N6 Galway City Ring Road
Natura Impact Statement

Galway City Transport Project

Volume 1
Executive Summary

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An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

Bonneagar Iompair Éireann
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1 Introduction

Galway County Council on behalf of itself, and on behalf of Galway City Council, is proposing to develop the N6 Galway City Ring Road (GCRR) around Galway City, hereinafter referred to as the proposed road development.

A Natura Impact Statement (NIS) has been prepared in accordance with the current legislative provisions and having regard to best practice guidance in preparing an NIS. The NIS considers the impacts of the proposed road development, on its own and in combination with other plans or projects, on European sites in view of the conservation objectives of those sites and then assesses whether the integrity of those European sites would be adversely affected.

This executive summary gives an overview of assessment and findings presented in the NIS report and follows the same layout from **Sections 1** through to **Section 4** giving an overview of the proposed road development, consultations undertaken and the methodology followed for the assessment. **Section 5** presents the ecological, hydrogeological and hydrological baseline (as it relates to the local European sites), **Section 6** identifies the European sites potentially affected by the proposed road development and **Sections 7** to **10** present the assessment as to whether the proposed road development will impact on the site integrity of these European sites in turn. A summary of the in combination assessment of the proposed road development with other plans and projects is presented in **Section 11** and the overall conclusion in **Section 12**.

2 Overview of the Proposed Road Development

The proposed road development comprises of the construction of approximately 6km of a single carriageway from the western side of Bearna as far as the Ballymoneen Road and approximately 12km of a dual carriageway from there to the eastern tie in with the existing N6 at Coolagh, Briarhill, along with associated link roads, side roads, junctions and structures and localised works to the existing electricity transmission and distribution networks (specifically comprising of the diversion of 110kV and 38kV services).

The total area within the footprint of the proposed development boundary[1] is 280ha. Of this total area, an area of 180ha is required for the footprint of the proposed road development. A full description of the proposed road development is presented in **Section 2** of the main NIS and on **Plate 1** below and **Figures 1.1** to **1.15**.

There is an at-grade roundabout proposed on the R336 Coast Road and the Bearna to Moycullen Road, at-grade signalised junctions at Cappagh Road and Ballymoneen Road and grade separate junctions for the N59 Moycullen Road (including a link road from the junction north to the N59 Moycullen Road

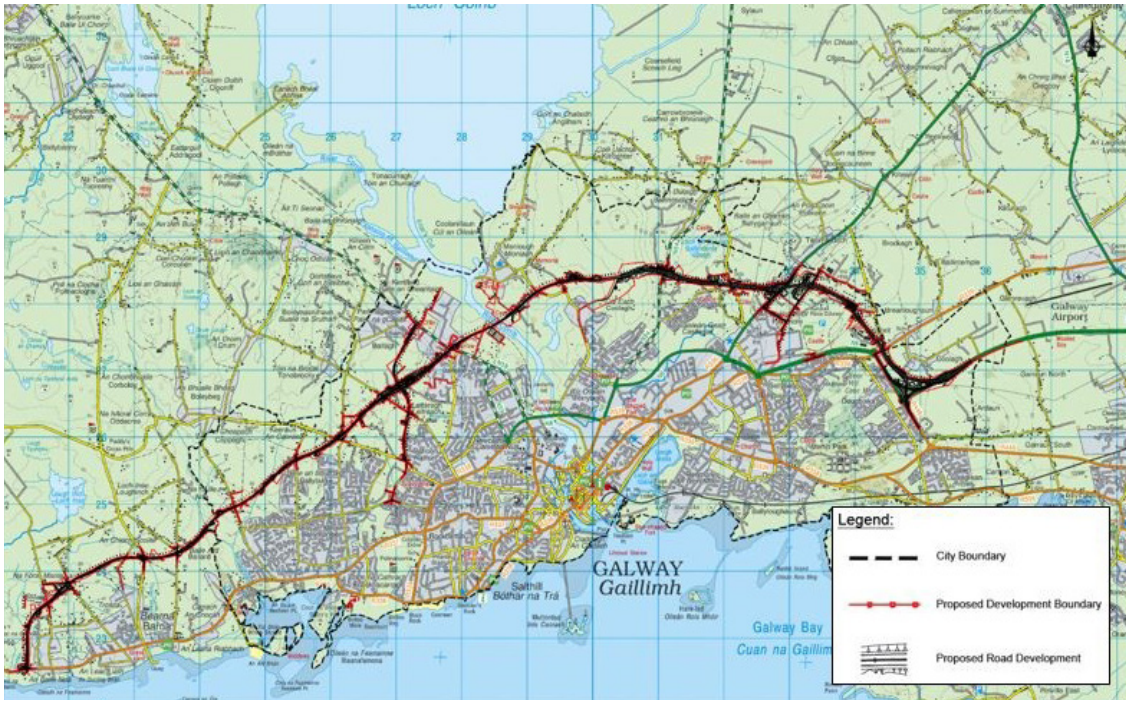


Plate 1: Proposed Road Development Overview

[1]The extents of the lands to be compulsory acquired for the construction and operation of the proposed road development is referred to as the proposed development boundary.

and south to the Knocknacarra area), the N84 Headford road and the N83 Tuam Road and a free flow junction with the tie-in to the existing N6 at Coolagh, Briarhill.

There are four significant structures included in the design of the proposed road development namely the River Corrib Bridge which traverses NUIG Sporting Campus and the river itself, Menlough Viaduct over an area of Annex I habitat outside any European sites, Lackagh Tunnel beneath the Lough Corrib candidate Special Area of Conservation (cSAC) at Coolough and Menlough, and Galway Racecourse Tunnel to the north of the race track. To mitigate impacts to existing pitches at NUIG Sporting Campus at Dangan it is also proposed to construct an all-weather full size GAA pitch and a training pitch at the location of the existing GAA pitches adjacent to the River Corrib. Additional lands to the north of Menlo Castle are included as part of the proposed road development to provide lands for the enhancement of the core foraging habitat for the Lesser horseshoe bat known to roost at Menlo Castle and mitigate against potential impacts to this species. These lands will be planted with additional hedgerows and maintained as agricultural lands by the local authority and will remain in their ownership. There will be a tunnel maintenance building located adjacent to Lackagh Tunnel and another one adjacent to the Galway Racecourse Tunnel. The proposed road development will also include extensive landscape planting and the creation of Annex I habitat areas[2] (e.g. Calcareous grassland habitat within Lough Corrib cSAC on the east bank of the River Corrib). Noise barriers will also be installed at locations along the proposed road development.

There are many European sites present in the local and surrounding areas. Lough Corrib cSAC is the only European site traversed by the proposed road development. Galway Bay Complex cSAC and Inner Galway Bay SPA are downstream of the proposed road development. While Lough Corrib SPA is generally upstream of the proposed road development, a single outfall (the proposed drainage outfall for the N59 Link Road North) eventually discharges to a part of the River Corrib which falls within the SPA designation. All other European sites are at a greater distance from the proposed road development. The proposed road development and its boundary overlaps with (i.e. traverses through, or lies adjacent to), Lough Corrib cSAC at four locations: at the termination of the proposed drainage outfall from the N59 Link Road North at Kentfield; at the site of the proposed River Corrib Bridge between Dangan and Menlough; to the west of the Coolagh Lakes (Ch. 9+850 to Ch. 10+100); and, to the west and north of Lackagh Quarry where the proposed road development will consist of a tunnel (Lackagh Tunnel) and approach road infrastructure. Refer to **Plate 2** below and Section 2 of main NIS for plates of these locations.

