Scottish & Southern Electricity Networks

Biodiversity Net Gain Report

Bhlaraidh Extension Wind Farm Grid Connection

October 2022

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EXECUTIVE SUMMARY

Scottish Hydro Electric Transmission plc ("the Applicant") who, operating and known as Scottish and Southern Electricity Networks Transmission ("SSEN Transmission") is seeking to construct a new electricity connection to serve as grid connection from the consented Bhlaraidh Extension Wind Farm to Fort Augustus substation, hereafter referred to as the Proposed Grid Connection. The Proposed Grid Connection is situated approximately 5 km northwest of Invermoriston, running southward to Fort Augustus in the Highlands. This Biodiversity Net Gain (BNG) Report defines the Proposed Grid Connection as approximately 14.5 km of OHL, 5 km of underground cable (UGC) and associated works.

The land which is the subject of this report, comprises the limit of deviation for the proposed OHL and UGC (100m buffer of the alignment centre lines) is referred to hereafter as 'the Site'. The route runs north to south from Bhlaraidh Extension Wind Farm substation to the existing Fort Augustus substation. The route is dominated by woodland and open moorland habitats.

This report describes the methods and results of the BNG Assessment for the Proposed Grid Connection and includes:

- Initial assessment to determine the biodiversity baseline of the Site prior to development using the UK Habitat Classification survey data for the Proposed Grid Connection; and
- Assessment of whether the Proposed Grid Connection would result in a net loss, no net loss (NNL) or a net gain in biodiversity.

Small amounts of irreplaceable habitats will be affected by the Proposed Grid Connection. Construction of the Proposed Grid Connection will result in losses to habitats considered to be habitats of High distinctiveness.

When considering non-irreplaceable habitats alone, construction of the Proposed Grid Connection will result in a **1 % loss in biodiversity** (8755.63BU – 85.65BU = 8669.98BU remaining).

It is understood that SSEN Transmission are exploring opportunities for compensation that would support the project to achieve its NNL goals.

1. INTRODUCTION

1.1 Background

1.1.1 Scottish Hydro Electric Transmission plc ("the Applicant") who, operating and known as Scottish and Southern Electricity Networks Transmission ("SSEN Transmission") is seeking to construct a new electricity connection to connect the consented Bhlaraidh Extension Wind Farm, located 5 km to the northwest of Invermoriston, to the existing Fort Augustus substation, as shown in **Figure 1**.

1.1.2 This Biodiversity Net Gain (BNG) Report defines the Proposed Grid Connection as approximately 14.5 km of OHL, 5 km of underground cable (UGC) and associated works.

1.1.3 The Proposed Grid Connection is being driven by the requirement to provide a grid connection for the consented Bhlaraidh Extension Wind Farm.

1.1.4 The area in which the Proposed Grid Connection will be sited is defined as the 100 m limit of deviation (LoD) from the proposed route of the OHL and UGC as shown on **Figure 1**, the area within this boundary will be referred to as "the Site".

1.1.5 The Site runs north-south from high ground near Bhlaraidh Wind Farm, along the southern banks of the River Moriston and over higher ground through Inverwick and Inchacardoch forests before terminating at Fort Augustus substation. Much of the higher ground is dominated by heath and mire habitats, whilst lower slopes are dominated by commercial plantation and semi-natural woodland habitats. Smaller areas of grassland, bracken and scrub habitats are present, principally along the River Moriston valley.

1.1.6 During surveys carried out in 2022 to inform the Environmental Appraisal Report (EA Report) for the Proposed Grid Connection, eight bird species listed as Red in Birds of Conservation Concern (BoCC)[1]: Black grouse, Cuckoo, Grey Wagtail, Merlin, Mistle thrush, Skylark, Spotted flycatcher, Tree pipit; and seven Amber listed: Bullfinch, Dunnock, Golden plover, Meadow pipit, Song thrush, Willow warbler and Wren had possible, probable or confirmed breeding territories within the Site. Protected mammal species identified as being present within the Site and the surrounding area included badger, otter, and pine marten. Seven potential Groundwater Dependent Terrestrial Ecosystem (GWDTE) habitats were identified within the Site, comprising wet woodland, acid flush, wet heath and basin mire communities.

1.2 Biodiversity Net Gain

1.2.1 Biodiversity Net Gain (BNG) is a process which leaves nature in a better state than it started. Although it is an internationally recognised process and tool within the development industry, it is not a term that is widely used or implemented in Scotland[2]. A small handful of businesses are making voluntary commitments to incorporating BNG into their projects, including SSEN Transmission.

