Scawd Law Wind Farm

Additional Information: Volume 3
Alternative Layout Report

February 2025

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Contents

List of Abbreviations

Abbreviation	Description
AA	**Appropriate Assessment**
AI	**Additional Information**
BESS	**Battery Energy Storage System**
BoCC	**Birds of Conservation Concern**
CEMP	**Construction Environment Management Plan**
CIA	**Cumulative Impact Assessment**
CRM	**Collision Risk Modelling**
CRZ	**Collision Risk Zone**
ECoW	**Environmental Clerk of Works**
ECU	**Energy Consents Unit**
ECZ	**Eskdalemuir Consultation Zone**
EcIA	**Ecological Impact Assessment**
EIAR	**Environmental Impact Assessment Report**
EKA	**Eskdalemuir Seismic Array**
FEI	**Further Environmental Information**
FMMP	**Fish and Macro-invertebrate Monitoring Programme**
GET	**Golden Eagle Topographical**
GPS	**Global Positioning System**
GWDTE	**Groundwater Dependent Terrestrial Ecosystems**
IEF	**Important Ecological Feature**
IOA GPG	**Institute of Acoustics document, A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise**
IOF	**Important Ornithological Feature**
LBAP	**Local Biodiversity Action Plan**
LCT	**Landscape Character Type**

Abbreviation	Description
LDP2	**Scottish Borders Local Development Plan**
LVIA	**Landscape and Visual Impact Assessment**
MoD	**Ministry of Defence**
NPF4	**National Planning Framework 4**
NVC	**National Vegetation Classification**
OMP	**Operational Monitoring Plan**
OWPS	**Onshore Wind Policy Statement**
PAT	**Predicting Aquila Territories**
PCH	**Potential Collision Height**
PMP	**Peat Management Plan**
PWS	**Private Water Supply**
PWSRA	**Private Water Supply Risk Assessment**
RSG	**Raptor Study Group**
RSPB	**Royal Society for the Protection of Birds**
S36	**Section 36 Application**
SBL	**Scottish Biodiversity List**
SIL	**Seismic Impact Limit**
SPA	**Special Protection Area**
SRMS	**Scottish Raptor Monitoring Scheme**
SSGEP	**South of Scotland Golden Eagle Project**
SSSI	**Site of Special Scientific Interest**
SUP	**Southern Upland Partnership**
VP	**Vantage Point**
ZoI	**Zone of Influence**
ZTV	**Zone of Theoretical Visibility**

Glossary

Term	Definition
Proposed Development Area	**The development area within the red line site boundary (application area) as shown in EIAR Volume 3a Figure 1.2: Site Layout and Annex A Figure FEI 3.1 – Proposed Amended Development.**
Proposed Development	**Scawd Law Wind Farm as submitted to Energy Consents Unit December 2022 (ECU00002111) comprising of 8 Turbines**
Proposed Amended Development	**Alternative 6 turbine layout of Scawd Law Wind Farm**

1. Introduction

1.1 Introduction

1.1.1 A Section 36 Application ("the application") for the proposed Scawd Law Wind Farm was submitted to the Energy Consents Unit (ECU) in December 2022, reference ECU00002111. Scawd Law Wind Farm (the Proposed Development) will comprise the construction and operation of up to 8 turbines and battery storage as well as associated ancillary infrastructure. The Proposed Development is situated north-east of Innerleithen, in the Scottish Borders.

1.1.2 The accompanying Environmental Impact Assessment Report (EIAR) provided an assessment of the likely significant effects of the Proposed Development, as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

1.1.3 This Additional Information (AI) Report provides an assessment of an alternative layout with reduced turbine numbers and increased Battery Energy Storage System (BESS) to address concerns raised by statutory consultees in relation to potential impacts on Golden Eagles (the Proposed Amended Development).

2. Alternative Layout

2.1.1 Figure FEI 3.1 (Annex A) shows an alternative 6 turbine Proposed Amended Development.

2.1.2 The alternative layout comprises up to 6 wind turbines with a blade tip of up to 180 m (based on a 6 MW candidate turbine, giving 36 MW) and an increase to 24 MW of battery storage units. Therefore, the Proposed Amended Development would maintain a generation capacity of 60 MW.

2.1.3 This layout shows T7 and T8 removed with the substation, control building and compound and the BESS infrastructure relocated to the 'temporary construction compound' area at T3 (see Figure 1.2 of EIAR, included in annex A). **Note:** there is **no change** to red line boundary and the development area.

2.1.4 The operational life for the wind farm would remain 35 years.

2.1.5 The application would still include all associated infrastructure:

- Turbine infrastructure including turbine foundations; external transformer housing; crane pads and hardstand areas;
- Micro-siting allowance of turbines and associated infrastructure of up to 75 m;
- Substation, control building and compound;
- Battery/energy storage infrastructure;
- Construction of approximately 7.5 km of new access tracks;
- Alterations to the public road network;
- Underground electricity cables;
- Anemometry mast;
- Signage;
- One temporary borrow pit;
- Temporary concrete batching plant;
- Temporary construction and storage compounds, laydown areas and ancillary infrastructure;

- One minor water crossing between T3 and T6 (a peat drain from the acrotelm (one layer in an undisturbed peat bog) and not a major water crossing); and
- Drainage and drainage attenuation measures (as required).

3. Ornithology

3.1 Introduction

3.1.1 This section provides an updated assessment of potential impacts on ornithological receptors relevant to the Proposed Amended Development. An assessment of the effects of the Proposed Development on ornithological receptors was provided within Chapter 8 of the EIAR submitted to the ECU in December 2022, which predicted a low negative/negligible impact on all Important Ornithological Features (IOFs). All impacts predicted were considered to result in effects which are not significant.

3.1.2 The author has five years of experience in the environmental sector in ecology and conservation, with four of those years in environmental consultancy focused on onshore renewable energy developments including wind and solar. The author was assisted by an Associate Technical Director of onshore ornithology with 12 years of experience in ornithological consultancy and a Technical Director of onshore ecology with 16 years of experience in ecological consultancy.

3.1.3 Following establishment of a nearby golden eagle breeding territory, additional vantage point (VP) surveys to record golden eagle flight activity between May and August were completed in 2022 prior to submission of the EIAR. As these surveys covered only part of a single breeding season, further VP surveys to record golden eagle flight activity were completed between March 2023 and January 2024, at the request of consultees.

3.1.4 Flight data of all target species from the full suite of VP surveys completed between 2017 and 2024 was used to reassess collision risk for all ornithological receptors with respect to the Proposed Amended Development. However, a full account of methods and results previously provided in the EIAR are not repeated here for VP surveys completed between September 2017 and August 2022. Methods and results of VP surveys completed prior to 2023 are included where relevant for comparison or completeness of information regarding the updated impact assessment only. For all other information relating to impact assessment of ornithological receptors, refer to Chapter 8 of the EIAR.

3.1.5 As discussed later in this section, the updated assessment concludes that no significant effects have been identified as a result of the Proposed Amended Development.

3.2 Consultation

3.2.1 Details of consultee responses to the EIAR with specific relevance to ornithology are provided in Table 3.1. Pre-application consultation is not included within this table but can be found in in Table 8.5, Chapter 8 of the EIAR. Consultee responses with relevance to ecology are presented in Table 4.1, Section 4.2.

Table 3.1: Summary of consultee responses following submission of the EIAR

Consultee	Comments/issues raised/recommendations	Addressed responses/outcomes
NatureScot 26 May 2023	Recommended that a brief explanation of the change to VPs used during VP surveys following submission of the EIAR in 2022 should be included in an AIR, should an AIR be required.	An explanation of changes to VP locations, used in 2023 and 2024, is provided in Section 3.3, Paragraph 3.3.9.

Consultee	Comments/issues raised/recommendations	Addressed responses/outcomes
RSPB 24 November 2023	Disagreed with assessment of significance of impact of the Proposed Development on golden eagle due to the location of proposed turbines 7 and 8, on an important ridge within a breeding territory. Proposed that turbines 7 and 8 should be removed from the Proposed Development to avoid displacement and reduce collision risk of breeding golden eagle from the newly established territory.	Impacts of the Proposed Amended Development on golden eagle have been reassessed in this AIR.
	Advised that an outline Habitat Management Plan (HMP) be submitted prior to consent of the Proposed Development, if granted to ensure that the HMP appropriately addresses mitigation, compensation and enhancement measures required to comply with NPF4.	An outline HMP will be submitted alongside this AIR.
NatureScot 2 February 2024	Disagreed with assessment of significance of impact of the Proposed Development on golden eagle due to the location of proposed turbines 7 and 8, on an important ridge within a breeding territory. Proposed that turbines 7 and 8 should be removed from the Proposed Development to avoid displacement of breeding golden eagle from the newly established territory.	Impacts of the Proposed Amended Development on golden eagle have been reassessed in this AIR.
	Satisfied that an Appropriate Assessment (AA) is not required for the Gladhouse Reservoir Special Protection Area (SPA) and Fala Flow SPA.	None
	Satisfied that the Proposed Development will have no impact on the breeding bird assemblage notified feature of the Moorfoot Hills Site of Special Scientific Interest (SSSI).	None
	Noted that impact of the Proposed Development on the notified golden plover population feature of the Moorfoot Hills SSSI was not assessed.	Impact on the notified golden plover population feature of the Moorfoot Hills SSSI has been assessed within this AI Report.

3.3 Method of Assessment

3.3.1 Amendments to the turbine layout of the Proposed Amended Development and associated infrastructure will likely change the assessment of impacts to some of the IOFs, detailed in Chapter 8 of the EIAR. Chapter 8 assessed the following potential impacts during construction, operation and decommissioning of the Proposed Amended Development on ornithological receptors:

- Habitat loss due to land-take;
- Disturbance and/or displacement; and

- Collision with turbines.

3.3.2 As additional VP surveys were completed following submission of the EIAR, results of all VP surveys completed between September 2017 and January 2024 have been combined to provide an updated assessment of collision risk on all ornithological receptors recorded at the Proposed Amended Development.

3.3.3 Given the scope of the amendments set out in the Proposed Amended Development, it is considered that only potential effects in relation to potential IOFs previously identified within Chapter 8 of the EIAR and potential effects of collision risk on ornithological receptors that have since been identified require re-assessment.

3.3.4 All appropriate embedded mitigation as identified within the EIAR will be retained.

3.3.5 In addition, the cumulative impact assessment (CIA) has been refreshed to allow consideration of any additional developments proposed, consented or becoming operational since the submission of the EIAR.

Desk Study

3.3.6 To obtain two full years of satellite tag data (July 2021 to September 2023), further data recorded between September 2022 and September 2023 (inclusive) relating to golden eagles monitored as part of the South of Scotland Golden Eagle Project (SSGEP) was requested from the Southern Upland Partnership (SUP) in September 2023.

Vantage Point Surveys

3.3.7 Additional VP surveys to target golden eagle flight activity within the Proposed Development Area (the same as that defined within the EIAR), were completed between March 2023 and January 2024, following NatureScot guidance[1]. Recording of flight data was consistent with methods used during baseline VP surveys carried out between September 2017 and August 2022, including time and duration, and the altitude of the bird at the start of the observation and at 15 second intervals thereafter into one of four height bands (HBs):

- HB 1 = 0-25 m;
- HB 2 = 25-50 m;
- HB 3 = 50-200 m; and
- HB 4 = >200 m.

3.3.8 Although the VP surveys focused on recording golden eagle flights, flights of other target species, including all raptor species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)[2] and/or Annex I of the Birds Directive[3], waterfowl (except Canada goose and mallard), wader species and black grouse, were recorded. Additionally, information relating to secondary species (all other raptor species (e.g. buzzard and kestrel), gull species, red grouse, raven, grey heron, cormorant, and flocks of >20 passerines listed on the UK Birds of

[1] SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage (now NatureScot), Battleby.
[2] UK. Wildlife and Countryside Act (1981). Available from https://www.legislation.gov.uk/ukpga/1981/69 [Accessed: 26/07/2024]
[3] UK. Directive 2009/147/EC of the European Parliament and of the Council (2009). Available from - https://www.legislation.gov.uk/eudr/2009/147/contents [Accessed: 31/07/2024]

Conservation Concern (BoCC) Red List[4]) was also recorded in line with the methods carried out during VP surveys completed between 2017 and 2022.

3.3.9 The VP surveys completed between September 2017 and August 2022 were carried out from three VPs: VP1 (NT 378413), VP2 (NT 351400), and VP3 (NT 377424). The additional VP surveys completed between March 2023 and January 2024 were undertaken from two alternative VP locations: VP4 (NT 367405) and VP5 (NT 366415), selected to minimise disturbance to breeding golden eagle within proximity to the Proposed Amended Development, of which NatureScot was notified (See Table 3.1). The locations of VPs 4 and 5 are shown on Figure FEI 3.2, Annex A.

3.3.10 The survey effort completed at VPs 4 and 5 between March 2023 and January 2024 is detailed in Table 3.2. Details of survey effort completed at VPs 1-5 between 2017 and 2024 is provided in AI Volume 3 Annex B AI Appendix 3.1.

Table 3.2: Survey effort completed at VP4 and VP5 between March 2023 and January 2024

Year	VP4	VP5
March 2023	6	6
April 2023	6	6
May 2023	12	12
June 2023	6	6
July 2023	6	6
August 2023	6	6
Breeding season total	**42**	**42**
September 2023	6	6
October 2023	6	6
November 2023	6	6
December 2023	6	6
January 2024	6	6
Non-breeding season total	**30**	**30**

Collision Risk Modelling

3.3.11 The results of additional VP survey data collected at the Proposed Amended Development between March 2023 and January 2024 (inclusive) from VPs 4 and 5 were combined with results of VP surveys completed between September 2017 and August 2022 to provide an overall collision risk estimate for all ornithological receptors recorded which qualified for

[4] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). Birds of Conservation Concern 5: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 114, 723–747.

Collision Risk Modelling (CRM). The methods used to calculate collision risk were consistent with those used to inform the assessment in Chapter 8 of the EIAR.

3.3.12 An updated CRM was carried out for all ornithological receptors recorded at the Proposed Amended Development during VP surveys completed between September 2017 and January 2024 for which at least three flights or 10 individuals were recorded within the collision risk zone (CRZ) at potential collision height (PCH), defined below.

3.3.13 Flights considered to represent a potential collision risk were those that passed within the CRZ; a 277.5 m buffer of the proposed turbine locations representing half the rotor diameter of the maximum turbine specification proposed plus a 200 m precautionary buffer zone, at PCH. PCH was defined as the 25 – 180 m height range within which the proposed turbines will operate. Flight activity was recorded relative to the four height bands detailed in Paragraph 3.3.7.

3.3.14 Since the height within which the proposed turbine blades will rotate (PCH) falls within height bands 2 and 3, only flight activity within these height bands was considered to be at potential collision risk. A precautionary approach was taken in which it was assumed that all flight activity within the 25 m – 200 m height range covered by the height bands was assumed to be within the 25 m – 180 m height range that would be rotor-swept under the scenario in which the maximum turbine size is used.

3.3.15 CRM was carried out according to the Band Collision Risk Model[5]. Data collected during all VP surveys completed at the Proposed Amended Development were used to predict the number of individuals expected to collide with the turbine rotors per season.

3.3.16 Ornithological receptors which qualify for CRM are categorised into receptors which exhibit 'non-directional flight' (i.e. those that spend time travelling randomly within the Proposed Amended Development e.g. raptor species) or 'directional flight' (passing directly through the Proposed Amended Development e.g. goose and swan species). For species which exhibit random/non-directional flight behaviour, the observed time spent flying within the CRZ at PCH is used to calculate collision risk; whereas for species that exhibit regular/directional flight behaviour, the number of flights that pass through the rotor-swept volume is used. This information is extrapolated up to predict the number of seconds within the CRZ at PCH or the number of transits through the rotor-swept volume per season (Band *et al*., 2007)[5].

3.3.17 For each species, the risk of collision for an individual is calculated by estimating the likelihood of collision based on the characteristics of each species and of the turbines. This is then scaled using a species-specific avoidance rate[6]. Further details of parameters and assumptions used in the CRM are provided in AI Volume 3 Annex B AI Appendix 3.1.

Golden Eagle Topography Model

3.3.18 In the UK, golden eagle is confined almost exclusively to the Scottish Highlands and Islands, with very few pairs nesting regularly further south. Although historically more home ranges were occupied across Scotland, in south-east Scotland just one territory was regularly occupied[7]

[5] Band, W., Madders, M. and Whitfield, D. P., (2007). Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G. F. E. and Ferrer, M. (eds) Birds and Wind Farms: Risk Assessment and Mitigation, pp 259-275. Quercus, Madrid.
[6] SNH (2018). *Avoidance rates for the onshore SNH wind farm collision risk model*. SNH Guidance Note, September 2018, v2.
[7] Murray, R.D., Andrews, I.J. & Holling, M. (2019). Birds in South-east Scotland 2007-13: a tetrad atlas of the birds in Lothian and Borders. The Scottish Ornithologists' Club, Aberlady.

during the period 2007-2013. As a result, the SSGEP[8] was launched in 2018 to boost the population of golden eagles in southern Scotland through translocations of juveniles and immature birds. A report published in September 2023 revealed that the population within the south of Scotland had since grown to 46 individuals[9] and currently stands at 49 individuals (Cat Barlow *pers comm*, November 2024).

3.3.19 A previous report on golden eagles in southern Scotland concluded that the south of Scotland could potentially hold 14-16 pairs[10]. The study indicated that the Moorfoot Hills, local to the Proposed Amended Development, had the capacity to support a single pair of golden eagles or provide suitable habitat for non-breeding golden eagles. In 2022, a newly established golden eagle breeding territory was identified within 10 km of the Proposed Amended Development. As such, a Golden Eagle Topography (GET) Model was carried out as recommended by NatureScot[11]. The GET Model assessed the suitability of habitat for golden eagles within the Proposed Amended Development and surrounding 300 m buffer.

3.3.20 The GET Model is a simple model that has been developed to predict golden eagle habitat usage within a site based on the topographical characteristics of that site[12]. The model is based around the assumption that golden eagles will use ridges and rugged topography to exploit the vertical lift generated by such features. It has been developed and validated using Global Positioning System (GPS) telemetry records from satellite-tagged golden eagles in Scotland. It has been demonstrated that the GET Model is suitable to predict habitat use by both dispersing, and territorial golden eagles which occupy a home range[13].

Survey Limitations

3.3.21 The following survey limitations are specific to the additional VP surveys completed between March 2023 and January 2024, except where it is relevant to refer to baseline ornithology surveys completed prior to submission of the EIAR for full context of limitations. For details of survey limitations of all baseline ornithology surveys completed before March 2023, refer to Chapter 8 of the EIAR.

Weather Conditions

3.3.22 Weather conditions during the VP surveys were not always optimal, with occasional periods of heavy rain, strong winds, low cloud and moderate visibility reported. However, it is not always possible to avoid poor weather conditions and surveying in a range of weather conditions is

[8] South of Scotland Golden Eagle Project. Available from - https://www.goldeneaglessouthofscotland.co.uk/ [Accessed 26/07/2024]
[9] NatureScot (2023). Pioneering conservation project reveals new record number of golden eagles in southern Scottish skies and confirms love is in the air for established pair. Available from - https://www.nature.scot/pioneering-conservation-project-reveals-new-record-number-golden-eagles-southern-scottish-skies-and [Accessed 26/07/2024]
[10] Fielding, A.H. and Haworth, P.F. (2014). Golden eagles in the south of Scotland: an overview. Scottish Natural Heritage Commissioned Report No. 626.
[11] NatureScot (2021). NatureScot statement on modelling to support the assessment of forestry and wind farm impacts on golden eagles. Available from - https://www.nature.scot/doc/naturescot-statement-modelling-support-assessment-forestry-and-wind-farm-impacts-golden-eagles [Accessed 26/07/2024]
[12] Fielding, A.H., Haworth, P.F., Anderson, D., Benn, S., Dennis, R., Weston, E., & Whitfield, D.P. (2020). A simple topographical model to predict Golden Eagle Aquila chrysaetos space use during dispersal. Ibis, 162, 400-415.
[13] Fielding, A.H., Anderson, D., Benn, S. Taylor, J., Tingay, R., Weston, E.D. & Whitfield, D.P. (2023). Responses of GPS-Tagged Territorial Golden Eagles Aquila chrysaetos to Wind Turbines in Scotland. Diversity, 15, 917.

considered give an accurate representation of the environment within and surrounding the Proposed Amended Development. It is therefore considered that occasional periods of poor weather is not a significant limitation to the dataset obtained.

Survey Effort

3.3.23 The golden eagle breeding season runs between February and August (inclusive). The VP surveys completed during the 2023 breeding season did not start until March. However, an additional 6 hours of VP survey was completed at both VP4 and VP5 in May. A total of 30 hours of VP survey was completed during the golden eagle non-breeding season (September to January) which is under the minimum number of observation hours recommended in NatureScot guidance.

3.3.24 However, the discrepancies in survey effort are not considered to be a limitation to the assessment of golden eagle as supplementary satellite tag data between July 2021 and September 2023 provided by SSGEP gives an indication of flight activity and use of the area surrounding the Proposed Amended Development during the early part of the golden eagle breeding season and during the non-breeding season.

Collision Risk Modelling

3.3.25 Overall collision risk could not be calculated by combining all breeding and non-breeding seasons due to the changes in VPs and viewsheds between survey years. As such, collision risk was calculated for each individual breeding season and non-breeding season between 2017 and 2024 for each species which qualified for CRM (see Table 3.1.7, AI Volume 3 Annex B AI Appendix 3.1). Overall breeding season and non-breeding season collision risk estimates were then calculated as the mean of all collision risk estimates across all individual breeding seasons and non-breeding seasons. The annual collision risk estimate for each species was then calculated using the sum of the overall breeding season and non-breeding season estimates for each species.

3.3.26 Breeding season VP surveys in 2022 were carried out between May and August. The flight data recorded during this period was extrapolated up to cover the March to August breeding season (February to August for golden eagle), assuming that flight activity during May to August is representative of overall activity during the respective breeding seasons. Similarly, the breeding season VP surveys in 2023 were carried out between March and August. The CRM has therefore been conducted under the assumption that flight activity across March to August is representative of golden eagle flight activity from February to August.

3.4 Baseline Results

3.4.1 Overall results of VP surveys completed between September 2017 and January 2024 are presented below. For more detailed results of VP surveys completed during each breeding and non-breeding season, see AI Volume 3 Annex B AI Appendix 3.1.

3.4.2 For results of all other baseline ornithology surveys, refer to Chapter 8 the EIAR.

Desk Study

3.4.3 Details of data provided by the SSGEP is included in AI Volume 3 Annex B Confidential Appendix 3.2.

Vantage Point Surveys

3.4.4 Sixteen target species were recorded during the breeding season VP surveys carried out in 2018, 2019, 2022 and 2023. Of these, seven qualified for CRM: golden plover, curlew, golden

eagle, goshawk, hen harrier, red kite and merlin. During the non-breeding season VP surveys completed between 2017-2018, 2019-2020 and 2023-2024, eight target species were recorded, of which five, golden plover, golden eagle, goshawk, red kite and merlin, qualified for CRM. Details of the number of flights and individuals observed for each target species during each breeding and non-breeding season between 2017 and 2024 are provided in AI Volume 3 Annex B AI Appendix 3.1.

