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6.7 Environmental Statement – Appendix 9.16 Red Squirrel Survey Report

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CONTENTS	
1 Introduction	4
1.1 Scheme Background.....	4
1.2 Report Rationale	4
1.3 Definitions.....	4
1.4 Legislative and Regulatory/Policy Context	4
2 Methodology	6
2.1 Objectives.....	6
2.2 Desk Study	6
2.3 Field Survey.....	6
2.4 Survey Limitations	9
3 Baseline	11
3.1 Desk Study	11
3.2 Field Results.....	11
4 Summary	13
5 References	14
6 Figures	15
Appendix A – Red Squirrel Biology, Habitat Requirements and Conservation Status 16	
Appendix B – Citation for River Coquet Valley Woodlands SSSI	18
Appendix C – Woodland Scoping Results	21

EXECUTIVE SUMMARY

This technical report presents the findings of a suite of red squirrel (*Sciurus vulgaris*) surveys undertaken by Jacobs UK Ltd. (Jacobs) on behalf of Highways England to establish the status of red squirrel within the survey area of the proposed upgrade of the A1 carriageway in Northumberland.

The report provides a summary of ecological information obtained from a desk study and the red squirrel surveys that were undertaken between November 2016 and September 2017. All squirrel surveys were based on the practice note produced by Gurnell et al. (2001 & 2009). Red squirrel evidence was observed in three woodlands within the Survey Area, although grey squirrels were also found to be present in the same locations, and widespread throughout the wider area.

38 out of 96 woodlands with potential to support high and moderate sized populations of red squirrel were found in the Survey Area, although if grey squirrel numbers are unmanaged it is likely that the suitability of all surveyed woodlands will decline.

Red squirrels are wild animals and therefore have the potential to move or behave unpredictably. Therefore, this report reflects the status of red squirrels on the date of the surveys; however, their status in September 2017 can serve as an indication for their likely future presence.

As the behaviour of wildlife is seasonable and highly unpredictable, it is therefore considered good practice for the red squirrel surveys to be repeated if the development is deferred for over 12 months from the date of the initial survey.

1 INTRODUCTION

1.1 Scheme Background

1.1.1 Following the outcomes of the 2014 A1 North of Newcastle Feasibility Study the Department of Transport confirmed, in its first Roads Investment Strategy, the intention to upgrade twenty-one kilometres of the existing A1 to a dual carriageway between Morpeth and Ellingham in Northumberland. This comprised two discreet sections:

- Section A - Morpeth to Felton, and;
- Section B - Alnwick to Ellingham.

1.1.2 At this stage of the project (PCF Stage 2) one option was under consideration for Section A, this is briefly described below:

Section A - Morpeth to Felton

- Offline Option – this option would be online at its north and south ends, but a large central section would form a new bypass to the west of the existing A1 between the Floodgate Burn crossing and Bockenfield Bridge. The existing A1 would be detrunked and form part of a local road network, which would separate local and strategic traffic.

1.2 Report Rationale

1.2.1 The aim of this report is to present red squirrel (*Sciurus vulgaris*) desk study information and data from field surveys undertaken between December 2016 and August 2017 by Jacobs (UK) Ltd on behalf of Highways England. The information presented will be used to inform the preferred option and identify the requirement for additional surveys to be completed at PCF Stage 3. The data will ultimately inform the Environmental Impact assessment (EIA) for the preferred options.

1.3 Definitions

1.3.1 The study area relates to a 2 km buffer around the proposed options for Section A in which desk study information has been collated via online and third party sources.

1.3.2 The survey area refers to a 500 m buffer around the offline option for Section A.

1.4 Legislative and Regulatory/Policy Context

1.4.1 A summary of the legislation and policy framework for red squirrel is provided below. Full details for this species including information regarding the biology, habitat requirements and nature conservation status is provided in Appendix A.

1.4.2 Red squirrels have a restricted distribution in the UK, following major range contractions resulting from the loss and fragmentation of native habitats and the introduction of the grey squirrel from North America (*Sciurus carolinensis*). Grey squirrels can outcompete red squirrels and also carry a poxvirus which is often fatal to red squirrels. Red squirrel populations are thought to be further declining as grey squirrels spread. Red squirrels are now one of the most threatened native mammals in the UK. Scotland is the main stronghold for red squirrels, with fragmented populations found on islands or in large coniferous forests in England, Wales and Ireland. In 1995 the red squirrel population was put at 161,000 in Great Britain (70-75% of these in Scotland) (Harris et al. 1995). A more recent estimate of their total population in Britain is about 140,000, with 120,000 in Scotland, 3000 in Wales and 15,000 in England (Forestry Commission 2011). In England, most red squirrels are found in the north of the country, but they are still present on the Isle of Wight, and the islands of Brownsea and Furzey off the south coast. In 2008, it was estimated that there

were 40,000 red squirrels in the whole of Ireland (see National Parks & Wildlife Service; Northern Ireland Environment Agency 2008).

- 1.4.3 The red squirrel is a protected species in the UK and is included in Schedules 5 and 6 of the Wildlife & Countryside Act 1981 (WCA) (amended by the Countryside & Rights of Way Act 2000).
- 1.4.4 The inclusion of the species in Schedule 5 means that, under Section 9 of the WCA it is an offence to:
- Intentionally kill, injure or take (capture) a red squirrel [S9(1)]
 - Intentionally or recklessly damage or destroy any structure or place a red squirrel uses for shelter or protection or disturb a red squirrel while it is occupying such a place [S9(4)]
 - Possess a dead or live wild red squirrel, or any part of a red squirrel, unless you can show that the animal was taken legally. [S9(2)]
 - Sell, or offer for sale, a wild red squirrel or any part of a wild red squirrel.
- 1.4.5 Under Section 11 of the Act, it is also illegal to:
- Set in place a trap, snare, electrical device for killing or stunning or any poisonous, poisoned or stupefying substance; use a decoy, gas or smoke, bows or cross-bows, explosives, automatic weapons or mechanically propelled vehicles which are of such a nature and so placed as to be calculated to cause bodily injury to a red squirrel.
- 1.4.6 Section 18 of the Act makes it clear that attempting to commit an offence is, legally, the same as committing the offence¹.
- 1.4.7 Red squirrel are a Species of Principal Importance (SoPI) under the NERC Act (2006) and listed as a priority species on the Northumberland Local Biodiversity Action Plan (LBAP).

¹ UK Red Squirrel Group (2004). Advice Note: Red Squirrels and the law.

2 METHODOLOGY

2.1 Objectives

2.1.1 The objectives of the red squirrel surveys were to:

- Scope woodlands for squirrel habitat suitability;
- identify red squirrel presence within the survey area;
- establish a baseline to determine the importance of the Survey Area for the local red squirrel population;
- inform the assessment of potential impacts on red squirrel associated with the scheme;
- provide sufficient field data for the development of an appropriate mitigation strategy.

2.2 Desk Study

2.2.1 A search of online resources was undertaken to obtain ecological information about the Study Area and surrounding landscape.

2.2.2 The following websites were researched:

- National Biodiversity Network (NBN),
- Multi-Agency Geographic Information for the Countryside (MAGIC) and,
- Northumberland Biodiversity Action Plan.

2.2.3 In addition to online resources, data searches were undertaken in 2016 with:

- Environmental Records Information Centre North East (ERIC North East);
- Alnwick & District Natural History;
- Alnwick Wildlife Group;
- the Natural History Society of Northumberland, and;
- Red Squirrels Northern England (RSNE).

2.2.4 Ordnance survey maps and aerial photographs were also studied to identify habitats of possible conservation importance within the study area.

2.2.5 Desk study records are mapped on Figure 1 of this report.

2.3 Field Survey

Scoping Survey

2.3.1 All suitable habitat within the Survey Area was surveyed for evidence of and potential for squirrel activity between the 6th and 19th December 2016 and the 4th and 6th of January 2017. Areas not surveyed included arable fields, grassland and hard-standing areas within housing estates and large developments such as Morpeth Hospital. The surveys were broadly based on methodologies described in the practice note: Practical Techniques for Surveying and Monitoring Squirrels (Gurnell et al, 2009). The Survey Areas referred to in this report are shown on Figures 2.1 & 2.2.

2.3.2 Ninety-six woodland parcels were identified from aerial imagery and internet resources for pre-survey screening within Section A. These included small immature plantations, semi-natural broad-leaved and mixed plantations and mature conifer plantation. The carrying capacity of the woodlands was based on a walk-through of all parcels, estimating the

abundance or otherwise of squirrel signs and recorded as unsuitable, low, moderate or high. A summary of the categories is shown in Table 1 below:

Table 1: Summary of categories based on potential carrying capacity

Category of Potential Carrying Capacity	Carrying Capacity Value	Description
High	0.33	Woodland offers foraging opportunities and is able to support a large population of squirrels. Woodland is well connected and field signs including dreys and feeding remains are present.
Moderate	0.22	Woodland provides, or is connected to woodland which provides, some foraging opportunities for squirrels and is of a size able to support a moderately sized population. Some field signs are present including feeding remains, dreys or visual observations of squirrels.
Low	0.11	Woodland has no or very few field signs, is small or not well connected to other woodlands and provides limited foraging opportunities.
Unsuitable	0	Woodland has no potential for supporting squirrel populations, for example has been recently clear felled or is a very immature woodland (<10 years).

2.3.3 Field signs that were searched for in order to determine suitability for red squirrels comprised; visual sightings, feeding remains and dreys.

2.3.4 Of the 96 woodland parcels initially assessed, 75 were scoped out of further survey after the initial walkover survey, to include only those woodlands with moderate or high carrying capacity and that also lay within 100 m of the preferred (offline) option or that had connectivity to woodlands within 100 m of the offline option. Immature plantation woodlands assessed to be less than 15 years old were also discounted as were woodlands of unsuitable composition, e.g. sycamore/ash plantation. Five woodland parcels could not be surveyed due to access restrictions; see Section 2.4 below.

Field Survey

2.3.5 The red squirrel surveys were undertaken in 2017 between the 3rd and 7th July, between the 31st July and the 4th August and between the 11th and 15th September by experienced Jacobs' ecologists.

2.3.6 Five indirect methods can be used for surveying and monitoring squirrel populations. Most are effective in assessing the presence of squirrels and, to varying degrees, giving density estimates. However, only two methods – visual surveys and hair tube surveys – can distinguish red from grey squirrels and so provide separate population assessments. Drey counts can be useful in some circumstances, but are not always reliable. Feeding transects can only be carried out in conifer woodland, although where hazel is present, the characteristic split shells can also be observed. The use of whole maize bait is a quick and easy method to ascertain whether squirrels of either species are present in a woodland (Gurnell, Lurz and Pepper 2001).

2.3.7 Three methods were utilised during the surveys undertaken in 2017 these are described below:

- 2.3.8 **Basic visual survey:** This method involved walking along predetermined survey lines, through or alongside woodland, recording all the squirrels seen. Survey lines were marked out along rides or woodland tracks, or between rows of trees within suitable squirrel habitat. The surveyors walked lines, starting as soon after first light as possible as this is the time when squirrels are most likely to be active. The surveyors stopped at 100 m intervals for 5 minutes, taking about 5 minutes to walk each intervening 100 m. At each stopping point, bait consisting of peanuts, maize kernels and sunflower seeds were scattered up to a 10 m radius of each stopping point. Each transect was repeated two days after the first transect was completed. This process was repeated during each survey period as summarised in Table 2. All squirrel sightings were recorded, together with time and place seen and behaviour.
- 2.3.9 Visual surveys were repeated three times over the survey period to take into account variations in weather and squirrel activity, providing three basic visual surveys and three baited visual surveys over the survey period. The highest number of squirrels seen on a single visit was recorded. All stopping points were grid referenced for consistency with a hand held GPS device to an accuracy of ± 5 m. Stopping points were also scattered with a handful of maize kernels on the second survey of each week to encourage squirrel encounters on subsequent visits.
- 2.3.10 **Hair tube survey:** Hair tube surveys were considered for woodlands with high or moderate suitability, and where visual baited surveys were unsuitable, for example where visibility is low due to a dense canopy. Hair tube surveys are a standard method for differentiating the presence of red or grey squirrels in an area. This survey involved the installation of 65 mm diameter drainage pipe in 300 mm sections onto branches within suitable habitat using cable ties. Tubes were placed within eight woodlands (those that contained an abundance of feeding remains coupled with adequate access). Tubes were placed in an approximate grid pattern 100 m apart wherever possible but in smaller or densely vegetated woodlands this spatial range could not always be adhered to. The tubes were baited with whole maize, sunflower seeds, pine nuts and peanuts. Velcro strips were placed inside each end to the roof of the tube with the sticky side down. As the animals enter the tubes to get the food, they leave some of their hairs on the tapes, which were removed for later examination under a microscope. Hairs were identified later using a microscope following the method outlined by Gurnell et al (2009). It is not possible to separate red and grey squirrel hairs on the basis of colour, and the hairs have similar cuticle scale patterns and medullas. However, when viewed under a microscope (x400) the cross-section differs. Red squirrel hairs contain a groove which is absent from grey squirrel hair (Teerink 1991). Staining a sample of hairs with ink using the negative staining technique enables the type of cross-section to be seen more easily (Gurnell and Pepper, 1994; Dagnall et al., 1995).
- 2.3.11 **Whole maize baiting:** The presence of squirrels can be determined from the remains of yellow whole maize put out as feed or bait for traps or hair tubes. Red and grey squirrels are the only species to remove the germ from the maize grain and discard the rest intact. However, it is not possible to determine which species is present, or level of presence, unless used in conjunction with trapping or hair tubes (Gurnell et al. 2009). Whole maize was placed in all hair tubes and scattered in the immediate area of the tubes and transect stopping points. Additionally, whole maize bait was left in a number of locations to supplement the survey effort within woodlands where feeding remains were scarce or with limited accessibility. Feeding remains were searched for during subsequent surveys and during removal and replacement of the Velcro strips.
- 2.3.12 Baiting stations and hair tube locations were classed as visual survey locations to avoid unnecessary duplication of survey effort. All survey locations including transect stopping points, hair tubes and whole maize baited locations are shown on Figures 3.1 to 3.6 (Section 6). Surveyed woodlands were divided into two tranches and surveyed on subsequent days as shown in Table 2 below.

