

ECOLOGICAL IMPACT ASSESSMENT & BAT SURVEY

GAS HOUSE, RABY CASTLE



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ENVIRONMENTAL RECORDS DATA

Unless requested otherwise, the information below can be used by the Local Environmental Records Centre. E3 has an agreement with the Environment Records Centre North East whereby any information included in the below table can be stored.

Species	Recorder	Date	Location	Abundance	Comment
Soprano pipistrelle	E3 Ecology	04/06/21	Raby Castle Gas House – NZ132219	2	Day roosts used by single bats, one in Gas House and one occasionally used roost in an ash tree to the rear
Common pipistrelle	E3 Ecology	05/07/21	Raby Castle Gas House – NZ132219	2	Two day roosts used by single bats
Brandt's bat	E3 Ecology	04/06/21	Raby Castle Gas House – NZ132219	5	Day roost used by 5 bats

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A. SUMMARY

E3 Ecology Ltd was commissioned to undertake an ecological impact assessment (EclA) and a bat survey of a proposed development site at Raby Castle, Staindrop, County Durham, where it is proposed to renovate the Gas House and lay services between the building and the Raby Castle Estate buildings to the west, which already have planning consent for redevelopment. The pipeline will pass through some woodland and will require removal of a single small ash tree. In addition, the High Vinery building within the estate may require a rear extension, which may also require tree removal. A desk study was completed, including consultation with DEFRA's MAGIC website and the Environmental Records Information Centre North East (ERIC NE), and an ecological walkover, bat risk assessment, presence / absence, remote monitoring and aerial tree inspection surveys were undertaken in June and July 2021 in order to inform this assessment.

The results of the desk study indicate that there are no statutorily or non-statutorily protected sites within 2km of the proposed development site. The site does not lie within a SSSI Impact Risk Zone (IRZ) for this type of development. The majority of the site is mapped as wood-pasture and parkland or deciduous woodland Priority Habitats. There is a single record of a granted European Protected Species (EPS) mitigation licence affecting bats within 2km from site, but no such records affecting great crested newts (GCNs).

The site boundary covers approximately 0.48ha and comprises the Gas House building, two small timber sheds immediately to the south, broadleaved plantation woodland, improved grassland, amenity grassland, ornamental planting and hardstanding areas. The majority of the development footprint is considered to be of up to local value for the habitats it supports. The plantation woodland is considered to be of parish value in its entirety, but the development footprint would only impact a small area of this and the service pipeline route has been chosen to minimise anticipated tree losses. The woodland to the rear of the Gas House also contained small amounts of rhododendron, an invasive, non-native species listed on Schedule 9 of the Wildlife & Countryside Act 1981 (as amended).

With regard to bats, the habitats in the local area are of good suitability for use by foraging and commuting bats, with areas of parkland, blocks of woodland and scattered ponds all presenting foraging opportunities.

There are three buildings and two tree groups which were subjected to detailed surveys: the Gas House and trees to the rear (west), two small timber sheds to the south of the Gas House and trees to the rear (north) of the High Vinery building.

The Gas House is a two storey stone building with pitched slate roofs. Based on the daytime bat risk assessment, it was considered to be of moderate roosting suitability. Further surveys of the building have subsequently confirmed the presence of the following roosts:

- Common pipistrelle day roost. Peak count of one bat recorded emerging from the central roof structure during a dusk presence / absence survey.
- Soprano pipistrelle day roost in the northern section, east-facing gable end, accessed via a gap in the wall beneath the guttering on the south-eastern elevation of this section. Peak count of one bat recorded using the roost.
- Brandt's bat day roost. Peak count of five bats recorded re-entering the building during the dawn survey, using two access points.
- Common pipistrelle day roost in a gap at the south eastern gable end wall above the ground floor door, with a single bat entering during the dawn survey.

The Gas House also has the potential to support hibernating bats during the winter, predominantly on the wall tops or gaps in the thick stone walls. The building is considered to be of parish value to roosting bats.

The two small sheds to the south of the Gas House are considered to be of low roosting suitability and no roosts were recorded during the single dusk survey of these buildings. They are also unlikely to support hibernating bats and are considered to be of negligible value to bats.

Of the trees along the proposed pipeline route to the rear of the Gas House, survey to date has recorded the following:

- An ash tree (T205) of moderate roosting suitability. No roosts were recorded in the tree during the aerial endoscope inspection and dusk survey, however bat activity during the dawn survey suggests it may be occasionally used by single to low numbers of soprano pipistrelle bats on an opportunistic basis.
- A single sycamore tree (T204) initially considered of low to moderate suitability when assessed from ground level, but when inspected aurally was downgraded to low suitability. No roosts recorded during the dusk survey.
- Several negligible to low suitability beech, sycamore and oak trees (T202, T201, T201a-c, T209).

These trees are considered to be of up to local value to bats.

The four beech trees to the rear of the High Vinery were given a precautionary assessment of moderate roosting suitability given the constraint of the trees being in full leaf and the foliage obscuring views into the canopy (as well as the trees not being safe to climb). Subsequent dusk and dawn surveys recorded no confirmed roosts. The four sycamore trees to the rear of the High Vinery are of low roosting suitability and low value to roosting bats.

No surveys are required to assess the value of the site for species other than bats. It is considered of up to parish value for birds (with most interest in the woodland), local value for common amphibians (excluding GCNs, but including common toad), hedgehog and brown hare and low value for badgers, with other protected and priority species likely to be absent.

The results of the site surveys to date, combined with the desk study, have highlighted the following further ecological survey, mitigation or compensation requirements.

Ecological Receptor	Impact	Mitigation
<i>Protected Sites</i>		
No protected sites within 2km	None anticipated.	None required.
<i>Habitats</i>		
Woodland, scattered trees and hedgerows	Loss of a single small ash tree (T208) to the rear of the Gas House and possibly up to eight trees to rear of High Vinery (depending on arboricultural impact assessment) and temporary damage/disturbance of retained trees/hedges during construction.	Hedgerows, trees and woodland will be retained where possible. Works will be undertaken in accordance with BS5837-2012 'Trees in relation to construction' and retained hedgerows and trees will be protected, including protection of roots. Any removal will be appropriately compensated for within the landscaping proposals. Only native species will be planted unless compensating for the loss of non-native amenity trees/hedgerows. The pipeline route has been carefully designed to minimise the requirement for tree removal within

		<p>the woodland to the rear of the Gas House. Similarly the eight semi-mature sycamore and beech trees to the rear of the High Vinery building will be retained if possible. The loss of such a small number of trees is not anticipated to significantly impact the quality of the woodland habitats, and may cause benefits in the form of decreasing light competition in the understorey and ground flora and in creating a woodland ride along the pipeline route. No trees will be planted along the pipeline route to avoid future constraints with maintenance, but the pipeline route within the woodland will be seeded with a shade-tolerant native wildflower seed mixture, such as Emorsgate EW1 or similar.</p> <p>Retained woodland will be protected from disturbance during construction by heras fencing.</p>
Invasive species	Spread of rhododendron on and off site.	Works will be undertaken to a precautionary invasive species method statement.
Biodiversity (general)	Loss of biodiversity as a result of development of the site.	The pipeline route has been designed to allow the retention of as much higher value habitat as possible, with the route crossing predominantly poor semi-improved grassland, amenity grassland and hardstanding areas. It is anticipated that the small scale habitat losses will be balanced on site through habitat enhancements and creation, including those detailed within the wider application to redevelop the Raby Castle Estate (DM/20/01183/FPA).
<i>Species</i>		
Bats	<p>Harm/disturbance to bats should they be present during works to the Gas House, possibly including during winter.</p> <p>If proposals change and the ash tree (T205) to the rear of the Gas House is to be felled or otherwise affected, this impact would also apply to that tree.</p>	<p><u>A Natural England mitigation licence will be required prior to works commencing on the Gas House which may impact bats.</u></p> <p>All works will follow the approved Natural England method statement. This will include a tool box talk to contractors prior to works commencing on building and ash tree (T205 - if affected) with confirmed roosts, inspection and supervision of works to high risk features (e.g. roof coverings, loft spaces, stone walls, eaves and cavities in the tree) by the Project Ecologist and capture and translocation of bats by hand by the ecologist to a pre-erected bat box. Three concrete-type bat boxes will be erected on suitably mature trees in an undisturbed area of the site for this purpose. If bats cannot be safely captured, they will be excluded from the features by the use of one-way valves over a minimum of five nights of suitable weather conditions. No exclusion will take place during winter (November to end of February inclusive).</p> <p>The following key elements of work will not be completed during the bat hibernation period (November to end of February inclusive) as a</p>

		<p>precaution to avoid disturbance and harm during this sensitive period:</p> <ul style="list-style-type: none"> ▪ Re-structuring/re-pointing of existing stone/brickwork ▪ Exposing of the wall tops via roof stripping works ▪ Felling of ash tree (T205 – if development proposals change and it is required)
	<p>Modification of common pipistrelle, soprano pipistrelle and Brandt's bat day roosts in the Gas House, used by single to low numbers of bats.</p> <p>If proposals change and the ash tree (T205) is to be affected, potential loss of soprano pipistrelle occasional/day roost used by single to low numbers of bats.</p>	<p>It is anticipated that all roosts recorded within the Gas House can be retained or modified. The proposals also indicate that the soprano pipistrelle roost in the ash tree will be retained.</p> <p>Roof coverings (slate, leadwork etc.) will be repaired, but only following inspection of the features by the Project Ecologist. Roosting locations will be retained during the repairs where possible, and if repairs are required of the roosting feature (e.g. to make watertight) then a raised slate, ridge tile with a gap for access or dedicated bat access tile will be installed in the same location.</p> <p>Gaps in the stonework and in the pointing will also be repaired, with roosts retained where possible and with at least eight gaps leading onto the wall tops, measuring approx. 20mm x 40mm, two on each elevation.</p> <p>No use of the loft space is required; therefore this will be retained for bat use. A door will be installed on the currently open entrance hatch to minimise any disturbance when accessing the first floor of the southern section of the building.</p> <p>No breathable roofing membranes will be installed.</p> <p>If development proposals change and removal of the ash tree (T205) is required, it will first be inspected for bats by the supervising ecologist, bats will be captured by hand if possible and transported to a pre-installed bat box, or alternatively excluded in accordance with the latest version of the Bat Workers Manual.</p> <p>It will then be "soft felled" – cut in sections, making sure to avoid cutting through internal cavities, and then lowering the sections to the ground. They will be stacked/left overnight so that the potential access points (e.g. woodpecker/squirrel holes) are not blocked, before they can then be moved as required.</p> <p>Any tree felling in the area surrounding T205 will be completed in a way that avoids falling timber on T205.</p>

	<p>Low residual risk of harm/disturbance to bats in the unlikely event that they are roosting within other trees scheduled for removal at the time of their removal.</p>	<p>Trees which require removal will be soft felled as detailed above, though these do not specifically require ecological supervision.</p> <p>If they are due to be felled over 12 months from the last survey, an updating survey will be required of any moderate or high roosting suitability trees.</p>
	<p>Increased lighting affecting foraging/commuting areas potentially used by bats (and other nocturnal wildlife)</p>	<p>Light levels around retained and newly installed roost locations and foraging/commuting areas (e.g. woodland and trees) will be low level, below 2m in height, and low lux (below 1 lux 5m from the light source).</p> <p>Warm-light LEDs with very low UV will be used, with cowls designed to accurately target which areas are lit.</p>
Common amphibians (excluding GCNs)	<p>Harm/disturbance to common amphibians, including common toad</p>	<p>Works will be undertaken to a precautionary amphibian method statement.</p>
Birds	<p>Harm/disturbance to nesting birds if vegetation clearance or building works are carried out during the bird breeding season</p>	<p>A pre-commencement check for nesting birds will be undertaken by a suitably experienced ornithologist if vegetation clearance or building works to the Gas House is undertaken between March and August inclusive.</p>
	<p>Loss of bird foraging opportunities of up to local value</p>	<p>Landscape planting to include plants bearing flowers, nectar and fruits which are attractive to invertebrates, thereby helping to maintain the food resource for birds and wildlife generally</p>
	<p>Loss of bird nesting opportunities of up to local value</p>	<p>Installation of six concrete type bird nest boxes on trees within the woodland areas – four general purpose ~26-28mm and ~32mm entrance hole types and two open fronted types. Boxes are to be installed at a minimum height of 2m, on a north or east orientation.</p> <p>Four concrete type bird nest boxes/bricks will be installed on the renovated Gas House building, two suitable for swift (minimum 5m high) and two suitable for house sparrow (eaves level).</p>
Hedgehog	<p>Harm/disturbance to hedgehog</p>	<p>Works will be undertaken to a precautionary hedgehog method statement including a hand search of suitable refugia, such as log piles, prior to removal.</p>
Wildlife (general)	<p>Entrapment of wildlife during construction if trenches are left open overnight</p>	<p>Any excavations left open overnight will have a means of escape for wildlife that may become trapped in the form of a ramp at least 300mm in width and angled no greater than 45°.</p>

The following enhancements are recommended:

-
- Removal of rhododendron within the woodland to the rear of the Gas House in accordance with an invasive species method statement.
 - Creation of a hedgehog/reptile/amphibian hibernacula or habitat pile within the woodland to the rear of the Gas House.
 - Installation of two flat, concrete type bat boxes (Schwegler 1FF or similar) to be installed in the enclosed loft space of the Gas House to enhance internal roosting opportunities.

