Thomson environmental consultants



Ecological Impact Assessment Report

N6 Galway City Ring Road

For

An Bord Pleanála

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1. Summary

1.1.1 The N6 Galway City Ring Road (N6 GCRR) is a proposed road development to the north of Galway, extending for approximately 18km from the R336 west of Bearna to a junction with the N6 at Briarhill, with a new crossing of the River Corrib. The proposed road is part Protected Road and part Motorway. As part of the application, the proposed road is the subject of an Environmental Impact Assessment and Natura Impact Assessment, as required by the EIA Directive and the Habitats Directive, respectively.

1.1.2 The route of the proposed road traverses two distinct geologies; granite in the west and limestone karst in the east, with the River Corrib separating the two. This, combined with generally low intensity land use, gives rise to two distinct sets of terrestrial habitats, with a mix of base-poor peatland habitats in the west, including wet heath, dry heath and blanket bog, and mix of calcareous habitats in the east, including woodland, calcareous grassland and limestone pavement. Due to these factors, the route corridor supports at least 658 native species of vascular plants and bryophytes, or about 37% of the total Ireland native flora. This includes six types of plant which are classified as near-threatened or vulnerable. In accordance with Transport Infrastructure Ireland (TII) guidelines, some areas of terrestrial habitat are of International importance, while others are of national, county or local value. These high value semi-natural habitats occupy about half of the land in the route corridor, with the rest, mainly in the east, being primarily improved agricultural grassland and sub-urban.

1.1.3 The route corridor supports a range of fauna commensurate with the habitats including marsh fritillary butterfly, marsh whorl snail, all nine species of Irish bat, most of the Irish land mammal species, including Irish hare, red squirrel, pine marten, Irish stoat, badger and otter, a variety of wintering birds, including a flock of oystercatcher, breeding birds, including barn owl and peregrine falcon, the only native reptile and two of the three amphibian species, and several native fish species, including salmon, brown trout and European eel. The populations of these species present in the route corridor range from local to international importance.

1.1.4 Much of the land and coastline in the vicinity of the route corridor is included in areas designated for their nature conservation interest, with Lough Corrib candidate Special Area of Conservation (cSAC) lying partly to the north and partly to the south of the route in the east, Moycullen Bogs Natural Heritage Area (NHA) lying to north of the route in the west and Galway Bay Complex cSAC to the south. Lough Corrib and Galway Bay are also designated as Special Protection Areas (SPA) for their bird interest. Where the route passes through the Galway City area, much of the high value terrestrial habitat areas mentioned above are included in Local Biodiversity Areas (LBAs), which have some protection through local development plan policy.

1.1.5 The design of the road includes measures to avoid or minimise direct impacts on the cSACs, NHAs and SPAs with mitigation measures also included to further remove residual risks to these designated areas. Several of the LBAs will however be bisected by the proposed road, as well as some equivalent quality habitat to the west of the Galway City area. Altogether, this would result in the loss of just over 100ha of the higher quality terrestrial habitat, including the loss of areas of two types of irreplaceable habitat, wet heath (2.47ha) and limestone pavement

(0.94ha), with the peatland habitats west of the Corrib accounting for most of the total, while approximately 5ha of woodland which supports red squirrel, pine marten and rare species of bats, would also be lost at Menlough. Direct or indirect impacts could occur during construction on at least one population of all the species mentioned above, and ongoing risks to the remaining populations during the operation of the road, especially those located to the south of the proposed road.

1.1.6 The applicant has proposed some compensation for the loss of terrestrial habitats. This is a total of 14.87ha, comprising wet woodland (0.18ha), dry heath (7.06ha), calcareous grassland (7.14ha) and wet grassland (0.49ha), along with an estimated 16ha of screening planting and 8ha of grassland creation in the soft estate for the proposed road which will also provide habitat for some species. The compensatory habitat is presented as a straight replacement however there is a risk that these areas are of lower quality or may fail, for example, 4.85ha of the dry calcareous grassland is to be created on top of buried peat in a quarry which may flood on occasion. Even taking it at face value, there would be an overall loss of higher value semi-natural habitats of 86.3ha, ameliorated to some degree by the (estimated) 24ha of roadside planting.

1.1.7 A range of mitigation measures to address the identified impacts on fauna have also been proposed, including timing site clearance to avoid the bird breeding season, rescuing animals found during site clearance, replacement roosts for bats, measures to reduce habitat degradation in proximity to the road and culverts and a bridge designed to facilitate the passage of wildlife across the proposed road. These measures are likely to ensure the proposed road does not contribute to local declines for badger, otter and the fish species, but all the other species mentioned will experience a net loss of habitat and populations along the route corridor are at further risk during the operation of the road.

1.1.8 Given this, there will be significant negative effects on features valued, in accordance with TII guidelines, at local to international value. This is acknowledged by the applicant e.g. EIAR p361 and p711-p712, although there are differences between the applicant's assessment and mine. For example, in my assessment more ecological features are subject significant impacts and there would be a net loss, rather than a net gain, of biodiversity. In its further information response, p83, the applicant makes the case that the amount of each habitat type lost to the proposed road becomes insignificant when compared to that present more widely. This has some validity; the proposed road would affect small areas of habitats and species populations which are internationally scarce but locally and regionally common. However, the twin geologies make the area unusual, the proposed road would impact on at least five species that are rare in Ireland, and the edge of the city may be particularly important for bats, having a combination of buildings for roosting and access to high quality foraging habitat. Moreover, in the context of Galway City, the loss of over 100ha of higher value terrestrial habitats is equivalent to 5 to 10% of the total and therefore not insignificant in this context.

1.1.9 In the event that the road is consented, I have identified some additional mitigation measures which would reduce the likelihood and/or severity of indirect effects on habitats and species populations but which would not change my conclusions on the significance of the identified residual impacts. This is because these measures do not address the overall loss of higher

value habitats, and their fragmentation and isolation. With more ambition, it would be possible to achieve better outcomes for biodiversity for example by better protecting and managing the remaining parts of local biodiversity areas and creating compensatory woodland in areas of currently low biodiversity value.

2. Introduction

2.1 Background

2.1.1 The N6 Galway City Ring Road is a proposed road development to the north of Galway City, approximately 18km in length, extending from a new junction with the R336 at the western side of Bearna to the existing N6 to the east of Galway City at Coolagh, Briarhill. The proposed road comprises a single carriageway from the new junction with the R336 to the Ballymoneen Road (approximately 5.6km of the route) and a dual carriageway from the Ballymoneen Road to where it joins the existing N6 (approximately 11.9km of the route), including a junction with the N59 at Letteragh. The proposed road would be a Protected Road from the R336 as far as the junction with the N59 and then a motorway eastward from the N59 junction to the N6. The proposal includes a number of junctions, link roads, slip roads and associated infrastructure. The applicant is Galway County Council, on behalf of itself and Galway City Council. The application for the N6 Galway City Ring Road follows a previous application for a new road to the north of Galway City, the N6 Galway City Outer Bypass. This was part consented however the decision was overturned in the Irish Supreme court following a ruling by the ECJ (European Union Court of Justice Case C-258/11).

2.2 Environmental Impact Assessment Report

2.2.1 To support the planning application, the applicant has prepared an Environmental Impact Assessment Report (**the EIAR**) for the N6 Galway City Ring Road which includes a chapter on biodiversity, which is 384 pages and is supported by 24 sets of figures and 26 appendices, mainly survey reports or results.

2.2.2 Following the production of the EIAR, additional relevant information has been provided by the applicant at various stages of the planning process (as set out in section 2.4 below). This includes:

- Request for Further Information Response Vols 1- 3, especially the main reports pages 66 – 82, **the "RFI response"**;
- Statement of Evidence: Responses to EIA Biodiversity Objection/Submission dated 19th February 2020, **the "Biodiversity Statement of Evidence"** (101 pages);
- A Corrigenda dated 21st February 2020, and updated 11th March 2020, which corrects some details in previously submitted documents, **the "Corrigenda"**;
- Response to Queries raised in Module 2 [sic] of the N6 Galway City Ring Road Oral Hearing dated 10th March 2020, **the "Module 1 response**";
- EIAR Cumulative Impact Assessment Addendum Update Report (Dealing with proposed and permitted projects and plans since publication of the EIAR) dated 10th March 2020, updated on 15th October 2020 and again on 3rd November 2020 and supplemented on 4th November, with the last two forming the complete assessment, **the "cumulative assessment update"**; and
- The **Schedule of Environmental Commitments** which restates the mitigation measures committed to in the documents above, last updated 4th November 2020.

2.2.3 These documents together are taken to be information provided by the applicant in support of the ecological impact assessment, which is part of the assessment required under the EIA Directive, as amended. Additional information is provided in other planning documents including the Natura Impact Statement Report **the "NIS"** and **the "Design Report"** (submitted as part of the FIR response, Volume 4).

2.3 Submissions

2.3.1 The applicant refers to 47 submissions which relate to the biodiversity elements of the EIAR for the proposed N6 Galway City Ring Road prior to the oral hearing, of which 43 to 46 (depending on how these are counted) are addressed by the applicant in the Biodiversity Statement of Evidence. I note that a number of the objections were subsequently withdrawn prior to the completion of the oral hearing. The objections and submissions were wide ranging, each is summarised in Appendix 2. In summary, the submissions covered the following topics:

- Clarifications on impacts and mitigation proposals, and emphasis on the need for the latter to be effectively implemented;
- Objections to the proposed route because priority has been given to ecology and impacts on biodiversity over impacts on private property and the wellbeing of people in the route selection process;
- Objections to the location of compensatory habitat to be created in response to losses of Annex I habitat along the road route;
- Objections due to impacts on stone walls and the flora and fauna that they support, in conjunction with impacts on this type of boundary at private property; and
- Objections due to the loss of biodiversity in general, including garden wildlife, but also more specifically, including impacts on bees, ants, curlew, lesser horseshoe bats, pine marten, fox and hare.

2.3.2 As noted above, most of these submissions were responded to by the applicant in the Biodiversity Statement of Evidence dated 19th February 2020. These submissions and those received at the oral hearing are addressed directly in Appendix 2 of my report.

2.4 Further Information Request and Oral Hearing

2.4.1 Following the submission of the EIAR, a request for further information (FIR) was made by An Bord Pleanála in April 2019 with a response received from the applicant on 30th August 2019.

2.4.2 An oral hearing for the proposed road took place between 18th February 2020 and 4th November 2020, the hearing having been interrupted by the Covid-19 pandemic. The applicant responded to written submissions on ecology and hydrology/geohydrology on 19th and 20th February 2020, respectively, as set out in its statements of evidence. Oral submissions from the prescribed bodies including the Department of Culture, Heritage and the Gaeltacht (NPWS), pertaining to ecology and hydrology/ geohydrology were made on 21st February 2020, while Module 1, which dealt specifically with ecology and hydrology/geohydrology, took place on 24th and 25th February

2020 and 10th and 11th March 2020. Module 1 was completed prior to the interruption caused by the pandemic.

2.4.3 At the oral hearing, submissions related to the ecological impact assessment, or referred to potential effects on biodiversity (other than Natura 2000 sites). In summary these were:

- The Department of Culture, Heritage and the Gaeltacht (National parks and Wildlife Service) on 21st February, **NPWS3,** raised several points which it considers further detail is required in relation to the ecological impact assessment (in addition to those required for the appropriate assessment under the Habitats Directive) these were (i) potential de-watering affecting the water table at Moycullen Bogs NHA; (ii) marsh fritillary mitigation; (iii) Annex I habitat creation including remedial actions; (iv) mitigation for peregrine falcon; (v) net effect on barn owl foraging habitat; . The Department stressed the importance of effective and timely mitigation in order for the applicant's conclusions to hold.
- Mr Deidre Goggin raised points about the impacts on wildlife in and around homes and gardens at Castelgar and the links of a wildlife corridor to Ballindooley wetlands which do not seem to have been considered by the applicant in the EIAR;
- Mr Kevin Gill raised concerns about the apparent priority of ecology and biodiversity over the impact on humans, in particular the effect on private property, in the route selection process and the potential for the mitigation (monitoring and management) to fail, citing examples of other failures, and how long the commitment to manage mitigation lasts, noting that the cost to people and the environment will be very high if the scheme is consented.
- Mr Peter Connelly who also raised concerns about the apparent priority of ecology and biodiversity over the impact on humans, preferring a route to the north of the GCRR, such as the GCOB, noting that the land here has all been subject to farming and querying whether mitigation/compensation could be applied, and also the impact on stone walls with around 3000m of stone wall lost and only 1000m created, with post and rail fencing used instead, which would cause damage to soils etc during installation and re-installation.
- Mr Brendon Mulligan cites one planet living principles including biodiversity protection, and the general need for biodiversity protection in general, and the links between climate change and biodiversity loss, and the need to act now, in response to the climate and biodiversity emergency, with the N6 GCRR contributing significantly to the detriment of biodiversity in Ireland, and the actual implementation of the mitigation is uncertain, questioning if the resources needed will really be available for it to be successfully implemented, meaning the outcome may be even worse than described in the EIAR with increased carbon emissions making matters worse still.
- Mr Patrick McDonagh who raised concerns about the effects of the flooding within Lackagh Quarry being exacerbated by material deposition in the quarry, the potential for polluted road run-off to reach Lough Corrib cSAC via ground water infiltration basins, the effect of material deposition within the quarry on petrifying springs within the quarry, the

effect on carline thistle in Lackagh Quarry, the potential loss of ant hills, foxes and the local hare population, which latter being a substantial population.

- Mr. Michael O'Connor makes points about the ability of the environment/biodiversity to recover, citing the Mutton Island Waste Water Treatment, and that adequate account appears to have been made of ecology/biodiversity impacts by the applicant in order for the road to be consented.
- Mr Tom Corr who represents Dermot and Sarah Harney who raised concerns about the use of a nearby building as a replacement bat roost, preferring it to be elsewhere, away from their property.
- Mr Stephen Dowds who represents of N6 Action Group who mainly makes points relevant to impacts on Lough Corrib cSAC which is relevant to the appropriate assessment report, but also sought clarification about the route selection process and avoidance of designated sites and development sites.
- Mr Vincent Carragher raises concerns about animal corridors and the movement of species, stated that the EIAR is flimsy and does not cover insects well enough, nor firm detail of corridors and how these will account for land-based invertebrates (as well as vertebrates), essentially is view is that the assessment and mitigation is not adequate.
- Mr. Dermot Flanigan on behalf of McHugh Property Group makes the case for material deposition areas and compensatory habitat to be other than in Lackagh Quarry, and for reduced quantity of grassland with a ratio of slightly greater than1:1 being all that is required.
- Galway Athletics Board raised concerns about the impacts on (i) the River Corrib and surrounding area (including loss of access to nature by people) and its plant and animal life; (ii) badger, including the efficacy of badger/mammal underpasses, (iii) kingfisher, other birds and the adequacy of the bird survey which did not detect kingfisher; (iv) impacts on bats, including loss of 14 roosts in buildings and two in trees, loss of foraging habitat, noise and light pollution, and (v) risks to peregrine falcon, affecting one of only two nesting pairs in the whole of Galway. Also observes that (vi) NUIG new pitches application needs to be included in cumulative impact assessment; (vii) there has been lack of a biodiversity officer in Galway City to represent the views of local people; (viii) it is a fabrication in the EIAR to say that there will be no impact; (ix) that there will be a disparity between proposed mitigation and what will actually be delivered and (x) that the Development does not meet the objectives of the Galway City Development Plan or the National Biodiversity Plan.

2.4.4 These submissions were responded to by the applicant at the oral hearing, including a written response to the NPWS submission, which is included in the Module 1 response.

2.4.5 Further, Mr. Dodds and I put a series of questions to both the NPWS and the applicant to seek clarification on aspects of the EIAR, and to inform this report. The questions and the answers were provided by the NPWS in its submission on 10th March 2020 **NPWS4** and by the applicant in the Module 1 response. The four NPWS submissions are gathered in Appendix 1.

2.5 Site Visits and Scope

2.5.1 In addition to the information, observations and responses described above, I undertook two site visits to gain a general understanding of the receiving environment, these were on 6th and 7th March 2019 and 12th and 13th November 2019. Mr. Dodds also made a site visit.

2.5.2 This report is an ecological impact assessment based upon the information submitted by the applicant in support of the planning application, written submissions made by the NPWS and representations made by others at the Oral Hearing held in Galway in 2020. The purpose of the report is to assist An Bord Pleanála in undertaking its Environmental Impact Assessment of the proposed development.

2.5.3 This document contains measurements of areas which are either taken from the applicants work or measured by me using basic GIS tools but without undertaking detailed GIS work or the use of specialist GIS consultants. The areas that I have measured are therefore approximate and may not reconcile fully with the areas measured by the applicant.

3. Description of the Proposed Development

3.1.1 The applicant provides a description of the project in Section 5 of the EIAR and elsewhere in the application documents, especially the N6 Galway City Ring Road Design Report (Arup February 2019). In summary, the project comprises:

- New single carriageway road from a new junction with the R336 Coast Road at in An Baile Nua on the western side of Bearna eastwards for approximately 5.6km to the Ballymoneen Road, where there will be a new junction;
- New dual carriageway from the Ballymoneen Road eastwards for approximately 11.9km to a new junction (the Coolagh Junction) with the existing N6;
- A series of other junctions with the existing road network, including a junction with the N59 Moycullen Road at Letteragh, the N84 Headford Road, and the N83 Tuam Road;
- Three link Roads, the N59 Link Road North, connecting to the N59 Moycullen Road, the N59 Link Road South, connecting to Letteragh Road, the Parkmore Link Road connecting to Ballybrit Business Park and the Parkmore Industrial Estate;
- An open span bridge over the River Corrib, 620m in length with eight spans, the main span of 153m is over the river and without supports in the river, the eastern approach is one a retained embankment with five culverts passing beneath the road, with the bridge having a sealed and isolated drainage system which discharges to a new wetland/ attenuation area, Design Report p248, RFI response appendix A.1.1;
- The Menlough viaduct which carries the road over an area of limestone pavement, with the viaduct 320m in length with eight spans of approximately 40m each, with some footings within the limestone pavement, with the viaduct having a sealed and isolated drainage system which discharges to a new wetland/ attenuation area, Design Report p250, RFI response appendix A.1.3;

- The 270m Lackagh Tunnel, which takes the road under (approximately 8.6m below) an area of limestone pavement, Design Report p251 to p255, RFI response Appendix A.1.4, and the 240m Galway Racecourse Tunnel, which takes the road under the racecourse, with both tunnels having a sealed and isolated drainage system, with collected water pumped to the nearest foul sewer, Design Report p255 to p258;
- Seven overbridges to standard design, four carrying roads over the proposed road development, one for wildlife and two at the Coolagh junction, Design Report p239 – p241 and FIR response Appendix A.1.7 , plus 10 underbridges all for roads, Design Report p242 – 244 and FIR response Appendix A.1.6.;
- Twenty-eight culverts and underpasses, with the majority of these including, being or providing a mammal underpass (although some are only suitable for bats, rather than walking mammals), Design Report p245 to p248, FIR response Appendix A.1.8 and the Module 1 response p26 and Appendix A;
- Ten Retaining walls between 6m and 288m in length, plus five strengthened slopes, Design Report p258 to 259;
- Drainage infrastructure, with flow rate and pollution controls, to collect and discharge rainwater which falls onto the new road surface and surface water flows (interceptor ditches), with discharge into watercourses, via attenuation ponds, to the west of the River Corrib (including indirectly and directly the River Corrib) and a combination of discharging to watercourses (again including the River Corrib, indirectly and directly) and into the ground, via infiltration basins, to the east of the River Corrib, reflecting the underlying geology (Design Report p265 – p301);
- Road lighting including at road junctions and along the main carriageway on the western and eastern approaches of the Lackagh tunnel and Racecourse tunnel, Design Report p332 – 333 and drawings GCOB-1300-D-000 to -015;
- Noise barriers at various locations, Design Report p261 – p264;
- Fencing of various types along the boundary, including timber post and rail, mammal proof fencing and palisade fencing (around ponds, etc.), FIR response Appendix A.8.1.
- Sign gantries, Design Report p259- p260;
- Forty potential Material Deposition Areas, including four at Lackagh Quarry (DA24, DA25, DA27 and DA28) see FIR response p13 to p15 and FIR response Appendix A1.11 (which supersedes the EIAR on this topic) and the Module 1 response p 38, p57-61;
- Compensatory habitat creation (or in some cases re-instatement) EIAR p 699, EIAR Figures 8.23.1 to 8.23.14 and EIAR Appendix A.8.26 FIR response Appendix A.1.11 p21 to p23;
- Other ecological mitigation areas, including an extensive area of land at Menlo (approximately 8ha) to the north of the proposed road development for bat and barn owl mitigation, see EIAR p710 and EIAR Figure 8.23.7;
- Landscaping of the soft estate to include screening planting (effectively woodland), boundary hedgerows and stone walls in specific locations and grassland sown with a low maintenance seed mix with stones over 50mm removed or buried, potential for some exposed rock in cuttings, EIAR p1110 and p1111; and

- (Up to) thirteen temporary construction compounds, Design Report p 387 and EIAR Figures 7.001 and 7.002.

3.1.2 The project will take approximately 36 months to construct, including archaeological trial trenching and ground investigation.

4. Study Area and Zone of Influence

4.1.1 The applicant describes the zone of influence in the EIAR p381 to p382, Figures 8.12.1 and 8.13.1. It is the road plus varying distances from this depending on the ecological feature or receptor under consideration and the pathways which connect it to the route corridor of the proposed road. In summary, the zone of influence considered in the EIAR is the footprint of the proposed road plus:

- Terrestrial habitats – 200m either side of the alignment.
- Aquatic habitats – as for terrestrial plus any downstream habitats (up to and including Galway Bay) including those connected via groundwater (which could be in any direction).
- Bats - the home range of the species in question, perhaps 1km being the maximum.
- Mammals other than bats – the home range of the species in question, perhaps 1km being the maximum.
- Birds – plus 300m or more, or 800m from blasting sites during construction.
- Amphibians – 0m plus any adversely affected wetlands.
- Common lizard – c.10m.

4.1.2 However, my view is that the zone of influence could extend beyond these distances for several features, as follows:

- Terrestrial habitats – traffic noise and isolation of habitats could extend the zone of influence beyond 200m.
- Scarce habitats and species populations – impacts at the project site could result in the remaining habitat parcels and species populations becoming more vulnerable, at almost any distance, but particularly if connected by one or two steps by dispersing plants and animals (supporting populations).
- Bats and other mammals – populations isolated by the proposed road could be affected beyond those which have a home range overlapping with the proposed road.
- Migratory birds and bats – impacts at the project site could have an impact on populations and the ecosystem at all other places used by the same migratory birds and bats.

4.1.3 The zone of influence should also be extended to include the haul roads and other areas subject to heavy construction traffic.

4.1.4 Cumulative impacts may also extend the zone of influence. The proposed road sits within a broader development plan for Galway City, which includes new residential development and more, with anticipated population growth and measures to encourage tourism. The additional mobility created by the road may encourage more visits by the increased population to sites of nature conservation importance in the locality, potentially causing damage by trampling etc. Therefore, such sites should also be considered in the zone of influence when considering cumulative impacts.

5. Legislation and Policy Context

5.1.1 The applicant lists the relevant legislation in the EIAR p366 and provides a list of guidance documents, EIAR p368, while the planning policy context, with respect to biodiversity was provided at the oral hearing in the module 1 response p41-43.

5.1.2 The Galway County Development Plan includes these policies and objectives:

- Policy NHB 1 Natural Heritage and Biodiversity - *It is the policy of Galway County Council to support the protection, conservation and enhancement of natural heritage and biodiversity, including the protection of the integrity of European sites…., the protection of Natural Heritage Areas, …(and other designated sites including any future designations) and the promotion of the development of a green/ ecological network within the plan area, in order to support ecological functioning and connectivity…*
- Policy NHB 2 – Non-Designated Sites - *Recognise that nature conservation is not just confined to designated sites and acknowledge the need to protect non-designated habitats and landscapes and to conserve the biological diversity in the County.*
- Policy NHB 6 -…Biodiversity Plan[s] - *It is the policy of the Council to support the implementation of the National Biodiversity Plan and Galway County Biodiversity Plan and Galway County Heritage Plan in partnership with relevant stakeholders, subject to available resources.*
- Objective NHB 6 – *Protection of Bats and Bats Habitats Seek to protect bats and their roosts, their feeding areas, flight paths and commuting routes…..*
- Objective NHB 11 – *Trees, Parkland/Woodland, Stonewalls and Hedgerows - b) Seek to retain natural boundaries, including stonewalls, hedgerows and tree boundaries, wherever possible and replace with a boundary type similar to the existing boundary where removal is unavoidable*.
- Policy TI 8 – *Transportation Infrastructure Requirements - [the] solution [to the transport needs of the Galway Gateway] shall have due regard to the necessity to protect the environment and will comply fully with the requirements of the Habitats Directive.*

5.1.3 The Galway City Development Plan includes these policies:

- Policy 4.2 *Protect, conserve and support the development of an ecological network throughout the city which will improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive.*
- Policy 4.2 *Protect Local Biodiversity Areas, wildlife corridors and stepping stones identified in the Galway City Habitat Inventory 2005 and Galway Biodiversity Action Plan 2014-2024 in supporting the biodiversity of the city and in the Council's role/responsibilities, works and operations, where appropriate*.
- Policy 4.2 *Support the actions of the Galway City Heritage Plan 2016-2021 and Biodiversity Action Plan 2014-2024 relating to ….., the protection of wildlife corridors and the prevention of wildlife habitat fragmentation.*

5.1.4 However, the City Plan does give precedence to the N6 GCRR in section 3.10 stating the objective (but not a policy) to "*give priority to the reservation of the N6 GCRR Preferred Route Corridor and the associated land requirements over other land uses and objectives in the City Development Plan*". There does not seem to be a similar priority statement at the County level and the City level objective cannot apply outside the City boundary (i.e. the western part of the N6 GCRR near Bearna).

6. Appraisal Methodology

6.1 Consultation

6.1.1 The applicant consulted with the NPWS and other organisations during the design and planning application process, EIAR p370-373. This continued up to and during the oral hearing in February and March 2020.

6.2 Desk Study

6.2.1 The applicant undertook an ecological desk study, drawing on a comprehensive range of sources, EIAR p368.

6.3 Field Assessment

6.3.1 The applicant undertook a suite of ecology surveys to inform the ecological impact assessment, EIAR p375. These include surveys of:

- Habitats
- Protected plants (for slender naiad *Najas flexilis* and varnished hook moss *Hamatocaulis vernicosus*)
- Bats, including radio tracking, hibernation surveys, activity surveys and roost surveys
- Otter
- Other mammals
- White-clawed crayfish

- Molluscs including freshwater pear mussel
- Marsh fritillary
- Birds, comprising red grouse, barn owl, peregrine, woodcock, breeding and wintering bird surveys
- Amphibians and reptiles
- Fish

6.3.2 The original surveys were supplemented by updated vegetation surveys completed in 2019, with a greater focus on the selected route for the proposed road, FIR response relevé dataset and Figures 2.4.00 to 2.4.120. The updated vegetation surveys provided a significant amount of additional data (>700 relevés) which, clearly, was not considered in the EIAR but was subsequently by the applicant in the FIR response, p26-p27.

6.4 Evaluation of Nature Conservation Interest

6.4.1 The applicant sets out the method for its evaluation of nature conservation value in the EIAR p377, which it says was in accordance with TII guidelines (NRA, 2009).

6.4.2 This guidance provides a five-point scale and gives examples for each:

- International importance
- National importance
- County importance (or vice-county in the case of plant or insect species)
- Local importance (higher value)
- Local importance (lower value)

6.4.3 There is more recent guidance from the Chartered Institute of Ecology and Environmental Management, first published in 2016 (CIEEM, 2018), although the approach is similar, and the applicant draws upon both.

6.4.4 Under both systems, the value of designated sites is assigned in accordance with the level of the designation, so an SAC is assigned international importance and so on. The TII guidelines also states that undesignated sites which fulfil the criteria for a designated site at a given level should be assigned that level of value.

6.4.5 The TII guidance offers guidance for site-based assessments rather than individual habitats, except for areas of habitat included in a biodiversity action plan, which, if viable, should be assigned county value, the guidelines suggest. This does not translate easily to the area around Galway City where the concept of ‘site’ is perhaps harder to define compared to more intensively farmed landscapes.

6.4.6 Outside of the designated sites, the applicant has evaluated individual habitats primarily on the basis of the inclusion of a habitat on a list (Annex I, etc), so any area of Annex I habitat outside of a designated site was assigned national value, for example.

6.4.7 However, the higher value habitat parcels along the route corridor are generally small, clustered and intermixed, sometimes with apparently lower value habitats, forming a mosaic which together have a value potentially greater than each parcel individually. Therefore, I grouped these into clusters (equivalent to sites), and evaluated each in accordance the TII guidance, as I felt this gives a better understanding of the value of each area. Even so, there remains the challenge of placing a value on habitats which are internationally scarce but abundant locally; using the TII guidelines means, for example, assigning 'sites' which support unviable areas of Annex I wet heath County importance even though this habitat is widespread in County Galway.

6.4.8 The TII guidelines suggest using the, *inter alia*, 1% criteria for evaluation species populations, so 1% or more of the national total would be of national importance and so on, which is a standard approach and works well when the data is available. The applicant has adopted this approach generally, particularly for protected species. However, species on the red list appear to have been omitted from the assessment and so I have included these. The guidance also makes clear that the value of an assemblage of species can be greater than its constituent parts, so I have considered this as well.

7. Description of the Existing Environment

7.1 Designated Areas

7.1.1 The applicant lists and describes sites designated for their nature conservation interest in the EIAR p383 to p396. These are summarised in my Table 1 (next page), along with their nature conservation value. For statutory designated sites, my assessment agrees with that presented by the applicant, EIAR p474. The non-statutory Local Biodiversity Areas are more problematic as these sometimes contain the same habitats as included in the statutory sites which are designated as of international and national importance, so it is not as simple as assigning local value to local sites. I have therefore evaluated these or parts of these under terrestrial habitats, where they are included in the surveys undertaken by the applicant.

Table 1: Designated sites within the zone of influence of the proposed road

Site Code	Site Name & designation	Brief Description & Qualifying Features (with code)	Distance to N6 GCRR Site (closest point)	Value
Natura 2000				
000297 000228	Lough Corrib cSAC pNHA including Ballycuirke Lough pNHA and River Corrib and adjoining wetlands LBA	Comprises Lough Corrib, River Corrib, twelve or more other rivers and the land surrounding the Lough, encompassing bog, heath, woodland, grassland and limestone pavement. Supporting important populations of stoneworts in the southern basin of Lough Corrib and a population of lesser horseshoe bats at Ebor Hall, plus Ballycuirke Lough pNHA	0 km (i.e. overlapping boundaries), to north and south	International
000268	Galway Bay Complex cSAC pNHA, including Rusheen Bay – Barna Woods – Illaunafamona LBA and Mutton Island and nearby shoreline LBA and overlapping with Lough Atalia and Renmore Lagoon LBA	Inner part of Galway Bay including shallow, inter-tidal inlets and bays, small islands, coastal cliffs, lagoons and surrounding terrestrial habitats.	0.16km, south	International
004042	Lough Corrib SPA	Lough Corrib.	0.2km	International
004031	Inner Galway Bay SPA	Inner Galway Bay, see description for Galway Bay Complex cSAC.	1.1km	International
004142 000253 NHA	Cregganna Marsh SPA NHA	Primarily lowland wet grassland with other habitats including limestone pavement.	4km, south-east	International
002034	Connemara Bog Complex cSAC pNHA	A very large site encompassing the majority of the south Connemara lowlands, underlain with granite and supporting areas of deep peat, with the main habitat being Atlantic blanket bog. The blanket bog is interspersed with a variety of base-poor terrestrial habitats and lakes, supporting a number of rare plant species.	6km west	International
004181	Connemara Bog Complex SPA	South Connemara lowlands, see description for Connemara Bog Complex cSAC.	9km west	International
000606	Lough Fingall Complex cSAC pNHA	Within an area of flat, low-lying limestone and supporting a complex of calcareous habitats including limestone pavements, calcareous grassland and a series of turloughs. The grassland supports a	9.5km south east	International

Site Code	Site Name & designation	Brief Description & Qualifying Features (with code)	Distance to N6 GCRR Site (closest point)	Value
		variety of orchids and an additional feature of the site is an internationally important population of lesser horseshoe bats.		
001312	Ross Lake and Woods cSAC pNHA	Ross lake is a mediums size lake on limestone supporting a variety of stoneworts adjoined by a conifer plantation and some broadleaved woodland. Supports otter and a breeding population of common gull.	10km north-west	International
000020	Black Head-Poulsallagh cSAC pNHA	Part of the Burren, including the shoreline, sand dunes at Fanore, limestone pavement and the Caher River.	11km south	International
000322	Rahasane Turlough cSAC pNHA	One of only two large turloughs in the country which still functions naturally, supporting two rare plant species including Fen Violet (*Viola persicifolia*), and is also the most important turlough in Ireland for its birdlife.	11.5km south east	International
004089	Rahasane Turlough SPA	Large turlough, see description for cSAC.	12km south-east	International
001285	Kiltiernan Turlough cSAC pNA	A relatively dry turlough which is notable for the presence of two rare plant species; alder buckthorn (*Frangula alnus*) and fen violet (*Viola persicifolia*)	12km south east	International
000242	Castletaylor Complex cSAC pNHA	Complex of habitats on limestone including Caranavoodaun turlough, limestone pavement, calcareous grassland, heath and woodland.	12km south east	International
001271	Gortnandarragh Limestone Pavement cSAC pNHA	Limestone pavement located on the south side of Lough Corrib, interspersed with heath, grassland and scrub, plus an area of bog, which the is only known locality for the endemic fungus *Entoloma jenny*	12.5km north-west	International
002244	Ardrahan Grassland cSAC	Large flat limestone area with a mosaic of calcareous habitats plus Brackloon Lough, a small marl lake, with adjoining wetlands and two small turloughs.	13km south east	International
000054	Moneen Mountain cSAC pNHA	Part of the Burren, open limestone pavement, associated grassland and heaths, plus scrub and woodland.	13km south	International
001926	East Burren Complex cSAC pNHA	All of the high ground in the eastern Burren area, comprising limestone pavement and associated calcareous grasslands and heath, scrub and woodland together with a network of calcareous lakes and turlough.	13km south	International

Site Code	Site Name & designation	Brief Description & Qualifying Features (with code)	Distance to N6 GCRR Site (closest point)	Value
002008	Maumturk Mountains cSAC	A series of peaks over 600m above sea level and surrounding areas, with wet heath, dry heath and blanket bog.	34km, northwest	International
002031	The Twelve Bens/Garraun Complex cSAC	A series of peaks over 500m above sea level and surrounding areas with heath and blanket bog, part of the Connemara National Park.	47km, northwest	International
Natural Heritage Areas and proposed Natural Heritage Areas				
002364	Moycullen Bogs NHA and part of Ballagh – Barnacranny Hill LBA	Connemara peatland, including blanket bog, fen, wet grassland, heathland and scrub, located east of Tonabrocky.	0m, immediately adjacent	National
002431	Oughterard District Bog NHA	Large area of lowland and upland blanket bog, interspersed with other peatland habitats.	15km	National
001267	Furbogh Wood pNHA	Oak woodland bordering the Furbogh River, and one of the few Atlantic woodlands which occurs directly at the coast, and on a mineral soil.	2.3km	National
000287	Kiltullagh Turlough pNHA	Turlough, unusual in supporting a dry grassland type.	2.2km	National
002083	Killarainy Lodge, Moycullen	Natterer's bat nursery roost	7.2km	National
001260	Drimcong Wood pNHA	Mixed broadleaved and coniferous woodland	8.2km	National
001788	Turloughcor pNHA	Wetland Supporting wintering bird populations	15km	National
Local Biodiversity Areas				
-	Unnamed LBA 1 at Cloughscoltia	Peatland habitats including wet grassland, west of the Cappagh Road	0m (crossed by proposed road)	See terrestrial habitats
-	Cappagh – Ballymoneen LBA	An area of blanket bog, fen, wet grassland and scrub located between Cappagh and Ballymoneen Roads.	0m (crossed by proposed road)	See terrestrial habitats
-	Unnamed LBA 2 at East of Ballymoonen Road	Peatland habitats including scrub and wet grassland, east of Ballymoonen Road	0m (crossed by proposed road)	See terrestrial habitats
-	Ballagh – Barnacranny Hill LBA	Connemara peatland, including blanket bog, fen, wet grassland, heathland and scrub, located east of Tonabrocky. This area is partly within Moycullen Bog NHA but appears to extend beyond it, encompassing peatland to the east of Lettaragh Road	0m (crossed by proposed road	See terrestrial habitats
-	River Corrib and adjoining wetlands LBA	Partly within Lough Corrib cSAC pNHA	0m (road passes over)	See terrestrial habitats

Site Code	Site Name & designation	Brief Description & Qualifying Features (with code)	Distance to N6 GCRR Site (closest point)	Value
-	Menlough to Coolough Hill LBA	Partly within Lough Corrib cSAC pNHA, includes Lackagh Quarry	0m (crossed by proposed road)	See terrestrial habitats
-	Unnamed LBA 3 at Lackagh	Calcareous habitats including limestone pavement	0m (crossed by proposed road)	See terrestrial habitats
-	Ballindooley - Castlegar LBA	Area centred on Ballindooley Lough, includes fen, reed swamp, wet grassland, scrub and exposed limestone rock. The Castlegar area contains smaller areas of wet grassland, scrub and exposed limestone.	0m (crossed by proposed road)	See terrestrial habitats
-	Galway Racecourse, Ballybrit LBA	Large open area of species-rich calcareous grassland.	0m (road passes underneath and through?)	Local
-	Doughiska	Area of exposed limestone rock with calcareous grassland and scrub located along the eastern boundary of the city. The grassland contains orchid species and protected Small white orchid (*Pseudorchis albida*).	100m	At least local
-	Merlin Park Woods	Mature broad-leaf trees, mixed broad-leaf / conifer woodlands.	700m	At least local
-	Roscam	Relatively undisturbed examples of salt marsh, shingle banks, brackish lagoon, sandy shore and muddy sand shore, with calcareous grassland and scrub.	c.2km	At least local

7.1.2 The mapping available for the Local Biodiversity Areas is poor, with only a small-scale map without labels available in the Galway Local Development Plan. The boundaries are unclear, and some areas do not fit the name or description. As such, three areas are referred to as "unnamed LBA", although these may be included in the named LBAs listed in Table 1 or possibly not within an LBA at all (the mapping is that unclear).

7.2 Terrestrial Habitats

7.2.1 The applicant recorded many habitat types along the route of the proposed road, both inside and outside the boundary. Two overlapping systems of habitat classification are used the first is the Fossitt classification (Fossitt, 2007), which is a complete classification system for Irish habitats, and the second is Annex I habitats from the Habitats Directive (EC, 2013), which is an incomplete classification system covering Annex I habitats only.

7.2.2 As set out by the applicant, EIAR p 398 to 399, and elsewhere, the underlying geology is a key determinant of the habitats, with the geology to the west of the N59 Moycullen Road comprising granite and naturally supporting base poor, peatland habitats (heathland, bogs, fen and mire)

and that to the east comprising limestone and supporting base rich habitats (calcareous grassland, limestone pavement, turloughs and other ground water dependent ecosystems).