3.4.5 The total number of flights recorded during all VP surveys between September 2017 and January 2024, including the flights and individuals observed passing through the CRZ at PCH during the breeding season and non-breeding season for target species which qualified for CRM are shown in Table 3.3. Breeding and non-breeding season collision risk estimates for these species were calculated using the mean value across all breeding seasons and non-breeding seasons.

3.4.6 Figures 3.3 and 3.4 show breeding season flights for all species recorded between 2018-2023, excluding golden eagle and hen harrier. Figure 3.5 shows non-breeding season flights for all species recorded between 2017-2024, excluding golden eagle. Figures 3.3-3.5 are provided in Annex A. Figures relating to golden eagle and hen harrier flights are provided in Confidential AI Volume 3 Annex B AI Appendix 3.2.

Table 3.3: Number of flights and individuals observed passing through the CRZ at PCH during the breeding season flight activity surveys (February to August inclusive for golden eagle and March to August inclusive for all other species) and non-breeding season flight activity surveys (October to January inclusive for golden eagle and October to February inclusive for all other species)

Species	Season	Total flights	Total individuals	Risk flights**	Risk individuals***
Golden plover	Breeding	5	26	5	26
	Non-breeding	7	287	2	46
	Total	**12**	**313**	**7**	**72**
Curlew	Breeding	70	112	7	21
	Non-breeding	0	0	0	0
	Total	**70**	**112**	**7**	**21**
Golden eagle	Breeding	19	19	3	3
	Non-breeding	14	16	4	5
	Total	**33**	**35**	**7**	**8**
Goshawk*	Breeding	15	16	3	3
	Non-breeding	27	29	8	9
	Total	**42**	**45**	**11**	**12**
Hen harrier	Breeding	50	50	32	32
	Non-breeding	0	0	0	0

Species	Season	Total flights	Total individuals	Risk flights**	Risk individuals***
	Total	**50**	**50**	**32**	**32**
Red kite	Breeding	8	8	4	4
	Non-breeding	2	2	0	0
	Total	**10**	**10**	**4**	**4**
Merlin	Breeding	11	20	4	8
	Non-breeding	4	4	0	0
	Total	**15**	**24**	**4**	**8**

**Six additional goshawk flights comprising 7 individuals were also recorded in the 2018 – 2019 non-breeding season. Of these, three goshawk flights of one individual each were recorded within the CRZ at PCH. However, surveys were only conducted for a single month (September) during this season so an analysis has not been carried out due to the temporal bias that would be introduced if it were to be included; **Number of flights within the CRZ at PCH; ***Number of individuals recorded within the CRZ at PCH*

Collision Risk Modelling

3.4.7 All ornithological receptors which qualified for CRM, golden plover, curlew, golden eagle, goshawk, hen harrier, red kite and merlin, are expected to spend time travelling within, or in proximity to, the Proposed Amended Development ('non-directional flight') rather than passing directly through ('commuting flight').

3.4.8 The risk of collision for golden plover, curlew, golden eagle, goshawk, hen harrier, red kite and merlin, calculated with avoidance factors of 95%, 98%, 99%, 99.2% and 99.8%, is presented in Table 3.4. The values shown in bold represents the species-specific avoidance level recommended for collision risk analysis for each species by NatureScot[6].

3.4.9 Details of the collision risk estimates calculated for each ornithological receptor during each breeding and non-breeding season between 2017 and 2024 are provided in AI Volume 3 Annex B AI Appendix 3.1.

Table 3.4: Estimated number of collisions during the species-specific breeding and non-breeding seasons. The breeding season and non-breeding season values are the mean of individual breeding season and non-breeding season estimates across all survey years. Annual values are the sum of the breeding and non-breeding season mean estimates. Values marked in bold represent avoidance rates recommended by NatureScot (SNH, 2018a)[6].

Species	Model type	Season	Estimated mortality assuming avoidance of:				
			95%	**98%**	**99%**	**99.5%**	**99.8%**
Golden plover	Non-directional	Breeding*	0.48	**0.19**	0.10	0.05	0.02
		Non-breeding	1.55	**0.62**	0.31	0.15	0.06
		Annual	2.02	**0.81**	0.41	0.20	0.09

Species	Model type	Season	Estimated mortality assuming avoidance of:				
			95%	**98%**	**99%**	**99.5%**	**99.8%**
Curlew	Non-directional	Breeding*	0.65	**0.26**	0.13	0.07	0.03
		Non-breeding	0	**0**	0	0	0
		Annual	0.65	**0.26**	0.13	0.07	0.03
Golden eagle	Non-directional	Breeding*	0.02	0.01	**<0.01**	<0.01	<0.01
		Non-breeding	0.02	0.01	**<0.01**	<0.01	<0.01
		Annual	0.04	0.02	**0.01**	<0.01	<0.01
Goshawk	Non-directional	Breeding*	0.04	**0.02**	0.01	0.01	<0.01
		Non-breeding	0.11	**0.04**	0.02	0.01	<0.01
		Annual	0.15	**0.06**	0.03	0.02	0.01
Hen harrier	Non-directional	Breeding*	1.33	0.53	**0.35**	0.18	0.07
		Non-breeding	0	0	**0**	0	0
		Annual	1.33	0.53	**0.35**	0.18	0.07
Red kite	Non-directional	Breeding*	0.06	0.03	**0.01**	0.01	<0.01
		Non-breeding	0	0	**0**	0	0
		Annual	0.06	0.03	**0.01**	0.01	<0.01
Merlin	Non-directional	Breeding*	0.09	**0.04**	0.02	0.01	<0.01
		Non-breeding	0	**0**	0	0	0
		Annual	0.09	**0.04**	0.02	0.01	<0.01

**Data collected during a survey period of May to August 2022 is extrapolated up to cover the full March to August breeding season (February to August for golden eagle), assuming that the activity on site during May to August is representative of overall activity during this season.*

3.4.10 A comparison of the collision risk estimates calculated for each ornithological receptor at risk of collision within Chapter 8 of the EIAR with an updated collision risk estimate calculated within this Report is provided in Table 3.5. Hen harrier, red kite and merlin flights were recorded during the VP surveys between 2017 and 2022 but did not qualify for CRM within the EIAR. Therefore, a comparison is not provided for these species in Table 3.5.

Table 3.5: A summary of the estimated number of collisions during the species-specific breeding and non-breeding seasons for each ornithological receptor assessed for collision risk in Chapter 8 of the EIAR compared with updated estimates presented in this Report, based on species-specific avoidance rates recommended by NatureScot.

Species	Season	EIAR	AIR
Golden plover	Breeding	0.56	0.19
	Non-breeding	1.74	0.62
	Annual	2.30	0.81
Curlew	Breeding	0.12	0.26
	Non-breeding	0	0
	Annual	0.12	0.26
Golden eagle	Breeding	0.02	<0.01
	Non-breeding	0	<0.01
	Annual	0	0.01
Goshawk	Breeding	0.06	0.02
	Non-breeding	0.11	0.04
	Annual	0.17	0.06

Golden Eagle Topography Model

3.4.11 An updated GET Model report which provides detailed results is provided in Confidential AI Volume 3 Annex B AI Appendix 3.2.

3.4.12 The newly established home range of the breeding golden eagle pair, in which the Proposed Amended Development is situated, is estimated to be approximately 7,786 ha. Of the home range, 95.2% (6,491 ha) comprises available good golden eagle habitat (GET 6+). The exclusion zone (the Proposed Amended Development turbine array and a surrounding 300 m buffer) is 197 ha, which equates to 3% of the total available GET 6+ habitat within the home range.

3.5 Updated Feature Assessment

3.5.1 An updated feature assessment has been completed for the ornithological receptors and predicted impacts previously assessed in Chapter 8 of the EIAR which are considered to require re-assessment. These are golden plover, curlew, snipe, golden eagle and goshawk.

3.5.2 Predicted impacts on black grouse were not reassessed for the Proposed Amended Development, the closest known lek site to the Proposed Amended Development infrastructure

remains to be beyond 750 m maximum disturbance distance during the breeding season[14]. Similarly, predicted impacts on snipe were not reassessed as there is no change to the number of breeding territories impacted (a single territory within 500 m of the Proposed Amended Development). As such there is no change to the assessments of black grouse and snipe provided within Chapter 8 of the EIAR.

3.5.3 Predicted impacts on the ornithological features of the Moorfoot Hills SSSI were not assessed in Chapter 8 of the EIAR. NatureScot noted that the breeding bird assemblage notified feature of the SSSI will not be impacted by the Proposed Development (See Table 3.1) and therefore has not been assessed in this Report. However, predicted impacts on the golden plover breeding population notified feature of the SSSI have been assessed within this section.

3.5.4 Given the Proposed Amended Development infrastructure layout and results of additional VP surveys, an additional three ornithological receptors which, following an update to CRM, have been assessed for collision risk in this Report: hen harrier, red kite and merlin.

3.5.5 No breeding raptor surveys were undertaken during 2023, however the flight activity exhibited by hen harrier during the breeding season indicates that hen harrier held a breeding territory within or close to the Proposed Development Area (See Confidential AI Volume 3 Annex B AI Appendix 3.2). As many of the hen harrier flights recorded at PCH in the CRZ were associated with territorial breeding behaviour, the impact of disturbance and/or displacement on hen harrier has also been assessed.

3.5.6 There was no indication that the red kite and merlin flights were associated with breeding behaviour. Therefore, disturbance and/or displacement impacts were not assessed for these species.

3.5.7 A list of the ornithological receptors and predicted impacts that have been assessed within this Report are shown in Table 3.6.

3.5.8 Furthermore, a summary of each ornithological receptor in combination with legislation, guidance and baseline results, and its determination as an IOF requiring full ecological impact assessment (EcIA), is detailed in Table 3.7.

[14] NatureScot (2022). *Disturbance Distances in selected Scottish Bird Species – NatureScot Guidance.* Available from - https://www.nature.scot/doc/disturbance-distances-selected-scottish-bird-species-naturescot-guidance [Accessed 26/07/2024]

Table 3.6: A summary of the ornithological features and associated impacts assessed within Chapter 8 of the EIAR and this Report.

Feature	EIAR	AI Report
Fala Flow SPA/SSSI	Pink-footed goose non-breeding population qualifying feature	Not reassessed (See Table 3.1)
Gladhouse Reservoir SPA/SSSI	Pink-footed goose non-breeding population qualifying feature	Not reassessed (See Table 3.1)
Moorfoot Hills SSSI	Not assessed	Golden plover breeding population qualifying feature (See Table 3.1)
Pink-footed goose	Connectivity with Fala Flow and Gladhouse Reservoir SPAs	Not reassessed (See Table 3.1)
Black grouse	Disturbance/displacement	Not reassessed (See Paragraph 3.5.2, above)
Golden plover	Collision and disturbance/displacement	Collision and disturbance/displacement
Curlew	Collision and disturbance/displacement	Collision and disturbance/displacement
Snipe	Disturbance/displacement	Not reassessed (See Paragraph 3.5.2, above)
Golden eagle	Collision and disturbance/displacement	Collision and disturbance/displacement
Goshawk	Collision and disturbance/displacement	Collision and disturbance/displacement
Hen harrier	Not assessed	Collision and disturbance/displacement
Red kite	Not assessed	Collision
Merlin	Not assessed	Collision

Table 3.7: Determination of ornithological features as IOFs occurring within the Proposed Development Area

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
Golden plover	Annex I, SBL, LBAP	Local	UK: 32,500-50,500 breeding pairs; 410,000 wintering individuals Scotland: 15,000 breeding pairs; 25,000-35,000 wintering individuals; 10,000-30,000 spring passage individuals; 20,000-60,000 autumn passage individuals	Golden plover is a widespread breeding bird in upland habitat in Scotland, supporting 80% of the breeding population in the UK. During winter, golden plover occupy coastal areas around Scotland, joined by other wintering golden plover from	Two breeding territories were located within 500 m of the Proposed Development. As eight flights of 190 birds were recorded at PCH in the CRZ, golden plover qualified for CRM. Breeding season and non-breeding season	One of the two breeding territories identified within the Proposed Development Area is located within 500 m of the Proposed Amended Development. An updated total of seven flights of 72 birds were recorded at PCH in the CRZ.	No	Golden plover is an Annex I, SBL-listed species of conservation concern that is also listed on the Scottish Borders LBAP. It is also a qualifying feature of the Moorfoot Hills SSSI for the breeding population. A single breeding territory identified in 2018 was located within 500 m of the Proposed Amended Development. Given that disturbance and/or displacement on golden plover was assessed within Chapter 8 of the EIAR on the basis of

[15] Scottish Government (2020). Scottish Biodiversity List. Available from - https://www.nature.scot/doc/scottish-biodiversity-list [Accessed 31/07/2024]
[16] Scottish Borders Council (2018). Supplementary Guidance Scottish Borders Local Biodiversity Action Plan (2018-2028). Scottish Borders Council, Melrose.
[17] Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). *Population estimates of birds in Great Britain and the United Kingdom*. British Birds 113: 69–104.
[18]Forrester, R.W., Andrews, I.J., McInerny, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C. & Grundy D.S. (eds). (2007). *The Birds of Scotland.* The Scottish Ornithologists' Club, Aberlady.
[19] Wilson, M.W., Austin, G.E., Gillings, S. & Wernham, C.V. (2015). *Natural Heritage Zone bird population estimates. SWBSG commissioned report number 1504.* pp72.

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
			NHZ: 1,058 breeding pairs	Fennoscandia and Greenland.	predicted collision mortality was 0.56 and 1.74 birds, respectively.	The updated breeding season and non-breeding season predicted collision mortality is 0.19 and 0.62 birds, respectively.		two breeding territories present within 500 m of the Proposed Development, with no significant impact predicted, it is considered that the impact of the Proposed Amended Development on disturbance/displacement of golden plover remains as **not significant**. An updated predicted breeding season collision mortality of 0.19 birds represents 0.009% of the NHZ breeding population, 0.006% of the breeding population in Scotland and the UK. An updated predicted non-breeding season collision mortality of 0.62 birds represents 0.003% of the non-breeding population in Scotland and 0.0002% of the non-breeding population in the UK. The impact of collision risk is lower than previously assessed in Chapter 8 of the EIAR. It is therefore considered to be of

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
								negligible magnitude and **not significant**. Therefore, golden plover is not considered to be an IOF.
Curlew	Red, SBL, LBAP	Local	UK: 58,500 breeding pairs; 125,000 wintering individuals Scotland: 58,800 breeding pairs; 85,700 wintering individuals NHZ: 1,400 breeding pairs	There is a widespread population of breeding curlew within Scotland in upland and agricultural areas, supporting approximately 16-27% of the European breeding population. There has been a significant decline (60%) in breeding curlew in Scotland within the past 26 years[20].	Four breeding territories were identified within the Survey Area, two of which were located within 500 m of the Proposed Development. As six flights of 14 birds were recorded at PCH in the CRZ, curlew qualified for CRM. Breeding season predicted collision	One of the four breeding territories identified within the Survey Area is located within 500 m of the Proposed Amended Development An updated total of seven flights of 21 birds were recorded at PCH in the CRZ. Updated breeding season predicted collision	No	Curlew is a UK BoCC Red List and SBL-listed species of conservation concern also listed on the Scottish Borders LBAP. A single breeding territory identified in 2018 was located within 500 m of the Proposed Amended Development. Given that disturbance and/or displacement on curlew was assessed within Chapter 8 of the EIAR on the basis of two breeding territories present within 500 m of the Proposed Amended Development, with no significant impact predicted, it is considered that the impact of the Proposed Amended Development on

[20] Heywood, J.J.N., Massimino, D., Balmer, D.E., Kelly, L., Noble, D.G., Pearce-Higgins, J.W., Woodcock, P., Wotton, S., Gillings, S. & Harris, S.J. 2023. The Breeding Bird Survey 2022. BTO Research Report 756. British Trust for Ornithology, Thetford.

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	**AIR (2017-2024)**		
					mortality was 0.12 birds.	mortality is 0.26 birds.		disturbance/displacement of curlew remains as **not significant**. An updated predicted breeding season collision mortality of 0.26 birds represents 0.009% of the NHZ breeding population, 0.0004% of the breeding population in Scotland, and the UK. The impact of collision risk is therefore considered to be of **negligible magnitude** and **not significant**. Therefore, curlew is not considered to be an IOF.
Golden eagle	Schedule 1, 1A, A1, Annex I, Red, SBL	Regional	UK: 510 breeding pairs Scotland: 440 breeding pairs; 1000 wintering individuals NHZ 20: 3 occupied breeding territories (based on results of the 2003 golden eagle survey)	Golden eagle is widely distributed in the Scottish Highlands and on most Hebridean Islands. In south-east Scotland it is a very rare resident, with one known occupied territory between 2007	A breeding territory was identified within 10 km of the Proposed Development in 2022. As four flights by four birds were recorded at PCH in the CRZ, golden eagle qualified for CRM.	The breeding territory within 10 km of the Proposed Amended Development was confirmed to be occupied in 2023. An updated total of seven flights by eight birds were recorded at	**Yes**	Golden eagle is a Schedule 1, 1A, A1, Annex I, UK BoCC Red List and SBL-listed species of conservation concern also listed on the Scottish Borders LBAP. Given the high conservation status of golden eagle in Scotland, the reintroduction of a small population in the south of Scotland, and the close proximity of a newly established breeding

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
				and 2013[21]. Since 2018, juvenile and immature golden eagles have been released in the Moffat Hills as part of the SSGEP to boost the local population. The most recent report produced by the SSGEP noted that since the start of the translocation project, there are 46 golden eagles within the south of Scotland population[22] this now stands at 49 individuals (Cat Barlow	Breeding season prediction collision mortality was 0.02 birds.	PCH in the CRZ. Updated breeding season predicted collision mortality, and non-breeding season mortality is <0.01 birds, resulting in an annual collision mortality of 0.01 birds.		territory to the Proposed Amended Development, golden eagle is considered to be an IOF and is taken forward for full EcIA.

[21] Murray, R.D., Andrews, I.J. & Holling, M. (2019). Birds in South-east Scotland 2007-13: a tetrad atlas of the birds in Lothian and Borders. The Scottish Ornithologists' Club, Aberlady.
[22] NatureScot (2023). Pioneering conservation project reveals new record number of golden eagles in southern Scottish skies and confirms love is in the air for established pair. Available from - https://www.nature.scot/pioneering-conservation-project-reveals-new-record-number-golden-eagles-southern-scottish-skies-and [Accessed 26/07/2024]

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
				pers comm), with 13 territorial pairs)[23].				
Goshawk	Schedule 1	Regional	UK: 620 breeding pairs Scotland: 130 breeding pairs; 350-450 wintering individuals NHZ 20: 13 breeding pairs	Goshawk is a scarce breeding bird in Scotland, found primarily in woodland habitat during the breeding season. The breeding population is distributed mainly across the south and north-east of Scotland. In 2022, the most-recent estimated breeding population in the UK was 945 breeding pairs (range 740-1,252) and >315 pairs in Scotland. A total of 117	An occupied breeding territory was identified approximately 2.5 km from the Proposed Development in 2017-2018. As 11 flights of 12 birds were recorded at PCH in the CRZ, goshawk qualified for CRM. Breeding season and non-breeding season predicted collision mortality was 0.06 and 0.11	An updated total of 11 flights by 12 birds were recorded at PCH in the CRZ. Updated breeding season and non-breeding season predicted collision mortality is 0.02 and 0.04 birds, respectively.	No	Goshawk is a Schedule 1-listed species of conservation concern also listed on the Scottish Borders LBAP. The Proposed Amended Development is still approximately 2.5 km from the breeding territory identified in 2017-2018. Given that disturbance and/or displacement on goshawk was assessed within Chapter 8 of the EIAR on this basis, with no significant impact predicted, it is considered that the impact of the Proposed Amended Development on disturbance/displacement of goshawk remains as **not significant**. An updated predicted breeding season collision mortality of 0.02 birds

[23] Eaton, M. and the Rare Breeding Birds Panel. (2024). Rare breeding birds in the UK in 2022. *British Birds* 117, November 2024, p591-656.

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
				breeding pairs were located in the south of Scotland in 2022 (including 45 in the Scottish Borders)[23]. As goshawk is a secretive species and remains inconspicuous for much of the year, this species is notoriously difficult to monitor and likely under reported, thus any population estimates are probably highly conservative.	birds, respectively.			represents 0.08% of the NHZ breeding population, 0.008% of the breeding population in Scotland, and 0.002% of the breeding population in the UK. These figures are based on data presented in the Population estimate column and therefore are likely to be underestimates given the most recent breeding population estimates for the Scottish Borders, Scotland and the UK. An updated predicted non-breeding season collision mortality of 0.04 birds represents 0.01% of the non-breeding population in Scotland. The impact of collision risk is therefore considered to be of **negligible magnitude** and **not significant**. Therefore, goshawk is not considered to be an IOF.
Hen harrier	Schedule 1, 1A, Annex I, Red, SBL	Regional	UK: 545 breeding pairs	Hen harrier is a widespread but generally	As a single flight by a single bird	Twenty-two of the 46 flights recorded	**Yes**	Hen harrier is a Schedule 1 and 1A, Annex I, UK BoCC Red List and SBL-listed

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
			Scotland: 633 breeding pairs; 1,050-1,540 wintering individuals NHZ 20: 13 breeding pairs	scarce breeding species in Scotland, found mostly in upland areas, with some moving to lower altitudes or south during winter. Persecution of this species across Scotland is well documented and remains severe in certain areas. The breeding population of hen harrier in Scotland was estimated at 633 pairs in 2004 and 505 in 2010[24]. The most recent estimated breeding population size in Scotland is	was recorded at PCH in the CRZ, hen harrier did not qualify for CRM.	during the 2023 breeding season were associated with breeding behaviour during which the bird was exhibiting territorial display within the Proposed Development Area. This concentrated flight activity suggests that hen harrier nested within close proximity to the Proposed Amended Development in 2023. As an updated total of 32 flights by 32 birds were recorded at PCH in the		species of conservation concern also listed on the Scottish Borders LBAP. Given the relatively high collision mortality rate in relation to the breeding population within NHZ 20 and the likely presence of a breeding territory within close proximity to the Proposed Amended Development in 2023, hen harrier is considered to be an IOF and has been taken through to full EcIA.

