

Curraghinalt Mine Project (Dalradian)

Ecology Statement of Case

Evidence of:

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Prepared for:

Fermanagh and Omagh District Council

2740409

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EXECUTIVE SUMMARY

Having reviewed the ecological information provided by the applicant, I have identified a range of issues as outlined in Table 1 of my evidence below.

Table 1 Ecological Issues and concerns identified

Ecological issue	Concerns
Ecological surveys	
Aquatic habitat surveys (RHS and LCUS)	Undertaken during suboptimal conditions and surveys considered out of date
Fish surveys	Surveys not undertaken in smaller watercourses / burns. Surveys undertaken in larger watercourses could be considered out of date
Freshwater pearl mussel surveys	Surveys out of date, undertaken during sub-optimal conditions and not undertaken in smaller watercourses / burns
Crayfish surveys	No evidence of having been undertaken, or no obvious justification for them not being undertaken
Otter surveys	Undertaken during suboptimal conditions and not in all areas which may be impacted by the scheme
Environmental Statement	
Designated sites	Impacts on designated sites not given due consideration
Non-designated sites	Impacts on other habitats not given due consideration
Species	Impacts on Otter have not been adequately considered in the ES
Species	Mitigation for Badgers, Breeding birds, Bats and Marsh fritillary not sufficient to comply with local nature conservation policy
Monitoring	Monitoring of mitigation for habitats and species not of a sufficient timescale for a development of decades
Habitats Regulations Assessments	
Adequacy of HRAs (insufficient certainty in outcomes)	Lack of clarity in information presented
	Inadequacy of screening
	Lack of detail in identification of source-impact-pathway
	Lack of consideration of potential impacts on supporting habitats
	Inadequacy of ecological surveys underpinning the assessment
	Inadequacy of assessment of air quality impacts
	Inadequacy of assessment of disturbance from human activity (noise and visual disturbance)
	Inadequacy of assessment of hydrological implications
Inadequacy of in-combination assessment (including lack of transboundary assessment)	
Adequacy of BNG Assessment	
	Concerns with applicant's proposed habitat creation/enhancement

Ecological issue	Concerns
Adequacy of BNG Assessment	Applicant's BNG assessment significantly flawed and overstated
	Errors in applicant's metric calculations
	No BNG assessment for Power Line application

1 INTRODUCTION

1.1 Qualifications and experience

- 1.1.1 My name is Jon Davies. I am a Director at RSK Wilding and have more than 28 years of experience in ecological consultancy. I am a Chartered Ecologist, a Chartered Environmentalist and a Fellow of the Chartered Institute for Ecology and Environmental Management. I have a BSc (Hons) in Zoology from Bristol University and an MSc in Conservation from University College, London.
- 1.1.2 I have extensive experience in this field. For example, as Environmental Advisor to the Welsh Government, I previously gave evidence on ecological issues at the year-long Public Inquiry into the M4 Corridor around Newport project, and I have also previously been an Expert Witness at various other public inquiries and development consent order hearings into projects such as road schemes, gas pipelines and electricity transmission projects.
- 1.1.3 I also recently provided ecology affidavits on behalf of Derry and Strabane District Council for a Judicial Review in the matter of the grant by the Department of the Economy on 8 May 2019 of mineral prospecting licences to Flintridge Resources Ltd and Dalradian Gold Ltd under s11 of the mineral development act (Northern Ireland) 1969. The Judicial Review was held over four days in early April 2024.
- 1.1.4 The grounds of challenge in the Judicial Review included inadequate consultation, breach of the Habitats Directive and the Conservation (Natural Habitats etc) Regulations (Northern Ireland) 1995, and failing to comply, when deciding to grant the licences, with a number of statutory duties, including: to have regard to the need to conserve the natural beauty and amenity of the countryside (under Article 4 of the Nature Conservation and Amenity Lands (NI) Order 1985); to take reasonable steps to further the conservation and enhancement of the flora, fauna and other features of ASSIs (under Art 38 of the Environment (NI) Order 2002); and to further the conservation of biodiversity (under s1(1) of the Wildlife and Natural Environment Act (NI) 2011)).
- 1.1.5 My RSK Wilding, Biodiversity Net Gain (BNG) team is a specialist group of ecologists focuses on habitat surveys (using the UK Habitat Classification System), BNG calculations (using the Statutory Biodiversity Metric), habitat creation and restoration, Habitat Management and Monitoring Plans (HMMPs) and Biodiversity Gain Plans (BGPs). We also recently became a Responsible Body under the Environment Act 2021 and can thus oversee the work of other habitat banks and engage in Conservation Covenants with them to ensure successful delivery of BNG. We are thus recognised experts in the field of BNG.
- 1.1.6 I am familiar with the Code of Practice of the Chartered Institute for Ecology and Environmental Management (CIEEM). I believe that in addressing the ecology matters relating to this inquiry I have fulfilled my professional responsibilities in accordance with the Code of Practice.
- 1.1.7 I understand my duty to the inquiry and have complied with and will continue to comply with that duty. I believe that the facts stated within this proof of evidence

are correct and I confirm that the opinions expressed are my true and professional opinions.

- 1.1.8 I therefore confirm that this is my own professional opinion, provided in accordance with my professional qualifications. I have thus complied with my duties to the court, in particular that it is the duty of experts to help the court on matters within their expertise, and that this duty overrides any obligation to the person from whom experts have received instructions or by whom they are paid.
- 1.1.9 I am supported on the aquatic ecology aspects of this case by my colleague Dr Peter Walker
- 1.1.10 Dr Walker is a chartered environmentalist at RSK Biocensus where he is a technical director overseeing the aquatic ecology team and associated projects. Following on from a successful career in academia, resulting in multiple peer-reviewed publications, Dr Walker has been actively employed in aquatic ecological consultancy roles for more than 16 years. He is also an active member of the Institute of Fisheries Management (IFM), including holding the position of Chairman for the West Midlands branch, and sits on the advisory committee. He has also previously been an active member of fisheries consultatives and rivers trusts, including positions as a director and chair of the Cotswolds Rivers Trust.
- 1.1.11 Dr Walker has worked in every conceivable aquatic habitat throughout the UK, as well as undertaking surveys abroad in Azerbaijan, Albania, Greece and East Africa. He is familiar with various habitat assessment methods and standard survey methods for fish, macroinvertebrates, diatoms and macrophytes. He is experienced in surveys for riparian mammals and invasive non-native species, and holds several protected species survey licences, including for white-clawed crayfish, great crested newt and barn owl, and has an application pending for hazel dormouse.

2 BACKGROUND CONTEXT

2.1 Introduction

- 2.1.1 In November 2017, an application (LA10/2017/1249/F) was submitted by Dalradian Gold Ltd (DGL) to the Strategic Planning Division of the Department for Infrastructure (DfI) to construct an underground gold mine and associated infrastructure at a site located between the towns of Gortin and Greencastle in County Tyrone (the Curraghinalt Mine Project). The application was submitted with an accompanying Environmental Statement (ES).
- 2.1.2 There was also a planning application submitted by NIE Networks for a 33kV distribution line from the existing Strabane Main sub-station to the proposed mine site (Planning references: LA10/2019/1386/F and LA11/2019/1000/F). The proposed connection is 37.9 km in length comprising 26.9 km of overhead line and 11 km of underground cable.
- 2.1.3 The ES for the main application was accompanied by the following individual survey reports in Appendix C8: Phase 1 and 2 Habitats; Badger; Bats; Otter; Wintering Birds; Common lizards; Smooth newt; Fisheries and River Habitat Assessment; Freshwater pearl mussel; Marsh fritillary; Terrestrial and Freshwater invertebrates; and Breeding birds. All surveys were undertaken by SLR Consulting.
- 2.1.4 In August 2019, DGL submitted Further Environmental Information (FEI) in the form of an addendum to the ES. As part of this, the following additional reports of relevance were provided:
- Curraghinalt Gold Project Addendum to Environmental Statement (SRK Consulting, UK, Ltd);
 - Information to inform Habitats Regulation Assessment Pursuant to Article 6(3): Curraghinalt Gold Project (James O'Neill Associates);
 - C.8 Further Environmental Information - Addendum to Ecological Impact Assessment and Baseline Reports (SLR Consulting Ltd);
 - Further Environmental Information - Addendum to Ecological Impact Assessment and Ecological Mitigation and Management Plan (SLR Consulting Ltd); and
 - Proposed Infrastructure Site for the Gold Mine Badger Monitoring Report 2018 (SLR Consulting).

In October 2020, DGL again submitted Further Environmental Information (FEI) in the form of a further addendum to the ES: Curraghinalt Gold Project Addendum to Environmental Statement (SRK Consulting, UK, Ltd). There were no changes to impact descriptions and conclusions related to ecology in this second addendum, although the results of the EIA screening and the fisheries and aquatic ecology screening assessments related to the Power Line application are summarised. An updated shadow Habitats Regulations Assessment by Ecology Solutions was also submitted (C10).

3 PURPOSE AND SCOPE OF MY STATEMENT

3.1 Introduction

- 3.1.1 I was instructed by Fermanagh and Omagh District Council to provide expert ecology evidence in respect of the conjoined Public Inquiry for the Curraghinalt Project in County Tyrone, Northern Ireland.
- 3.1.2 The proposed Project would involve prospecting / exploration and mining for gold at the Curraghinalt deposit. My evidence deals with ecology, biodiversity and nature conservation matters in relation to the overall project site (including the Appeal Site and the associated NIE Networks power lines site), and is based upon my own professional opinion in line with my professional qualifications.
- 3.1.3 My evidence should be read in conjunction with the Statements of Case for Hydrology, Hydrogeology and Peat, Economics, Landscape & Visual and Carbon.
- 3.1.4 The principal purpose of my statement of case is to present evidence which demonstrates why, in my judgement, the effects of the Proposed Development in ecological terms are major and significant and should weigh heavily against approval of the applications in the overall planning balance.
- 3.1.5 The sections of my evidence are structured as follows:
- 1 Section 4 provides details of the legislation and planning policy background relevant to the scope of my evidence.
 - 2 Section 5 sets out my assessment in relation to the adequacy of ecological surveys undertaken to inform the ecological assessments for the Project.
 - 3 Section 6 sets out my assessment of the adequacy of the ecology elements of the Environmental Statement (ES), including any proposed mitigation and/or compensation.
 - 4 Section 7 sets out my assessment of the adequacy of the Habitats Regulations Assessments (HRAs), including any proposed mitigation and/or compensation.
 - 5 Section 8 sets out my assessment of the adequacy of the Biodiversity Net Gain (BNG) assessment (with the full report presented in Appendix 1 to this Statement).
 - 6 Section 9 provides my summary conclusions.
- 3.1.6 I shall comment on the extent of harm to the ecology of the area in the context of relevant planning policy. It is not, however, the purpose of my statement to draw a conclusion on the overall acceptability of the proposed development. That is a matter of planning balance to be presented by the Council in its main statement of case.

4 LEGISLATION, PLANNING POLICY AND GUIDANCE

4.1 Overview

4.1.1 Planning policy is dealt with in detail by the Council in its main statement of case, but I have set out below a brief summary of the legislation and policy context relevant to the appeal proposals where it may have a bearing on a consideration of ecology matters.

4.2 Regional Development Strategy

4.2.1 With regards to this ecology statement of case, policy RG11: '*Conserve, protect and, where possible, enhance our built heritage and our natural environment*', is relevant. RG11 sets out to:

- *Sustain and enhance biodiversity;*
- *Identify, establish, protect and manage ecological networks;*
- *Protect, enhance and restore the quality of inland water bodies (this includes rivers); and*
- *Protect designated areas of countryside from inappropriate development (either directly or indirectly) and continue to assess areas for designation.*

4.2.2 I shall demonstrate through evidence that the proposed development would be in breach of this policy, specifically with regard to the enhancement of biodiversity and the protection of watercourses.

4.3 County Donegal Development Plan 2024-2030

4.3.1 The County Donegal Development Plan 2024-2030 (which is of relevance with regard to transboundary effects) was adopted on 16th May 2024 and came into effect on 26th June 2024. The plan has three aims related to biodiversity:

- *A requirement for all developments to comply with the Habitats and Birds Directive;*
- *To protect Ramsar Sites, Nature Reserves, Natural Heritage Areas and Species protected under the Wildlife Act; and*
- *To protect, where justified, features of local biodiversity value (e.g. hedgerows/field boundaries, trees, woodlands, and wetlands).*

4.3.2 In my opinion, and as demonstrated through the evidence I present, the proposals insufficiently address the potential impacts upon habitats protected under the Habitats and Birds Directive (specifically the Owenkillew SAC and its qualifying habitats and species), both within Fermanagh and Omagh District and indeed the neighbouring County Donegal.

4.4 Local Development Plan 2030 - Plan Strategy

- 4.4.1 The Fermanagh and Omagh District Council Local Development Plan 2030 - Plan Strategy was adopted in 2023. There is a statutory duty to take account of the local development plan in decision-making (section 45(1) Planning Act (Northern Ireland) 2011).
- 4.4.2 There are a number of policies which have relevance to the natural environment, and only those parts of the policies relevant to the Ecology Statement of Case are referenced below.

DE02 - Design Quality

- 4.4.3 Policy DE02 addresses development proposals in the countryside and states:
'The Council will support development proposals which...
- f) protect and enhance features and assets of the natural and historic environment and landscape'*
- 4.4.4 I shall demonstrate through evidence that the proposed development would be in breach of this policy, specifically with regard to the Owenkillew SAC (and its constituent habitats and species), peatland habitats and protected species.

NE01 - Nature Conservation

- 4.4.5 Policy NE01 states that:
'The Council will only support development that, either individually or in combination with existing and/or proposed plans or projects, is not likely to have a significant effect on an existing or proposed SPA, existing or candidate SAC, Sites of Community Importance, or a listed or proposed RAMSAR. Development affecting Nationally important sites such as an ASSI, National Nature Reserve or Nature Reserve will only be permitted where it is not likely to adversely affect the integrity of the area, including the value of the site to the habitat network or the features for which it has been designated'.
- 4.4.6 I shall demonstrate through evidence that the proposed development would be in breach of this policy. Not only are in-combination effects insufficiently addressed, but also I will set out how there would be likely significant effects both on a SAC (the Owenkillew River) and an ASSI (the Owenreagh River).

NE02 - Protected Species and their Habitats

- 4.4.7 Policy NE02 states that:
'Development that is likely to harm a European Protected species will not be permitted unless it can be demonstrated that: (a) there is no satisfactory alternative; (b) the development is required in the interest of public health or public safety, or for other imperative reasons of over-riding public interest, including those of a social and economic nature and beneficial consequences of primary importance to the environment; (c) there is no detriment to the maintenance of the population of the species at a favourable conservation status; and (d) mitigation and compensatory measures are agreed and their delivery secured. The Council will only permit development that is not likely to harm any statutorily protected species and where any impact arising can be adequately mitigated or compensated against'.

4.4.8 I shall demonstrate through evidence that the proposed development would be in breach of this policy.

4.4.9 Furthermore, Policy clarification 5.39 states that:

'In addition, seasonal factors should be taken into account when assessing development proposals that could impact upon protected species for example nesting seasons. This is also important in determining when surveys should be carried out to establish the presence of a species on site'

4.4.10 In my opinion, where surveys have been carried out in the wrong season this aspect of the policy is also breached, and I discuss this further under Adequacy of Surveys in Section 5.

NE03 - Other Habitats, Species or Features of Natural Heritage Importance

4.4.11 Policy NE03 states that:

'The Council will only permit development likely to result in an unacceptable adverse impact on, or damage to, habitats, species or the features listed below, where the benefits of the development outweigh the value of the habitat, species or feature. In such cases, appropriate mitigation and/or compensatory measures will be required. These habitats and species include (but are not restricted to) - priority habitats and species; active peatland; ancient and long-established woodland; wetlands; rare and threatened species.'

4.4.12 I shall demonstrate through evidence that the proposed development would be in breach of this policy, most significantly with regard to the peatland habitat restoration proposals and the impacts upon the Owenkillev SAC.

4.4.13 Policy NE03 goes on to state that:

'Where there is potential that a habitat, species or other feature of natural heritage importance exists on a site or is likely to be impacted by development, the developer will be required to carry out an appropriate survey of the site's interests and undertake a suitable ecological appraisal.'

4.4.14 In my opinion, the inadequacy of the surveys and assessments carried out for the Project (e.g. in relation to freshwater pearl mussel, salmonids, the Pollenroe Burn, etc.) mean that this policy has also been breached.

MIN01 - Minerals Development

4.4.15 Policy MIN01 states that:

'The Council will support proposals for minerals development where it is demonstrated that they do not have an unacceptable adverse impact upon:- a) the natural environment; and d) the water environment'

4.4.16 I shall demonstrate through evidence that the proposed development would be in breach of this policy, especially with regards to the impacts on peatland habitats and the Owenkillev SAC, and indeed to the overall biodiversity loss.

MIN02 - Restoration and Aftercare

4.4.17 Policy MIN02 states that:

'All applications for mineral development must be accompanied by satisfactory proposals for the final restoration scheme and proposed future land use; timescales for restoration; aftercare and site management restoration'

- 4.4.18 In my opinion the failings associated with the peatland restoration proposals means that the proposed development would be in breach of this policy.

4.5 Strategic Planning Policy Statement (SPPS) Northern Ireland

- 4.5.1 Before commenting on the Strategic Planning Policy Statement (SPPS), I note that the applicant refers to policy contained in the now superseded Planning Strategy for Rural Northern Ireland (1993) as well as Planning Policy Statement 2 Natural Heritage (PPS2) and Planning Policy Statement 21 Sustainable Development in the Countryside (PPS21). These policy statements ceased to have effect in Fermanagh and Omagh District when the Fermanagh and Omagh District Council Local Development Plan 2030: Plan Strategy was adopted on 16 March 2023.

- 4.5.2 Paragraph 4.40 states that:

"Plans and proposals should be rigorously assessed for their environmental impacts. There are a variety of assessments that are relevant to the planning process, some of which are required under European and domestic legislation. These include Sustainability Appraisal (SA) and Sustainable Environmental Assessment (SEA) for plans, Environmental Impact Assessment (EIA) for projects, and Habitats Regulations Assessment for plans and projects affecting Natura 2000 sites."

- 4.5.3 I shall consider the extent to which the proposals have been '*rigorously assessed for their environmental impacts*' through my evidence, especially with regard to the HRA process.

