



**ACHAGLASS WIND FARM  
TECHNICAL APPENDIX:  
BATS & PROTECTED SPECIES**

**DECEMBER 2018**



Prepared By:

**Arcus Consultancy Services**

7th Floor  
144 West George Street  
Glasgow  
G2 2HG

**T** +44 (0)141 221 9997 | **E** info@arcusconsulting.co.uk  
**w** [www.arcusconsulting.co.uk](http://www.arcusconsulting.co.uk)

Registered in England & Wales No. 5644976

**TABLE OF CONTENTS**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Site Background .....	1
<b>2</b>	<b>BASELINE METHODS .....</b>	<b>1</b>
2.1	Desk Study.....	1
2.2	Bat Survey .....	2
2.2.1	Roost Surveys .....	2
2.2.2	Remote Static Activity Surveys .....	2
2.2.3	Bat Activity Index (BAI).....	3
2.3	Protected Species Survey .....	4
2.4	Wildcat Walkover Survey .....	6
2.5	Survey Limitations.....	6
<b>3</b>	<b>BASELINE RESULTS .....</b>	<b>6</b>
3.1	Desk Study Results.....	6
3.1.1	Designated Sites.....	6
3.1.2	Species Records.....	6
3.2	Bat Survey Results .....	6
3.2.1	Remote Static Activity Survey .....	6
3.2.2	Site Utilisation Summary.....	9
3.3	Protected Species Survey Results .....	9
3.3.1	Amphibians .....	9
3.3.2	Badger.....	9
3.3.3	Otter .....	10
3.3.4	Pine marten .....	10
3.3.5	Red squirrel.....	10
3.3.6	Reptiles .....	10
3.3.7	Water vole .....	11
3.4	Wildcat Walkover Survey .....	11
<b>4</b>	<b>CONCLUSION.....</b>	<b>12</b>
	<b>APPENDIX A .....</b>	<b>13</b>
	Figures.....	13

## 1 INTRODUCTION

This Technical Appendix (TA) describes the methods and results of the ecology surveys undertaken to obtain baseline ecological information, to inform the Environmental Impact Assessment (EIA) of the proposed Achaglass Wind Farm (the Development).

The following terminology is used throughout this TA:

- **The Development:** the whole physical process involved in the development of the land at Achaglass Wind Farm, including the wind farm construction and operation (not a piece of land);
- **The Site:** all land with the potential to support the Development (shown as the red line boundary in Figures 1 and 2, Appendix A);
- **Ecology Survey Area:** the area of land within which the ecology surveys were undertaken (shown as the blue line boundary in Figures 1 and 2, Appendix A); The Ecology Survey Area encompasses the Development Site and includes, where access permitted, a buffer of up to 250m surrounding the Development Site.

### 1.1 Site Background

The Site, centred on national grid reference NR 80811 57350, is located in the northern part of the Kintyre peninsula of Argyll and Bute. It is accessed via an existing timber haulage route located off the A83, approximately 3 kilometres (km) south of the hamlet of Whitehouse. The majority of the Site is comprised of wet grassland habitats, exposed upland/moorland habitats, and felled plantation woodland; the blocks of forestry which remain are found in the west of the Site.

## 2 BASELINE METHODS

### 2.1 Desk Study

To provide context for the results of baseline surveys a search for recent (0-20 years) biological records of legally protected and notable species was carried out using the publicly available data source, National Biodiversity Network (NBN) database<sup>1</sup>. A search radius of 5 km of the Ecology Survey Area was applied for protected species. A search radius of 5 km was also applied to bat species of low to medium risk from wind turbines (as defined by Mitchell-Jones, 2014<sup>2</sup>) with a 10 km search radius applied to high risk species, such as Leisler's bat (*Nyctalus leisleri*), noctule (*Nyctalus noctula*) and Nathusius' pipistrelle (*Pipistrellus nathusii*).

Further to this, a search was undertaken for designated sites of nature conservation interest. The search criteria applied for the designations is provided in Table 1, below. Details of site designations were sought from the Scottish Natural Heritage (SNH) SiteLink website (SNHi Information Service)<sup>3</sup>.

**Table 1: Search Criteria for Designated Sites of Relevance to Bats**

Protection	Designation	Search radius
Non-statutory	Ancient Woodland Inventory (AWI) Site of Interest for Nature Conservation (SINC) Local Nature Reserves (LNR)	2 km

<sup>1</sup> National Biodiversity Network (2016). Available at: <https://data.nbn.org.uk/> [Accessed on 03/12/2018]

<sup>2</sup> Mitchell-Jones, T., Carlin, C. (2014) : Natural England Technical Information Note TIN051 - Bats and onshore wind turbines Interim guidance (3<sup>rd</sup> Edition), Natural England 2014, ISBN 978-1-78354-095-2

<sup>3</sup> Scottish Natural Heritage SiteLink. Available at: <https://gateway.snh.gov.uk/sitelink/> [Accessed 03/12/2018]

Statutory	Sites of Special Scientific Interest (SSSI) National Nature Reserves (NNR)	5 km
	Ramsar Sites Special Area of Conservation (SAC)	10 km

### 2.2 Bat Survey

Bat Surveys were carried out in accordance with an augmented version of Bat Conservation Trust (BCT) survey guidelines<sup>4,5</sup> (see further details in Section 2.2.2) between May and September 2018 (the Survey Season), with all survey work undertaken by Arcus. The Site was considered to be of low risk to bats and therefore a low risk survey effort was applied. The Survey Season comprised of the following three seasonal survey sessions;

- Survey Session 1: April/May (Spring);
- Survey Session 2: June/July (Summer); and,
- Survey Session 3: September/October (Autumn)

#### 2.2.1 Roost Surveys

No specific Roost Surveys were carried out. There are no known records of any bat roosts within the Ecology Survey Area or the wider local area. Pipistrelle bats, the most commonly encountered species, have a tendency to roost in trees and buildings<sup>6</sup>. The majority of the Site is comprised of open grassland habitats or felled plantation which is unsuitable for roosting bats, and coniferous plantation generally offers poor roost potential compared with broadleaved tree species<sup>7</sup>. There are a few buildings present within the Ecology Survey Area, however these buildings will not be affected by the Development and therefore any potential roosting bats within them will also be unaffected. As such, Roost Surveys of the buildings within the Ecology Survey Area are not considered necessary.