The local planning authority is likely to require the means of delivery of the mitigation to be identified. It is recommended that mitigation, compensation and enhancement proposals are incorporated into the planning documents.

Provided that the above recommendations are implemented, it is anticipated that the proposals may proceed with no significant adverse effect on protected or notable habitats and species. Ecological enhancement opportunities include control of non-native invasive species and bat and bird roosting/nesting provision, contributing to local and national conservation targets

If you are assessing this report for a local planning authority and have any difficulties interpreting plans and figures from a scanned version of the report, E3 Ecology Ltd would be happy to email a PDF copy to you. Please contact us on 01434 230982.

B. INTRODUCTION

E3 Ecology Ltd was commissioned by Raby Estates in May 2021 to undertake an EclA and bat survey of a proposed development site at Raby Castle, Staindrop, County Durham.

This assessment has been prepared taking account of the Chartered Institute of Ecology and Environmental Management's (CIEEM) "Guidelines for Ecological Impact Assessment in the UK and Ireland" (2019).

B.1 AUTHOR, SURVEYORS & QUALIFICATIONS

The author's professional qualifications and survey licences are detailed in the table below, as well as those of additional lead surveyors who completed survey work at the proposed development site:

TABLE 1: LEAD SURVEYORS			
Name	Position	Professional Qualifications	Natural England Survey Licence Numbers
Declan Ghee	Senior Ecologist	BSc ACIEEM Field Identification Skills Certificate Level 4 (certified)	2016-26454-CLS-CLS (GCN*) 2018-38363-CLS-CLS (Bats)
Jessica Wilson	Ecologist	BSc MSc ACIEEM	2019-40053-CLS-CLS (Bats)
Richard Thompson	Graduate Ecologist	BSc MSc	-
Georgia Vessey	Graduate Ecologist	BSc	-
Rosie Mackenzie	Graduate Ecologist	BSc MSc	-

*GCN: Great Crested Newt

Further details of experience and qualifications are available at www.e3ecology.co.uk.

All surveyors have the knowledge, skills and experience identified within the relevant CIEEM Competencies for Species Survey guidance, or were under the supervision of a surveyor with the required competencies.

B.2 OBJECTIVES

The objectives of the assessment are to:

- Establish baseline ecological conditions and determine the importance of ecological features present or potentially present within the survey area;
- Complete comprehensive building inspections to search for evidence of bat use;
- Establish the bat roosting suitability of any buildings, structures or trees which may be present on site and at risk of impact by the development;
- Identify and describe potentially significant ecological constraints and effects associated with the proposed development;
- Make recommendations for design options to avoid significant effects on important ecological resources at an early stage of development planning where possible;
- Identify the potential requirement for further surveys on protected species and habitats which may be present on site;
- Set out the mitigation, compensation and enhancement measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- Identify how these measures could be secured; and
- Identify any requirements for post-construction monitoring of the site.

B.3 PROPOSED DEVELOPMENT SITE

The site is located in to the east of the Raby Castle Estate, north of Staindrop with the Gas House an approximate central grid reference of NZ 13219 21992.

The figures below illustrate firstly the survey boundary and secondly the broad habitats present on site and within an approximate 500m buffer zone. The green line boundary shows the Gas House and pipeline route, whereas the yellow indicative survey boundary shows the location of the trees to the rear of the High Vinery building.

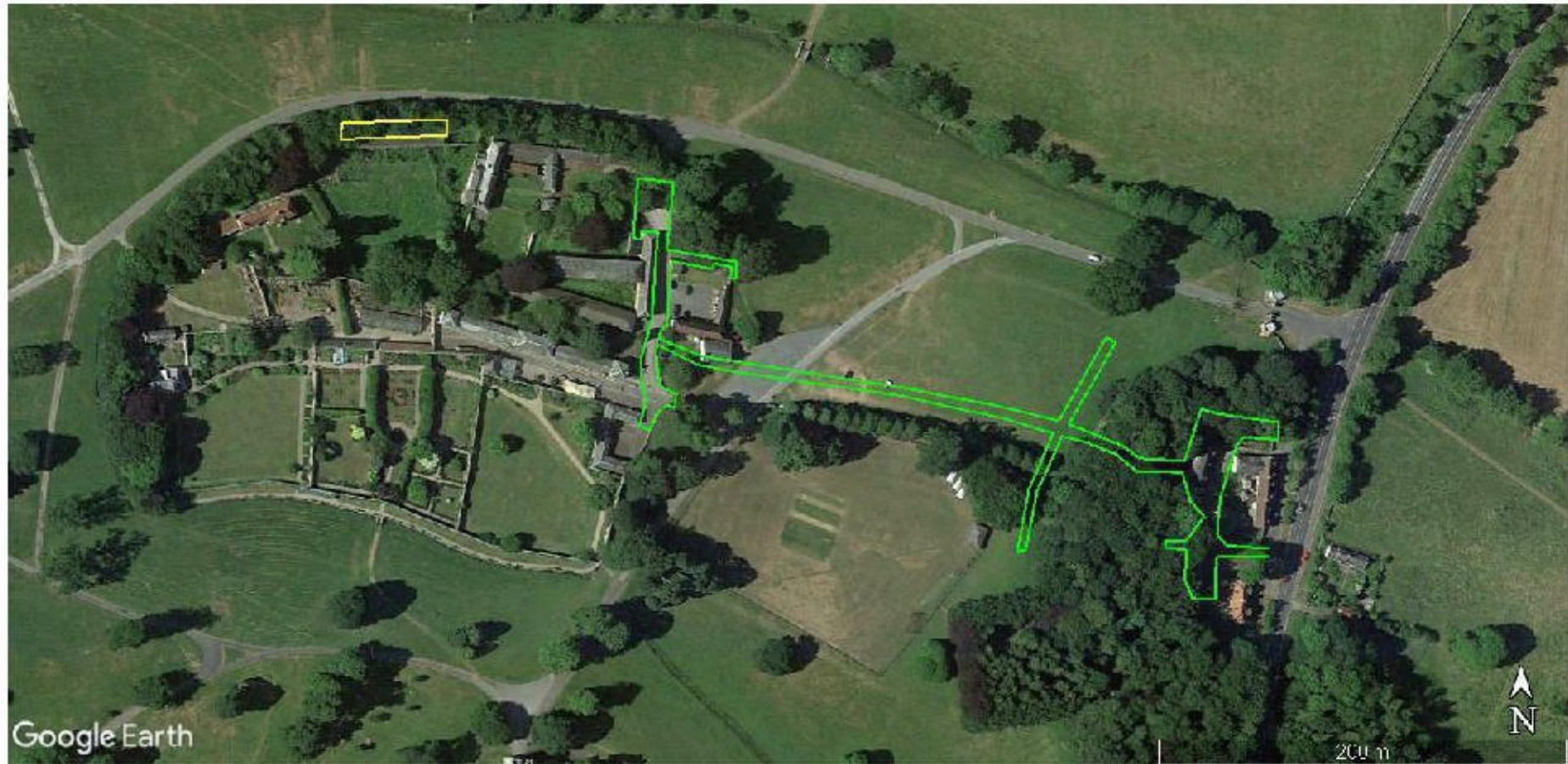


FIGURE 1: SITE BOUNDARY
(Reproduced under licence from Google Earth Pro.)



FIGURE 2: SITE AND 500M SETTING
(Reproduced under licence from Google Earth Pro.)

B.4 DEVELOPMENT PROPOSALS

The proposed development involves renovating the Gas House and laying services between the building and the Raby Castle masterplan area to the west. The Gas House will

accommodate plant equipment for the services and the service route will extend westwards through an area of woodland, across a grassland field used for car parking and into the estate. The renovation works to the Gas House building will involve:

- Repair of roof coverings, to include lead dressings and slate main surfaces.
- Raising the chimney flue to 1m above the ridge line.
- Repointing external masonry, with some minor renewal of decayed elements.
- Conversion of the south door and a window on the west elevation to form louvres for the combustion air supply.
- Possible construction of a new external staircase to serve the central first floor door on the east elevation (the existing internal access is inadequate).
- Construction of an external meter cupboard surround structure.
- Relocation of two existing timber frame and cladding garages.
- External redecoration of joinery and rainwater goods.

There are also proposals to extend the High Vinery Building to the rear to accommodate a larger kitchen. This may impact on the line of trees closest to the rear of the building, which comprise (west to east) four semi-mature sycamore trees and four semi-mature beech trees. Detailed proposals plans are not yet available for these works.

C. METHODOLOGY

C.1 SCOPE OF STUDY

The scope of the study, in terms of the survey area and the desk study area, is based on professional judgement. The likely zone of influence of the proposal has been considered, including both potential direct effects, such as habitat loss, and potential indirect effects, such as disturbance. Consideration has been given to potential effects both during the construction and operational phases of the development.

For this site the survey area comprised the green and yellow line boundaries as defined within the figures in section B.

In some circumstances field signs and habitat suitability may indicate the potential presence of nearby protected species and/or habitats immediately adjacent to the site which may fall within the zone of influence. In this scenario, if access was available the survey boundary was extended to include these areas. If access was not possible at the time of initial survey, the ecological impact assessment and required mitigation measures have been prepared taking this limitation into account.

The desk study included an assessment of land-use in the surrounding area and a data search covering a 2km buffer zone (see below for further detail).

The following types of ecological receptors have been considered:

- Statutorily designated sites for nature conservation;
- Non-statutorily designated sites for nature conservation;
- Species protected by law;
- Species and/or habitats listed under the NERC Act (2009) as being of principal importance for conservation of biodiversity; and
- Species and/or habitats listed in relevant local biodiversity action plans.

Further details on planning and legislative context are provided in the appendices of this report.

C.2 DESK STUDY

Initially, the site was assessed from aerial photographs and 1:25,000 Ordnance Survey maps.

Following this, a data search was submitted to the Local Records Centre in June 2021, requesting data relating to protected or otherwise notable species and non-statutory sites for nature conservation within 2km of the survey area.

In addition, a search was made of the MAGIC website¹ for all statutorily protected sites for nature conservation within 2km of the survey area, as well as notable habitats or species records.

Additional records of protected or notable species and habitats were sourced from E3 Ecology's previous survey work of the Raby Castle Estate.

¹ MAGIC Website: www.magic.gov.uk

C.3 FIELD SURVEY

An ecological walkover survey of the site was completed, comprising a phase 1 habitat survey and a preliminary appraisal for protected and otherwise notable species.

C.3.1 METHODOLOGY

C.3.1.1 PHASE 1 HABITAT SURVEY

The field survey of the proposed site was conducted using the methodology of the Joint Nature Conservation Committee's Phase 1 Habitat Survey, as outlined in their habitat-mapping manual². Each parcel of land was assessed by a trained surveyor and classified as one of ninety habitat types. These were then mapped and the habitat information supplemented by dominant and indicator species codes and target notes where appropriate. Where areas within the study area do not fall into the Phase 1 Habitat Survey classification, alternative methods of classification have been used.

C.3.1.2 PRELIMINARY PROTECTED/NOTABLE SPECIES APPRAISAL

A preliminary appraisal of the site was completed to search for field signs or evidence of protected or notable³ species and to assess the suitability of habitats to support such species.

When conducting the survey, particular focus was concentrated on, but not restricted to, the following taxa:

- Amphibians, including great crested newt (GCN)
- Badger
- Bats
- Birds
- Brown hare
- Fish
- Hedgehog
- Notable butterfly species
- Non-native invasive species
- Otter
- Red squirrel
- Reptiles
- Water vole
- White-clawed crayfish

Assessment of habitat suitability to support such species was based on professional judgement and experience, species-specific habitat preferences, knowledge of local and broad geographical species distribution and connectivity to other areas of suitable habitat.

Where it is considered likely that there is a significant risk of protected or otherwise notable species being affected, or where habitats are of particularly high value, additional specialist survey work has been recommended. Further survey work may also be recommended where development proposals have the potential to affect statutorily designated sites in the vicinity.

