APPENDIX 4-3

ASSESSMENT OF FORESTRY REPLACEMENT LANDS

Planning and Environmental Consultants

Assessment of Proposed Replanting Lands

Lyrenacarriga Wind Farm, Co. Waterford and Co. Cork

DOCUMENT DETAILS

Client:	**Curns Energy Ltd**
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Project Number:	**170749**
Document Title:	**Assessment of Proposed Replanting Lands**
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Prepared By:	**MKO**
	Tuam Road
	Galway
	Ireland
	H91 VW84

Planning and Environmental Consultants

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1. INTRODUCTION

1.1 Introduction

This Forestry Replacement Assessment report has been prepared by MKO on behalf of Curns Energy Ltd., who intends to apply to An Bord Pleanála for planning permission to construct a wind energy development and all associated infrastructure at Lyrenacarriga and other townlands, located in Counties Waterford and Cork.

Construction of the proposed wind farm will require permanent felling of 45.6 hectares (ha) of forestry. In line with the Forest Service's published policy on granting felling licenses for wind farm developments, areas permanently cleared of forestry for turbine bases, access roads, and any other wind farm-related uses will have to be replaced by the planting of forestry at an alternative location. The Forest Service policy requires replanting on a hectare for hectare basis.

A total of 45.6 hectares of new forestry will therefore be replaced as a condition of any felling licence that might issue in respect of the proposed wind farm development. Replanting is a requirement of the Forest Service and is primarily a matter for the statutory licensing processes under the Forestry Act 2014 that are under the control of the Minister for Agriculture, Food and the Marine and the Forest Service.

The replacement of forestry can occur anywhere in the State subject to licence. Bare replacement lands are therefore required to be obtained by the applicant and ringfenced for the replacement of forestry felled as part of the construction of wind energy developments. These lands are subject to an application for Technical Approval by the Forest Service. Should Technical Approval be granted, the lands can be left bare until a felling licence for the wind farm to which they are linked has been acquired. Bare replacement lands, on a site which has Technical Approval, can also be planted ahead of a felling licence being acquired for the wind farm as long as they are held specifically for the purpose of replacing forestry felled as part of a wind farm development.

A potential replanting site for the proposed Lyrenacarriga Wind Farm felling requirement has been identified in County Sligo. These lands have been granted Forest Service Technical Approval for afforestation (see Appendix 1 for technical approval document) and these or similarly approved lands will be used for replanting should the proposed wind farm receive planning permission.

1.2 Report Structure

This report provides a description of the proposed replanting land and an assessment of the potential impacts including cumulative impacts associated with afforestation at this location. The main sections of this report are presented as follows:

- Section 2: Project Background and Description
- Section 3: Planning Policy and Planning History
- Section 4: Impact Assessment Methodology
- Section 5: Biodiversity
- Section 6: Land, Soils and Geology
- Section 7: Water (Hydrology and Hydrogeology)
- Section 8: Landscape
- Section 9: Cultural Heritage
- Section 10: Air, Climate and Noise
- Section 11: Population & Human Health
- Section 12: Material Assets

2. PROJECT BACKGROUND AND DESCRIPTION

2.1 Background

2.1.1 Afforestation Approval

Replanting or off-site afforestation is a requirement of the Forestry Act 2014 and its consent is regulated under the Forestry Regulations 2017 (SI 191/2017) which set out the provisions for licensing for afforestation. To afforest any land where the area involved is greater than 0.1 ha requires the approval of the Minister for Agriculture, Food and the Marine, under the 2017 Regulations. The application for approval is known as Pre-Planting Approval – Form 1 and is subject to the following procedures:

- The application is referred to the relevant Forest Service Inspector for assessment and recommendations;
- If there are any environmental considerations identified, the application is referred to the relevant external body, e.g. National Parks and Wildlife Services, National Monuments Service, Regional Fisheries Boards, Local Authorities, etc., for consideration;
- If the proposed development is greater than 25 hectares the application is referred to the relevant Local Authority;
- If the site is greater than 2.5 hectares the application is advertised on the Department's website; and
- If the site is greater than 50 hectares an Environmental Impact Assessment and planning permission are required.

The Pre-Planting Approval – Form 1 requires a wide range of details in relation to the proposed area to be forested. Notwithstanding the size of the proposed application, the environmental considerations which must be answered/considered for the approval are listed in Table 2-1 below. The Pre-Planting Approval – Form 1 notes that, if present, all items listed may require the Department of Agriculture, Food and the Marine (DAFM) to consult with prescribed bodies, while those in bold type may require the DAFM to undertake public consultation.

Table 2-1 Environmental Considerations in Afforestation Applications for Approval - Form 1

No.	Environmental Considerations
1	**Water Quality**
1.1	Is the area designated potentially acid sensitive by this Department (DAFM)?
1.2	Is the area >5 ha and sensitive for fisheries?
1.3	Is the area non-sensitive for fisheries and >40 ha?
1.4	Is the area >10 ha and within a catchment area of a Local Authority designated water scheme?
2	**Designated Habitats**
2.1	Is the area within a NHA, pNHA, SAC, SPA or National Park?
2.2	If the area is within a NHA, is a completed notifiable Action Form/ Action Requiring Consent Form (consent from National Parks and Wildlife Service) included?
2.3	If the area is within a Hen Harrier SPA, will operations occur between the 1st of April and the 15th August inclusive?
2.4	Is the area within a NPWS referral zone for NHA, pNHA, SAC or SPA?
2.5	Is the area within 3 km upstream of a NHA, pNHA, SAC, SPA or National Park?

No.	Environmental Considerations
2.6	Is the area within a Fresh Water Pearl Mussel 6 km zone? If yes, the Forestry and Fresh Water Pearl Mussel Requirements Forms A and B should be included with the Application.
2.7	Is the area within a Freshwater Pearl Mussel Catchment?
2.8	Does the area contain a current REPS plan habitat?
3	**Archaeology**
3.1	Does the area contain an archaeological site or feature with intensive public usage?
3.2	Does the area contain or adjoin a listed archaeological site or monument?
4	**Landscape**
4.1	Is the area within a prime scenic area in the County Development Plan?
4.2	Are there any other High Amenity Landscape considerations?
5	**Size for Notification to Local Authority**
5.1	Is the area greater than 25 ha?
6	**Other Environmental Considerations**
6.1	Specify

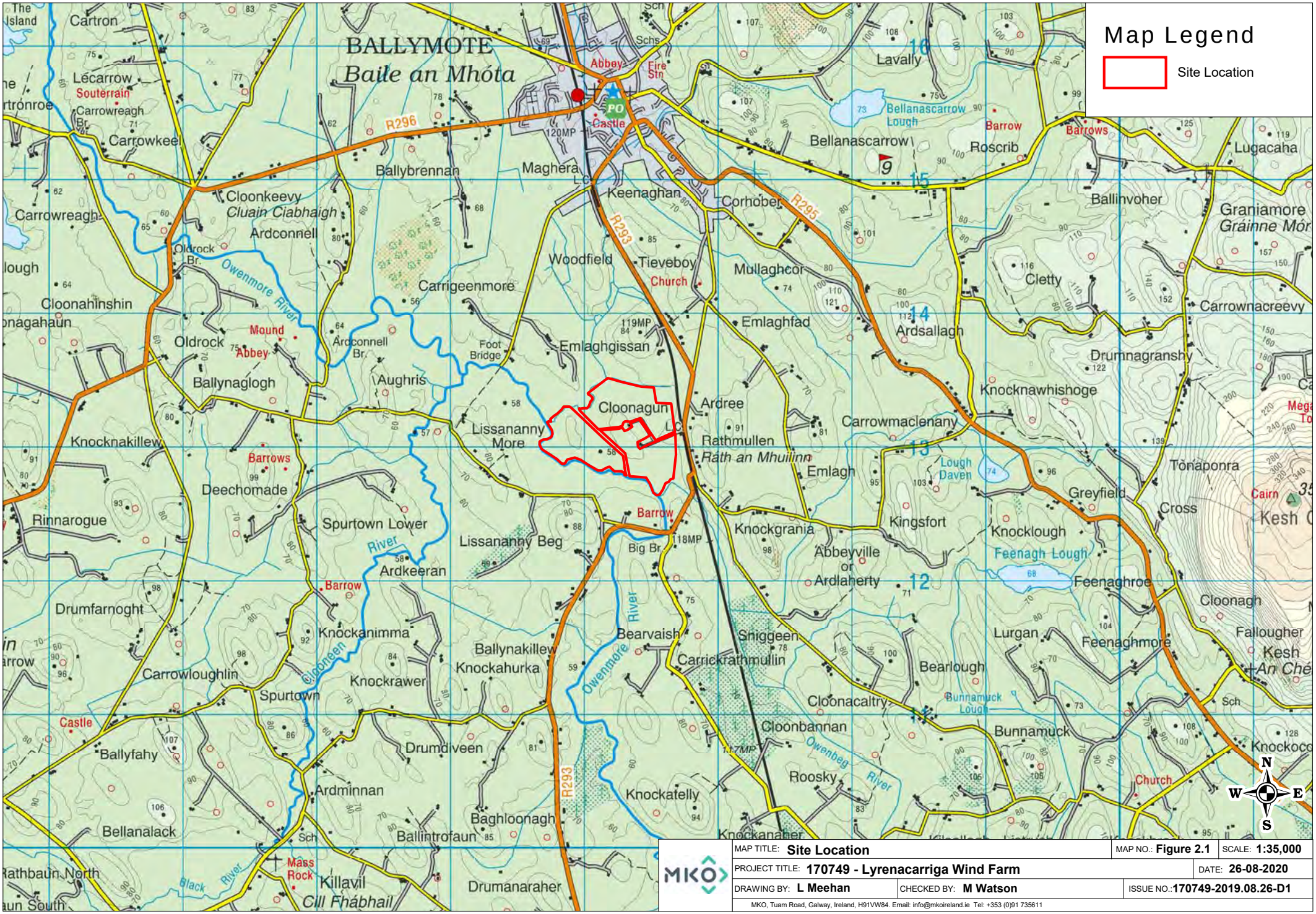
Before the Minister can grant approval, he must first determine if the project is likely to have a significant environmental effect. Approval for afforestation is not granted by the Forest Service on lands where there is the potential for significant environmental impacts. The lands assessed in this document have been granted Technical Approval by the Forest Service for afforestation.

2.2 Proposed Replanting Lands

A potential replanting site has been identified, and any replanting associated with the proposed development will take place at this or similarly Technically Approved lands. The potential site has been assessed as part of the Afforestation Approval – Form 1 process described above, and has obtained Technical Approval for Afforestation from the Forest Service.

The replanting site is located in the townland of Cloonagun, Co. Sligo, approximately 3km south of Ballymote. The site is located just off the R293 Regional Road which runs from Ballyhaunis, Co. Mayo and Colloney, Co. Sligo. The site location is presented in Figure 2.1.

The total approved area for afforestation, as per the Technical Approval document, is approximately 49.98 hectares ('Proposed Site'), which is currently dominated by agricultural grassland and wet grassland and is currently used for agricultural purposes (grazing). The Owenmore River flows in a westerly direction along the southern and western site boundary. The Ballymote Stream flows in westerly/south westerly direction along the northern and western boundary of the site.



MAP TITLE: **Site Location**		MAP NO.: **Figure 2.1**	SCALE: **1:35,000**
PROJECT TITLE: **170749 - Lyrenacarriga Wind Farm**			DATE: **26-08-2020**
DRAWING BY: **L Meehan**	CHECKED BY: **M Watson**	ISSUE NO.: **170749-2019.08.26-D1**	

MKO, Tuam Road, Galway, Ireland, H91VW84. Email: info@mkoireland.ie Tel: +353 (0)91 735611

2.3 Proposed Afforestation Techniques

2.3.1 Forest Service Best Practice

Afforestation and subsequent harvesting will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM guidance documents, including the specific guidelines listed below, to ensure that newly planted trees remain viable and afforestation provide minimal potential impacts to the receiving environment.

- Environmental Requirements for Afforestation (Forest Service, 2016a)
- Land Types for Afforestation (Forest Service, 2016b)
- Forest Protection Guidelines (Forest Service, 2002)
- Forestry Harvesting and the Environment Guidelines (Forest Service, 2000a)
- Forest Operations and Water Protection Guidelines (Coillte, 2013)
- Forestry and Water Quality Guidelines (Forest Service, 2000b)
- Forestry and the Landscape Guidelines (Forest Service, 2000c)
- Forestry and Archaeology Guidelines (Forest Service, 2000d)
- Forest Biodiversity Guidelines (Forest Service, 2000e)
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018)

Planting will be carried out in accordance with the *Forestry Schemes Manual* (Forest Service, 2011), which provides guidance in relation to ground cultivation, stocking and spacing, plant handling, planting dates, fertiliser application, fencing, fire, and weed control. Certain specific silvicultural and environmental conditions are also set out in the Forest Service Technical Approvals for each site, which will be adhered to.

2.3.2 Planting

Planting will be by hand. The main forms of planting, as described in the Forestry Schemes Manual, are set out as follows.

Slit Planting

A spade is used to make a vertical slit in the ground. The trees roots are carefully positioned in the slit to ensure that roots are equally spaced in the vertical slit created. The slit is closed and firmed up ensuring the tree is vertical and upright. It is important to ensure that roots are not bent over which can lead to poor development, e.g. J root. This form of planting can be suitable for ribbons, mounds and ripped ground.

Angle Notch

A spade is used to cut a T or L-shaped slit in the ground. The spade is used to lift the slit and the trees roots placed underneath to ensure good root distribution without causing damage. The slit is closed and firmed up to ensure that stem is left vertical and upright.

Pit Planting

A spade is used to dig a hole and the trees roots placed in the centre. Soil is placed around the tree and firmed in, ensuring that it is upright and straight. This form of planting can be used in sensitive sites where no ground preparation has taken place. It may also be appropriate for steep slopes where other types of preparation may lead to sediment run off.

The Technical Approvals for the proposed replanting lands include the species approved for afforestation.

2.3.3 Drainage

Drainage and sediment control at each site will conform to Forest Service best practice, i.e. the guidelines referred to under Section 2.3.1 above. Appropriate drainage designs will include collector drains, interceptor drains and cut-off drains. A description of each drain type, as per the Forestry Schemes Manual, is set out below. Figure 2-2 below presents a schematic diagram of each drain type.

Collector Drains

Collector drains collect water from mound drains, plough furrows, mole drains, etc., and discharge via sediment traps and/or an interceptor drain. Collector drains are excavated to a depth not greater than 10-15 cm below the depth of mound drains. Where collector drains have to be extended into erodible material, 'mini' silt traps are placed appropriately by deepening the drains in places.

Interceptor Drains

Interceptor drains are constructed along the edges of aquatic buffer zones, i.e. areas where forest operations are curtailed and which are managed for environmental protection and enhancement. Interceptor drains collect the discharge from the drainage sub-catchment and allow it to overflow into the buffer zone. In most cases, slope will allow for drainage channels to taper out or be connected to an interceptor drain rather than enter a buffer zone. However, on flat sites, or those with low slopes, it will be necessary to connect drains into the aquatic zone. This may be done only where it will not result in sediment or any pollutants entering the aquatic zone.

Cut off Drains

Cut off drains are constructed immediately up slope of a site and are designed to direct water away from the site.

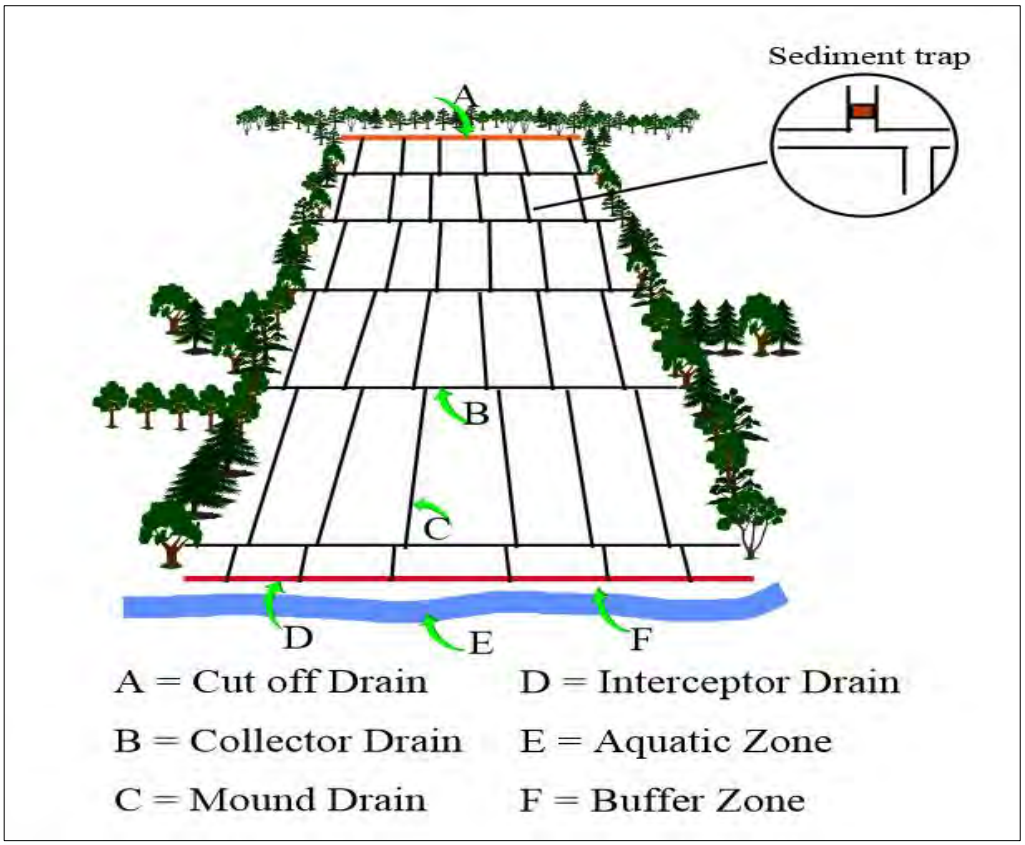


Figure 2-2 Standard Forestry Drainage (Forest Service, 2011)

Designs similar to the one above may be suitable for steeper erodible sites.

3. PLANNING POLICY AND PLANNING HISTORY

This section contains relevant national and local policies regarding forestry. This includes reference to several national forestry policy documents, the *Climate Action Plan 2019* (Department of Communications, Climate Action & Environment, 2019) as well as the County Development Plan for Sligo.

This section of the report also addresses the planning history within, and in the vicinity of, the proposed replanting lands.

3.1 Planning Policy

3.1.1 National Policy

National policy includes Forest Service policy as well as policy on climate change. Forestry policy in Ireland is overseen by the Forest Policy Section of the DAFM. At a European and international level, the Forest Policy Section is responsible for the transposition of EU directives and regulations into Irish law, as well as representing the Forest Service at a European level. On a national level, the Forest Policy Section deals with issues relating to climate change, carbon sequestration, wood energy, forestry and the environment, legislative framework and liaison with stakeholders which includes other government agencies.

National policy is aimed towards increasing Ireland's forest cover in a sustainable manner. The document *Forests, products and people: Ireland's forest policy – a renewed vision* (DAFM, 2014) sets out an updated national forest policy strategy that takes account of the substantial changes that have occurred in Irish forestry since the publication of its forerunner, *Growing for the Future (DAFM, 1996).* As part of the Department's policy to ensure compatibility between forestry development and the protection of the environment, the Forest Service is implementing Sustainable Forest Management (SFM) with a view to ensuring that all timber produced in Ireland is derived from sustainably managed forests. This work is in accordance with Ireland's commitment to the six pan-European criteria for SFM adopted at the Third Ministerial Conference on the Protection of Forests in Europe, Lisbon, 1998. The implementation of SFM within Ireland is supported by the Irish National Forest Standard, the *Code of Best Forest Practice* and a suite of environmental guidelines (relating to water quality, landscape, archaeology, biodiversity and harvesting) as well as the work of the Forestry Inspectorate and the ongoing review of Irish forest legislation.

