



**Clachaig Glen Wind Farm**

**Environmental Impact  
Assessment Report**

**Volume 2a**

**Main Report**

**Chapter 10:  
Ornithology**

# 10. Ornithology

## 10.1 Introduction

- 10.1.1 This chapter addresses ornithology matters and assesses the potential impacts and effects of the Proposed Development on bird species. Where appropriate, it provides details of proportionate mitigation and/or enhancement measures to minimise adverse effects on birds. This chapter relates to ornithological features only. Chapter 9 of this Environmental Impact Assessment Report (EIAR): Ecology describes the assessment of impacts and effects on ecological features.
- 10.1.2 This chapter is supported by Figures 10.1 to 10.14 (EIAR Volume 2b) and the following Appendices (EIAR Volume 3):
- Appendix 9.1: Method for Assessment of Ecological Impacts<sup>1</sup>,
  - Appendix 10.1: Zone of Influence of Ornithological Features, and
  - Appendix 10.2: Collision Risk Modelling.
- 10.1.3 Certain raptor and other rare species are regarded by NatureScot (formerly Scottish Natural Heritage (SNH)) as being vulnerable to persecution, for which reason the precise locations of breeding sites of these species are confined to Confidential Annex 10.1: Breeding Locations of Schedule 1 Birds (EIAR Volume 4).
- 10.1.4 Also relevant to this chapter is the Habitats Regulations Appraisal (HRA) Screening Report which is one of the documents submitted as part of the Section 36 Application in support of the Proposed Development. This describes the screening exercise conducted to test for likely significant effects from the Proposed Development on the qualifying features of Special Protection Areas (SPA). Where appropriate, reference is made in this chapter to the analysis presented in the HRA Screening Report.
- 10.1.5 Throughout this chapter, species are given their scientific names when first referred to and their common names only thereafter. All distances are cited as the shortest boundary to boundary distance ‘as the crow flies’ unless otherwise specified. The term the ‘Development Site’ is used to refer to the area within the red line boundary of the Proposed Development, including access tracks (as shown on Figure 1.4: Site Access leading to Main Development Site, EIAR Volume 2b).
- 10.1.6 The assessment of impacts on ornithological features has been informed and influenced by consultation held with several statutory and non-statutory stakeholders. A summary of the consultation held, the information / recommendations provided by consultees and details of how this EIA has responded to consultee feedback is provided in Table 10-1.

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<sup>1</sup> The methods for assessing ecological impacts are consistent when considering both ecological features addressed in Chapter 9 and the ornithological features addressed in this Chapter.

**Table 10-1 Summary of Consultation**

<b>Consultee</b>	<b>Information / Recommendations Provided</b>	<b>Response in this EIAR</b>
Argyll and Bute Council	<p>Date of response: 16 October 2020</p> <p>The Local Biodiversity Officer (LBO) provided comments as part of the Council's consultation response to the Scoping Report (see Appendices 5.1: Scoping Report and 5.2: Scoping Opinion; EIAR Volume 3). The LBO identified a number of species which could be important for consideration as part of the Environmental Impact Assessment (EIA) and noted that mitigation to protect breeding birds would be required during construction of the Proposed Development.</p>	<p>Important bird species for which potentially significant effects could occur as a result of the Proposed Development have been included in the EIA. Mitigation measures to protect breeding birds are described in this chapter.</p>
NatureScot	<p>Date of response: 08 May 2020</p> <p>A summary of all of the ornithological desk study and field survey carried out to date both for the 2016 EIA and subsequently for the Proposed Development was provided to NatureScot in April 2020. NatureScot were asked to confirm whether the studies completed between 2014 and 2019 were sufficient to inform the EIA for the Proposed Development, and that the survey data collected in 2015/16 would be considered NatureScot valid.</p> <p>NatureScot advised that if the EIAR was not submitted until 2021, they would consider the 2015 breeding season data to be too dated. NatureScot therefore advised that survey during an additional breeding season should be completed prior to submission.</p> <p>NatureScot also advised that the EIAR should include a full assessment of all 'key' species and include revised collision risk modelling based on the proposed layout and revised specification of the turbines.</p>	<p>Following NatureScot's advice, an additional breeding season of ornithological field survey was completed in 2020. Moreover, due to unexpected delays to submission of the Section 36 Application, surveys were also carried out between 30 March and 20 August 2021. The data collected have been used to inform the impact assessment described in this chapter.</p> <p>Collision risk modelling was also carried out using the data collected from field surveys completed in 2019, 2020 and 2021, in addition to modelling carried out previously using data collected between 2014 and 2018. The modelling was based on the layout and revised turbine specifications of the Proposed Development.</p>
Royal Society for the Protection of Birds (RSPB)	<p>Date of response: 31 August 2020</p> <p>RSPB provided a consultation response to the Scoping Report. RSPB advised that, in their opinion, turbines T01 and T03 should be moved east from open ground and into plantation forestry, and that T04 should be</p>	<p>The RSPB's consultation response has been considered by the Applicant. However, the positions of T01, T03 and T04 have not been substantially changed due to the spacing requirements between each turbine, as</p>

Consultee Information / Recommendations Provided	Response in this EIAR
<p>moved further from the edge of the forestry. They also recommended that turbines should be located at least 500m from black grouse <i>Tetrao tetrix</i> lek sites.</p> <p>RSPB also recommended that the EIAR should include details of mitigation / enhancement measures in relation to priority habitats and species, including peatland restoration and native broadleaved tree planting.</p>	<p>recommended by manufacturers. This is to reduce stresses on the turbines and also ensure high operating efficiencies. Whilst there is additional space within the forestry for one of the turbines to move, this is into an area of high sensitivity for landscape and, balancing the various factors, it was decided not to move turbines into that area following the responses during the public consultations where concerns were raised by NatureScot and Argyll and Bute Council on the visibility of turbines placed on higher ground on the hills.</p> <p>The nearest black grouse lek identified through targeted survey is located more than 750m from the closest turbine location and more than 500m from the nearest infrastructure (borrow pit BP05).</p> <p>Habitat creation and enhancement which will be delivered by Forestry and Land Scotland (FLS) – with funding provided by the Applicant – within the Development Site, as is described in this chapter and in Chapter 9: Ecology.</p>

## 10.2 Legislation, Policy and Guidance

- 10.2.1 This assessment has been carried out within the context of the following relevant legislative instruments, planning policies and guidance documents:
- Directive 2009/147/EC on the conservation of wild birds (the ‘Birds Directive’),
  - Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the ‘Water Framework Directive’),
  - Regulation 1143/2014 on invasive alien species (‘Invasive Alien Species Regulation’),
  - Convention on Wetlands of International Importance (‘Ramsar convention’),
  - Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the ‘Habitats Regulations’),
  - Wildlife and Countryside Act 1981 (as amended) (the ‘WCA’),

- Nature Conservation (Scotland) Act 2004 (as amended),
- Wildlife and Natural Environment (Scotland) Act 2011 (as amended),
- Scottish Planning Policy (SPP) 2014,
- The Argyll and Bute Local Development Plan (LDP) 2015,
- The Argyll and Bute Proposed Local Development Plan 2 (LDP2), to be adopted in January 2023,
- Argyll and Bute Local Biodiversity Action Plan 2010 – 2015 (LBAP) and subsequent reports prepared by Argyll and Bute Council to comply with their Biodiversity Duty,
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (the Chartered Institute of Ecology and Environmental Management (CIEEM), 2018),
- Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH, 2017),
- Assessing Significance of Impacts from Onshore Windfarms on Birds out with Designated Areas (SNH, 2018a),
- Assessing Connectivity with Special Protection Areas (SPAs) (SNH, 2016), and
- Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012).

10.2.2 Further information on relevant planning policy can be found in Chapter 6: Planning and Energy Policy Context, as well as the Planning Statement submitted as part of the Section 36 application for the Proposed Development.

## 10.3 Methodology

### *Assessment Scope*

- 10.3.1 The scope of survey and assessment described in this chapter was informed by the guidance contained in the published documents listed in Paragraph 10.2.1, on the responses of consultees (as set out in Table 10-1), and on the results of detailed study completed previously for the 2016 EIA.
- 10.3.2 NatureScot has devised 21 ‘Natural Heritage Zones’ (NHZ) covering the whole of Scotland, which reflect biogeographical differences across the country. Assessment of the impacts on birds in this EIA has been carried out in the context of the Argyll West and Islands Natural Heritage Zone (NHZ 14), within which the Proposed Development is located (see Figure 10.1, EIAR Volume 2b). This includes the assessment of cumulative effects which has considered the potential for in-combination effects to arise due to other wind farm developments and land use changes within NHZ 14.
- 10.3.3 For the purposes of desk study, field survey and impact assessment, protected and notable species which were the target ornithological features of this EIA comprised:

- Qualifying features of SPAs within 10km (or further where connectivity exists) of the Proposed Development,
- All species listed on Annex I of the Birds Directive,
- All species listed on Schedule 1 of the WCA,
- Species listed on the Scottish Biodiversity List (SBL),
- All species on the Argyll and Bute LBAP,
- All species on the Red and Amber Lists of Birds of Conservation Concern 4 (BoCC4) (Eaton et al, 2015), and
- Invasive non-native bird species listed on Schedule 9 of the WCA (although this no longer legally applies in Scotland) and those considered to be of European Union (EU) concern under the Invasive Alien Species Regulation.

10.3.4 The following potential impacts have been assessed in this chapter:

- Loss of habitat which supports bird species as a result of the construction of wind farm infrastructure,
- Disturbance to and/or displacement of species during construction, operation and/or decommissioning,
- Accidental destruction of active bird nests,
- Barrier impacts (by which birds are deterred from using normal routes to feeding or roosting grounds),
- Mortality or injury through collision with wind turbine blades or other infrastructure, and
- Cumulative impacts arising in combination with other wind farms or due to other land use changes within NHZ 14.

### *Zone of Influence*

- 10.3.5 The ‘zone of influence’ (Zol) of the Proposed Development is the area over which ornithological features may be subject to significant effects as a result of its construction, operation, decommissioning and/or associated activities. The Zol can extend beyond the boundary of the Proposed Development.
- 10.3.6 The Zol will vary for different ornithological features depending on their sensitivity to an environmental change. It is therefore appropriate to identify different Zol for different features. As recommended by CIEEM (2018), professionally accredited or published studies and guidance, where available, were used to help determine the likely Zol, as well as professional judgement. However, CIEEM (2018) also highlights that establishing the Zol should be an iterative process and can be informed by further desk study and field survey. Where limited information is available, the precautionary principle was adopted and a Zol estimated on that basis.
- 10.3.7 A Zol was estimated for each relevant ornithological feature through the consideration of the nature of the Proposed Development, a review of published literature and the results of desk

study and field survey which were carried out to establish the baseline conditions. The ZOI adopted in this EIA are given in Appendix 10.1: Zone of Influence for Ornithological Features (EIAR Volume 3).

## **Ornithological Impact Assessment**

10.3.8 The assessment of ornithological impacts described in this chapter was conducted in accordance with the guidelines published by CIEEM (2018). The principal steps involved in the CIEEM approach can be summarised as:

- Baseline conditions are determined through targeted desk study and field survey to identify ornithological features that are both present and might be affected by the Proposed Development (both those likely to be present at the time works begin, and for comparison, those predicted to be present at a set time in the future),
- The importance of identified ornithological features is evaluated to place their relative biodiversity and nature conservation value into a geographic context, determining those that need to be considered further within the impact assessment,
- The potential impacts of the Proposed Development on relevant ornithological features are described, taking into account established best practice, legislative requirements and embedded design measures,
- The likely effects (adverse or beneficial) on relevant ornithological features are assessed, and where possible quantified,
- Measures to avoid or reduce (or, if necessary, compensate) any predicted significant effects, if possible, are developed in conjunction with other elements of the design (including mitigation for other environmental disciplines),
- Any residual effects of the Proposed Development and their significance are reported, and
- Scope for enhancement measures is considered.

10.3.9 Impacts are assessed in view of the conservation status of the bird species under consideration. NatureScot defines the conservation status of a species as “*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest*” (SNH, 2018a). A species’ conservation status is considered to be ‘favourable’ when:

- Population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats,
- The natural range of the species is not being reduced, nor is it likely to be reduced for the foreseeable future, and
- There is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis.

10.3.10 NatureScot recommends that the concept of the favourable conservation status of a species should be applied at a national (Scottish) level in order to determine the level of significance

of an effect arising from the impact(s) of development (SNH, 2018a). However, as highlighted in Paragraph 10.3.2, this assessment has also been conducted in the context of NHZ 14, within which the Proposed Development is located. Therefore, even where an impact may not affect the conservation status of a species at the national level, the potential for effects on the conservation status of that species within the NHZ has also been considered.

10.3.11 A detailed description of the CIEEM method for impact assessment is provided in Appendix 9.1: Method for Assessment of Ecological Impacts (EIAR Volume 3).

10.3.12 However, CIEEM impact terminology and the geographical scale employed for importance and significance of effect have been translated in this assessment into more widely-used terms, in keeping with other chapters of the EIAR and following the approach and definitions set out in Chapter 2: Approach to EIA. Full descriptions of the definitions of impact magnitude and significance of effect can be found in Tables 2-5 and 2-6, respectively, in Chapter 2. However, in short, the terms used are as follows:

- Sensitivity has been translated to the terms ‘Very High’, ‘High’, ‘Medium’, ‘Low’ and ‘Negligible’ as referenced in Chapter 2,
- Magnitude of change (severity of impact, accounting for parameters such as duration and frequency, as well as magnitude or extent, as described in Appendix 9.1: Method for Assessment of Ecological Impacts (EIAR Volume 3), and employing professional judgement as necessary) has been translated to the terms ‘High’, ‘Medium’, ‘Low’ or ‘Negligible’ as referenced in Chapter 2, and
- Significance of effect has been translated to the terms ‘Major’, ‘Moderate’, ‘Minor’ or ‘Negligible’ as referenced in Chapter 2. Significance of effect can either be adverse or beneficial.

10.3.13 For the purposes of this EIA, effects predicted to be Minor or Negligible are generally considered to be ‘Not Significant’. Effects assessed as either Moderate or Major are generally considered to be ‘Significant’.

## *Desk Study*

10.3.14 A desk study was carried out to identify nature conservation designations, and protected and notable species potentially relevant to the Proposed Development. A stratified approach was taken when defining the desk study area, based on the likely ZOI of the Proposed Development on different ornithological features. Accordingly, the desk study sought to identify:

- International nature conservation designations within 10km of the Development Site (or further afield where there is clear connectivity (e.g. through hydrological linkage or where the qualifying species are known to range over a wider distance than this)),
- National statutory nature conservation designations within 2km,
- Local non-statutory nature conservation designations within 1km, and
- Records of protected and/or notable bird species within 2km.

10.3.15 The desk study was carried out using the data sources detailed in Table 10-2.

**Table 10-2 Desk Study Data Sources**

Data Source	Date Accessed	Data Obtained
NatureScot SiteLink website ( <a href="https://sitelink.nature.scot/home">https://sitelink.nature.scot/home</a> )	26 May 2020 (revisited 18 October 2021)	<ul style="list-style-type: none"> <li>International statutory designations within 10km of the Development Site; and,</li> <li>Other statutory designations within 2km.</li> </ul>
Argyll Raptor Study Group	13 September 2020	<ul style="list-style-type: none"> <li>Information on the breeding locations of raptors within approximately 2km of the Development Site, extended to approximately 6km for golden eagle <i>Aquila chrysaetos</i>.</li> </ul>
NBN Atlas Scotland (commercially-available records only)	27 May 2020	<ul style="list-style-type: none"> <li>Commercially-available biological records made since the year 2000 (inclusive).</li> </ul>
Argyll and Bute Council website ( <a href="https://www.argyll-bute.gov.uk/home">https://www.argyll-bute.gov.uk/home</a> )	26 May 2020	<ul style="list-style-type: none"> <li>Local Development Plan policies relevant to nature conservation;</li> <li>Local non-statutory nature conservation designations within 1km of the Development Site; and,</li> <li>Argyll and Bute LBAP information.</li> </ul>
Ordnance Survey (OS) 1:25,000 maps and aerial photography	26 May 2020	<ul style="list-style-type: none"> <li>Habitats and connectivity relevant to interpretation of planning policy and potential protected / notable species constraints.</li> </ul>

10.3.16 The Highland Biological Recording Group (HBRG) was contacted as they currently hold all records for the Argyll and Bute region. HBRG advised that all the records they currently hold can be found on the NBN Atlas Scotland. Therefore, all desk study records of protected and notable species were extracted from the commercially-available records provided by the NBN Atlas Scotland, from 2000 onwards.

### *Field Survey*

10.3.17 Ornithology field surveys were conducted between March 2014 and April 2016 to inform the 2016 EIA. Subsequently, field surveys were completed between April 2018 and August 2021 for the Proposed Development. As the Proposed Development has remained within the same general area throughout its design evolution, ornithological field survey has been consistent throughout the period 2014 to 2021, covering the same (or broadly similar) areas and following the same methodologies.

10.3.18 All ornithology surveys completed at the Development Site have followed the *Recommended bird survey methods to inform impact assessment of onshore wind farms* (SNH, 2017), as well as the following relevant guidance documents (or earlier versions of these, according to the time that survey was completed):

- The Brown and Shepherd (1993) methodology for censusing upland waders,
- Species-specific approaches for surveying raptors described in Hardey *et al* (2013), and
- Other species-specific methodologies described in Gilbert *et al* (1998), including for breeding divers and lekking black grouse.

- 10.3.19 An overview of the ornithological field surveys completed between 2014 and 2021 is provided in Table 10-3. A detailed description of the methods adopted for each survey type is provided under the relevant sub-headings in this section of the chapter.
- 10.3.20 The survey areas used varied according to survey type. All buffer distances quoted under the methodology sub-headings are based around the boundary of the Development Site. The adopted field survey areas for each survey type are shown on Figure 10.2 (EIAR Volume 2b).

**Table 10-3 Overview of Ornithology Field Survey Completed Between 2014 and 2021**

Year	Survey	Survey Period	Description of Survey Effort
2014	Breeding raptors	March – August 2014	Covering the entire 2014 breeding season.
	Lekking black grouse	April and May 2014	Covering the peak lekking season in 2014.
	Moorland breeding birds	April – July 2014	Four survey visits covering 2014 breeding season.
	Breeding divers	April – August 2014	Covering the entire 2014 breeding season.
	Vantage points (VPs)	November – December 2014	Together with VP survey completed in January and February 2015, this covered the majority of the 2014/15 non-breeding season.
2015	VPs	January – February 2015	Together with VP survey completed in November and December 2014, this covered the majority of the 2014/15 non-breeding season.
		March – August 2015	Full six months of survey covering the 2015 breeding season.
	Breeding raptors	March – August 2015	Covering the entire 2015 breeding season.
	Lekking black grouse	April and May 2015	Covering the peak lekking season in 2015.
	Moorland breeding birds	April – July 2015	Four survey visits covering 2015 breeding season.
	Breeding divers	April – August 2015	Covering the entire 2015 breeding season.

<b>Year</b>	<b>Survey</b>	<b>Survey Period</b>	<b>Description of Survey Effort</b>
2016	VPs	September – December 2015	Together with VP survey in January and February 2016, this covered the entire 2015/16 non-breeding season.
		January – February 2016	Together with VP survey between September – December 2015, this covered the entire 2015/16 non-breeding season.
		March – April 2016	Covering early part of 2016 breeding season.
2018	VPs	April – August 2018	Covering the majority of the 2018 breeding season.
	Breeding raptors	July 2018	Single breeding season survey visit.
	Breeding divers	July 2018	Single breeding season survey visit
2019	VPs	September – December 2018	Together with VP survey between January – February 2019, this covered the entire 2018/19 non-breeding season.
		January – March 2019	Together with VP survey between September – December 2018, this covered the entire 2018/19 non-breeding season.
	VPs	March – August 2020	Covering the entire 2020 breeding season.
2020	Breeding raptors	March – August 2020	Covering the entire 2020 breeding season.
	Lekking black grouse	March and April 2020	Covering the peak lekking season in 2020.
	Moorland breeding birds	May – July 2020	Three visits covering the 2020 breeding season (visit in April 2020 not possible due to Covid-19 pandemic).
2021	Breeding divers	May – August 2020	Covering the entire 2020 breeding season.
	VPs	March – August 2021	Covering the entire 2021 breeding season.

10.3.21 In summary, and as shown in Table 10-3, survey effort between 2014 and 2021 has resulted in the completion of:

- Non-breeding season vantage point surveys: covering two full non-breeding seasons (2015/16 and 2018/19), plus the majority of the 2014/15 non-breeding season (November 2014 – February 2015),

- Breeding season vantage point surveys: covering three full breeding seasons (2015, 2020 and 2021) plus the majority of the 2018 breeding season (April – August 2018),
- Moorland (including wader) breeding bird surveys: full seasons of survey completed in each of 2014, 2015 and 2020,
- Breeding raptor and breeding diver surveys: full programme of breeding raptor and diver surveys completed in each of 2014, 2015 and 2020. A single survey visit for breeding raptors and breeding divers was completed in 2018, and,
- Lekking black grouse: surveys for lekking black grouse completed in 2014, 2015 and 2020.

### **Vantage Point Surveys**

- 10.3.22 Vantage point survey was completed from three locations between November 2014 and April 2016. Approximately nine hours of survey per month were completed from each VP during this period, resulting in a total of 485 hours of observation. The location of VP1 was moved by approximately 430m in April 2015, giving a slightly smaller but broadly similar viewshed to the original location. The original location of VP1 is therefore referred to as VP1a, while the second altered location, which was used until surveys were completed in 2021, is referred to as VP1b. A note on the reasons why the VP was moved is provided further in Confidential Annex 10.1.
- 10.3.23 In 2018, VP surveys were initially carried out from two of the three locations used between 2014 and 2016 (VP1b and VP3). From August 2018, a new VP location was adopted to capture additional golden eagle activity. This location is referred to throughout this chapter as VP2b. The location used between 2014 and 2016, which was dropped in 2018, is hereafter referred to as VP2a. The area covered by the viewshed of VP2b was entirely different from that covered by VP2a. Six hours of survey per month were completed from each of VP1b and VP3 between April and July 2018, inclusive. From August 2018, this was increased to at least nine hours per month from each of VP1b, VP3 and VP2b. In total, 271 hours of survey were completed between April 2018 – February 2019, comprising 99 hours from VP1b, 76 hours from VP2b and 96 hours from VP3.
- 10.3.24 In 2020, six hours per month were completed from each of VP1b, VP2b and VP3, giving a total of 108 hours of observation.
- 10.3.25 In 2021, the location of VP2b was again moved, giving a slightly different viewshed. The 2021 location is referred to as VP2c. Six hours of survey were carried out per month from each of VP1 and VP3 between March and August 2021, inclusive. Only three hours of survey were carried out from VP2c in March 2021. Thereafter, six hours of survey were carried out from this location per month between April and August 2021, inclusive. A total of 105 hours of survey were completed from all three VP locations during the 2021 breeding season.
- 10.3.26 Full details of the VP survey effort between 2014 and 2021 is provided in Appendix 10.2: Collision Risk Assessment (EIAR Volume 3). The locations of VP1a, VP1b, VP2a, VP2b, VP2c and VP3, and their associated viewsheds, are shown on Figure 10.3 (EIAR Volume 2b).
- 10.3.27 VP surveys followed the methods described in SNH (2017) (or the previous revision of that document where surveys preceded the 2017 version of the guidance). The surveys were

carried out during daylight hours, including around sunrise and sunset, at which times certain species may be more active, including Greenland white-fronted goose *Anser albifrons flavirostris*. Each survey lasted for a maximum of three hours, with a minimum of thirty minutes break between each three-hour survey.

10.3.28 Target species recorded during the VP surveys were:

- All raptor species listed on Schedule 1 of the WCA,
- All diver species,
- All wader species,
- All geese, swans and ducks, and
- Black grouse.

10.3.29 Kestrels *Falco tinnunculus*, buzzards *Buteo buteo*, ravens *Corvus corax*, red grouse *Lagopus lagopus*, grey heron *Ardea cinerea* and gulls were also recorded as secondary species.

