

10 Breeding Birds

Methodology

Pre-existing data records

- 10.1 Pre-existing biological data records were sourced from GMRC, for the Study Area and a 2 km buffer. A large number of records were subsequently supplied, and were reduced to those dated within the last 10 years.
- 10.2 No breeding bird surveys were completed by EnviroCentre in 2017.

Field survey

- 10.3 The breeding bird survey methodology was based on the Woodland Point Count method as described by Bibby *et al.* (2000)³⁸. The Site was covered by a transect route that evenly covered the Development area, with 16 count point locations (**Figure 10.1**). At each count point there was a two minute 'settling in' period to allow any displaced birds to settle, and then a five-minute period of recording time. All birds detected whether visually or by hearing were recorded including species not associated with woodland such as waterbirds. The location of birds detected by songs or calls, or visually, were estimated in bands of up to 50 m and 100 m from the count point, along with their compass direction.
- 10.4 The survey was repeated on four occasions between May and July 2021, namely on 22 May 2021, 28 May 2021, 26 June 2021 and 30 July 2021. Visits started at dawn and lasted around four hours. All surveys were carried out in good weather.
- 10.5 All birds recorded during the survey visits were plotted in GIS, and classified according to their conservation status (Stanbury *et al.*, 2021³⁹). GIS was used to create "heatmaps", and distribution maps produced according to their classification within the Red and Amber lists within Birds of Conservation Concern (BoCC).

Limitations of the breeding bird surveys

- 10.6 Due to the late commissioning of the surveys two visits were carried out in May rather than the initial survey being carried out in April as planned. However, this is not considered to have had any significant effect on the overall results as spring 2021 was unusually late. There were no access restrictions within the Site and therefore no limitations to completing the surveys.

³⁸ Bibby, C.J., Burgess, N.D. & Hill, D.A. & Mustoe, S. (2000) *Bird Census Techniques* (Second edition). Academic Press, London.

³⁹ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747.



Results

Pre-existing data records

- 10.7 There were records for 72 species of birds in the Study Area and a 2 km buffer in the dataset provided by GMRC. Forty-four of these occurred in the breeding season (March – August) although 11 were unlikely to have bred due to lack of suitable habitat (e.g. glaucous gull and guillemot), or were late over-wintering birds. Breeding season records of notable species not recorded during the field surveys included cuckoo, house martin and osprey.
- 10.8 There were several species recorded during the field surveys but for which there were no records of in the breeding season in the GMRC dataset, including bullfinch and great spotted woodpecker, although these species were recorded in winter.

Field survey

- 10.9 Results of the breeding bird survey are shown in **Figures 10.2 and 10.3** and **Tables 10.1 and 10.2**. Notes on the breeding status of birds are found in **Appendix K**.

Species assemblage

- 10.10 Forty-one species were recorded during the breeding bird surveys, with a further three recorded though *ad hoc* observations. Twenty-eight of these species were proven to or were thought to have bred within the Site, with a further seven being potential breeders. The Site held a typical assemblage of small common woodland birds including blackbird, song thrush, robin, and a number of tit and finch species. Less common passerines included wood warbler, redstart, and spotted flycatcher, with these species breeding or potentially breeding on the Site.

Table 10.1: Summary of breeding bird data by BoCC status.

BoCC status	Number of species	% of species	Breeding species			
			Confirmed	Potential	Total	% species
Red	5	11.4	3	1	4	11.8
Amber	13	29.5	7	3	10	29.4
Green	26	59.1	17	3	20	58.8
n/a	-	-	-	-	-	-
Total	44		27	7	34	100.0

- 10.11 During bat surveys within ruined buildings on the Site (See **Chapter 9**), a number of passerine active nests were observed including nuthatch and blackbird, as well as old nests, probably of the latter species.
- 10.12 Larger bird species present included corvids such as magpie, carrion crow and jackdaw, as well as woodpigeon. Raven and buzzard were recorded flying over the Site but did not breed within it. Tawny owls were regularly seen and heard while doing bat surveys and one was seen flying out of Building C. It is likely that this species bred on the Site or close to it.



There was a single sighting of a barn owl hunting at dusk at Woodbank, and although there were potential nest sites for this species on the Site in the form of old buildings and potentially tree cavities, no evidence was found of this species breeding.

- 10.13 A number of aquatic bird species were recorded as well as larger birds such as gulls. There was no suitable habitat for most of these species to breed within the Site, but some like mallard probably bred in undergrowth in the woodlands.
- 10.14 Under criteria developed by Fuller (1980)⁴⁰, the total of 27 species recorded breeding at the Site during field surveys means that it is of **Council** importance for breeding birds, the requirement for this being a total of 20-39 species. Regarding ornithological species-richness criteria, the Site ranks as being of **Local** conservation importance (25-49 species). All of the confirmed or suspected breeding species were those which breed in woodland and scrub, the key habitats surveyed by the method used. However, the inclusion of any aquatic species present and were likely to have bred would not alter the Site's status regarding these two rankings.

Key areas for nesting birds

- 10.15 As the nesting bird assemblage was recorded using point counts, the heatmap shown in **Figure 10.3** will by definition show concentrations of bird numbers around each point count location. It can therefore only be used comparatively between those key recording locations. To that end, it is notable that the greatest number of birds were recorded within the woodland clearing to the north of the visitor centre, and the woodland/loch shore interface at the boathouse. To a lesser extent, the areas around Woodbank House were also important for nesting birds.

⁴⁰ Fuller, R.J. (1980) A method for assessing the ornithological interest of sites for conservation. *Biological Conservation*, **17** pp229-239.



Table 10.2: Summary of species recorded in 2021.

Species	Schedule 1	SBL	LBAP	Red	Amber	Green
Barn owl	X		X			X
Black-headed gull		X			X	
Blackbird						X
Blue tit						X
Bullfinch		X	X		X	
Buzzard						X
Carrion crow						X
Chaffinch						X
Chiffchaff						X
Coal tit						X
Duncock		X			X	
Garden warbler						X
Goldcrest						X
Goldfinch						X
Goosander						X
Great tit						X
Great-spotted woodpecker			X			X
Herring gull		X		X		
Jackdaw						X
Lesser black-backed gull					X	
Long-tailed tit						X
Magpie						X
Mallard					X	
Mistle thrush				X		
Moorhen					X	
Mute swan						X
Nuthatch						X
Oystercatcher					X	
Pied wagtail						X
Raven						X
Redstart			X	X		
Robin						X
Siskin		X				X
Song thrush		X	X		X	
Spotted flycatcher		X	X		X	
Starling		X		X		
Swallow			X			X
Tawny owl					X	
Treecreeper						X
Whitethroat					X	
Willow warbler					X	
Woodpigeon					X	
Wood warbler		X		X		
Wren						X
Totals	1	9	7	5	13	26



Discussion

Relevant legislation

- 10.16 All wild birds in the UK, their nests and their eggs are protected by the Wildlife and Countryside Act 1981, (as amended). Under this legislation it is an offence, with certain exceptions, to:
- intentionally or recklessly kill, injure or take any wild bird;
 - intentionally or recklessly take, damage or destroy the nest of any wild birds while it is in use or being built;
 - intentionally or recklessly take or destroy the egg of any wild bird.
- 10.17 As described above, a number of bird species have been highlighted as priorities for bird conservation in the UK (Stanbury *et al.*, 2021⁴¹). Certain bird species also have additional protection under the terms of the EC Birds Directive, and may be local priorities for conservation action via Local Biodiversity Action Plans (LBAPs).

Nesting birds at Lomond Banks

- 10.18 Although the Site did contain some scarcer passerines such as wood warbler and redstart, most of the species breeding there were common and typical of woodland and garden habitats. Clusters of bird activity were related to where count points coincided with habitat boundaries such as woodland/scrub edges or features such as hedges which provide good nesting and feeding opportunities for birds. This particularly appeared to be the case in the west of the site where most of the intense ‘hotspots’ were. One hotspot in the north of the Site was related to a high level of use of water by aquatic birds and so not indicative of a high level of breeding activity.
- 10.19 Over 40 % of the species assemblage was comprised of red- or amber-listed species, and therefore birds in the breeding season at the Site should be considered as being an IEF of **Council** importance in the EcIA.

Recommendations

Construction phase

- 10.20 The legislation relating to nesting birds on the Site will be applicable within the bird breeding season⁴². Given the likely nesting within buildings, trees and dense shrubs, habitats to be possibly impacted by the Development, any works involving the removal or disturbance of these habitats should be executed outside of the breeding bird season.
- 10.21 If works cannot be scheduled so as to avoid the nesting bird season, the relevant areas will need to be inspected by a suitably qualified ecologist in advance of the works, to ensure

⁴¹ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747.

⁴² The breeding bird season is usually considered to be mid-March through to mid-August, although some species can start to nest earlier than this, and some continue later. In all cases timings are dependent on the prevailing weather conditions each spring. Advice should be sought from a Suitably Qualified Ecologist.

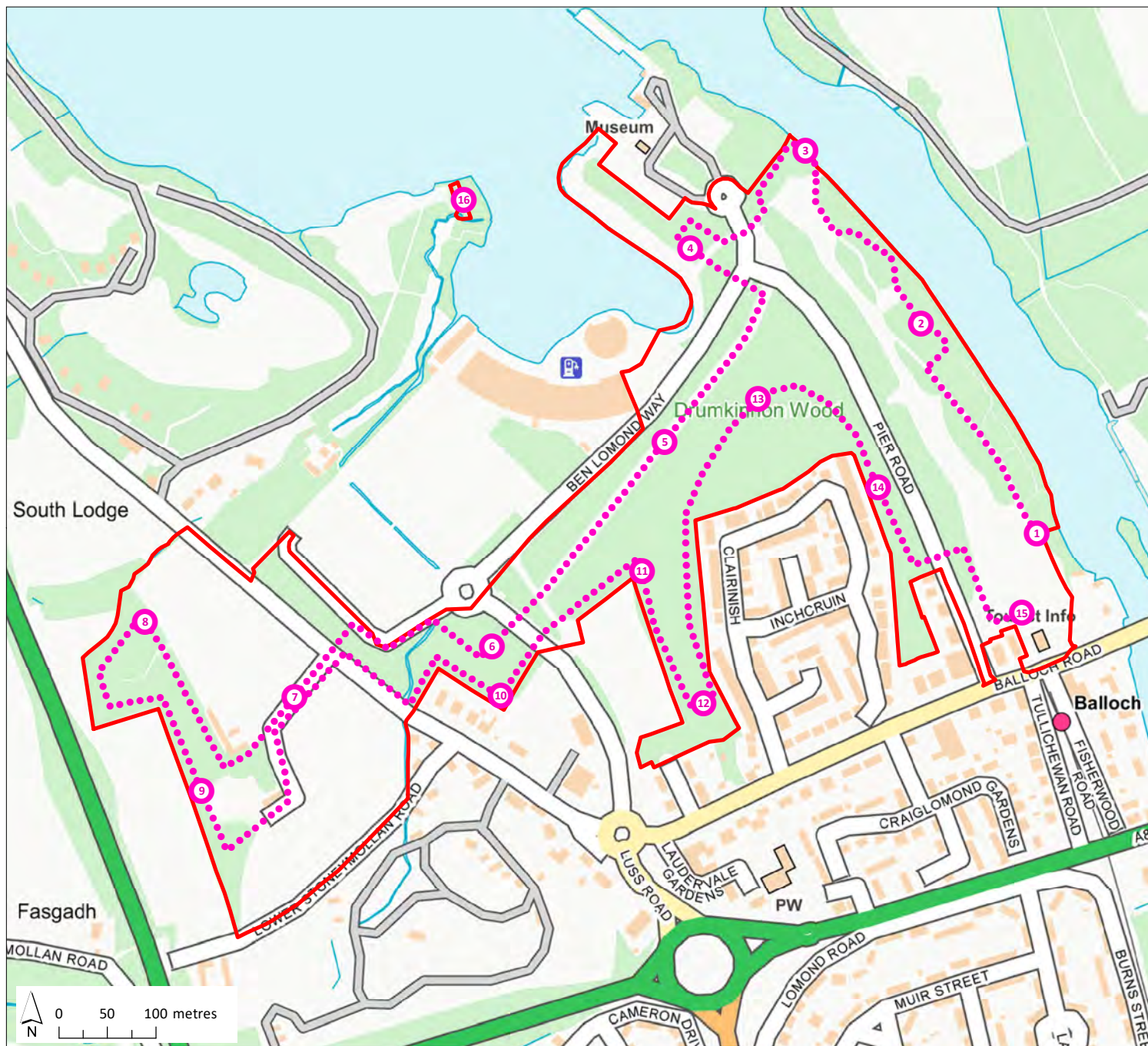


that no breeding birds are present. If nesting is noted or suspected, works will need to cease until it has been ascertained that all fledglings have hatched and have left the nest(s). The time required for this varies between bird species.

Enhancements for nesting birds

- 10.22 Soft landscaping proposals for the Site should also take into consideration the potential for incorporating enhancement measures for birds (and other wildlife). These could include:
- use of native tree species, such as oak, hazel, rowan and silver birch, in soft landscaping proposals, with under-planting with appropriate native shrub species such as bramble, hawthorn and elder. The same principle should apply to new hedging if used, where native species-richness and connectivity should be the main priorities. The buffering of edge habitats using native shrubs and trees is beneficial for nesting birds, which prefer thick hedgerows and scrub. The planting of new hedgerows with berry-producing species such as hawthorn, dog-rose, elder and bramble would also assist in providing additional potential nesting and foraging resources for birds;
 - provision of nest boxes on buildings to replace current nesting sites, suitable for use by tit sp., house sparrow and specific house martin boxes. The use of integrated nest boxes could be considered for house sparrow, as these are unobtrusive;
 - provision of additional new nest boxes on retained suitable trees for use by tree nesting bird species.
- 10.23 The incorporation of such measures would represent best practice for the promotion and enhancement of biodiversity.





Lomond Banks

Breeding Bird Survey Strategy

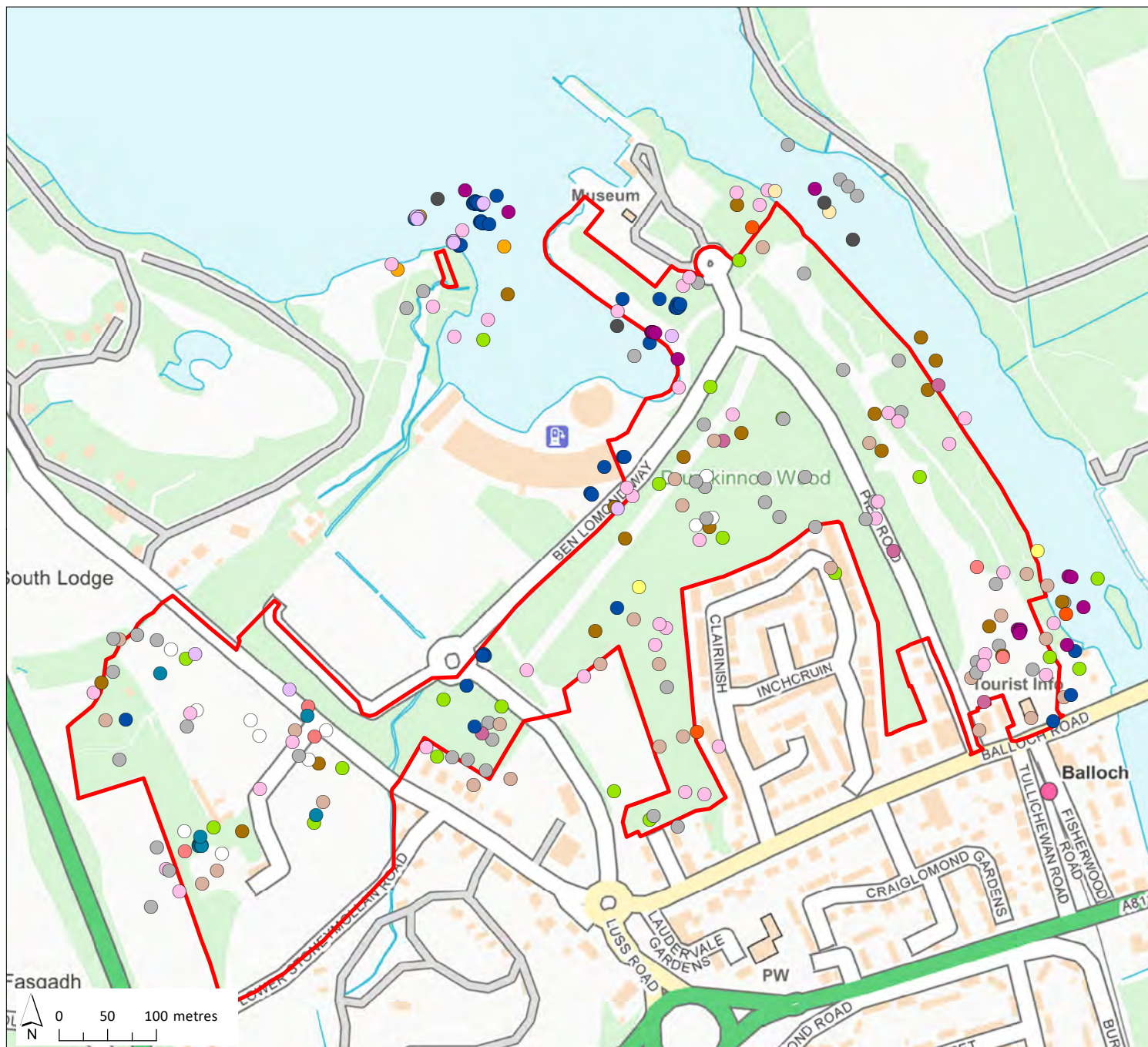
- Site boundary
- Breeding bird transect route
- Point count locations

Figure 10.1

Map Scale @ A4: 1:6,000

Surveyed by: SS
Survey date: May-July 2021
Drawn by: RAH
Checked by: KD
Status: Final





Lomond Banks

Breeding Bird Survey Results - Red and Amber BoCC

Site boundary

Red list species:

- Herring gull
- Mistle thrush
- Spotted flycatcher
- Starling
- Wood warbler

Amber list species:

- Black-headed gull
- Bullfinch
- Dunnock
- Lesser black-backed gull
- Mallard
- Moorhen
- Oystercatcher
- Redstart
- Song thrush
- Whitethroat
- Willow warbler
- Woodpigeon
- Wren