C.3.2 SURVEY EQUIPMENT

The following equipment was used during the phase 1 habitat survey:

- Binoculars
- Camera
- Torch

² Handbook for Phase 1 habitat survey, A Technique For Environmental Audit, JNCC, 2010

³ To include national priority species as listed in Section 41 of the NERC Act (2006) and local or regional priority species as listed within the relevant Biodiversity Action Plan

C.3.3 ENVIRONMENTAL CONDITIONS

The table below details the environmental conditions during the survey.

TABLE 2: SURVEY CONDITIONS				
Date	Temperature (°C)	Cloud Cover (%)	Precipitation	Wind Conditions (Beaufort scale)
04/06/21	15	50	Dry	0

BATS

Where present, the bat roosting suitability of any buildings/structures and trees on site, or within the zone of influence, were appraised in accordance with the guidelines provided within the Bat Conservation Trust Bat Survey: Good Practice Guidelines⁴ and these are detailed within the table below.

TABLE 3: ASSESSMENT OF BAT ROOSTING SUITABILITY OF BUILDINGS/STRUCTURES & TREES (TO BE APPLIED USING PROFESSIONAL JUDGEMENT, TAKEN FROM TABLE 4.1 OF BCT'S BAT SURVEY GUIDELINES)	
Suitability	Roosting Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A building/structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A building/structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Note that any comments within this report on the state or condition of buildings/structures relate solely to their potential use by bats and must not be taken as a professional assessment of the structural integrity or safety of the structures.

C.3.4 BAT RISK ASSESSMENT SURVEY EQUIPMENT

- High-powered torch
- Binoculars
- Camera
- Extendable ladders
- Eppendorf dropping sample tubes

⁴ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

C.3.5 PRESENCE/ABSENCE SURVEY

C.3.5.1 SURVEY EFFORT

The level of survey effort employed has taken account of the guidance provided by the Bat Conservation Trust (BCT)⁵ and summarised within the table below.

	Low Roost Suitability*	Moderate Roost Suitability	High Roost Suitability
Recommended minimum number of survey visits for presence/absence survey to give confidence in a negative result	One survey visit. One dusk emergence or dawn re-entry survey (structures). For trees with low roost suitability, no further surveys required.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn.
Recommended timings for presence/absence surveys	May to August	May to September with at least one of the surveys between May and August	May to September with at least two of the surveys between May and August
* If a structure is classified as having low suitability for bats an ecologist should make a professional judgement on how to proceed based on all of the evidence available. If sufficient areas of a structure have been inspected and no evidence found (and is unlikely to have been removed by weather or cleaning or be hidden), then further surveys may not be appropriate.			
Note: Where a roost is confirmed as being present, further surveys may be required to fully characterise the roost			

The recommendations provided above are guidelines and it is recognised by BCT that ‘the number of visits could be adjusted (up or down) if necessary by the ecologist, bearing in mind the site-specific circumstances’.

At this site, the following initial suitability assessments were completed:

- Gas House – moderate
- Ash tree along pipeline route – high
- Beech and sycamore trees along pipeline route – low to moderate
- Four beech trees to rear of High Vinery building – likely low to moderate, but foliage obstructing clear views

The following surveys have been completed in line with these assessments:

- Gas House – DNA species analysis of bat droppings, remote monitoring of interior for 10 days, dusk survey, dawn survey
- Ash tree along pipeline route – aerial inspection, dusk survey, dawn survey
- Beech and sycamore trees along pipeline route – aerial inspection, dusk survey
- Four beech trees to rear of High Vinery building – dusk survey, dawn survey

Following the aerial inspections of the trees along the pipeline route, the ash tree was downgraded to moderate suitability and the beech and sycamore trees were downgraded to low suitability.

This survey effort is considered sufficient to robustly assess the capacity in which bats may be roosting within the structures/trees.

⁵ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

Details of dates, timings, weather, and surveyor numbers and names are provided in the results section.

C.3.5.2 SURVEY METHODS

Activity surveys were undertaken in suitably mild conditions when bats are active. Surveyor locations sought to box-in the site and give a good degree of confidence as to whether bats were flying into or out of the survey area.

Light levels were recorded at 5 minute intervals, using a light meter, located in an open area and directed upwards to ensure a standard baseline. Light levels generally provide a more reliable indicator of the likely times for bat emergence than minutes past sunset and this approach is recommended by BCT⁶. There is significant variation in emergence times, but hundreds of surveys by E3 in northern England over recent years have indicated that pipistrelles are likely to start emerging around 70 lux, noctule at a similar level or earlier, *Myotis* bats generally start to emerge below 10 lux, with most *Myotis* activity and brown long-eared emergence below 2lux. Bats are rarely recorded above 150 lux, and as light levels go below 0.5 lux bat activity in the vicinity of the roosts tends to decrease as bats disperse across the wider countryside. Bat emergence will start at higher light levels when there is good cover close to the roost. For example *Myotis* bats have been recorded emerging in light conditions above 50 lux when there is a short flight line from the roost site to dense woodland. If a species is recorded when light levels are close to expected emergence light levels, then the likelihood that a roost is nearby is greatly increased.

Surveyors were positioned to ensure coverage of all high-risk areas of the site, including any potential flight-lines from structures within the site to adjacent cover such as woodland blocks. If bats were recorded within the site before bats were seen in the wider area, or seen flying into the site, it is assumed that roosts are present within the site.

All surveyors used both Batbox Duet bat detectors to listen for bats and Anabat Express detectors, at each surveyor location, to record and better identify bat species. Listening through earphones to both heterodyne and frequency division signals helps ensure that all bat species were detected⁷, whilst recording all bat activity using the Express removes the risk of surveyor error in timings and species ID.

Infra-red and thermal imaging cameras were used to supplement the surveys given the surrounding tree cover and dark conditions.

Timings for observations of key bat activity such as emergence, first records of each species and commuting routes were recorded using radio-wave synchronised clocks. All data were recorded using the Anabat Express for future reference and to allow confirmation of species identification through call analysis (using Analook software), and to capture brief echolocation calls that could not be reliably identified in the field⁸. Field survey recorded numbers of bats detected, feeding activity, flight paths, species (as far as is practicable), and social calls.

⁶ http://www.bats.org.uk/pages/recording_light_level_data.html

⁷ Listening to frequency division calls as well as heterodyne significantly increases the detection rate of *Nyctalus* species

⁸ Reviewing data recorded by surveyors using Duet detectors and the Anabat data indicated that reliable *Myotis* records increased through Anabat use, particularly once conditions were too dark for visual cues to assist in identification, when there was a lot of bat activity, and with bats in clutter. It also reduces errors where pipistrelles in clutter can be mis-identified as *Myotis* bats.

C.3.5.3 PRESENCE/ABSENCE SURVEY EQUIPMENT

- Duet bat detectors
- Anabat Expresses
- Light meter
- Infra-red video camera
- Infra-red torches and floodlights
- Thermal imaging camera

C.3.6 REMOTE MONITORING

An Anabat Express bat detector was positioned in the Gas House first floor to record overnight bat activity from 26th June 2021 to 5th July 2021.

This technique helps to record both emerging or flying bats and their echolocation calls without any disturbance from the presence of people. This technique provides supplementary data which, through cross-referencing times of calls and species recorded, can provide greater confidence in assessing the capacity in which bats may be using the building.

C.3.7 DATA ANALYSIS

All bat calls were analysed using Analook with calls identified to species where possible, referencing call parameters as detailed within Russ (2012)⁹ and Middleton et al (2014)¹⁰.

Species from the *Myotis* genus of bats produce frequency modulated calls with overlapping call parameters and cannot be reliably distinguished to species level on call alone. As such, within this report, *Myotis* calls are identified as '*Myotis ?species*', with the most likely species identified through an assessment of a combination of call slope, loudness, frequency range, habitat and, where the bat was observed in flight, flight characteristics. Where insufficient information is available, calls are simply identified as '*Myotis sp.*'.

Bats from the pipistrelle genus also produce calls with overlapping parameters and the call criteria used to differentiate between species of this genus, based on peak frequencies, are detailed within the table below.

Species	Call Peak Frequency Range (KHz)
Common pipistrelle	>42 and <49
Soprano pipistrelle	≥51
Nathusius' pipistrelle	<40
Common or soprano pipistrelle ('50KHz pip')	≥49 and <51
Common or Nathusius' pipistrelle ('40KHz pip')	≥40 and ≤42

Similarly, bats of the *Nyctalus* genus produce calls with overlapping call parameters. Where calls are obtained in an open environment, the two *Nyctalus* species found in this region can be differentiated and calls will be identified as noctule or Leisler's bat. Where there is doubt, calls are noted as *Nyctalus sp.*

Within this report, for all species, if the species name is given without qualification, the record was of good quality and fell within recognised parameters with no potential overlap with other species present in the region. If there is a degree of uncertainty this is indicated by a question

⁹ Russ, J. (2012) British Bat Calls: A Guide to Species Identification. Pelagic Publishing

¹⁰ Middleton, N., Froud, A. and French, K. (2014) Social Calls of the Bats of Britain and Ireland. Pelagic Publishing

mark, e.g. brown long-eared. If identification to species is not practicable, then where possible calls are identified to genus.

C.4 SURVEY CONSTRAINTS

Certain plant species may not be identifiable throughout the year. However, it is considered that sufficient botanical identification was possible to facilitate a robust assessment of habitats for the purposes of this report.

The trees to the rear of the High Vinery building were only assessed from ground level and while in full leaf. This may have obscured potential roosting features during the assessment of bat roosting potential. However, the trees were assessed from various angles on site using good quality binoculars and professional judgement was used based on the tree characteristics to supplement the assessment. The trees could not be aerially inspected due to overhead wires passing through the trees, therefore a precautionary approach was adopted and two dusk/dawn surveys were recommended in order to give greater confidence in the results and assessment.

Trees along the pipeline route to the rear of the Gas House were inspected from ground level and aerially with ropes and harnesses, which provided further confidence in assessments.

The rear (west) elevation of the Gas House is overshadowed by the surrounding woodland creating dark conditions and the roof is not fully visible from ground level. However, the roof pitch was inspected with binoculars while aerially inspecting the trees to the rear, which gave a good view over the building, and the dusk and dawn surveys were supplemented with an infra-red camera to aid detection of roosts.

The loft space within the Gas House could not be fully inspected due to health and safety concerns, though it is considered that through internal remote monitoring, two peak maternity season presence / absence surveys and inspection of the accessible areas, it is still possible to obtain a robust assessment of bat usage of the site. No internal inspections were undertaken of the two small sheds, though this is not considered to have significantly impacted the assessment.

The survey completed at the site will provide reasonably typical data for the season in which it was undertaken, and internal field signs are likely to reflect activity over the preceding active season. Assessment of the bat use of the site at other times of year and the potential impacts of the proposed development is based on professional judgement. This is an approach supported by the Bat Conservation Trust Good Practice Guidelines¹¹.

C.5 ASSESSMENT METHODOLOGY

The relative value of the ecological receptors (habitats, species and designated sites) was assessed using a geographical frame of reference. For designated sites this is generally a straightforward process with the assigned designation generally being indicative of a particular value, e.g. Sites of Special Scientific Interest are designated under national legislation and are therefore generally considered to be receptors of national value. The assignment of value to non-designated receptors is less straightforward and as recognised by the Guidelines for

¹¹ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

Ecological Impact Assessment produced by CIEEM¹², is a complex and subjective process and requires the application of professional judgement.

When assessing the value of species and habitats, relevant documents and legislation are considered including the lists of species and habitats of principal importance annexed to the NERC Act (2006) and those provided within relevant local Biodiversity Action Plans. Data provided through consultation is also considered. These data sources can provide context at a local, regional and national scale.

The table below provides examples of receptors of value at different geographical scales.