10.3.30 The flight lines of all recorded target species were drawn and flight heights estimated at fifteen second intervals. Any other observations of note were also recorded, including evidence of territorial behaviour.

10.3.31 Throughout this chapter, when describing the results of VP surveys, the term ‘individual’ is used to give an indication of the level of flight activity by particular species. However, the term ‘individual’ when used in this capacity does not necessarily mean different birds. Rather, ‘individual’ is used to illustrate the number of birds recorded in a single flight observation. For example, a flight by two birds would represent one flight, involving two individuals. The same two birds recorded together later in the same survey would represent another one flight, involving two individuals. The total for that survey would therefore be two flights, involving four individuals, even though only two different birds were present. In summary, therefore, the number of ‘individuals’ is not necessarily the number of different birds but is a reflection of the level of flight activity by a species.

### **Moorland Breeding Bird Survey**

10.3.32 Survey for moorland breeding birds was carried out within the boundary of the Development Site plus a 2km buffer (reduced to a 500m buffer around the main access track), following an adapted version of the methodology for surveying upland waders (Brown and Shepherd, 1993). In line with recommendations made by Calladine *et al* (2009), four survey visits were made between April and July in 2014 and 2015. Due to restrictions associated with the Covid-19 pandemic in 2020, no survey visit was carried out in April of that year. Three visits were made subsequently between May and July 2020.

10.3.33 Pre-determined survey routes were devised which allowed surveyors to approach all parts of the survey area to within at least 100m. Surveyors maintained a constant speed, covering 500m<sup>2</sup> quadrats in 20 to 25 minutes. The route taken to walk the moorland breeding bird survey transects was varied between survey visits. Stops were made at regular intervals to scan for birds and to listen for song and calls. Surveys were conducted during daylight hours in favourable weather conditions and were not carried out during persistent rainfall or in winds exceeding approximately Beaufort force 4.

- 10.3.34 Birds encountered were recorded and mapped onto a suitably scaled OS field map using standard British Trust for Ornithology (BTO) notation, including a description of activity / behaviour. Where necessary, additional field notes were taken.

### **Breeding Raptor Survey**

- 10.3.35 Survey for breeding raptor species listed on Annex I of the Birds Directive and/or Schedule 1 of the WCA was carried out in all areas of suitable habitat within 2km of the Development Site, this being extended to 6km for golden eagle. Surveys were carried out between March and August, inclusive, and were conducted under favourable weather conditions, in particular avoiding persistent heavy rainfall.
- 10.3.36 During preliminary visits, all suitable nesting habitats (such as areas of deep heather *Calluna vulgaris*, rocky crags or other areas of dense vegetation) within the survey area were searched for signs of occupancy. This involved a walkover of the survey area, with short *ad hoc* vantage point watches being made from suitable locations to observe birds and any behaviour indicative of breeding (for example, displaying, alarm calling, etc.). Searches were also made in potentially suitable locations for evidence of raptor presence, including prey remains, plucking posts, pellets, etc. All raptor species (or evidence) encountered were recorded and mapped on to suitably scaled OS maps. Any suspected or confirmed nest sites were also described and accurately mapped.
- 10.3.37 During subsequent survey visits, the species-specific methodologies described in Hardey *et al* (2013) were used to target areas in which raptors had been previously encountered (including during the course of other field survey) to establish and monitor the breeding success of those birds where nesting was suspected or confirmed. Extended vantage point watches were made from a suitable distance to avoid disturbance. Observations of activity and behaviour were made, and the numbers of chicks / fledged birds noted where possible.

### **Breeding Diver Survey**

- 10.3.38 Targeted searches were conducted for breeding red-throated diver *Gavia stellata* and black-throated diver *Gavia arctica*. The surveys were designed following the species-specific guidelines in Gilbert *et al* (1998).
- 10.3.39 All waterbodies within 2km of the Development Site were searched for the presence of divers. Viewing was initially done from a distance using telescope and binoculars to scan the surface of the water and shoreline of the waterbodies. In instances where no birds were observed on a waterbody, surveyors slowly approached and once satisfied that divers were absent, walked the entire perimeter to look for empty nest scrapes or signs that birds may have attempted to breed but had failed (for example, broken eggshells or dead chicks). Any other notes of relevance, including the presence of disturbance sources and/or evidence of predators, such as otter *Lutra lutra* and grey heron, were also recorded.
- 10.3.40 If any divers were detected on a waterbody, their behaviour was observed, taking particular note of evidence that breeding may be taking place, such as birds displaying, copulating or going ashore.

### **Lekking Black Grouse Survey**

- 10.3.41 Survey for lekking (displaying) black grouse followed the methods described for this species in Gilbert *et al* (1998).
- 10.3.42 Surveys were carried out within one hour of dawn to identify and locate the number and distribution of leks within at least 1.5km of all proposed turbine locations and associated infrastructure. All suitable areas were visited on at least two occasions in each of the years of 2014, 2015 and 2020.
- 10.3.43 Surveys were conducted in dry and calm weather and involved surveyors walking slowly, listening for lekking black grouse and scanning from suitable vantage point locations with binoculars. Where a lek was found, the number of males present was recorded, in addition to any females observed.

### **Collision Risk Modelling**

- 10.3.44 The Band Collision Risk Model (Band CRM) (Band *et al*, 2007) was used to estimate collision risk for those target species for which a sufficient level of flight activity was recorded by VP surveys. Modelling of collision risk under the Band CRM is a two-stage process. Stage 1 estimates the number of birds that will fly through the rotor swept area. Stage 2 predicts the proportion of these birds that would be hit by a wind turbine rotor blade. Combining both stages produces an estimate of collision fatality in the absence of any avoidance action by the birds. In reality, however, birds do avoid flying through rotor swept areas. Avoidance rates were therefore applied to the Band CRM following recommendations provided by NatureScot (SNH, 2018b).
- 10.3.45 As VP surveys were carried out from different VP locations, the data collected between 2014 and 2021 could not be combined for use in collision risk modelling. The results of CRM carried out for the 2016 EIA and again in using data collected between 2018 and 2021 are therefore all presented individually in this EIAR. The results of these separate CRM exercises still serve to predict potential collision risk for key species using data collected during these periods.
- 10.3.46 A full description of the CRM methods used for the Proposed Development are provided in Appendix 10.2: Collision Risk Modelling (EIAR Volume 3).

### **Limitations and Assumptions**

- 10.3.47 Desk study information is dependent upon people and organisations having submitted records for the area of interest. As such, a lack of records for particular species does not necessarily mean that they are absent from the study area. Likewise, the presence of records for particular species does not automatically mean that these still occur within the area of interest or are relevant to the Proposed Development.
- 10.3.48 Due to travel restrictions imposed in response to the Covid-19 pandemic, a moorland breeding bird survey visit could not be completed in April 2020. As a result, three, rather than four, moorland breeding bird survey visits were completed in 2020, between May and July. Given the relatively limited species assemblage present at the Development Site, this is not considered likely to have caused a significant underestimation of the species and/or number of birds present.

- 10.3.49 The location of VP2 moved twice between 2014 and 2021. The location of the original VP (VP2a) was to the south of the Proposed Development, while VP2b and VP2c were located within a short distance of one another to the north of the Proposed Development. Moreover, the turbine specifications proposed in 2014, and which were used to devise height bands for recording data during VP surveys at that time, changed following the consenting of the original scheme ('the Consented Development'). The height bands used from 2018 onwards were changed to reflect the new turbine specifications for the Proposed Development. Due to the differing viewsheds and different height bands used when surveying, it was not possible to combine data collected between 2014 and 2021 to conduct CRM. Instead, the results of CRM carried out using data collected between 2014 and 2018, and again between 2018 and 2021, have been compared.
- 10.3.50 There were no other significant limitations to the desk study, field survey or subsequent analysis which could affect the reliability of this impact assessment.

## 10.4 Baseline Environment

### Designated Sites

#### Statutory Designations

- 10.4.1 Four statutory designated sites for the conservation of bird species exist within or just beyond the search distances specified in Paragraph 10.3.14 (Rhunahaorine Point Site of Special Scientific Interest (SSSI) and Kintyre Goose Lochs SSSI are both included as they are located just beyond the 2km search distance for nationally designated sites). These are described in Table 10-4, listed in order of increasing distance from the Development Site. Their locations in relation to the Proposed Development are illustrated on Figure 10.4 (EIAR Volume 2b).

**Table 10-4 Statutory Designated Sites**

Designation	Reason(s) for Designation	Relationship to the Proposed Development
Sound of Gigha SPA	<p>Fully designated in December 2020, this is a large site providing diverse marine habitats for a range of sea birds.</p> <p>The qualifying features are:</p> <ul style="list-style-type: none"> <li>• Eider <i>Somateria mollissima</i>, non-breeding,</li> <li>• Great northern diver <i>Gavia immer</i>, non-breeding,</li> <li>• Red-breasted merganser <i>Mergus serrator</i>, non-breeding, and</li> <li>• Slavonian grebe <i>Podiceps auritus</i>, non-breeding.</li> </ul>	<p>Located 645m west of the access track entrance and 1.25km west of the main part of the Proposed Development. There is a hydrological connection between the Proposed Development and the SPA via the Clachaig Water and Killean Burn.</p>

<b>Designation</b>	<b>Reason(s) for Designation</b>	<b>Relationship to the Proposed Development</b>
Rhunahaorine Point Site SSSI	<p>The site is important as a roosting and feeding area for large numbers of wintering Greenland white-fronted geese and for supporting the largest little tern <i>Sternula albifrons</i> colony on Kintyre.</p> <p>The notified ornithological features are:</p> <ul style="list-style-type: none"> <li>• Greenland white-fronted goose, non-breeding, and</li> <li>• Little tern, breeding.</li> </ul>	<p>Located 2.2km north of the access track and 4km north of the main part of the Proposed Development. Separated from the Development Site by farmland and conifer plantation.</p>
Kintyre Goose Roosts SPA and Wetland of International Importance (Ramsar site)	<p>The Kintyre Goose Roosts SPA and Ramsar site comprises a series of hill lochs (Loch Garasdale, Loch an Fhraoch, Loch Lussa, Tangy Loch and Black Loch) and an area of grassland and heath at Rhunahaorine Point. The site regularly supports an internationally important wintering population of Greenland white-fronted goose, which is the sole qualifying feature.</p>	<p>A multi-part site located 2.4km north of the access track and 3.1km north of the main part of the Proposed Development at its nearest point. All but one area (located at Refleuch) of the Kintyre Goose Roosts SPA are coincident with the Ramsar site.</p>
Kintyre Goose Lochs SSSI	<p>The Kintyre Goose Lochs SSSI comprises a series of hill lochs (Loch Garasdale, Loch an Fhraoch, Loch Lussa and Black Loch). These sites are notified for their aggregations of Greenland white-fronted geese with each roost supporting nationally- or internationally-important numbers over the winter months.</p>	<p>A multi-part site located 2.4km north of the access track and 3.1km north of the main Development Site at its nearest point and separated by farmland and conifer plantation.</p> <p>Partly coincident with the Kintyre Goose Roosts SPA, but wholly coincident with the Kintyre Goose Roosts Ramsar site boundary.</p>

### ***Non-statutory Designations***

10.4.2 No non-statutory locally designated sites for the conservation of bird species exist within 1km of the Proposed Development.

### ***General Moorland Breeding Birds***

10.4.3 Moorland breeding bird surveys completed in 2014 and 2015 revealed a limited species assemblage, with small numbers of curlew *Numenius arquata* and snipe *Gallinago gallinago*. All curlew observations were well over 1km from the nearest turbine location (with the nearest

being approximately 1.4km from T03), and approximately 550m from the main access track. Snipe records were likewise mostly distant from proposed infrastructure, with the exception of one observation near the Allt Achadh a' Choirce and T03. Red grouse were recorded sparsely across open moorland areas. Otherwise, the breeding bird assemblage was generally composed of common breeding passerines typical of coniferous plantation. The locations of curlew and snipe observations from the 2014 and 2015 moorland breeding bird surveys are shown on Figure 10.5 (EIAR Volume 2b).

- 10.4.4 Only two wader species were recorded during the moorland breeding bird surveys in 2020. Snipe was recorded once, near T03 and T04, while a single lapwing *Vanellus vanellus* was recorded in flight approximately 750m west of T10 (see Figure 10.5, EIAR Volume 2b).
- 10.4.5 Common crossbills *Loxia curvirostra*, which are protected under Schedule 1 of the WCA but which are a common species in afforested sites across much of Scotland, were also recorded on three occasions as flocks of up to ten birds in flight (see Figure 10.6, EIAR Volume 2b).
- 10.4.6 Eight bird species on the Red List of Birds of Conservation Concern and seven species on the Amber List were recorded during the 2020 moorland breeding bird surveys. This included incidental observations of raptors and black grouse. The BoCC species recorded are presented in Table 10-5.

**Table 10-5 Red and Amber List Birds of Conservation Concern Recorded During 2020 Moorland Breeding Bird Surveys**

Red List BoCC	Amber List BoCC
Black grouse*	Common gull <i>Larus canus</i>
Cuckoo <i>Cuculus canorus</i>	Kestrel <i>Falco tinnunculus</i>
Hen harrier <i>Circus cyaneus</i> *^	Mallard <i>Anas platyrhynchos</i>
Lapwing	Meadow pipit <i>Anthus pratensis</i>
Lesser redpoll <i>Carduelis cabaret</i>	Red grouse
Skylark <i>Alauda arvensis</i>	Snipe
Song thrush <i>Turdus philomelos</i>	Willow warbler <i>Phylloscopus trochilus</i>
Whinchat <i>Saxicola rubetra</i>	

\* Also listed on Annex I of the Birds Directive

^ Protected under Schedule 1 of the WCA

- 10.4.7 The locations of Red and Amber Listed BoCC recorded during the 2020 moorland breeding bird surveys are shown on Figure 10.6 (EIAR Volume 2b; with the exception of lapwing and snipe which are shown on Figure 10.5).

## *Golden Plover*

- 10.4.8 Golden plover *Pluvialis apricaria* were not recorded at any time during breeding bird surveys between 2014 and 2020. They are therefore considered to be likely absent as a breeding species from the Development Site and wider Zol of the Proposed Development.
- 10.4.9 However, flights by flocks of golden plover during the non-breeding season were recorded from VPs in 2015/16 and in 2018/19. In 2015/16, a total of seventeen flights of 216 individuals were recorded. Most of these flights were associated with the ridge of Cruach Mhic an t-Saoir, to the east of the Development Site. There was only one flight recorded which passed across the footprint of the Proposed Development. Between January and March 2019, a total of twenty golden plover flights were recorded. Two flights comprising three individuals were recorded from VP1b and seven flights comprising 142 individuals were recorded from VP3. The remaining eleven flights, comprising 277 birds, were recorded from VP2b, but these were all more than 500m from the nearest turbine location and associated with the open ground to the north of the Development Site. The flights recorded from VP1b and VP3 were almost all on the open ground around Cnoc Odhar Auchaluskin, to the north-west of T03 and T04.
- 10.4.10 No flights by golden plover were recorded in 2020 or in 2021.
- 10.4.11 All recorded golden plover flights are shown on Figure 10.7 (EIAR Volume 2b).

## *Curlew*

- 10.4.12 Six curlew observations were made during moorland breeding surveys carried out within 2km of the Proposed Development in 2014 and 2015. However, curlew were not recorded during repeat surveys in 2020.
- 10.4.13 Curlew flight activity between 2014 and 2016 was limited to a total of nine flights, comprising eleven individuals. The majority of these were over the open ground at Cnoc Odhar Auchaluskin, to the north-west of T03 and T04, with a single flight through the centre of the Proposed Development.
- 10.4.14 Only two curlew flights were recorded between 2018 and 2021, with single birds observed in January 2019 and in June 2019.
- 10.4.15 With the exception of one observation, all curlew flights recorded from VP surveys were over open ground to the north-west, east and south of the Development Site. All recorded curlew flights are shown on Figure 10.7 (EIAR Volume 2b).

## *Snipe*

- 10.4.16 Snipe were recorded in open ground habitats by moorland breeding bird surveys. There were only five observations of this species within the Development Site. Four of these were to the north-west of T03, near the Allt Achadh a' Choirce. The remaining record within the Development Site was near Loch na Creige, more than 1km from the nearest proposed infrastructure.
- 10.4.17 Flight activity by this species was limited to a total of seven flights comprising twelve individuals. These were all over open ground to the north and north-west of the Development

Site, with a single flight crossing the footprint of the Proposed Development, between T03 and T04.

- 10.4.18 All recorded snipe flights are shown on Figure 10.7 (EIAR Volume 2b).

### *Greenland White-fronted Goose*

- 10.4.19 Between 2014 and 2016, a total of sixteen Greenland white-fronted goose flights were recorded, comprising 487 individuals. The majority of these were flights made in an easterly or westerly direction to the south of the Development Site boundary, with birds likely commuting between coastal feeding areas and a roosting loch. Three of the recorded flights were to the north of the Development Site boundary, all heading east. A further two flights were recorded just inside the boundary of the Development Site, approximately 415m from the position of T02.
- 10.4.20 However, between 2018 and 2021 no Greenland white-fronted goose flight activity was recorded. All recorded Greenland white-fronted goose flights are illustrated on Figure 10.8 (EIAR Volume 2b).
- 10.4.21 This species was not recorded using any habitat within the Development Site at any time between 2014 and 2021.

### *Raptors*

#### *Golden Eagle – Flight Activity*

- 10.4.22 Flight activity by golden eagle was recorded regularly during VP surveys carried out between 2014 and 2021. A summary of the number of golden eagle flights recorded, and number of individuals involved (see 10.3.30 for definition of 'individual'), in each of the survey periods is provided in Table 10-6.

**Table 10-6 Golden Eagle Flight Activity Summary**

<b>Survey Period</b>	<b>Number of Flights and Individuals</b>
November 2014 to April 2016	77 flights, involving 87 individuals
April 2018 to March 2019	29 flights, involving 34 individuals
March 2020 to August 2020	19 flights, involving 24 individuals
March 2021 to August 2021	Four flights, involving four individuals

- 10.4.23 In total, therefore, 129 golden eagle flights involving 149 individuals were recorded by VP surveys carried out between 2014 and 2021. Flights were recorded over much of the Development Site, including the afforested areas within which the majority of turbines are proposed. Further details are provided in Confidential Annex 10.1 (EIAR Volume 4).

#### *Golden Eagle – Breeding*

- 10.4.24 Details of golden eagle breeding are provided in Confidential Annex 10.1 (EIAR Volume 4).

### ***Hen Harrier – Flight Activity***

- 10.4.25 A total of 111 flights comprising 112 individual hen harriers were recorded between 2014 and 2016. From April 2018 to March 2019 there were 44 flights comprising 47 individuals. In each of 2020 and 2021, there were seven flights by seven individuals. Further details are provided in Confidential Annex 10.1 (EIAR Volume 4).

### ***Hen Harrier – Breeding***

- 10.4.26 Details of hen harrier breeding are provided in Confidential Annex 10.1 (EIAR Volume 4).

### ***White-tailed Eagle – Flight Activity***

- 10.4.27 A single flight by a white-tailed eagle *Haliaeetus albicilla* was recorded during VP surveys between 2014 and 2016. No white-tailed eagles were recorded between April 2018 and August 2020.
- 10.4.28 In April 2021, three white-tailed eagle flights were recorded. On 21 April, a single bird was observed from VP1, while on the following day, two birds were observed together from VP3.
- 10.4.29 All recorded white-tailed eagle flights are shown on Figure 10.9: Schedule 1 Raptor Flights (EIAR Volume 2b).

### ***White-tailed Eagle - Breeding***

- 10.4.30 There was no evidence of breeding by white-tailed eagle within 6km of the Proposed Development at any time between 2014 and 2021.

### ***Other Raptors – Flight Activity***

- 10.4.31 A summary of the flight activity of other raptors which were recorded infrequently between 2014 and 2021 is given in Table 10-7. The recorded flights of the target Schedule 1 species are illustrated on Figure 10.9 (EIAR Volume 2b). The flights of the non-target species are shown on Figure 10.10 (EIAR Volume 2b).

### ***Other Raptors – Breeding***

- 10.4.32 A single hobby was recorded during a moorland breeding bird survey in 2020. No further hobby observations were made in 2020, either during the course of moorland breeding bird surveys or other ornithological field survey. This species is therefore not believed to have bred in the area around the Proposed Development at this or any other time during the 2014 to 2020 survey period.
- 10.4.33 None of the other target raptor species in Table 10-7 are believed to have bred within 2km of the Proposed Development during the field survey period.
- 10.4.34 Three kestrel nests, all containing chicks, were found in 2020, all to the east of the Proposed Development. One was located at Cruach Mhic an t-Saoir and the other in plantation forestry just outside of the Development Site boundary (see Figure 10.11; EIAR Volume 2b).

**Table 10-7 Flight Activity by Other Raptor Species**

Species	Number of Flights					Total
	Nov 2014 – Apr 2016	Apr 2018 – Mar 2019	Mar 2020 – Aug 2020	Mar 2021 – Aug 2021		
<b>Target species</b>						
Goshawk <i>Accipiter gentilis</i>	1	-	-	-	-	1
Hobby <i>Falco subbuteo</i>	1	-	-	-	-	1
Merlin <i>Falco columbarius</i>	3	1	-	-	-	4
Osprey <i>Pandion haliaetus</i>	1	2	-	3	-	6
Peregrine <i>Falco peregrinus</i>	4	-	-	-	-	4
<b>Non-target species</b>						
Buzzard	260	27	36	-	-	323
Kestrel	125	23	29	-	-	177
Sparrowhawk <i>Accipiter nisus</i>	16	5	4	-	-	26

10.4.35 Two buzzard nests were also found in 2020, both east of the Cruach Mhic an t-Saoir ridge, to the east of the Development Site (see Figure 10.11; EIAR Volume 2b).

## Divers

### Flight Activity

- 10.4.36 A total of sixteen red-throated diver flights, comprising 25 individuals, were recorded in 2015. A single flight by an individual red-throated diver was recorded from VP1 in May 2018. There were no red-throated diver flights observed during VP surveys in 2020. In 2021, seven flights by seven individuals were recorded. Recorded flight activity was predominantly to the south of the Development Site, although six passed directly through the Proposed Development.
- 10.4.37 All red-throated diver flights recorded between 2014 and 2021 are shown on Figure 10.12 (EIAR Volume 2b).
- 10.4.38 Black-throated diver was not observed from VP surveys at any time between 2014 and 2021.

### **Breeding**

- 10.4.39 Details of breeding by red-throated diver are provided in Confidential Annex 10.1 (EIAR Volume 4).
- 10.4.40 There was no observation of black-throated divers at any time between 2014 and 2021.

### **Black Grouse**

#### **Flight Activity**

- 10.4.41 Eight black grouse flights were recorded from VP surveys between 2014 and 2021. Five flights were of single birds, two flights involved two birds, and one flight comprised three individuals. Five of the flights were over open ground to the north-west of the Proposed Development, near T01 and Cnoc Odhar Auchaluskin. Two were in the vicinity of an identified lek at Cnoc na Seilg and the remaining one was to the south of the Development Site.
- 10.4.42 All black grouse flights recorded from VP surveys are shown on Figure 10.13 (EIAR Volume 2b).

#### **Breeding**

- 10.4.43 No black grouse leks were recorded in 2014.
- 10.4.44 In 2015, four black grouse leks were identified. These were all small, with two males observed displaying at one lek, and single males present at the other three. The leks were all located in forestry to the south of the proposed wind turbines.
- 10.4.45 In 2020, single male black grouse were recorded displaying at locations to the east of the Development Site. The nearest was approximately 750m from T10.
- 10.4.46 The locations of all identified black grouse leks are shown on Figure 10.13 (EIAR Volume 2b).
- 10.4.47 Male black grouse were also recorded elsewhere as individuals and in pairs at various locations in the area surrounding the Development Site, including the main access track. With the exception of the lek located at Cnoc na Seilg, none were observed within the boundary of the Development Site. Individual females were also observed to the north of the Proposed Development, the nearest being approximately 160m from the main access track and the other being more than 1km distant from any proposed infrastructure. The locations of all black grouse sightings are shown on Figure 10.13 (EIAR Volume 2b).