Figure 10.2

Map Scale @ A4: 1:6,000

Surveyed by: SS

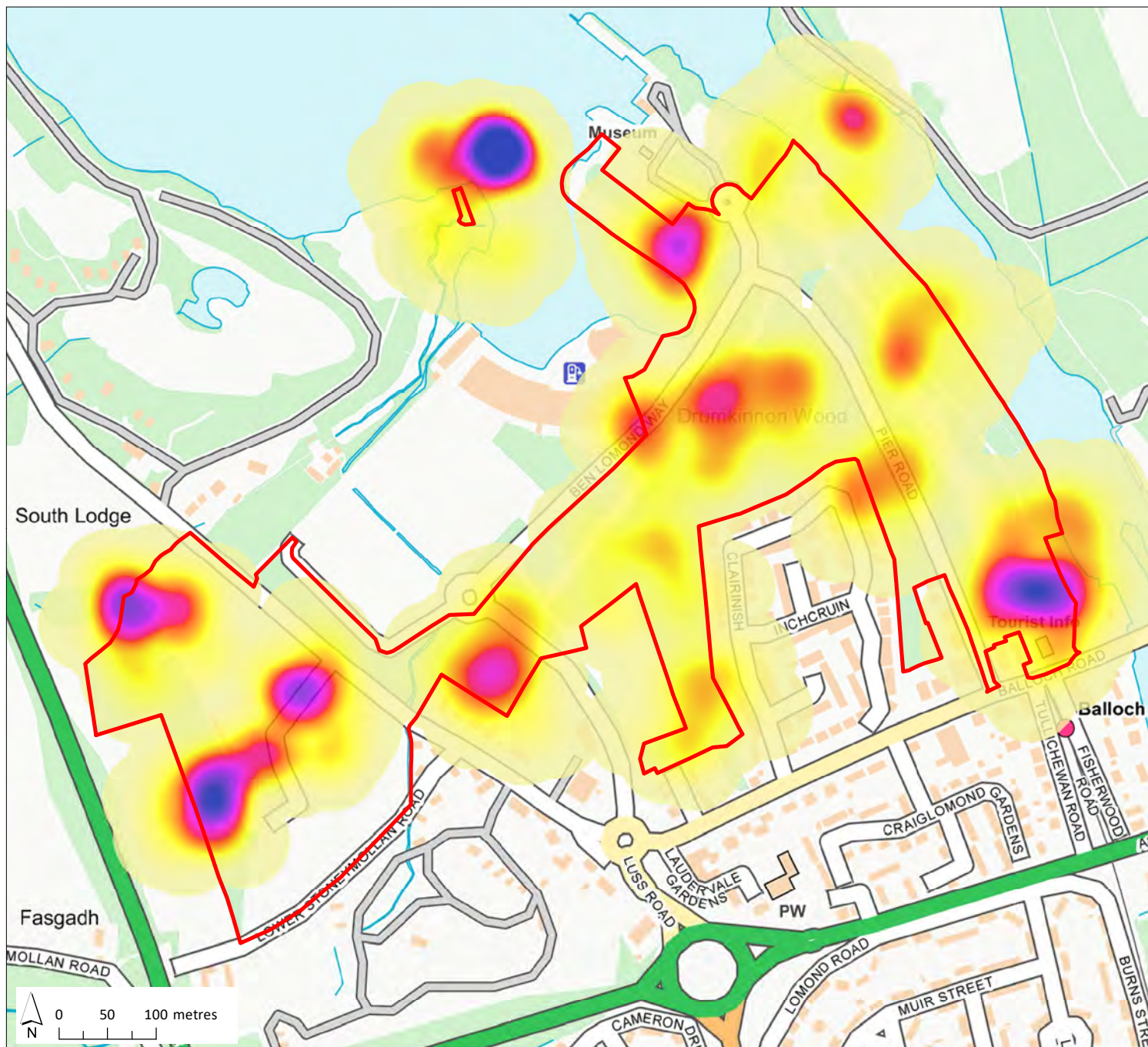
Survey date: May - July 2021

Drawn by: RAH

Checked by: KD

Status: Final





Lomond Banks

Key Areas for Birds in the Breeding Season (Heatmap)

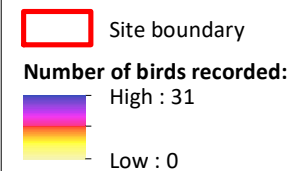


Figure 10.3

Map Scale @ A4: 1:6,000

Surveyed by: SS
Survey date: April-July 2021
Drawn by: RAH
Checked by: KD
Status: Final



11 Over-Wintering Birds

Methodology

Pre-existing data records

- 11.1 Pre-existing biological data records were sourced from the BTO Wetland Bird Survey⁴³, representing the most relevant dataset for wintering aquatic birds. This was because the Site included a small part of the River Leven – Balloch to Dumbarton WeBS site⁴⁴.
- 11.2 Pre-existing biological data records were also sourced from GMRC, for the Study Area and a 2 km buffer of this. A large number of records were subsequently supplied and were reduced to those dated within the last 10 years.
- 11.3 No wintering bird surveys were undertaken by EnviroCentre in 2017.

Field survey

- 11.4 Field surveys for over-wintering birds were based on the BTO WeBS counts method⁴⁵. Surveys were carried out once a month between October and February inclusive. A transect route was walked covering the River Leven and the shoreline of Loch Lomond adjacent to the Development, as shown in **Figure 11.1**. The transect route took in prominent vantage points on the riverbanks and loch shore where the water and water's edge could be scanned with binoculars. When the transect was finished the same route was walked back but this time only recording species or obvious individuals (such as swans or herons) missed on the initial transect, so as to avoid double counting.
- 11.5 In line with WeBS, the surveys visits were carried out in the morning and lasted around three hours. All waterfowl, gulls, grebes and other aquatic birds such as herons and cormorants were counted. Passerines associated with aquatic habitats such as grey wagtails were also counted. There were no particular weather conditions selected or avoided as this would have no impact on the behaviour of most aquatic species.
- 11.6 Tallies of each species counted were made during the surveys. The distribution of birds counted was also recorded and later mapped on a GIS.

Limitations of the over-wintering bird survey

- 11.7 The River Leven was crowded with moored boats, often for its much of its width. In places, this impeded open water views in places. However, it was possible to check some of these areas from public footpaths on the opposite bank to the Site. In addition, the boats were also used as for perching by some birds, especially gulls, providing easy opportunities for counting. There was open public access and so there were no physical restrictions in carrying out the counts. The presence of often large numbers of people was not

⁴³ [Wetland Bird Survey | BTO - British Trust for Ornithology](#) Viewed February 2022.

⁴⁴ [BTO WeBS Reports](#) Viewed February 2022.

⁴⁵ [Waterbirds in the UK \(bto.org\)](#) Viewed February 2022.



considered to have any impact on the surveys at this already heavily used, public site. Therefore, there were no limitations to completing the over-wintering bird survey.

Results

Pre-existing data records

- 11.1 Thirty-two species of wildfowl, waders and other aquatic birds were reported within the River Leven – Balloch to Dumbarton WeBS dataset between 2015 and 2020. The species composition was similar to that found during the field surveys with 17 of the WeBS species recorded during the Site field surveys. The two most common birds were black-headed gull with a 5-year average (2015-20) peak of 192 birds and mallard with a five-year average of 113 in the same period, however these numbers are for the whole River Leven – Balloch to Dumbarton WeBS count area of which the Site forms a very small part.
- 11.2 There were records of 26 species of aquatic birds recorded in the Study Area and a 2 km buffer during winter periods (September – February) in the GMRC dataset. Seventeen of these species were recorded during field surveys but other, scarcer species not recorded included Iceland gull, velvet scoter, scaup, black guillemot and little auk.

Field survey

- 11.3 Results of the field survey are summarised in **Tables 11.1** and **11.2**, and displayed in **Figures 11.2** and **11.3**.

Species assemblage

- 11.4 The Site held a typical assemblage of wintering wildfowl and water birds, such as black-headed gull, mallard, tufted duck, moorhen and mute swan, as well as less common wintering wildfowl such as goldeneye. A single female long-tailed duck, normally a marine species was present near the Loch Lomond Shores retail area during four of the counts. There was one record of three guillemot, also a marine species. Other less common species included mandarin duck.

Key areas for wintering birds

- 11.5 There was one main cluster of high bird activity identified through the surveys. This 'hotspot' on the bank of the River Leven was largely the result of members of the public feeding birds, predominantly mallards and black-headed gulls, from a public footpath. There was also a number of moored boats which served as perching places for black-headed gulls at the same location.
- 11.6 There were two less intense areas of bird use in the west of the Study Area. One was also due to large numbers of mallard and gulls being fed (or anticipating being fed) by members of the public. The second, more westerly hotspot was largely associated with black-headed gulls, and to a lesser extent common gulls, using a jetty as a loafing place.
- 11.7 Distribution and density of aquatic birds elsewhere in the Study Area was fairly uniform and low, although there was an increased level of use near 'The Maid of the Loch' where the remains of a jetty was used as a perch for gulls and cormorants.



- 11.8 Thirteen of the 22 recorded species were of some conservation concern being either red- or amber listed BoCC. However, all the red-listed species were represented by a small number of individuals and in the case of long-tailed duck, a single individual. This was also true of most of the amber-listed species with the exception of mallard and black-headed gull.

Table 11.1: Summary of conservation status of over-wintering aquatic birds recorded at the Site.

BoCC status	Number of species	% species assemblage	Number of birds	% birds recorded
Red	3	14.3	48	4.4
Amber	10	42.8	958	86.9
Green	7	33.3	81	7.4
n/a	2	9.5	15	1.3
Total	22	100.0	1102	100.0

Table 11.2: Results of over-wintering bird counts.

Species	Survey date					
	12/10/2021	22/11/2021	15/12/2021	12/01/2022	10/02/2022	Total ⁴⁶
Black-headed gull	125	120	67	73	68	453
Common gull	7	19	13	8	8	55
Coot	-	-	1	1	1	3
Cormorant	3	5	4	-	2	14
Domestic/hybrid duck	2	2	2	-	-	6
Goldeneye	-	3	7	7	14	31
Goosander	-	5	9	4	1	19
Great black-backed gull	1	1	-	1	-	3
Grey wagtail	3	-	-	-	-	3
Guillemot	3	-	-	-	-	3
Heron	1	1	1	1	-	4
Herring gull	1	3	2	5	2	13
Lesser black-backed gull	21	-	-	1	-	22
Little grebe	1	2	3	3	5	14
Long-tailed duck	-	1	1	1	1	4
Mallard	64	84	82	88	71	389
Mandarin	-	-	2	6	1	9
Moorhen	4	6	9	5	4	28
Mute swan	4	2	2	2	2	12
Oystercatcher	-	-	-	-	1	1
Red-breasted merganser	1	-	-	-	-	1
Tufted duck	-	4	6	5	-	15
Total - species	15	15	16	16	14	21
Total - birds	241	258	211	211	180	1102

⁴⁶ These numbers should be taken as numbers of records (i.e., a record meaning one sighting of one individual bird) rather than actual individuals as there will have been double counting of individuals over the separate visits.



Discussion

Over-wintering birds at Lomond Banks

- 11.9 The field surveys results matched the BTO WeBS results in that black-headed gull and mallard were the two most abundant birds recorded, and the majority of the species recorded during the field surveys were all recorded during the WeBS counts. Nevertheless, as the Study Area only contained a small part of the River Leven WeBS count area and also captured a small section of Loch Lomond, it is difficult to make any definitive comparisons. In addition, the WeBS counts will have continued outwith the winter. The high numbers of mallard and black-headed gull, both amber-listed BoCC, resulted in a high number of birds of conservation concern being present when given as number of individuals. However, the number of these birds was artificially inflated due to their feeding by members of the public, especially in the east of the Study Area.
- 11.10 Less common aquatic birds included the single long-tailed duck present during four of the surveys. Although this species is primarily a winter visitor to coastal areas, records in inland lochs are relatively common⁴⁷. Similarly, guillemot is also a marine species but records of these are also relatively common on inland lochs, especially after storms. Mandarin duck was recorded on three of the surveys, and although an introduced species, these were considered wild birds and the population of this species is increasing in western Scotland, including in the Loch Lomond area⁴⁸.
- 11.11 Generally however, the Site held relatively low numbers of aquatic wintering birds and most species recorded were mainly common and widespread. Under criteria developed by Fuller (1980)⁴⁹, the total of 21 species (excluding feral domestic duck) recorded at the Site does not rank it as being of any importance for wintering aquatic species, the lowest ranking of **Local** importance for wintering birds requiring a total of 25-54 species. Similarly, the Site did not have sufficient numbers of wildfowl under the same criteria (500 or 100 of two species) to assign a rank of importance to it regarding bird numbers.

Recommendations

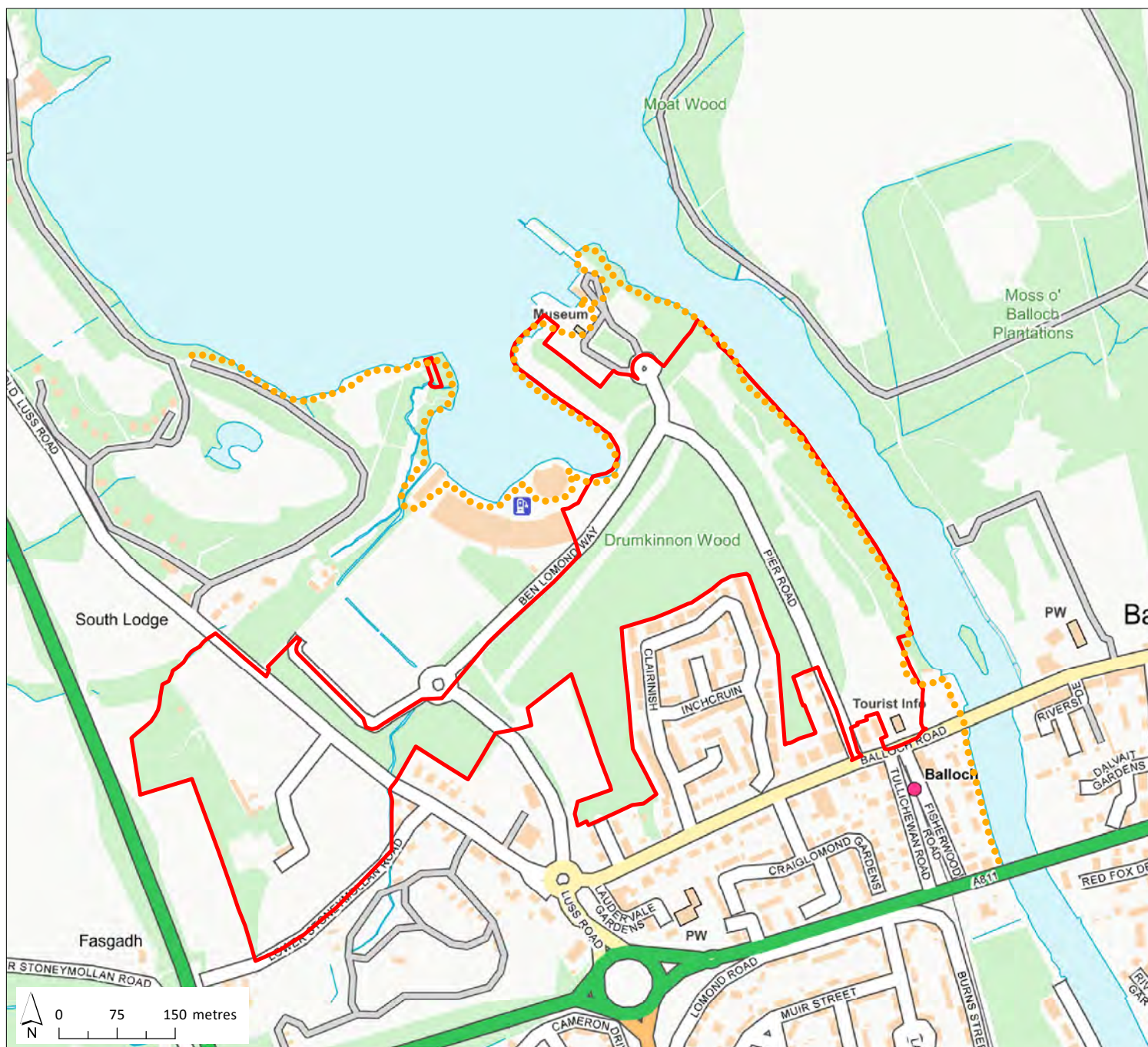
- 11.12 Given the widespread and commonplace nature of the over-wintering bird assemblage at Lomond Banks, these species do not need to be included in the EcIA as an IEF. However, some general best practice recommendations for working near over-wintering birds should be followed, including:
- avoiding introduction of any new direct lighting into waterbodies which are currently unlit, both during construction and operation of the Development;
 - avoiding high disturbance construction activities within 10 m of the shoreline, such as piling, an hour either side of sunrise and sunset, during the winter months.

⁴⁷ Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. (2013). *Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland*. BTO Books, Thetford, p. 218.

⁴⁸ Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. (2013). *Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland*. BTO Books, Thetford, p. 190.

⁴⁹ Fuller, R.J. (1980) A method for assessing the ornithological interest of sites for conservation. *Biological Conservation*, **17** pp229-239.





