

# Screening for Appropriate Assessment & Natura Impact Statement Report

Proposed redevelopment  
Ballyhaunis Convent Site, Co. Mayo.



For Matthew Stevens  
Mayo County Council

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# Table of Contents

<b>1.0</b>	<b>Introduction</b>	<b>3</b>
1.1	<i>Overview of proposed redevelopment at Convent Site, Ballyhaunis, Co. Mayo.</i>	3
<b>2.0</b>	<b>The Appropriate Assessment Process</b>	<b>4</b>
2.1	<i>Introduction</i>	4
2.2	<i>Appropriate Assessment Stages</i>	6
<b>3.0</b>	<b>Methods</b>	<b>6</b>
3.1	<i>Zone of influence</i>	6
3.2	<i>Desk-top study</i>	7
3.3	<i>Field Survey</i>	8
<b>4.0</b>	<b>Screening for Appropriate Assessment</b>	<b>11</b>
4.1	<i>Description of development</i>	11
4.2	<i>Description of Natura 2000 sites</i>	13
<b>5.0</b>	<b>Assessment of Likely Effects</b>	<b>22</b>
5.1	<i>Direct, indirect or secondary impacts</i>	22
5.2	<i>Cumulative Impacts – other projects</i>	48
5.3	<i>Cumulative impacts – other plans</i>	51
<b>6.0</b>	<b>Screening Conclusion and Statement</b>	<b>52</b>
<b>SECTION 2</b>		<b>53</b>
<b>7.0</b>	<b>Natura Impact Statement to inform Appropriate Assessment</b>	<b>53</b>
7.1	<i>Introduction</i>	53
7.2	<i>Conservation Objectives of Lough Corrib SAC</i>	53
7.3	<i>Impact Prediction</i>	54
7.4	<i>Cumulative Impacts</i>	64
7.5	<i>Measures to Mitigate Potential Adverse Impacts</i>	64
7.5.1	<i>Habitat Loss</i>	64
7.5.2	<i>Fragmentation</i>	64
7.5.3	<i>Disturbance</i>	64
7.5.4	<i>Species impact</i>	65
7.5.5	<i>Water Resource</i>	66
7.5.6	<i>Water Quality</i>	66
7.5.7	<i>Visual Impact</i>	68
7.6	<i>Collated mitigation measures</i>	68
7.7	<i>Conclusions</i>	70
<b>8.0</b>	<b>References</b>	<b>71</b>
<b>9.0</b>	<b>Appendices</b>	<b>73</b>
	<i>Appendix 1 – Screening Matrix</i>	73

<i>Appendix 2 – Qualifying interests and documented threats to the Natura 2000 sites</i>	75
<i>Appendix 3 – Soil and Geological Information</i>	82
<i>Appendix 4 – Biodiversity records</i>	83
<i>Appendix 5 – Site synopses</i>	84
<i>Appendix 6 – Japanese Knotweed Locations</i>	92
<i>Appendix 7 - Slit fence installation</i>	94
<i>Appendix 8 - Qualifications</i>	95

## 1.0 Introduction

Giorria Environmental Services were commissioned by Matthew Stevens (Architects Department, Mayo County Council) to undertake a Screening for Appropriate Assessment under Article 6 of the EU Habitats Directive on the proposed redevelopment of the former Convent site at Ballyhaunis, Co. Mayo.

The aim of this report is to identify any significant impacts of the proposed development on any adjacent Natura 2000 sites. The report has been prepared in accordance with the current guidance (NPWS 2009, revised February 2010, Office of Planning Regulator 2021). The report was compiled and written by Dr. Karina Dingerkus, ecologist (see Appendix 8 for qualifications).

### 1.1 Overview of proposed redevelopment at Convent Site, Ballyhaunis, Co. Mayo.

It is proposed to undergo a redevelopment of the former convent school in the town of Ballyhaunis, Co Mayo. The redevelopment will become a community hub, with some restoration and extension works to the building plus development of the surrounding grounds as an amenity space. The site area is 0.74 hectares and adjoins the River Dalgan, which runs south – west through Ballyhaunis.

The site will comprise of one large building and three outdoor zoned areas. The building will be split in two levels, a ground floor consisting of a dining room, WC and community learning space, and the second floor will consist of a craft workshop, canteen, artist studio, community activity space, social hub and WC's.



**Photograph 1: Site location of proposed redevelopment of convent and grounds**

## 2.0 The Appropriate Assessment Process

### 2.1 Introduction

Natura 2000 is a European network of important ecological sites. The EU Habitats Directive (92/43/EEC) placed an obligation on Member States of the EU to establish the Natura 2000 network. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (2009/147/EC), and Special Area of Conservation, SACs, established under the Habitats Directive itself.

An AA is required of the implications for the European site concerned in view of the site's conservation objectives of any plan or project not directly connected with or necessary to the management of that site but likely to have a significant effect thereon, either individually or in combination with any other plans or projects.

The assessment procedure is based on a four-stage approach, where the outcome at each successive stage determines whether a further stage in the process is required.

The purpose of the screening stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone or in-combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site's conservation objectives. There is no necessity to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of AA has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded.

#### An Appropriate Assessment

(i) must identify, in the light of the best scientific knowledge in the field, all aspects of the project which can, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;

(ii) must contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and

(iii) may only include a determination that the proposed development will not adversely affect the integrity of any relevant European site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of the identified potential effects. If adverse impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete.

If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to stage three and, if necessary, stage four.

Stage Three of the potential process arises where adverse effects on the integrity of a European site cannot be excluded and examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European site.

Stage Four is the derogation process of Article 6(4), which examines whether there are imperative reasons of overriding public interest [IROPI] for allowing a project to proceed where

adverse effects on the integrity of a European site have been predicted. Compensatory measures must be proposed and assessed as part of this stage and the EU Commission must be informed of the compensatory measures.

Several guidance documents on the appropriate assessment process have been referred to during the preparation of this NIS. These are:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (NPWS 2009, Revised February 2010)
- Circular NPW 1/10 & PSSP 2/10 (March 2010)
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (2007)
- Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (Nov. 2001 – published 2002)
- Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (2000).
- Office of the Planning Regulator (2021). Appropriate Assessment Screening for Development Management. OPR Practice Note PN01.

Screening for appropriate assessment is the first stage of the AA process (Stage One), in which the possibility of there being a significant effect on a European site is considered. Plans or projects that have no appreciable effect on a European site are thereby excluded, or screened out, at this stage of the process. Where screening concludes that there is the potential for significant effects, then it is necessary to carry out an AA (Stage Two) for the purposes of Article 6(3), and a Natura Impact Statement (NIS) is produced.

The guidance for Appropriate Assessment (NPWS, 2009, revised February 2010) states:

*“AA is an impact assessment process that fits within the decision-making framework and tests of Articles 6(3) and 6(4) and, for the purposes of this guidance, it comprises two main elements. Firstly, a Natura Impact Statement – i.e. a statement of the likely and possible impacts of the plan or project on a Natura 2000 site (abbreviated in the following guidance to “NIS”) must be prepared. This comprises a comprehensive ecological impact assessment of a plan or project; it examines the direct and indirect impacts that the plan or project might have on its own or in combination with other plans and projects, on one or more Natura 2000 sites in view of the sites’ conservation objectives. Secondly, the competent authority carries out the AA, based on the NIS and any other information it may consider necessary. The AA process encompasses all of the processes covered by Article 6(3) of the Habitats Directive, i.e. the screening process, the NIS, the AA by the competent authority, and the record of decisions made by the competent authority at each stage of the process, up to the point at which Article 6(4) may come into play following a determination that a plan or project may adversely affect the integrity of a Natura 2000 site”.*

## 2.2 Appropriate Assessment Stages

The European Commission's Guidance promotes a four-stage process to complete the Appropriate Assessment.

Stage 1 – Screening Process

Stage 2 – Appropriate Assessment

Stage 3 – Assessment of alternative Solutions

Stage 4 – Assessment where no alternative solutions exist and where adverse impacts remain.

Stage 1 and 2 deal with the main requirements of assessment under Article 6.3. Stage 3 may be part of Article 6.3 or a necessary precursor to Stage 4.

Screening determines whether appropriate assessment is necessary by examining:

1. Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of the site, and
2. The potential effects of a project or plan, either alone or in combination with other projects or plans, on a Natura 2000 site in view of its conservation objectives and considering whether these effects will be significant.

Screening involves the following:

1. Description of plan or project, and local site or plan area characteristics.
2. Identification of relevant Natura 2000 sites, and compilation of information qualifying interests and conservation objectives.
3. Assessment of likely effects – direct, indirect on the basis of available information as a desk study and/or field survey and/or primary research as necessary.
4. Screening statement and conclusion.

## 3.0 Methods

### 3.1 Zone of influence

The Zone of Influence of a project may be defined as area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities (CIEEM 2016). The zone of influence can extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries.

The NPWS (2010) recommends that: *“the distance should be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects.”* Generally, all European sites within 15km of the proposed project are examined. In some circumstances it may be necessary to go beyond this distance (e.g. hydrologically connect site).

Recent guidance from Office of the Planning Regulator (2021) indicates that the zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a Natura 2000 Site. It indicates that this should be established on a case-by-case basis using the Source-Pathway-Receptor framework.

### 3.2 Desk-top study

A desk study was carried out to gather information available on Natura 2000 sites in the vicinity of the proposed project. The Environmental Protection Agency Appropriate Assessment GeoTool application was used to gather data about SACs and SPAs from the National Parks and Wildlife Service (NPWS). The Environmental Sensitivity Mapping tool (ESM tool) was also consulted (<https://airomaps.geohive.ie/ESM/>). The NPWS and National Biodiversity Data Centre online databases were consulted concerning designated conservation areas in the vicinity of the proposed development and protected species. The Mayo County Council website online planning access

<http://www.mayococo.ie/PlanSearch/mcc4/PlanningViewer/SelectPlan.asp>

was consulted for information on other plans or projects in the area, which may result in a cumulative impact when considered with the proposed development. Other databases consulted include:

- Information on other plans or projects in the area from [www.myplan.ie](http://www.myplan.ie)
- Information on soils, geology and hydrogeology in the area [www.gsi.ie](http://www.gsi.ie)
- National Biodiversity Action Plan 2017–2021 (Department of Culture, Heritage and the Gaeltacht, 2017)
- Mayo County Development Plan 2014-2020
- National Biodiversity database maps <https://maps.biodiversityireland.ie/>
- Environmental Protection Agency - <https://gis.epa.ie/EPAMaps/>



### 3.3 Field Survey

A multidisciplinary walkover survey was conducted on the 1<sup>st</sup> November 2021 following NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes) by ecologists Dr. Karina Dingerkus and Dr Richard Stone. All habitats were identified. The walkover surveys are designed to detect the presence, or likely presence, of a range of protected species. The survey included a search of all potentially suitable habitat for protected species that are likely to occur in the vicinity of the project area. Habitats were identified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000).

The site is located in Ballyhaunis town and is on the east bank of the River Dalgan, south of Bridge Street and west of Abbey Street. The site occupies the old convent site in Ballyhaunis and the grounds are 0.75 ha in size. The site extends from Bridge Street with a low wall and small gate along Abbey Street for 100 m. This boundary has a larger gate access allowing vehicular access and a concrete post and rail fence extending up the hill to the site boundary to the south. The western boundary has two distinct areas, the northern area borders the building and runs around the front of the building and along the south-west side. The boundary in the southern half extends further west to the riverbank and follows this to the southern boundary. The southern boundary is fenced and in a scrub area.

The site can be divided into distinct areas. To the north and east the site is mainly grass that would have been lawn area in the past. Plants here include red clover (*Trifolium pratense*), yarrow (*Achillea millefolium*), dandelion (*Taraxacum officinale* agg.), knapweed (*Centaurea nigra*), bush vetch (*Vicia sepium*), and creeping buttercup (*Ranunculus repens*). This area extends to Bridge Street where there are a few trees of birch (*Betula* spp.), ash (*Fraxinus excelsior*), ornamental evergreens, sycamore (*Acer pseudoplatanus*) and a willow (*Salix* spp.) sapling. This area also has a large area of hardstanding, including the access drive and area towards the north of the convent. Further along Abbey Street, towards the top of the hill, the land is steeper and has steps down to the convent and overgrown bushes and ornamental conifer shrubs.

Much of the hard standing is gradually becoming vegetated with various common plants including coltsfoot (*Tussilago farfara*), dandelion, hogweed (*Heracleum sphondylium*), ivy (*Hedera helix*), bindweed (*Calystegia* spp.), ragwort (*Senecio jacobaea*), thistle (*Cirsium* spp.), docks (*Rumex* spp.), buddleja (*Buddleja davidii*) and bramble (*Rubus fruticosus* agg.). A couple of small sycamore and willow saplings also occur.

To the west is a large two storey boarded-up building and another area of hardstanding that extends towards the north and north-west of building. There is also a derelict building to the west of the house. This building is open to the yard area with closed walls on the other three sides, and extensive ivy growing on the roof. Another small building is attached to the rear of the larger building. The door of this building is open and there is evidence of anti-social behaviour here and in other areas of the site.

The site is relatively level, though the yard area is slightly lower than the access area to the north. Further west beyond the hardstanding the land slopes down steeply towards the river. There is a narrow level area along the bank. This area is well wooded with mature and semi-mature trees of willow, ash and alder (*Alnus glutinosa*) as well as bramble and ivy. There is a

small patch of Japanese Knotweed present at Grid Reference M 496 794. This patch had about six stems, so is relatively small. Further patches of knotweed occur outside of the site boundary close to the riverbank (see Diagram 4 in Appendix 6 which shows approximate locations). Japanese knotweed also occurs on the bank on the other side of the river.

A soil bank rises to the southwest outside the site boundary. This bank is wooded with various mature trees. Rubbish has been dumped just by the fence at this location. Trees include willow, alder and sycamore.

The old two storey building has board-up doors and windows. However, boards covering two upstairs windows have holes which could potentially allow access for bats. A very preliminary search for evidence of bats was made around the building and none was found. However, there was no access to the upper storey and the building is fully roofed so there is potential for it to be suitable for use by bats.

The site soil type (National soil Survey) falls under Made (Made / Built land). The site is mainly built land and hard standing (Fossett classification BL3), amenity grassland (Fossett classification GA2) with scattered trees and shrubs and riparian woodland (Fossett classification WN5).



**Diagram 1: Habitat map of site**



**Photograph 2: Japanese knotweed stand on edge of site**



**Photograph 3: Potential entrance for bats to building**



**Photograph 4: Riverbank from car park opposite project site**

## **4.0 Screening for Appropriate Assessment**

The aim of this section of the report is to identify any significant impacts of the proposed development on any adjacent Natura 2000 sites. The report covers Stage 1 screening for appropriate assessment and has been prepared in accordance with the current guidance (NPWS 2009, revised February 2010 and Office of the Planning Regulator 2021).

### **4.1 Description of development**

It is proposed to undergo a re-development of the former convent school on Abbey Street, Ballyhaunis, Co Mayo. The re-development will become a community hub, with some restoration and extension works to the building, plus development of the surrounding grounds as an amenity space. The site area is 0.74 hectares and adjoins the River Dalgan which flows south-west through Ballyhaunis.

The access road will be located to the north-east of the project site and will adjoin the main N60 road (Bridge Street / Abbey Street) located in the Ballyhaunis village. The site will comprise of one large community building and three outdoor zoned amenity areas.

The outdoor zoned amenity areas are as follows: Zone 1 – Play, Zone 2 – Restful, Zone 3 – Auditorium. The area running along Abbey Road (Zone 3) from the main road to the southern end, will be more open with mainly grass and some tree planting. A new entrance will be created using the existing entrance but with some car and bicycle parking and remodelling. A new path with steps, leading from the existing steps in the south down to convent building, will extend from the road and curve round the slope and down to a new grass area to the north of the building. To the right of the path will be a new circular Auditorium. While on the right will be more grass and additional seating in front of the building.

To the west of this area will be a restful area (Zone 2). This area will have seating and more tree planting. A path through Zone 2 leads to Zone 1, a play area. This area uses the old hardstanding area and has new sports pitch markings for football at one end and basketball at the other end with a wall (using existing wall) surround on two sides.

The old convent building will also be upgraded and refurbished with new windows and a double height glass front to the main entrance. Inside there is a new room layout to accommodate new use. The ground floor will consist of a dining room, WC and community learning space, and the second floor will consist of a craft workshop, canteen, artist studio, community activity space, social hub and WC's.