Table 2: Survey dates

Survey Period Number	Location	Date
1	Visual survey with bait scattered at each stopping point: Tranche 1.	03/07/2017
	Visual survey with bait scattered at each stopping point: Tranche 2.	04/07/2017
	Baited visual survey: Tranche 1.	05/07/2017
	Baited visual survey: Tranche 2.	06/07/2017
2	Visual survey with bait scattered at each stopping point: Tranche 1.	31/07/2017
	Visual survey with bait scattered at each stopping point: Tranche 2.	01/08/2017
	Baited visual survey: Tranche 1.	02/08/2017
	Baited visual survey: Tranche 2.	03/08/2017
3	Visual survey with bait scattered at each stopping point: Tranche 1.	11/09/2017
	Visual survey with bait scattered at each stopping point: Tranche 2.	12/09/2017
	Baited visual survey: Tranche 1.	13/09/2017
	Baited visual survey: Tranche 2.	14/09/2017

2.4 Survey Limitations

- 2.4.1 Although the data provided by the desk study consultees / sources is the most complete set of species data available, the absence of records should not be taken as an indication of the absence of a species. Additionally, double-counting is a possibility within the data. As the desk study data was used to inform further survey this is not considered a significant limitation.
- 2.4.2 Access restrictions prevented surveys from taking place within four woodland parcels north of the B6345 that crosses the A1 at Felton. However, these were north of the juncture where the dualled A1 merges into a single carriageway. As such it was not anticipated that these woodlands would be affected. Tile Kiln Rush woodland (WA85) to the north-east of the scheme above the River Coquet was placed out of bounds at the request of the local gamekeeper due to the presence of pheasant chicks preventing more than the initial survey taking place. However, Tile Kiln Rush is part of a woodland tract including Mill Banks wood to the south which is separated from Tile Kiln Rush only by a woodland track. Mill Banks wood was successfully surveyed and due to the small areas involved (2.1 and 1 ha respectively), it was therefore considered safe to assume that both woods could be classed as one entity. Similarly, surveys of woodland WA90 were prevented at request of the local gamekeeper for the same reasons as with WA85. However woodland WA87, 5 m to the south did not contain pheasant rearing pens and was close enough to WA90 to be considered representative of both woodland parcels.
- 2.4.3 For visual surveys the Ideal is to mark out several survey lines at a density of about one line per 10–20 ha, with each line between 500 m and 1000 m long. Gurnell *et al* (2009) recommend the use of up to 20 tubes to survey one piece of woodland by deploying them 100 m to 200 m apart in lines or in the pattern of a grid. However, the woodland parcels surveyed ranged in area from only 0.4 ha to 11.2 ha with an average area of 3.4 ha. Therefore, whilst visual stopping places were positioned as close to 100 m apart as possible, the transect length did not always reach the minimum 500m recommended. Although Gurnell *et al* (2009) suggests that a number of woodlands could be combined to reach the desired length it was felt that surveying individual woodlands provided a better

assessment of squirrel activity in any particular wood. In addition, this enabled greater focus on identifying squirrel activity through increased survey effort in individual woodlands.

- 2.4.4 Similarly, the ideal positioning of hair tubes within a woodland according to guidelines (Gurnell *et al* 2009) are 100 m to 200 m apart, in a grid or linear style, and at a suitable height that does not require the use of a ladder. In many instances it was not possible for all of these parameters to be met, and in these cases surveyors attempted to position hair tubes to meet the guideline parameters as closely as possible. In most cases woodlands had a higher density of hair tubes when compared to those suggested in the guidance. However, this was considered to offer an increased likelihood of determining presence or absence. Average tube density was estimated at 1.6 per hectare.
- 2.4.5 Dense, impenetrable vegetation, notably gorse and bramble, may have caused some ground field signs to be overlooked. However, given the baiting methods and location of the hair tubes employed, this was not considered a significant limitation on the survey.
- 2.4.6 Surveys of the A1 verges were not undertaken due to health and safety concerns over working next to a live carriageway. However, surveys were carried out on all adjacent parcels of land up to their boundary with the embankments. Where definitive field signs were noted in these locations, the likelihood of squirrels being present within the embankments was considered to be similar.
- 2.4.7 Surveys were undertaken at an optimal time of year so the results are considered appropriately robust. However, it should be noted that site conditions can change over time with the inward and outward movement of species so an absence of a species record should not be taken as an indication of an absence of that species from the Survey Area. Therefore, this report reflects the site conditions up to the 15th September 2017. The behaviour of wildlife is seasonable and highly unpredictable and as such, it is considered good practice for wildlife surveys to be repeated should development be deferred for over 12 months from the date of the initial survey.
- 2.4.8 The findings of this report represent the professional opinion of qualified ecologists and do not constitute professional legal advice. The client may wish to seek professional legal interpretation of the relevant wildlife legislation cited in this document. Should there be a delay in the proposed construction programme, it is considered prudent that the survey findings be reviewed and updated as required for subsequent planning application(s) to ensure that the assessment of ecological impacts is undertaken against an accurate baseline.

3 BASELINE

3.1 Desk Study

- 3.1.1 The desk study revealed one designated site within the scheme footprint where red squirrels are known to be present; River Coquet and Coquet Valley Woodlands Site of Special Scientific Interest (SSSI) (Ordnance Survey Grid Reference: NZ 17438 99796). The citation for this designated site is shown in Appendix B.
- 3.1.2 The data search provided by ERIC North-East returned 262 records of red squirrel, several of which contained multiple sightings, and 106 records of grey squirrel present in the Study Area. There were also six records of unidentified squirrel. Records returned from RSNE from 2013 onwards provided 76 red squirrel records, and 272 grey squirrel records in the Study Area. Records received from RSNE prior to 2013 had been submitted to ERIC North East and were excluded to avoid duplication. The results for these are summarised below in Table 3, and a full description is shown in Figure 1: Desk study data.

Table 3: Summary of desk study records.

Desk study squirrel records		
Number of red squirrel records	Number of grey squirrel records	Unidentified squirrel
338	378	6

3.2 Field Results

Scoping surveys

- 3.2.1 Assessment of potential carrying capacity of woodlands within 100 m of the offline route option were carried out in December 2016 and January 2017. Of the 96 woodlands assessed 58 had low suitability, 35 had moderate suitability and three had high suitability. Four woodlands were unable to be accessed (refer to Section 2.4). A full description of these results is shown in Appendix C. Twenty-one woodlands met the criteria for further survey as outlined in the methodology section above.

Field Survey Results

- 3.2.2 Rudimentary baited visual surveys were carried out on three separate occasions: between the 3rd and 7th July, between the 31st July and the 4th August and between the 11th and 15th September. Inspection of the squirrel hair tubes was undertaken between the 31st July and the 4th August and between the 11th and 15th September. Baited visual surveys returned few results, all of which were grey squirrel observations within all woodlands assessed; there were no red squirrels observed (Table 4 overleaf).
- 3.2.3 Following the hair tube inspections, sticky pads were removed from all the tubes, numbered and taken for analysis. Sticky pads and bait were replaced in all tubes in readiness for the subsequent inspection. During the first analysis of hairs caught on the sticky pads, three out of the 48 samples collected appeared to contain red squirrel hairs; tube numbers 28, 31 & 41 located in woods WA 86, 68 and 54 respectively. Consequently, trail cams were installed at these locations on the 22nd August 2017 to seek additional corroboration. The trailcams were trained on the squirrel tubes by attaching them on trees adjacent to the tubes under investigation and set to record 10 second videos. Cameras were recovered on the 11th and 12th of September during a subsequent squirrel survey. A table summarising the results of the hair analysis is shown overleaf (Table 5). No red squirrel hairs were identified in subsequent analyses from the same locations. Trailcam footage contained no activity from red squirrels. The tubes were visited by grey squirrels, mice and birds.
- 3.2.4 Maize baited stations proved ineffective with no evidence of feeding by squirrels noted on subsequent inspections. Bait stations located within woodland WA87 recorded grey squirrel

activity with additional foraging by mice, deer and common species of bird. Red squirrel was not identified at this location.

- 3.2.5 The trail cams did not provide any positive identification of red squirrels at any of the locations, however grey squirrels were observed at these locations, indicating that red and grey squirrels may be coexisting at present.

Table 4: Summary of visual baited survey results.

Woodland number	Red squirrel sighting	Grey squirrel sighting	Peak no. of individuals
WA30	No	No	-
WA36	No	No	-
WA42	No	No	-
WA43	No	No	-
WA48	No	Yes	1
WA52	No	No	-
WA53	No	Yes	1
WA54	No	Yes	1
WA56	No	No	-
WA61	No	Yes	1
WA62	No	No	-
WA64	No	No	-
WA67	No	Yes	1
WA68	No	No	-
WA72	No	Yes	1
WA81	No	Yes	1
WA83	No	Yes	1
WA84	No	No	-
WA85	No	Yes	2
WA86	No	No	-
WA87	No	Yes	3

Table 5: Summary of hair analysis results.

Woodland number	Number of samples containing red squirrel hairs	Number of samples containing grey squirrel hairs	No. of samples containing other / no hairs
WA30	0	2	1
WA54	1	2	1
WA62	0	4	1
WA67	0	4	5
WA68	1	3	0
WA72	0	1	2
WA83	0	4	1
WA86	1	3	2
WA87	0	9	0

4 SUMMARY

- 4.1.1 The desk study records indicate that grey and red squirrels were coexisting in some woodlands within the Study Area within the previous 10 years, with records of red squirrels from as recent as May 2016, and records of grey squirrels from November 2016. The field survey results are consistent with these findings, as evidence of red squirrel presence was observed in woodlands where grey squirrels were also known to be present. The desk study records suggest a trend of red squirrel population decline, with only 9 records submitted in 2016 and 3 in 2015 in comparison with 38 records for 2014 and 43 for 2013. Grey squirrel records appear to increase in the period 2013 – 2014, as the number of records increases from 22 in 2012, to 43 in 2013 and then 141 in 2014. However, it is important to note that an absence of a record does not infer an absence of a species, and so there are no firm conclusions that can be drawn from this.
- 4.1.2 The Survey Area was found to have 58 woodlands with low suitability for red squirrels, 35 woodlands with moderate suitability and 3 woodlands were found to have high suitability for red squirrels. Positive identification of red squirrel hairs was observed from hair tubes located in woodlands WA68, WA86 and WA54; woodlands which were assessed respectively as high, moderate and moderate suitability. However, grey squirrel hairs were also identified at these locations, and positively identified on subsequent trail cameras.
- 4.1.3 The result of this is likely to be a further decline in red squirrel abundance in these woodlands, and throughout the survey area, due to grey squirrels outcompeting red squirrels for resources and potential disease introductions.
- 4.1.4 Red and grey squirrels eat the same types of tree seed including oak acorns. Interestingly, dietary studies have revealed that grey squirrels are better able to extract the proteins and energy stored in acorns than are red squirrels. Where oak is present in a landscape it therefore gives grey squirrels a competitive advantage. Grey squirrels are almost twice the weight of red squirrels and consequently require more energy per day. In upland spruce forests where tree seeds are so small that grey squirrels find it difficult to eat enough to satisfy their basic energy needs the smaller red squirrel is better able to survive. These respective facts help explain why regionally where grey squirrels are present, red squirrels persist for longest in coniferous stands (RSST 2017).
- 4.1.5 Hence, red squirrel populations are more likely to survive in coniferous woodland, however there are examples where grey squirrels are known to have colonised extensive conifer woodlands when there is no control of grey squirrels (Pepper & Patterson, 1998). As a result, the value of the site can be viewed as below optimum while grey squirrels are resident and unmanaged in the area. The survey area may have importance nationally as suitable habitats for red squirrels if grey squirrel numbers are controlled in the future.
- 4.1.6 All of the woodlands with known red squirrel presence are either located, or have connectivity, within 100 m of the offline option, and red squirrel populations may be at risk from disturbance, isolation or habitat degradation and / or destruction as a result. However, this may need to be re-assessed once the area of land-take (temporary or permanent) has been fully determined.
- 4.1.7 To minimise the likelihood of adverse effects on protected animal species, it is accepted good practice to repeat surveys should a significant period of time lapse between the initial survey visit and works commencing. If the works are not undertaken within a year of this report, a repeat survey should be carried out by an appropriately experienced ecologist who is fully informed of all previous survey work carried out on the site.
- 4.1.8 If the work proposals are altered to include use of additional areas (e.g. for the purposes of access or materials storage) assessment in relation to protected species in these areas would also be required.