Lomond Banks

Winter Bird Survey Strategy

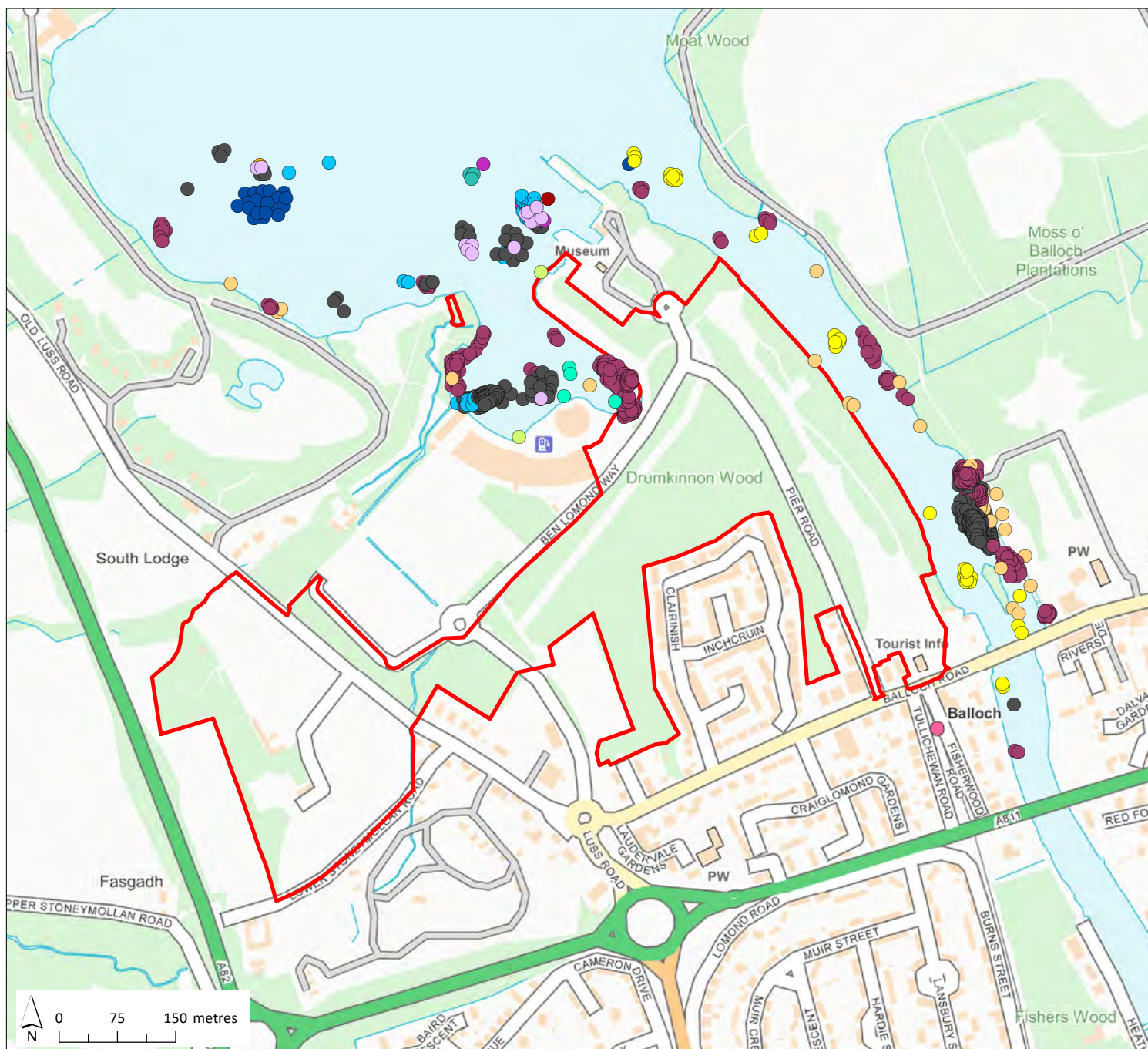
- Site boundary
- Transect route

Figure 11.1

Map Scale @ A4: 1:7,500

Surveyed by: KD
Survey date: Nov 2021 - Feb 2022
Drawn by: RAH
Checked by: KD
Status: Final





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Lomond Banks

Over-Wintering Birds Survey Results - Red and Amber BoCC

Site boundary

Red list species:

- Goldeneye
- Herring gull
- Long-tailed duck

Amber list species:

- Black-headed gull
- Common gull
- Great black-backed gull
- Grey wagtail
- Guillemot
- Lesser black-backed gull
- Mallard
- Moorhen
- Oystercatcher
- Red-breasted merganser

Figure 11.2

Map Scale @ A4: 1:7,500

Surveyed by: KD

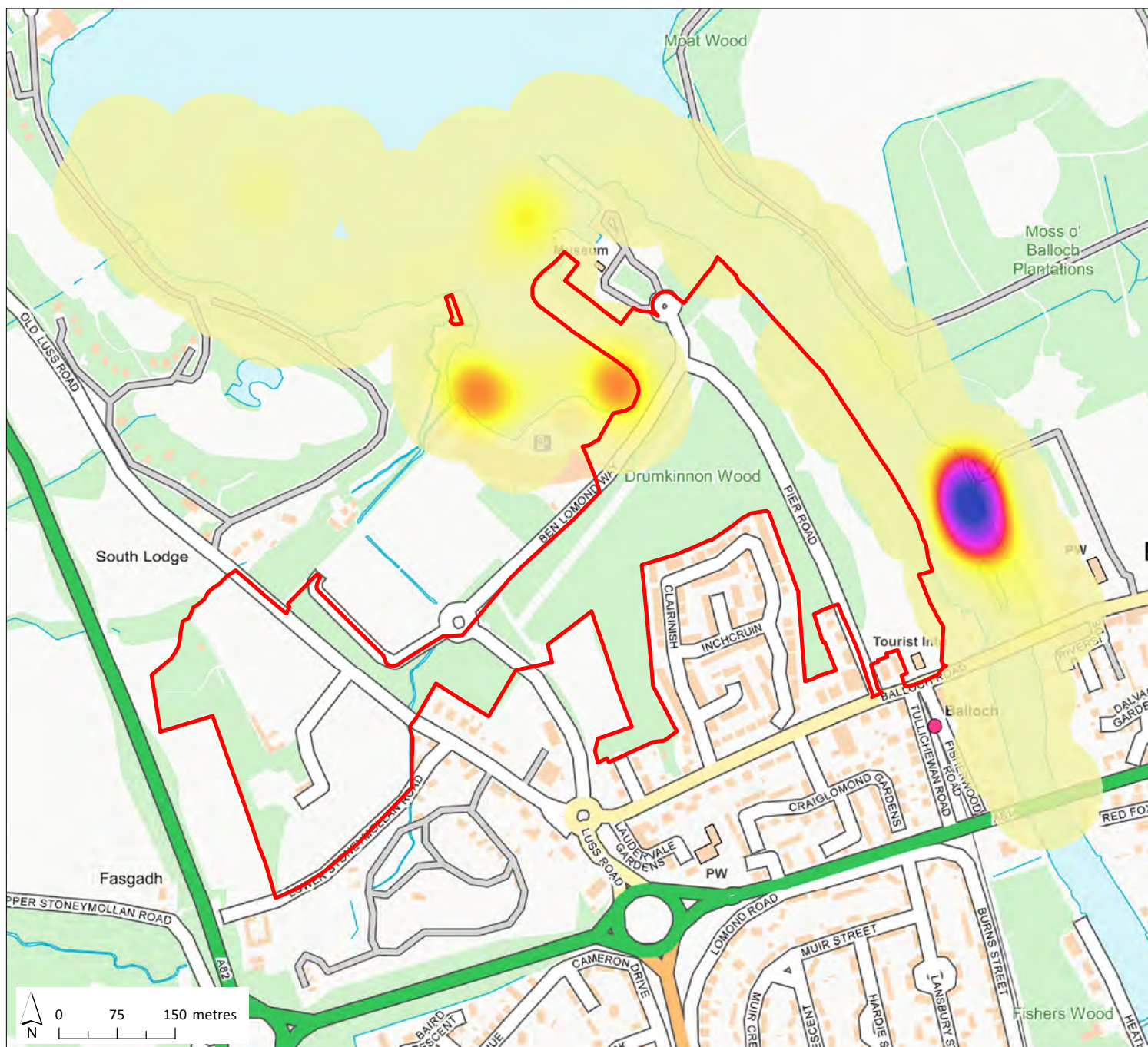
Survey date: Nov 2021 - Feb 2022

Drawn by: RAH

Checked by: KD

Status: Final





Lomond Banks

Key Areas for Over-Wintering Birds (Heatmap)

Site boundary

Number of birds recorded:

High : 300

Low : 0

Figure 11.3

Map Scale @ A4: 1:7,500

Surveyed by: KD

Survey date: Nov 2021 - Feb 2022

Drawn by: RAH

Checked by: KD

Status: Final



12 Conclusions

- 12.1 A range of habitat, protected species and ornithological survey were undertaken across the Site at Lomond Banks during 2021 and early 2022. The results of these surveys have informed constraints mapping for the proposed Development and will be utilised in the Ecology chapter of the EIA-R.
- 12.2 These results and conclusions will remain valid for a period of 12-18 months, after which time a review would be needed.



Appendix A

List of Abbreviations Used in this Report



Abbreviation	Full terminology
AEL	Applied Ecology Ltd
AGL	Above Ground Level
AWI	Ancient Woodland Inventory
BLE	Brown long-eared bat
BoCC	Birds of Conservation Concern
BRS	Bat Roost Suitability
CIEEM	Chartered Institute of Ecology and Environmental Management
DAFOR	Dominant, abundant, frequent, occasional or rare.
EclA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIA-R	Environmental Impact Assessment Report
EUNIS	European Nature Information System
GIS	Geographical Information System
GMRC	Glasgow Museums Records Centre
GWDTE	Groundwater Dependent Terrestrial Ecosystem
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LDP	Local Development Plan
LLTNP	Loch Lomond and the Trossachs National Park
LLTNPA	Loch Lomond and the Trossachs National Park Authority
LNCS	Local Nature Conservation Site
MMU	Minimum Mappable Unit
ppn	[Bat] passes per night
PRA	Preliminary Roost Assessment
PRF	Potential Roost Feature
SBL	Scottish Biodiversity List
SEPA	Scottish Environmental Protection Agency
SNH	Scottish Natural Heritage (now known as NatureScot)
WANE Act	Wildlife and Natural Environment (Scotland) Act (2011)
WDC	West Dunbartonshire Council
EPS	European Protected Species
HRA	Habitats Regulations Assessment
SSSI	Site of Special Scientific Interest
SAC	Special Area of Conservation
ECOW	Ecological Clerk of Works
GPS	Global Positioning System
SSRS	Saving Scotland's Red Squirrels
BCT	Bat Conservation Trust
MTUK	Mammal Trust UK
SPP	Species Protection Plan
MEWP	Mobile Elevated Work Platform
BTO	British Trust for Ornithology



Abbreviation	Full terminology
WeBS	Wetland Birds Survey



Appendix B

Scottish EUNIS Target Notes



Target Note	Description
1	Northern strip of Drumkinnon Wood which was long-established Ancient Woodland. Mature beech along the top of the slope. Other species frequently found included mature sycamore, mature oak, birch, larch and occasional lime. Lower canopy had hazel, hawthorn and holly. Ground layer had been impacted by worn paths. Dominant native bluebell along slopes, alongside fern species, red campion, wood sorrel, dog's mercury, pink purslane, and bramble. Other frequent species found included wood sorrel, wood avens, wood speedwell, greater woodrush and herb robert. Trees throughout this area displayed bat roost suitability.
2	Previously cleared ground that was still bare. Appeared to be from an avenue historically cleared for a pipeline linking to the substation building at the north-eastern end of Drumkinnon Wood. Evidence of use as a mountain bike track which had prevented ground vegetation recovering.
3	Strip of previously cleared ground for pipeline. Now tall ruderal habitat dominated by native bluebell along with rosebay willowherb, bramble and bracken.
4	Continuation of plantation Ancient Woodland along this section of Drumkinnon Wood. Mature beech and sycamore with occasional larch, oak and birch. Hawthorn and holly in lower canopy. Similar tree composition and ground flora to TN1. Trees throughout this area displayed bat roost suitability.
5	Small clearing within woodland. Resembled amenity grassland but slightly more species rich. Red fescue the dominant grass with Yorkshire fog and sweet vernal-grass. Forb species included creeping buttercup, redshank <i>Persicaria maculosa</i> , eyebright <i>Euphrasia officinalis</i> agg., daisy, and occasional bluebell.
6	Broad-leaved woodland with naturally forming canopy dominated by birch, sycamore, oak, willow and occasional elm. Large mature oaks were scattered throughout this section of Drumkinnon Wood. Hawthorn was frequent in the lower canopy as well as occasional rowan and locally abundant honeysuckle. Species rich ground flora in many areas, with carpets of native bluebell. Where native bluebell had not formed dense carpets, it was continuous as the dominant species elsewhere at a lower density. Other dominant species included red campion, pink purslane and enchanters nightshade. Wood avens, common figwort, creeping buttercup and cleavers were all frequent. Opposite-leaved golden saxifrage was locally abundant further south, and common nettle, rosebay willowherb and dense bracken were found adjacent to previous disturbed ground. Highly shaded areas in the north-east of Drumkinnon Wood had less ground cover, with scattered native bluebell, ferns, bramble and foxglove <i>Digitalis purpurea</i> . Trees throughout this area displayed bat roost suitability.
7	Embankment within Drumkinnon Wood that was overwhelmingly dominated by sycamore, both mature specimens and dense sapling regeneration. Occasional birch. Bluebells not as densely occurring along this section as the ground layer was highly shaded. Species found included ferns, bramble, native bluebell and locally abundant common comfrey.
8	Strip of younger broad-leaved plantation woodland surrounding Lomond Shores constructed car park. Commonly found mixture of species within this type of screening planting including ash, wild cherry, birch, oak and occasional lodgepole pine. Ash trees appeared to be heavily afflicted with dieback.
9	Broad-leaved woodland that appeared younger in structure with possible previous planting. Now formed natural occurring canopy. Southern end of woodland had oak, sycamore birch and willow. Hawthorn was frequent in lower canopy. Shading in places had reduced density of the ground flora, but native bluebell was dominant throughout. Other species included ferns, common comfrey, wood avens, red campion, enchanters nightshade, honeysuckle, common nettle, Welsh poppy and bramble. Far southern end of the woodland had evidence of garden escapee plants such as cotoneaster and Spanish bluebell. Trees throughout this area displayed bat roost suitability. Nest boxes were erected on small number of trees.
10	Broad-leaved woodland with evidence of planting adjacent to road. Ash and hazel appeared to be the most dominant species planted as part of screening at the roadside. Remainder of woodland in this area was naturally occurring canopy of sycamore, oak, birch and elm. Lower canopy had hawthorn, elder and hazel. Ash trees appeared to have dieback. Ground layer had dominant bluebells with hybrid/Spanish bluebell more dominant further south. Common nettle, ferns, cleavers, creeping buttercup, red campion, wood avens, Welsh poppy and bramble all occurred frequently. Far southern end was not accessible due to dense vegetation. Trees throughout this area displayed bat roost suitability.
11	Fragmented section of broad-leaved woodland that would have originally have been part of Drumkinnon Wood. It was now separated by the Lomond Shores path network. The woodland was enclosed by planted ornamental beech hedge. Scattered mature species throughout included oak, sycamore and ash. Additional planting in recent years appeared to have been carried out with younger specimens of birch, elder, hawthorn and rowan. Highly shaded ground flora but dominant native bluebell was evident throughout alongside



Target Note	Description
	bramble, ferns, common comfrey and common nettle. There was a line of planted ornamental lime trees along the southern edge adjacent to the road. Trees throughout this area displayed bat roost suitability.
12	Southern edge of Lomond Shores building that was located on Site boundary. Building has modern construction and did not display any bat roost suitability. Surrounding area was mostly hard standing with ornamental hedge landscaping as well as a playground.
13	Section of broad-leaved plantation woodland from Lomond Shores development. Woodland was enclosed with ornamental beech hedge. Alder, oak, elm, rowan and willow dominant. Frequent lodgepole pine but overall not high enough density to be classed mixed plantation.
14	Bare gravel manmade shoreline. No vegetation. Northern edge had line of trees dominated by planted alder and birch.
15	Plantation woodland similar species to TN13 but slightly larger in area. Enclosed by ornamental beech and hawthorn hedge. Ground layer was highly shaded and limited to saplings, patches of field horsetail <i>Equisetum arvense</i> and locally abundant creeping buttercup along the northern edge.
16	Strip of broad-leaved woodland. Not ancient woodland in form but had naturally occurring diverse structure. Birch, sycamore, oak and elm all were frequently occurring. Willow was dominant along the northern edge. Hazel, hawthorn, elder and rowan comprised the lower canopy. Ground layer was highly shaded in places and was limited to ferns, common nettle and saplings in these areas. Richer ground flora was evident elsewhere with bluebell (dominated by hybrid/Spanish), dog's mercury, wood avens, pink purslane and red campion. Common figwort and Welsh poppy were found occasionally. Common nettle, creeping buttercup and wild strawberry were locally abundant along the northern edge. Rhododendron and cotoneaster was within the woodland at NS 38861 82100. Trees throughout this area displayed bat roost suitability.
17	Continuation of woodland similar to TN16 but more dominated by willow. Sycamore, birch and elm were still frequent but oak was absent. Tall ruderal fringes along the northern edge, with common nettle, cleavers, rosebay willowherb, creeping buttercup and common hogweed. Patches of Japanese knotweed at NS 38912 81974 and NS 38927 81963.
18	Strip of broad-leaved woodland similar to TN16. Sycamore, birch, ash and elm were dominant with occasional beech. Hazel and hawthorn and holly were frequent in the lower canopy. Scattered willow along edge of the water but no continuous cover. Ground flora was again highly shaded in places and comprised dominant ferns and common nettle in these areas. More species rich ground flora occurred in patches throughout, with wood avens, enchanters nightshade, common comfrey, creeping buttercup, cleavers and herb robert all commonly found. Dense patches of bramble occurred along the slope adjacent to the water. Patches of woodland on the southern side of the path tended to have additional species such as germander speedwell, wood forget-me-not, wild strawberry, cuckoo flower and occasional raspberry. Hybrid/Spanish bluebell throughout this section of woodland. Patch of snowberry at NS 38837 82291. Trees throughout this area displayed bat roost suitability. Piles of previously felled wood in places here, suitable for invertebrates.
19	Gravel bare shoreline with open water. No vegetation within gravel.
20	Amenity grassland strip between woodland. Frequently mown and areas were heavily worn from continuous foot traffic. Red fescue, Yorkshire fog and rough meadow grass were the dominant grasses. Forb species included creeping buttercup, ribwort plantain, greater plantain, daisy, white clover and black medic.
21	Mixed plantation woodland strip with larch and elm dominant. North-eastern fringe was more recent plantation broad-leaved woodland associated with Lomond Shores development. Young trees comprising birch, oak, ash and willow. Ground flora was shaded along the south-west edge of mixed plantation woodland. Common nettle and bramble were the most frequently occurring species. Young magpie fledgling found on the ground.
22	Broad-leaved woodland with naturally occurring canopy. Wetter ground conditions related to the burn have led to dominant willow, sycamore, oak, elm and also frequent alder. Ground flora was species rich with ferns, native bluebell, greater woodrush, common comfrey, woodruff, red campion, Welsh poppy, wood avens and herb robert. Dog's mercury was locally abundant near the burn. Himalayan balsam found in small areas along burn. Trees throughout this area displayed bat roost suitability.
23	Woodland structure similar to TN22, but alder more frequent along burn. Larger scattered mature oak trees in places. Opposite-leaved golden saxifrage carpeted the side of the burn, underneath a dense covering of common comfrey. Common nettle, greater woodrush, ferns were other dominant species. Cleavers and bramble occurred frequently with occasional wood speedwell and Welsh poppy. Trees throughout this area displayed bat roost suitability.