7.2.3 The habitat types were originally presented and described in the EIAR p397 to p427 and shown on Figures 8.14.1 to 8.14.15 and 8.15.1 to 8.15.15. This was based on work undertaken for the route selection and therefore updated survey work, classification and mapping were undertaken in response to the FIR request and is provided in the FIR response, Appendix A.3.1. and Figures 2.5.1 to 2.5.15 and 2.6.1 to 2.6.15, although these show habitats within the proposed road boundary only. This was further refined at the oral hearing with updated figures provided in the corrigenda.

7.2.4 The land within the red line boundary of the proposed road is 280ha in total. The applicant provides some information on the quantities of habitats within the route corridor, for some this is the amount present and amount lost, for others it is just the amount present or the amount lost, for others it is aggregated, and for one (Active Quarries and mines (ED4)) there is no data, corrigendum p13 to p16 . There is also no data presented in the EIAR on the total sizes of a given habitat parcel which can be an important determinant of the value of the habitat. However, mapping and a GIS dataset was provided as part of the FIR response.

7.2.5 Due to the intricate nature and abundance of higher value semi-natural habitats, I have grouped them geographically as a way of better understanding the baseline conditions, moving west to east, as follows:

- Cluster 1 Forramoyle (Ch. 0+000 to Ch. 1+600[1]) mixed area of 4010/HH3 dry heath, 4030/HH1 wet heath, *7130/PB3 lowland active peat bog, GS3 acid grassland, GS4 wet grassland, WS1 scrub and HD1 bracken, includes Sruthan na Libeirti (a stream), extends eastwards from Knockhagteana to the Troscaigh Road L5387 to, south to Barna and northwards where it connects directly with Moycollen Bogs. It is likely to be of county value.
- Cluster 2 Troscaigh (Ch.1+600 to Ch. 2+800), large areas of 4010 HH3 wet heath, 4030/HH1 dry heath *7130/PB3 active lowland blanket bog with WS1 scrub, GS4 wet grassland and HD1 bracken, it is a continuation of Cluster 1 extending from Troscaigh Road L5387 eastwards to Trusky East (Bearna to Moycullen Road). This area is of at least national value as it supports three rare types of plants (see below).
- Cluster 3 Cloughscoltia (Ch. 2+800 to Ch. 4+400, apparently[2] partly within unnamed LBA 1, but mostly outside the Galway City area), large areas of GS4 wet grassland including 6410 Molinia meadows, with areas of 4010/HH3 wet heath, 4030/HH1 dry heath and WS1 scrub, with some HD1 bracken. The Trusky and Bearna Streams pass through this area from north to south. The area extends from Trusky East (Bearna to Moycullen Road) to the Cappagh Road i.e, it is a continuation of Cluster 2. It is likely to be of county value.

[1] Ch. = chainage, which is a measurement in distance from the start of the proposed road in the west, with the first number whole kilometers and the second three digits being the additional meters from the nearest kilometers, here approximate overlap of each cluster with the route alignment is given.
[2] The available mapping of local biodiversity areas is poor, hence the uncertainty about which areas of land are included in LBAs, this does not affect the valuation of the area, however, it does determine which plan policies apply.

- Cluster 4 Cappagh Road to Ballymoneen Road (Ch 4+400 to Ch. 5+600, appears to be part of the Cappagh – Ballymoneen LBA), comprising comparatively large areas of 4010/HH3 wet heath, *7130/PB3 active lowland blanket bog and HD1bracken, plus smaller areas of 4030/HH1 dry heath, WS1 scrub, GS4 wet grassland and 6410 Molinia meadows on …. peaty…soils (Molinion caeruleae), plus the Tonabrocky Stream. This area extends southwards to developed residential land and northwards to Boleybeg East/Rahoon Road (with apparently similar habitats beyond). Active lowland blanket bog in particular is a high value habitat, which along with wet heath could be considered irreplaceable, making this one of the most important areas of base-poor habitats within the Galway City area, although more extensive areas occur outside the city area boundary (it is basically an extension of Moycullen Bog). This area is of at least county value.
- Cluster 5 East of Ballymoonen Road (Ch.5+750 to Ch. 5+950, apparently part within an unnamed LBA 2), mostly WS1 scrub with GS4 wet grassland, and towards the south patches of 4030/HH1 dry heath, 4010/HH3 wet heath, GS3 acid grassland, GS4 wet grassland and bracken, located between the Ballymoonen Road and Keeraun Bothrin extending southwards to developed land (Ard Fraoigh) of Galway City, it is relatively isolated from areas of similar habitats by residential developments and roads. This area is likely to be of county value, although it does include wet heath which is regarded as an irreplaceable habitat.
- Cluster 6 Knocknabrona/Knocknafrosca (Ch. 7+700 to Ch. 8+300, apparently included in the Ballagh – Barnacranny Hill LBA), mainly the Molinia dominated variety of GS4 wet grassland, EIAR p413 to p414, and WS1 scrub, plus smaller areas of 4030 European dry heaths/HH1 dry siliceous heath, GS3 dry-humid acid grassland, GS2 dry meadows (and grassy verges), PF2 poor fen and flush and HD1 dense bracken. It extends from an area of improved grassland east of the Letteragh Road north eastwards to the southwestern edge of the developments along the N59 Moycullen Road, and westwards as far as Moycullen Bogs NHA. This area is likely to be of county value.
- Cluster 7 Menlough (Ch. 9+600 to Ch. 10+450, apparently included in the Menlough LBA), in contrast to Clusters 1 to 6, the Menlough area is base-rich and therefore supports a completely different set of habitats and flora, with *8240 Limestone pavement mostly wooded with WN2 oak-ash-hazel woodland, plus a small *3180/FL6 turlough, *6210 calcareous grassland, GS1 calcareous grassland, WS1 scrub and WD1 mixed broadleaved woodland, from the River Corrib to Monument Road excluding land within cSAC, The eastern part of this area includes the same habitats as within the Lough Corrib cSAC although the limestone pavement is a little more wooded, there is no clear reason why this area was excluded from the cSAC. It provides a link between two parts of the cSAC and supports three priority Annex I habitats of the same type and quality as included in the cSAC, it is therefore likely to be of international value.
- Cluster 8 Lackagh (CH. 11+800 to Ch. 12+100, apparently included in unnamed LBA 3) another area of *8240 Limestone pavement including wooded with WN2 oak-ash-hazel woodland, interspersed with *6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) with orchids, WS1 scrub and GS1 calcareous grassland, to the east of Lackagh Quarry and west of the N84. This area is probably of county value.

- Cluster 9 Ballindooley Lough and surrounding land (Ch. 12+300 to Ch. 12+500, apparently included in the Ballindooley – Castlegar LBA), comprising the Lough 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp /FL3/FS1, with smaller areas of *7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* and 7230 Alkaline fens, surrounded by substantial areas of 6410 Molinia meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*)/GS4 , and smaller parcels of WN2 oak-ash-hazel woodland, WS5 recently felled woodland, GS2 dry meadows, ER2 exposed calcareous rock, PF1 Rich Fen and Flush and WS1 Srub, located to east of N84 and extending from the Lough southwards to Bathar an Choiste. This area is of at least national value.
- Cluster 10 Castlegar (Ch.13+500 at nearest point, apparently included in the Ballindooley – Castlegar LBA), centred on large area of *8240 Limestone pavement some wooded with WN2 oak-ash-hazel woodland, plus 6510 Lowland hay meadows and smaller areas of scrub, dry calcareous (and neutral) grassland and dry meadows (and grassy verges), stretching from Tuam Road in the east to Ballindooley Lough in the west, somewhat fragmented due to agricultural improvements and the limestone pavement is a remnant of a larger area which has been quarried. Due to the large area of exposed limestone pavement present, and unimproved lowland hay meadow, this area is probably of international value.
- Cluster 11 Briarhill (Ch. 15+900 to Ch. 16+300, not included in an LBA), with a relatively equal mix of *8240 Limestone pavement, 6210 calcareous grassland, calcareous grassland, scrub, and oak-ash-hazel woodland, plus stone walls and treelines, with the cluster divided into three blocks separated by existing road infrastructure. Supports spring gentian (*Gentiana verna*) which is classified as Vulnerable in the Irish Red List and a rare species in northern Europe, making this area of international value.
- Cluster 12 Arduan (Ch. 16+950 to Ch. 17+150, not included in an LBA) a mix of 6210 calcareous grassland, GS1 calcareous grassland and WS1 scrub, to the east of Cluster 2 alongside and south of existing N6, likely to be of county value.

7.2.6 I have provided a value for each cluster, as though it were a site, using TII guidelines. However, probably a better way to think of it is that, apart from areas which have been developed or agriculturally improved, which is the minority, the general vicinity is of international importance for nature conservation due to the prevalence of a wide variety of Annex I habitats, including six priority types; limestone pavement, active lowland bog, calcareous fens, calcareous springs, turlough and calcareous grassland. There are better and more extensive, or even the best and most extensive, examples of peatland and limestone habitats nearby, in Connemara and the Burren, respectively. However, the value of these habitats around Galway City is elevated by the proximity of the peatland and limestone habitats, coupled with the River Corrib, Lough Corrib, and Galway Bay, providing a high level of biodiversity over a compact area. The value is further elevated because it is within easy reach of around 100,000 residents (and perhaps 10 to 20 times that number of tourists).

7.2.7 The total area of high value semi-natural habitats, mostly within the 12 clusters described above within the proposed road boundary is approximately 135ha, which is just under half of the total land within the proposed road boundary. Outside of the clusters described above, the land is generally more improved for agriculture and in some parts e.g. around Galway Racecourse is

more sub-urban in character. Patches of semi-natural habitats are present but, due to small size and isolation, these are not as valuable as the those included in the clusters.

7.3 Aquatic Habitats

Rivers and Streams

7.3.1 The main watercourse crossed by the proposed road is the River Corrib, EIAR p407-p408. The River is included partly in the Lough Corrib cSAC and partly in Galway Bay Complex cSAC , linking the two. It is therefore considered to be of international importance.

7.3.2 Five smaller watercourses would be crossed by the proposed road, all in the west and draining into Galway Bay. These are Sruthan na Libeirti (in Cluster 1), the Trusky Stream (in Cluster 3), the Bearna Stream (in Cluster 3), the Tonabrocky Stream (in Cluster 4) and the Knocknacarragh stream. These are described in the EIAR p958 to p962 and shown on Figure 11.1.001. The importance for these streams for salmon is assessed in the EIAR p968 which indicates varying importance for salmon and all support otter. The watercourses are of at least local importance.

Ground Water Dependent Terrestrial Ecosystems

7.3.3 There are four Ground Water Dependent Terrestrial Ecosystems (GWDTE) in proximity to the proposed road:

- Coolagh Lakes, comprising three lakes, within Lough Corrib cSAC and therefore included within a site of international importance.
- Ballindooley Lough, comprising four lakes, within Cluster 9, for which see evaluation in paragraph 7.2.5
- Small turlough at Menlough Ch. 10+320., within cluster 7, paragraph 7.2.5.

7.3.4 These are described in the EIAR p402-p403.

Standing Water

7.3.5 Lough Corrib is outside the route corridor and upstream of the proposed road development, and therefore was not described by the applicant. It is the second largest lake in Ireland measuring 18,420ha and contains two distinct basins, the southern containing lime rich water and the northern containing oligotrophic to acidic water. It is included in the Lough Corrib cSAC and is of international importance (NPWS Site Synopsis).

Calcareous Springs

7.3.6 Twenty-seven springs (or seepage lines) were recorded at Lackagh Quarry, six being of the priority Annex I habitat, *7220 Petrifying springs with tufa formation (Cratoneurion), EIAR p404 and Appendix A.8.21. The springs are present as a result of quarrying and exist within an area which is otherwise of limited nature conservation value (but see assessment for peregrine falcon). The species supported by the springs are relatively common and widespread, despite the specialised nature of this habitat, and so the springs could be of local value.

Coastal/Marine

7.3.7 The coastal and marine habitats to the south of Galway City include a marine lagoon (Lough Atalia), a shallow bay with saltmarsh (Rusheen Lough) and vegetated shingle at Rusheen Bay/Silverstrand. These are included in the Galway Bay Complex cSAC and Inner Galway Bay SPA and are therefore of assigned international importance.

7.4 Flora

7.4.1 The twin geology of Galway (and coastal location) means that the area around Galway City is particularly rich in plant species. The applicant recorded from within the route corridor for the proposed road 778 vascular plants, bryophytes and lichens in total, including 59 non-native species. For native vascular plants and bryophytes, the total number of species found in Ireland is 1,764 of which the applicant recorded 658[3], or about 37%, in approximately 360ha.

Mosses and Liverworts

7.4.2 The applicant recorded 239 species of mosses and liverworts combined within the route corridor. The total number of native species for Ireland is 784, so about 30% of the Ireland total is found in the route corridor. This total includes four species which are identified as being of concern in the Irish Red data book.

- Woodsy thyme moss *Plagiomnium cuspidatum*, which is classified as Near Threatened, it was found in three relevés[4] 2680_R1 at Ch. 3+350, 2527_R1 at Ch4+450 and 2354_R1 at Ch. 12+950, with records on both sides of the River Corrib. This species has a scattered distribution in Ireland and is apparently more widespread in Britain. The population is likely to be of national importance.
- Lesser striated feather-moss *Plasteurhynchium striatulum*, which is also classified as Near Threatened, was found in six relevés 3857_R1 at Menlough Woods mitigation area, 4422_R1 at Ch. 9+800, 3941_R1 at Ch. 9+900, 4033_R1 in Lackagh Quarry, 5507_R1 at Ch.10+000 and 3790b_R1 at Ch. 10+100, which are all east of the River Corrib. This species occurs primarily in the Burren and around Galway, with scattered records elsewhere in Ireland. The population is likely to be of national importance.
- Imbricate bog-moss *Sphagnum affine*, classified as Vulnerable, it was found in relevés EC12 R2 at Ch.1+250 and lies inside the route alignment in an area classified as wet heath. This is in Cluster 2. *Sphagnum affine* is particularly rare with only three known locations in the whole of Ireland (red list criteria D2 = less than 5 locations in Ireland). This population is of at least national importance.
- Red bog-moss *Sphagnum capillifolium s. capillifolium* which is classified as data deficient which means that it is expected to be added to the red list when more is known about this

[3] For comparison, the Burren, which is internationally famous for its flora, supports 1,100 plant species, or about 62% of the total. However, the Burren total includes aquatic and coastal species, and comes from an area of an order of magnitude greater at 250/560 square kilometres.

[4] A relevé is a sample of the vegetation, created by recording all plant species within a given area e.g. 2m x2m, the applicant gave each a unique code in the format 1234_R1 or sometimes BEC123 or EC12 R1.

sub-species, it was found in relevé 735_R1 at Ch. 1+250 in the same area of wet heath as *S. affine*. *Sphagnum capillifolium s. capillifolium* is known to occur more widely than *S.affine* but it is still an apparent rarity and therefore this population should also be considered of national importance.

Vascular Plants

7.4.3 The applicant recorded 415 native vascular plants in the route corridor, compared to 980 native species of vascular plant in Ireland, so about 42% is found in the route corridor. This includes two species listed in the Irish red data book, three species which may be locally uncommon, up to twelve types of orchid and up to ten species which are specialities of limestone pavement and similar habitats in the west of Ireland.

- Spring gentian *Gentiana verna* , is classified as near threatened. In Ireland, it is only found in the Burren and around Galway, usually in association with limestone pavement, and is only found in one locality in Britain. There are three records, two at Briarhill (in Cluster 11) and one within Lough Corrib cSAC at Lackagh (above the location for the proposed Lackagh tunnel). There is the potential for this species to be present in other areas of exposed limestone pavement along the route corridor. The population is likely to be of at least national importance.
- Brown beak-sedge *Rhynchospora fusca*, which is also classified as near threatened. In Ireland, it is found in scattered localities in the midlands and west, especially County Kerry and County Galway, it is also scarce in Britain being mainly found in the New Forest, Dorset and a very few west coast locations. In the dataset, there is just one record in relevé EC25 R3 which is within an area of wet heath however the applicant did not provide the location for this relevé and its assumed to be outside the boundary for the proposed road. In FIR Appendix A.3.1, this species is listed again, this time in relevé EC14 R3 which is at Ch.2+350 just outside the route alignment and in area classified as *7130/PB3 active lowland blanket bog in Cluster 2. The population is likely to be of at least national importance.
- The locally uncommon species are fern grass *Catapodium rigidum*, which is more frequent further south and east, an eyebright *Euphrasia arctica* , which is more frequent north and east, and downy oat-grass *Helictotrichon pubescens*, which more frequent to the east, there were also two species apparently not, or very rarely[5], recorded in Ireland and assumed to be non-native or errors; meadow oat-grass *Helictotrichion pratense* and marsh valerian *Valeriana dioica*. The populations of the first three are likely to be of at least local importance, while native populations of the last two would be of national importance.
- The orchid species recorded in the route corridor are pyramidal orchid *Anacamptis pyramidalis*, common spotted orchid *Dactylorhiza fuchsia*, O'kelly's spotted orchid *Dactylorhiza fuchsii v. okellyi*, heath spotted-orchid *Dactylorhiza maculata*, a sub-species of heath spotted-orchid *Dactylorhiza maculata s. ericetorum*, a spotted orchid *Dactylorhiza* sp.,

[5] There are a few recent records of *Valeriana dioica* in Northern Ireland, but whether these are introduced or native is unclear.

common helleborine *Epipactis helleborine*, a helleborine *Epipactis* sp., fragrant orchid *Gymnadenia conopsea*, common twayblade *Listera (Neottia) ovata*, early purple orchid *Orchis mascula* and lesser butterfly-orchid *Platanthera bifolia*. These are all classified as being of least concern in Ireland however the variety *Dactylorhiza fuchsii v. okellyi* is found mainly in Ireland.

- The speciality plant species of limestone pavement and similar habitats in the west of Ireland that were recorded in the route corridor are *Gentiana verna*, hard shield fern *Polystichum aucleatum*, wild madder *Rubia peregrina* and blue-moor grass *Sesleria caerulea*. Other species which have a population centred around Galway are St. Daboec's Heath *Daboecia cantabrica*, common juniper *Juniperus communis,* mountain everlasting *Antennaria dioica* and *Dactylorhiza fuchsii v. okellyi* while hedge bindweed subspecies roseata *Calystegia sepium s. roseata* is uncommon in Ireland and Britain, with a restricted, mainly coastal distribution and its stronghold along the west coast of Ireland, and the eyebright *Euphrasia tetraquetra* which also has a restricted coastal distribution.

7.4.4 In addition, there are records of three species protected under the Flora Protection Order 2015, slender cotton grass *Eriophorum gracile*, small white orchid *Pseudorchis albida* and varnished hook-moss *Hamatocaulis vernicosus* however these were not recorded within proximity to the proposed road EIAR p427 Figure 8.2.1 and FIR response relevé dataset.

7.5 Invertebrates

Marsh Fritillary *Euphydryas aurinia*

7.5.1 The larval webs of the marsh fritillary butterfly *Euphydryas aurinia* were found in suitable habitat along the route corridor with variability in location and number from year to year, EIAR p452-p454 and Figures 8.6.1 and 8.6.3 to 8.6.8. In summary, larval food webs were present in Clusters 1 to 4, all in the west. This species is estimated to occur in 705 1km squares in Ireland and the applicant recorded marsh fritillary larval food webs in 8 or 9 which is greater than 1% of the total, indicating national importance (Applicant: County, EIAR p477).

Marsh Whorl Snail *Vertigo antivertigo*

7.5.2 During the surveys, a population of Marsh Whorl Snail *Vertigo antivertigo* was at four wetland sites; the banks of the River Corrib near Menlo Castle (within the cSAC), Coolagh Lakes (also within the cSAC), Ballindoley Lough (Cluster 9) and "at the marsh in Castlegar"; this is within the boundary of the proposed road at Ch.13+000, mapped as GM1 Marsh on Figure 8.14.9,and not in any of my clusters. This species is classified as vulnerable due to ongoing decline. The population(s) represent one of the 142 10km squares in which this species is known from in Ireland and one of only twelve in County Galway, it is therefore most likely of county importance (Applicant: Local Importance (Higher value), EIAR p477).

Other terrestrial invertebrates

7.5.3 Other than molluscs, a general survey for invertebrates was not undertaken by the applicant, which leaves a gap in the baseline data (not subject to a Further Information Request). However, the general value for invertebrates can be inferred from the habitats present, with typically the value for invertebrate communities mirroring that of the value of vegetation communities, for which see paragraphs 7.2.5 and 7.2.7. One of the submissions received provides records of ant hills (probably yellow meadow ant) and two to three species of bumblebee.

Other Freshwater Invertebrates

7.5.4 White-clawed crayfish and freshwater pearl mussel were either found to absent during the surveys or ruled out due to unsuitable water chemistry, which is a sound approach.

7.5.5 Records of mussels in the River Corrib were discussed at the oral hearing. These are most likely to be swan mussel *Anodonta cygnea*. This species is classified as vulnerable in the Irish Red data Book, it being found in only 29 10km squares, four of which are in County Galway, and declining. If this is a correct identification, then the population is of national importance, (Applicant: not assessed).

7.6 Bats

7.6.1 The applicant recorded all nine of the bat species which occur in Ireland, including three which are uncommon or rare, with roosts present in the local area for at least eight species.

Lesser horseshoe bat *Rhinolophus hipposideros*

7.6.2 There are three populations of lesser horseshoe bat in the vicinity of the proposed road, the first centred on Castlegar, the second at Menlough (peak count of 43 at Menlo Castle) and the third at Aughnacurra (peak count 12), with at least the second two linked, with hibernation sites located at Cooper's Cave (6), Menlo Castle (several), Cloonnabinnia Cave (5), Moycullen Cave (3), EIAR p430-p439 Figure 8.18.1. The lesser horseshoe bat population is estimated at 12,791 nationally (NPWS, 2019), indicating that the Galway population may be of County importance, although its position relative to other roosts may confer higher value (Applicant: National, EIAR p477).

Whiskered bat *Myotis mystacinus*

7.6.3 Two Whiskered bat roosts were found and two Whiskered bats were captured, one at Merlin Woods to the east of the city and one at NUIG, which was later found to roost near Barna Woods EIAR p444-446, Figure 8.20.1. This species is the rarest of the bat species recorded and therefore the population is likely to be of national value (Applicant: Local (Higher), EIAR p477).

Natterer's bat *M. nattereri*

7.6.4 Four Natterer's bat roosts were recorded, all in buildings, and two Natterer's bats were captured, both in Menlough Woods (near to Menlo Castle, in Cluster 7), EIAR p444-446, Figure 8.20.1.

This is a rare species of bat in Ireland and the local population is therefore likely to be of national value (applicant: Local (Higher), EIAR p477).

Daubenton's bat *M. daubentonii*,

7.6.1 Six roosts of Daubenton's bat were recorded, including at Menlo castle, and twenty were captured, the captures were in woodland (Menlough Woods, Merlin Wood), at NUIG and at Cooper's Cave. A maternity roost of at least 25 bats was found in a wall along the River Corrib. This species, as is typical, was recorded foraging at rivers and wetlands, i.e. the River Corrib, Terryland River and Coolagh lakes, EIAR p444-446, Figure 8.20.1. Most of the unidentified Myotis records were along these watercourses as well, which is strong indicator that the majority were Daubenton's (another indicator is that the other two Myotis are much rarer generally). This species is widespread and about as numerous as the brown long-eared bat, with an estimated national population of 57,000 to 79,000. The population of this species is likely to be of local importance (Applicant: Local (Higher), EIAR p477).

Leisler's bat *Nyctalus leisleri*

7.6.2 Four roosts of Leisler's bat were located with three bats captured in surveys and this species otherwise recorded widely across the locality, EIAR p439-p440 Figure 8.19.1, indicating a typical density of this species for Ireland (approximately 1 bat/km2). It is a relatively common and widespread species in Ireland, the national population is 63,000 to 113,000 (NPWS, 2019), indicating that the Galway population may be of Local Importance (Applicant: Local (Higher), EIAR p477).

Common Pipistrelle *Pipistrellus pipistrellus*

7.6.3 Four roosts (plus perhaps three more) of common pipistrelle were located with six bats captured, and it was widely recorded in more rural areas especially along hedgerows, EIAR p440-p441 Figure 8.21.1. This species is very common with 1 to 2.4m individuals, or about 22 individuals per km^2. The survey results indicate typical or below typical densities and therefore the population is of local value at most (Applicant: Local (Higher), EIAR p477).

Soprano Pipistrelle *P. pygmaeus*

7.6.4 Fourteen roosts (plus perhaps three more) of soprano pipistrelle were found and this species was widely recorded in more rural areas, EIAR p441-442 Figure 8.21.1. This species is less common than the common pipistrelle, with 500,000 to 1.2m individuals and an average population density of about 10 per km^2. The survey results again indicate typical densities and therefore the population is of local value at most (Applicant: Local (Higher), EIAR p477).

Nathusius' Pipistrelle *P. nathusii*

7.6.5 No roosts of Nathusius' pipistrelle were found but it was recorded widely but infrequently across the locality, EIAR p442 Figure 8.20.1. It was most frequently recorded at the River Corrib. It is a much scarcer bat than the other pipistrelles with only 3,000 to 4,000 nationally and recorded at scattered locations across Ireland. The survey results indicate a population of perhaps 20 or so

bats, although this just an estimate, indicating that the population is of county importance (Applicant: Local (Higher), EIAR p477).

Brown long-eared bat *Plecotus auritus*

7.6.6 Twenty-seven day-roosts of brown long-eared bat were recorded by the applicant, plus 12 night-roosts, and four bats captured. The survey results indicate that this species was widespread, EIAR p443-444 Figure 8.20.1. This species is widespread and fairly common in Ireland with a national population estimated to be 62,000 to 97,000 (similar to Leisler's bat) and a density of approximately 1.3 per km^2. The survey results indicate the population around Galway is higher than this, perhaps due to the availability of buildings (for roosts) close to good foraging habitat. The population of brown long-eared bat may therefore be of County importance (Applicant: Local (Higher), EIAR p477).

7.7 Mammals other than bats

7.7.1 Other than seals, bats and extinct species, there are 15 species of terrestrial mammal which are native to Ireland or were introduced before 1500. The applicant recorded or found records of all except four black rat, house mouse, red deer and fallow deer (so 73%). Including bats brings the proportion of extant terrestrial mammal species recorded to 83% of the total native or long-introduced mammalian fauna. All the mammals other than bats that were recorded are classified as being of least concern in the Irish red list (Marnell, Looney, & Lawton, 2019).

Irish hare *Lepus timidus hibernicus*

7.7.1 Irish hare was recorded frequently by the applicant in the western part of the route corridor of the proposed road EIAR p450. This species is relatively common and widespread with an estimated population of between 338,000 and 999,000. The local population is likely to be local value (Applicant: Local (Higher), EIAR p477).

Red squirrel *Sciurus vulgaris*

7.7.1 The applicant reports that the red squirrel is found at Menlough and other woodlands locally, EIAR p450. This species is restricted to woodland and therefore has a widespread but patchy distribution in Ireland. The population is likely to be of at least local value, given the apparent absence of this species in the west of County Galway (Applicant: Local (Higher), EIAR p477).

Pine marten *Martes martes*

7.7.1 A pine marten was recorded at Menlough, with records also at Barna Woods and Mincloon, EIAR p450. It is most strongly associated with woodland and scrub. There are around 3,000 individuals in Ireland which makes this by far the scarcest mammal other than bats recorded in the route corridor for the proposed road. The national population is, however, increasing. The local population is likely to be of county importance (Applicant: Local (Higher), EIAR p477).

Irish stoat *Mustela erminea Hibernica*

7.7.1 An Irish stoat was recorded at Bóthar Nua at Menlough, Ch. 10+450 EIAR p450, and this species is associated with woodland and populations of rabbits. The national population size is not known however the species has a widespread and possibly patchy distribution, indicating that the population may be of local importance (Applicant: Local (Higher) EIAR p477).

Badger *Meles meles*

7.7.1 As would be expected, badger signs and therefore territories occur along the length of the route except the suburban areas around the Galway Racecourse, EIAR p447-450, Figures 8.3.1 to 8.3.14. Sixteen in-use setts were found in the route corridor, including up to seven main setts. Badgers are a common and widespread species and therefore the population around Galway city is of no more than local value (Applicant: Local (Higher), EIAR p477).

Otter *Lutra lutra*

7.7.2 Otter is present along watercourses bisected by and in proximity to the road, the River Corrib, the Bearna Stream and the Tonabrocky Stream, as well as Ballindooley Lough, Coolagh Lakes, and the shores of Galway Bay and Lough Corrib, EIAR p428. The otters in the vicinity of the proposed road are most likely a single population, NPWS2. The applicant does not provide a population estimate but there may be less than five breeding females locally (only one potential breeding holt was found during the surveys). The otter is a widespread species in Ireland with an estimated population of between 7,218 and 10,186 breeding females nationally. The population is therefore likely to be of local importance (applicant: International, EIAR p477).

Widespread mammal species

7.7.3 The applicant recorded or obtained records of wood mouse *Apodemus sylvaticus*, pygmy shrew *Sorex minutus*, rabbit *Orytolagus cuniculus*, hedgehog *Erinaceus europaeus* and fox *Vulpes Vulpes*, plus the more recently introduced, invasives bank vole *Myodes glareolus* and American mink *Mustela vison*. The populations of all but the last two are likely to be of no more than local value. (Applicant: hedgehog and pygmy shrew Local (Higher), other species populations not stated, assumed negligible, EIAR p477).

7.8 Breeding Birds

Curlew *Numenius arquata*

7.8.1 A curlew was observed once during the breeding season at Ballindooley Lough (Cluster 9) so it was probably not breeding at this location. The date of the record is not stated but it could have been a late migrant, EIAR p456. As there is no extant breeding population, it is inappropriate to value one (Applicant: Local Importance (Higher Value), EIAR p477).

Ringed Plover *Charadrius hiaticula*

7.8.2 Ringed plover was recorded exhibiting breeding behaviour near the western edge of Galway Racecourse, EIAR p 457. This is an unusual location for a species which breeds on beaches

and by rivers. This species breeds around the coast of Ireland and so the population here is likely to be of local importance only. (Applicant: Local Importance (Higher Value), EIAR p477).

Barn Owl *Tyto alba*

7.8.3 Barn owl was recorded breeding in one location in proximity to the proposed road, at Menlo Castle EIAR p457 and Figure 8.8.1 and Appendix A.8.15. This pair represents one of 400 -500 pairs in Ireland, (Lusby & O'Clery, 2014) the pair at Menlo Castle is therefore likely to be county importance. (Applicant: County, EIAR p477).

Peregrine Falcon *Falco peregrinus*

7.8.4 Peregrine falcon was recorded breeding at three quarries (three pairs), including Lackagh Quarry. There are around 500 pairs on the island of Ireland (Mee, 2012), which makes the three pairs here of collectively of county importance. (Applicant: County, EIAR p477).

Other species

7.8.5 Approximately fifty-nine other bird species were recorded in the route corridor for the proposed road. Excluding the species listed above, these were all common and widespread breeding species, although some are declining and included on the red and amber lists, or birds which are unlikely to be breeding locally, EIAR p454-p457. The populations are of local value, with those of open habitats such as stonechat, skylark, meadow pipit and linnet being of importance in the context of Galway city area (Applicant: Local Importance (Higher Value), EIAR p477).

7.9 Wintering Birds

7.9.1 There are 11 of the applicant's wintering bird surveys sites within the route corridor. These are set out in Table 2, moving west to east, with any high counts for the species in the locality in bold, EIAR p459-p465.

Table 2: Peak counts of wintering birds at sites within the route corridor

Site Code	Site Name	Birds Species (Peak Count)
WB08	Lough Inch/Moycullen Bogs NHA	Blackbird (1), Blue tit (2), Chaffinch (2), Common Gull (6), Cormorant (2), Curlew (1), Dunnock (1), Goldcrest (3), **Golden Plover (73)**, Goldfinch (25), Grey heron (3), Herring gull (1), Hooded crow (3), Jackdaw (1), Kestrel (1), Lapwing (17), Lesser Redpoll (1), Little grebe (2), Long tailed tit (7), Magpie (4), Mallard (4), Meadow pipit (12), **Merlin (1**), Mute swan (3), Pheasant (1), Raven (6), **Red grouse (1),** Redshank (2), Reed bunting (2), Robin (2), Rook (8), Skylark (4), **Snipe (14**), Song thrush (1), Starling (1), Stonechat (2), Teal (6), Wood pigeon (2), Wren (2)
WB07	Troscaigh	Blackbird (1), Chaffinch (1), Cormorant (1) Curlew (3), Dunnock (1), Fieldfare (1), Goldcrest (1), Goldfinch (1), Grey heron (1), Herring gull (1), Hooded crow (5), Jackdaw (1), Kestrel (1), Linnet (1), Magpie (3), Mallard (2). Meadow pipit (1), Pheasant (3), Pied wagtail (1), Raven (1), Reed bunting

Site Code	Site Name	Birds Species (Peak Count)
		(2), Robin (3), Rook (7), Snipe (5), Song thrush (1), Starling (4), Stock dove (1), Wood pigeon (1), Woodcock (1), Wren (3)
WB03	Ballymoonen	Blackbird (2), Blue tit (1), Bullfinch (3), Chaffinch (1), Coal tit (2), **Curlew (5),** Dunnock (2), Goldfinch (1), Great tit (1), Grey heron (1), Hooded crow(1), Jackdaw (1), Kestrel (1), Magpie (3), Mallard (2), Meadow pipit (1), Mistle thrush (2), Pheasant (1), Raven (1), Redwing (1), Reed bunting (1), Robin (4), Rook(1), Snipe (9), Sparrowhawk (1), Starling (1), Stonechat (2), Wood pigeon (1), Woodcock (1), Wren (3)
WB10	Bushypark	Blue tit (2), Common Gull (1), Curlew (2), Hooded crow (2), Jackdaw (17), Magpie (1), Meadow pipit (1), Robin (1), Rook (6), Snipe (6), Starling (1), Stonechat (1), Teal (1), Wood pigeon (7), Wren (1)
WB45	NUIG	Blackbird (3), Black-headed gull (47), Common Gull (21), Hooded crow (2), Jackdaw (18), Magpie (2), **Oystercatcher (34),** Pied wagtail (1), Wood pigeon (1)
WB12	River Corrib	Black-headed gull (119), Common Gull (78), Coot (9), Cormorant (4), **Curlew (16),** Feral Pigeon (25), GBBG (2), Great crested grebe (2), Grey heron (1), Grey wagtail (1), Herring gull (99), Kestrel (1), LBBG (1), Little grebe (3), Mallard (20), Meadow pipit (1), Moorhen (4), Mute swan (14), Oystercatcher (7), Pied wagtail (2), Redshank (1), Snipe (6), Sparrowhawk (1), Water rail (1)
WB04	Coolagh Lakes, in Lough Corrib cSAC	**Bittern (1),** Black-headed gull (26), Coot (4), Cormorant (1), Great Black Backed Gull (2), Grey heron (1), Herring gull (3), Hooded crow (2), House Martin (1), Jackdaw (100), Jay (1), Little grebe (5), Mallard (8), Moorhen (2), Mute swan (2), Pied wagtail (6), Rook (2), Snipe (2). Sparrowhawk (1), **Starling (5,000),** Swallow (100), Teal (4), **Water rail (13),** Wood pigeon (41)
WB16	Lackagh Quarry	Kestrel (3)
WB02	Ballindooley Lough	**Bar-tailed godwit (9**), Blackbird (3), Black-headed gull (21), Chaffinch (1), Coot (11), Cormorant (1), **Curlew (8),** Great Black-Backed Gull (3), Goldfinch (1), Grey heron (2), Herring gull (4), Hooded crow (1), Jackdaw (1), Lapwing (16), Linnet (1), Little grebe (5), Magpie (1), **Mallard (47**), Meadow pipit (1), Moorhen (4), Mute swan (4), Pheasant (1), Redwing (1), Robin (1), Rook (1), **Shoveler (144), Snipe (37),** Song thrush (1), Sparrowhawk (1), Starling (1), Stonechat (1), **Teal (146),** Tufted duck (26), Water rail (1), Wigeon (28), Wood pigeon (1), Wren (1)
WB23	Galway Racecourse	Black-headed gull (3), Common Gull (3), **Curlew (37),** Jackdaw (5), Magpie (1), Oystercatcher (1), Starling (10)
WB01	Arduan	Black-headed gull (21), Jackdaw (15), Magpie (2), Rook (5)

7.9.2 Most of the birds recorded at each site are likely to move around between sites and therefore form part of a wider population. For several species, this will mean that the individuals recorded belong to the internationally important populations associated with either Lough Corrib or Galway Bay, or both. These are bar-tailed godwit, black-headed gull, common gull, cormorant, coot, curlew, golden plover, grey heron, hen harrier, lapwing, redshank, shoveler, teal, tufted

duck and wigeon. The numbers recorded in proximity to the proposed road are higher than might be expected when compared to the totals for the two SPAs, see my Table 7.

7.9.3 Most of the remaining species are common and widespread (although many are declining) and recorded in typical numbers. Therefore, the wintering populations recorded are of local value at most. The exceptions (plus more detail on hen harrier) are assessed below.

Bittern *Botaurus stellaris*

7.9.4 A bittern was recorded at the Coolagh Lakes (WB04) which is within the Lough Corrib cSAC. This is a very rare winter visitor to Ireland and most likely a vagrant rather than this being a regular wintering site for this species. If it is a vagrant, then there is not really a population in the locality. It does however indicate the value of the Coolagh lakes as a site capable of attracting rare birds, such as the bittern. (Applicant: County, EIAR p461)

Merlin Falcon *Falco columbarius*

7.9.5 A merlin was recorded in the area west of Lough Inch (WB08), which is part of Moycullen Bogs NHA, in December 2014. There are an estimated 250+ breeding pairs in Ireland (Mee, 2012) with the main location being in west Connacht. The breeding birds are supplemented in winter by migrants from Iceland (Balmer, et al., 2013) and the bird recorded is likely to be a representative of a larger number of birds present in winter at Moycullen Bogs which is perhaps of County importance (Applicant: County, EIAR p461).

Hen Harrier *Circus cyaneus*

7.9.6 A Hen harrier was recorded in the area east of Lough Inch (WB06), this is also part of Moycullen Bogs NHA in January 2015, EIAR p463. These are highly mobile birds and there is at least a possibility that this species would be found within wet heath and bog habitats closer to the route corridor of the proposed road e.g. WB08. There are an estimated 190-220 breeding pairs and these are thought to be resident, not supplemented by birds which breed overseas in winter (Balmer, et al., 2013). The bird is likely to be representative of a small wintering population in Connemara, which breeds elsewhere in Ireland, and may be of international importance (Applicant: International, due to link to SPA populations, EIAR p461)

Red Grouse *Lagopus lagopus*

7.9.7 Evidence of red grouse was recorded during the winter at Lough Inch/Moycullen NHA (WB08). This species is sedentary (not migratory and with juvenile dispersal being less than 1km) indicating a potential breeding population nearby. This species is declining rapidly and there are now less than 2,000 pairs on the island of Ireland (Cummins, et al., 2015). Any viable population is therefore likely to be of national importance (Applicant: Local Importance (Higher Value), EIAR p477).