- 4.5.4 In addition, Paragraph 6.161 of the SPPS states that:

'Applications for the extraction of minerals must include satisfactory restoration proposals'.

- 4.5.5 Given the overlap between natural environment plan policies and natural environment policies within the SPPS, I do not propose to repeat all of the policies within the SPPS which relate to the natural environment. These are principally found between paragraphs 6.186 and 6.189 and are reflected in the core planning principle of preserving and improving the built and natural environment.

- 4.5.6 I shall demonstrate through my evidence that the restoration proposals are not satisfactory and would result in undue adverse effects on the important peatland habitats.

4.6 Wildlife and Natural Environment Act (WANE) in Northern Ireland

- 4.6.1 In 2011, the Wildlife and Natural Environment Act (WANE) in Northern Ireland came into force, amending the Wildlife Order (NI) 1985 and introducing new species to protected lists. The WANE Act includes a significant change for public bodies with the introduction of a new Biodiversity Duty for all public bodies:

"It is the duty of every public body, in exercising any functions, to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions."

- 4.6.2 Guidance on the section 1(1) biodiversity duty was published in May 2016 under section 1(4).
- 4.6.3 As set out in Section 8, it is my assertion that the Project would not result in a net gain for biodiversity, as calculated by the applicant using the Defra Biodiversity Metric, but would in fact lead to a significant net loss.

4.7 Fermanagh and Omagh Biodiversity Strategy and Action Plan (2022-2027)

- 4.7.1 This document sets out Fermanagh and Omagh District Council's Biodiversity Strategy and Action Plan from 2022 - 2027. Through the delivery of seven thematic action plans based on evidenced needs, the intention is that the Council will contribute to the wider outcomes linked to principles contained within the legislation, which places a legal duty and responsibility on Council to act, namely:
- Protection of biodiversity;
 - Maintenance of biodiversity;
 - Enhancing biodiversity;
 - Restoring biodiversity; and
 - Promoting the understanding of biodiversity.
- 4.7.2 In my opinion, the above objectives for Fermanagh and Omagh District Council's biodiversity will be significantly compromised by the Project's activities, especially through the impacts upon aquatic species (and the Owenkillew River SAC) and through the loss of irreplaceable peatland habitats. This loss of biodiversity is specifically evidenced through our Defra Biodiversity Metric calculations (Section 8 of this statement), which demonstrate a significant net loss of biodiversity (rather than the net gain claimed by the applicant).

4.8 The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985

- 4.8.1 This order sets out the former Department of the Environment for Northern Ireland's (DOENI), now the Department of Agriculture Environment and Rural Affairs (DAERA), rights and duties to protect and enhance sites of natural beauty or special scientific interest in Northern Ireland. It places particular emphasis on the establishment of a network of Areas of Special Scientific Interest (ASSI), National Nature Reserves (NNR) and Marine Nature Reserves (MNR).
- 4.8.2 As above, it is my opinion that these biodiversity duties are compromised by the Project.

4.9 The Conservation (Natural Habitats etc.) Regulations (NI) 1995, amended in 2012

- 4.9.1 The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended) transpose European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) and Directive 2009/147/EC on the Conservation of Wild Birds (The Birds Directive) into national law, and provide for the classification/designation and protection of 'European sites' including Special Protection Areas (SPA) and Special Areas of Conservation (SAC), the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.
- 4.9.2 I shall consider the extent to which these Regulations have been implemented, especially with regard to the HRA process, through my evidence.

4.10 The UK Peatland Strategy and the Northern Ireland draft Peatland Strategy

- 4.10.1 Approximately 80% of our peatlands are in a damaged and deteriorating state, and the UK Peatland Strategy (2018-2040) represents a collaborative and co-ordinated effort (developed by the IUCN UK Peatland Programme) to tackle the significant threats to these key habitats and to ensure that they are conserved, enhanced and restored.
- 4.10.2 Similarly, the draft NI Peatland Strategy (2021-2040) also identifies the ongoing threat to these habitats, especially in relation to the ecosystem services they provide, and again sets out a collaborative approach to their restoration across Northern Ireland through the delivery of specific Strategic Objectives and Actions.
- 4.10.3 It is my assertion that the peat restoration proposals would result in undue adverse effects on the important peatland habitats, and are thus contrary to the objectives of these strategies.

5 ADEQUACY OF ECOLOGICAL SURVEYS

5.1 Introduction

- 5.1.1 I have reviewed the various ecological survey reports with a view to determining whether the surveys undertaken were sufficient to accurately record notable ecological receptors (including both habitats and species) such that any potential impacts on such features could be adequately assessed.
- 5.1.2 This is especially relevant to the qualifying habitats and species of the Owenkillew River SAC, given that the burden of proof for HRA, and specifically the Appropriate Assessment stage of the process, involves using the 'best available scientific evidence' to determine 'beyond reasonable scientific doubt' that there will be no adverse effects on the integrity of the SAC.
- 5.1.3 A summary of this evaluation is provided for selected receptors in the following sections.

5.2 Aquatic Habitat Surveys

- 5.2.1 A combination of a desk-based study, River Habitat Survey (RHS) and Life Cycle Unit System (LCUS) study was undertaken for the aquatic habitat assessment. Whilst such an approach is appropriate for salmonids, it does not optimally consider or record habitat for other species, in particular lampreys, eels and freshwater pearl mussels. With regard to the latter, a separate, species-specific survey report is available, although this focuses on actual pearl mussel counts and does not discuss the habitat suitability in the larger or smaller watercourses.
- 5.2.2 Specifically, the habitat surveys did not seem to include any mention of the presence or frequency of occurrence of marginal fine sediment/silt deposits (which are important habitat for juvenile lamprey (ammocoetes)) nor of structural habitat such as undercut banks, boulders, submerged tree roots or woody debris, which might be used by a host of species, including the critically endangered European eel.
- 5.2.3 The tributaries of the Owenkillew and Owenreagh rivers (in particular the Pollanroe Burn, Curraghinalt Burn and Attagh Burn) do not appear to have been thoroughly assessed, and have largely been discounted as important habitat. As noted in the Hydrology, Hydrogeology and Peat SoC and raised by the Loughs Agency, these watercourses have been assessed as being of 'low sensitivity' but with little or no justification. No detailed descriptions of the habitat throughout the watercourses have been provided, despite their connectivity to the larger, 'high sensitivity' rivers.
- 5.2.4 However, based upon a site visit carried out by Dr Peter Walker (an aquatic ecologist colleague with 16 years aquatic ecology consultancy experience and 35 years as an angler), suitable habitat for multiple fish species (including juvenile salmonids, which could carry glochidia, the larval stage of freshwater pearl mussel) was clearly present. Given the importance of juvenile salmonids (including trout and salmon) in the life cycle of the critically endangered freshwater pearl mussel, we would have expected to see at least some exploratory fish surveys carried out

(e.g. using electrofishing gear) or a more detailed habitat description to justify screening the watercourse out.

- 5.2.5 It is, therefore, my opinion that the importance of this habitat has been overlooked, especially in light of plans to physically and chemically alter it, both via removal of c.975m of the upper Pollanroe Burn and through increasing the discharge of water, including with a high proportion of treated (via reverse osmosis) water. More recent surveys, undertaken in February 2021 by the Northern Ireland Environment Agency (NIEA) and the Loughs Agency, suggested that the habitat within the Curraghinalt Burn, and more so the Pollanroe Burn, included functional fish habitat such as refuge areas and potential spawning, nursery and holding habitat. Subsequent electrofishing surveys in June 2021 found fish in both the aforementioned burns, including juvenile salmonids (Atlantic salmon [*Salmo salar*] and brown trout [*Salmo trutta*]), thus confirming the value of these watercourses.
- 5.2.6 Furthermore, even those surveys that the applicant did carry out, undertaken in 2015, were completed in sub-optimal conditions due to unusually high / frequent rainfall creating more frequent spates and higher than normal river levels for the time of year. This is likely to have hindered the ability of surveyors to accurately assess substrate types in all areas of the watercourses, including the suitability of habitat for spawning, refuge etc.
- 5.2.7 Rivers, especially spate ones, can be very dynamic, with substrates frequently being scoured and redeposited. This can change the location of spawning areas, or other functional habitat, with the potential for some to disappear completely or become unsuitable, and new ones to be created. Given the spate nature of the assessed watercourses, I would consider the river habitat assessment to be out of date and unreliable for accurately determining the presence of potentially sensitive habitats, such as spawning areas or juvenile lamprey habitat. This is particularly pertinent given the records of significant storm events since 2015.
- 5.2.8 Whilst a small number of targeted lamprey surveys (targeting ammocoetes) were undertaken using electrofishing methods, there is no detail on the frequency and/or abundance of suitable habitat for juvenile lampreys, which would provide key evidence for the likely value of these watercourses. Furthermore, lamprey surveys were not undertaken in the smaller tributaries, and in the absence of detailed habitat maps or photographs it is not possible to determine whether or not suitable habitat was or is present for these species.
- 5.2.9 River and stream habitats are dynamic places which are constantly changing with changes in flow. Banks can be eroded and river bed material moved. As such, in-channel habitats are constantly changing, sometimes in relatively insignificant ways but, particularly following high flow / spate / flood events (e.g. during storms) the changes can be very significant, leaving the in-channel and riparian habitats quite different to what was present beforehand.
- 5.2.10 Whilst there is no specific guidance on the frequency with which habitat assessments should be undertaken, consideration of storm and flood events should be included when considering data which is not particularly recent. In this instance, there have been several notable (named) storm events which are likely to have caused spate or flood conditions in the watercourses concerned, and this in turn

can quite conceivably have resulted in the movement of substrates and changes in channel form. Spawning and refuge areas, for example, may now exist where they did not previously, and vice versa. In the case of pearl mussels, it may be that old beds have been displaced and new ones created. Current, or at least recent survey data is required to determine this.

- 5.2.11 In summary, the aquatic habitat surveys have been insufficient to properly assess the value of the watercourses present on site, specifically with regard to their suitability to support important species such as lamprey, pearl mussels and salmonids. This in turn means that the impact assessments, carried out both for the ES and HRA, are flawed, since the assessment of 'low sensitivity' for these watercourses, which are due to be both directly and indirectly affected by the proposals, likely understates their nature conservation value.
- 5.2.12 It is my opinion, therefore, that significant impacts upon these features, owing both to the nature of the impacts (see Section 7, below) and the value of the receptors, cannot be ruled out.

5.3 Fish Surveys

- 5.3.1 No fish surveys (e.g. using electrofishing equipment) were initially undertaken in the smaller watercourses, including the Curraghinalt Burn, Attagh Burn and Pollanroe Burn. During a site visit in March 2024, my colleague Dr Peter Walker observed a small section of the lower reaches of Pollanroe Burn from a road bridge. He concluded that the habitat was almost certainly capable of supporting various fishes, including juvenile salmonids, contrary to the habitat assessment undertaken by SLR. This opinion was based on observations of the physical features visible, including a diverse substrate and a mixture of flow types, including deeper, slower-flowing sections and faster run-and-riffle areas. He considered that together these combined to provide a diversity of habitats suitable for different fish species and life stages.
- 5.3.2 Following surveys undertaken in February 2021 by NIEA and the Loughs Agency to assess the habitat in selected burns, subsequent electrofishing surveys in June 2021 found fish in both the Curraghinalt Burn and Pollanroe Burn; this included juvenile salmonids (Atlantic salmon and brown trout). Given that such surveys only give a 'snap shot' of the fish present at the precise time of the survey, it may be that other fish species also use the burns at different times of the year.
- 5.3.3 Detailed habitat assessments (see above) are useful for determining whether the habitat is generally suitable for different species and if it contains habitat which fits the characteristics for, for example, salmonid spawning habitat, parr habitat or lamprey refuge habitat (which can then be surveyed). Lamprey ammocoetes and European eel (*Anguilla anguilla*) can be under-represented in standard electrofishing surveys, so without targeted surveys for these species it cannot be concluded that they are likely to be absent (unless a formal habitat assessment has been undertaken which determined a lack of suitable habitat or other significant reasons which could prevent their presence, such as an impassable downstream barrier).

- 5.3.4 Lamprey are a selection feature of the Owenkillev SAC (though not technically a 'qualifying' feature, owing to the fact that the habitat present may not be of sufficient extent or quality to merit listing as SAC feature) and all three lamprey species (brook, river and sea) are present in the Owenreagh. All three species are listed in Annex II of the Habitats Directive. Lamprey spawning habitat is fairly specific as is juvenile (ammocoete) habitat, which is primarily silt accumulations in shallow slack water marginal areas (though there is some limited evidence that sea lamprey ammocoetes occur in deeper water mid-channel in some rivers).
- 5.3.5 Targeted surveys for lamprey should therefore be carried out in areas of likely habitat, formally referred to as optimal or sub-optimal. However, the habitat survey carried out for the site (which was salmon- and trout-focussed) does not report on such habitat, and it is therefore unclear whether or not it was looked for.
- 5.3.6 With regard to salmonids, the brief observation on-site by Dr Walker, supported by the views and data from NIEA and the Loughs Agency, suggests that the habitat was indeed suitable for supporting at least juvenile salmonids, and therefore warranted a more detailed assessment than that which was undertaken by the applicant.
- 5.3.7 Without a true understanding of the importance of these watercourses for key fish species (especially those associated with the nearby SAC rivers), it is not possible to properly assess the impacts of the proposals, such that both the ES and HRA will be flawed.

5.4 Freshwater Pearl Mussel Surveys

- 5.4.1 Freshwater pearl mussel (*Margaritifera margaritifera*) surveys completed in 2015 were re-surveys from those undertaken previously. However, both data sets should be considered out of date, particularly given the dynamic nature of the spate rivers within which surveys were carried out (as noted above). Since the surveys were undertaken, there have been multiple significant storm events (including storm Desmond in December 2015, followed by storm Frank) which will have resulted in high fluvial flows. Such conditions can cause mobilisation of riverbed substrates and associated biota, including freshwater pearl mussels.
- 5.4.2 The freshwater pearl mussel baseline survey report claims that it is 'highly unlikely that baseline conditions significantly alter year to year'. However, freshwater pearl mussels are benthic organisms sensitive to hydrological regime alterations and habitat degradation, including physical movement of substrate and excessive fine bed material deposits. Impacts from changes in flow (and in particular, increased flow) can include habitat loss, due to the formation of a new and unsuitable substrate, and a decrease in the potential dispersal among the residual habitats.
- 5.4.3 For example, during the 2015 high-flow events, the loss of freshwater pearl mussel beds was documented from the River Dee in Aberdeenshire. It is perfectly possible, therefore, that storm-related impacts on river flows in Northern Ireland since the surveys in 2015 might also have resulted in similar impacts, with loss or redistribution of mussel beds within the rivers during those events.
- 5.4.4 This dynamic nature of pearl mussel populations means that survey information can quickly become out of date. Given the importance and sensitivity of this receptor

(the Owenkillev population is the largest known population surviving in Northern Ireland), it is clearly very important to have a good and current understanding of where mussels associated with the SAC population (including outside of the Owenkillev River itself within its tributaries) are located and the extent of the population.

- 5.4.5 The freshwater pearl mussel baseline report also states that deep-water areas were not surveyed, and that there were no suitable gravels. Given that freshwater pearl mussels can be found in deep pools, these pools need to be surveyed using appropriate methods¹, unless the substrate can be confirmed as wholly unsuitable. Given the higher than usual flows reported for the year in which the surveys were undertaken, it is considered likely that the substrate in deeper pools will not have been wholly visible. Therefore, if they were discounted on the basis of habitat being unsuitable, evidence as to why it was unsuitable should have been provided.
- 5.4.6 NIEA and the Loughs Agency identified, in 2021, that the Curraghinalt and Pollanroe Burns were capable of sustaining juvenile salmonids. Surveys found juvenile trout and salmon in the Pollanroe Burn, with two trout also being caught in the Curraghinalt Burn. Surveys undertaken by SLR dismissed the ecological importance of these two smaller watercourses, but they are clearly important from a freshwater and migratory fisheries perspective. Furthermore, the presence of juvenile salmonids, the hosts for freshwater pearl mussel glochidia, would indicate that there is at least a possibility of freshwater pearl mussel being present. Surveys of these watercourses for this species should therefore have been undertaken.
- 5.4.7 Finally, with regard to other studies required, investigations into the impacts of different chemicals on freshwater pearl mussel are also lacking, largely due to difficulties in undertaking experiments with critically endangered species which have potential to harm them. However, it is known that pH, iron and aluminium can impact survival of early life stages². Reverse osmosis (RO) reportedly lowers the pH of water, making it slightly acidic; this is because the process removes minerals in water that neutralise acid, which reduces the pH of water because of the high amount of carbonic acid in the water after it has been filtered. Water subjected to this RO process, and subsequently discharged into natural watercourses, therefore has the potential to impact freshwater pearl mussels, and other aquatic life, if present. I discuss the impacts of this in more detail in Section 7.8.
- 5.4.8 In the absence of suitable and recent survey data, particularly with regard to the watercourses due to be affected either by habitat loss or through adverse changes in water quality and/or quantity, it is not possible to rule out any likely significant impacts on this protected and critically endangered species.

¹ Cosgrove P, Hastie L, MacDougall K & Kelly A (2007) Development of a remote deep-water survey method for freshwater pearl mussels. Scottish Natural Heritage Commissioned Report No.263 (ROAME No. F06AC606).

² J. Taskinen, P. Berg, M. Saarinen-Valta, S. Väililä, E. Mäenpää, K. Myllynen, J. Pakkala (2011). Effect of pH, iron and aluminium on survival of early life history stages of the endangered freshwater pearl mussel, *Margaritifera margaritifera*. *Toxicol. Environ. Chem.*, 93, pp. 1764-1777, 10.1080/02772248.2011.610798

5.5 White-clawed Crayfish Surveys

- 5.5.1 We have not seen any evidence of either a thorough desk-based or field-based survey to determine the presence or likely absence of white-clawed crayfish (*Austropotamobius pallipes*). From the limited habitat evidence provided, and the small sections of watercourses observed during my aquatic ecologist's site visit in March 2024, the habitat appears generally suitable for supporting the species, with abundant refuges, diverse substrate and varying flow characteristics³.
- 5.5.2 White-clawed crayfish are certainly present in Northern Ireland, with reports from other watercourses and catchments within just a few kilometres of the site and associated watercourses. It is not unreasonable, therefore, to conclude that there is a possibility of this important species being present, and that detailed field surveys should have been undertaken to evaluate this further.
- 5.5.3 Such surveys do not appear to have been carried out to date, and without such surveys it is not possible to discount their likely presence or, therefore, to determine no likely significant effects on this protected species.

