all stages will be required. The stages of appraisal and assessment are:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

### 2.2 Flood zones

Here, initial flood risk shall be done using indicative flood zone maps. According to the guidelines: “Flood zones are geographical areas within which the likelihood of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning.”



*Figure 2-2: Indicative Flood zone map extract*

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

### **2.3 Vulnerability assessment of an infrastructure or site**

After checking the risk zone of flood risk, the vulnerability level of the development being proposed should be checked. The table below is used for checking the vulnerability type of a development:

Vulnerability class	Land uses and types of development which include*:
<p><b>Highly vulnerable development (including essential infrastructure)</b></p>	<p>Garda, ambulance and fire stations and command centres required to be operational during flooding;</p> <p>Hospitals;</p> <p>Emergency access and egress points;</p> <p>Schools;</p> <p>Dwelling houses, student halls of residence and hostels;</p> <p>Residential institutions such as residential care homes, children's homes and social services homes;</p> <p>Caravans and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</p> <p>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.</p>
<p><b>Less vulnerable development</b></p>	<p>Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;</p> <p>Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;</p> <p>Land and buildings used for agriculture and forestry;</p> <p>Waste treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport infrastructure.</p>
<p><b>Water-compatible development</b></p>	<p>Flood control infrastructure;</p> <p>Docks, marinas and wharves;</p> <p>Navigation facilities;</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;</p> <p>Water-based recreation and tourism (excluding sleeping accommodation);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).</p>
<p>*Uses not listed here should be considered on their own merits</p>	

Figure 2-3: Classification of vulnerability of different types of development

Based on the flood zone and vulnerability class of the development, the suitability of the development can be assessed with the matrix shown in Figure 2-4. If it is deemed inappropriate by the matrix, then justification test has to be performed.

	Flood Zone A	Flood Zone B	Flood Zone C
High Vulnerability	Justification Test	Justification Test	Appropriate
Low Vulnerability	Justification Test	Appropriate	Appropriate
Water Compatible	Appropriate	Appropriate	Appropriate

Figure 2-4: vulnerability versus flood zone matrix from the guidelines

### 2.3.1 Justification test

If a development falls in the justification test category then the test must demonstrate that the development meets the following criteria:

1. *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.*
2. *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.*

The overall approach to flood risk assessment should be as shown in Figure 2-5 below:

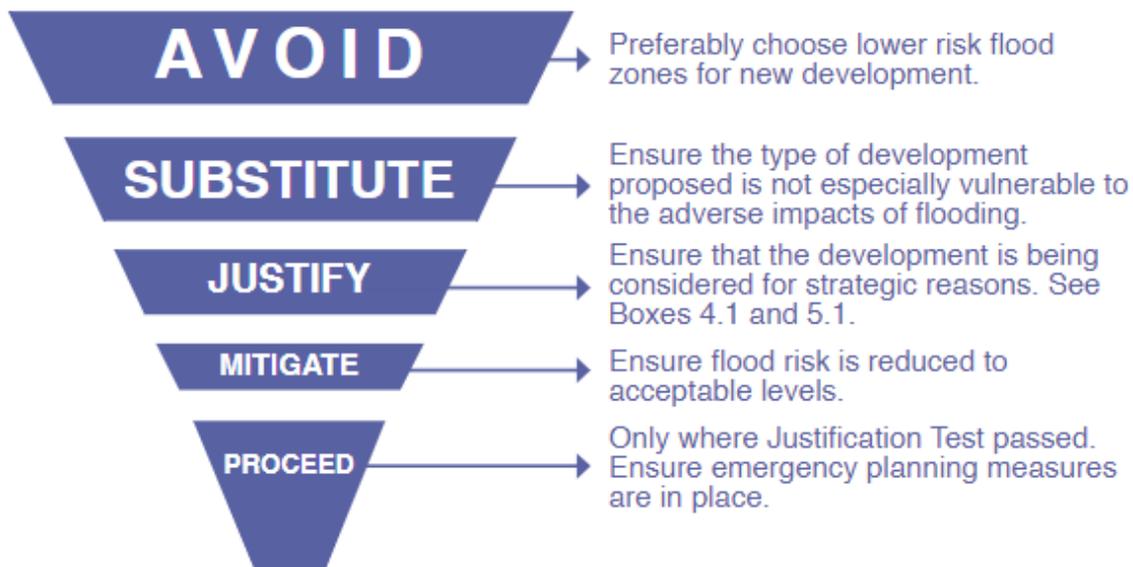


Figure 2-5: Sequential approach principle in flood risk management

## 2.4 Longford County Development Plan 2021-2027

The Longford County Development Plan 2021 to 2027 includes the following Longford County Policy objective CPO 5.152:

Encourage proposals for commercial wind energy developments to be located on cutaway peatlands in those areas identified as having wind potential within the county, as defined in Appendix 2, subject to environmental, landscape, habitat and wildlife protection requirements being addressed.

It also includes the following Development Management Standard DMS 16.182:

Ensure that proposals for the development of wind farms are not located within areas identified as being within Flood zones A or B as per the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

The majority of the proposed site is located within a Preferred Area for windfarm development as shown in “Appendix 2 – Areas of wind farm potential” in the development plan. An extract from this appendix with the proposed site overlaid on it is shown in Figure 2-6.