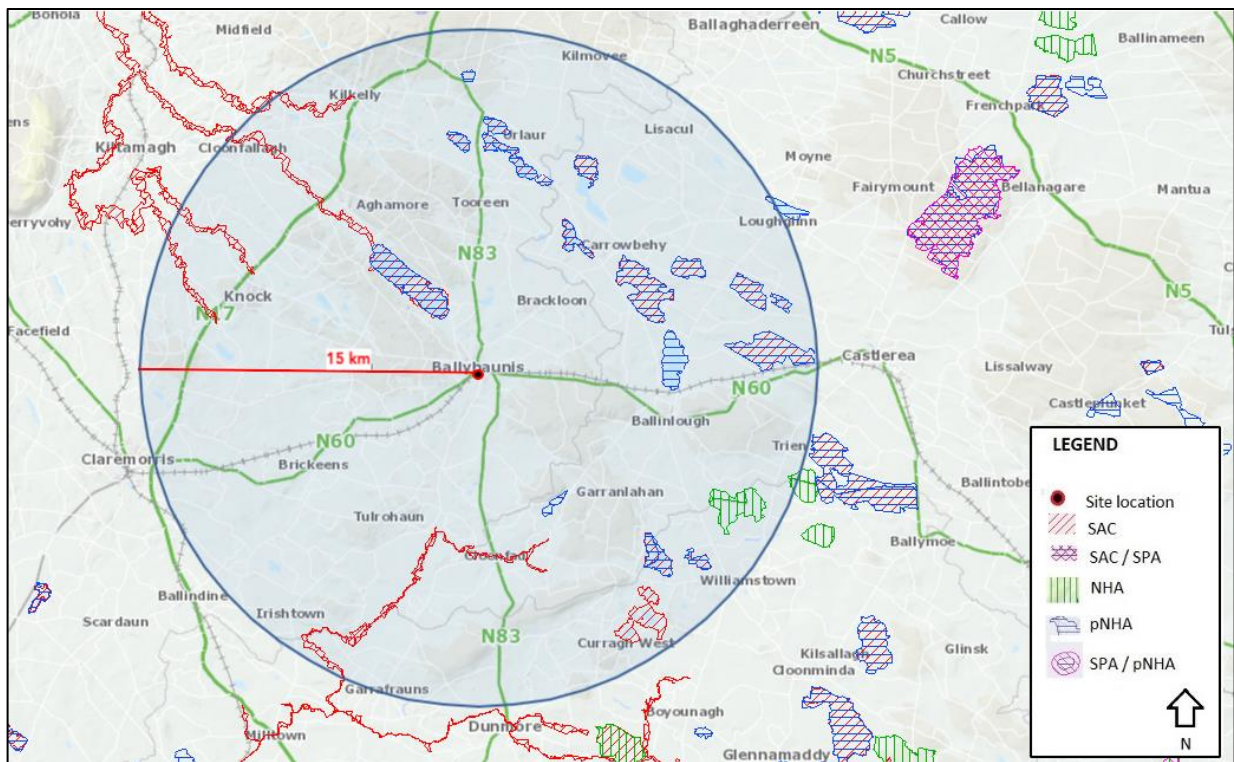
**Diagram 2: Site layout at Ballyhaunis, Co. Mayo**

## 4.2 Description of Natura 2000 sites

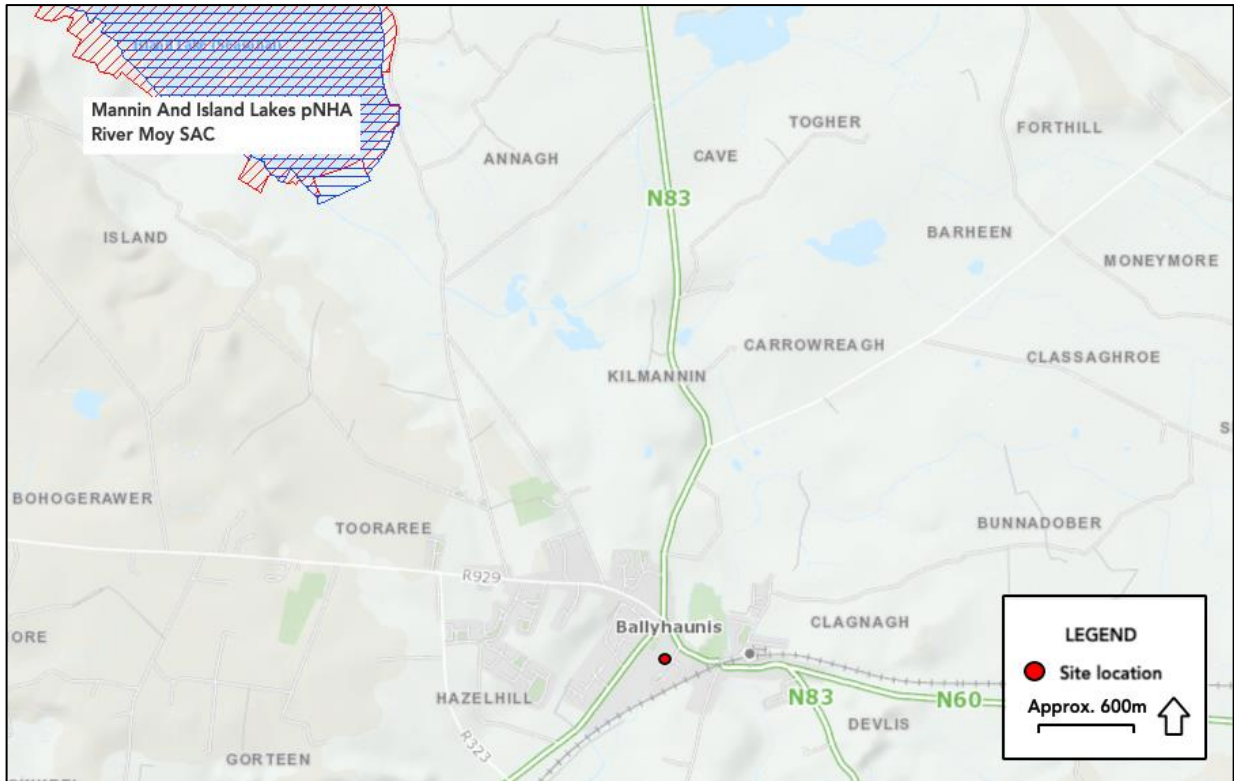
Due to the scale and nature of the proposed project the zone of influence is highly unlikely to extend to 15 km. However, in order to ensure no impact on Natura 2000 sites occurring within 15 km of the project site, all were considered for the initial assessment.

The closest Natura 2000 site is the River Moy SAC. The proposed project is situated within 2.7 km of the River Moy SAC and 7.4 km from Lough Corrib SAC. Ten other Natura 2000 sites fall within a 15 km radius of the site. See Table 1 below for details.

Five Natural Heritage Areas (NHAs) and proposed NHAs (pNHA) lie within 15 km of the site (see Table 2 below). The basic designation for wildlife is the Natural Heritage Area. It is an area considered important for the habitats present, or which holds species of plants and animals whose habitat needs protection.



**Map 1. Natura 2000 sites within 15 km radius of site**  
(Map source: <http://dahg.maps.arcgis.com/apps/webappviewer>)



**Map 2. Natura 2000 sites in close proximity to development site**

(Map source - <https://www.npws.ie/maps-and-data>)

**Table 1: Natura 2000 sites lying in a 15km radius of the proposed development site and connectivity to Natura sites**

Site Code, Name & description	Qualifying Interests (* denotes a priority habitat)	Distance To (m)	Downstream hydrological distance to (m)	Assessment
<p><b>002298 River Moy SAC</b>                      This site comprises almost the entire freshwater element of the River Moy and its tributaries, including both Lough Con and Lough Cullin. The catchment area of 80 km<sup>2</sup>. The river and its tributaries rise in several locations some of which are upland areas dominated by blanket bog and heath. Throughout most of its course the river flows through low-lying countryside consisting mainly of agricultural grassland. In addition to river and lake habitats, the site contains adjoining habitats of ecological interest such as raised bogs, heath, wet grassland, and deciduous woodland.</p>	<p><b>Habitats</b>                      7110 Active raised bogs*                      7120 Degraded raised bogs still capable of natural regeneration                      7150 Depressions on peat substrates of the Rhynchosporion                      7230 Alkaline fens                      91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles                      91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)*  <b>Species</b>                      1096 Brook Lamprey (<i>Lampetra planeri</i>)                      1106 Salmon (<i>Salmo salar</i>)                      1355 Otter (<i>Lutra lutra</i>)                      1092 White-clawed Crayfish (<i>Austropotamobius pallipes</i>)                      1095 Sea Lamprey (<i>Petromyzon marinus</i>)</p>	2732.97	N/A	<p>SAC lies north-east of project site. No direct or indirect hydrological link.</p> <p>Due to no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, it is unlikely for significant effects on this SAC and it's QIs.</p> <p>However, due to the proximity of the SAC to the project site a further assessment will be carried out in Table 3 below.</p>
<p><b>000607 Errit Lough SAC</b>                      Errit Lough is a hard water lake situated in the upper part of the Boyle River catchment, 10 km south-west of Ballaghderreen, Co. Roscommon. Errit Lough is situated in an area of intensive agriculture and is vulnerable to deterioration in water quality</p>	<p><b>Habitats</b>                      3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.</p>	6589.44	N/A	<p>SAC lies north-west of project site. No direct or indirect hydrological link.</p> <p>Due to distance from project site to SAC being over 6.5 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained</p>



through farm pollution and neighbouring forestry activities.				within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.
<p><b>000597 Carrowbehy/Caher Bog SAC</b> Carrowbehy/Caher Bog is a large floodplain bog developed between low drumlin hills in the headwaters of the River Suck, close to Lough O'Flynn and 8 km northeast of Ballyhaunis, Co. Roscommon. Unusually, the bog has partly enveloped a drumlin to the north. The site is a good example of a western raised bog. It is a notably species-rich bog featuring extensive, welldeveloped hummock/pool systems, small in-filling lakes, scarce species and, in places, semi-natural margins undisturbed by recent peat cutting.</p>	<p><b>Habitats</b> 7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion</p>	7297.67	N/A	<p>SAC lies north-west of project site. No direct or indirect hydrological link.</p> <p>Due to distance from project site to SAC being over 7.2 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.</p>
<p><b>000297 Lough Corrib SAC</b> Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included within the SAC as they are important for Atlantic Salmon.</p>	<p><b>Habitats</b> 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) 3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)</p>	7353.99	9804.0	<p>SAC lies south-east of project site. There is a hydrological link from project site to SAC as River Dalgan forms north-west boundary of site.</p> <p>Project site lies adjacent to River Dagan (IE_WE_30D010200), which has a downstream connection to the SAC. The downstream distance from project site to SAC is approximately 9.8 km.</p> <p>Due to the hydrological connection of the SAC to the project site, a further assessment will be carried out in Table 4 below.</p>

	<p>6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>)</p> <p>7110 Active raised bogs*</p> <p>7120 Degraded raised bogs still capable of natural regeneration</p> <p>7150 Depressions on peat substrates of the Rhynchosporion</p> <p>7210 Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion <i>davalliana</i>*</p> <p>7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)*</p> <p>7230 Alkaline fens</p> <p>8240 Limestone pavements*</p> <p>91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</p> <p>91D0 Bog woodland*</p> <p><b>Species</b></p> <p>1096 Brook Lamprey (<i>Lampetra planeri</i>)</p> <p>1092 White-clawed Crayfish (<i>Austropotamobius pallipes</i>)</p> <p>1095 Sea Lamprey (<i>Petromyzon marinus</i>)</p> <p>1393 Slender Green Feather-moss (<i>Drepanocladus vernicosus</i>)</p> <p>1106 Salmon (<i>Salmo salar</i>)</p> <p>1303 Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)</p> <p>1355 Otter (<i>Lutra lutra</i>)</p> <p>1029 Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)</p> <p>1833 Slender Naiad (<i>Najas flexilis</i>)</p>			
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<p><b>001571 Urlaur Lakes SAC</b>          Urlaur Lakes SAC comprises three small hard water lakes - Lough Nanoge, Lough Roe and Urlaur Lough. They lie in the upper catchment of the Lung River, a major tributary of the Boyle River. The site is located approximately 10 km north of Ballyhaunis in Co. Mayo. All three lakes at this site lie on marl.</p>	<p><b>Habitats</b>          3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.</p>	8664.02	N/A	<p>SAC lies north of project site. No direct or indirect hydrological link.</p> <p>Due to distance from project site to SAC being over 8.5 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.</p>
<p><b>000604 Derrinea Bog SAC</b>          Derrinea Bog is a small raised bog site in Co. Roscommon. It is situated on the northern margin of Cloonagh Lough, just east of the Mayo/Roscommon border and approximately 10 km north-west of Ballyhaunis. A river emanating from Cloonagh Lough forms the eastern and northern boundary of the site. The site is an example of a western raised bog. A number of other raised bogs and calcareous lakes lie in close proximity to this site and together they constitute one of the most important ecological areas in the east Mayo/Roscommon region.</p>	<p><b>Habitats</b>          7110 Active raised bogs*          7120 Degraded raised bogs still capable of natural regeneration          7150 Depressions on peat substrates of the Rhynchosporion</p>	9452.86	N/A	<p>SAC lies north-east of project site. No direct or indirect hydrological link.</p> <p>Due to distance from project site to SAC being over 9.4 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.</p>
<p><b>002338 Drumalough Bog SAC</b>          Drumalough Bog is located 5 km north-west of Castlerea in Co. Roscommon, mainly in the townlands of Drumalough, Breanabeg and Cloonflower. The site comprises three separate sub-sites which were once part of an extensive bog complex, but which are now separated by cutover bog. Two of these</p>	<p><b>Habitats</b>          7110 Active raised bogs*          7120 Degraded raised bogs still capable of natural regeneration          7150 Depressions on peat substrates of the Rhynchosporion</p>	9654.55	N/A	<p>SAC lies north-east of project site. No direct or indirect hydrological link.</p> <p>Due to distance from project site to SAC being over 9.5 km, no direct hydrological connection, the size and nature of the proposed project and</p>

sub-sites contain high bog, with associated cutover bog, and the third area is open water (Drumalough) surrounded by wet grassland and freshwater marsh.				the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.
<b>000218 Coolcam Turlough SAC</b> Coolcam Turlough lies in a complex area of eskers, south of Ballinlough, on the borders of Counties Galway and Roscommon,. It is a typical, wet, western turlough, with a semi-permanent lake with marl deposits, as well as several separate, more muddy basins which dry out in summer. The nearby eskers are sinuous, with a general north-south orientation - the turlough basin has this orientation also. The turlough has no permanent inflow but the main basin takes water from a boggy area to the north, and a smaller quantity from the south-west corner.	<b>Habitats</b> 3180 Turloughs*	10537.68	N/A	SAC lies south-east of project site. No direct or indirect hydrological link.  Due to distance from project site to SAC being over 10 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.
<b>000600 Cloonchambers Bog SAC</b> Cloonchambers Bog is a large, relatively intact, undulating bog which lies north of the Ballinlough to Castlerea road, and about 6 km west of Castlerea town in Co. Roscommon. It consists of two elongated peat-filled basins, separated by a strip of grassy, fen vegetation, found where thinner peat merges with mineral soil.	<b>Habitats</b> 7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion	11103.62	N/A	SAC lies south-east of project site. No direct or indirect hydrological link.  Due to distance from project site to SAC being over 11 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.
<b>002296 Williamstown Turloughs SAC</b> Williamstown Turloughs are a suite of turloughs - Curragh, Polleagh (and Polleagh West) and Gortduff - the first two of which	<b>Habitats</b> 3180 Turloughs*	12210.62	N/A	SAC lies south-east of project site. No direct or indirect hydrological link.

<p>are situated alongside the R380 road about 7 km west of Williamstown, Co. Galway. They lie within a complex of esker ridges and raised and valley peats, close to the Shannon - Corrib watershed. Drainage is westwards. To the north-west is the Old Red Sandstone ridge of Slieve Dart and sandstone is probably present at, or close, to the north-west side of Curragh turlough.</p>				<p>Due to distance from project site to SAC being over 12 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.</p>
<p><b>000255 Croaghill Turlough SAC</b>  Croaghill Turlough is situated just to the east of Coolcam in Co. Galway, close to the Dunmore/Ballymoe road. It is a wet turlough, parts of which stay flooded into July. The topography is dominated by glacial deposits, in that eskers and drift slopes surround the turlough, and morainic deposits occur within the basin, giving it an undulating floor. This means that the vegetation of the basin floor has a complex pattern. The wetness of the turlough has led to the accumulation of deep peat, and a 3 m depth is recorded.</p>	<p><b>Habitats</b>  3180 Turloughs*</p>	<p>12389.47</p>	<p>N/A</p>	<p>SAC lies south-east of project site. No direct or indirect hydrological link.</p> <p>Due to distance from project site to SAC being over 12 km, no direct hydrological connection, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on this SAC and it's QIs.</p>

Inner Galway Bay SAC and Galway Bay Complex SAC are also hydrologically connected to the site. Due to a downstream hydrological distance of over 78 km, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects.

**Table 2: Natural Heritage Area lying in a 15 km radius of the proposed development site**

<b>Site Code</b>	<b>Natural Heritage Area</b>	<b>Approximate Distance from site (km)</b>	<b>Connectivity / comment</b>
001618	Attishane Turlough pNHA	6.79	No direct or indirect hydrological connectivity
001645	Lough O'Flynn pNHA	8.34	No direct or indirect hydrological connectivity
000220	Lough Namucka Bog NHA	11.9	No direct or indirect hydrological connectivity
000523	Lough Gower	12.8	No direct or indirect hydrological connectivity
000221	Moorfield Bog/Farm Cottage NHA	14.8	No direct or indirect hydrological connectivity

## **5.0 Assessment of Likely Effects**

The proposed development is not directly connected with or necessary to the management of a Natura 2000 site. In light of this the site must be subject to AA screening for its implications for the Natura 2000 sites in view of the site's conservation objectives "*if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects*" (EC, 2006). The assessment is based on a preliminary impact assessment using available information and data (e.g. NPWS data, water quality data etc.), supplemented with local site information and ecological surveys.

In order, to assess the likely impacts and ascertain whether a significant impact on the integrity of the Natura site is likely to occur as a result of the proposed development it is necessary to consider what constitutes the integrity of a Site as referred to in Article 6(3). The document Managing Natura 2000 Site, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (2000) gives clear guidance and states: "*The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives*".

### **5.1 Direct, indirect or secondary impacts**

The screening analysis below considers each qualifying interest of River Moy SAC and Lough Corrib SAC and lists the potential pathway and potential threat source and whether it is likely to have a significant effect on the qualifying habitats or species of special conservation interest.

**Table 3: River Moy SAC – Screening analysis (using source-pathway-receptor model) to identify SAC qualifying habitats and any “Likely Significant Effects” of impacts on Natura 2000 site, based on current project proposals.**

Qualifying Interests and code (Potential receptors)	Conservation objectives	Pathway / Comment	Source of potential threats	Likelihood of significance
Lowland hay meadows ( <i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i> ) [6510]	To maintain the favourable conservation condition of Lowland hay meadows ( <i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i> ) in River Moy SAC. No attributes and targets currently listed in conservation objectives.	Land/Air pathway	Intensification of agriculture	Habitat has not been mapped for SAC. However, none of this habitat was recorded within or close to site during field visit.  Due to terrestrial nature of this habitat, the size and scale of the proposed project and the fact that works will only occur within site boundary, there is no possibility for significant effects on Lowland hay meadows
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )  91E0	To maintain the favourable conservation condition of Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) in River Moy SAC, which is defined by the following list of attributes and targets:  <b>Attribute:</b> Habitat area <b>Target:</b> Area stable or increasing, subject to natural processes <b>Attribute:</b> Habitat distribution <b>Target:</b> No decline  <b>Attribute:</b> Woodland size	Land/Air pathway  Hydrological pathway	Invasive species, pollution	Habitat within SAC occurs along shores of Lough Conn, known habitat at least 49.7 km from site.  As habitat lies over 49.7 km, and due to the nature and scale of the development, and the fact that development works will only occur within site boundary, there will be no likely significant effect on Alluvial forests.