The *Environmental Requirements for Afforestation* (Forest Service, 2016a), released in December 2016, incorporate more recent developments in relation to environmental regulation, research and changes in forest practices, and consolidate into one single coherent document those measures and safeguards relating to afforestation which were previously contained within the following Forest Service Environmental 'Guidelines': *Forestry and Water Quality Guidelines*, *Forestry and Archaeology Guidelines*, *Forestry and the Landscape Guidelines*, and *Forest Biodiversity Guidelines*. The use of the word 'requirements' in the title was selected over 'guidelines', in order to underline the mandatory nature of the measures therein.

These environmental guidelines are referred to in Section 3.1.3 below.

3.1.1.1 Forests, Products and People: Ireland's Forest Policy – A Renewed Vision

This document, published in 2014 by DAFM, contains strategic goals and recommendations of the Forest Policy Review Group. The strategic goal is defined as:

> *"Develop an internationally competitive and sustainable forest sector that provides a full range of economic, environmental and social benefits to society and which accords with the Forest Europe definition of sustainable development."*

The report notes the increasing economic, environmental and social role of forestry in Ireland, stating that forestry accounts for 10.8% of the land area of the country, which is low in comparison with other European countries. The strong forest growth rates found in Ireland when compared to other European countries is also noted. The role of forestry in rural development and diversification as well as rural employment is also recognised.

The document notes also the contribution of forests to mitigation of climate change through carbon sequestration and notes that Irish forests will sequester approximately 4.8 million tonnes of CO_2 in 2020. This document's afforestation policy therefore supports Ireland's efforts to reach the greenhouse gas emission reduction targets as well as reducing dependence on fossil fuels.

The role of the forest resource in contributing to the renewable energy policy goals, such as achieving a percentage of power generation by co-firing with biomass, as well as biomass in power generation, is also noted. The report notes that the contribution of forestry to achieving renewable energy targets is dependent on the scale and accessibility of the resource, and that a continuation of afforestation in order to maintain a sustainable level of supply of small roundwood would result in confidence for investment in Combined Heat and Power (CHP) and other wood energy technologies.

Some recommended relevant policies and actions include:

- **Expansion of the Forest Resource**: To increase the forest area, in accordance with SFM principles, in order to support a long term sustainable roundwood supply of 7 to 8 million cubic metres per annum. This policy aims to increase afforestation to 15.000 hectares annually.
- **Management of the Resource**: To ensure that the sustainable management of the forest resource in accordance with best practice thereby ensuring its capacity to provide the full range of timber and other benefits.
- **Environment and Public Goods**: To ensure that afforestation, management of existing forests and development of the forest sector are undertaken in a manner that enhances their contribution to the environment and the capacity to provide public goods and services.

3.1.1.2 Forestry Programme 2014-2020

This document was submitted in accordance with EU Guidelines on State Aid for Agriculture and Forestry in Rural Areas 2014-2020 and represents Ireland's proposals for 100% State aid funding for a new forestry programme 2014-2020. These measures are consistent with the document *Forests, products and people; Ireland's forest policy – a renewed vision* as referred to in Section 3.1.1.1 above.

This document contains a number of responses to the actions and policies identified in the above document, and these include an Afforestation scheme - this is the main response to the policy entitled *'Expansion of the forest resource'*.

An identification of needs was carried out by DAFM in relation to forestry, and these needs are as follows:

- Increase, on a permanent basis, Ireland's forest cover to capture carbon, produce wood and help mitigation;
- Increase and sustain the production of forest-based biomass to meet renewable energy targets;
- Support forest holders to actively manage their plantations; and
- Optimise the environmental and social benefits of new and existing forests.

A number of measures are proposed to meet these needs, and the most relevant of these refers to the first measure, which is aimed at increasing Ireland's forest cover (currently at approximately 10.8%) which is well below the EU average of 38%. The aim is to increase forest cover to 18% by the mid-century. The second need, that to increase forest-based biomass in order to meet the stated targets for renewable energy by 2020.

3.1.1.3 Climate Action Plan 2019

The *Climate Action Plan* (DCCAE, 2019) which features 183 action plans sets out how Ireland will meet its EU targets to reduce its carbon emissions by 30% between 2021 and 2030 and lay the foundations for achieving net zero carbon emissions by 2050. One of the key targets in relation to forestry is the delivery of '*..an average of 8,000 ha per annum of newly planted forest, and sustainable forest management of existing forests (21 MtCO2eq. cumulative abatement)'.* Ongoing and proposed measures to deliver the target include:

- The investment of nearly €3 billion in forestry, since the late 1980s, which through ongoing sustainable forest management will contribute to delivering abatement of 21 $MtCO_2eq$ over the period 2021 to 2030.
- Review of the current afforestation programme to enhance participation rates, and inform land use policy to increase the benefits for climate, the environment, and rural communities.
- Commitment by Coillte to replant or restock a total of 34,770 hectares between 2016 and 2020.
- Hedgerows are estimated to cover 3.9% of the Irish landscape or 660,000 km length. The total area of hedgerow and non-forest woodland patches across the landscape could represent a significant carbon sink and could potentially be used as a mitigation option.

3.1.1.4 Project Ireland 2040- National Planning Framework

Agricultural diversification and alternative land-uses are necessary in order to maintain and create jobs in rural Ireland where low quality land presents challenges for sustainable development and economic growth. Afforestation is recognised as an alternative land-use which creates rural employment and drives the national economy. The direct and indirect contribution of the forestry sector to the economy has been calculated at €2.3 billion annually.

Afforestation plays an important role reaching national CO_2 target emissions "through carbon sequestration in forests and the provision of renewable fuels and raw materials. Irish forestry is a major carbon sink and afforestation is the most significant mitigation option that is available to Ireland's land use sector". In order to facilitate this further, the annual target for afforestation by 2020 is 8,290 hectares, an increase in over 2,000 hectares over the past three years.

Table 3-1 Project Ireland 2040 NPF Objectives which relate to forestry

National Policy Objective 23	Facilitate the development of the rural economy through supporting a sustainable and economically efficient agriculture and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism.

3.1.2 Local Policy

3.1.2.1 Sligo County Development Plan 2017 – 2023

The *Sligo County Development Plan 2017 - 2023* (Sligo County Council, 2017) contains a number of policies and objectives relating to natural resources and forestry. The *County Sligo Landscape Characterisation Map* (Sligo County Council, 2016) and general policies on landscape are also referred to in Section 8 of this report.

Section 4.3.2 of the Sligo County Development Plan contains the following three primary policies regarding forestry:

- **P-FOR-1:** Support sustainable forestry development in County Sligo, subject to the protection of scenic landscapes and views, water quality, heritage features, residential amenity and public safety.
- **P-FOR-2:** Discourage new forestry development, except for broadleaf, in proposed/candidate and adopted NHAs, SACs and SPAs, in designated Sensitive Rural Landscapes and Visually Vulnerable Areas, along designated Scenic Routes and in water quality-sensitive areas. (Broadleaf forestry will be open to consideration in these areas and in all proposed and adopted NHAs, SPAs and SACs, will be subject to consultation with the DECLG and shall have regard to any management plans prepared by the Department.)
- **P-FOR-3**: Require identification of existing rights-of-way and established walking routes before planting commences. Forestry should not obstruct existing rights-of-way, traditional walking routes, recreational and tourism facilities.

The Plan also recognises the value of forestry for both recreation and tourism, in supporting local community forestry initiatives, protecting access to forests and woodlands and supports implementation of national policies to achieve more sustainable forestry.

3.1.3 Forest Service Guidelines

The *Environmental Requirements for Afforestation* (Forest Service, 2016a), released in December 2016, incorporate more recent developments in relation to environmental regulation, research and changes in forest practices, and consolidate into one single coherent document those measures and safeguards relating to afforestation which were previously contained within the following Forest Service Environmental Guidelines: *Forestry and Water Quality Guidelines*, *Forestry and Archaeology Guidelines*, *Forestry and the Landscape Guidelines*, and *Forest Biodiversity Guidelines*. The use of the word 'requirements' in this document's title was selected over 'guidelines', in order to underline the mandatory nature of the measures therein.

The overall aim of the *Environmental Requirements for Afforestation* is to ensure that the establishment of forests is carried out in a way that is compatible with the protection and enhancement of the environment, in regard to water quality, biodiversity, archaeology, landscape and other environmental receptors. In relation to water, the focus is on reducing and eliminating sources of pollution and

preventing the creation of pathways to receiving waters. The Requirements provide an enhanced baseline level of protection regarding afforestation and water, with the water setback representing an important feature. They will also support the *Plan for Forestry and Freshwater Pearl Mussel in Ireland* (DAFM, 2016), by providing an enhanced baseline level of protection regarding afforestation and water.

The *Environmental Requirements for Afforestation* are set out in three stages that reflect the project development process, i.e. pre-application design, site works, and ongoing site management. While some overlap exists, these three stages reflect the typical sequence of activities undertaken by an Applicant and her / his Registered Forester, and the corresponding sequence of mandatory environmental measures that apply, throughout afforestation up until the end of the premium period (or 15 years, for non-grant aided forests).

Afforestation at the proposed replanting lands will be carried out in accordance with the *Environmental Requirements for Afforestation* document, as stated in the conditions attached to each Technical Approval.

3.2 Planning History

A planning history search was carried out for the proposed replanting lands and the lands in their immediate vicinity. This entailed reference to the Planning Application search facility and maps on the website of the Planning Authority, i.e. Sligo County Council. The planning history searches found that planning applications in the vicinity of the proposed replanting lands relate to one-off houses. No projects or plans were identified that would be incompatible with the proposed replanting or give rise to significant cumulative impacts.

4. IMPACT ASSESSMENT METHODOLOGY

The impacts of afforestation at the potential replanting land described in Section 2.2 of this report have been assessed under the following key environmental headings:

- Biodiversity
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Landscape
- Cultural Heritage
- Air, Climate and Noise
- Human Beings
- Material Assets

The site is addressed separately under the key environmental headings, and described in terms of Baseline Environment, Impact Assessment, Proposed Mitigation Measures and Residual Impacts and Significance of Effects. The findings of the assessment are presented in Sections 5 to 12 of this report.

Impacts are described in terms of quality, significance, duration and type, where possible. The classification of impacts in this report uses the standard best-practice terms provided in the Environmental Protection Agency (EPA) document, *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2017). Table 1-2 in Chapter 1 of the Environmental Impact Assessment Report (EIAR) submitted as part of the Lyrenacarriga Wind Farm planning application presents a copy of the impact classification terminology.

Appropriate mitigation measures are presented where relevant to reduce, remedy or eliminate potential impacts. Residual impacts are also presented following any impact for which mitigation measures are prescribed.

5. BIODIVERSITY

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

An ecological walkover survey of the proposed afforestation site and surrounding area was conducted on the 8th of January 2020 in line with NRA (2009) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*) by Julie O'Sullivan (MSc., BSc.) and Katie Pender (BSc.).

5.1 Establishing the Zone of Influence

As described in the CIEEM, 2018 Guidelines for Ecological Impact Assessment in The UK and Ireland, the 'zone of influence' for a project is *'the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities'*. The zone of influence will vary with different ecological features, depending on their sensitivities to an environmental change. This may extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.

The assessment of the site began with a desk study of available published data on sites designated for nature conservation, other ecologically sensitive sites, habitats and species of interest near the proposed replanting site (the 'Proposed Site'). A review of OSI mapping, online environmental web-mappers and ortho-photography was also undertaken. The baseline information obtained from the desk study was the first stage in defining a zone of influence of the proposed planting.

The zone of likely influence for the Proposed Site varied depending on the ecological receptors identified on site. In the assessment, effects on habitats and species within the site were considered and also the potential for the proposed planting to affect habitats and species outside the site.

5.2 Statement of Authority

A field assessment was undertaken by Julie O'Sullivan (B.Sc., M.Sc.) and Katie Pender (B.Sc.) on the 8th of January 2020. This report has been prepared by Julie O'Sullivan and Katie Pender. Katie is a graduate ecologist. Julie is an experienced ecologist with over five years professional experience. This report has been reviewed by Pat Roberts, Principal Ecologist, (B.Sc., MCIEEM) who has over 15 years' experience in ecological consultancy.

5.3 Methodologies and Limitations

A multidisciplinary ecological walkover survey of the proposed site was conducted on the 8th of January 2020 by Julie O'Sullivan and Katie Pender.

Habitats were identified in accordance with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in '*Best Practice Guidance for Habitat Survey and Mapping*' (Smith *et al.*, 2011). Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010), while mosses and liverworts nomenclature follows '*Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

The multi-disciplinary walkover survey was designed to detect the presence, or likely presence, of a range of protected habitats and species. Incidental sighting/observations of birds and additional fauna were noted during the site visit. Surveys were undertaken in accordance best practice guidance (TII,

2008: *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*). During the multi-disciplinary ecological walkover surveys the potential for the Proposed Site to support protected mammals listed in the Wildlife Acts, 1976–2018, such as pine marten, red squirrel, Irish hare, pygmy shrew, Irish stoat etc. was assessed.

During the multi-disciplinary walkover survey, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

Seasonal factors that affect distribution patterns and habits of species were taken into account when conducting the surveys. The potential of the site to support certain populations (in particular those of conservation importance that may not have been recorded during the field survey due to their seasonal absence or nocturnal/cryptic habits) was assessed. All habitat and species were readily identifiable, and it is considered that a comprehensive an accurate assessment of the habitats was achieved.

5.4 Desk Study

The following sections detail the results of the searches of published material that were consulted as part of the desk study. These included the Site Synopses of relevant designated sites as compiled by the National Parks and Wildlife Service (NPWS) of the Department of Culture Heritage, and the Gaeltacht (CHG) bird and plant distribution atlases and other research publications.

5.4.1 Designated Sites

European Sites

The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all the directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

With the introduction of the EU Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) which were transposed into Irish law as S.I. No. 94/1997 European Communities (Birds and Natural Habitats) Regulations 1997, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also, more importantly, their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011- European Communities (Birds and Natural Habitats) Regulations 2011. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed 'European Sites'. This includes Special Areas of Conservation and Special Protection Areas, as described below.

Special Areas of Conservation

Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. Annex I of the Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. Marsh Fritillary, Atlantic Salmon, and Killarney Fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as is the case with Otter and Lesser Horseshoe Bat which are listed on both Annex II and Annex IV.

Special Protected Areas

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interests of clarity and rationality the said Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3).

A subset of bird species have been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

Nationally Designated Sites

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that were designated for the protection of flora, fauna, habitats and geological sites under the Wildlife (Amendment) Act 2000. These sites do not form part of the Natura 2000 network.

5.4.2 Identification of the Designated Sites

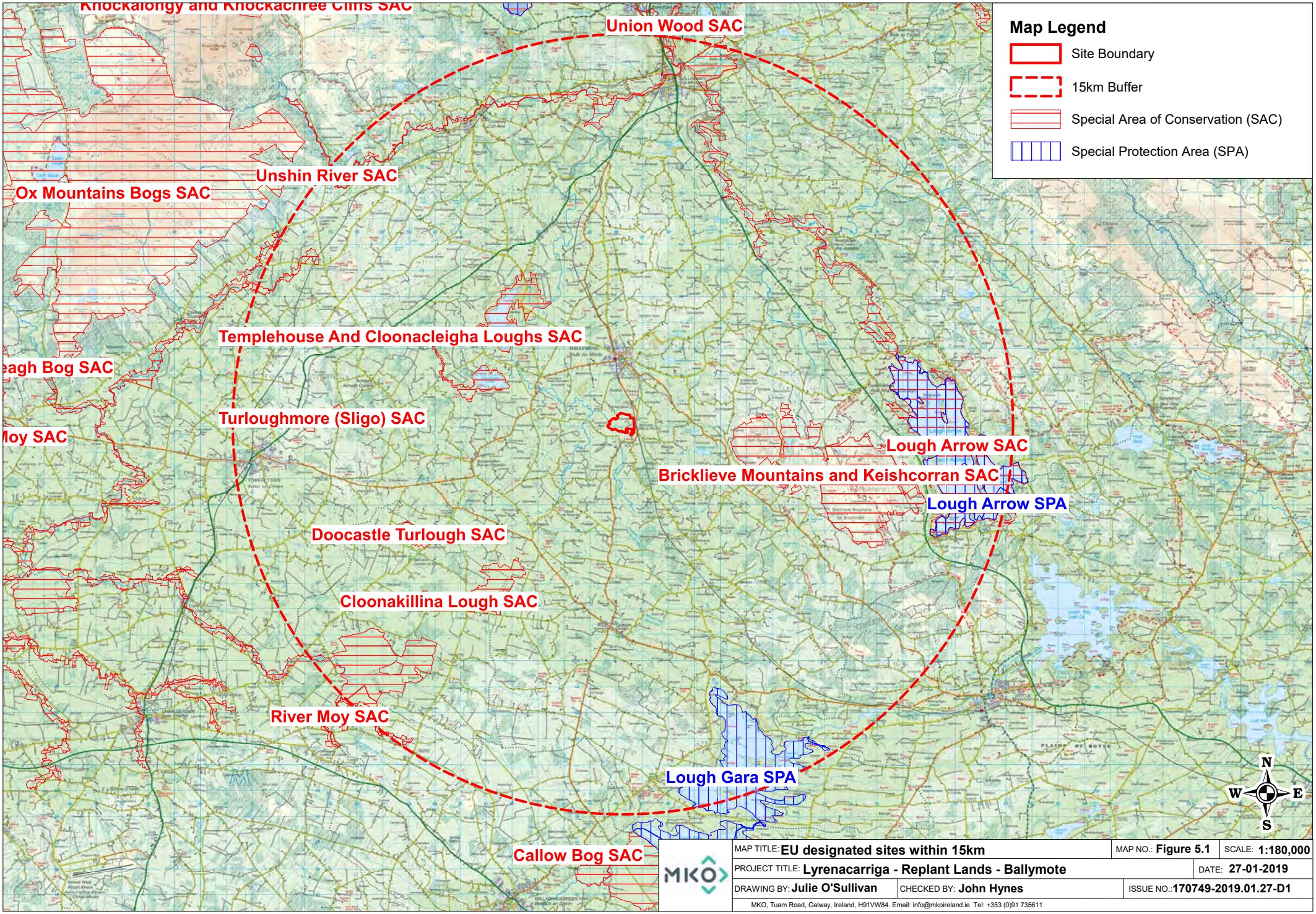
Using the GIS software QGIS (Version 3.4), designated sites within a 15-kilometre radius of the proposed afforestation were identified. Sites outside 15km were considered but no potential for impact was identified. The designated sites are listed below in Table 5-1. EU designated sites within 15km of the development site are displayed on Figure 5-1 and nationally designated sites within 15km of the development site are displayed on Figure 5-2.