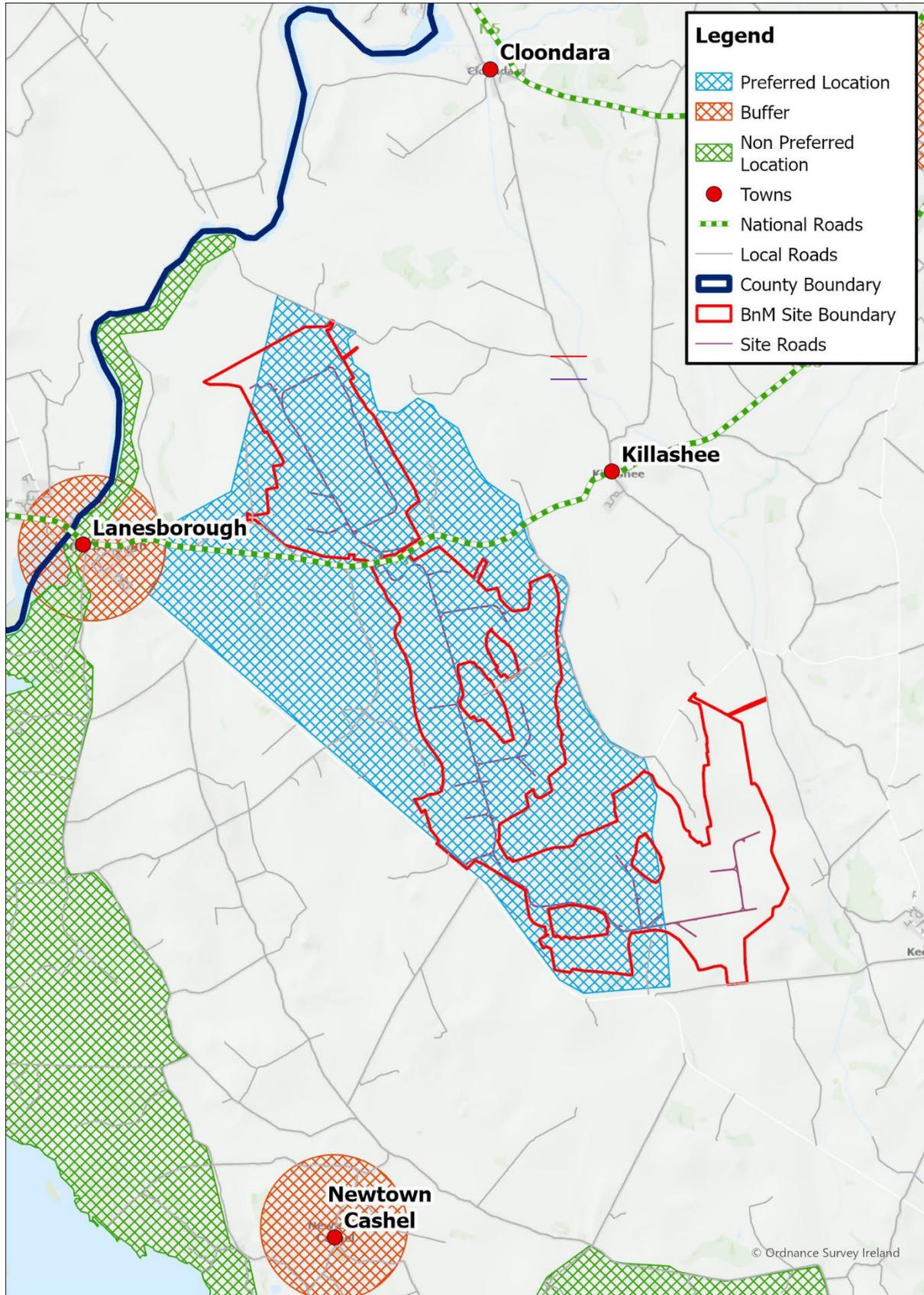


Figure 2-6: Longford County Development Plan Appendix 2 extract showing site location.

### 3 FLOOD RISK ASSESSMENT

#### 3.1 Sources of Flooding

Flood risk assessment to a development site involves flood risk identification, i.e., confirmation of all sources of flooding and surface water management issues, quantification of the associated risks and proposal of mitigation measures. A review of all recorded and historical flooding incidents in the area is carried out followed by qualitative appraisal of the identified risks and their impact on the proposed development and associated risks elsewhere.

The potential sources of flooding to the development site may include: -

1. Fluvial Flooding;
2. Surface water Runoff;
3. Groundwater Flooding; and
4. Coastal Flooding.

#### 3.2 Brief Appraisal of Flood Sources

A brief appraisal of the potential sources of flooding and their potential impact on the proposed development is summarized in Table 3-1 below.

*Table 3-1: Appraisal of Flood Risk Sources*

Source	Pathway	Receptor	Likelihood	Consequence	Risk= Likelihood x consequence
Coastal	Overtop/ breach	People/ property	Remote	High	Low
Fluvial	Overbank	People/ property	Possible	Medium	Medium
Surface	Blockage/o verflow	People/ property	Likely	Medium	High
Groundwater	Rising water level	People/ property	Possible	Low	Low

### 3.3 Site Drainage

#### 3.3.1 Existing Site Drainage

Walkover surveys were carried out in January and February 2021 to understand the drainage patterns on the existing bogs. Additional topographic surveys were carried out in March and April 2021 to gather further detail on the drainage systems.

When the bogs were in production, peat was harvested from “fields” along which the harvesting machinery travelled. A thin layer of peat was removed from the top surface with each pass of the machinery. To dry the top surface for harvesting, all three bogs which make up the Derryadd Windfarm site were provided with a series of parallel open field drains approximately 1.5m deep oriented in a south-southeast to north-northwest direction with an approximately 15m spacing between drains. The field drains are connected together at their low points with pipes or open drains which lead towards external discharge points.

Over the lifetime of the working bog as the top surface was harvested the elevation of the bog was reduced to below the elevation of the surrounding land and external streams so that now much of the bog drainage must be pumped from the bogs up to the level of the surrounding streams. When the pumps are switched off localised flooding can occur on the bogs. There are currently 18 pumping stations on the three bogs pumping water between internal drainage systems and to the external streams. As required by the IPC Licence REF P0504-1 there are settlement ponds upstream or downstream of the external pumping stations to allow sediment to settle out of the water before it is discharged to the external streams.

Derryarogue bog (Figure 3-1) has deep collector drains approximately every 300m running north south, with smaller field drains running parallel at approximately 15m centres. The field drains are connected by pipes at the low points, and these pipes are connected to the deep collector drains. Pumps (P07, P08, & P09) lift water from the central collector drains to collector drains nearer to the periphery of the bog, and pumps on these peripheral drains (P01-P06) lift the water for discharge to surrounding watercourses. Pumps 01, 02, 03, and 04 are outside of the proposed development area.

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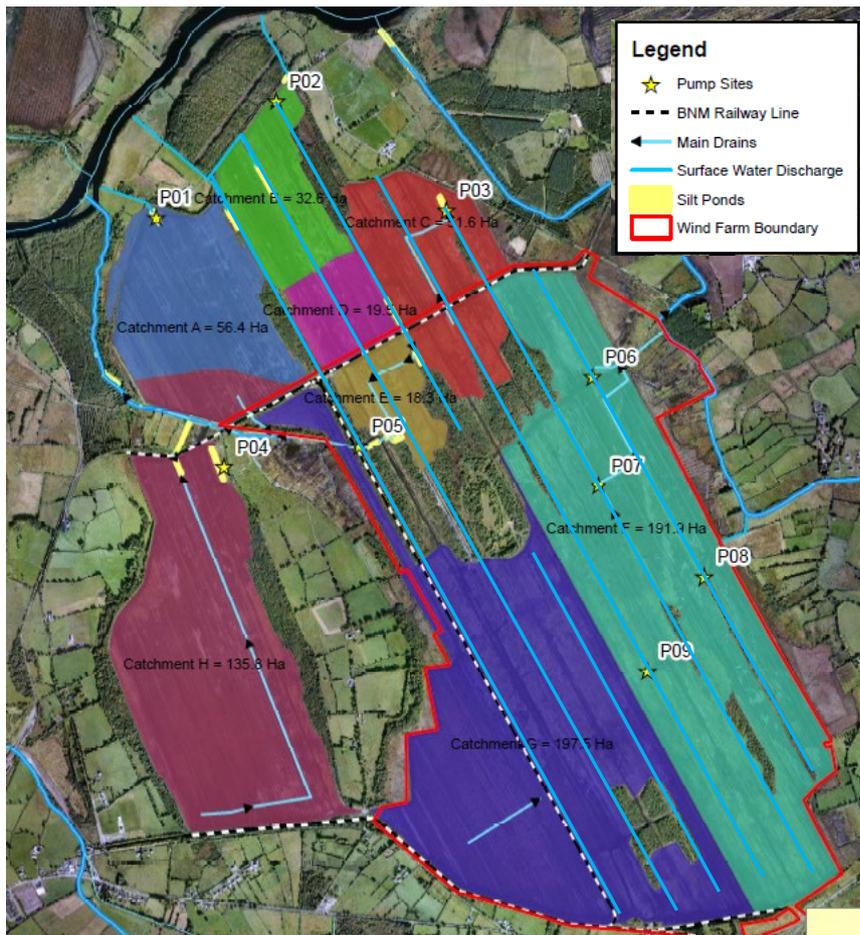