[24] Hayhow D. B., Eaton M. A., Bladwell S., Etheridge B., Ewing S., Ruddock M., Saunders R., Sharpe C., Sim I. M. W. and Stevenson A. (2013) The status of the Hen Harrier, Circus cyaneus, in the UK and Isle of Man in 2010. Bird Study 60: 446-458

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
				529 pairs in 2023, according to the most recent national hen harrier survey[25].		CRZ, hen harrier qualified for CRM. Breeding season predicted collision mortality is 0.35 birds.		
Red kite	Schedule 1, 1A, Annex I, SBL	Local	UK: 4,400 breeding pairs Scotland: 60 breeding pairs; 300-350 wintering individuals NHZ 20: 0 breeding pairs (based on 2013 data)	Red kite is a scarce resident species within Scotland, with a growing population and breeding range following successful re-introductions in Ross & Cromarty, Stirling and Dumfries & Galloway. Red kite breeds and forms winter roosts in coniferous and	As two flights by two birds were recorded at PCH in the CRZ, red kite did not qualify for CRM.	As a total of four flights by four birds were recorded at PCH in the CRZ, red kite qualified for CRM. Breeding season predicted collision mortality is 0.01 birds.	No	Red kite is a Schedule 1 and 1A, Annex I and SBL-listed species of conservation concern. A predicted breeding season collision mortality of 0.01 birds represents 0.008% of the breeding population in Scotland, and 0.0001% of the breeding population in the UK. The most recently reported NHZ 20 breeding population of red kite is 0 pairs, based on Scottish Raptor Monitoring Scheme (SRMS) data recorded in 2013. Since then, the red kite population has

[25] Kelly, L. A., Tománková, I., Downing, S., Lindley, P., Mattingley, W., Morris, N. G., Murphy, S., Orr-Ewing, D., Owens, R., Rooney, E., Ruddock, M., Stevenson, A., Thomas, M. and Wotton, S. R. (2025). The status of breeding Hen Harriers *Circus cyaneus* in the UK and Isle of Man in 2023. *Bird Study*, 1–18.

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
				broadleaved woodland stands with open foraging habitat including moorland and lowland farmland. A total of 157 breeding pairs were located in the south of Scotland in 2022 of a national population of at least 298 pairs (six in South Strathclyde, 147 in Dumfries and Galloway, and four in Lothian and Borders)[26].				expanded in size and distribution, with 157 breeding pairs reported in the south of Scotland in 2022. Given that red kite have established a presence within the south of Scotland since 2013, there is a risk that collision mortality may impact the local population. However, even if a single pair were present in NHZ 20, the estimated collision mortality of 0.01 birds would impact 0.5% of the NHZ population. The impact of collision risk is therefore considered to be of **negligible magnitude** and **not significant**. Therefore, red kite is not considered to be an IOF.
Merlin	Schedule 1, Annex I, Red, SBL	Local	UK: 1150 breeding pairs	Merlin is a widespread but scarce resident breeding bird in	As a single flight by a single bird was recorded	As a total of four flights by eight birds were recorded	No	Merlin is a Schedule 1, Annex I, UK BoCC Red

[26] Challis, A., Beckmann, B.C., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2023). Scottish Raptor Monitoring Scheme Report 2021 & 2022. BTO Scotland, Stirling.

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
			Scotland: 800 breeding pairs; 3000 wintering individuals NHZ 20: 22 breeding pairs	Scotland, found mainly in upland heather moorland habitat. During passage and winter, non-breeding birds move to coastal and lowland areas. The merlin population in Scotland was estimated at 800 breeding pairs in 1993-1994. The most recent estimated breeding population size in Scotland is 733 in 2008. In 2022, 37 pairs were located in the south of Scotland (including 28 in the Borders)[23].	at PCH in the CRZ, merlin did not qualify for CRM.	at PCH in the CRZ, merlin qualified for CRM. Breeding season predicted collision mortality is 0.04 birds.		List and SBL-listed species of conservation concern. A predicted breeding season collision mortality of 0.04 birds represents 0.09% of the NHZ breeding population, 0.003% of the breeding population in Scotland, and 0.002% of the breeding population in the UK. The impact of collision risk is therefore considered to be of **negligible magnitude** and **not significant**. Therefore, merlin is not considered to be an IOF.

Species	Conservation designation[2,3,4,15,16]	Value	Population estimate[17,18,19]	Scottish context[18]	Baseline		IOF	Justification
					EIAR (2017-2022)	AIR (2017-2024)		
Designated site		Notified feature		Importance	Assessed condition		IOF	Justification
Moorfoot Hills SSSI		Breeding golden plover		National	Unfavourable, no change		**Yes**	Breeding golden plover is a qualifying feature of Moorfoot Hills SSSI. A single golden plover breeding territory, identified in 2018, is located within 500 m of the Proposed Amended Development. The SSSI lies approximately 0.2 km to the north of the Proposed Development Area, therefore connectivity between the SSSI and the Proposed Amended Development is highly likely.

3.6 Updated Impact Assessment

3.6.1 Following an updated feature assessment, three ornithological receptors have been identified as IOFs, requiring EcIA following the application of embedded mitigation (see Chapter 8 of the EIAR). These are:

- Moorfoot Hills SSSI – Breeding golden plover;
- Golden eagle; and
- Hen harrier.

3.6.2 An updated impact assessment for golden eagle, and impact assessments for Moorfoot Hills SSSI and hen harrier are provided below for the construction and operation periods. For all designations and species, decommissioning effects are predicted to be of similar or lower magnitude to the effects during construction.

Moorfoot Hills SSSI – Breeding Golden Plover

Introduction

3.6.3 Moorfoot Hills SSSI lies approximately 16 m north of the Proposed Amended Development Area at the closest point. The ornithological features for which the SSSI is designated include breeding golden plover and its breeding bird assemblage which includes red grouse, black grouse, oystercatcher, lapwing, curlew, dunlin, common sandpiper and redshank as further notified features. NatureScot noted that the Proposed Development would not impact the breeding bird assemblage (See Table 3.1) and therefore this has not been assessed in this Report. This EcIA focuses on the impact of the Proposed Amended Development on the breeding golden plover population feature of the SSSI, which was assessed as unfavourable in 2004 due to significant decline of >25% between 1976-78 (5.4-9.3 pairs per km^2) and 2004 (1.2 pairs per km^2)[27]. The most recent condition assessment in 2023 remains as unfavourable with no change[28].

Potential Disturbance Impacts

3.6.4 During construction of the Proposed Amended Development, impacts of disturbance on breeding golden plover within the SSSI would be temporary and short-term in duration. Any impacts of disturbance would be avoided with the implementation of embedded mitigation (see Chapter 8 of the EIAR), and therefore would be of **negligible magnitude** and **not significant**. Similarly, any impacts of disturbance during operation of the Proposed Amended Development would be occasional and short-term and therefore of no more than **negligible magnitude** and **not significant**.

Potential Displacement Impacts

3.6.5 Given the total area of the SSSI is 88.3 km^2, it can be estimated that approximately 106 pairs were present within the Moorfoot Hills SSSI in 2004[27] based on the assessment of 1.2 pairs per km^2. However, the SSSI has capacity for approximately 477 to 822 breeding pairs during

[27] Moorfoot Hills SSSI (2011) *Site Management Statement*. Available from - file:///C:/Users/emmaa/Downloads/Site_Management_Statement_1186%20(6).pdf [Accessed 26/07/2024]
[28] SEPA (2024). *Protected Nature Sites Application*. Available from - https://informatics.sepa.org.uk/ProtectedNatureSites/ [Accessed 26/07/2024]

favourable condition, as assessed in 1976-78 (5.4-9.3 pairs per km^2)[27]. The management objectives outlined in the Site Management Statement include the maintenance of extent and distribution of the blanket bog habitat qualifying feature within the SSSI, which was assessed as unfavourable in 2009[27]. Although the blanket bog qualifying feature was assessed as unfavourable it was noted as unfavourable, recovering. It is therefore expected that following the implementation of habitat management, ample available suitable habitat exists within the Moorfoot Hills SSSI for the current breeding golden plover population.

3.6.6 Approximately 0.23 km^2 of the Moorfoot Hills SSSI lies within 500 m (maximum disturbance distance[14]) of the proposed turbine locations, which, if suitable habitat is present, may hold 1.2-2.1 breeding territories during favourable condition (5.4-9.3 pairs per km^2) and 0.3 breeding territories during unfavourable condition (1.2 pairs per km^2). Up to three breeding territories represents 0.4-0.6% of the SSSI population during favourable condition (822-477 breeding pairs, respectively) and a single breeding territory represents 0.9% of the SSSI population during unfavourable condition (106 breeding pairs).

3.6.7 As there is likely to be ample alternative suitable breeding habitat within the SSSI when the population is in unfavourable condition, displacement of a single breeding territory as a cause of the Proposed Amended Development is not likely to impact the SSSI breeding population during unfavourable status. Although less alternative suitable breeding habitat would be available when the population is in favourable condition, a smaller proportion of the SSSI breeding populations (0.4-0.6%) may be impacted during favourable status. As such, the potential displacement of breeding territories associated with the SSSI, within a maximum 500 m disturbance distance[14] of the Proposed Amended Development during operation, is not expected to be of more than **low negative magnitude** and **not significant**.

Potential Collision Impacts

3.6.8 As the Proposed Amended Development is in close proximity to the SSSI, it is likely that during the breeding season (March to August), golden plover breeding within the SSSI would pass through the Proposed Amended Development to forage (3-11 km foraging range during the breeding season[29]). However, of the five golden plover flights recorded during the breeding season, four of these were recorded during March, with the fifth flight recorded during May. As such, the majority of these flights are likely to be associated with birds on passage rather than breeding birds associated with the SSSI.

3.6.9 Following a significant decline between 1995 and 2014, the breeding population of golden plover has shown a gradual recovery within the last 10 years[30], reducing overall breeding population decline to 10% in Scotland between 1995 and 2022[31]. Given that the breeding population of golden plover in Scotland has been increasing within the last 10 years and an estimated collision risk of 0.19 birds would impact 0.09% of the SSSI population, as estimated when in unfavourable condition (106 breeding pairs), it is considered that collision risk of the Proposed Amended Development is unlikely to undermine breeding population recovery.

[29] SNH (2016) *Assessing connectivity with Special Protection Areas (SPAs)* (Guidance note: Version 3). Scottish Natural Heritage (now NatureScot), Edinburgh.
[30] BTO (2024). *Bird Trends Explorer*. Available from - https://data.bto.org/trends_explorer/?species=Golden+Plover [Accessed 26/07/2024]
[31] Heywood, J.J.N., Massimino, D., Balmer, D.E., Kelly, L., Marion, S., Noble, D.G., Pearce-Higgins, J.W., White, D.M., Woodcock, P., Wotton, S. Gillings, S. (2024) *The Breeding Bird Survey 2023*. BTO Research Report 765. British Trust for Ornithology, Thetford.

3.6.10 Additionally, it is unlikely that a predicted annual collision rate of 0.81 birds (0.0002% of the UK population) would be detectable against estimated annual background mortality of 22[32]-27%[33] of adults in the UK, based on over-winter survival[34]. It is therefore considered that collision risk of the Proposed Amended Development on the golden plover population within the Moorfoot Hills SSSI would be of **negligible magnitude** and **not significant**.

Golden Eagle

Introduction

3.6.11 In Scotland, a vast majority of the golden eagle population is distributed across the north of Scotland, mainly in the Highlands, and Inner and Outer Hebrides. Since 2018, a small, translocated population comprised largely of immature and sub-adult birds has been present in the south of Scotland and totalled 49 individuals in November 2024 (Cat Barlow *pers comm*). A total of 13 territorial pairs were recorded in southern Scotland in 2022[23].

3.6.12 A report commissioned by NatureScot estimated that a breeding population of approximately 14-16 pairs could be supported within the south of Scotland[10]. The Moorfoot Hills, where the Proposed Amended Development is situated was estimated to be sufficient to support a single breeding pair. The same was estimated for the Lammermuir Hills which neighbour the Moorfoot Hills to the east, whereas the Tweedsmuir Hills which neighbour the Moorfoot Hills to the southwest could support 2-3 breeding pairs. Given the additional pressures of persecution within the Moorfoot and Lammermuir Hills, it was predicted that these ranges would be of greater suitability for non-breeding birds.

Baseline Summary

3.6.13 A newly established breeding territory was identified within 10 km of the Proposed Amended Development in 2022 and was confirmed to be occupied again in 2023 and 2024. Further details are provided within AI Volume 3 Annex B AI Confidential Appendix 3.2.

3.6.14 A total of 19 flights were recorded during breeding season VP surveys between 2022 and 2023, with 14 recorded during the 2023-2024 non-breeding season VP surveys. Of these flights, seven were at PCH in the CRZ, three of which were recorded during the breeding season and four during the non-breeding season.

Potential Disturbance Impacts

3.6.15 Golden eagle are considered to have a high sensitivity to disturbance, with a recommended maximum disturbance distance of 1 km around active nest sites and 500 m around roost sites[14]. In 2022, it was identified that a golden eagle territory had recently been established within 10 km of the Proposed Amended Development, with an occupied nest located beyond disturbance distance of the nearest proposed turbine. As is typical of golden eagle, an alternative nest within the breeding territory was used in 2023 and 2024, both of which were further from the Proposed Amended Development, and therefore again located beyond disturbance distance. Further details are provided in AI Volume 3 Annex B AI Confidential Appendix 3.2.

[32] Parr, R. (1980). Population Study of Golden Plover Pluvialis apricaria, Using Marked Birds. *Ornis Scandinavica (Scandinavian Journal of Ornithology)*, *11*(3), 179–189.
[33] BTO (2024). *BirdFacts: Golden Plover*. Available from - https://www.bto.org/understanding-birds/birdfacts/golden-plover [Accessed 31/07/2024]
[34] Pearce-Higgins, J. W. & Yalden, D. W. (2003) Golden plover *Pluvialis apricaria* breeding success on a moor managed for shooting red grouse Lagopus lagopus. Bird Study, 50:2, 170-177.

3.6.16 During the construction phase of the Proposed Amended Development, effects of disturbance and displacement would be mitigated with the implementation of embedded mitigation (see Chapter 8 of the EIAR). This would include embedded mitigation measures such as pre-construction surveys and the implementation of exclusion zones up to recommended disturbance distances[14]. As such, disturbance effects during construction of the Proposed Amended Development are considered to be of a **low negative magnitude** and **not significant**.

3.6.17 Golden eagles exhibit clear avoidance behaviour in relation to turbine arrays, and in general do not utilise suitable habitat within or immediately surrounding a turbine array[35,36,37]. Although results of the GET Model (see Section 3.4, Paragraphs 3.4.11 and 3.4.12, and AI Volume 3 Annex B AI Confidential Appendix 3.3) show that there is good golden eagle habitat (GET 6+) suitable for nesting, roosting and foraging, within the Proposed Amended Development, this is likely to be avoided during the operational period. Given that the locations of current known nest sites are situated beyond the maximum disturbance distance from the Proposed Amended Development, it is considered that any impacts of disturbance during operation would be of **low negative magnitude** and **not significant**.

Potential Displacement Impacts

3.6.18 Results of the GET Model indicate that the home range in which the Proposed Amended Development is located is approximately 7,786 ha, of which 7,455 ha comprises good golden eagle habitat (GET 6+). Taking into account that 12.9% (964 ha) of all GET 6+ habitat within this home range is already lost due to forest cover, the available GET 6+ habitat (6,491 ha) covers 95.2% of the total area within the home range. This is considered to be a high proportion of available good quality habitat in comparison to other home ranges studied in Scotland. As such, the home range in which the Proposed Amended Development is located is considerably large and comprises a high percentage of available good quality habitat.

3.6.19 It is expected that as golden eagles exhibit avoidance of turbines even if there is suitable foraging habitat within a turbine array[37], that any suitable habitat within and immediately surrounding a turbine array would be lost. Therefore, the GET Model assumes that the Proposed Amended Development turbine array and a surrounding 300 m buffer ('exclusion zone') would be unavailable to the breeding pair within their home range. The total area of this exclusion zone is 197 ha (3% of total available habitat within the home range), which is below the 5% 'acceptable loss' threshold used in the Predicting Aquila Territories (PAT) model[38]. Given the high quantity of available good quality habitat within this home range, a loss of 3% of available habitat is unlikely to be significant in relation to this breeding pair.

3.6.20 The satellite tag data obtained from the SSGEP for this breeding pair spans 2.5 breeding seasons and two non-breeding seasons (July 2021 to September 2023). Out of all satellite tag

[35] Fielding, A.H., Anderson, D., Benn, S., Dennis, R., Geary, M., Weston, E. and Whitfield, D.P. (2021) Responses of dispersing GPS_tagged golden eagles (*Aqila chrysaetos*) to multiple wind farms across Scotland. *Ibis* 164,(1), 102-117.
[36] Fielding, A.H., Anderson, D., Benn, S., Dennis, R., Geary, M., Weston, E. and Whitfield, D.P. (2021) Non-territorial GPS-tagged golden eagles *Aquila chrysaetos* at two Scottish wind farms: Avoidance influenced by preferred habitat distribution, wind speed and blade motion status. *PLoS ONE* 16(8): e0254159.
[37] Fielding AH, Anderson D, Benn S, Taylor J, Tingay R, Weston ED, Whitfield DP. (2024) Approach Distances of Scottish Golden Eagles *Aquila chrysaetos* to Wind Turbines According to Blade Motion Status, Wind Speed, and Preferred Habitat. *Diversity*. 2024; 16(1):71.
[38] McLeod, D.R.A., Whitfield, D.P., Fielding, A.H., Haworth, P.F. & McGrady, M.J. (2002). Predicting home range use by golden eagles Aquila chrysaetos in western Scotland. *Avian Science*, 2, 183-198.

records, 0.7% (22 of 3,321) were located within the exclusion zone (300 m buffer of the Proposed Amended Development turbine array; see AI Volume 3 Annex B AI Confidential Appendices 3.2 and 3.3). Golden eagle flight patterns observed during the VP surveys (see Annex B AI Volume 3 Confidential Appendix 3.2) further indicate that there has so far been very little use of the available habitat within the exclusion zone (8 of 33 flights recorded located within the exclusion zone), and surrounding habitat to the south and west. As such, the location of the turbine array would be unlikely to create a barrier effect to this pair by reducing connectivity between core areas of the home range.

3.6.21 The home range was established in 2021, so there has been limited opportunity to establish multiple nest sites, although three nests have been used by the pair in as many years. Golden eagles can use up to 13 alternative nest sites but more typically up to six[39]. Similarly, it has been demonstrated through studies of satellite tagged individuals, that golden eagles use multiple roost sites within the home range throughout the year[40]. The distribution of flights and satellite tag records, however, indicate that there is little use of the habitat within the exclusion zone, suggesting that this is not a preferred area within the home range for foraging, commuting or roosting (and has not yet been used for nesting). As such, it is considered that any displacement effects during construction would be avoided with the implementation of embedded mitigation measures including timing of works and pre-construction surveys, and would therefore be of **low negative magnitude** and **not significant**.

3.6.22 It is also expected that an exclusion zone within and surrounding a turbine array would apply to dispersing golden eagles. As the south of Scotland golden eagle population comprises a large proportion of juvenile, immature and sub-adult birds, and the Moorfoot Hills are considered to be of greater value for dispersing birds than breeding birds, it is likely that the wider area surrounding the Proposed Amended Development will largely be used by dispersing golden eagles. However, as the Proposed Amended Development is located within an occupied home range, dispersing birds are already displaced from this area. Given that this growing population would continue to produce dispersing birds and the expectation that the Moorfoot Hills can support a single breeding pair, this home range is unlikely to lie vacant if one or both of the members of the current pair were removed from the population.

3.6.23 Taking into account all of the above information, it is considered that displacement effects during operation of the Proposed Amended Development on breeding and non-breeding golden eagles would be of **low negative magnitude** and **not significant**.

Potential Collision Impacts

3.6.24 The NHZ breeding population (three breeding territories) was based on 2003 survey data, however, the SSGEP has since led to an increase in the population of golden eagles within the south of Scotland to the most recently reported population of 46 individuals[22] (updated to 49 individuals in 2023 (Cat Barlow *pers comm*)). Although much of the newly established population within the south of Scotland comprises immature and sub-adult birds which have not yet reached breeding age, at least 13 breeding pairs are present within the south of Scotland[24]. Given that the Moorfoot Hills, Lammermuir Hills, Tweedsmuir Hills and Ettrick Hills, all present

[39] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). *Raptors: a field guide to survey and monitoring. 3rd Edition.* The Stationery Office, Edinburgh.
[40] Fielding, A.H., Anderson, D., Benn, S., Taylor, T., Tingay, R., Weston, E.D. and Whitfield, D.P. (2023). "Responses of GPS-Tagged Territorial Golden Eagles *Aquila chrysaetos* to Wind Turbines in Scotland". *Diversity* 15.

within NHZ 20, were predicted to support a total of six breeding territories combined, it is likely that there are more than three breeding territories currently within NHZ 20.

3.6.25 Of the 19 flights recorded during the breeding season VP surveys, three of these were recorded at PCH in the CRZ. During the non-breeding season VP surveys, four of 14 flights were recorded in the CRZ at PCH. Assuming a 99% avoidance rate, as recommended by NatureScot, a collision risk of <0.01 birds per breeding season and non-breeding season was predicted, resulting in an annual collision mortality of 0.01 birds. A collision mortality rate of 0.01 birds represents 0.2% of the NHZ 20 breeding population, 0.001% of the breeding and non-breeding population in Scotland (this is assessed using a known underestimate of 440 pairs taken from Forrester *et al.* (2007)[18] rather than the latest national survey estimate of 508 breeding pairs in 2015[41]) and the breeding population in the UK.

3.6.26 Despite the recent press release from the SSGEP regarding a golden eagle collision in southern Scotland[42], golden eagles are more likely to be impacted by the effects of displacement from suitable habitat within turbine arrays rather than collision. As such, the collision mortality estimate is not likely to be realised. The flight patterns observed during the VP surveys and supplementary satellite tag data provided by the SSGEP combined with the results of the GET model indicate that there is little use of suitable habitat in which the Proposed Amended Development is located by golden eagles compared with suitable habitat in the surrounding area. The potential effects of collision risk are therefore considered to be of **low negative magnitude** and **not significant**.

Hen Harrier

Introduction

3.6.27 Hen harrier is a widespread but scarce breeding species in Scotland and is a Schedule 1, 1A and Annex I protected species. This species is also listed on the UK BoCC Red List for severe historic decline and moderate decline of the breeding population in the UK[4] and is listed on the SBL. The breeding population of hen harrier in Scotland declined from 633 pairs in 2004 to 505 pairs in 2010, with 529 pairs recorded during the most recent national hen harrier survey undertaken in 2023[25]. The most recent estimate of breeding pairs within the south of Scotland (Southern Uplands) in 2023 was 26 territorial pairs.

Baseline Summary

3.6.28 A total of 50 flights were recorded during breeding season VP surveys between 2018 and 2023, four of which were recorded in 2018 and 46 in 2023. Of these flights, 32 were at PCH in the CRZ, all of which were recorded in 2023.

3.6.29 Of the 46 flights recorded during the breeding season in 2023, the majority of flights were recorded during April (13 flights) and May (30 flights), with 22 display flights recorded (12 of these were at PCH in the CRZ).

[41] Hayhow, D. B., Benn, S., Stevenson, A., Stirling-Aird, P. K., & Eaton, M. A. (2017). Status of Golden Eagle Aquila chrysaetos in Britain in 2015. *Bird Study*, 64(3), 281–294. https://doi.org/10.1080/00063657.2017.1366972

[42] SSGEP. (2024). *Sparky (B31) - Sad News from Galloway*. Available from https://www.goldeneaglessouthofscotland.co.uk/blog/sparky-b31-sad-news-from-galloway [Accessed: 22/11/2024].

3.6.30 Although no breeding raptor surveys were completed in 2023, it was assumed that hen harrier held territory within proximity to the Proposed Amended Development due to the flight activity observed (See Confidential AI Volume 3 Annex B AI Appendix 3.2).