Table 5-1 Designated sites within 15 kilometres of the replanting site

Designated Site	Distance from Proposed Afforestation Site (km)
Special Areas of Conservation (SAC)	
Bricklieve Mountains and Keishcorran SAC [001656]	3.7km
Templehouse And Cloonacleigha Loughs SAC [000636]	4.0km
Flughany Bog SAC [000497]	6.1km
Unshin River SAC [001898]	7.8km
Doocastle Turlough SAC [000492]	8.1km
Cloonakillina Lough SAC [001899]	8.9km
Lough Arrow SAC [001673]	9.7km

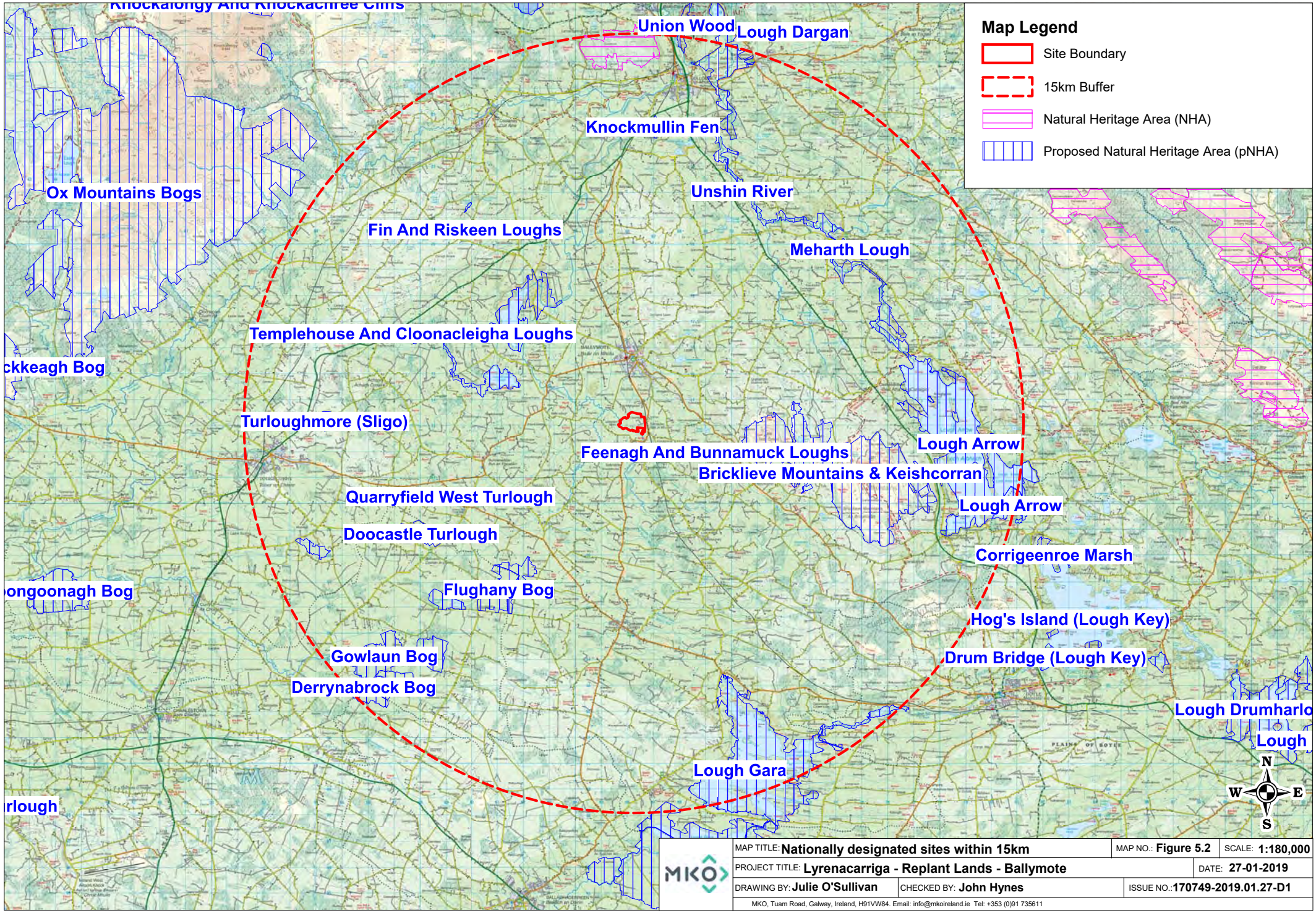
Designated Site	Distance from Proposed Afforestation Site (km)
Turloughmore (Sligo) SAC [000637]	10.1km
River Moy SAC [002298]	10.6km
Union Wood SAC [000638]	14.0km
Special Protection Area (SPA)	
Lough Arrow SPA [004050]	9.9km
Lough Gara SPA [004048]	13.4km
Natural Heritage Areas (NHA)	
Slieveward Bog NHA [001902]	13.6km
Proposed Natural Heritage Areas (pNHA)	
Feenagh And Bunnamuck Loughs [001905]	2.8km
Bricklieve Mountains & Keishcorran [001656]	4.2km
Templehouse And Cloonacleigha Loughs [000636]	4.6km
Flughany Bog [000497]	6.5km
Quarryfield West Turlough [001901]	7.4km
Doocastle Turlough [000492]	8.6km
Unshin River [001898]	9.0km
Cloonakillina Lough [001899]	9.5km
Fin And Riskeen Loughs [001907]	9.8km
Lough Arrow [001673]	10.1km
Lough Gara [000587]	10.2km
Meharth Lough [001900]	10.5km
Knockmullin Fen [001904]	11.0km
Tawnaghbeg Bog [000547]	11.0km
Turloughmore (Sligo) [000637]	11.4km
Gowlaun Bog [000502]	12.2km
Moylough Turlough [001677]	12.6km

Designated Site	Distance from Proposed Afforestation Site (km)
Kilgarriff Bog [000510]	12.8km
Derrynabrock Bog [000457]	13.6km
Union Wood [000638]	14.1km



MAP TITLE: **EU designated sites within 15km**		MAP NO.: **Figure 5.1**	SCALE: **1:180,000**
PROJECT TITLE: **Lyrenacarriga - Replant Lands - Ballymote**			DATE: **27-01-2019**
DRAWING BY: **Julie O'Sullivan**	CHECKED BY: **John Hynes**		ISSUE NO.:**170749-2019.01.27-D1**

MKO, Tuam Road, Galway, Ireland, H91VW84. Email: info@mkoireland.ie Tel: +353 (0)91 735611



MAP TITLE: **Nationally designated sites within 15km**		MAP NO.: **Figure 5.2**	SCALE: **1:180,000**
PROJECT TITLE: **Lyrenacarriga - Replant Lands - Ballymote**			DATE: **27-01-2019**
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MKO, Tuam Road, Galway, Ireland, H91VW84. Email: info@mkoireland.ie Tel: +353 (0)91 735611

5.4.3 New Flora Atlas

A search was made in the New Atlas of the British & Irish Flora (Preston et al, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive had been recorded in the relevant 10km square in which the study site is situated (G61), during the 1987-1999 atlas survey. Rare species that have been previously recorded within the hectad are presented in Table 5-2.

Table 5-2 Plant species of conservation interest recorded within hectad G61.

Common Name	Latin name	Conservation Status
Shepherd's-needle	Scandix pecten-veneris	Regionally Extinct (RE)
Slender Tufted-sedge	Carex acuta	Near Threatened (NT)
Frog Orchid	Coeloglossum viride	Near Threatened (NT)
Autumn Gentian	Gentianella amarella	Near Threatened (NT)
Least Bur-reed	Sparganium natans	Near Threatened (NT)

FPO – Flora protection Order.

5.4.4 NPWS Article 17 Datasets and Additional Habitat Databases

A review of the NPWS Habitat Directive - Article 17 datasets, Irish Semi-natural Grassland Survey datasets, National Survey of Native Woodlands, Long Established Woodland and National Uplands Survey datasets was conducted prior to undertaking the multi-disciplinary walkover survey. No mapped Article 17 Annex I habitats occur within or in close proximity to the site.

The wet grassland to the east of the site has previously been surveyed as part of the Sligo Wetland Surveys 2008 to 2011 (site name: Cloonagun Bog) (Wetlands of Ireland, 2020). The survey classified the grassland as of local conservation value (low value) and noted that the site had been reclaimed, reseeded and fertilized and was now reverting to wet grassland.

5.4.5 NPWS Records

NPWS online records were searched on 1st of September 2020 for records of any rare or protected species of flora or fauna within in the 10 kilometre grid square, G61, in which the proposed site lies. A data request was also sent to the NPWS and data received in relation to the grid square on the 15/01/2020. Table 5-3 lists the rare and protected species records obtained from the NPWS during this study.

Species that were also recorded in NBDC records (Table 5-4 to Table 5-6) or in New Flora Atlas records (Table 5-2) are not repeated in Table 5-3.

Table 5-3 Records for rare and protected species, NPWS.

Common Name	Scientific Name	Conservation Status
Reindeer Moss	Cladonia portentosa	Annex V
Irish Hare	Lepus timidus subsp. hibernicus	Annex V, WA, Least concern
Irish Stoat	Mustela erminea subsp. hibernica	WA, Least concern

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017), Red Data List (Curtis and McGough 1988), BoCCI Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets), AEWA -Agreement on the Conservation of African-Eurasian Migratory Waterbirds [1999].

5.4.6 Birds

A number of sources were assessed to determine the likely usage of the site by both breeding and wintering bird species, including Bird Atlases, National Biodiversity Data Centre (NBDC), BirdWatch Ireland and Conservation Objectives Supporting Documents from the National Parks and Wildlife Service (NPWS) for nearby Special Protection Areas (SPAs). The following sub sections provide a breakdown of the sources used and results obtained.

5.4.6.1 Irish Wetland Bird Survey (I-Webs) Data

Whooper swan (*Cygnus cygnus*) census data (2015 National Whooper Swan Census) was obtained from BirdWatch Ireland on the 27th of January 2020, following a formal data request. This was sought to determine if the site, or adjacent habitat, is used regularly by flocks of whooper swans during the winter months, and thus if any additional surveys may be required.

There was only one record of whooper swan from the wider surroundings of the site; a flock of 46 individuals were recorded at 2.7km north-east of the site.

5.4.6.2 Breeding and Wintering Bird Atlases

The *Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland* (Balmer *et al.*, 2013) provides the most up-to-date information regarding the distribution and relative abundance of bird species in Britain and Ireland, based on surveys carried out between 2007 and 2011.

Species listed under Annex I of the EU Birds Directive and red-listed birds of conservation concern that have been recorded within the relevant hectad (G61) are listed in Table 5-4.

Table 5-4 Bird Species of conservation interest recorded within hectad G61.

Common Name	Latin name	Conservation Status
Common Kingfisher	Alcedo atthis	EU Birds Directive Annex I
Greater White-fronted Goose	Anser albifrons	
Hen Harrier	Circus cyaneus	
Merlin	Falco columbarius	
Peregrine Falcon	Falco peregrinus	

Common Name	Latin name	Conservation Status
Whooper Swan	Cygnus cygnus	
Corn Crake	Crex crex	EU Birds Directive Annex I, Red List
Black-headed Gull	Larus ridibundus	Red List
Barn Owl	Tyto alba	
Eurasian Curlew	Numenius arquata	
Herring Gull	Larus argentatus	
Northern Lapwing	Vanellus vanellus	
Northern Shoveler	Anas clypeata	
Yellowhammer	Emberiza citrinella	

5.4.7 National Biodiversity Data Centre Notable Records

A search of the National Biodiversity Data Centre (NBDC) records for the relevant hectad, G61, provided details on a number of faunal species of conservation concern. These are provided in Table 5-5. Species reported in the preceding sections are not included in this Table.

Table 5-5 Species of conservation interest recorded within hectad G61.

Common Name	Latin name	Designation
Common Frog	Rana temporaria	HD, WA
Smooth Newt	Lissotriton vulgaris	WA
Freshwater White-clawed Crayfish	Austropotamobius pallipes	HD, WA
Marsh Fritillary	Euphydryas aurinia	HD
Large White-moss	Leucobryum glaucum	HD
Common Lizard	Zootoca vivipara	WA
Brown Long-eared Bat	Plecotus auritus	HD, WA
Daubenton's Bat	Myotis daubentonii	HD, WA
Natterer's Bat	Myotis nattereri	HD, WA
Whiskered Bat	Myotis mystacinus	HD, WA
Soprano Pipistrelle	Pipistrellus pygmaeus	HD, WA
Eurasian Badger	Meles meles	WA

Common Name	Latin name	Designation
Eurasian Pygmy Shrew	Sorex minutus	WA
Eurasian Red Squirrel	Sciurus vulgaris	WA
European Otter	Lutra lutra	HD, WA
Pine Marten	Martes martes	HD, WA
West European Hedgehog	Erinaceus europaeus	WA

HD = EU Habitats Directive; WA = Wildlife Acts (Ireland).

5.4.8 Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. Records of 'high impact' invasive species for hectad G61 are provided in Table 5-6.

Table 5-6 Invasive species recorded within hectad G61.

Common Name	Latin name
Canada Goose	Branta canadensis
Roach	Rutilus rutilus
Canadian Waterweed	Elodea canadensis
Japanese Knotweed	Fallopia japonica
Rhododendron	Rhododendron ponticum
Three-cornered Garlic	Allium triquetrum
Zebra Mussel	Dreissena (Dreissena) polymorpha
Brown Rat	Rattus norvegicus

5.4.9 Inland Fisheries Ireland

Templehouse Lake which lies approximately 6.7km downstream of the site via the Owenmore River was surveyed in 2008, 2011 and 2014 as part of the water framework directive monitoring programme. It was assigned a draft fish ecological status of 'poor/bad' and a species richness of 7 in 2008 and 2011, with species recorded including; bream, brown trout European eel, gudgeon, perch, pike, roach, roach x bream hybrid, rudd and rudd x bream hybrid. In 2014 it was assigned a draft fish ecological status of 'bad' and a species richness of 4, with species including European eel, perch, pike, roach and roach x bream hybrid.

5.4.10 Water Quality

The proposed afforestation site is located within the Owenmore (Sligo) sub-catchment and within the Ballymote groundwater catchment. This groundwater catchment has been assigned an overall

groundwater quality status of 'good' as part of the Ground Waterbody WFD Status 2013-2018 monitoring and been assessed as 'not at risk'.

The Owenmore River runs along a section of the southern boundary of the site, flowing in a northwesterly direction and discharging to the Templehouse Lake (Sligo), approximately 7.4km downstream of the site.

There is one EPA water quality monitoring station approximately 480m down-stream of the site (station name: 1 km d/s Ballymote Stream; site code RS35O060250). This monitoring station was most recently surveyed in 2018 and had a Q value of 4, indicating that water quality is good. The Owenmore River has also been surveyed approximately 330m upstream of the site, (station name: bridge S/SW of Emlaghfad; sitecode RS35O060200). This site was most recently surveyed in 2018 and received a Q value of 3-4, indicating moderate water quality. The Owenmore River had a River Waterbody WFD Status of good in the monitoring period 2013-2018.

5.4.11 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in hectad G61, within which the Proposed Site is located. The afforestation site is not located within any site designated for nature conservation. The mammal species recorded within the relevant hectad have widespread range and distributions and are likely to be recorded frequently throughout Ireland. A number of rare and protected habitats, flora and fauna have been recorded from the hectad in which the Proposed Site is located. The field surveys will identify if any of the identified habitats, flora or fauna or additional ecological receptors occur within the Proposed Site.

5.5 Flora in the Existing Environment

5.5.1 Habitats Present at the Site

The site was surveyed on the 8th of January by Julie O'Sullivan (BSc., MSc.) and Katie Pender (BSc). A habitat map is provided as Figure 5-3.

The south-western site boundaries are delineated by a watercourse. The Owenmore River, a ***Lowland/Depositing River (FW2)*** runs along the south-west boundary of the site, flowing in a northwesterly direction and discharging to the Templehouse Lake (Sligo), approximately 7.4km downstream of the site. This section of the Owenmore river was meandering, approximately 9m wide and at the time of survey, the river had a slow flow (Plate 5-1 below). The river featured largely homogenous habitat and was predominantly slow flowing, slightly turbid, glide habitat. the channel supported little instream vegetation and macrophyte growth was sparse.

This river had a poorly developed riparian zone and the embankment vegetation had been previously been cleared. The habitats on the bank are classified as agricultural grassland (GA1)/Wet grassland (GS4). Livestock poaching (cattle) was evident at several locations along the riverbank.

A tributary stream of the Owenmore River, the Ballymote (Stream), flows along the north-western boundary (Plate 5-2). The stream is approximately 2-2.5m wide and is characterized by a gravel/cobble substrate with occasional boulders. The stream had a moderate flow in the day of the survey and the water was turbid. The streambank had collapsed in places due to cattle poaching. Emergent vegetation included fools water cress (*Apium nodiflorum*). Species growing on the bank included occasional willows (*Salix* spp.), hawthorn (*Crataegus* spp.), common reed (Phragmites australis) and bramble (*Rubus fructicosus).*

Drawing Title

Habitat Map

Project Title

Lyrenacarriga - Replant Lands - Ballymote

Drawn By	Checked By
JOS	PR
Project No.	Drawing No.
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

This watercourse had been channelised and straightened at its lower reaches where it discharges to the Owenmore River. This section of the watercourse was 1.5m wide with an imperceptible flow, and evidence of poaching. Macrophyte growth was sparse although occasional common reed (*Phragmites australis*), fool's watercress (*Apium nodiflorum*) and common water starwort (*Callitriche stagnalis*) grew occasionally in the margins.

The majority of the site comprises *Improved Agricultural Grassland (GA1)* and *Wet Grassland (GS4)*, grazed by sheep.

Improved agriculture grassland (GA1) mainly occurs on the higher topography located in the centre of the site and was grazed by sheep at the time of the survey (Plate 5-3). This habitat was dominated by perennial ryegrass (*Lolium perenne*) with abundant soft rush (*Juncus effusus*) and frequent meadow grasses (*Poa* spp.) and creeping bent (*Agrostis stolonifera*). Forb species recorded included *daisy* (*Bellis perennis*), creeping buttercup (*Ranunculus repens*), clover (*Trifolium* spp.), broad-leaved dock (*Rumex obtusifolius),* ribwort plantain (*Plantago lanceolata*), common thistle (*Cirsium vulgare*) and common mouse-ear (*Cerastium fontanum).*

The improved agriculture grassland slopes downwards towards the river and becomes wetter underfoot forming a mosaic with Wet Grassland (GS4). This habitat had abundant perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), soft rush (*Juncus effusus*), pointed spear-moss (*Calliergonella cuspidata*), flag iris (*Iris* spp.), marsh thistle (*Cirsium palustre*) and clovers (*Trifolium* spp.). This mosaic habitat surrounds the transitional area between the higher and lower topography in the site.

Wet Grassland (GS4) occurs in the majority of the low-lying fields bordering the site (Plate 5-4). This habitat has greater structural diversity and is dominated by soft rush (*Juncus effusus*) with frequent Yorkshire fog (*Holcus lanatus*). Other components of the vegetation include pointed spear-moss (*Calliergonella cuspidata*), marsh thistle (*Cirsium palustre*), creeping buttercup (*Ranunculus repens*), St. John's wort (*Hypericum perforatum*), common mouse-ear (*Cerastium fontanum),* bog pimpernel *(Anagallis tenella),* flag iris (*Iris* spp.), common sorrel (*Rumex acetosa*), rosebay willowherb (*Chamaenerion angustifolium*), self-heal (*Prunella vulgaris*) and common vetch (*Vicia sativa*).

A more species diverse area of ***Wet Grassland (GS4)*** occurs within the eastern part of the site, close to the site boundary (Plate 5-5). Species recorded in this habitat included abundant soft rush (*Juncus effusus*), sharp-flowered rush (*Juncus acutiflorus*) and creeping bent (*Agrostis stolonifera*) with abundant purple moor-grass (*Molinia caerulea*), frequent devil's-bit scabious (*Succisa pratensis), sphagnum* spp., silverweed (*potentilla anserina*), crested dog's-tail (*Cynosurus cristatus*), clover (*Trifolium* spp.), ribwort plantain (*Plantago lanceolata*), common vetch (*Vicia sativa*), creeping buttercup (*Ranunculus repens*), marsh thistle (*Cirsium palustre*), springy turf-moss (*Rhytidiadelphus squarrosus),* with occasional bramble (*Rubus fructicosus),* wild angelica *(Angelica Sylvestris)* and rhododendron *(Rhododendron ponticum)* also present.