Figure 3-1: Derryarogue Bog existing drainage catchments

Derryadd bog (Figure 3-2) and Lough Bannow bog (Figure 3-3) have field drains at 15m centres but they do not have the same extent of deep drains as Derryarogue bog. The field drains are connected by pipes at the low points, and these pipes are connected to the external drainage systems.

Derryadd bog has 6 pump station locations, P10-P15, however pump station P13 is not commissioned and discharge is via a gravity outfall north of the pump station site.

Lough Bannow bog has 3 pump station locations, P16-P18.

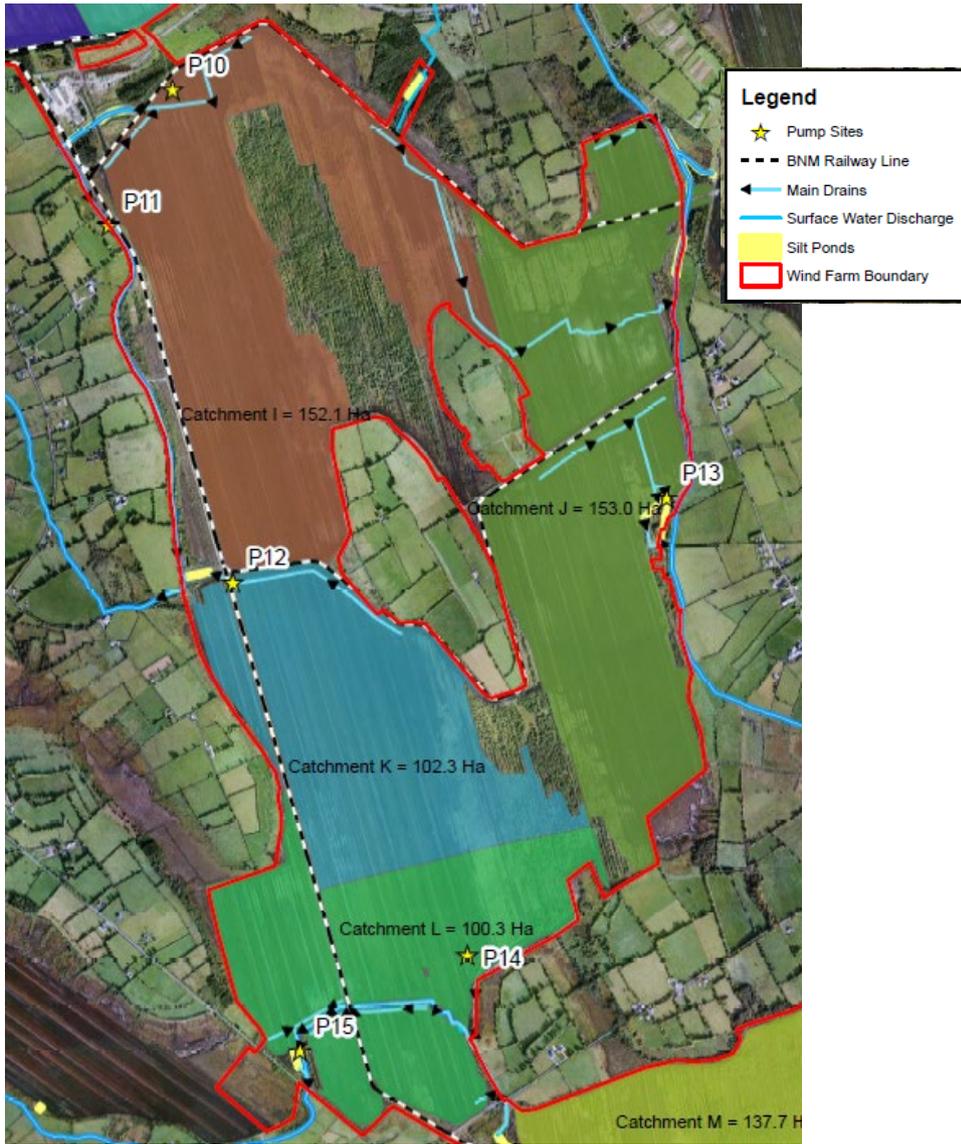


Figure 3-2: Derryadd Bog existing drainage catchments

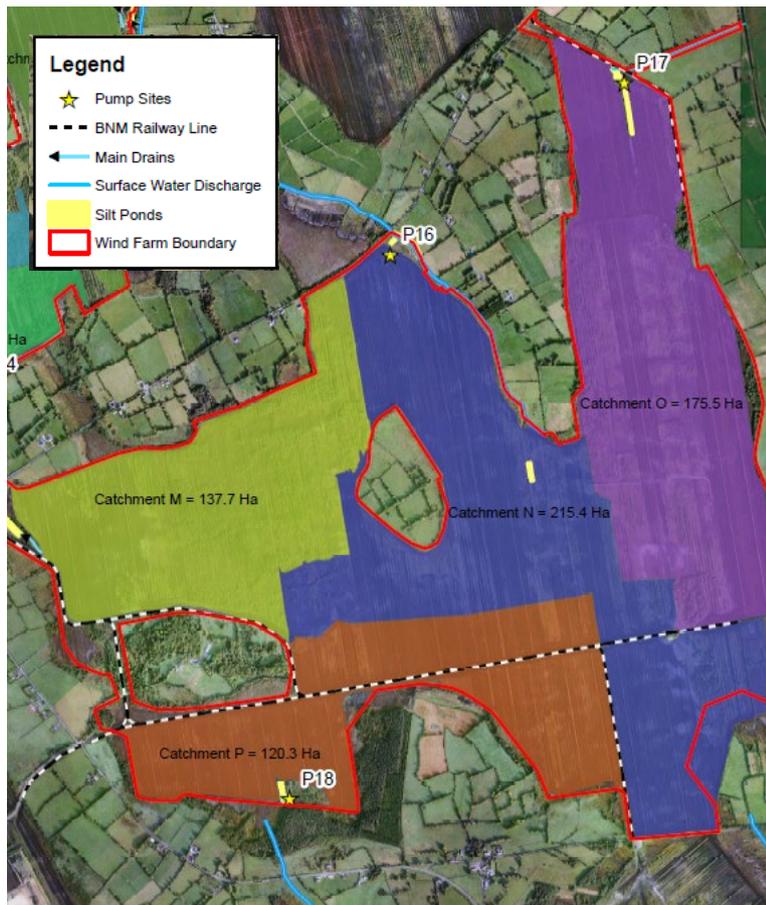


Figure 3-3: Lough Bannow Bog existing drainage catchments

### 3.3.2 Proposed Site Drainage

The proposed drainage system within the site will be designed so as not alter the exiting drainage philosophy at the site. The existing site drainage catchments will not be changed and that drainage will be discharged at the same locations and flow rates as it is currently discharged.

Where field drains would be cut by roads the bog runoff in the field drains will be collected on the upgradient side of the road and discharged via culverts to field drains running to the same ultimate drainage outfall.

To avoid changing the drainage patterns on the bog, runoff from the gravel roads and turbine hardstandings will be allowed to runoff over the edge through a grassed filter strip to enter the bog drainage systems as close as possible to where it fell. This will minimise any change to the hydrological regime on site.

The pump stations will be upgraded for health and safety purposes but will not have their flow rates significantly changed. It is likely that pumps will be standardised to two models across the site to allow for efficient operation and maintenance. The pump configuration to be installed in each pump station will be selected based on the existing installed capacities to avoid significant changes in the maximum outflow from the site. The existing sedimentation ponds upstream of the external discharge will remain in use. During construction of the upgraded pump stations discharging to the site boundaries the flow rates of any temporary pumping facilities provided should not exceed the design flow rates at those sites.

Central parts of the Derryarogue bog could be allowed to flood by decommissioning pump stations 7 and 9 without any impact on windfarm infrastructure provided additional culverts are provided below the road. This could be considered in the rehabilitation plans being produced for the bogs. Similarly during rehabilitation the pump stations on the Lough Bannow bog could be replaced with gravity connections provided the gravity connections (particularly at P18) take account of the elevations of windfarm infrastructure. Providing gravity connections in place of the currently proposed pumps may however allow increased runoff from the bog during flood periods compared to flow rates controlled by pumps.

### **3.4 Fluvial Flood Risk**

The streams around the subject site are too small to have been included in the CFRAM project flood mapping. The National Indicative Flood Mapping (NIFM) covers rivers such as these which have not been subject of detailed studies. The predictive flood mapping from Floodinfo.ie is shown in Figure 3-4 below. The flood outline along the River Shannon in the top left is from the CFRAM (blue = zone A, grey = Zone B), while the other flood outlines are from the NIFM (dark grey = zone A, light grey = zone B). The triangles on the map represent locations of past reported flooding. Two of these reported locations are on the road to the east of Derryadd bog.

As noted above, the predicted flood extents derive from two different sources. The CFRAM extents were calculated using site specific models based on surveyed and calibrated data, while the NIFM was calculated using a larger scale Digital Terrain Model and assuming that the existing channels have capacity for approximately the 2 year flow. The NIFM indicates areas which might be prone to flooding but in its guidance notes it states that “The maps only provide an indication of areas that may be prone to flooding. They are not necessarily locally accurate, and should not be used as the sole basis for defining the Flood Zones nor for making decisions on planning applications.”

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The CFRAM mapping does not show any expected impact inside the site boundary. The NIFM indicates two areas potentially at risk on Derryadd bog in the 1% and 0.1% AEP events, and a further location potentially at risk on Derryarogue bog in the 0.1% AEP event.