#### 2.2.2 Remote Static Activity Surveys

Remote Static Activity Surveys (hereby referred to as Static Surveys) were undertaken across the three Survey Sessions in 2018. A total of 13 AnaBats were deployed at ground level for 30 consecutive nights across a range of habitat types (Table 2 and Figure 1, Appendix A). This exceeds the BCT guidelines which recommend a minimum of 5 consecutive nights. It was necessary to split each Survey Session (1-3) into two parts (E.g. Session 1 and Session 1.5) in order to ensure that the battery life of equipment lasted the full 30 nights. The AnaBats were set to record from approximately half an hour before sunset until approximately half an hour after sunrise.

**Table 2: Remote Static Survey Dates**

Survey Session	Deployment Period	Survey Hours (per AnaBat)	Survey Hours (per Session)
1	04/05/2018	17/05/2018	1605.5
1.5	17/05/2018	12/05/2018	2870
2	02/07/2018	16/07/2018	1365
2.5	16/07/2018	08/08/2018	2376
3	04/09/2018	17/09/2018	1943.5

<sup>4</sup> Hundt, L. (2012). *Bat Surveys – Good Practice Guidelines 2nd edition*. Bat Conservation Trust, London.

<sup>5</sup> Collins, J. (ED.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. The Bat Conservation Trust, London

<sup>6</sup> Dietz, c & Keifer, A. (2016). *Bats of Britain and Europe*, Bloomsbury Publishing Plc, London

<sup>7</sup> Andrews H, et al (2013) Bat Tree Habitat Key. AEcol, Bridgwater

3.5	17/09/2018	09/10/2018	3150
Total			13310

In order to collect comparative data, all AnaBats were deployed at the same 13 Remote Static Survey Locations (RSSL) (labelled as RSSL A-M) across the three Survey Sessions (see Table 3. AnaBats were also located to allow for comparisons in recorded bat activity between two broad dominant habitat types; these are defined as open (i.e. open areas lacking high value linear habitat features with 50 m), or edge (i.e. within 50 m of woodland edges, or a linear feature such as a hedgerow or watercourse/waterbody).

Table 3: Remote Static Survey Locations

RSSL ID	GPS Location		Habitat Description	Habitat Type
	X	Y		
A	179568	658802	Woodland edge, felled woodland to the south	Edge
B	180128	658019	Forestry ride, located upon marshy grassland	Edge
C	180629	658201	Adjacent small pond in swamp habitat	Edge
D	180395	657400	Woodland edge facing into felled woodland	Edge
E	181939	657777	Situated on the edge of Loch Lurach	Edge
F	181206	657219	Open heather moorland habitat	Open
G	178398	655870	Within felled plantation woodland	Open
H	178389	654080	Located on drystone wall within felled/immature plantation	Open
I	180827	655749	On the edge of Loch Chorra-riabhaich	Edge
J	181309	655169	Within treeline on the edge of Lochan Fraoich	Edge
K	181806	655470	Grassland habitat adjacent Kintyre Way footpath	Open
L	182722	655674	Grassland habitat adjacent Kintyre Way footpath	Open
M	180246	659636	Within scrub habitat on drystone wall. Location accessed via farm track off A83	Edge

2.2.3 Bat Activity Index (BAI)

The length of the night (hours of darkness) varies throughout the Survey Season by up to 40%, and thus the period over which bats may be active also varies significantly. As Static Surveys were carried out over a month, the survey period of each Survey Session will be seen to vary. In order to carry out more detailed interpretation of the results, this temporal bias requires some correction. To correct for temporal bias in levels of bat activity, all bat Static Survey data was interpreted using the BAI.

Within this report, the value of the BAI is expressed as passes (i.e. bat files) per hour (pph). The BAI may not identify the overall abundance of bats (i.e. in terms of absolute number of registrations), but it helps to identify the highest intensities of habitat use by bats during the available recording time. Through the application of the BAI, data can be interpreted by RSSL, taxa, habitat feature or Survey Session, and used to determine spatial patterns in activity within the BSA, as well as temporal patterns across the Survey Season.

BAI was calculated for each RSSL by dividing the number of recorded AnaBat files by the total number of sampling hours (between 0.5 hours before sunset to 0.5 hours after sunrise), to provide the mean number of bat pph. The mean BAI for each Survey Session recorded across all RSSL was calculated by dividing the number of recorded AnaBat files by the total number of detector hours per session (total session sampling hours multiplied by number of detectors). The mean BAI across the Survey Season, for example BAI per species, was calculated by dividing the number of recorded AnaBat files across the Survey Season per species, by the total number of detector hours across the total Survey Season (sampling hours multiplied by number of detectors).

A summary of the bat activity recorded during Static Surveys expressed by BAI, is presented in Table 7 (see Section 3.2, below). This table presents the mean BAI per RSSL across all Survey Sessions.