1.2.2 SSEN Transmission has developed a BNG toolkit based upon the accepted Department for Environment, Food and Rural Affairs (Defra) metric[3],[4],[5] which aims to quantify biodiversity based upon the value of habitats for

[1] Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015) Birds of Conservation Concern 4: The Population Status of Birds in the UK, Channel Islands and Isle of Man. British Birds 108, 708-746

[2] CIEEM. 2019. Biodiversity Net Gain in Scotland. CIEEM Scotland Policy Group. https://cieem.net/wp-content/uploads/2019/06/Biodiversity-Net-Gain-in-Scotland-CIEEM-Scotland-Policy-Group.pdf

[3] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. User Guide (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/5366205450027008

[4] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Technical Supplement (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/4923683225468928

[5] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Calculation Tool: Short Guide (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/5815257627099136

nature. It is an efficient and effective method for demonstrating whether development projects have been able to maintain or increase the biodiversity value of a development site after construction works.

1.2.3 For BNG to be used appropriately and to generate long-term gains for nature, the good practice principles established by the Business and Biodiversity Offset Programme (BBOP)[6] should be followed. These principles have been established in the context of UK development by the Construction Industry Research and Information Association (CIRIA), the Chartered Institute for Ecology and Environmental Management (CIEEM) and the Institute of Environmental Management and Assessment (IEMA)[6]. The BNG process for the Proposed Grid Connection adheres to these principles.

1.2.4 BNG does not apply to statutory designated sites or irreplaceable habitats (e.g. blanket bog, ancient woodland)[7].

1.3 Scope of Assessment

1.3.1 The scope of this BNG assessment is to:

- quantify the potential biodiversity impacts for the Site, which includes a biodiversity baseline assessment, analysis of habitat losses due to temporary works and permanent structures during construction works;
- assess whether the Proposed Grid Connection would result in a net loss, no net loss (NNL) or a net gain in biodiversity; and
- Provide high level mitigation proposals to offset any loss in biodiversity units resulting from the Proposed Grid Connection, and/or increase the overall biodiversity value of the Site.

1.3.2 This report details the methodology and results of the BNG assessment for the Proposed Grid Connection. In consideration of the BNG assessment results, this report provides recommendations for SSEN Transmission to enable reduction in biodiversity losses and to maximise biodiversity gains.

1.4 SSEN Transmission's Biodiversity Ambition

1.4.1 SSEN Transmission is committed to protecting and enhancing the environment by minimising the potential impacts from their construction and operational activities. As part of this approach, SSEN Transmission has made commitments within its Sustainability Strategy (2018)[8] and Sustainability Plan (2019)[9] for new infrastructure projects to:

- ensure natural environment considerations are included in decision making at each stage of a project's development;
- utilise the mitigation hierarchy to avoid impacts by consideration of biodiversity in project design;
- positively contribute to the UN and Scottish Government Biodiversity strategies by achieving an overall 'No Net Loss' on new infrastructure projects gaining consent in 2020 onwards and achieving Net Gain on projects gaining consent in 2025 onwards; and
- work with their supply chain to gain the maximum benefit during asset replacement and upgrades.

[6] Guidance Notes to the Standard on Biodiversity Offsets (2012). Business and Biodiversity Offsets Programme (BBOP). https://www.forest-trends.org/wp-content/uploads/imported/BBOP_Standard_Guidance_Notes_20_Mar_2012_Final_WEB.pdf

[7] CIRIA, CIEEM, IEMA (2019). Biodiversity Net Gain: Good practice principles for development, A Practical Guide. https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf

[8] Delivering a smart, sustainable energy future: The Scottish Hydro Electric Transmission Sustainability Strategy (2018) https://www.ssen-transmission.co.uk/media/2701/sustainability-strategy.pdf

[9] Our Sustainability Plan: Turning Ambition into Action. (2019) SHE Transmission. https://www.ssen-transmission.co.uk/media/3215/our-sustainability-plan-consultation-report.pdf

2. METHODOLOGY

2.1 Biodiversity Assessment

2.1.1 The assessment was based upon collation of data from publicly available datasets provided by statutory and non-statutory authorities, analysis of freely-available aerial imagery and observations made during detailed habitat walkover surveys undertaken in July 2022.

2.1.2 The biodiversity of the Site is summarised using SSEN Transmission's Site Optioneering biodiversity toolkit (Version 1.1), which is based on the Defra metric.

2.1.3 The biodiversity metric and toolkit are based on habitats. Some features are part of a biodiversity baseline or Net Positive design but are not directly included in biodiversity unit calculations. For example, installation of boxes to encourage roosting bats. Features such as these are included in the qualitative assessment of a project's biodiversity baseline but not within the unit calculations.