	<p><b>Target:</b> Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size</p> <p><b>Attribute:</b> Woodland structure: cover and height</p> <p><b>Target:</b> Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer</p> <p><b>Attribute:</b> Woodland structure: community diversity and extent</p> <p><b>Target:</b> Maintain diversity and extent of community types</p> <p><b>Attribute:</b> Woodland structure: natural regeneration</p> <p><b>Target:</b> Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy</p> <p><b>Attribute:</b> Hydrological regime: Flooding depth/height of water table</p> <p><b>Target:</b> Appropriate hydrological regime necessary for maintenance of alluvial vegetation</p> <p><b>Attribute:</b> Woodland structure: dead wood</p> <p><b>Target:</b> At least 30m<sup>3</sup>/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both</p>			
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	<p>categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)</p> <p><b>Attribute:</b> Woodland structure: veteran trees <b>Target:</b> No decline</p> <p><b>Attribute:</b> Woodland structure: indicators of local distinctiveness <b>Target:</b> No decline</p> <p><b>Attribute:</b> Vegetation composition: native tree cover <b>Target:</b> No decline. Native tree cover not less than 95%</p> <p><b>Attribute:</b> Vegetation composition: typical species <b>Target:</b> A variety of typical native species present, depending on woodland type including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp.), oak (<i>Quercus robur</i>) and ash (<i>Fraxinus excelsior</i>)</p> <p><b>Attribute:</b> Vegetation composition: negative indicator species <b>Target:</b> Negative indicator species, particularly non-native invasive species, absent or under control</p>			
Active raised bog 7110	To restore the favourable conservation condition of Active raised bogs in River Moy	Land/Air pathway	Drainage and afforestation of surrounding	The raised bog habitat for which the SAC has been selected occurs at five locations, namely

	<p>SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> Habitat area  <b>Target:</b> Restore area of active raised bog to 132.4ha, subject to natural processes</p> <p><b>Attribute:</b> Habitat distribution  <b>Target:</b> Restore the distribution and variability of active raised bog across the SAC.</p> <p><b>Attribute:</b> High Bog Area  <b>Target:</b> No decline in extent of high bog necessary to support the development and maintenance of active raised bog</p> <p><b>Attribute:</b> Hydrological regime: water levels  <b>Target:</b> Restore appropriate water levels throughout the site</p> <p><b>Attribute:</b> Hydrological regime: flow patterns  <b>Target:</b> Restore, where possible, appropriate high bog topography, flow directions and slopes</p> <p><b>Attribute:</b> Transitional areas between high bog and adjacent mineral soils (including cutover areas)  <b>Target:</b> Restore adequate transitional areas to support/protect active raised bog and the services it provides</p>		<p>habitat, invasive species</p>	<p>Cloongoonagh Bog and a bog cluster that comprises of Derrynabrock Bog, Tawnaghbeg Bog, Kilgarriff Bog and Gowlaun Bog.</p> <p>As the closest bog cluster to the project site (Derrynabrock Bog, Tawnaghbeg Bog, Kilgarriff Bog and Gowlaun Bog) lies over 24.4 km north-east of the project site, and due to the nature and scale of the development, the terrestrial nature of this habitat and the fact that the development works will only occur within site boundary, there will be no significant effect on active raised bogs.</p>
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	<p><b>Attribute:</b> Vegetation quality: central ecotope, active flush, soaks, bog woodland  <b>Target:</b> Restore 66.2ha of central ecotope/active flush/soaks/bog woodland as appropriate</p> <p><b>Attribute:</b> Vegetation quality: micro-topographical features  <b>Target:</b> Restore adequate cover of bog moss (<i>Sphagnum</i>) species to ensure peat-forming capacity</p> <p><b>Attribute:</b> Typical ARB species: flora  <b>Target:</b> Restore, where appropriate, typical active raised bog flora</p> <p><b>Attribute:</b> Typical ARB species: fauna  <b>Target:</b> Restore, where appropriate, typical active raised bog fauna</p> <p><b>Attribute:</b> Elements of local distinctiveness  <b>Target:</b> Maintain features of local distinctiveness, subject to natural processes</p> <p><b>Attribute:</b> Negative physical indicators  <b>Target:</b> Negative physical features absent or insignificant</p> <p><b>Attribute:</b> Vegetation composition: native negative indicator species  <b>Target:</b> Native negative indicator species at insignificant levels</p>			
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	<p><b>Attribute:</b> Vegetation composition: non-native invasive species <b>Target:</b> Non-native invasive species at insignificant levels and not more than 1% cover</p> <p><b>Attribute:</b> Air quality: nitrogen deposition <b>Target:</b> Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr</p> <p><b>Attribute:</b> Water quality <b>Target:</b> Water quality on the high bog and in transitional areas close to natural reference conditions</p>			
<p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles</p> <p>91A0</p>	<p>To maintain the favourable conservation condition of Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles in River Moy SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> Habitat area <b>Target:</b> Area stable or increasing, subject to natural processes</p> <p><b>Attribute:</b> Habitat distribution <b>Target:</b> No decline</p> <p><b>Attribute:</b> Woodland size <b>Target:</b> Diverse structure with a relatively closed canopy containing mature trees;</p>	Land/Air pathway	Invasive species	<p>This habitat is found around shores of Lough Conn and Cullin but none identified close to the site. Potential habitat lies approximately 39.3 km from the site of the proposed development.</p> <p>Due to the nature and scale of the development, the terrestrial nature of this habitat and the fact that the development works will only occur within site boundary, there will be no likely significant effect on Old sessile oak woods.</p>

	<p>subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer</p> <p><b>Attribute:</b> Woodland structure: cover and height  <b>Target:</b> Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer</p> <p><b>Attribute:</b> Woodland structure: community diversity and extent  <b>Target:</b> Maintain diversity and extent of community types</p> <p><b>Attribute:</b> Woodland structure: natural regeneration  <b>Target:</b> Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy</p> <p><b>Attribute:</b> Woodland structure: dead wood  <b>Target:</b> At least 30 m<sup>3</sup>/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter</p> <p><b>Attribute:</b> Woodland structure: veteran trees  <b>Target:</b> No decline</p> <p><b>Attribute:</b> Woodland structure: indicators of local distinctiveness  <b>Target:</b> No decline</p>			
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	<p><b>Attribute:</b> Vegetation composition: native tree cover <b>Target:</b> No decline. Native tree cover not less than 95%</p> <p><b>Attribute:</b> Vegetation composition: typical species <b>Target:</b> variety of typical native species present, depending on woodland type, including oak (<i>Quercus petraea</i>) and birch (<i>Betula pubescens</i>)</p> <p><b>Attribute:</b> Vegetation composition: negative indicator species <b>Target:</b> Negative indicator species, particularly non-native invasive species, absent or under control</p>			
<p>Degraded raised bogs still capable of natural regeneration</p> <p>7120</p>	<p>The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in River Moy SAC</p>	Land/Air pathway	Drainage and afforestation of surrounding habitat	<p>Degraded bog habitat of the SAC is generally associated with raised bog above.</p> <p>As habitat lies over 24.4 km from the site of the proposed works, the nature and scale of the development, the terrestrial nature of this habitat and the fact that the development works will only occur within site boundary, there will be no likely significant effect on degraded raised bogs.</p>
<p>Depressions on peat substrates of the <i>Rhynchosporion</i></p>	<p>Depressions on peat substrates of the <i>Rhynchosporion</i> is an integral part of good quality Active raised bogs (7110) and thus a</p>	Land/Air pathway	Drainage and afforestation of surrounding	<p>Degraded bog habitat of the SAC is generally associated with raised bog above.</p>

7150	separate conservation objective has not been set for the habitat in River Moy SAC		habitat, invasive species	As habitat lies over 24.4 km from the site of the proposed works, the nature and scale of the development, the terrestrial nature of this habitat and the fact that the development works will only occur within site boundary, there will be no likely significant effect on this habitat.
Alkaline Fens 7230	<p>To maintain the favourable conservation condition of Alkaline fens in River Moy SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> Habitat area <b>Target:</b> Area stable or increasing, subject to natural processes</p> <p><b>Attribute:</b> Habitat distribution <b>Target:</b> No decline, subject to natural processes</p> <p><b>Attribute:</b> Hydrological regime <b>Target:</b> Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat</p> <p><b>Attribute:</b> Peat formation <b>Target:</b> Active peat formation, where appropriate</p> <p><b>Attribute:</b> Water quality: nutrients</p>	Land/Air pathway  Hydrological pathway	Drainage and afforestation of surrounding habitat	<p>The full extent of this habitat within the SAC is unknown. An extensive area is known to occur as part of a wetland complex on the Glore River, north-west of Ballyhaunis.</p> <p>Glore River flows south to Mannin Lake which is approximately 5.6 km from project site. There is no direct hydrological connection from project site to Glore River or Mannin Lake. Due to the nature and scale of the development, and the fact that the development works will only occur within the site boundary, there will be no likely significant effect on alkaline fens.</p>



	<p><b>Target:</b> Appropriate water quality to support the natural structure and functioning of the habitat</p> <p><b>Attribute:</b> Vegetation structure: typical species <b>Target:</b> Maintain vegetation cover of typical species including brown mosses and vascular plants.</p> <p><b>Attribute:</b> Vegetation composition: trees and shrubs <b>Target:</b> Cover of scattered native trees and shrubs less than 10%</p> <p><b>Attribute:</b> Physical structure: disturbed bare ground <b>Target:</b> Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%</p> <p><b>Attribute:</b> Physical structure: drainage <b>Target:</b> Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%</p>			
<p>White-clawed crayfish (<i>Austropotamobius pallipes</i>)</p> <p>1092</p>	<p>To maintain the favourable conservation condition of White-clawed Crayfish in River Moy SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> Distribution <b>Target:</b> No reduction from baseline.</p>	<p>Surface water pathway</p> <p>Hydrological pathway</p>	<p>Water pollution, disturbance, poor substrate quality</p>	<p>Population of crayfish are known to be present in River Moy and its tributaries.</p> <p>There will be no direct effects as no instream works will occur. Due to no hydrological connection, the nature and scale of the development and the fact that the development works will only occur within site</p>

	<p><b>Attribute:</b> Population structure: recruitment <b>Target:</b> Juveniles and/or females with eggs in all occupied tributaries</p> <p><b>Attribute:</b> Negative indicator species <b>Target:</b> No alien crayfish species</p> <p><b>Attribute:</b> Disease <b>Target:</b> No instances of disease</p> <p><b>Attribute:</b> Water Quality <b>Target:</b> At least Q3-4 at all sites sampled by EPA</p> <p><b>Attribute:</b> Habitat quality: heterogeneity <b>Target:</b> No decline in heterogeneity or habitat quality</p>			boundary, there will be no likely significant effect on this QI.
<p>Sea lamprey (<i>Petromyzon marinus</i>)</p> <p>1095</p>	<p>To maintain the favourable conservation condition of Sea Lamprey in River Moy SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> Distribution: extent of anadromy <b>Target:</b> Greater than 75% of main stem length of rivers accessible from estuary</p> <p><b>Attribute:</b> Population structure of juveniles <b>Target:</b> At least three age/size groups present</p> <p><b>Attribute:</b> Juvenile density in fine sediment <b>Target:</b> Mean catchment juvenile density at least 1/m<sup>2</sup></p>	<p>Surface water pathway</p> <p>Hydrological pathway</p>	<p>Water pollution, sedimentation</p>	<p>Common in lower section of River Moy around Ballina. Species probably under-recorded.</p> <p>Due to no hydrological connection, the nature and scale of the development, and the fact that the development works will only occur within site boundary, there will be no likely significant effect on this species.</p>

	<p><b>Attribute:</b> Extent and distribution of spawning habitat <b>Target:</b> No decline in extent and distribution of spawning beds</p> <p><b>Attribute:</b> Availability of juvenile habitat <b>Target:</b> More than 50% of sample sites positive</p>			
<p>Brook lamprey (<i>Lampetra planeri</i>)  1096</p>	<p>To maintain the favourable conservation condition of Brook Lamprey in River Moy SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> Distribution <b>Target:</b> Access to all watercourses down to first order streams</p> <p><b>Attribute:</b> Population structure of juveniles <b>Target:</b> At least three age/size groups of brook/river lamprey present</p> <p><b>Attribute:</b> Juvenile density in fine sediment <b>Target:</b> Mean catchment juvenile density of brook/river lamprey at least 2/m<sup>2</sup></p> <p><b>Attribute:</b> Extent and distribution of spawning habitat <b>Target:</b> No decline in extent and distribution of spawning beds</p> <p><b>Attribute:</b> Availability of juvenile habitat <b>Target:</b> More than 50% of sample sites positive</p>	<p>Surface water pathway.</p> <p>Hydrological pathway</p>	<p>Water pollution, sedimentation</p>	<p>River Moy and lakes support important populations.</p> <p>Due to no hydrological connection, the nature and scale of the development, and the fact that the development works will only occur within site boundary, there will be no likely significant effect on this species.</p>

<p>Salmon (<i>Salmo salar</i>)</p> <p>1106</p>	<p>To maintain the favourable conservation condition of Salmon in River Moy SAC, which is defined by the following list of attributes and targets:</p> <p><b>Attribute: Distribution:</b> extent of anadromy  <b>Target:</b> 100% of river channels down to second order accessible from estuary</p> <p><b>Attribute:</b> Adult spawning fish  <b>Target:</b> Conservation limit (CL) for each system consistently exceeded</p> <p><b>Attribute:</b> Salmon fry abundance  <b>Target:</b> Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling</p> <p><b>Attribute:</b> Out-migrating smolt abundance  <b>Target:</b> No significant decline</p> <p><b>Attribute:</b> Number and distribution of redds  <b>Target:</b> No decline in number and distribution of spawning redds due to anthropogenic causes</p> <p><b>Attribute:</b> Water quality  <b>Target:</b> At least Q4 at all sites sampled by EPA</p>	<p>Surface water pathway</p> <p>Hydrological pathway</p>	<p>Water pollution</p>	<p>River Moy system is one of most important in Ireland for salmon populations.</p> <p>Due to no hydrological connection, the nature and scale of the development, and the fact that the development works will only occur within site boundary, there will be no likely significant effect on this species.</p>
<p>Otter (<i>Lutra lutra</i>)</p> <p>1355</p>	<p>To maintain the favourable conservation condition of Otter in River Moy SAC, which is</p>	<p>Land/Air Pathway</p>	<p>Disturbance, destruction of holts</p>	<p>Records of otter within 1.6 km of site.</p>

	<p>defined by the following list of attributes and targets:</p> <p><b>Attribute:</b> distribution <b>Target:</b> No significant decline</p> <p><b>Attribute:</b> Extent of terrestrial habitat <b>Target:</b> No significant decline. Area mapped and calculated as 1068.8 ha</p> <p><b>Attribute:</b> Extent of freshwater (river) habitat <b>Target:</b> No significant decline. Length mapped and calculated as 479.4 km.</p> <p><b>Attribute:</b> Extent of freshwater (lake) habitat <b>Target:</b> No significant decline. Area mapped and calculated as 1248.2 ha.</p> <p><b>Attribute:</b> Couching sites and holts <b>Target:</b> No significant decline.</p> <p><b>Attribute:</b> Fish biomass available <b>Target:</b> No significant decline.</p> <p><b>Attribute:</b> Barriers to connectivity <b>Target:</b> No significant increase.</p>	<p>Surface water pathway. Hydrological pathway</p>	<p>Water pollution</p>	<p>Due to no hydrological connection, no potential for water quality impacts that may affect prey availability, a terrestrial separation distance of 2.7 km to SAC, the nature and scale of the development, no potential for disturbance effects within SAC and the fact that the development works will only occur within site boundary, there will be no likely significant effect on this species.</p>
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**Table 4: Lough Corrib SAC – Screening analysis (using source-pathway-receptor model) to identify SAC qualifying habitats and any “Likely Significant Effects” of impacts on Natura 2000 site, based on current project proposals.**

Qualifying Interests (QI) and code (Potential receptors)	Conservation objectives	Pathway / Comment	Source of potential threats	Likelihood of significance
Oligotrophic waters containing very few minerals of sandy plains ( <i>Littorelletalia uniflorae</i> ) [3110]	To restore the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains ( <i>Littorelletalia uniflorae</i> ) in Lough Corrib SAC, which is defined by the following list of attributes and targets: More information available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Hydrological pathway	Pollution	The distribution of lake habitat 3110 in Lough Corrib SAC has not been fully surveyed.  Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on this habitat.
Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]	To restore the favourable conservation condition of Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Hydrological pathway	Pollution	The full distribution and characteristics of lake habitat 3130 in Lough Corrib SAC have not been mapped. While the characteristic species slender naiad ( <i>Najas flexilis</i> ) was recorded in the western arm of Lough Corrib, that area appears to be dominated by lake habitat 3110, with lake habitat 3130 found towards the northern basin proper.  Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on this habitat.

<p>Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140]</p>	<p>To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a></p>	<p>Hydrological pathway</p>	<p>Pollution</p>	<p>The hard water lake habitat (3140) is found in Lough Corrib, notably the southern basin. Its exact distribution and area has not been mapped, and it is likely to also extend along the eastern side of the northern basin.</p> <p>Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on this habitat.</p>
<p>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]</p>	<p>To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a></p>	<p>Hydrological pathway</p>	<p>Pollution</p>	<p>The description of 3260 is broad, from upland bryophyte/macroalgal dominated stretches, to lowland depositing rivers with pondweeds and starworts. Distribution of the habitat and its sub-types in this SAC is unknown. The vegetation of the River Corrib was documented in Mooney and O'Connell (1990).</p> <p>Potential for habitat to lie downstream of project site and for it to be effect if sedimentation or pollution incident was to occur.</p>
<p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p>	<p>To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) in Lough Corrib SAC in owing list of attributes and targets: More available at:</p>	<p>Land / Air pathway</p>		<p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) occurs mainly as small areas and in association with other habitats in this SAC including other grassland types, fens and limestone pavements and is therefore difficult to map separately.</p>

	<a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>			As the proposed works intend to remain within the site boundary, and due to the terrestrial nature of this habitat and the size and nature of the project there will be no likely significant effect on the habitat. However, potential but small threat from invasive species if Japanese knotweed gets washed downstream to this habitat.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) [6410]	To maintain the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air pathway		<p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) occurs mainly as small areas and in association with other habitats in this SAC such as other grassland types and fens.</p> <p>As the proposed works intend to remain within the site boundary, and due to the terrestrial nature of this habitat and the size and nature of the project there will be no likely significant effect on the habitat. However, potential but small threat from invasive species if Japanese knotweed gets washed downstream to this habitat.</p>
Active raised bogs [7110]	To restore the favourable conservation condition of Active raised bogs* in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	<p>There are two raised bogs for which Active Raised Bog (ARB) has been selected in Lough Corrib SAC: Addergoole Bog and Lough Tee Bog.</p> <p>Addergoole Bog lies approximately 47.8 km south-west of the site. Lough Tee Bog lies approximately 42.9 km south of the site.</p> <p>Due to distance from project site to known habitat within SAC being over 40 km, none</p>



				of this habitat being recorded on or adjacent to project site, the terrestrial nature of this habitat, no potential for drainage effects, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on raised bogs.
Degraded raised bogs still capable of natural regeneration [7120]	The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Lough Corrib SAC.	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	Degraded bog habitat of the SAC is generally associated with raised bog habitat, see above. Habitat within SAC lies over 40 km from the site of the proposed works. Due to distance from project site to known habitat within SAC being over 40 km, none of this habitat being recorded on or adjacent to project site, the terrestrial nature of this habitat, no potential for drainage effects, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on Degraded raised bogs.
Depressions on peat substrates of the Rhynchosporion [7150]	Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Lough Corrib SAC.	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	Depressions on peat substrates of the Rhynchosporion habitat of the SAC is generally associated with raised bog habitat, see above. Habitat within SAC lies over 40 km from the site of the proposed works. Due to distance from project site to known habitat within SAC being over 40 km, none of this habitat being recorded on or adjacent to project site, the terrestrial nature of this habitat, no potential for drainage effects, the size and nature of the proposed project and the proposed works being contained

				within the project site boundary, there is no possibility for significant effects on Degraded raised bogs.
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> [7210]	To maintain the favourable conservation condition of Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> have not been mapped in detail for Lough Corrib SAC.  Potential for habitat to lie downstream of project site and for it to be affected if sedimentation or pollution incident was to occur.
Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220]	To maintain the favourable conservation condition of Petrifying springs with tufa formation ( <i>Cratoneurion</i> )* in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Hydrological pathway	Pollution	Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) have not been mapped within Lough Corrib SAC and thus the total area of the qualifying habitat in the SAC is unknown.  Potential for habitat to lie downstream of project site and for it to be effected if sedimentation or pollution incident was to occur.
Alkaline fens [7230]	To maintain the favourable conservation condition of Alkaline fens in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	Alkaline fens have not been mapped in detail for Lough Corrib SAC and thus total area of the qualifying habitat is unknown.  Potential for habitat to lie downstream of project site and for it to be effected if sedimentation or pollution incident was to occur.
Limestone pavements [8240]	To maintain the favourable conservation condition of Limestone pavements* in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at:	Land / Air pathway	Invasive species, scrub encroachment	Lough Corrib SAC, limestone pavements occur along the southern and eastern margins of Lough Corrib and more extensively in the southern part of the SAC.