TABLE 6: ECOLOGICAL RECEPTOR VALUATION	
Level of Value	Examples
International	An internationally designated site or candidate site.
	A site meeting criteria for international designation.
	A substantial* area of a habitat listed on Annex I of the EC Habitats Directive or smaller areas of such habitat, which are considered likely to be essential to maintain the functionality of a larger whole.
	The site is of functional importance** to a species population with internationally important numbers (i.e. >1% of the biogeographic population)
National	A nationally designated site.
	A substantial* area of a habitat listed as a Habitat of Principal Importance within Section 41 of the NERC Act (2006) or smaller areas of such habitat, which are considered likely to be essential to maintain the functionality of a larger whole.
	The site is of functional importance** to a species population with nationally important numbers (i.e. >1% of the national population)
Regional	An area of habitat that falls slightly below the criteria necessary for designation as a SSSI but is considered of greater than county value.
	The site is of functional importance** to a species population with regionally important numbers (i.e. >1% of the regional population)
County	A Local Wildlife Site (LWS) or equivalent, designated at a County level
	A substantial* area of a habitat listed within the relevant County Biodiversity Action plan or smaller areas of such habitat, which are considered likely to be essential to maintain the functionality of a larger whole.
	The site is of functional importance** to a species population of county value (i.e. >1% of the county population)
District	A Local Wildlife Site (LWS) or equivalent, designated at a District level
	A substantial* area of a habitat listed within the relevant District Biodiversity Action plan or smaller areas of such habitat, which are considered likely to be essential to maintain the functionality of a larger whole.
	The site is of functional importance** to a species population of district value (i.e. >1% of the district population)
Parish	Area of habitat or species population considered to appreciably enrich the habitat resource within the context of the parish.
	Local Nature Reserves
Local	Habitats and species that contribute to local biodiversity but are not exceptional in the context of the parish.
Low	Habitats that are unexceptional and common to the local area.
*Substantial defined as 'of considerable size or value within that area based on professional judgement, rather than a small, inconsequential area'	
** Functional importance defined as 'a feature which, based on professional judgement, is of importance to the day to day functioning of the population, the loss of which would have a detectable adverse effect on that population',	

12 Chartered Institute for Ecology and Environmental Management (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal

The site lies within the Raby with Keverstone Civil Parish which covers approximately 1,140ha and is mainly arable and pastoral farmland, with blocks of woodland.

D. RESULTS

D.1 DESK STUDY

D.1.1 PRE-EXISTING INFORMATION

D.1.1.1 ORDNANCE SURVEY MAPPING AND AERIAL PHOTOGRAPHY

The figures in Section B show that the general land use in the surrounding area is the landscaped gardens and parkland forming the Raby Estate. Habitats include large pasture and arable fields, broadleaved woodland, young plantation woodland, ponds and scattered farmsteads.

The most recent aerial photograph of the site (2018) indicates that habitats on site are dominated by the Gas House, woodland and the pipeline route extends into the gardens and grounds of the Raby Castle Estate, comprising hardstanding, amenity grassland and introduced shrubs / ornamental planting.

Historic imagery suggests that the site has remained largely unchanged since at least 2001. Blurry imagery indicates that the Gas House woodland immediately west and buildings within the estate were present in 1945, with groups of military buildings along the northern area of parkland in the estate.

D.1.1.2 MAGIC WEBSITE¹³

PROTECTED SITES

There are no statutorily designated sites within 2km of the site.

The site does not fall within a SSSI impact risk zone for this type of development.

HABITATS

The majority of the site is mapped on MAGIC as wood-pasture and parkland Priority Habitat. The woodland immediately west of the Gas House is listed as deciduous woodland Priority Habitat and broad-leaved woodland on the National Forest Inventory (see below Figure).

¹³ Multi Agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk

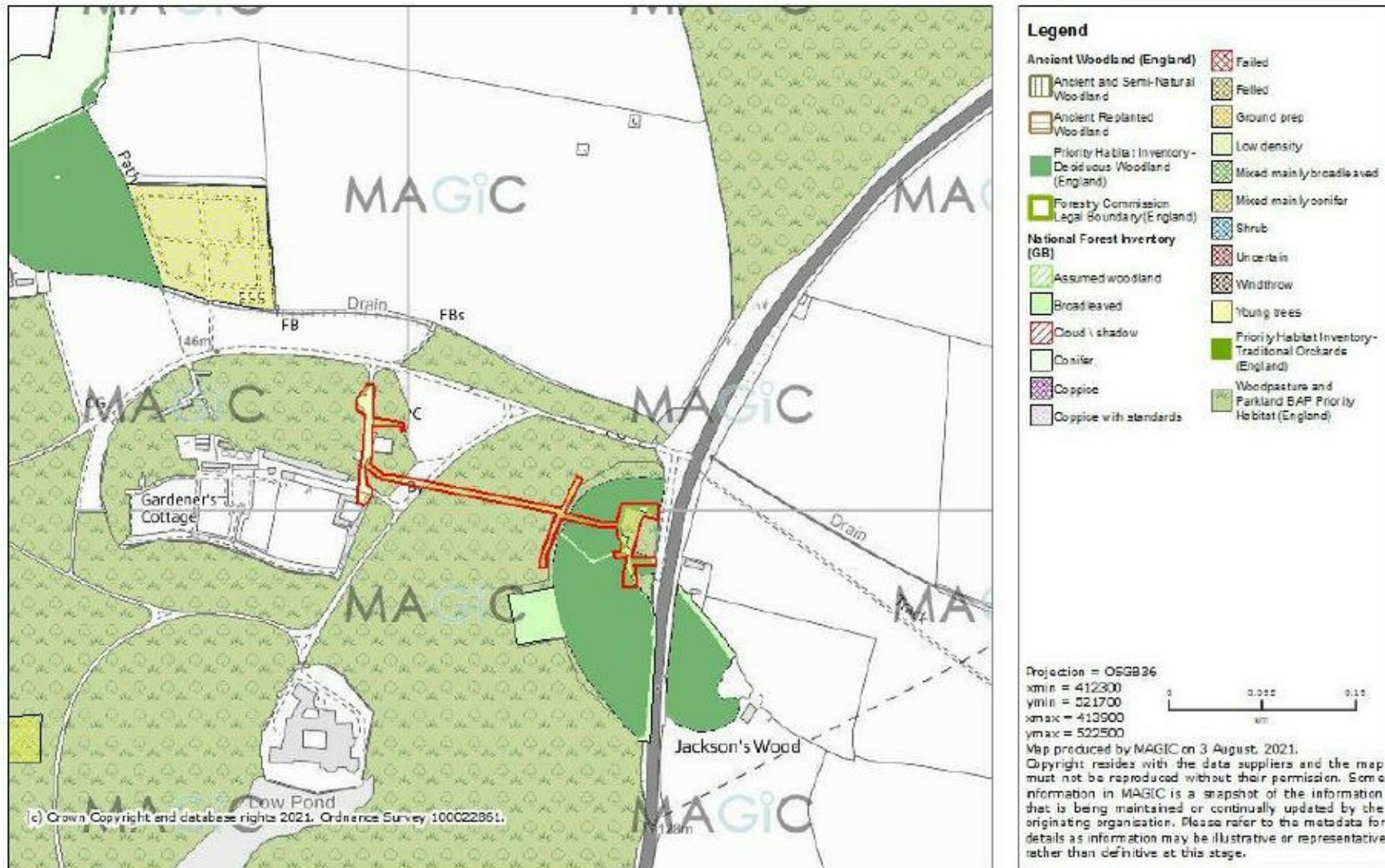


FIGURE 3 - MAGIC WOODLAND HABITATS

SPECIES

There is a single record of a granted European Protected Species (EPS) mitigation licence affecting bats within Staindrop over 1km from site, affecting common and soprano pipistrelle non-breeding resting places.

No granted GCN European Protected Species (EPS) mitigation licences, GCN survey licence returns or eDNA survey records (2017-2019) are shown within 2km of the site.

D.1.1.3 PREVIOUS SURVEY WORK BY E3

E3 has previously prepared survey reports for the Raby Castle Estate to inform the now granted planning application to renovate several buildings within the estate. Excerpts from the Ecological Impact Assessment, Bat Survey and Breeding Bird Survey reports are provided below, as well as summary figures.

Ecological Appraisal indicated that although the parkland has been managed as a deer park for many years, the grassland appears to be generally improved and of limited conservation value. Late maturity parkland trees are present, dating from park creation in the 1700s, but management has resulted in limited aerial deadwood and no areas of substantial fallen deadwood.

The Raby Gardens area contains extensive traditional stone and slate buildings, but generally they are in good repair, limiting bat roosting opportunities. The area is well treed, though few are of late maturity, and areas of ramsons and dog's mercury are present suggesting woodland origins. The garden areas generally have limited habitat value, but support a range

of bee species, and will provide good habitat for garden birds, including old yew hedges which will create good nesting and roosting sites.

Assessment of the survey results suggest that the gardens are of parish value for the habitats they support, set within parkland of at least district value.

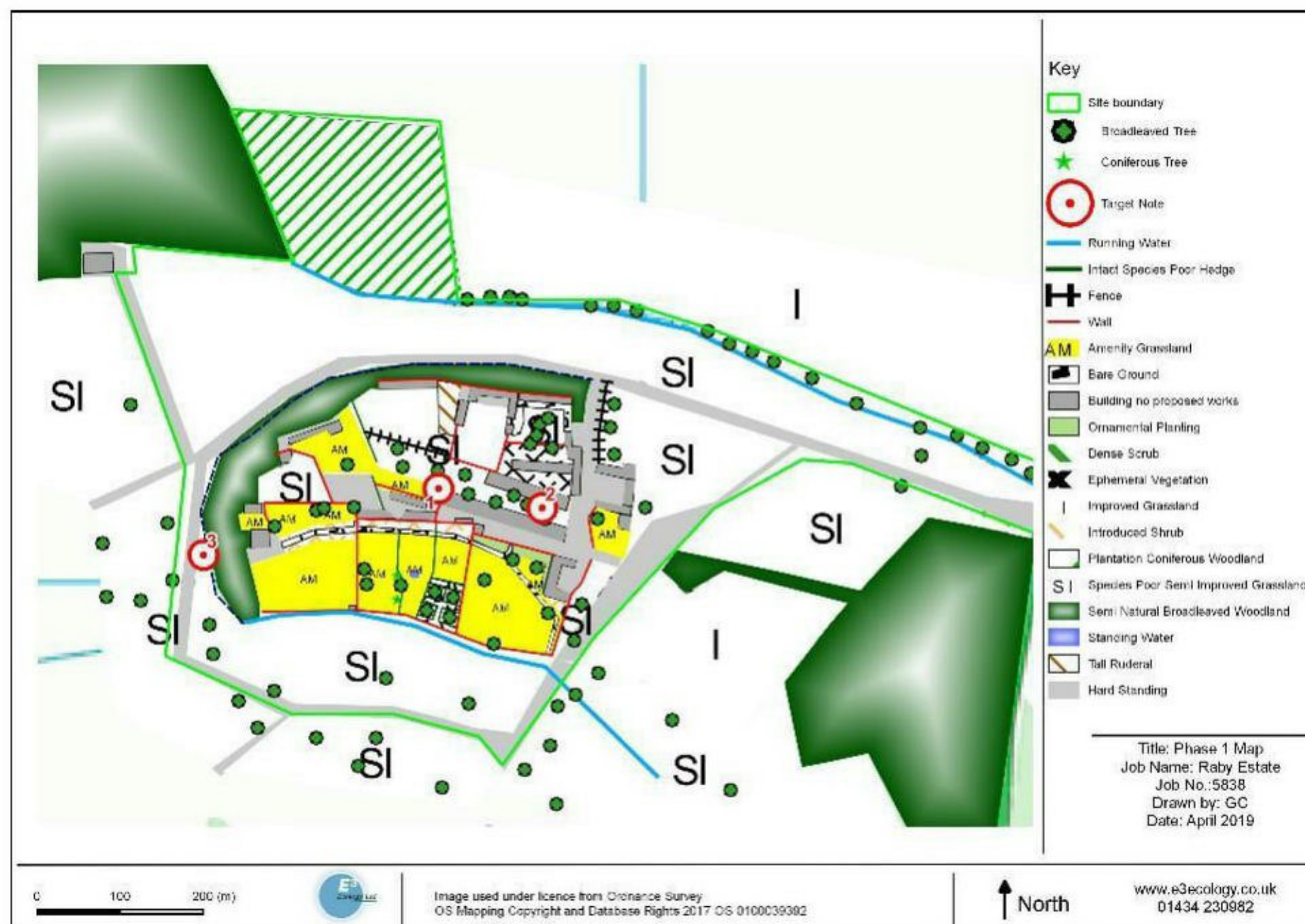


FIGURE 4 - E3 2020 ECIA PHASE 1 HABITAT MAP

A daytime bat survey and a single dawn return survey in August 2018 by Barrett Environmental Ltd recorded a number of bat roosts of a range of species. Updating surveys carried out by E3 Ecology in 2019 and 2020 identified several confirmed day roosts, within a number of the buildings on site, used by small numbers of common pipistrelle, brown long-eared bat, *Myotis* species and soprano pipistrelle. A small common pipistrelle maternity roost was also identified within one of the voids above the café/gift shop during the activity surveys. Bat transects and remote monitoring undertaken monthly between May-September recorded noctule in addition to the species listed above.