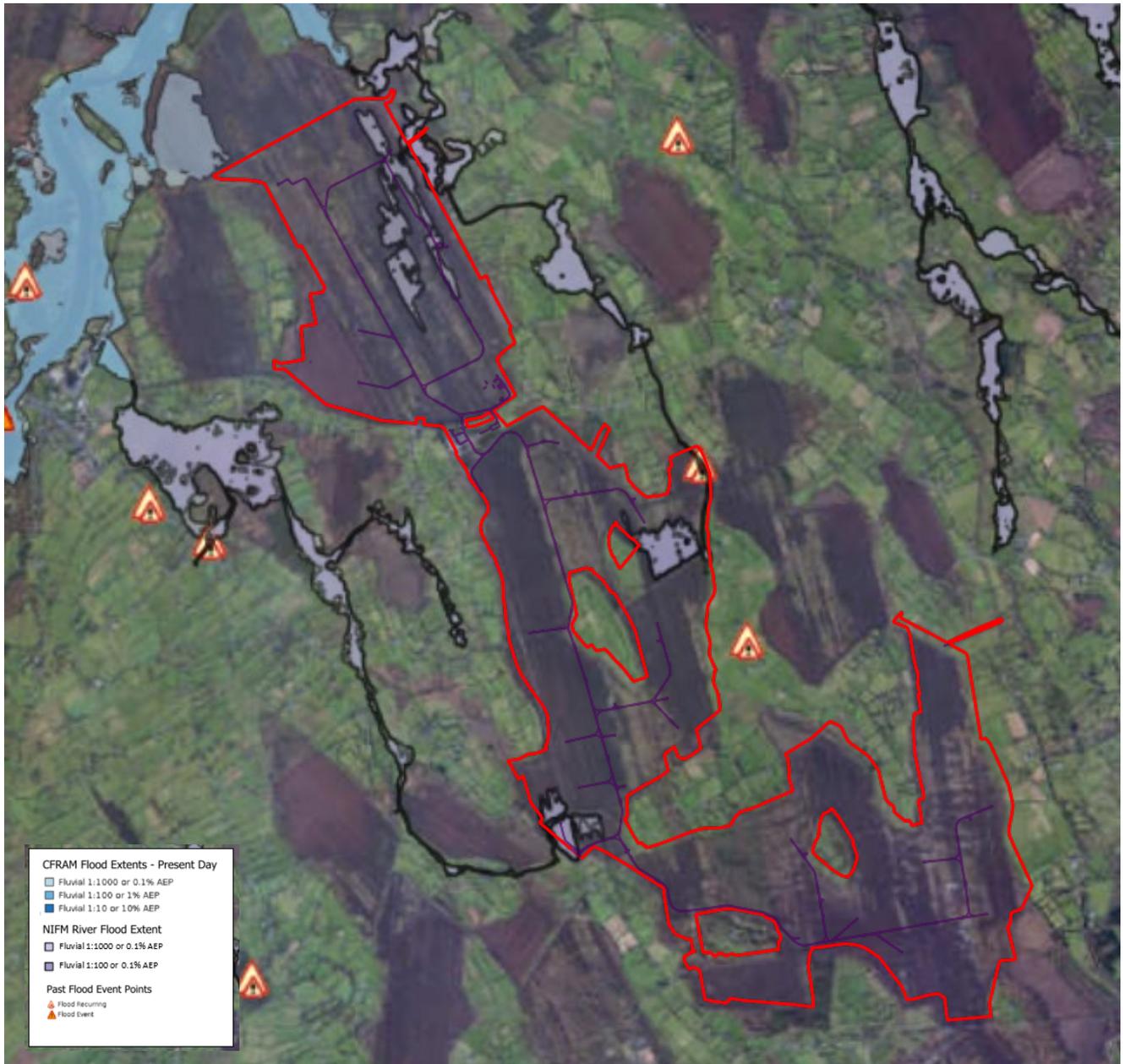


Figure 3-4: Existing flood risk data (source: <https://floodinfo.ie/>)

The fluvial flooding shown in the NIFM represents flooding of the site due to high water levels in the surrounding rivers. It should be noted that since the drainage from the southern part of Derryadd bog is pumped over the surrounding bank it is unlikely that river water can flood over the bank and into

the bog. The presence of pumping would not have been known or incorporated in the preparation of the NIFM.

The historical flooding reports from Floodinfo.ie are included in Appendix A.

### **3.5 Coastal Flood Risk**

The CFRAM coastal flood maps do not indicate any coastal flood risk at the site. The development site is located in the centre of Ireland, approximately 80km from Galway Bay, 90km from Sligo Bay, and 105 km from the Irish Sea. The site is above 36mOD Malin. The development site it is not considered to be at risk of coastal flooding.

### **3.6 Pluvial Flood Risk**

The risk of flooding from surface water would arise from accumulation of runoff across the site and surrounding areas. The site is a worked bog and is wet in many places. When pumps are switched off for any period runoff accumulates across the lower elevations of the site. In long rainfall events and during the winter time flooding has been observed to occur across parts of all three bogs. The GSI gives maps of the extent of historical flooding seen in 2015. These maps show areas seen to have been wet during winter 2015-2016 and this is shown in Figure 3-5. The precise date of the maximum flooding extent is not known so it cannot be linked to any particular AEP event.