This habitat has formed on a former bog/heath habitat, that had previously been reclaimed, reseeded and fertilised and has now reverted to wet grassland. Remnant peatland vegetation is present in some areas, adjacent to field drains with species including abundant soft rush (*Juncus effusus*), purple moor-grass (*Molinia caerulea*) and sharp-flowered rush (*Juncus acutiflorus*) and frequent heather (*Calluna vulgaris*), deergrass (*Trichophorum germanicum),* heath milkwort (*Polygala serpyllifolia*), cross-leaved heath (*Erica tetralix*), bog-cotton (*Eriophorum angustifolium*), lousewort (*Pedicularis sylvatica*) and gorse (*Ulex europaeus*), the moss layer included *Hylocomium splendens*, *Sphagnum* spp., *Polytrichum* spp., and *Rhytidiadelphus squarrosus.*

Hedgerows (WL1) and ***Treelines (WL2)*** occur along field boundaries within the centre of the site and around the house and farm buildings. Hedgerows are gappy, not well developed, with a low species diversity and are predominantly comprised of hawthorn (*Crataegus monogyna*) with occasional ash (*Fraxinus excelsior)* and willows (*Salix* spp.). Hedgerows growing within the site are generally formed on ***Earth banks (BL2)*** (Plate 5-6).

Treelines occur in the site and include ash (*Fraxinus excelsior)* and mature oaks *(Quercus spp).* Species recorded in the hedgerow understory include daisy *(Bellis perennis),* ivy (Hedera helix), common nettle (*Urtica dioica),* cock's-foot (*Dactylis glomerata*), cleavers *(Galium aparine),* hart's tongue fern (*Asplenium scolopendrium*), primrose *(Primula vulgaris)* and occasional thickets of bramble *(Rubus fruticosus).*

Drainage Ditches (FW4) are extensive throughout the site and occur through the wet grassland and agricultural grassland habitat. The majority of the drainage ditches have a low flow and are heavily vegetated.

A small pond occurs within the east of the site (Plate 1.8). This pond is classified as ***Other artificial lakes and ponds (FL8).*** Emergent vegetation included soft rush (*Juncus effusus*) and floating sweet-grass (*Glyceria fluitans*).

Plates

Plate 5-1 The Owenmore River, a Lowland/Depositing River (FW2), at the south-western boundary of the site.

Plate 5-2 A tributary stream of the Owenmore River, the Ballymote (Stream) flows along the western site boundary.

Plate 5-3 Wet grassland (GS4) and agricultural grassland (GA1) within the eastern section of the site.

Plate 5-4 Wet grassland (GS4) and agricultural grassland (GA1) within the north-eastern section of the site.

Plate 5-5 Wet grassland (GS4) formed on a former bog/heath habitat, that has been reclaimed, reseeded and fertilised and has now reverted to wet grassland. Remnant peatland vegetation occurs within the vegetation.

Plate 5-6 Hedgerows (WL1) within the site are predominantly formed on earthen banks and dominated by Hawthorns.

Plate 5-7 Treeline (WL2) within the centre of the site., adjacent to agricultural grassland (GA1)

5.5.2 Invasive Species

The invasive species rhododendron *(Rhododendron ponticum)* was recorded growing in the wet grassland habitat in the north east corner of the site (Plate 5-8). Several saplings (15 individuals) were recorded in this area (see Figure 5-4).

No other invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were identified within the site boundaries during field survey.

Plate 5-8 Invasive species rhododendron (Rhododendron ponticum), growing in wet grassland/degraded wet heath habitat within the north east corner of the site.

Map Legend

Site Boundary

Invasive Species - Rhododendron ponticum

N

Drawing Title

Invasive Species

Project Title

Lyrenacarriga - Replant Lands - Ballymote

Drawn By	Checked By
JOS	PR
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

5.5.3 Fauna in the Existing Environment

5.5.3.1 Birds

Records of birds seen and heard on the Proposed Site were taken. More detailed and extensive bird surveys were not considered necessary due to the limited ecological value of the habitat which is widespread in the locality.

A total of 19 bird species were recorded within or immediately adjacent to the site during the site visit (Table 5-7). Bird species recorded within the Proposed Site during the site visit were an assemblage of common birds that are typical of the agricultural and wet grassland habitats on the site. A small flock of whooper swan (seven individuals) was recorded in flight over the site. This flock landed on agricultural grassland west of the Owenmore River, outside of the boundary of the Proposed Site .

Thirteen of the bird species observed are green-listed and are common in Ireland. Six of the species observed are amber listed, including whooper swans which is also classified as Annex I under the EU Birds Directive (Council Directive 09/147/EC).

Table 5-7 Bird Species recorded within the site.

Species	Conservation status
Whooper swan (*Cygnus cygnus*)	Annex I, Amber listed
Robin (Erithacus rubecula)	Amber listed (breeding)
Common teal (*Anas crecca*)	Amber listed
Snipe (Gallinago gallinago)	Amber listed
Jack snipe (Lymnocryptes minimus)	Amber listed
Great black-backed gull (*Larus marinus*)	Amber listed
Long tailed tit (Aegithalos caudatus)	Green listed
Song thrush (Turdus philomelos)	Green listed
Mistle thrush (Turdus viscivorus)	Green listed
Buzzard (Buteo buteo)	Green listed
Heron (Ardea cinereal)	Green listed
Magpie (*Pica pica*)	Green listed
Wren (Troglodytes troglodytes)	Green listed
Hooded crow (*Corvus cornix*)	Green listed
Blackbird (Turdus merula)	Green listed
Chaffinch (Fringilla coelebs)	Green listed
Wood pigeon (Columba palumbus)	Green listed

Species	Conservation status
Goldfinch (Carduelis carduelis)	Green listed
Mallard (Anas platyrhynchos)	Green listed

5.5.3.2 Otter

A comprehensive search for otter was undertaken of the drainage ditches within the development site and 150m upstream and downstream of the Owenmore River and the tributary stream which flows in a south-westerly direction along the north-western site boundary, including a 10m riparian buffer (NRA, 2009). No evidence of this species was encountered.

A single otter holt was recorded adjacent to a drainage ditch to the south-east of the site. The location of the otter holt is provided in Figure 5-5. There was no evidence of recent otter activity at the holt, including scat, slides or prints. No other otter holts or evidence of otter activity was recorded within the site.

The watercourses along the site boundary and larger drainage ditches on site provide suitable habitat for this species.

5.5.3.3 Badger

The site was searched for signs of badger (*Meles meles*) during the walk over survey. Two badger setts were recorded within the site; one outlier sett and one main sett (Figure 5-6). The badger setts were recorded in the earthen embankment of two different hedgerows/treelines within the site, one to the northwest of the site (Plate 5-10) and one in the centre of the site.

Both setts had evidence of recent use including spoil heaps and bedding and the presence of runs between the hedgerows, suggesting that the setts were in active use.

The sett located in an embankment in a treeline in the centre of the site had five entrances has been classified as a main sett, as per guidance in Smal 1995; which states that main setts "usually have a large number of entrances (used and disused) with conspicuous soil heaps. The setts look well used, with the paths between entrances and to and from the sett being obvious and well-worn. Main setts are breeding setts and are normally in continuous use".

Map Legend

- Site Boundary
- Otter holt

N

Drawing Title

Otter holt map

Project Title

Lyrenacarriga - Replant Lands - Ballymote

Drawn By	Checked By
JOS	PR
Project No.	Drawing No.
170749	Figure 5.5
Scale	Date
1:5000	01.09.20

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- Site Boundary
- Badger sett

N

Drawing Title

Badger Sett

Project Title

Lyrenacarriga - Replant Lands - Ballymote

Drawn By	Checked By
JOS	PR
Project No.	Drawing No.
170749	Figure 5.6
Scale	Date
1:5000	01.09.20

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Plate 5-10 Main badger sett, spoil heap indicates that it is actively used.

5.5.3.4 Bats

There are several mature oak and ash trees within the Proposed Site that have potential roost features, including cracks and holes in branches and fissures in the bark which may provide suitable roosting habitat for bats. However, the site has a large open landscape structure and the existing treelines and hedgerows are isolated and not well connected with the surrounding landscape. The watercourses on the site lack well developed riparian vegetation with no scrub, hedgerow or treelines along their embankments.

Although linear features may be used by foraging and commuting bats, overall the site is considered to have ***low suitability*** for bat species (Collins, 2016), due to the lack of connectivity with the surrounding landscape. In addition, the replanting is highly unlikely to result in impacts on bat species as all linear features within the site will be retained, and new linear features and foraging habitat will be created with the afforestation of the site.

5.5.3.5 Other Fauna

The desk study indicates that Marsh fritillary (*Euphydryas aurinia*) has previously been recorded in the hectad in which the site is located. Devils bit scabious (*Succisa pratensis*), the food plant of the marsh fritillary, was recorded within the site during the field survey, suitable habitat for this species was identified within the Wet Grassland (GS4) habitat within the eastern part of the site (Figure 5-7). This habitat will be retained and no planting or works will take place within it. The habitat will be marked off at the outset of the works. Further details are provided in Section 5.5.5 below on potential impacts.

No evidence of other species such as Irish hare, pygmy shrew and Irish stoat; protected species under the Irish Wildlife Act 1976-2018, were recorded during the site visit of the Proposed Site. These species are likely to occur in the wider area, at least on occasion. However, these species have widespread and favourable ranges in Ireland and suitable habitats are widespread in the area. No suitable habitat for other taxa protected under the EU Habitats Directive, or other invertebrate species of conservation concern was identified within the boundaries of the Proposed Site.

Map Legend

- Site Boundary
- Marsh Fritillary suitable habitat

N

Drawing Title

Suitable Marsh Fritillary Habitat

Project Title

Lyrenacarriga - Replant Lands - Ballymote

Drawn By	Checked By
JOS	PR
Project No.	Drawing No.
170749	Figure 5.7
Scale	Date
1:5000	01.09.20

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

5.5.4 Importance of Ecological Receptors

Table 5-8. lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors.

Table 5-8 Importance of Ecological Receptors

Habitat/Species and Geographic Importance	KER Y/N	Rationale
› Lowland/Depositing River (FW2)	Yes	The watercourses within and adjacent to the site, have been categorised as ***Local Importance (higher value),*** as they provide cover and commuting corridors for a variety of local flora and fauna, as well as being of local biodiversity importance. Watercourses also provide connectivity with downstream protected sites including Templehouse and Cloonacleigha Loughs SAC, approximately 6.9km downstream. A pathway for impact in the form of deterioration in water quality was identified due to the potential for sedimentation and hydrocarbon pollution.
› Hedgerows (WL1) › Treelines (WL2)	No	These habitats have been categorised as ***Local Importance (higher value),*** as they provide cover and commuting corridors for a variety of local flora and fauna, as well as being of local biodiversity importance. However, all treelines and hedgerows within the site will be retained and these habitats are not considered a key ecological receptor.
› Improved Agricultural Grassland (GA1) › Wet Grassland (GS4) › Drainage Ditch (FW4) › Earth Bank (BL2) › Ponds (FL8) › Buildings and Artificial Surfaces (BL3)	No	These habitats have been categorised as ***Local Importance (Lower value)*** as they are common in the wider landscape, are highly managed/modified and are not of ecological significance.
› Birds	No	The desk study did not indicate the site to be of ecological significance to bird species of conservation concern and no species of conservation concern were recorded using the habitats within the site. Bird species recorded within the site boundaries are common and typical of agricultural and wet grassland habitats and have been assessed as ***Local Importance (Lower value).***

Habitat/Species and Geographic Importance	KER Y/N	Rationale
		A small flock of seven Whooper Swan were recorded in flight over the site and on agricultural grassland adjacent to the site. Suitable habitat for this species occurs within the Proposed Site, in the form of agricultural grassland and wet grassland. However, these habitats, and other suitable whooper swan habitats including peatland and marsh habitats, are widespread in the locality, and the loss of these grassland habitats within the site will not significantly affect the conservation status of this species at any geographic scale. Bird species are not considered a KER.
› Badger	Yes	Active badger setts were recorded within the site. The species is common and widespread across Ireland. Badger, as an ecological receptor in this context, is considered to be of ***Local importance (higher value)*** and is considered a KER.
› Otter	Yes	An otter holt was found within the Proposed Site. Otter is a species listed on Annex IV of the habitats directive and is considered to be of ***Local importance (higher value)***. On a precautionary basis, **otter is considered to be a KER** as there is potential for indirect effects as a result of deterioration in surface water quality due to the potential for sedimentation and hydrocarbon pollution. Potential disturbance/displacement effects are also considered.
› Aquatic species	Yes	The Owenmore River and its tributaries flow along the site boundaries. Aquatic species are known to occur in the wider area (as identified in the desk study), including; freshwater white-clawed crayfish and European eel. A pathway for impact on aquatic species in the form of deterioration in water quality was identified due to the potential for sedimentation and hydrocarbon pollution. For this reason, aquatic species that may occur within the Owenmore River adjacent to and downstream of the Proposed Site, including; freshwater white-clawed crayfish and European eel have been identified as KERs. Impacts on aquatic fauna will

Habitat/Species and Geographic Importance	KER Y/N	Rationale
		be discussed in conjunction with impacts on water quality.
› Marsh Fritillary	Yes	The desk study indicated that the wider area is of importance for marsh fritillary, with the nearest records occurring 1.3km north west of the site. There is suitable habitat for this species within the wet grassland habitat within the eastern section of the Proposed Site. Therefore, this species is considered a KER.

5.5.5 Potential Impacts

5.5.5.1 Do Nothing' Scenario

If the site were to remain unplanted, the management onsite would likely remain as it is presently i.e. regularly grazed by livestock. However, given that the site has received Technical Approval from the Forest Service it will likely be afforested according to the provisions of the approval document.

5.5.5.2 Impacts during the Site Preparation and Planting Phase

5.5.5.2.1 *Loss of Habitat*

Long-Term Not Significant Neutral Impact

The loss of habitat will be restricted to Improved Agricultural Grassland (GA1), Wet Grassland (GS4) mosaic habitat all categorised as Local Importance (Lower value). These habitats are common in the wider landscape, this loss is considered to be not significant.

Hedgerows (WL1) and Treelines (WL2), classified as Local Importance (Higher value), will be retained.

The impacted habitats are not considered to be of ecological sensitivity and their loss will constitute a neutral impact when compared with the coniferous forestry to be planted.

Best Practice

All works will be carried out in accordance with the relevant Forest Service guidelines, including 'Forestry Biodiversity Guidelines' (2000)' and DAFM Environmental Requirements for Afforestation (2016). The Technical Approval document specifies the area that should contain suitable broadleaf and conifer species. This management allows for the retention of the Local Value (Higher Importance) habitats Hedgerows (WL1) and Treelines (WL2).

5.5.5.2.2 *Faunal Species*

Otter – Disturbance/Displacement and Habitat Deterioration

Evidence of otter, limited to a single holt, was recorded along a drainage ditch along the south-eastern boundary of the Proposed Site. No additional otter holts or couches, or evidence of otter including spraints, prints or slides were recorded within or adjacent to the development site.

The potential for the proposed afforestation works to result in disturbance/displacement of the local population of otter was considered. However, the planting phase of the works will be short term in nature, and disturbance and disruption to otter is considered to be a temporary negative effect of slight magnitude.

There is potential for water pollution to occur through discharge to the adjacent and downstream watercourses as a result of the proposed afforestation in the form of release of suspended solids, siltation and erosion. Potential impacts in terms of deterioration of otter habitat were considered.

Mitigation

All works will be carried out in accordance with the relevant Forest Service guidelines, including 'Forestry and Otter Guidelines' (2009)' including the following mitigation measures:

- Apply aquatic buffer zones as required by Forest Service Guidelines (minimum width of 10m). This setback is to remain undisturbed during establishment and throughout the forest rotation. Apply and maintain as per details set out in Tables 5 and 6 of the Environmental Requirements for Afforestation (DAFM, 2016).
- Avoid any mechanised operations within 50m of known holt or couch sites. No drainage/mounding will take place within 50m of the holt and all planting will be by hand. Trees planted within the 10m-20m buffer, will be restricted to additional broadleaved species and will be manually planted only by the slit planting method, therefore making as little impact as possible.
- All hedgerow habitat close to the otter holt will be retained. Tree planting will be restricted to broadleaves species (beech/oak trees) only within a 10m-20m buffer of the holt, in order to minimise future disturbance.
- Fencing will be mammal friendly and allow movement from holt/couch to watercourse and will not prevent movement along the riparian corridor (otters will use watercourses/aquatic zones to circumvent fences).
- Any new paths or infrastructure will be located at least 50m/100m from likely holt sites.
- Timing of works: All afforestation works will be undertaken during daylight hours to avoid disturbance to otter, a largely crepuscular species.

The proposed afforestation will not impact upon watercourses along the boundary of the site which may be used as commuting and foraging habitat by otter. The works will be set back a minimum distance of 10m from all watercourses, in accordance with the Forest Service (2000) guidance document "Forestry and Water Quality Guidelines".

All forestry activities will be undertaken in accordance with industry guidance and best practice including the DAFM Environmental Requirements for Afforestation guidelines (December, 2016). Best practice measures for the protection of water quality, fully described in section 5.5.2.2.3 below, will be incorporated into the proposed afforestation to prevent any deterioration in water quality.

Residual effects

No significant effects are anticipated.

Badger - Disturbance

Evidence of badger was recorded within the site. Two badger setts were recorded within the site; one outlier sett and one main sett. Both setts had evidence of recent use.

Mitigation/best-practice

Best practice methods related to forestry and badger setts incorporated into the forestry management and mitigation measures have been derived from:

- Forestry Commission (1995) Forest Operations and Badger Setts, Forestry Practice Guide 9, Publ. Forestry Commission, Edinburgh;
- NRA (2006) Guidelines for the treatment of badgers prior to the construction of national road schemes. National Roads Authority.
- The proposal afforestation has been designed to avoid destruction of the badger sett and disturbance to badgers. The following provisions will be applied to all afforestation works near the badger sett:
- All affected badger setts will be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing and signage. All contractors/operators on site should be made fully aware of the procedures pertaining to each sett on site.
- Badger sett tunnel systems can extend up to c. 20m from sett entrances. As per NRA guidelines, no heavy machinery will be used within 30m of badger setts, lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances.
- As per forestry and environment guidelines, a setback distance of 5 metres will be implemented in relation to all mature treelines and hedgerows, to ensure their continued presence as the surrounding canopy develops. All treeline/hedgerow and scrub habitat surrounding the badger setts will be retained. Tree planting will be restricted to broadleaves species (beech/oak trees) only within a 10m-20m buffer of the sett, in order to minimise future disturbance.
- No mounding will take place within 20m of a badger sett. Trees planted within the 10m-20m buffer, will be restricted to additional broadleaved species and will be manually planted only by the slit planting method, therefore making as little impact as possible.
- Drainage, ploughing or scarifying machinery will not take place within 20 metres of any entrance to a sett. Care will be taken when aligning drains which are uphill of a sett so that water is not diverted into the sett and its immediate vicinity.
- Where there is a need for fencing to protect the tree crop, mammal friendly fencing will be erected with a 20 to 30 centimetre gap between the base of the fence and the ground continuously along the fencing. Thus, commuting corridors will be maintained.
- Timing of works: During the breeding season (December to June inclusive), no afforestation works will be undertaken within 50m of active setts. All afforestation works will avoid the most sensitive time (generally between January and February).
- All afforestation works will be undertaken during daylight hours to avoid disturbance to badger, largely a nocturnal species.

Residual Effect

No significant effects are anticipated.

Marsh Fritillary – Habitat loss

The desk study indicates that Marsh fritillary (*Euphydryas aurinia*) has previously been recorded in the hectad in which the site is located. Devils bit scabious (*Succisa pratensis*), the food plant of the marsh fritillary, was recorded within the site during the field survey and suitable habitat for this species was identified within the Wet Grassland (GS4) habitat within the eastern part of the site (Figure 5-7).