Of the 280ha of land within the proposed development boundary, approximately 4.0ha of the proposed road development lies within the Lough Corrib cSAC (c0.6ha above Lackagh Tunnel and c0.5ha beneath River Corrib Bridge). The proposed road development also traverses a number of groundwater bodies that support groundwater dependant wetland habitats within European sites and traverses a number of watercourses that lie within or drain to a European site.

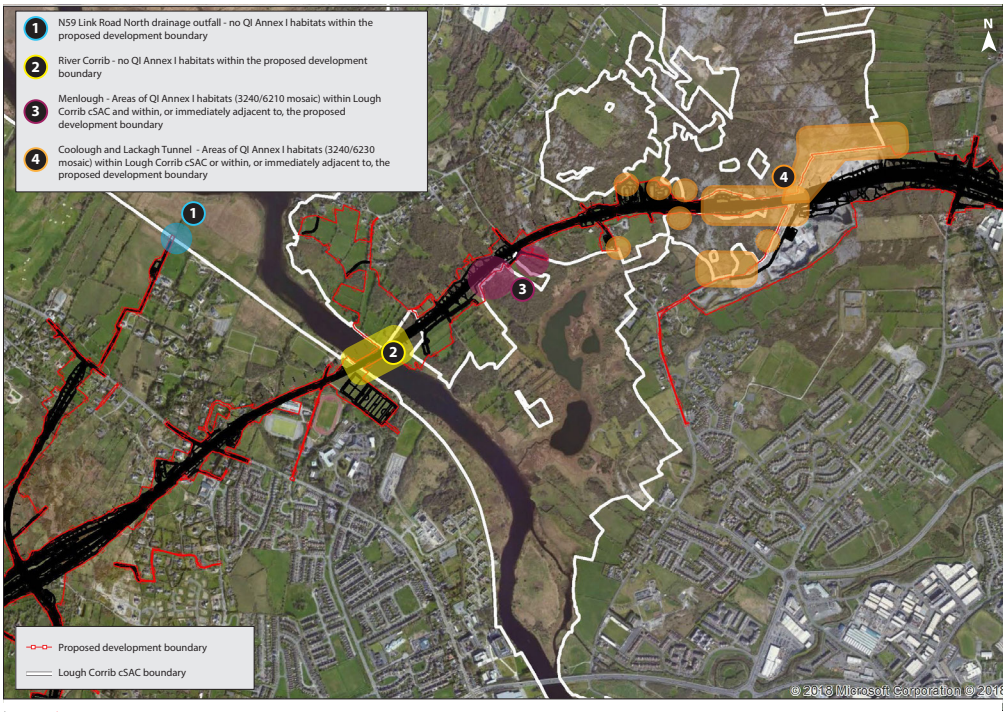


Plate 2: Proposed Road Development overlap with European sites

[2]The Annex I habitat creation relates to addressing residual impacts to Annex I habitats outside of any European sites in the EIA Report. It is not in response to any impacts on Annex I habitats that relate in any way to effects on QIs or the conservation objectives of any European sites and that habitat creation does not constitute "compensatory measures" in the meaning of that term in Article 6(4) of the Habitats Directive.

West of the N59 Moycullen Road, the drainage system will discharge to watercourses crossed by, or adjacent to, the proposed road development that eventually outfall to Galway Bay which is within the Galway Bay Complex cSAC and Inner Galway Bay Special Protection Area (SPA), or the River Corrib, either directly or to a tributary, which is within the Lough Corrib cSAC. East of the N59 Moycullen Road, a fully sealed drainage system will generally discharge to ground via infiltration, with the exception of five drainage networks which either directly or indirectly outfall to the River Corrib. A separate isolated sealed drainage system will be utilised for the Lackagh Tunnel and the Galway Racecourse Tunnel structures which will be pumped to the Mutton Island Waste Water Treatment Plant for treatment, via the existing fowl sewer network. Attenuation will be provided at outfalls and discharge points to maintain existing flow rates in receiving watercourses. Infiltration basins have been sized to allow sufficient time for infiltration to discharge to the ground. Pollution control measures (e.g. petrol and oil interceptors, spill containment areas and wetlands) will be provided on all mainline road drainage networks prior to outfalling/discharging to ensure water quality is maintained in receiving watercourses. Refer to Section 2.4 of the main NIS for further details.

The construction activities associated with the proposed road development include enabling works, site preparation and clearance works, fencing, main construction (e.g. roadworks, drainage, structures, tunnels, blasting and accommodation works), material sources and transportation, service and utility diversions, commissioning and decommissioning of proposed road development. Refer to Section 2.5 of the main NIS for further details.

The design progressed in tandem with environmental studies which were undertaken to both inform the baseline environmental data and inform the design to minimise impacts to the receiving environment. As such, key design measures to avoid or reduce impacts on European sites are included within the design of the proposed road development, refer to Section 2.6 of the main NIS for further details.

The proposed road development, including the drainage, will be maintained on a regular basis to ensure all elements function as per their design and achieve the required standards.

3 Consultations

Six consultation meetings have been held by the project team with the National Parks & Wildlife Service (NPWS) section of the Department of Culture, Heritage and the Gaeltacht (formerly the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, and previous to that, the Department of Arts, Heritage and the Gaeltacht) between 2014 and 2017. In summary, discussions with the NPWS were broad ranging covering general requirements and process relating to scoping and preparation of the EIA Report and NIS, the ecological baseline surveys and findings, boundaries of the existing European sites, valuing ecological receptors, mitigation, impact assessment, conservation objectives, derogation licences, supporting land use plans and transportation strategies and the Lough Corrib cSAC boundary and its Qualifying Interest species and habitats (QIs).

Two consultation meetings were held with IFI (in August 2014, and in September 2016) to discuss the fisheries value of the watercourses crossed by the proposed road development and culvert/bridge design and construction.

4 Methodology

Full details of the methodology are outlined in Section 4 of the NIS with a brief summary of the desk study and survey elements provided here.

A desk study was undertaken in the preparation of the NIS to inform the assessment along with the results of the field surveys undertaken.

A comprehensive range of baseline ecological surveys were carried out between 2013 and 2018 which informed this assessment: habitat surveys (including aquatic habitat surveys), surveys for the Slender naiad *Najas flexilis* and Varnished hook-moss *Hamatocaulis vernicosus*, Otter surveys, White-clawed crayfish surveys, molluscan surveys, breeding and wintering bird surveys, and fish surveys. The surveys were carried out during the optimal survey season for each receptor.

Hydrological surveys including water quantity and quality monitoring were undertaken to inform the NIS assessment, as the proposed road development crosses catchments/ subcatchments that drain to European sites.

A hydrogeological study was undertaken to inform the NIS assessment as the proposed road development traverses a number of groundwater bodies that support groundwater dependant wetland habitats within European sites. This included site specific ground investigation works, undertaken in 2015 and 2016, to understand the existing geological environment and ground conditions at Lackagh Quarry.

5 Existing Baseline

A summary of the existing ecological, hydrogeological and hydrological environment is included below in order to allow the potential impacts associated with the proposed road development to be fully understood, and to understand how these impacts might affect the conservation objectives of European sites.

5.1 Ecological Baseline

5.1.1 Habitats

The local ecological baseline, and in particular the habitats present, is greatly influenced by the underlying geology. Within the western part of the study area, which is underlain by granite, peatland habitats are most frequent. The most notable of these were the Annex I habitats Dry heath [4030], Wet heath [4010], *Molinia* meadow [6410], Species-rich Nardus upland grassland [*6230], Transition mires [7140], *Rhynchosporion* depressions [7150] and Blanket bog [*7230/7230][3].