Potential Disturbance Impacts

3.6.31 Hen harrier are considered to have a medium sensitivity to human-related disturbance, with a recommended maximum disturbance distance of 750 m[14]. Given that hen harrier do not exhibit evidence of disturbance when nesting within 750 m of operational turbines[43], it is during construction that hen harrier are most likely to be susceptible to disturbance. However, the implementation of embedded mitigation outlined in Chapter 8 of the EIAR would ensure that where possible during construction, works take place outside of the hen harrier breeding season. Where this is not possible other embedded mitigation measures would be implemented, including pre-construction surveys and exclusion zones around located nests. The impact of disturbance during construction and operation is therefore considered to be of **low negative magnitude** and **not significant**.

Potential Displacement Impacts

3.6.32 Almost half (22) of the 46 hen harrier flights recorded during the breeding season VP surveys in 2023 were associated with breeding behaviour. Due to the high concentration of these flights and their proximity to the Proposed Development Area, it was considered likely that hen harrier held a breeding territory close to the Proposed Amended Development in 2023. Displacement of a single breeding pair from the Proposed Development Area would represent 7.7% of the NHZ 20 breeding population, and 3.8% of the most recently reported breeding population in the south of Scotland (Southern Uplands)[25].

3.6.33 However, hen harrier was not recorded during the breeding raptor surveys completed in 2018 and 2019, and no records of breeding hen harrier were returned by the Lothian and Borders RSG within 5 km of the Proposed Amended Development between 2010 and 2020. Similarly, four hen harrier flights were recorded during the breeding season VP surveys in 2018, whereas none were recorded during breeding season VP surveys in 2019 or 2022. As such, there has been no historic indication of hen harrier regularly utilising the available habitat within the Proposed Development Area. The hen harrier flight activity recorded during the 2023 breeding season is therefore not considered to be typical within 5 km of the Proposed Amended Development and is not predictive of future use of the habitat within the Proposed Development Area.

3.6.34 Given there is ample suitable breeding habitat within NHZ 20 and the wider area, any impact of displacement during the construction phase would be of **low negative magnitude** and **not significant**. Furthermore, hen harriers have been shown to nest within 200-300 m of turbines and continue to hunt within close proximity to operational turbines with no evidence of effects of disturbance[44], indicating that breeding pairs are not likely to be displaced. Therefore, it is considered that any impact of displacement during operation of the Proposed Amended Development would be of **low negative magnitude** and **not significant**.

[43] Whitfield, D. P. and Madders, M. (2005) *A review of the impacts of wind farms on hen harriers*. Natural Research Information Note 1. Natural Research Ltd., Banchory.
[44] Fielding, A. H. and Haworth, P.F. (2015). *Edinbane Windfarm: Ornithological Monitoring 2007-2014. A review of the spatial use of the area by birds of prey*. Haworth Conservation Ltd., Isle of Mull.

Potential Collision Impacts

3.6.35 Of the 50 flights recorded during the breeding season VP surveys across 2018-2023 (four in 2018 and 46 in 2023), 32 of these were recorded at PCH in the CRZ. Assuming a 99% avoidance rate, as recommended by NatureScot[6], a collision risk of 0.35 birds per breeding season was predicted, which represents 0.03% of the breeding population in Scotland and the UK. Based on the most recent available breeding population data for NHZ 20 (13 breeding pairs; taken from 2010 national hen harrier survey data)[19], a collision risk of 0.35 birds would represent 1.35% of the NHZ 20 breeding population.

3.6.36 The NHZ report noted that the total number of breeding pairs listed for the NHZs within the south of Scotland based on 2010 survey data (46 breeding pairs across NHZs 16-20 inclusive) is likely to be an underestimate given that a total of 64 breeding pairs was recorded by the SRMS within the south of Scotland in 2014 for example (South Strathclyde (40 pairs), Lothian and Borders (four pairs) and Dumfries and Galloway (20 pairs))[45]. The most recent estimate for the south of Scotland was 26 territorial pairs in 2023[25]. An estimated collision mortality rate of 0.35 birds represents 0.7% of the most recently reported breeding population in the south of Scotland.

3.6.37 However, despite a relatively high estimated collision mortality rate associated with the Proposed Amended Development on the NHZ 20 population (estimated in 2010) and south of Scotland breeding population (estimated in 2023), this is unlikely to be realised. Hen harrier collisions are generally uncommon due to foraging behaviour which comprises low, gliding flights, usually beneath turbine rotor height[46]. Even when foraging in close proximity to turbines, no adverse effects have been reported[47,48,49], indicating that hen harriers are not particularly vulnerable to collision when hunting. Hen harriers are generally most at risk of collision during the breeding season if nesting in close proximity to turbines, as territorial displays (known as skydancing), food passes and juvenile practise flights are most likely to occur at PCH. However, an eight-year long monitoring study[44] noted that despite high level of flight activity and a clear lack of avoidance behaviour by hen harrier when flying close to turbines, no collisions were reported during that time.

3.6.38 The majority of the hen harrier flights recorded at the Proposed Amended Development were related to breeding activity, likely associated with a pair breeding in close proximity to the Proposed Amended Development in 2023. As such, this led to a high concentration of flights at PCH in the CRZ likely by the same two birds. The majority of recorded flights took place in April and May 2023 during the peak time for territorial display, with three hunting flights recorded subsequently in July 2023 and no signs of juvenile birds later in the breeding season. It is possible that any breeding attempt made by the pair failed. Given the three flights recorded in July were by a hunting male (known to hunt up to 10 km from a nest, whereas females hunt up

[45] Challis, A., Wilson, M.W., Holling, M., Roos, S., Stevenson, A. & Stirling-Aird, P. (2015). *Scottish Raptor Monitoring Scheme Report 2014.* BTO Scotland, Stirling

[46] McCluskie, A., Sansom, A. and Roos, S. (2017) *A Circus of Uncertainty; Collision Risk and Hen Harriers*. Presentation at CWW 2017, Available at - http://cww2017.pt/images/Congresso/presentations/oral/CWW17_talk_S06_4_McCluskie%20et%20al.pdf

[47] Thelander, C. G. & Rugge, L. (2000) *Avian risk behavior and fatalities at the Altamont wind resource area*. National Renewable Energy Laboratory NREL, Colorado.

[48]Green, M. (1995) *Effects of Windfarm Operation on the Winter Bird Community of the Bryn Titli Uplands: 1994/95.* Report to National Wind Power Ltd.

[49] Bioscan (UK) Ltd. (2001) *Novar Windfarm Ltd Ornithological Monitoring Studies: breeding bird and birdstrike monitoring 2001 results and 5-year review*. Report to National Wind Power Ltd.

to 500 m from a nest), a second attempt may have been made up to 1.4 km from the initial nest location[39].

3.6.39 Prior to the 2023 VP surveys, the four hen harrier flights which were recorded were not associated with breeding behaviour. Similarly, during the breeding raptor surveys in 2018 and 2019, no hen harrier were recorded within the Proposed Development Area, nor had the Lothian and Borders RSG returned any records of breeding hen harrier within 5 km of the Proposed Amended Development between 2010 and 2020. As such, the breeding territory within proximity to the Proposed Amended Development may be newly established. However, hen harriers generally occupy large home ranges (males up to 7.3 km^2 and females up to 3.6 km^2)[39], so it is possible that the individuals recorded in 2023 previously nested 5 km beyond the Proposed Amended Development.

3.6.40 Breeding hen harriers are known to continue to nest within proximity to turbines[43,44]. As a result, a breeding pair present on territory which overlaps with the Proposed Amended Development may not be displaced and may continue to be at risk of collision. The latest hen harrier survey undertaken in 2023 indicates that the overall hen harrier breeding population in Scotland is increasing (460 breeding pairs in 2016 to 529 breeding pairs in 2023)[25]. However, as the breeding population of hen harrier within the Southern Uplands has shown a recent decline of 32%, the impact of collision risk is considered to be of a moderate negative magnitude at a regional level. As such, operational monitoring (outlined in Section 3.7) will be undertaken to monitor the use of the Proposed Development Area by breeding hen harrier and assess if further mitigation is required.

3.6.41 Given the large home range of hen harriers, the available suitable nesting habitat within the wider area and the infrequency of hen harriers recorded breeding within 5 km of the Proposed Development Area, it is unlikely that the estimated collision mortality of 1.35% of the NHZ 20 population or 0.7% of the most recently estimated south of Scotland population would be realised as a cause of the Proposed Amended Development. Furthermore, a collision mortality of 0.03% of the breeding population in Scotland is unlikely to be detected against annual background mortality of adult hen harriers (19%[50]). It is therefore considered that collision risk associated with the Proposed Amended Development would not undermine the recovery of the breeding population of hen harrier in Scotland overall. As such, collision risk is considered to be of **low negative magnitude** overall and **not significant**.

3.7 Updated Mitigation and Residual Effects

3.7.1 The Proposed Amended Development is predicted to have a low negative impact on the breeding golden plover population notified feature of the Moorfoot Hills SSSI, golden eagle and hen harrier. These impacts are considered to result in effects which are not significant.

3.7.2 For all IOFs, embedded mitigation measures (outlined in Chapter 8 of the EIAR) will be implemented to ensure compliance with legislation, and to follow good practice guidance with regards to breeding birds.

3.7.3 It is recommended that should the Proposed Amended Development receive consent, an Operational Monitoring Plan (OMP) to monitor the potential impact of the Proposed Amended Development on golden eagle and hen harrier should be secured through a planning condition, in agreement with NatureScot. The OMP to monitor use of the Proposed Amended Development by raptors would include:

[50] BTO (2024). *BirdFacts: Hen Harrier*. Available from - https://www.bto.org/understanding-birds/birdfacts/hen-harrier [Accessed 01/08/2024]

- Breeding raptor surveys to locate breeding pairs within species-specific disturbance distances[14] of the Proposed Amended Development during the first three years of operation;
- Monthly carcass searching for bird species during species-specific breeding seasons[51] for the first three years of operation; and
- If impacts on golden eagle, hen harrier or other Schedule 1[2] and/or Annex I[3]-listed raptors (including owls) as a result of the Proposed Amended Development are identified during the operational phase, additional mitigation measures will be discussed and implemented in agreement with NatureScot.

3.8 Summary of Effects

3.8.1 The magnitude of pre-mitigation and residual impacts and the significance of residual effects on each IOF during the construction and operation phases of the Proposed Amended Development is detailed in Table 3.8 below. As the Proposed Amended Development is not predicted to have a significant effect on any IOF, embedded mitigation will ensure compliance with legislation and good practice guidance.

[51] NatureScot (2021). *Bird breeding season dates in Scotland*. Available from - https://www.nature.scot/doc/bird-breeding-season-dates-scotland [Accessed 26/07/2024]

Table 3.8: Summary of pre-mitigation impacts and residual impacts on IOFs, and the residual significance of effect.

IOF	Conservation importance	Nature of potential pre-mitigation impact	Magnitude of pre-mitigation impact	Significance of pre-mitigation effect	Specific mitigation/ enhancement measures	Magnitude of residual impact	Residual significance	Level of certainty/ comments
Construction/Decommissioning								
Moorfoot Hills SSSI	National	Disturbance and/or displacement	Low negative	Not significant	No specific mitigation required (after embedded mitigation measures outlined in Chapter 8 of the EIAR)	Negligible	Not significant	High
Golden eagle	Regional	Disturbance and/or displacement	Low negative	Not significant	No specific mitigation required (after embedded mitigation measures outlined in Chapter 8 of the EIAR)	Low negative	Not significant	High
Hen harrier	Regional	Disturbance and/or displacement	Low negative	Not significant	No specific mitigation required (after embedded mitigation measures outlined in Chapter 8 of the EIAR)	Low negative	Not significant	High
Operation								
Moorfoot Hills SSSI	National	Collision risk	Negligible	Not significant	None	Negligible	Not significant	High
Golden eagle	Regional	Collision risk	Low negative	Not significant	Implementation of an OMP	Low negative	Not significant	High

IOF	Conservation importance	Nature of potential pre-mitigation impact	Magnitude of pre-mitigation impact	Significance of pre-mitigation effect	Specific mitigation/ enhancement measures	Magnitude of residual impact	Residual significance	Level of certainty/ comments
		Displacement	Low negative	Not significant	No specific mitigation required	Low negative	Not significant	Moderate-High
		Disturbance	Low negative	Not significant	Implementation of an OMP	Low negative	Not significant	Moderate-High
Hen harrier	Regional	Collision risk	Moderate negative	Not significant	Implementation of an OMP	Moderate negative	Not significant	Moderate-high
		Displacement	Low negative	Not significant	No specific mitigation required	Low negative	Not significant	High
		Disturbance	Low negative	Not significant	Implementation of an OMP	Low negative	Not significant	High

3.9 Updated Cumulative Impact Assessment

3.9.1 The following section provides an updated assessment of the predicted cumulative effects on IOFs from the Proposed Amended Development along with all other developments within an appropriate zone of influence (ZoI) and against the relevant NHZ 20 population estimates, following NatureScot guidance[52].

3.9.2 In line with this guidance, any wind farm developments of fewer than three turbines (small scale wind energy proposals[53]) were excluded from the cumulative impact assessment (CIA). Within Chapter 8 of the EIAR, three developments, Bowbeat Wind Farm, Greystone Knowe, and Longpark Wind Farm were included within the CIA. No additional operational, consented, submitted wind developments or developments under construction were identified within 10 km of the Proposed Amended Development.

3.9.3 In line with the CIA completed within Chapter 8 of the EIAR, only IOFs for which a greater than negligible residual impact is predicted are considered in the CIA, as negligible impacts will not result in a detectable increase in cumulative impacts. The IOFs for which cumulative effects may occur are as follows:

- Golden eagle: collision and disturbance/displacement effects; and
- Hen harrier: collision and disturbance/displacement effects.

3.9.4 The residual effect of the individual operational, constructed, consented and submitted developments and the cumulative residual effect on each of the IOFs most likely to be affected by cumulative effects (as listed above) is described in Table 3.9.

3.9.5 No significant cumulative collision, displacement or disturbance effects were concluded for any IOFs.

[52] SNH (2018). *Assessing the cumulative impacts of onshore wind farms on birds: guidance*. Scottish Natural Heritage (now NatureScot), Inverness.
[53] SNH (2016) *Assessing the impact of small-scale wind energy proposals on the natural heritage (Guidance note)*. Scottish Natural Heritage.

Table 3.9: Cumulative Impact Assessment of IOFs for Developments within 10 km of the Proposed Amended Development

Site	Scawd Law (Proposed Amended Development)	Bowbeat	Longpark*	Greystone Knowe	Cumulative residual effects
Site status	6 turbines	24 turbines Operational since 2002 Baseline surveys undertaken in 1997. Application for extension submitted 2024. Surveys for extension undertaken between 2020-2023	29 turbines (including extension) Operational since 2009 Baseline surveys undertaken between 2011 and 2013	15 turbines Application submitted, in planning. Baseline surveys undertaken between 2017 - 2019	74 turbines
Golden eagle	A newly established home range was identified within 10 km of the Proposed Amended Development in 2022 and was confirmed to be occupied again in 2023. A total of 19 flights were recorded during breeding season VP surveys between 2022 and 2023, with 14 recorded during the 2023-2024 non-breeding season VP surveys. Of these flights, seven were at PCH in the CRZ, three of which were recorded during the breeding season and four during	Golden eagle was not recorded during baseline surveys.	Golden eagle was not recorded during baseline surveys.	Golden eagle was not recorded during baseline surveys.	Given that there is a reduction in the cumulative number of turbines and there is no change to the number of consented and operational developments within 10 km of the Proposed Amended Development, predicted impacts of cumulative disturbance, displacement and collision risk are still considered to be **not significant**.

Site	Scawd Law (Proposed Amended Development)	Bowbeat	Longpark*	Greystone Knowe	Cumulative residual effects
	the non-breeding season. Updated breeding season predicted collision mortality, and non-breeding season mortality is <0.01 birds, resulting in an annual collision mortality of 0.01 birds.				
Hen harrier	A total of 50 flights were recorded during breeding season VP surveys between 2017 and 2023, four of which were recorded in 2018 and 46 in 2023. Of these flights, 32 were at PCH in the CRZ, all of which were recorded in 2023. Although no breeding raptor surveys were completed in 2023, it was assumed that hen harrier held territory within close proximity to the Proposed Amended Development due to the flight activity observed. As an updated total of 32 flights by 32 birds were recorded at PCH in	Hen harrier was not recorded during baseline surveys in 1997. Hen harrier was recorded during surveys for the extension between 2020-2023. However, no breeding territories were identified, and CRM was not undertaken.	Hen harrier was not recorded during baseline surveys.	No breeding territories were identified during baseline ornithology surveys. Three flights were recorded during the flight activity surveys. A predicted annual collision mortality rate of 0.005 birds was calculated, representing 0.019% of the NHZ 20 population.	A cumulative annual collision mortality rate of 0.36 birds represents 1.39% of the NHZ 20 population. As such, collision risk is considered to be of a **moderate negative magnitude** at a regional level. However, a cumulative mortality rate of 0.36 birds represents 0.03% of the most recently estimated breeding population in Scotland (529 in 2023[28]). Cumulative collision risk is therefore considered to be **not significant**. There are no additional cumulative impacts on displacement or disturbance. Therefore, a cumulative impact of

Site	Scawd Law (Proposed Amended Development)	Bowbeat	Longpark*	Greystone Knowe	Cumulative residual effects
	the CRZ, hen harrier qualified for CRM. Breeding season predicted collision mortality is 0.35 birds.				displacement or disturbance is considered to be **not significant**.

** Original EIAR could not be accessed but EIAR for the 10-turbine extension (2014) was used for information.*

3.10 Summary

3.10.1 An updated assessment has been made of the predicted significance of effects of the Proposed Amended Development on IOFs. The Proposed Amended Development includes for a 50 m micrositing allowance where the environmental impacts would be assessed and signed-off by the ECoW.

3.10.2 By applying effective embedded mitigation measures and following good practice guidelines during construction, the magnitude of residual effects of the Proposed Amended Development on all IOFs is assessed as being **moderate/low negative/negligible** in terms of magnitude, and **not significant**.

4. Ecology

4.1 Introduction

4.1.1 This Chapter of the Report provides an updated assessment of potential impacts on ecological receptors relevant to amendments to the infrastructure layout for the Proposed Amended Development. An assessment of the effects of the Proposed Development on ecological receptors was provided within Chapter 7 of the EIAR submitted in December 2022, which predicted a low/negligible impact on all Important Ecological Features (IEFs). All impacts predicted were considered to result in effects which are not significant.

4.1.2 This Report provides updated assessments for ecological features based on changes to the layout of the temporary and permanent infrastructure of the Proposed Amended Development.

4.1.3 Methods and results provided in the EIAR are not repeated here. Only changes to the previously reported results arising from the Proposed Amended Development are presented, along with updated impact assessment based on these results where relevant. For all other information relating to impact assessment of non-avian ecological receptors, refer to Chapter 7 of the EIAR.

4.1.4 As discussed later in this section, the updated assessment concludes that no significant effects have been identified as a result of the Proposed Amended Development.

4.2 Consultation

4.2.1 Details of feedback from consultees regarding the EIAR following submission in December 2022 are provided in Table 4.1. Only aspects of consultee responses with relevance to ecology (non-avian) are included here.

4.2.2 A summary of consultation with relevance to ecology undertaken prior to submission of the EIAR in December 2022 is presented in Table 7.5, Chapter 7 of the EIAR.

Table 4.1: Summary of consultee responses to the EIAR

Consultee	Comments/issues raised/recommendations	Addressed responses/outcomes
NatureScot **2 February 2024**	Advised that an Appropriate Assessment (AA) will be required for the River Tweed Special Area of Conservation (SAC). However, noted that the Proposed Development will not have a likely significant effect on the River Tweed SAC if the Construction Environment Management Plan (CEMP) is strictly adhered to.	Mitigation measures detailed in the CEMP will be strictly adhered to. Additional mitigation measures will be implemented if required following AA.
	Satisfied that embedded mitigation measures implemented for the River Tweed SAC will also apply to the River Tweed Site of Special Scientific Interest (SSSI).	None

Satisfied that appropriate assessment for Moorfoot Hills SAC is not required.	None
Satisfied that the Proposed Development will have no impact on the blanket bog and upland habitat assemblage notified features of the Moorfoot Hills SSSI.	None
Identified five pinch points along the access route to the Proposed Development that may impact the upland habitat assemblage notified feature of the Moorfoot Hills SAC and SSSI. Advised that NatureScot should be included in discussions regarding the access track post-consent.	This will be discussed with NatureScot post-consent, as advised.
Agree with production and implementation of a CEMP, Species Protection Plans (SPPs) and Construction Methods Statement (CMS).	None
Noted that the outline Habitat Management Plan (HMP) was limited in “scale, nature and ambition”. Recommended that the HMP include broader and more ambitious aims and objectives, with plans for restoration of bog habitats within the Proposed Development Area.	This will be addressed within an updated HMP, which will be submitted with this AIR.

4.3 Method of Assessment

4.3.1 The potential changes as a result of the Proposed Amended Development and associated infrastructure will likely change the assessment of impacts to some of the IEFs, detailed in Chapter 7 of the EIAR. Chapter 7 assessed the following potential impacts during construction, operation and decommissioning of the Proposed Development on ecological receptors:

- Direct impacts associated with habitat loss and/or mortality;
- Direct impacts on protected species associated with resting place destruction;
- Direct impacts on protected species associated with altering foraging and commuting behaviour;
- Indirect impacts on habitats and species associated with dust, siltation, leaks and spillages**;**
- Indirect impacts on protected species associated with disturbance; and
- Indirect impacts on species through pollution of habitats/watercourses affecting food sources.

4.3.2 Given the scope of the potential amendments as a result of the Proposed Amended Development, it is considered that only potential effects in relation to impacts on habitats and bats require re-assessment. The impacts of potential effects previously assessed on habitats and bats within Chapter 7 of the EIAR have been updated within this section of this Report.

4.3.3 All appropriate embedded mitigation as identified within the EIAR will be retained.

4.3.4 In addition, the cumulative impact assessment (CIA) has been refreshed to allow consideration of any additional developments proposed, consented or become operational since the submission of the EIAR.

Habitat Loss Calculations

4.3.5 The pre-construction and construction phase of the Proposed Amended Development would result in some habitat loss due to the construction of access tracks, turbine bases, crane hardstandings, construction compound and substation. Some construction areas would be reinstated following construction (for example the borrow pits) and therefore only represent temporary loss and have not been included in the calculations.

4.3.6 The Proposed Amended Development consists of the potential removal of two proposed turbines and associated track, turbine bases and crane hardstandings, and the potential relocation of the proposed substation, control building and battery storage areas. Habitat loss has been recalculated based on the layout of the Proposed Amended Development in line with methods used in the EIAR (see Chapter 7). As such, results of updated habitat loss calculations (HLC) are provided for all Phase 1 habitats within the Proposed Development Area. The Proposed Amended Development and Phase 1 habitats are shown in Figure FEI 4.1, Annex A.

4.4 Baseline Results

Habitats

4.4.1 The habitats present within the Proposed Development Area remain as those presented in Chapter 7 of the EIAR, however, the potential Proposed Amended Development layout have resulted in changes to habitat loss. An updated HLC is presented in Table 4.2.