	<a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>			None of this habitat being recorded on or adjacent to project site. As mapped habitat lies over 54 km south-west of the site of the proposed works, and due to the terrestrial nature of this habitat and the size and nature of the project there will be no likely significant effect on the habitat.
Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	To maintain the favourable conservation condition of Old sessile oak woods with Ilex and Blechnum in the British Isles in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	<p>Most of the woodland in Lough Corrib SAC occurs as narrow belts of low woodland around the lake, with occasional larger stands. Further un-surveyed areas of old oak woodland may to be present within the SAC, including at the Hill of Doon and on some of the islands in the lake.</p> <p>None of this habitat being recorded on or adjacent to project site. As mapped habitat lies over 51 km north-west from the site of the proposed works, and due to the terrestrial nature of this habitat and due to the size and nature of the project there will be no likely significant effect on the habitat.</p>
Bog woodland [91D0]	To maintain the favourable conservation condition of Bog woodland* in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air pathway	Drainage, afforestation of surrounding habitat, invasive species	<p>Bog woodland occurs on Addergoole Bog in Lough Corrib SAC and is regarded as a component of the Active raised bogs habitat (7110) of that bog.</p> <p>As habitat lies over 54 km south-west from the site of the proposed works, and due to the terrestrial nature of this habitat, no potential for drainage impacts that may affect this habitat, and due to the size and</p>

				nature of the project there will be no likely significant effect on the habitat.
<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]	To restore the favourable conservation condition of Freshwater Pearl Mussel in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Surface water pathway  Hydrological connection	Water pollution, disturbance, poor substate quality	<p>The conservation objective applies to the Owenriff freshwater pearl mussel population, which lies on the western side of Lough Corrib. The species is widespread in the Owenriff catchment, being found in the lower reaches of the Glengawbeg River, from Lough Agraffard to just upstream of the mouth of Lough Corrib in the Owenriff, and also in the Derrygauna tributary. The Owenduff lies on the western side of Lough Corrib.</p> <p>The Owenriff is in a separate WFD River Sub Basins the OWENRIF (CORRIB)_020 to the River Dalgan WFD River Sub Basins DALGAN_010 and there is no direct connection between the two even though they both drain into Lough Corrib.</p> <p>Therefore, there will be no likely significant effect on the species.</p>
<i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]	To maintain the favourable conservation condition of White-clawed Crayfish in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Surface water pathway  Hydrological connection	Water pollution, disturbance, poor substate quality	<p>White-clawed crayfish (<i>Austropotamobius pallipes</i>) is recorded from the entire lengths of the four main tributaries of the River Clare. The distribution of crayfish in Lough Corrib is uncertain but is probably widely distributed.</p> <p>Species has been recorded in the River Dalgan that passes along north-western border of site (at M496794) and also downstream of the project site at grid</p>

				<p>reference M480729, just outside the SAC boundary.</p> <p>There will be no direct effects as no instream works will occur. However, potential for species to be affected if sedimentation or pollution incident was to occur.</p>
Petromyzon marinus (Sea Lamprey) [1095]	To restore the favourable conservation condition of Sea Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	<p>Surface water pathway</p> <p>Hydrological connection</p>	Water pollution, sedimentation	<p>Sea lamprey spend much of their lives at sea only returning to rivers to spawn. However, juvenile lamprey (<i>ammocoetes</i>) live in river sediments. Ammocoetes are relatively immobile in the substrate and tend to concentrate in areas that include many age classes making them very susceptible to pollution.</p> <p>There will be no direct effects as no instream works will occur. However, as ammocoetes are susceptible to water pollution they could be affected indirectly if water quality of river was impacted by sedimentation or a pollution incident during construction works.</p>
<i>Lampetra planeri</i> (Brook Lamprey) [1096]	To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	<p>Surface water pathway</p> <p>Hydrological connection</p>	Water pollution, sedimentation	<p>Brook lamprey are an entirely freshwater species. The juvenile lamprey, <i>Ammocoetes</i>, are relatively immobile in the substrate and tend to concentrate in areas that include many age classes making them very susceptible to pollution.</p> <p>There will be no direct effects as no instream works will occur. However, as brook lamprey are susceptible to water</p>

				pollution they could be affected indirectly if water quality of river was impacted by sedimentation or a pollution incident during construction works.
<i>Salmo salar</i> (Salmon) [1106]	To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Surface water pathway  Hydrological connection	Water pollution	Salmon are known to occur in Lough Corrib and it's tributaries.  There will be no direct effects as no instream works will occur. However, salmon could be affected indirectly if water quality of river was impacted by sedimentation or a pollution incident during construction works.
<i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	To restore the favourable conservation condition of Lesser Horseshoe Bat in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air Pathway	Disturbance	Lough Corrib SAC has been selected for lesser horseshoe bats because of the presence of one important summer roost (roost id. 217 in NPWS database). Lesser horseshoe bats use buildings as roosts. While there is an old building on site there are no records of lesser horseshoe bat in or around Ballyhaunis (generally the species has a more westerly distribution).  As a precaution the external areas of the old buildings (convent and outbuildings) were checked visually and while there were potential access holes there was no evidence of use by bats, and there was no sign of staining. It should be noted that the building is however two storey high and all visual inspections were made from ground level.

				<p>Species has been recorded over 20 km from the site of the proposed works.</p> <p>There will be no significant decline of foraging habitat within 2.5km of qualifying roosts and no significant decline of linear features within 2.5km of qualifying roosts</p> <p>There will be no significant increase in artificial lighting adjacent to roosts or along commuting routes within 2.5 km.</p> <p>All external lights of development will be downfacing and low key.</p>
<i>Lutra lutra</i> (Otter) [1355]	To maintain the favourable conservation condition of Otter in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	<p>Land/Air Pathway</p> <p>Surface water Pathway</p> <p>Hydrological pathway</p>	<p>Disturbance, destruction of holts</p> <p>Water pollution</p>	<p>Nearest otter records are within 1 km of the site. The bank leading to the river from the project site is steep and parts are inaccessible due to brambles. However, the areas searched showed no evidence of otter holts, tracks or scats. Otters are likely to use the River Dalgan but are unlikely to stay within proximity of the town which is busy and otters would be disturbed by general activity.</p> <p>No instream works or works that will impact the banks will occur due to this project. However, otters could be affected indirectly by prey availability if water quality of river was impacted by sedimentation or a pollution incident during construction works.</p>
<i>Najas flexilis</i> (Slender Naiad) [1833]	To restore the favourable conservation condition of Slender Naiad in Lough Corrib SAC, which is	Surface water Pathway	Water pollution	Slender Naiad is small, annual submerged macrophyte that is found in lowland, clear-

	defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Hydrological pathway		<p>water lakes. The location of the only record for the species in Upper Corrib in a north-western bay though it is possible that habitat for the species occurs elsewhere in the upper basin, particularly towards the west.</p> <p>Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on Slender Naiad.</p>
<i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]	To maintain the favourable conservation condition of Slender Green Feather-moss (Shining Sicklemoss) in Lough Corrib SAC, which is defined by the following list of attributes and targets: More available at: <a href="https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a>	Land / Air Pathway	Destruction of habitat Drainage	<p>The known population of slender green feather-moss (<i>Hamatocaulis vernicosus</i>) in Lough Corrib SAC occurs at NW of Gortachalla Lough in transition mire which is bounded to the west by acid bog.</p> <p>As species has been recorded over 51 km south-west from the site of the proposed works, the terrestrial nature of this species and due to the size and nature of the project, and works only occurring within site boundary there will be no likely significant effect on the habitat.</p>



There are eleven Natura 2000 sites within a 15km radius of the proposed project, all of which are SACs.

The proposed project is not situated within any of the SACs or SPAs. Therefore, no direct impacts will occur through habitat loss or fragmentation of habitats or species. The proposed project is situated within 2.7 km of the River Moy SAC, though there is no hydrological connection to this SAC. The proposed project is located 7.4 km from Lough Corrib SAC and is hydrologically connected through the River Dalgan.

The proposed project borders the River Dalgan (EPA Code: IE\_WE\_30D010200) to the north-west of the project site. The river has a downstream distance of 9.8 km to Lough Corrib SAC. The river has a “Poor” River Waterbody WFD Status 2013-2018. Lough Corrib SAC is located downstream. While the distance to some of the qualifying interests of this SAC and the size and scale of the proposed project means that there can be no effect, other qualifying interests lie 9.8 km downstream and there is small potential for effect if water quality is impacted during works.

Japanese knotweed occurs onsite. The patch within the site boundary has about six stems, so is relatively small. Further patches of knotweed occur outside of the site boundary close to the riverbank. If care is not taken during works, there is a possibility that Japanese knotweed could be washed into the river and spread downstream to the Lough Corrib SAC. Even tiny fragments of knotweed can become rooted, and it may well be how the knotweed had spread along the riverbank in this area.

Disturbance (e.g., for otter) will not be an issue as project is located in an urban area where there is already a lot of noise and human activity. There is potential that otters will use the river to commute and possibly even feed, but they are unlikely to remain in the vicinity due to the busy nature of the location.

While numerous qualifying species are recorded for the SACs there are no existing records of them occurring on site, though White- Clawed Crayfish have been recorded within 100 m of the site, though the record is from 1989 and is upstream of proposed works (see Appendix 4).

## **5.2 Cumulative Impacts – other projects**

Under Appropriate Assessment it is necessary to investigate if there are any other projects or plans that together with the project outlined here could affect the Natura 2000 Sites. Table 5 below lists other proposed plans accesses through the Mayo County Council planning database.

**Table 5: Planning application near proposed development site**

(Data source:

<https://mayococo.maps.arcgis.com/apps/webappviewer/index.html?id=2b1fc4da0e214d25b5727fecb908ae27>

date of search 20/10/2021)

Mayo County Council Planning Number	Details	Is there a risk of significant impact or in combination effects from the plans
20993 Old Convent accommodation centre, Abbeyview, Ballyhaunis, Co Mayo.	Retention of existing temporary prefab, for a period of 5 years for childcare services, 8 car parking spaces and all associated site works.	Having regard to policies and objectives of the Mayo County Development plan 2014 – 2020, and due to temporary permission, there are no risk of significant impacts on any adjacent Natura 2000 sites.
20212 Abbey Street , Ballyhaunis , Co Mayo.	The development will consist of the retention of existing prefab crèche and all associated site works and services.	Further information has been requested for this application.
21449 Abbeyquarter, Ballyhaunis, Co Mayo.	Erection of classroom addition approximately 82 square metres, along with all associated site works.	The proposed development, by itself, or in combination with others would not be likely to have a significant effect on any surrounding Natura 2000 site(s).
21769 Hazelhill, Clare street, Ballyhaunis, Co Mayo.	Construction of a storage shed for mid-western radio stations, outside broadcasting unit / road cruiser, along with all associated site works.	The proposed development, by itself, or in combination with others would not be likely to have a significant effect on any surrounding Natura 2000 site(s).
21736 Mainstreet, Ballyhaunis, Co Mayo.	Change of use of ground floor retail use to a coffee shop and restaurant and the provision of signage to the front elevation of the building along with all associated services.	The proposed development, by itself, or in combination with others would not be likely to have a significant effect on any surrounding Natura 2000 site(s).
201027 Upperstreet, Ballyhaunis, Co Mayo.	Construct of a single story discount food store and upgrade of existing laneway from upper main street, the provision of an ESB substation as well as landscaping, boundary treatments and site works.	Having regard to mitigation methods set out in AA report it can be concluded that the proposed development, by itself, or in combination with others would not be likely to have a significant effect on any surrounding Natura 2000 site(s).
2027, Devlis, Ballyhaunis, Co Mayo.	Retain extension constructed to rear dwelling house, together with all associated site works and services.	The proposed development, by itself, or in combination with others would not be likely to have a significant effect on any surrounding Natura 2000 site(s).
2147 Carrownalugaun, Doctors Road, Ballyhaunis, Co Mayo.	Warehouse and loading / off-loading bay extension to existing warehouse, together with all associated site works.	Further information has been requested for this application.
21644 Hazelhill,	Construction of a new residential dwelling, shed and connection to	The proposed development, by itself, or in combination with others would

Ballyhaunis, Co Mayo.	public foul sewer, together with all associated ancillary site works and services.	not be likely to have a significant effect on any surrounding Natura 2000 site(s).
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**Table 6: An Bord Pleanála Planning Appeals near proposed development site**

(Data source: <https://www.pleanala.ie/en-ie/home/>, date of search 20/10/2021, Search townland of Ballyhaunis for 2020-2021)

<b>Application Number</b>	<b>Description</b>	<b>Is there a risk of significant impact or in combination effects from the plans</b>
308469: Curries, Ballyhaunis, Co Mayo (20355)  Mayo County Council.	Construction of a house.	No information available as appeal withdrawn.
308660: Greenwood, Ballyhaunis, County Mayo. (19174)  Mayo County Council.	Demolition of 2 broiler chicken houses with a population of 24,000 birds and the construction of 1 Replacement broiler chicken house with a population of 40,000 birds.	In overall conclusion, the Board was satisfied that the proposed development would not adversely affect the integrity of European sites in view of the sites' Conservation Objectives and there is no reasonable scientific doubt as to the absence of such effects. There is no reasonable doubt as to the absence of adverse effects based on the nature of the activities to be undertaken on the subject site including the removal of waste by a licenced contractor, the separation distance between the subject site and the Special Areas of Conservation in question, the absence of any hydrological connection in the vicinity of the subject site and the Special Areas of Conservation in question, and the very limited potential for the proposed development to result in the pollution of underlying groundwaters.

### 5.3 Cumulative impacts – other plans

It is a requirement of Appropriate Assessment that the ‘in-combination’ (the cumulative development with any other plans) effects be assessed. A search of Mayo County Council Planning enquiry system was conducted for plans that may have in-combination effects on the listed Natura 2000 sites.

**Table 7: Other plans and possible impacts**

Plan	Summary objectives	Possible impacts from plans	Is there a risk of significant in combination effects from the plans
Mayo County Development Plan 2014-2020 Volume 1, 2014	1: To promote rural sustainability by encouraging more people to live in Rural Areas through the promotion of sustainable rural communities and economic development. 2: To attract investment and people into the County. 3: To ensure a sustainable economy. 4: To adopt ‘green principles’ that promote a high quality of life. 5: To create attractive settlements that promote a high quality of life. 6: To maintain and provide additional services for our citizens, investors and visitors. 7: To protect and enhance our natural environment. 8: To offer visitors, from Ireland and overseas, a range of high quality experiences.	No negative impacts envisaged	Screening completed for this plan – no significant ‘in combination’ effects
River Basin Management Plan for Western River Basin District in Ireland	1. Prevent deterioration 2. Restore good status 3. Reduce chemical pollution 4. Achieve water related protected areas objectives.	No negative impacts envisaged	Screening completed for this plan – no significant ‘in combination’ effects

In reviewing the above plans and projects and the best objective information, no cumulative effects were identified as a result of the proposed projects that could cause significant effects. No impacts were identified that might arise from the combination of projects and plans with the proposed project.

## 6.0 Screening Conclusion and Statement

The screening process identified eleven Natura 2000 sites within a 15km radius of the proposed project, all of which were SACs. The proposed project is situated within 2.7 km from the River Moy SAC and 7.4 km from Lough Corrib SAC.

See also Screening Matrix in Appendix 1.

The screening exercise concludes that potential significant effects on some of the qualifying interests of Lough Corrib SAC are likely or uncertain.

Based on the information contained in this Screening Report, it was not considered possible to rule out the potential for significant effects of the proposed project on the conservation objectives of the following European site, whether alone or in-combination with other plans or projects:

- Lough Corrib SAC

Signed

Dr. Karina Dingerkus (Ecologist)

## SECTION 2

### 7.0 Natura Impact Statement to inform Appropriate Assessment

#### 7.1 Introduction

The impact of a project or plan alone and in combination with other projects or plans on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function. The Natura Impact Statement provides information to aid the competent authority in making the Appropriate Assessment.

The Stage 1 Screening concluded that there was potential for Lough Corrib SAC to be affected by the development (see Table 3 above), due to the potential for sediment run off and pollution from the site into the adjacent River Dalgan which is hydrologically linked to Lough Corrib SAC. In addition, Japanese knotweed on site could get washed down river to the SAC. Therefore, it is necessary to prepare a Natura Impact Statement that outlines mitigation measures to prevent sediment run-off and pollution.

#### 7.2 Conservation Objectives of Lough Corrib SAC

The general aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. European and national legislation places a shared obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network (SACs and SPAs) at favourable conservation status. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, is stable or increasing.
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The Conservation Objectives of the Lough Corrib SAC are listed in Table 4 above.

### 7.3 Impact Prediction

The proposed project is not situated within any of the SACs or SPAs. Therefore, no direct impacts will occur through habitat loss or fragmentation of habitats or species. The proposed project is located 7.4 km from Lough Corrib SAC and is hydrologically connected through the River Dalgan.

The proposed project borders the River Dalgan (EPA Code: IE\_WE\_30D010200) to the north-west of the project site. The river has a downstream distance of 9.8 km to Lough Corrib SAC. The river has a “Poor” River Waterbody WFD Status 2013-2018. Lough Corrib SAC is located downstream. While the distance to some of the qualifying interests of this SAC and the size and scale of the proposed project means that there can be no effect, other qualifying interests potentially lie 9.8 km downstream and there is small possibility for effect if water quality is impacted during works.

In addition, Japanese knotweed occurs onsite. The patch within the site boundary has about six stems, so is relatively small. Further patches of knotweed occur outside of the site boundary close to the riverbank. If care is not taken during works, there is a possibility that Japanese knotweed could be washed into the river and spread downstream to the Lough Corrib SAC. Even tiny fragments of knotweed can become rooted, and it may well be how the knotweed had spread along the riverbank in this area.