Snipe *Gallinago gallinago*

7.9.8 A relatively large count of snipe came from both Lough Inch/Moycullen Bogs NHA (WB08) and Ballindoolley Lough (WB02), 17 and 37 respectively. This species is on the amber list, and these

numbers could be up to county importance (Applicant: Local Importance (Higher Value), EIAR p477).

Starling *Sturnus vulgaris*

7.9.9 A large starling roost of 5,000 birds was recorded at the Coolagh Lakes (WB04). This species is still common and widespread but it is on the amber list of birds of conservation concern (as a breeding species) and this is a sizeable roost, which may be of County value (Applicant: Local Importance (Higher Value), EIAR p477).

Water Rail *Rallus aquaticus*

7.9.10 A large count of water rail (13) was made from the Coolagh lakes (WB04). This species is on the green list however, the count is significant at least locally, indicating at least local value for this population (Applicant: Local Importance (Higher Value), EIAR p477).

7.10 Amphibian and Reptiles

7.10.1 Smooth newt *Lissotriton vulgaris* and common frog *Rana temporaria* were recorded from various waterbodies along the route corridor, EIAR p465 -p467. These species are therefore likely to make use of the habitats in and around the route corridor for the proposed road.

7.10.2 The applicant recorded common lizard *Zootoca vivipara* at 50% of its selected survey sites, all west of the River Corrib, indicating widespread occurrence of this species in the peatland habitats here, EIAR p467.

7.10.3 The amphibian and reptile populations are likely to be of local importance. (Applicant: Local Importance Higher Value).

7.11 Fish

7.11.1 The fish communities of the watercourses crossed by the proposed road are described and assessed in the EIAR p467 – p470. Fish species recorded include in the freshwater sections include European eel *Anguilla anguilla*, brown trout *Salmo trutta*, Atlantic salmon *Salmo salar* and sea trout *Salmo trutta* morpha *trutta*, plus sea lamprey *Petromyzon marinus* and brook lamprey *Lampetra planeri* in the River Corrib. The Coolagh Lakes and Ballindooley Lough both support a variety of introduced coarse fish.

7.11.2 The European eel is a critically endangered species and therefore the populations here are potentially of international importance, and the same level of importance could be attributed to salmon and the lampreys where these form part of the Lough Corrib cSAC population. The other fish populations are likely to be of local importance. (Applicant: European eel, international; all other fish populations, Local Importance Higher Value).

7.12 Predicted Baseline Conditions

7.12.1 The surveys that informed the baseline conditions have taken place over several years and there is the potential for habitats to expand or contract, species populations to rise and fall.

However, the applicant has undertaken habitat surveys over three periods, 2013/14, 2015 plus minor additions in 2016 and 2017 and then again in 2019. The applicant describes the changes in the FIR response p26 – p27, with an apparent large increase in dry calcareous and neutral grassland GS1 from 13.7ha to 43.5ha and smaller changes in other habitats, some of which is due to more accurate mapping in 2019, with other changes due to changes in management and scrub encroachment. The increase in GS1 is not fully explained by the applicant but since there was no corresponding decrease in higher value habitats or Key Ecological Receptors, the new areas of GS1 may be derived from areas previously mapped as Improved agricultural grassland GA1. This, combined with scrub encroachment, would suggest a general trend of reducing intensity of land use, which can result in both increases and decreases in biodiversity, but would generally be positive if large areas of grassland are becoming more diverse. A second trend influencing biodiversity is the increasing residential and other development around Galway city which would generally have a negative effect on biodiversity, EIAR p480-481.

8. Construction Stage Impacts

8.1 Designated Areas

Natura 2000 Sites

8.1.1 The construction stage impacts on Natura 2000 sites are assessed separately in the appropriate assessment report and by the applicant in the NIS and in the EIAR p482-p490. The appropriate assessment report necessarily focuses on the qualifying interest features of these sites. The conclusion of the appropriate assessment is that, with mitigation, adverse effects on the integrity of Natura 2000 sites can be avoided during the construction stage. Therefore, the impacts on Natura 2000 sites would not be significant, providing the mitigation measures are properly implemented.

8.1.2 The remaining ecological features (habitats, invertebrates, bats and other mammals) present within these sites, especially Lough Corrib cSAC, are addressed under the headings below.

Moycullen Bogs NHA

8.1.3 There would be no direct impact on Moycullen Bogs during NHA construction, however, as the NHA lies adjacent to the boundary for the proposed road, there is the potential for indirect habitat damage and disturbance of fauna within the NHA through dust (EIAR p492), site run-off (EIAR p494), spread of invasive non-native species (EIAR p493) noise, light and presence of construction workers. However, the construction period is of short duration and the potential impacts can be mitigated, although some additional mitigation measures to those proposed by the applicant are required to protect the NHA, see Section 11.2.

Proposed Natural Heritage Areas

8.1.4 There are two proposed Natural Heritage Areas pNHA in proximity to the proposed road, these are Lough Corrib pNHA and Galway Bay pNHA. The Lough Corrib pNHA includes the River Corrib at the point where it is crossed by the proposed road extending downstream to the

existing N6 bridge, as well as the Coolagh Lakes and surrounding wetlands. The pNHA is wholly included within the Lough Corrib cSAC but not as extensive, for example, it excludes the limestone pavement at Menlough. The Galway Bay pNHA includes the River Corrib as far upstream as the first road bridge crossing, as well as Lough Atalia. It is wholly included within the Galway Bay Complex cSAC. There does not appear to be a separate site synopsis for these two pNHAs and therefore the interest features are assumed to be as for the corresponding Natura 2000 sites, where these also occur within the pNHA, plus any other species populations of note, which include marsh whorl snail, swan mussel, the bats which forage along the River Corrib and wintering birds at the Coolagh Lakes. The potential effects on these two pNHAs are therefore as described for the relevant Natura 2000 sites, EIAR p494-p495, plus the potential effects on the species populations described below.

8.1.5 The remaining proposed Natural Heritage Areas fall into two categories; those included within Natura 2000 sites, for which see Table 1 and the appropriate assessment report, and those which lie outside. The latter are all greater than 2km distant and therefore unlikely to be directly or indirectly affected by the construction of the proposed road, EIAR p491.

Local Biodiversity Areas

8.1.6 The proposed road will bisect several local biodiversity areas, resulting in habitat loss during construction, EIAR p599-p601, which may[6] be as follows:

- Unnamed LBA 1 (partly overlaps Cluster 3 Cloughscoltia where this is within the Galway City area), approximately 4.3ha, EIAR p599;
- Cappagh – Ballymoneen LBA (overlaps with Cluster 4 Ballymoneen Road to Cappagh Road), approximately 7.3ha, EIAR p599;
- Unnamed LBA 2 (overlaps with Cluster 5 East of Ballymoonen Road), approximately 2.2ha EIAR p599;
- Ballagh – Barnacranny Hill LBA (overlaps with Cluster 6 Knocknabrona/Knocknafrosca), approximately 6.0ha EIAR p599;
- Menlough to Coolough Hill LBA (overlaps with Cluster 7 Menlough), approximately 6.4ha EIAR p600;
- Unnamed LBA 3 (overlaps with Cluster 8 Lackagh), approximately 1.8ha EIAR p600; and
- Ballindooley – Castlegar LBA (overlaps Cluster 9 Ballindooley and Cluster 10 Castlegar), approximately 1.0ha, EIAR p600 to p601.

8.1.7 The total area of land within Local Biodiversity Areas that would be directly affected by the proposed road could be c. 29 hectares. The areas of the LBAs adjoining the boundary for the proposed road will also be at risk from indirect effects from construction, as described for Moycullen Bogs NHA, however, the degree of risk is higher due to the long lengths of the

[6] As previously noted, the available mapping for LBAs is poor, making assessment of the impacts problematic; the unnamed LBAs may not be designated and the extent of the other LBAs is unclear. The applicant also describes losses of habitat at Doughiska EIAR p601 however this is apparently outside the Doughiska LBA.

proposed road which passes through and adjacent to the LBAs. The River Corrib and wetlands LBA will also be crossed by the proposed road and potentially subject to indirect effects, including suspended solid pollution form site run-off, EIAR p600, while the road passes underneath the Galway Racecourse LBA, with no direct impacts during construction, EIA p601.

8.1.8 The loss of terrestrial habitats within these areas and outside them is addressed in more detail below, note that the losses of habitats listed from within the LBAs paragraph 8.1.6 is a subset of those shown in Table 3.

8.2 Terrestrial Habitats

Habitat Loss

8.2.1 The proposed road will result in direct loss of habitat along the route. This is described in the EIAR p496 – p497 and p504 - p521 with updated quantities provided in the FIR response and finally in the Corrigenda. The total habitat losses for Annex I types is presented in Amended Table 4.1 Corrigenda p13-p14 and the amount of each habitat type valued at local or higher value within the development boundary are provided in the Corrigenda Amended Table 2 p14-p16. It is not clear if the total of these habitats within the boundary will be lost but it is assumed that this is the case.

8.2.2 The applicant takes a reductionist approach, quantifying the losses of all the habitats individually. This needs to be done, but there are a lot of different habitat types and these are present in intertwined and co-dependent patches, for example wet heath, dry heath, wet (Molinia) grassland, bracken and scrub are frequently recorded together with the collective value usually being greater than the individual parts, see paragraph 7.2.5. In Table 3, I give the approximate losses of habitats by cluster which should be read in conjunction with the applicant's work.

Table 3: Terrestrial Habitats directly lost during the construction stage

Cluster	Habitats Present	Value	Habitat Loss Approx..	Fragmented	Isolated
Cluster 1 Forramoyle	4010/HH3 dry heath, 4030/HH1 wet heath *7130/PB3 lowland active peat bog, GS3 acid grassland, GS4 wet grassland, WS1 scrub and HD1 bracken.	County	14.3ha	Yes	Yes
Cluster 2 Troscaigh,	4010 HH3 wet heath, 4030/HH1 dry heath *7130/PB3 active lowland blanket bog with WS1 scrub, GS4 wet grassland and HD1 bracken	National	6.7ha	Yes	Yes

Cluster	Habitats Present	Value	Habitat Loss Approx..	Fragmented	Isolated
Cluster 3 Cloughscoltia (partly within unnamed LBA 1)	Wet grassland including 6410 Molinia meadows, with areas of 4010/HH3 wet heath, 4030/HH1 dry heath and WS1 scrub, with some HD1 bracken	County	13.9ha	Yes	Yes
Cluster 4 Ballymoneen Road to Cappagh Road (within Cappagh – Ballymoneen LBA)	4010/HH3 wet heath, *7130/PB3 active lowland blanket bog and HD1bracken, plus smaller areas of 4030/HH1 dry heath, WS1 scrub, GS4 wet grassland and 6410 Molinia meadows	County	7.3ha	Yes	Yes
Cluster 5 East of Ballymoonen Road (within unnamed LBA 2)	WS1 scrub with GS4 wet grassland, and towards the south patches of 4030/HH1 dry heath, 4010/HH3 wet heath, GS3 acid grassland, GS4 wet grassland and bracken,	County	2.2ha	Yes	Yes
Cluster 6 Knocknabrona/ Knocknafrosca (Ballagh – Barnacranny Hill LBA)	GS4 wet grassland, and WS1 scrub, plus smaller areas of 4030 European dry heaths/HH1 dry siliceous heath, GS3 dry-humid acid grassland, GS2 dry meadows (and grassy verges), PF2 poor fen and flush and HD1 dense bracken.	County	6.0ha	Yes	Yes
Sub-total Peatland Habitats			50.4ha		
Cluster 7 Menlough (Menlough to Coolough Hill LBA)	*8240 Limestone pavement mostly wooded with WN2 oak-ash-hazel woodland, plus a small *3180/FL6 turlough, *6210 calcareous grassland, GS1	International	5.4ha (incl. 0.8ha under viaduct)	Yes	Yes

Cluster	Habitats Present	Value	Habitat Loss Approx..	Fragmented	Isolated
	calcareous grassland, WS1 scrub and WD1(mixed broadleaved woodland)				
Cluster 8 Lackagh (unnamed LBA 3)	*8240 Limestone pavement including wooded with WN2 oak-ash-hazel woodland, interspersed with *6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) with orchids, WS1 scrub and GS1 calcareous grassland,	County	1.8ha	No	Yes
Cluster 9 Ballindooley Lough (Ballindooley – Castlegar LBA)	3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp /FL3/FS1, with smaller areas of *7210 Calcareous fens with Cladium 7230 Alkaline fens, 6410 Molinia meadows GS4, WN2 oak-ash-hazel woodland, WS5 recently felled woodland, GS2 dry meadows, ER2 exposed calcareous rock, PF1 Rich Fen and Flush and WS1 Scrub,	National	1.0ha	No	No
Cluster 10 Castlegar (Ballindooley – Castlegar LBA)	*8240 Limestone pavement some wooded with WN2 oak-ash-hazel woodland, plus 6510 Lowland hay meadows and smaller areas of scrub, dry calcareous	International	<1.0ha	No	No

Cluster	Habitats Present	Value	Habitat Loss Approx..	Fragmented	Isolated
	(and neutral) grassland and dry meadows (and grassy verges),				
Cluster 11 Briarhill	*8240 Limestone pavement, 6210 calcareous grassland, calcareous grassland, scrub, and oak-ash-hazel woodland, plus stone walls and treelines,	International	4.0ha	Yes	Yes
Cluster 12 Arduan	6210 calcareous grassland, GS1 calcareous grassland and WS1 scrub,	County	0.7ha	No	No
Sub-total Calcareous Habitats			12.9ha	-	-
			63.3ha	-	-

8.2.3 In addition to the habitats inside the clusters, there are areas of (semi-improved) neutral and calcareous grassland and scrub, plus smaller parcels, hedgerows and treelines which brings the total losses of habitats of local value or higher up to 100ha (including dense bracken which the applicant excludes), and 147ha of negligible value habitats, although as discussed in paragraph 7.12.1, the value of the grassland may be improving over time due to reductions in the intensity of agriculture, meaning that the losses of local value habitats may be higher when the proposed road comes to be constructed.

8.2.4 The loss of woodland, plus fragmentation and isolation, at Menlough is notable. Native woodland is a relatively scarce habitat in Ireland, there being only 132,000 hectares nationally (10,000 in Galway), compared to for example 159,000 hectares of wet heath and 257,400 ha of blanket bog. Large areas are even scarcer, with most woodlands being less than 5ha in size, while that at Menlough (with some dominated by non-native beech *Fagus sylvatica*) may be around 35ha in size. Approximately 5ha of this woodland would be lost to the proposed road, equivalent to 0.05% of the Galway total of native woodland.

8.2.5 The loss of higher value habitats is greatest in the western portion of the proposed road, with a total of 50.4ha of semi-natural habitats within the clusters lost versus 12.9ha within the clusters for the eastern portion, where the main areas of impact are at Menlough Woods and at Brialhill/Ardaun.

Habitat Fragmentation

8.2.6 The applicant does not fully address habitat fragmentation in the EIAR although it is mentioned.

8.2.7 Habitats will be fragmented at the level of the habitat parcel, for example, an area of wet heath at Troscaigh will be divided in two by the proposed road, with a larger fragment to the north of the proposed road and a much smaller fragment to the south. Other examples include wet heath at Cloughscoltia and the woodland at Menlough woods. Habitats will also be fragmented more broadly with Cluster 1 through to Cluster 7, plus Cluster 11 all divided into two parts by the proposed road, see Table 3.

8.2.8 Dividing areas of habitat can compound the effects of habitat loss, which can make each smaller fragment (and especially the smallest) less resilient to external threats such as climate change, nutrient enrichment, invasive species and so on and less able to support the full range of species expected for the habitat type and those that remain more vulnerable to local extinction.

Habitat Isolation

8.2.9 The proposed road will isolate the remaining fragments of semi-natural habitat closest to the city from more extensive areas of semi-natural habitats on the other side of the proposed road. This affects the fragmented habitats/clusters, paragraph 8.2.7, and cluster 8 Lackagh which lies to the south of the proposed road, see Table 3. The coastal location of Galway compounds the isolation. Isolated habitats are likely to be less resilient, as described in paragraph 8.2.7., with additional risks as a result of the more urban location e.g., waste dumping, unofficial recreation, cessation of traditional farming. The last of these could cause profound changes, with ungrazed vegetation succeeding to scrub and woodland.

Habitat Degradation

8.2.10 As for Moycullen Bogs, paragraph 8.1.3.

8.3 Aquatic Habitats

Habitat Loss

8.3.1 During construction, sections of watercourses will be culverted, resulting in the loss of riparian habitats and shading of the watercourse, EIAR p514 – p515, as shown in Table 4 (next page), with the total length of watercourses affected being just under 1km. In addition, one watercourse, the Tonabrocky Stream will be re-routed causing a further loss of riparian habitat with a net loss of 145m.

Table 4: Lengths of watercourse culverted and substantially re-routed

Watercourse	Culvert Reference	Approx. Chainage	Approx. Length Culverted (m)	Length re-routed
Sruthán na Libeirtí	C00/01	0+650	100	45
Sruthán na Libeirtí	C00/02	1+000	50	40
Small coastal stream	C01/01	1+500	25	
Trusky Stream	C02/01a	2+800	40	65
Trusky Stream	C02/01b	2+850	75	
Trusky minor drain	C03/01	3+050	50	
Trusky minor drain	C03/02	3+350	10	
Bearna Tributary	C03/03	3+925	50	
Unnamed	C03/04	3+940	50	
Bearna Stream	C04/01	4+100	50	
Tonabrocky	C04/02	4+900	100	395m (becomes 250m)
Knocknacarra Minor Drain	C06/01	6+850	75	
Knocknacarra Minor Drain	C07/02B	7+250	20	
Knocknacarra Minor Drain	C07/02A	7+210	100	
Minor Drain Dangan	C08/01	8+375	100	
Minor Drain Coolagh	C10/02	10+730	40	
Knocknacarra Minor Drain	C07/01a	N59 Link Road south 1+600	50	
		TOTAL:	985	

Habitat Degradation

8.3.2 The main risk to aquatic habitats during the construction period is through site run-off containing high levels of suspended solids, which could result in the killing of aquatic animals and plants, and smothering of spawning grounds where these exist downstream of the crossing point, EIAR p467, as is the case in at least the Trusky, Bearna and Tonabrocky Streams. A second key risk is the potential to inadvertently spread non-native invasive species on construction machinery, EIAR p500, especially if these are inadequately cleaned when moving between catchments.

Habitat Fragmentation/Isolation

8.3.3 The culvert design allows for the development of a natural riverbed and continued passage for aquatic species (fish, etc) through the culvert, equivalent to the baseline., thereby avoiding potential effects from fragmentation and isolation.

8.4 Flora

8.4.1 Based on the relevé data, construction stage would result in the following potential impacts on red data book flora:

- Woodsy thyme moss *Plagiomnium cuspidatum*, one population would be directly affected (at least partially lost) at Ch. 3+350 (2680_R1), while the other two may also be affected directly or indirectly, as the record is within the boundary for the proposed road but not within areas obviously subject to earthworks at Ch4+450 (2527_R1) and at Ch. 12+950 (2354_R1).
- Lesser striated feather-moss *Plasteurhynchium striatulum*, one population would be directly affected (at least partially lost) at Ch. 9+800 4422_R1 as the recorded location is within the footprint of the proposed road, while three further records of this species, at Ch. 9+900 (3941_R1), Ch.10+000 (5507_R1) and at Ch. 10+100 (3790b_R1), are inside the boundary but outside obvious earthworks and therefore may be lost or partially lost, with the remaining two records in areas not likely to be impacted during construction.
- Imbricate bog-moss *Sphagnum affine*, the only recorded population would be lost (or at least partially lost) at Ch.1+250 (EC12 R2) is it occurs in the centre of the alignment for the proposed road.
- Red bog-moss *Sphagnum capillifolium s. capillifolium,* the only recorded population would be lost or partially lost at Ch.1+250 (765_R1).
- Spring gentian *Gentiana verna*, the three known locations are not directly affected by earthworks, one being above the proposed Lackagh tunnel and the other two being at Briarhill, but are at risk from indirectly from construction activity, especially dust. As this species is most likely to be found within areas of exposed limestone pavement, it probably does not occur in areas subject to earthworks elsewhere.
- Brown beak-sedge *Rhynchospora fusca*, the only known location is just outside the route alignment at Ch.2+350 (EC14 R3) however it is conceivable that this species distribution also extends into the route alignment for the proposed road wherever there is wet heath or blanket bog, and even if not, it is vulnerable to indirect effects such as dust and even slight changes in hydrology.

8.4.2 Therefore, five (of six) red data book species of sub-species would be directly impacted by the proposed road development, the most serious being *Sphagnum affine* which is classified as Vulnerable.

8.4.3 Of course, the above is based upon relevé data and it would be surprising if this captured the full extent of any plant distribution, which means the above represents both the minimum population present and the minimum number of populations impacted.

8.4.4 In addition to the red data book flora, populations of locally scarce species, characteristic species and orchids would also be affected during site clearance.

8.5 Invertebrates

Marsh Fritillary

8.5.1 The applicant reports a direct loss of 5.2ha of marsh fritillary habitat, all in the western part of the route corridor, which is 4.7% of the total that was recorded by the applicant in the route corridor and obviously a smaller proportion of that in the county, etc. A population decline commensurate with the habitat loss would be expected, with the possibility, when combined with other impacts, of losing this species from one (M2424) of the 705 1km^2 in which it currently occurs.

Marsh Whorl Snail

8.5.2 The proposed road will result in the loss of most of the marsh at Castlegar (Ch. 13+000) where a marsh whorl snail population was recorded, and most likely the loss of the population from here. This is the smallest of the three sites where this species was recorded along the route corridor, and the species was recorded elsewhere in the same 1km^2 at Ballindooley Lough.

Other terrestrial invertebrates

8.5.3 The effects of loss of habitat on invertebrate populations is expected to be commensurate with losses of habitat and flora.

Other Freshwater Invertebrates

8.5.4 No impacts are expected on populations of white clawed crayfish or freshwater pearl mussel, EIAR p564. The potential swan mussel population in the River Corrib is vulnerable to aquatic pollution during the construction stage, in the same way as the fish species that are qualifying interest features of the Lough Corrib cSAC. The effects on other aquatic invertebrates are expected to be commensurate with aquatic habitats, see section 6.3.

8.6 Bats

Bat roosts

8.6.1 There will be a loss of fourteen buildings (PBR) containing up to 19 bat roosts and two trees (PTR) containing bat roosts, EIAR p526 to p530, and two further roosts likely to be disturbed during construction, as shown in Table 5 (next page).

Table 5: Bat roosts directly or indirectly affected by the proposed road

Species	Lost maternity roost	Lost other roost	Disturbed maternity roost	Disturbed other roost	Maternity roost Within 100m	Other roost Within 100m (or known to be used by same bats)	TOTAL
Lesser horseshoe bat	PBR178	PBR210 and PBR204		PBR154		PBR06, PBR156, PBR219, PBR129, PBR85, PBR154, PBR153, (PBR54), (PBR112)	13
Natterer's Bat						PBR73	1
Daubenton's bat						PBR06	1
Leisler's bat		PTR48				PBR139	2
Pipistrelle species		PBR182				PBR242	2
Common pipistrelle		PBR205				PBR228	2
Soprano pipistrelle		PBR267, PBR255, PBR177, PBR196, PBR205 and PTR43			PBR225	PBR49	8
Brown long-eared bat	PBR256 and PBR178	PBR267, PBR204, and PBR196	PBR173	PBR183	PBR145, PBR192	PBR49, PBR225, PBR156	12
Unknown species		PBR253 and PBR270					2
TOTAL	3	16	1	2	3	18	43

8.6.2 There will also be a further 15 trees felled which are assessed as high potential to support roosting bats. This number would be expected to change over time, as trees age, with potentially more trees with high potential affected by the time that the road is constructed.

8.6.3 The loss of the roosts and potential roosts, plus disturbance to others, as indicated in Table 5 has the potential to cause a reduction in the bat populations listed with lesser horseshoe bats, brown long-eared bat and soprano pipistrelle being the most likely to suffer population level effects as a result of roost loss and disturbance during construction.

Bat Foraging Habitat

8.6.4 The entire area within the proposed road boundary lies within a Core Sustenance Zone (CSZ) of at least one of the identified bat roosts in Table 5 (the furthest distance apart of any of the roosts in Table 5 is 2900m, at the western end), EIAR p548, and within this there is approximately 100ha of high quality bat foraging habitat that would be lost to the proposed road. As the applicant points out, the area lost is less than 7% of the CSZ in each case, EIAR p530 to p548 although, as the applicant also points out, for lesser horseshoe bats at Menlo Castle the loss of habitat is a key part of the foraging habitat at Menlough Woods, EIAR p547, and this assumes that the bats are as likely to cross the land affected by the proposed road when it is operational as they are today, EIAR p532. This is unlikely to be the case and, as each of the bat roosts identified are on or about the route alignment, 40% to 50% of the CSZ will become less accessible and the route to get there more perilous during and after construction. Further, for those roosts located to the south of the proposed road, such as PBR49, PBR173, PBR145 and PBR153, the more readily accessible half of the CSZ may be of lower quality as it could include urban and residential areas, see Operational impacts paragraph 9.6.1.

Bat Commuting Routes

8.6.5 During site clearance, all hedgerows, treelines and stonewalls within the boundary of the proposed road would be lost, and all watercourses covered over except the River Corrib. These features are known to be used by most bat species (the exception being Leisler's bats) as both foraging habitat and commuting routes. There are around 200 linear features that would be bisected by the proposed road. Those closest to roosts or joining roosts to the best foraging habitat are the likely to the most important for bats.

8.6.6 It is notable that the applicant does not appear to have undertaken full surveys[7] to determine which of these crossing points is the most important for bats, EIAR p620 but plans to do this post-consent (10 or 20% have been surveyed to date). The surveys do show that the proposed road is crossed by lesser horseshoe bat (two of 21 locations surveyed, EIAR p435), Myotis bat species (7, p446), Leisler's bat (6, EIAR p440), common pipistrelle (16, EIAR p441), soprano pipistrelle (21, EIAR p442) and Nathusius' pipistrelle (2, EIAR p442). The results indicate that it is also likely to be crossed by brown long-eared bat[8] (EIAR, p444) and the Myotis records may include Natterer's bat and Whiskered bat. Multiplying the results from the crossing point surveys

[7] Twenty-one crossing points, an average of one per 850m, were surveyed, as shown on EIAR Figure 8.22.1, out of a possible c.200 linear features bisected by the proposed road. This is however supplemented by static monitoring surveys which were placed at an additional 18 linear features bisected by the road (plus others coincidental with the crossing point surveys).

[8] Brown long-eared bat is harder to detect with acoustic monitoring devices.

by 8 to 10 might give a truer reflection of bat activity across the proposed road and the degree to which bat commuting activity could be disrupted.

Additional Impacts

8.6.7 Lighting during construction works during the bat active season could temporarily displace bats or disrupt their behaviour.

8.7 Mammals other than bats

Irish hare

8.7.1 During site clearance, there is a risk of direct mortality of Irish hare EIAR p561 to p562, particularity during the peak breeding season in spring and early summer when small leverets are hiding in vegetation (the adults being able to escape easily).

8.7.2 Irish hare occupies a range of open habitats are widely varying densities; however, the average density is 3.19 hares/km^2 (McGowan, et al., 2019). The applicant recorded this species in the western part of the route corridor, beyond the River Corrib, with the loss of habitat here being approximately 0.75km^2 which enough habitat for 2.3 hares, a tiny fraction of the estimated Irish population of 223,000.

Red squirrel

8.7.1 Red squirrel has also been recorded at Menlough Woods plus a few other places locally. Menlough woods will be directly impacted during site clearance for the proposed road. During site clearance, there is a risk of killing red squirrel, especially when kittens are in the dreys (February to July, inclusive).

8.7.2 The red squirrel is confined to woodland, with little of this habitat available locally. The proposed road will result in the loss of 8ha of woodland of which most, say 5ha, must be in Menlough Woods, which is an estimated total of 35ha. The proposed road would therefore result in approximately 14% loss of the woodland here and effectively divide the woodland in to two, albeit with some connectivity under the proposed River Corrib Bridge and Menlough Viaduct.

8.7.3 A single red squirrel requires a minimum of 1.5ha of woodland and obviously more than that is required for a viable population. Assuming the population of red squirrel at Menlough Woods is at the maximum possible density, we would expect a population decline of about 4 animals due to the loss of 5ha of woodland at Menlough and the remaining population would be divided into two, creating two separate populations of approximately nine squirrels, which is clearly less viable than a single population of 23. The impact may be ameliorated to some degree when the screening planting along the proposed road reaches maturity, however accessibility to the new habitat would be constrained by the River Corrib and Lackagh Quarry. There is a risk of losing red squirrel entirely from Menlough Woods through population decline rather than displacement.

Pine marten

8.7.4 There is a record of pine marten was at Menlough Woods, plus only two other places locally. Menlough woods will be directly impacted by the proposed road and so there is also the risk of pine marten dens, including breeding dens, being destroyed during site clearance and therefore a risk of killing pine marten, especially when kits are present in the den (March to June, inclusive).

8.7.5 Like the red squirrel, the pine marten is primarily a woodland species. The pine marten has large territories with females 14-25ha and males 50-80ha. The loss of woodland habitat at Menlough is equivalent to up to 35% of a female's territory and 10% of a male's territory. The landscape is largely unwooded which means there is not much alternative habitat available for this species. Given the risks from traffic, new woodland along the proposed road is not suitable habitat for pine marten. Moreover, the proposed road divides Menlough Woods into two, which may further compromise its continued suitability for pine marten. The loss, rather than displacement, of one breeding female territory seems likely.

Irish stoat

8.7.6 The Irish stoat is similarly at risk during vegetation clearance, with young present in the nest from April to early July. This species is not as restricted to woodland as the pine marten and red squirrel and is therefore less vulnerable to more serious effects on the local population as a result of the loss of woodland habitat at Menlough. Whilst loss of habitat due to the construction of the proposed road would most likely result in some decline, it would be proportionally much less than the more specialist mammal species.

Badger

8.7.1 The proposed road would result in the loss of three badger setts (main sett S9, subsidiary sett S11 and subsidiary sett S14) which belong to two separate badger groups (S9 and S11, Lackagh Group and S14 the Cappanabornia Group) and construction activity would potentially result in disturbance for a further two setts (main sett S3 and subsidiary sett S10), EIAR p557 and any setts present in dense vegetation that was not surveyed could also be lost or disturbed. Without mitigation, there is a risk of killing badgers in their setts during site clearance.

8.7.2 The proposed road would also result in the loss of badger foraging habitat for ten badger social groups whose territories overlap with the proposed road, EIAR p557-p558. There were badger signs along most of the route corridor for the proposed road except Lackagh Quarry (400m of the route) and the area around Galway Racecourse (2km of the route), leaving around 245ha of suitable foraging habitat lost or becoming inaccessible/undesirable for badger foraging. There are no territory maps provided by the applicant and so calculating losses per individual territory is not straightforward. However, the median badger territory size in Ireland is 130ha (Hayden & Harrington, 2000) and the average direct loss per territory here is 24.5ha, which is approximately 18% of the median territory size.

8.7.3 Unmitigated, the proposed road could also prevent badgers from reaching the part of their foraging area. Fortunately, one of the social groups with a main sett (S3) closest to the road is

close to the River Corrib Bridge which should allow access either side of the proposed road. However. the other is next to Lackagh Quarry, which is unsuitable for badger foraging and creates a barrier to badger movement, meaning this social group could lose access to 50% of its foraging area (the route over the Lackagh Tunnel being too long). Other social groups could be similarly affected, although the proportion of their territory is likely to be less.

8.7.4 The direct loss of habitat due to the proposed road would put at least some of the badger social groups under pressure, which would be substantially worsened if the badgers had no way to reach the far side of the road.

8.7.5 Construction activity also has the potential to disturb badgers in their setts when this causes significant ground vibration. Badgers are quite tolerant of noise and vibration, so any effects would be very short-lived.

Otter

8.7.1 There are no known otter breeding holts within the route corridor and so there is little risk of direct mortality or disturbance during site clearance.

8.7.2 Other than the River Corrib, there would be small loss of riparian habitat alongside the watercourses crossed by the proposed road, however, this is unlikely to affect food availability for otters and therefore effects on the otter population are unlikely, EIAR p523.

8.7.3 During the installation of culverts, otter movements could be interrupted. However, this is easily mitigated by the provision of safe passage through the construction site during the hours of darkness.

8.7.4 Impacts on aquatic habitats as described in Section 6.4 could also impact on otter if severe enough to affect otter food supply or availability.

Widespread mammal species

8.7.5 All of the other mammal species recorded are at risk from direct mortality during site clearance, especially when breeding., and would be likely to suffer a small degree of population decline commensurate with the loss of habitat, which would be partially offset for the smaller species by the creation of new woodland and grassland habitat in the soft estate. The population decline attributed to the construction of the proposed road would be a tiny fraction of the of the national population in each case.

8.8 Breeding Birds

8.8.1 During site clearance there is a risk of destroying birds' nests if carried out during the bird breeding season. Both ground nesting and bush/tree nesting bird species were recorded, so this risk applies to heathland etc as well as woodland and scrub, EIAR p572. Birds nesting close to the construction site could also be disturbed resulting in loss of a clutch of eggs, with barn owl at Menlo Castle (140m distant) and peregrine falcon at Lackagh Quarry (0m distant) being the most sensitive EIAR p572 to p573. Both species are however quite tolerant of human activity,

and frequently nest in or on buildings that are in use, suggesting that these birds may not be seriously affected during construction of the proposed road.

8.8.2 The proposed road will result in loss of bird nesting and foraging habitat EIAR p571 to p572, which includes all of the semi-natural, agricultural and sub-urban habitats within the boundary of the proposed road, approximately 187ha (of which up to 76ha is improved agricultural grassland of limited value for breeding birds).

8.8.3 The applicants mapping indicates losses of territories of breeding birds of conservation concern (red and amber list species) as shown on the applicant's Figure and in my Table 6. For each species, the number of territories affected is a very small proportion of the national total, and likely to be less than 0.05% of the county total, except for linnet which has a relatively low population density in the west of Connacht. However, the number of territories affected is likely to be more than 1% of the Galway City total, especially Stonechat (estimated up to 7% loss) and Linnet (estimated minimum 3% loss). This assumes, as is likely, that available habitat is the principal factor limiting the populations of these species and that the birds would not simply be displaced elsewhere. The data was not provided for green list species, the territory count would obviously be higher if these species were included.

Table 6: Breeding Bird Territories of conservation concern lost to the proposed road

	Territories directly impacted	Ireland Pop Estimate (Crowe, Musgrove, & O'Halloran, 2014)	Estimated % of Galway City Population (based on average density)
Robin	33	4,769,540	0.90 =
Meadow pipit	19	1,46,310	1.68 O
Linnet	11	451,430	3.16 U
Goldcrest	7	611,280	1.48 =
Greenfinch	7	693,890	1.31 U
Stonechat	6	109,770	7.09 O
Mistle thrush	2	197,070	1.32 U
Coot	2	No data	-
Skylark	1	322,900	0.40 O

O likely over-estimate, U likely underestimate, based on density mapping for Ireland (Balmer, et al., 2013)

8.8.4 Some of the species affected nest in trees and shrubs and may benefit from the screening planting however nesting close to roads is hazardous and avoided by many bid species, which means that the new planting should be discounted as mitigation.

8.9 Wintering Birds

8.9.1 Nine of the identified wintering bird areas which are directly impacted by the proposed road development, five in a minor way and four more significantly; WB03 (Balllymoneen) 4.2ha, WB45 (NUIG sporting ground) 3.7ha, WB16 (Lackagh Quarry) and WB01 (Arduan).

8.9.2 For each of the wintering bird species (i.e. migratory or semi-migratory birds which spend the winter locally) recorded, the total numbers affected in each case is likely to be less than 0.05%

of the national (Burke, et al., 2018) (Lewis, Burke, & Crowe, 2016) (Lewis L. J., Burke, Fitzgerald, Tierney, & Kelly, 2019) and county populations. However, as shown in Table 7, the numbers of gulls and oystercatcher at WB45 NUIG are surprisingly high compared to the average total count for Inner Galway Bay (a proxy for local populations and the best available data), being more than 1% in each case.

Table 7: Wintering bird populations affected by the proposed road

Site	Species	Peak Count	National Population estimate in winter	Lough Corrib 5 year mean I-Webs	Galway Bay 5 year mean I-Webs	% of Galway Bay Population
WB03 Ballymoonen	Curlew	5	28,300	34	604	0.8 O
	Redwing	1	ND	NA	NA	NA
	Woodcock	1	ND	NA	NA	NA
WB45 NUIG	Black-headed gull	47	>57,900	70	3108	1.5 O
	Common Gull	21	>30,200	74	1215	1.7 O
	Oystercatcher	34	42,875	0	558	6.0 O
WB01 Arduan	Black-headed gull	21	>57,900	70	3108	0.67 O

8.9.3 As pointed out by the applicant, only parts of these wintering bird survey sites will be directly affected, there is similar suitable habitat available locally and the use of these sites by the birds is somewhat transient, with birds also using other sites. The expected response to habitat loss at these sites for the gulls is therefore displacement within the site or elsewhere, rather than population decline attributable to the proposed road, EIAR p577 – p578. However, this is less certain for oystercatcher which make regular use of the WB03 NUIG fields with the proposed road directly affecting about 10% of this site and dividing it in two. The birds may continue to use the site but if displaced elsewhere, the evidence suggests they would not fare well (Burton, Rehfisch, & Clark, 2002).

8.9.4 Construction activity also has the potential to displace birds from beyond the area directly affected due to noise and the visibility of human operatives, as assessed by the applicant EIAR p578 to p586. Many bird species quickly habituate to human activity and the construction period is of a short duration which means that long term affects are not likely from construction activity (but see operation effects Section 7.10). Once again, the oystercatcher population at WB03 NUIG is the most at risk of the wintering birds.

8.10 Amphibian and Reptiles

8.10.1 Site clearance has the potential to result in direct mortality of common frog and smooth newt, EIAR p590, and common lizard EIAR p592-p593.

8.10.2 There would also be a direct loss of habitat for these species. For common frog, there appear to be around 10 breeding sites affected directly and for smooth newt it is two. These are spread fairly evenly along the route of the proposed road, except at Galway racecourse and around. This means that the terrestrial habitats along the proposed road will also be used by these species with the land within 100m of these breeding sites likely to be the most important, an estimated 8ha.

8.10.3 For common lizard, the loss of habitat is estimated by the applicant to be c4.7ha of peatland and heathland habitats, all in the western part of the proposed road, the module 1 response p33. This would be the minimum since it excludes wet grassland (15.2ha), dense bracken (14ha), acid grassland (up to 7.8ha) and about 14ha scrub which are interspersed among the two heathland types and may also support this species at least along the margins (Marnell, 2002) . There is no data on population densities for this species in Ireland however data from elsewhere indicates 40 per hectare is a reasonable estimate, indicating an impact on more than 200 individuals, assuming, as is likely, that adjoining habitats are at carrying capacity. This would however be ameliorated by the creation of new habitats, including translocation of dry heath, within the soft estate. As the applicant points out, EIAR p592 and response to module 1 p33, the loss of habitats and numbers of lizards affected would be a very small proportion of that occurring locally and more widely in Galway.