2.3 Protected Species Survey

Protected species surveys were carried out by Laura Spence BSc (Hons) ACIEEM, Katie Allan BSc (Hons), and Ben Wright BSc (Hons) MRes ACIEEM, of Arcus, during July 2018.

The protected species surveys included surveys for the following:

- Amphibians;
- Badger (*Meles meles*);
- Otter (*Lutra lutra*);
- Pine marten (*Martes martes*);
- Red squirrel (*Sciurus vulgaris*);
- Reptiles; and,
- Water vole (*Arvicola amphibius*).

The location of field signs, habitats and notable features identified during the protected species surveys were recorded on a handheld Global Positioning System (GPS) or using a mobile data collecting application (Collector for ArcGIS). Where appropriate, photographs were taken to visually document field evidence and habitat features, to assist with interpretation of results and to inform reporting and assessment. Various guidance current at the time of surveys was consulted to ensure accuracy of the identification of field signs and employment of appropriate methods. The key utilised texts and field indicators of protected species presence are summarised in Table 4.

In addition to the targeted protected species surveys, a watching brief was maintained by Arcus personnel whilst undertaking other work within the Ecology Survey Area and any incidental observations of protected or notable species were recorded.

Table 4: Summary of Protected Species Indicators and Key Guidance

Species	Indicators of presence	Key guidance documents utilised
Amphibians	Sightings, suitable habitats, spawn	Common Standards Monitoring Guidance for Reptiles and Amphibians <sup>8</sup>

<sup>8</sup> Joint Nature Conservation Committee (2004) *Common Standards Monitoring Guidance for Reptiles and Amphibians*, Version February 2004. JNCC, Peterborough.

Species	Indicators of presence	Key guidance documents utilised
Badger	Setts, paths, snuffle holes, feeding remains, scratching posts, latrines, prints, hairs and suitable habitats	Surveying Badgers <sup>9</sup> Best Practice Badger Survey Guidance Note <sup>10</sup> Badger Licensing Guidance: What is a badger sett? <sup>11</sup> Scotland's Wildlife: Badgers and Development <sup>12</sup> Badgers <sup>13</sup>
Otter	Sprainting sites, prints, resting places, paths, slides, feeding remains and suitable habitat	Animal Tracks and Signs <sup>14</sup> How to find and Identify Mammals <sup>15</sup> Protected Species Advice for Developers: Otter <sup>16</sup>
Pine marten	Dens, scats, prints and suitable habitats	UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigations <sup>17</sup> Protected Species Advice for Developers: Pine Marten <sup>18</sup>
Red squirrel	Sightings, dreys, feeding remains (characteristically chewed cones)	Practical Techniques for Surveying and Monitoring Squirrels <sup>19</sup> Protected Species Advice for Developers: Red Squirrel <sup>20</sup>
Reptiles	Sightings, suitable hibernacula.	National Amphibian and Reptile Recording Scheme Reptile Habitat Guide <sup>21</sup>
Water vole	Droppings, prints, burrows, feeding stations, runs, lawns of short vegetation around burrow entrances, and suitable habitat.	The Water Vole Mitigation Handbook <sup>22</sup> Protected Species Advice for Developers: Water Vole <sup>23</sup> Mammals of the British Isles: Handbook, 4th Edition <sup>24</sup>

<sup>9</sup> Harris, S., Cresswell, P. and Jefferies, D. (1991) *Surveying Badgers*. The Mammal Society, London

<sup>10</sup> Scottish Natural Heritage. *Best Practice Badger Survey Guidance Note*. Available at: <http://www.snh.gov.uk/docs/B957619.pdf> [Accessed 03/12/2018].

<sup>11</sup> Scottish Natural Heritage (2014). *Licensing Guidance: What is a badger sett?* Available at: <http://www.snh.gov.uk/docs/A1391121.pdf> [Accessed on 03/12/2018].

<sup>12</sup> Scottish Natural Heritage (2001). *Scotland's Wildlife: Badgers and Development*. Available at: <http://www.snh.org.uk/pdfs/publications/wildlife/badger.pdf> [Accessed on 03/12/2018].

<sup>13</sup> Scottish Natural Heritage (2016). *Badgers*. Available at: <http://www.snh.gov.uk/about-scotlands-nature/wildlife-and-you/badgers/> [Accessed on 03/12/2018].

<sup>14</sup> Bang, P. and Dahlström, P. (2001). *Animal Tracks and Signs*. Oxford University Press, Oxford.

<sup>15</sup> Sargent, G. and Morris, P. (2003). *How to find and Identify Mammals*. The Mammal Society, London.

<sup>16</sup> Scottish Natural Heritage (2016). *Advice for Planners and Developers: Protected Animals. Otter*. Available at: <http://www.snh.gov.uk/docs/A1959316.pdf> [Accessed 03/12/2018]

<sup>17</sup> Cresswell, W.J., Birks, J.D.S., Dean, M., Pacheco, M., Trehwella, W.J., Wells, D. and Wray, S. (2012). *UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigations*. The Mammal Society, Southampton

<sup>18</sup> Scottish Natural Heritage (2016). *Advice for Planners and Developers: Protected Animals. Pine Marten*. Available at: <http://www.snh.gov.uk/docs/A1959323.pdf> [Accessed 03/12/2018].

<sup>19</sup> Gurnell, J., Lurz, P. and Pepper, H. (2009). *Practical Techniques for Surveying and Monitoring Squirrels*. Forestry Commission (2009).