Mitigation/best-practice

This habitat will be retained and no planting or works will take place within it. The habitat will be marked off at the outset of the works. Note the remaining Technically Approved area available for planting at the site is sufficient to accommodate the 45.6 hectares permanent felling area proposed on the Lyrenacarriga wind farm site.

Residual Effect

No significant effects are anticipated.

Other fauna

The planting phase of the proposed afforestation has the potential for some localised disturbance to faunal species. However, the planting phase of the works will be short term in nature, and disturbance and disruption to other faunal species is considered to be a temporary negative effect of slight magnitude.

No other faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit. The proposed planting site is not of high value or importance as a faunal habitat, being dominated by an open expanse of Wet Grassland and Agricultural Grassland with little to no cover or shelter for faunal species. It is likely that the proposed planting of forestry will result in some loss of faunal habitat for species such as Fox (*Vulpes vulpes*) and other small mammals. This habitat is widespread in the local area and this loss is considered to be negligible.

The Proposed Site does not provide significant foraging or roosting habitat for protected bird species given the highly managed/modified nature of habitats on site, dominated by improved agricultural grassland and wet grassland. There will be no loss of hedgerow or trees as part of the proposal, therefore no impacts on bird nesting habitat. The afforestation, in particular that of broadleaf species will result in the creation of cover and nesting habitat for a range of bird species, resulting in an overall Long-Term Neutral Impact. Given the lack of significant bird assemblages recorded within or adjacent to the site, significant impacts as a result of disturbance or displacement are not anticipated on bird species at any geographic scale.

Best Practice

The afforestation, in particular that of broadleaf species will result in the recreation of cover and shelter for a range of species including songbirds and fox, resulting in an overall Long-Term Neutral Impact.

5.5.5.2.3 *Water Pollution and Aquatic Fauna*

The Owenmore River and its tributaries flow along the boundary of the site, flowing in a northwesterly direction. These watercourses are classified as Depositing/Lowland Rivers (FW2). Drainage ditches on the Proposed Site discharge into these watercourses.

Shallow forestry drains will be constructed using an excavator throughout the site. Potential impacts during drain construction occur mainly from:

- Exposure of soil and subsoils due to excavation, vehicle tracking, and skidding resulting in a source of suspended sediment which can become entrained in surface water runoff and enter drains; and
- Nutrient release.

There is potential for water pollution and subsequent impacts on aquatic faunal habitat to occur through discharge to the adjacent and downstream watercourses as a result of the proposed afforestation in the form of release of suspended solids, siltation and erosion. Deterioration of water quality is considered to be a significant effect, in the absence of mitigation.

Best Practice

Best practice methods related to water incorporated into the forestry management and mitigation measures have been derived from:

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures; and,
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.
- Forest Service (2016) Environmental Requirements for Afforestation. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.
- Forest Service (2016) Land Types for Afforestation. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which will be applied at the replanting site. These include:

- Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast.
- A limited area of soils will be stripped at any one time to avoid exposing large areas of the Proposed Site, thereby limiting rainfall infiltration and preventing run off onto exposed soil surfaces.
- Machine combinations will be chosen which are most suitable for ground conditions at the time of excavation and felling, and which will minimise surrounding soils disturbance;
- Where possible, existing drains will not be disturbed during drainage works;
- Drains and sediment traps will be installed during ground preparation and felling. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and should avoid being placed at right angles to the contour;
- Drains and silt traps will be maintained throughout all planting works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled.

Buffer Zones

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "Forestry and Water Quality Guidelines" are shown in Table 5-9. Buffer zones will be implemented along aquatic zones and drainage ditches.

Table 5-9 Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

Residual Impact

No impacts on water quality are anticipated as a result of any element of the proposed afforestation. No significant effects are anticipated.

5.5.5.3 Impacts During Operational Phase (i.e. Harvesting/Replanting)

Afforestation and subsequent harvesting will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte produced guidance documents, including the specific guidelines listed below, to ensure that newly planted trees remain viable and afforestation results in minimal potential impacts to the receiving environment.

- 'Land Types for Afforestation' [2016]
- 'Environmental Requirements for Afforestation' [2016]
- 'Forest Operations & Water Protection Guidelines' (2009)
- 'Methodology for Clear Felling Harvesting Operations' (2009)
- 'Forestry and Water Quality Guidelines' (2000)
- 'Forestry and the Landscape Guidelines' (2000)
- 'Forestry Biodiversity Guidelines' (2000)
- 'Forestry Protection Guidelines' (2002)
- 'Forestry Harvesting and Environmental Guidelines' (2000)

Following afforestation, subsequent forestry related activities will be subject to a separate consent process (i.e. from the Forest Service). All such activities will be undertaken in accordance with the above guidance documents.

No potential for significant effect has been identified.

5.5.5.4 Designated Sites

5.5.5.4.1 *Impacts on EU Designated Sites*

The replanting site has been subject to the DAFM Appropriate Assessment process as part of the technical approval process and the replanting site has been granted Technical Approval for afforestation.

5.5.5.4.2 *Impacts on Nationally Designated Sites*

The site has connectivity with the Templehouse and Cloonacleigha Loughs pNHA (approximately 7.3km downstream) via the Owenmore River, a tributary of this river and drainage ditches throughout the Proposed Site.

The potential for the proposed afforestation to result in indirect effects on this designated site as a result of deterioration in water quality due to release of suspended solids, siltation and erosion was considered.

All forestry activities will be undertaken in accordance with industry guidance and best practice. Best practice measures fully described in section 5.5.2.2.3, will be incorporated into the proposed afforestation to prevent any deterioration in water quality. No potential for significant effect was identified based on the nature and scale of the works and distance from the designated site.

5.5.5.5 Cumulative Impacts

The potential for the proposed planting to contribute to a cumulative impact on European Sites was considered. The online planning system for Sligo County Council was consulted on the 02/09/2020. Additional projects identified in the townlands of Coolnagun, Emlaghgissan and Ardree, Co. Sligo from the last 5 years include permission for the following;

- Permission for the demolition of existing single storey dwelling and associated outbuildings, decommissioning of existing wastewater system and the construction of a new dwelling, effluent treatment system with percolation area and all associated site works (planning reference: 17227).
- Permission for development consisting of change to the two windows on the front of the house at either side to match the window currently in the centre of the house (no other work to be out to house or site) (planning reference: 14298).

The Sligo County Development Plan 2017-2023 (as varied) was also reviewed and considered as part of this assessment.

The proposed afforestation has Technical Approval from the Forest Service and will be undertaken accordingly. This approval is conditional to all associated works being undertaken in accordance with Forest Service guidelines. The impacts associated with this afforestation have been classified overall as a neutral impact. As such, when considered in combination with the other land uses in the area, and considering that the forestry guidelines are designed to minimise and prevent impacts to habitats that are outside the Proposed Site, cumulative impacts on sensitive ecological receptors are not anticipated.

6. LAND, SOILS AND GEOLOGY

6.1 Introduction

This section of the report provides baseline information on the environmental setting of the approved afforestation lands in terms of soils and geology and discusses the potential impacts and associated effect that the activity may have on them. Where required, appropriate mitigation measures to limit any identified significant impacts to land, soils and geology are recommended.

6.1.1 Desk Study

This desk study involved collecting all relevant geological data for each site and its surrounding area. This included consultation of the following resources:

- Environmental Protection Agency database (www.epa.ie)
- Geological Survey of Ireland (GSI) - National Draft Bedrock Aquifer Map
- Geological Survey of Ireland - Groundwater Database (www.gsi.ie)
- Bedrock Geology 1:100,000 Scale Map Series. (GSI, 2003)
- Geological Survey of Ireland – 1:25,000 Field Mapping Sheets
- General Soil Map of Ireland, 2nd edition (www.epa.ie)

6.1.2 Impact Assessment Methodology

Using information from the desk study, an estimation of the importance of the soil and geological environment within each of the study areas is assessed using the criteria set out in the *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes* (NRA, 2005) and presented below in Table 6-1.

Table 6-1 Estimation of Importance of Soil and Geology Criteria (NRA, 2005)

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying site is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or highly fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed wastes.

Importance	Criteria	Typical Example
	Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying site is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

The statutory guidelines (EPA, 2017, 2003 and 2002) for the assessment of impacts require that likely impacts are described with respect to their extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable). The descriptors used in the EIAR are those set out by the EPA (EPA, 2017) Glossary of Impacts as shown in Chapter 1 of the EIAR which accompanies the application. In addition, the two impact characteristics, proximity and probability, are described for each impact, and these are defined in Table 6-2.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of impacts are related to examples of potential impacts on the hydrology and morphology of the existing environment, as listed in Table 6-3.

Table 6-2 Additional Impact Characteristics

Impact Characteristic	Degree / Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Low	A low likelihood of occurrence of the impact.
	Medium	A medium likelihood of occurrence of the impact.
	High	A high likelihood of occurrence of the impact.

Table 6-3 Impact Descriptors Related to the Receiving Environment

Impact Characteristics		Potential Hydrological Impacts
Quality	Significance	
Negative Only	Profound	Widespread permanent impact on: - The extent or morphology of a cSAC. - Regionally important aquifers. - Extents of floodplains. Mitigation measures are unlikely to remove such impacts.
Positive or Negative	Significant	Local or widespread time-dependent impacts on: -The extent or morphology of a cSAC / ecologically important area. -A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). -Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area. Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.
Positive or Negative	Moderate	Local time-dependent impacts on: - The extent or morphology of a cSAC / NHA / ecologically important area. - A minor hydrogeological feature. - Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends.
Positive, Negative or Neutral	Slight	Local perceptible time-dependent impacts not requiring mitigation.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

6.2 Proposed Replanting Lands

6.2.1 Geology and Subsoils

Information on the main geological formations and subsoils underlying the replanting area is shown in Table 6-4.

Table 6-4 Geology and Subsoil Information – Cloonagun, Co. Sligo

Geological Formation	Subsoil Type
Leitrim Group which consists of shale and micritic limestones. Upper Bricklieve Limestone Formation which consists of bioclastic cherty limestone.	Shale and Sandstone Till, Cutover raised Peat.

The site and surrounding area at Cloonagun is underlain by shale and sandstone and peat over the Leitrim Group and the Upper Bricklieve Limestone Formation.

6.2.1.1 Geological Resource Importance

The GSI online Aggregate Potential Mapping Database shows that areas of the Proposed Site which are underlain by the Bricklieve Limestone Formation are mapped as having a Moderate Potential in terms of crushed rock aggregate potential. Areas of the Proposed Site underlain by the Leitrim Group are mapped as being typically Very Low to Low in terms of crushed rock aggregate potential. The GIS database shows the Proposed Site does not have granular aggregate potential (i.e. potential for gravel reserves).

The bedrock at the site could be classified as "Medium" importance and has the potential to be used on a "sub-economic" local scale for construction purposes. The bedrock has not been used in the past at the Proposed Site for this purpose, and it is not proposed to do so.

The peat deposits at the site could be classified as "low" importance. While peat has not been cut at th Proposed Site, it is not designated in this area, is of a small volume, is used for agricultural purposes and is poorly drained. Refer to Table 6-1 for criteria.

6.2.1.2 Geological Heritage and Designated Sites

There are no recorded Geological Heritage sites, mineral deposit sites or mining sites (current or historic) within the Proposed Site.

6.2.1.3 Potential Impacts

6.2.1.3.1 *'Do-Nothing' Scenario*

The lands have been Technically Approved and will be afforested should the Lyrenacarriga Wind Farm proceed or not.

6.2.1.3.2 *Likely and Significant Impacts and Associated Mitigation Measures*

The likely impacts of the proposed planting and mitigation measures that will be put in place to eliminate or reduce them are described below.

Construction of Drains and Planting of Trees

There will be some minor disturbance of soils, associated with the construction of drains through the Proposed Site. Planting of trees will be carried out by hand using the slit planting method, so soil disturbance from this will not be significant. There are no likely impacts of this afforestation on the underlying geology.

Construction of Site Roads and Tracks

Forestry felling can occur within 0.8 -1.0 km of access points (roads and tracks) to the main forest body. Due to the small size of this Proposed Site, additional access tracks or roads will not be required. The Proposed Site is located adjacent to an existing road network with existing entrances which will not require alteration.

6.2.1.3.3 *Mitigation Measures*

Planting of trees will be carried out by hand. Any drains will be generally shallow and will be constructed in accordance with the forestry service best practice guidelines described in detail in Section 2. Soils will remain in-situ at the site and will not be removed off-site.

6.2.1.3.4 *Residual Impact*

There will be imperceptible impacts on soils and geology associated with the proposed afforestation.

6.2.1.3.5 *Significance of the Effects*

Based on the above, there will be no significant effects on soils and geology at this site.

7. WATER

7.1 Introduction

7.1.1 Background and Objectives

MKO was engaged to undertake an assessment of the potential impacts and associated effect of forestry planting at the replanting site on water aspects (hydrology and hydrogeology) of the receiving environment. The objective of the assessment is to:

- Produce a baseline study of the existing water environment (surface and groundwater) in the area of the site location;
- Identify likely positive and negative impacts of the proposed planting on surface and groundwater during all phases of the development; and,
- Identify mitigation measures to avoid, remediate or reduce significant negative impacts.

This section of the report provides baseline information on the environmental setting of the approved afforestation sites in terms of hydrology and hydrogeology and discusses the potential impacts that the activity may have on them. Where required, appropriate mitigation measures to limit any identified significant impacts to site hydrology and hydrogeology are recommended.

7.1.2 Methodology

7.1.2.1 Desk Study

A desk study of the Proposed Site and the surrounding areas involved collecting all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included consultation with the following resources:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland – Spatial Resources Map (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive "WaterMaps" Map Viewer (www.wfdireland.ie);
- OPW Flood Maps (www.floodinfo.ie); and
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

7.1.2.2 Impact Assessment Methodology

Please refer to Section 1 of the EIAR which accompanied the application for details on the impact assessment methodology (EPA, 2002, 2003 & 2017). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study. Levels of sensitivity which are defined in Table 7-1 are then used to assess the potential effect that the proposed planting may have on them.

Table 7-1 Receptor Sensitivity Criteria (adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not Sensitive	Receptor is of low environmental importance (e.g. surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted). Heavily engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability "Low" – "Medium" classification and "Poor" aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability "High" classification and "Locally" important aquifer.
Very Sensitive	Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer.

7.2 Proposed Drainage

The proposed replanting lands will be drained in accordance with the Forestry Guidelines, as described in Sections 2.3.1 and 3.1.3 of this document. Forestry plantations are generally drained by a network of mound drains which typically run perpendicular to the topographic contours of the Proposed Site and feed into collector drains, which discharge to interceptor drains down-gradient of the plantation.

Mound drains are generally spaced approximately every 15m. Interceptor drains are generally located up-gradient (cut-off drains) and down-gradient of forestry plantations. A schematic of a typical standard forestry drainage network and one which is representative of the Proposed Site drainage network is shown in Figure 2-2 (in Section 2) of this report.

7.3 Baseline Environment and Local Hydrology

Ground level elevations range between approximately 60m and 70m AOD (meters above Ordnance Datum).

There are no streams or rivers within the Proposed Site boundary, however the Ballymote Stream flows in westerly/south westerly direction along the northern and western boundary of the site, whilst the Owenmore River flows in a westerly/north westerly direction along the southern and western boundary of the site.

There are numerous manmade drains within the site and surrounds that are in place predominately to drain the surrounding lands for agricultural purposes.

7.3.1 Water Balance

While the process of afforestation may result in a slight alteration in the water runoff of the site, the small size of the site (0.5 km^2) when compared with the Sligo Bay & Drowse Catchment (1,599 km^2) means that any potential impacts this may have would be insignificant. The afforestation will lead to an imperceptible reduction in the runoff volumes in the longer term as the trees mature.

7.3.1.1 Regional Hydrology

Under the Water Framework Directive (WFD), the Proposed Site is located within the Sligo Bay & Drowse Catchment (Catchment ID35) and Owenmore [Sligo]_SC_010 sub catchment (Sub catchment ID 35_7). The Sligo Bay & Drowse Catchment comprises 13 sub catchments with 70 river water bodies, 18 lakes, 6 transitional water bodies, 6 coastal water bodies and 25 groundwater bodies.

7.3.1.2 Flood Risk Identification

OPW's river and coastal flood maps (www.floodinfo.ie) and the Department of Housing, Planning and Local Government on-line planning mapping (www.myplan.ie) were consulted to identify those areas as being at risk of flooding.

Where complete, the Catchment Flood Risk Assessment and Management (CFRAM) OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. The mapping for the area shows that sections of the site are considered to be at risk from fluvial flood events (10%, 1% and 0.1% AEP Fluvial Flood Extent).

The OPW Flood Maps have no records of flood points or recurring flood points in the vicinity of the site. The closest recurring flood point is at Big Bridge (Owenmore River) which is located approximately 400 metres southwest of the site.

The mapping indicates that the site is not at risk from pluvial flood events.

7.3.1.3 Surface Water Hydrochemistry

Slightly acidic pH values of surface waters would be typical of peatland environments due to the decomposition of peat. In addition, the sandstone and shale bedrock (and related till subsoils) which underlie the area would have slightly acidic groundwater characteristics which would have some effect on surface water chemistry specifically during dry periods when baseflow is likely to be more prevalent.

7.3.1.4 Hydrogeology

According to the GSI www.gsi.ie, the site is underlain by the Upper Bricklieve Limestone Formation which consist of cherty limestone and the Leitrim Group (refer to Section 6 – Soils & Geology). The GSI has classified the Upper Bricklieve Limestone Formation as a Regionally Important Aquifer (Rkc) - Karstified (conduit). The GSI has classified the Leitrim Group as a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones.

7.3.1.5 Groundwater Vulnerability

The GSI and EPA has assigned a groundwater vulnerability rating of 'Low' to the majority of the site which is likely to be as a result of the presence of low permeability till and peat underlying the site.

7.3.1.6 Surface Water Body Status

The EU Water Framework Directive aims to protect, enhance and restore all waters with aim to achieve at least good status by 2027.

The Water Framework Directive Status Report 2013 - 2018, published by the EPA has classified the Owenmore River and Ballymote Stream as having a 'Good' status. The risk status of both waterbodies is currently under review by the EPA.

7.3.1.7 Groundwater Body Status

The EPA has classified the groundwater within the aquifer underlying the site as being of 'Good' status. The groundwater risk is currently under 'Review' by the EPA.

7.3.1.8 Designated Sites and Habitats

Designated sites include National Heritage Areas (NHAs), Proposed National Heritage Areas (pNHAs) Special Areas of Conservation (SACs), candidate Special Areas of Conservation (cSAC) and Special Protection Areas (SPAs). The proposed forestry development site is not located within any designated conservation site. Designated sites in proximity to the Proposed Site are described Section 5, Biodiversity.

7.3.1.9 Water Resources

There are three borehole wells located within 5km of the replanting lands (GSI Name 1431SEW001, 1431SEW002 and 1431SEW004), according to www.gsi.ie. All three wells were constructed in 1899 and used for agricultural and domestic uses.

7.3.1.10 Receptor Sensitivity

Due to the nature of afforestation, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be from nutrients associated with fertilisers.

Based on criteria set out in Table 7-1 groundwater at the Proposed Site can be classed as 'Very Sensitive' to pollution given the bedrock is classified as a regionally important Aquifer. However, the site is covered in blanket peat and till which acts as a protective cover to the underlying aquifer. Any contaminants which may be accidently released on-site are more likely to travel to nearby streams within surface runoff.

Surface waters such as the Owenmore River and Ballymote Stream are sensitive to potential contamination. Surface water mitigation and controls are outlined in Section 7.3.4 below to ensure the protection of all downstream receiving waters. Mitigation measures will ensure that surface runoff from the afforested areas of the Proposed Site will be of a high quality and will therefore not impact on the quality of downstream surface water bodies.