5.6 Otter Surveys

- 5.6.1 Otter (*Lutra lutra*) surveys carried out in 2012 yielded many more results (field sign observations) than those carried out in 2015/16. This may be due to water levels being higher than normal (and rising) on five out of 12 survey occasions in the latter survey period (as reported by SLR, and as noted in the sections above). Current NIEA guidance (2017) states that surveys should not be carried out after heavy rain; this is because signs may have been washed away and/or because higher water levels will make the identification of potential holts etc. more difficult or even not possible. The 2012 surveys noted several potential holt sites; however, these were not surveyed further (e.g. using camera traps) to confirm whether or not they were active.
- 5.6.2 The smaller tributaries on site were dismissed as being ecologically unimportant and unlikely to be of value to otters. This was apparently on the presumption that the streams did not contain prey for otters. However, surveys undertaken in 2021 have now shown notable numbers of fish in the Pollanroe Burn, and the ponds on site (and the peatland more generally) are likely to be good for amphibians. These are an important food source for otters, especially when present in large numbers during the breeding season in spring. The smaller tributaries may also be used by otters commuting across the landscape and between watercourses or catchments, and despite a lack of evidence found during 2015 (when surveys were undertaken in suboptimal conditions) there is no clear reason for assuming that they will not use these tributaries during other years. Therefore, these survey data should also be considered as inadequate and out-of-date.
- 5.6.3 There is little available guidance setting out the required frequency of survey for otters. However, the species is highly mobile and has extensive territories, so survey effort needs to be sufficient to understand the extent to which the site is being used. This is especially important where significant amounts of potentially important

³ Peay S. (2003) Guidance on Habitat for White-clawed crayfish. R&D Technical Report W1-067/TR, Environment Agency, Bristol. 66 pp

habitat is due to be lost (in this case approximately two kilometres of suitable watercourse habitat - including 975m of the Pollanroe Burn - that could support holts or resting sites).

- 5.6.4 Although surveys on the Pollanroe Burn included a potential focal point (for sprainting), they only covered a very small section (c.100m). Given the not insignificant impacts predicted for this watercourse (e.g. removal of 975m of it), additional survey effort was clearly warranted (such as surveys in other years and more optimal conditions, and potentially the use of strategically-placed camera traps).
- 5.6.5 The surveyors were only able to access small areas within the development site, so other potentially useable habitat areas (e.g. for resting sites or holts) were not surveyed. Surveys relied on commuting otters leaving signs which could be detected by surveyors; however, this technique may have had limited success given the suboptimal weather and river conditions reported, and as discussed above.
- 5.6.6 It is therefore clear, given the lack of a good understanding of the importance of the area to otters, that any assessment of the impacts on otters, whether in the ES or HRA, will have been flawed, and that the potential for significant impacts on otters cannot be ruled out.

6 ADEQUACY OF ENVIRONMENTAL STATEMENT (ES)

6.1 Introduction

- 6.1.1 Having reviewed the ecological information provided by the applicants, I have identified a range of issues related to the adequacy of the impact assessments provided in the Environmental Statement (ES) documents.
- 6.1.2 Based upon the information provided within the documents listed below, my professional judgement is that there are elements of the assessment which have not been adequately addressed and/or sufficiently evidenced. As a result, I consider the ES to be deficient in its assessment of likely significant effects.

Documentation reviewed:

- Environmental Statement for the Curraghinalt Project, County Tyrone, Northern Ireland Volume 2 Chapter 8: Environmental and Social Impact Assessment (November 2017). (and associated Annexes). SRK Consulting (UK) Limited
- Curraghinalt Gold Project Addendum to Environmental Statement (July 2019; including the update to the Ecological Impact Assessment). SRK Consulting (UK) Limited.
- Curraghinalt Gold Project Second Addendum to Environmental Statement (November 2020). SRK Consulting (UK) Limited.
- Curraghinalt Gold Project Ecological Mitigation and Management Plan (2017) and the subsequent Addendum (2019). SLR.
- Individual 2017 survey reports in Appendix C8 of the ES (Phase 1 and 2 Habitat; Badger; Bats; Otter; Wintering Birds; Common lizards; Smooth newt; Fisheries and River Habitat Assessment; Freshwater pearl mussel; Marsh fritillary; Terrestrial and Freshwater invertebrates; and Breeding birds) and the subsequent EclA and Baseline Reports Addendum (2019). SLR

6.2 Impacts on Designated Sites

- 6.2.1 Despite the proximity of the future mine workings to four sensitive designated sites (the Owenkillew River SAC, Owenkillew River ASSI, Drumlea and Mulan Woods ASSI and Owenreagh River ASSI), and even though smaller watercourses drain directly from the development site into these key rivers and bog woodlands, the impacts during construction, operation and closure are not assessed to be significant in the ES. I believe that the impact assessment has not properly considered the nature of the works and the sensitivities of the species and habitats for which they are designated, and I discuss this in more detail for the individual habitats and species below, especially in relation to the SAC river.

- 6.2.2 A key potential impact on designated sites is related to suspended solids in the Owenreagh River ASSI. Quantitative modelling predicts that *"the average concentration of suspended solids in the Owenreagh downstream of the Pollanroe Burn will be 5.7mg/L (95%ile) and the annual mean for the creation of suspended solids will not exceed 10mg/L"*. It goes on to say that *"This is highly unlikely to have a significant adverse effect on the spawning habitat of the Owenreagh River, or on the ability of eggs and juvenile fish to develop"*.
- 6.2.3 The accepted critical sediment preferences for salmon (collated as part of the Life in UK Rivers project, www.riverlife.org.uk) is 10 mg/L, and it is therefore expected that loading of sediment at this critical limit, over the full period of the mine operation, could impact on salmonids.
- 6.2.4 Also of note is the fact that the Owenreagh River is an ASSI based upon the presence of the freshwater pearl mussel; this species relies on *"no sedimentation in the few weeks after settlement of juveniles where these require clean sandy or gravelly substrates on the bed of a river in order to grow"*. There is no reference in the ES to any potential impacts of sedimentation on this species.
- 6.2.5 Additionally, Impact ECO5 - 'Potential impact of dust emissions from construction and operational activities at the proposed infrastructure site on ecological receptors', fails to mention the Drumlea and Mulan Woods ASSI, which lies between 79m and 300m north of the Project Areas.
- 6.2.6 In both cases, insufficient consideration has been given to the potential for the qualifying features of the designated site to be adversely affected.

6.3 Impacts on Habitats

Pollanroe Burn

- 6.3.1 The ES notes that 975m of the Pollanroe Burn will be lost as part of the project and assesses this as a *"minor watercourse with limited ecological value"* and of Local (Higher) value.
- 6.3.2 As I have noted earlier, there is no evidence in the ES, nor in the Addendum to the ES (2019), that aquatic habitat and species surveys of the smaller watercourses, including the Pollanroe Burn, were undertaken. However, fish surveys undertaken in 2021 did record the presence of juvenile salmonids, thus indicating that the burn is likely to be of value to salmonids associated with both the Owenkillev and Owenreagh rivers (the former being an SAC). Furthermore, the presence of salmonids also means that the Burn could be of importance for freshwater pearl mussels, which use these fish species as hosts.
- 6.3.3 Therefore, I would question the classification of the Pollanroe Burn as being of limited ecological value, especially given that it flows directly into the designated Owenreagh River (and indirectly into the Owenkillev SAC) and is thus functionally-linked to both. I would thus suggest that the permanent loss of almost a kilometre of this watercourse should not be considered to be insignificant.
- 6.3.4 Furthermore, as noted in the Hydrology, Hydrogeology and Peat SoC, at closure of the mine, nitrate levels in the retained stretches of the Pollanroe Burn are predicted to be 12mg/L at low flows, which is above the national standards of 11.3mg/L.

Antimony, iron and manganese will also be elevated above standard levels at closure (iron and manganese already exceed national standards). The cumulative impacts on aquatic habitats and species exposed to elevated nitrate and metals are not considered in the ES, nor are sub-lethal impacts (e.g. impacts on reproductive rates and immune responses), and potential bioaccumulation of metals.

- 6.3.5 The ES also states that at closure of the mine, the average flow rates in the Pollanroe Burn will be *"50% higher than pre-development flows"* and that this will potentially flush pollutants (nitrates/metals) downstream into the Owenkillev River SAC/ASSI at a more rapid rate. This impact has been not considered significant: *"It is assessed that post-closure the mine is highly unlikely to have a significant effect on water quality in the Owenkillev River. No significant effects are predicted on habitat or species associated with the Owenkillev River from the proposed closure of the mine."*
- 6.3.6 There is no reference in the ES to any potential impacts from elevated nitrate and metal levels in the Pollanroe Burn, nor to changes in pH levels or the removal of key minerals from the water as a result of the reverse osmosis process. This is discussed in more detail in the Hydrology, Hydrogeology and Peat SoC, but again the potential certainly exists for significant long-term effects.

Owenkillev River SAC

- 6.3.7 One of the qualifying features of the Owenkillev River SAC is *"water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion"*. Water quality (particularly phosphorus and nitrates) strongly influences the species composition, extent and condition of riverine plant communities (Hatton-Ellis *et al*, 2003). Increasing nutrient supply will lead to an overall reduction in the number of species, with a loss of *Ranunculus* spp., and these communities are also sensitive to nitrates, metal pollution and sediment load.
- 6.3.8 It cannot be determined that the discharge of elevated nitrates and metal pollutants into the Pollanroe Burn will not impact on this qualifying feature in the Owenkillev River SAC over time.

Peatland habitats

- 6.3.9 Current plans show a loss of 30.25 hectares of five peatland habitats *"with affinities to Annex 1 Habitats and Northern Ireland Priority Habitats"* and the loss of 7.94 hectares of valley mire. These are highly important and sensitive habitats, and it is stated that is not possible to fully mitigate these habitat losses, that residual impacts will remain and that compensation is therefore required.
- 6.3.10 The Ecological Mitigation and Management Plan (EcMMP, 2017 and 2019) suggests that this loss can be successfully compensated through habitat creation, enhancement and restoration of retained areas. I would strongly suggest that creating new peatland habitat in Area A using peat overburden during construction works is highly unlikely to be successful. It will certainly not replicate the structure, diversity and complexity of the Annex 1 and NI Priority habitats being removed, since peatland habitats (of the value being lost) take hundreds of years to establish.
- 6.3.11 As suggested by John Ingham in his evidence, and on the basis of his extensive experience in minerals restoration projects, including upland moorland such as

this: 'if the peat from site is mixed with topsoil and mineral to form the planting media, it is no longer functioning peat and the carbon stores are lost'. He also notes how difficult it will be to establish heathland habitat as part of the restoration plans (see Section 8.3 of the Landscape and Visual Statement of Case). Further discussion into the flaws in the peat restoration proposals is also provided by Dr Catherine Isherwood in Section 7 of her Hydrology, Hydrogeology and Peat SoC.

- 6.3.12 I would also suggest that the proposed ratio of 2:1 for compensation area (relative to the area being lost) is wholly inadequate given the value of the habitat and the difficulty in its replacement/recreation. The Hydrology, Hydrogeology and Peat SoC suggests that a 10:1 ratio is likely to be more appropriate, whilst Section 8 of this SoC highlights that the loss of 'irreplaceable' habitat such as blanket bog requires a significant bespoke compensation package far greater than the proposed 2:1 replacement. I will discuss this key issue further in Section 7 and Section 8.
- 6.3.13 Finally with regard to habitats and the ES, it is important to note that the baseline provided in the impact assessment is fundamentally wrong. This is because the existing surface infrastructure site (Area C) was not reinstated to habitat as it was legally required to be as part of the consent for this activity, so instead the baseline comprised buildings and other lower-value habitats. Clearly an impact assessment based upon a lower-value baseline will understate the scale and importance of the impact.
- 6.3.14 Also, my understanding is that, given that this is thus unauthorised EIA development (at least on the existing infrastructure site), the applicant has to demonstrate an absence of unfair advantage. Given that the impact assessment will have benefitted from the lower baseline, I do not believe that an unfair advantage was absent. Similarly, there was also clearly an unfair advantage with regards to the BNG assessment (see Section 8, below), since the baseline for the Metric calculations (upon which the required net gain percentage is determined) would have been lower, meaning that less habitat creation and/or restoration would be required to achieve the necessary net gain.
- 6.3.15 Furthermore, had reinstated habitats been present in Area C, the applicant would also have had to undertake a much more substantial survey and assessment than simply saying making assumptions about the habitats (and indeed species) that might have been present in those circumstances. Again I consider this to be an unfair advantage.

6.4 Impacts on Species

Bats

- 6.4.1 Six species of bat will be impacted by the construction of the goldmine as "development of the infrastructure will lead to fragmentation of flight lines and commuting routes for the species of bat using the cottage, and for *Nathusius' pipistrelle*, *Leisler's bat* and a *Myotis* species". A total length of 1870m of new and supplementary hedgerow planting will "connect the new bat house to the Pollanroe Burn, the other existing disused building and block of woodland on adjoining land to the south west". The ES does not, however, mention the loss of nearly 1km of the

Pollanroe Burn and associated bankside vegetation, which will result in a discontinuous commuting route along this burn.

- 6.4.2 The EcMMP states that the new bat house being created will be monitored for a period of four years post the construction phase. Given the scale of the development and its long-life span, monitoring for such a short period of time does not seem sufficient to ensure that there are no significant residual adverse impacts on bat populations using the bat house.
- 6.4.3 Additional mitigation proposes that the semi-improved grasslands in the field where the new bat house will be built, and in the adjacent field to the south, will be “*enhanced through the sowing of a commercially available or bespoke wildflower seed-mix locally sourced in Northern Ireland*”, presumably to encourage a diversity of invertebrate prey for bat populations. Given the sensitivity of the floral communities associated with the five peatland habitats “*with affinities to Annex 1 Habitats and Northern Ireland Priority Habitats*”, I would suggest that this approach is not appropriate, as it could introduce species not typically associated with those communities, potentially causing changes to the plant communities and the ground conditions, and thus significant adverse effects on the sensitive peatland habitats.

Otter

- 6.4.4 The ES (2017) does not refer to any impacts on otters from the development. While otter signs were only found in a small number of locations in the accompanying surveys, it is my opinion that the survey work was inadequate, as stated above. Instead, I suggest that it is highly likely that otters are using minor watercourses, ponds and wetland/peatland habitats for both commuting and foraging, and therefore are likely to be moving across the catchment of the proposed mine.
- 6.4.5 The loss of three ponds supporting common frog (*Rana temporaria*), a common and accessible food source for otters during the breeding season, plus the loss of areas of marshy grassland, wet heathland, bog and fen habitat, could have impacts on otter populations in the catchment, but these were not considered.
- 6.4.6 Without additional survey effort along the Pollanroe Burn, the presence of otters along this watercourse cannot be ruled out, and the removal of 975m of this watercourse could present significant impacts for this species (both in terms of the loss of potential holt and foraging habitat and the fragmentation effect) as well as result in a breach of protected species legislation.

Breeding birds

- 6.4.7 The 2015 breeding bird surveys recorded a number of species within the survey area, including Golden Plover (*Pluvialis apricaria*), Skylark (*Alauda arvensis*), Cuckoo (*Cuculus canorus*), Red grouse (*Lagopus lagopus*) and Wheatear (*Oenanthe oenanthe*). These species will be impacted by the loss of peatland habitats from the development site. Enhancement of habitats in Area A was proposed by the applicant as mitigation for the impacts on these (and other) species, though only after this was queried by the RSPB (FEI, 2019).
- 6.4.8 My concern is that the EcMMP states that apart from checking bird boxes, which are not suitable for use by these species, there is “*No other specific monitoring programme*

for birds is proposed at the proposed infrastructure site during the operation of the gold mine". Given the very long operational period, and the potential impacts upon these key species, without regular breeding bird surveys there will be no way to monitor bird numbers and the success, or otherwise, of the proposed habitat enhancements.

- 6.4.9 The ES categorises the impact of disturbance on breeding bird communities as having significant residual impacts (impacts will remain significant after mitigation), so the lack of ongoing monitoring for the lifespan of the operational phase is surprising.

Badger

- 6.4.10 The most recent survey for badgers (2018) on the proposed development site recorded five badger setts in the south/southeast portion of Area A (the proposed infrastructure site). Two of these were classified as main setts, and while one of these was found to be inactive at the time of survey, the other was classified as having "Very high" levels of activity. The remaining three setts were classified as outliers with activity levels recorded as being "Not present", "Low" and "Moderate", respectively.
- 6.4.11 There is a proposed loss of "64.8 ha of potential foraging habitat (mostly of poor value) for badgers, within possible territory of a single badger clan, and one active badger outlier sett will be affected by construction at the proposed infrastructure site". The EcMMP states that "the loss of potential foraging habitat within the proposed infrastructure site is considered highly unlikely to be critical to the maintenance of the local badger population". However, given that the infrastructure site supports five setts, with one very active main sett, I would suggest that it is more likely that the badger population is highly reliant on the surrounding habitats, and that the loss of 64.8 ha could, therefore, be of significance.
- 6.4.12 The compensation to mitigate the loss of the main badger sett is the installation of an artificial sett. This does not compensate for the substantial loss of foraging habitat nor the loss of the other four setts in the area. The EcMMP states that monitoring of the artificial sett will take place for only two years post-construction. With decades of site operation, a two-year monitoring programme will not allow the residual impacts of the mine operation, and their potential significance, to be fully understood.
- 6.4.13 Effective mitigation is important as there is also the potential for a further main sett north of the existing surface infrastructure site (Area B) to be impacted by underground blasting. The suggested mitigation for this in the EcMMP is for blasting to occur under licence "where this is deemed necessary by an EcOW", but this does not tell us how the impacts would be mitigated, nor indeed if a disturbance licence could be obtained.
- 6.4.14 In summary, it does not seem that appropriate consideration has been given to the impacts of the mine development on resident badger populations, and I would dispute that the impacts regarding Surface Disturbance, Noise and Vibration (Table 8-62 ES, 2017) are classified as "not significant after mitigation". (N.B. This sett was not surveyed as part of the 2018 surveys).

Marsh fritillary

- 6.4.15 The marsh fritillary butterfly is afforded protection under Schedules 5 and 7 of the Wildlife (Northern Ireland) Order 1985 (as amended), which fully protects the species and its habitat. Marsh fritillaries are also afforded protection under Annex II of the

European Habitats Directive 92/43/EEC, which places a duty on the Northern Ireland Environment Agency (NIEA) to maintain the species at a favourable conservation status.