2.1.4 Detailed methodology is provided in **Appendix A**.

2.2 Area and Surveys

2.2.1 The red line boundary for the baseline biodiversity assessment area was assumed to be the LoD for the Proposed Grid Connection, as shown in **Figure 1,** excluding the existing substation.

2.2.2 Field surveys were undertaken in July 2022 and habitats classified to Phase 1 habitat terminology.

2.3 Background Information

2.3.1 Desk-based survey included analysis of the following datasets:

- Habitat Map of Scotland (HabMoS). HabMoS is a national repository for habitat and land use data and comprises a composite map, containing data from many different sources. Currently available data includes the following datasets of relevance to this project:
  - Native Woodland Survey Scotland (NWSS) 2006-2013;
  - National Forest Inventory (NFI) 2015;
  - Ordnance Survey (OS) delineation of Inland Surface Waters 2017; and
  - Trees for Life National Vegetation Classification (NVC) data for Dundreggan Estate 2007.
- Aerial imagery provided by Ordnance Survey (2020)

2.4 Limitations to the Assessment

2.4.1 HaBMoS datasets have been analysed using Geographical Information Systems (GIS) and due to variation in the purpose, accuracy and scale of their data, a number of assumptions have been made to inform this assessment. These are described below for each dataset type.

2.4.2 NWSS data comprises multiple layers for mapped polygons, with each layer comprising an assigned component woodland type. However, this survey data does not indicate the proportional cover for each woodland type within a polygon. Woodland type, according to broad habitat classification, is therefore based on the presumed dominant woodland cover as indicated by aerial imagery and/or field surveys.

2.4.3 NFI data provides forest classifications that are generally too broad for determination to specific habitat types. These have been aligned with aerial imagery and results from field surveys to assign the most suitable woodland type.

2.4.4 NWSS and NFI data can provide contradictory habitat classification for equivalent, or overlapping, polygon data. These have been aligned with aerial imagery and results from field surveys to assign the most suitable woodland type.

2.4.5 Aerial imagery is considered recent (Ordnance Survey, 2020), but classification of particular habitat types – including heathlands, mires, woodlands and Bracken - can present uncertainty at provided resolution and RGB colour scheme. These have been aligned with existing datasets and results from field surveys to assign the most suitable habitat type.

2.4.6 As per the accepted guidance for the Department for Environment, Food and Rural Affairs (Defra) metric[10],[11],[12] connectivity is assumed, and for habitats of High and Very High distinctiveness a Medium connectivity multiplier is assigned and for all other habitats a Low connectivity multiplier is assigned. This assumption means the concepts of intactness, resilience, and potential for dispersal/re-colonisation of habitats are not accounted for within the calculations and resulting analysis within this assessment.

[10] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. User Guide (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/5366205450027008

[11] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Technical Supplement (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/4923683225468928

[12] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Calculation Tool: Short Guide (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/5815257627099136

3. RESULTS

3.1 Biodiversity Baseline

3.1.1 The Proposed Grid Connection between Bhlaraidh Wind Farm Extension substation and Fort Augustus substation traverses a complex mosaic of open-ground upland habitat and woodland. Assigned habitat types are displayed in **Figure 1**

3.1.2 Woodland areas are dominated by conifer plantations, but there are numerous, extensive areas of semi-natural coniferous and broadleaved woodland near Allt Phocaichain and Bhlaraidh. Smaller fragments of broadleaved and mixed woodland are associated with riparian zones, field boundaries, roadsides, and around settlements.

3.1.3 Open, hill ground is dominated by heathland habitats, with smaller pockets of blanket bog and occasional surface water bodies. Heathlands are extensive across higher ground near Bhlaraidh Wind Farm.

3.1.4 Other habitats present include grasslands, along the River Moriston, scrub, urban or semi-urban habitats and intensively-managed grassland/crops.

3.1.5 There are a number of watercourses present within the Site. Larger river bodies include the River Moriston, Allt Phocaichain, and a network of hill lochans near Bhlaraidh Wind Farm Extension substation.

3.1.6 The biodiversity baseline for the Site is based upon the non-irreplaceable habitat types, their distinctiveness and condition scores, the area of the habitats and the number of BU each type of habitat contributes. Irreplaceable habitats (e.g. ancient woodland, active peatland) are present within the Site, but are included in the assessment for the Site. **Figure 1** displays the habitats across the Site according to Phase 1 habitat survey classification which comprises the baseline biodiversity.