7.3.2 Proposed Site Drainage

The site will be drained in accordance with the Forestry Guidelines. Forestry plantations are generally drained by a network of mound drains which typically run perpendicular to the topographic contours of the site and feed into collector drains, which discharge to interceptor drains down-gradient of the plantation.

Mound drains are generally spaced approximately every 15m. As illustrated in Figure 2-2, Interceptor drains are generally located up-gradient (cut-off drains) and down-gradient of forestry plantations. A schematic of a typical standard forestry drainage network and one which is representative of the proposed site drainage network is shown above as Figure 2-2.

7.3.3 Proposed Drainage Management

Runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods will be employed to manage drainage water within the Proposed Site. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features. The second method involves collecting any drainage waters from planted areas within the site that might carry silt or sediment, and nutrients, using cut off drains to control direct discharge into streams. Drainage water from planted areas will be filtered through the use of e.g. silt screens, check dams, and straw bales, prior to reaching the outflow point.

7.3.4 Potential Impacts

The potential impacts of the proposed afforestation and mitigation measures that will be put in place to eliminate or reduce them are set out below.

7.3.4.1 'Do-Nothing' Scenario

The lands have been Technically Approved for planting and will be afforested should the Lyrenacarriga Wind Farm proceed or not.

7.3.4.2 Excavation of Forestry Drains and Planting

Pathways: Drainage and surface water discharge routes.

Receptors: Surface waters and associated dependent ecosystems.

Potential Impacts: Indirect, negative, slight, short term, medium probability impact.

Shallow forestry drains will be constructed using an excavator throughout the site to a similar drainage pattern as Figure 2-2. There are no surface watercourses on the site and so the drains will ultimately discharge to the existing offsite field drain networks.

Potential impacts during drain construction occur mainly from:

- Exposure of soil and subsoils due to excavation, vehicle tracking, and skidding resulting in a source of suspended sediment which can become entrained in surface water runoff and enter drains; and
- Nutrient release.

7.3.4.3 Harvesting Operations

Pathways: Drainage and surface water discharge routes.

Receptors: Surface waters and associated dependant ecosystems.

Potential Impacts: Indirect, negative, moderate, short term, medium probability impact.

Potential impacts during tree felling occur mainly from:

- Exposure of soil and subsoils due to vehicle tracking, and skidding or forwarding extraction methods resulting in a source of suspended sediment which can become entrained in surface water runoff;
- Release of sediment attached to timber in stacking areas; and,
- Nutrient release.

7.3.4.4 Site Access

Forestry felling can occur within 0.8-1km of access points (roads & tracks) to the main forest body. Due to the small size of this site, additional access tracks or roads will not be required. This site is located adjacent an existing road network with existing entrances which will not require upgrading or alteration.

7.3.4.4.1 *Proposed Mitigation Measures*

Best practice methods related to water incorporated into the forestry management and mitigation measures have been derived from:

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures;
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- Forest Service (2016) Environmental Requirements for Afforestation. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford; and
- Forest Service (2016) Land Types for Afforestation. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford.

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which will be applied at the replanting site. These include:

- Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast.
- A limited area of soils will be stripped at any one time to avoid exposing large areas of the Proposed Site, thereby limiting rainfall infiltration and preventing run off onto exposed soil surfaces.
- Machine combinations will be chosen which are most suitable for ground conditions at the time of excavation and felling, and which will minimise surrounding soils disturbance;
- Where possible, existing drains will not be disturbed during drainage works;
- Drains and sediment traps will be installed during ground preparation and felling. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and should avoid being placed at right angles to the contour;
- Drains and silt traps will be maintained throughout all planting works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled.

7.3.4.4.2 *Buffer Zones*

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document *Forestry and Water Quality Guidelines* are shown in Table 7-2.

Table 7-2 Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

7.3.4.4.3 *Residual Impact*

Indirect, imperceptible, short term, low probability impact.

7.3.4.5 Potential Release of Hydrocarbons during drainage works

Pathway: Groundwater flow paths and site drainage network.

Receptor: Groundwater and surface water.

Potential Impact: Indirect, negative, slight, temporary, medium probability impact to surface water quality.

Indirect, negative, slight, temporary, medium probability impact to local groundwater quality.

The replanting will be carried out by hand but it may be necessary to employ one excavator to create shallow drainage channels prior to planting. There is the potential for minor leaks from the excavator.

7.3.4.5.1 *Proposed Mitigation Measures:*

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- Maintenance will not be carried out on site.
- Fuels will not be stored on site.
- The plant used will be regularly inspected for leaks and fitness for purpose.

7.3.4.5.2 *Residual Impact*

Indirect, negative, imperceptible, short term, low probability impact.

7.3.4.6 Potential Hydrological Impacts on Designated Sites

The proposed afforestation site is located within the Sligo Bay & Drowse Catchment. There will however be no direct discharges from the site and the hydrological regime locally will not be altered by the afforestation due to its small scale.

Pathway: Surface water flow paths.

Receptor: Down-gradient water quality & designated sites.

Potential Impact: Indirect, negative, imperceptible, short term, low probability impact.

7.3.4.6.1 *Impact Assessment & Proposed Mitigation Measures*

The proposed mitigation measures which will include buffer zones and drainage control measures (i.e. cut off drains, tapered drains before buffer zones) will ensure that the quality of runoff from proposed planting areas will be very high. The Proposed Site is located in the Sligo Bay & Drowse Catchment. There could potentially be an "imperceptible, short term, low probability impact" on local streams and rivers but this would be very localised and over a very short time period (i.e. hours).

Potential impacts on designated sites are also addressed in Section 5 of this document.

7.3.4.6.2 *Residual Impact*

No residual impacts.

7.3.4.7 Significance of the Effects

Based on the above, there will be no significant effects on hydrology and hydrogeology at this site.

8. LANDSCAPE AND VISUAL

8.1 Introduction

This section of the report addresses the landscape and visual impacts of the proposed replanting areas. It includes a description of Sligo County Council landscape policy and describes the site's landscape values and sensitivity. The landscape is described in terms of its character, which includes a description of landform and landcover. An impact assessment of the proposed replanting is then undertaken. Documents consulted include:

- 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities' (Department of the Environment and Local Government 2000).
- 'Guidelines for Landscape and Visual Impact Assessment' (The Landscape Institute/Institute of Environmental Management & Assessment, 2013).
- 'Forestry and the Landscape Guidelines' (Forest Service, 2000).

8.1.1 Baseline Landscape Assessment Methodology

In order to carry out this assessment, a desk study was undertaken which identified relevant policies and guidelines, both at national and local level. This includes policies on forestry, landscape and landscape character, designated landscapes, and scenic routes. Maps and aerial images of the proposed replanting site were also studied.

8.2 Landscape Policy Context

8.2.1 Sligo County Development Plan 2017 – 2023

8.2.1.1 Forestry Policy

Section 4.3.2 of the Sligo County Development Plan (CDP) outlines policies relating to forestry which are summarised below:

> ***P-FOR-1*** *Support sustainable forestry development in County Sligo, subject to the protection of scenic landscapes and views, water quality, heritage features, residential amenity and public safety.*
>
> ***P-FOR-2*** *Discourage new forestry development, except for broadleaf, in proposed/candidate and adopted NHAs, SACs and SPAs, in designated Sensitive Rural Landscapes and Visually Vulnerable Areas, along designated Scenic Routes and in water quality-sensitive areas. (Broadleaf forestry will be open to consideration in these areas and in all proposed and adopted NHAs, SPAs and SACs, will be subject to consultation with the DECLG and shall have regard to any management plans prepared by the Department.)*
>
> ***P-FOR-3*** *Require identification of existing rights-of-way and established walking routes before planting commences. Forestry should not obstruct existing rights-of-way, traditional walking routes, recreational and tourism facilities.*

8.2.1.2 Landscape Character Assessment of County Sligo

Sligo County Council commissioned a study that resulted in the Landscape Characterisation Map (LC Map). The LC Map classifies the county according to its visual sensitivity and capacity to absorb new development without compromising the scenic character of certain areas. It designates the following:

> ***Normal Rural Landscapes:*** *areas with natural features (e.g. topography, vegetation) which generally have the capacity to absorb a wide range of new development forms – these are largely farming areas and cover most of the County. At the same time, certain areas located within normal rural landscapes may have superior visual qualities, due to their specific topography, vegetation pattern, the presence of traditional farming or residential structures. These areas may have limited capacity for development or may be able to absorb new development only if it is designed to integrate seamlessly with the existing environment.*
>
> ***Sensitive Rural Landscapes:*** *areas that tend to be open in character, highly visible, with intrinsic scenic qualities and a low capacity to absorb new development – e.g. Knocknarea, the Dartry Mountains, the Ox Mountains, Aughris Head, Mullaghmore Head etc.*
>
> ***Visually Vulnerable Areas:*** *distinctive and conspicuous natural features of significant beauty or interest, which have extremely low capacity to absorb new development – examples are the Ben Bulben plateau, mountain and hill ridges, the areas adjoining Sligo's coastline, most lakeshores etc.*
>
> ***Scenic Routes:*** *public roads passing through or close to Sensitive Rural Landscapes, or in the vicinity of Visually Vulnerable Areas, and affording unique scenic views of distinctive natural features or vast open landscapes. In addition to remote views, scenic routes have often a distinctive visual character conferred by old road boundaries, such as stone walls, established hedgerows, lines of mature trees, adjoining cottages or farmyards together with their traditional, planted enclosures etc., all of which warrant protection.*

The proposed replanting site is within a 'Sensitive Rural Landscape' area.

8.2.1.3 Scenic Routes

Appendix E of the Sligo CDP sets out the counties approach to scenic routes and lists the scenic routes in hierarchical order of national primary roads, national secondary roads, regional roads and local roads. Furthermore, the following policy item relates to scenic routes:

P-LCAP-3 Preserve the scenic views listed in Appendix E and the distinctive visual character of designated Scenic Routes by controlling development along such Routes and other roads, while facilitating developments that may be tied to a specific location or to the demonstrated needs of applicants to reside in a particular area. In all cases, strict location, siting and design criteria shall apply, as set out in Section 13.4 Residential development in rural areas (development management standards).

The proposed replanting site is not located along or adjacent to a scenic route.

8.2.2 Forestry and the Landscape Guidelines

The Forest Service have produced the *'Forestry and the Landscape Guidelines'* (Forest Service, 2000) which provide recommendations on forest planning and design which aim to ensure that the proposed forest is sympathetic to the landscape character of the location. The Guidelines identify scenarios for four main types of landscape character:

- Rolling Moorland
- Rolling Fertile Farmland

- Drumlins
- Mountain and Farmland complex

The replanting site is best described as a 'Rolling Moorland' landscape type. This Guidelines describe this landscape type as follows:

> *"Many mountain slopes in Ireland are sweeping and extend as open, expansive and undulating moorland. Many existing forests in such areas have tended to be angular in nature, because of their straight boundaries. Due to poor site conditions and exposure, they have inclined to be of limited species and age diversity, resulting in a severe visual impact on the landscape."*

For this landscape character type, the Guidelines recommend certain approaches to the planning and design of the plantation. Forest planning considerations include size, arrangement, location, and for this landscape type, the Guidelines indicate that developing large forests, keeping the arrangement continuous and locating the forest on lower ground is recommended. Forest design considerations include shape, pattern, proportion, edge, margin, colour and texture.

The replanting site has been granted Technical Approval for afforestation. The Technical Approval document includes as a condition that all Forest Service guidelines will apply to afforestation at this location. In addition, the document specifies the approved species to be planted on the site.

8.3 Baseline Landscape

8.3.1 Landscape Character

The topography, vegetation and anthropological features on the land surface in an area combine to set limits on the amount of the landscape that can be seen at any one time. These physical restrictions form individual areas or units, known as physical units, whose character can be defined by aspect, slope, scale and size. A physical unit is generally delineated by topographical boundaries and is defined by landform and landcover.

The proposed replanting site is located on low-lying, relatively flat land. The site itself lies at an elevation of approximately 60 to 70 metres O.D. The landcover of the Proposed Site is composed primarily of agricultural grassland and wet grassland. The land to the north, west and south is bordered by agricultural grassland. Field boundaries are evident.

The proposed replanting area is located within the Sligo Bay & Drowse Catchment. There are no streams or rivers within the Proposed Site boundary, however the Ballymote Stream flows in westerly/south westerly direction along the northern and western boundary of the site, whilst the Owenmore River flows in a westerly/north westerly direction along the southern and western boundary of the site.

The proposed replanting site is accessed via the R293 Regional Road, which runs along the eastern boundary of the site and which is separated from the site by the Sligo-Dublin railway line.

8.3.2 Landscape Sensitivity

The sensitivity of a landscape to development and therefore to change, varies according to its character and to the importance that is attached to any combination of landscape values. The sensitivity of a landscape is derived from consideration of designations such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Natural Heritage Areas (NHAs) and National Parks, from information such as tourist maps, guidebooks and brochures, and from the evaluation of indicators such as uniqueness, popularity, distinctiveness, and quality of the elements of the area.

A desktop assessment of landscape sensitivity in the vicinity of the proposed replanting site was carried out. The methodology for this assessment was based on that set out in the Department of the Environment and Local Government (DoEHLG) guidance document *'Landscape and Landscape Assessment – Consultation Draft of Guidelines for Planning Authorities'* (2000). This document recommends an assessment of landscape sensitivity based on an evaluation of individual features, such as the quality, integrity, etc. The results of the assessment are presented in Table 8-1.

Table 8-1 Landscape Sensitivity

Feature	Description
Quality	The quality of the landscape of the proposed site and its immediate environs can be described as modified.
Integrity	The current development site has been modified by the interaction of man with the environment, primarily in the form of agriculture.
Distinctiveness	There is no particular feature of distinctiveness on the site.
Popularity	A sense of popularity is created where landscape features are widely recognised or appreciated. There are no such features on this site.
Rarity	The proposed replanting site is not considered to represent a rare or unique landscape type, at a local or regional scale. The site is not located within a designated ecological area. The closest Natura 2000 site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA), is the Bricklieve Mountains and Keishcorran SAC, located approximately 3.6 kilometres to the east of the subject site.
Cultural Meaning	A sense of cultural meaning arises where a site or features within a site are deemed to explain, represent or inspire cultural values. There are no recorded archaeological features on the study site. There are no recorded archaeological features on the study site. The nearest recorded features is a Barrow - bowl-barrow (SL039-016), located approximately 230 metres southeast of the site.
Sense of Public Ownership & Social Importance	A sense of public ownership arises due to ease of accessibility, visibility or a widely shared meaning. This is privately owned land and there is no sense of public ownership.

Following the assessment presented in Table 8-1, the proposed replanting site is considered to be of low landscape sensitivity.

8.3.3 Landscape Context and Site Visibility

The site is visible from the R293 Regional Road, which runs along the eastern boundary of the site.

8.4 Impact Assessment

8.4.1 'Do-Nothing' Scenario

In the 'Do Nothing' scenario, the Proposed Site would be afforested in any case, as per Technical Approval that has been issued for the site.

8.4.2 Site Preparation and Planting Phase

8.4.2.1 Impacts on Landscape Character

The planting of forestry will entail site works in terms of woody weed clearance and construction of forestry drains and will use the angle notch planting method described in Section 2.3.2 above. These activities will have a temporary neutral impact on the landscape character, which is that of a rural working landscape with agricultural land uses. There are forested areas located approximately 750 metres to the south/southeast of the site. A neutral impact is a change which does not affect the quality of the environment (EPA, 2017). The site clearance and replanting activities will assimilate well into the receiving environment, and are therefore classed as an imperceptible impact, i.e. an impact capable of measurement but without noticeable consequences.

8.4.2.2 Impacts on Visual Amenity

The proposed replanting is to be carried out in an area of agricultural grassland where the surrounding lands already have existing conifer plantations, and therefore the proposed replanting and potential future harvesting is not introducing a new land use but conforming to an established one. The predicted visual impact of the proposed replanting is therefore a Long Term, Imperceptible Neutral Impact.

8.4.3 Operational Phase

8.4.3.1 Impacts on Landscape Character

The proposed replanting is to be carried out in an area where there are already existing conifer plantations among agricultural fields, and therefore the proposed replanting is contributing to the patchwork of forestry plantations. The predicted impact of the proposed replanting on landscape character is a Long Term, Imperceptible Neutral Impact.

8.4.3.2 Impacts on Visual Amenity

The proposed replanting is to be carried out in an area where there are already existing conifer plantations among agricultural fields, and therefore the proposed replanting is not introducing a new land use but conforming to an established one and contributing to the patchwork of forestry plantations within open land. Felling will be carried out in accordance with the Forestry and the Landscape Guidelines. The predicted long-term visual impact of the proposed replanting is therefore a Long Term, Imperceptible Neutral Impact.

8.4.4 Proposed Mitigation Measures

8.4.4.1 Site Preparation and Planting Phase

Mitigation measures for the construction of the drainage and planting methods have been included in the Technical Approval document. The planting method will be as per Section 2.3.2 above and mound drains will be constructed. The proposed replanting will be carried out in line with the recommendations of the Forestry and the Landscape Guidelines.

8.4.5 Residual Impacts

Following mitigation, the Residual Impact on Landscape Character will be Long Term Imperceptible Neutral Impact while the Residual Impact on Visual Amenity will be Long Imperceptible Term Neutral Impact.

8.4.6 Cumulative Impacts

Cumulative impacts are described as additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments or actions that occurred in the past, present or are likely to occur in the foreseeable future. The cumulative impact assessment is based on the Planning History search carried out and described in Section 2 and the existing land-uses. There is coniferous forestry located to the north, south, southeast and southwest of the site, and the cumulative impact arising from the proposed replanting in conjunction with the existing forestry plantations and future development is assessed as Long Term, Imperceptible Neutral Impact.

9. CULTURAL HERITAGE

9.1 Introduction

This section presents the results of an archaeological and cultural heritage impact assessment for the proposed afforestation of the replanting areas.

The purpose of this section is to assess the potential impacts of the afforestation on the surrounding archaeological, architectural and cultural heritage landscape. An assessment of potential impacts is presented, and a number of mitigation measures are recommended where appropriate.

9.2 Methodology

A desk-based study of the proposed replanting area was undertaken in order to assess the archaeological, architectural and cultural heritage potential of the area and to identify constraints or features of archaeological/cultural heritage significance within or adjacent to the site. The proposed site has been Technically Approved for afforestation which will be completed in accordance with the *'Forestry and Archaeology Guidelines' (2000) (the Guidelines).* The guidelines provide specific mitigation measures to be employed for afforestation which will minimise potential impacts on this resource.

9.2.1 Statutory Context

9.2.1.1 Current Legislation

Archaeological monuments are safeguarded through national and international policy, which is designed to secure the protection of the cultural heritage resource. This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention). This was ratified by Ireland in 1997.

Both the National Monuments Acts 1930 to 2004 and relevant provisions of the Cultural Institutions Act 1997 are the primary means of ensuring protection of archaeological monuments, the latter of which includes all man-made structures of whatever form or date. There are a number of provisions under the National Monuments Acts which ensure protection of the archaeological resource. These include the Register of Historic Monuments (1997 Act) which means that any interference to a monument is illegal under that Act. All registered monuments are included on the Record of Monuments and Places (RMP).

The Record of Monuments and Places (RMP) was established under Section 12 (1) of the National Monuments (Amendment) Act 1994 and consists of a list of known archaeological monuments and accompanying maps. The Record of Monuments and Places affords some protection to the monuments entered therein. Section 12 (3) of the 1994 Amendment Act states that any person proposing to carry out work at or in relation to a recorded monument must give notice in writing to the Minister (Environment, Heritage and Local Government) and shall not commence the work for a period of two months after having given the notice. All proposed works, therefore, within or around any archaeological monument are subject to statutory protection and legislation (National Monuments Acts 1930-2004).