- 6.4.16 Surveys were undertaken in 2016 in two areas of the proposed infrastructure site (Area A) where there was presence of Devil'-bit scabious (*Succisa pratensis*), the only known food plant of this species. These surveys are referenced in the Addendum to Environmental Statement (2019). A historical population of marsh fritillary was known from one of these sites (SP2), and the sampling sites were assessed, respectively, as 'suitable (under-grazed) habitat' (SP1) and 'good condition habitat' (SP2) for marsh fritillary.
- 6.4.17 Whilst no individuals were recorded in these surveys, it was noted that populations of this species can fluctuate greatly in size from year to year, with small colonies prone to extinction where there is a small population in isolated areas of habitat. The habitat areas supporting Devil's-bit scabious within the study area were considered to be small, isolated areas within the context of the local landscape, and very poor weather conditions for all butterfly species in 2015 may have impacted upon the colony historically recorded at SP2.
- 6.4.18 Based on these considerations, it was stated that "*there is all reasonable likelihood of absence of Marsh fritillary within the proposed infrastructure site for the proposed gold mine development*". Given the results are from only a single year's survey effort, and that the previous year had been "*very poor weather conditions for all butterfly species*" it would not be right to assume the absence of this species from the proposed infrastructure site.
- 6.4.19 The survey report states that as "*Marsh fritillary populations function at a landscape scale and are able to colonise sites within a range of 10 km, then consideration must be given to ensure that any loss of potential habitat for this butterfly species through the gold mine development is adequately compensated for*". I note that the EcMMP states that annual monitoring of this species would occur from 2017 in one of the five retained units of peatland habitat in the infrastructure area (unit MU7), and that this unit would be enhanced for this species. The results of these surveys may provide more detail on the likelihood of absence of this species, but it is unsafe to assume the absence of marsh fritillaries on the basis of the current survey information. It is, therefore, also unsafe to assume that there will be no impacts upon this species.

7 ADEQUACY OF HABITATS REGULATIONS ASSESSMENT (HRA)

7.1 Introduction

- 7.1.1 The following HRA documents have been provided by the applicants as part of the application:
- Curraghinalt Project County Tyrone Northern Ireland. Update Shadow Habitats Regulations Assessment (November 2020) (referred to below as the sHRA), which supercedes two previous iterations:
 - Curraghinalt Project County Tyrone. Prepared for Dalradian Gold Limited (November 2017). Environmental Statement - Volume 3. C10 Shadow Habitat Regulations Assessment.
 - James O'Neill Associates. Information to inform Habitats Regulation Assessment Pursuant to Article 6(3): Curraghinalt Gold Project Prepared for: Dalradian Gold Limited (July 2019).
 - Ecology Solutions. Discharge licence 068/12/3 Curraghinalt, Cortin County Tyrone. shadow Habitats Regulations Assessment (January 2020) (referred to below as the discharge licence sHRA).
- 7.1.2 Having reviewed the information provided within these documents, I have identified a range of issues relating to the adequacy of the HRA for the project, and these are summarised below.
- 7.1.3 The burden of proof for HRA, and specifically the Appropriate Assessment stage of the process, involves using the 'best available scientific evidence' to determine 'beyond reasonable scientific doubt' that there will be no adverse effects on the integrity of a European designated site.
- 7.1.4 As I will explain in the following sections, and based upon the information provided within the documents - and specifically the lack of robust survey information with regard to key qualifying species such as otter, salmonids and freshwater pearl mussel, and insufficient consideration of potential impact pathways - it is my professional judgement that this burden of proof has not been met.

7.2 Clarity of Information Presented

- 7.2.1 While the latest sHRA makes reference to previous iterations (2017 and 2019), it does not bring together all the necessary supporting information and evidence into one document. This makes the task of concluding the HRA difficult for the Competent Authority. In addition, it does not make reference to more recent, potentially relevant ecological information presented in the second addendum to the ES (October 2020). It should also be noted that not updating the sHRA further on the basis of other important evidence, such as the fish survey work undertaken in June 2021 by NIEA and the Loughs Agency (as discussed in Section 5.3, above), means that the assessment to be carried out by the Competent Authority is not based upon the 'best available scientific evidence'.

- 7.2.2 The sHRA also does not include a detailed map clearly identifying all of the tributaries which represent hydrological links from the site to the designated sites, nor indeed the areas of sensitive woodland and bog habitat within the SAC that could be affected by air quality impacts. This is unhelpful when trying to consider impact pathways between the development site and the designated sites, and thus makes it very difficult to properly assess impacts.

7.3 Adequacy of Screening

- 7.3.1 The sHRA identifies the need for detailed consideration of impacts on the following designated sites:
- Owenkillew River SAC;
 - River Foyle and Tributaries SAC;
 - Lough Foyle SPA (UK and ROI);
 - Lough Foyle Ramsar site; and
 - River Finn SAC.
- 7.3.2 The following potentially significant effects are identified:
- habitat loss, damage and fragmentation;
 - disturbance from human activity (noise and visual disturbance);
 - dust deposition;
 - disturbance from vibration;
 - changes in air quality (traffic emissions);
 - changes in water quality (groundwater and surface water); and
 - changes to the hydrogeological and hydrological regime.
- 7.3.3 The sHRA identifies all of the above impacts as relevant to the Owenkillew River SAC during at least one phase of the proposed project. For the other designated sites identified above, only changes in water quality and changes to the hydrogeological/hydrological regime are screened in. Whilst these are indeed likely to be the main potential impact pathways to these additional designated sites, in my opinion a more thorough justification is required explaining why the other impacts have been screened out for these sites. This should include clear identification of the source-impact-pathway (as discussed below) and a clear explanation 'beyond reasonable scientific doubt' for the lack of impact, taking into account the precautionary principle.
- 7.3.4 For example, the discharge licence sHRA considers the potential for adverse effects on the Owenkillew River SAC as a result of the planned discharge of surface water from the site water treatment system to the Curraghinalt Burn (a tributary of the Owenkillew River SAC). However, there is no justification as to why potential impacts on the other designated sites downstream of the Owenkillew River SAC (i.e. the River Foyle and Tributaries SAC, Lough Foyle SPA, Lough Foyle Ramsar site and River Finn SAC) have been screened out.
- 7.3.5 Whilst these other designated sites are further away from the proposed development site, the nature of the impacts (see below), and specifically the toxicity risks associated with a number of the chemicals that could be released, means that the potential for significant indirect impacts some distance downstream of the discharge point cannot be discounted. The chemicals involved are potentially highly toxic, and the qualifying

habitats and species highly sensitive, such that even very small concentrations could accumulate within these watercourses.

- 7.3.6 Similarly, the potential air quality impacts on sensitive qualifying habitats associated with increased nitrogen deposition are also screened out without any clear justification. This includes the SAC designated features 'Bog Woodland' and 'Old Sessile Oak woods with *Ilex* and *Blechnum*'). As noted in the 2017 SRK report (p194), there will be an increase in nitrogen as a result of vehicular emissions. Given that many of the sensitive habitats within the vicinity of the site are currently exceeding critical loads for nitrogen, owing to intensive agricultural practices, there is a clear potential for increased emissions from this project to have cumulative and in-combination effects that could significantly harm these habitats (e.g. through changes in vegetation composition, with sensitive plant species being out-competed by grasses and other more dominant species). More detailed consideration of this potential needs to be provided before such impacts can be screened out.

7.4 Lack of Detail in Identification of Source-Impact-Pathway

- 7.4.1 The sHRA lacks clear identification of the ecological impacts that could potentially arise from the activities associated with the proposed project. Although the assessment includes reference to the source-impact-pathway methodology, it does not clearly describe or bring together the impact sources (i.e. the activities taking place during each phase of the project), the potential biophysical changes resulting from these activities, nor the ecological receptors which could be affected by the activities/impacts identified and their sensitivities to the likely change.
- 7.4.2 For example, the impact assessments for changes in air quality (traffic emissions) and hydrological implications (changes in water quality, changes to the hydrogeological and hydrological regime, etc.) do not identify which of the qualifying features of the Owenkillew River SAC are relevant to each assessment. This is a significant failing, since it is the nature of each qualifying habitat and/or species, and its particular sensitivity to the biophysical changes brought about by specific impacts, that determines the likelihood (and potential significance) of an adverse effect.
- 7.4.3 Even where the qualifying features are discussed, the sHRA does not demonstrate an understanding of the sensitivities of the ecological receptors to the potential impacts being assessed, which in my opinion significantly reduces confidence in any conclusion of no adverse effects. For example, several of the chemicals that would be released into the surface and groundwater, primarily through the reverse osmosis process, are known to be of moderate to high toxicity to fish and other species (see Section 6 and Appendix C of the Hydrology, Hydrogeology and Peat SoC), and could therefore have significant effects upon qualifying features of the SAC (especially the freshwater pearl mussels and salmonids, but also the floating water-crowfoot habitat ('Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation') and, more indirectly, the otters).
- 7.4.4 Further critique with regard to the hydrological impact pathways is provided in Section 7.8, below.
- 7.4.5 In addition, the sHRA does not clearly identify or justify which impacts are relevant to each stage of the development (construction, operation and closure). For example,

there is clearly the potential for disturbance from human activity (noise and visual disturbance) during the closure phase, which have not been considered. Similarly, there is a failure to fully consider the decommissioning/post-operational effects associated with water levels rising for 90 years after mine closure, with potential impacts on surface waters (see the Hydrology, Hydrogeology and Peat SoC for details). This piecemeal approach to the assessment reduces confidence, and raises doubts, in the overall conclusions of the sHRA.

- 7.4.6 Furthermore, the impact assessments do not assess each phase separately in order, which also makes the assessment confusing and difficult to determine whether the conclusions are acceptable. For impacts resulting from changes in air quality (traffic emissions), although the potential for impacts has been identified during the operational phase, the assessment only considers construction phase impacts.
- 7.4.7 Finally, as suggested in the section above, the potential impact pathways between the development (and specifically those activities likely to lead to nitrogen emissions) and the sensitive bog woodland that is a qualifying feature of the Owenkillew River SAC, have not been explored in any detail in the sHRA. In addition, it should be noted that the Black Bog SAC and Ramsar site, which was designated for its sensitive raised bog habitats, and which was screened out of the sHRA, is located less than 5km south-east of the development site (i.e. down-wind of the mine site in prevailing wind conditions).
- 7.4.8 Whilst previous DAERA/NIEA standing advice on air quality impacts (known as the Operational Protocol) suggested that anything less than a 1% increased 'process contribution' to critical levels of nitrogen deposition and nitrous oxides would not need further assessment in HRA, this has recently been replaced with 'case and site-specific advice (on a case-by-case basis)'. The reason for this is that 'urgent action is required to prevent rising ammonia concentrations and deposition at sensitive habitats to avoid further deterioration in their condition', since '98% of Special Areas of Conservation (SACs).. had nitrogen deposition rates exceeding their Critical Load' (DAERA, 2023).
- 7.4.9 Therefore, in my opinion bespoke assessment and detailed consideration of the potential air quality impacts upon both the bog woodland within the Owenkillew River SAC and the raised bog at the Black Bog SAC and Ramsar site are required in order to understand the implications of the proposals for these sensitive habitats (and in the light of the current serious situation regarding nitrogen deposition on SACs in Northern Ireland).

7.5 Lack of Consideration of Potential Impacts on Supporting Habitats

- 7.5.1 In my professional judgement, there is a lack of consideration of the potential for adverse impacts on supporting habitats; these are habitats outside the boundary of the designated sites, but which could support species which are part of the designated site populations, such as salmon, freshwater pearl mussels, floating water-crowfoot and otters.
- 7.5.2 Whilst the updated sHRA quotes the *Holohan Judgment* (which relates to the need to 'examine the implications for habitat types and species outside the boundaries of the protected site, insofar as those implications are liable to affect the site's Conservation Objectives'), both the sHRA and discharge licence sHRA focus on direct impacts within

the boundary of the Owenkillev River SAC rather than considering functionally-linked habitats and features outside the SAC. Although the sHRA mentions discharges into three 'less sensitive' tributaries of the Owenkillev River SAC (the Pollanroe Burn, Curraghinalt Burn and Attagh Burn), the implication is that these watercourses are not part of the SAC and are therefore not important.

- 7.5.3 But as I will discuss below, not only are these features likely to be of importance for populations associated with the SAC (i.e. as 'supporting habitat'), but also the lack of robust survey data means that the presence and distribution of SAC qualifying species are currently not known. During his site visit, my colleague Dr Walker assessed the Pollanroe Burn as suitable for most if not all of the qualifying species of the SAC, on the basis that in places it was several metres wide and supported areas of riffle, sediment and gravel.
- 7.5.4 The sHRA also fails to identify potential supporting habitats, such as ponds, within the site boundary which could be a foraging resource for otters. Once supporting habitats are identified, the sHRA should assess the potential for impacts on them as a result of the Project.
- 7.5.5 Given that almost a kilometre of nearby supporting aquatic habitat, the Pollanroe Burn (known to supporting qualifying species, including salmon and otter, and potentially also freshwater pearl mussel), is due to be lost and not replaced, this could represent a significant impact upon the SAC populations of these species.
- 7.5.6 The discharge licence sHRA also considers potential for adverse effects on the Owenkillev River SAC as a result of discharge of surface water from the site water treatment system to the Curraghinalt Burn (a tributary of the Owenkillev River SAC). However, it does not include consideration of whether the burn itself is 'supporting habitat' through its potential to support qualifying species of the SAC.
- 7.5.7 It is my professional opinion that the omission of identification and proper assessment of supporting habitats renders the sHRAs for the project and discharge licence incomplete, and undermines the certainty of the conclusions of no adverse effects on the integrity of the designated sites.

7.6 Adequacy of Ecological Surveys

- 7.6.1 Section 5, above, identifies a number of issues regarding the adequacy of ecological surveys, including those for qualifying species of the Owenkillev SAC (salmon, fresh water pearl mussel and otter). It also notes the lack of baseline ecological surveys of potential supporting habitats, such as the Pollanroe Burn and Curraghinalt Burn, which would be required to inform the assessment of potential effects (as noted above).
- 7.6.2 Without reliable information regarding the presence, distribution and abundance of these species, it is not possible to properly quantify the effects, especially with regard to favourable conservation status. It is therefore my professional opinion that it cannot be demonstrated that the habitats regulation assessments have been based on 'the best available scientific evidence'.
- 7.6.3 This further undermines the certainty of the conclusions within the sHRAs for the project and discharge licence that there will be no adverse effects on the integrity of the designated sites.

7.7 Adequacy of Assessment of Disturbance from Human Activity (Noise and Visual Disturbance)

- 7.7.1 The sHRA assessment concludes that *'no adverse effect on the integrity of the Owenkillew River SAC or any other European / Ramsar site would arise in relation to human / visual disturbance'*. However, the evidence/justification provided in the assessment only considers noise, it does not assess visual disturbance.
- 7.7.2 Given the likely presence of otters within what is currently a tranquil environment with very few people, there is the potential for the otter population to be excluded from the area, and for many years, through a combination of noise, visual disturbance and general human activity over a large area.
- 7.7.3 It is, therefore, my professional opinion that conclusions of no adverse effects on the integrity of the otter component of the designated site have not been demonstrated.

7.8 Adequacy of Assessment of Hydrological Implications

- 7.8.1 As noted in Section 7.4 above, the sHRA does not identify which SAC qualifying features (habitats and/or species) are relevant to the assessment of hydrological impacts. The assessment only mentions freshwater pearl mussel, but should also consider the potential for impacts on salmon, lampreys, otters and habitats (including floating water-crowfoot vegetation and bog woodland), which are all also features of the Owenkillew River SAC.
- 7.8.2 In addition, the assessment also does not consider the potential for impacts on other related ecological receptors which are important in supporting SAC species, and which are also sensitive to changes in water quality. This includes brown trout (which can act as hosts for the larval glochidia of pearl mussels), and aquatic invertebrates, which are a food source for fish (including juvenile salmon and trout).
- 7.8.3 Lack of consideration of supporting habitats (as discussed in Section 7.5 above) is particularly relevant to hydrological impacts, given that there will be runoff and discharges directly into a number of tributaries that are hydrologically linked to the Owenkillew River SAC. In my opinion, these have not been adequately assessed to determine whether they represent supporting habitat for SAC qualifying species.
- 7.8.4 Whilst the impact assessment presents a lot of detail about the changes in water quality, it does not provide details of relevant sensitivities/vulnerabilities of the qualifying features of the Owenkillew SAC, and thus how the changes could impact them (for example, through sub-lethal levels and/or chemical bioaccumulation).
- 7.8.5 In my opinion, the assessment does not provide enough evidence to conclude, beyond reasonable scientific doubt, that there will be no adverse effect on the integrity of the SAC. Indeed the loss of 975m of the Pollanroe Burn, along with the discharge of water containing toxic chemicals and/or with important minerals removed by reverse osmosis (see Section 5 of the Hydrology, Hydrogeology and Peat SoC for further details), would strongly suggest that such a conclusion cannot be drawn. This opinion is shared by the Loughs Agency (see Section 2.2 of the Hydrology, Hydrogeology and Peat SoC).
- 7.8.6 The sHRA notes that *'the reverse osmosis plant would be expected to produce significantly higher quality effluent than is required by the site discharge consent,*

resulting in better water quality in the Owenkillew River than predicted in the Proposed Discharge Criteria document (Kaya 2020) and increases in baseline of less than 10% of the EQS.' The document goes on to state that 'Discharges to less sensitive watercourses (Pollanroe Burn, Curraghinalt Burn, Attagh Burn) will meet drinking water standards'. However, the suitability of the water for human consumption is quite different from its suitability for aquatic habitats and species, and as noted above (and discussed in detail in the Hydrology, Hydrogeology and Peat SoC), reverse osmosis treatment removes both beneficial and potentially harmful substances from the water. Trace elements such as calcium and magnesium that are essential for fish metabolism and growth will be removed, which could lead to adverse effects on fish, including salmonids.