Disturbance (e.g., for otter) will not be an issue as project is in an urban area where there is already a lot of noise and human activity. There is a possibility that otters will use the river to commute and possibly even feed, but they are unlikely to remain in the vicinity due to the busy nature of the location.

While numerous qualifying species are recorded for the SACs there are no existing records of them occurring on site, though White-Clawed Crayfish have been recorded within 100 m of the site, though the record is from 1989, and is upstream of proposed works (see Appendix 4).

**Table 8: Lough Corrib SAC qualifying interests - assessment of potential impacts on qualifying interest assessed as having potential impact at Pre-Screening stage.**

Qualifying Interests (QI) and code (Potential receptors)	Assessment	Source of Potential Threats/Pressures from project	If the potential for an adverse effect on this QI / SCI exists, are mitigation required to prevent impact
Oligotrophic waters containing very few minerals of sandy plains ( <i>Littorelletalia uniflorae</i> ) [3110]	Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on this habitat.	No threats from this project due to distance to lough and size and scale of development.	No mitigation required
Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130]	Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on this habitat.	No threats from this project due to distance to lough and size and scale of development.	No mitigation required
Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. [3140]	Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on this habitat.	No threats from this project due to distance to lough and size and scale of development.	No mitigation required
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and	Potential for habitat to lie downstream of project site and for it to be effect if sedimentation or pollution incident was to occur.	Surface – water pathway  Potential threats arising from this project are: <ul style="list-style-type: none"><li>• Release of sediment to receiving waters.</li></ul>	Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals



Callitricho-Batrachion vegetation [3260]		<ul style="list-style-type: none"> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) [6210]	As the proposed works will remain within the site boundary, and due to the terrestrial nature of this habitat and the size and nature of the project there will be no likely significant effect on the habitat. However, potential threat from invasive species if Japanese knotweed gets washed downstream to this habitat.	Potential threat from invasive species Japanese knotweed if it got washed downstream to SAC.	Spread of invasive species could impact this habitat. Recommend an invasive species management plan is prepared for the project.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) [6410]	As the proposed works intend to remain within the site boundary, and due to the terrestrial nature of this habitat and the size and nature of the project there will be no likely significant effect on the habitat. However, potential but small threat from invasive species if Japanese knotweed gets washed downstream to this habitat.	Potential threat from invasive species Japanese knotweed if it got washed downstream to SAC	Spread of invasive species could impact this habitat. Recommend an invasive species management plan is prepared for the project.
Active raised bogs [7110]	Due to distance from project site to known habitat within SAC being over 40 km, none of this habitat being recorded on or adjacent to project site, the terrestrial nature of this habitat, no potential for drainage effects, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required

	possibility for significant effects on raised bogs.		
Degraded raised bogs still capable of natural regeneration [7120]	Due to distance from project site to known habitat within SAC being over 40 km, none of this habitat being recorded on or adjacent to project site, the terrestrial nature of this habitat, no potential for drainage effects, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on Degraded raised bogs.	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required
Depressions on peat substrates of the Rhynchosporion [7150]	Due to distance from project site to known habitat within SAC being over 40 km, none of this habitat being recorded on or adjacent to project site, the terrestrial nature of this habitat, no potential for drainage effects, the size and nature of the proposed project and the proposed works being contained within the project site boundary, there is no possibility for significant effects on Degraded raised bogs.	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210]	Potential for habitat to lie downstream of project site and for it to be affected if sedimentation or pollution incident was to occur.	Surface – water pathway Potential threats arising from this project are: <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> </ul>	Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.  See detailed mitigation in Section 7.4 below.

		<ul style="list-style-type: none"> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	
Petrifying springs with tufa formation ( <i>Cratoneurion</i> ) [7220]	Potential for habitat to lie downstream of project site and for it to be affected if sedimentation or pollution incident was to occur.	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
Alkaline fens [7230]	Potential for habitat to lie downstream of project site and for it to be affected if sedimentation or pollution incident was to occur.	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
Limestone pavements [8240]	None of this habitat being recorded on or adjacent to project site. As mapped habitat lies over 54 km south-west of the site of the	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required

	proposed works, and due to the terrestrial nature of this habitat and the size and nature of the project there will be no likely significant effect on the habitat.		
Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	None of this habitat being recorded on or adjacent to project site. As mapped habitat lies over 51 km north-west from the site of the proposed works, and due to the terrestrial nature of this habitat and due to the size and nature of the project there will be no likely significant effect on the habitat.	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required
Bog woodland [91D0]	As habitat lies over 54 km south-west from the site of the proposed works, and due to the terrestrial nature of this habitat, no potential for drainage impacts that may affect this habitat, and due to the size and nature of the project there will be no likely significant effect on the habitat.	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required
<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029]	The conservation objective applies to the Owenriff freshwater pearl mussel population, which lies on the western side of Lough Corrib. The Owenriff is in a separate WFD River Sub Basins the OWENRIFF (CORRIB)_020 to the River Dalgan WFD River Sub Basins DALGAN_010 and there is no direct connection between the two even though they both drain into Lough Corrib.  Therefore, there will be no likely significant effect on the species.	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required

<p><i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</p>	<p>Species has been recorded in the River Dalgan that passes along north-western border of site (at M496794) and also downstream of the project site at grid reference M480729, just outside the SAC boundary.</p> <p>There will be no direct effects as no instream works will occur. However, potential for species to be affected if sedimentation or pollution incident was to occur.</p>	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
<p><i>Petromyzon marinus</i> (Sea Lamprey) [1095]</p>	<p>There will be no direct effects as no instream works will occur. However, as ammocoetes are susceptible to water pollution they could be affected indirectly if water quality of river was impacted by sedimentation or a pollution incident during construction works.</p>	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
<p><i>Lampetra planeri</i> (Brook Lamprey) [1096]</p>	<p>There will be no direct effects as no instream works will occur. However, as brook lamprey are susceptible to water pollution they could be affected indirectly if water quality of river was impacted by sedimentation or a pollution incident during construction works.</p>	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>

<p><i>Salmo salar</i> (Salmon) [1106]</p>	<p>Salmon are known to occur in Lough Corrib and its tributaries.</p> <p>There will be no direct effects as no instream works will occur. However, salmon could be affected indirectly if water quality of river was impacted by sedimentation or a pollution incident during construction works.</p>	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
<p><i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]</p>	<p>Lough Corrib SAC has been selected for lesser horseshoe bats because of the presence of one important summer roost (roost id. 217 in NPWS database). Lesser horseshoe bats use buildings as roosts. While there is an old building on site there are no records of lesser horseshoe bat in or around Ballyhaunis (generally the species has a more westerly distribution).</p> <p>As a precaution the external areas of the old buildings (convent and outbuildings) were checked visually and while there was potential access holes there was no evidence of use by bats, and there was no sign of staining. It should be noted that the building is however two storey high and all visual inspections were made from ground level.</p> <p>Species has been recorded over 20 km from the site of the proposed works.</p>	<p>Building onsite is unlikely to be used by lesser horseshoe bat as there are no records of lesser horseshoe bat in or around Ballyhaunis (generally the species has a more westerly distribution).</p>	<p>As a precaution, it is recommended that a bat survey be conducted prior to works commencing on the building.</p>

	<p>There will be no significant decline of foraging habitat within 2.5km of qualifying roosts and no significant decline of linear features within 2.5km of qualifying roosts</p> <p>There will be no significant increase in artificial lighting adjacent to roosts or along commuting routes within 2.5 km.</p> <p>All external lights of development will be downfacing and low key.</p>		
<p><i>Lutra lutra</i> (Otter) [1355]</p>	<p>Nearest otter records are within 1 km of the site. The bank leading to the river from the project site is steep and parts are inaccessible due to brambles. However, the areas searched showed no evidence of otter holts, tracks or scats. Otters are likely to use the River Dalgan but are unlikely to stay within proximity of the town which is busy and otters would be disturbed by general activity.</p> <p>No instream works or works that will impact the banks will occur due to this project. However, otters could be affected indirectly by prey availability if water quality of river was impacted by sedimentation or a pollution incident during construction works.</p>	<p>Surface – water pathway</p> <p>Potential threats arising from this project are:</p> <ul style="list-style-type: none"> <li>• Release of sediment to receiving waters.</li> <li>• Release of levels of nutrients into the water, which could lead to oxygen depletion in the water.</li> <li>• Release of chemicals (pesticides, fuels, hydraulic oils) into watercourses</li> </ul> <p>Disturbance will not be an issue as site is within can urban area where otters will be used to regular human activity.</p>	<p>Release of suspended solids can impact this habitat. To protect water quality for this qualifying interest, mitigation measures are required in order to minimise release of suspended solids and release of no chemicals into the water.</p> <p>See detailed mitigation in Section 7.4 below.</p>
<p><i>Najas flexilis</i> (Slender Naiad) [1833]</p>	<p>Slender Naiad is small, annual submerged macrophyte that is found in lowland, clear-water lakes. The location of the only record for the species in Upper Corrib in a north-western bay though it is possible that habitat</p>	<p>No threats from this project due to distance to habitat and size and scale of development.</p>	<p>No mitigation required</p>

	for the species occurs elsewhere in the upper basin, particularly towards the west. Due to a downstream hydrological distance of over 42 km to the lough, the size and scale of the proposed project and the assimilative capacity of the intervening waterways there is no possibility for significant effects on Slender Naiad.		
<i>Hamatocaulis vernicosus</i> (Slender Green Feather-moss) [6216]	The known population of slender green feather-moss ( <i>Hamatocaulis vernicosus</i> ) in Lough Corrib SAC occurs at NW of Gortachalla Lough in transition mire which is bounded to the west by acid bog. As species has been recorded over 51 km south-west from the site of the proposed works, the terrestrial nature of this species and due to the size and nature of the project and works only occurring within site boundary there will be no likely significant effect on the habitat.	No threats from this project due to distance to habitat and size and scale of development.	No mitigation required



## 7.4 Cumulative Impacts

Under Appropriate Assessment it is necessary to investigate if there are any other projects or plans that together with the project outlined here could affect the Natura 2000 Sites. Table 5 in section 1 above lists other proposed plans accesses through the Mayo County Council planning database.

It is a requirement of Appropriate Assessment that the 'in-combination' (the cumulative development with any other plans) effects be assessed. Table 6 in section 1 above lists other plans.

## 7.5 Measures to Mitigate Potential Adverse Impacts

Mitigation refers to *measures taken to avoid or reduce negative impacts and effects* (CIEEM 2018).

The evaluation of likely significant impacts of the proposed development includes recommendations for specific measures to avoid and reduce any negative impacts of a project (i.e. mitigation measures). These measures are considered necessary to minimise environmental impacts associated with the proposed development. Avoiding and/or minimising negative impacts is best achieved through consideration of potential impacts of the proposed project from the initial stages.

To minimise environmental impacts, it is important in the first instance that the following general principles are taken on board:

- Implementation of good work practices on site
- Working in accordance with relevant legislation, for example, (Wildlife Acts 1976 to 2021 and European Communities (Birds and Natural Habitats) Regulations 2011-2021).
- Contractors shall ensure adequate site supervision and security.
- Contract workers shall be briefed to ensure that environmental issues are taken into consideration and that guidelines and codes of practice are followed.
- 

### 7.5.1 *Habitat Loss*

No area of qualifying habitat will be lost from Natura 2000 sites, so no mitigation is proposed.

### 7.5.2 *Fragmentation*

No direct mitigation is proposed as no fragmentation of Natura 2000 sites will occur.

### 7.5.3 *Disturbance*

No direct mitigation is proposed as no disturbance of qualifying interests is expected to occur.

#### **7.5.4 Species impact**

##### BATS

Potential for bats to use site. While Lesser horseshoe bat are not predicted to occur at this site as the species tends to have a more westerly distribution, a bat survey is recommended prior to works commencing on the building.

##### INVASIVE SPECIES

Japanese knotweed occurs on the site boundary and just outside the site boundary. An Invasive Species Management Plan is recommended in order to ensure Japanese knotweed is not spread downstream to Lough Corrib SAC.

There is a small risk of potential spread of an invasive species which will have negative impact on native species. It is important that care is taken to ensure that Japanese knotweed (an invasive species) is not spread during proposed works. Japanese knotweed spreads through various means (see Appendix 6). The root system are rhizomes which can extend to depths of 3 metres to 7 metres across from the parent plant. The plants can regenerate from tiny fragments. Cut fresh stems can produce fresh shoots and roots from nodes when immersed in soil or water. Tiny fragments of rhizome can also result in new plants.

Managing invasive species can be challenging and many factors need to be considered in achieving safe and effective control. It is recommended that a detailed management plan for the control of Japanese knotweed is completed for the site. Japanese knotweed is very difficult to eradicate successfully. At best it can be controlled and left in a dormant stage. The treatment programme should be reviewed annually by a certified surveyor. Chemical control may not be suitable for this site due to the proximity to the river. Even with control measures in place it will be important for the owners to remain vigilant to ensure that any new growth is detected as plants can remain dormant for decades.

Biosecurity measures are vital to ensure the knotweed does not spread beyond the site and these measures should be outlined in detail in the Invasive Species Management Plan. Contractor / Operatives should receive training on potential species impacts. This should include how invasive species are spread. Contractor / Operatives should receive training on identifying Japanese knotweed in all its growth stage. Additional biosecurity measures recommended include the following:

- On site foot baths and clean down zones to be provided as footwear acts as a vector for the spread of invasive plants.
- Any machinery being brought to site must be inspected for any soils that may contain invasive plant material before being allowed to enter the work zone. Machinery should also be checked when leaving site.
- Management records and biosecurity records to be updated on a daily basis and attached to the management plan, all records to be signed and dated.
- No grass cutting or strimming in area of stand.
- Regrowth monitoring to take place from late July in subsequent years.

Herbicide treatment of Japanese knotweed will be difficult in this area due to its proximity to the River Dalgan. See [http://invasivespeciesireland.com/wp-content/uploads/2021/09/Good Practice Management - Japanese knotweed-1.pdf](http://invasivespeciesireland.com/wp-content/uploads/2021/09/Good_Practice_Management_-_Japanese_knotweed-1.pdf) for more information.

### AQUATIC SPECIES

No aquatic species impacts are predicted if water quality is not impacted. Water quality is dealt with in 7.5.6 below.

#### **7.5.5 Water Resource**

No direct mitigation is proposed as water resource will not be impacted.

#### **7.5.6 Water Quality**

Mitigation measures aim to eliminate both the discharge of polluting materials (e.g. fuel or oil from vehicles; concrete etc.) and the mobilisation of silts and sediments into the watercourses. Pollution may occur following accidents that result in spillage of fuel or other materials. Strict pollution prevention measures must be implemented during construction of the new dwelling, garage and all associated works to avoid siltation or discharge of pollutants into nearby drains as these are potentially hydrologically linked to the River Moy SAC.

#### Pre-construction

- All machinery should be jet-washed in approved facility prior to arrival on site to ensure there is no cross contamination.

#### Construction site set-up

##### *Sediment control measures*

- During construction, it will be necessary to install a silt fence along the site boundary with the River Dalgan to prevent any silt or other run-off running from the site entering into the river (see Diagram 2 below). See also Appendix 7 for silt fence installation guide.
- Any soil stripping should only occur during periods of dry weather.



**Diagram 3: Proposed location of silt fence**

## Construction

Standard good building practices should always be followed with extra care given to following points:

- Sediment control measures must be put in place during construction as detailed above.
- Shuttering needs to be adequately secured and sealed to ensure no leakage of concrete. Ensure shutters are stable enough to eliminate failures.
- There should be supervision of the delivery of concrete to site.
- Concrete pouring should be carried out in dry weather.
- All concrete pouring should be monitored carefully to ensure no accidental discharge.
- Mixer washings and excess concrete should not be discharged to the river and should be carried out in designated area well away from the watercourse (a minimum of 50m).

## Hydrocarbon use

Hydrocarbon use (e.g. fuel) during construction may lead to potential pollution of the waterway. Examples of potential threats include spillages during re-fuelling operations, leaks in poorly maintained plant and machinery and the use of oil on shuttering boards.

- Fuel storage - all fuels, lubricants and hydraulic fluids should be kept in secure bunded areas away from the river (recommend a minimum of 100 m from watercourse). The bunded area will accommodate 110% of the total capacity of the containers within it. Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure should be put in place (see below). Any waste oils or hydraulic fluids should be collected, stored in appropriate containers and disposed of off-site in an appropriate manner.
- The contractor should provide spill kits and they should be stored on-site during construction and used in the event of a fuel or chemical spillage. Such kits should contain absorbent materials (such as absorbent granules, booms or mats). Appropriate operatives responsible for handling chemicals or oils or for plant refuelling should be trained in the use of this kit.
- Re-fuelling and lubrication of plant should not occur within 50m of the water source. Appropriate drip-trays should be used. Vehicles should never be left unattended during re-fuelling.
- All construction vehicles should be regularly maintained and checked to prevent hydrocarbon leaks.
- All stationary machinery such as pumps should be placed on drip trays to contain any hydrocarbon spillages. These trays will be checked regularly, and rainwater removed to maintain their effectiveness.
- Biodegradable, vegetable-based oils should be used to oil shuttering boards.
- Any hydraulically operated machinery to be used within 50 m of the river should utilize synthetic biodegradable hydraulic oil such as Castrol Tribol Biotop 1448.

## Site decommissioning

Decommissioning of the construction site needs to be carefully managed as there is the potential for polluting material to enter any waterway.

- Any contaminated materials should be removed from the site and disposed of in the appropriate manner.

- No construction materials, plant or machinery should be left on site following completion of works.
- All machinery leaving site should be jet-washed in approved facility to ensure there is no cross contamination (Japanese knotweed).

### **7.5.7 Visual Impact**

No direct mitigation is proposed as the development will have limited visual impact on the Natura 2000 sites.

## **7.6 Collated mitigation measures**

### **Collated Mitigations**

Following measures will need to be followed in order to ensure there is no risk of water quality of SAC being impacted by sediment run-off or pollution and no treat from invasive species.

1. An Invasive Species Management Plan is recommended in order to ensure Japanese knotweed is not spread downstream to Lough Corrib SAC.
2. A bat survey is recommended prior to works commencing on the building.
3. During construction, it will be necessary to install a silt fence along the site boundary with the River Dalgan to prevent any silt or other run-off running from the site entering into the river (see Diagram 2 below). See also Appendix 7 for silt fence installation guide.
4. Any soil stripping should only occur during periods of dry weather.
5. Standard good building practices should always be followed with extra care given to following points:
6. Sediment control measures must be put in place during construction as detailed above.
7. Shuttering needs to be adequately secured and sealed to ensure no leakage of concrete. Ensure shutters are stable enough to eliminate failures. There should be supervision of the delivery of concrete to site.
8. Concrete pouring should be carried out in dry weather.
9. All concrete pouring should be monitored carefully to ensure no accidental discharge.
10. Mixer washings and excess concrete should not be discharged to the river and should be carried out in designated area well away from the watercourse (a minimum of 50m).
11. Hydrocarbon use (e.g. fuel) during construction may lead to potential pollution of the waterway. Examples of potential threats include spillages during re-fuelling

operations, leaks in poorly maintained plant and machinery and the use of oil on shuttering boards.