4.4.2 The National Vegetation Classification (NVC) communities, their conservation designations and Groundwater Dependent Terrestrial Ecosystems (GWDTE) potential for each habitat are provided within Chapter 7 of the EIAR.

Table 4.2: Phase 1 habitats present within the Proposed Development Area and percentage of habitat lost to Proposed Amended Development, habitats for which values which have changed are highlighted in bold

Phase 1 Habitat type	Area in Proposed Development Area (ha)	EIAR		AI Report	
		Area lost to Proposed Development (ha)	% lost to Proposed Development	Area lost to Proposed Amended Development (ha)	% lost to Proposed Amended Development
A1.1.1 Semi-natural broadleaved woodland	7.11	0	0	0	0
A1.2.2 Plantation coniferous woodland	20.99	0	0	0	0
A1.3.2 Plantation mixed woodland	6.38	0	0	0	0
A2.1 Dense/ continuous scrub	4.96	0	0	0	0
A2.2 Scattered scrub.	1.63	0	0	0	0
B1.1 Unimproved acid grassland	**252.96**	**8.70**	**3.44**	**5.85**	**2.31**
B1.2 Semi-improved acid grassland	62.97	2.03	3.22	2.03	3.22
B2.1 Unimproved neutral grassland	0.43	0	0	0	0

Phase 1 Habitat type	Area in Proposed Development Area (ha)	EIAR		AI Report	
		Area lost to Proposed Development (ha)	% lost to Proposed Development	Area lost to Proposed Amended Development (ha)	% lost to Proposed Amended Development
B2.2 Semi-improved neutral grassland	1.73	0	0	0	0
B3.1 Unimproved calcareous grassland	12.30	0.02	0.16	0.02	0.16
B4 Improved grassland	20.11	0.42	2.08	0.42	2.08
B5 Marshy grassland	**50.30**	**0.99**	**1.96**	**0.96**	**1.91**
B6 Poor semi-improved grassland	5.16	0	0	0	0
C1.1 Continuous bracken	57.07	0	0	0	0
D1.1 Acid dry dwarf shrub heath	**201.83**	**3.59**	**1.78**	**4.18**	**2.07**
D5 Dry heath/acid grassland mosaic	35.11	0	0	0	0
E1.7 Wet modified bog	**46.67**	**5.48**	**11.74**	**4.69**	**10.05**

Phase 1 Habitat type	Area in Proposed Development Area (ha)	EIAR		AI Report	
		Area lost to Proposed Development (ha)	% lost to Proposed Development	Area lost to Proposed Amended Development (ha)	% lost to Proposed Amended Development
E1.8 Dry modified bog.	2.05	0.07	3.41	0.07	3.41
E2.3 Bryophyte dominated flush/spring	0.53	0	0	0	0
F1 Swamp	0.08	0	0	0	0
G1.3 Oligotrophic standing water	0.02	0	0	0	0
G2 Running water	1.15	0	0	0	0
I1.2.1 Scree acid/neutral	0.57	0	0	0	0
J1.1 Arable	4.27	0	0	0	0

Bats

4.4.3 The overall risk level of the Proposed Amended Development has not changed from that identified for the Proposed Development. The previous layout of the Proposed Development, outlined within the EIAR, comprised 8 turbines, which is considered to be a small project (≤8 turbines)[54].The potential 6-turbine Proposed Amended Development layout still meets the criteria of a small project. The Phase 1 habitat survey for the Proposed Development Area was completed in 2019 and 2021 and there have been no changes to land management practices within the Proposed Development Area. It is therefore likely that the habitats within the Proposed Development Area remain similar to those recorded during the Phase 1 habitat survey. As such, the habitat within the Proposed Development Area is still considered to be moderate in relation to suitability to support bats. Therefore, consistent with conclusions reported within the EIAR, the overall risk level of the Proposed Amended Development is level 2.

4.4.4 In the assessment of the predicted impacts of the Proposed Development on bats in the EIAR, relative bat activity was assessed at 13 static detector locations (See Tables A7.19 and A7.20 in Appendix 7.1 of the EIAR). Three of the static detector locations represented controls (MCB, Pond and Stream) placed at points where habitat is suitable for bats. The other 10 static detectors (A-J) were placed across the Proposed Development Area at locations which represented the habitats recorded at each proposed turbine location. As detectors H, I and J were placed to represent habitat at turbine 8 only, these were removed from the assessment of the Proposed Amended Development. A comparison of overall relative bat activity at the control locations, locations A-J, and locations A-G, is provided in Table 4.3.

[54] NatureScot (2021). Bats and onshore wind turbines - survey, assessment and mitigation. Available from - https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation [Accessed 20/08/2024]

Table 4.3: A summary of relative bat activity of bats recorded across each night of the bat survey for the control detectors (MCB, Pond and Stream), detectors A-J, and detectors A-G. Where relative bat activity has changed following removal of detectors H, I and J, this is presented in bold.

Species	Activity level (percentile)	Relative bat activity (Static detector locations)		
		Controls (MCB, Pond and Stream)	EIAR (A-J)	AI Report (A-G)
***Myotis* sp.**	Median	Low-Moderate	Low	Low
	Maximum	Moderate-High	Low-Moderate	Low-Moderate
***Nyctalus* sp.**	Median	Moderate	Moderate	Moderate
	Maximum	Moderate	Moderate	Moderate
Common noctule	**Median**	**Moderate**	**Moderate**	**Low-Moderate**
	Maximum	High	Moderate-High	Moderate-High
Pipistrelle sp.	Median	High	Moderate-High	Moderate-High
	Maximum	High	High	High
Nathusius' pipistrelle	Median	Low-Moderate	Low	Low
	Maximum	Moderate	Low-Moderate	Low-Moderate
Common pipistrelle	Median	Moderate-High	Moderate	Moderate
	Maximum	High	High	High
Soprano pipistrelle	Median	High	Moderate	Moderate
	Maximum	High	High	High

Species	Activity level (percentile)	Relative bat activity (Static detector locations)		
		Controls (MCB, Pond and Stream)	EIAR (A-J)	AI Report (A-G)
Brown long-eared bat	Median	Low	Low	Low
	Maximum	Moderate	Low-Moderate	Low-Moderate

4.5 Updated Feature Assessment

4.5.1 An updated feature assessment has been completed for the ecological receptors and predicted impacts previously assessed in Chapter 7 of the EIAR which are considered to require re-assessment. These are unimproved acid grassland, marshy grassland, acid dry dwarf shrub heath, wet/dry modified bog and bats.

4.5.2 The Proposed Amended Development would result in no changes to the distances of the Proposed Development to the Plora Wood SSSI, Williamhope SSSI, Nut Wood SSSI or Glenkinnon Burn SSSI, reported within Chapter 7 of the EIAR. Therefore, there is no change to the assessment of these SSSIs.

4.5.3 Predicted impacts on semi-natural/plantation broadleaved woodland and scrub, coniferous and mixed plantation woodland, improved and semi-improved grassland, and calcareous grassland, were not reassessed as the Proposed Amended Development would result in no change to the HLC for these habitats. As such, there is no change to the assessments of these habitats provided within Chapter 7 of the EIAR. Similarly, it is not expected that there has been any change to the watercourses within the Proposed Development Area, and therefore there is no change to the assessment of predicted impacts on running water within Chapter 7 of the EIAR.

4.5.4 There were no changes to the distances of the Proposed Amended Development to protected mammal signs recorded during the baseline surveys. Therefore, predicted impacts on otter, red squirrel and badger have not been reassessed and there is no change to the assessment of these species provided within Chapter 7 of the EIAR.

4.5.5 Predicted impacts of disruption on reptiles and amphibians were considered to be temporary, with a negligible impact of habitat loss for reptiles, as reported in Chapter 7 of the EIAR. Embedded mitigation measures outlined in Section 7.7 in Chapter 7 of the EIAR will minimise impacts on reptiles and amphibians. Therefore, there are no changes to the assessment of predicted impacts on reptiles and amphibians following any potential amendments to the FEI Proposed Amended Development.

4.5.6 The proximity of the Proposed Amended Development to watercourses which drain into the River Tweed SAC has not changed. Additionally, Chapter 7 of the EIAR outlined the implementation of a Fish and Macro-invertebrate Monitoring Programme (FMMP) to minimise impacts of the Proposed Amended Development during construction, operation and decommissioning. Therefore, there is no change to the predicted impacts of the Proposed Amended Development on fish.

4.5.7 The Proposed Amended Development would result in no change to the distance of suitable habitat for northern brown argus. Therefore, there is no change to the assessment of predicted impacts on invertebrates within Chapter 7 of the EIAR.

4.5.8 A list of the ecological receptors and predicted impacts that have been reassessed within this Report are shown in Table 4.4.

4.5.9 Furthermore, a summary of each ecological receptor in combination with legislation, guidance and baseline results, and its determination as an IEF requiring full ecological impact assessment (EcIA), is detailed in Table 4.5.

Table 4.4: A summary of the ecological features and associated impacts assessed within Chapter 7 of the EIAR and this AI Report

Feature	EIAR	AI Report
Moorfoot Hills SAC/SSSI	Upland dry heath and blanket bog qualifying features	Not reassessed (See Table 4.1)
River Tweed SAC/SSSI	Atlantic salmon, river lamprey, brook lamprey, otter, freshwater habitats, vascular plant assemblage and invertebrate assemblage	Not reassessed (See Table 4.1)
Plora Wood SSSI	Upland oak woodland qualifying feature	Not reassessed (See Paragraph 4.6.2, above)
Williamhope SSSI	Lowland calcareous and neutral grassland, lowland dry heath and springs qualifying features	Not reassessed (See Paragraph 4.6.2, above)
Nut Wood SSSI	Upland mixed ash woodland	Not reassessed (See Paragraph 4.6.2, above)
Glenkinnon Burn SSSI	Upland birch and mixed ash woodland and lichen assemblage qualifying features	Not reassessed (See Paragraph 4.6.2, above)
Semi-natural/plantation broadleaved woodland and scrub	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Not reassessed (See Paragraph 4.6.3, above)
Coniferous and mixed plantation woodland	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Not reassessed (See Paragraph 4.6.3, above)
Improved and semi-improved grassland	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Not reassessed (See Paragraph 4.6.3, above)
Unimproved acid grassland	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats
Calcareous grassland	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Not reassessed (See Paragraph 4.6.3, above)

Feature	EIAR	AI Report
Marshy grassland	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats
Dry dwarf shrub heath - Acid	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats
Wet/dry modified bog	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats	Permanent habitat loss; changes to hydrology via drainage; accidental pollution incident leading to contamination of habitats
Running water	Accidental pollution incident leading to contamination of watercourse; contamination of watercourses via sediment, run-off or pollution event	Not reassessed (See Paragraph 4.6.3, above)
Bats (all)	Displacement or disturbance to foraging or commuting bats from construction activity and/or through habitat loss; collision risk	Displacement or disturbance to foraging or commuting bats from construction activity and/or through habitat loss; collision risk
Otter	Displacement or disturbance to foraging or commuting otter from construction activity and/or through habitat loss; pollution of habitats	Not reassessed (See Paragraph 4.6.4, above)
Red squirrel	Displacement or disturbance to foraging or commuting red squirrel from construction activity and/or through habitat loss; pollution of habitats	Not reassessed (See Paragraph 4.6.4, above)
Badger	Displacement or disturbance to foraging or commuting badger from construction activity and/or through habitat loss; pollution of habitats	Not reassessed (See Paragraph 4.6.4, above)
Reptiles	Disturbance from construction activity; habitat loss and/or pollution of habitats	Not reassessed (See Paragraph 4.6.5, above)
Amphibians	Disturbance from construction activity; habitat loss and/or pollution of habitats	Not reassessed (See Paragraph 4.6.5, above)

Feature	EIAR	AI Report
Fish	Accidental pollution incident leading to contamination of watercourse; contamination of watercourses via sediment, run-off or pollution event	Not reassessed (See Paragraph 4.6.6, above)
Invertebrates; Northern Brown Argus	Habitat loss and/or pollution of habitats	Not reassessed (See Paragraph 4.6.7, above)

Table 4.5: Determination of ecological features as IEFs occurring within the Proposed Development Area

Species/**Habitats**	**Conservation designation**[55,56,57,58,59]	**Value**	**Baseline**		**IEF**	**Justification**
			EIAR	**AI Report**		
Unimproved acid grassland	Scottish Biodiversity List (SBL)	Local	8.70 ha (3.44%) of habitat lost within the Proposed Development Area.	5.85 (2.31%) of habitat lost within the Proposed Development Area.	No	The Proposed Amended Development would result in less of this habitat being lost within the Proposed Development Area (2.31%). This habitat was considered to be of low conservation value at the Proposed Development in Chapter 7 of the EIAR and embedded mitigation measures implemented in the CEMP were considered sufficient to prevent adverse effects on this habitat during construction of the Proposed Amended Development. As there is a reduction in loss of this habitat, there are no changes to the assessment made in Chapter 7 of the EIAR as a result of the Proposed Amended Development and this habitat is not considered to be an IEF.

[55] UK Government (1981). Wildlife and Countryside Act 1981, Chapter 69. Part 1. Available from - http://www.legislation.gov.uk/ukpga/1981/69/section/1 [Accessed 19/08/2024]
[56] European Commission (1992). Council Directive 92/43/EEC the Conservation of Natural Habitats and of Wild Fauna and Flora. Available from - https://eur-lex.europa.eu/eli/dir/1992/43/oj [Accessed 19/08/2024]
[57] UK Government (2012). The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations. Available from - https://www.legislation.gov.uk/ssi/2012/228/contents/made [Accessed 19/08/2024]
[58] UK Government (2017). The Conservation of Habitats and Species Regulations. Available from - https://www.legislation.gov.uk/uksi/2017/1012 [Accessed 19/08/2024]
[59] Scottish Government (2020). Scottish Biodiversity List. Available from - https://www.nature.scot/doc/scottish-biodiversity-list [Accessed 19/08/2024]

Species/Habitats	Conservation designation[55,56,57,58,59]	Value	Baseline		IEF	Justification
			EIAR	AI Report		
Marshy grassland	SBL; GWDTE	Local	0.99 ha (1.96%) of habitat lost within the Proposed Development Area.	0.96 (1.91%) of habitat lost within the Proposed Development Area.	No	The Proposed Amended Development would result in less of this habitat will being lost within the Proposed Development Area (1.91%). It was noted within Chapter 7 of the EIAR that 53% of the marshy grassland habitat within the Proposed Development Area comprised NVC community M25, which has no conservation value. NVC communities, M10, M23 and M32 (priority habitats listed on the SBL), were noted to make up 39% of the marshy grassland habitat within the Proposed Development Area, of which it was calculated that 11% would be lost based on the previous 8-turbine layout (described within the EIAR). Embedded mitigation measures included within the CEMP such as micrositing (75 m allowance) of infrastructure and a pollution prevention plan were considered to be sufficient to reduce impacts on sensitive areas of marshy grassland habitat and prevent adverse effects during construction. As there is a reduction in loss of this habitat, there are no changes to the assessment made in Chapter 7 of the EIAR as a result of the Proposed Amended

Species/Habitats	Conservation designation[55,56,57,58,59]	Value	Baseline		IEF	Justification
			EIAR	AI Report		
						Development and this habitat is not considered to be an IEF.
Dry dwarf shrub heath – Acid	Annex I of Habitat's Directive; SBL	Local	3.59 ha (1.78%) of habitat lost within the Proposed Development Area.	4.18 ha (2.07%) of habitat lost within the Proposed Development Area.	No	The Proposed Amended Development would result in an 0.59 ha of habitat being lost within the Proposed Development Area (4.18 ha). This equates to 2.07% of all acid dry dwarf shrub heath present within the Proposed Development Area. This habitat was considered to be of negligible value at the Proposed Development in Chapter 7 of the EIAR with no likely significant effects on integrity predicted. Although there is an increase in loss of this habitat, it is marginal. Additionally embedded mitigation measures implemented in the CEMP were considered sufficient to prevent adverse effects on this habitat during construction of the Proposed Amended Development. As such, there are no changes to the assessment made in Chapter 7 of the EIAR and this habitat is not considered to be an IEF.
Wet/dry modified bog	Annex I of Habitat's Directive; SBL	Regional	5.48 ha (11.74%) of wet modified bog and 0.07 ha (3.41%) of dry modified bog lost within the Proposed Development Area.	4.69 ha (10.05%) of wet modified bog and 0.07 ha (3.41%) of dry modified bog lost within the Proposed Development Area.	**Yes**	The Proposed Amended Development would result in less of this habitat being lost within the Proposed Development Area. As wet/dry modified bog was considered to be an IEF within

Species/Habitats	Conservation designation[55,56,57,58,59]	Value	Baseline		IEF	Justification
			EIAR	AI Report		
			5.48 ha represents 0.35% of wet modified bog habitat present in NHZ 20 (1583.1 ha), and 0.07 ha represents 0.01% of dry modified bog habitat present in NHZ 20 (908.4 ha).	4.69 ha represents 0.30% of wet modified bog habitat present in NHZ 20 (1583.1 ha), and 0.07 ha represents 0.01% of dry modified bog habitat present in NHZ 20 (908.4 ha).		Chapter 7 of the EIAR, it has been taken through to full EcIA.
Bats (all)	Conservation Regulations; Wildlife and Countryside Act; SBL	Local	EIAR Proposed Development classed as a small project (≤8 turbines). Moderate habitat for bats present within the Proposed Development Area. Overall moderate bat activity level within the Proposed Development Area.	Proposed Amended Development classed as a small project (≤8 turbines). Moderate habitat present as no change to habitats present within the Proposed Development Area. Overall moderate bat activity level within the Proposed Development Area.	**Yes**	Bats were considered to be an IEF within Chapter 7 of the EIAR and have been taken through to full EcIA.

4.6 Updated Impact Assessment

4.6.1 Following an updated feature assessment, no additional ecological receptors have been identified as IEFs requiring EcIA following the application of embedded mitigation (see Chapter 7 of the EIAR). There are no changes to the assessment of impacts for IEFs outlined in Section 7.7 of Chapter 7 of the EIAR.

Habitats: Wet/dry Modified Bog

Construction

4.6.2 Following any potential amendments as a result of the Proposed Amended Development, less of this habitat will be lost within the Proposed Development Area (10.05% of wet modified bog habitat and 3.41% of dry modified bog habitat). Combined, 9.77% (4.76 ha) of wet/dry modified bog habitat will be lost within the Proposed Development Area, and 0.19% lost within NHZ 20.

4.6.3 The EcIA of wet/dry modified bog within the EIAR predicted effects of a **low negative magnitude** as a result of the Proposed Development that were considered **not significant**. With the implementation of mitigation proposed within the HMP, the magnitude of residual effect was considered to be of **low beneficial magnitude** and **not significant**. Given that there is a reduction in the predicted loss of habitat, there is no change to the assessment of predicted impacts on wet/dry modified bog during the construction period, detailed within Chapter 7 of the EIAR.

Operation

4.6.4 It was considered within Chapter 7 of the EIAR that the operational phase of the Proposed Development would have a predicted effect of **low negative magnitude** which was **not significant**. Following the implementation of the HMP, the magnitude of residual effect would reduce to **negligible**. As an updated HMP will be submitted alongside this Report, there is no change to the assessment of predicted impacts on wet/dry modified bog during the operation period, detailed within Chapter 7 of the EIAR.

Bats

Construction

4.6.5 The Proposed Amended Development would result in no change to the distance of potential roost features identified during baseline surveys to the Proposed Development (none present within 200 m of the Proposed Development Area). Embedded mitigation measures implemented in the CEMP and SPP were considered sufficient to mitigate effects of disturbance and/or displacement on bats during construction of the Proposed Amended Development. Therefore, there is no change to the assessment of predicted impacts on bats during the construction period of the Proposed Amended Development, which was considered to be of **negligible magnitude** and **not significant** following the implementation of embedded mitigation.

Operation

4.6.6 Overall the bat activity level within the Proposed Development Area was considered within the EIAR to be moderate. Following removal of static detector locations H, I and J, the overall activity level is still considered to be moderate. Within the EIAR, common, soprano and

Nathusius' pipistrelles are all considered to be at high risk of collision with turbines. *Nyctalus* species and brown long-eared bat were considered to be at low to moderate risk of collision, with *Myotis* species at low risk of collision.

4.6.7 There is no change to the overall relative activity levels of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* species and brown long-eared bat following the removal of static detector locations H, I and J (See Table 4.3). However, the relative activity level of *Nyctalus* species, noctule bat, reduced from Moderate to Low-Moderate. Although the reduction in relative activity level would reduce the significance of the impact of collision risk, the magnitude of impact is still considered to be moderate negative, considering the low to moderate risk of noctule bats to collision.

4.6.8 Given that there is no change to the magnitude of impact for each bat species assessed within the EIAR, there is no change to the overall assessment of predicted impacts on bats during operation of the Proposed Development made in Chapter 7 of the EIAR. Predicted impacts on bats are therefore still considered to be of a **low negative magnitude** and **not significant** following the implementation of embedded mitigation for the Proposed Amended Development.

4.7 Updated Mitigation and Residual Effects

4.7.1 There is no change to the mitigation and residual effects on IEFs presented within Section 7.9, Chapter 7 of the EIAR.

4.8 Updated Cumulative Impact Assessment

4.8.1 Within Chapter 7 of the EIAR, three developments, Bowbeat Wind Farm, Greystone Knowe, and Longpark Wind Farm were included within the Cumulative Impact Assessment (CIA). No additional operational, consented, submitted wind developments or developments under construction were identified within 10 km of the Proposed Development Area. Therefore, there is no change to the CIA provided within Chapter 7 of the EIAR.

4.9 Summary

4.9.1 An updated assessment has been made of the predicted significance of effects of the Proposed Amended Development on ecological receptors. There have been no changes to the magnitude of effects outlined within Chapter 7 of the EIAR, which were predicted to be of low negative or low-moderate negative magnitude and not significant for all IEFs. As such, it is considered that the Proposed Amended Development would have no change to the magnitude of residual effects of the Proposed Development which would remain as low negative/negligible with the implementation of embedded mitigation and a HMP, and therefore are not significant.

5. Hydrology

5.1 Introduction

5.1.1 This chapter provides an updated assessment of potential impacts on hydrological receptors relevant to amendments to the infrastructure layout for the Proposed Amended Development. An assessment of the effects of the Proposed Development on hydrological receptors was provided within Chapter 9 of the Environmental Impact Assessment Report (EIAR)[60] submitted to the Energy Consents Unit (ECU) in December 2022, which predicted a Moderate/Minor to Minor/Negligible impact on all hydrological receptors. All impacts predicted were considered to result in effects which are not significant.

5.1.2 This Report provides updated assessments for hydrology based on changes to the layout of the temporary and permanent infrastructure of the Proposed Amended Development.

5.1.3 Methods and results provided in the EIAR are not repeated here. Only changes to the previously reported results arising from the Proposed Amended Development are presented, along with updated impact assessment based on these results where relevant. For all other information relating to impact assessment of hydrological receptors, refer to Chapter 9 of the EIAR and supporting appendices.

5.1.4 This section is supported by the following appendices which are also submitted as part of the AI:

- AI Volume 3 Chapter 8: Carbon Balance Assessment;
- AI Volume 3 Figure FEI 5.1: Private Water Suppliest; and
- AI Volume 3 Figure FEI 5.2: Potential GWDTE.