Under the Heritage Act (1995) architectural heritage is defined to include 'all structures, buildings, traditional and designed, and groups of buildings including street-scapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents...'. A heritage building is also defined to

include 'any building, or part thereof, which is of significance because of its intrinsic architectural or artistic quality or its setting or because of its association with the commercial, cultural, economic, industrial, military, political, social or religious history of the place where it is situated or of the country or generally'.

9.2.1.2 Granada Convention

The Council of Europe, in Article 2 of the 1985 Convention for the Protection of the Architectural Heritage of Europe (Granada Convention), states that *'for the purpose of precise identification of the monuments, groups of structures and sites to be protected, each member State will undertake to maintain inventories of that architectural heritage'*. The Granada Convention emphasises the importance of inventories in underpinning conservation policies.

The National Inventory of Architectural Heritage (NIAH) was established in 1990 to fulfill Ireland's obligations under the Granada Convention, through the establishment and maintenance of a central record, documenting and evaluating the architectural heritage of Ireland. Article 1 of the Granada Convention establishes the parameters of this work by defining 'architectural heritage' under three broad categories of Monument, Groups of Buildings, and Sites:

- Monument: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings;
- Group of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest, which are sufficiently coherent to form topographically definable units;
- Sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogenous to be topographically definable, and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest.

The Council of Europe's definition of architectural heritage allows for the inclusion of structures, groups of structures and sites which are considered to be of significance in their own right, or which are of significance in their local context and environment. The NIAH believes it is important to consider the architectural heritage as encompassing a wide variety of structures and sites as diverse as post boxes, grand country houses, mill complexes and vernacular farmhouses.

9.2.2 Desktop Assessment

A primary cartographic source and base-line data for the archaeological assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) through the electronic database of recorded monuments which may be accessed at www.archaeology.ie. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record.

The following sources were consulted for this assessment report:

- Electronic database of recorded monuments (www.archaeology.ie).
- Aerial photographs (copyright of Ordnance Survey Ireland (OSI.ie).

9.2.2.1 Recorded Monuments and Places

The Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) is a record of all known recorded archaeological monuments. The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP, the electronic database of recorded monuments which may be accessed at www.archaeology.ie was consulted.

9.2.2.2 Aerial Photograph Analysis

Aerial photographs of the site were examined and no previously unrecorded archaeological features could be seen. Sources included Bing, Google Maps and Ordnance Survey of Ireland.

9.2.3 Archaeology

Archaeological heritage is a non-renewable resource. The overall objective of this assessment of impacts of the proposed planting is to ensure that where a potential impact has been identified, that it can be mitigated against to ensure that the archaeological heritage will be available for future generations. The potential impacts on the recorded archaeological heritage are assessed here.

Potential impact are assessed on the basis of the impact classification terminology outlined in Table 1.1 of the EIAR, with the significance of impacts being defined as either imperceptible, slight, moderate, significant or profound, or if no impact is predicted to occur, 'No Impact'.

9.2.4 Potential Impacts

Potential afforestation impacts include direct destruction of recorded and unrecorded sites and indirect impacts on archaeological potential of nearby sites.

9.3 Existing Environment

The electronic database of recorded monuments (www.archaeology.ie) was used to compile a list of known sites which occur in the vicinity of the site. There are no recorded archaeological features on the study site.

The nearest recorded features is a Barrow - bowl-barrow (SL039-016), located approximately 230 metres southeast of the site.

There are no structures listed in the NIAH located within or in the vicinity of the site.

9.4 Potential Impacts

9.4.1 'Do-Nothing' Scenario

The lands have been Technically Approved and will be afforested should the Lyrenacarriga Wind Farm proceed or not.

9.4.2 Potential Direct Impacts on the Archaeological/Architectural Heritage

Direct Impact refers to a 'physical impact' on a monument. The afforestation will require some minor earthmoving activities such as drainage and the provision of access tracks. Harvesting will require tree felling.

There are no recorded monuments or structures on the site and therefore there will be no direct impacts.

9.4.3 Potential Indirect Impacts on the Archaeological/ Architectural Heritage

Potential indirect impacts may arise where a monument or area of archaeological or architectural potential is situated in relatively close proximity to a proposed development but is not directly (physically) affected by the development. In such cases the impact on the setting of the monument or views to and from it are assessed.

There are no recorded monuments or structures in the vicinity of the site and therefore there will be no indirect impacts.

9.4.4 Cumulative Impacts

There will be no cumulative impact associated with the afforestation of the site as there are no features close to the site. A planning history search of applications in the vicinity of the proposed replanting lands has also been carried out, as described in Section 3.2 of this report. There are no developments located in the vicinity of the site that would give rise to cumulative impacts in conjunction with the proposed on features of cultural heritage significance.

9.5 Significance of the Effects

Based on the above, there will be no significant effects, on cultural heritage or archaeology, associated with afforestation at this site.

10. AIR, CLIMATE AND NOISE

10.1 Air

10.1.1 Background

The primary land-uses within and in the vicinity of the Proposed Site comprise agriculture, forestry and wetlands. Due to the non-industrial nature of afforestation and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this study. It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g. heavy industry) in the vicinity of the site.

The growth of forestry has no direct atmospheric emissions. Some minor indirect emissions associated with site preparation, planting and harvesting include vehicular and dust emissions.

10.1.2 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM2.5 (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM10) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 10-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre (µg/m3) and parts per billion (ppb). The notation PM10 is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM2.5 represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

Table 10-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Particulate matter 2.5 ($PM_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 10-2 presents the limit and target values for ozone.

Table 10-2 Target values for Ozone Defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT_{40} calculated from 1 hour values from May to July	18,000 $mg/m^3.h$ averaged over 5 years	6,000 $mg/m^3.h$
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT_{40} is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 g/m^3 and is expressed as g/m3 hours.

10.1.3 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site for afforestation lie within Zone D, which represents rural areas located away from large population centres.

10.1.4 Likely and Significant Impacts and Associated Mitigation Measures

10.1.4.1 'Do-Nothing' Impact

The land has been Technically Approved and will be afforested should the proposed Lyrenacarriga Wind Farm proceed or not.

10.1.4.2 Long Term Slight Positive Impact

The growth of trees will result in the fixation of atmospheric carbon, and the production of oxygen.

10.1.4.3 Short-term Imperceptible Negative Impact

10.1.4.3.1 *Exhaust Emissions*

Some minor emissions associated with the use of an excavator for site drainage works are expected. This potential impact will not be significant and will be restricted to the duration of the drainage works.

Mitigation

All construction machinery will be maintained in good operational order while on-site, minimising any emissions that are likely to arise.

Residual Impact

Short-term Imperceptible Negative impact.

Significance of the Effects

Based on the above, there will be no significant effects, on air quality, associated with afforestation at the Proposed Site.

10.1.4.3.2 *Dust Emissions*

Potential dust emission sources include the working of an excavator. This potential impact will not be significant and will be restricted to the duration of the drainage works.

Mitigation

Areas of excavation will be kept to a minimum, and all works will be carried out in accordance with the Forestry Service Best Practice Guidelines described in detail in Section 2.

Residual Impact

Short-term Imperceptible Negative Impact.

Significance of the Effects

Based on the above, there will be no significant effects, on air quality, associated with afforestation at the site.

10.2 Climate

10.2.1 Climate Change and Greenhouse gases

Although climate change is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are thought to increase the frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

10.2.2 International Policy

10.2.2.1 United Nations Framework Convention on Climate Change

In 1992, countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), as a framework for international efforts to combat the challenge posed by climate change. The UNFCCC seeks to limit average global temperature increases and the resulting climate change. In addition, the UNFCCC seeks to cope with impacts that are already inevitable. It recognises that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The framework set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. Instead, the framework outlines how specific international treaties (called "protocols" or "Agreements") may be negotiated to set binding limits on greenhouse gases.

Ireland is a Party to the Kyoto Protocol, which is a protocol to the UNFCCC. The Kyoto Protocol is an international agreement that sets limitations and reduction targets for greenhouse gases for developed countries. It came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, are now binding. Further details on Ireland's obligations under the Kyoto Protocol are presented below.

10.2.2.2 Kyoto Protocol Targets

Under the Kyoto Protocol, the EU agreed to achieve a significant reduction in total greenhouse gas emissions of 8% below 1990 levels in the period 2008 to 2012. Ireland's contribution to the EU commitment for the period 2008 – 2012 was to limit its greenhouse gas emissions to no more than 13% above 1990 levels.

10.2.2.3 Doha Amendment to the Kyoto Protocol

In Doha, Qatar, on 8th December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the first commitment period, 37 industrialised countries and the European Community committed to reduce GHG emissions to an average of 5% against 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18% below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first.

Under the protocol, countries must meet their targets primarily through national measures, although market based mechanisms (such as international emissions trading) can also be utilised.

10.2.2.4 COP21 Paris Agreement

COP21 was the 21st session of the Conference of the Parties (COP) to the UNFCCC. Every year since 1995, the COP has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments. COP21 was organised by the United Nations in Paris and held from 30thNovember to 12thDecember 2015.

COP21 closed on 12th December 2015 with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The 12-page text, made up of a preamble and 29 articles, provides for a limitation of the global average temperature rise to well below 2°C above pre-industrial levels and to limit the increase to 1.5°C. It is flexible and takes into account the needs and capacities of each country. It is balanced as regards adaptation and mitigation, and durable, with a periodical ratcheting-up of ambitions. Ireland formally ratified the agreement on the 27th October 2016, and it entered into force on the 4th November 2016.

10.2.2.5 Baseline Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Claremorris which is located approximately 50 kilometres from the site, is the nearest weather and climate monitoring station to the Proposed Site that has meteorological data recorded for the 30-year period from 1971-2000. Meteorological data recorded at Claremorris over the 30-year period from 1971 - 2000 is shown in Table 10-3 overleaf. The wettest months are October and December, and April is usually the driest. July is the warmest month with an average temperature of 18.9° Celsius.

Table 10-3 Data from Met Éireann Weather Station at Claremorris, 1971 to 2000

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	7.5	8.1	9.8	12.1	14.9	17.0	18.9	18.7	16.4	13.1	9.9	8.1	12.9
Mean daily min	1.7	1.8	2.9	3.9	6.1	8.8	11.0	10.6	8.6	6.4	3.5	2.5	5.7
Mean temperature	4.6	4.9	6.3	8.0	10.5	12.9	15.0	14.7	12.5	9.8	6.7	5.3	9.3
Absolute max.	13.3	13.6	16.2	22.3	25.4	29.8	30.5	28.0	25.1	19.9	15.9	14.3	30.5
Absolute Min.	-11.7	-9.1	-8.0	-5.5	-3.1	0.7	0.6	2.6	-1.2	-4.3	-5.3	-12.9	-12.9
Mean No. of Days with Air Frost	8.7	7.3	5.2	3.3	0.8	0.0	0.0	0.0	0.1	1.2	5.3	7.6	39.5
Mean No. of Days with Ground Frost	15	14	12	10	5	0	0	0	2	5	12	14	89
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	90.7	90.3	88.7	82.5	79.3	80.4	83.6	86.2	88.1	91.6	91.2	91.0	87.0
Mean at 1500UTC	85.6	79.8	75.7	67.9	68.0	71.1	73.2	73.4	74.7	80.2	84.4	88.1	76.8
SUNSHINE (Hours)													
Mean daily duration	1.3	1.9	2.6	4.3	5.0	4.4	3.7	3.8	3.2	2.4	1.7	0.9	2.9
Greatest daily duration	7.9	9.3	10.8	13.4	15.1	15.8	14.8	13.7	11.4	9.3	8.6	6.7	15.8

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean no. of days with no sun	9.5	7.3	5.7	2.8	2.0	2.2	2.2	2.1	3.4	5.0	8.1	10.8	61.1
RAINFALL (mm)													
Mean monthly total	127.9	102.1	101.6	63.7	68.1	64.5	70.1	95.7	94.3	128.2	127.7	129.6	1173.6
Greatest daily total	31.5	107.0	26.8	34.0	51.3	38.0	42.2	49.7	41.0	46.7	54.9	41.2	107.0
Mean num. of days with >= 0.2mm	21	18	21	16	16	15	17	18	18	21	21	22	224
Mean num. of days with >= 1.0mm	18	15	17	12	12	11	12	13	14	17	18	17	176
Mean num. of days with >= 5.0mm	9	7	7	4	4	4	4	6	5	8	8	9	75
WIND (knots)													
Mean monthly speed	10.2	10.3	10.2	8.7	8.1	7.7	7.2	6.8	7.7	8.7	8.9	9.7	8.7
Max. gust	96	85	74	74	62	51	66	78	58	70	67	81	96
Max. mean 10-minute speed	59	48	45	41	41	34	39	32	37	46	40	52	59
Mean num. of days with gales	1.4	0.9	0.7	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.4	0.8	4.8
WEATHER (Mean No. of Days With:)													
Snow or sleet	5.7	4.4	3.8	1.6	0.2	0.0	0.0	0.0	0.0	0.1	1.2	3.1	20.0
Snow lying at 0900UTC	2.3	0.7	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	4.6

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Hail	4.4	3.2	5.4	3.2	1.6	0.4	0.1	0.0	0.7	0.8	2.6	2.7	25.2
Thunder	0.3	0.1	0.2	0.2	0.4	0.7	0.7	0.2	0.2	0.2	0.3	0.5	4.0
Fog	3.4	2.3	1.6	1.8	1.2	1.4	2.0	3.2	3.3	3.2	2.6	3.4	29.5

10.2.2.6 Potential Impacts

10.2.2.6.1 *Long Term Slight Positive Impact*

The growth of forestry allows for the fixation of atmospheric carbon as it grows.

10.2.2.6.2 *Short Term Imperceptible Negative Impact*

The use of machinery during the drainage works will result in the emission of greenhouse gases. Operations such as the transport of materials are typical examples of machinery use. This impact is considered to be imperceptible only, given the insignificant quantity of greenhouse gases that will be emitted. Planting will be carried out by hand.

Proposed Mitigation Measures

Planting of trees will be carried out by hand using the methods described in Section 2.3.2 above. Any drains will be constructed in accordance with the Forestry Service Best Practice Guidelines described in detail in Section 2.

Residual Impacts

On balance there will be positive impacts on air and climate associated with the proposed afforestation at this site.

Significance of the Effects

Based on the above, there will be no significant effects, on climate, associated with afforestation at this site.

10.3 Noise

10.3.1 Receiving Environment

The nearest sensitive location to the afforestation site is the residential dwelling and agricultural yard located in the centre of the site which will be retained and the residential dwellings located along the R293 Regional Road to the east of the site. In general, the existing noise climate is typical of a rural agricultural location. There are a small number of agricultural yards in the vicinity of the site and existing forestry plantations located to the south of the site.

10.3.2 Likely and Significant Impacts and Associated Mitigation Measures

10.3.2.1 'Do-Nothing' Scenario

The land has been Technically Approved and will be afforested should the proposed Lyrenacarriga Wind Farm proceeds or not.

10.3.3 Planting Phase

10.3.3.1 Construction Activities

There will potentially be an increase in noise levels in the vicinity of the proposed planting site during the planting phase, as a result of the use of an excavator for drainage works. These impacts will be short-term in duration and are not considered potentially significant. The noise levels will be similar to the existing agricultural machinery in use in the vicinity of the lands which is a working rural environment. Noise at any given noise sensitive location will be variable throughout the works, depending on the distance from the excavator to the receiving properties. This is likely to have a Short-term Negative Imperceptible Impact.

Mitigation

Best practice measures for noise control will be adhered to onsite during the planting phase of the afforestation in order to mitigate the potentially imperceptible short-term negative impact associated with this phase of the development. The measures include:

- Noise will be controlled by prescribing that all work will be restricted to the specified working hours. Any work carried out outside of these hours shall be restricted to activities that will not generate noise of a level that may cause a nuisance.
- The excavator used on the site shall be well maintained and will comply with E.U. and Irish legislation in relation to noise emissions. The timing of on- and off-site movements of plant near occupied properties will be controlled.

10.3.4 Operational Phase

There will be an intermittent increase in noise levels in the vicinity of the Proposed Site during the operational phase, as a result of the use of machinery for timber harvesting works. These impacts will be short-term in duration. Noise at any given noise sensitive location will be variable throughout the harvesting works, depending on the distance from the machinery to the receiving properties.

Mitigation

Best practice measures for noise control will be adhered to onsite during the timber harvesting at the proposed afforestation site in order to mitigate the slight short-term negative impact associated with this phase of the development. The measures include:

- Harvesting noise will be controlled by prescribing that all construction work will be restricted to the specified working hours. Any work carried out outside of these hours shall be restricted to activities that will not generate noise of a level that may cause a nuisance.
- The machinery used on the site shall be well maintained and will comply with E.U. and Irish legislation in relation to noise emissions. The timing of on- and off-site movements of plant near occupied properties will be controlled.

Residual Impacts

Potential residual impacts will be imperceptible and temporary in nature and not dissimilar to the existing noise sources of a working rural environment.

Significance of the Effects

Based on the above, there will be no significant effects, in relation to noise, associated with afforestation at this site.

11. POPULATION AND HUMAN HEALTH

This section of the report describes the potential impacts of the proposed afforestation on Population & Human Health, and has been completed in accordance with the guidance set out by the Environmental Protection Agency in *'Draft Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2017*).*

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human health, directly and indirectly, positively and negatively. The key issues examined in this section of the document include population, employment, health and safety, land-use, residential amenity, community facilities and services, and tourism.

11.1 Baseline Environment

The site is located approximately 3km south of Ballymote, Co. Sligo. The proposed replanting site is accessed off the R293 Regional Road which runs from Ballyhaunis, Co. Mayo and Colloney, Co. Sligo. The overall level of residential development in the area around the site is low, and comprises one-off houses located along R293. The nearest major settlement to the proposed replanting site is Ballymote, located approximately 3 kilometres to the north of the site.

11.1.1 Population

The proposed replanting land is located within the District Electoral Division (DED) of Ballymote. Population data for the Ballymote DED has been sourced from the results of the Census of Ireland 2016, as provided on the Central Statistics Office website, www.cso.ie. Population data for Ballymote DED and Co. Sligo are presented in Table 11-1.

Table 11-1 Population 2011 – 2016 (Source: CSO)

Area	Population		% Population Change
	2011	2016	2006-2011
Ballymote DED	2,074	2,064	-0.48
County Sligo	65,393	65,535	0.2%

The population of Ballymote DED recorded during the 2016 Census was 2,064 persons. The population density of the DED at this time was 82.3 persons per square kilometre, based on a total DED area of 25.07 square kilometres. This is higher when compared to the population density of County Sligo as a whole during the 2016 Census, which equates to 35.83 persons per square kilometre, based on the County area of 1,829 square kilometres.

The population of Ballymote DED declined by 0.48% between the 2011 and 2016 Censuses. The rate of population change within Ballymote DED between these Censuses is different to the average rate of population growth within the County as a whole, which had a growth of 0.2% in the same time.

The number of households recorded within Ballymote DED during the 2016 Census was 848 households. The proposed replanting site is located adjacent to the R293 Regional Road and the Sligo to Dublin railway line. The overall level of residential development within a kilometre of this site is

low, with intermittent houses located along the local road network. The nearest dwelling to the replanting site is located in the centre of the site. The dwelling is residence of the afforestation licensee.

11.1.2 Employment

Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. The 'Higher Professional' category includes scientists, engineers, solicitors, town planners and psychologists. The 'Lower Professional' category includes teachers, lab technicians, nurses, journalists, actors and driving instructors. Skilled occupations are divided into 'Manual Skilled', such as bricklayers and building contractors; 'Semi-skilled', e.g. roofers and gardeners; and 'Unskilled', which includes construction labourers, refuse collectors and window cleaners.