12. Fuel storage - all fuels, lubricants and hydraulic fluids should be kept in secure bunded areas away from the drain (or any other watercourse) (recommend a minimum of 100m from watercourse). The bunded area will accommodate 110% of the total capacity of the containers within it. Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure should be put in place (see below). Any waste oils or hydraulic fluids should be collected, stored in appropriate containers and disposed of off-site in an appropriate manner.
13. The contractor should provide spill kits and they should be stored on-site during construction and used in the event of a fuel or chemical spillage. Such kits should contain absorbent materials (such as absorbent granules or mats). Appropriate operatives responsible for handling chemicals or oils or for plant refuelling should be trained in the use of this kit.
14. Re-fuelling and lubrication of plant should not occur within 50m of the water source. Appropriate drip-trays should be used. Vehicles should never be left unattended during re-fuelling.
15. All construction vehicles should be regularly maintained and checked to prevent hydrocarbon leaks.
16. All stationary machinery such as pumps should be placed on drip trays to contain any hydrocarbon spillages. These trays will be checked regularly, and rainwater removed to maintain their effectiveness.
17. Biodegradable, vegetable-based oils should be used to oil shuttering boards.
18. Any hydraulically operated machinery to be used within 50m of the river should utilize synthetic biodegradable hydraulic oil such as Castrol Tribol Biotop 1448.
19. Decommissioning of the construction site needs to be carefully managed as there is the potential for polluting material to enter any waterway.
20. Removed straw bale from drain and compost.
21. Remove sediment fence, taking care to ensure that any trapped sediment is removed well away from the watercourse.
22. No construction materials, plant or machinery should be left on site following completion of works.

## 7.7 Conclusions

Screening for Appropriate Assessment of the proposed development concluded that there was potential for the Lough Corrib SAC to be affected by the development due to the potential for sediment run off and pollution from the site into the adjacent river. In addition, Japanese knotweed on site could potentially be washed downstream to the SAC.

For the reasons set out in detail in this NIS, in the light of the best scientific knowledge in the field, all aspects of the proposed project which, by itself, or in combination with other plans or projects, which may affect the relevant European Sites have been considered.

The NIS contains information which the competent authority, may consider in making its own complete, precise, and definitive findings and conclusions and upon which it is capable of determining that all reasonable scientific doubt has been removed as to the effects of the proposed project on the integrity of the relevant Natura 2000 sites.

In conclusion, in the light of the conclusions of the assessment which it shall conduct on the implications for the European sites concerned, the competent authority is enabled to ascertain that the proposed project will not affect the integrity of any of the European sites concerned.

Signed

Dr. Karina Dingerkus (Ecologist)

19<sup>th</sup> November 2021

## 8.0 References

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NPWS (2015) Conservation Objectives: Carrowbehy/Caher Bog SAC 000597. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

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NPWS (2016) Conservation Objectives: Cloonchambers Bog SAC 000600. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2016) Conservation Objectives: Drumalough Bog SAC 002338. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2016) Conservation Objectives: River Moy SAC 002298. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2017) Conservation Objectives: Coolcam Turlough SAC 000218. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2017) Conservation Objectives: Croaghill Turlough SAC 000255. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

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NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2017) Conservation Objectives: Urlaur Lakes SAC 001571. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.



NPWS (2018) Conservation Objectives: Williamstown Turloughs SAC 002296. Version 1.  
National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

## 9.0 Appendices

### Appendix 1 – Screening Matrix

<i>Description of project</i>	See section 3.1
<i>Description of Natura 2000 sites</i>	See section 3.2

Assessment Criteria	
<i>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 site.</i>	It is considered that the proposed plan either alone or in combination with other plans or projects is not likely to give rise to significant effects on the Natura 2000 sites if mitigation measured outlined Section 7.5 are taken into consideration.
<i>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of:</i>	There is potential impact on water quality of Lough Corrib SAC and potential for spread of Japanese knotweed.
	<b>Size and scale</b> The size and scale of the project is small and does not impact directly on a Natura 2000 sites.
	<b>Land-take</b> There will be no land take from any Natura 2000 sites
	<b>Distance from the Natura 2000 site or key features of the site</b> The distances to the Natura sites are listed in Table 1 – the closest Natura 2000 sites is the River Moy SAC which lies approximately 2.7 km from the project site but it is not hydrologically connect. The nearest hydrologically connected SAC is Lough Corrib SAC.
	<b>Resource requirements (water abstraction etc.)</b> The proposed development is not dependent on any resource, such as freshwater, from any of the Natura sites.
	<b>Emissions (disposal to land, water or air)</b> Minimal emissions from proposed development.
	<b>Excavation requirements</b> Some excavation will occur on site during the construction phase of the project. Slight potential for run-off to enter nearby Dalgan River.
	<b>Transportation requirements</b> Minimum increase in traffic during construction phase. Will not impact Natura 2000 sites.
	<b>Duration of construction, operation, decommissioning, etc.</b> Short construction phase. Unlikely to impact Natura 2000 sites.
	<b>Other</b> -
<i>Describe any likely changes to the site(s) arising as a result of:</i>	<b>Reduction of habitat area</b> None.
	<b>Disturbance of key species</b> Disturbance will be minimal. The work is of short enough duration not to have an adverse impact on species.
	<b>Habitat or species fragmentation</b>

	None.
	<b>Reduction in species density</b> Species impacts minimal.
	<b>Changes in key conservation indicators</b> Unlikely.
	<b>Climate change</b> Negligible impact and additional tree planting could be beneficial.
<i>Describe any likely impacts on the Natura 2000 site as a whole in terms of:</i>	<b>Interference with the key relationships that define the structure of the site</b> None envisaged.
	<b>Interference with key relationships that define the function of the site</b> None envisaged.
<i>Provide indicators of significance as a result of the identification of effects set out above in terms of:</i>	<b>Loss</b> N/A
	<b>Fragmentation</b> N/A
	<b>Disruption</b> N/A
	<b>Disturbance</b> N/A
	<b>Change to key element of the site</b> N/A

<b>The Assessment of Significance of Effects</b>	
<i>Describe how the project or plan (alone or in combination) is likely to affect the Natura sites.</i>	The proposed project is not likely to affect any Natura 2000 sites.
<i>Explain why these effects are not considered significant.</i>	There eleven Natura 2000 sites within a 15 km radius of the proposed project, all of which are SACs. The proposed project is not situated within any of the SACs or SPAs and therefore no direct impacts will occur through habitat loss or fragmentation of habitats or species. Disturbance will be minimal and only caused during the construction phase of the project. Although the project site runs adjacent to the River Dalgan, it has a downstream flow of 9.8 km to the nearest SAC, Lough Corrib SAC. However, impact on water quality cannot be ruled out if mitigation measure to protect water are not implemented. Potential for spread of Japanese knotweed which occurs on site if mitigations measure and biosecurity measures are not implemented.
<i>List of agencies consulted and responses, if applicable</i>	-

<b>Data collected to carry out the Assessment</b>	
Who carried out the Assessment	Giorria Environmental Services
Sources of data	'' , Giorria Environmental Services
Level of assessment completed	Desktop and site survey
Where can full results of the Assessment screening be viewed	Mayo County Council Planning

## Appendix 2 – Qualifying interests and documented threats to the Natura 2000 sites

**Table 9: Qualifying interests and documented threats to the Natura 2000 sites lying in a 15km radius of the proposed development site**

Site Code, Name & description	Qualifying Interests (* denotes a priority habitat)	Conservation Objectives	Documented Threats / Pressures Information primarily based on NPWS Site Synopses, NATURA 2000 – standard data forms and other sources
<p><b>002298 River Moy SAC</b> This site comprises almost the entire freshwater element of the River Moy and its tributaries, including both Lough Con and Lough Cullin. The catchment area of 80 km<sup>2</sup>. The river and its tributaries rise in several locations some of which are upland areas dominated by blanket bog and heath. Throughout most of its course the river flows through low-lying countryside consisting mainly of agricultural grassland. In addition to river and lake habitats, the site contains adjoining habitats of ecological interest such as raised bogs, heath, wet grassland, and deciduous woodland.</p>	<p><b>Habitats</b> 7110 Active raised bogs* 7120 Degraded raised bogs still capable of natural regeneration 7150 Depressions on peat substrates of the Rhynchosporion 7230 Alkaline fens 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)* <b>Species</b> 1096 Brook Lamprey (<i>Lampetra planeri</i>) 1106 Salmon (<i>Salmo salar</i>) 1355 Otter (<i>Lutra lutra</i>) 1092 White-clawed Crayfish (<i>Austropotamobius pallipes</i>) 1095 Sea Lamprey (<i>Petromyzon marinus</i>)</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002298.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002298.pdf</a></p>	<ul style="list-style-type: none"> <li>• Forest planting on open ground</li> <li>• Aerodrome, heliport</li> <li>• Invasive non-native species</li> <li>• Diffuse pollution to surface waters due to agricultural and forestry activities</li> <li>• Peat extraction</li> <li>• Agricultural intensification</li> <li>• Use of fertilizers (forestry)</li> </ul>
<p><b>000607 Errit Lough SAC</b> Errit Lough is a hard water lake situated in the upper part of the Boyle River catchment, 10 km</p>	<p><b>Habitats</b> 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000607.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000607.pdf</a></p>	<ul style="list-style-type: none"> <li>• Other human intrusions and disturbances</li> </ul>

<p>south-west of Ballaghderreen, Co. Roscommon. Errit Lough is situated in an area of intensive agriculture and is vulnerable to deterioration in water quality through farm pollution and neighbouring forestry activities.</p>			
<p><b>000597 Carrowbehy/Caher Bog SAC</b>  Carrowbehy/Caher Bog is a large floodplain bog developed between low drumlin hills in the headwaters of the River Suck, close to Lough O'Flynn and 8 km northeast of Ballyhaunis, Co. Roscommon. Unusually, the bog has partly enveloped a drumlin to the north. The site is a good example of a western raised bog. It is a notably species-rich bog featuring extensive, well developed hummock/pool systems, small in-filling lakes, scarce species and, in places, semi-natural margins undisturbed by recent peat cutting.</p>	<p><b>Habitats</b>  7110 Active raised bogs*  7120 Degraded raised bogs still capable of natural regeneration  7150 Depressions on peat substrates of the Rhynchosporion</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000597.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000597.pdf</a></p>	<ul style="list-style-type: none"> <li>• Disposal of household / recreational facility waste</li> <li>• Modification of hydrographic functioning, general</li> <li>• Invasive non-native species</li> </ul>
<p><b>000297 Lough Corrib SAC</b> Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the</p>	<p><b>Habitats</b>  3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)  3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>  3140 Hard oligo-mesotrophic waters</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf</a></p>	<ul style="list-style-type: none"> <li>• Fertilisation</li> <li>• Diffuse pollution to surface waters due to household sewage and waste waters</li> <li>• Infilling of ditches, dykes, ponds, pools, marshes or pits</li> </ul>

<p>south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included within the SAC as they are important for Atlantic Salmon.</p>	<p>with benthic vegetation of <i>Chara</i> spp.  3260 Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation  6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)  6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)  7110 Active raised bogs*  7120 Degraded raised bogs still capable of natural regeneration  7150 Depressions on peat substrates of the Rhynchosporion  7210 Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i>*  7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)*  7230 Alkaline fens  8240 Limestone pavements*  91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles  91D0 Bog woodland*  <b>Species</b>  1096 Brook Lamprey (<i>Lampetra planeri</i>)  1092 White-clawed Crayfish (<i>Austropotamobius pallipes</i>)  1095 Sea Lamprey (<i>Petromyzon marinus</i>)</p>		<ul style="list-style-type: none"> <li>• Forest planting on open ground</li> <li>• Dispersed habitation</li> <li>• Other human induced changes in hydraulic conditions</li> <li>• Removal of hedges and copses or scrub</li> <li>• Agricultural intensification</li> <li>• Disposal of household / recreational facility waste</li> <li>• Sand and gravel extraction</li> <li>• Other human intrusions and disturbances</li> <li>• Roads, paths and railroads cargo lanes</li> <li>• Continuous urbanisation</li> <li>• Invasive non-native species</li> <li>• Abandonment of pastoral systems, Lack of grazing</li> </ul>
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	<p>1393 Slender Green Feather-moss (<i>Drepanocladus vernicosus</i>)</p> <p>1106 Salmon (<i>Salmo salar</i>)</p> <p>1303 Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>)</p> <p>1355 Otter (<i>Lutra lutra</i>)</p> <p>1029 Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)</p> <p>1833 Slender Naiad (<i>Najas flexilis</i>)</p>		
<p><b>001571 Urlaur Lakes SAC</b></p> <p>Urlaur Lakes SAC comprises three small hard water lakes - Lough Nanoge, Lough Roe and Urlaur Lough. They lie in the upper catchment of the Lung River, a major tributary of the Boyle River. The site is located approximately 10 km north of Ballyhaunis in Co. Mayo. All three lakes at this site lie on marl.</p>	<p><b>Habitats</b></p> <p>3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001571.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001571.pdf</a></p>	<ul style="list-style-type: none"> <li>• Dispersed habitation</li> <li>• Roads, motorways</li> <li>• Mechanical removal of peat</li> <li>• Disposal of household / recreational facility waste</li> <li>• Grazing</li> <li>• Hand cutting of peat</li> <li>• Human induced changes in hydraulic conditions</li> <li>• Leisure fishing</li> <li>• Electricity and phone lines</li> <li>• Mechanical removal of peat</li> <li>• Fertilisation</li> </ul>
<p><b>000604 Derrinea Bog SAC</b></p> <p>Derrinea Bog is a small raised bog site in Co. Roscommon. It is situated on the northern margin of Cloonagh Lough, just east of the Mayo/Roscommon border and approximately 10 km north-west of</p>	<p><b>Habitats</b></p> <p>7110 Active raised bogs*</p> <p>7120 Degraded raised bogs still capable of natural regeneration</p> <p>7150 Depressions on peat substrates of the Rhynchosporion</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000604.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000604.pdf</a></p>	<ul style="list-style-type: none"> <li>• Disposal of household / recreational facility waste</li> <li>• Invasive non-native species</li> <li>• Modification of hydrographic functioning, general</li> </ul>

<p>Ballyhaunis. A river emanating from Cloonagh Lough forms the eastern and northern boundary of the site. The site is an example of a western raised bog. A number of other raised bogs and calcareous lakes lie in close proximity to this site and together they constitute one of the most important ecological areas in the east Mayo/Roscommon region.</p>			
<p><b>002338 Drumalough Bog SAC</b>  Drumalough Bog is located 5 km north-west of Castlerea in Co. Roscommon, mainly in the townlands of Drumalough, Breanabeg and Cloonfower. The site comprises three separate sub-sites which were once part of an extensive bog complex, but which are now separated by cutover bog. Two of these sub-sites contain high bog, with associated cutover bog, and the third area is open water (Drumalough) surrounded by wet grassland and freshwater marsh.</p>	<p><b>Habitats</b>  7110 Active raised bogs*  7120 Degraded raised bogs still capable of natural regeneration  7150 Depressions on peat substrates of the Rhynchosporion</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002338.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002338.pdf</a></p>	<ul style="list-style-type: none"> <li>• Modification of hydrographic functioning, general</li> <li>• Disposal of household / recreational facility waste</li> <li>• Invasive non-native species</li> </ul>
<p><b>000218 Coolcam Turlough SAC</b>  Coolcam Turlough lies in a complex area of eskers, south of Ballinlough, on the borders of Counties Galway and Roscommon,. It is a typical, wet, western turlough, with a semi-permanent lake with marl deposits, as well as several separate, more</p>	<p><b>Habitats</b>  3180 Turloughs*</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000218.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000218.pdf</a></p>	<ul style="list-style-type: none"> <li>• Restructuring agricultural land holding</li> <li>• Fertilisation</li> <li>• Sand and gravel quarries</li> <li>• Intensive mixed animal grazing</li> </ul>

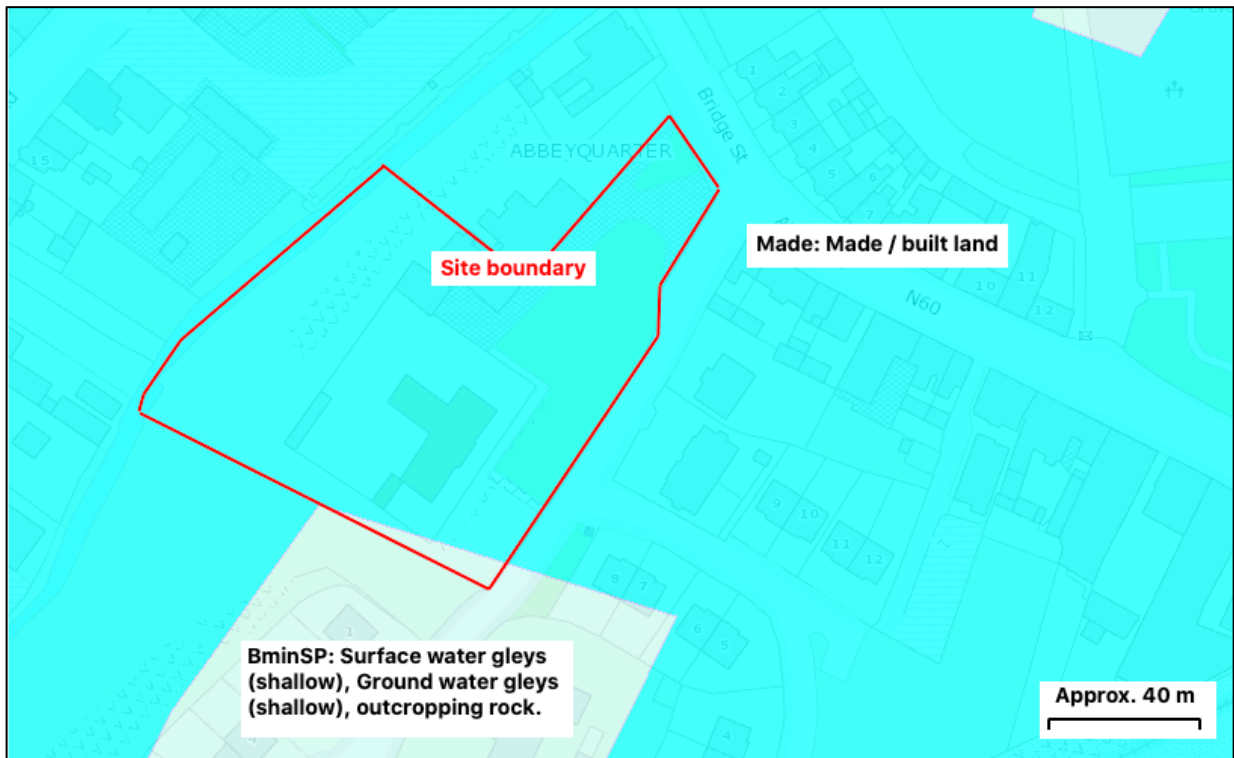


<p>muddy basins which dry out in summer. The nearby eskers are sinuous, with a general north-south orientation - the turlough basin has this orientation also. The turlough has no permanent inflow but the main basin takes water from a boggy area to the north, and a smaller quantity from the south-west corner.</p>			<ul style="list-style-type: none"> <li>• Agricultural intensification</li> </ul>
<p><b>000600 Cloonchambers Bog SAC</b>  Cloonchambers Bog is a large, relatively intact, undulating bog which lies north of the Ballinlough to Castlerea road, and about 6 km west of Castlerea town in Co. Roscommon. It consists of two elongated peat-filled basins, separated by a strip of grassy, fen vegetation, found where thinner peat merges with mineral soil.</p>	<p><b>Habitats</b>  7110 Active raised bogs*  7120 Degraded raised bogs still capable of natural regeneration  7150 Depressions on peat substrates of the Rhynchosporion</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000600.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000600.pdf</a></p>	<ul style="list-style-type: none"> <li>• Modification of hydrographic functioning, general</li> <li>• Disposal of household / recreational facility waste</li> <li>• mechanical removal of peat</li> <li>• Invasive non-native species</li> </ul>
<p><b>002296 Williamstown Turloughs SAC</b>  Williamstown Turloughs are a suite of turloughs - Curragh, Polleagh (and Polleagh West) and Gortduff - the first two of which are situated alongside the R380 road about 7 km west of Williamstown, Co. Galway. They lie within a complex of esker ridges and raised and valley peats, close to the Shannon - Corrib watershed. Drainage is westwards. To the north-west is</p>	<p><b>Habitats</b>  3180 Turloughs*</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002296.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002296.pdf</a></p>	<ul style="list-style-type: none"> <li>• Restructuring agricultural land holding</li> <li>• Sand and gravel quarries</li> <li>• Urbanised areas, human habitation</li> <li>• Diffuse groundwater pollution due to non-sewered population</li> <li>• Mechanical removal of peat</li> </ul>