- 7.8.7 Reverse osmosis also lowers the pH of water, making it slightly acidic. The process removes minerals in water that neutralise acid, which reduces the pH of water because of the high amount of carbonic acid in the water after it has been filtered. Decreases in pH have the potential to adversely affect survival of freshwater pearl mussel (both the glochidia and juveniles).
- 7.8.8 In addition, Appendix C of the Hydrology, Hydrogeology and Peat SoC provides details of the potential toxicity and other effects of a number of chemicals (including ammonia, nitrates, chromium VI and arsenic) that may arise from the underground mine workings or mine water discharge. All of these are noted to have exceeded their respective environmental standards for groundwater and have known adverse effects on fish, invertebrates and/or aquatic habitats, with most having moderate to high chronic or acute toxicity to fish.
- 7.8.9 As such, there is clearly the potential for changes in water quality (both surface water and groundwater), including resulting from the discharge of water treated by reverse osmosis, to adversely affect the suitability of the watercourses (both the Owenkillew River and its tributaries) for SAC qualifying features. This has not been addressed in the sHRA.
- 7.8.10 Instead the focus seems to be on suggesting that there will be net benefits to water quality rather than adverse effects. The sHRA states that '*The exceedances in accepted standards or proposed ranges relating to discharges / water quality must be viewed in the light of the betterment arising from a reduction in agricultural practices in the catchments*'. It goes on to suggest that as diffuse pollution from agricultural sources is known to be a major contributor to degraded water quality, the proposed change to land use resulting from the project will effectively remove an element of agriculture from the relevant river catchments. It then concludes that '*it is considered that that no adverse effect on the integrity of the Owenkillew River SAC would arise in relation to effects from changes in surface water quality, and noting the improvements in the baseline situation which would arise from removal of land from agriculture (through delivery of the mine project), the discharges are not likely to retard any measures aimed at restoring or maintaining populations of qualifying species, such as Freshwater Pearl Mussel*'.
- 7.8.11 In my opinion, as the assessment does not quantify the stated 'betterment' of water quality resulting from agricultural change, it cannot, and does not, demonstrate that this is sufficient to offset the predicted '*exceedances in accepted standards or proposed ranges relating to discharges / water quality*' as a result of the proposed project, especially given that the toxic effects of many of the chemicals involved (as set

out in Appendix C of the Hydrology, Hydrogeology and Peat SoC) have not been considered. Furthermore, given the existing low intensity sheep-grazing in the area, and thus the relatively minor influence of the agricultural land management on water quality, it seems to me highly unlikely that this change in land use would be sufficient to offset the potentially significant, adverse changes in water quality resulting from the proposed project activities described above.

- 7.8.12 As noted in Sections 5.4 and 5.5 of the Hydrology, Hydrogeology and Peat SoC, in addition to the potential impacts to water quality, the predicted changes in flow rates could also have significant effects. The higher flow rates predicted in some watercourses could flush away silts used by lamprey ammocoetes and/or freshwater pearl mussel, whilst the low flow rates in others (caused by changes in catchment areas) could also make the watercourses unsuitable (and potentially even to dry out). Neither of these eventualities, nor their potential implications for the qualifying features of the SAC (including supporting habitat), have been properly assessed in the sHRA.
- 7.8.13 Most of the hydrological effects described above either relate to supporting habitats of the Owenkillew River SAC and/or would have indirect or distance effects on the river itself. However, as noted in the Hydrology, Hydrogeology and Peat SoC, ground water contributes approximately 16% of base flows in the Owenkillew River; therefore, any impacts on groundwater, either in relation to water quality or quantity, could clearly have a direct effect on the integrity of the SAC.
- 7.8.14 Finally, the sHRA notes that *'section 3.2 of the CEMP specifically considers those mitigation measures relevant to water pollution, vegetation clearance and soil conservation. The reader's attention is drawn to the CEMP for the relevant detail'*. In my opinion, it is wholly inadequate to address the mitigation measures in this way. In order to demonstrate 'beyond reasonable scientific doubt' that there will be no significant effect, it is necessary to set out clearly and precisely within the HRA what the mitigation measures are, to explain how they would reduce the specific effect on each qualifying feature (with reference to the specific impact pathways and biophysical changes that are being considered), and then provide a justification or explanation for why it is considered that the mitigation will ensure these impacts are not significant.
- 7.8.15 A full evidence-backed consideration of the detail is required to meet the high burden of proof. And given that each receptor-impact-mitigation interaction is different, this needs to be done for each of these interactions.
- 7.8.16 In my opinion, on the basis of the issues identified above, it cannot be concluded that there will be no adverse effect on the integrity of the Owenkillew River SAC (both directly and through its supporting habitat) arising in relation to effects from changes in the quality or quantity of both surface water and groundwater.

7.9 Adequacy of in-combination assessment

- 7.9.1 The sHRA includes an assessment of the potential for in-combination effects with *'the powerline project'* (which is related to the project, but subject to separate planning applications). It notes that *'No other plans or projects have been identified which must be considered in-combination with the project proposals'*. In my opinion, there is insufficient explanation as to why other plans and projects have not been considered, given the potential for in-combination and cumulative impacts with the mine project.

- 7.9.2 Futhermore, the list of ecological documents relating to the powerline project, which were reviewed to inform the in-combination assessment, does not include reference to a HRA. It is therefore not clear whether the conclusions of the powerline HRA were taken into consideration in the in-combination assessment.
- 7.9.3 Although the powerline HRA concluded no significant effects in its own right, given that the powerline will cross the Owenkillow River SAC as well as numerous tributaries of that SAC and the River Foyle and Tributaries SAC, and that both open-cut techniques and underground cabling will be carried out, the potential for in-combination effects on sensitive aquatic habitats and species clearly exists.
- 7.9.4 The impact conclusion statements within the discharge licence sHRA refer to '*alone and in-combination*' effects; however, the document does not include a section clearly setting out other plans and /or projects which have been considered as part of the in-combination assessment.
- 7.9.5 Given the issues identified here and above, in my opinion consideration of in-combination effects for both the sHRA and discharge licence sHRA need to be re-assessed, taking into account the likely impacts associated both with other plans (including the County Donegal Development Plan 2024-2030, the Fermanagh and Omagh District Council Local Development Plan 2030 - Plan Strategy and the Regional Development Strategy) and with concurrent projects, including review only the mineral prospecting licence application recently taken to judicial Review by Derry and Strabane District Council but also any other projects that could potentially impact upon the favourable conservation status of the Owenkillow River SAC and other designated sites in the area.

8 ADEQUACY OF BIODIVERSITY NET GAIN ASSESSMENT (BNG)

8.1 Introduction

- 8.1.1 In Northern Ireland, Biodiversity Net Gain (BNG) is not mandatory, as it now is in England. The Wildlife and Natural Environment Act 2011 does, however, include a statutory biodiversity duty for all government departments and public sector bodies (stating that *"it is the duty of every public body in exercising any functions to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions"*). The applicant also relies on the concept of net biodiversity gain so it is relevant to consider.
- 8.1.2 In addition, 'Valuing Nature: A biodiversity strategy for Northern Ireland to 2020' notes that it is important to *"consider the outcomes of the consultation on Biodiversity Offsetting carried out by Defra and decide on the way forward in Northern Ireland"*, whilst the Strategic Planning Policy Statement for Northern Ireland (SPPS) identify that *"planning policies of this statement....must have regard to any strategy designated for the conservation of biodiversity"*.
- 8.1.3 Finally, Fermanagh and Omagh District Council's Biodiversity Strategy and Action Plan from 2022 - 2027 has three main aims that are relevant here: *"to protect, enhance and restore biodiversity on Council managed estate; to increase awareness and action for local biodiversity in the District; and to work in partnership with others to deliver biodiversity action in the District"*.
- 8.1.4 Therefore, any development that leads to a net loss of biodiversity would clearly be contrary to prevailing planning policy, so the claims of net biodiversity gain must be robustly considered as part of this application.

8.2 Review of Applicant's BNG Assessment

- 8.2.1 There is an obvious direction of travel in policy terms, and it is this that the applicant was responding to in their consideration of the implications of their proposals on biodiversity. To do this they used a version of the Defra biodiversity metric ('Version 1') that was current at the time (2017), I and my BNG team reviewed how this was done and whether the methods and assumptions were appropriate. We then re-assessed the biodiversity implications of the proposals using the current version of the metric - the Statutory Biodiversity Metric (SBM) - to consider how using better-developed methodologies might influence the conclusions.
- 8.2.2 I recognise that the SBM was clearly not available at the time of the initial application. However, given the considerable ecological value of the habitats that would be affected, the large areas involved, and the importance of succeeding with the mitigation and compensation proposed, I consider that is important to understand as accurately as possible what the true biodiversity implications of the project will be.
- 8.2.3 My concern relates to whether the proposals would *'further the conservation of biodiversity'* and whether, when assessed using current standards, there might be a

net loss of biodiversity associated with construction of the gold mine rather than the net gain claimed. This is clearly a material consideration in the decision to grant or refuse planning permission for the project.

- 8.2.4 My detailed review of the BNG proposals is presented in Appendix 1. The conclusions of this assessment are summarised below.

Affected Habitats

- 8.2.5 The peat on the crest of the site supports a complex mosaic of blanket bog, wet heath, marshy grassland and acid grasslands, and forms a watershed for several small burns that flow into the Owenkillew River SAC/ASSI and Owenreagh River ASSI. The loss of almost 2km of this burn habitat (including 975m of Pollanroe Burn) is barely considered in the applicant's BNG assessment.
- 8.2.6 'Blanket bog' is treated as an 'irreplaceable habitat' within the current Statutory Biodiversity Metric (SBM), and any loss requires bespoke mitigation. The replacement ratio of 2:1 for peat habitat (as used in the applicant's assessment) is much lower than would be expected when compensating for the loss of irreplaceable habitat. The Hydrology, Hydrogeology and Peat SoC suggests that a 10:1 ratio would be more appropriate, and I would consider this to be much more realistic. Ultimately, this should be decided on a case-by-case basis with the local authority and statutory consultees.
- 8.2.7 Large areas of important, sensitive, and difficult-to-recreate habitats will be lost as part of the proposals and it is, therefore, surprising that a biodiversity net gain is predicted through the EcMMP proposals.
- 8.2.8 It is surprising that no mitigation is proposed for the loss of watercourse habitat. The SBM stipulates a requirement for a 10% uplift in each of the three habitat categories (habitat area units, watercourse units and hedgerow units), and even using the 2017 version of the metric, it should have been apparent that the loss of key aquatic linear habitats should have been mitigated and/or compensated.

Proposed Habitat Creation and Enhancement

- 8.2.9 As with Catherine Isherwood (in her Hydrology, Hydrogeology and Peat SoC) and John Ingham (in his Landscape and Visual SoC), I have considerable concerns about the likelihood of success of the peatland 'habitat creation' to replace the loss of valley mire or blanket bog that has developed over decades or even centuries. This clearly has implications for the accuracy of the BNG calculations, since the 'post-development' scenario which, alongside the baseline conditions, determines the net change in biodiversity, will not be realistic.
- 8.2.10 There is no detail in the EcMMP regarding water management in this peatland 'creation', and this is vital for ensuring that the peat remains wet enough to be 'active' (i.e. to generate *Sphagnum*). Furthermore, the 'bundled cells' into which the peat will be placed will be elevated on top of existing habitat, hydrologically disconnecting it.
- 8.2.11 Peatland takes hundreds of years to develop, so I dispute the claim in the applicant's assessment that new peatland habitat of "*good condition and high distinctiveness*" will be achieved. Indeed, this is supported in the EcMMP by the statement '*Whilst the aim is to restore the peatland communities so that they become active, it is acknowledged that in practice this may not always be possible*'.

- 8.2.12 The applicant has also not accounted for significant commitments in legal agreements (e.g. Covenants), nor for sufficient duration of ongoing monitoring and management of species and habitats, and potential remediation requirements. Uplift in biodiversity without these cannot be guaranteed.

Errors in the Applicant's Metric Calculations

- 8.2.13 A key error in the applicant's calculations (based upon Version 1 of the Defra Metric) is that they have subtracted the Habitat Impact Score (HIS) from the Habitat Mitigation Score (HMS) to provide the overall BNG figure - this is fundamentally wrong. The net change in units should be calculated with reference to the baseline habitat score across the whole site (Areas A, B and C combined), not just to the score associated with habitat loss. Therefore, to achieve a 10% net gain post-development (i.e. including all on-site and off-site mitigation and compensation), the baseline habitat score (which takes into account the value of all of the habitat within the site, including the lost, retained and enhanced habitats), should equal 1543.17 (i.e. 1402.88×1.1) and not 1402.88 as stated.
- 8.2.14 The calculation of net change presented in the 2019 Biodiversity Impact Statement is therefore incorrect. The figures should be calculated against the total baseline (1402.88) rather than against the value of only the areas directly affected (i.e. the HIS, 626.86). When calculated correctly, there will be a net loss of 868.28 units before compensation (i.e. $534.6 - 1402.88$), and still a net loss of 647.65 units after compensation (i.e. $755.13 - 1402.88$). This is clearly a very substantially different result from the claimed net gain.
- 8.2.15 Furthermore, in both of the applicant's Biodiversity Impact Assessments linear habitats have not been assessed correctly. A total of 8.14km of linear habitats would be lost as part of the proposals, including 1.71km of watercourse draining into a European designated river (the Owenkillew River SAC). Whilst some of the impacts on hedgerow habitat are to be mitigated - through the creation of 1.84km of species-rich hedgerow and the enhancement of 0.42km of currently defunct hedgerow - there is no mitigation or compensation proposed for the loss of stream habitat (including Pollanroe Burn).
- 8.2.16 I recognise that the inclusion of watercourse features in BNG metrics has developed since the applicant's assessment. However, as the watercourses are so close to the Owenkillew River SAC an Owenreagh ASSI, and the Pollanroe Burn is known to support otters and juvenile salmonids (2021 surveys), and potentially also freshwater pearl mussel, it is a significant failing that no mitigation or compensation has been proposed.
- 8.2.17 Finally, the existing infrastructure on the site (Area C) was classified as 'buildings and bare ground' in the applicant's baseline assessment. This classification is incorrect, as this area should have been reinstated to more natural habitats. The retained infrastructure is there without the benefit of planning permission, and has therefore been retained on-site unlawfully, since the applicant has a planning condition in place requiring this infrastructure to have been removed and restored to habitat.
- 8.2.18 So, for the BNG calculation, the baseline for Area C should have been assessed as the restored habitat that should be present (had the planning condition been properly discharged) rather than the buildings and hard-standings that remain at present. This retrospective EIA development, therefore, clearly has an unfair advantage (with regards both to the EIA assessment and the BNG calculations), since the baseline

situation has been understated, meaning that the ecological impacts (EIA) have also been underplayed whilst the net biodiversity change (BNG) has been overstated.

- 8.2.19 Indeed, there is an additional unfair advantage here; had the existing infrastructure been restored to more valuable habitat (as was legally required) the applicant would also have had to undertake a much more substantial survey and assessment than was actually carried out.

Statutory Biodiversity Metric (SBM)

- 8.2.20 Given the extensive flaws identified in the applicant's metric calculations (see above), we have prepared two versions of the SBM: the first re-runs the calculations using the same information, allowing a direct comparison between the two metrics; and, the second corrects the errors (giving a full justification for where and how we have changed the assessment), and provides a more accurate representation of the true BNG status of the project. In both cases a very different outcome is achieved compared with that claimed by the Applicant.
- 8.2.21 Using the same data inputs as for 2019, our results show that instead of a net gain of 128.27 habitat area units, using the most up-to-date calculator would actually indicate a net loss of 336.96 units (-24.58%), even with the 52.73 hectares of compensation within the three Compensation Areas. This calculation corrects the major flaw in the 2017 and 2019 calculations, described in the section above.
- 8.2.22 It should be noted that this figure does not include the significant loss of 9.25 ha of blanket bog, since this habitat is considered 'irreplaceable' in the SBM and requires its own bespoke compensation proportionate to the significance of the habitat (as detailed above). Furthermore, as noted above and in the evidence of Catherine Isherwood and John Ingham, the habitat restoration that is suggested as part of the DSF (and included in the BNG calculations) is extremely unlikely to work, so should be discounted.
- 8.2.23 With regard to linear habitats, instead of the net loss of 6.35 'linear units' concluded in the 2019 calculations (which conflated watercourse and hedgerow impacts, but only mitigated the impacts on hedgerows), running the data through the SBM indicates a net loss of 18.68 watercourse units (-39.13%) and a net gain of 8.14 hedgerow units (+49.24%).
- 8.2.24 Our second re-run of the calculations using the SBM (correcting the errors that were made in order to provide a more realistic calculation of the true BNG position of the project) indicates a net loss of 376.12 units (or -23.39%). For linear habitats, instead of the net loss of 6.35 'linear units' concluded in the 2019 calculations, this amended assessment indicates a net loss of 22.84 watercourse units (-40.90%) and a net gain of 9.37 hedgerow units (+49.24%).
- 8.2.25 In addition to the flaws in the BNG assessment for the gold mine (as detailed above), there are 7km of underground cabling and 30km of overhead line being installed to provide a power supply for the gold mine. This has not been accounted for in the BNG calculations for the project. This is a very significant omission, leading to a considerable understatement of the BNG impacts of the project as a whole.

9 CONCLUSIONS

- 9.1.1 There is much inter-relatedness between the various ecological features, impacts and assessments. Therefore, whilst I have attempted to avoid too much repetition in my evidence, this has in parts been unavoidable. However, this has largely served to emphasize the key arguments that I am making with regard to inadequacies of the ecological assessment of the project.
- 9.1.2 In my evidence I have set out how the inadequacy of the survey and assessment carried out for the EIA and HRA, combined with unrealistic mitigation and compensation proposals, have resulted in an assessment of the ecological implications of the project that is significantly flawed.
- 9.1.3 It should be noted that for three of the qualifying features of the Owenkillew River SAC (the Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, the Old sessile oak woods with *Ilex* and *Blechnum*, and the Freshwater Pearl Mussel *population*), this SAC is considered to be one of the best in the United Kingdom. Therefore, ensuring there are no adverse effects due to water quality and other issues is of even greater importance.
- 9.1.4 Salmon, otter and freshwater pearl mussel are all qualifying features of the SAC. Each of these species has a reliance on the general ecology of the catchment within which they reside, and therefore any impacts within any part of the catchment have the potential to directly or indirectly affect these species.
- 9.1.5 In the case of salmon, their specific habitat requirements depend upon the life stage being considered and a variety of high-quality habitats are therefore required to ensure successful progression through all stages of the life cycle. Salmon is a species which requires very high-quality natural river water for spawning but also for growth, and this includes access to multiple invertebrate prey species throughout the time they reside in rivers after hatching.
- 9.1.6 Potential impacts on water quality, therefore, need to consider requirements for salmon specifically but also for the invertebrate prey upon which juvenile stages depend for food. The use of very pure (reverse osmosis) water may ensure that contaminants are not released into the watercourses, but they will also dilute the essential minerals which naturally occur and this could in turn have, at least localised, effects on fish and invertebrates.
- 9.1.7 The discounting of the Pollanroe Burn (and indeed the Curraghinalt and Attagh burns) as having little ecological importance is deeply flawed and has led to an unreliable assessment. This watercourse has been shown to contain juvenile salmonids and is also likely to contain a variety of other aquatic life which has not been surveyed or assessed. No surveys have been undertaken to confirm the presence or likely absence of freshwater pearl mussel. However, this species depends upon juvenile salmonids to transport glochidia, and thus if these fish are present there is at least potential for freshwater pearl mussel to be present, and surveys should have been undertaken to determine this.
- 9.1.8 Few experiments have been undertaken with freshwater pearl mussel due to their critically endangered status. Consequently, there is a paucity of information relating to

their tolerance to different pollutants / varying water quality or if exposure to pollutants may hinder reproductive success. A precautionary principle approach should, therefore, be adopted to ensure risks to this species are avoided, such that any meta-populations within the catchment, regardless of how many individual mussels these comprise, are not exposed to any substances or changes to habitat or water quality which has even a small chance of hindering their survival or ability to reproduce.