The eastern part of the study area is underlain by limestone and habitats present are primarily calcareous grasslands, woodland and exposed limestone rock. Wetlands are also associated with the River Corrib and Ballindooley Lough. The most notable terrestrial habitats present here were the Annex I habitats Calcareous grassland [*6210/6210], Limestone pavement [*8240], Lowland hay meadows [6510] and Petrifying springs [*7220]. These form a mosaic with the expanse of semi-natural hazel and ash woodland in the Menlough/Coolagh area that extends from the River Corrib to the north of Lackagh Quarry. The Coolagh Lakes and Ballindooley Lough both correspond with the Annex I habitat Hard water lakes [3180]. Along with the River Corrib, these areas supported diverse wetland complexes including the Annex I habitats *Cladium* fen [*7210], Alkaline fen [7230], Hydrophilous tall-herb [6430] and residual alluvial forests [*8240]. Turloughs [*3180] were also recorded across this area.

Habitat maps were prepared showing the habitat areas per the Fossitt habitat classification system and identifying Annex I habitat types. Refer to Section 5.1 of the main NIS and **Figures 13.1** to **13.15** and **14.1** to **14.15**.

5.1.2 Flora and Fauna Species

The local area supports a diverse range of flora and fauna species including QI species of nearby cSAC sites (e.g. Otter, Atlantic salmon, Brook lamprey and Sea lamprey) and Special Conservation Interest (SCI) bird species of the nearby SPA sites, as outlined in Section 5.4 of the main NIS. Ballindooley Lough is a locally important site for wintering birds and supports many bird species listed as SCIs of Lough Corrib SPA and/or Inner Galway Bay SPA.

[3]Where used in conjunction with Annex I habitat codes, an asterisk indicates a priority Annex I habitat type

5.1.3 Non-native Invasive Species

There are three non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations present within, or in close proximity to, the proposed road development: Japanese knotweed *Fallopia japonica*, Rhododendron *Rhododendron ponticum* and Himalayan knotweed *Persicaria wallichii*. Only the Japanese knotweed infestation at the NUIG Sporting Campus is close to a European site (Lough Corrib cSAC). Refer to Section 5.5 of the main NIS and Figures **13.1** to **13.5** for further details.

5.1.4 European sites

There are many European sites present in the local and surrounding areas. Lough Corrib cSAC is the only European site crossed by the proposed road development. Lough Corrib SPA is c200m from the proposed road development at Kentfield, c.70m from it at Menlough, and connected with it by the existing surface water drainage network in Kentfield. Galway Bay Complex cSAC lies c.160m to the south of the proposed road development at Bearna. Inner Galway Bay SPA also lies to the south of the proposed road development at Bearna (c.1.1km). Both these European sites are connected to the proposed road development by the network of watercourses that drain to Galway Bay. All other European sites are at a greater distance from the proposed road development. Refer to Section 5.6 of the main NIS and **Figure 12** for further details.

5.2 Hydrogeology Baseline

The proposed road development traverses, or will be close to, several groundwater bodies (GWB), each of which contributes groundwater to one or more European sites.

The hydrogeological studies identified that the construction of the proposed road development due to its design has the potential to affect groundwater dependant habitats within Lough Corrib cSAC only where it interacts with the following groundwater bodies (GWBs) that contribute groundwater to the cSAC as shown on **Plate 3** below:

- Ross Lake GWB which lies between the N59 Moycullen Road and the River Corrib

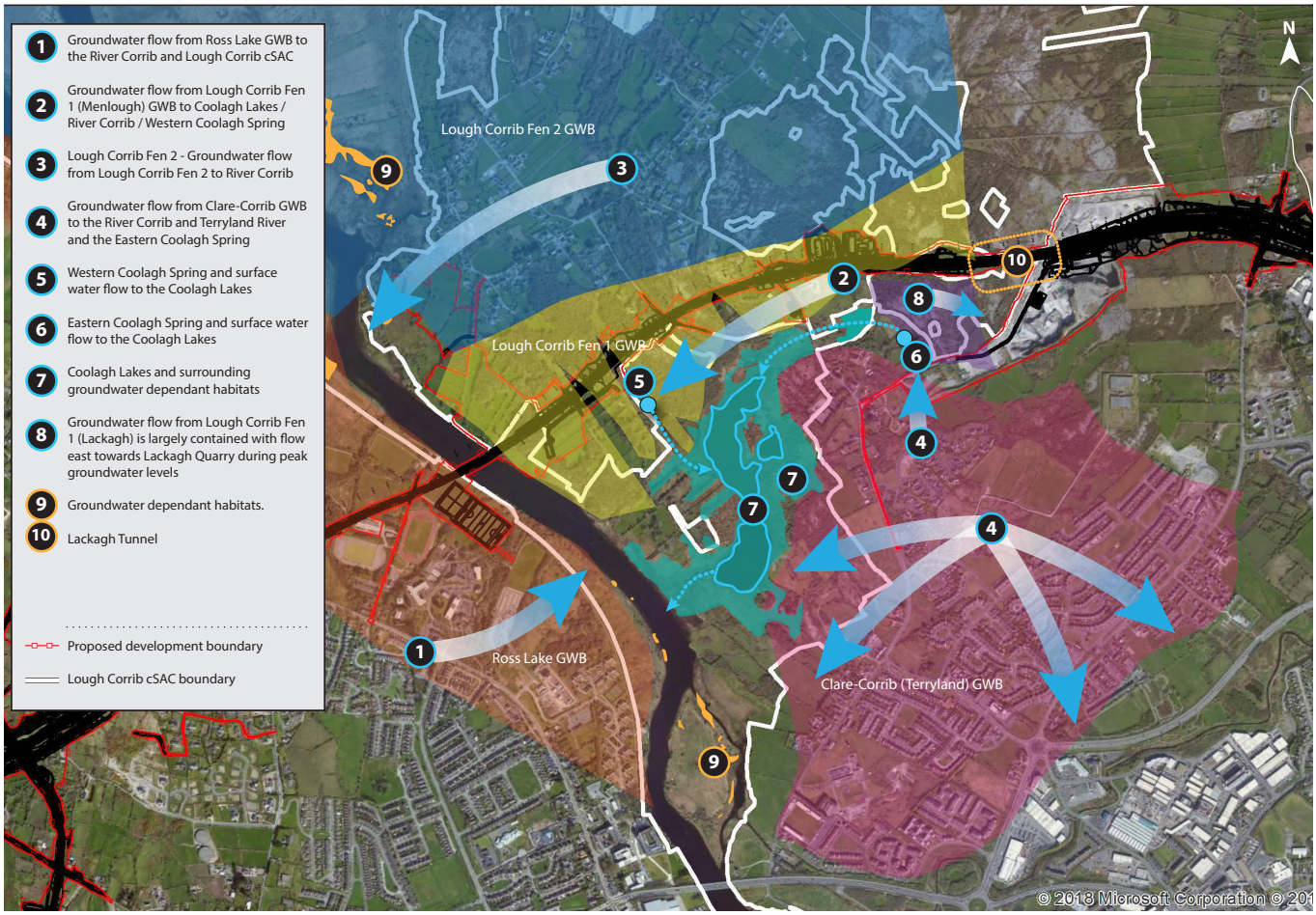


Plate 3: Generalised Hydrogeology interactions

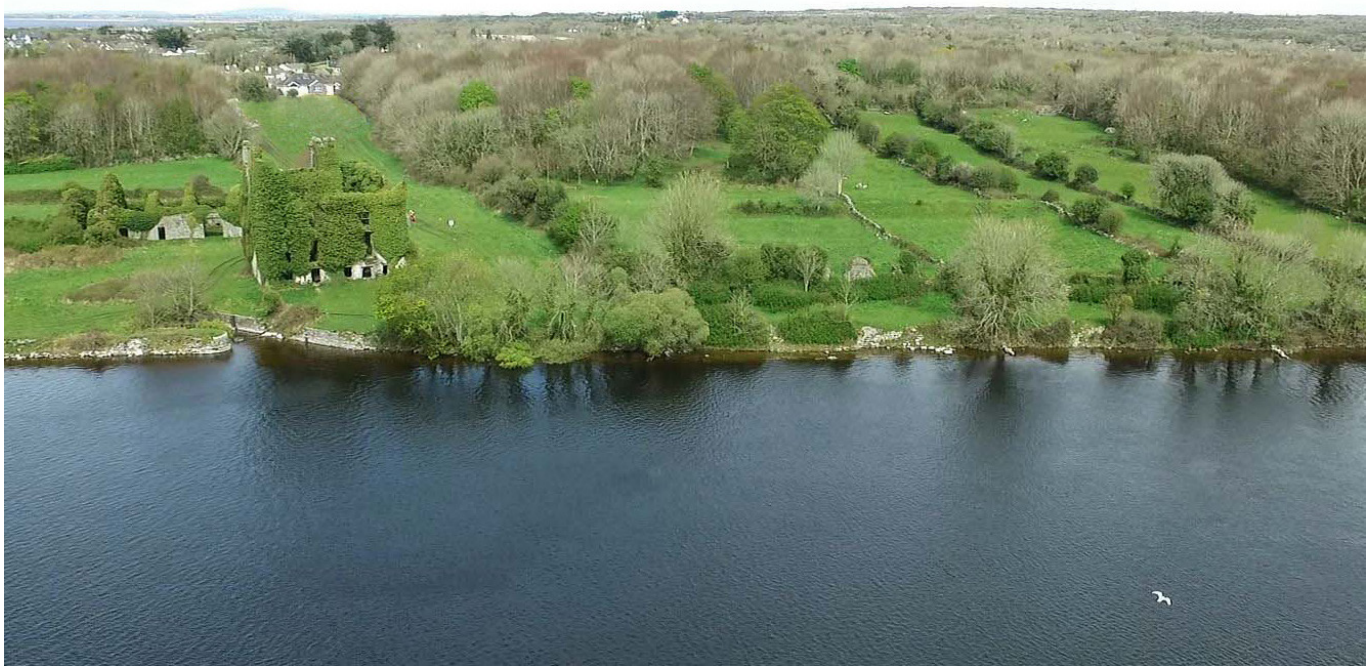
- Lough Corrib Fen 1 (Menlough) GWB which lies between the River Corrib and the western approach to the Lackagh Tunnel. This GWB contributes groundwater to the River Corrib and also to a spring (the Western Coolagh Spring) which supplies water to the Coolagh Lakes.
- Lough Corrib Fen 2 GWB, which lies between the proposed road development and Lough Corrib, contributes groundwater to the River Corrib
- The Clare-Corrib GWB is traversed by the proposed road development between Lackagh Quarry and the N83 Tuam Road[4]. This GWB contributes groundwater to the River Corrib and the Terryland River (which drains to the River Corrib). Although the Ballindooley Lough wetland complex lies within this GWB, it lies up gradient of the proposed road development and the proposed road development cannot affect the groundwater regime there.
- Due to the compartmentalisation of the aquifer by buried valleys/palaeokarst, the groundwater in Lough Corrib Fen 1 (Lackagh) GWB is largely contained. Due to the thick clay subsoil there are no observed discharges from the limestone bedrock to the Eastern Coolagh Spring and the compartmentalisation prevents discharge to Western Coolagh Spring. Instead, groundwater flow from Lough Corrib Fen 1 (Lackagh) is likely to flow eastwards to Lackagh Quarry during peak groundwater levels.

5.3 Hydrology Baseline

The watercourses crossed by the proposed road development are (from west to east) Sruthán na Líbeirtí, the Trusky Stream, the Bearna Stream, the Tonabrocky Stream, the Knocknacarragh Stream and the River Corrib. The proposed road development passes close to two lake systems: Coolagh Lakes and Ballindooley Lough (a section of the road drainage network discharges to Ballindooley Lough).

The River Corrib and the Coolagh Lakes lie within Lough Corrib cSAC and drain to Galway Bay. Part of the River Corrib to which the drainage system discharges also lies within Lough Corrib SPA. All the other watercourses also drain to Galway Bay and therefore, Galway Bay Complex cSAC and Inner Galway Bay SPA.

The drainage catchments crossed by the proposed road development is shown on **Figures 11.1** and **11.2** within the NIS.



[4]Formally known as the N17 Tuam Road.

6 European sites within the Zone of Influence of the Proposed Road Development

The proposed road development (including the proposed design, construction methodologies and operational effects) was analysed and assessed to identify the potential impacts associated with it that could affect any European sites. These potential impacts are listed in Sections 7 to 10 below, refer also to Section 6 of the main NIS.

Based upon the potential impacts identified, the ecological Zone of Influence (ZoI) i.e. the area within which the proposed road development could affect the ecological environment, was defined. Refer to Section 7 of the main NIS and **Plate 4** below.

Considering the ZoI of the proposed road development and taking into consideration all of the potential impact sources and pathways connecting the proposed road development to European site(s), in view of the site(s) conservation objectives, the European sites potentially at risk of impacts were identified.

The following four European sites were identified:

- Lough Corrib cSAC
- Galway Bay Complex cSAC
- Lough Corrib SPA
- Inner Galway Bay SPA

All other European sites are located beyond the ZoI and therefore are not at risk from the proposed road development.

Sections 7 to **10** below consider how, via the identified impacts and their defined ZoI, the proposed road development could affect the conservation objectives of each of these European sites, as affecting the conservation objectives of a European site would constitute an adverse effect on the integrity of that European site. Where a potential impact on a European site(s) conservation objectives is identified, mitigation measures are proposed to ensure no such effects could arise. The residual impacts once these mitigation measures have been implemented are then identified in order to reach a conclusion as to whether or not the proposed road development will adversely affect the integrity of a European site(s).