8.11 Fish

8.11.1 The proposed road development will include culverting of watercourses as set out in the EIAR p514 -515 and my Table 4. The fish surveys either did not reveal any fish or only low numbers of fish at the locations of the culverts, EIAR p597, and therefore the risk of direct mortality during construction is low and the loss of riparian habitat, this is unlikely to impact on fish populations, as the applicant describes, EIAR p594 – p595. The main risk to fish species during construction appears to be from site run-off which is high in suspended solids, should this make its way into the watercourses and affect fish populations and spawning habitat downstream from the construction site. These include European eel (Sruthán na Líbeirtí, Trusky Stream, Bearna Stream, Tonabrocky Stream and Knocknacarra Stream), brown trout *Salmo trutta* (Trusky, Bearna and Tonabrocky), sea trout (Tonabrocky) and Atlantic salmon parr *Salmo salar* (Tonabrocky), with spawning habitat present in at least the Trusky, Bearna and Tonabrocky Streams.

9. Operation Stage Impacts

9.1 Designated Areas

Natura 2000 sites

9.1.1 Potential effects during the operation stage for Natura 2000 sites are described in the appropriate assessment report.

Moycullen Bogs NHA

9.1.2 Moycullen Bogs NHA is approximately 3,600ha, divided into three separate blocks; (i) one, the smallest (23.7ha), within the Galway City area; (ii) one (61ha) in Tonabrocky; and (iii) a much larger area further to the north and west of Galway City. It is the first of these that is next to the boundary for the proposed road, however it is the proposed N59 link road rather than the main carriageway which is closest to the NHA. The main carriageway is more than 200m away from the NHA at its closest point, while approximately 1.7ha of the NHA is within 50 - 200m of the N59 link road, this equates to 7% of the Galway City element of the NHA and less than 0.05% of the total NHA.

9.1.3 There is a theoretical risk that this 1.7ha of NHA is affected by noise pollution, artificial light, air pollution (exhaust emissions) and water pollution (road run-off) during the operation of the road.

9.1.4 The N59 link road will be lit along its entire length however the applicant's modelling indicates that significant light spill would not reach the NHA, it being less than 1.0 LUX at the very edge of the NHA and only c.2ha hectares of the NHA within 200m of the proposed road (beyond which baseline light levels would be expected). The air quality modelling undertaken by the applicant indicates that air pollution would not be sufficient to cause a change in the vegetation within this or any part of the NHA, EIAR p492 – p493, while road run-off can be controlled through the scheme drainage design so as not to cause an impact. The NHA is primarily rain fed and, following the review of the potential impacts undertaken by Mr. James Dodds, water quantity within the NHA is expected to be maintained.

9.1.5 This leaves road noise. There were no noise monitoring stations at Moycullen Bogs NHA for the environmental impact assessment, the nearest being receiver 126 which is predicted to experience a 3dB increase from 49dB to 52dB, however this is closer to the existing N59 and therefore the increase may be higher for the small part of Moycullen Bogs NHA in proximity to the proposed road. Given the relatively small area affected (in comparison to the total size of the NHA) and the subtle effects of noise on wildlife, this is also unlikely to have an appreciable effect on the NHA.

Proposed Natural Heritage Areas

9.1.6 As for Natura 2000 sites, where these are coincidental. The other pNHAs are greater than 2km distant and are therefore unlikely to suffer indirect effects because of the proposed road during operation.

Local Biodiversity Areas

9.1.7 The proposed road bisects or is adjacent to up to eight areas included within Local Biodiversity Areas and so there is potential for indirect effects on each of these. As before, the local biodiversity areas have been considered in conjunction with terrestrial habitats, see section 7.2. Given the length of the proposed road passing through/adjacent to these local biodiversity areas, the potential for indirect effects is much greater than it is for Moycullen Bogs NHA. As discussed under construction impacts for terrestrial habitats, six of these LBAs will be fragmented, leaving an isolated area of habitat to the south of the road. These areas will be effectively encapsulated within the urban areas, and given their now smaller size less resilient to urban impacts from, for example, invasive plant species, informal recreation and lack of traditional management.

9.2 Terrestrial Habitats

9.2.1 The terrestrial habitats, Including the local biodiversity areas, in proximity to the proposed road are at risk from indirect effects during the operation of the road. These could arise from ongoing isolation, as described in paragraph 8.2.9, and noise pollution, artificial light, shading from structures, air pollution (exhaust emissions) and water pollution (road run-off) and changes in water quantity, which could degrade the terrestrial habitats over varying distances from the proposed road, as discussed below.

Noise

9.2.2 From the proposed junction with the existing N6 at Briarhill to the N59 (eastern section), the proposed road is predicted to receive approximately 40,000 AADT (annual average daily traffic) in 2039 with a design speed of 100km/h while the remainder (western section) is predicted to receive 15,000 AADT with a design speed of 85km/h, EIAR p246 and p280. The noise assessment in the EIAR focussed on properties; looking at a few of these indicates that in more rural locations in the west noise levels could be elevated by, for example, 27dB at 50m from the proposed road (receiver 13), 12dB at 125m (receiver 15) and 6dB at 150m (receiver 21), although one location showed an increase of 17dB at 300m (52). In the east, the figures are comparable with 20dB at 50m from the road (168), 18dB at 125m (167), 18dB at 175m (165) and 17dB at 300m (166). Similar levels of noise increase would be experienced by all the habitat clusters apart from Clusters 11 and 12, which are already subject to higher noise levels from existing roads. We do not know how far away elevated noise levels would extend beyond the road but is appears that it would be several hundred metres, say 500m, and would encompass large areas of higher quality terrestrial habitat (within the clusters).

Light

9.2.3 For Clusters 1 -5, lighting is proposed at junctions only, with minimal light spill into the adjoining habitats. Cluster 6 would be crossed by the N59 link road would be lit along its entire length and therefore this cluster would experience elevated light levels. Cluster 7, at Menlough, would not experience elevated light levels as the proposed road would be unlit. Clusters 8 to 12 would experience elevated light levels as the proposed road would be lit where it passes through or alongside these clusters. The total length of lit road (each side added together, where habitats

exist on both sides) alongside higher value habitats (in the clusters) would be c. 2,600m on the main carriageway and c.3000m on the N59 Link road. The applicant's light modelling, the design report Drawing No. GCOB 1300 D 1 to 15, indicates that light levels would be elevated by 1.0 LUX (equivalent to the light at 1m from a lit candle) at 25m from the carriageway, and it would obviously decrease with further distance from the road. So near baseline levels could be assumed within, say, 150m from the road, giving an area of higher value terrestrial habitats experiencing increased light levels as 168ha.

Shading

9.2.4 The potential for habitat degradation resulting from shading is addressed in the EIAR p502, and in the appropriate assessment report. Other that the River Corrib, the main area subject to shading is in Cluster 7 Menlough where the Menlough viaduct will shade the ground below, and prevent rainfall, sufficient to kill of most of the vegetation underneath the viaduct.

Air Pollution

9.2.5 The potential for habitat degradation resulting from air pollution is addressed in the EIAR p503-p504, which presents the air quality modelling undertaken by the applicant. This indicates that whilst emissions would be elevated along the route of the road, the degree of elevation from the baseline is not likely to affect the vegetation community beyond the soft estate or 30m from the edge of the carriageway. The most at risk habitat clusters are 9 and 10 where the traffic volume is greatest, and there may still be some plant species at risk in other locations, see Section 7.5.

Water Pollution

9.2.6 The potential for habitat degradation resulting from water pollution is addressed in the EIAR p500-p501. In the west, polluted road run-off could affect terrestrial habitats directly in proximity to the road. However, this is addressed in the scheme design through capturing and treating road run-off prior to discharge, design report p292. In the east, polluted run-off could affect groundwater quality and therefore ground water terrestrial ecosystems. Again, this is addressed in the scheme design through capturing and treating the run-off before discharging to the ground. The effectiveness of these systems has been assessed separately by Mr James Dodds (Dodds, 2020) and found to be adequate to avoid significant impacts. However, these systems require maintenance to continue functioning beyond the medium term and so there is a residual risk of water pollution affecting these habitats.

Water Quantity

9.2.7 The proposed road has the potential to reduce or increase water quantities in a given habitat by interrupting surface water flows and capturing and re-distributing water through the road drainage system. However, the habitats in the west are fed primarily through direct rainfall, while those in the east are fed by groundwater which has been taken into account with scheme design by ensuring captured rainfall is discharged to the same groundwater body as now. This has also been assessed separately by Mr. James Dodds.

Summary of Potential Indirect Effects during Operation

9.2.8 Table 8 provides a summary assessment for each terrestrial habitat cluster/local biodiversity area.

Table 8: Sources of potential indirect effects on terrestrial habitats during operation

(grey text is duplicated from Table 3)

Cluster	Habitats Present	Value	Light	Noise	Air	Water
Cluster 1 Forramoyle	4010/HH3 dry heath, 4030/HH1 wet heath *7130/PB3 lowland active peat bog, GS3 acid grassland, GS4 wet grassland, WS1 scrub and HD1 bracken.	County	~N	Y	=	(N)
Cluster 2 Troscaigh,	4010 HH3 wet heath, 4030/HH1 dry heath *7130/PB3 active lowland blanket bog with WS1 scrub, GS4 wet grassland and HD1 bracken	National	~N	Y	=	(N)
Cluster 3 Cloughscoltia (partly within an unnamed LBA 1)	wet grassland including 6410 Molinia meadows, with areas of 4010/HH3 wet heath, 4030/HH1 dry heath and WS1 scrub, with some HD1 bracken	County	~N	Y	=	(N)
Cluster 4 Ballymoneen Road to Cappagh Road (part of the Cappagh – Ballymoneen LBA),	4010/HH3 wet heath, *7130/PB3 active lowland blanket bog and HD1bracken, plus smaller areas of 4030/HH1 dry heath, WS1 scrub, GS4 wet grassland and 6410 Molinia meadows	County	~N	Y	=	(N)
Cluster 5 East of Ballymoonen Road (part within an unnamed LBA 2)	WS1 scrub with GS4 wet grassland, and towards the south patches of 4030/HH1 dry heath, 4010/HH3 wet heath, GS3 acid grassland, GS4 wet grassland and bracken,	County	~N	Y	=	(N)

Cluster	Habitats Present	Value	Light	Noise	Air	Water
Cluster 6 Knocknabrona/ Knocknafrosca (included in the Ballagh – Barnacranny Hill LBA)	GS4 wet grassland, and WS1 scrub, plus smaller areas of 4030 European dry heaths/HH1 dry siliceous heath, GS3 dry-humid acid grassland, GS2 dry meadows (and grassy verges), PF2 poor fen and flush and HD1 dense bracken.	County	Y on N59	Y	=	(N)
Cluster 7 Menlough (included in the Menlough LBA)	*8240 Limestone pavement mostly wooded with WN2 oak-ash-hazel woodland, plus a small *3180/FL6 turlough, *6210 calcareous grassland, GS1 calcareous grassland, WS1 scrub and WD1(mixed broadleaved woodland)	Inter-national	N	Y	=	(N)
Cluster 8 Lackagh (included in unnamed LBA 3)	*8240 Limestone pavement including wooded with WN2 oak-ash-hazel woodland, interspersed with *6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) with orchids, WS1 scrub and GS1 calcareous grassland,	County	Y, (south side)	Y	=	(N)
Cluster 9 Ballindooley Lough (included in the Ballindooley – Castlegar LBA)	3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp /FL3/FS1, with smaller areas of *7210 Calcareous fens with Cladium	National	Y	Y	Y	(N)

Cluster	Habitats Present	Value	Light	Noise	Air	Water
	7230 Alkaline fens, 6410 Molinia meadows GS4, WN2 oak-ash-hazel woodland, WS5 recently felled woodland, GS2 dry meadows, ER2 exposed calcareous rock, PF1 Rich Fen and Flush and WS1 Scrub,					
Cluster 10 Castlegar (included in the Ballindooley – Castlegar LBA)	*8240 Limestone pavement some wooded with WN2 oak-ash-hazel woodland, plus 6510 Lowland hay meadows and smaller areas of scrub, dry calcareous (and neutral) grassland and dry meadows (and grassy verges),	Inter-national	Y	Y	Y	(N)
Cluster 11 Briarhill	*8240 Limestone pavement, 6210 calcareous grassland, calcareous grassland, scrub, and oak-ash-hazel woodland, plus stone walls and treelines,	Inter-national	Y	N	=	(N)
Cluster 12 Arduan	6210 calcareous grassland, GS1 calcareous grassland and WS1 scrub,	County	Y	N	=	(N)

Y elevated levels expected, N levels expected to be similar to baseline, ~ mostly, = elevated levels, but expected to be insufficient to change the vegetation type, (N) requires maintenance to achieve

9.2.9 Areas of semi-natural habitats outside the clusters in proximity to the road would be affected similarly.

9.2.10 Traffic noise, combined with artificial light where it occurs, and perhaps also to a small degree air pollution, combined with traffic mortality (see subsequent sections) is likely to affect the abundance and distribution of fauna along the route corridor (as discussed in the next few sections) which could have subtle impacts on the vegetation and habitats. There is some research suggesting this would be the case (Shannon, et al., 2016) (Morley, Jones, & Radford,

2014) (Mulder, Koricheva, Huss-Danell, Högberg, & Joshi, 1999), with the effect extending over perhaps a few hundred metres.

9.3 Aquatic Habitats

9.3.1 During the operation of the road, aquatic habitats are at risk from reductions in water quality and changes in water quantity, however this has been addressed in the scheme design, as described in paragraphs 9.2.6 and 9.2.7. Provided the system works as intended both the water quality and quantity should be maintained in all the watercourses. There is even the potential for water quality to improve in the short term if existing traffic flows are diverted from roads which do not have road run-off treatment capacity. As noted previously, this is dependent on maintenance of the drainage infrastructure, especially the wetland treatment ponds and pollutions interceptors. Effects on aquatic habitats are further assessed by Mr. James Dodds.

9.4 Flora

9.4.1 The retained populations of red data book plant species are potentially at risk from indirect effects in the way described in paragraph 9.2.10, with vulnerabilities as follows:

- Woodsy thyme moss *Plagiomnium cuspidatum*, partially retained population (?) at Ch. 3+350 (2680_R1), and retained populations at Ch4+450 (2527_R1) and at Ch. 12+950 (2354_R1) potentially vulnerable to air pollution (Bignal, Ashmore, & Headley, 2008) (Pescott, et al., 2015)
- Lesser striated feather-moss *Plasteurhynchium striatulum*, partially retained population (?) at Ch. 9+800 4422_R1 and retained populations at Ch. 9+900 (3941_R1), Ch.10+000 (5507_R1) and at Ch. 10+100 (3790b_R1) are potentially vulnerable to air pollution.
- Imbricate bog-moss *Sphagnum affine*, if partially retained the population at Ch.1+250 (EC12 R2) is vulnerable to even slight reductions in water supply and possibly also air pollution.
- Red bog-moss *Sphagnum capillifolium s. capillifolium,* if partially retained the population at Ch.1+250 (765_R1) could be affected in the same way as *S.affine*.
- Spring gentian *Gentiana verna*, is likely to be very vulnerable to nitrogen deposition as it is found in extremely infertile sites (Ellenberg value = 1), it may however be sufficiently removed from the route in all three known locations to be affected by nitrogen deposition.
- Brown beak-sedge *Rhynchospora fusca*, the only known location is just outside the route alignment at Ch.2+350 (EC14 R3), it is also found in extremely infertile sites (Ellenberg value = 1) and it is a wet-site indicator, often on water-saturated, badly aerated soil (Ellenberg value = 9), it is therefore vulnerable to air pollution and slight changes in hydrology.

9.4.2 Some of the locally uncommon, locally characteristic and orchid species may be similarly vulnerable.

9.5 Invertebrates

Marsh Fritillary

9.5.1 There are three main risks for marsh fritillary during the operations stage, isolation of the populations south of the proposed road, mortality while trying to cross and degradation of its habitats in proximity to the road, which is most likely to arise from lack of management, see NPWS1. Given the mobility of the butterfly, it is plausible that sufficient numbers cross the proposed road for all current populations to be maintained, EIAR p570, however the populations south of the road are at greater risk, with only 7.6ha of suitable habitat available (see also cumulative effects).

Marsh Whorl Snail

9.5.2 The marsh whorl snail could be at risk from reduction in water quality, however, as described in paragraphs 9.3.1, the scheme design includes measures to trap and treat road run-off. The remaining risk is that populations become more isolated. The marsh whorl snail occurs at large sites, north and south of the proposed road, Ballindooley Lough and Coolagh Lakes/River Corrib, respectively. These populations are likely to be resilient and there is no obvious connection between these populations currently. The proposed road would appear not to change this situation.

Other terrestrial invertebrates

9.5.3 As for terrestrial habitats.

Other Freshwater Invertebrates

9.5.4 As for aquatic habitats.

9.6 Bats

9.6.1 The key risks for the bat populations during the operation of the proposed road are collisions with vehicles, EIAR p552, and effective habitat loss due to lighting, EIAR p555, along the proposed road, with the construction stage effects continuing to have an impact; loss of foraging habitat, reduced access to habitat on the far side of the proposed road from the roost and isolation of colonies to the south of the road, EIAR p554.

9.7 Mammals other than bats

9.7.1 All of the mammal species identified in the route corridor are at risk from direct mortality from road traffic and populations becoming isolated to the south of the road, EIAR p524-p526 (otter) p560 – p561 (badger) p562 (other mammals). Mammal species may also avoid the habitats in proximity to the road, compounding the effects of habitat loss (i.e. the effective habitat loss is more than the footprint of the road) (Benítez-López, Alkemade, & Verweij, 2010). The smaller populations of larger and/or more specialist species with such as Irish hare, red squirrel, pine marten and badger are most vulnerable. Otter is also vulnerable to direct mortality but less vulnerable to isolation since this species also uses the coastal habitats of Galway Bay.

9.7.2 The road design includes some locations where safe passage could be achieved, the River Corrib (red squirrel, pine marten, badger and otter), the Menlough Viaduct (red squirrel, pine marten and badger) and over the Lackagh Tunnel (pine marten and badger) and further crossing points are proposed in mitigation or in conjunction with culverts for watercourses. However, this is obviously very different from the situation without the proposed road. Direct mortality or avoidance of the area could suppress populations in proximity to the road, while isolated populations of Irish hare, red squirrel and pine marten to the south of the road of are at increased risk of dying out. The road design includes mammal resistant fencing which will prevent or reduce mortality for some species (e.g. badger, Irish hare) but may have limited effectiveness for others which can easily scale the fence (e.g. fox, pine marten)

9.7.3 A further risk comes from artificial lighting affecting the behaviour of nocturnal mammals however lighting is not proposed in proximity to otter habitats EIAR p525, in areas with badger setts or activity, EIAR p561, at Menlough Woods (with red squirrel and pine marten) or along most of the western section (where Irish hare was recorded), design report drawing GCOB-1300-D-000 to -015.

9.8 Breeding Birds

9.8.1 The density of breeding birds in proximity to roads is reduced (Benítez-López, Alkemade, & Verweij, 2010). This may be due to road noise or direct morality or a combination, EIAR p573. The effect is variable between species and depends on the volume and speed of the traffic. For the most sensitive species and the busiest roads, the effect is detectable for several kilometres (Reijnen, Foppen, & Veenbaas, 1997) but more usually species abundance is supressed up to 1km from the road (Benítez-López, Alkemade, & Verweij, 2010). If direct mortality is the reason, then this can lead to the creation of a population sink[9] and a reduction in populations more widely, EIAR p574.

9.8.2 The applicant's bird surveys extended just 100m either side of the footprint of the proposed road, sometimes less, which means that the surveys did not cover the areas over which displacement/population effects could occur. A reasonable but crude assumption is that the numbers of territories displaced would be double those directly lost for all except corvids and raptors. For birds of conservation concern the number of territories displaced can be estimated from the data in my Table 6, which indicates for all the species listed more than 1% of the Galway City population would be affected, with the populations of stonechat and linnet perhaps most impacted. Displacement or mortality of the barn owl pair which breeds at Menlo Castle is likely EIAR p574-p575, while loss of the peregrine pair from Lackagh Quarry is also a risk (albeit lower) for the same reasons, EIAR p575.

[9] A recent study in Portugal indicated 7 blue tit, 4 goldfinch and 3 house sparrows were killed by traffic per km of road per year with mortality higher during the breeding season, suggesting population level effects. (Pinto, Lourenço, Mira, & Santos, 2020)

9.9 Wintering Birds

9.9.1 Other than possible effects on aquatic habitats, see section 7.4, the main risk for wintering birds is permanent displacement of wading birds occurring in proximity to the road. Wading birds generally prefer open spaces, avoiding field boundaries, dense vegetation and other infrastructure. The regular oystercatcher flock at WB45 NUIG may be displaced from here, as the proposed road would reduce the size of largest of the playing fields, EIAR p584, while curlew at Ballymoonen could also be displaced from part of the area (the EIAR does not give exact locations for the records of these flocks of birds). As previously discussed, displaced wading birds are not thought to fare well.

9.10 Amphibian and Reptiles

9.10.1 The amphibian species are potentially at risk from changes in water quality and quantity, although as previously noted, the scheme design includes measures to control this risk.

9.10.2 An additional risk is from direct mortality with animals following traditional routes to reach breeding ponds and meeting road traffic, EIAR p591, or becoming trapped in the road drainage system if this is a kerb and gulley pot arrangement. The design report indicates that the entire eastern section from the N59 to N6 may have kerbs, gully pots and sub-surface carrier drains, and the same is true for junctions and link roads elsewhere, design report p280 to p281. Other locations appear to have gully pots and sub-surface carrier drains but no kerb. Kerbs and gully pots can act like a fencing and pitfall trap system and would pose a significant risk to amphibian populations with breeding ponds within 100m of the proposed road such as at the smooth newt population at Castlegar and the common frog populations are Briarhill.

9.10.3 Isolation is a further risk, EIAR p591, however both amphibian species can do well in sub-urban areas and along road verges.

9.10.4 Reptiles are similarly at risk from direct mortality and isolation EIAR p593 -p594, although this species can still do well at large, isolated sites and along road verges. The main risk for common lizard might be changes in vegetation management in currently suitable habitats to the south of the proposed road (see cumulative effects).

9.11 Fish

9.11.1 As for aquatic habitats.

10. Proposed Avoidance, Mitigation & Compensations Measures

10.1 Approach

10.1.1 The applicant's proposals for avoidance, mitigation and compensation are summarised over the following pages, with references to the relevant document for further details and the reference for the schedule of environmental commitments. In a few instances, I did not consider the mitigation credible in which case I have marked it as 'discounted mitigation'.

10.2 Designated Areas

Natura 2000

- See appropriate assessment report, SEC 8.2

Moycullen Bogs

- Standard measures for dust control during construction EIAR p613 plus a 2m [high] dust screen adjacent to Moycullen Bogs, EIAR p613 SEC 8.3 (as updated March 2020).
- Measures to control surface water run-off, EIAR p613 and CEMP EIAR Appendix A.7.5. SEC 8.3.
- Measures for non-native invasive species control during construction, as set out the invasive species management plan included in the CEMP, which covers Japanese knotweed, Himalayan knotweed and Rhododendron as these species are listed in Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 as amended, SEC 8.3.

10.3 Terrestrial Habitats

- Retention of some Annex I habitats within the proposed road boundary, with quantities calculable by subtracting the losses shown in amended table 4.1 (column 6) in the corrigendum p13-p14 from the total shown in amended Table 2 (column 2) in the corrigendum p14-p15, including one petrifying spring, with retained parts of Annex I habitats to be protected by fencing during the construction period EIAR p611 SEC 8.4, 8.9 and 8.16
- Protection of tree and hedgerow roots of retained vegetation EIAR p612 SEC 8.10
- Standard dust control measures during construction EIAR p613
- Measures to control the spread of invasive species EIAR p614 – p615 SEC 8.11, 8.12, 8.13, 8.14, 8.15
- Areas of compensatory habitat will be created as set out in the Compensatory Habitat Management Plan in Appendix A.8.26. SEC 8.18 and 8.19 (as updated March 2020) with locations of donor and receptors sites shown on Figures 1-9 in Appendix A.21.3 of the March 2020 Schedule of Additional Environmental Commitments, plus Ecology site Management

Plans to be prepared for all compensatory habitats, which will include translocation details SEC 8.19 (as updated March 2020).

- The compensatory habitat is to be created partly from donor material from lost areas of habitat within the proposed road boundary, as summarised in Table 9, noting that the amount of material is less than the total area due to the presence of other habitats in 60% of the donor sites.

Table 9: Summary of donor sites for habitat translocation

Dominant Habitat Code	Habitat Name	No. of donor sites	Average size	Total Area (ha)
GS1	Dry calcareous grassland	30	0.3954	11.8624
GS1 6210	Dry calcareous grassland (Annex I)	4	0.0611	0.2445
GS4 6410	Wet grassland	1	0.0723	0.0723
HD1, plus HH1 & HH3	Bracken (with dry and wet heath)	1	0.1239	0.1239
HH1 4030	Dry heath	44	0.0412	1.8124
HH1/HH3 4030/4010	Dry & wet heath	1	0.0962	0.0962
HH3 4010	Wet heath	23	0.0737	1.6967
PB3 *7130	Lowland blanket bog	1	0.0143	0.0143
WN6 *91E0	Riparian woodland	2	0.0722	0.1444
WS1	Scrub	2	0.0591	0.1181
All types		**109**	**0.1484**	**16.1852**

- The donor material is to be translocated to one of 29 small receptor sites, which are typically in the soft estate, in some cases are enclosed by road infrastructure (slip roads, etc), with larger area at Lackagh Quarry, as summarised in Table 10, noting that these differ slightly from totals given elsewhere and that there is an excess of dry calcareous grassland from donor sites (4.96ha excess) and a shortfall of heath (3.29ha shortfall), wet grassland (0.42ha) and 'forest' (0.04ha).

Table 10: Summary of receptor sites

Habitat Code	Proposed Habitat Type	No. of Receptor Sites	Average Size	Total
4030	Dry heath	21	0.33	7.03
6210	Calcareous grassland	6	1.19	7.14
6410	Molina meadow	1	0.49	0.49
*91E0	Alluvial Forest	1	0.18	0.18
All types		**29**	**0.51**	**14.84**

- The receptor sites already support habitats of a wide variety of types which is hard to summarise as there were 65 different mosaics of habitat recorded as present between the 29 receptor sites, however, there are 22 instances of wet grassland dominated mosaic, 19 of bracken and six of scrub, while improved agricultural grassland (of low ecological value) appears to dominate just three receptor sites (2.29ha) and bare ground/quarry floor another three (4.85ha), the remaining receptor sites (and about 50% of the total area) are mostly in areas that already have nature conservation value, including land within local biodiversity areas. Nineteen of the receptor sites are also material deposition areas and at least one is also a site compound.
- Three receptor/habitat creation sites for calcareous are located in Lackagh Quarry (6210.R5, 6210.R6 and 6210.R8) on top of material deposition including base-poor peat, the robustness of which was debated at the oral hearing, and with the quarry reported to be prone to flooding and difficult to access for grazing; this does not seem like a viable long term solution to creating dry calcareous grassland and so should be discounted by 50% due to risk of failure.
- The landscaping plans show that most (estimated 80% of the length and 80% of the width) of the soft estate is to be planted with screen planting at either minimum 3m wide or minimum 6m wide, with 6m wherever space allows, EIAR p1113, the total area in hectares is not stated in the EIAR, but it could be in the order of 16ha, comprising:
  - dense planting at 1m centres of alder, birch, blackthorn, elder, guelder rose, holly, hawthorn, hazel, rowan, and willow species. Shrubs shall be planted at between 60 to 90cm in height;
  - Scots pine of minimum 60cm in height at planting shall comprise 20% of the overall plant numbers and holly at a minimum of 45cm in height shall comprise a further 15%; and
  - Tree species, planted equally at half-standard (6-8cm girth) and standard size (8-10cm girth), shall comprise minimum 10% of the mix.
- Grassland seeding amongst the screening planting, seeded to a low maintenance non-agricultural grassland or to a diverse grass/wildflower sward, as appropriate, again the total

area in hectares is not stated in the EIAR, but it could be in the order of 8ha, EIAR p 1110 Table 12.7 and figures 12.01.01 to 12.01.15.

- Excavated blocks of limestone pavement will be placed within those lands along the east bank of the River Corrib in Menlough which are proposed for habitat retention, enhancement and creation, SEC8.71.
- *Discounted mitigation*: Loss of other habitats within the proposed boundary to be minimised, however the retained quantities are not stated, and therefore this mitigation measure must be discounted until quantities are provided, EIAR p612, SEC 8.7.

10.4 Aquatic Habitats

- Standard measures to control site run-off during construction, EIAR p613 and CEMP EIAR Appendix A.7.5.
- Measures to protect groundwater quantity and quality during construction and operation which have been separately assessed by Mr. James Dodds (Dodds, 2020) and deemed adequate.
- *Discounted mitigation*: Where possible retention of channel and bankside vegetation SEC8.8, discounted as it is uncertain if this will be achieved and to what extent.

10.5 Flora

- No specific mitigation for flora, see terrestrial habitats.

10.6 Invertebrates

Marsh whorl snail

- No specific mitigation for marsh whorl snail, see aquatic habitats.

Marsh fritillary

- Pre-construction survey and translocation of larval food webs EIAR p641 and the module 1 response p6-p9 SEC 8.41 (as updated in March 2020)
- Management of two areas of translocated and retained (6410.R1, 0.49ha, and an area of retained wet heath etc at Ch. 3+000, 0.6ha) Annex I habitats within the boundary of the proposed road, one at Ch.0+900 and a second at Ch. 3+000, with the vegetation maintained in a suitable condition for marsh fritillary, the module 1 response p7-p10.

10.7 Mammals other than bats

Otter

- Pre-construction survey to check for otter holts, EIAR p615 and SEC 8.20, and monitoring “of the effectiveness of environmental commitments” for one-year post-construction, SEC 8.23.

- Ledges to be installed within all culverts on stream used by otter, EIAR Table 8.36 indicates this applies to only the Bearna Stream C04/01 and Tonabrocky Stream C04/02, EIAR p615-p616, SEC 8.21 and 8.72.
- Mammal resistant fencing in accordance with TII guidelines to be installed in proximity to the culverts, EIAR p616 and Figures 8.23.1 to 8.23.14, SEC 8.22.

Badger

- Pre-construction survey of badger setts, SEC 8.30, and inaccessible areas, SEC 8.35, plus post-construction monitoring for one year 8.39.
- Exclusion zones will be established around retained badger setts during construction (>20m light machinery allowed in non-breeding season, >30m heavy machinery allowed in non-breeding season, >50m all works in breeding season and >150m all blasting in breeding season), demarcated by fencing EIAR p634, SEC 8.31 8.32.
- Badger sett closure will be done under licence and following standard protocols EIAR p635, SEC 8.33.
- Creation of an artificial badger sett in compensation for the loss of main sett S9 and subsidiary sett S11 at Lackagh EIAR p635, Figures 8.23.1 to 8.23.14 and Appendix A.8.24, SEC 8.34.
- Culverts and underpasses under the road to facilitate the passage of badgers, EIAR p639 SEC 8.36 and 8.74, as shown in Table 11, these are an average of 611m apart (treating those less than 50m apart as one crossing point), with a maximum of 3,550m separation at the western end of the proposed road and a further three locations where crossing points are separated by more than 1,000m, screening at tunnel entrances where needed to reduce artificial light, SEC 8.37.
- Mammal resistant fencing to guide badgers to underpasses, with the fencing along the entire route on both sides except to the south of the Galway Racecourse tunnel, EIAR p639 SEC 8.38, RFI response Appendix A.9.1.

Other mammal species

- None during construction.
- Culverts and underpasses, as described for badger, EIAR p640 SEC 8.40

Table 11: Proposed crossing points for otter and badger

(with other structures in grey text)

Structure	Location	Dimensions	Other Functions	Separation, from nearest western crossing point	Suitable for badger	Suitable for otter
Pipe C00/00	0+550	600mm	-	+550m	Yes	No
Culvert C00/01	0+640	2.5m wide by 1.35m high	Sruthán na Libeirtí Stream	N/A	No	No
Culvert C02/01b	2+840	2.5m wide by 2.5m high	Trusky Stream	N/A	No	No
Culvert C03/01	3+040	2.5m wide by 1.2m high	Trusky minor drain	N/A	No	No
Culvert C03/03	3+920	2.5m wide by 2.5m high	Bearna Stream Tributary	N/A	No	No
Culvert C03/04	3+640	2.5m wide by 2.5m high	Bearna Stream Tributary	N/A	No	No
Culvert C04/01	4+100	5m wide by 2.5m high with ledge	Bearna Stream	+3,550m	Yes	Yes
Culvert C04/02	4+895	3.1m wide by 2.5m high with ledge	Tonabrocky Stream	+795m	Yes	Yes
Pipe C05/01	5+270	600mm	-	+375m	Yes	No
Road Overbridge S06/01	6+335		Rahoon Road with lighting to allow safe pedestrian access	N/A	No	No
Culvert C06/00	6+450	2.5m wide by 2.5m high	-	+1180m	Yes, but unintended	No
Culvert C06/01	6+850	2.5m wide by 2.5m high	Knocknacarra Drain	N/A	Yes?	No
C06/01b	6+850	1200mm	Knocknacarra Drain	N/A	Error in Table 5.6 ?	No
Culvert C07/00	7+100	2.5m wide by 2m high	-	+650m	Yes, but unintended	No
Culvert C07/02A	7+210	2.5m wide by 2.5m high	Knocknacarra Drain	N/A	No	No
Pipe C07/02B	7+290	1200mm	-	N/A	No	No

Structure	Location	Dimensions	Other Functions	Separation, from nearest western crossing point	Suitable for badger	Suitable for otter
Pipe C07/04	0+700 of N59 Link?	600mm	-	??	Yes	No
Pipe C07/01(b)	1+610 of N59 Link?	600mm	-	??	Yes	No
Culvert C08/01(a)	8+450	2.5m wide by 2.5m high	-	+1350m	Yes, but unintended	No
Culvert C08/04	8+570	2.5m wide by 2.5m high	-	+120m	Yes, but unintended	No
Culvert C08/05	8+643	2.5m wide by 2.5m high	-	+73m	Yes, but unintended	No
Culvert C08/02	8+760	2.5m wide by 2.5m high	-	+17m	Yes, but unintended	No
River Corrib bridge Structure S08/04	8+850 to 9+500	650m wide by 3 - 7m high	River Corrib crossing	+90m	Yes, but unintended	Yes
Culvert C09/01	9+525	5m wide by 4m high	Part of River Corrib crossing structure	+25m	Yes	No
Culvert C09/02	9+540	5m wide by 4m high	Part of River Corrib crossing structure	+15m	Yes	No
Culvert C09/03	9+560	5m wide by 4m high	Part of River Corrib crossing structure	+20m	Yes	No
Culvert C09/04	9+570	5m wide by 4m high	Part of River Corrib crossing structure	+10m	Yes	No
Culvert C09/05	9+580	5m wide by 4m high	Part of River Corrib crossing structure	+10m	Yes	No
Culvert C09/06	9+710	2.5m wide by 2.5m high	-	+130m	Yes, but unintended	No
Road Overbridge S09/01	9+730	9.6m wide by 5.3m high	Menlo Castle Bóithrín Road	+20m	Yes	No
Culvert C09/07	9+920	2.5m wide by 2.5m high	-	+190m	Yes, but unintended	No
Underpass C10/01	10+040	18m wide by 2.35m high	Local access underpass or Minor Drain	+120m	Yes	No

Structure	Location	Dimensions	Other Functions	Separation, from nearest western crossing point	Suitable for badger	Suitable for otter
			Coolagh 10+730			
Menlough Viaduct S10/01	10+100 to 10+420	320m wide by 1m - 19m high	Viaduct over limestone pavement	+60m	Yes, but unintended	
Road Overbridge S10/02		9.6m wide by 5.3m high	Seanbóthar Road	N/A	No	No
Culvert C10/02	10+730	?	Minor Drain Coolagh	N/A	Assumed listed in error for C10/02a	No
Pipe C10/02 ((a)?)	10+740	1200mm		+320m	Yes	No
Lakagh Tunnel S11/01	11+150 to 11+420.	270m wide	Under limestone pavement, badgers can pass over (not through!)	+410m	Yes	No
Pipe C12/01	12+130	600mm	-	+710m	Yes	No
Culvert C12/02	12+350	2.5m wide by 2.5m high	-	+220m	Yes, but unintended	No
Culvert C12/03	12+390	2.5m wide by 2.5m high	-	+40m	Yes, but unintended	No
Culvert C12/04	12+450	2.5m wide by 2.5m high	-	+60m	Yes, but unintended	No
Green bridge S12/02	12+700	30m	-	+250m	Yes	No
Culvert C13/01	12+980	2.5m wide by 1.5m high		+280m	Yes	No
Culvert 13/02	13+710	Not stated		+730m	unknown	No
Galway Racecourse Tunnel S14/02	14+950 to 15+190	240m wide	Under racecourse, badgers can pass over (not through!)	+1240m, then nil until end at Ch. 16+650 +1460m	Yes, but unintended	No

10.8 Bats

- Adherence to the bat derogation licence method statement which includes measures to protect bats during the demolition of buildings and felling of trees, SEC 8.24 and 8.25.
- Replacement artificial roosts installed prior to the start of site clearance, comprising five artificial building roosts (four newly constructed and purpose built, and one converted from a garage), 16 bat boxes and in addition one bat box per tree confirmed as a roost, EIAR Appendix A.8.25, SEC 8.24 and 8.25.
- Standard measures to prevent harm to bats during building demolition including, *where possible* (emphasis added), buildings with confirmed roosts will be demolished outside breeding and hibernation periods, pre-construction surveys, exclusion of bats from the roost prior to demolition, EIAR Appendix A.8.25, SEC 8.24 and 8.25.
- Standard measures to prevent harm to bats during felling of trees confirmed as bat roosts or with high potential to support roosting bats, including felling in September or October, pre-felling survey, push the tree to the ground with an excavator or section felling, EIAR Appendix A.8.25, SEC 8.24 and 8.25.
- Temporary 'fencing'/artificial crossing structure, to guide bats across the road, to be installed at "key" crossing locations which are to be determined post-consent with further bat surveys at potential crossing points in Area 1: North of Bearna Woods, Area 2: Aughnacurra, Area 3: River Corrib to Coolough Road, Area 4: West of N84 Headford Road and Area 5: Ballindooley to Castlegar EIAR p619-p621, EIAR Appendix A.8.25, SEC 8.24 and 8.25.
- The Castlegar Wildlife Overpass at Ch. 12+690 – Ch. 12+720, unlit, 30m wide and planted with a double hedgerow, linking Menlough to Cooper's Cave, providing a single crossing point at a known crossing point linking these two important areas for lesser horseshoe bats, plus pre- and post-construction monitoring EIAR p621, SEC 8.27.
- Culverts/underpasses at important crossing point areas aligned with existing landscape features that are known to be used by bats, many of these have other purposes but some are specifically designed for bats, there are 33 in total, (including over tunnels and under Menlough viaduct, see Table 12) at an average of 517m[10] apart (max 2250, with the western and eastern ends least well served, western 2.85km has single crossing and eastern 3.7km also has just one) EIAR p621- p624 and Table 8.35, p627-p630, SEC 8.26, 8.28 and 8.73, for comparison, there are around 200 linear features which would be bisected by the road, at an average 90m apart.
- Pre-construction and post-construction surveys for five years at Menlo Castle, new roosts and bat boxes, location of crossing structures (underpasses in Area 1: North of Bearna Woods, Area 2: Aughnacurra, Area 3: River Corrib to Bothár Nua, Area 4: West of N84 Headford Road, Area 5: Ballindooley to Castlegar, including the Castlegar Wildlife Overpass) on four occasions each year before and for five years post-construction, and general diversity an abundance of bats along six transects (length not stated) before and for two seasons following construction EIAR p630-p633, SEC 8.29.