3.1.7 The Site comprises 1583.86 hectares (ha). The main habitat within the Site, covering 37.8 % of the total area is Coniferous woodland – plantation, of which 68.19 ha (or 11 % of the habitat area) was identified as being Coniferous woodland – recently-felled plantation. Conifer woodlands throughout the Site are dominated by coupes of Sitka spruce *Picea sitchensis* and Lodgepole pine *Pinus contorta*, with smaller areas of Larch sp. *Larix sp.* and Scot's pine *Pinus sylvestris.*

3.1.8 Wet dwarf shrub heath and blanket bog habitats cover a further 437.72 ha of the Site, with wet heath identified as being the second most abundant habitat type across the Site, covering 381.94 ha (24.11 %). Good quality blanket bog comprises 30.55 ha (1.93 %) and wet modified bog comprises 25.23 ha (1.59 %).

3.1.9 Other extensive areas habitat include areas of semi-natural broadleaved (112.28 ha, 7.09 %), coniferous (191.01 ha, 12.05%) and mixed woodland (75.11 ha, 4.74%). All other habitats comprise <4% of the total area.

3.1.10 Habitats identified within the Site with High distinctiveness scores include: semi-natural woodlands, bog, fen and wet dwarf shrub heath.

3.1.11 Habitats identified within the Site with Medium distinctiveness scores include: grasslands and mixed plantation woodland.

3.1.12 Habitats identified within the Site with Low Distinctiveness include: coniferous plantation woodland, felled coniferous woodland, bracken, quarry and bare ground.

3.1.13 A summary of the Biodiversity Units (BU) for each assigned habitat type, sorted by distinctiveness is presented in **Table 1** below.

Table 1: Summary of Biodiversity Units (BU) for each assigned habitat type within the Site

Habitat	Distinctiveness	Condition	Connectivity	Strategic significance	Area of Habitat (Ha)	Biodiversity Units (BU)	Biodiversity Units per hectare (BU/Ha)
A1.1.1: Woodland: Broadleaved - semi-natural (High)	High	Moderate	Moderate	High	112.28	1704.41	15.18
A1.2.1: Woodland: Coniferous - semi-natural	High	Moderate	Moderate	High	191.01	2899.53	15.18
A1.3.1: Woodland: Mixed - semi-natural	High	Moderate	Moderate	High	75.11	1140.17	15.18
E1.6.1: Bog: Blanket bog	High	Moderate	Moderate	High	30.55	463.75	15.18
E1.7: Bog: Wet modified bog	High	Moderate	Moderate	High	25.23	382.99	15.18
D2: Wet dwarf shrub heath	High	Moderate	Moderate	High	381.94	5797.85	15.18
E2.1: Flush and spring: Acid/neutral flush	High	Moderate	Moderate	Medium	0.39	5.66	14.51
E3.2: Fen: Basin mire	High	Moderate	Moderate	High	0.6	9.11	15.18
A1.3.2: Woodland: Mixed - plantation	Medium	Moderate	Low	Medium	43.46	382.45	8.80
B1.1: Acid grassland - unimproved (Medium)	Medium	Moderate	Low	Medium	4.1	36.08	8.80
B2.2: Neutral grassland: semi-improved	Medium	Moderate	Low	Medium	63.26	556.69	8.80
A1.2.2: Woodland: Coniferous - plantation (Low)	Low	Fairly poor	Low	Low	530.74	1592.22	3.00
A4.2: Recently-felled woodland: Coniferous	Low	Fairly poor	Low	Low	68.19	204.57	3.00
C1.1: Bracken: Continuous (Low)	Low	Fairly poor	Low	Low	21.73	65.19	3.00
I2.1: Rock exposure and waster (artificial): Quarry	Low	Fairly poor	Low	Low	0.7	2.1	3.00
J4: Bare ground	Low	Fairly poor	Low	Low	34.57	103.71	3.00
TOTAL BIODIVERSITY UNITS							**15346.48**
TOTAL BIODIVERSITY UNITS OF NON-IRREPLACEABLE HABITATS							**8755.63**
TOTAL AREA (Ha)							**1583.86**
TOTAL AREA (Ha) OF NON-IRREPLACEABLE HABITATS							**1149.68**
BIODIVERSITY UNITS/Ha							**9.69**
BIODIVERSITY UNITS/Ha OF NON-IRREPLACEABLE HABITATS							**7.84**

*Irreplaceable habitats are highlighted in red and reflect all semi-natural woodland and peatland habitats

3.2 Biodiversity Change from Proposed Grid Connection Construction

3.2.1 During the construction of the Proposed Grid Connection, habitats will be lost, either temporarily or permanently, due to construction works creating the footprint for the proposed infrastructure. For this development permanent habitat loss will be restricted to loss of woodland habitat for the creation of wayleaves for the OHL. The areas of impact from proposed pole locations are each less than 0.01ha, and as such are not included in construction phase habitat loss calculations. Installation of underground cabling will not result in permanent habitat loss.