5.1.5 The findings in EIAR Appendix 9.4: Borrow Pit Search Report remain applicable for the Proposed Amended Development. The only notable change is Figure A9.1.2: Aerial Photography from Google Earth reveals potential long-term soil creep on the steep slopes northwest of T7 and T8. Consequently, the previous description for this area is no longer relevant.

5.1.6 As discussed later in this section, the updated assessment concludes that no significant effects have been identified as a result of the Proposed Amended Development.

5.2 Consultation

5.2.1 In addition to the EIAR being submitted to the ECU and consultees in December 2022, a letter prepared by Natural Power was sent to the SEPA Senior Planning Office on 2 June 2023 that addressed prior feedback relating to the application. No further response is required and proposed conditions are accepted and will be complied with. Comments made by SEPA regarding peat are in agreement with our approach to the Proposed Amended Development.

5.2.2 A summary of consultation with relevance to hydrology undertaken prior to submission of the EIAR in December 2022 is presented in Table 9.2, Chapter 9 of the EIAR.

[60] FORL (2022) Scawd Law Wind Farm EIAR – Chapter 9: Hydrology, Geology & Hydrogeology

5.3 Method of Assessment

5.3.1 The assessment used in this AIR is consistent with the methodology outlined within Chapter 9: Hydrology, Geology & Hydrogeology of EIAR[1].

5.3.2 The baseline hydrology setting of the Proposed Amended Development Area (determined during development of the EIAR in 2022) is unchanged and no further baseline survey work was considered necessary to inform this updated assessment.

5.3.3 The following section will outline any changes to the receptors discussed in Chapter 9 of the EIAR[1]. All appropriate embedded mitigation as identified within the EIAR will be retained.

5.4 Updated Impact Assessment

Unaffected Hydrological Potential Receptors

5.4.1 The following potential receptors have not been affected by the Proposed Amended Development:

- Climate;
- Designated Sites;
- Water Quality;
- Water Resources – Public Water Supply;
- Geology; and
- Hydrogeology.

5.4.2 Details relating to these conditions can be found within Chapter 9: Hydrology, Geology & Hydrogeology of the EIAR.

Surface Water Hydrology

5.4.3 Within Chapter 9 of the EIAR[1], the following watercourses and their respective catchments were discussed in detail:

- Gatehopeknowe Burn;
- Harpershiels and Shaw Burn;
- Hope Burn; and
- Walker Burn.

5.4.4 However, the two proposed turbines that would be removed are situated within the Gatehopeknowe Burn catchment. Therefore, the level of works to be undertaken within this catchment has been reduced, specifically within the sub-catchment of Seathope Burn which will no longer feature any proposed infrastructure or associated access track.

5.4.5 Table 5.2 provides an updated overview of the distances between each infrastructure element and the nearest watercourse.

Table 5.2: Updated Infrastructure Distance to Nearest Watercourse as a result of the Proposed Amended Development

Infrastructure	Distance from watercourse (inclusive of 50 m buffer)
Turbines	
T1	352
T2	254
T3	185
T4	295
T5	279
T6	241
Ancillary Infrastructure	
Borrow pit (BP1)	204
Temporary Construction Compound (site entrance)	50
Temporary Construction Compound (including substation, control building and the battery storage area)	190
Anemometry Mast	195

Flood Risk

5.4.6 Within Chapter 9 of the EIAR[1], the flood risk from the following sources were discussed:

- Fluvial Flooding Sources;
- Pluvial Flooding Sources;
- Coastal Flooding Sources; and
- Groundwater Flooding Sources.

5.4.7 The EIAR considered the highest level of flood risk would be during the construction phase. The assessment concluded that significance of flood risk on the Proposed Development would be Minor/Negligible and the flood risk in watercourses downstream of the proposed Development would be Moderate/Minor. As a result of the Proposed Amended Development, the two turbines within the Gatehopeknowe Burn would be removed, and the potential to exacerbate flooding within this catchment is reduced further, specifically within the sub-catchment of the Seathope Burn.

Water Resources – Private Water Supply

5.4.8 In addition to the details provided within Chapter 9 of the EIAR[1], Appendix 9.2: Private Water Supply Risk Assessment (PWSRA)[61] was produced to support the EIAR and evaluate the risk to private water supplies (PWS). The PWSRA indicated that two PWS had Medium/Low or Low/Negligible residual risks from the Proposed Development, Holylee – Caberstongrains (Ki)) and Colquhar Farm (AC).

5.4.9 One of these PWS is located within the Gatehopeknowe Burn catchment (Holylee – Caberstongrains Supply (Ki)). Although the risk associated with this supply has not changed, the potential removal of the two proposed turbines (T7 and T8) within the catchment would serve to reduce the scope of construction activities taking place. Figure FEI 5.1 presents the PWS overlain by the revised site layout. It is considered, therefore, that the reduction of turbine and associated construction activities in this area will, in turn, reduce the potential for adverse impacts to occur to this PWS.

5.4.10 As noted within the SEPA consultation response, the Holylee – Caberstongrains (Ki) and Colquhar Farm (AC) and the Holylee – Seathope (Kii) will be monitored as part of the PWS Monitoring Plan (PWSMP).

Soils & Peat

5.4.11 The details provided in Chapter 9 of the EIAR[1] remain appropriate for the Proposed Amended Development, however the potential removal of two proposed turbines (T7 and T8) and the associated access tracks and the moving of the battery storage and substation into the temporary construction compound (near T3) could reduce the volume of excavated material, acknowledging that there may be a slight increase in excavation in the temporary construction compound area. It is recognised that the two turbines were not situated on peat, with the depths ranging from 0.2 to 0.3 m, there would be a reduction on the impact on soils and disturbance to ground material.

5.4.12 Table 5.3 provides the updated average peat depths for each element of infrastructure:

[61] FORL (2022) Scawd Law Wind Farm EIAR – Appendix 9.2: Private Water Supply Risk Assessment.

Table 5.3: Updated Recorded Depths at Infrastructure Elements as a result of the Proposed Amended Development

Infrastructure Element	Mean Peat Depth (m)
Turbines (T)	
T1	0.3
T2	0.2
T3	0.3
T4	0.3
T5	0.3
T6	0.7
Ancillary Infrastructure	
BP1	0.2
Temporary Construction Compound (Site Entrance)	0.2
Temporary Construction Compound (including substation, control building and the battery storage area)	0.2
Anemometry Mast	0.2
Access Track Segments	
Site entrance to T3	0.1
T3 to T2	0.2
T2 to T1	0.3
T3 to T6	0.7
Junction between T6 to **BP1**	0.2
BP1 to T4	0.2
T4 to T5	0.3

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

5.4.13 Chapter 9 of the EIAR[1] provided details relating to habitats that feature a potential for GWDTE. Within this GWDTE section, as well shown in Figure 9.10: Potential GWDTE, Cluster 10 – U6 habitat stretched between Bareback Knowe and Windlestraw Law. With removal of two proposed turbines along this ridge, there would be a reduction in the potential impact on this habitat. Figure FEI 5.2 presents the potential GWDTE overlain by the revised site layout.

5.4.14 It is considered, therefore, that the Proposed Amended Development could result in a decrease in significance of the effect on potential GWDTE habitats reported in the EIAR of Minor to Minor/Negligible.

5.5 Updated Mitigation and Residual Effects

5.5.1 There is no change to the mitigation and residual effects on hydrological assets as presented within Section 9.12, Chapter 9 of the EIAR.

5.6 Summary

5.6.1 The Proposed Amended Development gives rise to effects which are no greater than, and in some cases less than, those assessed in Chapter 9 of the EIAR, and so the conclusions of the EIAR remain valid.

6. Landscape and Visual Impact Assessment

6.1 Introduction

6.1.1 This chapter provides further information in relation to landscape character, views and visual amenity, and should be read in conjunction with Chapter 6: Landscape and Visual of the Environmental Impact Assessment Report (hereafter referred to as the EIAR) submitted in 2022. It details any changes to the significance of effects on landscape and visual receptors presented in the EIAR as a result of Proposed Amended Development as described in Chapter 2 of this Report.

6.1.2 This AI Landscape and Visual Impact Assessment (LVIA) was undertaken by Chartered Members of the Landscape Institute (CMLI) from MVGLA. Figures and visualisations were produced by Natural Power.

6.1.3 All figures accompanying this chapter retain the same figure numbering as presented in the EIAR for ease of comparison. Zone of Theoretical Visibility (ZTV) mapping and sequential ZTVs include a comparison of the previous and revised layouts in order to show the difference in theoretical visibility. The number of aviation lighting ZTVs have been reduced to reflect 4 turbines being lit instead of 6. Cumulative figures updated concentrate on a 25 km study area focussing on potential significant cumulative effects. A list of figures updated for AI are listed as follows:

- Figure FEI 6.1: 25 km Study Area – reduced from 45 km to 25 km;
- Figure FEI 6.2a: ZTV to Tip Height (A3 Size);
- Figure FEI 6.2b: ZTV to Tip Height (A0 Size);
- Figure FEI 6.3: ZTV to Hub Height (A3 Size);
- Figure FEI 6.4: ZTV of Aviation Lighting (Worst Case);
- Figures FEI 6.5a to d: ZTV of Aviation Lighting - Individual Turbines 1, 3, 5 and 6 (4 pages);
- Figure FEI 6.6: Landscape Character with ZTV;
- Figure FEI 6.7: Protected & Designated Landscapes with ZTV;
- Figure FEI 6.8: Visual Receptors;
- Figure FEI 6.9a: Sequential Receptors - Key Routes;
- Figure FEI 6.9b: Sequential Receptors – Scottish Hill Tracks within 10km;
- Figure FEI 6.9c: Sequential Receptors – Core Paths within 5km;
- Figure FEI 6.10: Sequential Routes Comparative ZTV;
- Figure FEI 6.12: Cumulative Sites considered within Cumulative Assessment out to 25km – reduced from 45 km to s5 km study area;
- Figure FEI 6.13: Cumulative 25km ZTV – Scenario 1: Scawd Law & Operational / Under Construction Sites;
- Figure FEI 6.14: Cumulative 25km ZTV - Scenario 2: Scawd Law & Operational / Under Construction / Consented Sites;
- Figure FEI 6.15: Cumulative 25km ZTV - Scenario 3: Scawd Law & Operational / Under Construction / Consented / Application Sites;
- Figure FEI 6.16: Cumulative ZTV 25km - Scenario 4: Scawd Law & Operational / Under Construction / Consented / Application / Scoping Sites;

- Figures FEI 6.17a-f: Viewpoint 1: Dewar Gill (B709 road/NCR1);
- Figures FEI 6.18a-f: Viewpoint 2: Lauder Common;
- Figures FEI 6.19a-f: Viewpoint 3: Core Path 41 near Scroof Hill;
- Figures FEI 6.20a-f: Viewpoint 4: The Meldons;
- Figures FEI 6.21a-f: Viewpoint 5: Priesthope Hill;
- Figures FEI 6.22a-f: Viewpoint 6: The Sware;
- Figures FEI 6.23a-f: Viewpoint 7: A7, near Buckholm;
- Figures FEI 6.24a-f: Viewpoint 8: Lee Pen;
- Figures FEI 6.25a-f: Viewpoint 9: Bonnington Road, Peebles;
- Figures FEI 6.26a-f: Viewpoint 10: A72, East of Holylee (wireline only);
- Figures FEI 6.27a-f: Viewpoint 11: Innerleithen, Car Park;
- Figures FEI 6.28a-f: Viewpoint 12: Minor Road/NCR1 (The Batta);
- Figures FEI 6.29a-f: Viewpoint 13: Traquair;
- Figures FEI 6.30a-f: Viewpoint 14: Peel;
- Figures FEI 6.31a-f: Viewpoint 15: Hundleshope Heights;
- Figures FEI 6.32a-f: Viewpoint 16: SUW/B709 near Kirkhouse;
- Figures FEI 6.33a-f: Viewpoint 17: SUW, Minch Moor;
- Figures FEI 6.34a-f: Viewpoint 18: Eildon Hills;
- Figures FEI 6.35a-f: Viewpoint 19: Three Brethren;
- Figures FEI 6.36a-f: Viewpoint 20: Selkirk Common;
- Figures FEI 6.37a-f: Viewpoint 21: Clovenfords;
- Figures FEI 6.38a-f: Viewpoint 22: Cairn Hill Cairn;
- Figures FEI 6.39a-f: Viewpoint 23: Blake Muir;
- Figure FEI 6.40: Residential Viewpoints; and
- Figures FEI 6.41a-f: Residential Visualisations 1-6.

6.2 Key Considerations from the EIAR

6.2.1 The LVIA identified that the scale and characteristics of the receiving landscape was considered appropriate to accommodate the type of development proposed. Significant effects were identified to landscape and visual receptors on the upper slopes of the Tweed Valley, hill tops to the north, east and south of the Proposed Development, short sections of minor roads and longer sections of footpaths within the area including the Southern Upland Way (SUW).

6.2.2 A total of 59 LCTs were identified within the 45 km study area, of these, 6 were taken forward for detailed assessment. Significant landscape effects were assessed as being restricted to 3 LCTs as follows:

- **LCT 190 - Dissected Plateau Moorland**: is the host LCT and would result in a loss of 12.16 hectares (ha) of unimproved and improved grassland, 4.51 ha of heather and 5.55 ha of modified bog resulting in a Substantial magnitude of change and a **Major** adverse and **significant** effect to the Proposed Development Area. Within the wider LCT beyond the Proposed Development Area a Substantial magnitude of change was judged within 5 km, reducing to Medium – Negligible as distance increases resulting in a **Major** adverse **significant** effect to the key characteristics within 5 km and Moderate to Minor adverse **significant** to **not significant** effect thereafter as the distance increases.

- **LCT 93 – Southern Uplands with Scattered Forest**: Magnitude of change was judged to be Moderate for the closest areas forming the southern side of the Tweed Valley, an area with a high occurrence of forestry, reducing to Slight and Negligible levels on account of the indirect nature of the change and distance involved where it is not considered to alter the key characteristics of this LCT. This would be short-term and reversible and result in a **Major-moderate** adverse **significan**t effect for the northern part of the LCT bordering the Tweed Valley, reducing to non-significant levels of **Minor** and **Negligible** as a result of the higher sensitivity of the LCT combined with distance from the EIAR Proposed Development;
- **LCT 116: Upland Valley with Woodland**: Magnitude of change was judged to be Moderate for areas near the EIAR Proposed Development on the ridgeline to the south of the EIAR Proposed Development, and Slight elsewhere due to partial and full screening by landform, forestry and woodland, as well as distance. Changes experienced would be long-term during operation, and reversible. This would result in a **Major** adverse and **significant** effect directly to the south occupying the northern ridgeline, and **Moderate** adverse and **significant** effects along the southern valley sides to approximately 8 km where woodland, forestry and distance would reduce effects to non-significant levels. It should be noted that intervisibility would mainly occur on the valley sides rather than the floor where the A72 road and settlements are situated.

6.2.3 The majority of significant visual effects were identified as typically occurring within approximately 15 km from the nearest proposed turbine. This is mainly from hill tops and walking routes where the EIAR Proposed Development would appear in open views.

6.2.4 A total of 23 viewpoints were selected to represent the most sensitive receptors within the study area (see Appendix 6.4: Viewpoint Assessment of the EIAR). A total of 4 were assessed as receiving a **Major** adverse and **significant** effect as follows:

- Viewpoint 3: Core Path 41 near Scroof Hill;
- Viewpoint 5: Priesthope Hill;
- Viewpoint 8: Lee Pen; and
- Viewpoint 22: Cairn Hill Cairn.

6.2.5 The above viewpoints are all located between 1.2 – 4.0 km from the EIAR Proposed Development and would receive very close views of the turbines, aviation lights and supporting infrastructure during both construction and operational phases. Magnitude of change was judged as **Substantial**, which combined with a High sensitivity due to the viewpoint locations being hill summits popular with walkers results in a **significant** effect.

6.2.6 A total of 11 viewpoints were assessed as receiving a **Moderate** adverse and **significant** effect as follows:

- Viewpoint 2: Lauder Common;
- Viewpoint 4: The Meldons;
- Viewpoint 6: The Sware;
- Viewpoint 9: Bonnington Road, Peebles;
- Viewpoint 10: A72, East of Holylee (wireline only);
- Viewpoint 12: Minor Road/NCR1 (The Batta);
- Viewpoint 15: Hundleshope Heights;
- Viewpoint 16: SUW/B709 near Kirkhouse;
- Viewpoint 17: SUW, Minch Moor;
- Viewpoint 19: Three Brethren; and

- Viewpoint 23: Blake Muir.

6.2.7 The viewpoints noted are generally of High sensitivity due to their recreational use and location within national and local level landscape designations. Covering distances between 4.8 – 13.9 km from the EIAR Proposed Development. These are located to the south and west where they would obtain views of the turbines on the skyline above the Tweed Valley. The 8 turbines would occupy a small part of the overall view, and partial screening of the bottom sections of the towers as well as the supporting infrastructure would lead to a **Slight** magnitude of change and **Moderate** adverse effect. All the viewpoints are considered to be **significant** on account of their proximity to the EIAR Proposed Development which would form a new and prominent feature within the view.

6.2.8 The remaining 8 viewpoints were all assessed as receiving a **Minor** adverse and **not significant** effect as follows:

- Viewpoint 1: Dewar Gill;
- Viewpoint 7: A7 road, near Buckholm;
- Viewpoint 11: Innerleithen, car park;
- Viewpoint 13: Traquair House;
- Viewpoint 14: Peel;
- Viewpoint 18: Eildon Hills;
- Viewpoint 20: Selkirk Common; and
- Viewpoint 21: Clovenfords.

6.2.9 These viewpoints range between 4.1 – 18.1 km from the EIAR Proposed Development and the turbines and supporting infrastructure would occupy a small part of the overall view from each viewpoint due to a combination of factors including screening by landform and forestry, distance, and in some cases where the receptor is assessed as having a Medium sensitivity, combined with a Slight magnitude of change.

6.2.10 Six properties/groups were identified within 3 km from the EIAR Proposed Development. Two of these are located within the Proposed Development Area and are financially involved with the EIAR Proposed Development, the remaining properties are scattered along the B709 road to the west of the EIAR Proposed Development.

6.2.11 Significant visual effects of **Major** adverse and **significant** have been predicted for 2 properties due to their proximity and open views from the gardens at the front of the houses where turbines would be viewed at a greater elevation resulting in a Substantial magnitude of change and would be financially involved:

- Property 1: Seathope; and
- Property 2: Caberstongrains.

6.2.12 Two properties are predicted to receive a **Moderate** adverse and **significant** effect due to receiving views of three turbines and a blade tip of a fourth resulting in a Slight magnitude of change as follows:

- Property 4: Glentress; and
- Property 5: Colquhar.

6.2.13 Two properties (Property 3: Blackhopebyres & Blackhopebyres Steading and Property 6: The Common) are not predicted to receive an effect on account of screening by a combination of

landform and forestry which would screen all views towards the Proposed Development resulting in a Negligible magnitude of change.

6.2.14 Cumulative effects would arise mainly from the addition of the Proposed Development in combination with the Greystone Knowe (Scenario 3) development. This would increase the concentration of turbines in the Dissected Plateau Moorland LCT as a result of two operational wind farms and an application site being located within the same LCT.

6.2.15 A total of 7 settlements were assessed with theoretical visibility of the Proposed Development. Of these, none were judged as receiving a significant effect on account of a combination of screening by adjacent buildings, woodland and landform, distance and the small extent of the landscape that the Proposed Development would occupy.

6.2.16 Route receptors assessed in the detailed assessment included 6 roads, two long distant footpaths, and 4 Core Paths. Of the 12 route receptors assessed, the following 5 were predicted to receive a significant effect:

- Minor road on the southern bank of the River Tweed: experiences close views of the Proposed Development above the ridgeline to the north;
- Southern Upland Way: Due to face-on views for a section between Traquair and Blake Muir, as well as between Traquair and Three Brethren including Minch Moor;
- Cross Border Drove Road: obtains same level of effects where the route follows the SUW; and
- Core Paths No 161 & 163: would receive close face-on views of the Proposed Development within 5 km.

6.2.17 Magnitude of change was judged to be **Moderate** on account of the turbines being prominent in views due to proximity from the Proposed Development and openness of the views. This would result in a **Major** and **Major-moderate** adverse **significant** effect for the sections described above.

6.2.18 There are a large number of hill summits located within the Moorfoot Hills and to the south of the Tweed Valley. For the vast majority of these, open views of the Proposed Development would be seen alongside the supporting infrastructure. As distance increases, foreground landform would provide some screening to the base of the towers reducing their vertical prominence as well as screening the supporting infrastructure.

6.2.19 Magnitude of change would vary between Substantial depending on the extent of the Proposed Development seen and proximity, in particular from summits in the Moorfoot Hills where hill tops are generally open and not influenced by forestry. This would typically occur but not exclusively to summits within 5 km, reducing with distance to Moderate levels and long-term during operation, but reversible.

6.2.20 This would result in **Major** adverse and **significant** effect within 5 km where the changes would be prominent, reducing with distance to **Moderate** and **significant** levels where the Proposed Development occupies a smaller extent of the view, and the vertical extent reduces.

6.2.21 Cumulative Scenario 2 (Consented sites) would be located further away from the receptors assessed and the addition of the Proposed Development were not judged to lead to a change to the effects assessed for Scenario 1.

6.2.22 Scenario 3 wind farms included Greystone Knowe located within 5.6 km to the north east of the Proposed Development. This would be separated by the land mass of the Moorfoot Hills providing some visual separation. Nevertheless, both developments would be visible from the south with the Proposed Development turbines being more prominent due to their higher

elevation. Only the Dissected Plateau Moorland LCT would receive an increase in effects due to the Proposed Development and Greystone Knowe being located within the same LCT.

6.3 Changes to Legislation, Policy and Guidance

6.3.1 There have been notable changes to the policy context since the EIAR was prepared in 2021 - 2022. Of key importance are the adoption of the National Planning Framework 4 (NPF4) and the Onshore Wind Policy Statement (OWPS). These documents are analysed in Chapter 2: Policy Context of the EIAR, but key points relevant to landscape and visual matters include:

- Policy 11.e.ii. sets out that "*where impacts are localised and/or appropriate design mitigation has been applied, they will generally be considered to be acceptable*". For the AI it is noted that:
  - Significant landscape and visual effects of the Proposed Development were identified as being contained to approximately 13.9 km, and do not extend further with the Proposed Amended Development;
  - Design mitigation measures were set out in the EIAR, and further design mitigation measures were undertaken for the Proposed Development layout, as set out in Chapter 3 Site Selection and Design Evolution of EIAR.
- Policy 4.c states that "Development proposals that will affect a National Park, National Scenic Area, Site of Special Scientific Interest or a National Nature Reserve will only be supported where:" For the AI it is noted that:
  - The Proposed Development Area lies outside the Upper Tweeddale NSA, which occupies an area between 12.4 – 28.1 km to the west; and
  - Effects on the special qualities of the NSA reconsidered for the Proposed Amended Development are also identified as not significant (see below).

6.4 Assessment Methodology and Significance Criteria

6.4.1 The study area and methodology used to undertake the revised assessment and significance criteria are the same as are set out in Appendix 6.1 of the EIAR.