<p>the Old Red Sandstone ridge of Slieve Dart and sandstone is probably present at, or close, to the north-west side of Curragh turlough.</p>			<ul style="list-style-type: none"> <li>• Diffuse pollution to surface waters due to agricultural and forestry activities</li> <li>• Water abstractions from groundwater</li> </ul>
<p><b>000255 Croaghill Turlough SAC</b>  Croaghill Turlough is situated just to the east of Coolcam in Co. Galway, close to the Dunmore/Ballymoe road. It is a wet turlough, parts of which stay flooded into July. The topography is dominated by glacial deposits, in that eskers and drift slopes surround the turlough, and morainic deposits occur within the basin, giving it an undulating floor. This means that the vegetation of the basin floor has a complex pattern. The wetness of the turlough has led to the accumulation of deep peat, and a 3 m depth is recorded.</p>	<p><b>Habitats</b>  3180 Turloughs*</p>	<p><a href="http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000255.pdf">http://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000255.pdf</a></p>	<ul style="list-style-type: none"> <li>• Non intensive mowing</li> <li>• Non intensive mixed animal grazing</li> <li>• sand and gravel quarries</li> <li>• Stock feeding</li> <li>• Fertilisation</li> </ul>

### Appendix 3 – Soil and Geological Information

Following information is from the Geological Survey Ireland  
<https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx>



Following information is from the Geological Survey Ireland  
<https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx>  
 and ESM tool (<https://airomaps.geohive.ie/ESM/>)

<b>Geology</b>	64, Marine shelf facies; Limestone & calcareous shale
<b>Aquifer</b>	Regionally Important Aquifer - Karstified (conduit)
<b>Aquifer vulnerability</b>	High
<b>Ground water vulnerability</b>	At risk
<b>Groundwater Status</b>	Good

## Appendix 4 – Biodiversity records

**Table 10: National Biodiversity Record Centre showing sample records in vicinity of site**

Species	Date of record	Approximate distance from site	Grid Reference	Data set
Brook Lamprey ( <i>Lampetra planeri</i> )	25/05/2013	>40 km	G8705	Irelands BioBlitz
Salmon ( <i>Salmo salar</i> )	1996	28 km	M230886	Freshwater Fish in Irish Lakes
Otter ( <i>Lutra lutra</i> )	25/04/1990	1.6 km	M5080	Badger and Habitats Survey of Ireland
White-clawed Crayfish ( <i>Austropotamobius pallipes</i> )	31/12/1989	Within 100 m	M496794	River Biologists' Database (EPA)
Sea Lamprey ( <i>Petromyzon marinus</i> )	Unknown	>40 km	G21	Rare marine fishes taken in Irish waters from 1786 to 2008
Slender Green Feather moss ( <i>Drepanocladus vernicosus</i> )	06/08/2009	>40 km	M063629	Bryophytes of Ireland
Lesser Horseshoe Bat ( <i>Rhinolophus hipposideros</i> )	26/06/2006	26 km	M2567	National Lesser Horseshoe Bat Database
Freshwater Pearl Mussel ( <i>Margaritifera margaritifera</i> )	09/11/2006	>40 km	M14	River Biologists' Database (EPA)
Slender Naiad ( <i>Najas flexilis</i> )	25/07/2018	>40 km	M034440	Irish Vascular Plant Data - Robert Northridge

## Appendix 5 – Site synopses

**SITE NAME: RIVER MOY**

**SITE CODE: 002298**

This site comprises almost the entire freshwater element of the Moy and its tributaries including both Loughs Conn and Cullin. The system drains a catchment area of 805 sq. km. Most of the site is in Co. Mayo though parts are in west Sligo and north Roscommon. Apart from the Moy itself, other rivers included within the site are the Deel, Bar Deela, Castlehill, Addergoole, Clydagh and Manulla on the west side and the Glenree, Yellow, Strade, Gweestion, Trimogue, Sonnagh, Mullaghanoe, Owengarve, Eighnagh and Owenaher on the east side. The underlying geology is Carboniferous Limestone for the most part though Carboniferous Sandstone is present at the extreme west of the site with Dalradian Quartzites and schists at the south west. Some of the tributaries at the east, the south of Lough Conn and all Lough Cullin are underlain by granite. There are many towns adjacent to but not within the site. These include Ballina, Crossmolina, Foxford, Swinford, Kiltimagh and Charlestown.

The site is a candidate SAC selected for alluvial wet woodlands and raised bog, both priority habitats on Annex I of the E.U. Habitats Directive. The site is also a candidate SAC selected for old oak woodlands, alkaline fens, degraded raised bog and Rhynchosporion, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Atlantic Salmon, Otter, Sea and Brook Lamprey and White-clawed Crayfish.

On the slopes and rising ground around the southern shores of Loughs Conn and Cullin, Oak woodlands are seen. Sessile Oak (*Quercus petraea*) is the dominant tree with an understorey of Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Birch (*Betula pubescens*) with some Ash (*Fraxinus excelsior*). Additional species are associated with the lakeshore such as the whitebeam (*Sorbus rupicola*), Aspen (*Populus tremula*), Silver Birch (*B. pendula*) and the shrubs Guelder Rose (*Viburnum opulus*), Buckthorn (*Rhamnus catharticus*) and Spindle Tree (*Euonymus europaeus*). The ground flora is usually composed of Bilberry (*Vaccinium myrtillus*), Wood Rush (*Luzula sylvatica*), Wood Sorrel (*Oxalis acetosella*), Buckler Ferns (*Dryopteris aemula* and *D. dilatata*), Hard Fern (*Blechnum spicant*), Cow-wheat (*Melampyrum* spp.) and Bracken (*Pteridium aquilinum*). The rare Narrow-leaved Helleborine (*Cephalanthera longifolia*), protected under the Flora Protection Order, 1999, occurs in association with the woodlands. Also found in these woodlands is the snail (*Acanthinula lamellata*), associated with old natural woodlands.

Alluvial woodland occurs at several locations along the shores of the lakes but is particularly well developed along the river at Coryosla Bridge. Principal tree species are Willows (*Salix cinerea*) and Alder (*Alnus glutinosa*). Herbaceous species include Royal Fern (*Osmunda regalis*), Meadowsweet (*Filipendula ulmaria*) and Reed Canary-grass (*Phalaris arundinacea*). The woods are flooded by seasonal fluctuations in lake level. On higher ground adjacent to the woodlands is blanket bog with scattered shrubs and trees on the drier areas. The rocky knolls often bear Juniper (*Juniperus communis*) or Gorse (*Ulex europaeus*), with some unusual rare herb species such as Intermediate Wintergreen (*Pyrola media*) and Lesser Twayblade (*Listera cordata*).

Within the site are a number of raised bogs including those at Kilgarrieff, Gowlaun, Derrynabrock, Tawnaghbeg and Cloongoonagh. These are examples of raised bogs at the north-western edge of the spectrum and possesses many of the species typical of such in Ireland, including an abundance of Bog Asphodel (*Narthecium ossifragum*), Carnation Sedge (*Carex panicea*) and the moss *Campylopus atrovirens*. Some of the bogs include significant areas of active raised bog habitat. Well

developed pool and hummock systems with quaking mats of bog mosses (*Sphagnum* spp.), Bog Asphodel (*Narthecium ossifragum*) and White Beaked-sedge (*Rhynchospora alba*) are present. Many of the pools contain a diversity of plant species, including Bogbean (*Menyanthes trifoliata*), the bog moss *Sphagnum cuspidatum*, *Campylopus atrovirens*, Common Cottongrass (*Eriophorum angustifolium*), Great Sundew (*Drosera anglica*) and occasional Lesser Bladderwort (*Utricularia minor*). Several of the hummock-forming mosses (*Sphagnum fuscum* and *S. imbricatum*) which occur here are quite rare in this region and add to the scientific interest of the bogs within the overall site.

Depressions on the bogs, pool edges and erosion channels, where the vegetation is dominated by White Beaked-sedge (*Rhynchospora alba*) comprise the habitat Rhynchosporion. Associated species in this habitat at the site include Bog Asphodel, Sundews, Deergrass (*Scirpus cespitosus*) and Carnation Sedge.

Degraded raised bog is present where the hydrology of the uncut bogs, has been affected by peat cutting and other land use activities in the surrounding area such as afforestation and associated drainage and also by the Moy arterial drainage. Species typical of the active raised bog habitat are still present but the relative abundance of them is different. A typical example of the degraded habitat, where drying has occurred at the edge of the high bog, contains an abundance and more uniform cover of Ling Heather (*Calluna vulgaris*), Carnation Sedge, Deergrass and sometimes Bog-myrtle (*Myrica gale*). Occurring in association with the uncut high bog are areas of wet regenerating cutover bog with species such as Common Cottongrass, bog mosses and Sundew, while on the drier areas, the vegetation is mostly dominated by Purple Moor-grass (*Molinia caerulea*). Natural regeneration with peat-forming capability will be possible over time with some restorative measures.

Alkaline fen is considered to be well developed within the site. An extensive stand occurs as part of a wetland complex at Mannin and Island Lakes on the Glengarriff River. Key diagnostic species of the *Schoenus* association characteristic of rich fens include the bryophytes *Campylium stellatum*, *Aneura pinguis*, *Scorpidium scorpioides*, and the herbaceous species Long-stalked Yellow-sedge (*Carex lepidocarpa*), Grass-of-Parnassus (*Parnassia palustris*) and Common Butterwort (*Pinguicula vulgaris*). Other fen species include Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass (*Molinia caerulea*), Marsh Helleborine (*Epipactis palustris*), Meadow Thistle (*Cirsium dissectum*) and Blunt-flowered Rush (*Juncus subnodulosus*). The rare moss *Bryum uliginosum* occurs on exposed marl at a ditch to the east of Island Lake. The open water of Loughs Conn and Cullin is moderately hard with relatively low colour and good transparency. The phytoplankton of the lake is dominated by diatoms and blue-green algae and there is evidence that the latter group is more common now than in former years. This indicates that nutrient inflow is occurring. Arctic Charr (*Salvelinus alpinus*) appear to have disappeared from the lake over the same period of time. The changes in Lough Conn appear to represent an early phase in the eutrication process. Stoneworts still present include *Chara aspera*, *C. delicatula* and *Nitella* cf. *opaca*. Other plants found in the shallower portions are the pondweeds. Where there is a peat influence Intermediate Bladderwort (*Utricularia intermedia*) is characteristic while Water Lobelia (*Lobelia dortmanna*) often grows in sand. Narrow reedbeds and patches of Yellow Water-lily (*Nuphar lutea*) occur in some of the bays.

Drainage of the Moy in the 60s lowered the level of the lakes, exposing wide areas of stony shoreline and wet grassland, which are liable to flooding in winter. This increased the habitat diversity of the shoreline and created a number of marginal wetlands, including fens and marshes. Plant species of note in the lake-margin include Heath Cudweed (*Omalotheca sylvatica*), Great Burnet (*Sanguisorba officinalis*) and Irish Lady's-tresses (*Spiranthes romanzoffiana*). These three species are listed on the Irish Red Data list and are protected under the Flora Protection Order 1999.

Other habitats present within the site include wet grassland dominated by Rushes (*Juncus* spp.) grading into species-rich marsh in which sedges are common. Among the other species found in this habitat are Yellow Iris (*Iris pseudacorus*), Water Mint (*Mentha aquatica*), Purple Loosestrife (*Lythrum salicaria*) and Soft Rush (*Juncus effusus*).

Grey Willow (*Salix cinerea*) scrub and pockets of wet woodland dominated by Alder (*Alnus glutinosa*) have become established in places throughout the site. Ash (*Fraxinus excelsior*) and Birch (*Betula pubescens*) are common in the latter and the ground flora is typical of wet woodland with Meadowsweet (*Filipendula ulmaria*), Angelica (*Angelica sylvestris*), Yellow Iris, Horsetail (*Equisetum* spp.) and occasional tussocks of Greater Tussock-sedge (*Carex paniculata*).

Small pockets of conifer plantation, close to the lakes and along the strip both sides of the rivers, are included in the site.

The Moy system is one of Ireland's premier salmon waters and it also encompasses two of Ireland's best lake trout fisheries in Loughs Conn and Cullin. Although the Atlantic Salmon (*Salmo salar*) is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. The Moy is a most productive catchment in salmon terms and this can be attributed to its being a fingered system with a multiplicity of 1-to 5-order tributaries which are large enough to support salmonids < 2 years of age while at the same time being too small to support significant adult trout numbers and are therefore highly productive in salmonid nursery terms.

Salmon run the Moy every month of the year. Both multi-sea-winter fish and grilse are present. The salmon fishing season is 1-February to 30-September. The peak of the spring fishing is in April and the grilse begin running in early May. The average weight of the spring fish is 9 lb and the grilse range from about 3-7 lb. In general spring fish are found more frequently in the rivers at the western extent of the Moy system.

The Arctic Char (*Salvelinus alpinus*), an interesting relict species from the last ice age, which is listed as threatened in the Irish Red Data Book has been recorded from Lough Conn and in only a few other lakes in Ireland. The latest reports suggest that it may now have disappeared from the site.

The site is also important for the presence of three other species listed on Annex II of the E.U. Habitats Directive, namely Sea Lamprey (*Petromyzon marinus*), Otter (*Lutra lutra*) and White-clawed Crayfish (*Austropotamobius pallipes*). The Sea Lamprey is regularly encountered in the lower stretches of the river around Ballina, while the otter and crayfish are widespread throughout the system. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger, Irish Hare and Daubenton's Bat. Common Frog, another Red Data Book species, also occurs within the site.

Loughs Conn and Cullin support important concentrations of wintering waterfowl and both are designated Special Protection Areas. A nationally important population of the Annex I species Greenland White-fronted Geese (average 113 over 6 winters 1994/95 to 1999/00) is centred on Lough Conn. Whooper Swans also occur (numbers range between 25 to 50), along with nationally important populations of Tufted Duck 635, Goldeneye 189 and Coot 464. A range of other species occur on the lakes in regionally important concentrations, notably Wigeon 303, teal 154, Mallard 225, Pochard 182, Lapwing (>1,000) and Curlew 464. Golden Plover also frequent the lakes, with numbers ranging between 700 and 1,000.

Loughs Conn and Cullin are one of the few breeding sites for Common Scoter in Ireland. Breeding has occurred on Lough Conn since about the 1940s when about 20-30 pairs were known. A census in 1983 recorded 29 pairs. Breeding was first proved on Lough Cullin in 1983 when 24 pairs were recorded. In 1995, 24-26 pairs were recorded at Lough Conn and 5 pairs at Lough Cullin. The latest survey in 1999 gives a total of 30 birds for both lakes, comprising only 5 pairs, 18 unpaired males and 2 unpaired females. The reason for the decline is not known but may be due to predation by mink, possible changes in food supply and/or redistribution to other sites. The Common Scoter is a Red listed species.

Agriculture, with particular emphasis on grazing, is the main landuse along the Moy. Much of the grassland is unimproved but improved grassland and silage are also present. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the large lakes. Fishing is a main tourist attraction on the Moy and there are a large number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The North Western Regional Fishery Board have erected fencing along selected stretches of the river as part of their salmonid enhancement programme. Other aspects of tourism are concentrated around Loughs Conn and Cullin.

Afforestation has occurred in the past around the shores of Loughs Conn and Cullin. The coniferous trees are due for harvesting shortly. It is proposed to replant with native tree species in this area. Forestry is also present along many of the tributaries and in particular along the headwaters of the Deel. Forestry poses a threat in that sedimentation and acidification occurs. Sedimentation can cover the gravel beds resulting in a loss of suitable spawning grounds. The Moy has been arterially dredged in the 60s. Water levels have been reduced since that time. This is particularly evident along the shores of Loughs Conn and Cullin and in the canal-like appearance of some river stretches. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low. This is extremely destructive to salmonid habitat in the area.

The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of this directive, as well as examples of other important habitats. The presence of a fine example of broad-leaved woodland in this part of the country increases the overall habitat diversity and adds to the ecological value of the site as does the presence of the range of nationally rare and Red Data Book plant and animal species.