### **Other Species**

- 10.4.48 Five whooper swan *Cygnus cygnus* flights were recorded between 2014 and 2021, comprising a total of eleven individuals. As shown on Figure 10.14 (EIAR Volume 2b), three of these passed directly through the Proposed Development, with the other two just to the north.
- 10.4.49 Five greylag goose *Anser anser* flights comprising 48 birds (with a single flock of 33 birds making up the majority) were recorded between 2014 and 2021. All greylag goose flights were to the north or south of the Proposed Development (see Figure 10.14; EIAR Volume 2b).

- 10.4.50 A single flight of two pink-footed geese *Anser brachyrhynchus* was recorded in March 2021, as shown on Figure 10.14 (EIAR Volume 2b).
- 10.4.51 Canada goose *Branta canadensis* flights were observed on four occasions, with a single bird in one flight and pairs of birds in the other three (see Figure 10.14; EIAR Volume 2b).
- 10.4.52 Common gull *Larus canus* was observed in flight from VP surveys widely across the Development Site and the surrounding area (see Figure 10.14; EIAR Volume 2b). In total, 28 flights comprising 56 individuals were recorded.
- 10.4.53 Red grouse flights were recorded on four occasions, with six individuals involved. As can be seen from Figure 10.14 (EIAR Volume 2b), all were over open ground to the north-west and north-east of the Proposed Development.
- 10.4.54 No other protected and/or notable bird species (as defined in Paragraph 10.3.3) were recorded within the Development Site or wider ZOI of the Proposed Development.

## *Future Baseline*

### *Baseline at Time of Construction*

- 10.4.55 Construction of the Proposed Development is anticipated to commence in 2023/24. Prior to the commencement of construction, the majority of the conifer plantation woodland within which the Proposed Development is sited will be clear felled by FLS. This FLS felling is being undertaken for timber harvesting purposes as part of Phases 1 (2022 to 2025) and 2 ('Wind Farm Construction') of the planned commercial management of the forest, as set out in the updated Carradale Land Management Plan (FLS, *unpublished*) which covers the Development Site (see Figure 17.4: Baseline Felling Plan; EIAR Volume 2b). The exception to this is the areas required for wind farm construction which are within the Phase 3 (2026 to 2030) FLS felling areas, namely small areas around wind turbines T02, T04, T05, T06, T08, T10, T11 and T13. To facilitate the Proposed Development, the Applicant will conduct additional felling as set out in Chapter 17 of this EIAR: Forestry (see also Figure 17.6: Proposed Felling Plan; EIAR Volume 2b).
- 10.4.56 Timber harvesting by FLS across the Development Site is scheduled to take place between 2022 and 2025. With an intervening period potentially of up to two years between felling and construction in some places<sup>2</sup>, there is consequently the possibility for there to be varying degrees of natural regeneration of vegetation across areas opened up through tree removal. However, in a study of clear-felled plantation forests in upland locations in the UK, Spracklen *et al* (2013) found that mean vascular plant coverage of the ground was 19% two years after clear felling, compared to 111% (a value of more than 100% coverage can be achieved by overlapping of different layers of vegetation) ten years after felling. Vegetation after clear felling was largely composed of wavy hair-grass *Avenalla flexuosa* and tufted hair-grass *Deschampsia cespitosa* and did not include species more typical of open moorland habitats, such as heather and heath bedstraw *Galium saxatile*, until later. Particularly in wetter oceanic

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<sup>2</sup> It is expected that the maximum time period between felling by FLS and construction of the Proposed Development commencing would be three years. It is possible that the intervening period may be substantially less. In this case, there would be even less time for vegetation to regenerate between tree felling and construction works commencing. The assessment provided is therefore a 'worst-case' in terms of considering the degree to which habitat may become suitable for ground-nesting birds.

areas of Scotland, soft-rush *Juncus effusus* is also a likely species to colonise clear-felled areas.

- 10.4.57 At the time of construction, therefore, the Development Site will potentially be substantially different from the situation in the 2014 to 2021 survey period, in that most of the forestry in areas identified in Figure 17.6: Proposed Felling Plan (EIAR Volume 2b) will be felled, and the clear-felled area, although in many cases intended to be restored to open peatland, will likely contain only limited amounts of vegetation. This may result in some changes to the baseline conditions with respect to ornithology.
- 10.4.58 With the exception of common crossbill, none of the protected and/or notable species identified through desk study and/or field survey as being part of the current baseline assemblage are reliant on conifer plantation habitat. Rather, those species are typically birds of the open moorland habitats to the east and west of the Proposed Development. Effects from clear felling will therefore predominantly be limited in the short-term to common passerine species associated with commercial conifer plantation. These species (with the exception of common crossbill) are not protected or otherwise considered to be notable and are therefore not 'important' in the context of this impact assessment (see Paragraph 10.3.3).
- 10.4.59 As described in Paragraph 10.4.56, it is unlikely that sufficient vegetation regeneration will have occurred in the period between felling and construction to be sufficiently dense to support ground-nesting raptors, in particular hen harriers. For example, Madders (2000) reported that no occupied hen harrier nests were found during searches in areas of forest which had been restocked after felling, despite the area having been occupied by this species when the sites were first afforested. This included around 500 hectares (ha) of recently replanted ground on the Kintyre peninsula. Likewise, it will similarly be the case that foraging by raptors (for example, on small mammals) and black grouse (for example, on regenerating bilberry *Vaccinium myrtillus* or heather) will be limited by the degree of vegetation growth in the intervening period between clear-felling and construction. As aforementioned, it is expected that any such growth will be limited, and that clear fell areas will remain relatively unsuitable for foraging by these species. For example, in the same paper, Madders (2000) also suggest that hen harrier foraging is likely to be limited over clear fell as there is no ground vegetation and it is covered with brash. As a consequence, prey populations in these areas may increase slowly, and be relatively inaccessible to hen harriers.
- 10.4.60 Therefore, given that the intervening period between tree felling and the commencement of construction, it is unlikely that there will be sufficient time for a dense grass sward and/or dwarf shrub layer to establish. It is consequently expected that these areas will remain sub-optimal, at best, for protected or notable bird species. It is instead more likely that these species will continue to use the higher quality open ground habitats around the Development Site, as has been shown by the baseline data collected between 2014 and 2021. In this case, changes from the baseline conditions as currently determined are unlikely to be significant.
- 10.4.61 This assessment of impacts on ornithological features presented in this chapter has therefore been conducted in the following context:
- That clear felling will have been carried out in advance of construction by FLS at all locations with the exceptions noted in Paragraph 10.4.55 (and shown on Figure 17.6: Proposed Felling Plan; EIAR Volume 2b). Felling in these areas will be limited to small

- areas required to enable construction only. Therefore, impacts of clear felling itself are not considered by this assessment, and
- That small areas of felling specifically for the Proposed Development will be carried out around wind turbines T02, T04, T05, T06, T08, T10, T11 and T13. As this felling is being done to accommodate the Proposed Development (and not independently for commercial forest management purposes), the impacts of felling in these areas is considered by this assessment.
- 10.4.62 In conclusion, therefore, although the baseline conditions at the Development Site will be different from the 2014 to 2021 survey period, the changes with respect to ornithological features are unlikely to be significant. The assessment of impacts in this chapter is therefore carried out in the context of felling being carried out by FLS, but is still reliably informed by the data collected by the desk study and field surveys carried out between 2014 and 2021.
- Baseline in the Absence of the Proposed Development***
- 10.4.63 For the purposes of considering the baseline in the absence of the Proposed Development for this chapter, a point twenty years in the future has been adopted.
- 10.4.64 As set out in detail in Chapter 1 of this EIAR: Introduction, a wind farm development at the Development Site was consented by the Scottish Government in December 2019 (the ‘Consented Development’). The Proposed Development is largely similar to the Consented Development, however with larger wind turbines and very minor changes to the layout of infrastructure, limited to realignment of short sections of access track to accommodate the larger turbine components, alterations to some turbine locations to accommodate the larger models and further environmental assessment, and repositioning of some borrow pit locations. Consequently, even in the absence of the Proposed Development, an almost identical wind farm (i.e. the Consented Development) could be constructed at the Development Site. However, it is understood that the Consented Development is not an alternative option to the Proposed Development. For this reason, the baseline in the absence of the Proposed Development would be as described in the section above, which explains that large-scale felling activities will be undertaken by FLS irrespective of the wind farm.
- 10.4.65 The updated Carradale Land Management Plan (see Figures 17.2 to 17.5; EIAR Volume 2b), which has been developed by FLS (*unpublished*) has therefore been used as a future baseline for the assessment within this chapter. It is assumed that the predicted impacts and effects on ecological features from the updated Carradale Land Management Plan will occur in the absence of the Proposed Development.

## 10.5 Embedded Mitigation

- 10.5.1 Embedded mitigation measures are incorporated into the design of a development and aim to avoid or reduce adverse effects, including those on ornithological features. Embedded mitigation can be considered at the impact assessment stage, whereas specific mitigation measures which are not part of the design and are developed after the initial impact assessment, are assessed at a later stage when considering the residual effects.
- 10.5.2 The following embedded mitigation is relevant to this chapter:

- The majority of turbines and associated infrastructure are located in areas of commercial plantation forestry, rather than open moorland habitats. Areas of commercial plantation are of relatively low value to bird species, and, at the Development Site, are inhabited by common and widespread passerines,
- In accordance with the above, the position of T13 has changed from a location which was previously in a relatively large open clearing in the plantation forest. The habitat at this location was a mix of intact and degraded blanket bog. By moving T13 into the plantation habitat, the loss of this sensitive habitat, and the potential effects on moorland birds, has been minimised,
- The access track to the main Development Site utilises an existing large track for forestry vehicles and vehicles travelling to another wind farm. A large part of the principal access track through the main Development Site also utilises for much of its length the substantial existing forest track, and
- A proposed borrow pit which was located on an open hilltop at Cnoc na Seilg, to the south-east of T14, has been dropped because of the presence of a black grouse lek at this location (Figure 10.13; EIAR Volume 2b), as well as blanket bog (see Chapter 9 of this EIAR: Ecology).

10.5.3 The updated Carradale Land Management Plan (see Figures 17.2 to 17.5; EIAR Volume 2b), which has been developed by FLS (*unpublished*), covers an area of approximately 6,700ha of the central and eastern side of Kintyre, including the entirety of the Development Site. The plan is in the process of being updated, however it is assumed that the multiple objectives set out in an earlier version of the Carradale Land Management Plan published for consultation (FLS, 2020) are unchanged. This includes the following which are relevant to biodiversity:

- Provide a sustainable, productive forest with a diverse range of species, taking into account future threats of climate change and disease,
- Identify areas of deep peat for peatland restoration,
- Protect and enhance key species and protected habitats, including the removal of invasive non-native species,
- Work to support renewable energy developments to facilitate their integration into the landscape and other land management objectives, and
- Identify and prioritise ancient woodland for restoration.

10.5.4 In relation to the Proposed Development, the Carradale Land Management Plan will see measures implemented to create conditions suitable for blanket bog to form in areas currently planted with commercial conifers. This is being undertaken to help meet the peatland restoration objective listed above. The primary way in which peatland restoration will be delivered is through the removal of conifer trees, with other measures likely to be adopted to facilitate re-wetting of the ground, such as ditch blocking. The removal of conifer plantation to create blanket bog represents habitat creation, while measures implemented in existing areas of bog (e.g. within larger forest rides) represents habitat enhancement. In this EIAR, therefore, peatland restoration delivered under the updated Carradale Land Management Plan would provide habitat creation and enhancement.

10.5.5 There are several areas identified for peatland restoration within and immediately surrounding the Development Site. Therefore, to mitigate for adverse effects on habitats and species from the Proposed Development, the Applicant will fund the creation / enhancement of blanket bog over an area of approximately 56.2ha within the Development Site. Funding will be provided by the Applicant to FLS, who will ultimately be responsible for delivering the works required to meet the habitat creation / restoration objectives. The creation / enhancement of 56.2ha of blanket bog habitat, to be delivered under the Carradale Land Management Plan, is therefore considered as embedded mitigation and the assessment of impacts on ornithological features has been carried out in this context.

## 10.6 Assessment of Effects

### *Features Scoped Out of Further Assessment*

10.6.1 Relevant ornithological features are those that are considered to be 'important' and have the potential to be affected by the Proposed Development (CIEEM, 2018). In view of the baseline data obtained through desk study and field survey, the following features have been excluded from further assessment because: a) they have been found to be likely absent from the Zol of the Proposed Development; b) it is clear that no effect from the Proposed Development is possible; and/or, c) they are species that are common and widespread and not of significant importance:

- Statutory designated sites: a HRA Screening Report has also been prepared, assessing whether there are likely significant effects from the Proposed Development on any European site. The HRA Screening Report concludes that there are no likely significant effects on any such site. This exercise is therefore not repeated in this chapter. Refer to the HRA Screening Report, which is submitted as a separate document with the Section 36 Application, for the detailed assessment,
- Non-statutory designated sites: there are no such sites within the Zol of the Proposed Development and therefore no potential for impacts on non-statutory nature conservation designations,
- General moorland breeding birds: only two turbines (T01 and T03), plus their associated access tracks, and part of the hard-standing area for T04 (or potentially the turbine itself if it were micro-sited to the north or north-east), are located in an area of open moorland habitat. Impacts on general moorland breeding birds will therefore be very limited in spatial extent. As can be seen from Figure 10.6, the only Red or Amber Listed BoCC (not including other birds flying over which would not make use of the habitat in this area) recorded in the vicinity of T01, T03 and T04 were meadow pipit, skylark and red grouse. Despite being on the Red and Amber Lists, these are all common and widespread species. They are therefore not considered to be sufficiently 'important' for assessment in this chapter, particularly due to the limited extent of infrastructure associated with the Proposed Development which will be constructed on open moorland habitat. Lapwing, which are also Red-listed, were only recorded in flight on one occasion and are considered to be absent as a breeding species from the Development Site,

- Curlew: no curlews were recorded during moorland breeding bird surveys carried out in 2020. Prior to that, six curlew observations were made during moorland breeding bird surveys in 2014 and 2015. None of these were within the Development Site, with the nearest being approximately 1.4km distant to the nearest proposed turbine (T04). This is beyond the distance at which disturbance and/or displacement caused by construction and/or operation of the Proposed Development is likely to occur. For example, in a study conducted by the RSPB (2009), it was found that displacement of curlew extended up to 800m from turbines. Flight activity levels by curlew were also very low, limited to a total of eleven flights between 2014 and 2021,
- Greenland white-fronted goose: a detailed assessment of the potential for likely significant effects on Greenland white-fronted goose, as the qualifying feature of the Kintyre Goose Roosts SPA, has been carried out for the Proposed Development and is reported in the HRA Screening Report. It is concluded in the HRA Screening Report that there would be no likely significant effects on Greenland white-fronted goose from the Proposed Development due to the fact that there were no flights by this species within 400m of any proposed turbine location, and because the species was not recorded using habitats within the Development Site at any time. On this basis, this species is excluded from further assessment in this EIAR,
- Raptor species (with the exception of golden eagle, hen harrier and kestrel): flight activity by Schedule 1 raptor species (with the exception of golden eagle, hen harrier, osprey and kestrel) was very low, with a maximum of four flights recorded by white-tailed eagle, merlin and peregrine, and fewer flights by all other species. Furthermore, none of these species were found breeding within 2km of the Proposed Development at any time (or 6km in the case of white-tailed eagle). Two buzzard nests were identified, but these were both situated outside of the Development Site. Although flight activity by this species was considerably higher than that of Schedule 1 species, buzzard is a common and widespread raptor, reflected by its placement on the Green List,
- Black-throated diver: this species was not recorded at any time during field surveys between 2014 and 2021 and is considered likely absent from the Development Site and the wider zone of influence of the Proposed Development, and
- All other species (including whooper swan, greylag goose, Canada goose and red grouse): although all of these species are considered to be notable according to the definition provided in Paragraph 10.3.3, these are generally all common and widespread. Whooper swan, which are less common, were only recorded in a total of eleven flights, three of which passed directly over the Proposed Development, by VP surveys carried out between 2014 and 2021. Canada goose are identified as being notable because they are an invasive non-native species listed on Schedule 9 of the WCA. However, the Proposed Development will have no effects on the distribution of this species.

## *Importance of Ornithological Features*

- 10.6.2 The assessed importance of those ornithological features identified in the baseline conditions, and which have not been screened out above, is set out in Table 10-8, together with rationale. Ornithological importance has been assessed considering geographic scale, in accordance

with CIEEM (2018) guidelines. However, the geographic scale of importance has been translated to the sensitivity categories used throughout this EIAR. The corresponding sensitivity to the importance assigned to each ornithological feature is given in Table 10-8. The approach to valuing ornithological features is described in detail in Appendix 9.1: Method for Assessment of Ecological Impacts (EIAR Volume 3).

- 10.6.3 When considering geographic scale, for the purposes of this assessment ‘Regional’ (Medium sensitivity) is defined as the area encompassed by the Argyll West and Islands NHZ, ‘Local’ (Low sensitivity) as the Kintyre Peninsula between the Mull of Kintyre and Tarbert, and ‘Development Site’ (Negligible sensitivity) as the area within the Development Site. National (High sensitivity) and International (Very High sensitivity) geographic scales were also considered but were not applied to any of the ornithological features included in this assessment.

**Table 10-8 Importance of Ornithological Features**

Ornithological Feature	Importance (Sensitivity)	Rationale
Common crossbill	Local (Low)	<p>Common crossbill (hereafter simply ‘crossbill’) are listed on Schedule 1 of the WCA. This provides additional protection beyond that afforded to all bird species, making it an offence to intentionally or recklessly disturb crossbills while breeding, including while building or using their nest, and to disturb their dependent young. However, although specially protected, crossbill is a common species, reflected by their Green-listed status. The Scottish breeding population is estimated to be between 5,000 and 50,000 pairs in most years, with a wintering population between 10,000 and 100,000 birds (Forrester <i>et al</i>, 2007). The species is widespread in suitable plantation forestry, similar to that at the Development Site and across the surrounding landscape. For example, the Argyll Bird Report 2019 (the latest edition of the annual report produced by the Argyll Bird Club) states that “large numbers breed in good cone years” (Dickson, 2020). Impacts as a result of the Proposed Development will therefore affect a very small proportion of the national and regional populations. The crossbill population at the Development Site is therefore not of higher than Local importance (Low sensitivity).</p>
Golden plover	Local (Low)	<p>Golden plover were recorded only during the non-breeding season and the species is absent from the breeding bird assemblage at the Development Site. A total of 37 flights of golden plover flocks were recorded by VP surveys between 2014 and 2021. However, these were all associated with areas of open ground to the north-west, north and east of the Proposed Development. The wintering population of golden plover in Scotland is estimated to be between 25,000 and 35,000 birds (Forrester <i>et al</i>, 2007). Therefore, the flocks recorded would represent a very small proportion of the national population. Moreover, as a species which tends to winter in coastal areas, it is</p>

Ornithological Feature	Importance (Sensitivity)	Rationale
		unlikely that the Development Site or its immediate surrounds are of significant importance to this species. Golden plover is therefore assigned Local importance (Low sensitivity).
Snipe	Local (Low)	Snipe are on the Amber List of BoCC due to a breeding range decline of 31% between 2007 and 2011 (Eaton <i>et al</i> , 2015). However, according to Forrester <i>et al</i> (2007), this is a widespread species in Scotland, with a breeding population estimated between 34,000 and 40,000 pairs. The breeding population of NHZ 14 is estimated at 1,289 pairs (Wilson <i>et al</i> , 2015). Four observations of this species were made in the vicinity of T01 and T03 during moorland breeding bird surveys. Assuming a maximum of four pairs present in this area, this would represent approximately 0.3% of the Argyll West and Island NHZ breeding population. This is not sufficient to be considered Regionally important. However, it is possible that four pairs may represent 1% of the breeding population of snipe across the Kintyre peninsula, and therefore Local importance (Low sensitivity) has been assigned.
Golden eagle	Regional (Medium)	See Confidential Annex 10.1 (EIAR Volume 4).
Hen harrier	Regional (Medium)	See Confidential Annex 10.1 (EIAR Volume 4).
Osprey	Local (Low)	Osprey was only recorded on six occasions during VP surveys carried out between 2014 and 2021. There was no evidence of breeding by this species within 2km of the Development Site, and there are no waterbodies within the Development Site suitable for foraging.
Kestrel	Local (Low)	Kestrel is an Amber-listed BoCC. Three active nests, all containing young, were found within 2km of the Development Site in 2020, and flight activity levels were relatively high in all years of VP survey. The NHZ 14 breeding population is estimated at 136 pairs (Wilson <i>et al</i> , 2015), meaning that the three pairs in 2020 would represent approximately 2.2% of the total NHZ population. However, this species is much more common across some of the more lowland areas of Scotland, and the national population is estimated to be between 7,500 and 7,800 breeding pairs (Forrester <i>et al</i> , 2007). Given its national population size and distribution, Local importance (Low sensitivity) is therefore considered more appropriate for this species than Regional.
Red-throated diver	Regional (Medium)	See Confidential Annex 10.1 (EIAR Volume 4).

<b>Ornithological Importance</b>		<b>Rationale</b>
<b>Feature</b>	<b>(Sensitivity)</b>	
Black grouse	Regional (Medium)	Black grouse leks and observations of black grouse were widely distributed in the area around the Proposed Development, although only one was within the Development Site. The NHZ 14 population of displaying male black grouse is estimated at 67 birds (Wilson <i>et al</i> , 2015). Thus, the number of birds recorded by baseline surveys will exceed 1% of the NHZ population of displaying males. Regional importance (Medium sensitivity) has therefore been assigned to black grouse.

## ***Impacts on Crossbill***

### ***Construction***

#### ***Loss of Habitat***

- 10.6.4 Crossbill were recorded only in the north of the Development Site. However, they can be reliably expected to occur throughout the entirety of the plantation forest within the Development Site, and in the surrounding area, at different times. Keyhole felling to accommodate wind turbines T02, T04, T05, T06, T08, T10, T11 and T13 may result in a small loss of habitat and the displacement of birds from these locations and into surrounding area. Given the availability of suitable coniferous forest habitat in the wider landscape, however, this is unlikely to result in any significant change in the Local population of this species and would represent a Low magnitude impact. It is therefore concluded that habitat loss through keyhole felling will have **Negligible (non-significant) effect** on crossbills.

#### ***Disturbance of Breeding Birds***

- 10.6.5 As a species listed on Schedule 1 of the WCA, it is an offence to disturb crossbills while breeding, or to disturb their dependent young. Unlike many species in Scotland, crossbill can breed year-round (Woodward *et al*, 2018; SNH, 2014). However, at the time of construction, the vast majority of conifer plantation suitable for crossbill nesting will have been felled by FLS.
- 10.6.6 This is a small passerine species which is not generally considered to be particularly susceptible to disturbance. For example, FLS advise a works exclusion zone of between 50-150m around the active nest of crossbills for forestry operations (FCS, 2006). It is therefore very unlikely that construction works will cause any disturbance to nesting crossbill and there will be Negligible impact, resulting in a **Negligible (non-significant) effect** on this species during the construction phase.

## ***Operation***

### ***Collision Mortality***

- 10.6.7 Crossbill are a small passerine species and the population is not considered to be at significant risk from collision with operational wind turbines. This is largely due to their life-history and relatively high abundances (as set out in Table 10-8). These factors make it less likely that large population-level effects would arise due to small numbers of collision mortalities because population growth rate in species such as this is less sensitive to reductions in adult survival (Thaxter *et al*, 2017). Therefore, however unlikely, collision mortality would not have a significant effect on the Local crossbill population and there will be Negligible impact from collision mortality. It is concluded that collision mortality during the operational phase will have **Negligible (non-significant) effect** on common crossbill.