3.2.2 Habitat areas and BU that will be removed to accommodate the Proposed Grid Connection are listed in **Table 2**.

3.2.3 The results highlight **a loss of 345.53 BU, a 2% loss of biodiversity** within the Site when Irreplaceable habitats are included in calculations.

3.2.4 When only non-irreplaceable habitats are assessed, the results highlight **a loss of 85.65 BU** within the Site**, a 1% loss of biodiversity**.

3.2.5 Most of the units lost are in semi-natural woodland habitats of high distinctiveness, with loss of semi-natural coniferous woodland undergoing the largest loss biodiversity units (-114.61BU). The greatest loss by area is within coniferous plantation woodland, however the low distinctiveness rating afforded to this habitat type is reflected by a proportionally lower amount of biodiversity loss (-66.03BU).

3.2.6 One of the main principles of biodiversity offsetting is to replace any affected habitat with a 'like-for-like' habitat of ecological equivalence or more. For the Proposed Grid Connection to achieve NNL, any habitats that are affected by the Proposed Grid Connection must be compensated for by achieving at least equivalent gains of biodiversity elsewhere within the Site. The loss of a habitat with High distinctiveness cannot be compensated for by creating a habitat that has a lower value of biodiversity.

Table 2: Habitat area and Biodiversity Units retained and removed for construction of the Proposed Grid Connection.

Habitat	Area Retained (ha)	Area removed (ha)	Biodiversity Units retained	Biodiversity Units removed
A1.1.1: Woodland: Broadleaved - semi-natural (High)	104.37	7.91	1606.65	97.76
A1.2.1: Woodland: Coniferous - semi-natural	182.01	9.00	2784.92	114.61
A1.3.1: Woodland: Mixed - semi-natural	71.38	3.73	1092.66	47.51
A1.3.2: Woodland: Mixed - plantation	41.23	2.23	362.82	19.62
A1.2.2: Woodland: Coniferous - plantation (Low)	508.73	22.01	1526.19	66.03
TOTAL	907.33	45.27[13]	7373.25	345.53

*Irreplaceable habitats are highlighted in red and reflect all semi-natural woodland and peatland habitats

[13] Chapter 9: Forestry notes that the overall area of woodland to be felled is 55.98 ha. This differs from the 45.27 ha noted in the BNG assessment above due to differences in the grain of the mapping and data used to calculate the figures. Chapter 9: Forestry uses data provided by the involved landowners, which defines larger areas as woodland. The BNG calculations use Phase 1 Habitat mapping which accounts for smaller variations in the habitat. Compensatory planting under the Scottish Government's Control of Woodland Removal Policy is based on the 55.98 ha identified in Chapter 9: Forestry. The 45.27 ha of woodland identified to be felled based on the Phase 1 Habitat mapping has been used to calculate the loss of particular types of biodiversity units to inform the BNG assessment.

4. CONCLUSIONS

4.1 Summary

4.1.1 Irreplaceable habitat of High distinctiveness (all semi-natural woodland habitats) will be affected by the Proposed Grid Connection.

4.1.2 The Proposed Grid Connection will result in the loss of small areas of habitat of High distinctiveness.

4.1.3 Construction of the Proposed Grid Connection will result in a 1% loss in biodiversity when considering only non-irreplaceable habitats alone (8755.63BU – 85.65BU = 8669.98BU remaining). It is understood that SSEN Transmission are exploring opportunities for compensation that would support the project to achieve its NNL goals.

4.2 Discussion and Recommendations

4.2.1 To offset loss of biodiversity units within the Site the following mitigation could be adopted:

- Establishment of scrub habitat (medium distinctiveness) within the felling corridor for the OHL wayleave with low-growing shrubs eg. Juniper *Juniperus communis* would reduce overall biodiversity loss.
- Creation of 9.18ha of scrub habitat to moderate target condition within areas of coniferous woodland – plantation (low distinctiveness) that are required to be felled for the OHL wayleave (22.01ha) would result in no net loss of biodiversity units in this habitat.
- Creation of 1ha of scrub habitat to good target condition within areas of mixed woodland – plantation (medium distinctiveness) that are required to be felled for the OHL wayleave (2.23ha) would result in a net loss of 12.89BU (reduced from a net loss of 19.62BU).

4.2.2 Assuming an appropriate location for additional compensatory habitat creation can be identified, it is likely that NNL could be achieved for non-irreplaceable habitats if these measures were implemented.