29.9.2010



## Site Name: Lough Corrib SAC

### Site Code: 000297

Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included within the cSAC as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan and Black to the east, as well as the Cong, Bealanabrack, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- [3110] Oligotrophic Waters containing very few minerals
- [3130] Oligotrophic to Mesotrophic Standing Waters
- [3140] Hard Water Lakes
- [3260] Floating River Vegetation
- [6210] Orchid-rich Calcareous Grassland\*
- [6410] Molinia Meadows
- [7110] Raised Bog (Active)\*
- [7120] Degraded Raised Bog
- [7150] Rhynchosporion Vegetation
- [7210] Cladium Fens\*
- [7220] Petrifying Springs\*
- [7230] Alkaline Fens
- [8240] Limestone Pavement\*
- [91A0] Old Oak Woodlands
- [91D0] Bog Woodland\*
- [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)
- [1092] White-clawed Crayfish (*Austropotamobius pallipes*)
- [1095] Sea Lamprey (*Petromyzon marinus*)
- [1096] Brook Lamprey (*Lampetra planeri*)
- [1106] Atlantic Salmon (*Salmo salar*)
- [1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)
- [1355] Otter (*Lutra lutra*)
- [1393] Slender Green Feather-moss (*Drepanocladus vernicosus*)
- [1833] Slender Naiad (*Najas flexilis*)

The shallow, lime-rich waters of the southern basin of Lough Corrib support one of the most extensive beds of stoneworts (Charophytes) in Ireland, with species such as *Chara aspera*, *C. hispida*, *C. delicatula*, *C. contraria* and *C. desmacantha* mixed with submerged pondweeds

(*Potamogeton perfoliatus*, *P. gramineus* and *P. lucens*), Shoreweed (*Littorella uniflora*) and Water Lobelia (*Lobelia dortmanna*). These Charabeds are an important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters, without Charaspecies, but with Shoreweed, Water Lobelia, Pipewort (*Eriocaulon aquaticum*), Quillwort (*Isoetes lacustris*), Alternate Water-milfoil (*Myriophyllum alternifolium*) and Slender Naiad (*Najas flexilis*). The last-named is listed under the Flora (Protection) Order, 2015, and is an Annex II species under the E.U. Habitats Directive.

Large areas of reedswamp vegetation, dominated by varying mixtures of Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), occur around the margins of the lake. Reedswamp usually grades into species-rich marsh vegetation characterised by Slender Sedge (*Carex lasiocarpa*), Water Mint (*Mentha aquatica*), Water Horsetail (*Equisetum fluviatile*) and Bogbean (*Menyanthes trifoliata*). Of particular note are the extensive beds of Great Fen-sedge (*Cladium mariscus*) that have developed over the marly peat deposits in sheltered bays, particularly in the south-east corner of the lake. Alkaline fen vegetation is more widespread around the lake margins and includes, amongst the typically diverse range of plants, the Slender Cottongrass (*Eriophorum gracile*), a species protected under the Flora (Protection) Order, 2015. Wet meadows dominated by Purple Moor-grass (*Molinia caerulea*) occur in seasonally flooded areas close to the lake shore. These support species such as Sharp-flowered Rush (*Juncus acutiflorus*), Jointed Rush (*J. articulatus*), Carnation Sedge (*Carex panicea*), Devil's-bit Scabious (*Succisa pratensis*), Creeping Bent (*Agrostis stolonifera*) and Tormentil (*Potentilla erecta*), amongst others.

This large site contains four discrete raised bog areas and is selected for active raised bog, degraded raised bog, Rhynchosporion and bog woodland. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge. At Addergoole, on the eastern shores of Lough Corrib, there is an important area of western raised bog. This bog area is one of the most westerly, relatively intact raised bogs in the country. There are also other substantial areas of raised bog along various tributaries of the Corrib in east Co. Galway, namely Slieve Bog, Lough Tee Bog and Killaclogher bog. The active parts of these bogs mostly correspond to the wettest areas, where there are well-developed surface features with hummocks, lawns and pools. It is in such areas that Rhynchosporion vegetation is best represented. The dominant species is the aquatic bog moss *Sphagnum cuspidatum*, which is usually accompanied by Bogbean, White Beak-sedge, Bog Asphodel, Common Cottongrass (*Eriophorum angustifolium*), Bog Sedge (*Carex limosa*) and Great Sundew (*Drosera anglica*). Brown Beak-sedge, a locally rare plant of wet bog pools, has been recorded from a number of the bog areas within the site. At Addergoole a substantial bog lake or soak occurs and this is infilling with large rafts of Rhynchosporion vegetation at present. This area is associated with an important area of wet bog woodland dominated by Downy Birch (*Betula pubescens*).

The largest part of the uncut high bog comprises degraded raised bog. Degraded bog is dominated by a raised bog flora which tends to be rather species-poor because of disturbance and/or drying-out. The most conspicuous vascular plant species are usually Carnation Sedge, Heather (*Calluna vulgaris*), Cotton grasses, Cross-leaved Heath (*Erica tetralix*), Bog Asphodel and Deergrass. Bog-rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*), two species indicative of raised bog habitat, are frequent on both degraded and active areas of raised bog. Sphagnum cover is generally low within degraded areas due to a combination of drying-out and frequent burning. Limestone pavement occurs along much of the shoreline in the lower Corrib basin, and supports a rich and diverse flora, including Herb-Robert (*Geranium robertianum*), Bloody Crane's-bill (*G. sanguineum*), Carline Thistle (*Carlina vulgaris*), Spring Gentian (*Gentiana verna*), Wild Thyme (*Thymus praecox*), Rustyback (*Ceterach officinarum*), Wood Sage (*Teucrium scorodonia*), Slender St. John's-wort (*Hypericum pulchrum*), Quaking-grass (*Briza media*) and Blue Moor-grass (*Sesleria albicans*). Areas of Hazel (*Corylus avellana*) scrub occur in association with exposed limestone pavement and these include species such as Hawthorn (*Crataegus monogyna*), Buckthorn (*Rhamnus catharticus*), Spindle (*Eunonymus europaeus*), with occasional Juniper (*Juniperus communis*). Three Red Data Book species are also found in association with limestone scrub - Alder Buckthorn (*Frangula alnus*), Shrubby Cinquefoil (*Potentilla fruticosa*) and Wood Bitter-vetch (*Vicia orobus*), the latter is also protected under the Flora (Protection) Order, 2015. Open areas of orchid-rich calcareous grassland are also found in association with the limestone exposures. These can support a typically rich vegetation, including many orchids such as Pyramidal Orchid (*Anacamptis pyramidalis*), Common Spotted-orchid (*Dactylorhiza fuchsii*), Early-purple Orchid (*Orchis mascula*), Frog Orchid (*Coeloglossum*) Fragrant Orchid (*Gymnadenia conopsea*), Marsh Hellebore (*Epipactis palustris*), Greater Butterfly-orchid (*Platanthera chlorantha*) and Irish Lady's-tresses (*Spiranthes romanzoffiana*). The latter is protected under the Flora (Protection) Order, 2015. The Hill of Doon, located in the north-western corner of the lake, is a fine example of a Sessile Oak (*Quercus petraea*) woodland. The understorey is dominated by Sessile Oak, Holly (*Ilex aquifolium*) and occasional Juniper. There are occasional Yew (*Taxus baccata*) and Ash (*Fraxinus excelsior*), and a well-developed ground layer dominated by Bilberry (*Vaccinium myrtillus*), Hard Fern (*Blechnum spicant*) and Wood Rush (*Luzula sylvatica*). Woodland also occurs on some of the islands in the lake.

A number of the rivers in the site support submerged and floating vegetation of the *Ranunculus fluitantis* and Callitricho-Batrachion, including mosses. For example, in the River Corrib species such as Shining Pondweed (*Potamogeton lucens*), Perfoliate Pondweed (*Potamogeton perfoliatus*), Small Pondweed (*P. berchtoldii*), Yellow Water-lily (*Nuphar lutea*), White Water-lily (*Nymphaea alba*) and stoneworts (*Chara* spp.) occur. The rare and Annex II-listed Slender Green Feather-moss (*Drepanocladus* [*Hamatocaulis*] *vernicosus*) is found at the fen at Gortachalla, north-east of Moycullen. Here it is widespread around the margins, and this constitutes a large and significant population in the national context. A very large population of another rare moss, *Pseudocalliergon trifarium*, is also found in this area.

The lake is rated as an internationally important site for waterfowl. Counts from 1984 to 1987 revealed a mean annual peak total of 19,994 birds. In the past a maximum peak of 38,281 birds was recorded. The lake supports internationally important numbers of Pochard (average peak 8,600) and nationally important numbers of the following species: Coot (average peak 6,756), Mute Swan (average peak 176), Tufted Duck (average peak 1,317), Cormorant (average peak 110) and Greenland White-fronted Goose (average peak 83). The latter species is listed on Annex I of the E.U. Birds Directive. The Coot population is the largest in the country

and populations of Tufted Duck and Pochard are second only to Lough Neagh. Breeding pairs of Common Scoter on the lake number 30-41 (1995 data), as well as breeding populations of Arctic Tern and Common Tern. Other bird species of note recorded from or close to the lake recently include Hen Harrier, Whooper Swan, Golden Plover and Kingfisher. All of these species are listed on Annex I of the E.U. Birds Directive.

Otter and Irish Hare have been recorded regularly within this site. Both of these species are listed in the Red Data Book and are legally protected by the Wildlife Act, 1976. Otter is also listed on Annex II of the E.U. Habitats Directive. Lough Corrib is considered one of the best sites in the country for Otter, due to the sheer size of the lake and associated rivers and streams, and also the generally high quality of the habitats. Atlantic Salmon (*Salmo salar*) use the lake and rivers as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive. Lough Corrib is also a well-known fishing lake with a very good Trout (*Salmo trutta*) fishery. The lake has a population of Sea Lamprey (*Petromyzon marinus*), a scarce, though probably under-recorded species listed on Annex II of the E.U. Habitats Directive. Brook Lamprey (*Lampetra planeri*), also listed on Annex II, are also known from a number of areas within the site. A population of Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs within the site. White-clawed Crayfish (*Austropotamobius pallipes*), also listed on Annex II, is well distributed throughout Lough Corrib and its in-flowing rivers over limestone. A summer roost of Lesser Horseshoe Bat, another Annex II species, occurs within the site -approximately 100 animals were recorded here in 1999.

The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localised eutrophication of the lake, and housing and boating development, which is causing the loss of native lakeshore vegetation. The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning. Peat cutting threatens Addergoole Bog and already a substantial area of it has been cut away. Fishing and shooting occur in and around the lake. Introduction of exotic crayfish species or the crayfish fungal plague (*Aphanomyces astaci*) could have a serious impact on the native crayfish population. The bat roost is susceptible to disturbance or development. Despite these ongoing issues, however, Lough Corrib is one the best examples of a large lacustrine catchment system in Ireland, with a range of habitats and species still well represented. These include 15 habitats which are listed on Annex I of the E.U. Habitats Directive, six of which are priority habitats, and nine species which are listed on Annex II. The lake is also internationally important for birds and is designated as a Special Protection Area.

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## Appendix 6 – Japanese Knotweed Locations



**Diagram 4: Approximate locations of Japanese knotweed stands within and adjacent to site**

Japanese Knotweed is a non-native, alien invasive plant species, which originally comes from Japan, Taiwan and Northern China. Japanese Knotweed was first introduced to Britain by the Victorians as an ornamental plant, and soon after brought to Ireland to the gardens of the big houses.

Japanese knotweed is a fast-growing perennial and can reach 2 - 3 metres in height. Japanese knotweed grows from underground rhizomes. The root system can extend as deep as 3 metres into the ground and 7 metres laterally from the parent plant. Japanese Knotweed is rated among the 100 worst invasive species in the world by the Global Invasive Species Programme (GISP). In Ireland, Japanese knotweed is widespread. It poses environmental and economic threats. Knotweed can spread rapidly in the wild by natural means and as a result of spread by humans. As the plant is thought not to produce seed in the UK, we assume it is the same for Ireland, but there is some evidence that hybrids produce viable seed (K. O'Shea personal communication). It is therefore spread by vegetative means, either fragments of rhizome or stem. The plants have a very strong, resilient underground rhizome growth. The tiniest piece of Japanese Knotweed can regrow. Fly tipping of garden waste and transportation of soil containing rhizome fragments have been a major cause of spread in both the urban and rural environments. Knotweed can also regenerate from freshly cut stems, which can produce fresh shoots and roots from nodes when immersed in soil or water.

Japanese Knotweed is now very common and widely distributed across a variety of habitat types in Ireland. It is most prominent on roadsides, hedgerows, railways, waste ground, riverbanks and wetland habitats due to its vigorous growth rate. It quickly forms tall stands shading out native plant species and in turn reducing diversity of insects and other species. The loss of biodiversity from the impacts of this invasive plant is a major concern.

Japanese knotweed is an extremely difficult plant to eradicate. At best maintaining effective control of knotweed is often the only option without long term chemical treatment of the plant. To date research indicates that glyphosate is the most effective chemical. Killing the plant on the surface does little to control the plant as the following year it will regrow from its extensive rhizome root system. For control to work the plant must take the herbicide down from the surface through its leaves and stems to its root system. If the plant is well established the root system can be extensive and therefore the plant can be difficult to eradicate.

A minimum 3 to 5 year herbicide treatment programme, with ongoing monitoring, has been identified as the most suitable treatment option for the Japanese Knotweed. The treatment window is normally August through to early October. It is important to repeat the treatment for a minimum of three years, and up to eight years for extensive stands. Total eradication may not be possible in many areas, particularly where infestations are extensive. It may only be possible to control the growth and spread of the plant.

## Appendix 7 - Slit fence installation

### SILT FENCING INSTALLATION

- Posts are placed every 3 to 5 m and a 1m high geotextile membrane is attached to this fence on the uphill side.
- Place about 600m of membrane on the post with the other 300mm loose at the bottom facing uphill.
- This membrane foot is then covered with soil / turf that is removed from the house plot area.
- The soil turfs should be bigger than the membrane foot, 400mm to 1000m wide. This is easily done with a digger bucket.
- The soil turfs hold the membrane down and any water/runoff has to go through the soil and membrane and is filtered as it goes.
- It is important not to leave any gaps in the membrane foot or to have any areas uncovered or lifted up as this will allow the runoff to go under the membrane foot and so it will not be filtered.
- When removing the fence, the turfs can be left in place the fence simply pulled out from under them.



See [http://ssienviromental.ie/wp-content/uploads/2018/03/Terrastop\\_Install\\_02-1.pdf](http://ssienviromental.ie/wp-content/uploads/2018/03/Terrastop_Install_02-1.pdf) for more information.

## Appendix 8 - Qualifications

### Dr. Karina Dingerkus

#### Summary

Experienced field ecologist with twenty years' experience of working with local authorities, communities, charities, academic institutions and as a self-employed consultant.

#### Employment

2005-present	Self-employed Environmental Consultant, based in Co. Mayo
2000–2005	Ecology Officer, Norwich City Council
1998–2000	Environmental Liaison Officer, Ulster Wildlife Trust/Lisburn Borough Council
1997	Part time field worker for ATEC (Environmental Consultants)
1993	Fieldworker at Culterty Field Station, Aberdeen University, Scotland

#### Education

**PhD. 1997** The Ecology and Distribution of the Irish hare in Northern Ireland, Queen's University, Belfast

**BSc. 1993** (2:1 Class Hons.), Zoology (Animal Ecology), Aberdeen University, Scotland

#### Selected publications and reports

Various NIS reports for planning applications for private individuals.

**Ballinedine Wildlife and Pollinator Wildlife (2018)**, Ballinedine Tidy Towns, Heritage Office, Mayo County Council

**Survey of woodland at Laghtarvarry, Ballyvary and Chancery, Turlough, Co Mayo (2016)** for Bernard and Zane Joyce. Unpublished report

**Survey for squirrels at Jamestown Forest, Co Westmeath for Coillte (2015)**

**County Louth Hedgerow Survey (2014)**: Survey and report for Heritage Office, Louth County Council. [www.louthheritage.ie/publications\\_39\\_2350481956.pdf](http://www.louthheritage.ie/publications_39_2350481956.pdf)

**Nature and Wildlife in Roscommon** - Action for Biodiversity, Giorria Environmental Services and Janice Fuller, Roscommon County Council (2012)

Dingerkus, SK, Stone, RE, Wilkinson, JW, Marnell F and Reid N., (2010) Developing a methodology for the National Frog Survey of Ireland: a pilot study in Co. Mayo. *Irish Naturalists' Journal* 31 No.2 2010: 85-90

West Galway Hedgerow Survey and associate hedgerow leaflets for Galway County Council (2007).

Biodiversity Action Plans for County Mayo and County Roscommon (Heritage Council funded) (2007).

County Cavan Hedgerow Report for Cavan County Council (2006).

Reid, N., Dingerkus, K., Montgomery, W.I., Marnell, F., Jeffrey, R., Lynn, D., Kingston, N. & McDonald, R.A. (2007) Status of hares in Ireland. *Irish Wildlife Manuals*, No. 30. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government



## Dr. Richard Stone

Experienced ornithologist and field ecologist with wide range of surveying experience including aquatic, hedgerow, bird, mammal, and vegetation surveys.

### Employment

2005 - present Self-employed Environmental Consultant, based in Co. Mayo  
2003 - 2005 Organ keyboard maker. P & S Specialist Joinery, UK  
2000 - 2002 Environmental Research Scientist at British Antarctic Survey, Cambridge, UK  
1998 - 1999 Field Ecologist ATEC Consultants  
1998 Breeding Bird survey for RSPB Northern Ireland.  
1989 Set-aside survey for RSPB, bird and vegetation surveys.  
1987 Vegetation survey of open cast coal sites, Wales for RSPB

### Education

**PhD. 1999** The ecology and behaviour of water birds in relation to human activity on Strangford Lough, Queen's University, Belfast.

**BSc. 1993** (2:1 Class Hons.), Zoology (Animal Ecology), Aberdeen University, UK.

### Selected publications and reports

Survey of woodland at Laghtarvarry, Ballyvary and Chancery Turlough Co Mayo (2016) for Bernard and Zane Joyce. Unpublished report

Survey for squirrels at Jamestown Forest, Co Westmeath for Coillte (2015)

Cooper, F., Stone, R.E., McEvoy, P., Wilkins, T. & Reid, N. (2012). The conservation status of juniper formations in Ireland. Irish Wildlife Manuals, No. 63. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Dingerkus, SK, Stone, RE, Wilkinson, JW, Marnell F and Reid N., (2010) Developing a methodology for the National Frog Survey of Ireland: a pilot study in Co. Mayo. Irish Naturalists' Journal 31 No.2 2010: 85-90

West Galway Hedgerow Survey and associate hedgerow leaflets (2007).

Mathers, R.G., Watson, S., Stone, R.E. and Montgomery, W.I. (2000) A study of the impact of human disturbance on Wigeon *Anas penelope* and Brent geese *Branta bernicla hrota* on an Irish Sea Loch. Wildfowl 51: 67-81.

Speakman, J.R., Irwin, N., Tallach, N. and Stone, R.E. (1999) Effect of roost size on the emergence behaviour of pipistrelle bats (*Pipistrellus pipistrellus*): Statistical artefacts and intra- and inter-roost effects. Animal Behaviour 58: 787-795.

Mathers, R.G., Montgomery, W.I., Portig, A.A. and Stone, R. (1998) Winter habitat use by Brent Geese *Branta bernicla hrota* and Wigeon *Anas penelope* on Strangford Lough, Co. Down. Irish Birds 6: 257-268.