- 9.1.9 Otter is a highly mobile species with extensive home ranges often including many kilometres of watercourses and their associated tributaries and riparian habitats. Large areas of the proposed development site have not been surveyed for this qualifying species, and the assessment of the Pollanroe Burn as being of negligible importance for otter was based on surveys which were undertaken under sub-optimal conditions and on the assumption that fish were unlikely to be present.
- 9.1.10 This latter point has now been proven to be inaccurate; however, even in the absence of prey, such water courses can still be important for commuting. Therefore, the loss of c.975m of the Pollanroe Burn, along with the disturbance effects associated with a major long-term infrastructure project, could therefore have a significant fragmentation effect for the resident otters.
- 9.1.11 All of the above points lead to the obvious conclusion that both the Environmental Statement and, more importantly, the Habitats Regulations Assessments, have been based upon insufficient evidence, inadequate mitigation proposals and a lack of robust assessment of the likely ecological impacts of the proposals. Rather than the project having no, or limited, significant effect upon key ecological receptors, in my opinion the applicant has certainly not demonstrated 'beyond reasonable scientific doubt' that there will not be a significant effect upon the integrity of the Owenkillew SAC.
- 9.1.12 In addition to the legislative implications of these failings, it also means that the project is likely to be non-compliant with numerous local, regional and national policies aimed at protecting, restoring and/or enhancing biodiversity.
- 9.1.13 Finally, on the subject of biodiversity, I have shown the applicant's claim with regards to Biodiversity Net Gain (BNG) to be not just optimistic but highly inaccurate. Rather than the net gain of 128.27 habitat area units claimed, we have calculated (using more accurate and up-to-date version of the Biodiversity Metric) that in fact the project would result in a loss of 376.12 habitat area units (equivalent to a 23.39% net loss) as well as a loss of 22.84 watercourse units (equivalent to a 23.39% net loss).
- 9.1.14 It should also be noted that this figure does not include the significant loss of 9.25 ha of blanket bog, since this habitat is considered 'irreplaceable' in the SBM and requires its own bespoke compensation proportionate to the significance of the habitat (as detailed above). Furthermore, as noted above, the peatland restoration that is included in the BNG calculations is extremely unlikely to work, so should, in reality, be discounted. These figures also do not take into account the BNG implications of the power lines.
- 9.1.15 Whilst our assessment used a version of the Metric that was not available at the time of the application, it does allow us to understand more accurately the true implications of the project for biodiversity, and should therefore be a material consideration for the Inquiry.

10 REFERENCES

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11 APPENDIX 1 – DETAILED BNG REPORT

Dalradian Biodiversity Net Gain review

Introduction

In Northern Ireland, Biodiversity Net Gain (BNG) is not mandatory, as it now is in England, but instead is required in accordance with policy. The Wildlife and Natural Environment Act 2011 does, however, include a statutory biodiversity duty for all government departments and public sector bodies (stating that *"it is the duty of every public body in exercising any functions to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions"*). The applicant in this case has referred to net gain.

In addition, 'Valuing Nature: A biodiversity strategy for Northern Ireland to 2020' notes that it is important to *"consider the outcomes of the consultation on Biodiversity Offsetting carried out by Defra and decide on the way forward in Northern Ireland"*, whilst the Strategic Planning Policy for Northern Ireland (SPPS) and Planning Policy Statement 2: Natural Heritage Wildlife identify that *"planning policies of this statement....must have regard to any strategy designated for the conservation of biodiversity"*.

Finally, Fermanagh and Omagh District Council's Biodiversity Strategy and Action Plan from 2022 - 2027 has three main aims that are relevant here: to protect, enhance and restore biodiversity on Council managed estate; to increase awareness and action for local biodiversity in the District; and to work in partnership with others to deliver biodiversity action in the District.

So there is an obvious direction of travel in policy terms, and it is this that the Applicant was responding to in their consideration of the implications of their proposals on biodiversity. To do this they used a version of the Defra biodiversity metric that was current at the time (2017), and in this document we review how this was done and whether the methods and assumptions were appropriate. We then reassess the biodiversity implications of the proposals using the current version of the metric - the Statutory Biodiversity Metric - to consider how using better-developed methodologies might influence our conclusions.

We recognise that the SBM was clearly not available at the time of the initial application. However, given the considerable ecological value of the habitats that would be affected, the large areas involved, and the importance of succeeding with the mitigation and compensation proposed, it is important to understand as accurately as possible what the true biodiversity implications of the project will be.

Ultimately, our concerns relate to the extent to which the proposals would indeed *'further the conservation of biodiversity'* and whether, when assessed using current standards, there might in fact be a net *loss* associated with construction of the gold mine rather than the net *gain* claimed. This is clearly a material consideration in the decision to grant or refuse planning permission for the project.

Review of Applicant's BNG assessment

The 2017 Environmental Statement includes a document - the Ecological Mitigation and Management Plan (EcMMP) - that undertakes something similar to what would now be considered to be a Biodiversity Net Gain (BNG) assessment.

In this document, the baseline habitats within three areas due to be affected by the proposals (the 143.78ha of the proposed infrastructure site Area A, the 1.81ha of the existing surface infrastructure site Area C, and the 0.40 ha of the 'ventilation raises') are assessed, the loss of habitat from these areas is calculated, and mitigation is also set out in order to determine the net biodiversity situation post-development.

The mitigation comprises habitat creation and enhancement for peatland habitat within seven locations within Area C (the 'Management Units') and a further seven 'Habitat Enhancement (HE) areas (also within Area C) that are primarily proposed to mitigate species impacts (but which are included in the calculations). A further three 'Compensation Areas', totalling 52.73ha, within the proposed mineral extraction area (Area B), are also included in the calculations, with habitat enhancement here designed to achieve a net overall gain for biodiversity.

The calculations are carried out using a version of the Defra biodiversity metric dating from 2012¹. Whilst this was a relevant methodology to use in the 2017 assessment, clearly BNG has moved on considerably since 2012, so the 'Biodiversity Impact Statement' included in the EcMMP is not to the standard that would be expected today.

However, notwithstanding how biodiversity assessment has improved in the intervening years, there are still a number of significant flaws in the assessment submitted with the application, and these are set out below. Furthermore, in order to provide a more realistic assessment of the actual biodiversity impacts of the project, we have also input the same baseline, habitat loss and habitat creation and enhancement data into the current metric (the Statutory Biodiversity Metric), in order to provide a better understanding of the true BNG status of the project.

Affected habitats

First of all, it is important to note that the area that would be affected by the proposals comprises a large area of valuable habitat (albeit that areas have been degraded over time through peat cutting, drainage and overgrazing). The peat on the crest of the site supports a complex mosaic of blanket bog, wet heath, marshy grassland and acid grasslands, whilst below the areas of peatland, there is a patchwork of fields bounded by earthbanks and hedgerows. The lower fields predominantly comprise improved and semi-improved grasslands, but pockets of peat remain which support a mosaic of mire and wet heath habitats.

The ridge also, significantly, forms a watershed for a number of small burns that flow into the Owenkillew and Owenreagh Rivers, the former of which is a European designated site. The loss of almost 2km of this burn habitat (including 975m of Pollanroe burn) is barely considered in the assessment, and this will be discussed further below.

It should not therefore be underestimated how important the baseline habitats are, and Table 2-1 in the EcMMP includes a long list of affected habitats, several of which are of some conservation importance (i.e. county or high local importance) even though the EclA only recognised 'peatland habitats' as an important ecological feature (along with a number of species). As an example, blanket bog is of such importance that it is treated as an 'irreplaceable habitat' within the current Statutory Biodiversity Metric (SBM), and any loss requires bespoke mitigation. The replacement ratio of 2:1 for peat habitat (as used here) is

certainly much lower than would normally be expected now when compensating for the loss of such habitat.

Table 2-1 also sets out the areas of habitat due to be lost, and this includes very significant areas of some key habitat types, including 7.94 ha of valley mire, 10.61 ha of marshy grassland, 9.05 ha of modified/blanket bog and nearly 2km of running water. Table 2-3 relates these habitats to EU Habitats Directive Annex I Habitats and Northern Ireland Priority Habitats, indicating the predicted loss of 1.57 ha Northern Atlantic Wet Heath/Lowland Heathland, 9.05 ha of Blanket Bog, 5.25 ha of Purple Moor-grass and Rush Pastures and 3.49 ha Upland Flushes, Fens and Swamps. In contrast, Section 3.1 of the EcMMP states that *'the gold mine development is predicted to result in the direct and indirect loss of 9.05 ha of bog communities, 7.94 ha of fen valley mire communities, 2.62 ha of wet heath / acid grassland communities and 6.20 ha of marsh / marshy grassland communities'*.

So there is a degree of inconsistency around the exact area of each habitat to be lost, and how that habitat should be classified (which we attempt to address through our re-running of the calculations using the SBM). However, what is clear is that these are large areas of important, sensitive and difficult to recreate habitats, such that it is surprising that a net gain is predicted as a result of the EcMMP proposals, even with relatively large areas of creation and enhancement.

Whilst there is mitigation and compensation proposed for most of the bog and peat habitats (see below) as well as for the impacts on various species (through the Habitat Enhancement areas), and the landscaping proposals will also offset much of the impact on woodland and grassland habitat, it is surprising that no mitigation is proposed for the loss of watercourse habitat. The current Metric, which stipulates a requirement for a 10% uplift in each of the three habitat categories (habitat area units, watercourse units and hedgerow units) would not allow this. However, even back in 2017 it should have been apparent that the loss of key aquatic linear habitats should have been mitigated.

Proposed habitat creation and enhancement

As noted above, the 'Habitat mitigation, enhancement and compensation measures' section of the EcMMP (i.e. Part 1) identifies seven Management Units (MUs) within the proposed infrastructure site Area A (Figure 3.2) and three Compensation Areas (CAs) within Area B (Figure 3.3). A variety of habitat creation and enhancement measures are set out for the MUs whilst the focus of the CAs is enhancement. In the metric calculations (Appendix 02 of the EcMMP), therefore, the MUs appear in both the 'enhancement' and 'creation' parts of the metric whilst the CAs are only included under enhancement.

Sections 3.4 and 3.5 of the EcMMP set out the proposed approach to the creation and/or restoration of peatland habitat in the seven Management Units and three Compensation Areas. The proposed interventions include: the creation of peatland habitat on historically cut/modified bog or improved grassland through the re-use of peat stripped from the development site; blocking drains to re-wet the peat; the removal of conifer trees; scrub control; and reducing grazing pressure. [It should be noted at this point that two of the three MUs where habitat creation was proposed were removed from the scheme when the Peat Management Plan was updated, such that only the 1.43 ha of creation in MU2 remains.]

Whilst the majority of the enhancement measures would seem appropriate, we have particular concerns about the likelihood of the peatland 'habitat creation' succeeding. We

believe that it is unsound to suggest that valuable peatland habitat – to replace the loss of valley mire or blanket bog that has developed over decades or even centuries – can be effectively created in this way. Whilst some detail is provided regarding how ‘peat overburden arising during the construction works’ will be used to create new peatland habitat on top of degraded areas, the information provided in the EcMMP is insufficiently detailed to understand how the creation would work.

It is not clear, for example, what water management is proposed, and this will be key for ensuring that the peat remains wet enough to be ‘active’ (i.e. to generate *Sphagnum*). We are also concerned that the ‘bunded cells’ into which the peat will be placed will essentially be elevated (since they will be created on top of the existing habitat) and thus raised above the neighbouring peatland and thus hydrologically disconnected. It is also not clear what will happen to the habitat onto which the peat is being placed, other than any areas of rushes being stripped. Understanding the importance of the habitat being affected, and also its influence upon the peat being placed there, will be important.

Therefore the claim in the metric calculation that peatland habitat of ‘good’ condition and high distinctiveness will be achieved seems very optimistic. Not only is it unlikely that it will be possible to achieve this level of condition, but also the habitat created cannot realistically be claimed as a proper peatland habitat. These habitats take hundreds of years develop, and cannot be recreated simply by piling up excavated peat.

We note that the document accepts that ‘Whilst the aim is to restore the peatland communities so that they become active, it is acknowledged that in practice this may not always be possible’. We believe that it is right to be wary of the likelihood of success, especially given the complexity and sensitivity of the habitats to be created.

Another key concern is that the duration of the proposed interventions is clearly inadequate. In BNG, habitat creation and/or enhancement measures are secured, managed and monitored for a minimum of 30 years in order to deliver the uplift in biodiversity required. Conservation covenants (i.e. legal land agreements) are then used as a mechanism for ensuring that delivery is successful, with enforcement possible where targets (i.e. expected increases in habitat condition) have not been met.

Without a similar commitment the uplift in biodiversity that is being claimed is invalid. The EcMMP requires, for example, the imposition of ‘a cessation of grazing ... for a period of up to five years’, after which the area could readily be overgrazed again. This will hardly be guaranteeing that the habitat that has been restored through the removal of grazing pressure will remain in good condition. Perhaps more importantly, there is also no indication of long-term secured management of the peatland creation areas. This will be key if these areas are to deliver the habitat being committed to, since the complexity of the creation will need adaptive management over a long period to ensure success.

Similarly, whilst monitoring is proposed, there is no mention of the implementation of remedial measures in those circumstances where the monitoring demonstrates a lack of success, and also no means of enforcing the delivery of these measures. Without this, there is no means of guaranteeing that the required uplift will be delivered.

This uncertainty regarding the success of implementation is addressed in the Statutory Biodiversity Metric (SBM) by the negative multipliers of ‘difficulty’ (a measure which represents the uncertainty in the effectiveness of management techniques used to enhance

or create habitat) and 'Time to target condition' (the average time taken between starting creation or enhancement of habitats and that habitat reaching its target condition or distinctiveness). Although the Metric used in the 2017 and 2019 calculations does take into account 'difficulty of creation' and 'difficulty of restoration', the way in which these multipliers are used in the calculations in the SBM are more refined and evidence-based, and will likely have a more significant impact upon the final scores.

As an additional point, it should also be noted that detailed baseline mapping of the compensation areas has not been carried out; instead the assessment was informed simply by a walkover survey. This would need to be rectified if an accurate BNG calculation is to be provided.

Biodiversity Impact Statement and the Metric calculation

Taking the above habitat creation and enhancement measures into account, alongside the quantified loss of habitat, the Biodiversity Impact Statement (Section 4 of the 2017 EcMMP) used a biodiversity metric that was current at the time (the 2012 Defra metric) and calculated what the residual biodiversity impact would be.

First of all, the metric calculated the baseline biodiversity value of the habitats within the proposed infrastructure site (Area A), the existing surface infrastructure site (Area C) and the site of the proposed ventilation raises (in Area B). It then took into account the loss of habitat within Areas A, B and C, alongside the proposed creation and enhancement measures within the seven Management Units located in Area A, and calculated that there would be a net loss of 131.76 habitat area units *without* compensation, but a net gain of 88.77 *with* the compensation (i.e. including the enhancement of the 52.73 ha of degraded blanket bog within the three Compensation Areas).

The metric also assessed the impacts upon linear habitats, suggesting a net loss of 6.35 units both before and after compensation (since no improvements to linear features are proposed at the Compensation Areas). [It should be noted that aquatic and terrestrial linear features (primarily watercourses and hedgerows, respectively) were considered together, our concerns with this are addressed below].

In 2019, these calculations were updated in an addendum submitted as part of a Further Environmental Information (FEI) submission. The main difference for this submission was that two of the Management Units (MU4 and MU5) were no longer required, owing to reductions in the land take. This meant that the amount of habitat loss was reduced, as was the amount of habitat creation and enhancement needed.

This document therefore slightly amended the areas of habitat to be affected, such that net loss *without* compensation decreased from 131.76 habitat area units to 92.26, whilst the net gain *with* the compensation increased from 88.77 to 128.27 units. The linear unit calculations remained unchanged. So it is the updated data upon which these calculations were based (Appendix 01 of the 2019 FEI Addendum to the EclA and EcMMP) that we have used in our re-running of the calculations using the Statutory Biodiversity Metric (SBM), see below.

A key error in the calculation of gains and losses is that the Applicant has subtracted the Habitat Impact Score from the Habitat Mitigation Score to provide the overall BNG figure, such that a gain is achieved simply by the HMS exceeding the HIS. This is fundamentally wrong. The net change in units should be calculated with reference to the baseline

biodiversity score across the whole site (Areas A, B and C combined), not just to the score associated with habitat loss. In other words, since the baseline habitat score (which takes into account the value of all of the habitat within the site, including the lost, retained and enhanced habitat) equals 1402.88, in order to achieve a 10% net gain the post-development scenario (i.e. including all on-site and off-site mitigation and compensation) should equal 1543.17 (i.e. 1402.88×1.1).