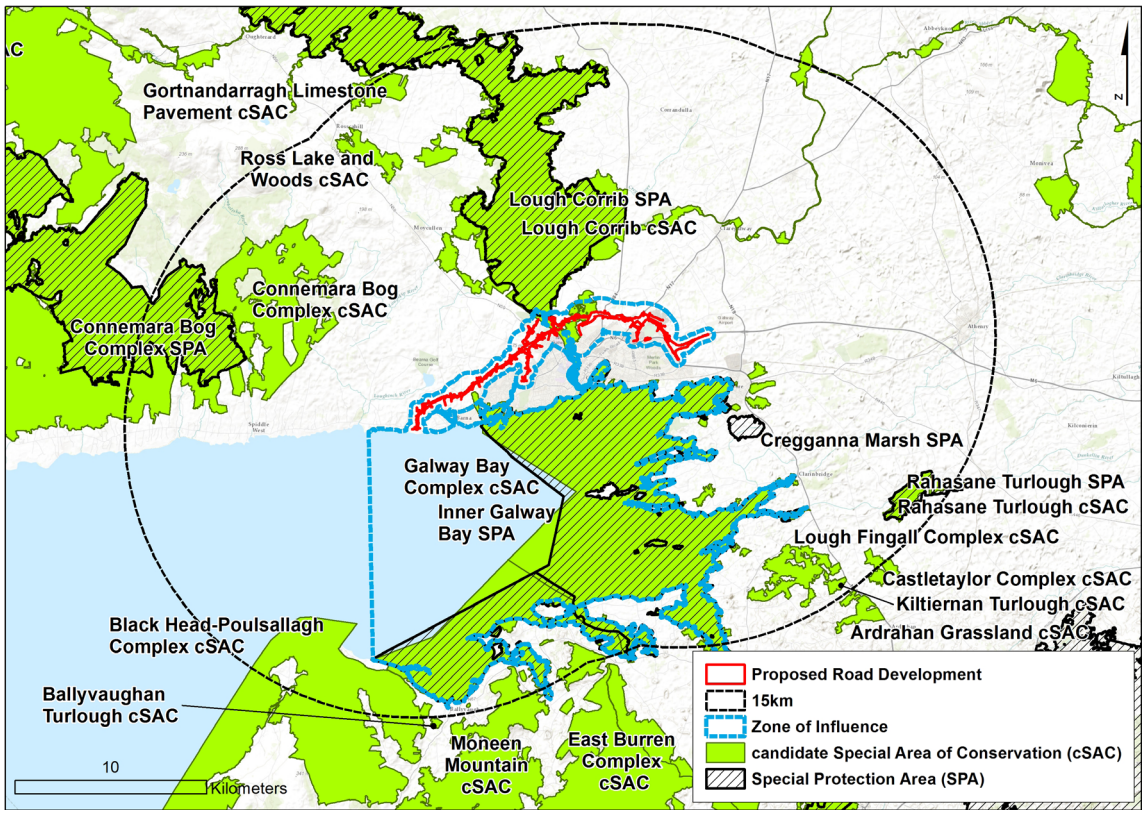


Plate 4: ZoI of the proposed road development and European sites[5]

[5]The 15km buffer is shown to provide some spatial context only and did not influence defining the ZoI

7 Examination and Analysis of Potential Impacts on Lough Corrib cSAC

7.1 Baseline

Lough Corrib cSAC is a large lake site of over 20,500ha, with Lough Corrib itself covering an area of c.18,240ha. The site is selected for a range of lake, wetland and terrestrial Annex I habitat types and a range of Annex II plant and animal species that these habitats support.

The QIs of Lough Corrib cSAC within the ZoI of the proposed road development are listed below:

[3140] Hard water lakes
[*6210/6210] Calcareous grassland
[6410] *Molinia* meadows
[*7210] *Cladium* fen
[7230] Alkaline fens
[*8240] Limestone pavement
[1029] Freshwater Pearl Mussel
[1095] Sea Lamprey
[1096] Brook Lamprey
[1106] Atlantic Salmon (only in fresh water)
[1355] Otter

The proposed road development passes through the southernmost part of Lough Corrib cSAC, between the wetland complexes at Coolanillaun and Tonacurragh and Galway City. There is a high diversity of habitats present throughout this area, including the following QI Annex I habitats (and priority Annex I habitats) of Lough Corrib cSAC: [3140] Hard water lakes, [*6210/6210] Calcareous grasslands, [6410] *Molinia* meadows, [7210] *Cladium* fens, [*7230] Alkaline fens and [*8240] Limestone pavement – see **Plate 5** below.

The River Corrib corridor in the vicinity of the proposed road development provides important habitat for QI species such as Atlantic salmon, Brook lamprey and Sea lamprey, particularly in the context of its function as a migration corridor from the sea to the spawning areas for Atlantic salmon and Sea lamprey. Otter (QI species) also use the River Corrib corridor in this area (although no holt or couch sites were present in the vicinity of the proposed road development).

The Coolagh Lakes correspond with the QI Annex I habitat Hard water lakes. The surrounding wetland complex is an integral component of the conservation objectives of this habitat type within Lough Corrib cSAC. These habitats include wet grassland, reed swamp, fen and wet heath; some of which correspond with the Annex I habitats Residual alluvial forests, *Cladium* fen, Alkaline fen, Hydrophilous tall herb, *Molinia* meadow, Wet heath and Transition mires. Water levels, and water quality, in the Coolagh Lakes are supported by groundwater inputs (via the western and Eastern Coolagh Springs) and by influx from the main channel of the River Corrib.

As noted in Section 2 above, the proposed road development overlaps with Lough Corrib cSAC at four locations. Approximately 4.8ha of the proposed development boundary[6] lies within this European site (c0.6ha above Lackagh Tunnel and c0.5ha beneath River Corrib Bridge).

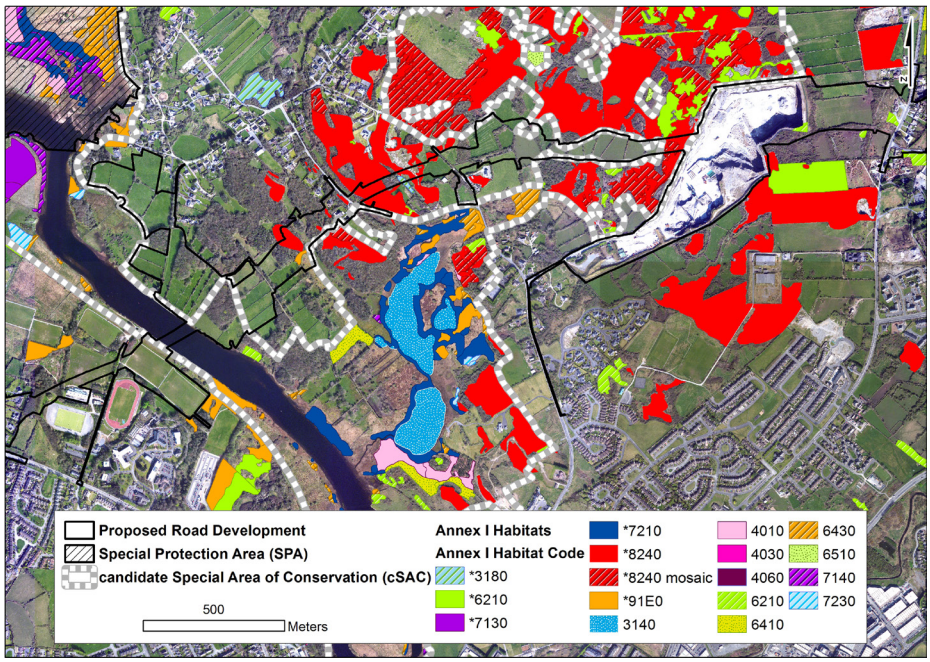


Plate 5: The proposed road development and an overview of Annex I habitats in the vicinity of Lough Corrib cSAC (refer also to Figures 14.1 – 14.5)

[6]The extents of the lands to be compulsory acquired for the construction and operation of the proposed road development is referred to as the proposed development boundary.

7.2 Potential Impacts

The proposed road development could (in the absence of mitigation measures) potentially affect QI habitats and species within Lough Corrib cSAC, by the following impacts:

- Direct loss of Limestone pavement and Calcareous grassland habitat west of Coolagh Lakes
- Loss of/damage to Limestone pavement and Calcareous grassland habitat above, or in the vicinity of, the Lackagh Tunnel and approaches during construction (through affecting the structural integrity of the supporting rock mass)
- Affect groundwater flow or groundwater quality during construction or operation which could impact upon groundwater dependant habitats. Most importantly, affecting groundwater in the Lough Corrib Fen 1 (Menlough) GWB and the Clare-Corrib GWB has the potential to affect the groundwater regime that contribute to the Coolagh Lakes (e.g. during the construction of the Lackagh Tunnel and during the installation of the supporting piers of the proposed Menlough Viaduct).
- Affect water quality in receiving watercourses during construction
- Affect habitats as a result of dust generated during construction works
- Introduce/spread non-native invasive plant species
- Pose a mortality risk to aquatic species during construction of the River Corrib Bridge
- Pose a mortality risk to Otter through the potential for collisions with road traffic

These potential impacts could affect the QIs and conservation objectives of Lough Corrib cSAC as outlined in the following table.