The highest level of employment within the Ballymote DED is within the 'Non-manual' and 'All others gainfully occupied and unknown' categories at 437 persons and 374 persons, respectively. The total number of persons working in the 'Farmers' category is 118. The total population in this DED in Census 2016 was 2,064.

11.1.3 Land-use

The current land-use on the proposed replanting area is agriculture. This site is located within a rural, working landscape in which agriculture form the primary land-use. There are areas of existing coniferous forestry to the south of the site.

11.1.4 Community Facilities and Amenities

There are no community facilities or amenities located within or in the vicinity of the proposed replanting site. The nearest retail services, schools and community facilities to the site are located in the town of Ballymote, approximately 3 kilometres north of the site.

11.1.5 Tourism

Ireland is divided into eight tourism regions. The Border region, in which the replanting site is located, comprises Counties Cavan, Donegal, Leitrim, Monaghan, Sligo and Louth. There are no tourist attractions located in the vicinity of the proposed replanting site. The nearest tourist attractions or facilities are located in the town of Ballymote, including B&B's and Pubs.

11.2 Potential Impacts

11.2.1 'Do-Nothing' Scenario

In the event that the proposed Lyrenacarriga Wind Farm does not proceed, the proposed replanting land will still be afforested, as per the specifications of the Technical Approval document for the site.

11.2.2 Population

Afforestation of the replanting land at Cloonagun will have no impact on population trends or population density in the vicinity of the site.

11.2.3 Employment

The preparation and planting of the proposed replanting land will provide short-term employment for three people; one person to operate an excavator for installation of drainage features, and two people to plant the site by hand.

In the longer-term, maintenance and felling of the site will provide part-term employment for two people.

11.2.4 Health and Safety

Health and safety in forestry is the concern of all those involved, including forest owners, managers, supervisors, operators, recreational users and trespassers (*'Code of Best Forest Practice'*, Forest Service, 2000). Forest practice must ensure that operations do not endanger workers and others. In the absence of the correct health and safety measures, forestry-related activities have the potential to have a significant negative effect on the health and safety of workers and members of the public, on and in the vicinity of the site.

The Forest Service's *'Code of Best Forest Practice'* states that the Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (General Application) Regulations 2007 as amended, place responsibilities on all involved in work activities, and set out a basis for managing health and safety in all workplaces. Forest owners have legal responsibilities to ensure that the workplace and all articles and substances situated there are safe and free from health risk. This involves informing contractors of potential hazards, work agreements and monitoring. Employers, self-employed and employees all have clear responsibility to ensure safe working practices for themselves and others.

All Forest Service guidelines and Health and Safety legislation will be adhered to during all forestry-related activities at the proposed replanting land. The residual potential for a significant negative impact on worker and public health and safety is therefore reduced to minimal.

11.2.5 Land-use

Afforestation of the proposed replanting site will result in a long-term change in use of the site, from agriculture to forestry. This change in land-use is in keeping with the character of the surrounding landscape, as forestry is already an established land-use in the area. The impact of the change in land-use is therefore neutral, i.e. a change which does not affect the quality of the environment.

11.3 Residential Amenity

Planting at the site will have no impact on the residential amenity of the area.

11.4 Community Facilities and Amenities

There are no community facilities or amenities located on or in the immediate vicinity of the proposed replanting land. No recreational walks are located close to the proposed replanting site. There will be no impact to these or any other community amenities within the wider area. All appropriate health and safety measures, including signage, will be adopted at the site to ensure the safety of workers and the general public.

11.4.1 Tourism

Afforestation of the proposed replanting land will have no impact on tourism. There are no tourist facilities or attractions located on or in the immediate vicinity of the proposed replanting land. Forestry is an established land-use in this area, and a common feature in the landscape.

12. MATERIAL ASSETS

Material Assets are resources that are valued and intrinsic to specific places. Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are dealt with in Sections 6, 7 and 8 of this report. Cultural heritage assets are discussed in Section 9. Transportation infrastructure and land-use practices, which are economic assets of human origin, are discussed in this section of the report.

12.1 Transportation

The proposed replanting site is accessed via the R293 Regional Road, which runs along the eastern boundary of the site and is separated from the site by the Sligo-Dublin train line.

Traffic movements associated with the preparation and planting of the site will be minimal. Preparation of the site will require the use of an excavator for drainage, and travel to the site by the driver. Planting of the site will be by hand, and will be carried out by one to two people over a two-week period approximately. Forestry felling can occur within 0.8-1 km of access points (roads and tracks) to the main forest body. Due to the small size of the proposed replanting area, additional access tracks or roads will not be required.

12.2 Land-Use

Land-use on the site will change from agriculture to coniferous forestry. Forestry, like agriculture, is an extractive industry, i.e. it produces a raw material which is then processed to add value. The use of the proposed replanting lands for coniferous forestry will have a positive effect on the economic assets of the site.

12.3 Potential Impacts

12.3.1 'Do-Nothing' Scenario

In the event that the proposed development at Lyrenacarriga Wind Farm does not proceed, the proposed replanting land at Cloonagun will still be afforested, as per the specifications of the Technical Approval document for the site.

12.3.2 Traffic

Planting of the proposed site will have an imperceptible impact on local traffic, given the low volume of traffic associated with planting and felling.

12.3.3 Land-use

The use of the proposed replanting land for coniferous forestry will have a positive effect on the economic assets of the site. In terms of the wider landscape, afforestation of the proposed site will be assimilated easily into the received environment.

12.3.4 Significance of the Effects

Based on the above, there will be no significant effects, on land use and traffic, associated with afforestation at this site.

APPENDIX 1

TECHNICAL APPROVAL DOCUMENT

RECEIVED
- 9 AUG 2018

Department of
Agriculture,
Food and the Marine
An Roinn
Talmhaíochta,
Bia agus Mara

HD
FB

SWS FORESTRY LTD
GATE LODGE
WEST CORK TECHNOLOGY PARK
CLONAKILTY
CO CORK

08/08/2018

Application for Technical Approval for an Afforestation Licence

Forest Owner	FO113095S
Contract Number	CN79755
Townland	Cloonagun
County	Sligo
Approved Area (ha)	49.98
Fencing Length (lm)	1,861.00

Robert Anderson

This is technical approval for an afforestation licence only and is not grant approval. You should note that the project will not be eligible for grant aid unless prior financial approval has been given in writing in advance of commencement of planting. Also, to qualify for Afforestation grant and premiums applicants must own, lease or be in joint management of the lands proposed for planting. You should consult with your registered forester about applying for financial approval under the Scheme.

I refer to your application for an afforestation licence as described above and shown on the enclosed map. Your application has been assessed and a licence is hereby issued on the basis that the works will be undertaken in accordance with the prescription set out in Appendix A, attached herewith. You are now required to remove your site notice immediately.

This scheme is financed by the State and payment of the grant, if financial approval is given, is subject to the following conditions:

1. Availability of funds in each financial year.

2. Submission of a fully completed and signed Form 2 (Application for Payment) and the following documents to support this application.

Proof of Ownership (including removal of any constraints on ownership)
Valid Mandate
Current Tax Clearance Certificate(s)
C2 Certificate
Provenance Certificates
Fencing Map
Biodiversity Map
Certified Species Map

3. Satisfactory completion of the work not later than 03/08/2021.

4. Compliance with Operational Proposals and Specifications enclosed.

5. Compliance with Departmental guidelines and requirements for Landscape, Water Quality, Harvesting, Biodiversity and Archaeology.

An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Eastát Chaisleán Sheonach
Contae Loch Gorman
Y35 PN52
Éire

Johnstown Castle Estate
Co. Wexford
Y35 PN52
Ireland

Telephone +353 (0)53 916 3400
Fax +353 (0)53 914 2839
info@agriculture.gov.ie
www.agriculture.gov.ie

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6. Compliance with Ecological Survey and Management Plan as submitted (if applicable).

7. The work is carried out by the registered company or forester specified on the original application. If it is intended to have a different company or forester undertake the work, it will be necessary to submit a new application (Form 1) to the Forest Service.

8. All applications are subject to the provisions of the penalty schedules as set out in the Afforestation Grant and Premium Scheme document.

9. All applications are subject to Cross Compliance checks with other grant schemes.

10. Grant payment may be subject to the netting policy of the Department of Agriculture, Food and the Marine.

11. This licence is issued subject to the terms and conditions of the Forestry Standards and Procedures Manual.

12. Your acceptance that the responsibility for the ultimate success of the plantation rests with you, the applicant. Plantations which fail to establish successfully will result in grant and premium recoupment.

13. Additional Environmental & Silvicultural Conditions

- Prior to any works commencing, the site should be walked with Inland Fisheries Staff and outline the operations on site. The drainage plan submitted as part of the application is to be implemented in full. Clean all drains as described and ensure full siltation control by any means.,
- This is a large site and extensive supervision by a consultant forester is essential. Ensure all required setbacks are adhered to.,
- A 5 m setback to all mature trees to be left from dripline and plant 3 rows of Beech adjoining these tree to protect them. Beech & Oak to be planted as ADB in better mineral soils and Birch & Alder in the wetter sections or on peat soils.,
- Adhere to Environmental Requirements for Afforestation,
- All guidelines to apply,
- All guidelines to apply

You are required to notify the Department of Agriculture, Food and the Marine in writing if any of the details of your application have changed. Changes to your application may invalidate this licence.

In order to allow for the possibility of appeals, you must not commence any works until 28 days from the date of this letter have elapsed. If an appeal is lodged, this licence will be suspended and no work may commence until the appeal process has concluded.

If you wish to appeal any condition attached to this licence, where applicable, you should do so in writing within 28 days of the date of this letter to the Forestry Appeals Committee. You must set out the grounds of your appeal and include a statement of the facts and contentions upon which you intend to rely along with any documentary evidence you wish to submit in support of your appeal. The appeal must be sent to the Forestry Appeals Committee, Kilminchy Court, Portlaoise, Co. Laois, Lo-Call 076 1064418 or 057 8631900.

Yours sincerely

COLIN GALLAGHER
Approval Section
Forestry Division

An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Eastát Chaisleán Sheonach
Contae Loch Gorman
Y35 PN52
Éire

Johnstown Castle Estate
Co. Wexford
Y35 PN52
Ireland

Telephone +353 (0)53 916 3400
Fax +353 (0)53 914 2839
info@agriculture.gov.ie
www.agriculture.gov.ie

APPENDIX A

Department of Agriculture, Food and the Marine

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

Operational Proposals for Technical Approval for an Afforestation Licence

Forest Owner Number	FO113095S
Contract Number	CN79755
Townland	Cloonagun
County	Sligo
Area Approved	49.98(ha)
Fencing Length (LM)	1,861.00

All applications must be developed in accordance with detailed standards and procedures as described in the current Forestry Schemes Manual. Certain specific operational proposals particular to this application are described below. No change is permitted to these proposals and species approved unless approved in advance by the Department. The Department may insist that proposed changes constitutes a new application.

Operational Proposal Details

Agro Forestry (GPC 11)		
1.	Tree Shelters	Not Entered
2.	Plant Size and Stocking	Not Entered
Drainage		
1.	Drainage	Not Required
2.	Drainage Comment	Not Entered
Fertiliser		
1.	Zero	Not Entered
2.	350 Kg Granulated Rock Phosphate	Not Entered
3.	250 Kg Granulated Rock Phosphate	Yes
4.	Split Application	Not Entered
5.	Other Details	Not Entered
Firebreaks/Res.		
1.	Firebreaks/Res	Not Required
Forestry for Fibre (GPCs: 12a and 12b))		
1.	Is Land Free Drainage arable or pasture soils	Not Entered
2.	Are there surface water gleys without a peat layer	Not Entered
3.	Do you intend to use improved genetic material	Not Entered
4.	Details	Not Entered
Ground Prep.		
1.	Woody Weed Removal	Yes
2.	Ripping	Not Entered
3.	Pit Plant	Not Entered
4.	Mole Drainage	Not Entered
5.	Mounding	Yes
6.	Ploughing	Not Entered
9.	Other Details	Invert NWS plots
Planting Method		
1.	Angle Notch	Not Entered
2.	Pit	Not Entered
3.	Machine	Not Entered

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Department of Agriculture, Food and the Marine
Eastát Chaisleán Sheonach
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Y35 PN52
Éire
Johnstown Castle Estate
Co. Wexford
Y35 PN52
Ireland
Telephone +353 (0)53 916 3400
Fax +353 (0)53 914 2839
info@agriculture.gov.ie
www.agriculture.gov.ie

4.	Slit	Yes
5.	Other Details	Not Entered
Road Access		
1.	Road Access	Provided
Standard Stocking		
1.	Standard Stocking	Yes
2.	Details	Not Entered
Weed Control		
1.	Herbicide Control yr0	Yes
2.	Herbicide Control yr1	Yes
3.	Herbicide Control yr2	Yes
3.	Herbicide Control yr4	Not Entered
4.	Manual	Yes
4.	Herbicide Control yr3	Yes

Fencing Details (metres)				
	Stock	0	Stock-Sheep	1861
	Stock-Rabbit	0	Upgrade to Deer	0
	Deer-Rabbit	0	Deer	0
	Upgrade Existing Fence(s)	0		
	Upgrade Details: None Entered			

Species Approved

The species approved in this proposal relate to the digitised certified species map attached.

Species Approved for Afforestation

Plot	Area	GPC	Land Type	Species	Species Area	Yield Class	Mixture Type	Exclusion	Exclusion Type
1	18.6	GPC 3	CHF	SS	16.74	20	Pure		
				ADB	1.86	8			
2	10.16	GPC 3	CHF	SS	9.14	20	Pure		
				ADB	1.02	8			
3	.41	GPC 3	Bio				None		
4	4.39	GPC 10 - NWE	BHF	ALD	3.51	8	Row		
				BI	.44	8			
				HZ	.44	8			
5	8.85	GPC 10 - NWE	BHF	ALD	7.08	8	Row		
				BI	.89	8			
				HZ	.89	8			
7	7.57	GPC 3	CHF	SS	6.81	20	Pure		
				ADB	.76	8			

Additional Silvicultural and Environmental Conditions

In addition to the Department's environmental and silvicultural guidelines the following specific conditions apply to this proposal:

Silvicultural and Environmental Conditions

Prior to any works commencing, the site should be walked with Inland Fisheries Staff and outline the operations on site. The drainage plan submitted as part of the application is to be implemented in full. Clean all drains as described and ensure full siltation control by any means.,
This is a large site and extensive supervision by a consultant forester is essential. Ensure all required setbacks are adhered to.,
A 5 m setback to all mature trees to be left from dripline and plant 3 rows of Beech adjoining these tree to protect them.
Beech & Oak to be planted as ADB in better mineral soils and Birch & Alder in the wetter sections or on peat soils.,
Adhere to Environmental Requirements for Afforestation,
All guidelines to apply,
All guidelines to apply

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Y35 PN52
Éire

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Co. Wexford
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Ireland

Telephone +353 (0)53 916 3400
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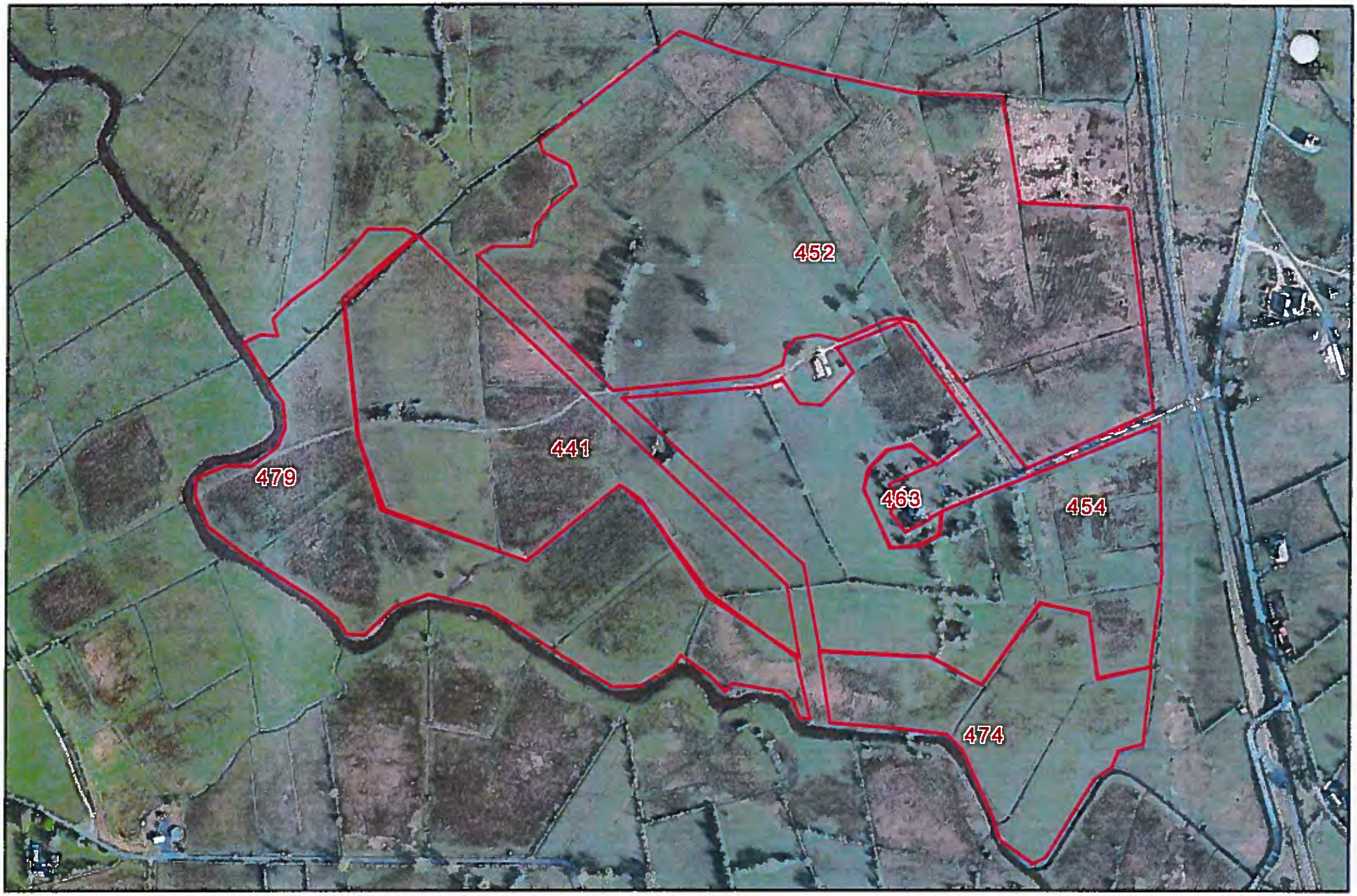
info@agriculture.gov.ie
www.agriculture.gov.ie



Contract: **CN79755** Scale 1: 5000

Certified Species Information

Contract Number	CN79755
Townland	Cloonagun
County	Sligo
6" OS No:	SO39

Plot No	GPC	Parcel No	GPC Area(H)	Land Use Type	Species Area	Species	Mixture Type	Excl Area(h)	Excl Type
1	3	45522452	18.6	CHF	18.6	ADB,SS	Pure	0	
2	3	45522454	10.16	CHF	10.16	ADB,SS	Pure	0	
3	3	45522463	.41	Bio	0		None	0	
4	9	45522474	4.39	BHF	4.39	ALD,BI,HZ	Row	0	
5	9	45522479	8.85	BHF	8.86	ALD,BI,HZ	Row	0	
7	3	45522441	7.57	CHF	7.57	ADB,SS	Pure	0	
		TOTALS	**49.98**		**49.58**			**0**	

Remarks:

Area Surveyed By: **Date:**

Species Certified By: **Date:**