Overall, the site is probably of lower value to bats than would be anticipated from the buildings and trees present and the landscape setting. A good range of species has been recorded, but generally in small numbers, with the exception of a small common pipistrelle maternity roost in Building 1. The buildings are generally well maintained, which reduces the number of roosting opportunities in walls and roofs, and the unoccupied houses will be cooler than occupied properties, reducing the likelihood of maternity roosts being present. Overall the site is considered to be of parish value for the bats it supports.

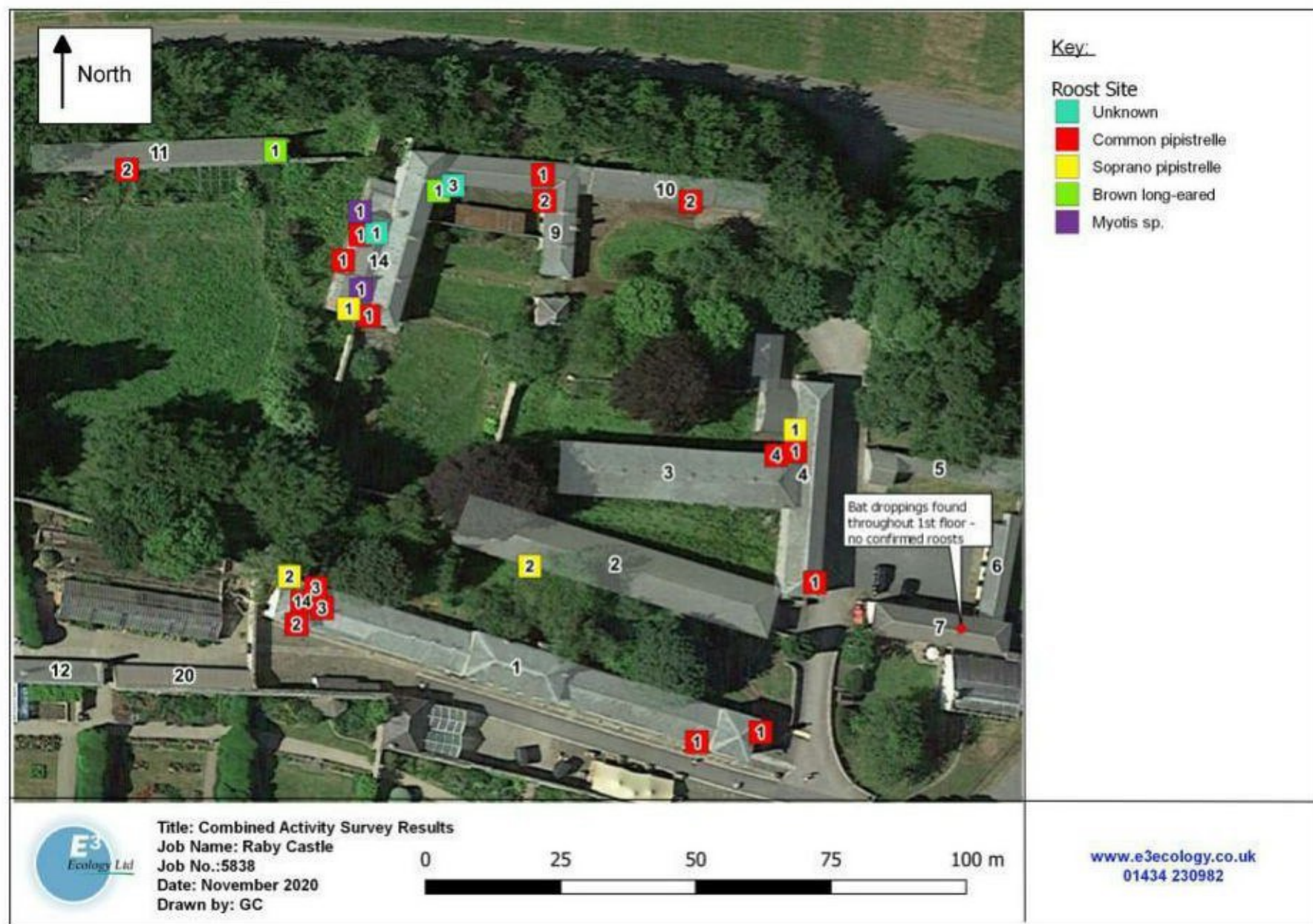


FIGURE 5 - BAT ROOSTS PREVIOUSLY RECORDED BY E3 AT THE RABY CASTLE ESTATE (2019 & 2020)

The habitats likely to be of highest value to breeding birds are the mature trees and woodland within the site. The buildings may support a small number of typical breeding species such as house sparrow and starling. Opportunities also exist for roosting barn owl in some of the buildings although no evidence was recorded during any of the bat or breeding bird surveys. The grassland areas are likely to be too heavily grazed to support breeding birds.

Breeding bird surveys undertaken in 2019 indicate that the breeding bird assemblage is likely to be of parish value. The study area was found to support approximately 97 pairs of 35 species in 2019. Of these, 67 pairs of 29 species were found within the site itself. Of the 35 recorded species, 11 are recognised as being of conservation concern. These comprised four BoCC4 red listed species¹⁴: mistle thrush (2 pairs), song thrush (4), spotted flycatcher (2), and starling (1) and 7 BoCC4 amber listed species¹⁴: bullfinch (2), dunnock (4), mallard (1), redstart (1), stock dove (2), swift (1), and willow warbler (2). Of these species five are listed as National priority species¹⁵. Additionally, three pairs of nuthatch recorded during the surveys is of up to district value. Full results are provided within the breeding bird survey (5838a Raby Castle BBS R01).

Habitats within the site are also suitable for hare, hedgehog and common toad. Reptiles, otter, water vole, great crested newts and red squirrel are considered to be absent based on habitats present, land use and consultation with the gamekeeper.

¹⁴ Red list species are of high conservation concern; amber list species are of medium conservation concern; Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708-746.

¹⁵ Species listed on the UK Post-2010 Biodiversity Framework published July 2012, formerly UK BAP

D.1.2 CONSULTATION

LOCAL RECORD CENTRE

The table below summarises the records provided by the local records centre, with the protected or otherwise notable species largely terrestrial mammals (included below), fish (not included as no aquatic habitat on or close to site) or birds (910 records, not included due to number of records) but includes Schedule 1 species such as barn owl. The full data search results can be provided on request.

Species	No. of Records	Closest distance (m – if sufficient record resolution provided)	Most recent date
Brown Hare	9	99	28/05/2016
Brown Long-eared Bat	5	402	30/08/2018
Common Pipistrelle	5	371	15/08/2018
Eastern Grey Squirrel	5	230	08/07/2012
Eurasian Red Squirrel	1	364	14/07/2015
European Otter	6	1307	17/11/2014
Hedgehog	2		18/05/2008
Noctule	1	1706	2010
Noctule Bat	1	81	12/05/2017
Pipistrelle Bat species	5	439	15/06/2011
Soprano Pipistrelle	3	402	15/08/2018
Unidentified Bat	1	402	15/08/2018
West European Hedgehog	33	187	27/04/2020
Whiskered Bat	1	439	04/12/1987

There are no non-statutory designated sites within 2km.

D.2 **FIELD SURVEY**

D.2.1 HABITATS

The site boundary covers approximately 0.48ha and comprises the Gas House building, two small timber sheds immediately to the south, broadleaved woodland, improved grassland, amenity grassland, ornamental planting and hardstanding areas.

The habitats present within the survey area are illustrated within the figure below and described in more detail below.



FIGURE 6: HABITAT MAP (WIDE)

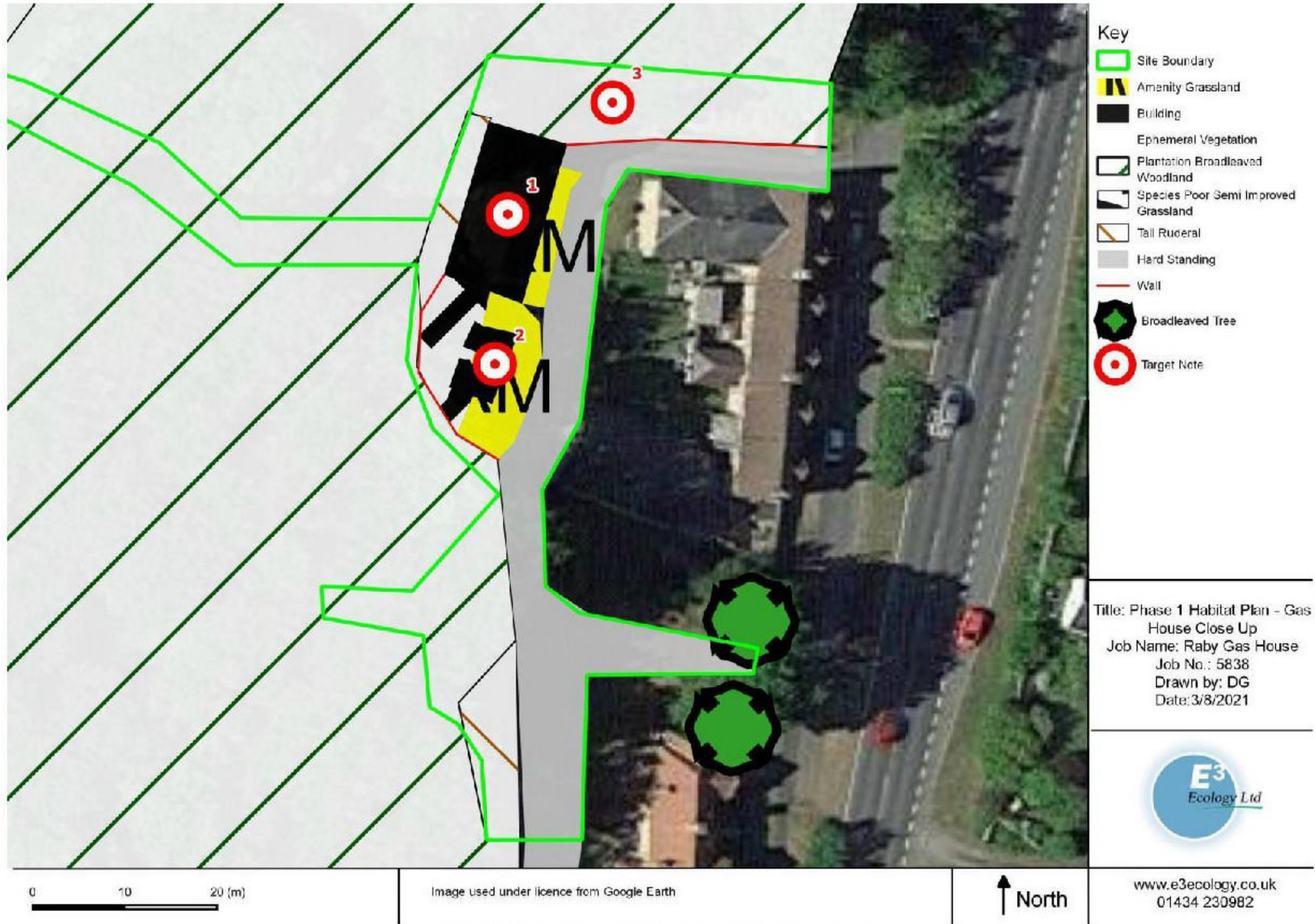


FIGURE 7: HABITAT MAP (CLOSE UP OF GAS HOUSE)

WOODLAND

Surrounding the Gas House to the north, west and south is a mature, broad-leaved woodland plantation. The canopy is tall at over 20m in places, with the dominant canopy species being beech *Fagus sylvatica* and sycamore *Acer pseudoplatanus*, with additional ash *Fraxinus excelsior* and horse chestnut *Aesculus hippocastanum*. Trees are well spaced, with a relatively dense understorey of mostly elder *Sambucus nigra* with some regenerating ash saplings, snowberry *Symphoricarpos albus* and a small amount of holly *Ilex aquifolium* and rhododendron *Rhododendron ponticum*. The ground flora is predominantly nettle *Urtica dioica*, with additional bramble *Rubus fruticosus*, herb robert *Geranium robertianum*, cow parsley *Anthriscus sylvestris*, lesser burdock *Arctium minus*, ground elder *Aegopodium podagraria*, wood dock *Rumex sanguineus*, wood millet *Milium effusum*, red campion *Silene dioica*, ivy *Hedera helix*, ramsons *Allium ursinum*, lesser celandine *Ficaria verna*, remote sedge *Carex remota*, ivy-leaved speedwell *Veronica hederifolia*, wood meadow grass *Poa nemoralis*, perennial rye grass *Lolium perenne*, dandelion *Taraxacum officinale* agg., hybrid bluebell *Hyacinthoides x massartiana*, wood forget-me-not *Mysotis sylvatica* and wood sedge *Carex sylvatica*.