Species/Habitat Type	Potential Impact to conservation objectives
Hard water lakes	Affecting water quality in the Coolagh Lakes and/or affecting the functioning of the existing hydrogeological regime could affect the quality of the habitat, and the extent of the supporting fringing habitat, potentially to the degree that the Annex I status of the habitat would be compromised.
***Molinia* meadows, *Cladium* fen and Alkaline fen**	Affecting water quality in the River Corrib and Coolagh Lakes, and/or affecting the existing hydrogeological regime, could affect the extent and quality of these habitats in Lough Corrib cSAC. Introducing or spreading non-native invasive plant species could affect the extent and quality of these habitats within Lough Corrib cSAC.
Limestone pavement and Calcareous grassland	Loss of Limestone pavement and Calcareous grassland habitat within Lough Corrib cSAC either directly, or as a consequence of construction works associated with the Lackagh Tunnel (and approaches) impacting on the structural integrity of the supporting rock mass. Introducing or spreading non-native invasive plant species, and/or dust deposition during construction, could affect the extent and quality of Limestone pavement and/or Calcareous grassland habitat in Lough Corrib cSAC.
Otter	Affecting water quality in the River Corrib catchment during construction could impact on the quality of Otter habitat and affect fish numbers (prey abundance). The mortality risk to Otter posed by construction of the River Corrib Bridge, and road traffic during operation, could affect population numbers.
Sea lamprey, Brook lamprey, Atlantic salmon	Affecting water quality in the River Corrib catchment during construction could impact on the quality, extent or availability of suitable aquatic habitat in Lough Corrib cSAC. The mortality risk posed by construction of the River Corrib Bridge could affect population numbers.
Freshwater pearl mussel	Affecting water quality in the River Corrib catchment and/or the mortality risk associated with bridge construction works over the River Corrib, could affect salmonid fish numbers. This could have knock-on effects on the QI population in the Owenriff River as salmonid fish species play an important part in the Freshwater pearl mussel's lifecycle.

7.3 Mitigation measures

The following mitigation measures will be implemented, under supervision of both the Project Ecologist (employed by the Employer) and the Ecological Clerk of Works (employed by the Contractor), to ensure that the proposed road development will not affect the conservation objectives of Lough Corrib cSAC:

- Limestone pavement and Calcareous grassland habitat which is within both the proposed development boundary and Lough Corrib cSAC will be protected during construction and retained. No permanent fencing will be erected within Annex I habitat areas within Lough Corrib cSAC to protect habitats from permanent damage and ensures grazing is not restricted.
- A detailed construction methodology, and monitoring strategy, has been developed for the proposed Lackagh Tunnel works to ensure that construction works do not affect the structural integrity of the limestone bedrock supporting Limestone pavement and Calcareous grassland habitats in Lough Corrib cSAC
- Mitigation measures have been developed and will be implemented to ensure that existing groundwater conditions are not affected, during construction or operation, in groundwater bodies traversed by the proposed road development which have been identified as contributing to ground water dependant habitats within the Lough Corrib cSAC
- Mitigation measures have been developed and will be implemented to ensure that water quality in receiving watercourses is protected during construction of the proposed road development
- Mitigation measures have been developed and will be implemented to ensure that dust generated during construction will be controlled and contained to avoid any effects on the QI habitats or species of Lough Corrib cSAC
- The non-native invasive species management plan developed in the Construction Environmental Management Plan for the proposed road development will ensure that non-native invasive plant species will be controlled and will not be introduced to Lough Corrib cSAC as a result of the construction and operation activities associated with the proposed road development
- Mitigation measures have been developed and will be implemented to ensure that construction materials are not accidentally introduced into the River Corrib during construction
- To prevent Otter mortality due to road traffic collisions, mammal fencing will be installed at high risk locations to ensure Otter cannot access the road carriageway.

7.4 Residual Impacts and Conclusion

The mitigation measures to protect QI habitats, to protect the rock mass above and adjacent to the Lackagh Tunnel works, to protect the receiving hydrological and hydrogeological environment, to control dust during construction, to control and prevent the spread of non-native invasive plant species, and to prevent the proposed road development creating a mortality risk to aquatic species in the River Corrib, will ensure that the proposed road development will not affect the conservation objectives of Lough Corrib cSAC.

Following an examination, analysis and evaluation in light of best scientific knowledge of all relevant information in respect of the QI habitats and species of Lough Corrib cSAC within the ZoI of the proposed road development, the potential impacts and mitigation measures, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition for the QIs concerned, it has been concluded that the proposed road development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of Lough Corrib cSAC and there is no reasonable scientific doubt with the conclusion.

8 Examination and Analysis of Potential Impacts on Galway Bay Complex cSAC

8.1 Baseline

Galway Bay Complex cSAC is a large marine-dominated site of over 14,400ha, covering the inner part of Galway Bay from Rusheen Bay near Bearna (including Bearna Woods) to Ballyvaughan Bay in County Clare. The site is selected for a range of terrestrial, coastal and marine Annex I habitat types and species. It overlaps with most of Inner Galway Bay SPA.

The QIs of Galway Bay Complex cSAC that are present within the ZoI of the proposed road development, are listed below:

[1140] Tidal mudflats

[*1150] Lagoons

[1160] Large shallow inlets and bays

[1170] Reefs

[1220] Perennial vegetation of stony banks

[1310] Salicornia muds

[1330] Atlantic salt meadows

[1410] Mediterranean salt meadows

[*6210/6210] Calcareous grassland

[1355] Otter

[1365] Harbour seal

The proposed road development does not traverse Galway Bay Complex cSAC. All watercourses crossed by the proposed road development, and all the surface water catchments to which the proposed road development's drainage network discharges, drain to Galway Bay. Therefore, potentially any of the marine/coastal QIs, or terrestrial habitats connected with the watercourses within the ZoI of the proposed road development, are at risk from impacts.

8.2 Potential Impacts

As the proposed road development does not traverse Galway Bay Complex cSAC, none of the QI species, or their supporting habitats within the cSAC, are directly impacted by the proposed road development.

However, the proposed road development could (in the absence of mitigation measures) potentially affect QI habitats and species within Galway Bay Complex cSAC, by the following impacts:

- Affect water quality in receiving watercourses and Galway Bay during construction
- Introduce/spread non-native invasive plant species
- New culvert structures could present a barrier to Otter movement within the Bearna Stream catchment
- Pose a mortality risk to Otter through the potential for collisions with road traffic

These potential impacts could affect the QIs conservation objectives of Galway Bay Complex cSAC as outlined in the following table.

Species/Habitat Type	Potential Impact to conservation objectives
Tidal mudflats, Lagoons, Large shallow inlets and bays, Reefs, Perennial vegetation of stony banks, Salicornia mud, Atlantic salt meadows, Mediterranean salt meadows	Affecting water quality in Galway Bay during construction could impact upon the extent, distribution or condition of these habitat types in Galway Bay Complex cSAC, and the species communities they support.
Calcareous grassland	Introducing or spreading non-native invasive plant species to Rusheen Bay, via the Bearna Stream or the R336 haul route, could potentially affect the areas and quality of Calcareous grassland habitat within Galway Bay Complex cSAC.
Otter	Affecting water quality in the Bearna Stream and Galway Bay during construction could impact on the quality of Otter habitat and affect fish numbers (prey abundance). The mortality risk to Otter posed by construction of the River Corrib Bridge, and road traffic during operation, could affect population numbers.
Harbour seal	Affecting water quality in Galway Bay during construction could affect Harbour seal breeding and haul out sites.