Although there is frequent accumulation of water on the site, the layout has been designed to avoid these wet areas as far as possible. Culverts will be provided at intervals beneath the road to maintain connectivity of the exiting field drains.

There is an existing drainage system on the site which prevents ponding on the site when the pumps are running. The drainage system relies on a network of pump stations to lift the gathered drainage water from the site into the surrounding watercourses. The development does not propose to change the pump rates at these sites. In the event that the pumps were not running for an extended period of time, rainfall would accumulate in the low areas of the bog until it reached a level which would allow it to flow to the external drains.

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The proposed development will not change the relationship between the bogs and the surrounding areas so there is not expected to be any additional flood risk outside of the site caused by this development. The development will be designed to ensure that sensitive equipment is located above the flood levels and that any other infrastructure in areas which may be subject to flooding will be designed to accommodate occasional flooding.

Therefore the risk of pluvial flooding can be considered low.

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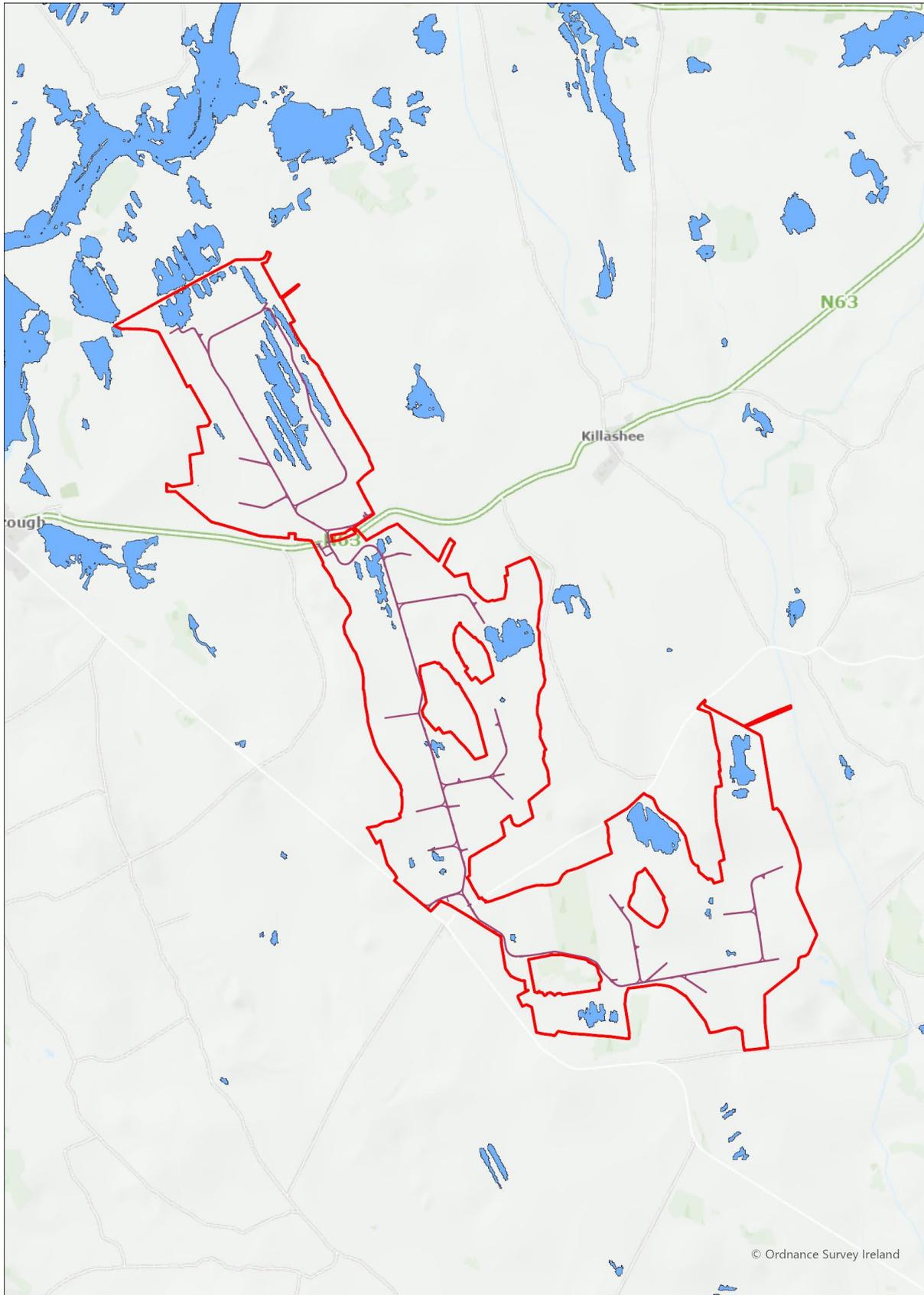


Figure 3-5: Extent of winter 2015-2016 wetted areas (source: GSI)

### **3.7 Groundwater Flooding**

The Geological Survey Groundwater Flooding Probability Maps (Figure 3-6) do not predict groundwater flooding within the site.