TALL RUDERAL

The area between the Gas House and the surrounding woodland to the west comprises tall ruderal vegetation dominated by nettle, as well as some rosebay willowherb *Chamerion angustifolium* and broad-leaved willowherb *Epilobium montanum*.



AMENITY GRASSLAND

Amenity grassland lies immediately to the front of the Gas House and sheds, comprising typical lawn grasses such as meadow grasses *Poa* sp., fescues *Festuca* sp., perennial rye grass and Yorkshire fog, as well as scattered forbs such as creeping buttercup *Ranunculus repens*, daisy *Bellis perennis* and dandelion. There are also some small localised patches of nettles and broad-leaved dock *Rumex obtusifolius* within this area.



EPHEMERAL / SHORT PERENNIAL

A small patch of ephemeral / short perennial habitat is located to the rear of the sheds, containing species such as herb robert, willowherb *Epilobium* sp. and cleavers *Galium aparine*.



WALL

A 3m high stone wall runs from the south-western corner of the Gas House southwards, around the rear of the sheds. The wall contains some small relatively superficial gaps in the pointing and occasional plant species growing on it such as ivy-leaved toadflax *Cymbalaria muralis*.



BUILDINGS & HARDSTANDING

The Gas House is a disused two storey stone building with pitched slate roof. There are two small timber sheds to the south of the Gas House. These buildings are described in more detail within section D2.5 below.

A hardstanding access road is located to the front of the Gas House.



PIPELINE ROUTE

The pipeline route passes out of the rear of the Gas House, headed west through the previously described plantation woodland. It then passes through a poor semi-improved grassland field used for car parking, which is managed to a short sward height of 5cm and has around 80-90% grass cover, with species including perennial rye grass, meadow foxtail

Alopecurus pratensis, creeping buttercup, white clover *Trifolium repens*, rough meadow grass *Poa trivialis*, annual meadow grass *Poa annua* and cock's-foot *Dactylis glomerata*. The pipeline is located outside of the root protection areas of a line of common lime *Tilia x europaea* trees on the southern boundary of the grassland field.

The pipeline then continues west into the Raby Castle Estate, passing through amenity grassland, hardstanding and similar poor semi-improved grassland habitats to provide services to the buildings which are already due to be redeveloped under a separate planning consent.



SURROUNDING HABITATS

To the east of the Gas House there are residential cottages and small amenity gardens, beyond which lies the A688 road.

The Raby Castle Estate is a mixture of buildings, hardstanding and amenity grassland areas, with ornamental gardens and mature scattered trees and amenity hedges. There are also scattered blocks or strips of mature plantation woodland similar to that already described.

Further details on the habitats within the Raby Castle masterplan area can be found in E3's Ecological Appraisal report (R05), planning application reference DM/20/01183/FPA.

D.2.2 HABITAT ASSESSMENT

The majority of the development footprint is considered to be of up to local value for the habitats it supports. The mature plantation woodland is considered to be of parish value in its entirety, but the development footprint would only impact a small area of this and the route has been chosen to minimise anticipated tree losses.

D.2.3 TARGET NOTES

TARGET NOTE 1

The Gas House



TARGET NOTE 2
Two timber sheds



TARGET NOTE 3
Area used for keeping goats.

D.2.4 SPECIES (EXCLUDING BATS)

GREAT CRESTED NEWT

There are two large mapped ponds within 500m of the development site, located approximately 320m south (known as Low Pond) and 450m south-west (known as High Pond), both of which lie within the grounds of the estate. They are stocked with fish, support large numbers of water fowl and have little bankside vegetation. Another mapped small, ornamental pond is located within the southern walled garden of the estate and is stone lined and also stocked with fish. The ponds are highly unlikely to support GCN and there are no recent records within 2km of the site.

GCN is considered likely to be absent from the site however common amphibians, including common toad, may be present on occasion. If present, the site is likely to be of up to local value to these common amphibian species.

BIRDS

The following bird species were recorded on site, in adjacent habitats or flying over the site: spotted flycatcher (red listed Bird of Conservation Concern¹⁶), wren, chaffinch, song thrush (red listed), robin, great tit, nuthatch, chiffchaff, carrion crow and blackbird.

The woodland, scattered trees, shrubs and buildings on site provide nesting and foraging opportunities to an assemblage of locally common bird species. The more open areas of the site are regularly disturbed and the presence of ground nesting birds is therefore considered unlikely.

Overall, the site is considered to be of up to parish value to birds, with the majority of value contained within the woodland.

BADGER

The site contains suitable foraging opportunities for badger and sett excavation opportunities are present within the woodland. However, no field signs directly attributable to badger were found during the survey.

Badger setts are considered to be absent from the site and badger presence on the site itself is likely to be limited to very occasional foraging and commuting.

¹⁶ Red listed species are of high conservation concern. Amber listed species are of medium conservation concern. Eaton *et al* (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708-746.

The site is therefore considered to be of low value to badger, [REDACTED]

REPTILES

Suitable reptile habitat on site is limited to the field boundaries and woodland edge. Overall, the site is considered to lack the typical mosaic of habitat types and vegetation structures used by reptiles. Furthermore, there are no records of reptiles within 2km of site. They are therefore considered likely to be absent from the site.

RED SQUIRREL

There is a single record of red squirrel within 2km of site from 2015. However, the estate gamekeeper provided anecdotal evidence to suggest that red squirrels are absent from the site and that grey squirrel are present.

They are therefore considered to be absent from the site.

INVERTEBRATES

Significant amounts of larval food-plants for priority butterfly species were absent from the site and, as such, notable populations of these species are considered likely to be absent. A good population of early mining bees, honey bees and bumble bees have previously been observed within the gardens on site.

OTTER, WATER VOLE & WHITE-CLAWED CRAYFISH

There are no aquatic habitats on or within the immediate vicinity of the development footprint with suitability to support these species.

There are opportunities for otter further to the south, with foraging opportunities within the two large ponds, but there are no substantial watercourses nearby and the five records of otter in the local area are all over 1km from the site.

There are also some ditches containing water within the Raby Castle Estate. These are shallow and well vegetated, providing some suitable habitat for water vole. However, no local records exist and the short-grazed nature of the site provides little habitat cover. The gamekeeper also reported that mink are abundant.

These species are therefore considered as likely to be absent from the site.

OTHER NATIONAL PRIORITY AND LOCAL BAP SPECIES

The site contains suitable habitat for hedgehog, common toad and brown hare and is considered to be of up to local value for these species.

D.2.5 SPECIES (BATS)

FORAGING HABITATS & COMMUTING ROUTES

The Gas House is immediately surrounded by mature plantation woodland which provides excellent foraging opportunities for bats. There are a number of good commuting opportunities into the wider surrounding area which lead to additional blocks of woodland and ponds which also present good foraging opportunities for species such as Daubenton's bats.





SHELTERED FLIGHT AREAS

The woodland will offer some sheltered foraging opportunities during periods of adverse weather.



ALTERNATIVE ROOST LOCATIONS

There are alternative roosting opportunities available in the nearby residential cottages and in the Raby Castle Estate buildings.



BUILDINGS/STRUCTURES

The location of each structure referenced is illustrated within the phase 1 habitat plan above, with descriptions detailed below.

Where recorded, field signs that confirm bat use are in bold.

BUILDING 1: GAS HOUSE

External

- Two storey.
- Pitched slate roofs – gaps under raised or slipped tiles and along ridge where bedding mortar has fallen away.
- Stone water tables.
- Brick chimney stack with timber vent structure on top.
- Leaded valleys – relatively well-sealed.
- Flat roof dormer windows to the front (east) and rear (west) constructed with lead, red brick and timber window frames – some small gaps leading under leadwork and minor gaps in brickwork pointing. Some windows are boarded.
- Random stone walls, with stone block quoins – pointing in reasonable condition with mostly superficial gaps, but additional gaps also present at wall tops.
- Timber sash windows with stone surrounds – some gaps around edges.
- Timber wall vents with no mesh allowing potential bat access.
- Timber doors with gaps around the edges leading into interior and a 1st floor external door.
- No external field signs of bats recorded.

Internal

- The interior is split into northern and southern sections.

Northern

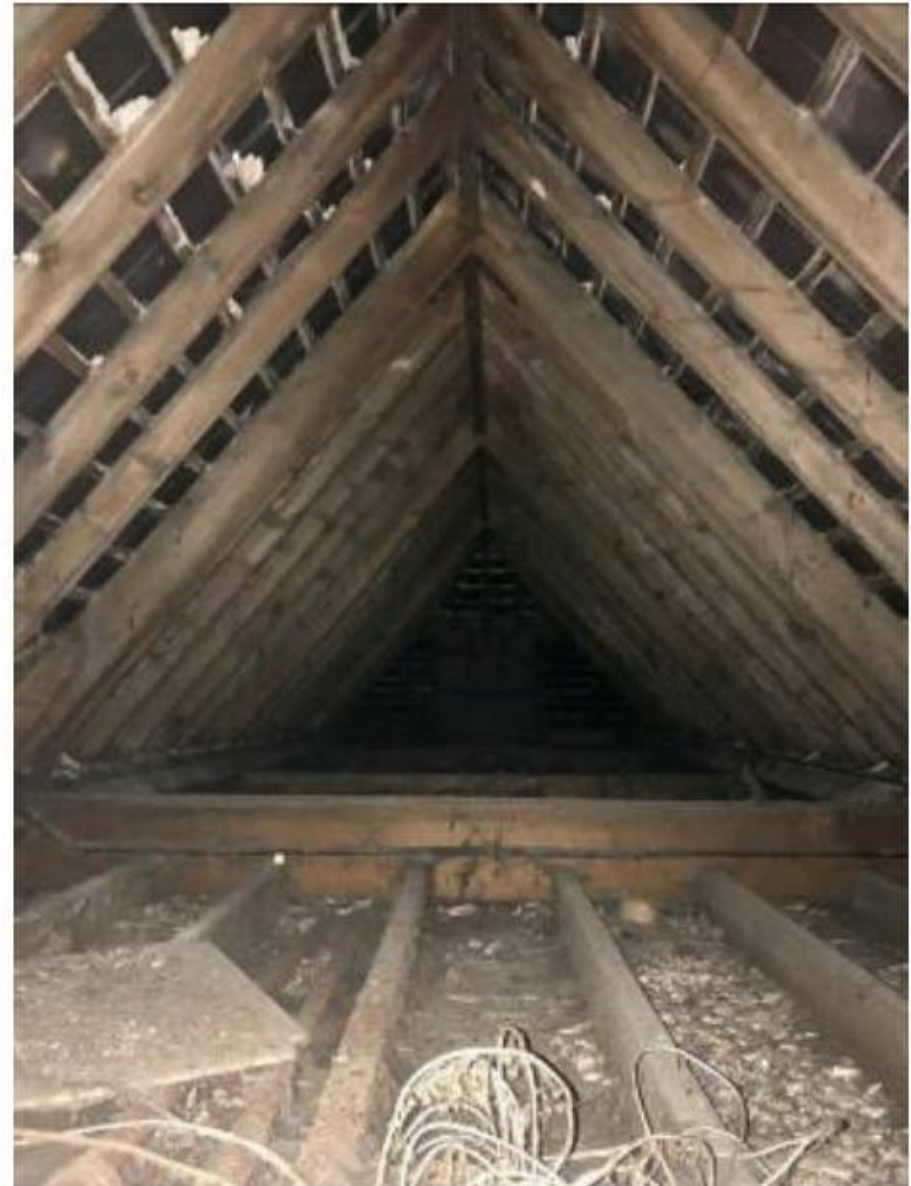
- The northern section is occasionally used as a workshop, with the ground floor plasterboarded and a relatively new timber staircase allowing access to the first floor which has bare stone walls with occasional remains of render and contains many gaps in the stonework. There are gaps between the plasterboard and the stone wall on the ground floor.
- There are timber and metal roof beams with some shallow gaps
- A brick painted wall divides the northern and southern first floor sections of the building, which has several missing bricks or gaps allowing bat access between the two sections.
- The roof is unlined but has the remains of torching on the undersides of the slates – light ingress is visible in places, highlighting that there are potential access gaps under roof tiles.
- Lots of cobwebs around the internal roof structure.
- **Approx. 30-40 pipistrelle type bat droppings were found on the eastern gable end of the northern section, on the internal first floor wall, caught in cobwebs. A small portion of these appeared relatively fresh. DNA analysis of the droppings has indicated that these droppings are attributable to soprano pipistrelle.**
- **A low number (<5) scattered butterfly/moth wings were found within the first floor.**
- Numerous bird droppings were also found within, though no birds were seen during the inspection.