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6 FIGURES




Figure 1: Desk Study Data (2016)
Figure 2.1 & 2.2: Field Survey Data (2017)
Figures 3.1 to 3.6: Squirrel Field Survey Location Points (2017)

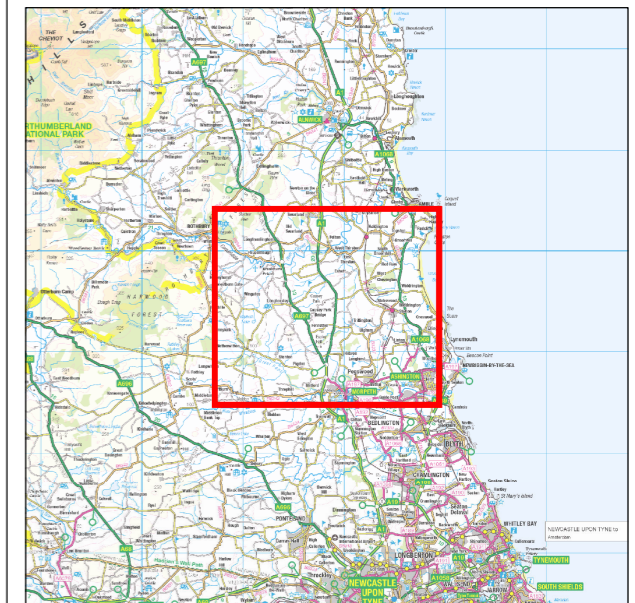
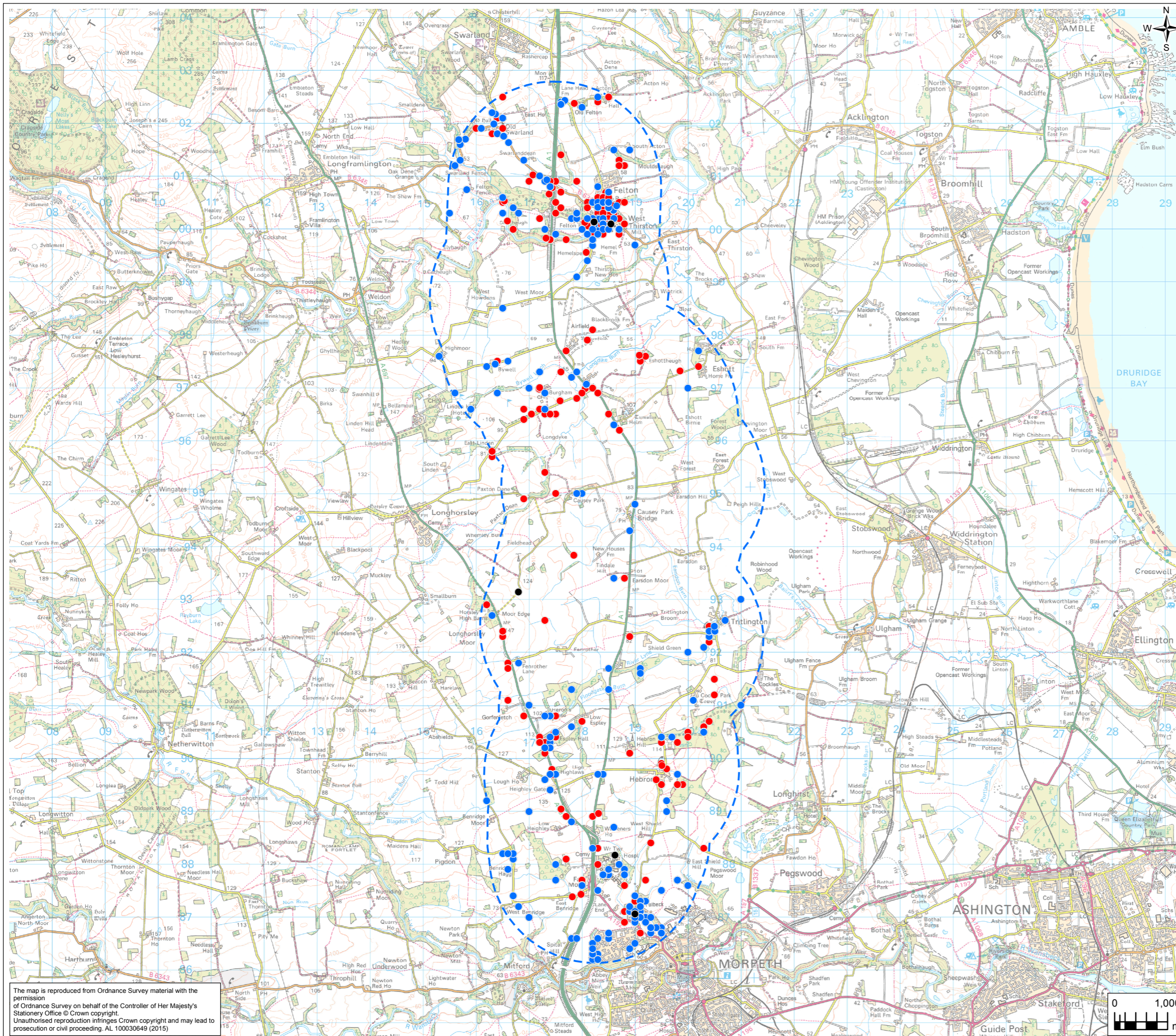
FIGURE 1

Legend

 2km Survey Area

Desk Study Records

-  Red Squirrel
-  Grey Squirrel
-  Unidentified Species



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 SQUIREL SURVEY MAP

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FIGURE 2.1

Legend

500m Survey Area

Surveyed Woodland

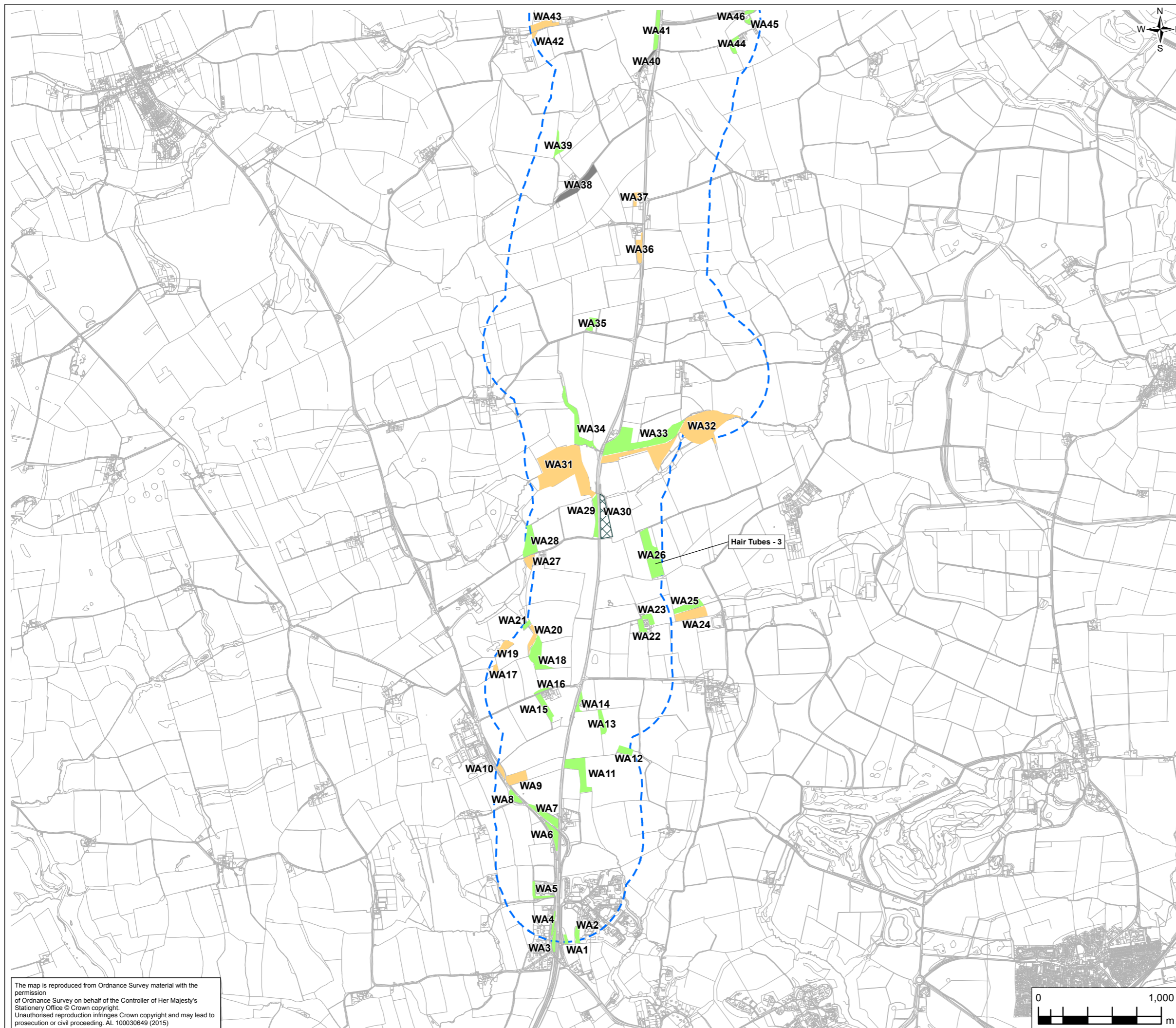
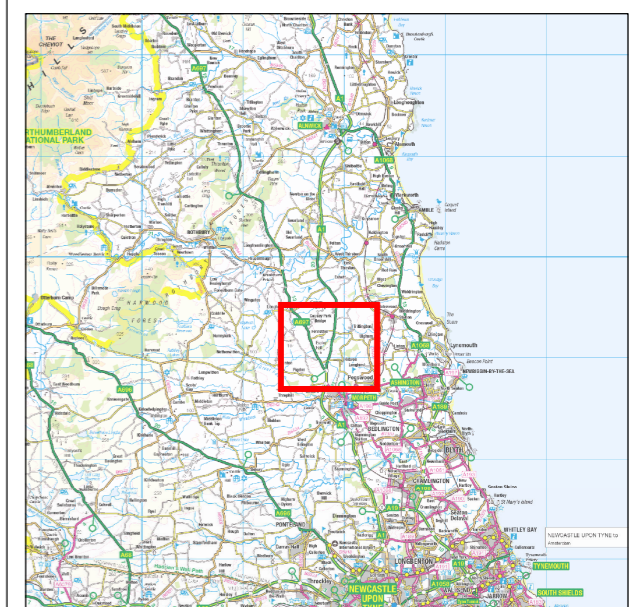
High