<sup>20</sup> Scottish Natural Heritage (2016). *Advice for Planners and Developers: Protected Animals. Red Squirrel*. Available at: <http://www.snh.gov.uk/docs/A1959329.pdf> [Accessed 03/12/2018]

<sup>21</sup> The Herpetological Conservation Trust (2007). National Amphibian and Reptile Recording Scheme, Habitat Recording Guide

<sup>22</sup> Dean, M., Strachan, R., Gow, D., and Andrew, R. (2016). *The Water Vole Mitigation Handbook* (The Mammal Society Mitigation Guidance Series). The Mammal Society, London.

<sup>23</sup> Scottish Natural Heritage (2016). *Advice for Planners and Developers: Protected Animals. Water Vole*. Available at: <http://www.snh.gov.uk/docs/A1959339.pdf> [Accessed 03/12/2018].

<sup>24</sup> Harris, S. & Yalden, D. W. eds. (2008). *Mammals of the British Isles: Handbook*, 4th Edition.

## 2.4 Wildcat Walkover Survey

A detailed Wildcat Walkover Survey was carried out by Nick Wright BSc (Hons) MRes CEnv MCIEEM, of Arcus, an experienced wildcat surveyor. The survey took place in December 2018 within the Ecology Survey Area and up 200m outwith (where accessible), in accordance with SNH guidance<sup>25</sup>. The aim of the survey was to record the habitat suitability for denning, hunting and commuting wildcat, as well as signs of wildcat presence, and to inform the requirement for, and scope of, further surveys, such as camera trapping surveys.

## 2.5 Survey Limitations

During Session 3.5 of the Static Surveys the malfunction of one of the AnaBats resulted in only 12 (of 13) AnaBats being deployed. Additionally, over the course of the Survey Season minor, partial failures of AnaBats (when device batteries ran out early) resulted in the loss of survey hours. Overall, there was a total loss of 281.5 recording hours during Session 3.5. However, as the data collected greatly exceeded that recommended by BCT guidelines<sup>5</sup> this limitation is not considered to affect the robustness of the data recorded.

Due to the nature of the terrain and the watercourses present, it was not possible to survey the full extent of all watercourses and wetland areas within the Ecology Survey Area in detail, for health and safety reasons. It is not considered however that this limitation affected the accuracy of the survey, or the robustness of the data recorded.

## 3 BASELINE RESULTS

### 3.1 Desk Study Results

#### 3.1.1 Designated Sites

One statutory designated site, Claonaig Wood SSSI, was identified within the Desk Study Area approximately 2.7 km south east of the Site. Claonaig Wood is an area of ancient semi-natural woodland designated for its assemblage of woodland communities. Claonaig Wood is significant within Kintyre because it contains the second largest area of W17 (as categorised under the National Vegetation Classification (NVC)) woodland, as well as important areas of W4 and W11 woodland types.

#### 3.1.2 Species Records

Table 5 provides a summary of protected species recorded within the Desk Study Area, as returned by a search of publically available records.

**Table 5: Protected Species Records within Desk Study Area**

Species	Date of Record	No of Records	Closest Proximity to Site
Badger	2013, 2016	3	4.8 km
Red squirrel	2010 (5), 2011 (2), 2012, 2015, 2016 (6), 2017 (4)	17	0.9 km

### 3.2 Bat Survey Results

#### 3.2.1 Remote Static Activity Survey

A total of 54,633 bat passes were recorded over a total of 13,047.5 survey hours across the Survey Season, giving a total overall mean BAI of 4.2 pph for the Site.

<sup>25</sup> Scottish Natural Heritage (SNH) (2016), Protected Species Advice for Developers: Wildcat. Available at: <http://www.snh.gov.uk/docs/A1959342.pdf> [Accessed on 03/12/2018].

The following species/genus were detected within the Ecology Survey Area:

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius’ pipistrelle;
- Leisler’s bat;
- Brown long-eared bat (BLE) (*Plecotus auritus*);
- *Myotis* sp.; and
- *Pipistrellus* sp.

Of the activity recorded, 54.73% was attributed to soprano pipistrelle, with 6.63 % and 37.31 % attributed to common pipistrelle and *Pipistrellus* sp. respectively. *Myotis* sp. was the genus with the next highest number of passes at 1.27 % of the total bat activity. BLE and Leisler’s bat and were recorded infrequently, making up 0.02 % and 0.01 % of activity recorded, respectively. The remaining activity (<0.01 %) was attributed to Nathusius’ pipistrelle (refer to Chart 2 below).

The design of Static Surveys allowed for the collection of comparative datasets sufficient to draw robust conclusions on spatial or temporal distributions of bat activity across the Site during the Survey season. A summary of these distributions is detailed in Section 3.2.1.1 and 3.2.1.2, below.

3.2.1.1 Spatial Activity Variation

Bat activity was recorded at the majority of RSSLs across all three Survey Sessions; however, notable spatial variation in the level of activity was evident. A total of five RSSLs recorded mean activity levels above the overall survey mean (4.2 pph), these were; RSSLs A (5.7 pph), D (13.6 pph), I (9.6 pph), J (9.1 pph) and M (6.3 pph). Activity at these five RSSLs constituted 84.65% of all bat passes recorded, with RSSL D responsible for 26.01% alone. All four RSSLs were located within edge habitat (see Figure 2, Appendix A), conifer plantation and/or waterbodies notably dominated habitats present at these RSSLs.