8.3 Mitigation measures

The following mitigation measures will be implemented, under supervision of both the Project Ecologist (employed by the Employer) and the Ecological Clerk of Works (employed by the Contractor), to ensure that the proposed to ensure that, as a result of the potential impacts, the proposed road development will not affect the conservation objectives of Galway Bay Complex cSAC:

- Mitigation measures have been developed and will be implemented to ensure that water quality in receiving watercourses is protected during construction of the proposed road development
- The non-native invasive species management plan developed in the Construction Environmental Management Plan for the proposed road development will ensure that non-native invasive plant species will be controlled and will not be introduced to Galway Bay Complex cSAC as a result of the construction and operation activities associated with the proposed road development
- Otter ledges or underpasses, in conjunction with mammal fencing, will be installed at the Bearna Stream (C04/01) and at the Tonabrocky Stream (C04/02), to ensure that the culverts do not present a barrier to Otter movement and to prevent Otter mortality by ensuring they cannot access the road carriageway

8.4 Residual Impacts and Conclusion

The mitigation measures to protect the receiving hydrological environment, to control and prevent the spread of non-native invasive plant species, and to prevent the proposed road development presenting a barrier to Otter movement or a mortality risk to the Otter population of Galway Bay, will ensure that the proposed road development will not affect the conservation objectives of Galway Bay Complex cSAC.

Following an examination, analysis and evaluation, in light of best scientific knowledge of all relevant information in respect of the QI habitats and species of Galway Bay Complex cSAC within the ZoI of the proposed road development, the potential impacts and mitigation measures, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition for the QIs concerned, it has been concluded that the proposed road development does not pose any risk (either directly or indirectly) of adversely affecting the integrity of Galway Bay Complex cSAC and there is no reasonable scientific doubt with this conclusion.

9 Examination and Analysis of Potential Impacts on Lough Corrib SPA

9.1 Baseline

Lough Corrib SPA is a vast site of over 18,600ha, comprising Lough Corrib, most of its islands, and much of the wetland habitat that surrounds the lake margin. Lough Corrib SPA is an internationally important site for wintering birds and is also a nationally important site for some breeding bird populations and this is the basis for its SPA designation.

The SCIs of Lough Corrib SPA within the ZoI of the proposed road development are listed below:

[A179] Black-headed gull – Breeding/Wintering

[A182] Common gull – Breeding/Wintering

[A193] Common tern – Breeding

[A125] Coot – Wintering

[A140] Golden plover – Wintering

[A082] Hen harrier – Wintering

[A056] Shoveler – Wintering

[A061] Tufted duck – Wintering

[A999] Wetlands and Waterbirds - wetland habitats at Coolanillaun

The proposed road development does not traverse Lough Corrib SPA. However, areas of wetland habitat within Lough Corrib SPA at Tonacurragh and Coolanillaun lie only c.60m to the north of the proposed road development at Menlough Village - a wetland mosaic of bog, heath, reed swamp, marsh and wet grassland habitats. In addition, many bird species listed as SCIs of Lough Corrib SPA were recorded during the breeding and wintering bird surveys at locations across the local area, remote from the SPA, some of which are impacted by the proposed road development. The habitat types associated with these sites ranged from natural/semi-natural lakes and wetland complexes (Ballindooley Lough, Coolagh Lakes and Lough Inch), the River Corrib, and upland mosaics of bog, heath, wet and acid grasslands, to improved and intensively managed habitats such as agricultural fields and recreational areas. Ballindooly Lough is an important local wetland site for wintering birds and regularly supported species listed as SCIs for Lough Corrib SPA.

9.2 Potential Impacts

As the proposed road development does not traverse Lough Corrib SPA, none of the SCI species, or their supporting habitats within the SPA, are directly impacted by the proposed road development.

However, the proposed road development could (in the absence of mitigation measures) potentially affect SCI bird species or their supporting wetland habitats, either within Lough Corrib SPA or in the surrounding local area, by the following impacts:

- Affect groundwater quality at wetland sites used by wintering SCI bird species outside of Lough Corrib SPA during construction/operation
- Affect the quality of surface water in the receiving freshwater environment during construction
- Long-term blasting between Lackagh Quarry and the N83 Tuam Road during construction could displace SCI listed bird species from Ballindooley Lough for one or more winter seasons

These potential impacts could affect the SCIs and conservation objectives of Lough Corrib SPA as outlined in the following table.

Species/Habitat Type	Potential Impact to conservation objectives
Shoveler, Tufted duck, Coot, Golden plover, Black-headed gull, Common gull, Common tern	Affecting surface water or groundwater quality in wetland sites used by SCI species could affect the type, quality and extent of wetland habitat available to support the SPA populations. Displacement of SCI wintering birds from wetland habitat at Ballindooley Lough could impact upon bird survival and population numbers by reduce the number and range of areas available to the wintering SPA populations.
Wetlands	Affecting surface water or groundwater quality in wetland sites used by SCI species could affect the type, quality and extent of wetland habitat available to support the SPA populations.

9.3 Mitigation measures

The following mitigation measures will be implemented, under supervision of both the Project Ecologist (employed by the Employer) and the Ecological Clerk of Works (employed by the Contractor), to ensure that, as a result of the potential impacts, the proposed road development will not affect the conservation objectives of Lough Corrib SPA:

- Mitigation measures have been developed and will be implemented to ensure that existing groundwater conditions are not affected, during construction or operation, in groundwater bodies traversed by the proposed road development
- Mitigation measures have been developed and will be implemented to ensure that water quality in receiving watercourses is protected during construction of the proposed road development
- Seasonal restrictions on blasting in the vicinity of Ballindooley Lough, will be implemented to minimise disturbance/displacement effects on wintering birds during construction

9.4 Residual Impacts and Conclusion

The mitigation measures to protect the receiving hydrological and hydrogeological environment, and to avoid/reduce the disturbance/displacement effects of blasting on wintering birds using Ballindooley Lough, will ensure that the proposed road development will not affect the conservation objectives of Lough Corrib SPA.

Following an examination, analysis and evaluation in light of the best scientific knowledge, of all relevant information in respect of all of the SCI bird species, and the supporting habitats, of Lough Corrib SPA within the ZoI of the proposed road development, the potential impacts and mitigation measures, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition for the SCIs concerned, it has been concluded that the proposed road development poses no risk (either directly or indirectly) of adversely affecting the integrity of Lough Corrib SPA and there is no reasonable scientific doubt about this conclusion.

10 Examination and Analysis of Potential Impacts on Inner Galway Bay SPA

10.1 Baseline

Inner Galway Bay SPA is a large marine-dominated site of over 13,260ha, covering the inner part of Galway Bay from Rusheen Bay near Bearna to Aughinish Bay in County Clare. Inner Galway Bay SPA is an internationally important site for wintering birds and is a nationally important site for some breeding bird populations; this is the basis for its SPA designation.

All of the SCIs of Inner Galway Bay SPA are within the ZoI of the proposed road development and are listed below:

[A157] Bar-tailed godwit – Wintering

[A179] Black-headed gull – Wintering

[A182] Common gull – Wintering

[A193] Common tern – Breeding

[A017] Cormorant – Breeding/Wintering

[A160] Curlew – Wintering

[A149] Dunlin – Wintering

[A140] Golden plover – Wintering

[A003] Great northern diver – Wintering

[A028] Grey heron – Wintering

[A142] Lapwing – Wintering

[A046] Light-bellied brent goose – Wintering

[A069] Red-breasted merganser – Wintering

[A162] Redshank – Wintering

[A137] Ringed plover – Wintering

[A191] Sandwich tern – Breeding

[A056] Shoveler – Wintering

[A052] Teal – Wintering

[A169] Turnstone – Wintering

[A050] Wigeon – Wintering

[A999] Wetlands

The proposed road development does not traverse Inner Galway Bay SPA. However, Galway Bay lies downstream of all the watercourses crossed by the proposed road development, and to which the road drainage will discharge. Therefore, all of the SCI bird species of Inner Galway Bay SPA, and the wetland and marine habitat that support them, are within the ZoI of the proposed road development and are therefore at risk of impacts.