Moderate

Low

No access

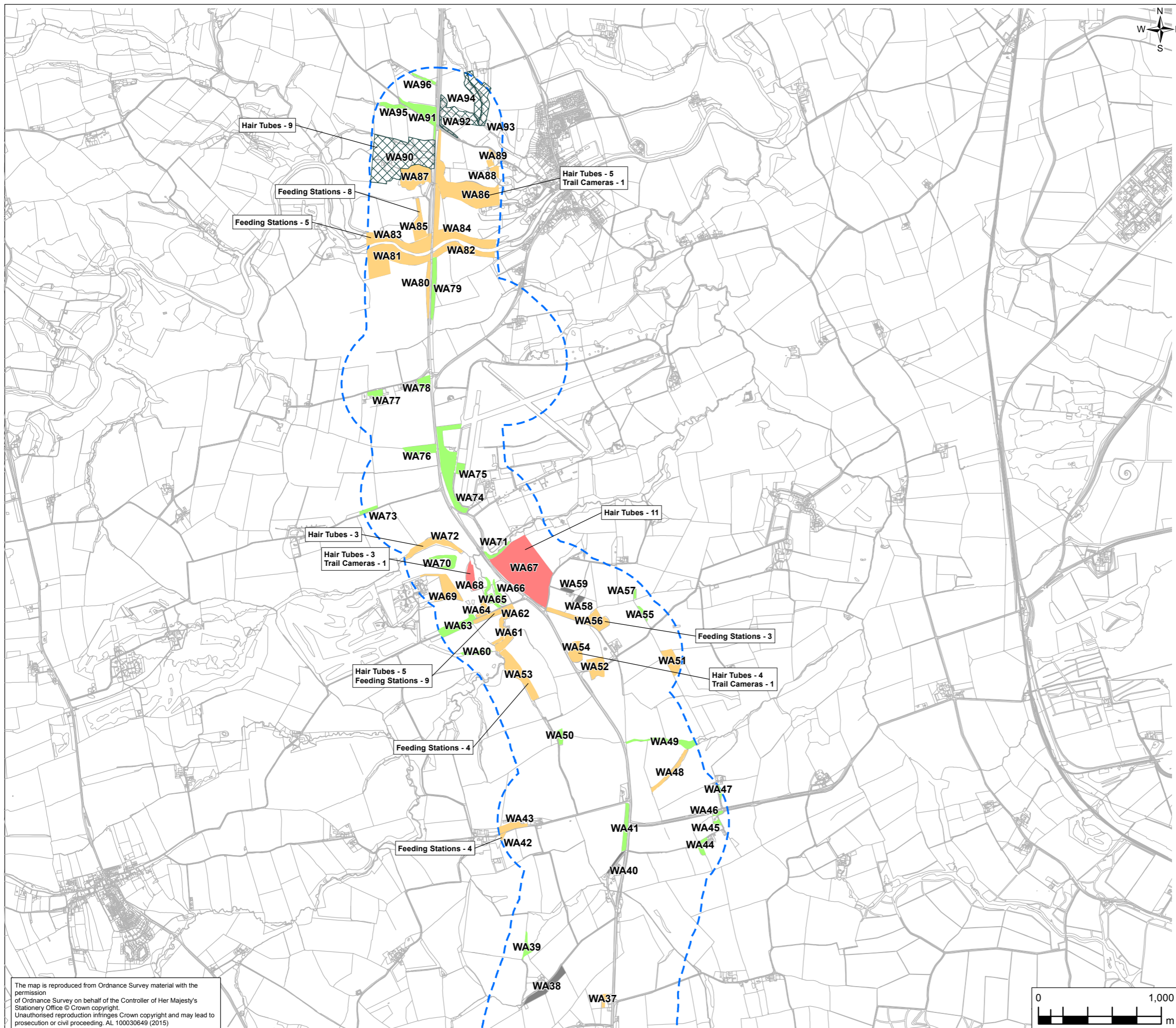
Unsuitable



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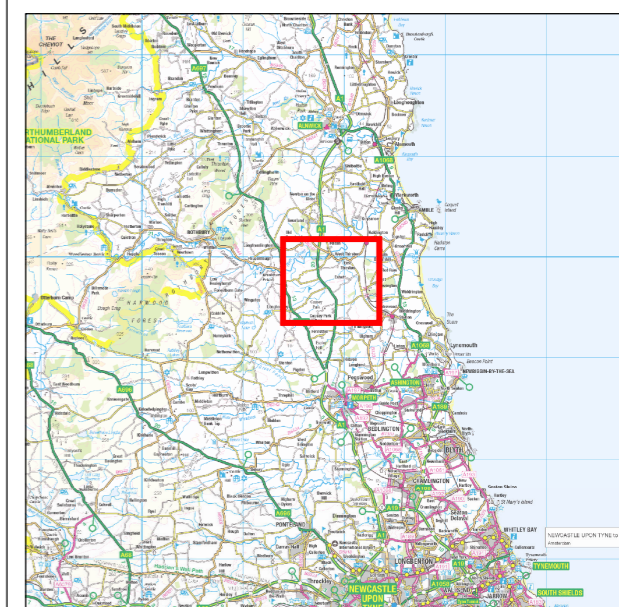
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FIGURE 2.2



Legend

- 500m Survey Area
- Surveyed Woodland**
- High
- Moderate
- Low
- No access
- Unsuitable



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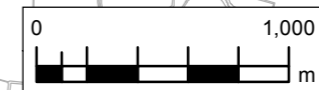
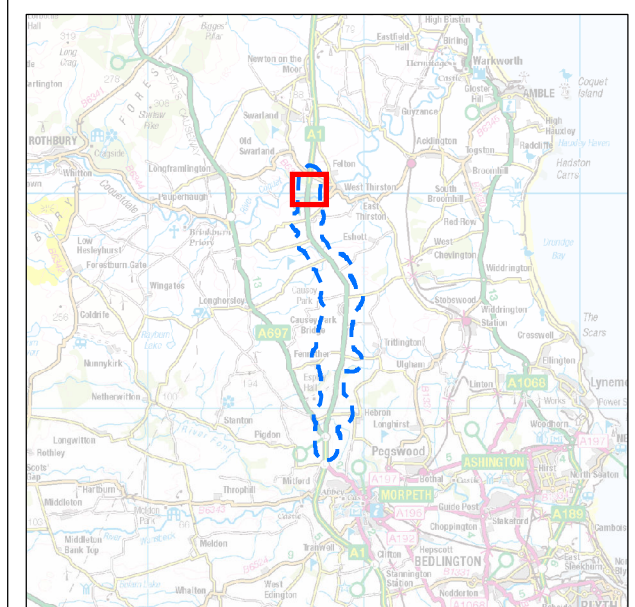
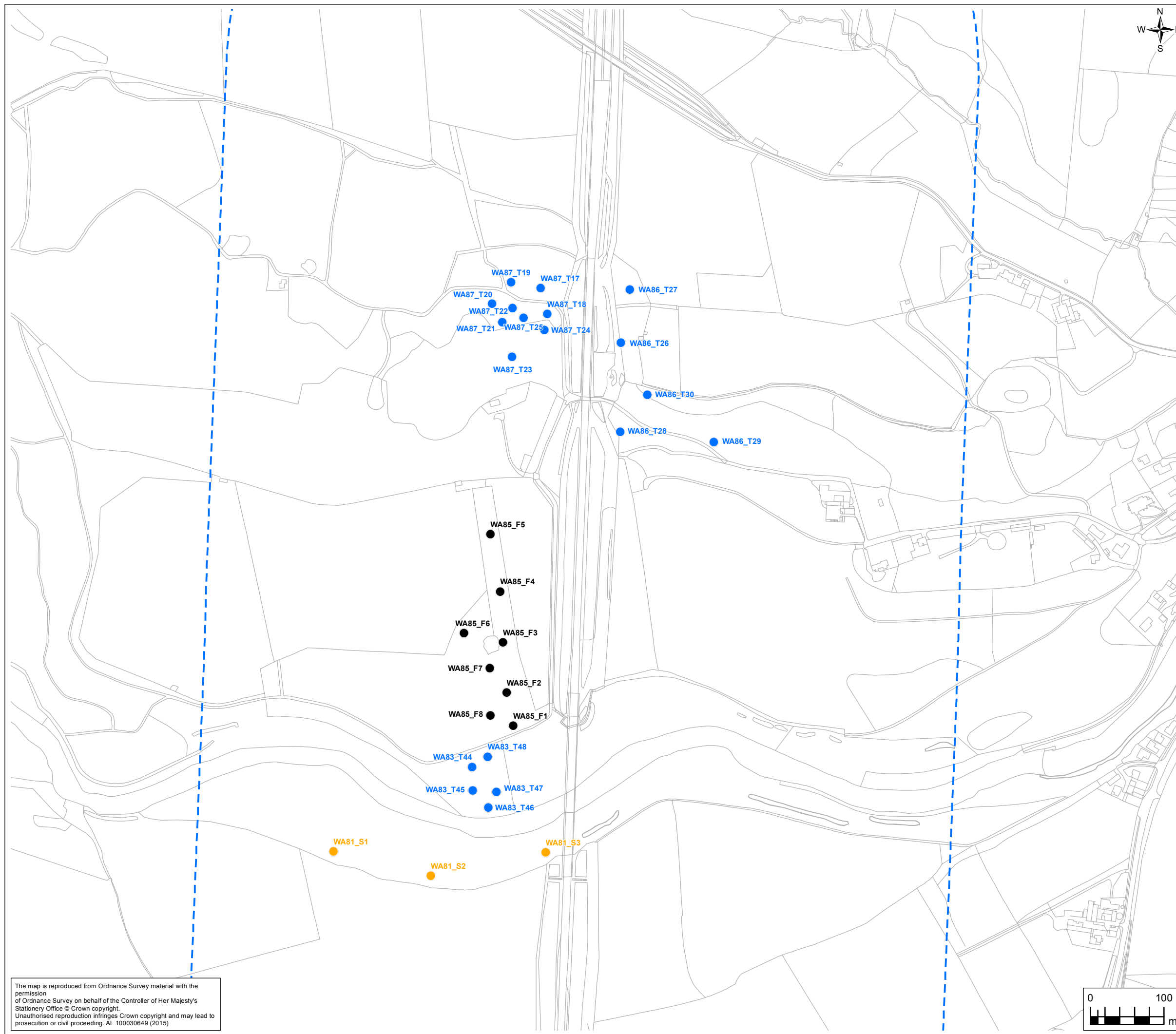


FIGURE 3.1



Legend

- 500m Survey Area
- Hair Tube
- Feeding Station
- Whole Maize Bait Locations



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Client **highways england**

Project **A1 NORTHUMBERLAND**

Drawing Title **SECTION A
SQUIREL FIELD SURVEY LOCATION POINTS
Sheet 1**

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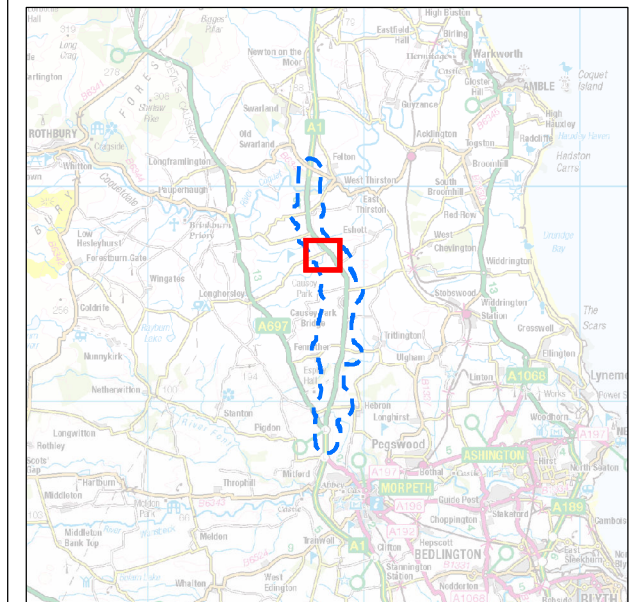
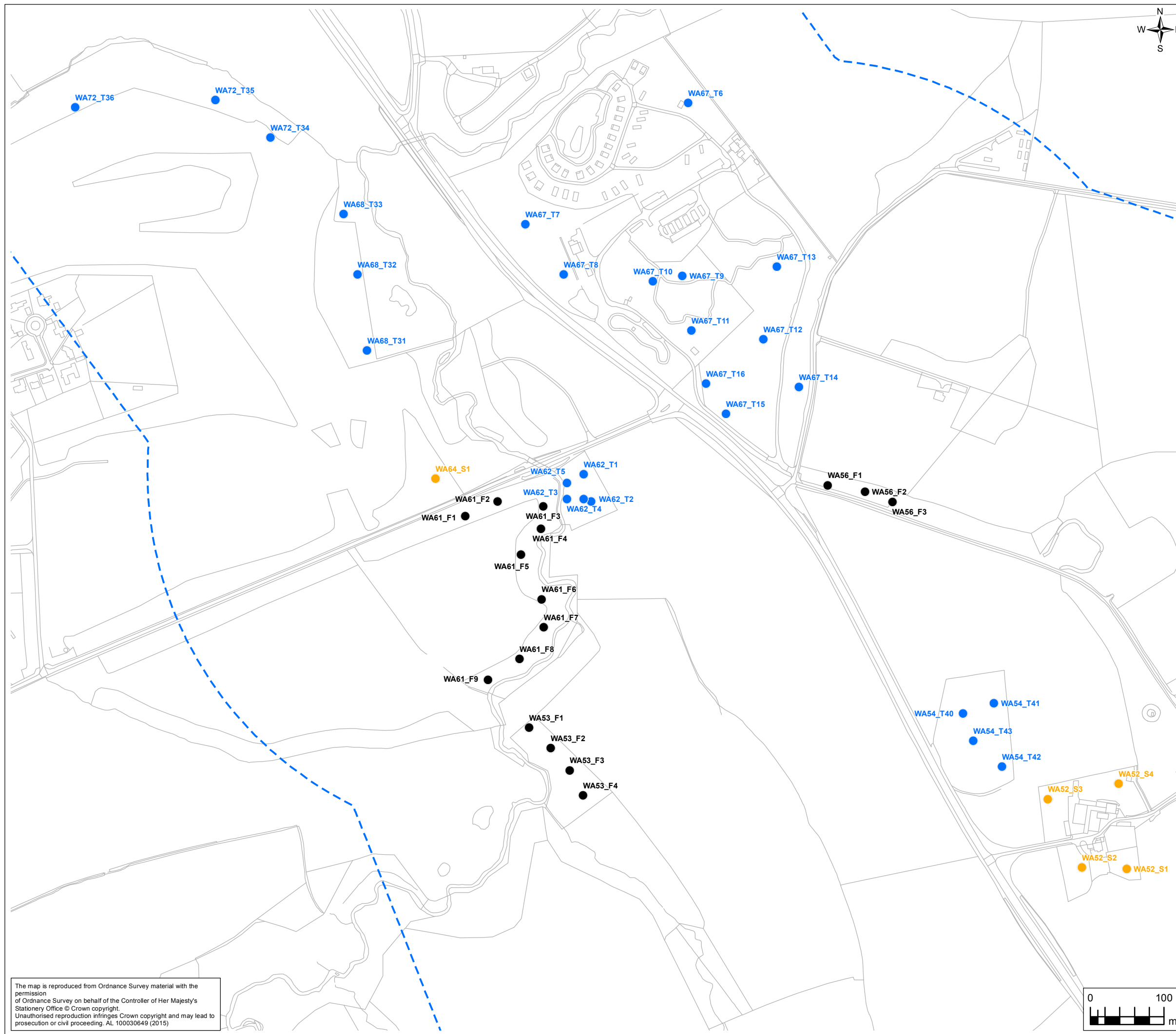