6.5 Consultation

6.5.1 Statutory consultees have provided a response to the submission of the EIAR and where relevant to LVIA is provided below.

6.5.2 Scottish Borders Council Interim Landscape Advice:

'It is my consideration that while a windfarm should be able to be accommodated in an upland landscape such as the Moorfoot Hills, the high sensitivity on the location due to its location adjacent to the Tweed valley, an iconic landscape known far and wide for its scenic quality and probably best described as a cultural landscape, together with the wider area popular for recreation and an extensive area of protected and designated landscape makes this proposal highly sensitive. I suggest that the upper and middle Tweed valley as far as Kelso, and its surrounding and enclosing uplands, is one of the foremost areas of landscape quality in the Borders and should be protected from large scale intrusive development that would impact on its special qualities. Chapter 6 - Landscape and Visual of the EIAR has demonstrated that there will be widespread visibility of the proposal from a high proportion of sensitive locations and will incur significant effects on the majority of these.'

6.5.3 NatureScot:

'The Proposed Development would cause a significant range of adverse landscape and visual effects as a result of its location on a ridgeline above the Tweed Valley, close to well-used hills and recreational receptors.

It would not cause significant adverse effects on the integrity of the Upper Tweeddale National Scenic Area (NSA).'

6.5.4 As a result of discussions, the Proposed Development has the potential to be revised to remove T7 and T8 which were the highest turbines located on the south western slopes of Windlestraw Law (659 m Above Ordnance Datum (AOD)).

6.6 Baseline Conditions

6.6.1 The baseline conditions remain unchanged since the previous LVIA was undertaken with the exception of changes to the cumulative situation as set out in the following section, such that existing conditions are otherwise as described in the EIAR.

6.6.2 Baseline photography has not been retaken, but modelling has been updated in the visualisations, to show changes from the Proposed Amended Development layout and the updated cumulative baseline (see Figures 6.17a – 39f).

Cumulative Baseline

6.6.3 The list of other wind farms (existing, consented and proposed) in the surrounding landscape has been updated to reflect changes to the cumulative baseline since the EIA, as of the end of October 2024. For the purposes of this AIR, cumulative sites within 25 km have been reviewed as it is within this area that potential significant cumulative effects would occur.

6.6.4 There is no change to the LVIA baseline (Scenario 1) or consented sites (Scenario 2) in this AIR with respect to existing wind farms. The following lists the sites that have become application (Scenario 3) and scoping sites in the intervening period since the Proposed Development was submitted:

- Cloich Wind Farm: previously consented- a new layout and dimensions have been submitted;
- Ditcher Law: previously Scoping, now submitted - new layout & dimensions; and
- Leithenwater: previously Scoping, now submitted - new layout & dimensions.

6.7 Assessment of Effects and Mitigation

6.7.1 This section contains an updated assessment of effects of the Proposed Amended Development (taking account of the potential removal of T7 and T8 and their associated infrastructure), which should be read in conjunction with Chapter 6 of the EIAR.

6.7.2 The findings of the LVIA contained in the EIAR are set out below, with a summary of the reassessment with the Proposed Amended Development.

6.7.3 Whilst the ground level infrastructure layout has been altered with shortening or slight realignment of tracks, the alterations will not be visible from most locations beyond the site. The effects of the changes to ground level elements have been reassessed as appropriate in the following sections.

Analysis of the ZTV

6.7.4 Figures FEI 6.2a – 6.3 show that there would be a slight reduction in the visual envelope of this Proposed Amended Development when compared to the EIAR. This would typically occur within the surrounding valleys where theoretical visibility would be higher up on valley sides to the previous layout on account of the potential removal of Turbines 7 and 8 from the highest part of the Proposed Development Area.

6.7.5 There would be a further reduction in theoretical visibility occurring mainly within the Midlothian area approximately 13 – 25 km to the north-west of the Proposed Development Area. However, no significant landscape or visual effects have been predicted from these locations.

Landscape Assessment for the Existing Scenario

6.7.6 Alterations to the identified effects on the site and surrounding Landscape Character Types (LCTs) are set out in Table 6.1 and shown on Figure 6.6:

Table 6.1: Landscape Effects with the Proposed Amended Development

LCT	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
Proposed Development Site	Major adverse and significant effect on the physical landscape fabric and perception of the Proposed Development Area.	A slight reduction in magnitude of change of direct effects due to non-construction of two turbines and their access tracks. Other turbines and infrastructure would remain.	No change to overall effect on the Proposed Development Area.
LCT 90: Dissected Plateau Moorland	Major adverse significant effect out to 5 km, reducing to Moderate adverse significant and not significant effects elsewhere.	Slight reduction in magnitude of change of effects due to omission of two turbines and their infrastructure but the change to character would still be experienced from similar locations.	Slight reduction but no change in effect.
LCT 91: Plateau Grassland – Borders	Moderate adverse and not significant effect due to a combination of the indirect nature of effect, distance, and presence of other operational wind farms within the LCT.	Slight reduction in magnitude of change due to omission of two turbines and their infrastructure.	Slight reduction but no change in effect.

LCT 93: Southern Uplands with Scattered Forest – Borders	Major-moderate significant adverse effect due to the High sensitivity of the LCT combined with distance from the Proposed Development, reducing to Moderate and not significant levels with distance.	Slight reduction in magnitude of change due to omission of two turbines and their infrastructure.	Slight reduction but no change in effect.
LCT 95: Southern Uplands – Borders	Moderate adverse not significant effect due to the High sensitivity of the LCT combined with distance from the Proposed Development, reducing to non-significant effects with distance.	Slight reduction in magnitude of change due to omission of two turbines and their infrastructure.	Slight reduction but no change in effect.
LCT 103: Undulating Upland Fringe	Moderate adverse not significant effect due to a combination of the overall Medium sensitivity and distance from the Proposed Development.	Slight reduction in magnitude of change due to omission of two turbines and their infrastructure.	Slight reduction but no change in effect.
LCT 116: Upland Valley with Woodland	Major adverse and significant effect directly to the south occupying the northern ridgeline, and Moderate adverse and significant effect along the southern valley sides to approximately 8 km. Thereafter, woodland, forestry and distance would reduce effects to non-significant levels. Visibility would mainly occur on the valley sides rather than the floor where the A72 road and settlements are situated.	Slight reduction in magnitude of change due to omission of two turbines and their infrastructure.	Slight reduction but no change in effect.

6.8 Visual Assessment for the Existing Scenario

6.8.1 Changes to the Proposed Amended Development are illustrated by the visualisations (FEI Figures 6.17a - 6.39f).

Assessment of Visual Effects

6.8.2 Alterations to the identified effects on views seen by people from selected viewpoints, settlements and routes, are set out in Table 6.2.

Table 6.2: Visual Effects with the Proposed Amended Development

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
Viewpoints			
1. Dewar Gill (B709 road / NCR1) (Figures FEI 6.17a-f)	Minor adverse and not significant effect	Turbines 7 and 8 are not visible from this location.	No change.
2. Lauder Common (Figures FEI 6.18a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 are the closest of the original turbines and highest upon the ridgeline. Their removal would result in a slight reduction in the horizontal extent of the ridgeline occupied by turbines. The remaining turbines would still be visible on the ridgeline.	Reduced, but no overall change in judgement of effect.
3. **Core Path 41 near Scroof Hill** (Figures FEI 6.19a-f)	Major adverse and significant effect.	Turbines 7 and 8 are the closest of the original turbines to the viewpoint and highest upon the ridgeline. Their removal would result in a slight reduction in the horizontal extent of the ridgeline occupied by turbines. The remaining turbines would be visible on the ridgeline.	Reduced, but no overall change in judgement of effect.
4. The Meldons (Figures FEI 6.20a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 are partially screened by the landform, their removal would reduce the horizontal extent of	Reduced, but no overall change in judgement of effect.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
		the landscape affected.	
5. Priesthope Hill (Figures FEI 6.21a-f)	Major adverse and significant effect.	Turbines 7 and 8 are the most distant turbines viewed within the cluster of the Proposed Development. There would be a slight reduction in the number of turbines forming the cluster with the remaining turbines being prominent and close.	No change.
6. The Sware (Figures FEI 6.22a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 removals would reduce the horizontal extent of turbines.	Reduced, but no overall change in judgement of effect.
7. A7, near Buckholm (Figures FEI 6.23a-f)	Minor adverse and not significant effect.	Turbines 7 and 8 are barely visible from this location due to a combination of screening by landform and roadside vegetation.	No change.
8. Lee Pen (Figures FEI 6.24a-f)	Major adverse and significant effect.	Turbines 7 and 8 are the most distant turbines and their removal would reduce the horizontal spread and a slight reduction in the number of turbines forming the cluster with the remaining turbines being prominent and close.	Reduced, but no overall change in judgement of effect.
9. Bonnington Road, Peebles (Figure FEI 6.25a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 are partially screened by the landform, their removal would reduce the horizontal extent of the landscape affected.	Reduced, but no overall change in judgement of effect.
10. A72, East of Holylee (wireline only) (Figures FEI 6.26a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 are not visible from this location due to screening by landform.	No change.
11. Innerleithen, Car Park (Figures FEI 6.27a-f)	Minor adverse and not significant effect.	Turbines 7 and 8 are not visible from this location.	No change.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
12. Minor Road/NCR1 (The Batta) (Figures FEI 6.28a-f)	Moderate adverse and significant effect.	Turbine 7 is the most prominent with Turbines 1-6 being screened by foreground trees, and Turbine 8 by landform limiting views to the blade only. The removal of Turbines 7 and 8 would result in a reduction in magnitude.	Minor not significant effect.
13. Traquair (Figures FEI 6.29a-f)	Minor adverse and not significant effect.	Views of Turbine 7 are limited to the blade seen within the cluster, and Turbine 8 would not be visible.	No change.
14. Peel (Figures FEI 6.30a-f)	Minor adverse and not significant effect.	Turbines 7 and 8 are not visible from this location.	No change.
15. Hundleshope Heights (Figures FEI 6.31a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 are the closest of the original turbines and highest upon the ridgeline. Their removal would result in a slight reduction in the horizontal extent of the ridgeline occupied by turbines. The remaining turbines would still be seen on the ridgeline.	Reduced, but no overall change in judgement of effect.
16. SUW/B709 near Kirkhouse (Figures FEI 6.32a-f)	Moderate adverse and significant effect.	Turbine 7 would be visible behind the larger cluster containing Turbines 1-6 with Turbine 8 being largely screened by landform limiting views to the blade only. The removal of Turbines 7 and 8 would result in a reduction of turbines seen in the main cluster and in the case of Turbine 7, reduce overlapping with Turbine 2.	Reduced, but no overall change in judgement of effect.
17. Viewpoint 17: SUW, Minch Moor (Figures FEI 6.33a-f)	Moderate adverse and significant effect.	Turbine 7 would be visible behind the larger cluster containing Turbines 1-	Reduced, but no overall change in judgement of effect.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
		6 with Turbine 8 extending the horizontal extent of the area occupied eastwards. Their removal would reduce the overlap with Turbine 4 and the overall horizontal extent. Turbines would still be prominent on the ridgeline and there would be no change to magnitude of change.	
18. Eildon Hills (Figures FEI 6.34a-f)	Minor adverse and not significant effect.	Turbines 7 and 8 extend the horizontal spread of turbines eastwards along the ridgeline. There would be a slight reduction, but the overall magnitude of change would remain the same.	Reduced, but no overall change in judgement of effect.
19. Three Brethren (Figures FEI 6.35a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 extend the horizontal spread of turbines eastwards along the ridgeline. There would be a slight reduction, but the overall magnitude of change would remain the same.	Reduced, but no overall change in judgement of effect.
20. Selkirk Common (Figures FEI 6.36a-f)	Minor adverse and not significant effect.	Turbines 7 and 8 extend the horizontal spread of turbines eastwards along the ridgeline. There would be a slight reduction, but the overall magnitude of change would remain the same.	Reduced, but no overall change in judgement of effect.
21. Clovenfords (Figure FEI 6.37a-f)	Minor adverse and not significant effect.	Turbines 7 and 8 are not visible from this location.	No change.
22. Cairn Hill Cairn (Figures FEI 6.38a-f)	Major adverse and significant effect.	Turbine 7 would be visible behind the larger cluster containing Turbines 1-6 with Turbine 8 extending the	Reduced, but no overall change in judgement of effect.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
		horizontal extent of the area occupied eastwards. Their removal would reduce the overlap with Turbine 4 and reduce the overall horizontal extent. Turbines would still be prominent on the ridgeline and there would be no change to magnitude of change.	
23. Blake Muir (Figures FEI 6.39a-f)	Moderate adverse and significant effect.	Turbines 7 and 8 would be visible within the cluster of turbines seen along the ridgeline. There would be a slight reduction in magnitude of change as a result of the reduction in overlapping turbines.	Reduced, but no overall change in judgement of effect.
Residential Properties within 3 km			
1. Seathope	Major adverse and significant.	Only the tips of Turbines 7 and 8 are visible from this property.	Reduced, but no overall change in judgement of effect.
2. Caberstongrains	Major adverse and significant.	Turbines 7 and 8 are visible from this property along the ridgeline to the north-west and are the most distant turbines. Their removal would reduce the number of turbines viewed along the ridgeline although Turbines 4, 5 and 6 would still be prominent in views above to the west.	Reduced, but no overall change in judgement of effect.
3. Blackhopebyres& Blackhopebyres Steading	Negligible and not significant.	Not visible.	No change.
4. Glentress	Moderate adverse and significant.	Turbines 7 and 8 are visible to the east alongside Turbine 6. Their removal would result in only one turbine being visible reducing the magnitude but still at a Slight level.	Reduced, but no overall change in judgement of effect.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
5. Colquhar	Moderate adverse and significant.	Turbines 7 and 8 are visible to the east alongside Turbines 3 and 6. Their removal would result in 2 turbines being visible reducing the magnitude but still at a Slight level.	Reduced, but no overall change in judgement of effect.
6. The Common	Negligible and not significant.	Turbines 7 and 8 not visible from this location.	No change.
Settlements			
Walkerburn	Moderate adverse and not significant.	Turbines 7 and 8 are not visible from this location.	No change.
Innerleithen	Moderate adverse and not significant.	Turbines 7 and 8 are not visible from this location.	No change.
Peebles	Moderate adverse and not significant.	Turbines 7 and 8 are the highest turbines upon the ridgeline. Their removal would result in a slight reduction in the horizontal extent of the ridgeline occupied by turbines. The remaining turbines would still be seen on the ridgeline.	Reduced, but no overall change in judgement of effect.
Traquair	Moderate not significant.	Views of Turbine 7 are limited to the blade seen within the cluster, and Turbine 8 would not be visible.	Reduced, but no overall change in judgement of effect.
Peel	Moderate adverse and not significant.	Turbines 7 and 8 are not visible from this location.	No change.
Stow	Moderate adverse, and not significant.	Turbines 7 and 8 are the closest of the original turbines and highest upon the ridgeline. Their removal would result in a slight reduction in the horizontal extent of the ridgeline occupied by turbines. The remaining turbines would still be seen on the ridgeline.	Reduced, but no overall change in judgement of effect.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
Clovenfords	Moderate adverse, and not significant.	Turbines 7 and 8 are not visible from this location.	No change.
Routes			
A7 Road	Minor adverse and not significant.	Limited theoretical visibility predicted along this route with the removal of Turbines 7 and 8.	Reduced, but no overall change in judgement of effect.
A72 Road	Locally Moderate adverse not significant.	Turbines 7 and 8 are further north away from this road and it is the southernmost turbines that are visible. The ZTV indicates that there would be no difference in visibility with the removal of Turbines 7 and 8.	Reduced, but no overall change in judgement of effect.
B709 Road	Localised Moderate effect would occur for the section south of Traquair, thereafter, reducing to not significant levels elsewhere along the route as distance increases.	Turbines 7 and 8 are the highest turbines within the view. Their removal would reduce the number of turbines within the cluster but the overall magnitude of change to the view from the road would remain the same.	Reduced, but no overall change in judgement of effect.
B6362 Road	Moderate adverse not significant.	Turbines 7 and 8 are the closest of the original turbines. Their removal would result in a slight reduction in the horizontal extent of the ridgeline occupied by turbines. The remaining turbines would still be visible on the ridgeline.	Reduced, but no overall change in judgement of effect.
B7062 Road	Minor adverse and not significant.	Turbines 7 and 8 removals would reduce the horizontal extent of turbines and cluster but would not alter the magnitude of change.	Reduced, but no overall change in judgement of effect.
Minor Road South of the River Tweed	Moderate adverse and significant effect.		
Walking Routes			

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
Southern Upland Way	This would result in a Major-moderate adverse significant effect.	There would be a slight reduction in the ridgeline occupied by turbines and number within the overall cluster but would not change the magnitude assessed for the Proposed Development.	Reduced, but no overall change in judgement of effect.
Cross Border Drove Road	Major-moderate adverse significant effect.	Theoretical visibility is predicted from similar sections of the footpath, there would be a slight reduction through the removal of Turbines 7 and 8, the remaining turbines which would be within the foreground of views would still be visible along the ridgeline resulting in no change to the magnitude.	Reduced, but no overall change in judgement of effect.
Core Path No.42 – Stow – Blackhaugh	Moderate adverse not significant effect.	The Proposed Amended Development would be seen from a short section of the path and the removal of Turbines 7 and 8 is not judged to reduce the magnitude of change.	Reduced, but no overall change in judgement of effect.
Core Path No.161 – Walkerburn – Priesthope	Major significant effect is predicted for a short section although it is acknowledged from a short section at the highest point, a Major-moderate significant effect would occur overall.	Close views if Turbines 1-6 would be prominent within the view and the removal of Turbines 7 and 8 would reduce the number of turbines within the cluster, but would not reduce the magnitude assessed in the EIA.	Reduced, but no overall change in judgement of effect.
Core Path No. 163: Walkerburn – Minch Moor	Major significant effect is predicted where open views can be obtained, reducing to Moderate and significant due to partial screening by forestry.	The removal of Turbines 7 and 8 would reduce the overall cluster by removing the furthest and highest turbines. Turbines 1-6 would be visible along the	Reduced, but no overall change in judgement of effect.

Receptor	Findings of the LVIA (EIAR)	Alterations with the Proposed Amended Development	Revised Findings for the LVIA with the Proposed Amended Development
		ridgeline and would not alter the magnitude.	
Hill Tops			
Moorfoot Hills / Minch Moor	This would result in Major adverse and significant effect within 5 km where the changes would be prominent, reducing with distance to Moderate and significant levels where the Proposed Development occupies a smaller extent of the view, and the vertical extent reduces.	From the Moorfoot Hills, Turbines 7 and 8 are the closest and most prominent within views and their removal would provide a slight reduction in magnitude. However, this would not reduce to the next level due to the open elevated views where Turbines 1-6 would still be seen along the ridgeline.	Reduced, but no overall change in judgement of effect.

Cumulative Assessment

6.8.3 Table 6.4 sets out the updated list of wind farms that are consented, in planning or at appeal that are shown on visualisations (FEI Figures 6.17a-6.39f).

6.8.4 Whilst there would be changes to the Proposed Amended Development, the relationships between it and other wind farms in the surrounding area would not be so greatly altered as to merit a full reconsideration of cumulative effects. This is because the site occupies an area away from other wind farm development and would not be altered with the changing status or presence of wind farms in the wider area. Potential changes in relation to the recent application schemes are considered briefly below.

6.8.5 With the key relationship being with the existing operational developments to the north east, north west and east, the alteration to the layout would not alter the judgements of cumulative effects from those reported in the EIAR.

6.8.6 Should the application schemes of Leithenwater be present in the future, they would contribute to the enlargement of Bowbeat, mainly to the north west. The immediate relationship of the Proposed Amended Development with adjacent turbines would remain similar to that assessed in the EIAR, but it would be seen as part of a larger cluster of turbines.

Implications on Designated Landscapes

6.8.7 The changes to the Proposed Amended Development do not result in changes to judgments of landscape or visual effects, and there is little change to the appearance of the turbine group from the wider landscape. Overall, the effects identified within, and implications for the designations, are judged to remain as they were identified in the EIAR as follows:

- Upper Tweeddale NSA - Moderate adverse and not significant;
- Traquair GDL – Moderate adverse and not significant;

- Tweedsmuir Uplands SLA – Moderate adverse and significant;
- Tweed Valley SLA – Moderate adverse and significant; and
- Tweed, Ettrick & Yarrow Confluences SLA – Major-moderate adverse and significant.

6.9 Summary (comparison of Proposed Amended Development with EIA effects)

6.9.1 In summary, the Proposed Amended Development would have a similar visual envelope as the Proposed Development, but a slight reduction in the horizontal extent and cluster of turbines (due to the potential removal of Turbines 7 and 8).

6.9.2 The visual envelope would decrease within the surrounding valleys with the removal of the two highest turbines from the Proposed Development resulting in visibility being experienced at higher altitudes on the valley sides. This would result in a slight improvement, but broadly theoretical visibility of the Proposed Amended Development would be the same as before.

6.9.3 It is also important to note that these alterations between the Proposed Development and the Proposed Amended Development are only apparent when comparing visualisations for each, and that this assessment of the Proposed Amended Development identifies that either layout will have a similar relationship, such that changes made to the Proposed Amended Development have minimal changes to landscape and visual effects.

6.9.4 There would be a slight improvement to the direct effects to the Proposed Development Area as a result of the potential removal of Turbines 7 and 8 and adjoining access track. However, the changes to the landscape within the site would still be significant.

6.9.5 Within the wider landscape, changes to landscape character would be minor and related to visibility of turbines as a cluster but would not alter the assessment of character provided for the Proposed Development.

6.9.6 For viewpoints, settlements and walking routes, there would be a slight change in the horizontal extent of the ridgeline occupied as a result of the potential removal of Turbines 7 and 8, as well as less turbines within the cluster. This reduction is noted but the other turbines would still be seen within the view and the effects assessed in the EIAR would not be altered. The exception to this is Viewpoint 12: Minor Road/NCR1 (The Batta) the potential removal of Turbines 7 and 8 would result in a reduction in magnitude from Moderate to Minor.

6.9.7 The addition of Leithenwater application site (Scenario 3) would increase the turbine numbers around Bowbeat operational wind farm. However, the addition of the Proposed Amended Development to this scenario would not increase cumulative effects from those assessed in the EIAR as the Proposed Amended Development appears as a standalone development.

6.9.8 Whilst the changes to the Proposed Amended Development have improved the overall layout by removing turbines from the highest part of the ridgeline, reducing the horizontal spread along the ridgeline, and reducing turbines within the cluster through the potential removal of Turbines 7 and 8, landscape and visual effects have not altered noticeably, and the alterations do not translate into a change in significant effects identified.

7. Noise

7.1 Introduction

7.1.1 This chapter considers the potential operational noise effects of the Proposed Amended Development. Noise impacts are assessed at residential receptors in the vicinity of the Proposed Amended Development.

7.1.2 The assessment has been undertaken following the legislation, policy and guidance as set out in section 11.3 of the EIAR and follows the assessment methodology set out in section 11.4 of the EIAR.

7.2 Assessment of Potential Effects

7.2.1 Operational noise predictions have been carried out according to the methodology described in the Institute of Acoustics document, *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (IOA GPG), with the full methodology set out in Appendix 11.1: Noise Methodology from the EIAR. Predictions for this revised assessment have been carried out for the layout shown at Table 7.1.