[10] This is calculated by treating crossing points less than 50m apart as one crossing point

Table 12: Proposed crossing points for bats

Structure	Location	Dimensions	Other Functions	Separation from nearest crossing point westwards	Known use? Or reported nearby
Culvert C00/01	0+650	2.5m wide by 1.35m high	Sruthán na Libeirtí stream	+650m, single crossing point in 2,850m	6 spp. incl. LHB, Myotis
Culvert C02/01b	2+850	2.5m wide by 2.5m high	Trusky Stream	+2200m	Pip
Culvert C03/01	3+050	2.5m wide by 1.2m high	Trusky minor drain	+200m	Pip
Culvert C03/03	3+925	2.5m wide by 2.5m high	Bearna Stream Tributary	+875m	Pip, LHB, Myotis
Culvert C03/04	3+940	2.5m wide by 2.5m high	Bearna Stream Tributary	+15m	Pip, LHB, Myotis
Culvert C04/01	4+100	5m wide by 2.5m high	Bearna Stream	+60m	Pip, LHB, Myotis
Culvert C04/02	4+900	3.1m wide by 2.5m high	Tonabrocky Stream	+800m	Pip, BLE, Myotis
Underbridge S06/01	6+335	Proposed road underbridge	Rahoon Road with lighting to allow safe pedestrian access	+1435m, single crossing point in 2,235m	Pip
Culvert C06/00	6+450	2.5m wide by 2.5m high	-	+115m	Pip
Culvert C06/01	6+850	2.5m wide by 2.5m high	Knocknacarra Drain	+400m	-
Culvert C07/00	7+100	2.5m wide by 2m high	-	+250m	Pip BLE

Structure	Location	Dimensions	Other Functions	Separation from nearest crossing point westwards	Known use? Or reported nearby
Culvert C07/02A	7+210	2.5m wide by 2.5m high	Knocknacarra Drain	+110m	Pip BLE
Culvert C08/01A	8+450	2.5m wide by 2.5m high	-	+1240m	Pip LHB
Culvert C08/04	8+570	2.5m wide by 2.5m high	-	+120m	-
Culvert C08/05	8+643	2.5m wide by 2.5m high	-	+73m	-
Culvert C08/02	8+760	2.5m wide by 2.5m high	-	+117m	-
River Corrib bridge Structure S08/04	8+850 to 9+500	650m wide by 3 - 7m high	River Corrib crossing	+90m	Pip, LHB, BLE, DB
Culvert C09/01	9+525	5m wide by 4m high	Part of River Corrib crossing structure	+25m	-
Culvert C09/02	9+540	5m wide by 4m high	Part of River Corrib crossing structure	+15m	-
Culvert C09/03	9+560	5m wide by 4m high	Part of River Corrib crossing structure	+20m	-
Culvert C09/04	9+570	5m wide by 4m high	Part of River Corrib crossing structure	+10m	-
Culvert C09/05	9+580	5m wide by 4m high	Part of River Corrib crossing structure	+10m	-

Structure	Location	Dimensions	Other Functions	Separation from nearest crossing point westwards	Known use? Or reported nearby
Culvert C09/06	9+710	2.5m wide by 2.5m high	-	+130m	LHB
Road Underbridge S09/01	9+730	9.6m wide 5.3m high	Menlo Castle Bóithrín Road	+20m	LHB
Culvert C09/07	9+920	2.5m wide by 2.5m high	-	+190m	LHB
Underpass C10/01	10+040	18m wide by 2.35m high	Local access underpass or Minor Drain Coolagh 10+730	+120m	LHB
Menlough Viaduct S10/01	10+100 to 10+420	320m wide by 1m - 19m high	Viaduct over limestone pavement	+60m	-
Seanbóthar Road Underbridge S10/02	10+520	9.6m wide by 5.3m high	Seanbóthar Road	+100m	LHB
Lakagh Tunnel S11/01	11+150 to 11+420.	270m wide	Under limestone pavement, bats can pass over (not through!)	+630m	-
Culvert C12/02	12+350	2.5m wide by 2.5m high	-	+930m	LHB, BLE
Culvert C12/03	12+390	2.5m wide by 2.5m high	-	+40m	LHB, BLE

Structure	Location	Dimensions	Other Functions	Separation from nearest crossing point westwards	Known use? Or reported nearby
Culvert C12/04	12+450	2.5m wide by 2.5m high	-	+60m	LHB, BLE
Castlegar Wildlife Overbridge S12/02	12+700	60m long x 30m wide	-	+250m	LHB
Culvert C13/01	Ch. 12+980	2.5m wide by 1.5m high	-	+280m	
Culvert C13/02	Ch. 13+700	Not stated	-	Not known if suitable	
Galway Racecourse Tunnel S14/02	14+950 to 15+190	240m wide	Under racecourse, bats can pass over (not through!)	+1970m Single crossing point in 3710m (+1460m to end at Ch. 16+650)	

Pip = pipistrelle, LHB = lesser horseshoe bat, BLE = brown-long-eared bat

10.9 Breeding Birds

General

- Vegetation clearance outside the bird breeding season or search for nests beforehand, EIAR p641, SEC 8.42.
- *Discounted mitigation:* Planting of woodland, hedgerow and grassland habitats along the proposed road, it is acknowledged by the applicant that some species will avoid this due to road noise and, I have discounted this measure because it will also increase the mortality risk for breeding birds, potentially becoming a population sink i.e. result in ongoing population declines, EIAR p643, SEC 8.43.
- Twenty nest boxes (in addition to those for barn owl and peregrine) to be provided, location and type to be decided, EIAR p643 SEC 8.44 however these are unlikely benefit the birds of conservation concern affected by the proposed road and obviously do not compensate for lost foraging habitats.

Peregrine

- Commencing works in Lackagh quarry prior to the start of the bird breeding season to displace breeding peregrine, EIAR p642, SEC 8.54 (as updated in March 2020).
- Rock-bolts will not be installed in the immediate vicinity of an active peregrine falcon nest site during the breeding bird season (1st March to 31st August), SEC 8.54.
- Install a nest box on Galway City Council owned lands to the south-east of Lackagh Quarry as indicated on drawing GCRR-SK-PP-067, to accommodate displaced birds, Biodiversity evidence Appendix A, SEC 8.54.
- Two artificial peregrine falcon nest boxes will be installed, one at each of the two former nest sites in Lackagh Quarry, Module 1 response p6 SEC 8.54 and monitored annually for three years post-construction SEC 8.58

Barn Owl

- Three barn owl nest boxes, EIAR p642, SEC 8.45.
- Tree and shrub planting will be used to discourage barn owl foraging, increase flight heights and reduce the risk of mortality from road traffic in the places shown on EIAR Figures 8.23.1 to 8.23.14 and on the landscape drawings (EIAR Figures 12.2.01 to 12.2.14). SEC 8.46, 8.47 and 8.48, this would however take five-ten years to develop, during which time the barn owl population would be at high risk.
- Monitoring of vegetation growth, barn owl carcasses on the road and breeding sites for two years post-construction, SEC 8.53.
- Providing barn owl foraging habitat in proximity to Menlo castle by (i) reducing grazing pressure on c.8ha of land in proximity to the Castle (ii) creating c.1.81ha of Calcareous grassland habitat at Menlough 6210.R1 and 6210.R2; and (iii) creating c.1.95ha of Dry heath habitat west of the River Corrib at receptor sites 4030.R18, 4030.R19, 4030.R20 and 4030.R21, all on currently grazed land, to give a total of c.11.76ha within 5km of Menlo Castle, module 1 response p3 -p4, SEC 8.49.
- *Discounted mitigation:* two of the three areas put forward as barn owl mitigation should be discounted (ii) c.1.81ha of Calcareous grassland habitat at Menlough 6210.R1 and 6210.R2; and (iii) c.1.95ha of Dry heath habitat west of the River Corrib at receptor sites 4030.R18, 4030.R19, 4030.R20 and 4030.R21 as barn owl habitat because the route that a barn owl might take to reach these areas is too perilous, which leaves the total created as c.8ha.

10.10 Wintering Birds

- Blasting during construction at Lackagh and Castlegar to take place April to September period (inclusive) only, to avoid disturbance of wintering birds at Ballindooley Lough, SEC 8.56 and 8.57.
- *Discounted mitigation:* hedgerow planting along the proposed development boundary at the locations shown on the landscape drawings EIAR Figures 12.1.01 to 12.1.15, as this is just or more likely to displace wintering birds as moving vehicles.

10.11 Amphibians and Reptiles

Smooth newt and Common frog

- Pre-construction survey of ponds and other waterbodies if these are to be removed during the amphibian breeding season, February to September, followed by translocation to the nearest available existing suitable habitat, with no effort to capture amphibians outside the breeding season or away from waterbodies, EIAR p645 SEC 8.58, 8.59, 8.60 and 8.62.
- Wildlife underpasses and overpasses as described for badger and bats, SEC 8.63.

Common lizard

- Habitat manipulation in areas of suitable habitat to persuade common lizard to vacate the construction site, EIAR p646, SEC 8.64.
- *Discounted mitigation:* Wildlife underpasses and overpasses as described for badger and bats, EIAR p646, as it is highly unlikely these will be used by common lizard (the culverts are dark and most in the western section where common lizard was recorded have the dual purpose of carrying water under the road), SEC 8.65.

10.12 Fish

- A 5m exclusion zone for construction works around rivers and streams during construction (apart from where culverts are to be installed), SEC 8.66.
- Construction works in streams will occur in the months of July and September (inclusive), and therefore construction works will not occur during the fish spawning season (November to January for salmon, for example)EIAR p647, SEC 8.67.
- New sections of river channel to be designed in accordance with Channels & Challenges. Enhancing Salmonid Rivers. (O'Grady, 2006), EIAR p647.
- Fish rescue in advance of culvert installation, EIAR p647, SEC 8.67.
- Temporary crossings during construction to be in accordance with IFI and TII guidelines, EIAR p648, SEC 8.68.

10.13 Biodiversity

- Results of the monitoring activities will lead to corrective action over the lifetime of the project if any aspects of the implementation of the ecological mitigation measures and monitoring commitments proposals are not effective, and this is to be reviewed by a professional ecologist, SEC 8.69 (March 2020 update).
- Establishment of a GIS to track the work and administer permits, SEC 8.70 (March 2020 update).

11. Predicted Residual Impacts

11.1.1 The mitigation measures should be sufficient to ensure that there is no significant negative effect on Moycullen Bogs NHA, otter, most wintering birds and fish species. The potential effects on Natura 2000 sites can also be reduced to insignificance with mitigation.

11.1.2 The mitigation measures have the effect of reducing the likelihood and/or severity of the impact on many of the key ecological receptors, but for many a likely significant impact remains. The applicant has acknowledged this in the EIAR and subsequently e.g. the biodiversity evidence. We differ for some features, with the applicant concluding significant effects unlikely where I consider significant effects likely, despite the implementation of the mitigation measures.

11.1.3 Table 13 attempts to quantify the potential residual impacts; the values are in many cases estimates however it gives an idea of the order of magnitude.

11.1.4 Generally, the most significant effects would occur in the western part of the route from the start to the route to the junction with the N59, with a further set at Menlough, which supports limestone pavement, red squirrel, pine marten, lesser horseshoe bat, Natterer's bat and barn owl. The impacts on designated local biodiversity areas and four red data book plants and one red data book mollusc are notable.

Table 13: Likely residual impacts with applicant's proposed mitigation and compensation

(see explanatory text at end of table, p86)

Feature	Direct Loss	At Risk (Un-mitigated)	Residual Risk (Mitigated)	Value	Significant Impact
Moycullen Bogs NHA	-	-	-	National	No
Cluster 1 Forramoyle	14.3ha	7ha?	21ha?	County	Yes
Cluster 2 Troscaigh	6.7ha	7ha?	14ha?	National	Yes
Cluster 3 Cloughscoltia (partly within an unnamed LBA 1)	13.9ha	15ha?	30ha?	County	Yes
Cluster 4 Ballymoneen Road to Cappagh Road (part of the Cappagh – Ballymoneen LBA)	7.3ha	9ha?	16ha	County	Yes
Cluster 5 East of Ballymoonen Road (part within an unnamed LBA 2)	2.2ha	2ha?	4ha?	County	Yes
Cluster 6 Knocknabrona/ Knocknafrosca (included in the Ballagh – Barnacranny Hill LBA),	6.0ha	8ha?	14ha?	County	Yes
Cluster 7 Menlough (included in the Menlough LBA)	5.4ha	8ha?	14ha?	Inter-national	Yes
Cluster 8 Lackagh (included in unnamed LBA 3)	1.8ha	4ha	6ha?	County	Yes

Feature	Direct Loss	At Risk (Un-mitigated)	Residual Risk (Mitigated)	Value	Significant Impact
Cluster 9 Ballindooley (included in the Ballindooley – Castlegar LBA)	1.0ha	1ha?	2ha?	National	Yes
Cluster 10 Castlegar (included in the Ballindooley – Castlegar LBA)	0ha	2ha?	2ha?	Inter-national	(No)
Cluster 11 Briarhill (not included in an LBA)	4.0ha	2ha?	6ha?	Inter-national	Yes
Cluster 12 Arduan (not included in an LBA)	0.7ha	1ha?	2ha?	County	Yes
Petrifying springs	1	0	1	Local	Yes
Sruthán na Libeirtí etc	255m	Down-stream to coast	170m	Local	Yes
Trusky Stream, etc	240m	To coast	175m	Local	Yes
Bearna Stream, etc	150m	To coast	150m	Local	Yes
Tonabrocky Stream	495m	To coast	245m	Local	Yes
Knocknacarra, etc	385m	To coast	385m	Local	Yes
Woodsy thyme moss Plagiomnium cuspidatum	1 locality	2 localities	3 localities	National	Yes
Lesser striated feather-moss Plasteurhynchium striatulum	1 locality	3 localities	4 localities	National	Yes
Imbricate bog-moss Sphagnum affine	1 locality	-	1 locality	National	Yes
Red bog-moss Sphagnum capillifolium s. capillifolium	1 locality	-	1 locality	National	Yes
Spring gentian Gentiana verna	-	3 localities	3 localities	Inter-national	(Yes)
Brown beak-sedge Rhynchospora fusca	-	1 locality	1 locality	National	(Yes)
Marsh Fritillary	4.7ha habitat	one 1km2	one 1km2	National	(Yes)
Marsh Whorl Snail	1 colony	3 colonies	1 colony	County	Yes
Lesser horseshoe bat	1 colony	2 colonies	3 colonies	County	Yes
Whiskered bat	-	1 colony	1 colony	National	(Yes)
Natterer's bat	-	1 colony	1 colony	National	(Yes)
Daubenton's bat	-	1 colony	1 colony	Local	(Yes)
Leisler's bat	-	-	-	Local	No

Feature	Direct Loss	At Risk (Un-mitigated)	Residual Risk (Mitigated)	Value	Significant Impact
Common Pipistrelle	1 colony?	1 colony	2 colonies	Local	(Yes)
Soprano Pipistrelle	2 colonies?	1 colony	2 colonies	Local	(Yes)
Nathusius' Pipistrelle		1 colony	1 colony	County	(Yes)
Brown long-eared bat	2 colonies	2 colonies	4 colonies	County	(Yes)
Irish hare	2 animals	Popn. South of road	Popn. South of road	Local	(Yes)
Pine Marten	1 (5ha habitat)	One population	One population	National	Yes
Red Squirrel	3-4 (5ha habitat)	One population	One population	County	Yes
Irish Stoat	In line with habitat	-	In line with habitat	Local	No
Badger	1 main sett	10 social groups	2 social groups	Local	(No)
Otter	-	3 or 4	-	Local	(No)
Other mammal populations	In line with habitat	-	In line with habitat	Negligible	No
Barn owl	-	One pair	One pair	National	(Yes)
Peregrine	-	One pair	One pair	National	(Yes)
Breeding Birds of Conservation Concern	88 territories	176 territories	264 territories	Local	Yes
Oystercatcher	-	1 flock ~30 birds	1 flock ~30 birds	Local	(Yes)
Curlew	-	<5 birds	<5 birds	Local	(Yes)
Other wintering birds	-	-	-	Various	(No)
Smooth newt	2 breed sites	2 popn.s	2 popn.s	Local	Yes
Common frog	10 breed sites	10 popn.s	10 popn.s	Local	Yes
Common lizard	200 animals	200 animals	-	Local	No
European eel	-	5 colonies	-	Inter-national	(No)
Brown trout	-	2 colonies	-	Local	(No)
Sea trout	-	1 colony	-	Local	(No)
Atlantic salmon	-	1 colony	-	Local	(No)

direct loss= the area or populations directly impacted,
at risk = an estimate of the area or population which could be subject to indirect effects without mitigation
mitigated risk = 'direct loss and 'at risk' added together adjusted for the proposed mitigation, if any
(Yes) = should the effect materialise it would be significant, occurrence not certain or less likely
(No) = conclusion of no significant effect dependent on mitigation

12. Cumulative Impact Assessment

12.1.1 The applicant provided an updated cumulative impact assessment at the oral hearing, 10th March 2020 and then again in November 2020. In summary, currently proposed or consented developments include:

- Road development schemes comprising the N6 Galway City Ring Road, M6 Motorway improvements, M17 Galway to Tuam, N18 Oranmore to Gort, N17 Tuam Bypass, N59 Maam Cross to Oughterard, N59 Moycullen Bypass and upgrades to the R336 Bearna to Scrib;
- A motorway service area on the M6 at Oranmore;
- National University of Ireland Galway (NUIG) New Pitches;
- Cycle/greenway projects with start points in Galway City;
- Two coastal protection projects in Galway bay, plus an extension of Galway Harbour;
- More than 962 residential units;
- Student accommodation with a total of 1,120 student beds; and
- Galway West Water Supply Scheme (abstraction from the River Corrib).

12.1.2 Development plans are set out in the Galway County Development Plan and the Galway City Local Development Plan.

12.1.3 The Galway City Development Plan shows residential development planned within Cluster 4 Ballymoneen Road to Cappagh Road (part of the Cappagh – Ballymoneen LBA), Cluster 5 East of Ballymoonen Road (part within an unnamed LBA 2) and Cluster 8 Lackagh (included in unnamed LBA 3) and Cluster 11 (which includes the site for spring gentian), thereby potentially adding to the direct impacts on these areas from the proposed road.

12.1.4 Both plans included residential development elsewhere including at Bearna, and it is clear from the two development plans that there is anticipated to be growth in the local population and continued or expanded tourism in the city and around.

12.1.5 The principal cumulative risk to biodiversity is degradation (or development) of the land of high biodiversity value that would be encapsulated in the urban environment by the proposed road and subject to increased urbanisation effects, for example, waste dumping, informal recreation, lack of traditional management, predation of wildlife by domestic cats, spread of non-native invasive species, together with the more isolated population of flora and fauna becoming more vulnerable to dying out. This risk applies to all of the features identified in Table 13 except Ballindooley Lough and barn owl.

13. Additional Mitigation

13.1 Approach

13.1.1 In the event that the proposed road is consented, I have identified some additional mitigation measures which would lessen the severity/likelihood of the impact but not change the significance of effects set out in Table 13. For each, I have made an assessment of ease of implementation (difficult, moderate, easy), level of benefit (high, medium, low) and whether required by law (yes, no) which follow each measure in the format (easy; moderate; no).

13.2 Designated Areas

- *Additional Mitigation:* The non-native species Fuchsia *Fuchsia* sp., winter heliotrope *Petasites fragrans*, Sitka spruce *Picea sitchensis*, European larch *Larix decidua*, Lodgepole pine *Pinus contorta* and Scots pine *Pinus Sylvestris* should be included in the invasive species management plan, as should the native species bracken *Pteridium aqulinum* and soft rush *Juncus effusus* to limit their spread from where they currently occur (easy. moderate, no).
- *Additional Mitigation:* The planting and sowing scheme should not include non-native tree species, especially those mentioned above, in proximity to Moycullen Bogs NHA. (easy. moderate, no).

13.3 Terrestrial Habitats

- *Additional mitigation:* Scots pine is an invasive non-native species in heathland and therefore this species should not be used for screening planting in the western section beyond the River Corrib (easy, moderate, no).
- *Additional mitigation:* screen planting to the west of the River Corrib should be minimised to make space for dry heath/acid grassland habitats to develop in the soft estate (easy, moderate, no).
- *Additional mitigation:* further details on the grassland seeding are needed, and it should be suitable for the soil types avoiding species that are negative indicators of Annex I habitats where these are not already abundant locally, aiming for dry heath/acid grassland in the west and calcareous grassland in the east from natural regeneration rather than seed mixes wherever soil erosion is not a major risk (and this could be mitigated by soil formation) (easy, moderate, no).
- *Additional mitigation:* see Moycullen Bogs and the appropriate assessment report for additional species to be included in the invasive species management plan (easy, moderate, no (but yes in proximity to Lough Corrib cSAC)).
- *Additional mitigation:* A clearer commitment to the management of peatland habitats and other translocated/created habitats within the soft estate, ideally in perpetuity or the lifetime of the project.

13.4 Aquatic Habitats

- None.

13.5 Flora

- *Additional Mitigation*: check the identification and map the extent of the six red data book plant species, plus measures to both minimise the loss and safeguard the retained areas by use of fencing, signs and ensuring workforce are aware (toolbox talks, etc), including the plants of *Plasteurhynchium striatulum* at the Menlough mitigation area (easy, moderate (or high if all populations can be retained), no).
- *Additional mitigation:* if the *Plagiomnium cuspidatum* and *Plasteurhynchium striatulum* plants directly impacted are growing on moveable substrates (rocks or logs) then these could be repositioned to retained vegetation, with precisely the same environmental conditions as where currently found, with follow-up monitoring to confirm success or failure (easy, moderate (or high if all populations can be retained), no).
- *Additional mitigation*: check the identification and native status of meadow oat-grass *Helictotrichion pratense* and marsh valerian *Valeriana dioica* and implement protection measures if appropriate (easy, moderate, no).

13.6 Invertebrates

- *Additional mitigation:* the retained part of the marsh at Castlegar to be protected during construction and measures put in place to maintain the existing hydrological regime as suitable for marsh whorl snail (easy, moderate, no).
- *Additional mitigation*: the infiltration basins at Castlegar to be planted with suitable vegetation for marsh whorl snail with hydrology adjusted to suit whilst maintaining the function of the basins (easy, moderate, no).
- *Additional mitigation*: management of all translocation sites for marsh fritillary to include management of an area at least equivalent in area to lost habitat for this species (loss is 4.7ha, while the applicant proposes to manage c1ha which is all in proximity to the road) to ensure long-term suitability for this species (difficult if on third party land, moderate, no).
- *Additional mitigation*: translocation of ant hills impacted by the road to a suitable receptor site within the soft estate (easy, low, no).
- *Additional mitigation*: provision of suitable habitat for nesting bees (patches of coarse grassland) within the soft estate (easy, low, no).

13.7 Bats

- *Additional mitigation:* two bat boxes to be installed on trees as close to each felled tree with potential for a bat roost, as close as possible but away from the carriageway of the proposed road and before the end of July in the year of felling, bat boxes to be a mixture of hollow (for Liesler's) and crevice types (for pipistrelles) in accordance with the potential roost that is lost (Kelleher & Marnell, 2006) (easy, low, no (or yes if bat roosts are present)).

- *Additional mitigation:* the land to the south of the Castlegar overbridge is earmarked for development in the Galway City development plan, which if implemented may render the overbridge ineffective, possible solutions include (i) change the development zoning for this land to open space, amenity or similar, (ii) ensuring the design of the development on this land accounts for lesser horseshoe bats(and other wildlife), or (iii) moving the over-bridge to a location where it would provide connectivity between high quality habitats on each side of the proposed road (difficult, moderate, no).
- *Additional mitigation:* clear commitments to safeguarding the new bat roosts including bat boxes, with replacements and repairs carried out as necessary for a period of ten years post-development (easy, low, no (or yes if bat roosts are present and required by the derogation licence)).
- *Additional mitigation:* monitoring for ten years post construction (easy, low, no (unless required by derogation licence)).

13.8 Mammals other than bats

- *Additional mitigation:* the provision of safe passage through the construction site during the hours of darkness alongside all watercourses crossed by the proposed road, including during the installation of culverts (easy, low, yes for otter otherwise no).
- *Additional Mitigation:* ledges to be installed in all other hydraulic culverts with a width greater than 2m to account for future range expansion or occasional use by otter as listed in EIAR p975 to p976, Table 11.20 which would be an additional eight structures, and to provide safe passage for badger (moderate, medium, yes for otter otherwise no).
- *Additional Mitigation:* monitoring “of the effectiveness of environmental commitments” requires further definition, for example, in accordance with TII guideline for otter which state quarterly monitoring for at least one year to check on the condition and effectiveness of the ledges installed in culverts; given the scale of the project, the monitoring should continue for at least three years and the maintenance of the ledges should be incorporated into the general road maintenance programme (easy, low, no).

13.9 Breeding Birds

- *Additional mitigation:* reduce screening planting width as much as possible and ideally screening on one side of the road only, to reduce likely mortality and the risk of creating a “population sink” along the road corridor, except in locations where planting is required to deter barn owls (easy, low, no).

13.10 Wintering Birds

- It is recommended that the Biodiversity Network to be established under the Galway City Development Plan includes a wet grassland management plan to help ensure that numbers of wintering curlew and oystercatcher are maintained (difficult, high, no).

13.11 Amphibian and Reptiles

- *Additional mitigation:* replace the ponds lost to the proposed road elsewhere in the soft estate, including at the barn owl/lesser horseshoe bat mitigation area at Menlo Castle (easy, moderate, no).
- *Additional mitigation:* structures which could be earth banks to guide amphibians towards the tunnels and culverts where these occur in proximity to ponds (easy, moderate, no).
- *Additional mitigation:* an alternative drainage solution without kerbs within minimum 100m of amphibian breeding ponds (easy, moderate, no).

13.12 Fish

- None

14. Conclusion

14.1.1 As acknowledged by the applicant, the road will have a significant effect on features, valued in accordance with TII guidelines, as being of international importance for nature conservation, including small areas of two types of irreplaceable habitats, wet heath and limestone pavement. The scale of the impact is generally greater in the western part, beyond the N59, however, impacts at Menlough are also significant.

14.1.2 Because the main impacts of habitat loss, fragmentation and isolation are only partially addressed, the mitigation and compensation are not enough to change the conclusions on impact significance. Notwithstanding, the mitigation and compensation measures do lessen the severity or likelihood of many of the identified impacts, and many of the measure such as the use of viaducts and tunnels, habitat creation and the provision of overpasses and underpasses are beneficial. The cumulative impacts work in the opposite direction and will also reduce the effectiveness of the mitigation measures for the proposed road, such as some of the artificial bat roosts and the wildlife overpass. Areas of habitat and species populations located between the proposed road and the City being most at risk.

14.1.3 It would be possible to achieve a better assessment through more ambitious commitment to the safeguarding and management of the retained parts of the local biodiversity areas and equivalent land of higher nature conservation interest in the city and the county, including areas at distance from the road. The loss of woodland at Menlough could also be addressed providing compensatory habitat elsewhere.

14.1.4 There is the point, made by the applicant, that the road causes small losses of habitats and species populations, which whilst internationally important, are abundant locally with plenty remaining after the road is constructed. This has some validity. However, the area through which the road would pass is unusual in several respects, firstly the twin geologies of the Galway area make it rich in plant species in a small area, secondly there are apparently five rare species present in in the footprint of the road and others nearby and finally, the edge of the city may be more important for bats than elsewhere due to the availability of roost sites near to high

quality foraging habitat. Moreover, in the context of Galway City, the loss of 100ha of higher value terrestrial habitats is equivalent to[11] 5 to 10% of the total present in the city boundary.

[11] "Equivalent to" because some of the habitat loss would be outside the city boundary.

15. References

Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., D. I., & Fuller, R. J. (2013). *Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland.* Thetford: British Trust for Ornithology.

Benítez-López, A., Alkemade, R., & Verweij, P. A. (2010). The impacts of roads and other infrastructure on mammal and bird populations: a meta-analysis. . *Biological conservation*, 143(6), 1307-1316.

Bignal, K. L., Ashmore, M. R., & Headley, A. D. (2008). Effects of air pollution from road transport on growth and physiology of six transplanted bryophyte species. *Environmental pollution*, 156(2), 332-340.

Burke, B., Lewis, L. J., Fitzgerald, N., Frost, T., Austin, G., & Tierney, T. D. (2018). Estimates of waterbird numbers wintering in Ireland, 2011/12-2015/16. *Irish Birds,* , 11, 1-12.

Burton, N. H., Rehfisch, M. M., & Clark, N. A. (2002). Impacts of disturbance from construction work on the densities and feeding behavior of waterbirds using the intertidal mudflats of Cardiff Bay, UK. *Environmental Management*, 30(6), 0865-0871.

CIEEM. (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* . Winchester: Chartered Institute of Ecology and Environmental Management.

Crowe, O., Musgrove, A. J., & O'Halloran, J. (2014). Generating population estimates for common and widespread breeding birds in Ireland. *Bird Study*, 61:1, 82-90.

Cummins, S., Teasdale, A., Douglas, C., Newton, S. F., O'Halloran, J., & Wilson, H. J. (2015). Densities and population estimates of Red Grouse Lagopus lagopus scotica in Ireland based on the 2006-2008 national survey. *Irish Birds*, 10(2), 197-210.

Dodds, J. (2020). *N6 Galway City Ring Road - Hydrogeology.*

EC. (2013). *Interpretation Manual of European Union Habitats EUR28.* European Commision.

Fossitt, J. A. (2007). *A Guide to Habitats in Ireland, 2007 reprint.* . Kilkenny: The Heritage Council.

Hayden, T. J., & Harrington, R. (2000). *Exploring Irish mammals.* . Town House.

Kelleher, C., & Marnell, F. (2006). *Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25.* . Dublin, Ireland: National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.

Lewis, L. J., Burke, B., Fitzgerald, N., Tierney, T. D., & Kelly, S. (2019). *Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106.* National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Lewis, L., Burke, B., & Crowe, O. (2016). *Irish Wetland Bird Survey: Results of Waterbird Monitoring in Ireland in 2014/15.* BirdWatch Ireland.

Lusby, J., & O'Clery, M. (2014). *Barn Owls in Ireland: information on the ecology of barn owls and their conservation in Ireland. .* Kilcoole: BirdWatch Ireland.

Marnell, F. (2002). The distribution and habitat of the common lizard, Lacerta vivipara Jacquin, in Ireland. *BULLETIN-IRISH BIOGEOGRAPHICAL SOCIETY*, 26, 75-82.

Marnell, F., Looney, D., & Lawton, C. (2019). *Ireland Red List No. 12: Terrestrial Mammals. .* Dublin, Ireland: National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, .

McGowan, N., McDermott, N., Stone, R., Lysaght, L., Dingerkus, S., Caravaggi, A., . . . Reid, N. (2019). *National Hare Survey & Population Assessment 2017-2019. Irish Wildlife Manuals,No. 113.* National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, .

Mee, A. (2012). An overview of monitoring for raptors in Ireland. *Acrocephalus*, 33 239-245.

Morley, E. L., Jones, G., & Radford, A. N. (2014). The importance of invertebrates when considering the impacts of anthropogenic noise. *Proceedings of the Royal Society Biological Sciences*, 281(1776), 20132683.

Mulder, Koricheva, Huss-Danell, Högberg, & Joshi. (1999). Insects affect relationships between plant species richness and ecosystem processes. *Ecology Letters*, 2: 237-246.

NPWS. (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.* National Parks and Wildife Service.

NRA. (2009). *Guidelines for Assessment of Ecological Impacts of National Roads Scheme.* National Roads Authority.

Pescott, O. L., Simkin, J. M., August, T. A., Randle, Z., Dore, A. J., & Botham, M. S. (2015). Air pollution and its effects on lichens, bryophytes, and lichen-feeding Lepidoptera: review and evidence from biological records. *Biological Journal of the Linnean Society,*, 115(3), 611-635.

Pinto, Lourenço, Mira, & Santos. (2020). Temporal patterns of bird mortality due to road traffic collisions in a Mediterranean region,. *Bird Study,* , 67:1, 71-84.

Reijnen, R., Foppen, R., & Veenbaas, G. (1997). Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors. *Biodiversity & Conservation*, 6(4), 567-581.

Shannon, G., McKenna, M. F., Angeloni, L. M., Crooks, K. R., Fristrup, K. M., Brown, E., & McFarland, S. (2016). A synthesis of two decades of research documenting the effects of noise on wildlife. *Biological Reviews,* , 91(4), 982-1005.

Appendix 1: NPWS Submissions

An Roinn Cultúir,
Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

Your Ref: ABP-302885-18
Our Ref: 177AE N6 Galway Ring Road

21 December 2018

The Secretary
An Bord Pleanála
64 Marlborough Street
Dublin 1
D01 V902
Via email to bord@pleanala.ie

Re: Notification to the Minister for Culture, Heritage and the Gaeltacht under the Planning and Development Act, 2000, as amended.

Proposed Development: Section 177AE application for 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.

A chara

On behalf of the Department of Culture, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

The Department refers to the current application for the proposed N6 Galway City Ring Road development (and Motorway Scheme) in Galway City and County. Reference is also made to the EIAR, Natura Impact Statement (NIS), associated volumes of figures and appendices, and other documentation that accompanies the application.

Context of observations
The following observations are made by the Department in its role as a prescribed body under planning legislation and as the authority with overarching responsibility for nature conservation and the implementation of the nature directives (i.e. the Birds and Habitats Directives) in Ireland. The observations are not exhaustive and are intended to assist An Bord Pleanála in its review and evaluation of the current proposal in the context of, among other things, obligations and commitments in relation to nature conservation, European sites, biodiversity and environmental protection, proper planning and sustainable development, and the undertaking of the environmental impact assessment (EIA) and the appropriate assessment (AA).

This submission is structured under a series of headings/topics, but should be read as a whole, noting that there are substantial overlaps, as well as key distinctions, between the implications of the proposed development for the conservation objectives and integrity of a European site or sites, for biodiversity and other aspects of the environment, and for the proper planning and sustainable

development of the area, taking relevant timeframes, past and future changes, and trends into account.

Consultations with NPWS
The Department acknowledges the series of pre-application meetings and consultations with NPWS (2013-2017) in relation to the proposed development, including meetings with the project team and with An Bord Pleanála. Submissions made by this Department (on a non-statutory basis) at pre-application stage are included in EIAR Appendix A.8.2. Draft documentation was reviewed by NPWS as an exceptional measure and this covered only the draft NIS and draft EIAR biodiversity chapter.

Consultations with NPWS regarding the related Galway Transport Strategy 2016-2036 are also acknowledged. This strategy was produced by the City and County Councils, and the National Transport Authority, and is given effect by Galway City and Galway County Development Plans, as varied. Submissions were made by this Department in relation to the Strategy, the Development Plans and Variations, and the associated environmental assessments, including the SEA Environmental Reports, Natura Impact Reports (NIRs) and NISs.

Scope of surveys and integration with design
The Department acknowledges the extent and detail of the surveys carried out in connection with the planning and design of the scheme, the consideration of constraints and alternatives, and the preparation of the EIAR and NIS, including as reported in appendices to main reports. The extent to which ecological and other data and information have informed and modified aspects of the design of the scheme to minimise adverse effects on biodiversity, as part of an iterative process, is also acknowledged.

Project outline and setting
The proposed road development is generally routed around the outskirts of Galway City, extending from the R336 west of Bearna, in the west, to the new N6/M6 motorway at Briarhill in the east. It passes through areas of granite and limestone geology, and through areas of marginal farmland and substantial areas of natural and semi-natural habitats on the urban fringe. The road crosses the main channel of the River Corrib, and passes through one European site, and close to (within 200m of) three other European sites (see below). All but the western end of the scheme drains to surface water or groundwater bodies that are hydrologically and/or hydrogeologically connected to European sites and the water-dependent habitats and species they support. The proposed development boundary also borders part of one Natural Heritage Area (NHA).

The description of the proposed development and its construction and operation, the project drawings, and other related reports (e.g. the CEMP in EIAR Appendix A.7.5) are noted. It is understood that the mainline of the proposed road is approximately 17.5km in length, and comprises 5.6km of single carriageway and 11.9km of dual carriageway. The latter, from the N59 Letteragh junction eastwards, will be motorway. The proposed development comprises many other elements, including two tunnels with maintenance buildings, two viaducts and one large bridge, and associated link roads, side roads, junctions, structures, earth works, accommodation works, drainage, demolitions, fencing, lighting, landscaping, and ecological mitigation (EIAR, NIS) and compensation measures (EIAR). The total 'area of the development boundary' is approximately 280ha; of this, about 180ha is required for the proposed road development and its construction. Construction, including advance project stages and enabling works, will take a number of years. Some enabling works may occur or extend outside the proposed development boundary, e.g. diversion or relocation of utilities.

The construction phase elements and aspects of mitigation are set out in the CEMP. This includes an Incident Response Plan, a Sediment Erosion and Pollution Control Plan, and a Non-native Invasive Species Management Plan. Chapters 20 and 21 of the EIAR are also noted, namely the Summary of mitigation measures and Schedule of environmental commitments. It is stated that the latter is an integral element of the application for approval. It is indicated that further work in

developing the design of the proposed road development (i.e. post-consent stage) will lead to no material change in the predicted significance of the adverse effects on the environment, and that opportunities may be identified to further reduce these effects and provide the optimum solution based on available construction techniques and technologies at the time of construction.

The commitment to having a Project Ecologist as part of the Employer's team for the duration of the construction phase of the proposed development is welcomed (CEMP section 1.1). For the avoidance of any doubt, the construction phase must be understood to mean all advance contracts and enabling works, as well as the main construction phase, as substantial ecological damage and disturbance can be caused during such early phases. To be effective, the mitigation measures and environmental commitments from the EIAR and NIS must apply to all stages and aspects of the development from the time that permission is granted. Furthermore, noting the volume and complexity of application documentation and the potential for conflicts in the mitigation and other measures specified, particular care and robust systems will be required to ensure their correct and timely implementation to safeguard European sites, NHAs, natural habitats and protected species, and to protect the environment. Where any uncertainties exist regarding the likely success or deliverability of the mitigation and compensation measures, or the significance of the ecological effects that will result, these should be reflected in the EIA and AA carried out for the proposed development.