APPENDIX A: BIODIVERSITY NET GAIN METHODOLOGY

A loss of biodiversity can occur from human activities (such as infrastructure projects or developments) even when efforts are made to avoid, minimise and restore nature. The principle of Biodiversity Net Gain (BNG) is to follow these steps to avoid, minimise and restore nature and ensure that any damages from human activities and development to biodiversity are balanced by equivalent and additional gains for biodiversity. Only as a last resort, residual losses are compensated for using biodiversity offsets, which are distinguished from other forms of mitigation in that they are delivered outside of the development site. BNG is therefore the end result of a process applied to infrastructure development so that overall, there is a positive outcome for biodiversity. No Net Loss (NNL) refers to a neutral outcome for biodiversity, i.e. biodiversity gained as a result of development is equal to biodiversity lost.

For many decades it has been recognised that biodiversity is in decline globally. As such, international and European targets have been set to halt this decline by 2020. Scotland's ambition to protect and restore biodiversity has been set out in the Government's '2020 Challenge for Scotland's Biodiversity'[14] and Scotland's Economic Strategy (2015)[15] which states that '*Protecting and enhancing this stock of natural capital, which includes our air, land, water, soil and biodiversity and geological resources is fundamental to a healthy and resilient economy*'.

Although national policies and strategies are in place, UK wide assessments show that we are still failing to deliver our target to halt the decline in biodiversity. There is greater focus on the use of tools within the development industry to quantify biodiversity losses and gains, such as the Defra biodiversity metric. These tools enable the losses and gains of biodiversity to be quantified to determine whether NNL or net gain in biodiversity has been achieved by development projects.

BNG is internationally recognised as an efficient process which ensures that developments can leave nature in a better state than which it started. At present around 100 countries currently have a legislative or strong policy requirement on developers to achieve either NNL or a net gain in biodiversity for their development projects. The number of countries with these requirements is continually increasing. For example, France passed a new biodiversity law in 2016 which makes it mandatory for developers to achieve NNL (or preferably net gain) in biodiversity.

The UK and Scottish governments have not made BNG a legal requirement, however the UK government's 25 Year Environment Plan[16] states a desire to 'embed a '*net environmental gain'* principle for development to deliver environmental improvements locally and nationally' and plans to consult on making BNG a mandatory requirement.

The Scottish Government have not yet made firm statements in support of BNG, however the Scottish Planning Policy (SPP)[17] states that '*The planning system should...seek benefits for biodiversity from new development where possible, including the restoration of degraded habitats and the avoidance of further fragmentation or isolation of habitats*'. With the review of the SPP and National Planning Framework 3 (NPF3)[18], it is possible that Scotland will move towards supporting BNG principles within the planning process.

Despite not being a mandatory requirement across the UK, there has been increased interest in the voluntary application of BNG principles and assessments over the last few years. This has included interest from a range of developers, including SSEN Transmission.

[14] 2020 Challenge for Scotland's Biodiversity: A Strategy for the conservation and enhancement of biodiversity in Scotland, Scottish Government (2013) https://www2.gov.scot/Resource/0042/00425276.pdf

[15] Scotland's Economic Strategy, Scottish Government (2015) https://www2.gov.scot/Resource/0047/00472389.pdf

[16] A Green Future: Our 25 Year Plan to Improve the Environment (2018), UK Government, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

[17] Scottish Planning Policy (2014), https://www2.gov.scot/Resource/0045/00453827.pdf

[18] National Planning Framework 3 (2014), https://www2.gov.scot/Resource/0045/00453683.pdf

IRREPLACEABLE HABITATS

BNG does not apply to statutory designated sites or irreplaceable habitats (e.g. blanket bog, ancient woodland)[19].

Defra guidance advises that irreplaceable habitats should not be quantified in terms of biodiversity units.

In these situations, Defra guidance dictates that any compensation offered to address impacts on irreplaceable habitats should be agreed directly with the statutory nature conservation agency (in this case NatureScot).

Unavoidable impacts on irreplaceable habitats should not undermine the BNG process for the other habitats. Projects in this situation should aim to achieve NNL or net gains in non-irreplaceable habitats.

BASELINE BIODIVERSITY CALCULATION

The biodiversity of the non-irreplaceable habitats within the Site was quantified in terms of biodiversity units (BU). Calculation of biodiversity units for habitats was in accordance with Defra's technical paper[20], guidance for developers[21] and guidance for offset providers[22]. This is the standard metric used for calculating biodiversity units in the UK.