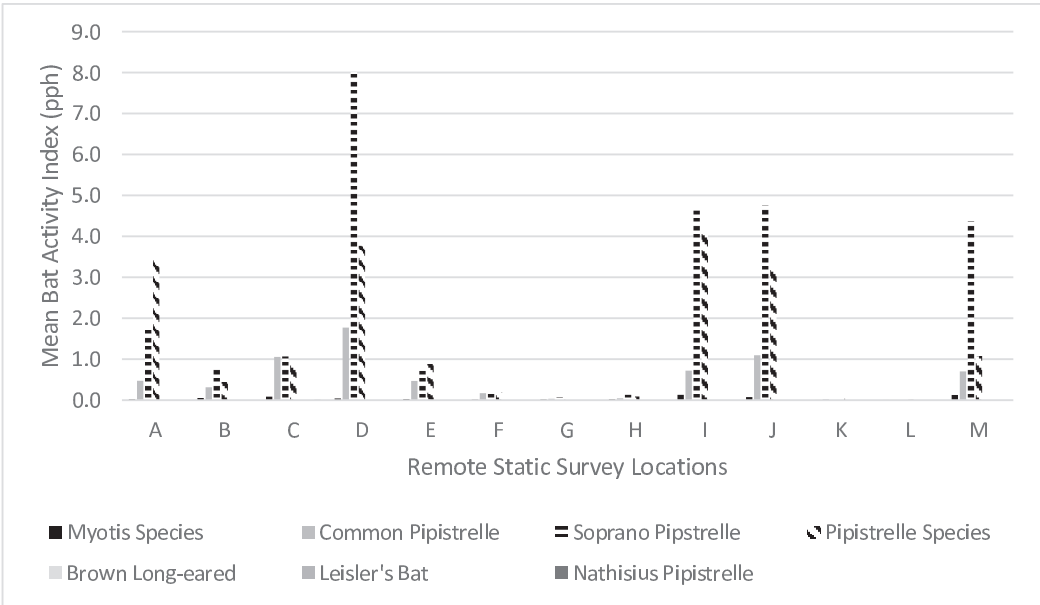


Chart 1: Spatial Variation in Total Bat Activity (mean BAI) across the Survey Season

3.2.1.2 Temporal Activity Variation

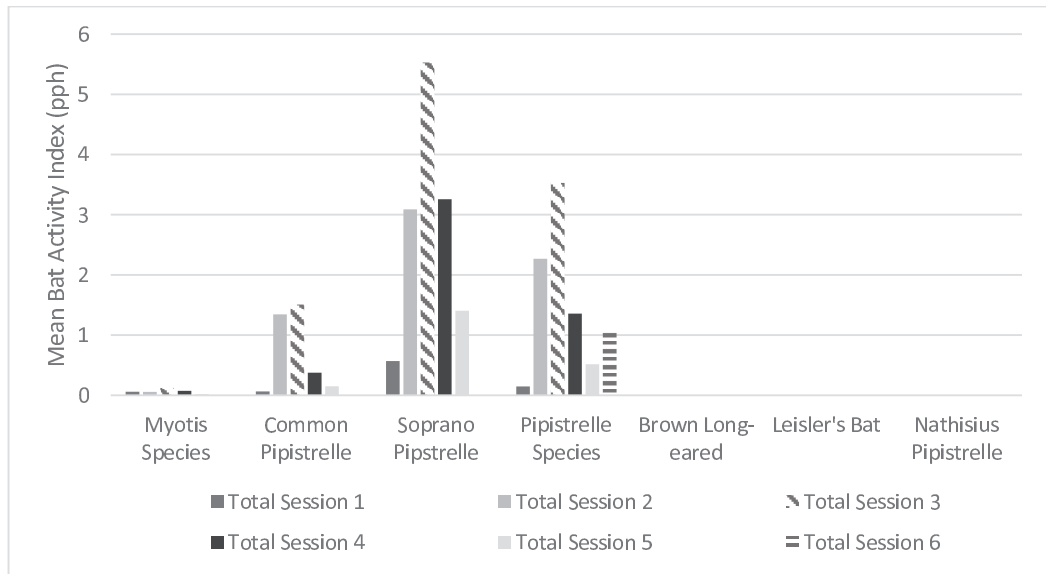
In addition to spatial variation, bat activity recorded notable temporal variation in the overall levels of activity and species abundances recorded. The highest level of activity was

recorded in Sessions 1.5, 2 and 2.5 (late spring and summer surveys). The mean BAI for these sessions was higher than that of the overall mean for the Site (4.2 pph) and markedly higher than the mean of the other RSSLs (Table 7).

Table 7: Summary of Mean Bat Activity Index (pph)

RSSL	Myotis Sp.	45* Pip	55* Pip	Pip* Sp.	BLE	Leisler's Bat	40* Pip	Mean Total
A	0.0	0.5	1.8	3.4	0.0	0.0	0.0	5.7
B	0.1	0.3	0.8	0.4	0.0	0.0	0.0	1.6
C	0.1	1.1	1.1	0.9	0.0	0.0	0.0	3.2
D	0.0	1.8	8.0	3.8	0.0	0.0	0.0	13.6
E	0.0	0.5	0.7	0.9	0.0	0.0	0.0	2.1
F	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.6
G	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2
H	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.3
I	0.1	0.7	4.6	4.1	0.0	0.0	0.0	9.6
J	0.1	1.1	4.8	3.2	0.0	0.0	0.0	9.1
K	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
L	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
M	0.1	0.7	4.4	1.1	0.0	0.0	0.0	6.3
Survey Session	Myotis Sp.	45 Pip	55 Pip	Pip Sp.	BLE	Leisler's Bat	40 Pip	Mean Total
1	0.1	0.1	0.6	0.1	0.0	0.0	0.0	1.3
1.5	0.1	1.3	3.1	2.3	0.0	0.0	0.0	6.8
2	0.1	1.5	5.5	3.5	0.0	0.0	0.0	10.7
2.5	0.1	0.4	3.3	1.4	0.0	0.0	0.0	5.1
3	0.0	0.1	1.4	0.5	0.0	0.0	0.0	2.1
3.5	0.0	0.0	0.0	1.1	0.0	0.0	0.0	1.1
Season	0.0	0.6	2.1	1.5	0.0	0.0	0.0	4.2
*45 Pip = common pipistrelle/55 Pip = soprano pipistrelle/*40 pip = Nathusius' pipistrelle/Pip Sp = Pipistrellus species								