### ***Disturbance of Breeding Birds***

- 10.6.8 As set out in Paragraph 10.6.6, crossbill are not considered to be particularly sensitive to disturbance. Therefore, any routine maintenance and operational activities are likely to have Negligible impact on this species. There will consequently be **Negligible (non-significant) effect** on breeding crossbill from disturbance during the operational phase.

## ***Decommissioning***

- 10.6.9 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above. There will therefore be **Negligible (non-significant) effect** on crossbill during the decommissioning phase.

## ***Impacts on Golden Plover***

### ***Construction***

#### ***Loss of Habitat***

- 10.6.10 Golden plover were recorded within the ZOI of the Proposed Development only during the non-breeding season, and is likely absent as a breeding species. All observations of golden plover were of flocks flying above open ground habitats to the north-west, north and east of the Development Site. None of these areas will be directly impacted by construction. With Negligible impact on habitat used by this species, it is concluded that there will be **Negligible (non-significant) effect** on golden plover from habitat loss.

#### ***Disturbance of Non-breeding Birds***

- 10.6.11 Although golden plover do utilise upland habitats during the non-breeding season, coastal areas are much more frequently used, with preferred habitats including intertidal flats, pasture and arable land (Forrester *et al*, 2007). The habitats used within the ZOI of the Proposed Development are therefore likely to be of relatively low importance to golden plover, and coastal habitats at least 2.5km to the west are much more likely to be of significant value. This is evidenced by the fact that although 37 golden plover flights were recorded, these observations were made on a total of only seven days during the entire survey period of 2014 to 2021.

- 10.6.12 Furthermore, Cutts *et al* (2013) suggest that non-breeding golden plover are reasonably tolerant of 'moderate' levels of visual disturbance, and that mitigation to avoid disturbance is only required between 200 to 300m of birds, including at inland roost sites. Of the 37 flights recorded, only fourteen were within 300m of proposed infrastructure, meaning that the majority were beyond the distance at which disturbance may be expected to occur.
- 10.6.13 It is concluded that any disturbance of non-breeding golden plover would be rare and would represent, at worst, a Low magnitude impact, especially due to the availability of coastal habitat in the wider area. Disturbance of non-breeding golden plover would therefore have **Negligible (non-significant) effect** on the species.

### *Operation*

#### *Collision Mortality*

- 10.6.14 Full details of the CRM outputs for golden plover are provided in Appendix 10.2: Collision Risk Modelling (EIAR Volume 3). However, based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 98% avoidance rate there would be 23.77 golden plover mortalities over 35 years..
- 10.6.15 The loss of 37.8 birds over 35 years, would represent a very small proportion of the overall Scottish wintering population of between 25,000 and 35,000 birds. This is almost certainly also true for the NHZ 14 non-breeding population. It is therefore considered that this level of mortality would have a Low magnitude impact on golden plover, resulting in an overall **Negligible (non-significant) effect**.
- 10.6.16 The collision risk prediction set out above is an increase of more than nine times that estimated by the 2016 EIA. This is primarily due to a flock of 24 birds recorded by VP survey in January 2019. Despite this, and as set out above, the overall effect on golden plover remains unchanged from the 2016 EIA due to the small number of collision mortalities predicted in the context of a very large wintering population.

#### *Displacement*

- 10.6.17 Pearce-Higgins *et al* (2009) studied the distribution of breeding waders around operational wind farms and found that golden plover breeding densities within 500m of turbines reduced by 39%. However, this related specifically to breeding birds, which are generally considered to be more sensitive than non-breeding birds. On the basis of the reasoning given in the above, it is expected that, in a worst-case scenario, displacement of non-breeding golden plover may occur up to 300m from operational turbines. Given the low reliance on the upland habitats within this distance of the Development Site during the non-breeding season, and the presence of extensive areas of similar or more optimal habitat in the wider area, this would represent a Low magnitude impact, resulting in an overall **Negligible (non-significant) effect** on golden plover.

#### *Disturbance of Non-breeding Birds*

- 10.6.18 As set out above, the majority of golden plover flocks were located beyond the distance at which disturbance can be expected from construction activities. Operational activities will be less frequent and are expected to be less disturbing than those of the construction phase, and

will be limited to routine maintenance works. The likelihood of disturbance to non-breeding golden plover is therefore further reduced at this time when compared to the construction phase.

- 10.6.19 Furthermore, as described in above, some displacement of birds from the area within 300 to 500m of the Proposed Development may also occur, meaning that they would already be beyond likely disturbance distance.
- 10.6.20 For the reasons set out during the construction phase, therefore, and given that works will be less intensive during the operational phase, there will be **Negligible (non-significant) effect** from disturbance of non-breeding golden plover during the lifetime of the Proposed Development.

#### *Barrier to Movement*

- 10.6.21 Hötker *et al* (2006) reviewed various published studies to investigate the effects of wind farm developments on birds. According to their review, there was no evidence of significant barrier effects to the movement of waders, including golden plover, from the presence of wind farms.
- 10.6.22 Based on this evidence, as well as the relatively small size of the Proposed Development, it is considered that there would be Negligible impact from the wind farm acting as barrier to movement. It is therefore concluded there will be **Negligible (non-significant) effect** on golden plover.

#### *Decommissioning*

- 10.6.23 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above. There will therefore be **Negligible (non-significant) effect** on golden plover during the decommissioning phase.

#### *Impacts on Snipe*

##### *Construction*

###### *Loss of Habitat*

- 10.6.24 Snipe forage and nest on the ground in wet areas, including rough pasture, acid grassland, marshy grassland and flushes (Hoodless *et al*, 2007). Snipe were recorded on four occasions (three in 2020 and one in 2015), all near to the Allt Achadh a' Choirce watercourse, in an area of suitable breeding habitat. The observations were in proximity to T01 and T03 and the access track which connects them and T04. Construction works therefore have the potential to result in the loss of nesting habitat and/or areas in which the birds, including recently fledged chicks, may forage.
- 10.6.25 The total area of habitat which will be lost as a result of the construction of T01, T03, T04 and the other associated infrastructure located on the open ground in the north-west of the Development Site is approximately 2.57ha. Hoodless *et al* (2007) found that mean snipe breeding density was between 1.14-1.34 pairs/km<sup>2</sup>. It is therefore possible that construction may result in the loss of habitat which could support approximately two pairs of breeding snipe.

- 10.6.26 In addition to direct loss, construction could also have indirect impacts on habitat used by snipe. This species relies on wet habitats for foraging, as the ground must be soft enough to probe with its long beak. Construction could result in hydrological changes, for example by reducing surface or groundwater flows, which could lead to the drying out of currently wet habitats, reducing the area available for snipe to forage.
- 10.6.27 A worst-case scenario is therefore that the direct and indirect impacts on habitat arising from the construction of T01, T03, T04 and associated infrastructure could lead to the loss of two or three snipe breeding territories. This would mean the almost complete loss of snipe from the Zol of the Proposed Development and would equate to the loss of approximately 0.2% of the breeding population of NHZ 14 (i.e. the Regional population). Assuming that there was no displacement of birds to other suitable open ground, including wet habitats further to the north-west, this would be a High magnitude impact. As a species considered to be of Local importance (Low sensitivity) at the Development Site, this is assessed as a **permanent Moderate adverse effect**. This is considered by this EIA to be **significant effect**.

#### *Disturbance of Breeding Birds*

- 10.6.28 There is little published information on the sensitivity of breeding snipe to disturbance from construction works or other anthropogenic activities. As a cryptic species which relies on remaining on the ground, hidden in vegetation to avoid danger, identifying ‘static’ disturbance (i.e. disturbance which causes birds to become ‘alert’ but not to flush) is difficult. A study by Scarton (2018) of non-breeding snipe at a waterbody in Italy found that the average distance at which snipe were flushed (i.e. showed ‘active’ disturbance) by boats and pedestrians was approximately 30m.
- 10.6.29 The locations of snipe observations shown on Figure 10.5 (EIAR Volume 2b) show that none were within 30m of proposed infrastructure associated with T01, T03 and T04. It is therefore unlikely that construction works will result in any significant disturbance of breeding snipe, and it is expected that there would be, at worst, a Low magnitude impact, resulting in **Negligible (non-significant) effect**.

#### *Accidental Destruction of Active Nests*

- 10.6.30 Snipe nest on the ground and initial construction works involving, for example, excavation or laying of floating track, have the potential to result in the accidental destruction of an active nest, when carried out during the breeding season (which is deemed by NatureScot to be April to August, inclusive (SNH, 2014)). Even if there were four nest sites in the vicinity of T01 and T03, the probability that all four would be directly under the footprint of construction areas is very low. Therefore, the potential for accidental destruction of nests is likely to extend to only one or two snipe nests. However, this impact would only arise during one breeding season, after which time construction works affecting nesting habitat will have been advanced such that no suitable nesting habitat remains. Accidental destruction of active nest sites would be considered a Medium magnitude impact because it would not mean the loss of snipe as a part of the baseline environment post-construction. There will consequently be a **temporary Minor adverse effect** on snipe due to accidental destruction of active nests. This is considered to be a **non-significant effect** by this EIA.
- 10.6.31 Regardless of the above, it is an offence under the WCA to intentionally or recklessly destroy the active nest of a wild bird, including snipe.

## ***Operation***

### ***Collision Mortality***

- 10.6.32 Snipe were recorded on seven occasions by VP survey between 2014 and 2021, with all but one flight occurring outside of the footprint of the Proposed Development. The risk of collision with operational turbines cannot therefore be calculated but is expected to be very low. It is concluded that there will be **Negligible (non-significant) effect** on snipe from collision mortality.

### ***Displacement***

- 10.6.33 Pearce-Higgins *et al* (2009) studied the distribution of breeding waders around operational wind farms and found that snipe breeding densities within 500m of turbines reduced by 48%. Assuming therefore that half of the breeding territories within 500m of the Proposed Development were displaced (i.e. two of the assumed four pairs), this would represent approximately 0.15% of the NHZ 14 population and would likely be less than 1% of the Local population on the Kintyre peninsula. There is alternative suitable habitat for snipe in the area to the north-west, immediately beyond 500m, meaning that displacement is likely to be restricted to a relatively short distance.
- 10.6.34 However, the potential loss of half of the snipe breeding population at the Development Site would represent at least a Medium magnitude impact and would lead to an overall **permanent Minor adverse effect** on the species. This is considered to be a **non-significant effect** by this EIA.

### ***Disturbance of Breeding Birds***

- 10.6.35 Operational activities at the Proposed Development will involve the infrequent movement of vehicles along access tracks and the presence of personnel on turbine hard-standings. Even more rarely there may be a requirement for cranes or other plant and machinery to be used, though this will all be restricted to the existing tracks and hard-standing areas. Such activities are likely to be of lower intensity than construction works, and it is assumed that any disturbance caused would be over a much smaller distance. Considering therefore: a) that disturbance is likely over a shorter distance than during construction; b) that such impacts would occur rarely as operational maintenance activities will be required infrequently; and, c) displacement impacts may have resulted in snipe moving away from the operational site, it is concluded that there will be Negligible disturbance impacts on snipe during the operational phase, result in an overall **Negligible (non-significant) effect**.

### ***Barrier to Movement***

- 10.6.36 Hötker *et al* (2006) reviewed various published studies to investigate the effects of wind farm developments on birds. According to their review, there was no evidence of significant barrier effects to the movement of waders, including snipe, from the presence of wind farms.
- 10.6.37 Based on this evidence, as well as the relatively small size of the Proposed Development, it is considered that there would be Negligible impact from the wind farm acting as barrier to movement. It is therefore concluded there will be **Negligible (non-significant) effect** on snipe.

### *Habitat Creation and Enhancement*

- 10.6.38 As part of the updated Carradale Land Management Plan (FLS, *unpublished*), large areas of conifer plantation, which are completely unsuitable for snipe, will be felled. Approximately 56.2ha will be subject to targeted management to create bog habitat which is suitable for snipe breeding and foraging. The time taken to establish wetland conditions which are suitable for snipe may be relatively long, and it is therefore concluded that the impact of habitat creation will be Low magnitude. In the short- to medium-term, therefore, the effects on snipe will be **Negligible (non-significant)**. Over the longer-term, there may be more significant beneficial effects for this species, however due to uncertainty over this timescale, no such conclusion is made.

### *Decommissioning*

- 10.6.39 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above.
- 10.6.40 The effects of habitat loss during the construction phase are temporary and will not apply during the decommissioning phase. Furthermore, displacement effects which may have been acting during the operational phase will cease with the removal of wind turbines. This may result in the return of breeding birds (assumed to comprise two pairs) to the area around T01 and T03. There will therefore be **Negligible (non-significant) effect** on snipe during the decommissioning phase.

### *Impacts on Golden Eagle*

- 10.6.41 A full assessment of the impacts on golden eagle is provided in Confidential Annex 10.1 (EIAR Volume 4). To avoid providing sensitive details on the location(s) of golden eagle, the assessed impacts only are given in this chapter, with no supporting evidence (other than for CRM), for which see Confidential Annex 10.1 (EIAR Volume 4).

### *Construction*

#### *Loss of Habitat*

- 10.6.42 Construction of the Proposed Development is predicted to have a **permanent Minor adverse effect** on golden eagles due to habitat loss. This is considered to be a **non-significant effect** by this EIA.

#### *Displacement*

- 10.6.43 Construction-related displacement of foraging golden eagle is predicted to give rise to a **temporary Moderate adverse effect** on this species. This is considered to be a **significant effect** by this EIA.

#### *Disturbance of Breeding Birds*

- 10.6.44 Construction-related disturbance of golden eagle is predicted to have a **temporary Moderate adverse effect** on this species. This is considered to be a **significant effect** by this EIA.

- 10.6.45 Regardless of this assessment, golden eagle is listed on Schedule 1 of the WCA, making it an offence to intentionally or recklessly disturb these birds while at, on or near an active nest, including when rearing dependent young. Construction-phase disturbance, which could be caused by noise and/or the presence of construction staff, must therefore be avoided to ensure no offence under this legislation.

### ***Operation***

#### *Collision Mortality*

- 10.6.46 Full details of the CRM outputs for golden eagle are provided in Appendix 10.2: Collision Risk Assessment (EIAR Volume 3). However, based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 99% avoidance rate there would be 5.18 golden eagle mortalities over 35 years.
- 10.6.47 This prediction is broadly similar to that of the 2016 EIA which, based on the previous wind farm layout and design (which involved smaller turbines), estimated that there would be 2.4 golden eagle mortalities over 25 years (equivalent to 3.4 deaths over 35 years). There is therefore no change to the conclusion of the 2016 EIA. This is particularly true as recent work has demonstrated that the main impact on golden eagle from wind farm developments in Scotland is habitat loss, and there is a very low, but not zero, probability of a collision (Fielding *et al*, In press (a) and (b)). On this basis, the avoidance rate of 99% is highly precautionary and consequently, the predicted number of collisions from the CRM is almost certainly too high. The effect of collision mortality on the population would therefore likely be less than estimated.
- 10.6.48 It is therefore concluded that, even using the likely overly-conservative results of the CRM, there is a low risk of golden eagle collision with the operational turbines of the Proposed Development. Five deaths over a 35-year period would not affect the conservation status of the species either at the NHZ 14 level or more locally. Therefore, collision impacts will be of Low magnitude, resulting in a **permanent Minor adverse effect** on golden eagle. This is considered to be a **non-significant effect** by this EIA.

#### *Displacement*

- 10.6.49 It is predicted that there will be **Negligible (non-significant) effect** on golden eagle from displacement.

#### *Disturbance of Breeding Birds*

- 10.6.50 It is predicted that there will be **Negligible (non-significant) effect** from operational disturbance on golden eagle.

#### *Barrier to Movement*

- 10.6.51 The operational turbines are predicted to result in, at worst, a **permanent Minor adverse effect** on golden eagles due to barrier impacts. This is considered to be a **non-significant effect** by this EIA.

### *Habitat Creation and Enhancement*

- 10.6.52 It is expected that there will be **Negligible (non-significant) effect** on golden eagle from the creation / enhancement of habitat by the Proposed Development.

### *Decommissioning*

- 10.6.53 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above.
- 10.6.54 It is predicted that decommissioning of the Proposed Development could have a **temporary Moderate adverse effect** through displacement of foraging birds. This is considered to be a **significant effect** by this EIA.
- 10.6.55 There is also the possibility of a **temporary Moderate adverse effect** due to disturbance during the decommissioning phase. This is considered to be a **significant effect** by this EIA.

### *Impacts on Hen Harrier*

- 10.6.56 A full assessment of the impacts on hen harrier is provided in Confidential Annex 10.1 (EIAR Volume 4). To avoid providing sensitive details on the location(s) of hen harrier, the assessed impacts only are given in this chapter, with no supporting evidence (other than for CRM), for which see the Confidential Annex.

### *Construction*

#### *Loss of Habitat*

- 10.6.57 It is predicted that the construction of the Proposed Development could have a **permanent Minor adverse effect** on hen harriers due to habitat loss. This is considered to be a **non-significant effect** by this EIA.

#### *Displacement*

- 10.6.58 Displacement of foraging hen harriers as a result of construction-related disturbance could result in a **temporary Moderate adverse effect** on the species. This is considered to be a **significant effect** by this EIA.

#### *Disturbance of Breeding Birds*

- 10.6.59 It is predicted that, at worst, a **temporary Minor adverse effect** on breeding hen harrier could occur during the construction phase. This is considered to be a **non-significant effect** by this EIA.
- 10.6.60 Regardless, hen harrier is listed on Schedule 1 of the WCA, making it an offence to intentionally or recklessly disturb these birds while at, on or near an active nest, including when rearing dependent young.

### *Accidental Destruction of Active Nests*

- 10.6.61 There is expected to be **Negligible (non-significant) effect** on hen harrier from the accidental destruction of active nests.

### *Operation*

#### *Collision Mortality*

- 10.6.62 Full details of the CRM outputs for hen harrier are provided in Appendix 10.2: Collision Risk Modelling (EIAR Volume 3). However, based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 99% avoidance rate there would be 0.38 hen harrier mortalities over 35 years.
- 10.6.63 This prediction is much lower than that of the 2016 EIA. The collision estimate for hen harrier from the 2016 EIA was for 1.3 mortalities over a 25-year period (equivalent to 1.8 deaths over 35 years).
- 10.6.64 The loss of two birds over a 35-year period would not be significant when considering the NHZ 14 population estimate of 125 pairs (250 adult birds).
- 10.6.65 It is therefore concluded that collision risk represents a Low magnitude impact, resulting in an overall **permanent Minor adverse effect** on hen harrier. This is considered to be a **non-significant effect** by this EIA.

#### *Displacement*

- 10.6.66 Displacement is expected to result in a **permanent Minor adverse effect** on hen harrier. This is considered to be a **non-significant effect** by this EIA.

#### *Disturbance of Breeding Birds*

- 10.6.67 There is predicted to be **Negligible (non-significant) effect** on hen harrier from disturbance during the operational phase.

#### *Barrier to Movement*

- 10.6.68 There is predicted to be **Negligible (non-significant) effect** on hen harrier movements during the operational phase.

#### *Habitat Creation and Enhancement*

- 10.6.69 It is predicted that habitat creation / enhancement will result in a **permanent Minor beneficial effect** for hen harrier, which can be expected in the medium-term. This is considered to be a **non-significant effect** by this EIA.

### *Decommissioning*

- 10.6.70 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above.

- 10.6.71 It is predicted that decommissioning of the Proposed Development could have a **temporary Moderate adverse effect** through displacement of foraging hen harrier. This is considered to be a **significant effect** by this EIA.
- 10.6.72 Furthermore, decommissioning activities could have a **temporary Minor adverse effect due** to disturbance of breeding hen harrier. This is considered to be a **non-significant effect** by this EIA.

### *Impacts on Osprey*

#### *Construction*

- 10.6.73 Osprey was not recorded breeding within the Development Site or surrounding 2km buffer, and there are no waterbodies within the Development Site which are suitable for foraging by this species. The only observations of osprey made during field surveys were of birds in flight. There are consequently no possible impacts from the construction of the Proposed Development which could affect osprey.

#### *Operation*

- 10.6.74 A total of six osprey flights were recorded during VP surveys between 2014 and 2021. With a 98% avoidance rate, the calculated osprey collision mortality from the operation of the Proposed Development is 6.26 deaths over 35 years. The worst-case scenario of this level of collision mortality being realised would therefore result in the death of one osprey approximately every 5.6 years. In 2013, there were estimated to be thirteen pairs of osprey in NHZ 14. However, range expansion and population increase by this species was considered at that time to be strongest in three NHZs, including NHZ 14 (Wilson *et al*, 2015). It is therefore likely that the current population size is greater than the thirteen pairs estimated in 2013. Consequently, the loss of one bird every approximately 5-6 years, or five birds over the lifetime of the Proposed Development would be very unlikely affect the conservation status of osprey within NHZ 14.
- 10.6.75 Therefore, collision impacts are expected to be of Low magnitude, resulting in a **Negligible (non-significant) effect** on osprey.

#### *Decommissioning*

- 10.6.76 In line with the construction phase, there are no possible impacts or effects on osprey from the decommissioning of the Proposed Development.

### *Impacts on Kestrel*

#### *Construction*

##### *Loss of Habitat*

- 10.6.77 Kestrels breed in almost any habitat that holds sufficient prey (small mammals or birds) and nest sites, including open moorland with trees and crags, upland grassland, young conifer plantations, heaths, and all types of farmland (Hardey *et al*, 2013). The species hunts over open habitats, and it can be seen on Figure 10.10 that the majority of recorded kestrel flights

were over the Cruach Mhic an t-Saoir ridge and the open ground around T01 and T03. Construction of T01, T03 and T04 and the associated infrastructure will result in the loss of approximately 8.25ha of open habitat.

- 10.6.78 During the breeding season, kestrel home range size varies from less than 1km<sup>2</sup> to more than 10km<sup>2</sup> (Village, 1990), depending on the availability of prey. When prey populations (in particular those of voles) are high, kestrels have smaller home ranges (Village, 1982). The nearest identified kestrel nest site to the area around T01 and T03 was approximately 2.2km distant. It is therefore likely to be outside of the core foraging range of birds belonging to that nest site, and may only be within the home range of those birds in years with low prey availability. The loss of 8.25ha (in other words 0.08km<sup>2</sup>) of suitable foraging habitat as a result of construction of the Proposed Development would therefore represent a small portion of the potential home range of a breeding kestrel pair. There will be no other loss of optimal kestrel foraging habitat as all other turbines and associated infrastructure are within continuous cover plantation forestry. The overall impact from habitat loss is likely to be Low, resulting in **Negligible (non-significant) effect** on kestrels.

#### *Displacement*

- 10.6.79 As can be seen in Figure 10.10, kestrels do forage over the open ground around T01, T03 and T04, particularly along the edge of the plantation woodland. Although construction will result in the loss of only a small area of habitat available to kestrels within their core foraging range, construction works have the potential to prevent birds from hunting over a wider area than this. However, kestrels are generally relatively tolerant of human activities, and regularly hunt alongside busy main roads and in other urban environments. It is therefore likely that any displacement of foraging birds as a result of construction activities would occur only over a small distance. Given the likely Low magnitude of such an impact, and the availability of extensive area of other open ground habitat nearby, it is assessed that there would be **Negligible (non-significant) effect** on kestrels from construction-related displacement.

#### *Disturbance of Breeding Birds*

- 10.6.80 Three kestrel nests were identified by targeted field survey, all more than 1km to the east of the Proposed Development. There is no suggested distance from construction works at which disturbance of nesting kestrels is unlikely to occur. However, FLS publish guidance on avoiding impacts on nesting birds from forestry operations and suggest a 200m works exclusion zone around buzzard nests. This species has a somewhat similar ecology to kestrel in terms of nest locations, habitat preferences and an apparent tolerance to human activities. It is therefore considered that 200m represents a suitable buffer for kestrel, beyond which disturbance from construction works is unlikely. Given that all known nests are situated well beyond this distance, there is no possibility of impacts and it is concluded that there will be **Negligible (non-significant) effect** of disturbance on breeding kestrels.