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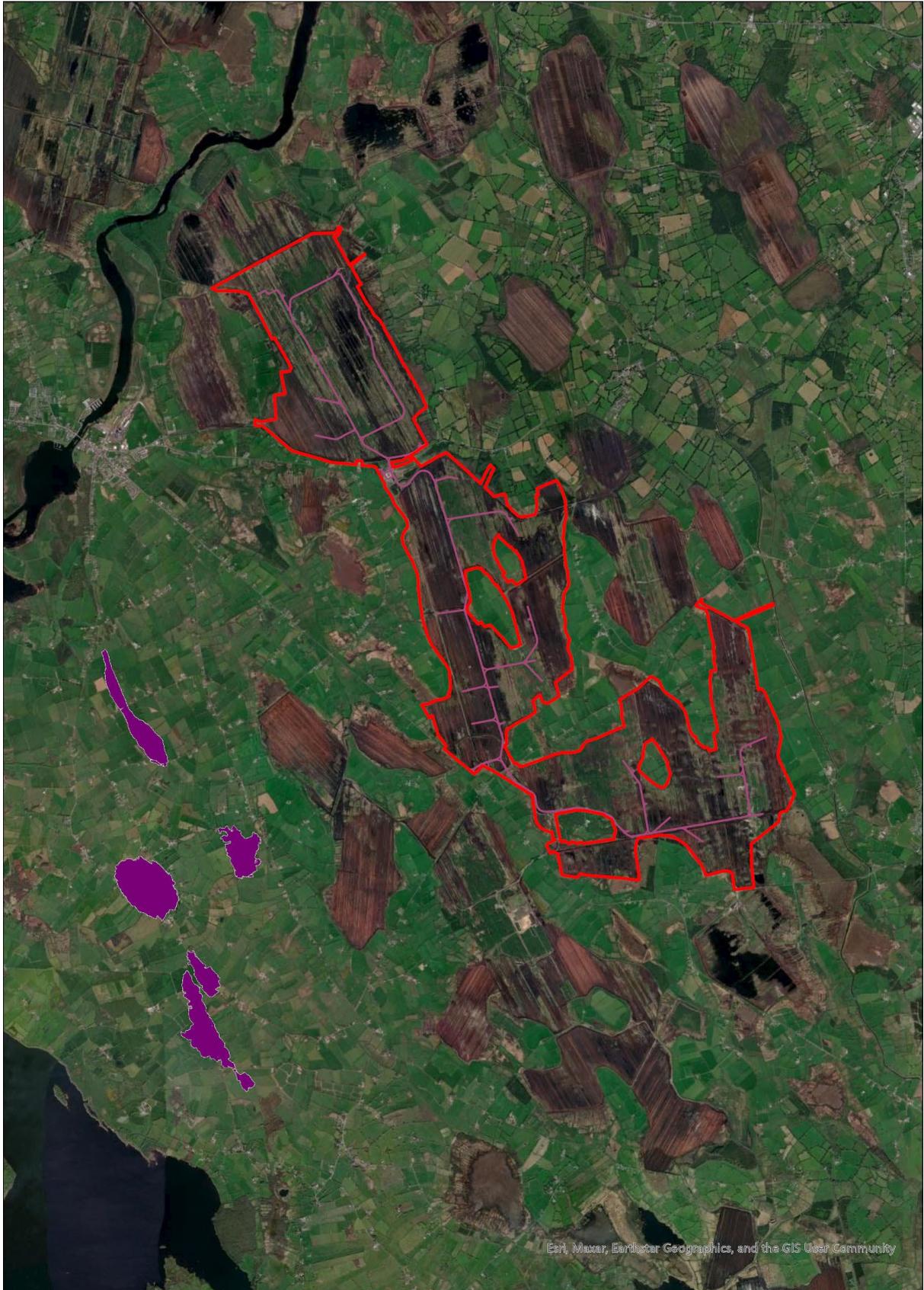


Figure 3-6: GSI Groundwater Flooding Probability Map (Floodmaps.ie)

### 3.8 Identification of Development Vulnerability

The proposed development type is a mix of essential infrastructure and amenity open space. The substation is classified as “*Highly Vulnerable*” as per the definition given in “*The Planning System and Flood Risk Management: Guidelines for Planning Authorities*”, as shown in Table 3-2. and the turbine locations are typically “*Less Vulnerable*” as can be seen by the increase in offshore windfarms operating in wet environments. The remaining site access roads and walking routes are considered to fall under the categories of local transport infrastructure which is categorised as “*Less Vulnerable*”.

Table 3-2: Type of Development or Vulnerability Class (see source for full list)

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

Vulnerability Class	Land uses and types of development which include*:
	Local transport infrastructure.
<b>Water-compatible development</b>	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
<b>*Uses not listed here should be considered on their own merits</b>	

### 3.9 Requirement for Detailed Flood Risk Assessment

Table 3-3 illustrates the circumstances in which the Justification Test is required for a proposed development, depending on the Flood Zone where the development is located and the vulnerability classification of the development.

The substation and wind turbine locations are all situated within Flood Zone C so the development is appropriate.

The site access roads in Derryarogue bog cross through an area identified on the flood maps as Flood Zone B so the development is appropriate. However, these have also been identified as areas of flooding on the GSI Winter 15/16 maps, and are known to flood each winter without pumping. The road is to pass along a high field alongside these flooded areas, but they will nonetheless be considered in the justification test. Similarly the access roads in Derryadd bog and in Lough Bannow bog pass close to areas shown as flooding in the GSI mapping, so these will also be included in the justification test.

In the southeast of Derryadd bog the site entrance and the access road for Pump Station 15 crosses through an area of Flood Zone A. A justification test is required for this development. There is an embankment between the bog and the river which prevents fluvial flooding at this location so the inundation noted in the NIFM has not been experienced to date.