Table 7.1 – Turbine Locations

Turbine ID	Easting	Northing	Hub Height (m)
1	336020	640609	113
2	335901	640940	113
3	335793	641399	113
4	336495	641194	113
5	336756	640856	113
6	336191	641911	113

7.2.2 Predictions were made at the residential noise sensitive receptors shown at paragraph 11.7.7 of the EIAR.

7.2.3 The same candidate turbine as assumed for the EIAR has been assessed and the octave band and overall sound power levels for the candidate turbine can be found at paragraphs 11.7.3 and 11.7.4 of the EIAR.

7.2.4 As the turbine dimensions and coordinates have remained the same for T1-T6, the calculated concave ground and shielding corrections remain the same for this assessment, as those found at Table 13.5 and Table 13.6 of the EIAR.

7.2.5 The results of the operational noise predictions are shown at Table 7.2. The table also shows the assigned noise limit and the margin to the limit for each property.

Table 7.2 – Noise Assessment Results

Location	Predicted Noise Level (dB LA90)	Noise Limit (dB LA90)	Margin to Limit (dB)
Seathope Cottage	38	45	7
Caberstongrains	39	45	6
Caddonhead	25	35	10
Seethope Cottage, Hogg's Knowe	24	35	11
Old Caberston	26	35	9
Walkerburn Nearest	25	35	10
The Bothy, The Common	28	35	7
Colquhar	29	35	6
Glentress	29	35	6
Blackhopebyres	26	35	9
Blackhopebyres Steading	26	35	9

7.2.6 The table above shows that predicted operational noise levels are below the ETSU-R-97 simplified noise limit or financially involved limits as appropriate. Therefore, operational noise from the Proposed Amended Development can be considered to be **not significant**.

8. Carbon Balance Assessment

8.1 Introduction

8.1.1 This chapter provides an updated carbon balance assessment relevant to amendments to the infrastructure layout for the Proposed Amended Development. A carbon balance assessment of the Proposed Development was provided within Appendix 9.1 of the Environmental Impact Assessment Report (EIAR)[62] submitted to the Energy Consents Unit (ECU) in December 2022. This predicted that the Proposed Development would have effectively paid back its expected carbon debt from manufacture, construction, impact on habitat and decommissioning within 1.5 years, if it replaced the fossil fuel-mix electricity generation method. Based on the minimum and maximum scenarios however, the analysis showed that the payback time for fossil fuel-mix generation ranges between 1.3 to 1.8 years respectively.

8.1.2 This section is supported by the following appendices which are also submitted as part of the AIR:

- EIAR Appendix 9.1: Carbon Balance Assessment
- AI Volume 3 Chapter 5: Hydrology, Geology and Hydrogeology;
- AI Volume 3 Appendix 8.1: Proposed Development 8 Turbine Carbon Calculator (offline version); and,
- AI Volume 3 Appendix 8.2: Proposed Amended Development 6 Turbine Carbon Calculator (offline version).

8.2 Carbon Balance Assessment

8.2.1 The online version of the carbon calculator is the latest version of the tool but is currently unavailable due to technical difficulties. As a result, the assessment has made use of the MS Excel based assessment tool, version 2.14.1 (last updated January 2023). Data should be uploaded to the online tool when it becomes available again.

8.2.2 The carbon balance assessment detailed in Appendix 9.1 of the EIAR was carried out using the online tool which was available at point of writing in 2022. For consistency, the carbon balance assessment for 8 turbine Proposed Development has therefore also been carried out using the MS Excel tool (see AI Volume 3 Appendix 8.1).

8.2.3 It should be noted that since original carbon balance assessment was completed further capacity factor data and temperature data is now available and this has been included in this update for both Proposed Development and Proposed Amended Development.

8.2.4 Inputs are detailed within '*core input data tab*' of both AI Volume 3 Appendix 8.1: Proposed Development 8 Turbine Carbon Calculator (offline version) and AI Volume 3 Appendix 8.2: Proposed Amended Development 6 Turbine Carbon Calculator (offline version). With amendments to infrastructure layout, inputs that vary between the Proposed Development and the Proposed Amended Development are as follows:

- Number of turbines (reduced);
- Average peat depth removed from turbine foundations (increased);
- Average peat depth removed from hard-standing (increased);

[62] FORL (2022) Scawd Law Wind Farm EIAR – Appendix 9.1: Carbon Balance Assessment

- Length of access track (reduced); and
- Additional peat excavated (increased).

8.3 Carbon Balance Summary

Proposed Development (8 Turbine)

8.3.1 Table 8.1 reveals the carbon losses and carbon gains for the Proposed Development (8 Turbine). Full details of results can be found within 'payback time and CO2 emissions' tab of AI Volume 3 Appendix 8.1: Proposed Development 8 Turbine Carbon Calculator.

Table 8.1: Expected CO2 losses and gains.

	Expected Results.
1. Windfarm CO_2 emission saving over other types of energy generation	
Coal fired electricity generation (tCO2yr-1)	97987
Grid mix of electricity generation (tCO2yr-1)	27053
Fossil fuel mix of electricity generation (tCO2yr-1)	47928
Energy output from windfarm over lifetime (MWh)	**3,727,765**
Total CO_2 losses due to wind farm (t CO_2 eq.)	
2. Losses due to turbine life (e.g. manufacture, construction, decommissioning)	41108
3. Losses due to backup	33113
4. Losses due to reduced carbon fixing potential	1471
5. Losses from soil organic matter	-5751
6. Losses due to DOC & POC leaching	1
7. Losses due to felling forestry	0
Total losses (tCO_2 eq.)	**69,942**
8. Total CO_2 gains due to improvement of site (t CO_2 eq.)	
8a. Change in emissions due to improvement of degraded bogs	0
8b. Change in emissions due to improvement of felled forestry	0
8c. Change in emissions due to restoration of peat from borrow pits	0
8d. Change in emissions due to removal of drainage from foundations & hardstanding	-570
Total change in emissions due to improvements	**-570**
Net CO2 emissions (tCO2 eq.)	**69,372**

8.3.2 The net emissions of CO2 of the Proposed Development are calculated by deducting the total CO2 gains produced by improvement and restoration of the site from the total CO2 emissions from manufacture of, construction of, and impacts on peat from, the individual elements of the Proposed Development (described in EIAR Appendix 9.1: Carbon Balance Assessment)

8.3.3 The wind farm CO2 emissions savings of the Proposed Development over other types of generation (i.e. coal-fired, grid-mix, fossil fuel-mix) is calculated by multiplying the energy output of the Proposed Development by the emissions factor of the other type of generation. However, this parameter only takes into consideration the energy output of the Proposed Development

and does not take into account any of the carbon losses or gains that are produced from manufacture of, construction of, and impacts on peat from, the individual elements of the Proposed Development. The parameter that takes all parameters into account is the carbon payback time and it is this value that provides an indication of the carbon balance of the Proposed Development.

8.3.4 The carbon payback time for the Proposed Development is calculated by comparing the net loss of CO2 from the site due to wind farm development with the carbon savings achieved by the wind farm while displacing electricity generated from coal-fired generation, grid-mix generation or fossil-fuel mix electricity generation. Figures 8.1 and 8.2 illustrate the payback times for the alternative Proposed Development in years. For full details see *'payback time and CO2 emissions'* tab of AI Volume 3 Appendix 8.1: Proposed Development 8 Turbine Carbon Calculator

RESULTS	*Exp.*	*Min.*	*Max.*
Net emissions of carbon dioxide (t $CO_{2\ eq.}$)	**69372**	**65943**	**75599**
Carbon Payback Time			
…coal-fired electricity generation (years)	0.7	0.6	0.9
…grid-mix of electricity generation (years)	2.6	2.3	3.2
…fossil fuel - mix of electricity generation (years)	**1.4**	**1.3**	**1.8**

Figure 8.1: Carbon payback time for the Proposed Development

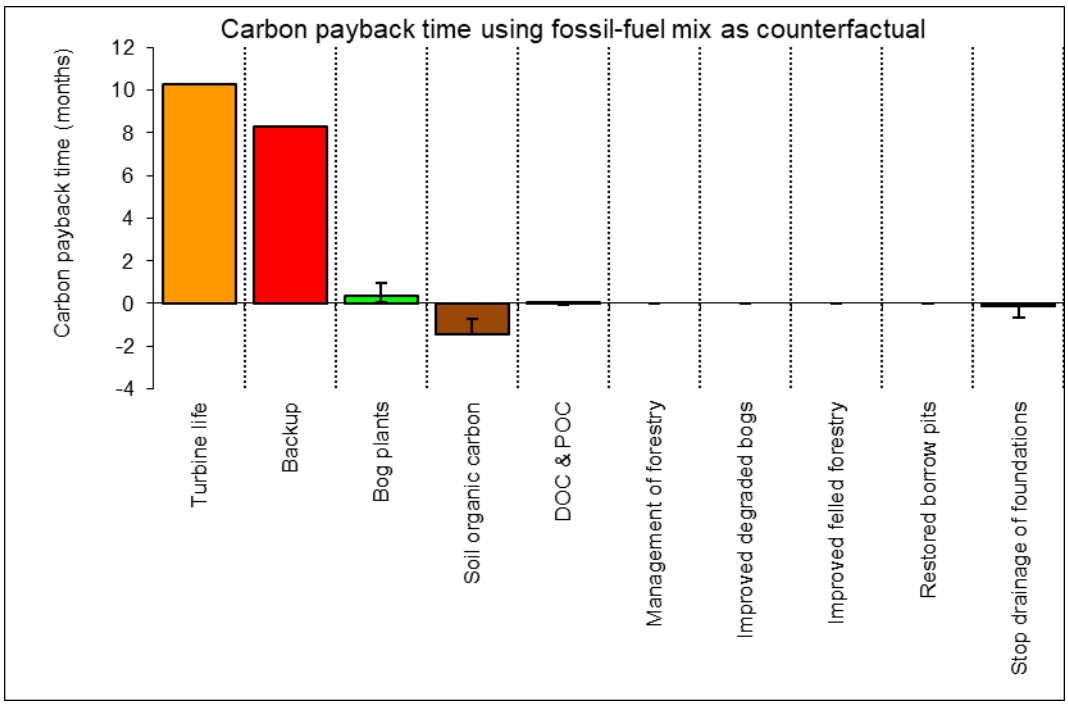

Figure 8.2: Carbon payback time for different elements of the assessment

8.3.5 The results from the carbon calculator reveal that the Proposed Development would have effectively paid back its expected carbon debt from manufacture, construction, impact on

habitat and decommissioning within 1.4 years, if it replaced the fossil fuel-mix electricity generation method. Based on the minimum and maximum scenarios however, the analysis shows that the payback time for fossil fuel-mix generation ranges between 1.3 to 1.8 years respectively.

Proposed Amended Development (6 Turbine)

8.3.6 Table 8.2 reveals the carbon losses and carbon gains for the Proposed Amended Development (6 Turbine). Full details of results can be found within *'payback time and CO2 emissions'* tab of AI Volume 3 Appendix 8.2: Proposed Amended Development 6 Turbine Carbon Calculator.

Table 8.2: Expected CO2 losses and gains.

	Expected Results.
1. Windfarm CO_2 emission saving over other types of energy generation	
Coal fired electricity generation (tCO2yr-1)	73490
Grid mix of electricity generation (tCO2yr-1)	20290
Fossil fuel mix of electricity generation (tCO2yr-1)	35946
Energy output from windfarm over lifetime (MWh)	**2,795,824**
Total CO_2 losses due to wind farm (t CO_2 eq.)	
2. Losses due to turbine life (e.g. manufacture, construction, decommissioning)	30831
3. Losses due to backup	24835
4. Losses due to reduced carbon fixing potential	1494
5. Losses from soil organic matter	-6179
6. Losses due to DOC & POC leaching	1
7. Losses due to felling forestry	0
Total losses (tCO_2 eq.)	**50,981**
8. Total CO_2 gains due to improvement of site (t CO_2 eq.)	
8a. Change in emissions due to improvement of degraded bogs	0
8b. Change in emissions due to improvement of felled forestry	0
8c. Change in emissions due to restoration of peat from borrow pits	0
8d. Change in emissions due to removal of drainage from foundations & hardstanding	-428
Total change in emissions due to improvements	-428
Net CO2 emissions (tCO2 eq.)	**50,553**

8.3.7 The carbon payback time for the Proposed Amended Development is calculated by comparing the net loss of CO2 from the site due to wind farm development with the carbon savings achieved by the wind farm while displacing electricity generated from coal-fired generation, grid-mix generation or fossil-fuel mix electricity generation. Figures 8.3 and 8.4 illustrate the payback times for the alternative Proposed Amended Development in years. For full details see *'payback time and CO2 emissions'* tab of AI Volume 3 Appendix 8.2: Proposed Amended Development 6 Turbine Carbon Calculator

RESULTS	Exp.	Min.	Max.
Net emissions of carbon dioxide (t $CO_{2\ eq}$.)	**50554**	**48268**	**57304**
Carbon Payback Time			
…coal-fired electricity generation (years)	0.7	0.6	0.9
…grid-mix of electricity generation (years)	2.5	2.2	3.2
…fossil fuel - mix of electricity generation (years)	**1.4**	**1.3**	**1.8**

Figure 8.3: Carbon payback time for the Proposed Development

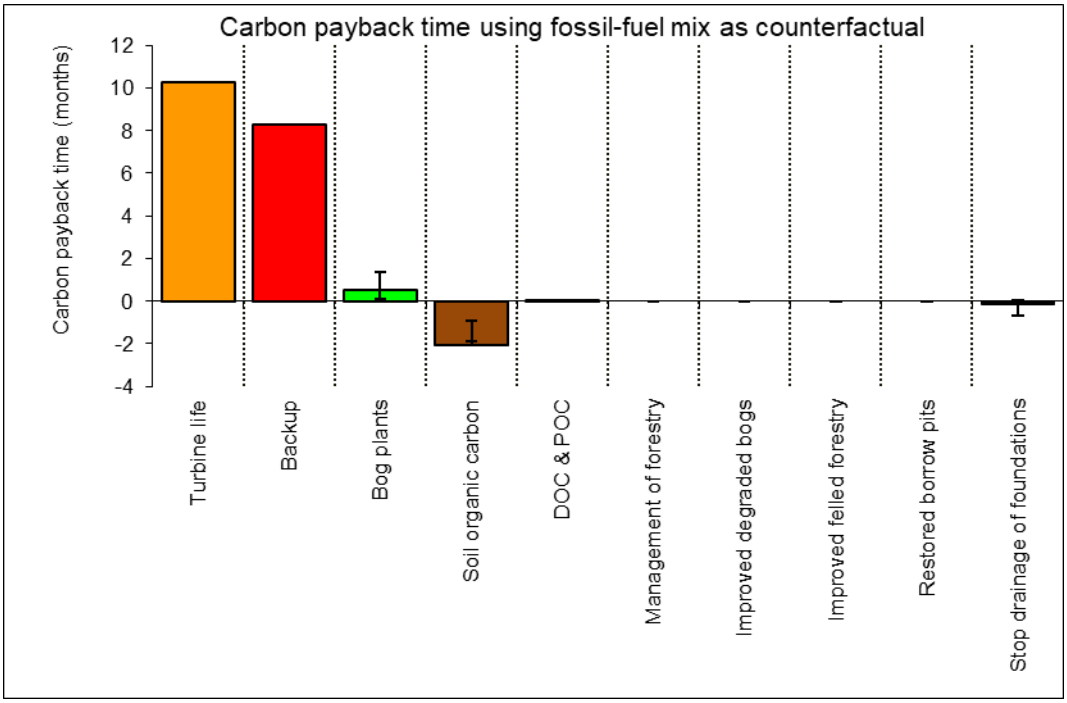

Figure 8.4: Carbon payback time for different elements of the assessment

8.3.8 The results from the carbon calculator reveal that the Proposed Amended Development would have effectively paid back its expected carbon debt from manufacture, construction, impact on habitat and decommissioning within 1.4 years, if it replaced the fossil fuel-mix electricity generation method. Based on the minimum and maximum scenarios however, the analysis shows that the payback time for fossil fuel-mix generation ranges between 1.3 to 1.8 years respectively.

Summary

8.3.9 In this context, the results of this assessment reveal that the net impact of the Proposed Amended Development would remain positive overall, as over its 35-year lifespan, it is expected to generate over 33 years' worth of clean energy if it replaced fossil fuel-mix electricity generation and nearly 32 years' worth of clean energy even if it replaces cleaner grid-mix electricity generation.

9. Eskdalemuir Impact Calculations and Assessment

9.1 Introduction to Eskdalemuir

9.1.1 Fred. Olsen Renewables' Scawd Law Development site lies within the 50km Ministry of Defence (MoD) Safeguarding zone for the Eskdalemuir Seismic Array. The detection capabilities of the Eskdalemuir Seismic Array are protected from seismic noise generated by wind turbines using a cumulative 0.336nm noise budget for all turbines built within 50 km of the array.

9.1.2 A Seismic Impact Limit (SIL) for any new wind turbines has been proposed to maximise the installable wind energy capacity of the Southern Uplands while continuing to protect the detection capabilities of the Eskdalemuir seismic array. A SIL between 0.00836 nm·MW-0.5 and 0.00528 nm·MW-0.5. will likely be set for all new wind turbines installing Eskdalemuir Consultation Zone.

9.1.3 For the full history and technical background of the Eskdalemuir Seismic Array and developments of policy to support Wind Energy developments in the region, please refer to sections 2, 3, and 4 of the full EKA calculations report for Scawd Law, in AI Volume 3 Appendix 9.1.

9.2 Scawd Law Calculation Results & Status in the ECZ

9.2.1 Fred. Olsen Renewables have contracted subject matter experts Xi Engineering Consultants (XiEC) to determine the impact of the site on the Eskdalemuir Seismic array. Scawd Law Wind Farm, as proposed, represents 6 turbines, each with a power rating of 6.0 MW and has an average distance to the Eskdalemuir seismic array of ~ 37.5 km.

9.2.2 Calculations to determine impact of developments in the ECZ include those to determine:

- Total seismic budget requirement for a selection of turbine models
- Results of Seismic Impact Limit (SIL) scenarios for a selection of turbine models
- Results of high-probability EKA wind farm approval queue scenarios

9.2.3 The levels of Seismic Budget required by Scawd Law Farm have been calculated using the best available science and most up to date data in the public domain. From these calculations conducted by XiEC, we see that the seismic budget requirement for the Scawd Law Wind Farm ranges between 0.003349 nm and 0.012995 nm, depending on which make of turbine is deployed.

9.2.4 The levels of Seismic Impact Limit have been calculated for all available data and 2023 Refined Phase 4 measurements. All 6 turbines could be built without exceeding the 1 GW SIL limit (0.00836 nm.MW-0.5), or the 2.5 GW SIL limit (0.00528 nm·MW-0.5.). All turbines are at a sufficient distance from the EKA that they do not breach any of the SIL scenarios under consideration by the EWG (1, 1.25, 1.5, 2 & 2.5 GW). The fact that any of the proposed SIL's would not be breached is testament to efficient use of any budget and minimal impact on the array.

9.2.5 Four queue scenarios with 1.0 GW, 2.0 GW or 2.5 GW SILs were considered. In all scenarios, Scawd Law will fall within the 0.336 nm budget except for Scenario 1 and Scenario 4 for a SIL

of 1 GW. These scenarios represent a 1GW being adopted and the consumption of the budget by Wind Farms ahead of Scawd Law in the 'queue'. However, if either a 2.0 GW or 2.5 GW SIL were adopted, Scawd Law would fall within budget for all Scenarios.

9.3 Conclusion

9.3.1 It is expected that the Scawd Law development will be capable of accommodation within the revised seismic budget and safeguarding polices that are under consideration by the Scottish Government and the MoD.

9.3.2 The analysis shows that the preferred Government and Industry SIL levels of 2-2.5GW would provide sufficient budget for the site to be built out within the cumulative seismic budget, without requirement of mitigation, and therefore not compromise the safeguarding of the array.

9.3.3 Due to the distance to the array, Scawd law represents an efficient use of seismic budget.

9.3.4 Sections 5 and 6 of AI Volume 3 Appendix 9.1 demonstrate the methodology of calculations for the Eskdalemuir Consultation Zone (ECZ), and the calculations as performed for Scawd Law, including detailed results.

10. Summary

10.1.1 This Report assesses an alternative layout with reduced turbine numbers and increased BESS(the Proposed Amended Development) to alleviate potential concerns.

10.1.2 By applying effective embedded mitigation measures and following good practice guidelines during construction, the magnitude of residual effects of the Proposed Amended Development on all IOFs is assessed as being **moderate/low negative/negligible** in terms of magnitude, and **not significant**.

10.1.3 For ecological concerns, it is considered that the Proposed Amended Development would have no change to the magnitude of residual effects of the Proposed Development which would remain as **low negative/negligible** with the implementation of embedded mitigation and a HMP, and therefore are not significant.

10.1.4 As a result of the Proposed Amended Development (the potential removal of turbines T7 and T8), the significance of effects of the Proposed Development with revised design on the geological, hydrological and hydrogeological environment remains as **not significant** as stated in Chapter 9 of the EIAR.

10.1.5 The Proposed Amended Development would have a similar visual envelope as the Proposed Development, but a slight reduction in the horizontal extent and cluster of turbines (due to the potential removal of Turbines 7 and 8).

10.1.6 The visual envelope would decrease within the surrounding valleys with the removal of the two highest turbines from the Proposed Development resulting in visibility being experienced at higher altitudes on the valley sides. This would result in a slight improvement, but broadly theoretical visibility of the Proposed Amended Development would be the same as before.

10.1.7 There would be a slight improvement to the direct effects to the Proposed Development Area as a result of the potential removal of Turbines 7 and 8 and adjoining access track. However, the changes to the landscape within the site would **still be significant**.

10.1.8 Within the wider landscape, changes to landscape character would be minor and related to visibility of turbines as a cluster but would not alter the assessment of character provided for the Proposed Development.

10.1.9 For viewpoints, settlements and walking routes, there would be a slight change in the horizontal extent of the ridgeline occupied as a result of the potential removal of Turbines 7 and 8, as well as less turbines within the cluster. This reduction is noted but the other turbines would still be seen within the view and the effects assessed in the EIAR would not be altered. The exception to this is Viewpoint 12: Minor Road/NCR1 (The Batta) the potential removal of Turbines 7 and 8 would result in a reduction in magnitude from Moderate to Minor.

10.1.10 Whilst the changes to the Proposed Amended Development have improved the overall layout by removing turbines from the highest part of the ridgeline, reducing the horizontal spread along the ridgeline, and reducing turbines within the cluster through the potential removal of Turbines 7 and 8, landscape and visual effects have **not altered noticeably**, and the alterations do not translate into a change in significant effects identified.

10.1.11 Operational noise from the Proposed Amended Development can be considered to be **not significant**.

10.1.12 The results of carbon balance assessment reveal that the net impact of the Proposed Amended Development would **remain positive** overall, as over its 35-year lifespan, it is expected to

generate over 33 years' worth of clean energy if it replaced fossil fuel-mix electricity generation and nearly 32 years' worth of clean energy even if it replaces cleaner grid-mix electricity generation.

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