**Chart 2: Temporal Variation in Bat Activity (Mean BAI) by Taxa across Survey Sessions**

### 3.2.2 Site Utilisation Summary

The majority of the bat activity recorded (98.67 %) within the Ecology Survey Area was attributable to common pipistrelle, soprano pipistrelle and *Pipistrellus* species (those calls which occurred within the cross-over frequency for common and soprano pipistrelle). Common pipistrelle and soprano pipistrelle are at medium risk from an individual bat perspective, however they are regarded as low risk from a population point of view. Small numbers of the low risk bat species (*Myotis* bats and BLE) were also recorded. The high risk species, Nathusius' pipistrelle and Leisler's bat were responsible for a very small percentage (<0.1 %) of the total bat activity recorded. Bat surveys recorded relatively low levels of activity with an overall mean BAI of 4.2 pph for the Ecology Survey Area.

Bats showed a preference for edge and riparian habitat features, with proportionally higher levels of activity recorded at riparian features. These habitats were likely favoured due to the presence of foraging opportunities, shelter from the environment and navigational aids such as linear landscape features. The survey results are in line with the most recent research in Britain<sup>2</sup>, which suggests that the activity of bats is strongly positively associated to certain habitat features and that both foraging and commuting activity decreases significantly at a distance of 35–50 m.

## 3.3 Protected Species Survey Results

### 3.3.1 Amphibians

Prevailing wet underfoot conditions throughout the Ecology Survey Area provides ample aquatic habitat for breeding amphibians including both common frog (*Rana temporaria*) and common toad (*Bufo bufo*). A number of observations of common frog and common toad were made during the survey. No suitability for great crested newt (*Triturus cristatus*) existed, furthermore this is a species which is largely absent from Argyll<sup>1</sup>.

### 3.3.2 Badger

Habitats throughout the Ecology Survey Area were considered to have low potential to support badgers. Small pockets of coniferous plantation forestry in the west of the Ecology Survey Area may provide suitable habitat in which badgers can excavate setts; however, open habitats surrounding the plantation forestry were considered of low value to foraging

badger, as they were dominated by felled plantation or wet grassland. No field evidence, setts or sightings of badgers were recorded during the protected species surveys; however as some habitats of limited suitability were recorded within the Ecology Survey Area, with more suitable habitat recorded in the surrounding environment, their presence in low densities cannot be ruled out.

### 3.3.3 Otter

Habitats throughout the Ecology Survey Area offered suitable commuting and foraging opportunities for otters. The following waterbodies are present within the Ecology Survey Area; Loch Freasdail, Loch Lurach, Loch Cruinn, Loch Chorra-riabhaich, Lochan a' Chreimh, Lochan Fraoich and Loch Ciaran (as well as several smaller unnamed waterbodies). Larachmor Burn (a tributary of the Claonaig Water which runs into the Sound of Bute) flows adjacent to the Kintyre Way footpath in the South of the Ecology Survey Area. The majority of the waterbodies within the Ecology Survey Area are partially connected via numerous small burns and drains. During the 2018 protected species surveys an otter was sighted on the bank of Loch Ciaran and evidence of otter (in the form of spraints) was found on Loch Lurach, Lochan Fraoich and Larachmor Burn. On Loch Cruinn, in addition to spraints, an otter couch was located at NR 82847 57747 (Figure 2, Appendix A).

### 3.3.4 Pine marten

No pine marten dens were identified during the protected species surveys; however areas of coniferous plantation forestry within the west of the Ecology Survey Area may provide potential denning habitat for pine marten. Wind-blown trees, particularly their root plates, can provide features (for example cavities) which pine marten may use for dens or refuge<sup>17</sup>. Non-forest habitats (such as felled areas and forest rides) within the Ecology Survey Area are considered likely to support rodent populations, offering suitable foraging habitat for pine marten. Evidence of pine marten in the form of scat was identified, predominantly in the south of the Ecology Survey Area; locations in which pine marten scat was found is shown in Appendix A, Figure 2.

### 3.3.5 Red squirrel

The Ecology Survey Area was considered to have moderate potential to support red squirrel. Suitable habitat within the Ecology Survey Area is limited, the majority is comprised of wet grassland and moorland habitats and felled woodland. However, the small blocks of forestry which remain are considered to be suitable for red squirrel. The Site is within the known range of the species and coniferous plantation provides suitable drey habitat and adequate food supply<sup>19</sup>, however red squirrel favour habitat with mixture of tree species which provides a more reliable food resource. Additionally the coniferous plantation is dominated by Sitka spruce which is less favourable to this species compared to woodland dominated by pine species<sup>19</sup>. No sightings of red squirrel were made, nor were any squirrel dreys identified. However, as some suitable habitats were recorded within the Ecology Survey Area and multiple, recent records of the species were identified within 1km of the Ecology Survey Area, it is likely that the species is present within the Site.