#### *Operation*

##### *Collision Mortality*

- 10.6.81 Collision risk modelling was not carried out for kestrel based on the layout of the Proposed Development. However, CRM was carried out for the 2016 EIA, based on the layout and design of the wind farm at that time. It was estimated that there was a risk of three kestrel

mortalities over a 25-year period. This would be small in the context of the NHZ 14 population which is estimated at 136 pairs (272 adult birds).

- 10.6.82 It is therefore concluded that collision risk represents a Low magnitude impact on kestrel, resulting **Negligible (non-significant) effect** on this species overall.

#### *Displacement*

- 10.6.83 There is little definitive published evidence of kestrel displacement from the area around operational wind farms. It is therefore assumed that, similar to hen harrier, there will be minor displacement of foraging kestrel from around the operational Proposed Development. The impact of displacement is therefore expected to be of Minor magnitude, meaning there would be **Negligible (non-significant) effect** on kestrel during the operational phase.

#### *Disturbance of Breeding Birds*

- 10.6.84 As described for the construction phase, the nearest known kestrel sites are beyond the distance at which disturbance from routine operational activities is likely to occur. There will consequently be **Negligible (non-significant) effect** from disturbance of breeding kestrel during the operational phase.

#### *Barrier to Movement*

- 10.6.85 Given that the effects of any displacement around the operational wind farm are expected to be Negligible, and considering the relatively small size of the Proposed Development, it is likely there will be Negligible barrier impact to kestrel flights. There will consequently be **Negligible (non-significant) effect** on kestrel movements.

#### *Habitat Creation and Enhancement*

- 10.6.86 As described in more detail above, the updated Carradale Land Management Plan will deliver the creation of areas of open ground where currently there is dense conifer plantation. This is likely to improve available foraging opportunity for kestrel in the medium-term. Similar to hen harrier and golden eagle, the impacts of this are expected to be of Medium magnitude, giving rise to a **permanent Minor beneficial effect** for kestrel. This is considered to be a **non-significant effect** by this EIA.

#### *Decommissioning*

- 10.6.87 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above. There will therefore be **Negligible (non-significant) effect** on kestrel during the decommissioning phase.

#### *Impacts on Red-throated Diver*

- 10.6.88 A full assessment of the impacts on red-throated divers is provided in Confidential Annex 10.1 (EIAR Volume 4). To avoid providing sensitive details on the location(s) of red-throated divers, the assessed impacts only are given in this chapter, with no supporting evidence (other than for CRM), for which see the Confidential Annex.

## ***Construction***

### *Loss of Habitat*

- 10.6.89 There will be **Negligible (non-significant) effect** of habitat loss on red-throated divers.

### *Disturbance of Breeding Birds*

- 10.6.90 There will be **Negligible (non-significant) effect** from construction-related disturbance on breeding red-throated divers.

## ***Operation***

### *Collision Mortality*

- 10.6.91 A total of six red-throated diver flights were recorded through the Proposed Development. This is an insufficient number to carry out collision risk modelling, but the risk of collision is expected to be very low. It is concluded that there will be **Negligible (non-significant) effect** on red-throated diver from collision mortality.

### *Displacement*

- 10.6.92 There is predicted to be **Negligible (non-significant) effect** from displacement impacts on red-throated divers.

### *Disturbance of Breeding Birds*

- 10.6.93 There will be **Negligible (non-significant) effect** from disturbance during the operational phase on breeding red-throated divers.

### *Barrier to Movement*

- 10.6.94 It is expected that there will be **Negligible (non-significant) effect** on red-throated divers as a result of barrier impacts.

## ***Decommissioning***

- 10.6.95 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above. There will therefore be **Negligible (non-significant) effect** on red-throated diver during the decommissioning phase.

## ***Impacts on Black Grouse***

## ***Construction***

### *Loss of Habitat*

- 10.6.96 Black grouse inhabit areas of open woodland and woodland edge adjacent to moorland and upland rough grassland. The diet of black grouse varies seasonally, with heather and bilberry being particularly important. However, birch *Betula* sp. catkins and buds, the needles, buds and flowers of pines *Pinus* sp. and larch *Larix* sp. and various flowers, fruits of sedges and

rushes and berries are all eaten. Chicks require a diet chiefly composed of invertebrates during the first two to three weeks of their life (Forrester *et al*, 2007).

- 10.6.97 These habitat preferences are demonstrated in the records of black grouse obtained within the potential Zol of the Proposed Development, which were predominantly associated with open ground habitat to the north and east, or in large clearings amongst the dense plantation forestry.
- 10.6.98 A borrow pit which was initially planned at Cnoc na Seilg was removed from the design of the Proposed Development as a form of embedded mitigation in order to minimise adverse effects on black grouse from habitat loss. Consequently, habitat loss impacts on black grouse will therefore be restricted to the open ground around T01, T03 and T04.
- 10.6.99 During the breeding season, both male and female black grouse are sedentary, with males being particularly restricted to small core areas no larger than 1.5km<sup>2</sup> (150ha). Chick rearing areas may be as small as 5ha, within 1.5km of a lek, provided there is ample shelter and insects (<http://www.blackgrouse.info/about/ecology/Habitat.htm>). The construction of T01, T03, T04 and BP06 will result in the loss of approximately 8.25ha of open ground habitat, which could be substantial in relation to black grouse foraging. However, with no lek sites located in the vicinity of this area, there is a reduced likelihood that it forms part of the home range of breeding black grouse and it is considered very unlikely that this impact would arise in reality.
- 10.6.100 It is therefore concluded that the small loss of habitat which is beyond 2km from the nearest known lek location would represent a Low magnitude impact and will have **Negligible (non-significant) effect** on black grouse.

#### *Displacement*

- 10.6.101 The only observations of black grouse in the area of open ground habitat near to T01 and T03 during the 2014 to 2021 survey period were three flights which passed over, rather than birds specifically using this habitat (see Figure 10.13; EIAR Volume 2b). This area, although potentially suitable, therefore appears to be of low importance to black grouse.
- 10.6.102 Although construction works have the potential to displace foraging birds, the likelihood of this is low given the lack of records of black grouse in this area. Furthermore, as the area seems to be of low importance to black grouse, any such impact would have a very small effect on black grouse. It is therefore concluded that, at worst, the impact of displacement during the construction phase would have a Low magnitude impact, resulting in **Negligible (non-significant) effect** on black grouse.

#### *Disturbance of Breeding Birds*

- 10.6.103 Male black grouse gather at prominent locations and engage in communal displaying (lekking) to attract females. Although lekking can occur year-round, females only attend leks in the spring (late-March to mid-May) at which time lekking activity by males is at its peak (Gilbert *et al*, 1998). The location of leks is generally traditional and used year-on-year. They are usually less than 0.5ha in size and comprise an area of relatively flat, open ground with short vegetation. This can be on pasture, moorland edge or in open areas within woodland. In addition, vehicle tracks are also used (Gilbert *et al*, 1998).

10.6.104 Although there is little published information available on disturbance of black grouse leks, Ruddock and Whitfield (2007) suggest that disturbance would not be caused at distances between 300m to 500m. However, based on evidence from other projects of a similar scale (e.g. Carraig Gheal Wind Farm, Argyll) and professional judgement, feeding black grouse have shown no active disturbance response to passing vehicles at distances of less than 10m. The nearest known lek site to the Proposed Development is at Cnoc na Seilg, approximately 500m from Borrow Pit 05, well beyond the distance at which disturbance is likely to be caused by construction works. Furthermore, although observations of black grouse have been made within approximately 180m of the main access track, considering the apparent tolerance of this species to the passage of vehicles, it is also unlikely that significant disturbance would be caused to birds foraging in this area. There is therefore expected to be Negligible impact from disturbance.

10.6.105 It is therefore concluded that disturbance of breeding black grouse is very unlikely and would result in **Negligible (non-significant) effect** on this species.

#### *Accidental Destruction of Active Nests*

10.6.106 Black grouse nest on the ground, in tall, reasonably dense vegetation, usually mature heather or rushes. As set out above, black grouse typically nest in proximity to lek sites. The nearest known lek site is approximately 500m from the nearest infrastructure. The possibility of accidental damage of an active black grouse nest is therefore remote. It is therefore assessed that there will be Negligible impact from accidental nest destruction, resulting in **Negligible (non-significant) effect**.

10.6.107 Regardless of the above, it is an offence under the WCA to intentionally or recklessly destroy the active nest of a wild bird, including black grouse. It is therefore essential, to comply with this legislation, to take steps to avoid the intentional or reckless destruction of black grouse nests.

#### *Operation*

##### *Collision Mortality*

10.6.108 Only three black grouse flights were recorded by VP survey in the vicinity of proposed turbine locations. This is an insufficient number to carry out collision risk modelling, but the risk of this species colliding with operational turbines is therefore considered to be very low. It is consequently predicted that there will be **Negligible (non-significant) effect** on black grouse from collision mortality.

##### *Displacement*

10.6.109 For the reasons described in relation to the construction phase, primarily that black grouse have not been recorded frequently in the area around proposed turbine locations, there is expected to be Negligible impact from displacement around the operational Proposed Development, resulting in **Negligible (non-significant) effect**.

### *Disturbance of Breeding Birds*

10.6.110 For the reasons described in relation to the construction phase, namely the distance to the nearest known black grouse lek site, there is expected to be Negligible impact from disturbance as a result of operational activity, giving rise to **Negligible (non-significant) effect**.

### *Barrier to Movement*

10.6.111 Black grouse are sedentary and generally fly at low levels. The operational wind turbines are not expected to act as a barrier to the movement of black grouse within and around the Development Site. There is therefore expected to be Negligible impact from the Proposed Development acting as a barrier to movement, resulting in **Negligible (non-significant) effect** on black grouse.

### *Decommissioning*

10.6.112 Decommissioning of the Proposed Development is not expected to give rise to any additional impacts not already discussed above. There will therefore be **Negligible (non-significant) effect** on black grouse during the decommissioning phase.

## 10.7 Cumulative Effects

- 10.7.1 Cumulative effects can result from individually insignificant but collectively (i.e. cumulative with other infrastructure developments) significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018). The assessment of cumulative effects has been carried out in the context of the Argyll West and Islands NHZ (NHZ 14). The assessment has considered all currently operational wind farms within NHZ 14, in addition to those which have been consented but are not yet operational (including those currently under construction), and those for which a planning application has been submitted, but which have not yet been granted planning consent. Other proposed wind farm developments which may be in the planning system (including those at EIA Scoping stage) have not been included as insufficient information is available to inform the cumulative impact assessment (e.g. there are no collision risk modelling results available).
- 10.7.2 The cumulative impact assessment therefore considered the developments listed in Table 10-9.

**Table 10-9 Wind Farm Developments Considered by Cumulative Impact Assessment**

Wind Farm	Status	Number of Turbines	Approximate Distance from the Proposed Development (km)
Deucheran Hill	Operational	9	2.6
Blary Hill	Consented/Under Construction	14	3.9

<b>Wind Farm</b>	<b>Status</b>	<b>Number of Turbines</b>	<b>Approximate Distance from the Proposed Development (km)</b>
Narachan	Application	17	4.0
Beinn an Tuirc	Operational	46	4.7
Auchadaduie	Operational	3	5.1
Beinn an Tuirc Extension	Operational	19	6.6
Cour	Operational	10	7.3
	Consented/	16	8.6
Beinn an Tuirc Phase III	Under Construction		
High Constellation	Consented	10	8.7
Gigha and Leim Farm	Operational	4	8.8
Tangy IV	Consented	16	11.7
Tangy and Extension	Operational	22	12.7
	Consented	/ 13	15.6
Eascairt	Under Construction		
Sheirdrim	Application	19	16.0
Freasdail	Operational	11	18.0
Airigh	Consented	14	22
Allt Dearg	Operational	12	34
A'Cruach	Operational	21	57
Srondoire	Operational	3	35
Cruach Mhor	Operational	25	52
A'Cruach Phase 2	Consented	2	57
Isle of Luing	Operational	2	65
An Suidhe	Operational	23	69
Creag Dubh	Application	9	73
Carraig Gheal	Operational	20	81
Clachan Flats	Operational	9	82
Beinn Ghlas	Operational	14	86

- 10.7.3 Conclusions on cumulative impacts at a regional or local population level require a form of Population Viability Assessment (PVA) to appraise how added mortality or loss of habitat due to the wind farms is likely to affect the viability and size of the bird population.
- 10.7.4 The potential collision mortality predicted to arise from the Proposed Development for golden plovers and hen harriers over a 35-year period is small. Bearing in mind the size of the non-breeding golden plover population and the breeding hen harrier population, the potential additional mortality arising from the Proposed Development is unlikely to make a meaningful contribution to cumulative mortality within NHZ 14. It is therefore expected that there would be Negligible cumulative impacts on these species and **Negligible effect** on golden plover and hen harrier.
- 10.7.5 Any assessment of loss of golden eagle habitat associated with construction of the Proposed Development results in a trivial figure, whether considered at the NHZ 14 or national level. For example, NHZ 14 has 229,700 ha of preferred golden eagle habitat. The loss of habitat to both range-holding and dispersing golden eagles from the Proposed Development is expected to be negligible and will contribute to an insignificant cumulative loss of such habitat at the scale of NHZ 14.
- 10.7.6 Furthermore, in terms of other possible impacts on golden eagle, assessment of cumulative effects is complex. For example, several wind farms, including Beinn Ghlas and Beinn an Tuirc, predicted adverse effects on this species. However, despite there being evidence of avoidance of operational wind farms, there is little proof that this has a negative effect on breeding golden eagles. Moreover, there are at least seven wind farms at which golden eagles have established nests nearby following commencement of operation, including on Kintyre.
- 10.7.7 On the assumption that golden eagle mortality levels at individual wind farms are unlikely to be as high as predicted by any EIA (due to the adoption of a conservative 99% avoidance rate in CRM), then adding them together would almost certainly produce an unrealistically high cumulative estimate. Cumulative predicted mortality for golden eagles from all submitted, consented and operational wind farms in NHZ 14 (excluding the Proposed Development) is unlikely to be greater than seven or eight over 35 years, even assuming the maximum case and the highly unlikely scenario of simultaneous operation of all wind farms. The predicted loss from the Proposed Development Site of 5.18 golden eagles over a period of 35 years adds to this potential cumulative mortality. However, as stated above, with almost no risk of collision in reality, this estimate is highly likely to be precautionary. With a total breeding population of 51 pairs, the golden eagle population in NHZ 14 will retain a capacity for expansion and remain in favourable conservation status over a 35-year period.
- 10.7.8 The cumulative impacts on golden eagles due to habitat loss, displacement and/or collision risk arising from all wind farms in NHZ 14 are considered to be of Low magnitude which represents a **permanent Minor adverse effect** at the scale of NHZ 14. This is **non-significant** in the context of this EIA.
- 10.7.9 For all other ornithological features considered by this EIA, there are expected to be Negligible cumulative impacts from all other planned, consented and operational wind farm developments in NHZ 14, resulting in **Negligible (non-significant) effects**.

## 10.8 Mitigation and Monitoring

### *General Mitigation Measures*

- 10.8.1 A range of standard mitigation measures will be implemented to minimise the impacts of the Proposed Development on ornithological features. These are well-developed and have been successfully adopted on infrastructure projects across Scotland, and there is a high degree of confidence in their success.
- 10.8.2 An Ecological Clerk of Works (ECoW) will be employed on a full-time basis for the duration of the construction of the Proposed Development. The ECoW will be responsible for monitoring and ensuring the implementation of all mitigation measures and compliance with legislative requirements in relation to ornithological features. The ECoW will also carry out pre-works checks for breeding birds and provide other advice in relation to ornithological features, as appropriate.
- 10.8.3 Throughout the construction, and where necessary decommissioning, phases, a programme of breeding bird surveys will be carried out within the potential Zol of the Proposed Development, as adopted during the pre-construction surveys which have informed this EIA. The surveys will be carried out by a suitably experienced ornithologist(s) and will follow best practice methods, similar to those described in this chapter. The results of on-going surveys will be communicated to relevant construction personnel to ensure that appropriate mitigation is implemented to protect identified breeding birds. The detailed programme of breeding bird surveys will be set out in a Species Protection Plan (SPP), which will be approved by Argyll and Bute Council, in consultation with NatureScot, prior to the commencement of construction and/or decommissioning works.
- 10.8.4 All construction personnel and staff involved in the operation of the Proposed Development will be made aware of the ornithological features at the Development Site and the mitigation measures and working procedures which must be adopted. This will be achieved as part of the induction process through the delivery of a Toolbox Talk. In addition, as required, briefings will also be provided in advance of works which are considered to present an increased risk of impacting ornithological features.
- 10.8.5 Wherever possible, vegetation clearance (i.e. the keyhole felling around wind turbines T02, T04, T05, T06, T08, T10, T11 and T13, but not including clear felling being carried out independently by FLS) will be undertaken outside of the breeding season, this being between March and August, inclusive. Where this cannot be achieved, a pre-works check for the presence of nesting birds will be conducted by the ECoW or other suitably experienced ornithologist. Consideration will be given to the use of innovative techniques for locating ground-nesting birds, including the use of thermal imaging cameras mounted onto unmanned aerial vehicles ('drones'). Pre-works checks for nesting birds should take place not more than 72 hours prior to the commencement of works as nests can be quickly established. Where any active nest sites are identified, suitable species-specific exclusion zones will be implemented and maintained until the breeding attempt has concluded. If a bird listed on Schedule 1 of the WCA is confirmed as, or is suspected to be, breeding, the works exclusion zone will be informed by the information provided in Ruddock and Whitfield (2007) and the site-specific characteristics of the nest site, including topography and the presence of

screening (e.g. woodland). The size of the exclusion zone around the nests of birds listed on Schedule 1 of the WCA will be agreed with NatureScot. Full details of the requirements in relation to the protection of breeding birds, included recommended sizes for works exclusion zones, will be included within the SPP.

10.8.6 The following additional standard mitigation measures will be implemented:

- A Construction Environmental Management Plan (CEMP) will be prepared. The CEMP will be approved by Argyll and Bute Council, Scottish Environment Protection Agency (SEPA) and NatureScot (where relevant) prior to commencement of construction. It will set out general environmental measures, including pollution prevention, and the roles and responsibilities of construction personnel. The CEMP will include, as a minimum, a Pollution Prevention Plan (PPP), Water Management Plan (WMP) and Dust Management Plan (DMP),
- SEPA Pollution Prevention Guidelines (PPG) and Guidance on Pollution Prevention (GPP) will be followed at all times during the construction, operation and decommissioning of the Proposed Development,
- Controls and contingency measures will be provided to manage run-off from construction areas and to manage sediment,
- In order to avoid potential pollution impacts to vegetation and watercourses from machinery during construction, all refuelling and servicing of vehicles and plant will be carried out in a designated area which is bunded and has an impermeable base. This will be situated away from sensitive habitats and at least 50m from any watercourse,
- Measures to avoid dust generation will be implemented as required during the construction phase,
- All construction compounds, access tracks and other works areas will be of the minimum size required for the safe construction of the Proposed Development. Compounds will be fenced to prevent encroachment of personnel, machinery and materials onto adjacent habitats. The temporary stockpiling of materials will be restricted to predetermined locations, such as compounds, and will not be done on undisturbed adjacent habitats,
- Construction works will take place within a clearly demarcated area,
- Where practicable, works near or at any retained trees (relevant only to the main access track) will follow guidance detailed in British Standard 5837:2021 *Trees in relation to design, demolition and construction – Recommendations*, and
- Sightings of protected and/or notable bird species within the Development Site during the construction period will be recorded. If any evidence or sightings of specially protected bird species listed on Schedule 1 of the WCA suggest that a nest site may be present within 1km of active or planned near term works, then works in that area will stop immediately and the ECoW will be contacted for further advice.

## ***Specific Mitigation***

- 10.8.7 Specific mitigation measures will also be implemented to minimise the significant effects on ornithological features identified by this assessment. Although mitigation is not required where effects are not considered to be significant (i.e. they have been assessed as being either Minor or Negligible), in some cases measures will be implemented where these can be readily achieved.
- 10.8.8 The implementation of mitigation does not negate the requirement to comply with relevant legislation pertaining to protected species.

### ***Snipe***

- 10.8.9 Although generally implemented as standard best practice, a range of measures will be adopted to ensure that impacts on the hydrology of the habitat surrounding T01, T03 and T04 is minimised. These measures will help to ensure that the habitat in this area remains suitable for snipe, maintaining wetland conditions needed for foraging and chick rearing. The following measures will be implemented (also see Chapter 9: Ecology and Chapter 11: Geology, Hydrology and Hydrogeology of this EIAR; Volume 2a):
- The access roads to T01, T03 and T04 will be micro-sited, where necessary and as far as possible, to minimise damage to or loss of flush or other important wetland habitats, including groundwater dependent terrestrial ecosystems (GWDTE),
  - As far as possible, the access tracks will be constructed via a ‘floating’ method, which retains the underlying substrate *in situ* and promotes continued flow of groundwater, and
  - Where floating track construction cannot be adopted, the access track will be constructed so as to permit the continued flow of surface water from one side to the other. This will involve the installation of culverts or small cross-pipes, incorporated at regular intervals and in particular in areas of obvious water flow.

### ***Golden Eagle***

- 10.8.10 See Confidential Annex 10.1 (EIAR Volume 4). See also Figure 10.15 (EIAR Volume 2b).

### ***Hen Harrier***

- 10.8.11 See Confidential Annex 10.1 (EIAR Volume 4). See also Figure 10.15 (EIAR Volume 2b).

### ***Black Grouse***

- 10.8.12 No black grouse leks were identified within 500m of any proposed infrastructure during surveys carried out between 2014 and 2020. However, should a black grouse lek be identified by during-construction (or decommissioning) ornithological surveys within 500m of any construction area, no works will be permitted to take place during the period of one hour before sunrise until one hour after sunset, in the months of April and May. This will ensure there is no disturbance to displaying black grouse.

## *Enhancement*

- 10.8.13 Enhancement for ornithological features will be delivered by the updated Carradale Land Management Plan to be implemented and managed by FLS. As embedded mitigation, consideration has been given through the impact assessment section of this chapter to the likely effects that the habitat management measures contained within the updated Carradale Land Management Plan will have for the key bird species included.
- 10.8.14 It has been concluded in this assessment that there will be permanent Minor beneficial effects for hen harrier and kestrel in the medium-term.
- 10.8.15 More widely, the measures are likely to benefit a range of other upland breeding bird species, as well as other ecological features (as discussed in Chapter 9: Ecology of this EIAR).

## *Monitoring*

- 10.8.16 Throughout the construction phase, the ECoW or another suitably experienced ornithologist will be responsible for carrying out a full programme of survey for sensitive bird species, namely lekking black grouse, breeding waders, breeding raptors and breeding divers. These surveys will follow good practice guidelines as adopted during the fieldwork completed to inform this EIA and referenced in Section 10.3 of this chapter. The purpose of these surveys will be to determine if and where sensitive bird species establish nest sites, and to therefore allow for appropriate avoidance and/or mitigation measures to be implemented to avoid or minimise impacts upon them. This will be particularly relevant to those bird species listed on Schedule 1 of the WCA, which may not be disturbed when actively breeding. Full details of the during-construction ornithological monitoring programme will be set out in the Species Protection Plan for the Proposed Development, to be submitted to NatureScot in advance of the commencement of construction. The results of all during-construction ornithological survey will be provided to NatureScot and the Argyll RSG.

## **10.9 Summary of Effects**

- 10.9.1 The potential effects of the Proposed Development during the construction, operation and decommissioning phases are summarised in Table 10-10. The general and specific mitigation measures proposed to minimise the identified effects are outlined in this tables and the residual, post-mitigation effect is assessed.
- 10.9.2 For the purposes of this assessment, only effects which are judged as Moderate or Major are considered to be Significant. On this basis, the only Significant adverse effects predicted on ornithological features in the absence of mitigation were as a result of:
- direct and indirect habitat loss for breeding snipe;
  - displacement and/or disturbance of golden eagles, and
  - displacement of hen harriers.
- 10.9.3 However, with the implementation of mitigation, as described above and summarised in Table 10-10, there were, at worst, Minor adverse effects on ornithological features, and no Significant adverse effects are predicted by this EIA.