FIGURE 3.2



Legend

- 500m Survey Area
- Hair Tube
- Feeding Station
- Whole Maize Bait Locations



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Project **A1 NORTHUMBERLAND**

Drawing Title **SECTION A
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Sheet 2**

Drawing Status **Scale @ A3 1:5,000 DO NOT SCALE**

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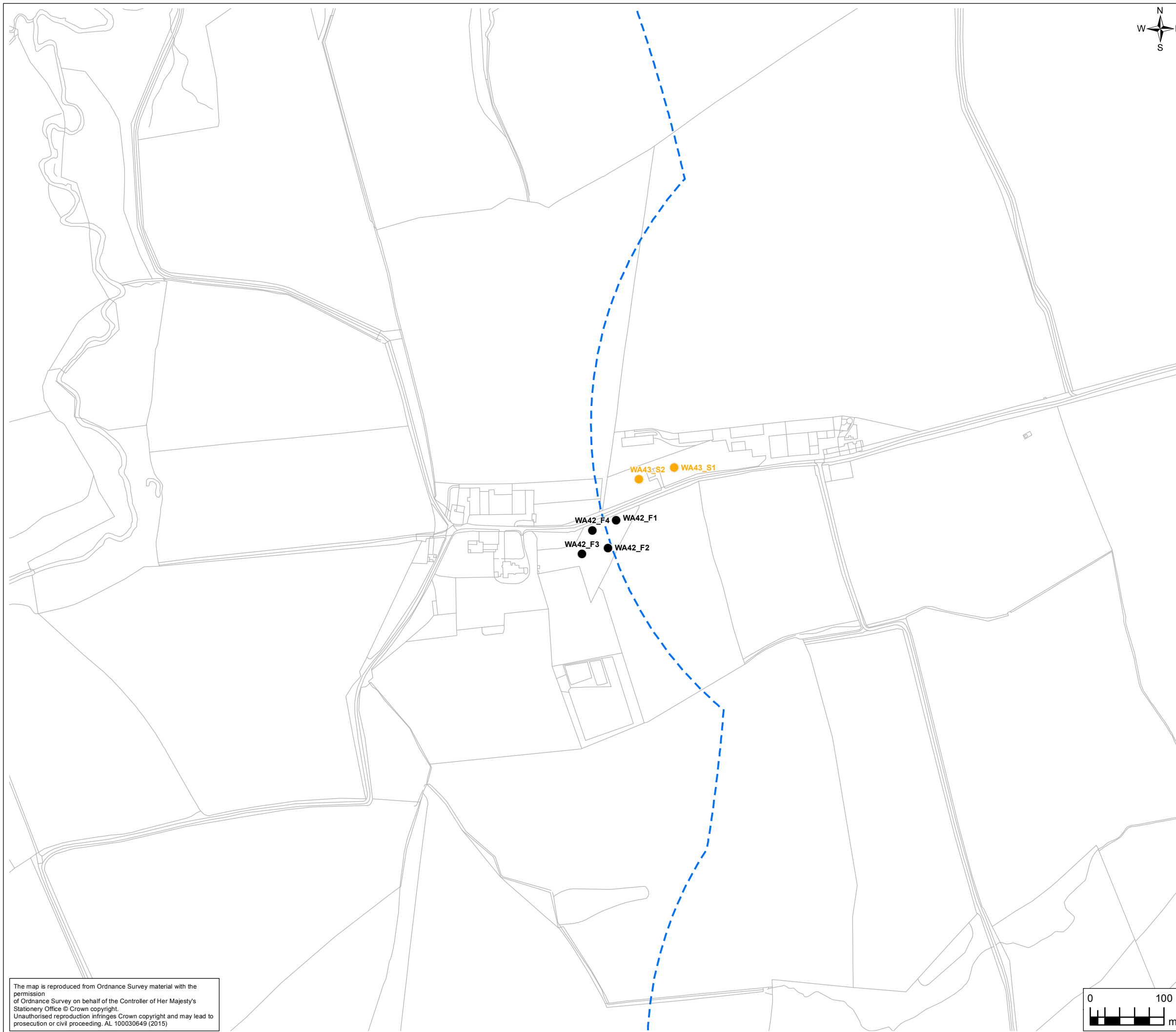
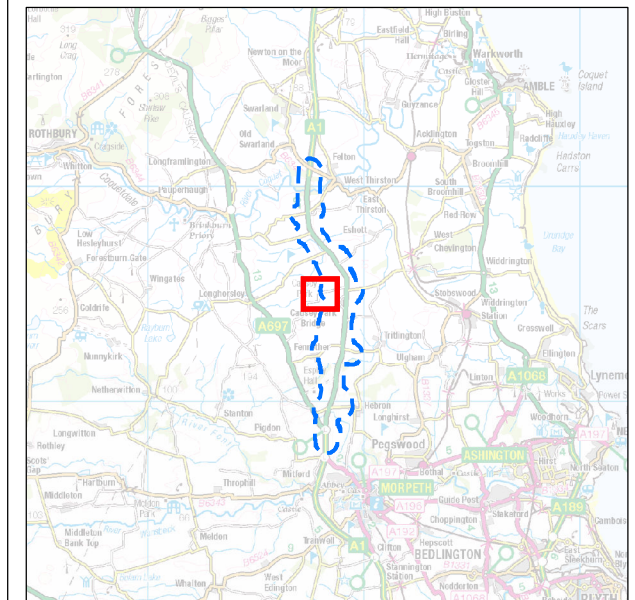


FIGURE 3.3

Legend

- 500m Survey Area
- Hair Tube
- Feeding Station
- Whole Maize Bait Locations



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Client **highways england**

Project **A1 NORTHUMBERLAND**

Drawing Title **SECTION A
SQUIREL FIELD SURVEY LOCATION POINTS
Sheet 3**

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Drawing No. **B2104700_EC_SQU_03_003**





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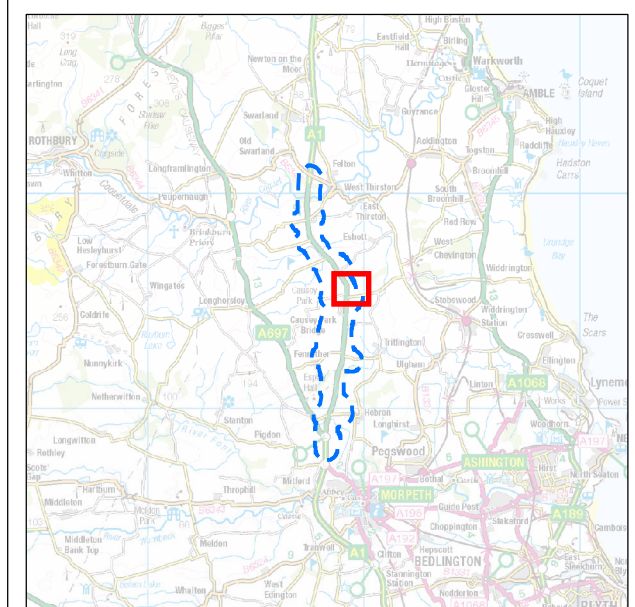
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FIGURE 3.4

Legend

-  500m Survey Area
-  Hair Tube
-  Feeding Station
-  Whole Maize Bait Locations



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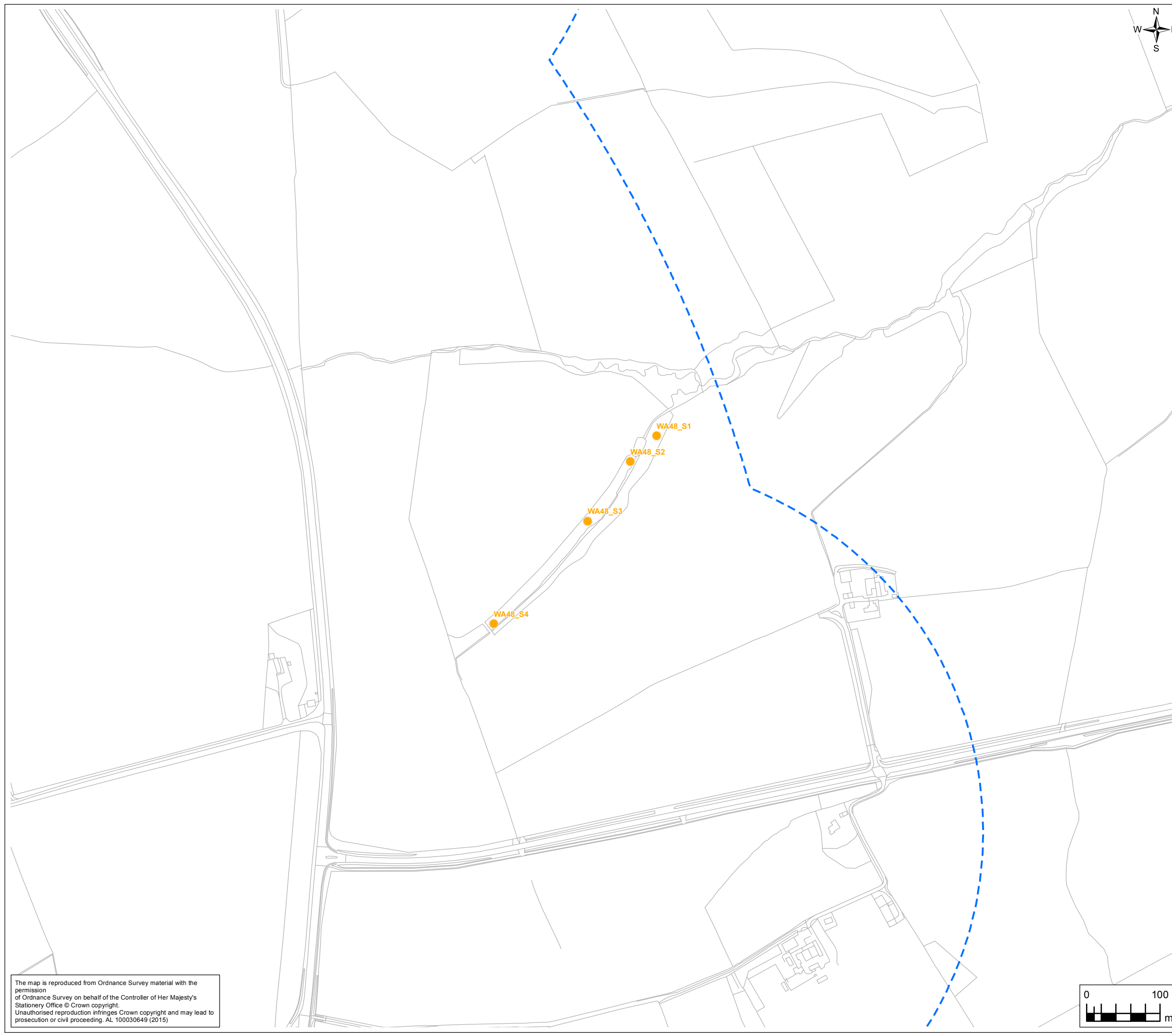
Client 

Project **A1 NORTHUMBERLAND**

Drawing Title **SECTION A
SQUIREL FIELD SURVEY LOCATION POINTS
Sheet 4**

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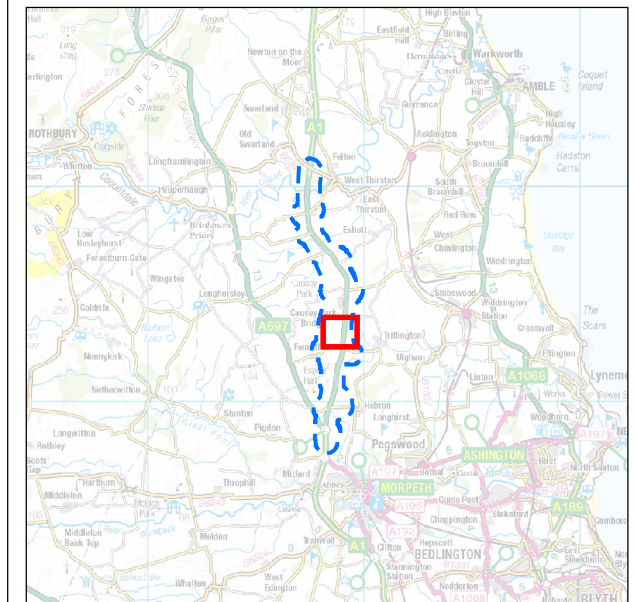


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FIGURE 3.5

Legend

-  500m Survey Area
-  Hair Tube
-  Feeding Station
-  Whole Maize Bait Locations