*Table 3-3: Requirement for Justification Test*

	Flood Zone A	Flood Zone B	Flood Zone C
<b>High Vulnerability</b>	Justification Test	Justification Test	Appropriate (Substation)
<b>Low Vulnerability</b>	Justification Test (Some site Roads – Derryarogue, Derryadd, Lough Bannow)	Appropriate (Some site roads – Derryarogue)	Appropriate (Turbines)
<b>Water Compatible</b>	Appropriate	Appropriate	Appropriate

## 4 JUSTIFICATION TEST

The Planning System and Flood Risk Management Guidelines requires that where a planning authority is considering proposals for new development in areas at a high or moderate risk of flooding that include types of development that are potentially vulnerable to flooding and that require additional consideration as set out in Table 3-3, the planning authority must be satisfied that the development satisfies all of the criteria of the Justification Test listed in Section 2.3.1 of this report.

The justification test was considered against the Longford County Development Plan 2021 – 2027 as published on the Longford County Council website and the answers in each section are given in Box 4-1 below.

### *Box 4-1: Justification Test for Development Management*

#### **Justification Test for Development Management**

1. 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.

**In the 2021 to 2027 development plan there is the Longford County Policy Objective 5.152: Encourage proposals for commercial wind energy developments to be located on cutaway peatlands in those areas identified as having wind potential within the county, as defined in Appendix 2, subject to environmental, landscape, habitat and wildlife protection requirements being addressed.**

**In Appendix 2 of the development plan (see Fig 2.6 of this report), the map of Areas of Wind Farm Potential, the majority of the site including the area is within an area shown as a preferred location for windfarms.**

2. 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;

**Yes, the site was subjected to appropriate flood risk assessment. The footprint of the development within the flood risk areas is made up of access roads. The access roads will be set below the 100 year flood level so will not obstruct the flooding or prevent areas from flooding. This will avoid any loss of flood plain. Culverts below the road will ensure hydraulic**

**connectivity for lower return period floods. Currently pump station 15 drains the south eastern part of Derryadd bog where the windfarm infrastructures is in Flood Zone A, and this is expected to continue for the lifetime of the windfarm.**

- ii. The development proposal includes measures to minimise flood risk to people, property, the economy, and the environment as far as reasonably possible;

**The development does not propose to significantly change the pumped outflows from the site. The flow rates from the refurbished pump stations will be matched as far as possible with the flow rates of the existing pump stations. Surface runoff from the development will be discharged as close as possible to the original location.**

- 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

**The site access roads are generally situated on higher ground and have multiple possible directions of access, so that in the event of a site road being inundated it is expected that the remainder of the site will remain accessible.**

- 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.

**Not applicable**

**Conclusion: The proposed development site passes the Justification Test**

## 5 CONCLUSIONS AND RECOMMENDATIONS

A Flood Risk Assessment has been undertaken for the Derryadd Wind Farm site owned by Bord na Móna.

There are areas of flooding known to occur on the sites when the pumps are not in operation, together with areas which the National Indicative Flood Mapping shows as being at risk of fluvial flooding during extreme events.

If there is any reduction in the existing pump operations it is likely that there would be additional areas flooded beyond those considered above. This could impact the windfarm infrastructure and may have stability implications for infrastructure on newly saturated areas.

The proposed use of the site includes high vulnerability use (energy infrastructure –substations), low vulnerability uses (wind turbines and site access roads), and water compatible uses (amenity tracks).

The developer will locate sensitive equipment above the 1000 year flood levels.

Vegetation has already started to reestablish on parts of the cutaway bog and this is expected to cover the entire extent of cutaway bog over time. As the vegetation establishes it will help to slow the runoff from the existing bog and will also increase evapotranspiration from the bog, further reducing the speed of runoff from the site.



## **APPENDIX A – Historical Flooding Reports**

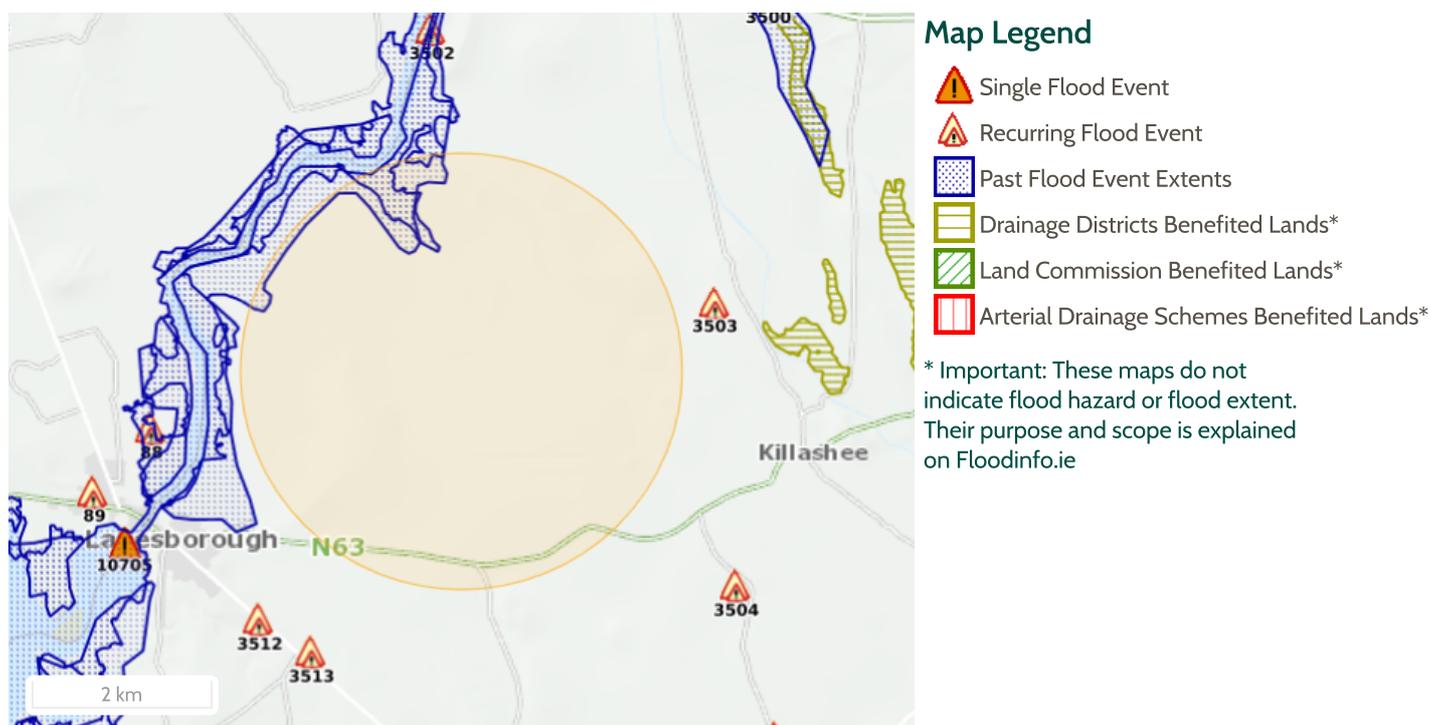




Report Produced: 29/5/2023 17:28

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from [www.floodinfo.ie](http://www.floodinfo.ie) (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