Target Note	Description
24	Tall ruderal clearing within woodland with common nettle and bracken dominant. Carpet of native bluebell occurred on the ground underneath.
25	Remnants of old woodland, with sizeable trees within fenced section. Large beech, oak, sycamore and ash trees. Canopy more spacious with less small tree species but hawthorn and younger sycamore comprised the lower canopy. A carpet of dense native bluebell (with occasional hybrid bluebell) comprised the majority of the ground layer. Pink purslane and common comfrey were frequent. Large patch of Japanese knotweed was found in the north-east corner of the woodland. Trees throughout this area displayed bat roost suitability.
26	Small strip of broad-leaved plantation woodland along the edge of adjacent gardens. Beech, ash, birch, elm and hawthorn.
27	Previous grazed field within wider grounds of Woodbank House. Grazing had not occurred in many years and now a relatively species rich meadow had formed. Dominant grasses included Yorkshire fog, meadow foxtail, red fescue and sweet vernal-grass. Timothy grass was frequent. Dominant other species included creeping buttercup, meadow buttercup, common sorrel, germander speedwell, black medic and ribwort plantain. Broad-leaved dock was locally abundant along the northern edge. A single elder shrub was within the centre of the field.
28	Similar open grassland to TN27 but with slightly wetter conditions as soft rush was frequent throughout. No other indicators of marshy grassland were found. Dominant grasses were Yorkshire fog, rough meadow grass, sweet vernal-grass and meadow foxtail. Cock's-foot was frequent. Common sorrel, ribwort plantain, creeping buttercup, meadow buttercup were the dominant forbs, alongside frequent germander speedwell, common knapweed, common hogweed and lady's mantle. Patches of bramble scrub occurred throughout, especially in the far south-west. Scattered mature trees in the south-west of the field with two large ash trees within the field, and mature oaks along the south-west boundary. Nuthatch nest confirmed within mature ash at NS 38188 81677. Patch of Himalayan balsam at NS 38169 81698. Mature trees in the south-west displayed bat roost suitability. Mature ash trees displayed bat roost suitability.
29	Line of scrub along boundary dominated by bramble and wild privet. Trees interspersed with scrub including sycamore, hawthorn, beech and locally abundant section of willow scrub.
30	Line of scrub and trees that had formed along existing avenue to Woodbank House at the field boundary. Dense bramble sat in front of dense rhododendron from previous landscaping. Leylandii and common laburnum with wild cherry also throughout. Trees throughout this area displayed bat roost suitability.
31	Old walled garden at the top of woodland slope and still enclosed by remnants of old stone wall. Now dominated by sycamore trees with occasional yew and hawthorn. Ground flora was shaded and limited to ferns and common comfrey.
32	Ancient Woodland as part of Woodbank House. Mature oaks frequent along with sycamore, ash, yew, silver birch and lime. Wild cherry found frequently in lower slopes of woodland here. Lower canopy had occasional elder and rowan. Majority of the sloped ground layer was covered in extremely dense rhododendron or cherry laurel. Upper slopes of the woodland had richer ground flora with carpet of native bluebell, wood sorrel and ferns. Trees throughout this area displayed bat roost suitability.
33	Woodland around Woodbank House with species including wild cherry, willow, sycamore and lime with occasional mature oaks. Dense rhododendron throughout along with scattered cherry laurel. Trees throughout this area displayed bat roost suitability.
34	Ancient Woodland with large mature oaks, but frequent sycamore. Ground layer on lower slopes had continuous dense rhododendron and large extended area of bamboo. Trees throughout this area displayed bat roost suitability.
35	Highest quality section of Ancient Woodland with mature oaks but a lot of sycamore still found here. Carpet of dense native bluebell extending down the slope, with wood sorrel, greater stitchwort, pink purslane, fringe cups and occasional pignut and common figwort. Wild garlic was locally abundant along the northern edge. Rhododendron less frequent in this section of woodland but scattered stands still present. Trees throughout this area displayed bat roost suitability.
36	Dense overgrown scrub surrounding existing ruined buildings, also occurring within the buildings. Bramble most common species here with scattered cherry laurel and rhododendron.
37	Eastern edge of woodland had a higher incidence of ornamental tree species from previous historic landscaping that were now of considerable size.



Target Note	Description
38	Scrub woodland forming at old pier. Successional habitat forming with regenerating alder, silver birch and willow. Broad-leaved woodland adjacent at the southern side of this habitat with mature oaks and sycamore. Ground flora of scrub woodland signalled wetter conditions with meadowsweet and common valerian. Other species here included creeping buttercup, bramble, fringe cups and red campion. Wet ditch was located at the south-eastern end of this part of the Site but had no water within the channel at the time of the survey.



Appendix C

Habitat Survey Photographs





(a) Drumkinnon Wood mixed broad-leaved woodland, with carpet of native bluebell, as described in TN6.



(b) Drumkinnon Wood mixed broad-leaved woodland, in the southern section described in TN10.



(c) Woodbank mixed broad-leaved woodland, with dense bamboo and rhododendron as described in TN34.



(d) Woodbank mixed broad-leaved woodland in the highest quality northern section, as described in TN35.



(e) Mixed plantation woodland along Old Luss Road, as described in TN21.



(f) Broad-leaved plantation woodland around the Pierhead, as described in TN15.



(g) Scrub woodland around the Boathouse area of the Site, as described in TN38.



(h) Strip of mixed scrub, with bramble and rhododendron, as described in TN30.



(i) mosaic of dense bramble scrub in the west of the Sitw within grassland field and individual mature trees.



(j) Northern section of unmown abandoned pasture (before mowing took place in July 2021), as described in TN27.



(k) Southern section of unmown abandoned pasture (before mowing took place in July 2021), as described in TN28.



(l) Open amenity grassland area in the east of the Site, lined by two areas of mixed broad-leaved woodland, as described in TN20.



(m) Area of bare ground within Drumkinnon Wood that was cleared as part of INEOS pipeline, as described in TN2.



(n) River Leven in the east of the Site that was classified as surface standing water.



(o) Derelict structures in the west of the Site that were classified as buildings.



(p) An example of a watercourse within the Site (TN23) that was classified as flowing water.



(q) An example of the highly managed hedgerows found across the Site.



(r) Line of mature lime trees along the field boundary in the west of the Site.



(s) Patches of hybrid/Spanish bluebell within the east of the Site.



(t) Dense rhododendron within the Woodbank woodland.



(u) Dense area of bamboo within Woodlank woodland.



(v) Cherry laurel surrounding existing derelict buildings.



(w) Himalayan balsam growth in the west of the Site.



(x) Dense patch of Japanese knotweed in the Ben Lomond Way section of the Site.

Appendix D

Squirrel Feeding Station Results



Date	Location 1	Location 2	Location 3	Location 4	Location 5
11/1/22	No activity.	Grey squirrel repeatedly visiting feeder.	No activity.	No activity.	-
12/1/22	No activity.	Two grey squirrels repeatedly visiting feeder.	No activity.	No activity.	-
13/1/22	No activity.	Two grey squirrels repeatedly visiting feeder.	No activity.	No activity.	-
14/1/22	No activity.	Two grey squirrels repeatedly visiting feeder.	Two grey squirrels recorded chasing each other.	No activity.	-
15/1/22	No activity.	Two grey squirrels repeatedly visiting feeder.	No activity.	No activity.	-
16/1/22	No activity.	Feeder now empty. Grey squirrel recorded in the hours after dawn.	No activity.	No activity.	-
17/1/22	No activity.	No activity.	No activity.	No activity.	-
18/1/22	No activity.	No activity.	No activity.	No activity.	-
19/1/22	No activity.	Grey squirrel recorded in the hours after dawn.	No activity.	No activity.	-
20/1/22	No activity.	Camera moved to Location 5.	No activity.	No activity.	Camera deployed from Location 2.
21/1/22	No activity.	-	Grey squirrel briefly visiting feeder.	No activity.	No activity.
22/1/22	No activity.	-	Grey squirrel repeatedly visiting feeder.	No activity.	Camera malfunctioned due to battery error
23/1/22	No activity.	-	Grey squirrel repeatedly visiting feeder.	No activity.	-
24/1/22	No activity.	-	Grey squirrel repeatedly visiting feeder. Two greys on camera briefly.	No activity.	-
25/1/22	No activity.	-	Feeder now empty. Grey squirrel recorded in the hours after dawn.	No activity.	-
26/1/22	No activity.	-	Grey squirrel recorded in the hours after dawn.	Grey squirrel repeatedly visiting feeder.	-
27/1/22	No activity.	-	Grey squirrel recorded in the hours after dawn.	Grey squirrel repeatedly visiting feeder.	-



Date	Location 1	Location 2	Location 3	Location 4	Location 5
28/1/22	No activity.	-	Grey squirrel recorded in the hours after dawn.	Grey squirrel repeatedly visiting feeder.	-
29/1/22	No activity.	-	Grey squirrel recorded in the hours after dawn.	No activity.	-
30/1/22	No activity.	-	Grey squirrel recorded in the hours after dawn.	Two clips of grey squirrel passing feeder.	-
31/1/22	No activity.	-	Grey squirrel recorded in the hours after dawn.	No activity.	-
1/2/22	No activity.	-	No activity.	No activity.	-
2/2/22	No activity.	-	No activity.	One clip of grey squirrel at feeder.	Feeder was empty on retrieval.



Appendix E

Photographs from Building Bat Surveys (PRA and Activity Surveys)





(a) Building A – part of the northern and eastern façade.



(b) Building A – southern and western façade.



(c) Building A – internal area of the building which had almost entirely collapsed.



(d) Building A – internal area of the eastern section of the building. Dense overgrown vegetation prohibited safe access.



(e) Building A - internal stone walls with numerous crevices for both summer roosting and potentially hibernation.



(f) Building A – deep sheltered void within previous fireplace.



(g) Building A – missing mortar on external wall with deep crevice.



(h) Building A – void on the northern façade, with flight access to basement area with hibernation suitability which was not safe to access.



(i) Building A – general area of three roost locations on the northern elevation, identified during the dusk survey on 14 July 2021.



(j) Building A – general area of roost location recorded on the eastern internal wall of the building, during the dawn survey on 30 July 2021.



(k) Building A – general area of roost location recorded on the northern external wall of the building, during the dawn survey on 30 July 2021.



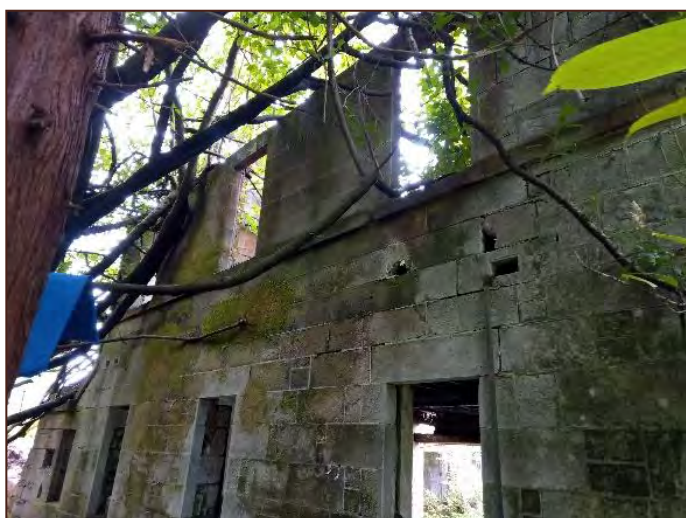
(l) Building B – southern façade.



(m) Building B – what remained of the eastern façade of the building.



(n) Building B – northern façade.



(o) Building B – western façade.



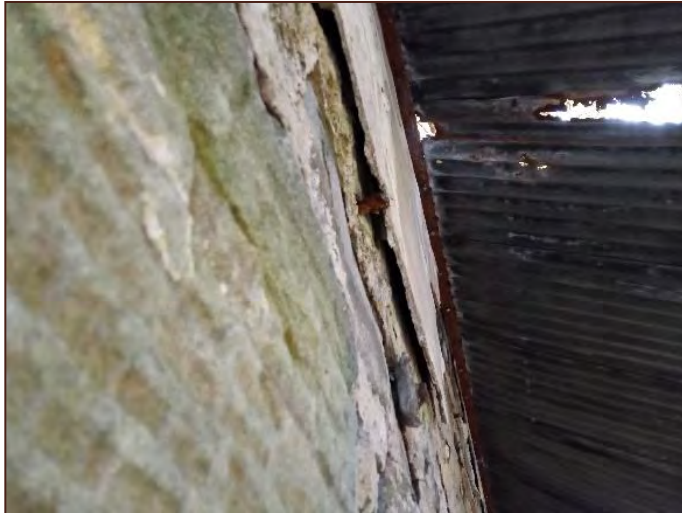
(p) Building B – remaining internal section of the building.



(q) Building B – remaining internal section of the building on the southern side.



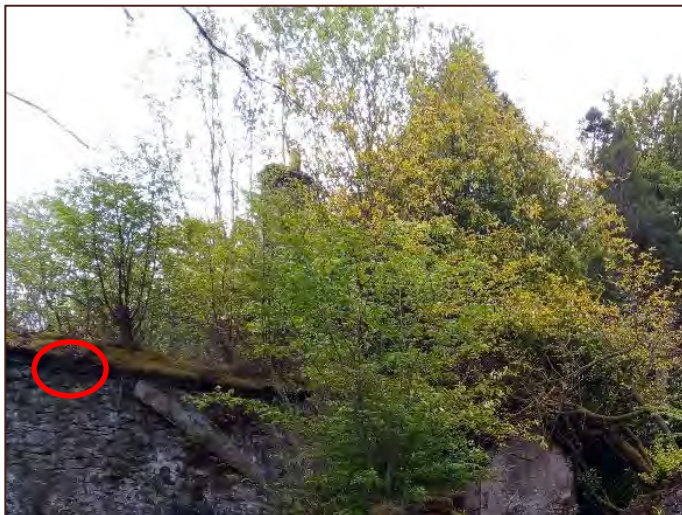
(r) Building B – void within existing window lintels throughout the building.



(s) Building B – potential roosting space behind broken plaster within internal areas.



(t) Building B – sheltered space under existing stairwell with crevices suitable for hibernation.



(u) Building B – general area of roost location recorded on the northern external wall of the building, during the dusk survey on 13 July 2021.



(v) Building C – southern and eastern façade.



(w) Building C – western façade.



(x) Building C – northern façade.



(y) Building C – internal area with single lined roof.



(z) Building C – chimney at the southern end of the building with minimal stone crevices.

Appendix F

Tree PRA Results



Tree tag	Area of Site	x	Y	Description of PRFs	Bat roost suitability	Species
390	Woodland south of the Ben Lomond Way roundabout	238428	681896	Large mature tree with multiple potential roost features. Snapped tear out on south side at 7 m Above Ground Level (AGL). Snag limbs at various heights. One snagged limb has failed hazard beam feature at 4 m AGL.	Moderate	Ash
393	Woodland south of the Ben Lomond Way roundabout	238439	681899	Hole on south facing branch at 5 m AGL where it joined with trunk.	Low	Birch
397	Woodland south of the Ben Lomond Way roundabout	238439	681910	Row of fallen ash trees. One remaining standing had no tag but was next to tag 397. Snag limb visible on east side at 11 m AGL.	Low	Ash
-	Woodland south of the Ben Lomond Way roundabout	238438	681889	Cavity in trunk on north side at 4.5 m AGL that appeared to be relatively shallow.	Low	Lime
-	Woodland south of the Ben Lomond Way roundabout	238434	681898	Southern branch had failed hazard beam at 7 m AGL.	Moderate	Oak
-	Woodland south of the Ben Lomond Way roundabout	238387	681921	Large tree with dense ivy cover. Potential for features behind ivy due to size.	Moderate	Ash
-	Woodland south of the Ben Lomond Way roundabout	238383	681919	Large tree with dense ivy cover. Potential for features behind ivy due to size.	Moderate	Beech
391	Boathouse	238381	682388	Hole visible on north branch at 4.5 m AGL. Potential for features at height due to size and age.	Moderate	Oak
-	Boathouse	238364	682375	Outside the boundary of boathouse but in close proximity. Large tree that is part of aerial climbing course. Two kent style bat boxes on western side of trunk. Inspected with torch but no bats present.	Moderate	Oak
-	Boathouse	238380	682372	Outside the boundary of boathouse but in close proximity. Large tree that is part of aerial climbing course. Potential for features at height due to size and age.	Moderate	Oak
-	Drumkinnon Parking	238825	682064	Cavity in trunk at 1.5 m AGL that extended a considerable distance. Cavity was dry when inspected with endoscope.	Moderate	Elm



Tree tag	Area of Site	x	Y	Description of PRFs	Bat roost suitability	Species
-	Drumkinnon Parking	238858	682012	Cavity in east facing branch at 4.5 AGL.	Moderate	Elm
-	Drumkinnon Parking	238838	681991	Twisted broken limb at 5 m AGL with potential for small cavities in splintered wood.	Low	Elm
-	Riverside	238707	682386	Single snapped limb at 8 m AGL but appeared to be upward facing.	Low	Elm
-	Riverside	238716	682426	Dead standing tree with large bend in trunk. Deadwood splintered at top of tree but any cavities likely upward facing. Unsafe to climb.	Low	Birch
-	Riverside	238701	682444	Included due to potential SUDS area. Large cavity in trunk at 4.5 m AGL.	High	Birch
-	Riverside	238875	682259	Large tree with knotholes visible on main trunk at various heights. Potential for additional features at height.	Moderate	Ash
-	Riverside	238878	682259	Large tree with knotholes visible on main trunk at various heights. Potential for additional features at height.	Moderate	Ash
-	Riverside	238863	682241	Frost crack in east facing branch at 10 m AGL with potential cavity.	Moderate	Elm
-	Riverside	238848	682235	Cavity on east side of trunk at 3 m AGL. Torch confirmed it extended upwards.	Moderate	Elm
-	Riverside	238868	682094	Sheltered cavity in leaning trunk at 3 m AGL.	Moderate	Elm
-	Riverside	238868	682101	Potential cavity from wound in south facing branch at 4 m AGL.	Moderate	Elm
-	Riverside	238772	682278	Frost crack with potential cavity on northern side of trunk at 7 m AGL.	Moderate	Birch
-	Riverside	238768	682273	Snapped deadwood visible in upper sections at over 20 m AGL.	Moderate	Oak
-	Riverside	2388752	682283	Series of knotholes in lower sections that are likely to be shallow.	Low	Sycamore
-	Riverside	238757	682307	Cavity in leaning trunk on top side at 8 m AGL.	Moderate	Elm
-	Riverside	238747	682317	Dead tree with large split up trunk. Potential for pockets within the split but open at the top. Unsafe to climb.	Low	Sycamore
-	Riverside	238768	682271	Rot hole on branch at 12 m AGL. Unsafe to climb.	Moderate	Oak
490	Woodbank	238299	681869	Broken limbs at height. Upward facing.	Low	Lime
492	Woodbank	238272	681887	Broken limbs at height. Upward facing.	Low	Lime
493	Woodbank	238224	681931	Split in stem between 2-5 m AGL. Shallow dry crevice.	Low	Lime
495	Woodbank	238173	681971	Twin stem with deadwood at the split. Upward facing cracks.	Low	Lime