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Project
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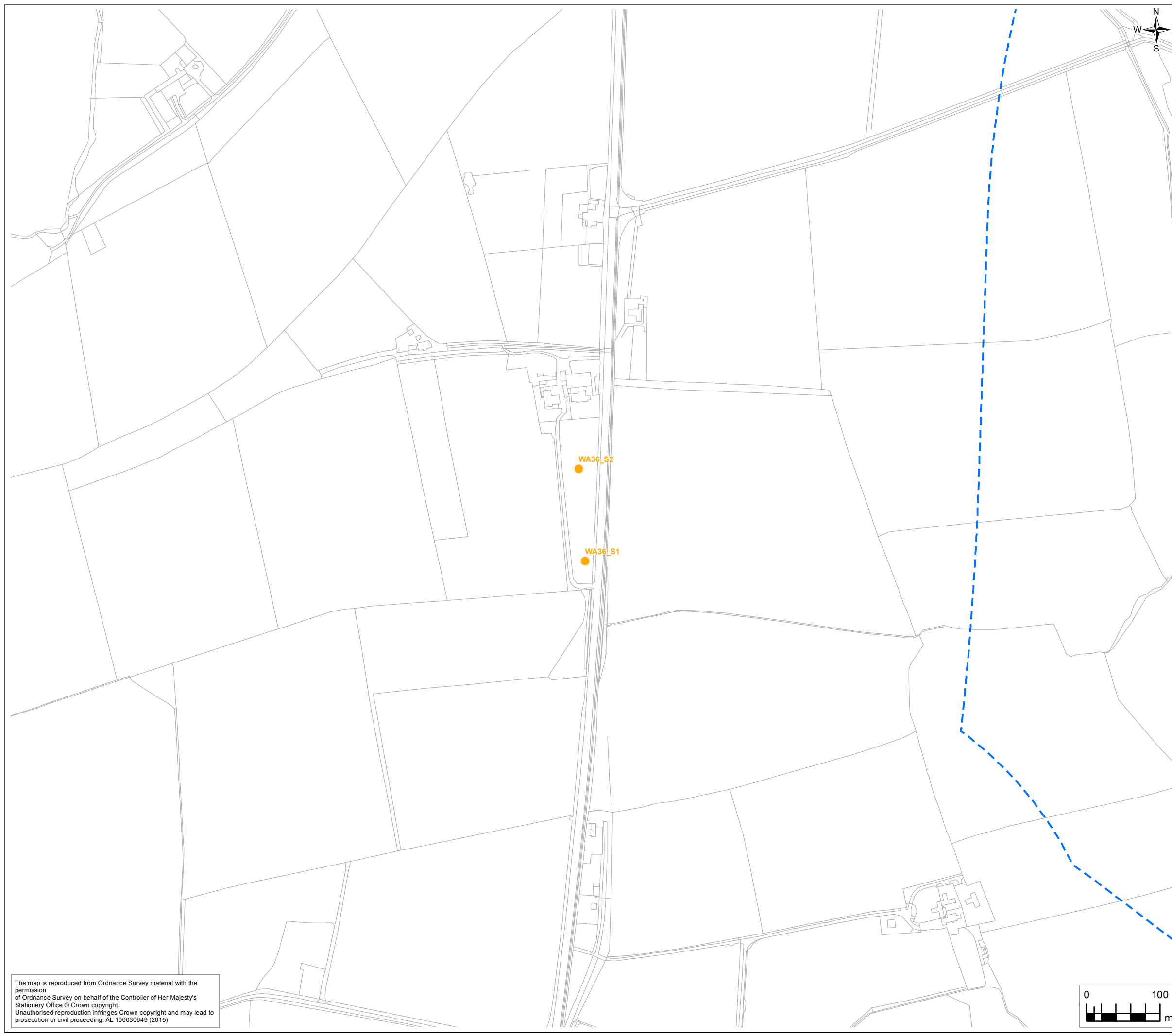
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 SQUIREL FIELD SURVEY LOCATION POINTS
 Sheet 5

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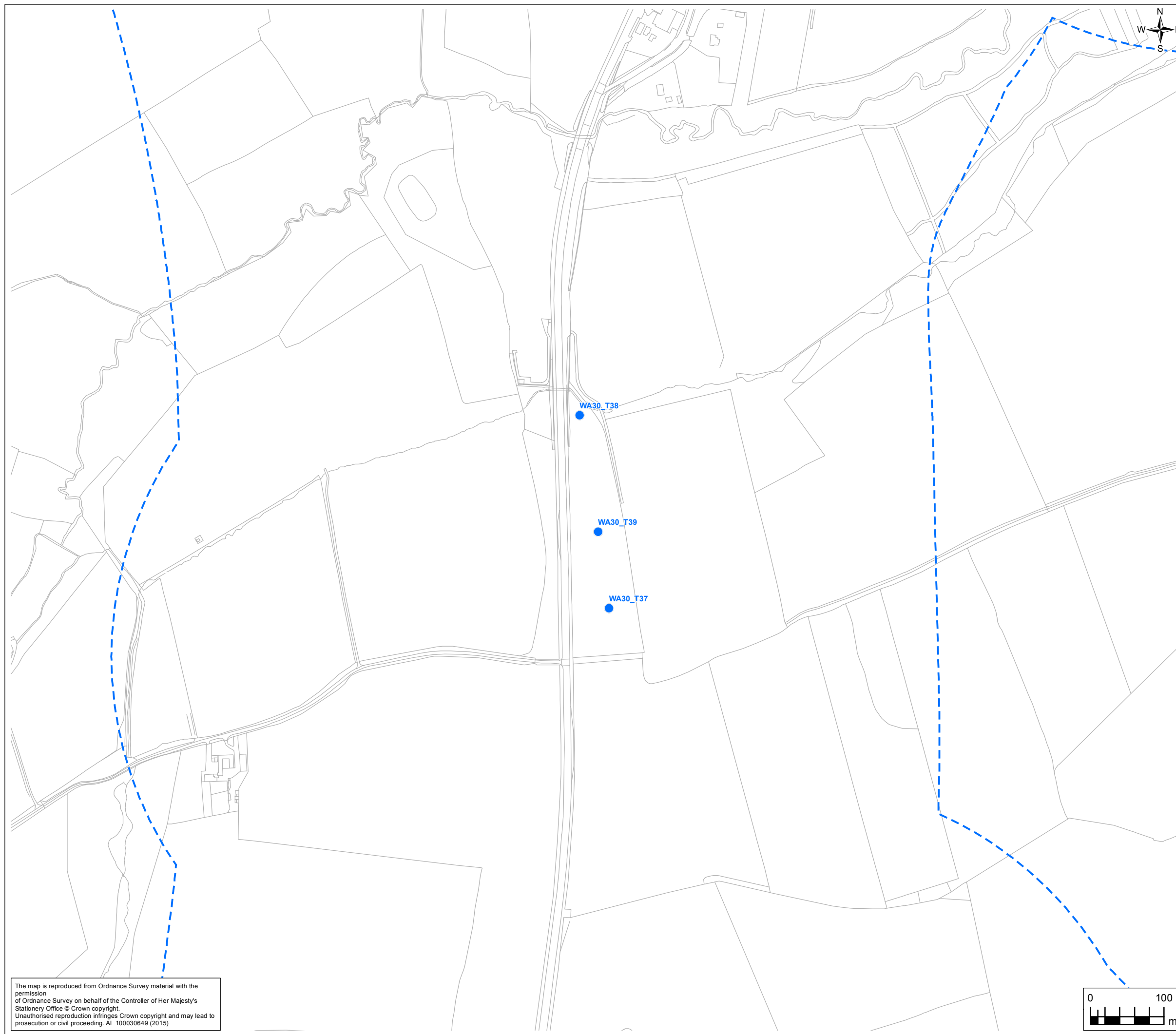
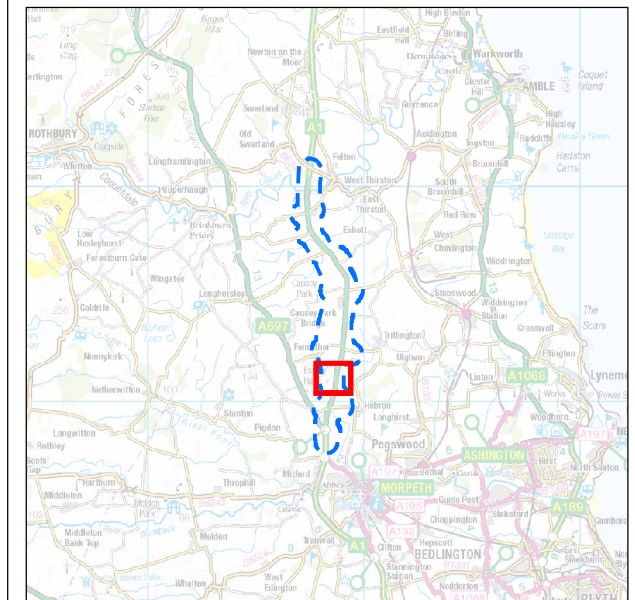
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FIGURE 3.6

Legend

-  500m Survey Area
-  Hair Tube
-  Feeding Station
-  Whole Maize Bait Locations



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Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd



Client 

Project **A1 NORTHUMBERLAND**

Drawing Title **SECTION A
SQUIREL FIELD SURVEY LOCATION POINTS
Sheet 6**

Drawing Status

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Drawing No. **B2104700_EC_SQU_03_006**

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APPENDIX A – RED SQUIRREL BIOLOGY, HABITAT REQUIREMENTS AND CONSERVATION STATUS²

Red Squirrel Description:

Red Squirrels have a chestnut upper body, with buff to cream underside, noticeable ear tufts and the famous fluffy tail. The red squirrel moults its coat twice a year but the ear tufts and the tail are only moulted annually. It is a smaller animal than the introduced grey squirrel.

Size

Head-body length: 20 - 22 cm

Tail length: 18 cm

Weight

280 - 350 g

Red Squirrel Biology

Red squirrels do not hibernate and lay down stores of food to see them through periods when fresh food is not available. Where they are found in mixed broad-leaved and coniferous woodland they have a source of food all year round, as pine seeds are present over the winter months. However, red squirrels have quite a varied diet which includes seeds, buds, flowers, leaves and fruit. They are known to take insects, fungi and birds' eggs.

Red squirrels build nests, called dreys, from sticks and moss placed high in the branches. They produce two litters of three to four kittens a year, usually in March and July. The drey is often the first evidence of the presence of red squirrels in a wood. Other signs are chewed pine cone 'cores' (birds leave ragged remains), split hazel nut shells (dormice make a hole to extract the kernel), cut tree shoots and scattered droppings.

Red squirrels can live for up to six years. They are chiefly active during the day and most of this time is spent foraging. Bad weather can seriously hinder this activity and without food the squirrels can only survive for a few days.

Red Squirrel Range

The red squirrel occurs across most of Europe into northern Asia and Siberia. In this part of its range the red squirrel is not threatened. In the UK it is restricted to a few sites, mainly those free from competition by grey squirrels, which is why it is classified as threatened. However, the two species share some habitats in Scotland and parts of Wales, Ireland and England.

Red Squirrel Habitat

Red squirrels prefer woodland that contains a fair proportion of conifer trees. In Europe they are found in large forests, gardens and parks and at altitudes of up to 2,000 metres. In the UK they are now chiefly confined to conifer forests but can live in mixed woodland that has yet to be invaded by greys.

Red Squirrel Status

Classified as Least Concern (LC) on the IUCN Red List, and listed under Appendix III of the Berne Convention. Threatened in the UK, and protected under Schedules 5 and 6 of the Wildlife and Countryside Act.

Red Squirrel Threats

There is evidence to suggest that red squirrels have fluctuated in numbers in the UK since the last ice age. In the last 50 years, however, their dramatic decline has been due to loss and fragmentation of habitat, disease and, in particular, competition from the introduced grey squirrel

² <http://www.arkive.org/red-squirrel/sciurus-vulgaris/>

(*Sciurus carolinensis*). The two species are known to coexist in some locations but while there is no evidence of aggressive behaviour by greys, competition for limited food sources tends to favour the introduced animal.

Red Squirrel Conservation

Fearing that the red squirrel would be lost as a species to central and southern England, English Nature included it in their Species Recovery Programme (SRP). In partnership with the Forestry Commission, SRP began a project to look at ways in which the red squirrel might be helped recover its population. The project is taking place in Thetford Forest in East Anglia, one of the few sites in southern England where the animal is still found. The work involves looking at changes in conifer woodland management to change the competitive balance in favour of red squirrels as well as developing new techniques in both conserving existing populations and improved re-introduction schemes.

Other methods that have been developed include cage traps that catch only the heavier grey squirrel, and a captive breeding programme that aims to release animals into specially prepared sites. They are then monitored to see how well they re-colonise a particular area.

APPENDIX B – CITATION FOR RIVER COQUET VALLEY WOODLANDS SSSI

SITE NOTIFIED TO THE SECRETARY OF STATE ON THE 31ST JULY 1996

COUNTY: NORTHUMBERLAND SITE NAME: RIVER COQUET AND
COQUET VALLEY WOODLANDS

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the
Wildlife and Countryside Act 1981 as amended.

Local Planning Authorities: Northumberland County Council
Northumberland National Park
Alnwick District Council
Castle Morpeth Borough Council

National Grid Reference: NT 786082 to NU 260051 Area: 1192.42 (ha.)

Ordnance Survey Sheets 1:50,000: 80 and 81 1:25,000: NT 80, 81, 90,91
NU 00, 10, 20
NY 99, NZ 09,19

Length of River: 125 km approx

First Notified: 1996

Description:

The River Coquet runs about 90km (57 miles) across Northumberland, from its tributaries south of Cheviot summit to reach the sea below Warkworth. As a relatively unmodified fast-flowing upland river supporting characteristic fauna and flora the Coquet is of key significance in the national resource for nature conservation. The river vegetation shows a natural succession from mineral poor upland streams, through to vegetation which reflects the characteristics of gravel, sandstone, limestone and alluvial sediments of the middle and lower reaches. The river is one of the most important game fisheries in the north of England, with large runs of sea trout and salmon. The fish are dependent on the rich insect life, of which the many species of mayfly are particularly significant. Coquetdale is a key area for otters and supports a high diversity of breeding birds which depend on riverine habitats. Many of the woodlands near the river are semi-natural and ancient woodland sites, representative of valley woodlands in Northumberland.