### 3.3.6 Reptiles

Habitats within the Ecology Survey Area provided good potential to support reptiles, particularly 'rough', tussock grassland and areas of clear fell woodland, which offered good foraging, refuge and basking resources for species such as adder (*Vipera berus*), common lizard (*Zootoca vivipara*), and slow worm (*Anguis fragilis*). During the survey an adder was observed at NR 81351 55077 on the southern boundary of the Site, basking on a tussock of grass along the Kintyre Way (Figure 2, Appendix A).



### 3.3.7 Water vole

The only named watercourse within the Ecology Survey Area is the Larachmor Burn. This watercourse, due to its steep banks and rocky substrate is unsuitable for water vole. The remaining watercourses were regularly observed as being heavily choked with vegetation, often resulting in an absence of a defined water channel and also reducing the presence of open areas (pools) of water, with some considered more like flushes. Larger waterbodies are present throughout the Ecology Survey Area, however these are considered sub-optimal as water vole show a preference for permanent slow-flowing water features<sup>22</sup>.

Livestock (sheep) are free to roam much of the Ecology Survey Area and adverse effects on some watercourses was observed in the form of faeces and crossings points. The negative effects of livestock on watercourses is considered likely to reduce the suitability of the habitat to support water voles. Nonetheless, localised sections of suitable water vole habitat were recorded within the Ecology Survey Area. No field evidence of water vole was recorded; however as some habitats of limited suitability were identified their presence in low densities cannot be ruled out.

### 3.4 Wildcat Walkover Survey

Wildcat are associated with mixed landscapes, largely comprised of coniferous and broadleaved woodland, bordering grassland and scrubland habitats<sup>26</sup> suitable to support their prey species, which on west coast of Scotland, is largely voles<sup>27</sup>. As a result, habitat preferences in the east and west of Scotland vary, with western cats largely utilising woodland margins bordering upland rough grazing grassland, moorland, and unimproved pasture<sup>26</sup>. Although wildcat will use suitable grassland and moorland to hunt, the use of these relatively open areas, are limited to those within close proximity to woodland edge habitats<sup>27</sup>. Woodland edge is necessary to support wildcat, as it provides essential cover and linear features required to aid commuting<sup>27</sup>. Furthermore, recent research by Scottish Wildcat Action (the government lead wildcat conservation group) has suggested that wildcat do not den further than 200m from woodland edge<sup>28</sup>. Wildcat are also known to utilise recently felled plantation woodland, where stumps and brash piles can provide suitable denning habitats, and emerging grasses can provide support prey species<sup>28</sup>.

Heathland habitats are of low value to wildcat, as heather can impede hunting and commuting<sup>27</sup>. For similar reasons dense coniferous woodland is considered unsuitable to support the species<sup>27</sup>. Although wildcat may use riparian features to commute and can swim when required<sup>26</sup>, wetland (or any wet) habitats, such as bogs and marshy areas are generally avoided by wildcat<sup>28</sup>. Wildcat generally den in rocky structures and under root plates or holes of trees within woodland, but may also use remote and disused man-made structures, such as ruined buildings, and as mentioned above, areas of clear fell woodland.

Habitats recorded during the Wildcat Walkover Survey were assessed to be largely of low value to wildcat, primarily due to dominance of large open areas of clear-felled woodland across the Ecology Survey Area, dense, wet, conifer plantation in the west and south and exposed upland areas which made up the majority of the north and east of the Ecology Survey Area.

Although suitable potential denning structures such as brash piles, tree stumps and buildings were recorded, unsuitable ground conditions and distance from woodland edge, meant that no confirmed dens or dens with the potential to be accessed by wildcats were recorded within the Ecology Survey Area.

<sup>26</sup> Kilshaw, K., Cole, M., and Baxter, J. (2011). Scottish wildcats: Naturally Scottish. Scottish Natural Heritage

<sup>27</sup> Clegg, Christopher (2017) The Scottish Wildcat: Britain's Most Endangered Mammal. Merlin Unwin Books.

<sup>28</sup> Scottish Natural Heritage (2017) Sharing Good Practice Event: Scottish Wildcats - Development, Forestry and SRDP. Available online at: <https://www.nature.scot/scottish-wildcats-development-forestry-and-srdp>. Accessed December 2018

Clear-fell plantation can be suitable for hunting wildcat, however it is only of value where access to, and movement within, the habitat is unimpeded (for example, by dense vegetation). Furthermore the presence of suitable sward to support prey species and allow stalking is also crucial. These habitats must also lie within close proximity to woodland edge, and in the context of suitable mosaic of habitats in the wider area. Access to the majority of clear fell areas for the species was severely limited by dense vegetation and brash, wet areas of emergent bog vegetation and forestry drainage grips.

A suitable mix of woodland, bordered by pasture, moorland, scrubland and recently felled conifer woodland was recorded to the north and west of the Ecology Survey Area, albeit largely outwith the boundary of the Site, therefore occasional use of the Site by wildcat cannot be entirely ruled out. However, the limited scale and evident fragmentation of suitable habitats, as well as disturbance by agricultural and forestry activity and proximity to human settlement, are all likely to notably reduce the suitability of these habitats for the species. Furthermore, no evidence of wildcat presence was recorded, and the closest recent record of wildcat was located between 20-30 km away, in northern Knapdale, a distance at the very limit of the known home range of wildcats<sup>28</sup>.