Therefore, the calculation of net change presented in the 2019 Biodiversity Impact Statement - which predicts a loss of 77.38 area units before compensation (i.e. without CA1-CA3 included)), and a gain of 128.27 units after compensation - is wrong. Instead, these figures should be calculated against the total baseline (1402.88) rather than against value only of the areas directly affected (i.e. the Habitat Impact Score, 626.86). When calculated this way, there will be a net loss of 868.28 units before compensation (i.e. $534.6 - 1402.88$), and still a net loss of 647.65 units after compensation (i.e. $755.13 - 1402.88$). **This is clearly a substantially different result.**

Another fundamental issue with the Biodiversity Impact Statements submitted by the Applicant (both in 2017 and 2019) is the way in which linear habitats are addressed. A total of 8.14km of linear habitats would be lost as part of the proposals, including 1.71km of watercourse draining directly into a European designated river (the Owenkillew SAC). Whilst some of the impacts on hedgerow habitat are to be mitigated, through the creation of 1.84km of species-rich hedgerow and the enhancement of 0.42km of currently defunct hedgerow, there is no mitigation or compensation proposed for the loss of stream habitat.

Although it is true that the inclusion of watercourse features in BNG metrics has developed significantly in recent years, the fact that these watercourses are so close to a SAC river, and are therefore likely to be of considerable nature conservation value (potentially containing spawning habitat for salmonids), makes it very surprising that no mitigation has been proposed.

Finally, it is also important to note that the calculations used within the Biodiversity Impact Statement counted the existing infrastructure on the site (Area C) as 'buildings and bare ground' in the baseline assessment. This infrastructure (including roads, stockpiles, bare ground, water treatment systems, areas of gravel, etc.) was put in place a few years ago as part of an exploration phase to assess the potential for the mine. However, it was a requirement of the consent that it should all be removed and the site restored at the end of that period.

Therefore, whilst 'buildings and bare ground' are clearly what is currently present, all of this is there without the benefit of planning permission. It has thus been retained on-site illegally, as the Applicant has a planning condition in place requiring this infrastructure to have been removed and restored to habitat. So for the BNG calculation, the baseline for Area C should have been assessed as the restored habitat that *should* be present (had the condition been properly discharged) rather than the buildings and hard-standings that *are* present.

Statutory Biodiversity Metric (SBM)

In order to determine the accuracy and appropriateness of the above calculations, and to challenge the assertion that there will be a significant net gain for biodiversity, we have carried out the following:

- An investigation into the data underpinning the metric calculations - the nature of the habitats, the condition assessment, etc.;
- An assessment of the pitfalls of the metric used (i.e. where there are limitations and whether or not these are addressed anywhere in the reporting);
- A consideration of the distinctiveness values used, whether they vary from the Statutory Biodiversity Metric (given that the SBM is England-specific) and if this is appropriate in an Irish context;
- An assessment of the potential requirement for re-classification of the value or condition of any created or enhanced habitats given what has been described in the proposals; and finally
- A re-run of the biodiversity calculations using the Statutory Biodiversity Metric.

Having carried out this work, we would summarise the errors within the 2017 and 2019 biodiversity calculations (further to the key issues described in the previous section) as follows (please note that a detailed list of our concerns is presented in Appendix 1):

- The wrong method for calculating the Habitat Impact Score (HIS) has led to a considerable understatement of the biodiversity implications of the project (as noted in the previous section);
- Errors and inconsistencies in the allocation of condition to habitats has affected the accuracy of the calculations;
- Errors, omissions and inconsistencies in the areas of different habitats to be affected (both positively and negatively) has affected the accuracy of the calculations, mostly leading to overestimates of the biodiversity benefits of the proposals;
- The way the enhancement section of the spreadsheet has been completed is wrong, leading to an overinflation of the Habitat Mitigation Score (HMS - i.e. the beneficial components of the project);
- Re-assessing the calculations (using the old Metric table but with the correct inputs, and assuming a baseline habitat area units score of 1388), demonstrates that achieving a 10% net gain for the project would require a further 383.61 habitat area units to be provided (i.e. in addition to the three Compensation Areas already secured). This rises to 399.98 if the alternative baseline figure of 1402.88 (see Appendix 1 for details) is used.
- As noted in the section above, hedgerows and watercourses are grouped together as 'linear habitats', with enhancement and creation measures only proposed for the hedgerow component. This serves to obscure the significant omission of any measures to offset the loss of important watercourse habitat. In more recent versions of the Metric, watercourse and hedgerow units are considered separately, along with habitat area units.

Given the wide-ranging flaws identified in the earlier metric calculations, we have prepared two versions of the Statutory Biodiversity Metric (SBM): the first re-runs the calculations using the same information, and thus allows a direct comparison between the two metrics (demonstrating how significantly the biodiversity impacts of the proposals have been understated in the 'old' format; see Appendix 2 and the separate SBM spreadsheet document in Excel (BNG Assessment 1); the second corrects the errors (giving a full justification for where and how we have changed the assessment), and thus provides a more accurate representation of the true BNG status of the project (see Appendix 3 and the separate SBM spreadsheet document in Excel (BNG Assessment 2)). In both cases a very different outcome is achieved compared to that claimed by the Applicant.

SBM - using 2019 data

The full details of the SBM calculations are presented in the excel spreadsheet appended to this evidence (BNG Assessment 1), with an explanation of the differences and the considerations provided in Appendix 2.

In summary, our BNG assessment of the proposals (using the same data inputs as for 2019) indicates that instead of a net *gain* of 128.27 habitat area units, using the most up-to-date calculator would actually indicate a **net loss of 336.96 units** (or 24.58%), even with the 52.73 hectares of compensation within the three Compensation Areas.

This calculation corrects the major flaw in the 2017 and 2019 calculations, described in the section above,

It should also be emphasized that this is in the absence of the significant losses that would be associated with the loss of 9.25 ha of blanket bog, since this habitat is considered 'irreplaceable' in the SBM and requires its own bespoke compensation proportionate to the significance of the habitat. This would likely be replacement at a considerably higher multiplier than the 2:1 ratio (i.e. 2 ha of replacement habitat for every 1 ha lost) proposed for peatland habitats in the Applicant's assessments.

With regard to linear habitats, instead of the net loss of 6.35 'linear units' concluded in the 2019 calculations (which conflated watercourse and hedgerow impacts but only mitigated the impacts on hedgerows), running the data through the SBM indicates a **net loss of 18.68 watercourse units** (-39.13%) and a **net gain of 8.14 hedgerow units** (+49.24%).

SBM - using more appropriate data

The aim of this assessment was to amend the data input to the SBM to be more 'accurate' (based upon our review and assessment - see Appendix 1), correcting the errors that were made in order to provide a more realistic calculation of the true BNG position of the project.

As with the above assessment, the full details of the SBM calculations are presented in the excel spreadsheet appended to this evidence (BNG Assessment 2), with an explanation of the differences and the considerations provided in Appendix 3.

When using what we would consider to be more appropriate data inputs (as set out in Appendix 3), our second (more accurate and appropriate) re-run of the calculations using the SBM indicates a **net loss of 376.12 units** (or 23.39%).

With regard to linear habitats, instead of the net loss of 6.35 'linear units' concluded in the 2019 calculations, running the data through the SBM indicates a **net loss of 22.84 watercourse units** (-40.90%) and a **net gain of 9.37 hedgerow units** (+49.24%).

Notwithstanding the caveats associated with using a Metric that was not available at the time of Application (nor indeed for the update set out in the 2019 FEI addendum), the fact that the SBM was designed for use in England, and the difficulty in deriving an accurate figure without being able to calculate habitat areas ourselves in GIS, this is clearly a very different interpretation of the biodiversity implications of the proposals, but one that is much more appropriate.

It should also be emphasized that even these results significantly over-state the biodiversity performance of the project, since, as highlighted in Appendix 2 and 3, they do not account for the fact that the loss of 9.25 ha of blanket bog would actually require significant bespoke compensation. The requirements for this would likely entail creating and/or enhancing several times the area of this habitat that is due to be lost, and certainly considerably more than the 2:1 ratio described in the Applicant's proposals.

Power Line BNG

In addition to the flaws in the BNG assessment for the gold mine site as set out above, it would also seem that 7 km of underground cabling and 30 km of overhead line is being installed purely to provide a power supply for the gold mine, and that this has not been accounted for in the BNG calculations for the project. If this is correct, it is another very significant omission, leading to a considerable understatement of the BNG impacts of the project as a whole.

All that we have seen is the Ecological Appraisal and Ecological Impact Assessment (EclA) for the power line. No BNG assessment or Biodiversity Impact Statement appears to have been produced.

As far as considering the biodiversity impacts of this component of the project are concerned, the mitigation table in the Ecological Appraisal simply says this for each habitat to be affected: *'The final power connection route will be carefully selected and in agreement with NIE Networks ecologist, following any future ecological surveys, to avoid the most sensitive areas of habitat. Site specific mitigation measures and working method statements will be developed where works are proposed, or access required through areas of [xx habitat] of high ecological value following any future ecological surveys and assessment to inform the consenting process for the power connection.'*

With regards to the EclA, Section 8 of the document identifies the construction footprint within NI Priority Habitats as follows: 293m² of blanket bog, fens, flushes and swamps; 42m² of upland heath; and 0.84m² of wet woodland. These appear to be extremely small areas, given the length of the scheme and that 7km of undergrounding will take place. Also there is no indication of the loss of other habitats (which would also normally be taken into account in a BNG assessment), even though Section 4.3 of the document states that a total of seven priority habitats will be directly affected by the proposals, including (in addition to the above three) purple moor-grass & rush pasture, hedgerows and rivers & streams.

Notwithstanding how accurate and complete the above figures may or may not be, there seems to have been no biodiversity net gain calculation carried out. If this is as much as has been presented to the planning authority, this is clearly wholly inadequate, especially given the wide variety of important habitats present along the proposed route of the power line.

Conclusion

In conclusion, whilst the Applicant has applied a mitigation and compensation approach that essentially considers the net effect on biodiversity, we believe that they have very significantly overstated the situation by claiming a net gain.

Our recalculation of the BNG for the scheme - on the basis of similar habitat data to that used by the Applicant, but with justified changes - has demonstrated very different results to those presented in 2017 and 2019.

Furthermore, the apparent lack of a BNG assessment for the power line (as well as the issue around the wrongful use of the existing features at the Area C site rather than the habitats that should have been restored) would suggest that the adverse biodiversity effects of the scheme are even more significant.

Whilst it was clearly appropriate to use a metric that was current at the time of the initial application, the considerable progress in biodiversity assessment over the intervening years means that it is entirely appropriate to re-assess the BNG calculations, as we have done, as this provides a much more realistic assessment of the true biodiversity position for the project.

Although it is a positive move that the Applicant has managed to secure the compensation areas, and that 52.73 hectares is not an insignificant area, when compared with the scale of the impact (and specifically the considerable amount of high quality habitat being lost) it is wholly insufficient. In order to deliver an actual net gain for the project, much more thought will need to be given to delivering more extensive and meaningful restoration and enhancement, especially of peatland habitats, and at a landscape scale.

The quantum of restoration required to offset the impacts is significantly greater than the ratio of 2:1 currently being delivered by the proposals, especially given the difficulty with creating valuable bog habitat.

The whole ridge is essentially one connected blanket bog, and the opportunity exists to deliver an actual net gain for biodiversity (based upon the SBM calculations rather than inadequate and wrongly calculated figures presented in the Biodiversity Impact Statements) through landscape-scale habitat intervention. Engaging with the local authority would allow for a meaningful contribution to national and local targets (specifically Nature Recovery Aspirations for Northern Ireland) to be achieved.

Without considerable increases in the amount of compensation - especially with regard to peatland habitats - the proposed gold mine would have a significant adverse effect on biodiversity, in stark contrast to the 'net gain' claimed by the Applicant.

BNG Appendix 1 - Detailed review of the Biodiversity Metric calculations used in Applicant's Biodiversity Impact Statement

- The condition of the Woodland: Mixed plantation is given as 'Poor' but has scored '2' (which is the score assigned to Moderate condition). Which is correct?
- Area of habitat to be retained, enhanced and lost does not equal the total area for the main development site, but it does for the entire assessment (1.24 ha discrepancy):
 - The 2019 calculator omits 1.24 ha of marshy grassland in Columns C, E and G which it includes in the Habitat Area for this habitat (which totals 36.06) - This 1.24 ha of habitat would have a value of 14.88 using the distinctiveness and condition in the calculator.

- Table 1 of the FEI addendum uses 1402.88 as the Habitat Biodiversity Value which accounts for the omitted 1.24 ha of marshy grassland; however, this should also be captured within the calculations.
- The Habitat Impact Score (HIS) in the table clearly states that this should be calculated as the 'Site Habitat Biodiversity Value (Column J)' + Value of indirect impacts (Column M) (HIS = J+M). However, no indirect impacts have been identified, therefore the HIS should match the 'Site Habitat Biodiversity Value (J)':
 - This therefore should at least be 1388 (or 1402.88 as displayed in Table 1).
 - Instead, the assessor has used the total existing value of 'Habitats to be lost within the development' (Column H) which is 611.98 in the calculator.
 - This means that any following assessment, particularly the overall 'Habitat Biodiversity Impact Score', will be incorrect, as the approach does not align to the methodology of the calculator used and does not therefore represent the actual value of the baseline.
 - The 611.98 value is further contradicted by Table 1, which puts the Impact Score at 626.86. This presumably assumes that the 1.24 ha of marshy grassland unaccounted for is lost ($611.98 + 14.88$ (the value of 1.24 ha of marshy grassland) = 626.86).
- The area of post development habitats (creation + enhancement) does not equate to the area of habitat lost or enhanced in the baseline.
- The area of habitat enhanced in the baseline (47.68 ha) does not match the area of habitat enhanced in the post development calculations (53.41):
 - This means that 5.73 ha of enhancement identified in the post development sheet is not identified in the baseline.
 - The additional enhancement is 3.96 ha of acid grassland restoration to wet heath/acid grassland mosaic, plus 1.77 ha of fen and mire enhancement (which includes 0.78 ha of marshy grassland restoration to sphagnum bog).
 - By adding these areas into the enhancement section, and not counting them in the baseline, may inflate the value used in the post development calculations for this area.
- The areas of habitat loss in the baseline (67.09 ha) does not equal the area of habitat created in the post development table (16.96 ha). It is assumed that the 50.13 ha unaccounted for is built environment, but clarification should be given.
- The % net gain value is based upon the area of habitats lost and NOT the total site habitat biodiversity value (as discussed above); however, the Applicant has claimed the baseline value + the enhancement value of the enhancement areas in the post development calculations:
 - Enhancement value claimed should only be what is additional uplift from the baseline value.
 - The 2019 calculator tries to account for this in Column S (which advises the assessor to input the existing value of habitats to be enhanced (from Column F).
 - The formula then subtracts Column S from the value generated by the Area x Distinctiveness x Condition calculation for proposed habitats to remove the baseline value, before adding the multipliers - $((N \times O \times P) - S) / Q / R$.
 - This has not been done, and it is difficult to understand where the values in Column S (which are all values from 1-3) have been derived from.
 - The use of the 1-3 values in Column S therefore does not subtract the actual baseline value of these areas of proposed enhancement to assess the actual uplift, only subtracting a small amount, meaning these values are overinflated.
 - This would reduce the value of the Habitat Mitigation Score (HMS - i.e. the beneficial components of the project) from 534.6 to a maximum of 293.78. [N.B. this is still slightly overinflated as the existing baseline value of the additional 5.73

- ha (discussed above) is hard to calculate without knowing what the specific baseline of these areas are].
- The result of the Habitat Biodiversity Impact Score is -77.38 in the 2019 calculator, in the absence of enhancement in CA1-3.
 - The use of different Figures in Table 1 suggest that this loss should instead be -92.26, when using 626.86 as the impact score:
 - The formula used in the calculator to get this figure is noted as the Habitat Mitigation Score - Habitat Impact Score (HMS - HIS). As mentioned above, the assessor has wrongly used the inflated value of enhancement and the value of created habitats to derive the HMS, and the value of habitats lost to derive the HIS.
 - Looking at the calculator formula, the HMS should either be 1388 (using the value in the calculator) or 1402.88 (using the value in Table 1), and the HIS should be 293.78 (assuming the approach above).
 - This would make the Habitat Biodiversity Impact Score:
 - -1094.22 when assuming a baseline value of 1388 (this is a 78.83% net loss in value).
 - -1109.1 when assuming a baseline value of 1402.88 (this is a 79.1% net loss in value).
 - However, the formula set out in the calculator, and therefore this result, is inherently flawed as it does not account for the baseline value of the retained habitats nor for the baseline value of the enhanced habitats (before enhancement) in the Impact Score, which should be used in the final post development value:
 - Using the 1388 calculator baseline, and accounting for the habitats mentioned above (which amount to a value of 231.96 for retained habitats and 544.16 for the baseline of the habitats to be enhanced) would make the Habitat Biodiversity Impact Score equal -318.1. This is a 22.9% net loss.
 - Using the Table 1 figure of 1402.88 instead would make the Habitat Biodiversity Impact Score -332.98. This is a 23.74% net loss.
 - Considering then the value of uplift that would be required to achieve 10% biodiversity net gain for the project:
 - If using the calculator scenario that values the Site Habitat Biodiversity Value as 1388:
 - This would need a post development value of 1526.8 units to achieve an overall 10% BNG (including retained, enhanced and created habitats);
 - With a net loss in value of 318.1 (as calculated above), this would mean that there is a 456.9 unit deficit to achieve 10%.
 - If using the Table 1 scenario, which values the Site Habitat Biodiversity Value as 1402.88:
 - This would need a post development value of 1543.17 units to achieve an overall 10% BNG (including retained, enhanced and created habitats)
 - With a net loss in value of 332.98 (as calculated above), this would mean that there is a 473.29 unit deficit to achieve 10%
 - These figures are before the accounting of the offsite areas (CA1 - CA3).
 - The calculations for offsite habitat enhancement in CA1 - CA3 are for some reason not included in the 2019 Addendum calculator. Table 2 suggests that these areas generate an additional value of 220.53 (755.13 - 534.6). This aligns with the figures provided in the 2017 calculator (138.6 habitat biodiversity value for CA1 + 62.05 for CA2 + 19.89 for CA3):
 - However, similar to other areas of enhancement described above, these figures assess the value of these enhanced areas without accounting for the value of the existing baseline. As such, the 220.53 value is not appropriate, meaning that it is overinflated.