The Defra metric assesses biodiversity based upon numerical scores of habitat condition, habitat distinctiveness, and the area in hectares (ha) or length in kilometres (km) of habitats:

- Area (ha) x Distinctiveness Score x Condition Score x Connectivity x Strategic Significance = Baseline (Area-Based) Biodiversity Units (BU);
- Length (km) x Distinctiveness Score x Condition Score x Connectivity x Strategic Significance = Baseline (Linear) Habitat Units (L).

Area-based habitats are calculated using the area (ha) and condition of the habitat, along with the habitat distinctiveness, whereas the biodiversity of linear habitats (e.g. hedgerows and watercourses) is calculated using the length (km) of the feature.

HABITAT DISTINCTIVENESS

Habitat distinctiveness is defined as a collective measure of biodiversity and includes parameters such as the number and variety of species found there (richness and diversity), how rare the species are, and how many species the habitat supports that are not common elsewhere.

To determine habitat distinctiveness, habitat types were transposed into the standard habitat distinctiveness typology and bands issued by Defra (the 'Defra habitat type'), enabling consistent assessment of distinctiveness for all habitat parcels.

The habitat typologies are split into four distinctiveness bands:

- Very High distinctiveness = 8;
- High distinctiveness = 6;
- Medium distinctiveness = 4; and
- Low distinctiveness = 2.

19 CIRIA, CIEEM, IEMA (2019). Biodiversity Net Gain: Good practice principles for development, A Practical Guide. https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf

20 Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. User Guide (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/5366205450027008

21 Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Technical Supplement (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/4923683225468928

22 Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Calculation Tool: Short Guide (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/5815257627099136

For some habitat types, multiple distinctiveness bands can apply, depending on the richness and diversity of the habitat. Decisions on which distinctiveness band to assign were based on criteria listed in the Habitat Matrix, employing a precautionary approach.

HABITAT CONDITION

Condition, in the context of BNG, is defined as the quality of a particular habitat. For example, a habitat is in poor condition if it fails to support the rare or notable species for which it is valued, or if it is degraded as a result of pollution, erosion, invasive species or other factors.

Habitat condition numerical 'scores' were assigned based on the following:

- Good, habitat passes all FEP criteria = 3;
- Moderate, habitat fails one FEP criterion = 2; and
- Poor, habitat fails two or more FEP criteria = 1.

CONNECTIVITY

Connectivity is a new measure used in the new Defra metric and reflects the relationship of a particular habitat patch to other surrounding similar or related semi-natural habitats facilitating flows of species and ecosystem services. There are three categories:

- Highly aggregated / connected: the habitat is directly connected to, or within 200 m of an area of habitat outside of the development site which is of the same broad habitat category.
- Moderate aggregation / connectivity: the habitat is within 200 – 500 m of an area of habitat outside of the development site which is of the same broad habitat category.
- Low aggregation / connectivity: the habitat is over 500 m or more from an area of habitat outside of the development site which is of the same broad habitat category.

Habitat Connectivity numerical 'scores' were assigned based on the following:

- High = 1.15;
- Medium = 1.1; and
- Low = 1.

STRATEGIC SIGNIFICANCE

Strategic significance gives extra value to habitats that are located in optimum locations for biodiversity and other environmental objectives, such as areas that are the focus of green infrastructure or local biodiversity action plans. There are three categories:

- High strategic significance: the habitat contributes to or supports significant sites for nature (National Park, Special Protection Area, Special Area of Conservation, Site of Special Scientific Interest, Ramsar, National Nature Reserve) located within 1 km, and supports the same communities of species.
- Medium strategic significance: the habitat contributes to or supports significant sites for nature (National Park, Special Protection Area, Special Area of Conservation, Site of Special Scientific Interest, Ramsar, National Nature Reserve) located within 2 km, and supports the same communities of species.
- Low strategic significance: the habitat does not contribute to or support significant sites for nature (National Park, Special Protection Area, Special Area of Conservation, Site of Special Scientific Interest, Ramsar, National Nature Reserve) located within 2 km and/or doesn't support the same communities of species.

Spatial Significance numerical scores were assigned based on the following:

- High = 1.15;
- Medium = 1.1; and
- Low = 1.

POST-DEVELOPMENT BIODIVERSITY UNIT CALCULATION

Biodiversity units resulting from landscape and ecological mitigation designs for the Site, including newly created, enhanced and retained habitats, are referred to as post-development biodiversity units.

These are calculated in a similar way to baseline biodiversity units for area-based habitats. However, in addition to area, condition and distinctiveness of the proposed habitats, the key risks to delivery are taken into account through the introduction of additional risk factors to the calculation.