Southern

- The southern section ground floor was historically used as a workshop but has been disused for some time. The room is bright with large windows and is generally plastered and well-sealed, though occasional gaps are present through the ceiling leading to the first floor.
- The first floor is bright and the walls are part plastered, part exposed well-pointed stone.
- **Small gaps are present in the rotten wooden window sills of the first floor and occasional butterfly/moth wings are present below one of the eastern windows.**
- There is a small loft space above the first floor, which is of a traditional timber rafter and purlin construction with an unlined roof but with the remains of torching on the undersides of the slates. The loft space is approximately 2m in height from floor to apex. No loft insulation.
- **A low number (<10) of scattered bat droppings were found within the loft and below the entrance hatch. Two samples were taken from these areas and both were attributable to Brandt's bats, as confirmed by DNA analysis.**

Overall the building is considered to be of moderate suitability for roosting bats, with two species confirmed to be using the building.





BUILDING 2 & 3 SMALL TIMBER SHEDS

External

- Small ~2.5m tall timber sheds
- Pitched corrugated metal roofs and metal ridge cap
- Timber cladding with gaps at edges and around doors
- Timber framed windows
- Used for storage
- No external field signs of bats recorded

Internal

- No internal inspection completed

Overall these buildings are considered to be of low suitability for roosting bats.



D.2.6 TREES

There are two areas of trees covered by this survey report. An area to the rear (west) of the Gas House and another area to the rear (north) of the High Vinery building.

The trees to the rear of the Gas House which were considered to be most at risk of requiring removal due to the pipeline route were firstly assessed from ground level (see below figure – *Qr = pedunculate oak, Fe = ash, Ap = sycamore, Fs = beech*).

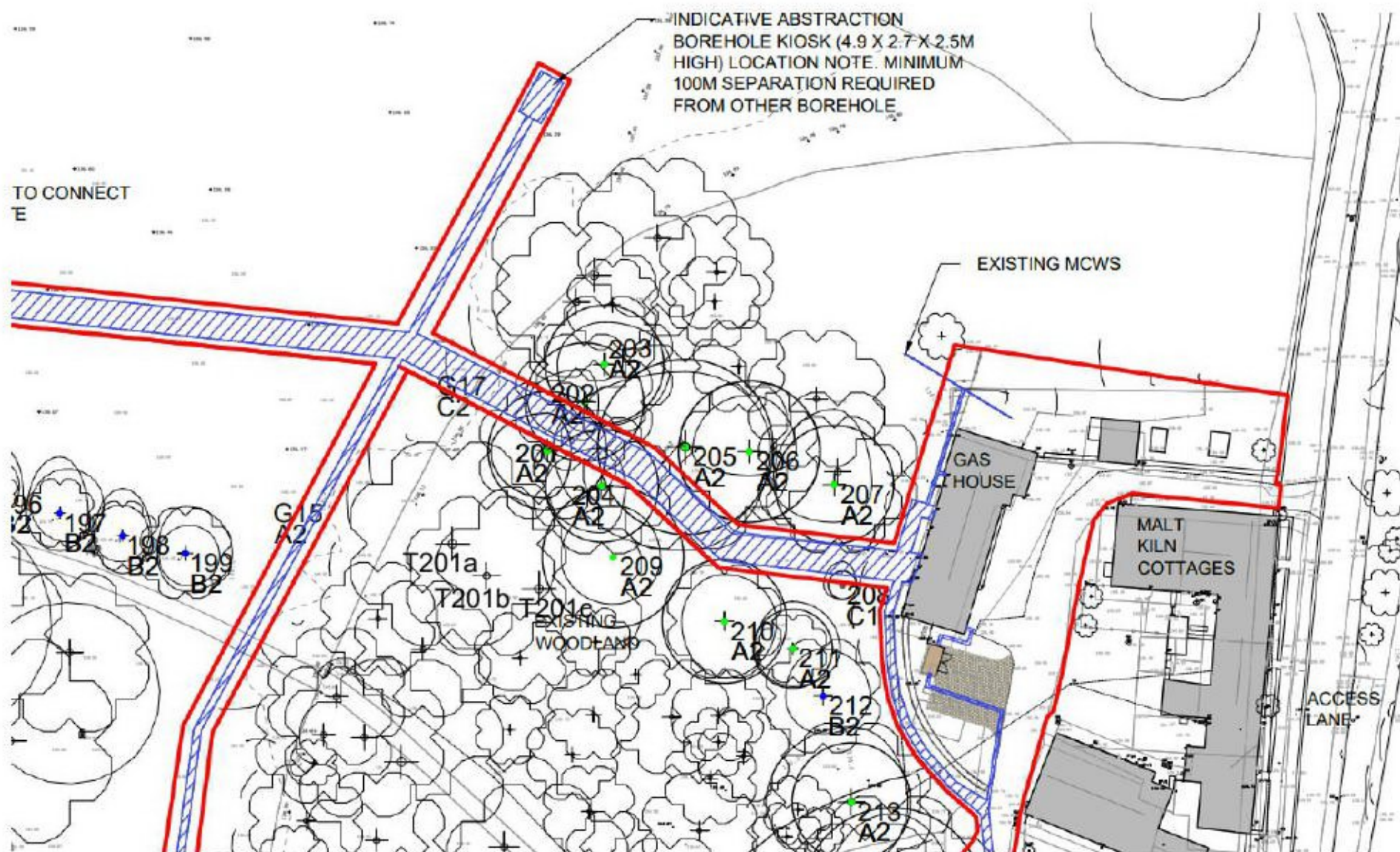


FIGURE 8: GAS HOUSE PIPELINE TREE LOCATIONS
(Courtesy of AWB Landscape Architecture – note that T201a-c have been retrospectively labelled)

Based on the initial ground-level assessment, the following assessments were completed:

- T202 – Pedunculate oak with dead limbs and peeling bark. **Low suitability.**
- T201 – Sycamore with small rot holes visible from ground level. **Low suitability.**
- T205 – Ash tree with some dieback and bracket fungus and a large dead limb projecting westwards with three woodpecker/squirrel holes visible from ground level (with another upward-facing hole identified while climbing), at 10-13m high. **High suitability.**
- T204 – Sycamore with a rot hole at 8m high on eastern aspect, ivy cover and several other small rot holes which appear likely to be superficial. **Low to moderate suitability.**
- T201a – Beech tree with an old wound at 8m high on the northern aspect, but the gap appears to be superficial. **Low suitability.**
- T201b – Sycamore tree with ivy cover. **Low suitability.**
- T201c – Beech tree –no features observed and tree in good condition. **Negligible to low suitability.**

- T209 - Sycamore tree –no features observed and tree in good condition. **Negligible to low suitability.**
- T208 – Immature ash - **Negligible to low suitability.**

Trees of moderate or above suitability were climbed with ropes and harnesses and inspected aurally with an endoscope on 12th July 2021. This also afforded views into the canopy of the other trees along the pipeline route to confirm the ground based assessments and also of the Gas House rear roof pitch.

The woodpecker/squirrel holes on T205 were closely inspected and all are around 5cm diameter holes which lead into cavities which extend downward (but not upwards) into small chambers measuring approx. 5-15cm x 15-20cm x 5cm. Two of the holes were filled with water, one of which also contained slugs. One of the holes appeared to contain some staining indicating animal use, but based on the apparent old nesting material in the base of the cavity and the morphology of the cavity, this is considered more likely to be used by birds rather than bats. Based on the aerial inspection, it was considered that an assessment of moderate suitability was more appropriate than high.



The ivy on T204 is generally too thin-stemmed to support bat roosts and no ivy-obscured features of moderate or above suitability were found during close inspection. The rot hole at 8m appears suitable from ground level, but when closely inspected it was found to only extend approx. 6cm back, with a 2-3cm diameter entrance hole. Based on the aerial inspection, it was considered that an assessment of low suitability was more appropriate than moderate.

The trees to the rear of the High Vinery building comprise a line (west to east from the north-western corner of the building) of four sycamore trees and four beech trees (see below figure for survey area – yellow line boundary).

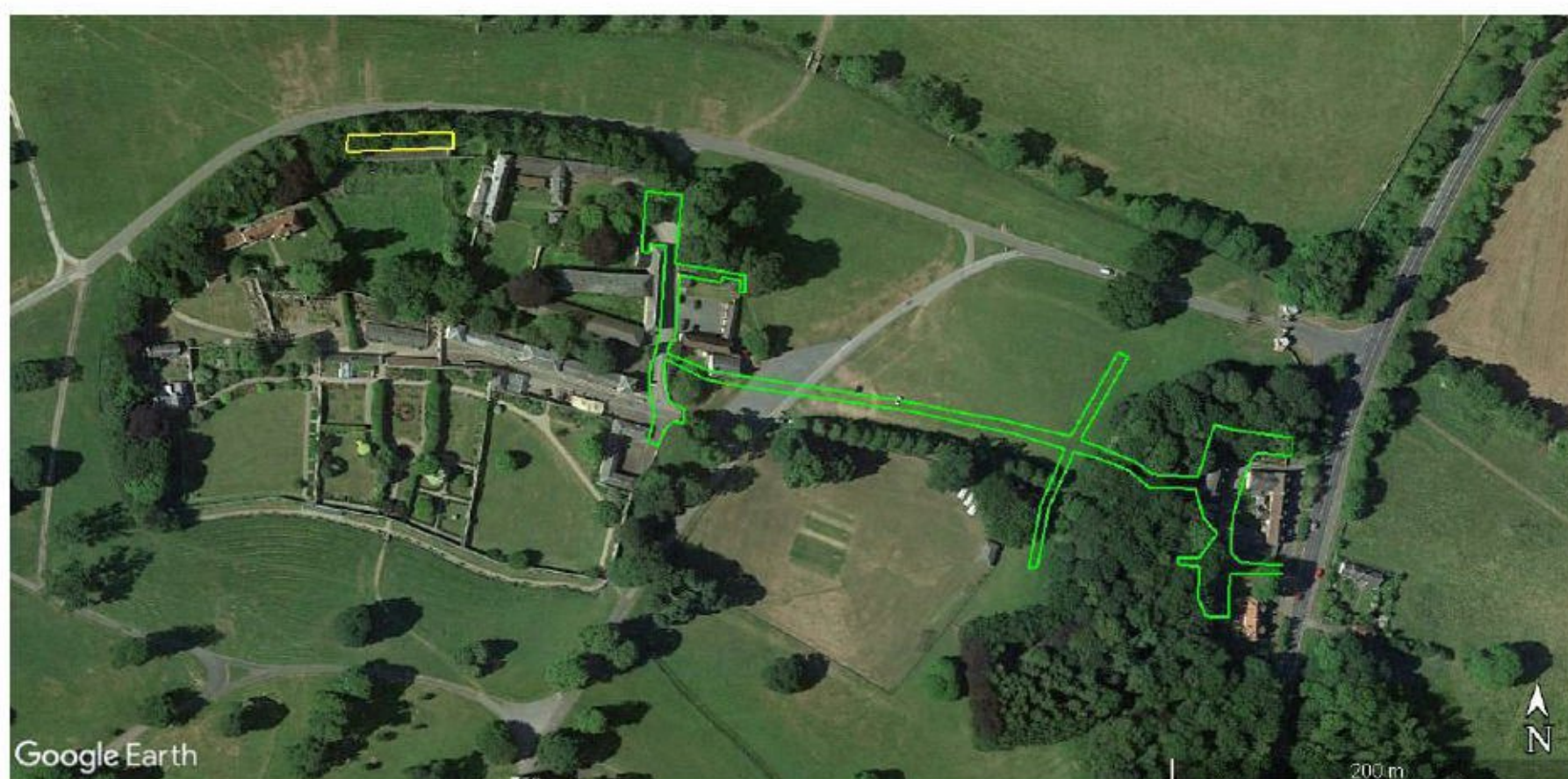


FIGURE 9: HIGH VINERY TREE LOCATIONS (YELLOW LINE)
(Reproduced under licence from Google Earth Pro.)

The sycamore trees are semi-mature and in good condition, with only one well-healed wound noted. They are considered to be of negligible to low suitability to support roosting bats.

The four beech trees are semi-mature and generally in good condition also, but the canopy was heavily obscured by foliage and aerial inspections were not possible due to the presence of overhead wires passing through/near the trees. As a precaution whilst taking account of this constraint, the four beech trees were assessed as moderate suitability to support roosting bats.