Tree tag	Area of Site	x	Y	Description of PRFs	Bat roost suitability	Species
496	Woodbank	238158	681985	Potential for features at height due to size and age.	Moderate	Lime
497	Woodbank	238153	681988	Broken limbs at height. Upward facing.	Low	Lime
498	Woodbank	238139	681994	Broken limbs at height. Upward facing.	Low	Lime
499	Woodbank	238127	682010	Broken limbs at height. Upward facing.	Low	Lime
507	Woodbank	238073	682001	Knothole on east facing trunk at 5 m.	Low	Ash
517	Woodbank	238016	681956	Split deadwood with cracks.	Moderate	Oak
553	Woodbank	238022	681917	Snapped off limb with cavity at 7 m AGL. Rotten section in upper branch over 15 m AGL.	Moderate	Oak
574	Woodbank	238006	681899	Large tree with potential for features not visible from ground level due to size and age.	Moderate	Oak
583	Woodbank	238022	681895	Large tree with potential for features not visible from ground level due to size and age.	Moderate	Oak
588	Woodbank	238012	681907	Split on south facing branch at 10 m AGL.	Moderate	Oak
643	Woodbank	238093	681901	Large tree with snapped off limb on eastern side. Could not see into snapped limb from ground level but there was potential for cavities.	Moderate	Larch
645	Woodbank	238096	681903	Split in east facing branch at 20 m AGL.	Moderate	Oak
652	Woodbank	238115	681866	Large oak. Clear feature on south facing branch at 20 m AGL. Potential for additional features due to size and age.	Moderate	Oak
666	Woodbank	238146	681853	Cavity in main trunk at 6 m AGL.	Moderate	Sycamore
672	Woodbank	238182	381838	Large tree. Numerous high quality features at various heights	High	Oak
673	Woodbank	238183	681825	Large tree. Lifted bark on broken limb. Potential for features at height due to size and age.	Moderate	Oak
694	Woodbank	238217	681728	Cavities at around 1 m AGL leading into stem.	Moderate	Ash
713	Woodbank	238047	681902	Large tree with potential for features not visible from ground level due to size and age.	Moderate	Oak
719	Woodbank	238062	681902	Large tree with numerous high quality features. Split limb and nearby clear hole on underside of west facing branch at 15 m AGL.	High	Oak
728	Woodbank	238062	681922	Woodpecker holes in north facing limb at over 15 m AGL.	High	Oak
823	Woodbank	238070	681853	Large tree. Multiple cracked limbs with downward facing openings.	Moderate	Oak



Tree tag	Area of Site	x	Y	Description of PRFs	Bat roost suitability	Species
826	Woodbank	238024	681838	Large tree with deadwood visible on snag limbs. Potential for other features at height due to size and age.	Moderate	Oak
836	Woodbank	238061	681848	Large tree. Multiple cracked limbs with downward facing openings.	Moderate	Ash
851	Woodbank	238014	681868	One notable feature on bend in branch at 20 m AGL.	Moderate	Oak
856	Woodbank	238021	681877	Knotholes and snag limbs visible at various heights. Potential for features not visible from ground level due to size and age.	Moderate	Oak
859	Woodbank	238035	681876	Old large oak with potential for features not visible from ground level due to size and age.	Moderate	Oak
862	Woodbank	238051	681872	Large old tree. Snapped limb with potential cavity at 15 m AGL.	Moderate	Oak
863	Woodbank	238050	681868	Old large oak with potential for features not visible from ground level due to size and age.	Moderate	Oak
864	Woodbank	238053	681878	Dead snag limbs at various heights. Potential for features not visible from ground level due to size and age.	Moderate	Oak
866	Woodbank	238062	681875	Old large oak with potential for features not visible from ground level due to size and age.	Moderate	Oak
868	Woodbank	238072	681874	Large oak with multiple high quality features at various heights.	High	Oak
882	Woodbank	238105	681851	Large tree with knotholes visible on main trunk at various heights.	Moderate	Lime
883	Woodbank	238110	681836	Old large oak. Deadwood visible in lower sections and potential for features not visible from ground level due to size and age.	Moderate	Oak
1254	Woodbank	238158	681649	Cavities visible within various broken limbs. Potential for features at height due to size and age.	High	Oak
1255	Woodbank	238166	681707	Broken limbs at height. Upward facing.	Low	Oak
1256	Woodbank	238162	681691	Multiple cracked/ twisted limbs with crevices and lifted bark.	High	Oak
1258	Woodbank	238170	681681	Large dead tree. Multiple knotholes and dead limbs with cracks.	High	Ash
1260	Woodbank	238197	681676	Large tree. Numerous high quality features at various heights	High	Ash
1270	Woodbank	238144	681691	Knotholes at height. Twisted limb with fissure.	High	Oak
1536	Woodbank	238153	681777	Thick, interweaving ivy that was thick enough to provide some potential roosting space for individual bats.	Low	Sycamore
1537	Woodbank	238155	681775	Thick, interweaving ivy that was thick enough to provide some potential roosting space for individual bats.	Low	Sycamore



Tree tag	Area of Site	x	Y	Description of PRFs	Bat roost suitability	Species
1539	Woodbank	238152	681776	Thick, interweaving ivy that was thick enough to provide some potential roosting space for individual bats.	Low	Sycamore
1546	Woodbank	238111	681779	Large tree with thick, interweaving ivy that was preventing full view. Split limbs visible at various heights.	Moderate	Oak
1555	Woodbank	238097	681804	Crevice in deadwood between 2-3 m AGL. Twisted/broken limbs with downward facing cracks.	Moderate	unknown
1558	Woodbank	238139	681792	Multiple downward facing cracks on broken limbs. Potential for features at height due to size and age.	High	Oak
1565	Woodbank	238170	681768	Large tree with potential for features not visible from ground level due to size and age.	Moderate	Lime
1574	Woodbank	238129	681800	Cracked limbs with downward facing openings.	Moderate	unknown
1579	Woodbank	238103	681815	Broken upward facing limbs.	Low	unknown
1599	Woodbank	238183	681804	Multiple broken limbs with cracks. Potential for features at height due to size and age.	Moderate	Oak
1600	Woodbank	238181	681811	Fissures all the way up the stem. Some shallow closer to ground level but not possible to assess ones higher up.	Moderate	Yew
-	Woodbank	238191	681734	Downward facing split in twisted branch.	Moderate	Goat willow
-	Woodbank	238154	681775	Thick, interweaving ivy that was thick enough to provide some potential roosting space for individual bats.	Low	Sycamore
-	Woodbank	238110	681812	Woodpecker hole visible.	Moderate	Birch
-	Woodbank	238102	681844	Old oak that has dead sections. Knothole and snag limb visible on north and south branches at 15 m AGL.	Moderate	Oak
-	Woodbank	238040	681840	Dead tree leaning towards fence line. Long crack with suitable crevice. Unsafe to climb.	Moderate	Ash



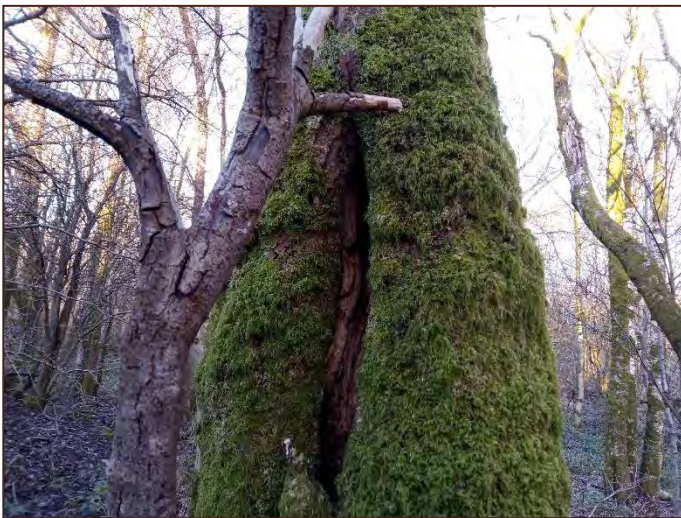
Appendix G

Photographs from the Ground Level Tree PRA





(a) Tear out with cavity at the base on Tree 390 in woodland south of the Ben Lomond Way roundabout.



(b) Cavity in elm tree within Drumkinnon Parking area.



(c) Cavity within birch tree within potential SUDs area in the Riverside area of the Site.





(d) Dense vegetation and tree cover within the Woodbank woodland.



(e) Area in the north-west of the Woodbank woodland with higher concentration of mature oaks.

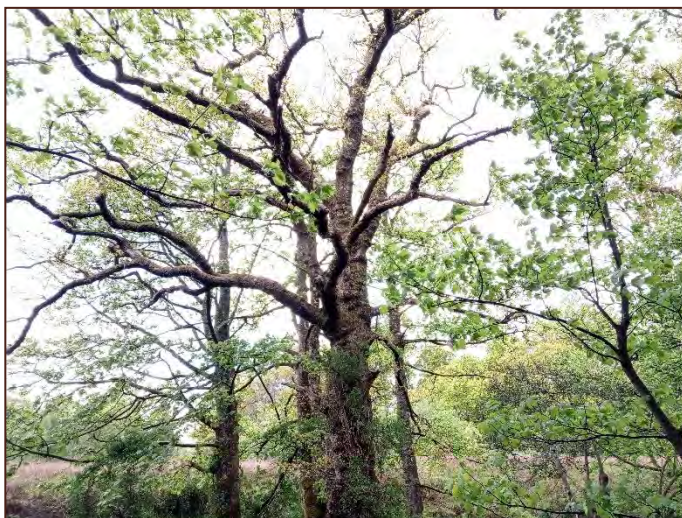


(f) Split on branch typical of that found on mature trees in the Woodbank woodland.





(g) Tree 1258 in the Woodbank Area of the Site with numerous high quality features (picture taken in summer 2021).



(h) Large mature oak tagged as 574, typical of trees found in north-west section of Woodbank Woodland (picture taken in summer 2021). Often these trees were too large to fully rule out features from ground level.



(i) High suitability woodpecker hole on Tree 728 in the Woodbank woodland.



Appendix H

Building Activity Survey Results



Abbreviation used	Full Latin name	Common name
P. pyg	<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle
P. pip	<i>Pipistrellus pipistrellus</i>	Common pipistrelle
Pip sp.	<i>Pipistrellus</i> sp.	Pipistrelle species
P. aur	<i>Plecotus auritus</i>	Brown long-eared bat
Myotis sp.	<i>Myotis</i> species	Myotis species
Chiro sp.	<i>Chiroptera</i> species	Bat species

Appendix H1: Building A activity survey results.

Dusk survey on 14 July 2021 – Surveyor 1

Target note	Time	Species	Activity
1	21:43	P. pyg	An individual bat was recorded commuting from north to south over the building.
2	21:53	P. pyg	Bat flew through window on the north elevation of the building.
3	21:17-23:20	P. pyg and P. pip	Bats were intermittently recorded foraging between surveyors 1, 2 and 4 throughout the survey. Both soprano and common pipistrelle bat species were recorded with a maximum of two bats foraging in the area at any one time.
4	22:21	P. pip	An individual bat was recorded commuting from east to west over the building.
5	22:50	Myotis sp.	Bat flew over the east elevation of the building. Not heard echolocating with Petterson but calls recorded on Anabat Swift.
6	23:01	Chiro sp.	An individual bat was recorded flying into the internal area of the building through a window on the west elevation. The bat was not echolocating and the Anabat Swift recorded no calls at this time.
7	23:09	P. pip	An individual bat was recorded commuting from north to south over the building.
8	23:22	P. pyg	Foraging bat flew through window on the east elevation of the building.

Dusk survey on 14 July 2021 – Surveyor 2

Target note	Time	Species	Activity
1	22:03	Chiro. sp.	Single bat seen commuting over woodland behind Surveyor 4.
2	22:18	P. pyg	Bat foraging between Surveyor 1 and 2.
3	22:22 – 22:32	P. pyg	Bat foraging between Surveyor 1,2 and 3.
4	22:33	Chiro. sp.	Single bat flew south to north over Surveyor 2. No calls were recorded.
5	22:37 – 23:09	P. pyg and P. pip	At least two bats foraging between Surveyor 1 and 2. Feeding buzzes heard.
6	23:11 – 23:25	P. pyg	Bat foraging between Surveyor 1 and 2.



Dusk survey on 14 July 2021 – Surveyor 3

Target note	Time	Species	Activity
1	22:03	Chiro. sp.	Bat seen foraging above the building. Too far away for any echolocation to be picked up by detector.
2	22:08	Chiro. sp.	Faint pass picked up on Pettersson detector but not the Anabat Swift. Was thought to be in woodland clearing to the east of the surveyor.
3	22:22	P. pyg	Bat flew out of woodland to the east of the surveyor and foraged between Surveyors 2 and 3 before flying into the building through the centre bay window on the second floor. No bat reported exiting by surveyors on opposite side of building.
4	22:24	P. pyg	Came over the building and foraged between Surveyors 2 and 3. Feeding buzzes heard on Pettersson.
5	22:29	Pip sp.	Faint passes heard on the Pettersson, probably originating from woodland to the south of the surveyor – calls not picked up by the Anabat Swift.
6	22:41	Chiro. sp.	Bat came along the western side of the building. Appeared not to be echolocating as no call detected by Pettersson or Anabat Swift.
7	22:51	Chiro. sp.	Faint passes heard on the Pettersson, probably originating from woodland to the south of the surveyor – calls not picked up by the Anabat Swift.
8	22:53	P. pip	Faint pass heard on the Pettersson and picked up by the Anabat Swift. No bats seen – call appeared to be from the woodland to the east.
9	22:56	Chiro. sp.	Faint passes heard on the Pettersson, probably originating from woodland to the south of the surveyor – calls not picked up by the Anabat Swift.
10	23:11	P. pyg	Two passes of a bat along the woodland edge between Surveyors 2 and 3.
11	23:17	Chiro. sp.	Faint call heard on the Pettersson but not picked up by the Anabat. Location uncertain – no bats seen on skyline.
12	23:25	P. pyg	Single pass of a bat across corner of building.

Dusk survey on 14 July 2021 – Surveyor 4

Target note	Time	Species	Activity
1	21:37	P.pyg	Very faint call. Heard not seen.
2	21:44	Pip sp.	Bat emerged from chimney brickwork but was not echolocating. Identified through flight pattern and early emergence.
3	22:00	Pip sp.	Bat emerged from stone wall. Identified through flight pattern and early emergence.
4	22:01	P. pyg	Bat re-entered same location in stone wall. Presumed to be the same bat.
5	22:17	P. pyg	Bat emerged again from roost in stone wall. Presumed to be same bat at TN3 and TN4.
6	22:20	P. pip	Heard not seen.
7	22:24	P. pip and P. pyg	Two bats recorded foraging.
8	22:26	P. pyg	Commuting pass from Surveyor 5 direction to Surveyor 3.
9	22:36	P. pyg	Commuting pass towards the centre of the building.
10	22:42	P. pip	Heard not seen.
11	22:43	Pip sp.	Bat flew into stone wall and appeared to re-enter a roost in a different location from TN3-TN5.
12	22:46	Myotis sp.	Heard not seen



Target note	Time	Species	Activity
13	22:51-23:06	Pip sp.	Foraging bat heard within trees.
14	23:07	P. aur	Quick pass picked up on the detector.
15	23:25	P. pyg	Quick pass detected from above surveyor.

Dusk survey on 14 July 2021 – Surveyor 5

Target note	Time	Species	Activity
1	21:43	Pip sp.	Bat seen out the corner of surveyors eye emerging from middle chimney high up on the brickwork. Also recorded by Surveyor 4.
2	22:00	Pip sp.	Emergence from stone wall crevice above open window on the north side of the building. Not echolocating but also recorded by Surveyor 4.
3	22:01	Pip sp.	Bat returned to roost in stone wall. Possible light sampling behaviour.
4	22:17	Pip sp.	Bat again emerged from stone wall and flew north.
5	22:25	P. pip	Commuting pass east to west over the building.
6	22:30	Pip sp.	Commuting pass east to west over the building. Heard on Pettersson but not picked up on Anabat.
7	22:36	Pip sp.	Commuting pass north to south over building. Heard on Pettersson but not picked up on Anabat.
7	22:42	Pip sp.	Probable return to roost on north stone wall in crevice.
8	22:43	P. pip	Foraging pass overhead.
9	22:49	Nyctalus sp.	'Chip-chop' call heard on Pettersson. Surveyor 1 also reported flight of bigger bat. Possible noctule pass.
10	22:52	P. pyg	Commuting pass. Heard not seen.
11	22:56	Pip sp.	Bat seen feeding above trees to the west of the building.
12	23:05	P. pip	Heard not seen.
13	23:25	P. pyg	Heard not seen.

Dawn survey on 30 July 2021 – Surveyor 1

Target note	Time	Species	Activity
1	03:12	P. pyg	An individual bat foraging from the start of the survey between Surveyor 1 and 2.
2	03:21	P. pyg	An individual bat commuting along the treeline to the east of the building. Very loud social calling.
3	03:21 – 04:20	P. pyg and P. pip	Intermittent foraging by up to Three bats throughout the first hour of the survey. Common pipistrelle occasionally recorded by the static detector.
4	03:47	Chiro sp.	An individual bat was observed flying in front of the building not echolocating.
5	04:22	P. pyg	Three bats were observed to commute from the north of the site towards Surveyor 2.
6	04:33	Chiro sp.	An individual bat was observed circling the building not echolocating.
7	05:12	Pip sp.	Two bats were observed investigating a gap in stonework above the open window on the north elevation of the building.
8	05:17	Pip sp.	An individual bat entered a roost location above an open window on the north elevation just before sunrise.



Dawn survey on 30 July 2021 – Surveyor 2

Target note	Time	Species	Activity
1	03:19-03:28	P. pyg	Foraging passes from bat in the general area around trees.
2	03:28-03:44	P. pyg	Foraging passes from bat in the general area around trees.
3	03:45	P. pip	Commuting pass towards Surveyor 3.
4	03:47-04:10	P. pyg	Foraging passes from bat feeding around trees.
5	04:10	P. pip and P. pyg	Two bats flying around building at the southern wall and flying over the building.
6	04:13	P. pyg	Flew over south wall towards Surveyor 3.
7	04:22	P. pyg	Two bats observed flying north to south and south to north.
8	04:23-04:28	P. pyg	Foraging around trees at the south of the building.
9	04:39	P. pip	Commuting pass north to south.
10	04:42	P. pyg	Passes from Surveyor 1 to Surveyor 2 and back again.
11	04:46	P. pyg	Commuting pass north to south.
12	04:52	P. pyg	Passes from Surveyor 1 to Surveyor 2 and back again.
13	05:14	P. pyg	Bat observed circling within internal area of the building. Picked up by Surveyor 5.

Dawn survey on 30 July 2021 – Surveyor 3

Target note	Time	Species	Activity
1	03:12	P. pyg	Bat heard not seen, foraging behind surveyor position.
2	03:17	P. pyg	Bat heard not seen, foraging behind surveyor position.
3	03:21-03:32	P. pyg	Bat foraging between Surveyor 2 and 3.
4	03:35	P. pyg	Bat calls recorded on Anabat, but not seen or heard during survey.
5	03:37-03:39	P. pyg	Bat foraging between Surveyors 4, 3 and 2.
6	03:58-04:21	P. pyg and Pip sp.	Bat calls and feeding buzzes recorded on Anabat, not heard or seen during survey.
7	04:23	P. pip	Bat commuting from Surveyor 2 and foraging between Surveyors 3 and 4.
8	04:26-04:36	P. pip and P. pyg	Occasional calls and feeding buzzes recorded on Anabat, but not seen or heard during survey.
9	04:37-04:42	P. pip	Bat continuously circling exterior of the building.