High in the Cheviot Hills the upper reaches of the river are torrential moorland streams on resistant bedrock. The descent becomes more gradual and substrates less stable in the middle reaches as the underlying geology changes in turn to cement stone, sandstone and limestone. Where the flood plain broad river meanders across the riverine deposits, forming oxbows, pools and marshy areas as the river channel moves with time. The lower river cuts through thick drift deposits, in places reaching underlying limestones and millstone grit, and forming a steep-sided, often wooded, valley with boulders along the river bed. Run-off within the catchment is very rapid, causing short but often violent floods. The water is clean, low in mineral content and moderately calcareous.

The plant life of the upper reaches, beyond Alwinton, 125m above sea level, is dominated by species typical of base and nutrient poor upland rivers. Several mosses including *Bynum pseudoniquetrum*, *Fontinalis antipyretica*, *Racomitrium aciculare* and *Philonotis fontana* are abundant on boulders and bed rocks. The lack of tree cover in the grazed moorland catchment influences the vegetation of the river with filamentous green algae a characteristic feature. Two species of water-crowfoot, *Ranunculus penicillatus* v. *pseudofluitans* and *R. peltatus* are the most commonly found water plants of slacks and riffles. A diatom, *Didymosphenia*, found in the upper reaches, is a species which

produces a seasonal bloom in streams on volcanic rocks; and the Cheviots are the only location in England where this phenomenon is recorded. Waterside plants including soft-rush *Juncus effusus*, common spike-rush *Eleocharis palustris*, procumbent pearlwort *Sagina procumbens*, blinks *Monta fontana* and a variety of sedges *Carex* spp. occur along the banks. Between Alwinton and Rothbury the river flows through a transitional zone taking a meandering course over a relatively level floodplain. Water-crowfoots *Ranunculus* spp. are the dominant plants, floating over the gravel and pebbles of the river bed. Below Rothbury in the lower reaches where the river cuts through sand, gravel and alluvium the richer and finer sediments support a greater diversity of plants. On rocks, the mosses *Fontinalis antipyretica* and *Rhyncostegium lusitanicum* are found. River water-crowfoot *Ranunculus fluitans*, characteristic of large clean rivers, is common on riffles while the presence of curled, perfoliate and horned pondweeds *Potamogeton crispus*, *P. perfoliatus* and *Zannichellia palustris*, branched and unbranched bur-weeds *Sparganium erectum* and *S. emersum* and the alga *Enteromorpha* reflect the base-rich nature of the river.

Many of the species of insects dependent on the river are typical of fast flowing waters. Most noticeable are the large numbers of caddis flies, *Trichoptera* and black flies, *Simuliidae*, with larvae living on the river bed, and the mayflies and stoneflies which emerge from their larval stars in the water for short lives on the wing. Of 23 species of mayfly identified from the river, two, *Ephemarella notata* and *Amelanus inopinatus* have a restricted distribution. The riverside shingle and sand habitats support an important assemblage of ground beetles with several nationally scarce species including *Bembidion schuppeli*.

The birdlife associated with the Coquet includes large numbers of common sandpipers, grey and yellow wagtails which nest and feed in high densities along or near the river above Alwinton. Oystercatchers, ringed plover, lapwing, snipe and redshank all breed on the haugh land, or floodplain. Dippers are common along the entire length and, unusually for a northern river, kingfishers hold several nesting territories in the lower reaches.

The lower and middle reaches of the river provide undisturbed habitat for otters, which are known to range throughout the catchment. The rich insect life also creates feeding grounds for bat colonies which roost and rear their young within the valley. Of particular note is the area around Brinkburn Priory where colonies of Daubenton's, natterer's, noctule, whiskered, Brandt's and pipistrelle bats have nursery roosts. The river is frequented by water voles along much of its length.

The fish fauna of the Coquet is diverse with salmon and trout being particularly significant. Salmon *Salmo salar* are known to spawn in the main river, with redds at Rothbury and upstream to Blindburn and along the River Alwin and the Wreighburn. Over 20,000 sea trout *Salmo trutta trutta* travel up the main river to spawn in many of the tributaries (1994); the River Alwin, the Rowhope and Trows Burns and several of the Wreigh Burn tributaries provide extensive spawning grounds. Also important is the occurrence of lampreys; brook lampreys *Lampetra planeri* have been recorded in the fresh waters as high as Alwinton, with sea lampreys *Petromyzon marinus* coming into the lower river, below Morwick, to breed. Other fish found regularly in the river system include stone loach *Noemacheilus barbatulus*, eels *Anguilla anguilla*, minnows *Phoxinus phoxinus* and sticklebacks *Gasterosteus aculeatus*.

The Coquet valley has several woodlands which are as being long established, relatively unmodified by planting and retaining semi-natural plant communities. There are few such woodlands now remaining in Northumberland and most are confined to steep river valleys, as along the Coquet below Rothbury. Most of the woodlands included in this site are of those along river valleys in the east of the County. Red squirrels are found in many of the woodlands.

A1 in Northumberland

Red Squirrel Survey Report

Much of the woodland immediately adjacent to the river is characterised by alder *Alnus glutinosa*, occasionally associated with ash *Fraxinus excelsior* or willows *Salix* spp. The ground flora here is diverse and characterised by meadowsweet *Filipendula ulmaria* and tufted hair-grass *Deschampsia cespitosa*, with pendulous sedge *Carex pendula*, yellow pimpernel *Lysimachia nemorum*, woodruff *Galium odoratum* and locally marsh Hawk's-beard *Crepis paludosa* and opposite-leaved golden-saxifrage *Chrysosplenium oppositifolium*. In the lower reaches where silt and debris is deposited the alder woodland has a species-poor ground flora characterised by stinging nettle *Urtica dioica* and cleavers *Galium aparine* and is locally bordered by osier *Salix viminalis*, both uncommon woodland habitats in Northumberland. Further back from the river ash and pedunculate oak *Quercus robur* are typical canopy species with wych elm *Ulmus glabra* found in some areas. Climbers including ivy *Hedera helix*, brambles *Rubus fruticosus* and honeysuckle *Lonicera periclymenum* are found in the oak woodlands with species-rich ground floras often dominated by great wood-rush *Luzula sylvatica* and other species present include bluebell *Hyacinthoides non-scripta*, wood-sorrel *Oxalis acetosella*, hedge woundwort *Stachys sylvatica* and wood avens *Geum urbanum*. Hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, rowan *Sorbus aucuparia*, holly *Ilex aquifolia* and downy birch *Betula pubescens* are the main shrub species found in the ash woods with dog's mercury *Mercurialis perennis* often dominating the ground flora and associated with wood avens *Geum urbanum*, enchanter's nightshade *Circea lutetiana*, several ferns including male-fern *Dryopteris filix-mas*, broad buckler-fern *Dryopteris dilatata* and lady-fern *Athyrium filix-femina*, an abundance of mosses and occasionally sanicle *Sanicula europea*.






Other Information:

Parts of this site are notified as separate SSSIs under the Wildlife and Countryside Act 1981, as amended; overlapping SSSI are: Linbriggs, Harbottle Moors and Barrow Meadows. The River Coquet SSSI also abuts Warkworth Dunes and Saltmarsh SSSI.






Otters, red squirrel and all species of bats in Britain are protected under Schedule 5 of the Wildlife and Countryside Act 1981, otters and bats are also listed on schedule 2 of The Conservation (Natural Habitats, etc) Regulations 1994.

Floating vegetation of *Ranunculus* of plain and submountainous rivers is a habitat listed in Annex I of the EC Habitats and Species Directive (92/43/EEC). Of species associated with the River Coquet, Annexes IIa, VIa and Va of the EC Habitats and Species Directive (92/43/EEC) list the following as specially protected: otters (IIa, IVa), all species of bats (IVa), salmon (IIa, Va) and all species of lamprey (IIa).

APPENDIX C – WOODLAND SCOPING RESULTS

Woodland number	Description	Photograph	Suitability category	Central Grid Reference (OSGR)
WA1	Isolated mixed woodland with cypress (<i>Cupressus x leylandii</i>), scots pine (<i>Pinus sylvestris</i>) and Austrian pine (<i>Pinus nigra</i>). No field signs observed.		Low	NZ 18275 87626
WA2	Coniferous woodland with Scots pine dominant. No field signs observed.		Low	NZ 18367 87713
WA3	Immature Scots pine dominated coniferous woodland approximately 25 years old. No field signs observed.		Low	NZ 18171 87614
WA4	Immature mixed plantation with Scots pine dominant. No signs observed.		Low	NZ 18174 87817
WA5	Immature broad-leaved woodland. No signs observed.		Low	NZ 18012 87995






A1 in Northumberland
Red Squirrel Survey Report

WA6	Broad-leaved beech (<i>Fagus sylvatica</i>) woodland with occasional immature scots pine. No signs observed.		Low	NZ 18182 88509
WA7	Broad-leaved beech woodland with scattered scots pine. No field signs.		Low	NZ 18132 88643
WA8	Ash (<i>Fraxinus excelsior</i>) and scots pine dominated. No field signs.		Low	NZ 17837 88813
WA9	Mixed woodland with sitka spruce (<i>Picea sitchensis</i>) dominant. Four dreys and feeding remains observed.		Moderate	NZ 17867 88984
WA10	Sycamore (<i>Acer pseudoplatanus</i>) and scots pine mixed woodland. One drey noted.		Moderate	NZ 17741 89036






A1 in Northumberland
Red Squirrel Survey Report

WA11	Immature broad-leaved plantation with occasional conifers. No signs.		Low	NZ 18405 89013
WA12	Scots pine dominated plantation. No signs observed.		Low	NZ 18711 89190
WA13	Scots pine, larch (<i>Larix decidua</i>) and ash plantation. No signs observed.		Low	NZ 18561 89419
WA14	Cypress, scots pine and larch plantation, no signs observed.		Low	NZ 18384 89605




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Red Squirrel Survey Report

WA15	Semi-mature ash plantation. No signs observed.		Low	NZ 18088 89574
WA16	Former ash hedgerow with scots pine. No signs observed.		Low	NZ 18079 89683
WA17	Dense mixed plantation with Sitka spruce, hawthorn and downy birch (<i>Betula pubescens</i>). Numerous feeding remains (stripped cones).		Moderate	NZ 17710 89862
WA18	Birch dominated plantation. No signs but connectivity with adjacent Sitka spruce plantation (WA20).		Low	NZ 18021 89992
WA19	Mixed plantation woodland with scots pine, Sitka spruce, larch, ash and hawthorn. Five dreys noted.		Moderate	NZ 17772 90070





A1 in Northumberland
Red Squirrel Survey Report

WA20	Dense Sitka spruce plantation. One drey observed.		Moderate	NZ 18004 90114
WA21	Sitka spruce and scots pine plantation with newly planted interior. No signs observed.		Low	NZ 17740 90372
WA22	Sycamore and scots pine mixed woodland. No signs observed.		Low	NZ 18880 90193
WA23	Broad-leaved plantation (beech, sycamore, birch sp. and occasional scots pine. No signs observed.		Low	NZ 18946 90282
WA24	Mixed plantation with Sitka spruce and Norway pine. A drey present with some feeding remains.		Moderate	NZ 19192 90277


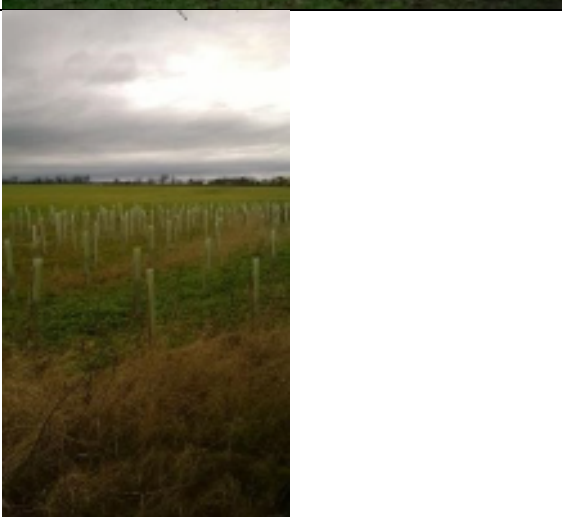

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WA25	Semi-mature birch plantation. No signs observed.		Low	NZ 19214 90353
WA26	Clear-felled former plantation. No field signs observed.		Low	NZ 18965 90802
WA27	Larch dominated coniferous woodland well connected to WA's 18, 20, 21. Three dreys observed.	No photograph available	Moderate	NZ 17975 90745
WA28	Mixed wood with immature scots pine and larch occasionally. No field signs observed.	No photograph available	Low	NZ 17983 90906
WA29	Immature line of sitka spruce trees. No signs observed.	No photograph available	Low	NZ 18516 91133
WA30	Unable to access due to location on A1 verge, but able to be visually assessed from adjacent land. Coniferous plantation woodland dominated by scots pine and larch. Dreys and feeding remains observed, although a grey squirrel has been observed here.		Moderate	NZ 18584 91087