## 4 CONCLUSION

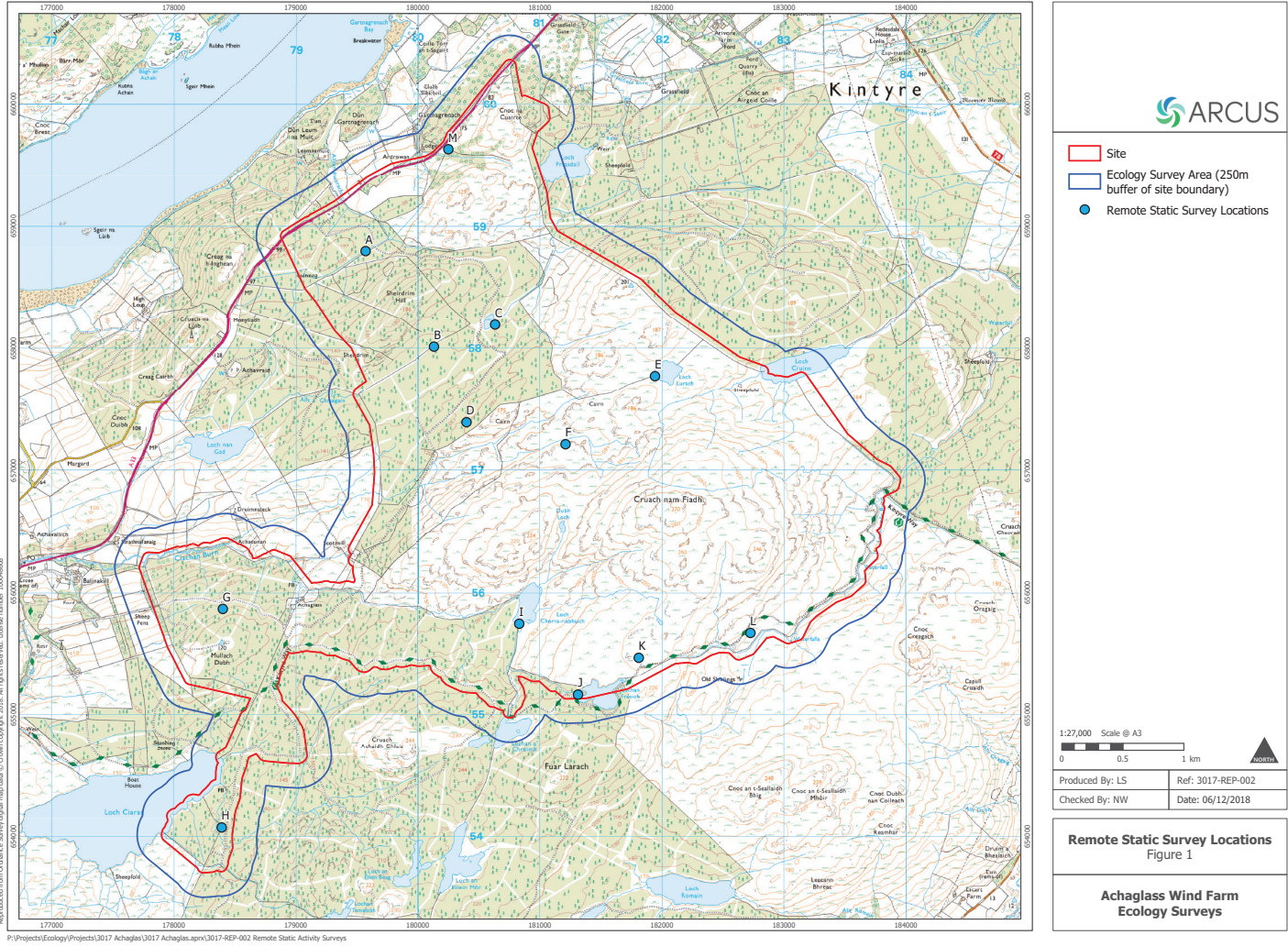
The levels of activity of both foraging and commuting bats recorded across the Ecology Survey Area was considered to be low overall, and dominated by common and widespread bat species. The lack of broadleaved woodland with the Ecology Survey Area is likely the reason for such a limited presence of woodland specialist species, such as high risk *Nyctalus* species, and likely accounts for the dominance of soprano and common pipistrelles, more capable generalist species, with broad habitat preferences<sup>6</sup>.

Habitats within the Ecology Survey Area offered moderate levels of suitability to support protected species, however it is considered that pine marten, otter, amphibians and reptiles are all present, and that water vole and red squirrel are likely present. No evidence of badger could be established, although small areas of suitable habitat exists within the Ecology Survey Area. Due to the inaccessibility of areas of coniferous plantation and the availability of suitable habitats in the wider landscape, the presence of badger within the Ecology Survey Area cannot be discounted. Despite the presence of small areas of localised suitability for wildcat across the Ecology Survey Area, the dominance of open areas of clear fell woodland, dense conifer plantation and upland habitats, as well as the lack of evidence of presence, and recent nearby records, means that suitability for wildcat is low. In light of this assessment, and in line with SNH guidance, no further wildcat surveys are currently required.

APPENDIX A

Figures

Figure 1: Remote Static Survey Locations  
Figure 2: Protected Species Survey Results







Reproduced from Ordnance Survey digital map data. © Crown copyright 2018. All rights reserved. Licence number: 100046026  
P:\Projects\Ecology\Projects\3017 Achaglass\3017-REP-003 Protected Species Surveys



- Site
- Ecology Survey Area (250m buffer of site boundary)
- ▲ Otter
- Amphibian
- Pine marten
- ★ Reptile

1:27,000 Scale @ A3



Produced By: LS Ref: 3017-REP-003

Checked By: NW Date: 06/12/2018

**Protected Species Survey Results**  
Figure 2

**Achaglass Wind Farm  
Ecology Surveys**