Dawn survey on 30 July 2021 – Surveyor 4

Target note	Time	Species	Activity
1	03:11	P. pyg	First bat recorded but not seen. Two passes recorded on Anabat with social calls.
2	03:13	P. pyg	Heard not seen. Social calls recorded
3	03:13 to 03:46	P. pyg	Multiple passes, with often two bats seen against the sky. Social calls recorded and chasing behaviour.
4	03:46	<i>Myotis</i> sp.	Commuting pass.
5	03:47-03:57	P. pyg	Foraging activity around building and trees, with often two bats seen against the sky. Social calls recorded and chasing behaviour.
6	03:58	<i>Myotis</i> sp.	Commuting pass.
7	03:58-04:20	P. pyg and <i>Myotis</i> sp.	Multiple foraging passes by the pipistrelle, visible against the sky.
8	04:20	P. pip	Commuting pass.
9	04:20-04:43	P. pip and P. pyg	Foraging activity and social calls recorded.

Dawn survey on 30 July 2021 – Surveyor 5

Target note	Time	Species	Activity
1	03:24	P. pyg	Social calls of pipistrelle heard. No main call. Could not locate bat due to level of darkness.
2	03:26-03:28	P. pyg	Faint calls heard of nearby foraging bat.
3	03:28-03:36	P. pyg	Intermittent foraging and social calls from bat foraging around building.
4	03:39	P. aur	Bat seen against sky and building. Later confirmed via Anabat calls as BLE.
5	03:40-03:44	Pip sp.	Foraging calls from bat feeding in general area.
6	03:45-03:50	P. pyg	Bat not echolocating on Pettersson but seen flying around vegetation within building. Later confirmed via Anabat calls as soprano pipistrelle.
7	03:58	P. aur	Pass heard on Pettersson. Confirmed as BLE from Anabat calls.
8	04:05	<i>Myotis</i> sp.	Bat flew in and around surveyor. Confirmed as <i>Myotis</i> from Anabat calls.
9	04:10	P. pip and P. pyg	Two bats flying around building and over surveyor 1.
10	04:13	P. pyg	Commuting pass east to west.
11	04:19	P. pyg	Commuting pass north to south.
12	04:24	P. pyg	Commuting pass south to north.
13	04:27-04:31	P. pyg	Multiple passes from bats commuting in the wider area and foraging over building.
14	04:37-04:38	P. pyg	Bat passes above building to the west and flying north to south.
15	04:41	P. pip	Two bats seen flying back and forth over building north to south and south to north.
16	05:15-05:18	Pip sp.	Two bats swarming around building at the eastern end. One bat eventually entered on the external northern wall confirmed by surveyor 1. Second bat entered on internal eastern wall within stone above window.



Dusk survey on 15 September 2021 – Surveyor 1

Target note	Time	Species	Activity
1	19:27	P. pyg	An individual bat was recorded flying along the eastern elevation of the building. Potential emergence from nearby due to timing of the pass.
2	19:37	P. pyg	Heard not seen. Faint call on Pettersson detector but recorded clearly on Anabat.
3	19:44	P. pyg	Heard not seen. Faint call on Pettersson detector but recorded clearly on Anabat.
4	19:47-20:50	P. pip and P. pyg	Up to three bats were recorded flying between surveyors 2, 1 and 4. Foraging activity and social calls continued intermittently throughout the survey.

Dusk survey on 15 September 2021 – Surveyor 2

Target note	Time	Species	Activity
1	19:33	P. pyg	Single commuting bat flew north to south over building before flying towards Surveyor 3.
2	19:45	P. pyg	Single commuting bat flew west to east over building.
3	19:46	P. pyg	Single commuting bat heard not seen.
4	19:47-19:53	P. pyg	Bat foraging over Surveyor 2 and then between Surveyors 1 and 2.
5	20:01-20:10	P. pyg	Two bats foraging between Surveyors 1 and 2, occasionally looping round to Surveyor 3 and back.
6	20:19	P. pip	Brief pass heard not seen in fading light.
7	20:28-20:41	P. pyg	Two bats foraging between Surveyor 1 and 2, occasionally looping round to Surveyor 3 and back.

Dusk survey on 15 September 2021 – Surveyor 3

Target note	Time	Species	Activity
1	19:45	P. pyg	Single commuting bat flew south over the building and looped back north.
2	19:47	P. pyg	Single bat looped east to west around the building. Very quiet on Pettersson.
3	19:57	P. pyg	Foraging bat flying from Surveyor 2 to Surveyor 3 and back again.
4	19:58	P. pyg	Bat foraging over Surveyor 3 before flying to Surveyor 2.
5	20:02	P. pyg	Bat foraging over Surveyor 3 before flying to Surveyor 2.
6	20:05	P. pyg	Foraging bat flew from Surveyor 2 to 3.
7	20:19	P. pip	Faint pass heard not seen.
8	20:29	P. pyg	Faint pass heard not seen.
9	20:37-20:40	P. pyg	Social calls heard from two bats.



Dusk survey on 15 September 2021 – Surveyor 4

Target note	Time	Species	Activity
1	19:33	P. pyg	An individual bat was recorded flying over the surveyor.
2	19:43	P. pyg	An individual bat was recorded flying high over the building from north to south.
3	19:45	P. pyg	An individual bat was recorded flying high over the building from west to east.
4	19:48	P. pyg	An individual bat was recorded flying high over the building from east to west.
5	19:57	P. pip	An individual bat was recorded flying high over the building from north to south.
6	20:05	P. pip and P. pyg	An individual bat was recorded flying around the building between Surveyor 4 and 1. Both common and soprano pipistrelle calls were recorded at during this time period. Social calls were audible.

Dusk survey on 15 September 2021 – Surveyor 5

Target note	Time	Species	Activity
1	19:33	P. pyg	Bat flew into open column of building, circled and then flew south over Surveyor 4. Probable emergence from nearby due to time recorded.
2	19:42	P. pyg	Commuting pass north-west to south-east towards Surveyor 2.
3	19:45	P. pyg	Foraging passes picked up from bat over Surveyor 2.
4	19:52	P. pyg	Faint foraging passes.
5	19:58	P. pyg	Faint passes from bat flying up and down the south side of the building.
6	20:01	P. pyg	Passes from bat foraging around the building.
7	20:03-20:12	P. pyg	Two bats at times, foraging around building and chasing behaviour.
8	20:19	P. pip	Faint pass.
9	20:25	P. pyg	Faint pass.
10	20:26-20:41	P. pyg	Two bats chasing each other around the building with loud social calls. Likely territorial behaviour at this time of year in preparation for breeding.
11	20:39	<i>Myotis</i> sp.	Single pass detected on Anabat detector.

Appendix H2: Building B activity survey results.**Dusk survey on 13 July 2021 – Surveyor 6**

Target note	Time	Species	Activity
1	22:06	Pip sp.	An individual bat flew along the eastern elevation of the building and then across to the north.
2	22:20	P. pyg	An individual bat was observed to commute from north to south.
3	22:40	P. aur	An individual bat flew along the eastern elevation of the building.
4	22:45	<i>Myotis</i> sp.	An individual bat flew along the eastern elevation of the building.
5	23:04	<i>Myotis</i> sp.	An individual bat flew along the eastern elevation of the building.



Dusk survey on 13 July 2021 – Surveyor 7

Target note	Time	Species	Activity
1	21:46	P. pyg	An individual bat commuted overhead from west to east.
2	21:58	P. pyg	An individual bat commuted overhead from west to east.
3	22:11	P. pyg	An individual bat commuted overhead from west to east.

Dusk survey on 13 July 2021 – Surveyor 8

Target note	Time	Species	Activity
1	22:28	P. pyg	An individual bat emerged from a roost in a crevice on the wall of the northern elevation.
2	22:56	<i>Myotis</i> sp.	An individual bat flew along the northern elevation of the building.
3	23:17	<i>Myotis</i> sp.	An individual bat flew along the northern elevation of the building.

Dusk survey on 13 July 2021 – Surveyor 9

Target note	Time	Species	Activity
1	22:14	P. pip	An individual bat was observed commuting from the south to north-east.
2	22:18	P. pyg	An individual bat was observed commuting from the east to north-west
3	22:24	P. pyg	An individual bat was observed foraging along the north, east and south elevations of the building.

Dusk survey on 13 July 2021 – Surveyor 10

Target note	Time	Species	Activity
-	-	-	No additional activity recorded other than passes observed by other surveyor positions.

Dawn survey on 03 August 2021 – Surveyor 6

Target note	Time	Species	Activity
1	04:35 – 04:38	P. pyg	An individual bat was observed foraging along the northern and eastern elevations of the building.
2	04:54 – 05:02	P. pip	Multiple passes by an individual bat along the eastern elevation.

Dawn survey on 03 August 2021 – Surveyor 7

Target note	Time	Species	Activity
-	-	-	No additional activity recorded other than passes observed by other surveyor positions.



Dawn survey on 03 August 2021 – Surveyor 8

Target note	Time	Species	Activity
1	04:05	<i>Myotis</i> sp.	An individual bat flew along the northern elevation of the building.
2	04:18	<i>Myotis</i> sp.	An individual bat flew along the northern elevation of the building.
3	04:23	<i>P. aur</i>	An individual bat flew along the northern elevation of the building.
4	04:39	<i>Myotis</i> sp.	An individual bat flew along the northern elevation of the building.
5	04:46	<i>P. pyg</i>	An individual bat flew along the northern elevation of the building.
6	05:15	<i>Pip</i> sp.	An individual bat flew along the northern elevation of the building.
7	05:18	<i>P. pyg</i>	Four bats were observed commuting from east to west along the northern elevation of the building.

Dawn survey on 03 August 2021 – Surveyor 9

Target note	Time	Species	Activity
1	04:07	<i>P. pyg</i>	An individual bat flew along the eastern elevation of the building.

Dawn survey on 03 August 2021 – Surveyor 10

Target note	Time	Species	Activity
-	-	-	No additional activity recorded other than passes observed by other surveyor positions.

Dusk survey on 27 August 2021 – Surveyor 6

Target note	Time	Species	Activity
1	20:44	<i>P. pyg</i>	Two bats were observed to commute from the northern elevation to the eastern elevation of the building.
2	20:46 – 22:00	<i>P. pip</i>	Occasional passes by 1–2 bats every ten minutes. Foraging activity as they passed.
3	20:46 – 22:00	<i>P. pyg</i>	Occasional passes by 1–2 bats every ten minutes. Foraging activity as they passed.
4	21:22	<i>P. aur</i>	An individual bat flew along the eastern elevation of the building.
5	21:54	<i>P. aur</i>	An individual bat flew along the eastern elevation of the building.

Dusk survey on 27 August 2021 – Surveyor 7

Target note	Time	Species	Activity
-	-	-	No additional activity recorded other than passes observed by other surveyor positions.

Dusk survey on 27 August 2021 – Surveyor 8

Target note	Time	Species	Activity
1	20:56	<i>Myotis</i> sp.	An individual bat flew along the northern elevation of the building.



Dusk survey on 27 August 2021 – Surveyor 9

Target note	Time	Species	Activity
1	20:41	<i>P. pyg</i>	An individual bat flew along the southern elevation of the building.
2	20:46	<i>P. pip</i>	An individual bat flew along the southern elevation of the building.
3	21:05	<i>Myotis</i> sp.	An individual bat was observed commuting passed the eastern elevation then the southern elevation of the building.

Dusk survey on 27 August 2021 – Surveyor 10

Target note	Time	Species	Activity
-	-	-	No additional activity recorded other than passes observed by other surveyor positions.

Appendix H3: Building C activity survey results.**Dusk survey on 01 July 2021 – Surveyor 11**

Target note	Time	Species	Activity
1	21:50	n/a	Tawny owl flew out of building when surveyors approached. Assumed to be a perch as no suitable nesting areas internally.
2	21:50	<i>P. pyg</i>	Foraging bat around Surveyor 2.
3	22:05	<i>P. pyg</i>	Foraging passes from the tree canopy.
4	22:08-22:10	<i>P. pyg</i>	Foraging passes around the front of the building in the tree canopy.
5	22:15	<i>P. pyg</i>	Foraging passes heard from within woodland.
6	22:23-22:33	<i>P. pyg</i>	Single bat observed foraging along woodland edge into open grassland behind surveyor.
7	22:33-22:46	<i>P. pyg</i>	Intermittent foraging by two bats along woodland edge and into open grassland behind surveyor. Social calls and chasing behaviour observed.
7	22:50	n/a	Barn owl flying along woodland edge and over grassland.
8	22:50	<i>Myotis</i> sp.	Bat seen flying across in front of building. Identified via Anabat calls.
9	23:03	<i>Myotis</i> sp.	Call picked up on Anabat. Assumed to be Natterer's due to habitat setting and slope pattern in analysis.
10	23:14	<i>Myotis</i> sp.	Call picked up on Anabat. Assumed to be Natterer's due to habitat setting and slope pattern in analysis.
11	23:17	<i>P. aur</i>	Potential BLE call picked up on Anabat. Short segment of call with few pulses.
12	23:23	<i>P. aur</i>	Potential BLE call picked up on Anabat. Short segment of call with few pulses.



Dusk survey on 01 July 2021 – Surveyor 12

Target note	Time	Species	Activity
1	21:50-22:20	P. pyg	An individual bat was recorded foraging from the start of the survey around the west side of the building. It left intermittently but returned to forage several times until 22:20.
2	22:25	P. pyg	Faint call on Pettersson, nothing recorded on Anabat.
3	22:38	P. pyg	An individual bat was recorded commuting over the treetops from the meadow to the east across the building in a westerly direction.
4	23:29	P. pyg	Heard not seen. Commuting pass.
5	23:35	<i>Myotis</i> sp.	Recording of one pass on Anabat. Nothing noted during survey using Pettersson.



Appendix I

Hibernation Survey Temperature Logger Data



Appendix I1: Table of temperature and humidity recordings.

Recording date and time	Temperature (°C)	Humidity (%rh)
16/12/2021 21:00	8.5	95.5
17/12/2021 03:00	8.5	96.5
17/12/2021 09:00	8.5	97.5
17/12/2021 15:00	8.5	98.5
17/12/2021 21:00	8.0	97.5
18/12/2021 03:00	7.5	97.5
18/12/2021 09:00	7.0	97.0
18/12/2021 15:00	6.5	98.0
18/12/2021 21:00	5.5	97.5
19/12/2021 03:00	4.5	96.5
19/12/2021 09:00	4.0	97.0
19/12/2021 15:00	3.5	98.5
19/12/2021 21:00	3.5	100.5
20/12/2021 03:00	3.0	101.5
20/12/2021 09:00	3.0	102.0
20/12/2021 15:00	3.5	102.5
20/12/2021 21:00	3.5	102.5
21/12/2021 03:00	3.5	102.5
21/12/2021 09:00	3.5	103.0
21/12/2021 15:00	3.0	102.5
21/12/2021 21:00	3.0	102.5
22/12/2021 03:00	2.5	102.5
22/12/2021 09:00	2.5	103.0
22/12/2021 15:00	2.5	103.0
22/12/2021 21:00	2.0	103.0
23/12/2021 03:00	2.0	103.5
23/12/2021 09:00	2.0	104.0
23/12/2021 15:00	2.0	104.5
23/12/2021 21:00	2.5	104.5
24/12/2021 03:00	2.5	104.5
24/12/2021 09:00	3.0	104.5
24/12/2021 15:00	3.0	104.5
24/12/2021 21:00	3.0	104.5
25/12/2021 03:00	3.0	103.0
25/12/2021 09:00	2.5	103.5
25/12/2021 15:00	2.0	103.5
25/12/2021 21:00	2.0	104.0
26/12/2021 03:00	1.5	104.0
26/12/2021 09:00	1.5	104.5
26/12/2021 15:00	1.5	105.0
26/12/2021 21:00	1.5	105.0



Recording date and time	Temperature (°C)	Humidity (%rh)
27/12/2021 03:00	1.5	105.5
27/12/2021 09:00	2.0	105.5
27/12/2021 15:00	2.0	105.5
27/12/2021 21:00	2.5	105.5
28/12/2021 03:00	3.0	105.5
28/12/2021 09:00	3.0	105.5
28/12/2021 15:00	3.5	105.5
28/12/2021 21:00	4.0	105.5
29/12/2021 03:00	4.0	105.0
29/12/2021 09:00	3.5	105.5
29/12/2021 15:00	3.5	105.5
29/12/2021 21:00	4.5	106.0
30/12/2021 03:00	5.5	106.0
30/12/2021 09:00	6.5	106.0
30/12/2021 15:00	7.5	105.5
30/12/2021 21:00	8.0	105.5
31/12/2021 03:00	8.5	105.5
31/12/2021 09:00	8.5	105.5
31/12/2021 15:00	8.5	105.5
31/12/2021 21:00	9.0	106.0
01/01/2022 03:00	9.5	105.5
01/01/2022 09:00	9.5	106.0
01/01/2022 15:00	10.0	105.5
01/01/2022 21:00	10.0	105.5
02/01/2022 03:00	9.0	103.5
02/01/2022 09:00	8.5	105.0
02/01/2022 15:00	8.5	105.5
02/01/2022 21:00	8.0	105.5
03/01/2022 03:00	8.0	105.5
03/01/2022 09:00	7.5	105.5
03/01/2022 15:00	7.5	105.5
03/01/2022 21:00	6.0	102.0
04/01/2022 03:00	4.5	102.0
04/01/2022 09:00	3.5	102.0
04/01/2022 15:00	3.0	103.5
04/01/2022 21:00	2.5	104.0
05/01/2022 03:00	2.0	105.5
05/01/2022 09:00	2.0	106.0
05/01/2022 15:00	1.5	106.0
05/01/2022 21:00	1.5	106.0
06/01/2022 03:00	1.0	106.0
06/01/2022 09:00	1.0	106.5
06/01/2022 15:00	1.5	107.0