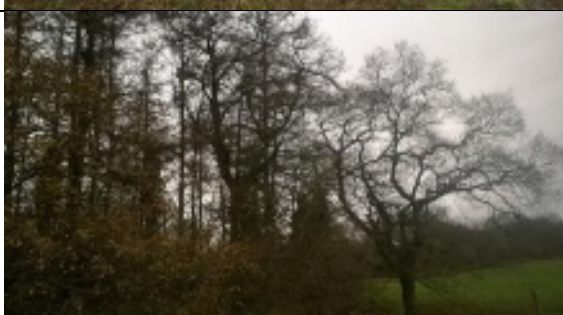

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WA31	Broad-leaved woodland dominated by oak (<i>Quercus sp.</i>) and beech. Potential dreys observed.		Moderate	NZ 18394 91435
WA32	Dense Sitka plantation connected to WA33 with occasional scots pine. No dreys observed.	No photograph available	Moderate	NZ 19458 91856
WA33	Semi-mature broad-leaved woodland. No signs observed.	No photograph available	Low	NZ 18844 91712
WA34	Immature broad-leaved plantation with ash, alder (<i>Alnus glutinosa</i>), beech. No field signs observed.		Low	NZ 18388 91740
WA35	Immature silver birch plantation. No field signs observed.		Low	NZ 18476 92669
WA36	Sitka dominated mixed plantation with a drey observed at southern end.		Moderate	NZ 18859 93275






A1 in Northumberland
Red Squirrel Survey Report

WA37	Unmanaged, dense Sitka spruce plantation with no access. Woodland is too dense for field observations.		Moderate	NZ 18856 93689
WA38	Newly planted mixed plantation. No field signs observed.		Low	NZ 18361 93786
WA39	Immature beech plantation. No field signs observed.		Low	NZ 18237 94098
WA40	New whip plantation. No field signs.		Low	NZ 18955 94835
WA41	Immature mixed plantation. No field signs.		Low	NZ 19009 95043






A1 in Northumberland
Red Squirrel Survey Report

WA42	Scots pine and Sitka immature plantation. No field signs but connected to WA31.		Moderate	NZ 17969 94999
WA43	Sitka and scots pine dominated plantation. Grey squirrel sighted, no other field signs.		Moderate	NZ 18016 95080
WA44	Mixed woodland with scots pine, sitka, larch, beech and oak. No field signs observed.		Low	NZ 19623 94915
WA45	Mixed scots pine and sycamore plantation. No field signs observed.		Low	NZ 19762 95127
WA46	Immature mixed plantation. No field signs observed.		Low	NZ 19766 95207






A1 in Northumberland
Red Squirrel Survey Report

WA47	Isolated scots pine and Sitka treeline. No field signs observed.		Low	NZ 19781 95403
WA48	Mixed woodland with larch, willow, oak and Sitka. Feeding signs observed in predominantly coniferous sections.		Low	NZ 19427 95596
WA49	Mature broad-leaved woodland with oak and ash dominant, birch occasional. No field signs observed.		Low	NZ 19498 95786
WA50	Isolated dense sitka and scots pine plantation. No field signs.		Low	NZ 18477 95834
WA51	Scots pine, Norway spruce (<i>Picea abies</i>), birch (<i>Betula sp.</i>) and sitka spruce. Two dreys and feeding remains observed.		Moderate	NZ 19348 96495

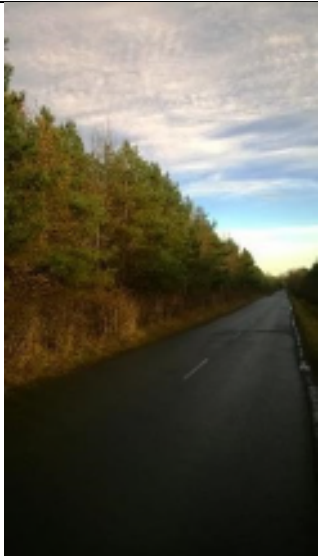

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WA52	Four small woodland compartments consisting of mixed and coniferous plantation. One drey observed in south-western compartment.		Moderate	NZ 18772 96396
WA53	Mature coniferous plantation with Sitka and scots pine, veteran oaks present on southern edge. Dreys observed in plantation.		Moderate	NZ 18201 96274
WA54	Sitka and scots pine coniferous plantation with one drey noted and feeding remains.	No photograph available	Moderate	NZ 18613 96525
WA55	Immature scots pine and beech plantation. No signs observed.		Low	NZ 19155 96845
WA56	Conifer and mixed woodland plantations. Three dreys and feeding remains observed.		Moderate	NZ 18783 96788
WA57	Mature broad-leaved woodland. No signs observed.		Low	NZ 19089 96995



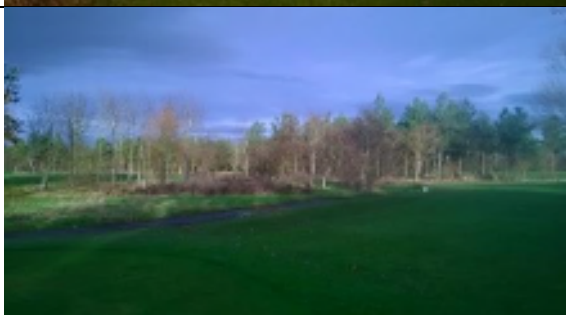
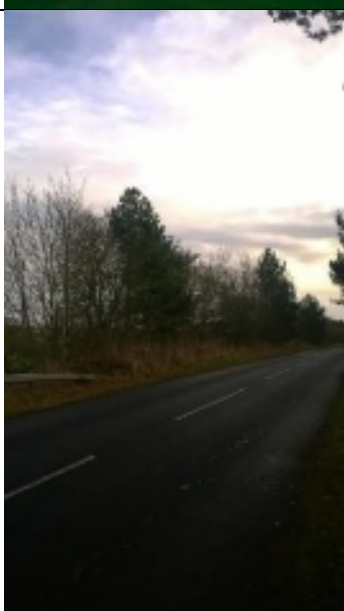
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WA58	Hawthorn scrub compartments (with WA59), no field signs observed.		Low	NZ 18621 96941
WA59	Hawthorn scrub compartments, no field signs observed.		Low	NZ 18524 97032
WA60	Immature scots pine plantation connected to WA61 and WA53. No signs observed.		Low	NZ 17642 96500
WA61	Sitka and scots pine plantation with three dreys noted. Connected to WA62, WA60 and WA53.		Moderate	NZ 18044 96634
WA62	Scots pine plantation with occasional broad-leaved trees. Four dreys observed.		Moderate	NZ 18091 96859



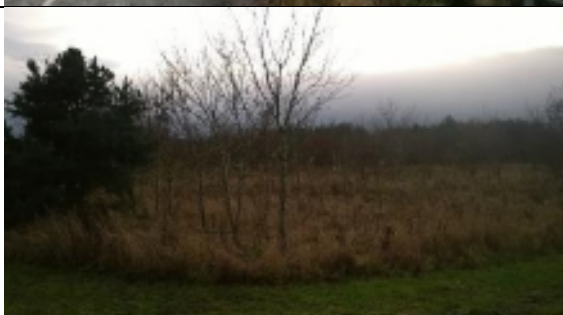

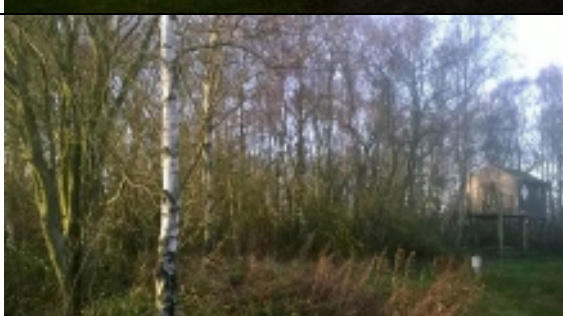
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WA63	Immature scots pine plantation shelter belt. No signs observed.			Low	NZ 17511 96678
WA64	Sitka and scots pine plantation with one drey observed.			Moderate	NZ 17847 96848
WA65	Immature birch stand. No field signs observed.			Low	NZ 17909 96935
WA66	Immature birch stand. No field signs observed.			Low	NZ 17949 97064
WA67	Dense Sitka plantation with Norway spruce, larch and occasional immature broad-leaved trees. Six dreys observed. Red squirrels have been			High	NZ 17981 97252


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Red Squirrel Survey Report

	observed by land owner, however a grey squirrel was observed this year.			
WA68	Scots pine plantation with ash and sitka occasional. Six dreys observed.		High	NZ 17751 97129
WA69	Scots pine plantation, one drey observed.		Moderate	NZ 17562 97057
WA70	Thinly planted scots pine, birch and alder windbreak at a golf course. No field signs observed.		Low	NZ 17610 97261
WA71	Sparse alder dominated mixed woodland. No signs observed.		Low	NZ 17900 97298






A1 in Northumberland
Red Squirrel Survey Report

WA72	Sitka and scots pine plantation with one drey observed.		Moderate	NZ 17500 97432
WA73	Oak, ash and beech woodland strip. No signs observed.		Low	NZ 16899 97677
WA74	Immature mixed plantation. No field signs observed.		Low	NZ 17533 97920
WA75	Immature mixed plantation. No signs observed.		Low	NZ 17567 98154
WA76	Small, isolated mixed woodland; willow (<i>Salix sp.</i>) birch and Sitka. No field signs observed.		Low	NZ 17374 98172





A1 in Northumberland
Red Squirrel Survey Report

WA77	Mixed immature woodland with birch and scots pine. Woodland is isolated and small. No field signs observed.		Low	NZ 16934 98627
WA78	Mixed plantation with Sitka, birch and oak. Woodland is small and isolate. No field signs observed.		Low	NZ 17371 98719
WA79	Immature broad-leaved plantation verge of A1. No field signs observed.		Low	NZ 17450 99516
WA80	Mixed immature plantation woodland with scots pine and beech.		Low	NZ 17400 99529
WA81	Broad-leaved woodland with beech, ash, sycamore, silver birch. South-western section of the River Coquet SSSI. Minimum of five dreys observed.		Moderate	NZ 17034 99759


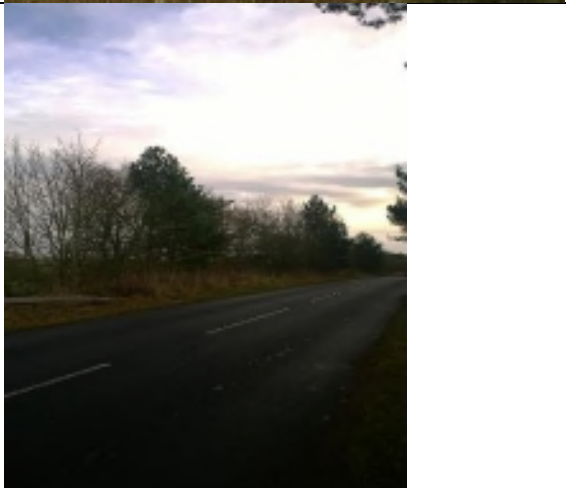



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WA82	Broad-leaved woodland within the River Coquet SSSI. Field signs not observed but connectivity with WA81 where numerous dreys were found.		Moderate	NZ 17647 99822
WA83	Sitka plantation with three dreys observed.		Moderate	NZ 17107 99888
WA84	Mature mixed woodland with Sitka, scots pine, larch, sycamore and beech. A drey was observed.		Low	NZ 17632 99917
WA85	Sitka plantation. Dreys observed and grey squirrel sighting.		Moderate	NZ 17345 99990
WA86	Mature mixed woodland with small patch of Sitka plantation in centre. A drey was observed.		Moderate	NU 17686 00291

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Red Squirrel Survey Report

WA87	Larch and sitka portion of WA90 with dreys		Moderate	NU 17362 00397
WA88	Mixed woodland with scots pine dominant around edges, centre dominated by rhododendron (<i>Rhododendron sp.</i>), birch and beech. No signs were observed but connectivity with WA89.		Moderate	NU 18011 00441
WA89	A Sitka plantation with occasional dreys and feeding remains observed.		Moderate	NU 17908 00557
WA90	There was no access to some of this woodland during time of survey. Woodland is mature coniferous and mixed plantation with small patches of broad-leaved woodland. Well connected to WA55 which was found to have dreys.		High	NU 17230 00593

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Red Squirrel Survey Report

WA91	Mixed woodland with Sitka dominant, scots pine, silver birch, sycamore occasional. No dreys noted.		Low	NU 17402 00937
WA92	Broad-leaved plantation woodland with sycamore dominant. No access, however observation from adjacent land indicated no field signs observed.		Low	NU 17598 00905
WA93	Coniferous Sitka plantation with oak and alder also present occasionally. Three dreys observed, well connected to WA92 and WA94.		Moderate	NU 17885 01094
WA94	Scots pine and birch dominant plantation woodland with occasional oak. Drey observed on scots pine.		Moderate	NU 17591 01414
WA95	Broad-leaved woodland with oak, beech and ash. No field signs were observed. Well connected to WA91.		Low	NU 17065 00988

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WA96	Broad-leaved narrow strip of woodland formed of ash and oak. No field signs observed.		Low	NU 17374 01201
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