Receiving environment – biodiversity/ecology
The proposed development passes through and close to sites with nature conservation designations, Annex I habitats, the habitats of Annex I (Birds Directive) and Annex II and IV (Habitats Directive) species, and the habitats of other protected species, as well as through wetlands, woodlands, ecological networks, and local biodiversity areas on the margins of an area of progressively expanding urban development, population and associated pressures. The new road will interconnect with a network of recently-developed motorways and national roads between Dublin and Galway, and Limerick and Tuam.

The proposed development and/or proposed development boundary:

- passes through parts of the European site, Lough Corrib SAC (site code 000297), and will, in part, drain towards that site;
- passes through, close to, under and over Annex I habitats and the habitats of Annex II species that are qualifying interests (QIs) of Lough Corrib SAC;
- passes within 200m of three other European sites, namely Lough Corrib SPA (site code 004042), Galway Bay Complex SAC (site code 00268) and Inner Galway Bay SPA (site code 004031);
- adjoins the boundary of part of Moycullen Bogs NHA (site code 002364), and will drain or drain towards that site (selected for the conservation of 'peatlands');
- passes through twelve Annex I habitats and 43 'Fossitt' habitat types;
- passes through the habitats and/or the breeding sites and resting places of Annex II and/or IV (Habitats Directive) species, including those of Lesser Horseshoe Bat, other bats, Otter and Marsh Fritillary;
- passes through the habitats of Annex I (Birds Directive) and other regularly occurring migratory bird species;
- passes through the breeding sites and resting places (and territories) of other protected species, e.g. badger and breeding birds.

In addition to the protection afforded to most of the above receptors under the Wildlife Acts, 1976-2000, and the European Communities (Birds and Natural Habitats) Regulations, 2011, they are also subject to protective objectives and policies in the Councils' Development Plans and other land use plans for the areas through which the proposed development passes.

1. LIKELY EFFECTS ON EUROPEAN SITES

Adequacy of NIS

There is a requirement to consider whether the NIS, which accompanies this application, complies with section 177T of the Planning and Development Act, 2000 as amended. Among other things, an NIS is defined as a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of the proposed development for one or more European sites in view of its conservation objectives; an NIS must include a report of a scientific examination of evidence and data to identify and classify such implications. In the event that inadequacies or gaps in the NIS are covered by data and assessments from other sources, this should be made clear in the AA carried out. The final assessment and analysis should be with respect to the implications for the conservation objectives and integrity of the European site or sites in question.

Notwithstanding the detailed surveys and assessments undertaken, some aspects of the approach and scientific analyses in the NIS, and their sequencing and findings, are complex to follow. At the same time, it is acknowledged that there are challenges in preparing an NIS for a project of this size and complexity, and that no particular format for an NIS is prescribed in law.

Annex I habitats – QIs

The European site most affected by the proposed development is Lough Corrib SAC. Approximately 4ha of the proposed development and/or proposed development boundary overlap directly with this SAC in multiple small and mainly peripheral locations. The extent and nature of habitat impacts and/or changes within the SAC are, at present, difficult to ascertain. It could assist interpretation if a clearer account of the direct and residual effects on habitats within the SAC, with clearer drawings, was provided. Areas for the extents of the predicted effects and overlaps with i) the proposed development boundary, and ii) the proposed development, would also be beneficial in supporting interpretation and the conclusions of the NIS in relation to the absence of implications for habitats and the conservation objectives of the SAC. The relationship of the road to nearby qualifying interest Annex I habitats within the SAC is also difficult to ascertain.

SAC – hydrogeology

The application would benefit from clarity on the changes in hydrogeological regime the Lackagh Tunnel will have on the groundwater catchment area. Boreholes were drilled in the area, and groundwater level data collected, but spatial information is absent on directions of groundwater flow and hydraulic gradients. The tunnel is adjacent to the Lough Corrib Fen 1 (Lackagh) groundwater body (GWB) which contains groundwater-fed lakes and fens in the Lough Corrib SAC. The question of whether groundwater drainage associated with tunnelling construction work, during and post development, will not have an effect in Lough Corrib Fen 1 (Lackagh), may need interrogation. Whilst it is stated that the level of the tunnel will be below the groundwater table (and that "there will be no groundwater lowering within groundwater bodies that support groundwater dependant habitats within a European site"), it is also noted that groundwater seeps at the existing quarry face and base and that there are 'perched' water tables in local subsoil units above the limestone. The inclusion of 'water-tight' barriers is necessary for the operation, and this will divert groundwater flow. It is unclear what the hydrological connectivity between the groundwater dependent terrestrial ecosystems (GWDTEs) of the SAC are, particularly the habitats south of the proposed road.

Following this, it is not clear how the GWDTEs in the Lough Corrib SAC are working 'hydrogeologically' and if flow paths may change post-construction. It appears that the lakes are underlain by significant thicknesses of low permeability substrate, with the fens developing on their margins, presumably due to artesian conditions and spring inputs (it is suggested the lake is fed by the Western Coolagh Spring), as indicated by the recorded alkaline conditions. The road will traverse the 'Lough Corrib Fen 1 (Menlough)' groundwater body. The road intercepts recharge and whilst the change in infiltration and aquifer loss is reported as minimal, it may be important considering the small catchment area(s) that appear to support the fen habitats. Further elucidation could be beneficial.

Conservation objectives and scope of NIS
Lough Corrib SAC has site specific conservation objectives, and these specify whether the conservation objective is to maintain or to restore the favourable conservation condition of the individual qualifying interest habitats and species, as defined by certain attributes and targets that are listed, within that site. Substantial analyses in the NIS are (or appear to be) undertaken without reference to the conservation objectives, as they are detailed first in Table 9.16. In Tables 9.1 and 9.15, prior to this, the qualifying interests, Petrifying springs of the tufa formation (Cratoneurion) and Lesser Horseshoe Bat, appear not to have been recorded in the 'zone of influence' and/or are omitted from further consideration and assessment of the likely effects on European sites. The justifications for these findings are unclear in Section 9 of the NIS, but may be explained elsewhere and that should be clarified.

Otter
The proposed development passes through mapped areas of Otter habitat in Lough Corrib SAC, and close to parts of Galway Bay Complex SAC. The two SACs are interconnected and both have been selected for the conservation of Otter. Otter were widely recorded along the River Corrib corridor. Other watercourses and lakes within and connected to these SACs, e.g. Bearna Stream, are likely to form part of Otter territories and be used as commuting and foraging habitat.

No Otter breeding sites or resting places (holts or couches) were recorded along or within 150m of the proposed development, meaning disturbance and displacement effects should not result. However, increased human presence and/or noise and vibration associated with construction works, particularly associated with the construction of the proposed River Corrib bridge, have the potential to (at least temporarily) displace commuting or foraging Otter. Bankside works are required to install the drainage outfalls on both banks of the Corrib and this will result in the severance of the bankside habitat used by Otter, at least temporarily, during construction. Blasting at some locations over extended periods (e.g. approximately 9 months in Ballagh) will cause some level of disturbance to Otter using the Bearna and Tonabrocky Streams. Operation of the road has potential to result in the mortality of Otter through the increased risk of road traffic collisions and this could affect the Otter populations of the two SACs, and the conservation objectives and integrity of these European sites. In terms of longer term potential in combination effects resulting from disturbance and displacement, the commitments to having a greenway along the western bank of the River Corrib and the current application for the proposed Galway Harbour Extension (PA0033), should be noted in particular (see below in relation to in combination effects).

The potential effects on Otter are to be avoided and reduced to insignificant by a series of design and other mitigation measures that are specified in the NIS and EIAR. The conclusions reached in the NIS in relation to Otter are contingent on i) the effective and timely implementation of these mitigation measures at or prior to construction stage, ii) their continued effective functioning (e.g. in the case of mammal passage facilities and fencing) for the lifetime of the project, and iii) their safeguarding in any future projects and development planning. Monitoring and the taking of timely and effective corrective action if problems arise are integral to their success, and to the conclusions and predictions that may be reached as part of the AA and EIA.

Birds
The NIS determines that the River Corrib bridge is the only structure that is "of a scale to pose a collision risk to birds". The NIS subsequently concludes, having considered the design of the proposed structure and the low number of special conservation interest (SCI) species, and individuals, that pass along the river corridor, that the proposed structure is "not predicted to pose a collision risk of a magnitude that would have any long-term effects on the numbers, distribution, or the existing population trend for any SPA". The SPAs specifically mentioned in the NIS in this regard are Lough Corrib SPA and Inner Galway Bay SPA, and these SPAs are considered with the following references to SCIs. The risk of bird collisions with the bridge is given no further consideration beyond identifying potential impacts. The data considered on the number of SCI

species and individuals using the river corridor are from a previous proposal and different structure in a different location on the river (RPS report, 2006). The specifications for that structure stated the bridge height would be 6m above the river, while the current proposed bridge is a minimum of 8m above the river. Consideration of the range of flight heights for the SCI species known to use the corridor, or the potential interaction of these flight heights and the proposed bridge would be appropriate. The previous survey report did not assess the nocturnal movements of bird species, e.g. typically nocturnal species and species that are known to migrate at night, and this also needs to be considered. Therefore, the Board could consider if it is satisfied that the collision risk of birds with the proposed River Corrib bridge is adequate and complete if its Appropriate Assessment would be facilitated by further consideration and assessment.

The NIS concludes that the effects of habitat loss and fragmentation arising from the proposed development will not significantly negatively affect the SCIs for surrounding SPAs, and no mitigation measures for SCIs (breeding or wintering species) are provided. For breeding species, this is based on i) the absence of a spatial overlap between known SCI breeding sites and the proposed development area, and ii) aspects the SCI species' foraging ecology. The rationale and evidence to support the latter claim is not made clear (i.e. with respect to foraging ecology).

It is considered the above points should be addressed by presenting further information from, and rationale based upon, completed survey work, additional available data sources and published literature.

Matters relating to the AA
The AA has yet to be carried out, and should take the NIS and this submission into account. Any scientific uncertainties or discrepancies regarding the implications for the conservation objectives and integrity of European sites will need to be addressed and resolved.

2. LIKELY EFFECTS ON THE ENVIRONMENT

EIAR – biodiversity
The following additional matters should be taken into account and addressed in relation to the likely effects of the proposed development on biodiversity, including in the context of the EIA which has yet to be carried out. Likely significant effects on European sites are also a matter for the EIA.

NHA – hydrogeology
The location of the road adjacent to Moycullen Bogs NHA and the possible effects on bog eco-hydrology. This peatland area is underlain by the 'Galway Granite Batholith', which will be dewatered (during construction and operation) within cutting areas. This could potentially result in a lowering of the peatland water table, peatland subsidence and a potential negative impact on bog ecology. Clarity may be needed on where dewatering/drainage are proposed in relation to the NHA area, together with a demonstration of the likelihood of impact (negligible or otherwise).

Habitats – general
The detailed habitat survey and mapping for the area of the proposed development and surrounds are noted. Text and tables in EIAR chapter 8 contain details of the areas and types of habitats that will be affected by the proposed development. Of the overall 280ha of the proposed development boundary, 196ha is habitat that is deemed to be of low ecological value, and about 84ha is of higher ecological value. Some of the habitats are linear habitats. In total, it appears that 43 'Fossitt' habitat types and twelve Annex I habitats were recorded within the proposed development boundary and/or will be impacted by the proposed development. Some of the habitat losses will be compensated by habitat creation or management measures within the proposed development boundary, and will be replacing pre-existing habitats or areas subject to temporary disturbance, including some sites used as 'material deposit areas'.

The combined length of linear habitats recorded (11.8km) includes hedgerows and treelines, but not stone walls (which are not the boundaries of properties). It is unclear if the figures represent the total resource of these habitats in the area of the proposed development, or those that will be affected. Based on figures quoted, it appears that the entire linear habitat resource, which was recorded, will be lost and further clarification would be useful in this regard.

It is unclear if abandonment of grazing and/or mowing, including because of fragmentation and isolation of land holdings, has been included among the potential significant effects on habitats that were considered and assessed. The habitats of species such as Marsh Fritillary could also be affected by such changes arising in connection with the development of the road and could lead to loss of habitat in 'favourable management'.

Annex I habitats
The losses of Annex I habitats (outside European sites) are presented in terms of losses resulting from the proposed development, and residual or permanent effects after the implementation of mitigation and compensation measures.

Some of the losses are to be compensated by translocating habitat from one location (donor site) to another location (receptor site) within the proposed development boundary. Some of the receptor sites are also identified as 'material deposit areas' where surplus inert materials will be recovered or disposed. The steps and methods to be followed in relation to habitat compensation are set out in EIAR Appendix A.8.26. It would assist interpretation if a table with the details of donor and receptor sites, including areas and habitat types present in each, was provided to clarify, among other things, what habitats will be lost in the receptor sites as a result of the compensation measures and what habitat gains are predicted to accrue. Future management of the compensatory habitats is likely to be required, and it should be clear how this will be achieved and delivered in the short- to long-term.

Otter
See above.

Bats
The EIAR, including appendices, documents one of the most detailed and comprehensive surveys for bats ever undertaken in Ireland. The bat survey work has identified and catalogued the diversity of bat species around Galway City. In summary, a total of 88 roost sites, and all nine Irish bat species, were recorded within the study area during the field surveys. All bat species occurring in Ireland are listed on Annex IV of the Habitats Directive and are strictly protected. Lesser Horseshoe Bat is also an Annex II species and qualifying interest of Lough Corrib SAC, primarily for the maternity roost at Ebor Hall, near Cong, to the north.

The EIAR provides a comprehensive and detailed assessment of the likely effects of the proposed development on bats, including with respect to loss and disturbance of roosts, loss and fragmentation of foraging and commuting habitat, barrier effects and collision risks with traffic. There is potential for short- and long-term effects on the favourable conservation status of Lesser Horseshoe Bat arising from the proposed development. Mortalities and ecological disruptions to other bats species (e.g. pipistrelles, Leisler's and Brown Long-eared) may also occur but these species are more widespread and abundant.

On the basis of the mitigation and compensation measures specified, the EIAR concludes that the predicted residual effects for Lesser Horseshoes will reduce from national to local significance. The predicted residual effects on all other bat species are also of local significance. The broad suite of mitigation and compensation measures specified in the EIAR is noted and includes the provision of new roosting sites (i.e. new buildings, buildings retrofitted to create roost sites, and bat boxes), underpasses, a 'green' bridge and habitat enhancement measures (e.g. hedgerow planting), among other things. The conclusions in the EIAR are contingent on i) the effective and timely implementation of these mitigation and compensation measures at or prior to construction stage, ii)

their continued effective functioning for the lifetime of the project, and iii) their safeguarding in any future projects and development planning. Monitoring and the taking of timely and effective corrective action if problems arise are integral to their success, and to the conclusions and predictions that may be reached.

Badger
Three badger setts will be lost as a result of the proposed development (setts 9, 11 and 14), and one replacement sett is to be constructed north of the new road (close to sett 9). There will be fragmentation and isolation of lands to the south, i.e. between the new road and the Lackagh tunnel, and the N84, in an area with no mammal underpass. Clearance of scrub and resurveys prior to construction may reveal other badger setts. In the case of impacts on badgers that are not considered and assessed as part of the current application, and covered by the consent for the proposed development, a licence may be required from the Minister of this Department under the Wildlife Acts, 1976-2000.

Animal passage
The general locations and details of the animal underpasses and the wildlife overbridge are noted. While not always clear from the scheme drawings, underpasses must extend as far as, and integrate with the boundary fencing to be effective and fit for purpose, and to mitigate fragmentation and the barrier effects of the proposed development. All relevant details and specifications for underpasses, fencing and guide planting in relevant TII/NRA guidance should be followed, and underpasses should be confirmed (by an ecologist) to be correctly installed and fully functional before the road becomes operational. Mammal-proof fencing should be installed to the minimum extent necessary for safety and to exclude animals from the road. All other fencing provided should allow the general passage of wild animals (e.g. sheep wire or larger mesh) so that the overall extent of fragmentation and barrier effects resulting from the road are reduced. In the case of the wildlife overbridge, the general configuration and planting, including guide planting, should facilitate and encourage its use by wildlife in general, including (but not only) bats.

Marsh Fritillary
Comprehensive surveys carried out for the Annex II species, Marsh Fritillary , recorded extensive areas of suitable habitat for Marsh Fritillary and the presence of the species in a number of locations within the area of the proposed development, mainly in the west. Breeding sites for Marsh Fritillary are mobile and can change, and are linked to the presence of suitable habitat containing the food plant, Devil's-bit Scabious (Succisa pratensis).

The proposed development will result in the loss of areas of occupied habitat in four locations, as well as other areas of suitable habitat for Marsh Fritillary. Of particular concern is the habitat area where the species was recorded in three survey years at Trusky More. Much of this area will be lost as a result of the proposed development. In addition to permanent losses of suitable Marsh Fritillary habitat, including habitat patches supporting larval webs, the proposed development will cause fragmentation of individual habitat patches and of the wider network of areas of suitable habitat for the species.

Details of mitigation measures could benefit from more clarity and consideration would need to be given to the extent to which they may be deliverable. A key element of mitigation is the translocation of larval webs that occur along the proposed development. Translocation sites need to contain suitable habitats and should also have good long-term prospects. In the case of any predictions made regarding the long-term survival of Marsh Fritillary, including in relation to the areas of habitat required within a network of sites, it should be clear that any figures quoted refer to habitat in favourable management (presumably meaning good or optimal condition) and with good long-term future prospects.

Further information on mitigation measures for Marsh Fritillary is available from the English Nature and Highways Agency publication: The Butterfly Handbook: General Advice Note on Mitigating the Impacts of Roads on Butterfly Populations (http://publications.naturalengland.org.uk/file/130004).

Birds

Barn Owl: the proposed development will reduce the extent of suitable foraging habitat for the local Barn Owl population. The Barn Owl mitigation measures proposed in the EIAR are primarily designed to reduce the risk of road traffic collision events, and include planting vegetation to deter owls from foraging alongside the proposed road margins, and installing barriers to force commuting birds to fly higher over the proposed road. These measures, which are necessary, will compound the likely reduction of foraging opportunities for the local Barn Owl population. To counterbalance this, Barn Owl foraging habitat should be conserved and enhanced in key areas close to the most suitable sites identified as active or potential nest sites for the species. The objective of such compensatory long-term habitat management would be to provide alternative foraging opportunities to the north and northwest of the proposed development, thereby further reducing the risk of road-related mortality events impacting the local population. Such long-term habitat management areas should dictate where the three Barn Owl nest boxes would be sited.

Peregrine Falcon: in the EIAR, there is a degree of uncertainty as to whether Lackagh Quarry will remain a suitable breeding site for Peregrine during and post-construction. No alternative breeding site for the Peregrine pair associated with this nest site is known locally. To counterbalance the potential loss of this breeding resource, a suitable alternative nest site(s) needs to be created, noting that the most recent National Peregrine Survey did not record any urban nesting pairs from Galway City. There may be opportunities to install artificial nesting platforms or boxes on other suitable features or buildings. Failing that, a bespoke nesting structure in an appropriate area should be constructed.

The EIAR could benefit from more clarity as to the efficacy of the mitigation measure to temporarily dissuade active breeding of Peregrine at Lackagh Quarry by commencing works from the Lackagh Tunnel to the N84 Headford Road Junction prior to mid-February. The appropriateness of potentially working in the vicinity of, and disturbing an active nest site to install rock bolts on the cliff face may be challenging. If an alternative suitable Peregrine nesting resource was created prior to any road development works being undertaken then the possibility of temporarily rendering the nesting ledges at Lackagh Quarry unavailable for Peregrine during the construction period as a mitigation measure to avoid the disruption of a breeding attempt could be considered.

Mitigation measures: as also noted below, there could be potential tensions between mitigation measures set out in the NIS and EIAR.

The NIS states that, in order to minimise disturbance to wintering birds at Ballindooley Lough, blasting at Lackagh Quarry (and Castlegar) will only be undertaken between the months of April to September (inclusive). The EIAR determines that construction activities at Lackagh Quarry, including rock breaking and rock blasting, have the potential to have long-term effects on the Peregrine population nesting in the quarry. Thus, the EIAR proposes mitigation measures specifying that works from the proposed Lackagh tunnel to the N84 Headford Road Junction commence prior to mid-February (i.e. wintering period). The EIAR does not specify whether the works proposed to begin in mid-February include blasting; if blasting was to be included in these works, this would contradict the mitigation approach outlined in the NIS for wintering birds.

It is important that the nature and extent of the proposed planting (likely to provide foraging habitat for general bird species) in close proximity to the proposed development does not act to attract foraging Barn Owl and thereby increase the risk of road collision mortality events.

It is proposed to install 20 nest boxes to further minimise the effects of breeding bird habitat loss. Post construction monitoring and reporting with regard to the rate of uptake of the boxes by birds and their breeding outcomes is recommended in order to determine the efficacy of this mitigation measure.

Mitigation measures – general

The following general observations are made in relation to mitigation measures:

- As outlined above, it should be clear that all relevant mitigation measures and commitments must apply, from the outset, to all parts of the development as permitted, including enabling works, site preparation and advance contracts, as well as at construction stage.
- Owing to the complexity and detail of the ecological or biodiversity mitigation measures specified, and the importance of knowing where, when and how these apply, competent ecologists will need to be involved directly at all project stages. There is a commitment to having a Project Ecologist as part of the Employer's team; references to an Ecological Clerk of Works are also noted in appendices. The main contractor will also require ecologists, and ecological supervision of other contractors will be necessary.
- The timings of many ecological mitigation measures are critical and, in many cases, are specified. Among these, some of the timings seem to be conflicting or competing (examples relating to birds above, and see also Common Lizard and vegetation clearance) and it needs to be clear how these discrepancies can be managed and resolved. Measures for other environmental topics could also be conflicting or competing, and will require review.
- Resurveys in advance of works being carried out may introduce additional and new considerations, and it should be clear how these will be addressed and managed.
- The scale of the documentation pertaining to this application and the range, specificity and detail of the mitigation measures to be delivered means that robust and interactive or real-time/live mapping systems will need to be developed, possibly in conjunction with 'permits to work' and sign off by the Project Ecologist of the correct completion and functioning of the measures.
- Consideration should be given to making reports on implementation and monitoring of measures available, including to NPWS, via a dedicated website.
- Locations of key ecological mitigation measures should be mapped with records kept that are able to interface with, for example, the Councils' GIS and planning systems, so they can be taken into account and safeguarded in future projects and plans.
- Any non-performance, non-compliances or other issues that arise should be addressed in a timely manner.

Monitoring/corrective measures

- A clearer schedule of monitoring commitments and responsibilities, including locations, methods and frequency, may be required for biodiversity in general, and for bats in particular. It is noted, for example, that the EIAR states that monitoring of artificial roosts "may be undertaken by NPWS staff, Galway bat group or others to be decided by the local authority". It should be noted that no such agreement has been discussed or reached with NPWS.
- Monitoring of certain measures, such as the wildlife overpass and hedgerow planting, is to continue for 5 years. It should be understood that, after the monitoring period, maintenance and management of various features will be required in the long-term.

You are requested to send further communications to this Department's Development Applications Unit (DAU) at manager.dau@chg.gov.ie (team monitored); if this is not possible, correspondence may alternatively be sent to:

The Manager
Development Applications Unit (DAU)
Department of Culture, Heritage and the Gaeltacht
Newtown Road
Wexford
Y35 AP90

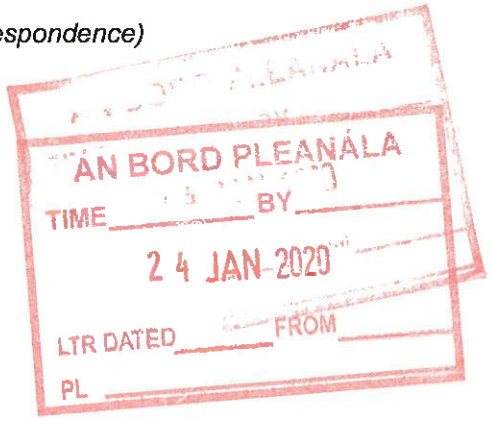
Is mise, le meas

Suzanne Nally

Suzanne Nally
Development Applications Unit

An Roinn Cultúir,
Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

Your Ref: ABP-302848-18
(Please quote in all related correspondence)



24 January 2020

The Secretary
An Bord Pleanála
64 Marlborough Street
Dublin 1
D01 V902

Via email to sids@pleanala.ie

Re: Notification to the Minister for Culture, Heritage and the Gaeltacht under the Planning and Development (Housing) and Residential Tenancies Act 2016; Planning and Development (Strategic Housing Development) Regulations 2017

RE: Section 177AE (ABP Deciding Authority) - 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.

A chara

On behalf of the Department of Culture, Heritage and the Gaeltacht, I refer to correspondence received in connection with the above.

Outlined below are heritage-related observations/recommendations of the Department under the stated heading(s).

Nature Conservation

The Department refers to the current application for the proposed N6 Galway City Ring Road development (and Motorway Scheme) in Galway City and County, and to the accompanying Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS), and associated documentation. Reference is also made to the significant additional information submitted by the applicants and notified to the Department on 4th December 2019. This includes the Request for Further Information Response Report (Volume 1) and Appendices (Volume 2) together with the Route Selection Report (Volume 3) and Design Report (Volume 4).

Context of observations

The following observations are made by the Department in its role as a prescribed body under planning legislation and as the authority with overarching responsibility for nature conservation and the nature directives (i.e. the Birds and Habitats Directives). The observations are not exhaustive and are intended to assist An Bord Pleanála in its review

and evaluation of the current proposal in the context of, among other things, obligations and commitments in relation to nature conservation, European sites, biodiversity and environmental protection generally. These observations are structured under a series of headings/topics, but should be read as a whole, together with our previous observations dated 21st December 2018.

1. Likely effects on European sites

Annex 1 habitats – Qualifying Interests (QIs)

The Department notes the significant additional information provided in relation to habitat surveying and mapping in Appendix A.3.1 (Annex 2 and Annex 3). This includes, *inter alia*, information in relation to habitats within the proposed development boundary[1], including Annex 1 habitats[2,3] and QI habitats within Lough Corrib cSAC in close proximity to the boundary of the proposed development (Figure 2.9.01). The Department also notes the vegetation sampling (relevé data) which has been provided and which has informed the habitat mapping referred to above.

This additional information has resulted in some changes to habitat mapping which is described and evaluated in Section 4 of the Request for Further Information Response Report (Volume 1), and is noted. In particular, Section 4.1 of the Report identifies an additional small area of limestone pavement [*8240] habitat near Menlo (see Figure 2.7.01). The boundary of Lough Corrib cSAC at this location intersects the area of limestone pavement so that some is within the cSAC and some is located outside the cSAC. The area of limestone pavement within the cSAC would have been directly affected by a proposed access route to farmland at this location. The proposed access route is now proposed to be altered to avoid any impacts to this area of limestone pavement and therefore to avoid impacts to Lough Corrib cSAC.

The Department further notes that updates to the boundary of Lough Corrib cSAC are possible pending finalization of the objections process at this site pursuant to the requirements of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended). The final objections relating to the boundary of Lough Corrib cSAC are currently being processed and an updated boundary map will be notified in the coming weeks, prior to the Oral Hearing. As part of this process a mapping error, at the location near Menlo described above, is under consideration. The correction of this minor mapping error will align the boundary to a small track to reflect the original survey intention. This will result in a larger area of the limestone pavement being located outside the Lough Corrib cSAC boundary. This is the only known alteration to the boundary of Lough Corrib cSAC which will interact with the proposed motorway and road scheme.

SAC – Hydrology

In the Department's previous observations it was noted that clarity was required in relation to changes in the hydrological regime and its impact on the groundwater catchment area as

[1] Figures 2.5.01 – Figure 2.5.15 inclusive (2019 Habitat Mapping with Fossitt (Level 3) Habitat Codes indicated)
[2] Figures 2.6.01 – 2.6.15 inclusive (2019 Habitat Mapping with Annex 1 Habitats indicated)
[3] Figures 2.7.01 & 2.7.02 (Areas of limestone pavement habitat within the proposed development boundary and Lough Corrib cSAC)

a result of the Lackagh Tunnel. This matter is addressed in the Request for Further Information Response Report (Volume 1) in Section 4.12.1. The Report states that only one European Site (i.e. Lough Corrib cSAC) lies within the hydrogeological zone of influence of the proposed road development. The Department remains of the view that this statement needs more clarification. The groundwater flow map is quite general and would benefit from groundwater levels from boreholes for example being indicated together with groundwater head contours. The delineated groundwater catchment divides should also be indicated and the location/mapping of the Groundwater Dependent Terrestrial Ecosystems (GWDTEs), particularly the fen habitats within the Lough Corrib cSAC, should also be shown. The NIS and the Request for Further Information Response Report states that the GWDTEs rely on 'seasonal groundwater levels', but it is still not clear what these are (baseflows for example?), and what groundwater levels need to be maintained to avoid negatively impacting on the conservation status of all GWDTEs in the Lough Corrib cSAC complex.

The Department also sought clarification in relation to how the GWDTEs in the Lough Corrib cSAC are working hydrogeologically and if flow paths may change post-construction. This is addressed in Section 4.13.1 of the Request for Further Information Response Report. The Department remains of the view that this matter requires clarification, such as the presentation of a clearer hydrogeological conceptualisation of the groundwater regime of the GWDTEs, and the changes that may or may not occur following construction. Additional hydrogeological cross-sections would assist in this regard. The Department is of the view that without a clearer presentation of the groundwater regime of the GWDTEs, it is difficult to assess the potential impacts of the proposed scheme and the adequacy of the mitigation measures being proposed.

Conservation objectives and scope of NIS

The Department notes the clarification in relation to the matters raised under this heading in its previous observations in Section 4.15 of the Request for Further Information Response Report.

Birds

The Department raised issues in relation to the potential for the proposed River Corrib bridge to pose a collision risk to birds in its previous observations. This has been addressed in Section 5.2 of the Request for Further Information Response Report. While no nocturnal surveys were undertaken the Department considers that taking into account the fact that the bridge will not be lit, the available data from the previous and recent surveys, and the available published literature, sufficient information has been provided to assess potential impacts to SCI bird species of the adjacent SPAs. The Department is of the view that the proposed bridge is unlikely to present a threat to SCI bird species of the adjacent SPAs.

The Department also raised issues in relation to habitat loss and fragmentation and the potential for this to impact SCI bird species for surrounding SPAs. This is addressed in Section 5.1 of the Request for Further Information Response Report. The Department

notes the additional information provided and considers that the matter raised has been addressed.

2. Likely effects on the Environment

NHA – hydrology

The Department reiterates its concerns regarding Moycullen Bog NHA, that dewatering of the 'Galway Granite batholith' within cutting areas during construction and operation of the proposed scheme, may result in a lowering of the peatland water table with peat subsidence and a consequent negative impact on the ecology of the Bog. The potential for such impacts needs to be assessed and mitigation measures proposed to address this matter as appropriate.

Habitats

As stated above, the Department notes the additional information in relation to habitat mapping provided in Section 4 of the Request for Further Information Response Report (Volume 1). This has resulted in some changes to habitat mapping which has been described and evaluated in Section 4 of the Report and associated mapping, and is noted.

It is also noted that there will be a number of habitat types of local biodiversity importance which will be permanently lost and where significant residual impacts are likely, including calcareous springs, dry-humid acid grasslands, poor fen and flush, mixed broadleaved woodland, hedgerows and treelines. The Report states that for mixed broadleaved woodland, hedgerows and treelines an area greater than that which will be permanently lost is being provided for in the landscape design (see page 30). It would be useful if the area of woodland and the length of hedgerow and treeline to be provided can be clearly set out.

It remains unclear if abandonment of grazing and/or mowing, including because of fragmentation and isolation of land holdings, has been included among the potential significant effects on habitats that were considered and assessed. Species such as Marsh Fritillary could be affected by such changes arising in connection with the development of the road and could lead to loss of habitat in 'favourable management'. Further clarification should be provided.

Compensatory Habitat

The Department notes the summary of residual Annex 1 habitat loss after compensatory measures have been implemented which is set out in Table 4.1 of the Report and revises the information previously provided in the EIAR.
Some of these losses are to be compensated by translocating habitat from one location (donor site) to another location (receptor site) within the proposed development boundary. The Department re-iterates its view (as set out in previous observations) that it would assist interpretation if a table with the details of donor and receptor sites, including areas and habitat types present in each, was provided to clarify, among other things, what habitats will

be lost in the receptor sites as a result of the compensation measures and what habitat gains are predicted to accrue.
There have been some amendments proposed in the Request for Further Information Response Report to the Material Deposition Areas in Lackagh Quarry (areas DA23, DA24, DA25, DA28). It is noted also that a large volume of peat (52,000m^3) – presumably removed from west of the River Corrib - will be deposited in this limestone quarry. While Tables 3.2 & 3.3 indicate that there will be no peat in area DA28, Table 6.2 indicates that there will 14,000m^3 of peat in this area. This matter needs to be clarified.
Some of the Material Deposition Areas listed above are also earmarked for habitat compensation notably for calcareous grassland. It is not clear from the documentation how this habitat will be created and how the proposed alterations to the material deposition areas will impinge on the habitat compensatory areas. It appears that the major horizontal portions of the depositional areas will consist of peat. For example, area DA24 was identified as an area for calcareous grassland but yet its entire area appears to be covered in peat (see Annex 2, Figure 1.8.6). It is not clear from the documentation if it is intended to create peatland habitat here or whether the peat is simply being stored in this area. Clarity is required in relation to these matters.
The Department notes the information provided in Section 4.11 of the Request for Further Information Response Report in relation to the time required to establish compensatory habitats. Because the timeline in the Report for Alluvial forest [*91E0] is expressed as a worst case scenario, the Department considers that the lower limit of the range should be increased from 20 to 30 years. More generally the Department notes the long time periods required for the establishment of all the Annex 1 habitat-types as set out in Section 4.11 of the Report, and notes that donor and receptor sites should be well matched in terms of their environmental conditions (e.g. geology, soils, altitude, slope, aspect) in order to enhance the prospects of success in a reasonable time-frame. In all cases future management will be required and it should be clear how this will be achieved and delivered in the short- to long-term.

Birds

The Department re-iterates the matters raised in its previous observations in relation to the need for compensatory long-term habitat management for Barn Owls.

The Department also raised issues in relation to the potential for impacts to Peregrine Falcon and to wintering birds at Ballindooley Lough arising from blasting activity at Lackagh Quarry (and Castle gar), and the mitigation measures proposed to address such impacts. These matters are addressed in Section 5.3 of the Request for Further Information Response Report. In relation to Ballindooley Lough it is clear that there is no risk of disturbance to waterbirds because blasting will not take place during the wintering period. In relation to Peregrine the Department is of the view that in addition to the mitigation measure proposed (i.e. blasting to commence prior to mid-February) there need to be suitable high ledges for prospecting pairs available, and that any active Peregrine nest site/ledge must be left undisturbed. If these conditions are met then the proposed works should not prohibit Peregrine breeding at the

site. Peregrine are regarded as being able to withstand significant disturbance at active quarry sites. However, the frequency, the location and intensity of the blasting could influence the outcome in terms of success/failure. Therefore monitoring of Peregrine breeding activity at the site through the season should ideally be carried out to ascertain any nest success/failure of the pair and to determine if blasting is also affecting numbers of common prey species for Peregrine (i.e. Feral Pigeon).

Marsh Fritillary

The Department reiterates its concerns in relation to the mitigation measures proposed for this Annex II species which, as set out in the Department's previous observations, lacked sufficient detail. This matter needs to be addressed to ensure that the mitigation measures proposed are realisable.

Bats

The Department notes the clarification in relation to Lesser Horseshoe Bat populations set out in Section 6.1 of the Request for Further Information Response Report, and the information provided in relation to core sustenance zones (CSZ) for bats in Section 6.2 of the Report. As stated previously, the conclusions in the EIAR in relation to bats are contingent on i) the effective and timely implementation of these mitigation and compensation measures at or prior to construction stage, ii) their continued effective functioning for the lifetime of the project, and iii) their safeguarding in any future projects and development planning. Monitoring and the taking of timely and effective corrective action if problems arise are integral to their success, and to the conclusions and predictions that may be reached. Any uncertainties in any of these regards should be taken into account in the context of the EIA.

Habitat Connectivity

The Department notes the clarification in relation to habitat connectivity for pine martens, squirrels and common lizard set out in Section 7.1 of the Request for Further Information Response Report.

Drawing GCOB-1700-D-S12-02-001 shows the overpass/green bridge. Clarification is required in relation to the proposed planting for the overpass setting out what species are proposed to be planted. It would appear that there will be a bank at each side of the metaled route and perhaps an area of soil cover outside of this. In order for the overpass to function correctly it must be clear that a sufficient depth of soil cover will be in place to support an appropriate planting regime.

There does not appear to be provision for ledges for passage by mammals in the drawings for culverts (see drawing GCOB-1700-D-GEN-011). The Department recommends that where culverts are designed to allow water flows through them, provision for mammal ledges should be included.

You are requested to send further communications to this Department's Development Applications Unit (DAU) at **manager.dau@chg.gov.ie** (team monitored); if this is not possible, correspondence may alternatively be sent to:

The Manager
Development Applications Unit (DAU)
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Connor Rooney
Development Applications Unit

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N6 Galway City Ring Road

Application for consent to An Bord Pleanála

Oral Hearing

Statement of Evidence

Gerry Clabby

National Parks and Wildlife Service

Department of Culture, Heritage and the Gaeltacht

21 February 2020

1. My name is Gerry Clabby and I am Head of Ecological Assessment, with the National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht. I hold a BSc in Botany and a PhD in ecology from University College Dublin. In my current role I am responsible, among other things, for providing advice and guidance to the Department in relation to the discharge of its function as a statutory consultee in the planning code and in this regard I manage a team of ten Divisional Ecologists. Prior to this I was Heritage Officer with Fingal County Council for 15 years based in the Planning and Strategic Infrastructure Department of the Council. In this role I contributed to the development of natural heritage policy for statutory land-use plans and to the consideration of a wide range of planning applications by providing advice and guidance in relation to environmental assessment. I was also previously Heritage Officer with Westmeath and Longford Councils and a Lecturer in Botany at University College Dublin.

2. The Department has previously made observations dated 21st December 2018 and 24th January 2020 in relation to the proposed motorway and road scheme. These observations were made by the Department in its role as a prescribed body under planning legislation and as the authority with overarching responsibility for nature conservation and the nature directives (i.e. the Birds and Habitats Directives). The observations are intended to assist An Bord Pleanála in its review and evaluation of the current proposal in the context of Ireland's obligations and commitments in relation to nature conservation, European sites, biodiversity and environmental protection generally.

3. The Department wishes to acknowledge the series of pre-application meetings and consultations held by the applicants with the National Parks and Wildlife Service between 2013 and 2017 inclusive. Three submissions made by the Department (on a non-statutory basis) at pre-application stage are included in the Environmental Impact Assessment Report (EIAR) at Appendix A.8.2. This included review of draft documentation by NPWS, as an exceptional measure, which included the draft Natura Impact Statement (NIS) and the biodiversity chapter of the EIAR biodiversity chapter, only.