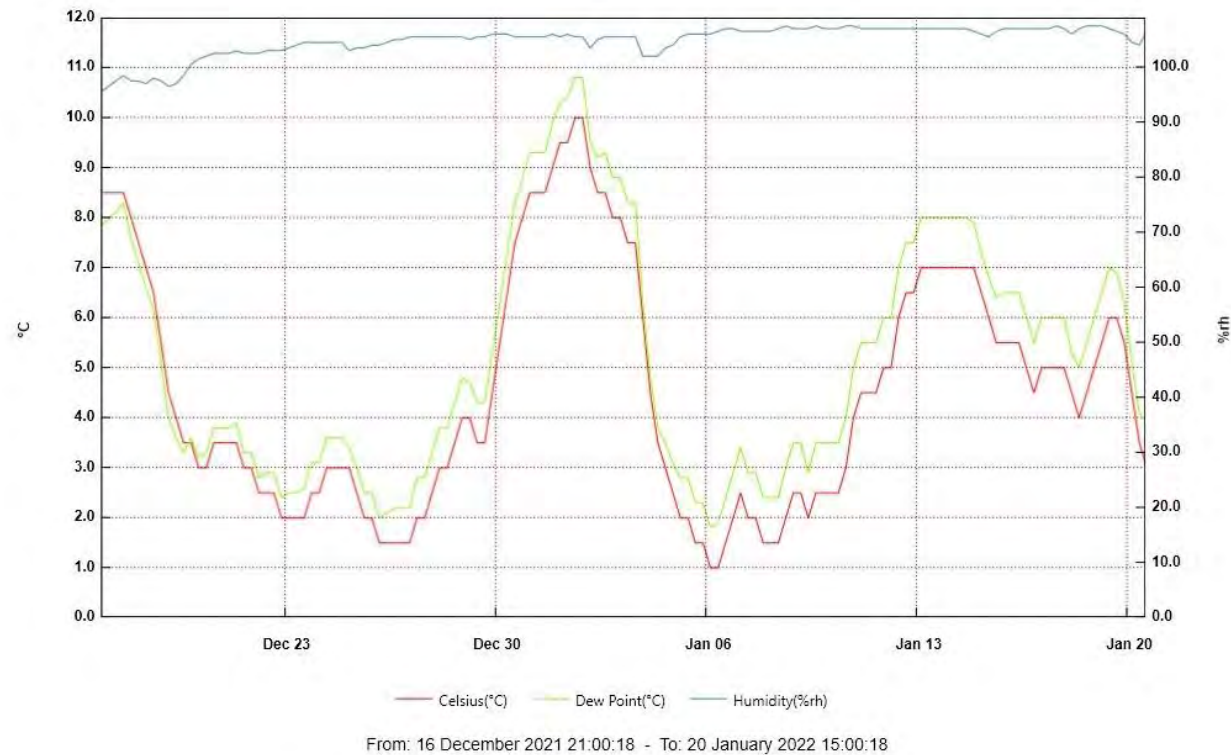
Recording date and time	Temperature (°C)	Humidity (%rh)
06/01/2022 21:00	2.0	107.0
07/01/2022 03:00	2.5	106.5
07/01/2022 09:00	2.0	106.5
07/01/2022 15:00	2.0	106.5
07/01/2022 21:00	1.5	106.5
08/01/2022 03:00	1.5	106.5
08/01/2022 09:00	1.5	107.0
08/01/2022 15:00	2.0	107.5
08/01/2022 21:00	2.5	107.0
09/01/2022 03:00	2.5	107.0
09/01/2022 09:00	2.0	107.0
09/01/2022 15:00	2.5	107.5
09/01/2022 21:00	2.5	107.0
10/01/2022 03:00	2.5	107.0
10/01/2022 09:00	2.5	107.0
10/01/2022 15:00	3.0	107.5
10/01/2022 21:00	4.0	107.5
11/01/2022 03:00	4.5	107.0
11/01/2022 09:00	4.5	107.0
11/01/2022 15:00	4.5	107.0
11/01/2022 21:00	5.0	107.0
12/01/2022 03:00	5.0	107.0
12/01/2022 09:00	6.0	107.0
12/01/2022 15:00	6.5	107.0
12/01/2022 21:00	6.5	107.0
13/01/2022 03:00	7.0	107.0
13/01/2022 09:00	7.0	107.0
13/01/2022 15:00	7.0	107.0
13/01/2022 21:00	7.0	107.0
14/01/2022 03:00	7.0	107.0
14/01/2022 09:00	7.0	107.0
14/01/2022 15:00	7.0	107.0
14/01/2022 21:00	7.0	106.5
15/01/2022 03:00	6.5	106.0
15/01/2022 09:00	6.0	105.5
15/01/2022 15:00	5.5	106.5
15/01/2022 21:00	5.5	107.0
16/01/2022 03:00	5.5	107.0
16/01/2022 09:00	5.5	107.0
16/01/2022 15:00	5.0	107.0
16/01/2022 21:00	4.5	107.0
17/01/2022 03:00	5.0	107.0
17/01/2022 09:00	5.0	107.0



Recording date and time	Temperature (°C)	Humidity (%rh)
17/01/2022 15:00	5.0	107.5
17/01/2022 21:00	5.0	107.0
18/01/2022 03:00	4.5	106.0
18/01/2022 09:00	4.0	107.0
18/01/2022 15:00	4.5	107.5
18/01/2022 21:00	5.0	107.5
19/01/2022 03:00	5.5	107.5
19/01/2022 09:00	6.0	107.0
19/01/2022 15:00	6.0	106.5
19/01/2022 21:00	5.5	106.0
20/01/2022 03:00	4.5	104.5
20/01/2022 09:00	3.5	104.0
20/01/2022 15:00	3.0	106.5



Appendix I2: Graph of temperature and humidity recordings.



Appendix J

Manual Transect Results



Abbreviation used	Full Latin name	Common name
P. pyg	<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle
P. pip	<i>Pipistrellus pipistrellus</i>	Common pipistrelle
Pip sp.	<i>Pipistrellus</i> sp.	Pipistrelle species
P. aur	<i>Plecotus auritus</i>	Brown long-eared bat
<i>Myotis</i> sp.	<i>Myotis</i> species	Myotis species
Chiro sp.	<i>Chiroptera</i> species	Bat species

Appendix J1: 25 May dusk transect.

Stopping point	Time	Location	Species	Activity
P1	21:42-21:47		P. pyg	Two bats foraging above trees around point count. Not echolocating loudly but visible.
P1-P2	21:48 21:51	NS 38958 82063 NS 38936 82115	P. pip and P. pyg P. pip and P. pyg	Two bats foraging under tree canopy. Three to five bats foraging along woodland path.
P2	21:54-21:59		P. pip and P. pyg	Three to four bats foraging along avenue close to ground level.
P2-P3	21:59 22:01-22:05	NS 38891 82230 NS 38843 82283	P. pyg P. pyg	Three to four bats foraging low under trees along path. Foraging bat along path continually flying up and down.
P3	22:07-22:12		P. pyg	Foraging bat around clearing at point count and at shoreline. Continual passes.
P3-P4	22:13 22:15 22:18	NS 38717 82380 NS 38669 82357 NS 38555 82399	P. pyg P. pyg P. pyg	Foraging bat around tree canopy. Foraging bat around street light and car park. Foraging bat feeding along woodland edge.
P4	22:19-22:24		P. pyg	Continual passes by foraging bat around woodland edge and out to shoreline around point count.
P4-P5	22:25	NS 38559 82364	P. pyg	Foraging bat flying up and down path under tree canopy.
P5	22:27-22:32		P. pyg Myotis sp.	Foraging bat flying up and down path. Two passes picked up on Anabat, not seen.
P5-P6	22:36-22:37 22:36	NS 38652 82212	P. pyg Myotis sp.	Brief foraging passes in tree canopy. Pass picked up on Anabat, not seen.
P6	22:39-22:44		P. pip and P. pyg	Foraging bat visible in clearing around trees. Second bat joined at 22:43.
P6-P7	22:48	NS 38499 82004	P. pip	Faint foraging passes from above. Not seen.
P7	22:50-22:55		No bats	-
P7-P8	22:57 22:59	NS 38327 81926 NS 38256 81967	Pip sp. P. pyg	Faint pass. Not picked up on Anabat. Foraging passes in trees overhanging road.
P8 (missed initially, done after P9)	23:13-23:18		No bats	-
P8-P9	23:05	NS 38238 81931	Pip sp.	Faint passes heard on Pettersson along woodland edge at road. Not picked up on Anabat.



Stopping point	Time	Location	Species	Activity
P9	23:06-23:11		P. pyg P. pyg	Single commuting pass. Heard not seen. Single commuting pass along road.
P9-P10	23:19 23:22	NS 38350 81943 NS 38488 81946	Pip sp. Pip sp.	Faint commuting pass. Not seen. Faint commuting pass. Not seen.
P10	23:27-22:32		P. pyg	Foraging bat heard in trees above continuously.
P10-P11			No bats	-
P11	23:36-23:41		Pip sp.	Brief pass heard above point count on Pettersson. Not recorded on Anabat.
P11-P12			No bats	-
P12	23:51-23:56		Pip sp.	Brief commuting pass heard on Pettersson. Not recorded on Anabat.
P12-P13	23:57	NS 38741 82155	Myotis sp.	Commuting pass along road at woodland edge.
P13	00:05-00:10		No bats	-
P13-end			No bats	-



Appendix J2: 14 June dusk transect.

Stopping point	Time	Location	Species	Activity
End-P13	22:16	NS 38901 82048	P. pyg	Foraging pass along the woodland edge.
P13	22:17-22:22		P. pyg	Three bats observed foraging under the tree canopy along the road.
P13-P12	22:24 22:26 22:29-22:34	NS 38830 82124 NS 38780 82227 NS 38715 82276	P. pip and P. pyg P. pyg P. pyg	Two bats foraging along the road. Faint pass heard not seen. Three bats foraging along woodland path at various locations low to the ground.
P12	22:34-22:39		P. pyg	Up to four bats foraging around woodland, both at head height in upper tree canopy.
P12-P11	22:40 22:43 22:46	NS 38695 82114 NS 38660 82092 NS 38609 81984	P. pyg P. pyg Pip sp.	Two bats foraging in tree canopy. Two bats foraging in tree canopy. Foraging in tree canopy.
P11	22:50-22:55		No bats	-
P11-P10			No bats	-
P10	23:01-23:06		P. pyg	Foraging along tree line at point count.
P10-P9	23:08 23:09 23:20	NS 38527 81988 NS 38474 81973 NS 38297 81881	P. pyg <i>Myotis</i> sp. Pip sp.	Foraging pass. Pass recorded on Anabat. Foraging pass.
P9	23:21-23:26		P. pyg	Foraging passes in tree line around point count and along road.
P9-P8	23:32	NS 38255 81971	P. pyg	Foraging pass heard but not seen.
P8	23:35-23:40		Pip sp.	Faint foraging activity not recorded on Anabat.
P8-P7			No bats	-
P7	23:44-23:49		P. pyg and Pip sp.	Foraging passes heard in adjacent woodland.
P7-P6			No bats	-
P6	23:54-23:59		P. pyg	Two bats continually foraging around point, both lower to the ground and in tree canopy.
P6-P5	00:01 00:03	NS 38650 92206 NS 38693 82287	P. pyg P. pyg	Foraging passes heard not seen. Foraging passes heard not seen.
P5	00:06-00:11		P.pyg <i>Myotis</i> sp.	Continuous foraging from two bats. Pass recorded on Anabat.
P5-P4	00:12 00:13	NS 38606 82328 NS 38562 82365	P. pyg P. pyg	Foraging activity along path adjacent to shore. Continuous foraging from three bats along path.
P4	00:15-00:20		P. pip and P.pyg	Continuous foraging by up to four bats around point count.
P4-P3	00:22	NS 38664 82367	P. pyg	Foraging pass along the road.
P3	00:24-00:29		P. pyg	Two bats foraging in trees around point count.
P3-P2	00:30 00:30-00:34	NS 38775 82363 Various	P. pyg P. pyg	Bat foraging along woodland path low down. Up to three bats flying low along woodland path and foraging.
P2	00:35-00:40		P. pyg	Two foraging bats along path low down under tree canopy. Same behaviour that was recorded in May transect.



Stopping point	Time	Location	Species	Activity
P2-P1	00:42	NS 38937 82119	P. pyg	Foraging passes along path under tree canopy. Same as May transect.
P1	00:45-00:50		P. pip	Foraging passes above trees at point count.



Appendix J3: 15 July dusk transect.

Stopping point	Time	Location	Species	Activity
P1	22:09-22:14		Pip sp.	Faint pass heard nearby. Not recorded on Anabat.
P1-P2	22:14 22:17 22:19	NS 38985 82037 NS 38946 82109 NS 38913 82152	P. pip P. pyg P. pyg	Bat feeding below tree canopy along path. Bat feeding below tree canopy along path. Four bats foraging along path, both below and above tree canopy.
P2	22:20-22:25		P. pyg	Three bats continuously foraging under and above tree canopy along path.
P2-P3	22:25 22:27 22:28 22:30	NS 38884 82221 NS 38843 82281 NS 38839 82304 NS 38789 82344	P. pyg P. pyg P. pyg P. pyg	Two bats feeding close to ground along path. Bat feeding along path under tree canopy. Bat feeding along path under tree canopy. Bat feeding along path under tree canopy.
P3	22:31-22:36		P. pyg	Two bats foraging at point count for around 3 mins.
P3-P4	22:37	NS 38707 82372	P. pyg	Commuting pass along woodland edge.
P4	22:40-22:45		P. pyg	Two bats continuously foraging over water and along woodland edge.
P4-P5	22:46	NS 38592 82333	P. pyg	Brief pass heard not seen.
P5	22:47-22:52		P. pyg <i>Myotis</i> sp.	Foraging passes around point count. Pass picked up on Anabat.
P5-P6	22:52 22:56 22:57	NS 38673 82343 NS 38671 82236 NS 38649 82211	Pip sp. Pip sp. Pip sp.	Faint pass heard not seen. Commuting pass through woodland. Foraging passes above tree canopy. Not picked up on Anabat.
P6	22:58-23:03		Pip sp.	Faint foraging passes above point count.
P6-P7			No bats	-
P7	23:08-23:13		P. pyg	Two single passes during point count.
P7-P8	23:15	NS 38334 81934	P. pyg	Faint commuting pass heard not seen.
P8	23:17-23:22		P. pyg	Single commuting pass overhead.
P8-P9	23:27	NS 38282 81896	P. aur	Pass recorded on Anabat.
P9	23:28-23:33		P. pyg P. pip	Single commuting pass. Single commuting pass.
P9-P10	23:38 23:41 23:44 23:46	NS 38233 81992 NS 38400 81952 NS 38468 81977 NS 38501 81969	P. pip P. pip P. pyg P. pyg	Brief commuting pass heard not seen. Foraging passes in woodland adjacent to road. Brief commuting pass along tree line. Brief commuting pass heard not seen.
P10	23:48-23:53		Pip sp.	Brief commuting pass heard at point count.
P10-P11			No bats.	-
P11	23:56-00:01		No bats.	-
P11-P12	00:03 00:05 00:06	NS 38599 81889 NS 38582 81930 NS 38583 81989	P. pyg P. pyg P. pyg	Faint commuting pass in tree canopy. Foraging pass low to ground along path. Foraging pass low to ground along path.
P12	00:09-00:14		P. pyg	Faint foraging passes heard around point count.
P12-P13	00:15	NS 38736 82173	P. pyg	Foraging pass low to ground along path.



Stopping point	Time	Location	Species	Activity
	00:16	NS 38739 82223	P. pyg	Foraging pass low to ground along path.
	00:22	NS 38889 82000	Pip sp.	Commuting pass along woodland edge.
P13	00:23-00:28		P. pyg	Pass within Drumkinnon Wood adjacent to Pier Road.
P13-End			No bats.	-



Appendix J4: 16 July dawn transect.

Stopping point	Time	Location	Species	Activity
End-P13	02:20	NS 38927 81971	P. pyg	Faint foraging passes heard not seen.
P13	02:22-02:27		P. pyg	Small number of passes at point count.
P13-P12	02:28	NS 38848 82081	P. pip	Brief commuting pass heard not seen.
P12	02:35-02:40		No bats.	-
P12-P11			No bats.	-
P11	02:47-02:52		No bats.	-
P11-P10			No bats.	-
P10	02:54-02:59		No bats.	-
P10-P9			Abandoned at southern exit to Drumkinnon Wood.	Anti-social behaviour was taking place within south end of Lomond Shores car park. Decision made to abandon P9 and P8 and carry on from P7. Ten minute point counts undertaken at P6, P5 and P4 to compensate and ensure transect was not finished too early.
P7	03:06-03:11		No bats.	-
P7-P6			No bats.	-
P6	03:15-03:25 (10 min point count)		P. pyg	Very faint foraging passes intermittently around point count.
P6-P5	03:30	NS 38695 82313	P. pyg	Brief commuting pass heard not seen.
P5	03:32-03:42 (10 min point count)		P. pyg and P. pip	Two bats with continuous foraging passes along path.
P5-P4	03:42	NS 38597 82331	P. pyg	Two bats foraging along path.
P4	03:45-03:55 (10 min point count)		P. pip and P. pyg	Two bats continuously foraging around treeline and shore.
P4-P3	03:56 04:00	NS 38565 82407 NS 38703 82368	P. pyg P. pyg	Foraging within car park area. Foraging along path between trees.
P3	04:01-04:06		P. pyg	Intermittent foraging around trees at point count.
P3-P2	04:08 04:10 04:12	NS 38814 82326 NS 38843 82283 NS 38885 82232	P. pyg P. pyg P. pyg	Foraging along path within woodland. Foraging along path within woodland. Foraging along path within woodland
P2	04:14-04:19		Pip sp.	One bat foraging high up above tree canopy. Not picked up on Anabat.
P2-P1			No bats.	-
P1	04:24-04:29		P. pyg	One bat foraging high above tree canopy near point count.



Appendix J5: 10 August dusk transect.

Stopping point	Time	Location	Species	Activity
P7	21:13-21:18		No bats	-
P7-P6	21:19 21:22	NS 38449 81998 NS 38492 82031	P. pyg P. pyg	Foraging in tree canopy. Foraging in tree canopy.
P6	21:25-21:30		P. pyg	Two bats foraging in clearing above point count.
P6-P5	21:32	NS 38638 82192	P. pyg	Two bats foraging in tree canopy.
P5	21:36-21:41		P. pyg	Foraging around point count.
P5-P4	21:42	NS 38594 82335	P. pyg	Foraging along path at woodland edge.
P4	21:43-21:48		P. pyg	Intermittent foraging around shore.
P4-P3	21:50	NS 38666 82366	P. pyg	Brief commuting pass.
P3	21:52-21:57		P. pyg <i>Myotis</i> sp.	Foraging passes around point count. Pass picked up on Anabat.
P3-P2	21:59 22:01	NS 38849 82275 NS 38890 82237	P. pyg P. pyg	Foraging passes in tree canopy. Brief commuting pass.
P2	22:02-22:07		P. pyg	Brief foraging along avenue under tree canopy.
P2-P1	22:08 22:09	NS 38927 82131 NS 38927 82131	P. pyg P. aur	Brief faint pass. Pass picked up on Anabat.
P1	22:11-22:16		P. pyg and P. pip	Two bats foraging in trees around point count.
P1-P13	22:17	NS 38905 81970	P. pyg	Brief faint pass.
P13	22:18-22:23		No bats	-
P13-P12			No bats	-
P12	22:31-22:36		P. pyg	Faint foraging passes.
P12-P11			No bats	-
P11	22:41-22:46		No bats	-
P11-P10			No bats.	-
P10	22:48-22:53		No bats.	-
P10-P9	22:56 22:58 23:02	NS 38459 81990 NS 38471 81923 NS 38301 81929	P. pyg P. pyg P. pip	Brief commuting pass. Foraging passes along woodland edge. Foraging passes along woodland edge.
P9	23:08-23:13		P. pyg	Two bats foraging around point count.
P9-P8	23:17	NS 38255 81962	P. pip	Foraging passes along woodland edge.
P8	23:19-23:24		No bats	-
P8-P7	23:24	NS 38373 81975	P. pyg	Brief commuting pass.



Appendix J6: 02 September dusk transect.