## 2 Results

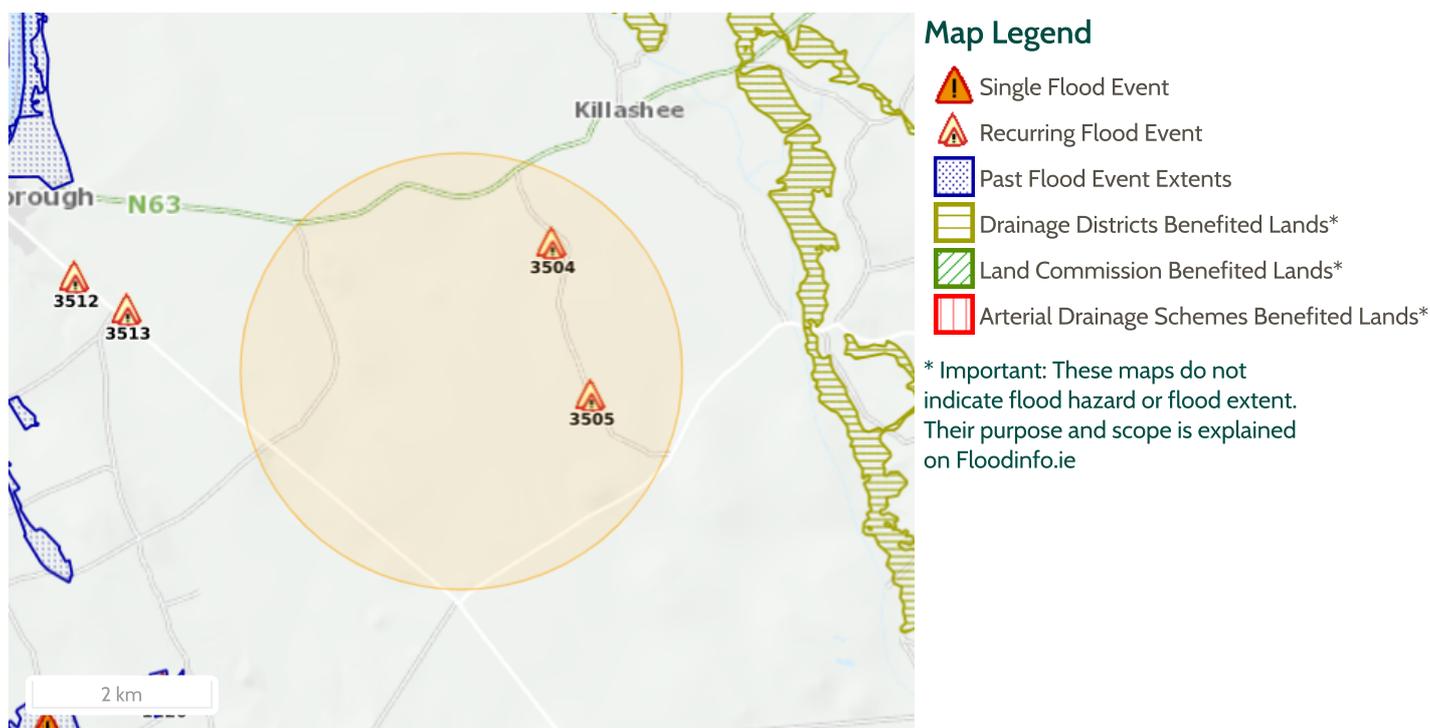
	Name (Flood_ID)	Start Date	Event Location
1.	 Shannon Winter 1999/2000 (ID-2) Additional Information: <a href="#">Reports (26)</a> <a href="#">Press Archive (19)</a>	30/11/1999	Area
2.	 Shannon December 1954 (ID-3) Additional Information: <a href="#">Reports (4)</a> <a href="#">Press Archive (16)</a>	01/12/1954	Area



Report Produced: 29/5/2023 17:29

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

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## 2 Results

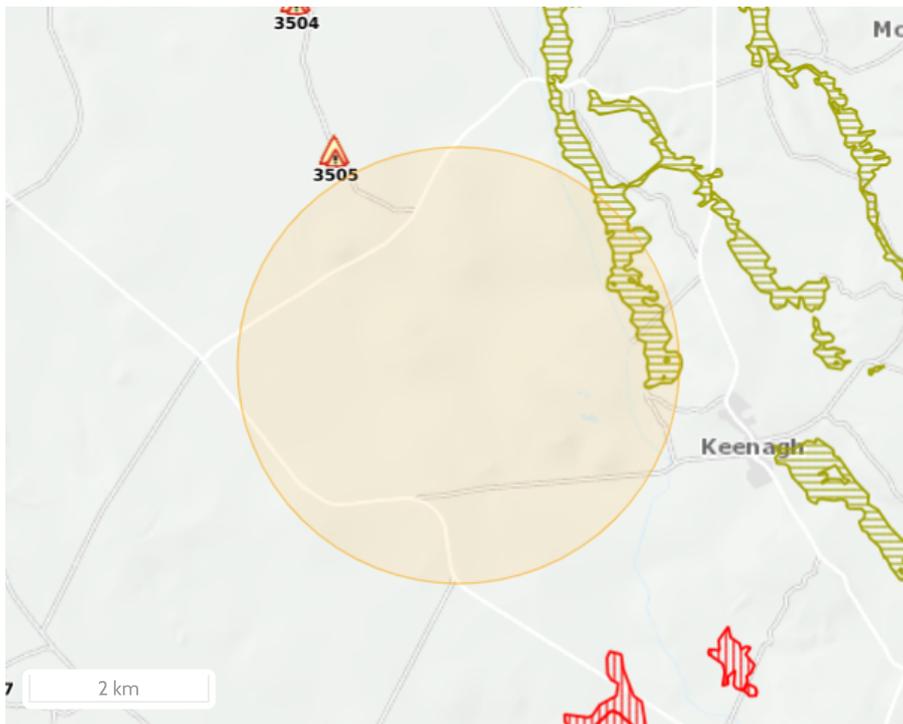
	Name (Flood_ID)	Start Date	Event Location
1.	Grillagh Recurring (ID-3504) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point
2.	Derryad Recurring (ID-3505) Additional Information: <a href="#">Reports (1)</a> <a href="#">Press Archive (0)</a>	n/a	Approximate Point



Report Produced: 29/5/2023 17:30

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

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## Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands\*
- Land Commission Benefited Lands\*
- Arterial Drainage Schemes Benefited Lands\*

\* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

## 0 Results

Name (Flood_ID)	Start Date	Event Location
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