4. The Department also acknowledges the extent and detail of the surveys carried out in connection with the planning and design of the scheme and acknowledges the extent to which ecological and other data and information have informed and modified aspects of the design of the scheme in order to minimise adverse impacts on biodiversity.

5. The Department has recently revised the boundary of Lough Corrib SAC, following the finalization of the objections process at this site, pursuant to the requirements of the European Communities (Birds and Natural Habitats) Regulations, 2011. Revised Irish Grid maps (Map Version 1.33) were notified to An Bord Pleanála and other public authorities on Monday 17th February 2020. These updated maps include a correction of a minor mapping error near Menlo as described in the Department's observations dated 24th January 2020.

6. The applicants have submitted a number of briefs of evidence to the Oral Hearing including the following in relation to ecology and hydrogeology:
    - Responses to EIA Biodiversity Objection/Submissions
    - Responses to AA Objection/Submissions
    - Responses to Hydrology Objection/Submissions

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7. The Department has only had time to undertake an initial review of this new information and in light of the complex nature of this proposed motorway and road scheme, and the extensive documentation involved, would welcome the opportunity to put some questions to the applicants this morning. The Department is willing to provide further inputs to the Oral Hearing at a later date, should this be helpful to the Inspector and the Board.

8. While not wishing to repeat its previous observations, which are to be taken as read, I wish to highlight a number of areas where, in the Department's view, further clarification is required to ensure that sufficient information is available to the Board in its decision making in this case:

    a. Further clarification is required in relation to the groundwater regime operating in ✓ the vicinity of the proposed Lackagh Tunnel. This is necessary in order to enable a full assessment of the potential impacts to Lough Corrib SAC, particularly Coolagh Lakes and Annex 1 Alkaline and Cladium fen habitats, as a result of the construction of the Tunnel and in order to ensure that the mitigation measures proposed will fully address potential impacts.

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    b. Clarification is needed in relation to the catchment areas and groundwater flow regimes of the dependency of Ground Water Dependent Terrestrial Ecosystems (GWDTEs) in the Lough Corrib cSAC; and whether groundwater flow paths may

change post-construction. Without this, it is difficult to assess the potential impacts of the proposed scheme and the adequacy of the mitigation measures being proposed.

c. In relation to Moycullen Bog Natural Heritage Area (NHA) there remain concerns that dewatering of the 'Galway Granite Batholith' as a result of the construction and operation of the scheme may result in a lowering of the peatland water table, resulting in a negative impact on the ecology of the Bog. This matter needs to be addressed.

d. Proposed mitigation measures for Marsh Fritillary should be clarified as set out in the Department's previous observations.

e. The Department is of the view that further detail is required in order to ensure that the provision of Annex 1 compensatory habitat is successfully achieved. This includes i) further detail in relation to how such habitat is to be provided including the steps involved in the process, particularly in relation to dry heath habitat; ii) further provision for monitoring; and iii) clarification in relation to the measures in place should habitat provision be unsuccessful and the steps needed to be repeated until success is achieved.

GA not AA.

9. The conclusions reached in the Natura Impact Statement (NIS) and the Environmental Impact Assessment Report (EIAR) with regard to the proposed scheme are contingent on mitigation measures and the provision of compensatory habitat. It is essential that provision is made for the effective and timely implementation of these measures at, or prior to, construction stage and, where applicable, during the operational stage. It is also essential that these measures are effective over the operational lifetime of the scheme and that they are safeguarded in any future project and development planning in the city and county. Monitoring and the making of provision for timely and corrective action should problems arise in relation to mitigation measures or compensatory habitat provision, is also a key element in ensuring success in this case. Any grant of permission in this case should ensure that these matters are fully addressed.

10. I am joined by my colleagues Dr Shane Regan, Dr David Tierney, Dr Ferdia Marnell and Dr Enda Mooney who wish to put some questions to the applicants with a view to clarifying some of the matters raised above.

a + b – AA + EIA

c - EIA

d + e less Important.

Comp. = focus - capable of being implemented

N6 Galway City Ring Road

Application for consent to An Bord Pleanála

Oral Hearing

Statement of Evidence

Gerry Clabby

National Parks and Wildlife Service

Department of Culture, Heritage and the Gaeltacht

11th March 2020

1. My name is Gerry Clabby and I am Head of Ecological Assessment, with the National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage and the Gaeltacht. I am responsible, among other things, for providing advice and guidance to the Department in relation to the discharge of its function as a statutory consultee in the planning code. I am joined today by my colleagues Dr Shane Regan and Dr Enda Mooney.

2. The Department made a Statement of Evidence to the Oral Hearing on 21st February 2020 and also put some questions in relation to the proposed development to the applicants which sought further information in relation to a number of matters. The Department indicated at the Hearing that a meeting with the applicants might be useful in relation to the matters raised by the Department and this course of action was agreed with the Inspector. The Department agreed that it would return to the Oral Hearing subsequent to such a meeting with the applicants.

3. Since 21st February 2020, the Department met with the applicants on 27th February 2020 and again, at the applicant's request, on 9th March 2020. The Minutes of these meetings are provided in an Appendix to this Statement of Evidence.

4. At the first meeting on 27th February the following matters were discussed:
    a. Hydrogeological matters arising in relation to Lough Corrib cSAC
    b. Hydrogeological matters arising in relation to Moycullen Bogs NHA
    c. Compensatory habitat provision – calcareous grassland and dry heath
    d. Mitigation measures in relation to Barn Owl and Peregrine Falcon
    e. Mitigation measures in relation to Marsh Fritillary.

5. At the second meeting on 9th March the only matter discussed was the provision of compensatory dry heath habitat.

6. The Department is of the view that the additional information contained in the Statement of Evidence made to the Oral Hearing on 10th March 2020 by the applicants provides further relevant information to An Bord Pleanála which will assist it, in its assessment of the current proposal.

7. In addition, the Board's ecological advisor Mr Richard Arnold put a series of questions to the Department at the Hearing on 21st February to which I will now provide responses.

Question 1

As stated by the applicant, there will be a loss of c.1ha of 8240 LP outside the cSAC. In the department's view, is the direct loss of limestone pavement (*and other Annex 1 habitats*), outside the cSAC consistent with the objectives of the Habitats Directive?

This question addresses the protection afforded to Annex I habitats that occur outside Special Areas of Conservation (SACs). One of the objectives of the Habitats Directive is to designate Special Areas of Conservation (SACs) which are defined in Article 1(l) of the Directive as follows:

"special area of conservation means a site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated;" [underlining added].

Annex I to the Directive lists natural habitat types whose conservation requires the designation of special areas of conservation. Limestone pavement is included in Annex I as a priority natural habitat, which means it is in danger of disappearance and is a habitat for which the European Union has a particular responsibility.

Article 6(2) requires that:
"Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of this Directive."[underlining added].

The European Commission guidance[1] advises that measures implemented under Article 6(2) are only required to target species and habitats located in the SACs, unless external events may have an impact on the species and the habitats inside the SAC.

[1] Commission notice "Managing Natura 2000 sites The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC" (page 27-28):
https://ec.europa.eu/environment/nature/natura2000/management/docs/art6/Provisions_Art_6_nov_2018_en.pdf

While the general provision, under Article 6(2), to conserve habitats for which a site has been designated applies at all times, Article 6(3) of the Directive applies only to plans and projects. Article 6(3) requires that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

In *Holohan*[2], the Court of Justice of the European Union (CJEU) ruled that an appropriate assessment under Article 6(3) of the Habitats Directive must identify and examine the implications of the proposed project for habitat types to be found outside the boundaries of a SAC provided that those implications are liable to affect the conservation objectives of the site.

In summary, the Department is of the view that any proposals which involve the loss of Annex 1 habitat outside Special Areas of Conservation, must take fully into account the findings of the CJEU in the *Holohan* case cited above. In proposals where the loss of Annex 1 habitat does not affect habitats and/or species within SACs, the Department is of the view that while such habitat loss is undesirable and to be avoided wherever possible, it is not inconsistent with the requirements of the Habitats Directive. In such cases the Department expects, among other things, the requirements of the EIA Directive to be applied in relation to the assessment of potential impacts to biodiversity including the assessment of impacts to Annex 1 habitats.

I would hasten to add that this view does not in any way purport to be a legal opinion. Should the subject matter of the question raised by the Board be considered by the Board to

[2] Case C-461/17, *Brian Holohan and ors. V. An Bord Pleanála* (para 70) https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62017CJ0461&qid=1583427673419&from=EN

be critical to its decision making in this case, it is respectfully suggested that the Board may wish to obtain legal advice in relation to this matter.

Question 2

With reference to the FIR response, section 4.3 and Figure 2.6.07 of the same; Why was the boundary of the cSAC drawn to include the woodland adjacent to Menlo Castle, Area 1f, in the applicant's mapping? To further clarify, this area lies immediately to the east of the proposed River Corrib bridge. Was this area considered in the recent revision to the cSAC boundary?

The reference to Figure 2.6.07 in this question is presumed to be a reference to Drawing 2.6.07 of the FIR. The area in question is also shown in Drawing 2.5.07 of the FIR which identifies the Fossitt habitat at this location as woodland (WD1). The boundary of the cSAC was surveyed in 1997 (see Figure 1 below). The rationale at the time was, *inter alia*, to include areas of semi-natural habitat within the boundary of the cSAC.

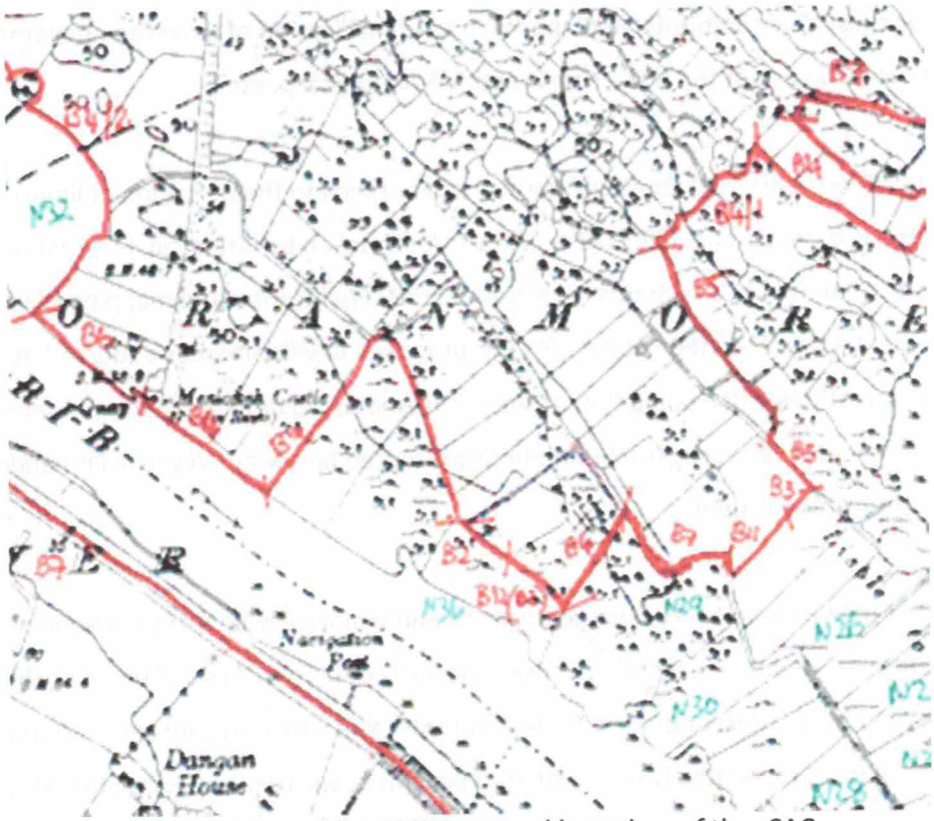

Figure 1: Scan of the 1997 surveyed boundary of the cSAC

While there are no specific target notes in the NPWS site file for the woodland area referred to as Area 1f, it is clear that this area was included on the basis that it was semi-natural woodland.

The boundary of the site was reviewed in 2003 but no amendments were proposed along this section of boundary and the woodland was retained within the cSAC. The Department has recently revised the Lough Corrib cSAC boundary. A revised boundary map for Lough Corrib cSAC was issued on Monday 17th February 2020 - Map Version 1.33. The revised map was issued following boundary changes recommended by the Designated Area Appeals Advisory Board (DAAAB) and approved by the Minister for Culture, Heritage and the Gaeltacht. A minor mapping error was also corrected on Map Version 1.33. None of the boundary changes to Map Version 1.33 related to the woodland south of Menlo Castle and this area was not assessed by the DAAAB in the recent revision of the cSAC boundary (i.e. this area was not subject to a formal appeal assessed by the DAAAB).

Question 3

With reference to the FIR response, section 4.5; What is the Department's impression of the applicant's definition(s) and approach to identification of limestone pavement in particular the use of the 50% criteria applied to polygons, etc?

In the FIR response, the applicant clarifies its approach to the definition of limestone pavement in Section 4.5 (page 32). The approach taken by Botanical, Environmental & Conservation (BEC) Consultants in relation to the classification and mapping of limestone pavement and associated habitats for this proposed development is endorsed by NPWS. It follows a rationale (including the setting of thresholds) to define this complex ecological mosaic and draws heavily from definitions presented below by Wilson & Fernandez (2013)[3], on page 7 of their report:

"Limestone pavements are both geologically and biologically important resources. The structure of limestone pavement consists typically of blocks of rock, known as clints, separated by fissures, or grykes. There is considerable variation with some areas of massive blocks of smooth, relatively un-weathered pavement with well-developed grykes, to areas

[3] Wilson, S & Fernández, F (2013) National Survey of limestone pavement and associated habitats in Ireland. Irish Wildlife Manuals , No 73. National Parks and Wildlife Service.
https://www.npws.ie/sites/default/files/publications/pdf/IWM73%20Limestone%20pavement.pdf

where the grykes are very narrow and shallow. Finely fractured pavements or shattered pavements where grykes are almost absent can also occur. The rock surface is almost devoid of overlying soils (considerably less than 50% cover) except for some patches of shallow skeletal soils, although more extensive areas of deeper soil occasionally occur (Anon. 2007). This morphology offers a variety of microclimates allowing the establishment of complex vegetation consisting of a mosaic of different communities. The vegetation in grykes is unusual as it is composed of woodland and shade species along with plants of rocky habitats (Osborne *et al.* 2003; Ward *et al.* 1976)."

The scale in terms of area at which the definition of limestone pavement is applied needs to be practical and common sense needs to be applied. Since limestone pavement is a geomorphological entity, this needs to be taken into account in applying definitions and it does not make sense to identify all areas that contain elements of water-worn limestone as limestone pavement. The Department's view is that the applicants have applied a justifiable approach to the mapping of limestone pavement and that the use of the 50% criteria relating to polygons is valid.

Question 4.

With reference to the FIR response, section 4.4, Figure 2.4-072, Figure 2.3.03 and Photograph for relevé 3734_R1 in Area. What is the Department's view on the habitat type, in accordance with EUR28? The photo is attached. In addition, it would helpful to have the same view for Relevé 1883_R1 also attached, refer to Figures 2.4-076 and Figure 2.3.04"

To assist with providing a response in relation to relevé 3734_R1, data for this relevé was inputted into ERICA (the Irish Vegetation Classification tool). ERICA is a web application which can be used to assign vegetation data to communities as defined by the Irish Vegetation Classification. Data can be uploaded, checked for errors and analysed and the results can then be downloaded. Further information in relation to this tool is available at the following link: https://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/erica/. Relevé 3734_R1 was identified as WL2A *Quercus robur – Circea lutetiana* woodland by ERICA. A full description of this community type is available at the following link for reference:

https://www.biodiversityireland.ie/wordpress/wp-content/uploads/WL2A.pdf. This describes a fairly species-poor woodland community with a very limited bryophyte flora. A small proportion of these stands (10.7%) may qualify as EU Annex I habitat 91A0 Old Oak Woodlands. Therefore the lack of assignment of this relevé to an Annex 1 habitat category appears appropriate.

ERICA identified relevé 1883_R1 as WL2E *Corylus avellana – Potentilla sterilis* woodland. A full description of this community type is available at the following link for reference: https://www.biodiversityireland.ie/wordpress/wp-content/uploads/WL2E.pdf. This is quite a species-rich woodland community with a fairly diverse bryophyte flora. Stands of this community-type do not qualify as any of the EU Annex I woodland habitats, but stands on thin soils occurring in association with karst limestone can be considered to be Annex 1 habitat 8240* Limestone pavement. In the case of relevé 1883_R1 the soil layer is thin, and blocky limestone has also been identified for this relevé. Therefore the assignment of this relevé to 8420* appears appropriate.

Question 5.

With reference to the FIR response, section 2.3, I understand that the Menlough viaduct will pass over 8240 Limestone Pavement outside the cSAC. In the Department's view, does the shading of limestone pavement under structures, for example beneath the Menlough viaduct, affect the conservation status of the Limestone Pavement?

In relation to shading, limestone pavement and its associated habitats and species occur across a spectrum of light levels, from open pavement to shaded grykes, through to scrub and woodland. As the proposed viaduct is generally orientated East -West, the impact of shading will be lessened. In addition, the main orientation of the grykes is North-South, meaning plants growing in grykes are already shaded in an East-West direction. The Department does not perceive there to be an issue with shading from the proposed viaduct.

APPENDIX

Minutes

Meeting between NPWS and N6 Galway City Ring Road Project Team

Location	NPWS Office, 90 North King Street, Smithfield, Dublin 7.	Time and date 11.00 am	27 February 2020
Purpose of meeting	Clarifications sought by NPWS at N6GCRR Oral Hearing		

Attendance	Gerry Clabby	NPWS
	Caitriona Douglas	NPWS
	Enda Mooney	NPWS
	Brian Nelson	NPWS
	Shane Regan	NPWS
	Enda Mullen	NPWS
	John Fitzgerald	NPWS
	Ciaran O'Keeffe	NPWS
	David Tierney	NPWS
	Aebhin Cawley	Scott Cawley (SC)
	Andrew Speer	Scott Cawley (SC)
	Catherine Buckley	Arup
	Les Brown	Arup
	Mary Hurley	Arup
	Eileen McCarthy	Arup
Apologies		
Circulation	Those present	

		Action
1.	**Overview**	
1.1	NPWS outlined that the purpose of the meeting is to identify to the applicant for the N6 Galway City Ring Road what NPWS consider would be required in terms of additional clarification to be provided to An Bord Pleanála (ABP) so that ABP can undertake a full assessment of the scheme in possession of relevant information.	Note
1.2	The matters discussed related to the following topics: • Birds • Hydrogeological matters arising in relation to Lough Corrib cSAC • Hydrogeological matters arising in relation to Moycullen Bogs NHA • Marsh Fritillary • Compensatory habitat provision – calcareous grassland and dry heath	
2.	**Birds**	
2.1	NPWS fully understand the principle of dissuading barn owls from foraging near the proposed road development for the	Note

	majority of the scheme. However, NPWS queried the net loss/gain of habitat versus habitat provided for Barn owl around Menlo Castle.	
2.2	SC confirmed that the resultant loss of suitable Barn owl foraging habitat within a 5km radius of Menlo Castle is approximately 9.9ha, and the provision of replacement habitat in this same area is approximately 11.76ha.	Note
2.3	Confirmation that the grazing regime required to maintain the habitat will be implemented into the future is required.	Design Team
2.4	Clarification is required on what level of protection is provided for the existing two Peregrine falcon nests in Lackagh Quarry.	Design Team
2.5	SC have spoken with John Lusby (Bird Watch Ireland) following the NPWS query with respect to the existing Peregrine falcon nests sites in Lackagh Quarry and proposed that artificial nest boxes will be provided on the existing ledges in Lackagh Quarry. This will be added to the Schedule of Environmental Commitments and will be presented to ABP.	Design Team
3.	**Hydrogeology at Lough Corrib**	
3.1	Arup gave an overview of the hydrogeology of the 2km section from River Corrib to Ballindooley Lough using data as presented in various reports within the EIAR/NIS with a groundwater contour map and hydrogeological cross-section (Lackagh to Coolagh lakes) as had been requested by NPWS at the N6 GCRR oral hearing on 21 February 2020.	Note
3.2	NPWS believe that the following clarifications should be made available to ABP: • An additional hydrogeological cross-section through the Fens adjacent to Coolagh Lake following the groundwater path that supports these Fens and include piezometric heads in the limestone aquifer. • There is a significant amount of ecology and hydrogeology data in the EIAR and NIS but the reports are voluminous. NPWS request a concise integrated eco-hydrogeology response note that links together the ecology and hydrogeology aspects with an assessment of the potential impacts on the Lough Corrib cSAC conservation objectives with specific reference to the following qualifying interests - Alkaline Fen [7230] and Calcareous fen with *Cladium mariscus* and species of the Caricion davallianae [7210*]; and with a clear conclusion to inform the Appropriate Assessment being undertaken by ABP.	Design Team
4.	**Hydrogeology at Moycullen Bogs NHA**	
4.1	NPWS noted that their main concern arose from a potential hydraulic connection via fractures in the granite between cuttings	Note

	of the proposed road development and Moycullen Bog NHA (Letteragh).	
4.2	Arup gave an overview of the hydrogeology in the area of the proposed road development relative to Moycullen Bog. The geophysical data presented (included in the EIAR) indicated that there are no fractures in the granite which may connect the bog to the proposed road development. The NPWS acknowledged that detailed mitigation measures were included in the EIAR to provide for remediation should any unforeseen fracture arise in the granite during construction.	Design Team
4.3	NPWS believe that the following clarifications should be made available to ABP: • A hydrogeological cross-section from the proposed road development to Moycullen Bogs NHA (Letteragh). This should show groundwater table levels, geophysical information, bog water tables and an indication of likely bog depth. • Provide an eco-hydrogeological response for Moycullen Bogs NHA at Letteragh that links all ecology and hydrogeology assessments undertaken, with supporting information from hydrology and geology assessments. This should include relevant excerpts from the contingency measures outlined in the Construction Environmental Management Plan included within the EIAR. This summary report is requested by NPWS to assist ABP in assessing potential impacts to Moycullen Bogs NHA.	
5.	**Marsh Fritillary Butterfly**	Design Team
5.1	NPWS request that the following clarifications to be made available to ABP: • Detail the purpose of the mitigation for the Marsh fritillary • Provide detail on the proposed translocation site(s) and on the methodology for translocation • Provide detail on the timing of when these measures would be implemented with respect to the construction activities • Clarify how the new sites will be managed for the years ahead	
6.	**Compensatory Habitat: Dry Heath**	Design Team
6.1	NPWS request that the following clarifications to be made available to ABP: • Specific proposals for translocation of *Arctostaphylos uvi-ursi* and *Daboecia cantabrica*. • Confirmation that Annex 1 Dry heath habitat [4030] can be successfully re-created using the donor and receptor sites as set out in the EIAR and supporting documentation. In this regard NPWS noted that Appendix A.8.26 of the EIAR contained, within the Compensatory Habitat Management Plan, a	

	commitment to the preparation of Ecology Site Management Plans prior to commencement of works. In NPWS view much of this information needs to be provided at this stage to ensure that it can be demonstrated that habitat re-creation will be successful at the sites proposed. • In addition details of the following need to be in place: the duration and frequency of monitoring to be provided for, certainty in relation to where responsibility lies with regard to the provision and management of habitats over the lifetime of the project, key performance indicators for measuring success in relation to habitat re-creation, details of corrective actions to be undertaken if aspects of the proposals are unsuccessful, commitments for ecologist and independent team to sign off in relation to successful habitat re-creation, separate to the construction team. • Provide commitment that any Ecology Site Management Plans, and monitoring reports will be made available to the Planning Authority and will therefore be publically available.	
7.	**Compensatory Habitat: Calcareous Grassland**	
7.1	NPWS request that the following clarifications to be made available to ABP: • Confirmation of confidence in the ability to recreate Calcareous grassland on the MDAs in Lackagh Quarry including clarification in relation to the proposals for peat to be deposited in these MDAs.	Design Team

Minutes

Meeting between NPWS and N6 Galway City Ring Road Project Team

Location	NPWS Office, 90 North King Street, Smithfield, Dublin 7.	Time and date	11.00 am 9 March 2020
Purpose of meeting	Clarifications sought by NPWS at N6GCRR Oral Hearing		
Attendance	Gerry Clabby	NPWS	
	Caitriona Douglas	NPWS	
	Enda Mullen	NPWS	
	John Fitzgerald	NPWS	
	Derek Pender	Galway County Council	
	Aebhin Cawley	Scott Cawley (SC)	
	Andrew Speer	Scott Cawley (SC)	
	Mary Hurley	Arup	
	Eileen McCarthy	Arup	
Apologies			
Circulation	Those present		

		Action
1.	**Overview**	
1.1	The purpose of the meeting is to allow the applicant for the N6 Galway City Ring Road to report back on what NPWS considered would be required in terms of additional clarification to be provided to An Bord Pleanála (ABP) in respect of the compensatory habitat provision – dry heath – so that ABP can undertake a full assessment of the scheme in possession of relevant information.	Note
2.	**Compensatory Habitat: Dry Heath**	
2.1	NPWS does not disagree with the concept of dry heath recreation. It was requested that the full bibliography citing examples of successful dry heath creation be made available to ABP.	Design Team
2.2	The following additional clarifications will be made available to ABP: • Specific proposals for translocation of *Daboecia cantabrica*. • Detailed information providing confirmation that Annex 1 Dry heath habitat [4030] can be successfully re-created using the propsoed donor and receptor sites. • The information to be contained in the Ecology Site Management Plans referenced in the Compensatory Habitat Management Plan to be set out in the documentation to be provided to ABP. • Proposals for temporary storage of turves as part of the proposed compensatory habitat provision to ensure that turves	

	are only watered with rainwater and are stored for as short a time as possible... As part of proposed dry heath compensatory habitat provision: • Monitoring to be undertaken after the turves are placed in the receptor sites every three weeks **and** after any heavy rainfall event(s) until such time as the dry heath is established, with adaptive management plans to be put in place on an ongoing basis as necessary if monitoring shows that establishment is not successful. • Monitoring to be undertaken post establishment of the dry heath habitat by Galway County Council for the lifetime of the project. • Steel Pegs of 500mm to be utilised to secure the geogrid, as part of habitat creation works. • The top 400mm of all MDAs on top of which dry heath is to be created will have a pH of less than 6.5. A root barrier is required at DA 18 which is the only MDA which may have material of a higher pH beneath the upper 400mm layer.	
2.3	NPWS expressed reservation about the use of bare peat at the receptor sites in addition to turves. Given the high rainfall amounts in the area, the use of bare peat increases the risks of erosion at the receptor sites and also creates a risk that undesirable plant species will be introduced to the receptor sites. The NPWS emphasised the need to create high quality dry heath habitat as compensatory habitat and queried whether proposals to create c. 7 ha of such habitat risked a reduction in the quality of the habitat created due to the need to use bare peat as part of compensatory habitat provision proposals.	

Appendix 2 Responses to Submissions

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
1	S_018	DCHG/NPWS	In their first submission the Department raises several topics which it considers important elements of the ecological impact assessment and mitigation in summary, these (in addition to those raised with respect to the NIS, are as follows: 1. Moycullen Bogs - Potential effects from dewatering during construction and operation of the road 2.Linear Habitats - Clarification on the length and type of boundary features Including stone walls affected by the proposed road. 3. Changes in land use - The effect on habitats within retained parts of fields bisected by the proposed Rd 4. Loss of Annex I habitats - Requested a table showing the net loss or gain of annex one habitat, plus plans for management.	These comments were responded to directly by the applicant at the oral hearing in the EIAR biodiversity evidence and separately in meetings between the Department and the applicant. These topics have also been addressed explicitly in my ecological impact assessment report. I understand that the Department satisfied with the clarifications received in each case. In summary: 1. The effect of dewatering on Moycullen Bogs NHA was assessed by Mr James Dodds and is assessment is that there is no risk of significant dewatering within the NHA as a result of the proposed road. 2. The quantity of linear habitats affected was clarified at the oral hearing with around 19 kilometres of stone wall affected plus 7.2 kilometres of hedgerows and 5.2 kilometres of tree lines. 3. The applicant has clarified that all land parcels will be accessible once the road is constructed, and therefore it will be possible for land management to continue as now. This does rather ignore that some fields will be smaller than before and therefore less useful for farming, a reduction in management could be both positive and negative football and diversity depending on the habitat president now. 4. The table showing losses and gains of annex I habitat has been provided by the applicant. This assumes that there would be 100% success rate in creating annex I habitats at the receptor site. There is a risk that the success rate is lower than this, especially on the material deposit areas in Lackagh quarry. Therefore, I would

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
				consider the net gain for calcareous grassland to be less than is indicated by this table.
			5. Mammal underpasses - Observes that, in relation to otter, the mammal passes need to be correctly installed, maintained and safeguarded in order to be effective and makes a similar point for other mammals.	5. The need for the correct installation maintenance and safeguarding of otter underpasses is recognised by all parties, and this has been written into the mitigation commitments made by the applicant. In addition to those proposed by the applicant, I have identified the requirement for additional otter passage to be provided at other watercourses, and with these there should be adequate passage for otter across the proposed road both now and in the future.
			6. Impacts on bats and mitigation measures. Again, makes the point that the mitigation for bats needs to be implemented carefully and backed up by monitoring in order for the conclusions in the EIAR to remain sound.	6. It is agreed by all parties that the bat mitigation needs to be carefully implemented. Critical to the maintenance or bat populations will be the long-term management of the created bat roosts, foraging habitat, and underpasses and overpasses. Without such management, I agree that the outcome will be worse than is set out in the EIAR. Even move the mitigation, there would still be a significant negative impact on bats due to the loss of foraging habitat and commuting corridors.
			7. Badgers - A licence may be required for any new badger sets found during site clearance.	7. Obtaining necessary licences for badger has been committed to by the applicant, see SEC 8.33
			8. Marsh fritillary mitigation measures - Observes that there will be impacts or Marsh fritillary populations and ask for more clarity on the mitigation proposed.	8. The applicant's proposal includes the translocation of marsh fritillary larval webs from the road construction site to another area of suitable habitat. However, the mitigation may be partly reliant on the provision maintenance of Marsh fritillary habitat by other landowners plus around 1ha of suitable habitat to be maintained within the soft estate. See SEC 8.41 and biodiversity evidence p23. Given the likely net loss habitat for this species, this approach could

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
				lead to a small but significant population decline in the vicinity of the road.
			9. Barn owl mitigation measures - request that barn owl habitat is enhanced or created to replace that lost because of the proposed road and at this will determine the location of the barn owl nest boxes.	9. The applicant increased its provision of barn owl habitat by essentially modifying the approach to land already set aside for bat mitigation, SEC 8.49 and identified other areas which would replace barn owl habitat, however, two of the three areas put forward as barn owl mitigation should be discounted because the route that a barn owl might take to reach these areas is too perilous, which leaves the total created as c.8ha.
			10. Peregrine falcon mitigation measures - Requests that peregrine nest sites are provided in case the current location becomes unsuitable	10. The applicant has offered an additional peregrine nest box site, to the south-east of Lackagh Quarry, see biodiversity evidence p26 and SEC8.54, which may be taken up by peregrine displaced from the quarry during construction.
			11. Wintering birds at Ballindooley Lough - Apparent contradiction between the mitigation set out in NIS and the EIAR and whether blasting is to take place in February and March in proximity to Ballindooley Lough.	11. The applicant as clarified that since Lackagh quarry is greater than 800 metres from Ballindooley lough, blasting can take place at the quarry during the winter in bird season without impacts on wintering birds at Ballindooley lough, see Biodiversity evidence p28, the distance is a minimum of 900m.
			12. Breeding birds – nest boxes - The proposed nest boxes should be monitored and the success rate reported.	12. Annual monitoring now has been committed to be the applicant, for a period of three years post construction, SEC 8.50, although it must be noted that the provision of the boxes and their monitoring will do little to mitigate the effects of the proposed road on nesting birds and bird populations.
			13. Mitigation measures and monitoring - Makes general points on the need for properly managed and implemented mitigation measures coupled with	13. I agree and have stressed that the conclusions reached n my report are contingent and the effective implementation of the mitigation.

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
			monitoring reporting and remedial actions.	
2	S_018.2	DCHG/NPWS	In its second submission the Department acknowledges some further information provided by the applicant but restates where it feels clarification is still required for: 1. dewatering at Moycullen bog NHA; 2. areas of habitats lost including for woodlands hedgerow and tree line; 3. abandoned fields fragmented by the proposed Rd; 4. Net gain or loss of annex I habitat types; 5 the use of peat In habitat creation areas for calcareous grassland; 5 the mitigation to offset loss of barn owl habitat 6. Blasting in February/March and effect on wintering birds at Ballindooley Lough 7. Mitigation measures for Marsh fritillary; 8. the need for effective mitigation for bats; 9. Planting measures on the Castlegar overbridge; 10. Mammal passage ledges within culverts	The points raised in the second submission are addressed above, except for planting measures on the Castlegar overbridge for which the applicant provided satisfactory details in the Biodiversity evidence p50. More fundamental is it location and the allocation of land to the south for development in the Galway City Development Plan, which if implemented would mean that the bridge leads to nowhere as far as the bats are concerned.
3	Ob_116	Peter and Michelle Connelly #1	Observe that there has been priority of biodiversity over impact on humans when selecting the route	The relative weight attached to private property and human wellbeing versus the environment and biodiversity is clearly an important and difficult topic.

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
				It is however a legal requirement for impacts on ecology and biodiversity to be described, assessed and considered during the route selection process and the determination of the planning application for the proposed route.
4	Ob_116.2	Peter and Michelle Connelly #2	Observes that priority has been given to ecology over people when selecting the route, noting that the habitats being avoided in the Barna area have been subjected to agricultural improvement which has only recently de-intensified and given rise to the habitats present today, also, given the proposal includes compensatory habitat creation of wet heath and dry heath, could more of this be done to facilitate a route further to the north and west, potentially making use of Article 6(4) of the Habitats Directive and citing the windfarm developments in Moycullen Bogs as evidence that development can be permitted there. Preference for the GCOB route.	As above, with respect to priorities. I think it is understood that some of the habitats present today are developing from de-intensified land use, and perhaps reverting to what might have been present prior to intensification. The habitat types and the assessment of their value has been based upon their type and condition at the time of the survey, by both the applicant and me, as set out in Section 5.12 of my report. As a point of clarification, the applicant proposes to create only dry heath, considering wet heath too difficult to replace and therefore there would be a net loss of wet heath. A route to the north and west would presumably have similar impacts and requirements for compensation. And, in terms of designated sites, Moycullen Bogs is an NHA rather than an SAC or SPA and therefore the Habitats Directive does not apply to Moycullen Bogs, which may explain the presence of the windfarms. A route further to the north and west of Barna may well be plausible, subject to a greater or lesser degree of comp5ensatory habitat creation, although I understand this option was rejected because it did not meet the objectives of the Galway Transport Strategy.
5	Ob_220	Kevin Gill and others	The constraints study area is too small and did not consider all factors equally, focussing on ecology over human	As for Peter and Michelle Connelly #1, in addition: It is correct that there will be habitat loss within the cSAC however the habitats affected are not part of the qualifying interest for the

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
			habitat, the route selection process is also excessively focussed on flora and fauna to the detriment of impacts on humans, and despite this the route selected is still damaging to the SAC, bat habitats and allows pollutants into Galway Bay, apparent preference is for no road, rather than an alternative route.	cSAC, and the area affected is a very small proportion of the total area of the cSAC which means that the impacts of the N6GCRR route are not considered significant or an adverse effect on the integrity of the cSAC, unlike the GCOB route. It is also correct that the proposed road will have an impact on bat habitats including bat roost, commuting corridors and foraging habitat. This is addressed in both the EIAR and my ecological impact assessment report. The proposed road includes mitigation such as replacement bat roosts, underpasses for bats to cross the road and the provision of enhanced foraging habitat at Menlo Castle. These measures will go some way to addressing the impact on bats but there would still be an overall negative impact on the bat population, which is described in my report. The proposed road includes treatment of road run-off before it is discharged into Galway Bay, which will remove at least most of the pollutants and, in the short term, may lead to an improvement in water quality in Galway Bay as existing traffic diverts from roads without such treatment onto the N6GCRR. However, if there is an increase in traffic, and the water treatment wetlands, are not adequately maintained, then there is the potential for additional pollutants, such as microplastics from tyre wear, to reach Galway Bay. There is also the short-lived risk of suspended solid pollution Arising from site run off during the construction phase this is however more of a risk to the rivers than to Galway Bay and would not be expected to have lasting significant effects. These three points have all been assessed in my report and will be considered when making the planning decision.

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
6	Ob_152	Sean and Audrey Dineen	Observes that wildlife seems to be more important to Galway City Council than human beings when selecting the preferred route option, with respect to the Barna area.	As for Peter and Michelle Connelly #1, in addition: I can see that avoiding adverse effects on the integrity of Lough Corrib cSAC has been a key consideration in the selection of the preferred route however in other areas such as at Barna prioritisation of wildlife areas is not so apparent in the preferred route, except for the avoidance of Moycullen Bogs NHA.
7	Ob_517.11_1	Katie Hughes	Identified by the applicant but no objection relating to biodiversity?	N/A
8	Ob_519	Colm and Marie O'hEocha	Also observe that wildlife has been prioritised over people, with an apparent preference for the GCOB route and invoking IROPI under Article 6 (4) of the Habitats Directive, and with respect to the Dangan locality	As for Peter and Michelle Connelly #1, in addition: The proximity and layout of the cSAC has clearly influenced the route of the proposed road in the Dangan locality, with the designers avoiding an adverse effect on the integrity of the cSAC. When considering the GCOB route, and the use of IROPI, it is important to remember that Article 6(4) also includes consideration of alternatives; there must be no feasible alternative to a proposed route which damages a cSAC for IROPI to be applied. There has been a negative assessment of the GCOB under Article 6(3) of the Habitats Directive and it has been decided not to proceed to the next steps under Article 6(4). If an assessment of alternatives under Article 6(4) were to be done, the currently proposed route of the N6 GCRR, or something similar, may well be the feasible alternative and would immediately take precedence over the GCOB route. That said, tunnelling along the GCOB route may also have been a feasible alternative.

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
				Moreover, I understand that the GCOB route has been rejected primarily because it does not meet with the objectives of the Galway Transport Strategy.
9	Ob_521 517.14.01	Annette and Michael Kerin	Also make the case that the consideration in the EIAR of alternatives did not adequately consider the effects on human beings and that, there being no real difference in terms of ecological impact between the routes, impacts on human beings would be the deciding factor.	As for Peter and Michelle Connelly #1, in addition: It is correct that consideration of alternatives is required under the EIA Directive, which states that the impact assessment must include "a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment" which includes the impact on human health and biodiversity. The EIA Directive does not give weight to either, nor requires prioritisation of one over the other, merely requiring a description. Other guidance makes clear that the depth and extent of the description should be proportionate to the impact in both cases. For a route options which would have an adverse effect on the integrity of the Lough Corrib cSAC, the law protecting the cSAC would prevent the use of such a route where feasible (in an engineering sense) alternatives exist, even if the impacts on flora and fauna are otherwise more or less equal between the Lough Corrib route and the alternative, see response to James McLoone for more detail.
10	Ob_521	The Kerin family, per Ciaran Sudway and Associates	Objects due to inadequate assessment of alternative routes nor given reasons for their rejection in compliance with the Habitats Directive, referencing case number C-461/17, that the EIA are did	As above.