The Defra metric sets out three risk factors: distance from development (spatial risk); time taken for created or enhanced habitats to reach target condition (temporal risk); and how difficult it is to create or enhance any given habitat (delivery risk). As this assessment only considers the habitats to be created within the Site, it is not necessary to account for spatial risk at this time.

The post-development area-based biodiversity units were calculated as follows:

- Distinctiveness Score x Condition Score x Area (ha) x Delivery Risk x Connectivity x Spatial Significance x Temporal Risk x Spatial Risk = Post-Development (Area-Based) Biodiversity Units.

The post-development length-based biodiversity units for linear habitats were calculated as follows:

- Distinctiveness Score x Condition Score x Length (km) x Delivery Risk x Connectivity x Spatial Significance x Temporal Risk x Spatial Risk = Post-Development (Length-Based) Linear Biodiversity Units.

HABITAT DISTINCTIVENESS

Selection of distinctiveness bands and associated numerical scores for post-development habitats followed the approach outlined above for baseline habitats.

TARGET CONDITION

The aim for the post-development habitats is that they will achieve either Good or Moderate condition. Good condition is considered achievable for habitat types which are of low or medium difficulty to create. Habitats which have a high difficulty to create are anticipated to reach a target condition of Moderate.

DELIVERY RISK

Delivery Risk is the risk associated with the difficulty to create any specific habitat. Appendix 1 of Defra's Technical Paper[23] provides an indicative guide to broad categories of risk for different habitats. For habitat types not listed in Defra's guidance, expert opinion was used to determine the appropriate level of delivery risk. This was informed by delivery risk levels assigned to similar habitat types by Defra. **Table A1** shows the multipliers assigned to each level of delivery risk.

Table A1: Defra Delivery Risk Multipliers.

Delivery Risk	Delivery Risk Multiplier
Low	1
Medium	0.67

[23] Natural England (2019) The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. Technical Supplement (Beta Version, July 2019). http://publications.naturalengland.org.uk/file/4923683225468928

Delivery Risk	Delivery Risk Multiplier
High	0.33
Very High	0.1

TEMPORAL RISK

In delivering compensation for habitat loss, the timing of the impact may not coincide with the new habitat reaching the required quality or level of maturity, which could result in loss of biodiversity for a period of time. This is called the Temporal Risk.

As time taken to reach target condition (i.e. maturity) is affected by multiple issues (e.g. soil type), there is no set guidance for each habitat type. Expert judgement was used to estimate number of years to target condition for each habitat type to be created before assigning risk multipliers defined by Defra as shown in **Table A2**. The length of time taken for varying habitat types to reach target is taken from the BREEAM Ecology Calculation Methodology[24].

Table A2: Defra Temporal Risk Multipliers.

Years to Target Condition	Temporal Risk Multiplier
1	0.965
5	0.837
10	0.700
20	0.490
30	0.343

SPATIAL RISK

Spatial Risk is the risk associated with delivering compensation for the loss of a habitat at a distance from that loss. The further from the site of the loss, the greater the risk. Spatial risk has not been included in the post-development calculation as this assessment deals with the habitats created within the Site only. Should it be deemed necessary to apply Biodiversity Offsetting for the development then spatial risk multipliers would be applied to those habitats created offsite.

CONNECTIVITY

Selection of connectivity bands and associated numerical scores for post-development habitats followed the approach outlined above for baseline habitats.

STRATEGIC SIGNIFICANCE

Selection of strategic significance bands and associated numerical scores for post-development habitats followed the approach outlined above for baseline habitats.

[24] BREEAM, CEEQUAL & HQM (2018) Guidance Note 36: Ecology Calculation Methodology – Route 2. https://www.breeam.com/resources/guidance-notes/ecology-calculation-methodology-route-2-gn36/

GOOD PRACTICE PRINCIPLES

For BNG to be used appropriately and to generate long-term gains for nature, the good practice principles established by the Business and Biodiversity Offset Programme (BBOP)[25] should be followed.

These principles have been established in the context of UK development by the Construction Industry Research and Information Association (CIRIA), the Chartered Institute for Ecology and Environmental Management (CIEEM) and the Institute of Environmental Management and Assessment (IEMA)[26] (Appendix B). The BNG process for the Proposed Grid Connection adheres to these principles.

[25] Guidance Notes to the Standard on Biodiversity Offsets (2012). Business and Biodiversity Offsets Programme (BBOP). https://www.forest-trends.org/wp-content/uploads/imported/BBOP_Standard_Guidance_Notes_20_Mar_2012_Final_WEB.pdf

[26] CIRIA, CIEEM, IEMA (2019). Biodiversity Net Gain: Good practice principles for development, A Practical Guide. https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf

FIGURES