**Table 10-10 Summary of Effects**

<b>Receptor</b>	<b>Description of Impact</b>	<b>Effect</b>	<b>Additional Mitigation</b>	<b>Residual Effects</b>	<b>Significance</b>
Crossbill	Keyhole felling for several turbines will result in the loss of a small area of habitat which is suitable for crossbills.	Negligible	None required.	Negligible	Not Significant
	Crossbill is a species protected from disturbance when breeding through its listing on Schedule 1 of the WCA. Construction, operational and/or decommissioning activities are unlikely to significantly impact this species, which is not generally considered to be susceptible to disturbance.	Negligible	A pre-works check for crossbill will be carried out prior to keyhole felling to search for the presence of breeding birds.	Negligible	Not Significant
	There is a low likelihood of mortality of birds due to collision with operational wind turbines. Even were this to occur, there would be Negligible effect on the conservation status of this species.	Negligible	None required.	Negligible	Not Significant
Golden plover	There will be a loss of some open ground habitat in the vicinity of T01, T03 and T04 which may be suitable for non-breeding golden plover. However, all observations of golden plover were of flocks beyond the Development Site. The loss of this area of habitat is therefore expected to have Negligible impact on non-breeding golden plover.	Negligible	None required.	Negligible	Not Significant
	Flocks of non-breeding golden plover recorded to the north-west, north and east of the Development Site could be disturbed by construction, operational and/or decommissioning activities. However, golden plover were only present in these areas on seven days during the	Negligible	None required.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
	<p>ornithological field survey period of 2014 to 2021. Moreover, birds were only present within 300m of proposed turbine locations on fourteen occasions, out of a total of 37 flights recorded.</p>				
	<p>Based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 98% avoidance rate there would be 23.77 golden plover mortalities over 35 years. The loss of 23.77 birds over 35 years, would represent a very small proportion of the overall Scottish wintering population of between 25,000 and 35,000 birds. This is almost certainly also true for the NHZ 14 non-breeding population.</p>	Negligible	None required.	Negligible	Not Significant
	<p>Golden plover may be displaced up to between 300-500m from operational turbines. Given the low reliance on habitats within this distance of the Proposed Development, and the availability of other suitable habitat nearby, the impact of displacement is expected to be Negligible.</p>	Negligible	None required.	Negligible	Not Significant
	<p>Published literature suggests there is no barrier effect from wind farms on wader species. Based on this evidence and due to the relatively small size of the Proposed Development, there is expected to be Negligible barrier impact on golden plover.</p>	Negligible	None required.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
Snipe	A total area of 8.25ha of habitat suitable for breeding snipe will be directly lost to the construction of T01, T03 and T04 and associated infrastructure. In addition, construction in the area around these turbines may also have indirect impacts on suitable breeding habitat by altering the hydrological regime. These direct and indirect impacts could combine to result in the loss of three snipe breeding territories.	Permanent Moderate adverse	<p>A range of measures will be adopted to ensure that impacts on the hydrology of the habitat surrounding T01, T03 and T04 is minimised by construction of these turbines and associated infrastructure:</p> <ul style="list-style-type: none"> <li>The access roads to T01, T03 and T04 will be micro-sited, where necessary and as far as possible, to minimise damage to or loss of flush or other important wetland habitats, including groundwater dependent terrestrial ecosystems;</li> <li>As far as possible, the access tracks will be constructed via a 'floating' method, which retains the underlying substrate <i>in situ</i> and promotes continued flow of groundwater; and,</li> <li>Where floating track construction cannot be adopted, the access track will be constructed so as to permit the continued flow of surface water from one side to the other. This will</li> </ul>	Permanent Minor Adverse	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
			involve the installation of culverts or small cross-pipes, incorporated at regular intervals and in particular in areas of obvious water flow.		
	<p>Snipe are not considered to be very susceptible to disturbance from anthropogenic activities. Any disturbance during the construction, operational and/or decommissioning stages in the area around T01, T03 and T04 is therefore expected to have a Low magnitude impact on this species.</p>	Negligible	None required.	Negligible	Not Significant
	<p>There is the potential for construction works associated with T01, T03 and T04 to cause the accidental destruction of snipe nests, if carried out during the breeding season. However, this impact would only arise during one breeding season, after which time construction works affecting Minor nesting habitat will have advanced such that no suitable adverse nesting habitat remains. It is also very unlikely that this impact would affect all of the breeding snipe within the potential ZOI of the Proposed Development.</p>	Temporary	As far as possible, clearance of vegetation in this area will be done outside of the breeding season (April to August, inclusive). Where this isn't possible, a pre-works check for the presence of nesting snipe will be carried out. The possibility of using innovative survey techniques to increase the success of these checks will be investigated.	Negligible	Not Significant
	<p>Snipe were recorded on seven occasions by VP survey between 2014 and 2021, with all but one flight occurring outside of the footprint of the Proposed Development. The risk of collision with operational turbines cannot therefore be calculated but is expected to be very low.</p>	Negligible	None required.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
	<p>A published study found evidence that snipe breeding densities within 500m of operational turbines reduced by 48%. Assuming this displaced two breeding pairs (based on assumption that there are at most four pairs in the vicinity of T01, T03 and T04, based on field survey data), Permanent this would represent 0.15% of the NHZ 14 population, and Minor would likely be less than 1% of the Local population on the adverse Kintyre peninsula. There is also alternative suitable habitat for snipe in the area to the north-west, immediately beyond 500m, meaning that displacement is likely to be restricted to a relatively short distance.</p>	None required.		Permanent Minor adverse	Not Significant
	<p>Published literature suggests there is no barrier effect from wind farms on wader species. Based on this evidence and due to the relatively small size of the Proposed Development, there is expected to be Negligible barrier impact on snipe.</p>	None required.		Negligible	Not Significant
	<p>As part of the updated Carradale Land Management Plan, large areas of conifer plantation, which are completely unsuitable for snipe, will be felled. Approximately 56.2ha will be subject to targeted management to create bog habitat which is suitable for snipe breeding and foraging. Negligible The time taken to establish wetland conditions which are suitable for snipe may be relatively long, and it is therefore concluded that the impact of habitat creation will be Low magnitude.</p>	None required.		Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
	Habitat loss impacts	Permanent Minor adverse	None required. Unlike for other species (e.g. hen harrier) golden eagle are not expected to benefit during the operational phase of the Proposed Development from the habitat enhancement measures. This is due to expected displacement of golden eagles from the area around the operational wind turbines.	Permanent Minor adverse	Not Significant
Golden eagle (see Confidential Annex 10.1  (EIAR Volume 4) for full details)	Construction and/or decommissioning phase displacement impacts.	Temporary Moderate adverse	See Confidential Annex 10.1.	Temporary Minor adverse	Not Significant
	Construction and/or decommissioning phase disturbance impacts.	Temporary Moderate adverse	Construction and/or decommissioning works which are considered to have the potential to disturb breeding golden eagle will not be permitted within 1km of any active golden eagle nest site during the breeding season. This will be informed by monitoring by the ECoW or other specialist ornithologist.	Negligible	Not Significant
	Operational phase disturbance impacts.	Negligible	None required. However, monitoring of active golden eagle nests may be required to ensure no disturbance caused by operational activities, which	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
			would constitute an offence under the WCA.		
	Based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 99% avoidance rate there would be 5.18 golden eagle mortalities over 35 years. Five golden eagle death over 35 years would not affect the conservation status of the species either at the NHZ 14 level or more locally. Therefore, collision impacts will be of Low magnitude.	Permanent Minor adverse	None required.	Permanent Minor Adverse	Not Significant
	Operational phase displacement impacts.	Negligible	None required.	Negligible	Not Significant
	Barrier impacts.	Permanent Minor adverse	None required.	Permanent Minor adverse	Not Significant
	Habitat creation / enhancement.	Negligible	None required.	Negligible	Not Significant
Hen harrier (see Confidential Annex 10.1 (EIAR Volume	Habitat loss impacts.	Permanent Minor adverse	None required. However, habitat adverse (during creation / enhancement to be delivered construction by updated Carradale Land phase); Permanent Management Plan.	Temporary Minor Minor beneficial in medium-term	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
4) for full details)	Construction and/or decommissioning phase displacement impacts.	Temporary Moderate adverse	See Confidential Annex 10.1.	Temporary Minor adverse	Not Significant
	Construction and/or decommissioning phase disturbance impacts.	Temporary Minor adverse	Breeding raptor surveys will be carried out during the construction and decommissioning phases. Where the risk of disturbance is deemed to be higher than is predicted by this assessment, works exclusion zone(s) may need to be implemented. Should there be any evidence of disturbance being caused, works will be stopped immediately (subject to making the area safe).	Negligible	Not Significant
	Operational phase disturbance impacts.	Negligible	None required. However, monitoring of active hen harrier nests may be required to ensure no disturbance caused by operational activities, which would constitute an offence under the WCA.	Negligible	Not Significant
	Impacts from accidental destruction of hen harrier nests.	Negligible	None required. However, as best practice, where possible, vegetation clearance will take place outside of the breeding season. Where this can't be done, a pre-works check will be carried	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
			out by the ECoW or a specialist ornithologist.		
	Based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 99% avoidance rate there would be 0.38 hen harrier mortalities over 35 years.	Permanent Minor adverse	None required.	Permanent Minor adverse	Not Significant
	Operational phase displacement impacts.	Permanent Minor adverse	None required.	Permanent Minor adverse	Not Significant
	Barrier impacts.	Negligible	None required.	Negligible	Not Significant
	Habitat creation / enhancement.	Permanent Minor beneficial (in medium-term)	None required.	Permanent Minor beneficial (in medium-term)	Not Significant
Osprey	Based on the levels of flight activity recorded by VP survey and on the layout of the Proposed Development, it is predicted that with a 98% avoidance rate there would be 6.26 osprey mortalities over 35 years. This is unlikely to affect the conservation status of the species either at the NHZ 14 level or more locally. Therefore, collision impacts will be of Low magnitude.	Negligible	None required.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
Kestrel	The loss of open ground habitat around T01, T03 and T04 is expected to have a Low magnitude impact on foraging kestrels due the distance to the nearest known nest site.	Negligible	None required.	Negligible	Not Significant
	All identified kestrel nests were located well beyond the distance at which disturbance from construction, operational or decommissioning works is likely to occur.	Negligible	None required.	Negligible	Not Significant
	Kestrel are relatively tolerant of human activity, and any displacement of foraging birds during the construction, and/or decommissioning phases is expected to occur over a small area.	Negligible	None required.	Negligible	Not Significant
	Collision risk modelling was not carried out for kestrel based on the layout of the Proposed Development. However, CRM was carried out for the 2016 EIA, based on the layout and design of the wind farm at that time. It was estimated that there was a risk of three kestrel mortalities over a 25-year period. This would be small in the context of the NHZ 14 population which is estimated at 136 pairs (272 adult birds).	Negligible	None required.	Negligible	Not Significant
	There is little definitive published evidence of kestrel displacement from the area around operational wind farms. It is therefore assumed that, similar to hen harrier, there will be minor displacement of foraging kestrel from around the Proposed Development.	Negligible	None required.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
	<p>Given that the effects of any displacement around the operational wind farm are expected to be Negligible, and considering the relatively small size of the Proposed Development, it is likely there will be Negligible barrier impact to kestrel flights.</p>	Negligible	None required.	Negligible	Not Significant
	<p>The updated Carradale Land Management Plan will deliver Permanent the creation of areas of open ground where currently there is dense conifer plantation. This is likely to improve available foraging opportunity for kestrel in the medium-term.</p>	Minor beneficial (in term)	None required.	Permanent Minor beneficial (in medium-term)	Not Significant
Red-throated diver	See Confidential Annex 10.1 (EIAR Volume 4).	Negligible	None required.	Negligible	Not Significant
Black grouse	<p>A borrow pit which was initially planned at Cnoc na Seilg was removed from the design of the Proposed Development as embedded mitigation to minimise adverse effects on black grouse from habitat loss. Consequently, the impacts of habitat loss will be restricted to the open ground habitat around T01, T03 and T04. The total area of Negligible habitat to be lost in this area is likely to represent a small proportion of the home range of breeding black grouse. Furthermore, there are no known lek sites within 1.5km of this area, which further reduces the likelihood it forms part of the home range of any breeding black grouse.</p>	Negligible	None required (formerly planned borrow pit at Cnoc na Seilg) removed from design of Proposed Development as embedded mitigation.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
	<p>The only observations of black grouse in the area of open ground habitat near to T01 and T03 during the 2014 to 2021 survey period were three flights which passed over, rather than birds specifically using this habitat. This area, although potentially suitable, therefore appears to be of low importance to black grouse. Although construction, operational and decommissioning works have the potential to displace foraging birds, the likelihood of this is low given the lack of records of black grouse in this area. Furthermore, as the area seems to be of low importance to black grouse, any such impact would have a very small effect on black grouse.</p>	Negligible	None required.	Negligible	Not Significant
	<p>The nearest known black grouse lek site is at Cnoc na Seilg, approximately 500m from Borrow Pit 05 and well beyond the distance at which construction, operational or decommissioning activities are likely to cause disturbance.</p>	Negligible	None required.	Negligible	Not Significant
	<p>Black grouse typically nest in proximity to lek sites. The nearest known lek site is approximately 1.3km from the nearest infrastructure. The possibility of accidental damage of an active black grouse nest is therefore remote.</p>	Negligible	None required	Negligible	Not Significant
	<p>Only three black grouse flights were recorded by VP survey in the vicinity of proposed turbine locations. This is an insufficient number to carry out collision risk modelling, but</p>	Negligible	None required.	Negligible	Not Significant

Receptor	Description of Impact	Effect	Additional Mitigation	Residual Effects	Significance
	<p>the risk of this species colliding with operational turbines is therefore considered to be very low.</p>				
	<p>Black grouse are sedentary and generally fly at low levels. The operational wind turbines are not expected to act as a barrier to the movement of black grouse within and around the Development Site</p>	Negligible	None required.	Negligible	Not Significant

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**RWE**

# **Clachaig Glen Wind Farm**

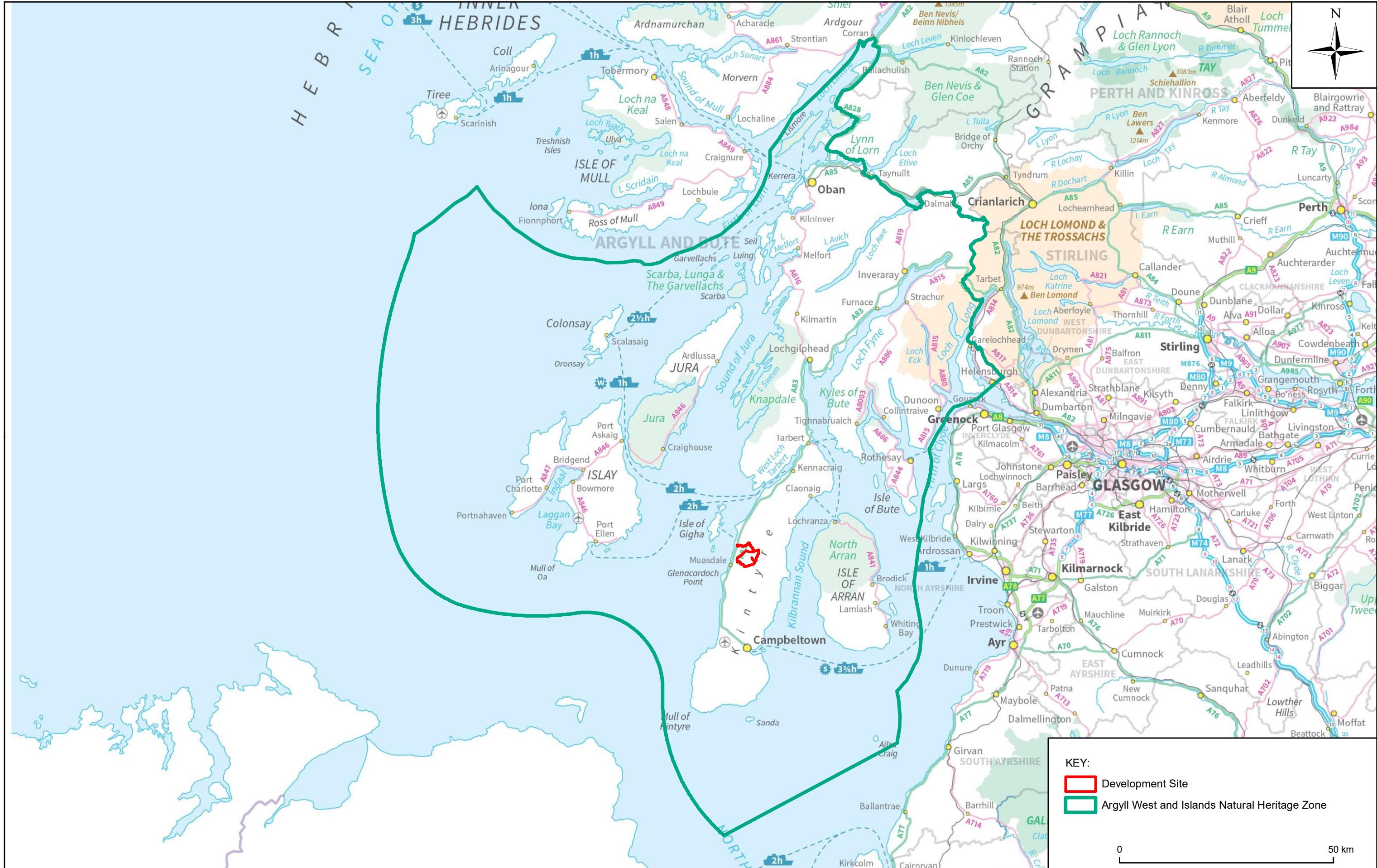
**Environmental Impact Assessment Report**

**Volume 2b**

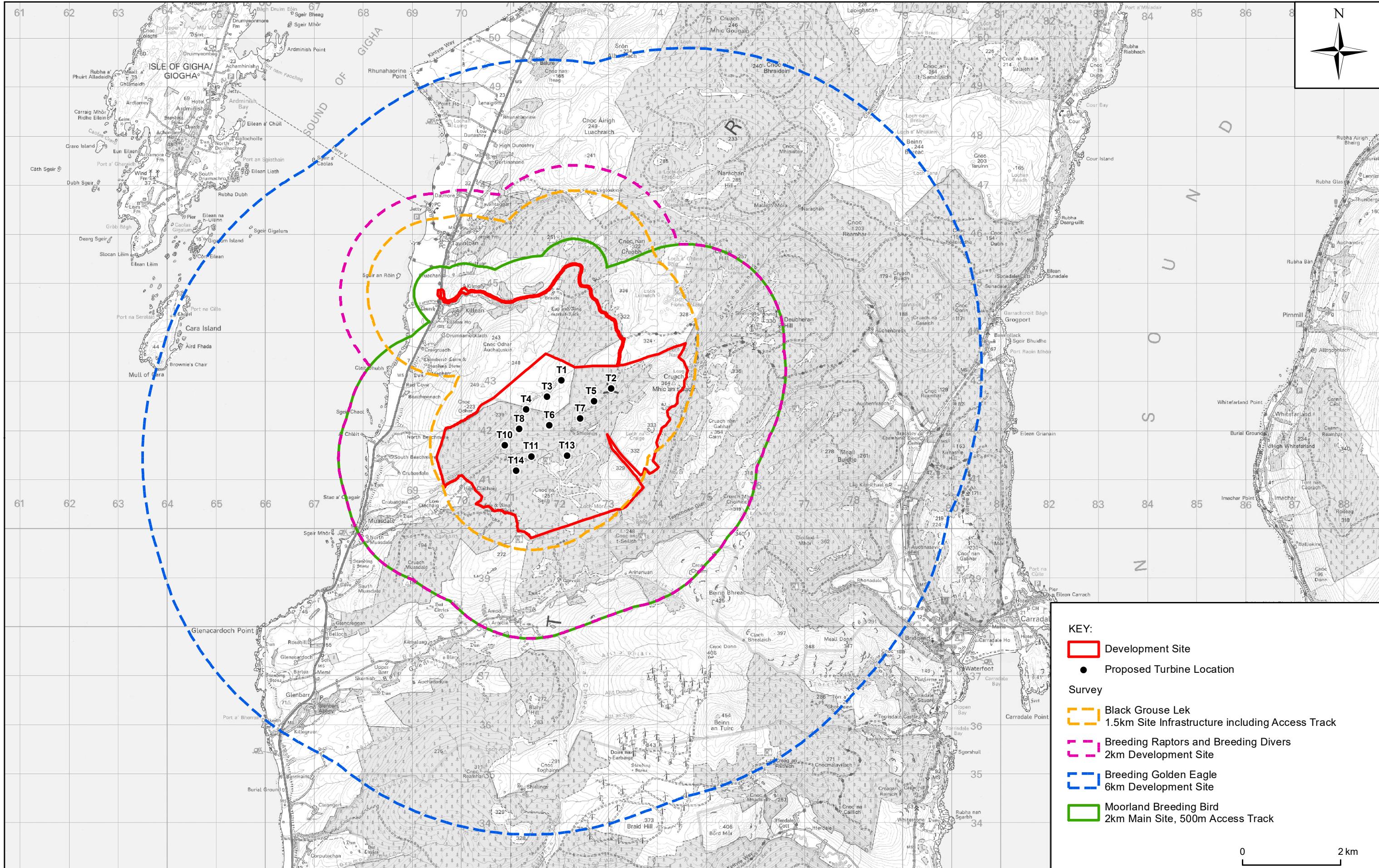
**EIAR Figures**

**Figures: 10.1; 10.2; 10.3; 10.4**





Client: <b>RWE</b>	Title: FIGURE 10.1 ARGYLL WEST AND ISLANDS NATURAL HERITAGE ZONE	AECOM One Trinity Gardens Quayside Newcastle, NE1 2HF	Drawn: LC Verified: TM Date: JANUARY 2022 Drawing Number: CG_220105_EIA10.1_v3	Checked: AR Approved: SW Scale at A3: 1:800,000 A3
Project: CLACHAIG GLEN WIND FARM ENVIRONMENTAL IMPACT ASSESSMENT		Tel +44 (0) 191 224 6500 Fax +44 (0) 191 224 6599 www.aecom.com		



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ENVIRONMENTAL IMPACT ASSESSMENT

Title:

**FIGURE 10.2**  
**ORNITHOLOGY FIELD SURVEY AREAS**

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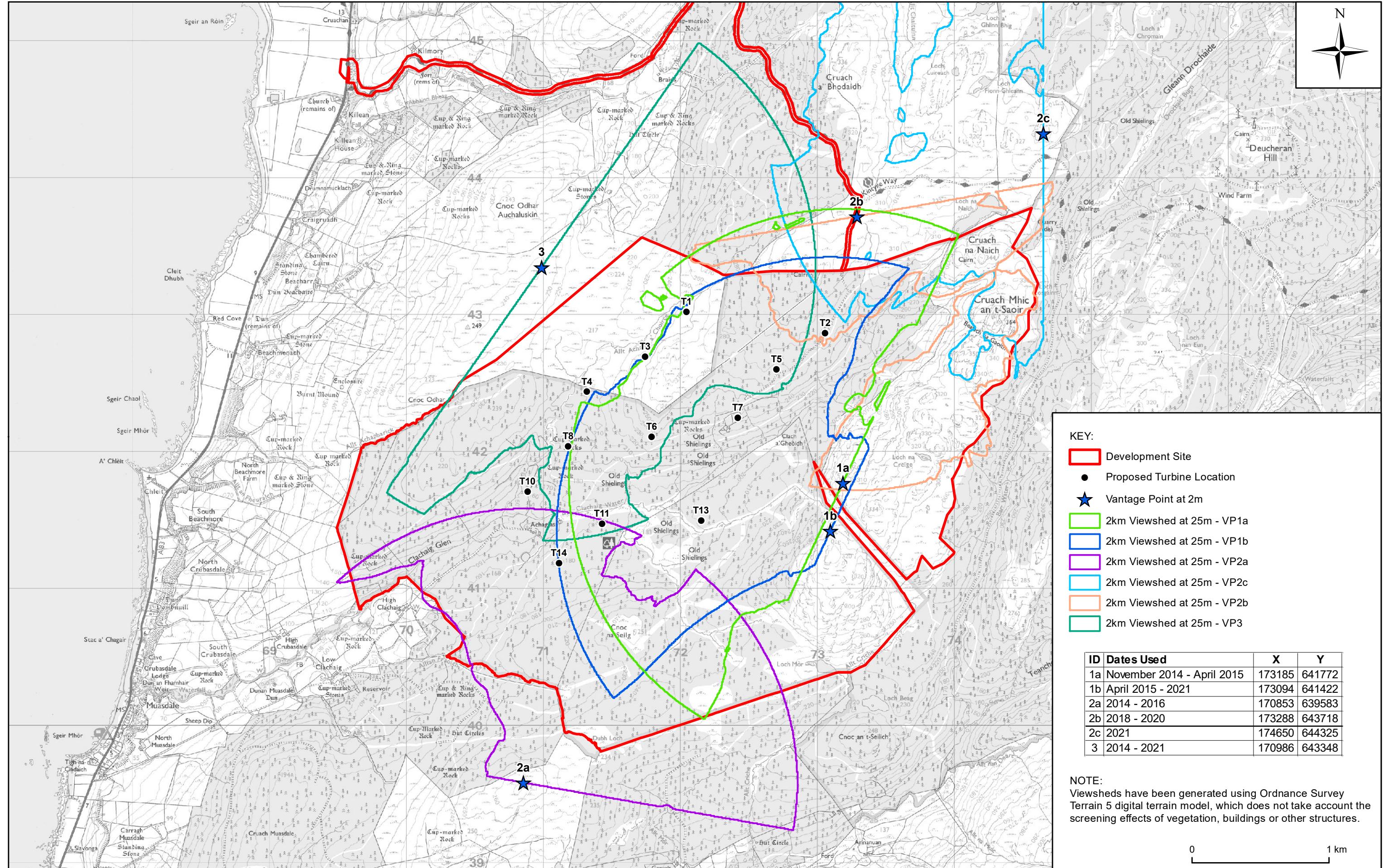
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Date: JANUARY 2022

Scale at A3: 1:70,000

Drawing Number: CG\_220105\_EIA10.2\_v4

A3



ID	Dates Used	X	Y
1a	November 2014 - April 2015	173185	641772
1b	April 2015 - 2021	173094	641422
2a	2014 - 2016	170853	639583
2b	2018 - 2020	173288	643718
2c	2021	174650	644325
3	2014 - 2021	170986	643348

NOTE:  
Viewsheds have been generated using Ordnance Survey Terrain 5 digital terrain model, which does not take account the screening effects of vegetation, buildings or other structures.