Stopping point	Time	Location	Species	Activity
P1	20:09-20:14		No bats	-
P1-P2			No bats	-
P2	20:17-20:22		No bats	-
P2-P3			No bats	-
P3	20:28-20:33		P. pyg	Two bats foraging around point and over shoreline.
P3-P4	20:35	NS 38590 82407	P. pyg	Commuting pass within car park.
P4	20:37-20:42		P. pyg	Brief commuting pass heard at the end of point count.
P4-P5	20:43	NS 38584 82342	P. pyg	Foraging bat along path by the shoreline.
P5	20:45-20:50		<i>Myotis</i> sp. P. pyg	Pass picked up on Anabat. Two bats chasing each other with loud social calls.
P5-P6	20:52 20:55	NS 38703 82294 NS 38654 82211	Pip sp. Pip sp.	Faint foraging passes in tree canopy. Faint foraging passes in tree canopy.
P6	20:57-21:02		<i>Myotis</i> sp.	Foraging passes heard in tree canopy. Assumed to be Natterer's.
P6-P7			No bats	-
P7	21:07-21:12		No bats	-
P7-P8	21:14	NS 38322 81924	<i>Myotis</i> sp.	Brief faint pass.
P8	21:16-21:21		No bats	-
P8-P9			No bats	-
P9	21:25-21:30		No bats	-
P9-P10			No bats	-
P10	21:42-21:47		No bats	-
P10-P11	21:49	NS 38610 81894	Pip sp.	Faint commuting pass.
P11	21:50-21:55		No bats	-
P11-P12	22:01 22:03	NS 38660 82088 NS 38688 82117	P. pyg P. pyg	Loud social calls heard with faint main call. Loud social calls heard with faint main call.
P12	22:04-22:09		No bats	-
P12-P13			No bats	-
P13	22:16-22:21		Pip sp.	Faint commuting pass.
P13-End	22:22	NS 38936 81977	P. pyg	Brief commuting pass.



Appendix J7: 05 October dusk transect.

Stopping point	Time	Location	Species	Activity
P1	18:56-19:01		P. pyg	Bat foraging above point count in trees.
P1-P2	19:02	NS 38970 82059	P. pyg	Foraging passes along tree avenue.
P2	19:06-19:11		P. pyg	Foraging passes in trees above point count.
P2-P3	19:13	NS 38850 82276	No bats	-
P3	19:16-19:21		Pip sp.	Brief foraging passes near shoreline.
P3-P4			No bats	-
P4	19:25-19:30		Pip sp.	Brief pass. Strong winds at this location.
P4-P5	19:31	NS 38550 82374	P. pyg	Three Foraging bats along path by the shoreline.
P5	19:35-19:40		<i>Myotis</i> sp. P. pyg	Pass picked up on Anabat. Two foraging bats in area of point count.
P5-P6			No bats	-
P6	19:45-19:50		P. pyg	Two foraging bats in area of point count. Social calls heard.
P6-P7			No bats	-
P7	19:53-19:58		No bats	-
P7-P8	19:59	NS 38375 81986	P. pyg	Brief faint pass.
P8	20:01-20:06		No bats	-
P8-P9	20:06	NS 38209 82017	P. pyg	Brief pass.
P9	20:10-20:15		P. pyg	Two commuting passes.
P9-P10	20:16 20:22 20:27	NS 38216 81948 NS 38399 81961 NS 38527 81991	P. pyg P. pyg P. pyg	Foraging passes along trees. Brief commuting pass. Brief commuting pass.
P10	20:29-20:34		Pip sp.	Single commuting pass heard.
P10-P11			No bats	-
P11	20:37-20:42		No bats	-
P11-P12			No bats	-
P12	20:48-20:53		Pip sp.	Passes from a single bat heard along with social calls.
P12-P13			No bats	-
P13	21:00-21:05		No bats	-
P13-End			No bats	-



Appendix K

Summary of Static Monitoring



Average passes per night recorded at each sampling location by species.

Month	Location	Common pipistrelle	Soprano pipistrelle	<i>Nathusius pipistrelle</i>	<i>Pipistrellus</i> sp.	<i>Myotis</i> sp.	BLE	<i>Nyctalus</i> sp.	Total
May	1	4.5	76.2	0.0	13.0	0.2	0.0	0.0	93.8
	2	7.3	129.0	0.0	3.7	1.0	0.0	0.2	141.2
	3	33.8	421.2	0.2	23.2	0.8	0.0	0.0	479.2
	4	22.2	816.8	0.0	106.5	0.0	0.0	0.0	945.5
	5	0.2	27.0	0.0	1.7	0.2	0.0	0.0	29.0
	6	13.0	182.8	0.0	24.5	1.0	0.2	0.0	221.5
	7	4.5	132.3	0.0	2.5	3.2	0.0	0.0	142.5
	8	0.3	111.7	0.0	3.3	0.0	0.0	0.0	115.3
	Total	10.7	237.1	0.0	22.3	0.8	0.0	0.0	271.0
June	1	0.0	19.8	0.0	0.0	0.0	0.0	0.0	19.8
	2	8.0	219.7	0.2	3.0	14.2	0.0	0.0	245.0
	3	239.7	941.3	0.0	83.2	3.8	0.3	0.0	1268.3
	4	46.0	318.0	0.0	115.5	0.0	0.0	0.0	479.5
	5	2.3	139.2	0.0	7.7	3.3	0.0	0.0	152.5
	6	110.0	103.2	0.0	3.0	12.0	0.0	0.0	228.2
	7	26.7	307.3	0.0	31.3	5.7	0.0	0.0	371.0
	8	19.0	379.0	0.0	45.3	0.2	0.0	0.0	443.5
	Total	56.5	303.4	0.0	36.1	4.9	0.0	0.0	401.0
July	1	0.0	3.3	0.0	1.2	0.7	0.0	0.2	5.3
	2	1.3	62.0	0.2	3.8	16.8	0.3	0.0	84.5
	3	125.0	831.2	0.0	49.2	2.5	0.2	0.0	1008.0
	4	52.7	592.3	0.0	65.0	1.0	0.0	0.0	711.0
	5	11.0	328.7	0.0	14.5	2.0	0.0	0.0	356.2
	6	41.5	64.8	0.0	30.3	4.2	0.0	0.0	140.8
	7	47.3	109.5	0.0	18.5	3.2	0.0	0.0	178.5
	8	17.2	278.0	0.0	83.0	1.8	0.0	0.0	380.0
	Total	37.0	283.7	0.0	33.2	4.0	0.1	0.0	358.0
August	1	0.2	7.3	0.0	11.2	0.0	0.0	0.0	18.7
	2	7.2	65.8	0.0	5.5	6.5	0.0	0.0	85.0
	3	76.3	856.2	0.0	45.5	3.8	0.0	0.0	981.8
	4	45.8	272.5	1.3	11.3	0.0	0.0	0.0	331.0
	5	4.2	123.5	0.0	6.0	1.7	0.0	0.0	135.3
	6	3.0	38.0	0.0	3.5	1.5	0.0	0.0	46.0
	7	6.7	134.8	0.2	4.2	3.8	0.0	0.0	149.7
	8	15.5	394.5	0.0	21.3	1.5	0.7	0.0	433.5
	Total	19.9	236.6	0.2	13.6	2.4	0.1	0.0	272.6
September	1	0.0	30.5	0.0	33.0	0.0	0.0	0.0	63.5
	2	2.5	75.0	0.0	5.0	0.7	0.7	0.0	83.8
	3	9.2	279.2	0.0	8.3	1.5	1.0	0.0	299.2
	4	11.8	251.5	0.0	20.5	0.2	0.3	0.0	284.3
	5	3.2	84.7	0.0	3.3	0.2	0.0	0.0	91.3



Month	Location	Common pipistrelle	Soprano pipistrelle	<i>Nathusius pipistrelle</i>	<i>Pipistrellus sp.</i>	<i>Myotis sp.</i>	BLE	<i>Nyctalus sp.</i>	Total
	6	8.5	247.8	0.0	14.3	0.3	0.0	0.0	271.0
	7	1.7	205.2	0.0	3.3	0.3	1.2	0.0	211.7
	8	1.5	70.5	0.0	0.3	0.0	0.0	0.0	72.3
	Total	4.8	155.5	0.0	11.0	0.4	0.4	0.0	172.2
October	1	0.0	3.8	0.0	0.0	0.0	0.0	0.0	3.8
	2	34.0	58.2	0.0	1.8	0.5	0.0	0.0	94.5
	3	0.5	126.5	0.0	9.2	0.7	0.0	0.0	136.8
	4	0.7	7.2	0.0	0.0	0.0	0.2	0.0	8.0
	5	1.8	91.0	0.0	0.2	0.0	0.0	0.0	93.0
	6	0.3	170.0	0.0	4.3	0.0	0.0	0.0	174.7
	7	3.3	87.8	0.0	2.2	0.5	0.0	0.0	93.8
	8	3.2	68.7	0.0	4.0	0.0	0.0	0.0	75.8
	Total	5.5	76.7	0.0	2.7	0.2	0.0	0.0	85.1
Totals		22.39	22.4	215.5	0.0	19.8	2.1	0.1	0.0



Appendix L

ECOBAT Bat Data



Appendix L1: Summary table showing the number of nights recorded bat activity fell into each activity band for each species.

Location	Species/Species Group	Nights of activity				
		High	Moderate/ High	Moderate	Low/ Moderate	Low
1	<i>Myotis</i> sp.	0	0	0	1	3
	<i>Nyctalus</i> sp.	0	0	0	0	1
	<i>Pipistrellus</i> sp.	9	6	4	0	0
	<i>Pipistrellus pipistrellus</i>	0	1	1	2	1
	<i>Pipistrellus pygmaeus</i>	6	11	5	7	0
2	<i>Myotis</i> sp.	0	13	2	5	3
	<i>Nyctalus</i> sp.	0	0	0	0	1
	<i>Pipistrellus</i> sp.	25	2	0	0	0
	<i>Pipistrellus nathusii</i>	0	0	0	0	2
	<i>Pipistrellus pipistrellus</i>	3	7	7	7	7
	<i>Pipistrellus pygmaeus</i>	24	10	1	0	0
	<i>Plecotus auritus</i>	0	0	0	2	2
3	<i>Myotis</i> sp.	0	1	7	12	4
	<i>Pipistrellus</i> sp.	28	0	0	0	0
	<i>Pipistrellus nathusii</i>	0	0	0	0	1
	<i>Pipistrellus pipistrellus</i>	16	7	3	2	0
	<i>Pipistrellus pygmaeus</i>	30	1	1	2	0
	<i>Plecotus auritus</i>	0	0	0	3	3
4	<i>Myotis</i> sp.	0	0	0	2	2
	<i>Pipistrellus</i> sp.	27	0	0	0	0
	<i>Pipistrellus nathusii</i>	0	1	0	0	0
	<i>Pipistrellus pipistrellus</i>	8	16	3	1	0
	<i>Pipistrellus pygmaeus</i>	29	1	0	1	1
	<i>Plecotus auritus</i>	0	0	0	0	3
5	<i>Myotis</i> sp.	0	1	2	7	3
	<i>Pipistrellus</i> sp.	22	3	1	0	0
	<i>Pipistrellus pipistrellus</i>	0	5	8	8	2
	<i>Pipistrellus pygmaeus</i>	24	6	3	1	0
6	<i>Myotis</i> sp.	1	0	10	4	6
	<i>Pipistrellus</i> sp.	27	2	0	0	0
	<i>Pipistrellus pipistrellus</i>	6	13	2	4	1
	<i>Pipistrellus pygmaeus</i>	28	1	0	1	1
	<i>Plecotus auritus</i>	0	0	0	0	1
7	<i>Myotis</i> sp.	0	2	11	7	6
	<i>Pipistrellus</i> sp.	28	1	0	0	0
	<i>Pipistrellus nathusii</i>	0	0	0	0	1
	<i>Pipistrellus pipistrellus</i>	3	12	6	5	1
	<i>Pipistrellus pygmaeus</i>	30	2	0	1	0
	<i>Plecotus auritus</i>	0	0	0	2	2



Location	Species/Species Group	Nights of activity				
		High	Moderate/ High	Moderate	Low/ Moderate	Low
8	<i>Myotis</i> sp.	0	0	2	4	2
	<i>Pipistrellus</i> sp.	24	2	0	0	0
	<i>Pipistrellus pipistrellus</i>	1	15	3	4	3
	<i>Pipistrellus pygmaeus</i>	26	7	0	0	0
	<i>Plecotus auritus</i>	0	0	1	0	0



Appendix L2: Summary table showing key metrics for each species recorded.

Location	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
1	<i>Myotis</i> sp.	1	1 - 1	26	4	785
	<i>Nyctalus</i> sp.	1	0	1	1	449
	<i>Pipistrellus</i> sp.	78	65 - 82.5	92	19	1955
	<i>Pipistrellus pipistrellus</i>	38	19.5 - 55	72	5	1411
	<i>Pipistrellus pygmaeus</i>	70	55 - 72.5	91	29	1759
2	<i>Myotis</i> sp.	66	37 - 68	76	23	785
	<i>Nyctalus</i> sp.	1	0	1	1	449
	<i>Pipistrellus</i> sp.	87	84.5 - 89	97	27	1955
	<i>Pipistrellus nathusii</i>	1	1 - 1	1	2	7
	<i>Pipistrellus pipistrellus</i>	46	32 - 53.5	85	31	1411
	<i>Pipistrellus pygmaeus</i>	84	80 - 86	97	35	1759
	<i>Plecotus auritus</i>	14	1 - 26	26	4	57
3	<i>Myotis</i> sp.	38	26 - 42	66	24	785
	<i>Pipistrellus</i> sp.	99	97.5 - 99	100	28	1955
	<i>Pipistrellus nathusii</i>	1	0	1	1	7
	<i>Pipistrellus pipistrellus</i>	84	70 - 86.5	97	28	1411
	<i>Pipistrellus pygmaeus</i>	98	92.5 - 98.5	100	34	1759
	<i>Plecotus auritus</i>	14	1 - 26	26	6	57
4	<i>Myotis</i> sp.	14	1 - 26	38	4	785
	<i>Pipistrellus</i> sp.	97	96 - 98	100	27	1955
	<i>Pipistrellus nathusii</i>	61	0	61	1	7
	<i>Pipistrellus pipistrellus</i>	77	67 - 78.5	88	28	1411
	<i>Pipistrellus pygmaeus</i>	96	91 - 96.5	100	32	1759
	<i>Plecotus auritus</i>	1	1 - 1	1	3	57
5	<i>Myotis</i> sp.	26	13.5 - 45	69	13	785
	<i>Pipistrellus</i> sp.	89	84 - 91	98	26	1955
	<i>Pipistrellus pipistrellus</i>	46	34 - 51	78	23	1411
	<i>Pipistrellus pygmaeus</i>	86	77 - 88.5	97	34	1759
6	<i>Myotis</i> sp.	46	23.5 - 46	80	21	785
	<i>Pipistrellus</i> sp.	88	86 - 91	98	29	1955
	<i>Pipistrellus pipistrellus</i>	73	56.5 - 76.5	92	26	1411
	<i>Pipistrellus pygmaeus</i>	84	83 - 88.5	99	31	1759
	<i>Plecotus auritus</i>	1	0	1	1	57
7	<i>Myotis</i> sp.	42	26.5 - 48.5	63	26	785
	<i>Pipistrellus</i> sp.	90	88.5 - 91	100	29	1955
	<i>Pipistrellus nathusii</i>	1	0	1	1	7
	<i>Pipistrellus pipistrellus</i>	66	52 - 68.5	88	27	1411
	<i>Pipistrellus pygmaeus</i>	88	86 - 89	100	33	1759
	<i>Plecotus auritus</i>	14	1 - 26	38	4	57
8	<i>Myotis</i> sp.	32	13.5 - 45	52	8	785
	<i>Pipistrellus</i> sp.	96	89.5 - 96	99	26	1955



Location	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
	<i>Pipistrellus pipistrellus</i>	65	45 - 68	82	26	1411
	<i>Pipistrellus pygmaeus</i>	89	82.5 - 92	99	33	1759
	<i>Plecotus auritus</i>	46	0	46	1	57



Appendix K:

Notes on breeding birds in 2021



Species	Bred	Notes
Barn Owl	P	One <i>ad hoc</i> record during bat survey, suitable nesting habitat present.
Black-headed Gull	N	No suitable habitat for nesting with the Site, birds using adjacent loch and river.
Blackbird	Y	Widespread across Site, 27 territories.
Blue Tit	Y	Widespread across Site, estimated minimum of 14 territories.
Bullfinch	Y	Pair seen with four fledged young, two territories.
Buzzard	N	No evidence of breeding on Site, birds recorded flying over.
Carrion Crow	Y	Pair present in suitable habitat.
Chaffinch	Y	Widespread across Site, 16 territories.
Chiffchaff	Y	Three territories.
Coal Tit	Y	Only one record but considered likely to have bred, at least one territory.
Dunnock	Y	Widespread across Site, nine territories.
Garden Warbler	Y	Birds in suitable habitat, six territories.
Goldcrest	Y	Only two records but considered likely to have bred, at least one territory.
Goldfinch	N	No evidence of breeding on Site.
Goosander	N	No evidence of breeding on Site.
Great Tit	Y	At least five territories, probably under-recorded.
Great-spotted Woodpecker	Y	Four probable territories.
Herring Gull	N	No suitable nesting habitat, birds using adjacent loch and river.
Jackdaw	Y	Birds in suitable habitat, at least one territory.
Lesser black-backed Gull	N	No suitable nesting habitat, birds using adjacent loch and river.
Long-tailed Tit	Y	Multiple birds in suitable habitat.
Magpie	Y	Widespread across Site, nine territories.
Mallard	P	Probably bred in waterside vegetation.
Mistle Thrush	Y	Two birds recorded, one alarm calling, one territory.
Moorhen	P	Probably bred in waterside vegetation.
Mute Swan	N	No evidence of breeding on Site, but pair with eight juveniles.
Nuthatch	Y	Nest in ash tree, Woodbank. Also recorded on camera trap set for red squirrels.
Oystercatcher	N	No evidence of breeding on Site, pair seen.
Pied wagtail	N	Single record in June.
Raven	N	No evidence of breeding on Site, birds recorded flying over.
Redstart	Y	One singing bird in suitable habitat, in both May and June.
Robin	Y	Widespread across Site, 19 territories.
Siskin	P	Only one record but considered likely to have bred.
Song Thrush	Y	Widespread across Site, 13 territories.
Spotted Flycatcher	Y	Two singing birds in suitable habitat, May, two territories presumed.
Starling	P	Potentially bred in tree cavities on Site, mainly flocks seen.
Swallow	P	Potentially bred in buildings on site.
Tawny Owl	P	Probably bred, multiple records of birds in suitable habitat.
Treecreeper	Y	Only one territory, probably under-recorded.
Whitethroat	Y	Widespread across Site, six territories.
Willow Warbler	Y	Widespread across Site, 13 territories.
Wood Pigeon	Y	Widespread across Site, 16 territories.
Wood Warbler	Y	Two singing birds in May, at different territories.
Wren	Y	Widespread across Site, 21 territories.



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