- The baseline value of the 'Wetland: Sphagnum bog' areas in CA1-CA3 is not provided; however, assuming that it is consistent with similar habitat in the proposed infrastructure site (i.e. of High Distinctiveness and in Moderate Condition), the baseline value of the 52.73 ha of offsite habitat would be 632.76.
- When entering the baseline values into Column S on the 2017 calculator, this estimates the ACTUAL total uplift from offsite enhancement as 73.29 (rather than 220.53).
 - $52.73 \text{ ha} \times 6 \text{ (high distinctiveness)} \times 2 \text{ (moderate condition)} = 949.14$; $949.14 - 636.76 \text{ (offsite baseline)} = 316.38$; $316.38 / \text{time multiplier} / \text{difficulty multiplier} = 73.89$.
- Adding this correct level of enhancement from the compensation areas to the net loss scenarios above (which left out CA1 - CA3) results in the following:
 - Calculator scenario baseline of 1388:
 - The overall net loss in Habitat Biodiversity Value reduces to 244.81. This is a 17.63% net loss, with a 383.61 unit uplift (offsite) needed to achieve 10% gain.
 - Table 1 scenario baseline of 1402.88:
 - The overall net loss in Habitat Biodiversity Value reduces to 259.69. This is an 18.51% net loss, with a 399.98 unit uplift (offsite) needed to achieve 10% gain.
- Finally, it is noted that in the 2019 Addendum, hedgerows were classified as 'high distinctiveness' habitats. Had this been applied to the other habitats that would have merited this assessment (valley mire, blanket bog, etc.) then the above performance would have been even worse.
- This review has been undertaken using the following assumptions/approach:
 - The review uses the suggested formula in the 2019 calculator to explore what the suggested result should be when using the data and formula set out in the 2019 calculator.
 - The document used for reference is Further Environmental Information - Addendum to Ecological Impact Assessment and Ecological Mitigation and Management Plan (SLR Ref: 501.00241.00006).
 - The values for the offsite enhancement areas were taken from Appendix 01 - Quadrat Data for the Compensation Areas.
 - The baseline and proposed habitat distinctiveness and condition values used reflects those in the 2019 assessment, and the 2017 assessment for offsite areas. This was to explore the methodology used in this assessment, and is not an agreement that the values used are appropriate.
 - The 'time till target condition' and 'difficulty of creation' multiplier values reflect those used in the 2019 and 2017 assessment. The appropriateness of these values is not reviewed here, particularly for the enhancement and creation of peatland habitats.

BNG Appendix 2 - Updated biodiversity assessment of the 2019 data using the Statutory Biodiversity Metric (SBM)

The aim of this Appendix (and the appended Metric excel spreadsheet; BNG Assessment 1) is to apply the same data that were used in the 2017/2019 assessment to the Statutory Biodiversity Metric (SBM) in order to provide as pure a comparison as possible between the two methodologies, thus demonstrating how the calculation of BNG has moved on over time. However, where clear errors have been made in the previous interpretation of the data that would lead to incorrect application of the SBM - such as those regarding the distinctiveness of Annex 1 habitats - these have been corrected (as explained below).

Assumptions and caveats

- The Phase 1 habitat data from the Environmental Statement has been translated into the UK Habitat Classification (UK Hab) habitats required for the SBM by using the translation tool in the SBM along with the Phase 1 and ES reports. The original Phase 1 classification and description of the habitats are provided in the 'user comment' column of the SBM excel spreadsheet (appended to this submission; BNG Assessment 1) to be clear what habitat is being assessed.
- The areas of the baseline habitats have been copied over from the 2019 assessment and, as with the earlier assessment, come to a total 140.44 ha.
- Distinctiveness:
 - Distinctiveness is built into the SBM, and for this reason the distinctiveness level for some habitats vary from the 2019 assessment (where the latter were incorrect or outdated).
 - For example, the 2019 assessment does not consider assigning distinctiveness above 'High', nor does it address how to accurately assess irreplaceable habitats. Both of these are key features of the SBM, so are taken into account in this assessment.
 - Defra Metric version 1 was apparently used to inform the 2017/2019 assessment. The technical paper guidance (2012) states '*Some very valuable habitats are either very rare, difficult/impossible to recreate, or both. Whilst development on these habitats would be unlikely, if a local planning authority did decide that a development should go ahead on this type of habitat, any compensation would have to be bespoke, and managed on a case-by-case basis. It would be for the local planning authority to decide if the offsetting mechanism could be used*'. This guidance has not been applied to the 2017/2019 assessments.
 - The blanket bog and valley mire on site are described in the documentation as Annex 1 quality, i.e. of international importance. Such habitats are considered of very high distinctiveness in the SBM, which is considered more appropriate than the 'high' distinctiveness allocated to them in the 2019 assessment.
 - The rush-pasture is also considered of very high distinctiveness in the SBM, as it is considered a priority habitat that is highly threatened, internationally scarce and requires conservation action. The documentation notes that this habitat on site meets the priority habitat criteria for rush pasture in Northern Ireland, so the classification of this habitat as being of 'very high distinctiveness' in the SBM is considered appropriate.
 - Further to this, blanket bog is considered an irreplaceable habitat in the SBM, which is reflected in Appendix 2 of the Metric version 1 technical note, which puts the timescale to restoring peatland at 1000 - 5000 years.
 - Even though the SBM distinctiveness values are England-specific, the distinctiveness values provided are considered appropriate in a Northern Ireland context given the international importance of peatland habitats and the priority status of rush-pasture.
- In absence of detailed condition assessment information for non-bog habitats, we have kept the condition of each habitat the same as it was in the 2019 assessment.
- Strategic significance was not included in the 2017/2019 assessments, even though it is explained in the metric Version 1 technical paper (2012). In this assessment using the SBM, we have assigned each line with low strategic significance to keep it as close to the 2019 assessment as possible. There are certainly habitats on site which would be considered to be of high strategic significance; however, the effect of using this function is explored in the next steps (see Appendix 3, below).

- It is unknown, on the basis of the habitat documentation available, whether or not any individual standalone trees were present (since these are also a feature of the SBM). For the purposes of this review, it is assumed that these habitats are absent.
- Habitats within the 'Existing Infrastructure Site' have been kept consistent with those in the 2019 assessment; however, some of these are considered inappropriate due to proposed habitat creation which should have occurred in this area. Adjusting habitats in this area to reflect what should be there will not significantly impact the net change results either way.
- The feasibility of the proposals (in particular the likely success of the proposals to 'create' peatland habitat) are not considered at this stage. This is instead addressed Appendix 3, below.

Results: habitat area units

- The total number of baseline habitat units using the SBM is 1496.22.
- **N.B. The baseline value of the 9.05 ha of blanket bog lost in the proposed infrastructure site, as well as the 0.2 ha lost in the ventilation raises (i.e. a total of 9.25 ha), are not included in this total.** This is because blanket bog is an irreplaceable habitat and the SBM considers any loss unacceptable, meaning it will not provide a baseline value for these areas. The SBM guidance states that irreplaceable habitats require consideration *outside* of biodiversity net gain, and that bespoke compensation, proportionate to the significance of the habitat, must be agreed to address losses and deterioration of irreplaceable habitats. Therefore, the lost blanket bog has been taken out of the rest of the assessment.
- However, the proposed blanket bog to be enhanced *is* included in the calculations, as this is allowed in the SBM, and is treated separately to the blanket bog lost to development.
- Otherwise, the area of habitat retained, enhanced and lost is consistent to the figures in the 2019 assessment.
- There are 562.88 habitat units lost by the development (outside of the loss of blanket bog, which cannot be included within the calculation, as noted above)
- There are 1114.74 habitat units delivered post intervention (239.42 units retained + 766.36 habitat units from enhanced habitats (baseline and uplift) + 108.96 habitat units from created habitats).
- There was 5.73 ha of proposed enhancement identified in the post development calculation in the 2019 calculator which was not identified in the 2019 baseline calculations. These proposals have been captured within the Habitat Creation tab in the SBM version of the calculations.
- We have assumed a total of 46.04 ha of 'developed land, sealed surface' in the Habitat Creation tab to account for the development. This is not included in the 2019 calculations, but we have included it to satisfy the Area Check of the SBM. It has no impact on the overall calculations.
- Taking the above figures into account, the On-site net change in habitat units (i.e. excluding the offsite compensation areas) is -381.48 units, which equates to a 25.5% net loss. It should again be noted that this is the net loss *without* considering the loss of irreplaceable blanket bog (which cannot be calculated in the SBM).
- The proposed offsite enhancement (it the three compensation areas CA1 to CA3) generates 44.52 habitat units. This brings the overall net change (without considering lost blanket bog) to -336.96, which is a 24.58% net loss.
- The SBM suggests that 1645.84 units are needed overall to achieve 10% net gain (i.e. the total baseline figure of 1496.22 x 1.1) leaving a deficit of 486.58 units (though again with the lost blanket bog still requiring bespoke compensation outside of this).

Trading Rules

- The trading rules for habitat area units within the SBM are not satisfied, since not enough habitat types have been proposed to compensate for the loss of areas of very high distinctiveness habitats, which need like-for-like habitat to compensate for losses. The rules suggest that the following would be needed:
 - 186.47 units of Fen;
 - 123.2 units of Purple moor grass and rush pasture; and
 - 27.29 units of any habitat (to make up the shortfall to no net loss).
- This is still in the absence of the loss of 9.25 ha of blanket bog, which would require bespoke compensation.

Results: hedgerow unit results

- The SBM considers the hedgerows to be of lower distinctiveness than was assessed in the 2019 calculation.
- The baseline is considered to be 16.54 hedgerow units.
- 7.66 hedgerow units are due to be lost.
- The post intervention hedgerow units delivered through retention, enhancement and creation is 24.68.
- This gives a biodiversity net gain in hedgerow units of 8.14. This is a net gain of 49.24%

Results: watercourse unit results

- The watercourses were assessed alongside the hedgerows in the 2019 assessment.
- More information is needed to classify the watercourses. We have classified them as 'other rivers and streams' (high distinctiveness) rather than 'very high distinctiveness' priority habitat, since much of the burn network seems modified. The exception to this would potentially be the headwaters of these systems. UK Hab Version 2 considers priority river habitat to include headwaters, which have not been significantly altered from their natural state. However, it is difficult to define where the extent of this classification may be, if present, hence the use of the 'other rivers and streams' classification. Our assessment could therefore be understating the value of the watercourses.
- As a precautionary approach, we have considered watercourse and riparian encroachment to be minor in the absence of further information. It is likely that this will vary across the 3.33km of watercourse within the site, but this cannot be ascertained without further information.
- There is a baseline watercourse value of 47.74.
- The post intervention watercourse unit value is 29.06.
- This results in a net change of -18.68 watercourse units which is a 39.13% net loss. As noted above, this could be an underestimate of the loss, should further information indicate that priority headwater habitat is in fact present.
- The SBM suggests that 52.52 watercourse units are required for 10% net gain, which means there is currently a deficit of 23.46 watercourse units.

BNG Appendix 3 – Statutory Biodiversity Metric assessment of the Dalradian project using more accurate inputs (correcting the errors identified in Appendix 1)

The aim of this Appendix (and the appended Metric excel spreadsheet; BNG Assessment 2) is to amend the data input to the SBM to be more 'accurate' (based upon our review and

assessment – see Appendix 1), correcting the errors that were made in order to provide a much more realistic calculation of the true BNG position of the project.

Assumptions and caveats

This assessment has been carried out with a number of assumptions/considerations, the main one to note is as follows:

- **The 9.25 ha of blanket bog lost is still entered into the calculator for this exercise but requires bespoke compensation (therefore has no baseline value).** We have kept the blanket bog areas to be enhanced in the calculator to show the impact these would have on the overall assessment. As these enhancements are applied to offset the loss of non-blanket bog habitats, they could NOT form part of the bespoke compensation for the loss of blanket bog. Any bespoke compensation would have to be additional to what is proposed.
 - If blanket bog enhancement were considered as part of the bespoke compensation for blanket bog loss, these areas would need to be removed from the calculator and the rest of the development assessed separately from them.

Habitat area units

- It is assumed that baseline habitat extent and classification from the Applicant is correct
- It is assumed that baseline habitat condition is appropriate for non-peatland habitats
- The distinctiveness of habitats set in the metric largely applies to a Northern Irish context (although it is potentially the case that ‘very high’ for Rush Pasture may be too high a distinctiveness for Northern Ireland, and that ‘high’ would have been more appropriate)
- Peatland habitat baseline condition was reviewed in line with the EcMMP, and reassessed as follows (this differs slightly from the 2019 assessment, which considered condition of baseline blanket bog as all moderate):
 - MU1 - largely degraded but active - moderate condition
 - MU2 - largely degraded but largely active - moderate condition
 - MU3 - heavily degraded, inactive but capable of regeneration - poor condition.
 - MU6 - Largely degraded, inactive - poor to moderate condition.
 - MU7 - Mire habitat does not appear to be adversely affected, peat largely inactive - Good condition.
 - CA1 - Heavily modified but largely active - moderate condition.
 - CA2 - historically cutover but largely active - moderate condition
 - CA3 - Very degraded, inactive but capable of regeneration - poor condition.
- The blanket bog to be lost is considered an irreplaceable habitat and therefore needs bespoke compensation. The blanket bog to be enhanced should be considered as part of the mitigation package to compensate for the loss of non-blanket bog habitats and NOT form part of the bespoke compensation. This would have to be additional to the proposals outlined in the EMMP.
- It has been assumed that the proposals for blanket bog enhancement would work so long as water level management is addressed however:
 - Blanket bog enhancement would not reach good condition in the timescales of the project. It is accepted that the enhancements proposed for MU1-3 and CA1-3 will likely have a positive effect. However, given the time it takes to accumulate new peat, the 2019 assessment is considered to be over-promising a condition that it cannot achieve, particularly given the degraded nature of most of the blanket bog.
 - Mire enhancement in MU6 is considered to only achieve moderate condition due to baseline habitats being largely degraded. This is captured within the SBM in

the 'Habitat Creation' tab, as there is not sufficient information in the 2019 calculator to suggest an accurate classification and extent of baseline habitats to effectively capture it as 'restoration' within the enhancement tab.

- Mire management in MU7 is considered to achieve good condition as it is already considered in good condition, and management would be to maintain the diversity of plants and the presence of Devil's-bit Scabious. This should not be captured within the SBM as its in good condition already so is not considered an enhancement (as there would be no uplift); instead, it should be captured as retention, with the management suggested simply maintaining its condition. However, we have kept this in the SBM in the 'Habitat Creation' tab as there is not sufficient information in the 2019 calculator to suggest an accurate classification and extent of baseline habitats to effectively capture it as 'retention' within the baseline tab.
- Blanket bog 'creation' in MU2 is described in the 2019 assessment as 'not designed to create blanket bog but rather a peatland habitat that is active'; however, blanket bog in good condition was selected in the 2019 Metric to represent this. This classification is considered inappropriate to effectively capture the result of these proposals (as you cannot 'create' blanket bog). Hydrological management seems to be absent from the proposals, and drainage is mentioned, raising the question as to whether this area would remain wet enough.
- It is likely that piling peat soils into an area would result in an acid-associated habitat; therefore, the medium distinctiveness 'upland acid grassland' has been selected in this version of the SBM. This results in a greater gain in habitat units (as the temporal and difficulty multipliers are lower) than if blanket bog were selected; however, it is considered a more appropriate habitat type to capture the nature of this intervention.
- The allocation of an appropriate level of Strategic Significance in the SBM has been informed by:
 - the Biodiversity Strategy and Action Plan - <https://fodc.online/Biodiversity Strategy January 23/>
 - It is the council's aim to assist in protecting, increasing and maintaining native woodland and tree cover in the district. Native woodlands have therefore been assigned High Strategic Significance.
 - Government Peatland Strategy - https://www.daera-ni.gov.uk/sites/default/files/consultations/daera/NI%20Peatland%20Strategy%20-%20Copy%20for%20EQIA%20Consultation.%20%208-2022.%20PDF_0.PDF
 - This has a goal that by 2040, Northern Ireland's peatland habitats are conserved and restored to optimise their Natural Capital value, so these habitats have also been assigned High Strategic Significance.
 - Fermanagh and Omagh Local Biodiversity Action Plan 2016- 2020 - <https://www.fermanaghomagh.com/app/uploads/2016/07/Fermanagh-and-Omagh-Local-Biodiversity-Action-Plan.pdf>
 - This includes actions for raising awareness of:
 - Rush pasture
 - Upland heath
 - Hedgerows
 - The updated 2023 strategy mentions this old plan, but it is assumed that these habitats are not a priority in the updated plan, so these have been selected for Moderate Strategic Significance.
 - See the calculator assessor's comments box for further assumptions.
- We have not changed the baseline habitats in Area C to reflect the proposals as we do not have information on the extent of these habitats. Doing so may marginally increase

the baseline value of the site; however, as this area is only 1.81 ha, it would not make a significant impact to the overall net loss shown by the assessment.

Hedgerow Units

- It is assumed that baseline habitat extent and classification is correct
- It is assumed that baseline habitat condition is appropriate
- It is considered that proposed habitat classification and condition is possible, under suitable management.
- All hedgerows are considered to be of High Strategic Significance due to the recent BAP aim in protecting, increasing and maintaining native tree cover in the district.

Watercourse Units

- More information is needed to classify the watercourses. However, for this version of the SBM we have classified them as ‘very high distinctiveness’ priority habitat, owing to their salmonid populations.
- As a precautionary approach, we have considered watercourse and riparian encroachment to be minor in the absence of further information. It is likely that this will vary across the 3.33km of watercourse within the site, but this cannot be ascertained without further information.
- The burns have been assigned Medium Strategic Significance, as they are not on a local plan but include headwaters in the catchment. The ditches have been classified as Low Strategic Significance.

Results

- Having re-run the SBM on the basis of the above assumptions and caveats, the results under the three habitat categories (habitat area units, watercourse units and hedgerow units) are as follows:

Unit Type	Baseline value	Post intervention value	Net unit change	Net % Change	Units required for overall 10% BNG	Unit deficit
Habitat onsite	1608	1199.19	-409.11	-25.44	1769.13	536.95
Habitat offsite	917.88	950.88	32.99	3.59		
Habitat combined	-	-	-376.12	-23.39		
Hedgerow	19.02	28.39	9.37	49.24	20.92	0
Watercourse	55.84	33.00	-22.84	-40.90	61.43	28.42

Trading rules

Assuming the distinctiveness level of rush pasture used in this assessment is appropriate (i.e. very high), the SBM indicates that the trading rules are not satisfied. Therefore, in order to achieve no net loss the following number of units of particular habitat types would need to be achieved as part of the overall units required:

- 215.34 units of Fen
- 135.52 units of Rush Pasture
- 25.26 units of any habitat type.

This would be needed alongside the existing EcMMP and bespoke compensation for the loss of peatland.