0 1 km

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### FIGURE 10.3 VANTAGE POINT LOCATIONS AND VIEWSHEDS

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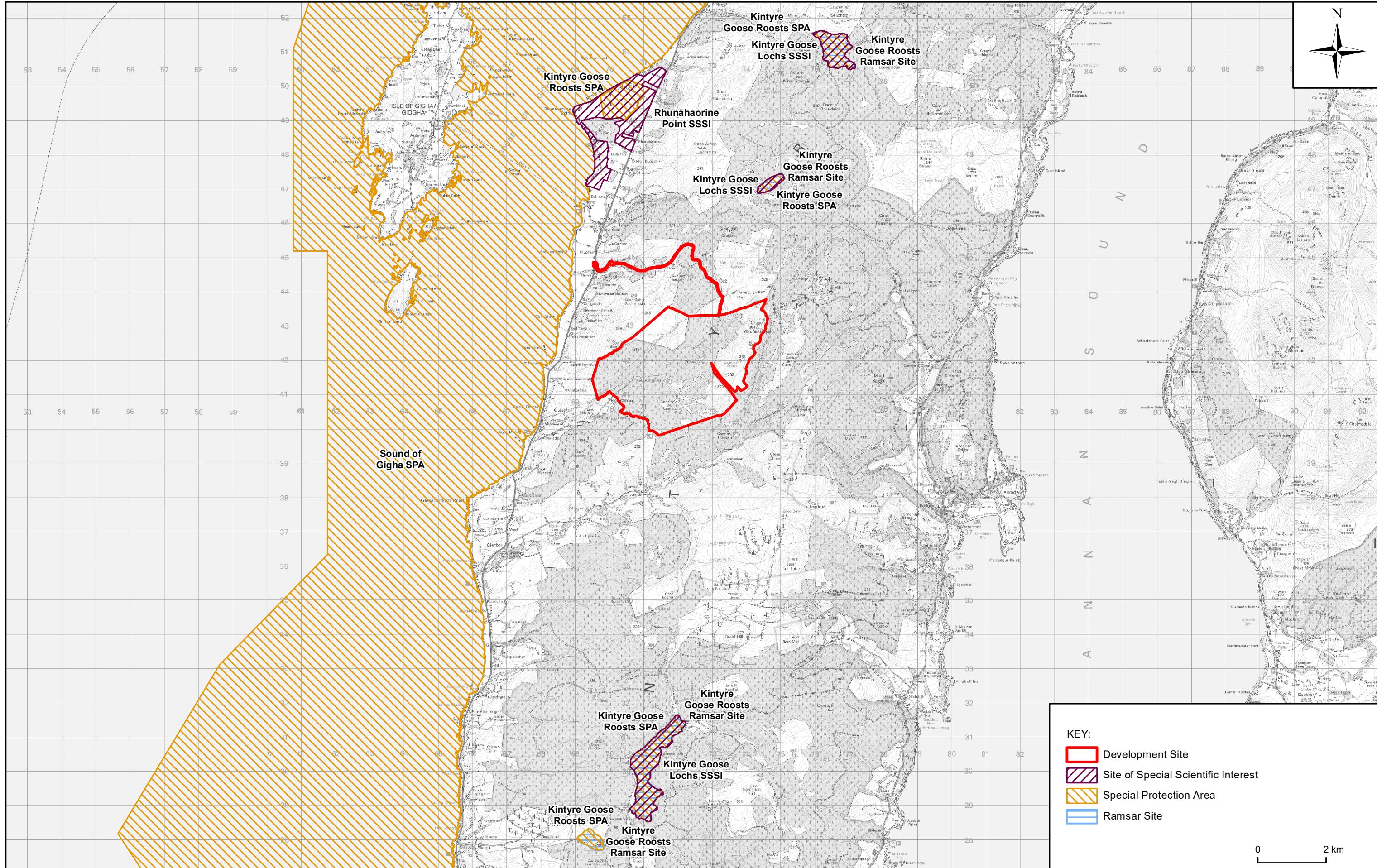
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JANUARY 2022

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Drawing Number: CG\_220106\_EIA10.3\_v3

A3



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FIGURE 10.4  
STATUTORY DESIGNATED SITES

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A3

**RWE**

# **Clachaig Glen Wind Farm**

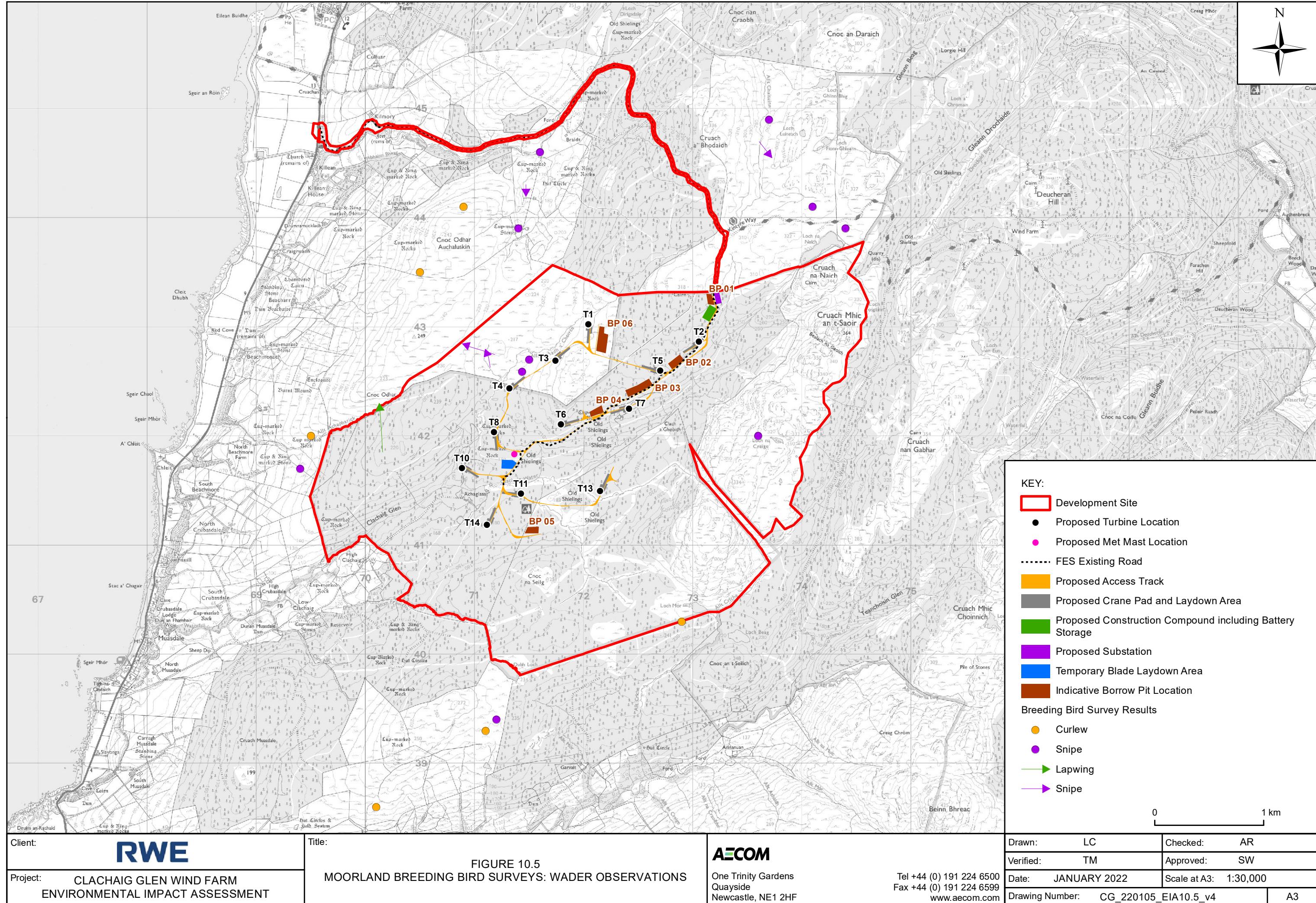
**Environmental Impact Assessment Report**

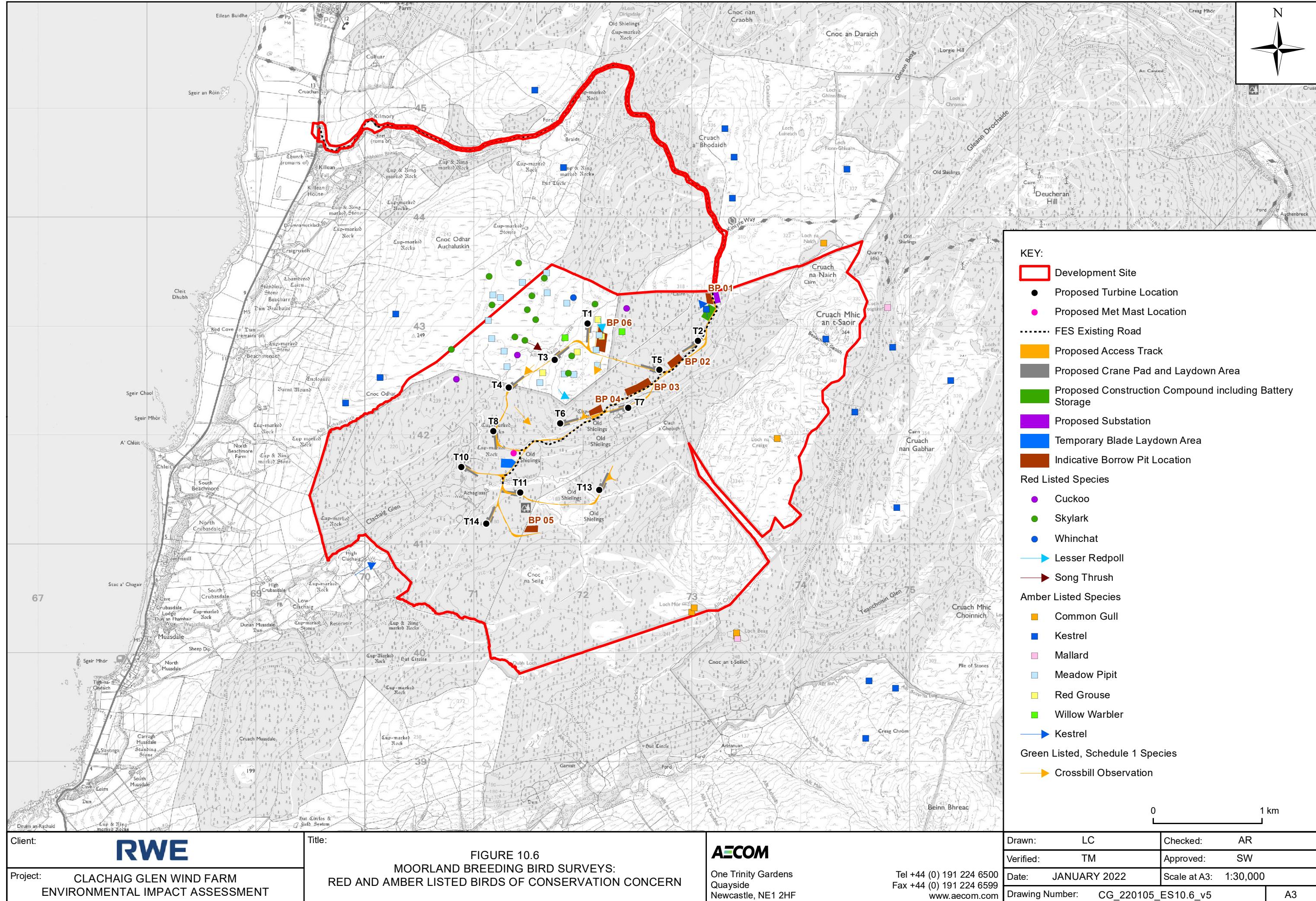
**Volume 2b**

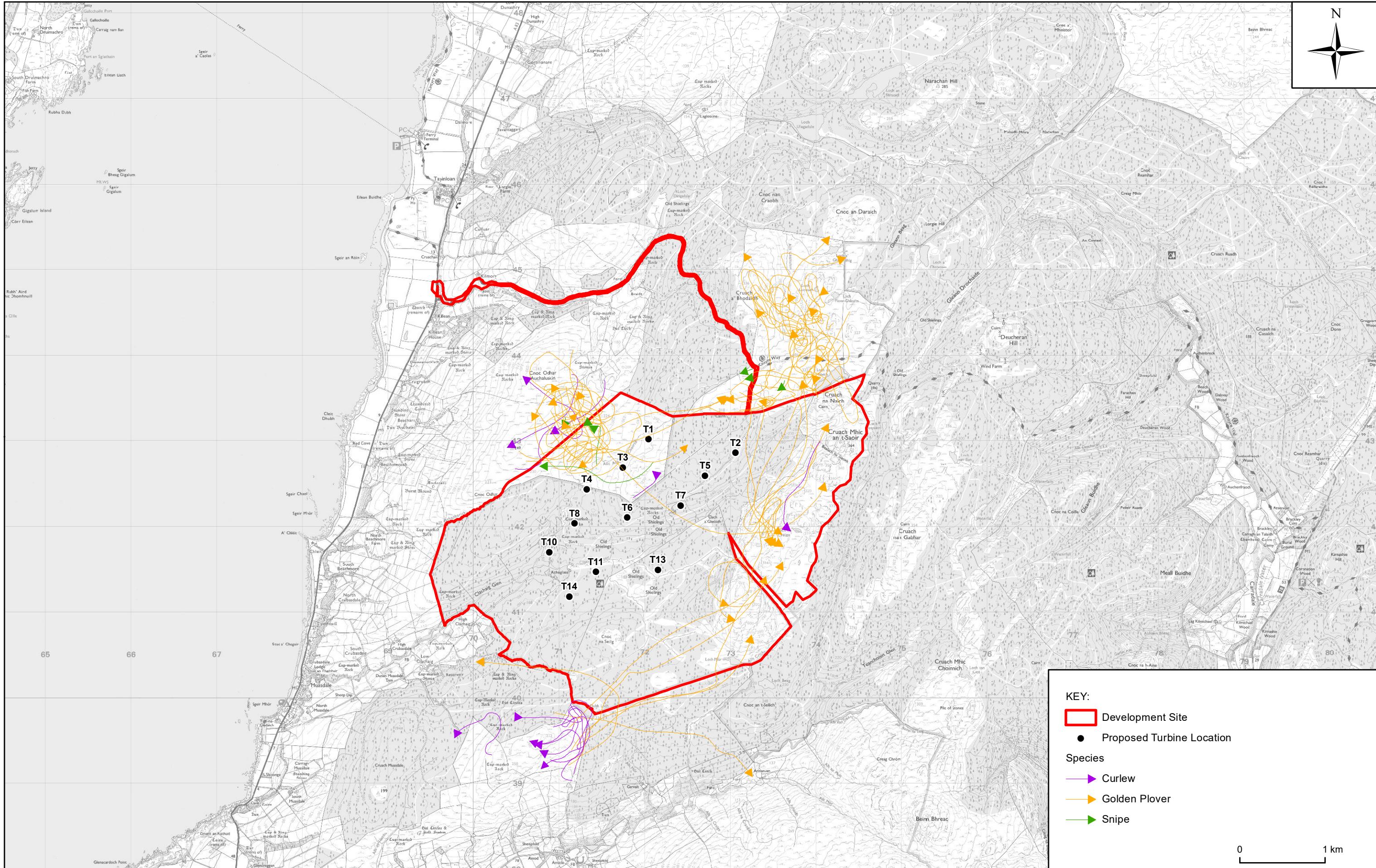
**EIAR Figures**

**Figures: 10.5; 10.6; 10.7; 10.8**









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FIGURE 10.7  
WADER FLIGHTS

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0

1 km

KEY:

  Development Site

● Proposed Turbine Location

Species

► Curlew

► Golden Plover

► Snipe

Checked:

AR

Verified:

SW

Date:

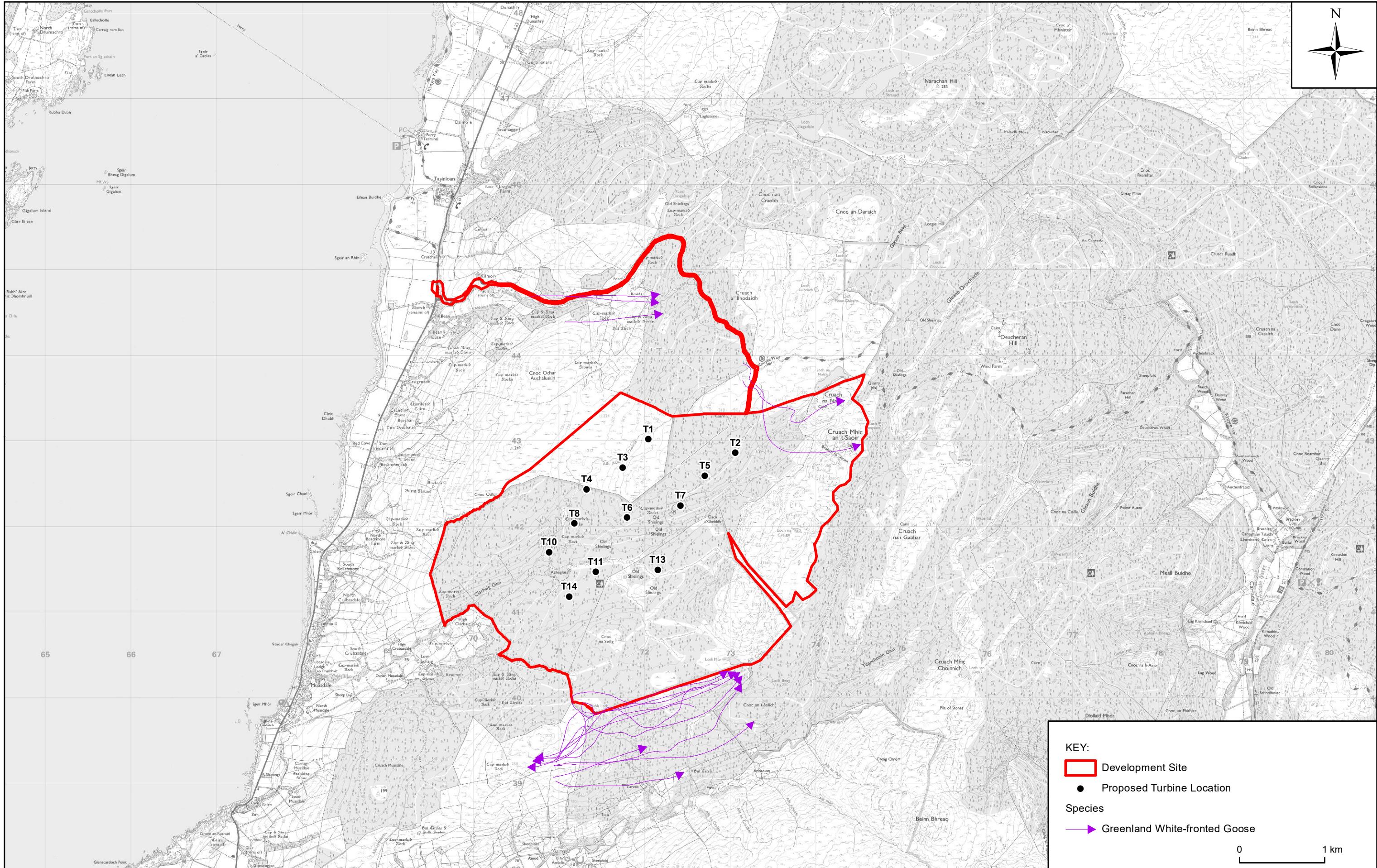
JANUARY 2022

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Drawing Number: CG\_220105\_EIA10.7\_v4

A3



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**FIGURE 10.8**  
**GREENLAND WHITE-FRONTED GOOSE FLIGHTS**

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Scale at A3:

1:40,000

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A3

**RWE**

# **Clachaig Glen Wind Farm**

**Environmental Impact Assessment Report**

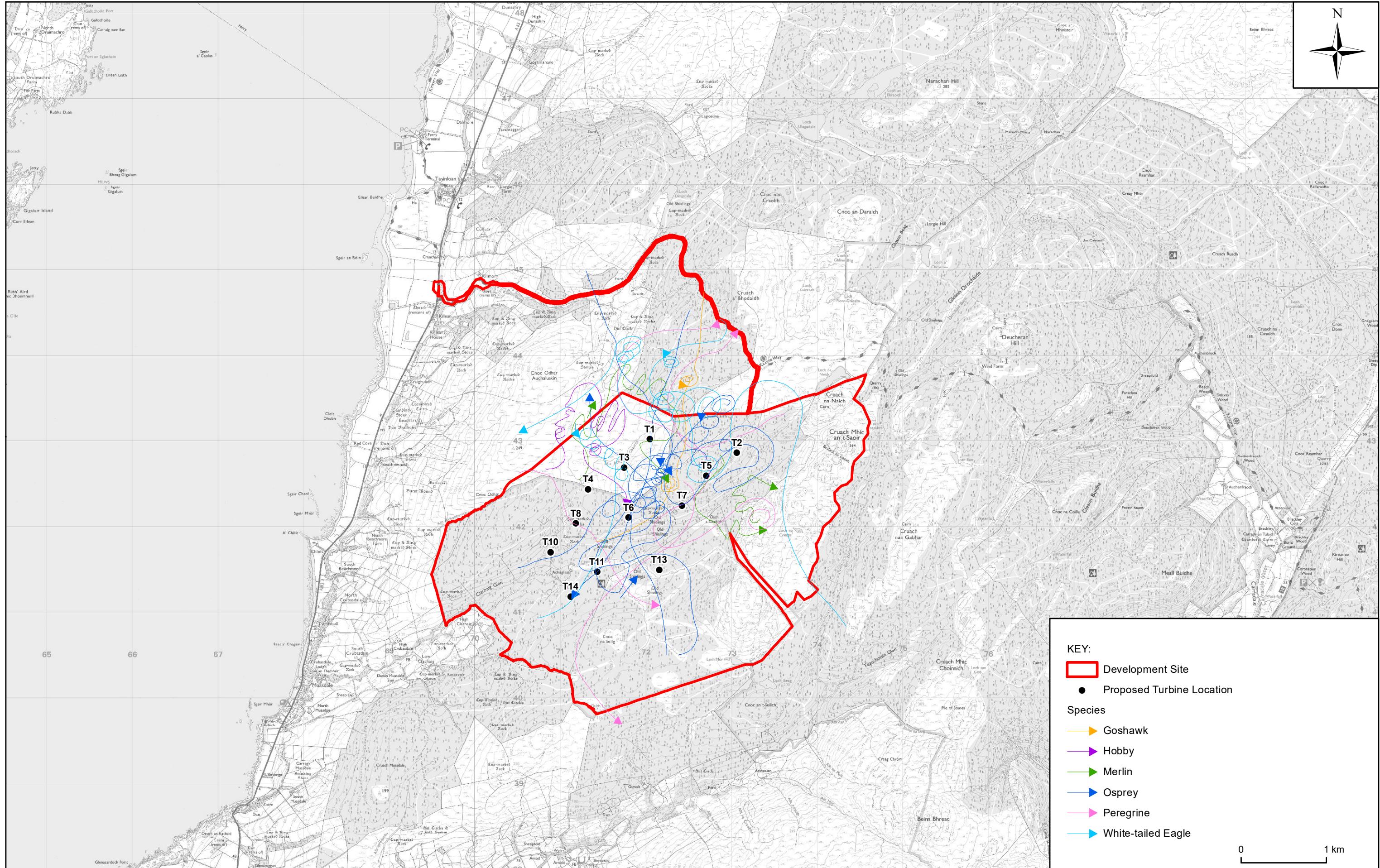
**Volume 2b**

**EIAR Figures**

**Figures: 10.9; 10.10; 10.12**

**(10.11 in Confidential Annex (Volume 4))**





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**FIGURE 10.9**  
**SCHEDULE 1 RAPTOR FLIGHTS**

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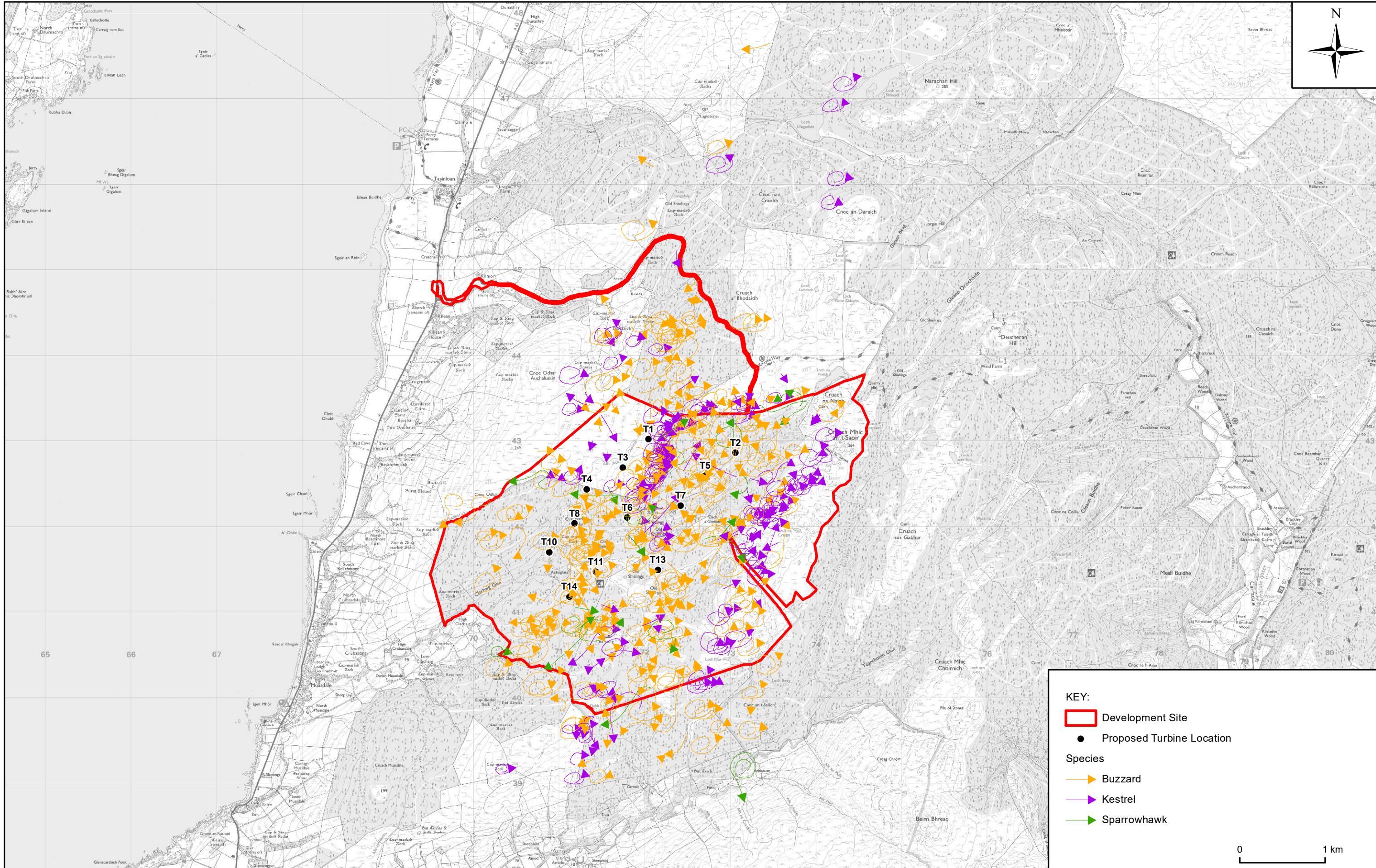
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Scale at A3: 1:40,000

Drawing Number: CG\_220105\_EIA10.9\_v3

A3



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**FIGURE 10.10  
OTHER NON-TARGET RAPTOR FLIGHTS**

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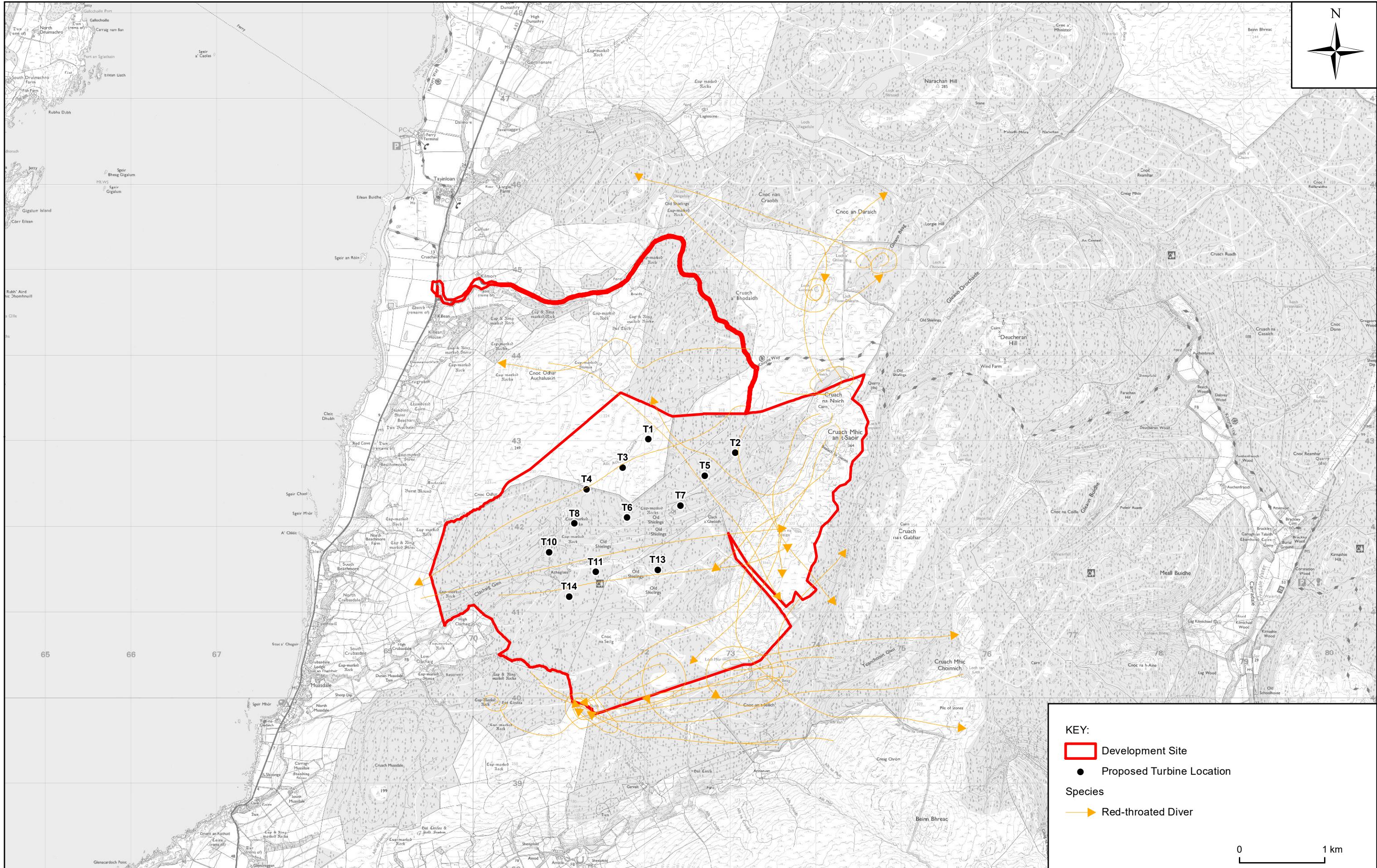
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Drawing Number: CG\_220105\_EIA10.10v4

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FIGURE 10.12  
RED-THROATED DIVER FLIGHTS

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LC

0

1 km

Checked:

AR

Verified:

TM

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Scale at A3:

1:40,000

Drawing Number:

CG\_220105\_EIA10.12\_v3

A3

**RWE**

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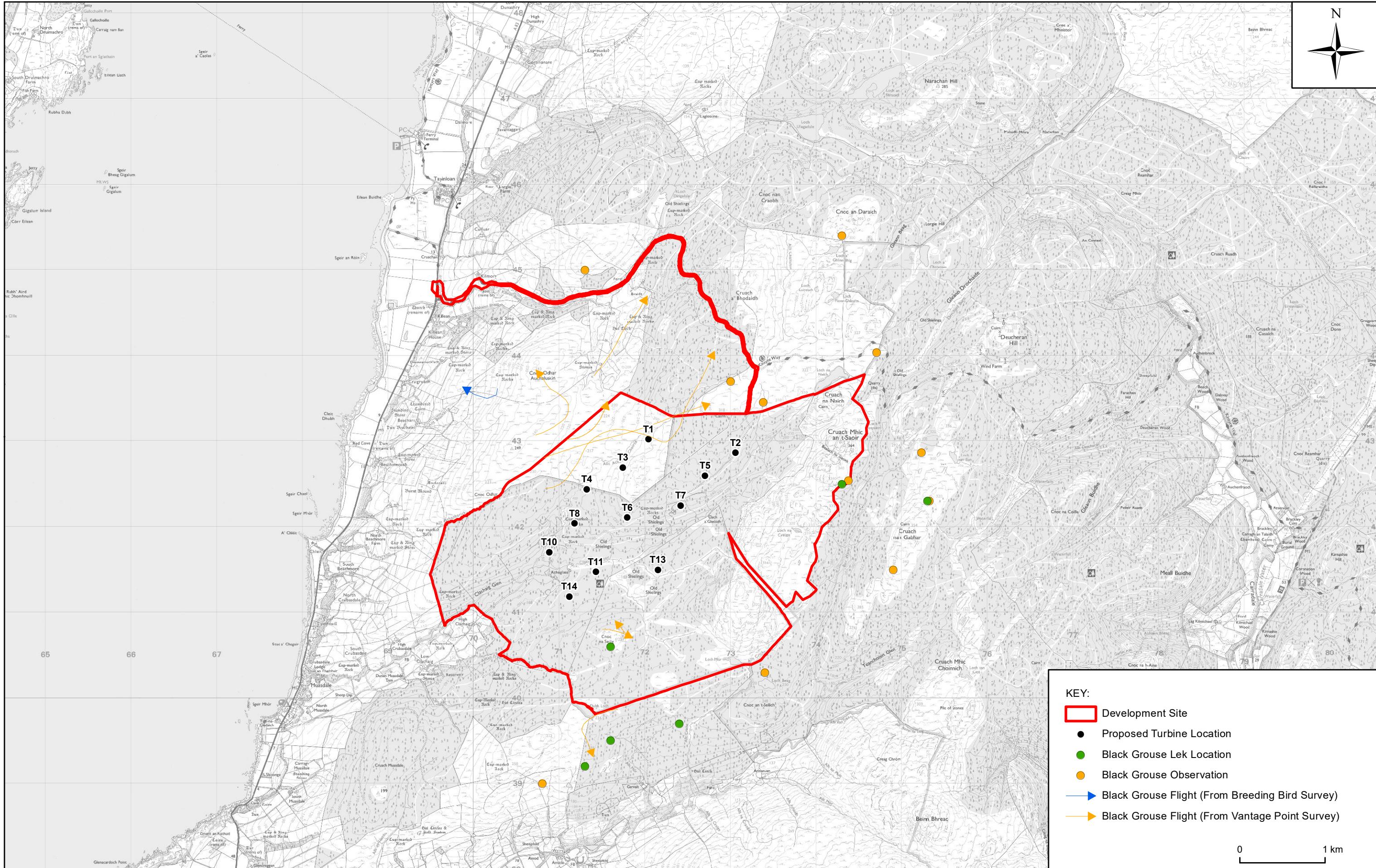
**Environmental Impact Assessment Report**

**Volume 2b**

**EIAR Figures**

**Figures: 10.13; 10.14; 10.15**





Client:

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Project: CLACHAIG GLEN WIND FARM  
ENVIRONMENTAL IMPACT ASSESSMENT

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FIGURE 10.13  
BLACK GROUSE LEK LOCATIONS

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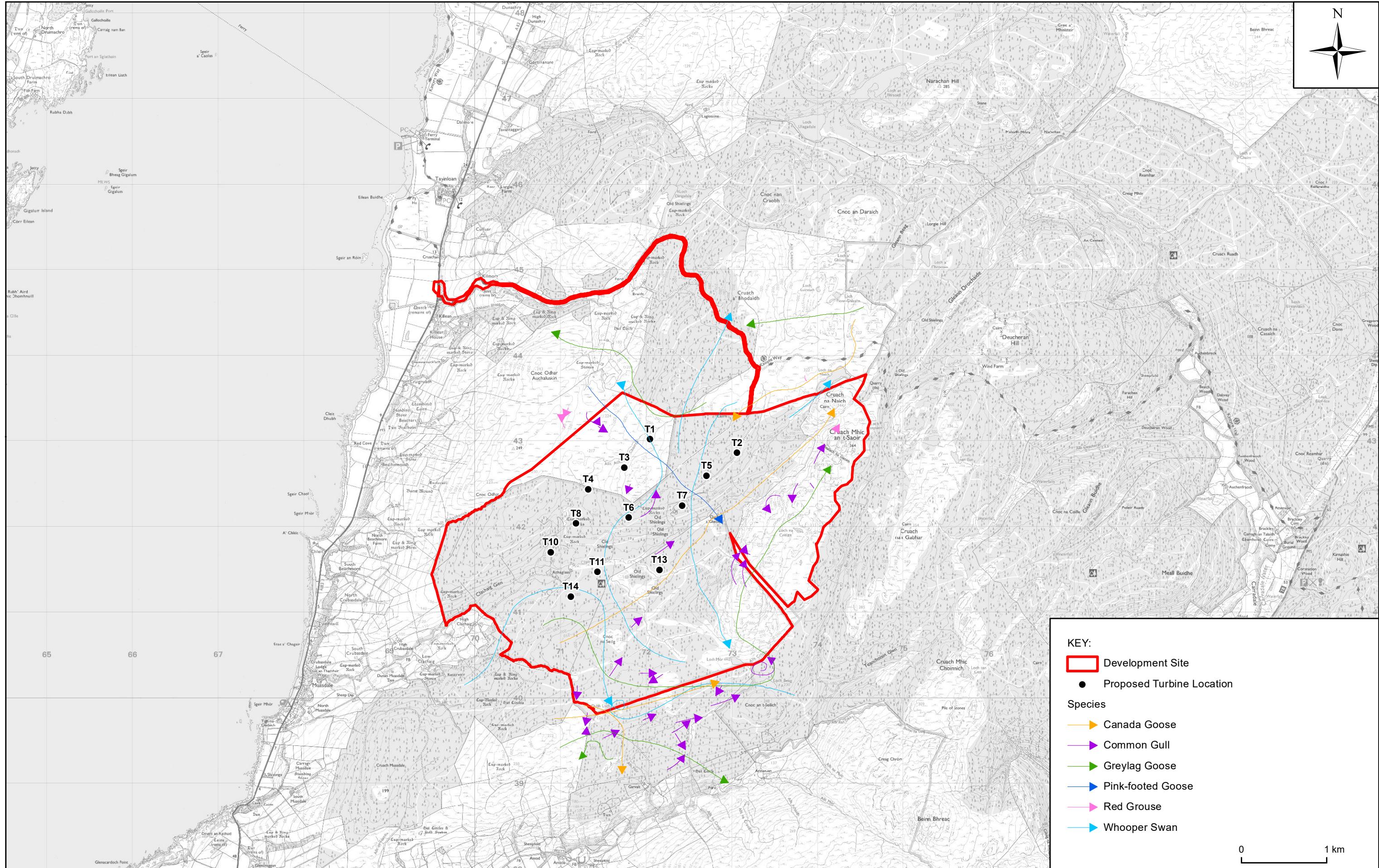
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Drawing Number: CG\_220105\_EIA10.13\_v4

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FIGURE 10.14  
FLIGHTS OF OTHER SPECIES

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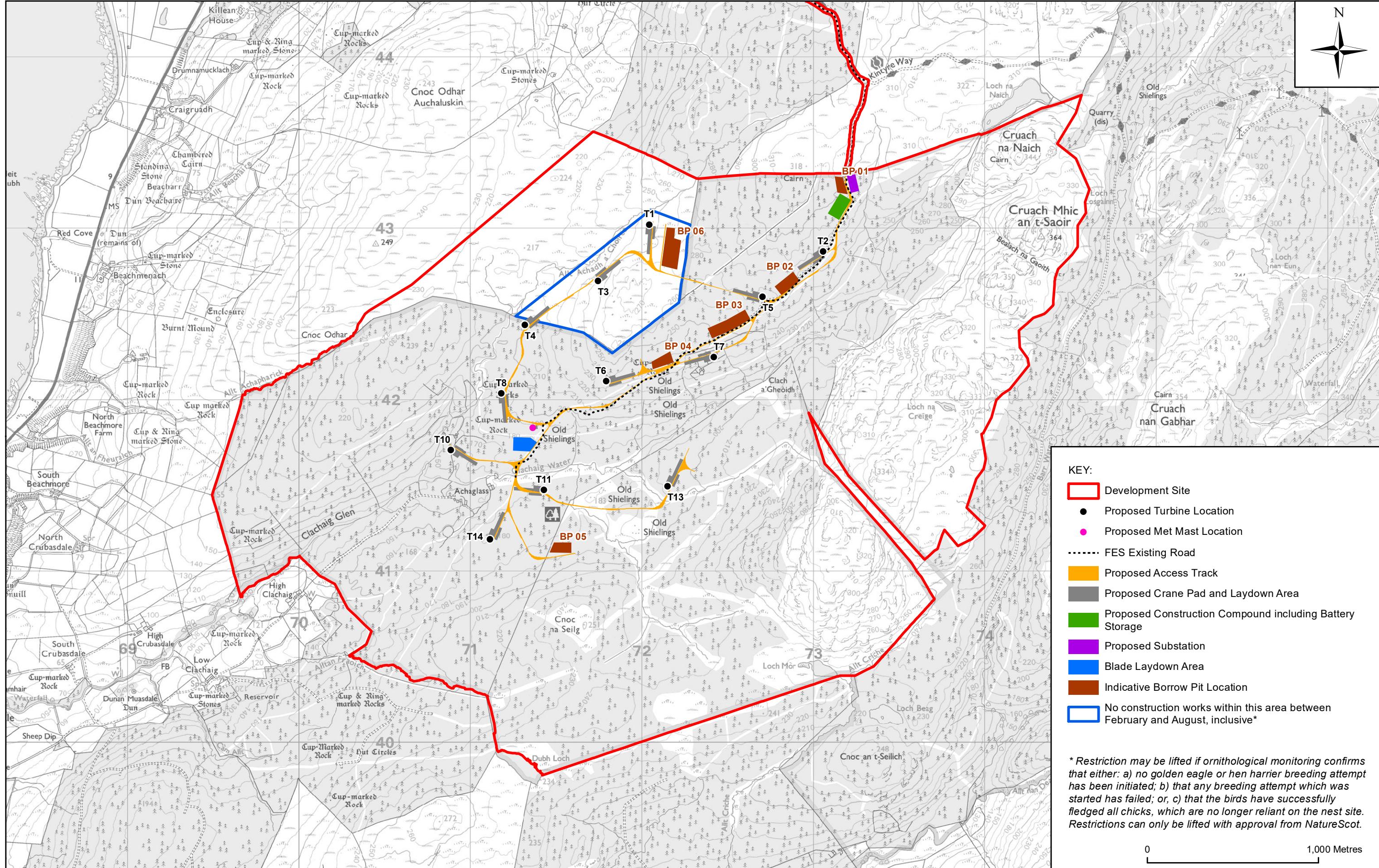
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Drawing Number: CG\_220105\_EIA10.14\_v3

A3



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FIGURE 10.15  
GOLDEN EAGLE AND HEN HARRIER  
BREEDING SEASON CONSTRUCTION WORKS RESTRICTION AREA

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Scale at A3: 1:20,000

Drawing Number: CG\_220105\_EIA10.15\_v3



KEY:

- [Red Box] Development Site
- [Black Dot] Proposed Turbine Location
- [Pink Dot] Proposed Met Mast Location
- [Dashed Grey Line] FES Existing Road
- [Orange Line] Proposed Access Track
- [Grey Shaded Area] Proposed Crane Pad and Laydown Area
- [Green Shaded Area] Proposed Construction Compound including Battery Storage
- [Purple Shaded Area] Proposed Substation
- [Blue Shaded Area] Blade Laydown Area
- [Brown Shaded Area] Indicative Borrow Pit Location
- [Blue Shaded Area] No construction works within this area between February and August, inclusive\*

\* Restriction may be lifted if ornithological monitoring confirms that either: a) no golden eagle or hen harrier breeding attempt has been initiated; b) that any breeding attempt which was started has failed; or, c) that the birds have successfully fledged all chicks, which are no longer reliant on the nest site. Restrictions can only be lifted with approval from NatureScot.

0 1,000 Metres