In addition, many bird species listed as SCIs of Inner Galway Bay SPA were recorded during the breeding and wintering bird surveys at locations across the local area, outside of the SPA, some of which are impacted by the proposed road development. The habitat types associated with these sites ranged from natural/semi-natural lakes and wetland complexes (Ballindooley Lough, Coolagh Lakes and Lough Inch), the River Corrib, and upland mosaics of bog, heath, wet and acid grasslands, to improved and intensively managed habitats such as agricultural fields and recreational areas. Ballindooley Lough is an important local wetland site for wintering birds and regularly supported species listed as SCIs for Lough Corrib SPA.

10.2 Potential Impacts

As the proposed road development does not traverse Inner Galway Bay SPA, none of the SCI species, or their supporting habitats within the SPA, are directly impacted by the proposed road development.

However, the proposed road development could (in the absence of mitigation measures) potentially affect SCI bird species or their supporting wetland habitats within Inner Galway Bay SPA or in the surrounding local area, by the following impacts:

- Affect groundwater quality at wetland sites used by wintering SCI bird species outside of Inner Galway Bay SPA during construction/operation
- Affect the quality of surface water in the receiving freshwater environment during construction
- Long-term blasting between Lackagh Quarry and the N83 Tuam Road during construction could displace SCI listed bird species from Ballindooley Lough for one or more winter seasons

How these potential impacts could affect the SCIs and conservation objectives of Inner Galway Bay SPA, as outlined in the following table.

Species/Habitat Type	Potential Impact to conservation objectives
Great northern diver, Light-bellied brent goose, Red-breasted merganser, Ringed plover, Golden plover, Dunlin, Redshank, Turnstone, Common gull, Sandwich tern and Common tern	Affecting surface water or groundwater quality in wetland sites used by SCI species could affect the type, quality and extent of wetland habitat available to support the SPA populations.
Wigeon, Shoveler, Lapwing, Bar-tailed godwit, Curlew, Cormorant, Grey heron, Teal and Black-headed gull	Affecting surface water or groundwater quality in wetland sites used by SCI species could affect the type, quality and extent of wetland habitat available to support the SPA populations. Displacement of SCI wintering birds from wetland habitat at Ballindooley Lough could impact upon bird survival and population numbers by reduce the number and range of areas available to the wintering SPA populations.
Wetlands	Affecting surface water or groundwater quality in wetland sites used by SCI species could affect the type, quality and extent of wetland habitat available to support the SPA populations.

10.3 Mitigation Measures

The following mitigation measures will be implemented, under supervision of both the Project Ecologist (employed by the Employer) and the Ecological Clerk of Works (employed by the Contractor), to ensure that, as a result of the potential impacts, the proposed road development will not affect the conservation objectives of Inner Galway Bay SPA:

- Mitigation measures have been developed and will be implemented to ensure that existing groundwater conditions are not affected, during construction or operation, in groundwater bodies traversed by the proposed road development
- Mitigation measures have been developed and will be implemented to ensure that water quality in receiving watercourses is protected during construction of the proposed road development
- Seasonal restrictions on blasting in the vicinity of Ballindooley Lough, will be implemented to minimise disturbance/displacement effects on wintering birds during construction

10.4 Residual Impacts

The mitigation measures to protect the receiving hydrological and hydrogeological environment, and to avoid/reduce the disturbance/displacement effects of blasting on wintering birds using Ballindooley Lough, will ensure that the proposed road development will not affect the conservation objectives of Inner Galway Bay SPA.

Following an examination, analysis and evaluation in light of best scientific knowledge of all relevant information in respect of all of the SCI bird species and supporting habitats of Inner Galway Bay SPA within the ZoI of the proposed road development, the potential impacts and mitigation measures, and whether or not the predicted impacts would affect the conservation objectives that support the conservation condition for the SCIs concerned, it has been concluded that the proposed road development poses no risk (either directly or indirectly) of adversely affecting the integrity of Inner Galway Bay SPA and there is no reasonable scientific doubt about this conclusion.

11 Potential for In combination Effects

The in combination assessment identified those plans and projects with the potential to act in combination with the proposed road development to affect the conservation objectives of Lough Corrib cSAC, Galway Bay Complex cSAC, Lough Corrib SPA and Inner Galway Bay SPA.

As the proposed road development will not affect the integrity of Lough Corrib cSAC, Galway Bay Complex cSAC, Lough Corrib SPA or Inner Galway Bay SPA, and given the protection afforded to European sites under the relevant land use plans, it was concluded that no other plans or projects will act in combination with the proposed road development to adversely affect the integrity of any European sites. Refer to Section 12 of the main NIS.

12 NIS Conclusion

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to those European sites within the ZoI of the proposed road development, the potential impact sources and pathways, how these could impact on the Sites' QI habitats and QI/SCI species and whether the predicted impacts would adversely affect the integrity of the European sites.

Avoidance, design requirements and mitigation measures are set out within the NIS and its appendices and they will ensure that any impacts on the conservation objectives of European sites will be avoided during the construction and operation of the proposed road development such that there will be no risk of adverse effects on these European sites.

It has been objectively concluded by Scott Cawley Ltd. following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed road development and with the implementation of the mitigation measures proposed, that the proposed road development does not pose a risk of adversely affecting (either directly or indirectly) the integrity any European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.

NIS Flowchart for the N6 GCRR

Section	Discription
1	**Introduction**
2	**Description of the Proposed Road Development**
3	**Consultations** Summary of the consultationsundertaken with the NPWS and Inland Fisheries Ireland
4	**Methodology** Guidance documents, desktop data sources, assessment methodology, ecology survey methodologies, hydrological and hydrogeological survey and monitoring methodologies, and geotechnical investigations
5	**Existing Ecological Baseline** Description of the local ecological baseline, including European sites, and an overview of the local hydrological and hydrogeological baseline data.
6	**Potential Impacts of the Proposed Road Development**
7	**Zone of Influence of the Proposed Road Development** Defining the area within which the proposed road development could affect the receiving environment such that it could potentially have significant effects on the QI habitats or QI/SCI species of a European site
8	**European sites within the Zone of Influence of the Proposed Road Development**
9	**Examination and Analysis of Potential Direct and Indirect Impacts on European Sites**
10	**Design Requirements and Mitigation Measures** Design measures included, and the mitigation measures to protect the qualifying interests and the conservation objectives of the European sites within the ZoI of the proposed road development
11	**Residual Impacts** The effects of the proposed road development on European sites in consideration of the mitigation measures
12	**Potential for In-combination Effects** The assessment carried out to examine whether any other plans or projects have the potential to act in combination with the proposed road development to affect the conservation objectives of any European sites
13	**NIS Conclusion**

Sub Sections

9.4	**Inner Galway Bay SPA** Examination and analysis of potential impacts on the SCIs and their conservation objectives
9.3	**Lough Corrib SPA** Examination and analysis of potential impacts on the SCIs and their conservation objectives
9.2	**Galway Bay Complex cSAC** Examination and analysis of potential impacts on the QIs and their conservation objectives
9.1	**Lough Corrib cSAC** Examination and analysis of potential impacts on the QIs and their conservation objectives

Sub Sections

11.1	**Lough Corrib cSAC**
11.2	**Galway Bay Complex cSAC**
11.3	**Lough Corrib SPA**
11.4	**Inner Galway Bay SPA**