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
			not specifically consider the impacts of the proposed Rd on the Kerin family, and that the EIAR for the proposed road did not give adequate attention to the impacts on the human environment.	
11	Ob_531.01	James McLoone	Makes similar points as Colm and Marie O'hEocha but goes further making the case that the N6 GCRR would not be found to be a reasonable alternative to the GCOB.	As for Colm and Marie O'hEocha, in addition: The wording of the Directive is "the absence of alternative solutions", with no qualifier, and the guidance is that this assessment of alternatives should be solely on the basis of ecological criteria i.e. the effects on the conservation objectives of the Natura 2000 sites, rather than economic/public interest criteria at that stage. In other words, the applicant had no choice but to choose an alternative option to one which damages the integrity Lough Corrib cSAC where such alternatives exist and are feasible (rather than reasonable) and without consideration of economics and public interest. Economic/public interest criteria only considered if no feasible alternatives are found to a development which results in the contravention of the conservation objectives. A full assessment has not been done because Article 6(4) has not been invoked however it does seem likely that the alternative assessment based upon the GCOB would point towards a solution like the N6GCRR or perhaps a tunnelling solution along the GCOB route, before IROPI would be invoked. See "Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC" (link)

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12	Ob_531.02	Donal & Elizabeth Courtney	As for Colm and Marie O'hEocha, again with respect to the Dangan locality.	As for Colm and Marie O'hEocha
13	Ob_534	Paddy & Marina O'Malley	Makes the case that ecology has been prioritised over impacts on people's homes and the investigation of alternatives is in adequate, again with respect to the Dangan locality.	As for Colm and Marie O'hEocha
14	Ob_569	Paul and Anne Mulhern	As for Paddy and Marina O'Malley, making the case that there has been inadequate attention given to impact on humans in the EIAR, with respect to the Menlo area, and requesting an amendment to the route alignment which would take it close to or into the Lough Corrib cSAC.	As for Annette and Michael Kerin and James McCloone, in addition: A revised route amendment as suggested would require a fresh look at the effects on the Lough Corrib cSAC, if it infringed on Annex I habitats then it is most likely Article 6(4) of the Habitats Directive would be invoked in which case it would need to be demonstrated first that there is no alternative (which there is, in the form of the existing preferred route) and then that there are imperative reasons of over-riding public interest, or if it did not infringe on Annex I habitats, then the amendment may be possible under Article 6(3) of the Directive in the same way as the current proposed route.
15	Ob_612	Loreta Needham and Tom Rea	Also makes the case that protection of designated sites and wildlife has been prioritised over people in the route selection, stating preferences for the GCOB, including pursuit of the IROPI option	As for Annette and Michael Kerin and James McCloone.

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16	Ob_613_657	Sharon Morris and Edward O'Reilly	Also makes the case that protection of wildlife has been prioritised over people, with reference to bat surveys and plans to relocate the bats when buildings are demolished.	As for Colm and Marie O'hEocha, in addition: The surveys and compensation measures for bats are a legal requirement and so must be done in the event that the road is constructed, provision for bats is a separate matter to consideration of the impact on private property.
17	Not listed?	Sean & Kathleen Martyn	Also makes the case that protection of wildlife has been prioritised over people, with reference to plans to relocate the bats when buildings are demolished receiving more consideration in the EIAR than homeowners. .	As for Sharon Morris and Edward O'Reilly
18	S_049	Michal and Trisha Murphy	Also makes the case that protection of wildlife has been prioritised over people, making the case for the original GCOB route and invoking IROPI under Article 6(4) of the Habitats Directive, although also refers to unacceptable impacts on designated sites at Cappagh/ Ballymoneen and the River Corrib	As for Annette and Michael Kerin and James McCloone, in addition: It is correct that the proposed road would have an impact on local biodiversity area at Cappagh/ Ballymoneen and this has been addressed in both the EIAR and in my ecological impact assessment report. The bridge however over the River Corrib should ensure no direct impacts here and subject to adequate maintenance the road run off will be treated and significant impacts on the River from pollution should be avoided
19	S_068	Galway N6 Action Group	Also make the case that the assessment of alternatives and route selection process was flawed, being excessively concerned with impacts on flora and fauna, SACs and SPAs, and avoiding the use of Article 6(4) of the	As for Annette and Michael Kerin and James McCloone,

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			Habitats Directive (the primary consideration) to the detriment of impacts on humans (a secondary consideration), with an apparent preference for no road at all, followed by a road to be located further north than currently proposed, potentially with tunnelling, or lastly, additional tunnelling along the current route at Dangan.	
20	S_070	Mary and Tom Kilgarriff	Also makes the case that protection of wildlife has been prioritised over people, and that the route selection process was not adequate, inferring that the environmental impact assessment and route selection should give more weight to human beings	As for Annette and Michael Kerin and James McCloone.
21	Ob_111	Pat Duane and Joy Bolster	Listed by the applicant but no specific points on ecology/biodiversity.	N/A
22	Ob_134	Gerard and Susan O'Dell	Makes the case that a proposed compensatory habitat area which would support dry heath will not be maintained and is inappropriate in this location, preferring a more managed amenity or agricultural land use for this plot.	The provision of compensatory habitat is necessary to offset the impacts of the proposed road on biodiversity, the site chosen for dry heath creation would need to be on relatively well drained acid soils which are prevalent to the west of the River Corrib. The exact location is a matter for the applicant's design, however the quantity created should be at least equal to that lost, and ideally several times more to account for risk. An alternative location on another person's land would be required if dry heath were not created here.

NO.	Applicants Reference	Party	Summary of submission, points relevant to ecology only	Response
				I would agree that fewer, larger areas of habitat creation than is proposed would give better results and be easier to manage. Management is essential for the maintenance of dry heath, it must be lightly grazed (which is not an option within the soft estate) or cut infrequently but regularly to prevent succession to woodland, and bracken may need to be controlled. The applicant has committed to preparing an ecological monitoring plan for each dry heath receptor site, including monitoring for at least 5 years and some management tasks presumably within the same period. There is a commitment to manage the calcareous grassland at Lackagh quarry in perpetuity, SEC 8.19, but I could find no such commitment to dry heath habitats, this needs to be addressed and I have specified additional mitigation to cover this point which may provide you with some reassurance.
23	Ob_583	McHugh Property Holdings	Whilst overall supportive of the proposed road, expresses concern about the extent of additional lands on their property, Lackagh quarry, being used to provide compensatory habitat to replace areas of Annex I habitat lost because of the proposed road and is therefore objecting. An alternative location at Kinvara is suggested, and the overall need for compensatory habitat and its quantum is not contested. .	The provision of compensatory habitat is necessary to offset the impacts of the proposed road however the location just needs to be in an area which has suitable geology and soils. It does appear as though the areas being used for deposition of excess material which cannot he used for road construction are also being used as convenient places for habitat creation even if these are not necessarily the most suitable areas for such habitat. A concern with the habitat creation at Lackagh quarry is that it is proposed to create dry calcareous grandstand upon material deposition areas containing peat and within an area which may occasionally flood. In my opinion, there is a reasonable prospect that some of the grasslands created here will not achieve the quality required to compensate for lost Annex I habitats. I have only been able to assess the proposal put forward by the applicant, but I could

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				say that the use of an area of now agriculturally improved grassland that was the Annex I habitat in the past as a receptor site would give more certain results. The issue with compulsory purchase which not go away as clearly the compensatory habitat will need to be provided on somebody's land.
24	Ob_566_598	Sylvester McDonagh	Objects to the compulsory purchase of lands at Menlough for use as bat mitigation, indicating that there are lots of other places where the mitigation could be located which would be more suitable for bats.	Menlo Castle supports an important roost for Lesser Horseshoe Bats and therefore the lands around the castle are the best location to provide foraging habitat for this species, as set out by the applicant in the Biodiversity evidence p35-40, I agree with the applicant's assessment set out on these pages.
25	Ob_6 48	Mary Flattery	Objects to land being used to compensate for impacts on bats, making the case that existing designated areas (SAC) are more than adequate to provide habitats for bats.	As for Sylvester McDonagh, in addition: The SAC does not provide enough habitat on its own to sustain the local bat population. Therefore, compensatory habitat is required to offset losses that would be caused by the proposed road. Even with the proposed compensatory habitat, there is a risk that bat populations decline locally because of the proposed road.
26	Ob_481	Nora Keane	Objects to the loss of a stone wall (and replacement with a fence) and stone walls in general partly due to loss of habitat for animals and plants.	It is correct that the proposed road will result in a net loss of stone wall habitat with consequent effects on the wildlife which inhabits the walls as well as bats which may use the walls as features along which to commute. This is a relatively minor impact when compared to the loss of semi-natural habitats such as wet heath and limestone pavement but an impact, nevertheless.
27	Ob_480	John Feeney	Objects due to the loss of stone walls which is contrary to the Galway City and Council Development Plans.	It is Galway City Council's policy to encourage the retention of stone walls within new development where feasible. However, the council also has an overriding policy for the GCRR, which states that the

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				GCRR has priority over other plan policies, including that concerned with the protection of stone walls.
28	Ob_311	Matthew and Eileen Burke	As Nora Keane for stone walls (similar text), same property consultant, also object to the serious negative impact the proposed road will have on wildlife and whether any consideration was given to wildlife in the area (Rahoon).	As Nora Keane for stone walls. The applicant has addressed the effects of the proposed road on wildlife (biodiversity) in the EIAR and obviously my report also addresses the topic. It is correct that the proposed road will result in the loss of biodiversity, as set out in the conclusion of my report. The applicant has put forward measures to mitigate the impact, and I have suggested additional mitigation. There remains in the proposal an extensive loss of habitat, plus fragmentation and isolation of remaining habitats along the route corridor which will deplete wildlife, as set out in Table 13 of my ecological impact assessment report. The impacts on biodiversity wil be considered as part of te planning application process.
29	Ob_246	Matthew and Mary Burke	As Nora Keane (similar text), same property consultant.	As Nora Keane.
30	Ob_201	Martina Concannon and Alan Giblin	Make an explicit observation with respect to the impact on wintering curlew at Cloughscoilte noting that 2.2 hectares of their habitat will be lost directly and that there will also be effects on curlew using the surrounding land and potentially those flying over the proposed road, reports a flock of around 15 curlew feeding daily In nearby fields.	The wintering population of curlew is primarily made up of migrants which breed outside of Ireland. This species does not have specific protection outside of the bird breeding season although the wintering population here could be part of population that forms the qualifying interest feature of the Inner Galway Bay SPA, if so this provides some protection i.e. the curlew population of the whole bay is to be maintained at a favourable conservation condition (it is currently in favourable condition). It is correct that a small number of curlew will be displaced by the construction and operation of the proposed road, both from the footprint of the road and up to 200m on either side. The birds may well find alternative habitat in which to forage. However, the

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				scientific evidence is that displaced wading birds do not fare well. Even so this may not cause any more than short-term decline in the population if there is ample alternative foraging habitat available, as the applicant asserts in the Biodiversity evidence p47. On balance, I would expect a change in distribution (birds moving away from the road) and a small decline in the population, which will be difficult to perceive (i.e. it would not cause appreciable population level effects). The observer's numbers are treble those reported by the applicant during its winter bird survey and they do not provide any supporting evidence or details of location (photos and maps) From their submission, I am not clear if these birds are habitually foraging within 200m of the route of the proposed road. Any impacts could be addressed by Galway City Council through the inclusion of wet grassland management in the Biodiversity Network for the city. The road would not be expected to present a barrier to the movement of the birds as this species readily crosses existing road infrastructure.
			Also request the use of evergreen species for screening planting including Scots pine and holly.	Scots pine is unfortunately a non-native species which is invasive in sensitive habitats such as heathland therefore I suggest this species is not planted in proximity to heathland habitats. The same issue does not apply to holly and therefore a higher proportion of holly in the species mix would be acceptable.
31	S_074	Menlough and Ballindooley Residents	Notes that the EIAR records 121 unidentified species and asks whether these species have subsequently been identified and for the list to be made available, make the point that these need to be considered.	I was not able to find a reference to unidentified species other than pipistrelle bats, which would be either common or soprano pipistrelle, which have a similar conservation status. Following the production of the EIAR, a Further Information Request was made of the applicant which included much more detailed vegetation surveys along the route of the proposed road with most species

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				identified fully, with a small number identified to genus only. I am satisfied that enough information has been gathered the plant and animal species present along the proposed road to make an informed ecological impact assessment and this has now been done and will be considered when determining the planning application for the proposed road.
			Notes that there will be significant losses of hedgerows which provides sanctuary to birds, requesting information on the legal position with regards to clearing bird nesting habitat during the nesting season.	The applicant has confirmed that 7.2 kilometres of hedgerows and 5.2 kilometres of tree lines will be lost, which will be a significant impact. The applicant has committed to clearing the vegetation outside the bird breeding season, or having an ecologist supervise the works, SEC 8.42. This does quite amount to protection of the nests but is inferred that active nest would not be destroyed. And of course, this is only helpful during the construction period, after that a decline in the breeding bird population would be expected due to loss of habitat. The legal position is that all wild birds receive protection in Ireland, under the Wildlife Act 1976 as amended; the original exceptions in the Third Schedule of the Act all now receive protection as a result of amendments in 1980 (bullfinch) and1985 (all the others). The law prohibits hunting (with exceptions); injury; wilfully taking, removing, destroying or mutilating eggs and nests; and wilfully disturbing protected species of birds on or near a nest containing eggs or young. Furthermore, Section 40 of the Act prohibits, with certain exceptions, the cutting, grubbing, burning or destruction of vegetation on uncultivated land between 1st March and 31st August, which covers the nesting and breeding season for most birds. The law includes a specific defence for those constructing a road or carrying out any other building and construction work, meaning that unintentional (NB this word was introduced in the

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				1985 amendment) killing, injury, etc of any bird species is not an offence if it occurs as a result of such activity. This means that deliberate destruction of bird nests during construction would be an offence.
			Observes that there is no reference in the EIAR to the many species of bees which inhabit the area, noting that there may be rare species of bees present and presenting photographs of nests from Lough Corrib cSAC and observing that there are similar nest sites in the adjoining areas. Also observes that there are ant hills which were not referred to in the EIAR.	The applicant responded specifically to the impact in bees in the statement of evidence on biodiversity, stating that the main habitats affected in Coolough area are woodland, scrub and improved grasslands, which are not good habitats for bees, while the proposed habitat creation within Lackagh quarry will provide good bee habitat, and provide a positive impact on bee populations. However, some bee species are found in woodland and can take advantage of woodland flowers in early spring, while woodland edge can also provide good foraging habitat for bees. Bee nests tend to occur in rough grassland, as shown in the photograph provided, with only a small patch needed. It is not clear whether any nest sites or suitable habitat for nest sites will be affected by the proposed road, nor what species of bee or bees would be affected if so. From your photographs, there may be three species of bumblebee present, possibly (i) *Bombus terrerstis* or *B. lucorum*; (ii) unidentified species and (iii) a carder bee, most likely *Bombus pascuorum*, however it is hard to tell from the images exactly which species. If my identification is correct, these are common species, impacts on which would not be significant. However, perhaps more could be done in mitigation to provide habitat for bees within the soft estate for the proposed road. The ant hills are most likely of yellow meadow ant, which is also a common species, upon which impacts would not be significant. Although again, perhaps more could be done in mitigation if any significant ant hills are to be lost as a result of the proposed

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				including translocation of the ant hills which has been shown to be successful elsewhere, see Box, J. D. (1987). A simple technique for the translocation of anthills. Field Studies, 6(4), 617-618.
			Observes the presence of endangered orchids in the area	The orchid species recorded in the route corridor by the applicant are pyramidal orchid *Anacamptis pyramidalis*, common spotted orchid *Dactylorhiza fuchsia*, O'kelly's spotted orchid *Dactylorhiza fuchsii v. okellyi*, heath spotted-orchid *Dactylorhiza maculata*, a sub-species of heath spotted-orchid *Dactylorhiza maculata s. ericetorum*, a spotted orchid *Dactylorhiza* sp., common helleborine *Epipactis helleborine*, a helleborine *Epipactis* sp., fragrant orchid *Gymnadenia conopsea*, common twayblade *Listera (Neottia) ovata*, early purple orchid *Orchis mascula* and lesser butterfly-orchid *Platanthera bifolia*. These are all classified as being of least concern in Ireland however the variety *Dactylorhiza fuchsii v. okellyi* is found mainly in Ireland. At least some individuals of these are likely to be impacted during the road construction, although some may be included in areas of grassland to be translocated to the habitat creation areas. Translocation of orchid plants is possible and could be included in the mitigation, where not already included in grassland translocation.
			Observes that there will be impacts on protected species including lesser horseshoe bat and that the bats are unlikely to occupy replacement roosts	You are correct that there will be a negative impact on protected species such as lesser horseshoe bats. There is however good evidence that replacement roosts are used by bats if they are in the right place and well-designed, see for example case study 4.
			Requests that ash is not included in the tree planting mix to avoid the introduction of ash dieback disease.	The use of ash and other tree species is governed by S.I. No. 459/2020 - European Union (Plant Health) Regulations 2020 which, if followed, should ensure that ash dieback disease is not imported to the locality, through the planting of ash trees, however the disease is now prevalent in Ireland and likely to cause the death of

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				the majority of ash trees over the next two decades (Ash dieback - Teagasc | Agriculture and Food Development Authority), regardless of any planting. The applicant may decide not to plant this species given its likely demise, and this would be a sensible decision.
			Observes that the EIAR fails to consider the populations of hare present at Lackagh quarry, Lough Corrib SAC and the surrounding areas, or a feral goat population in the same area and the impacts on pine marten which live along the route.	The EIAR does consider the effects on hare and pine marten populations, and I have also assessed the impacts on these species in my ecological impact assessment report. Irish Hare is relatively common in Ireland and whilst there will be a localised impact, this is not considered to be significant by either the applicant or me. Pine marten, however, is one of the rarest native mammals in Ireland and the loss of one territory is predicted by me (but not the applicant) and therefore, in my view, the road would have significant impact on pine marten populations. Goats are not native to Ireland and therefore would not normally be considered of ecological value.
			Observes the loss of Annex I and Annex I priority habitats, stating that this is ill-considered and reckless, stating that the loss of such habitat is irreplaceable, and that the mitigation measures mentioned in the EIAR are unrealistic.	It is acknowledged by the applicant that there will be a loss of Annex I habitat including small areas of two types which it considers irreplaceable: wet heath and limestone pavement. However, the applicant has proposed compensatory habitat creation for some Annex I types that it considers re-creatable. including dry heath and calcareous grassland. Therefore, while there will be a net loss of limestone pavement and wet heath, the compensatory habitat may go some way towards replacing lost areas of other Annex I habitats. I agree that there is however a risk that the replacement habitat does not achieve the quality or condition required, especially the calcareous grassland proposed for Lackagh Quarry, and this is acknowledged in my report.

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			Notes the potential impact of road construction on curlew and lapwing Ballindooley Lough.	The proposed road would not result in direct impacts Ballindooley lough and blasting activity for the construction of the road will not occur during the winter months, when it would be expected that curlew and lapwing are present at the Lough, therefore these species populations should not suffer disturbance during the construction of the road.
32	S_039	Joseph Hynes	Objects to the proposed road due to impacts at the River Corrib including the ecological impact.	The River Corrib will be crossed by a bridge and therefore the river and its wildlife would not be affected directly during the construction and operation of the road, there are risks of pollution during construction and operation, but these can be fully mitigated (with maintenance), which should safeguard the fish, otters and mussels for example that inhabit the river. Perhaps the main ecological impacts here are partial loss of the woodland on the east bank, potential displacement of a regular oystercatcher flock from the NUIG fields, and risks to barn owl, bats and other mammals from road traffic when the road is operational. These impacts are of at least local significance and should be considered when the planning application is determined.
33	S_046	Mary Silke	Raised a concern about the effect on garden wildlife including bats, hedgehogs, foxes, rabbits and birds at her property which is c. 100m from the proposed road nr Galway Racecourse	Bird densities are lower in proximity to roads and this is addressed in paragraph 9.8.1 of my report and it may be that other wildlife is similarly affected. Given the location of the garden, it is possible that the number of breeding birds in and around are reduced in number in and around the garden, with the other species you list also potentially affected as well due to loss of habitat and mortality during the operation of the road.
34	S_062	Sarah Silke	Also raised a concern about damage to garden wildlife, especially that arising from dust during construction	As for Mary Silke, in addition: Construction dust would not result in the mortality of birds, rabbits, foxes and hedgehogs, such mortality is more likely to occur for birds

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				and fox when the road is operational due to collisions with traffic and could well result in a population decline, as you suggest. Mammal resistant fencing should prevent mortality (and decline from this cause) of the other mammal species that you mention. This has been accounted for in my impact assessment, see Table 13 for example, and will be considered during the planning application process.
35	S_066	Siobhan Silke	Also raised a concern about the effect on garden wildlife at her property	As for Mary Silke
36	Ob_136	Barbara Flaherty	Listed by the applicant in the Biodiversity evidence but no specific points on ecology/biodiversity?	N/A
37	Ob _141.2	Angela Silke	Mentions enjoyment of wildlife in proximity to her property, including swallow, ducks, cuckoo and fox which live in nearby hedges and trees, with part of the garden also lost to development. The property is located in Forramoyle East, Barna	It is the case that bird densities in proximity to the proposed road are likely to be lower than currently, although the effect may not be so pronounced in the western section where this property is located due to lower volumes of traffic. Foxes are also vulnerable to being killed by traffic, although the design does include underpasses which could be used by this species. The effect on birds and other wildlife will be considered when the planning application is determined.
38	Ob_199	Thomas Concannon	Objects for a variety of reasons including the negative impact on the general ecology of the area around CPO Ref 199, which has a vast array of flora and fauna.	It is the case that along the route of the proposed road there will be a significant loss of flora and fauna, and some areas of irreplaceable habitat, as set out in the EIAR and my ecological impact assessment report. This will be considered when the application for the proposed road is determined.
39	Ob_630	Geraldine Boyle	Objects to the proposed road for reasons including that it is contrary to	The reference in the Galway City Development Plan for the Castlegar area and biodiversity is to the outcome of a public

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			the Galway City Development Plan for the Castlegar area, which highlights protection biodiversity in the Castlegar area as a priority and the huge disruption that construction of the road what have on wildlife and habitat in the area	consultation, rather than a policy statement. However, parts of the Castelgar area are included in the Ballindooley – Castlegar Local Biodiversity Area which is protected through policies in the local plan; Policy 4.2. It may be that up to 1.0ha of this LBA is affected. There is however a policy for the N6 GCRR which appears to override Policy 4.2 for the purpose of constructing the road.
40	Ob_751	Tom Burke	Objects to the proposed road for a variety of reasons including significant adverse impacts on the environment, including flora and fauna, which will be irreparable.	As for Thomas Concannon
41	S_017	Derrick Hambleton	Does not make a specific point about biodiversity but makes the observation that all environmental impacts should be identified and mitigated by the applicant, with appropriate alternatives considered, and that any deficiency in the EIAR should be remedied by an information request and that the board should only grant consent for the project when it can be demonstrated that the direct and indirect impacts happen identified at any significant adverse effects mitigated.	The purpose of the EIAR and the further information response is to provide information on the likely significant effects of the proposed road on the environment, including biodiversity. Unlike the habitats Directive, the EIA directive does not require tests to be met in order for consent to be granted. Therefore, the identification of significant impacts, mitigated or otherwise, does not necessarily lead to the refusal of planning consent. You will see from the further information request, that I did consider there to be gaps in the information provided in the EIAR. However, these were remedied through the information supplied both in the further information request and presented by the applicant at the oral hearing and have allowed an adequate description of the significant effects, with respect to biodiversity, to be made.
42	S_022	Eve Daly and Laura Kennedy	Observes that Dangan offers opportunities to connect with nature including the biodiversity trail which takes the public through natural	The comments relate mainly to the effect on people however It is correct that there will be an impact on biodiversity in this area, particularly the woodlands at Menlough and the NUIG sports pitches. This is partly offset by the creation of enhanced habitats for

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			habitats which exist along the banks of the River Corrib and that this situation will be adversely affected when the proposed road is constructed.	bats around Menlo Castle and impacts on the riverbanks are largely avoided with the construction of the River Corrib bridge.
43	Ob_155	Finbarr And Margaret McCarthy	Objects to the proposed road including on the grounds that the surrounding rural countryside and ecology would be overwhelmed with extra pollution unhealthy fumes and noise which would affect humans and widespread wildlife including birds, bats and other ground creatures and flora, with respect to the Barna region.	It is correct that the proposed road would result in the loss of biodiversity in the Barna area, principally through the loss of habitat during the construction of the road, with effects from air pollution and noise pollution being quite limited. However, there is evidence that numbers of birds are reduced in proximity to roads, which may be partly to do with these factors. The same may apply to other species. This is addressed in my report and will be considered as part of the planning consent process.
44	Ob_216	Mr Shane Kelly	Objects for reasons including Badger disturbance and the subsequent spread of bovine TB and mitigation.	The proposed road would result in some disruption to badger social groups. This is however mitigated through the provision of replacement setts and badger crossing points underneath and over the road. These measures will limit the degree to which badger territories are disrupted and therefore limit the dispersal of badgers. Overall, with the proposed mitigation, I would expect a relatively minor perturbation which would settle once the road becomes operational, see the case study referred to be the applicant in its Biodiversity evidence p48, for example. The effect of the proposed road on badger dispersal would not be expected as much disruption as an area wide cull. The science on the spread of TB by badgers is complicated, however, there may be a very slight increased risk to cattle during construction and the first year of operation, and then returning to baseline levels of risk.
45	Oral hearing	The Department	Considers further detail is required in relation to the ecological impact	Other than the potential for de-watering Moycullen Bogs NHA, these points were addressed by the applicant in the module 1 response,

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		of Culture, Heritage and the Gaeltacht	assessment (in addition to those required for the appropriate assessment under the Habitats Directive) these were (i) potential de-watering affecting the water table at Moycullen Bogs NHA; (ii) marsh fritillary mitigation; (iii) Annex I habitat creation including remedial actions; (iv) mitigation for peregrine falcon; (v) net effect on barn owl foraging habitat. The Department stressed the importance of effective and timely mitigation in order for the applicant's conclusions to hold.	65 pages plus appendices, which I understand meets the expectations, in terms of clarity, of the DCHG. The clarifications are welcomed and have based my assessment of the effects on the road on biodiversity based upon the responses provided by the applicant. In addition, all parties appear to be satisfied that the proposed road would not result in de-watering of the Moycullen Bogs NHA.
46	Oral hearing	Mrs Deidre Goggin	Raised points about the impacts on wildlife in and around homes and gardens at Castelgar and the links of a wildlife corridor to Ballindooley wetlands which do not seem to have been considered by the applicant in the EIAR.	The points about impacts on garden wildlife have been raised by others previously; it seems likely that there would be a negative effect from the road on wildlife, including garden wildlife, in proximity to the road, and also that there would be a degree of isolation of habitats and wildlife populations to the south of the road. I have considered these points in my impact assessment.
47	Oral hearing	Mr Kevin Gill	Raised concerns about the apparent priority of ecology and biodiversity over the impact on humans, in particular the effect on private property, in the route selection process and the potential for the mitigation (monitoring and management) to fail, citing examples of other failures, and how long the commitment to manage mitigation	The points about priorities were also raised in Mr. Gill's written submission, and these are addressed in row 5 of this table. There is a risk of the failure of the mitigation measures; in my experience this all depends on the quality of the detailed design, and the commitment to post-construction management, informed by high quality monitoring. The habitat creation measures are feasible, although I have reservations about the quality of the design for the calcareous grassland at Lackagh Quarry and suggest this is discounted by 50% to account for the risk of failure. Fewer, larger

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			lasts, notes that the cost to people and the environment will be very high if the scheme is consented.	areas of created habitat would make it easier to maintain, however, it is possible to manage small areas well. The applicant has stated its commitment to monitoring and management, and has committed to manage the calcareous grassland at Lackagh Quarry in perpetuity, but is vaguer about the time period for other habitats, I have proposed additional measures to address this point. I believe I have set out clearly the ecological impact that would be expected as a result of the proposed road and this will be considered during the planning application process, alongside the costs and benefits to the human population.
48	Oral hearing	Mr Peter Connelly	Raised concerns about the apparent priority of ecology and biodiversity over the impact on humans, preferring a route to the north of the GCRR, such as the GCOB, noting that the land here has all been subject to farming and whether mitigation/compensation could be applied, and also the impact on stone walls with around 3000m of stone wall lost and only 1000m created, with post and rail fencing used instead, which would cause damage to soils etc during installation and re-installation.	Mr. Connelly makes similar points in his two written submissions and these are responded to rows 3 and 4 of this table. The point about net loss of stone walls is also addressed above; the habitat in the fields between the stone walls is generally more valuable for biodiversity, nevertheless the net loss of stone walls is one of the impacts of the proposed road which could perhaps be mitigated further as you have suggested.
49	Oral hearing	Mr Brendon Mulligan	Cites one planet living principles including biodiversity protection, and the general need for biodiversity protection in general, and the links between climate change and biodiversity loss, and the need to act	Mr. Mulligan provides a good summary of the current state of biodiversity loss, climate change and the interaction between the two. Moreover, you are correct that the construction of the proposed road will contribute towards biodiversity loss and that there is some

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			now, in response to the climate and biodiversity emergency, with the N6 GCRR contributing significantly to the detriment of biodiversity in Ireland, and the actual implementation of the mitigation is uncertain, questioning if the resources needed will really be available for its successfully implemented, meaning the outcome may be even worse than described in the EIAR with increased carbon emissions making matters worse still.	uncertainty with respect to habitat creation, the net effect being between approximately 80ha and 100ha loss of higher value habitats, depending on the success of the habitat creation, plus the effects of fragmentation, isolation etc. The net loss of biodiversity was acknowledged by the applicant at the oral hearing and I have set out clearly in my ecological impact assessment report. That said, the Galway County and Galway City Development Plans contain measures which work in the opposite direction, such as the establishment of an ecological network in Galway City and a commitment to implement management plans for Natura 2000 sites in the County. The net effect on biodiversity has not been calculated. It would be possible, as set out in my conclusion, to go further than this and more directly offset the loss of biodiversity resulting from the proposed road through habitat restoration and enhancement elsewhere in the county. These measures could also assist with carbon sequestration.
50	Oral hearing	Mr Patrick McDonagh	Raised concerns about the effects of the flooding within Lackagh Quarry being exacerbated by material deposition in the quarry, the potential for polluted road run-off to reach Lough Corrib cSAC via ground water infiltration basins, the effect of material deposition within the quarry on petrifying springs within the quarry, the effect on carline thistle in Lackagh Quarry, potential loss of ant hills, foxes and the local hare population, which is substantial.	The points made by Mr. McDonagh were also made in his written submission, and are responded to above and in Appendix 3 of my appropriate assessment report. Additional points relate to petrifying springs and Carline thistle, which will be impacted during the construction of the proposed road. Carline thistle Carlina vulgaris is classified as Least Concern in the Ireland Red Data Book and is widespread in Leinster and Connaught; therefore impact on this species would not be significant beyond the local area. The impacts on petrifying springs are acknowledged by the applicant in the EIAR and subsequent documents and have been accounted for in my impact assessment see Table 13.

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51	Oral hearing	Mr. Michael O'Connor	Mr. Michael O'Connor makes points about the ability of the environment/ biodiversity to recover, citing the Mutton Island Waste Water Treatment, and that adequate account appears to have been made of ecology/biodiversity impacts by the applicant in order for the road to be consented.	I cannot comment on the Mutton Island impacts or effectiveness of the mitigation, but I can agree that is it possible to avoid, mitigate or compensate for impacts on biodiversity for some developments, and even provide a net gain. With respect to the proposed road, this would have an overall negative impact on biodiversity which would be partially mitigated in the applicant's proposals.
52	Oral hearing	Mr Tom Corr who represents Dermot and Sarah Harney	Mr Tom Corr who represents Dermot and Sarah Harney who raised concerns about the use of a nearby building as a replacement bat roost, preferring it to be elsewhere away from their property.	It will be a legal requirement to replace the bat roost somewhere in the vicinity of that being lost. I agree with the points made by the applicant's ecologist at the oral hearing that the presence of the bats in replacement roost with not be noticeable and that it will not attract predators or scavengers.
53	Oral hearing	Mr Stephen Dowds who represents of N6 Action Group	Mr Stephen Dowds who represents of N6 Action Group who mainly makes points relevant to impacts on Lough Corrib cSAC which is relevant to the appropriate assessment report, mainly but also sough clarification about the route selection process and avoidance of designated sites and development sites.	The clarification on the route selection process was provided by the applicant at the oral hearing, I believe to your (Mr Dowds) satisfaction.
54	Oral hearing	Mr Vincent Carragher	Raises concerns about animal corridors and the movement of species, the EIAR is flimsy and does not cover insects well enough, nor firm detail of corridors and how these will account for land-based invertebrates (as well as vertebrates), essentially the	It is correct that the proposed road will fragment some habitats and isolate those to the south of the road, this will be mitigated by the provision of underpasses, bridges, ledges in culverts, tunnels and overbridges, however the overall "permeability" of the landscape will be reduced from today particular for small land-based animals, but also bats. I have considered this point in my ecological impacts assessment and it has informed my conclusion. I agree that EIAR

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			assessment and mitigation is not adequate.	could have dealt with invertebrates more thoroughly, however, the value of invertebrate communities/populations is generally commensurate with the value of habitats and I have undertaken my assessment on that basis.
55	Oral hearing	Mr. Dermot Flanigan on behalf of McHugh Property Group	Mr. Dermot Flanigan on behalf of McHugh Property Group makes the case for material deposition areas and compensatory habitat to be other than in Lackagh Quarry, and for reduced quantity of grassland with a ratio of slightly greater than1:1 being all that is required.	It is necessary for compensatory habitat to offset losses of Annex I and other important habitats. The applicant has proposed the creation of compensatory habitat to replace some Annex I habitats affected by the proposed road but not other habitat types specifically. This means that there would be overall net loss of higher value habitats, rather than a gain. There is no standard ratio of gain to loss established in Ireland however in England the approach is set out in Natural England's Defra metric 2.0. Looking at calcareous grassland specifically, the ratio from this metric would be approximately 7ha to be created for every 1ha lost. Limestone pavement is regarded as irreplaceable and therefore no ratio is available from this source, but it could be assumed to be at least the same ratio. The proposed road would result in the loss of approximately 0.25ha calcareous grassland and 1ha of limestone pavement, so 1.25ha which when multiplied by 7 gives 8.75ha, which is above the amount proposed to be created. On that basis, and given the overall net loss of higher value habitats described above, I do not think there is an argument for reducing the level of compensatory habitat. The location of the created habitat would ideally be a restoration of where it occurred previously; the use of a highly engineered solution (including on buried peat) in the base of a quarry does not seem to be an ideal solution or location however it is the only one put

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				forward by the applicant and I have made my assessment on that basis.
56	Oral hearing	Galway Athletics Board	Raised concerns the following points:	
			(i) impacts on the River Corrib and surrounding area (including loss of access to nature by people) and its plant and animal life;	The River Corrib is spanned by a bridge and the water being discharged into the river will be treated beforehand which means that significant direct and indirect effects on the river and its wildlife are not expected, provided that the construction works are well managed, to avoid run-off into the river, and the water treatment infrastructure is properly maintained when the road is operational. I could agree that the presence of the road would be detrimental to the enjoyment of nature in this locality by people however it should not preclude it altogether.
			(ii) impacts on badger, including the efficacy of badger/mammal underpasses,	There will be direct and indirect effects on badgers, as set out in the EIAR and my ecological impact assessment report. You make valid points about the need to install wildlife underpasses correctly and to have enough of these, coupled with fencing, to prevent or reduce traffic mortality of badgers and other mammals. If installed correctly, these underpasses are effective. My assessment is that more culverts need to be made suitable for otter (and therefore badger) and that with these the quantity of crossing points to be provided is adequate for these two species and other large mammals such as fox. Mammal resistant fencing (post and rail construction) is effective for badger but not fox or pine marten which can easily scale the fence. The fencing is to be installed along the entire route

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				except for small areas close to the junction with the existing N6. This should prevent most badger mortality.
			(iii) impacts on kingfisher, other birds and the adequacy of the bird survey which did not detect kingfisher;	The bird survey work is borderline adequate for a scheme of this size and the number of visits is in accordance with TII guidelines. The survey has enabled the broad impact on bird species and numbers to be assessed. Nevertheless, more visits, the use of territory mapping and a broader survey area would have improved our understanding of the impacts of the proposed road on breeding birds. You are correct that the survey technique and effort used in the surveys would be unlikely to find kingfisher. However, it is also the case that the design of the road including a bridge over the Corrib and pollution control measures, should ensure that population of kingfisher on the River Corrib is not affected.
			(iv) impacts on bats, including loss of 14 roosts in buildings and two in trees, loss of foraging habitat, noise and light pollution,	It is correct that the proposed road, even with the proposed mitigation, is likely to have a negative impact on bat populations, I have set this out in my report, including in Table 13 and it has informed my conclusion.
			(v) risks to peregrine falcon, affecting one of only two nesting pairs in the whole of Galway.	Again, it is correct that there is a risk to the local peregrine population because of the prosed road. They are long-lived birds and could cope with displacement from the quarry for a breeding season or two during construction however the presence of the road and the risk of mortality from traffic may make Lackagh quarry unsuitable in the long term. I have accounted for this in Table 13 and my conclusion.

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			(vi) NUIG new pitches application needs to be included in cumulative impact assessment.	Again, you are correct that the NUIG pitches must be considered in the cumulative impact assessment, along with a host of other prosed developments in Galway City, I have done this and once again it has informed my conclusions.
			(vii) there has been lack of a biodiversity officer in Galway City to represent the views of local people.	As this is not directly part of the ecological impact assessment, I will not comment on this point.
			(vii) it is a fabrication in the EIAR to say that there will be no impact.	I think it is acknowledged that there will be a significant impact on biodiversity overall by all parties, including the applicant, although the detail varies. There are some instances, for example pine marten, where I would agree with you that there are significant impacts which have not been acknowledged by the applicant. I looked at all the applicant's data gain, and made my own assessment, in which I have been as objective as possible and I believe it represents a fair description of the likely significant effects of the proposed road on biodiversity.
			(viii) and that there will be a disparity between proposed mitigation and what will actually be delivered and	I agree with your point that for the proposed mitigation to be effective, it must be implemented properly, with adequate funding and so on. DCHG has also stressed this point repeatedly to the applicant and in its submissions to An Bord Pleanala. The applicant has committed to implementing the mitigation properly and if the road is consented then doing so would be a legal planning obligation, which may provide you with some reassurance.
			(ix) Development does not meet the objectives of the Galway City	The Galway City Development Plan includes an over-riding policy in favour of the GCRR, which means it takes precedence over all other policies along its route. Without this over-riding policy, the

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			Development Plan or the National Biodiversity Plan.	GCRR would be contrary to the objectives for biodiversity set out in Plan. As it would result in a net loss of biodiversity, the proposed road would clearly be contrary to the objectives of the national biodiversity Plan.