D.3 PRESENCE/ABSENCE SURVEY

D.3.1 DUSK /DAWN SURVEY SURVEYORS, TIMINGS & CONDITIONS

Date	Start	End	Sunset / Sunrise	Start Temp (°C)	End Temp (°C)	Cloud (%)	Precipitation	Wind (Beaufort)
05/07/21 (Gas House & Trees)	21:30	23:15	21:45	18	13	100	Dry	0
07/07/21 (High Vinery Trees)	21:25	23:15	21:43	18	13	40	Dry	0
21/07/21 (Gas House & Tree)	03:20	05:15	04:58	15	16	100	Dry	1

23/07/21 (High Vinery Trees)	03:30	05:15	05:00	16	15	100	Dry	0
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Date	Lead Surveyor	Assistant surveyors
05/07/21 (Gas House & Trees)	G Vessey	M lley, G Armstrong, P Kennington, P Server, V Cassidy, K Moore, M Guraliuc, G Iacob
07/07/21 (High Vinery Trees)	R Thompson	P Kennington, G Armstrong
21/07/21 (Gas House & Tree)	R Mackenzie	E Wise, P Kennington, D Mear, G Armstrong, R Grant-Mcleod
23/07/21 (High Vinery Trees)	J Wilson	V Cassidy

D.3.2 05/07/21 DUSK SURVEY RESULTS – GAS HOUSE & TREES TO REAR

The survey was undertaken in mild (18-13°C) conditions, with rain starting after the survey had ended.

One roost was identified during the survey; a common pipistrelle emerged from the building on the western elevation at roof level at 21:53 (~7 lux). This roof pitch is not easily visible from ground level, but from aerial inspections of nearby trees, it is considered that the most likely roosting location is under a ridge tile. The bat then flew west towards the woodland.

Bat activity levels were generally moderate to high. The first bat, a soprano pipistrelle, was detected at 21:29 north of the building as the survey was starting. Soprano pipistrelle foraging calls were occasionally recorded and social calls were also detected towards end of the survey.

There was consistent foraging by one common pipistrelle along the rear of the building for 30 minutes at the start of the survey and occasions where multiple common pipistrelles were foraging along the northern aspect. They were also recorded periodically around other aspects of the building throughout the survey.

Later, at 22:18 a *Myotis* sp. bat was also seen foraging to the rear of the building.

A noctule was heard but not seen the building at 23:02.

Three surveyors (and a thermal camera) covered areas of the woodland to the west of the Gas House in which T205 and T204 are situated. No roosts were identified within the trees. Foraging activity was dominated by soprano pipistrelle for the first 30 minutes of the survey, then later by *Myotis*. Common and soprano pipistrelle were seen commuting in and out of the woodland from the surveyor positioned at the western edge of the woodland.

The figure below provides a summary of the results of dusk emergence survey. More detailed data is available on request.



FIGURE 10: SUMMARY OF 05/07/21 DUSK SURVEY RESULTS
(Reproduced under licence from Google Earth Pro.)

D.3.3 07/07/21 DUSK SURVEY RESULTS – TREES TO REAR OF HIGH VINERY

The survey was conducted in suitably mild conditions ideal for bat activity.

No confirmed roosts were observed during the survey.

Foraging and commuting activity was high within the woodland. Common and soprano pipistrelle, *Myotis* sp. and noctule bats were all recorded. Bats were generally foraging/commuting along the woodland edge and commuting northward across the grassland field to other areas of woodland in the surrounding area. Common and soprano pipistrelle were seen to forage close to the trees, though they were not directly observed to have emerged from any features within the trees. The first pipistrelle seen was in the woodland at 21:43, 28 minutes after sunset (140 lux). The first bat seen outside of the woodland was a noctule at 22:05 (23 lux).

The figure below provides a summary of the results of dusk emergence. More detailed data is available on request.



FIGURE 11: SUMMARY OF 07/07/21 DUSK SURVEY RESULTS
 (Reproduced under licence from Google Earth Pro.)

D.3.4 21/07/21 DAWN SURVEY RESULTS – GAS HOUSE & TREES TO REAR

The survey was undertaken in mild (15-16°C), still conditions with no rain during the survey or in the night before the survey. Bat activity was recorded throughout the survey, with the last bat, a common pipistrelle, recorded at 05:13 entering a roost within another building to the east of the Gas House, off site. Approximately 10 bats were recorded entering this roost. The following roosts were observed within the Gas House building:

- A soprano pipistrelle day roost within the northern section, with a single bat entering a gap in the wall beneath the guttering on the south-eastern elevation of this section at 04:20, 38 minutes before sunrise at 0.9 lux. Due to the close proximity with the soprano pipistrelle droppings found internally, these are considered to be the same roost.
- A *Myotis* (Brandt's as confirmed by dropping DNA analysis) day roost within the main southern/central section, with three bats entering an access point at 04:20 at the north-west where the pitch of the northern section meets the wall top. Two further bats were observed circling the south western end at a similar time and are assumed to have entered on the western elevation where the two roof pitches meet, though this was not visible from ground level.
- A common pipistrelle day roost at the south eastern gable end, with a single bat entering into a crack in the stonework above the doorway at 05:05, 7 minutes after sunrise at 67 lux.
- An additional soprano pipistrelle occasionally used day/transitional roost was observed in the ash tree (T205) within the woods to the west, with a single bat entering, and 10 seconds later emerging from, a hole below the bracket fungus at 04:55, 3 minutes

before sunrise at 25 lux. As bats can use a number of different tree roosts on different nights, this is likely to form part of its roosting habitat.

Key foraging locations were associated with the trees to the west, and to the front of the building. The majority of activity was attributable to *Myotis* and soprano pipistrelle, but common pipistrelle, noctule and occasional brown long eared bats were also recorded.

The figure below provides a summary of the results of dawn survey. More detailed data is available on request.



FIGURE 12: SUMMARY OF 21/07/21 DAWN SURVEY RESULTS
 (Reproduced under licence from Google Earth Pro.)

D.3.5 23/07/21 DAWN SURVEY RESULTS – TREES TO REAR OF HIGH VINERY

The survey was conducted in suitably mild conditions ideal for bat activity.

No confirmed roosts were observed during the survey.

Foraging activity levels were low, with noctule, common and soprano pipistrelle, and *Myotis* sp. being recorded infrequently between 3:45 and 4:38. Only one bat was seen commuting across the site, a soprano pipistrelle at 4:38. The last pipistrelle seen was a soprano pipistrelle, and was in the woodland at 4:38 (lux 1.9), 22 minutes before sunset. The last *Myotis* sp. was recorded at 4:34 (lux 0.8), but was heard and not seen.

The figure below provides a summary of the results of the dawn survey. More detailed data is available on request.



FIGURE 13: SUMMARY OF 23/07/21 DAWN SURVEY RESULTS
(Reproduced under licence from Google Earth Pro.)

D.4 REMOTE MONITORING SURVEY

An Anabat Express bat detector was left in the Gas House 1st floor northern room, close to the dividing wall with gaps leading into the adjacent section. The detector was left from 25th June to 5th July 2021, recording nightly activity. A summary of the nightly activity is as follows (sunset and sunrise times during this period were approximately 21:50 and 04:30, respectively):

- 25th-26th June- 8 *Myotis* sp. calls recorded, likely Brandt's bat considering DNA analysis of droppings. Earliest call 03:46, latest 04:11.
- 26th-27th June- 17 *Myotis* sp. calls recorded, likely Brandt's bat considering DNA analysis of droppings. Earliest call 21:51, latest 22:40.
- 27th-28th June- No recordings.
- 28th-29th June- 7 *Myotis* sp. calls recorded, likely Brandt's bat considering DNA analysis of droppings. Earliest call 22:32, latest 04:10.
- 29th-30th June- No recordings.
- 30th June-1st July - No recordings.
- 1st July – 2nd July - 1 *Myotis* sp. call recorded, likely Brandt's bat considering DNA analysis of droppings, at 04:28.

- 2nd July – 3rd July - 1 *Myotis* sp. call recorded, likely Brandt's bat considering DNA analysis of droppings, at 04:30.
- 3rd July – 4th July - No recordings.
- 4th July – 5th July - 1 *Myotis* sp. call recorded, likely Brandt's bat considering DNA analysis of droppings, at 02:58.

D.5 BAT SURVEY ASSESSMENT

Surveys of the Gas House have confirmed the presence of the following roosts:

- Common pipistrelle day roost. Peak count of one bat recorded emerging from the roof structure during a dusk presence / absence survey.
- Soprano pipistrelle day roost in the northern section, east-facing gable end, accessed via a gap in the wall beneath the guttering on the south-eastern elevation of this section. Peak count of one bat recorded using the roost. The access point recorded and the internal droppings in the north-eastern gable end are considered to be linked as one roost.
- Brandt's bat day roost. Peak count of five bats recorded re-entering the building during the dawn survey, using two access points. This correlates with the timings of echolocation calls recorded during remote monitoring, the relatively low number of calls, and the DNA analysis and locations of droppings, in the top floor and particularly the loft space.
- Common pipistrelle day roost in a gap at the south eastern gable end wall above the ground floor door, with a single bat entering during the dawn survey.

The Gas House also has the potential to support hibernating bats during the winter, predominantly on the wall tops or gaps in the thick stone walls. It is considered to be of parish value to roosting bats.

The two small sheds to the south of the Gas House are considered to be of low roosting suitability and no roosts were recorded during the single dusk survey of these buildings. They are unlikely to support hibernating bats and are considered to be of negligible value to bats.

Of the trees along the pipeline route to the rear of the Gas House, surveys have recorded the following:

- An ash tree (T205) of moderate roosting suitability. No roosts were recorded in the tree during the aerial endoscope inspection and dusk survey, however bat activity during the dawn survey suggests it may be occasionally used by single to low numbers of soprano pipistrelle bats on an opportunistic basis.
- A single sycamore tree (T204) initially considered of low to moderate suitability when assessed from ground level, but when inspected aurally was downgraded to low suitability. No roosts recorded during the dusk survey (which was completed before the aerial inspection downgraded the suitability).
- Several negligible to low suitability beech, sycamore and oak trees (T202, T201, T201a-c, T209).

The trees are considered to be of up to local value to bats.

The four beech trees to the rear of the High Vinery were given a precautionary assessment of moderate roosting suitability given the constraint of the trees being in full leaf and the foliage

obscuring views into the canopy (as well as the trees not being safe to climb). Subsequent dusk and dawn surveys did not record any confirmed roosts. The four sycamore trees to the rear of the High Vinery are of low roosting suitability and low value to roosting bats.

E. IMPACT ASSESSMENT & RECOMMENDATIONS

E.1 FURTHER SURVEY

If development does not happen within 12 months of the last survey, an updating bat survey will be required, ideally to be undertaken between May and August.

E.2 POTENTIAL IMPACTS, MITIGATION & COMPENSATION

The likely impacts of the proposed development, without appropriate targeted mitigation and/or compensation, are detailed in the table below.

Ecological Receptor	Impact	Mitigation
<i>Protected Sites</i>		
No protected sites within 2km	None anticipated.	None required.
<i>Habitats</i>		
Woodland, scattered trees and hedgerows	Loss of a single small ash tree (T208) to the rear of the Gas House and possibly up to eight trees to rear of High Vinery (depending on arboricultural impact assessment) and temporary damage/disturbance of retained trees/hedges during construction.	<p>Hedgerows, trees and woodland will be retained where possible. Works will be undertaken in accordance with BS5837-2012 'Trees in relation to construction' and retained hedgerows and trees will be protected, including protection of roots. Any removal will be appropriately compensated for within the landscaping proposals. Only native species will be planted unless compensating for the loss of non-native amenity trees/hedgerows.</p> <p>The pipeline route has been carefully designed to minimise the requirement for tree removal within the woodland to the rear of the Gas House. Similarly the eight semi-mature sycamore and beech trees to the rear of the High Vinery building will be retained if possible. The loss of such a small number of trees is not anticipated to significantly impact the quality of the woodland habitats, and may cause benefits in the form of decreasing light competition in the understorey and ground flora and in creating a woodland ride along the pipeline route. No trees will be planted along the pipeline route to avoid future constraints with maintenance, but the pipeline route within the woodland will be seeded with a shade-tolerant native wildflower seed mixture, such as Emorsgate EW1 or similar.</p> <p>Retained woodland will be protected from disturbance during construction by heras fencing.</p>
Invasive species	Spread of rhododendron on and off site.	Works will be undertaken to a precautionary invasive species method statement.
Biodiversity (general)	Loss of biodiversity as a result of development of the site.	The pipeline route has been designed to allow the retention of as much higher value habitat as possible, with the route crossing predominantly poor semi-improved grassland, amenity grassland and hardstanding areas. It is anticipated that the small scale habitat losses will be balanced on site through habitat enhancements and creation,

		including those detailed within the wider application to redevelop the Raby Castle Estate (DM/20/01183/FPA).
<i>Species</i>		
Bats	<p>Harm/disturbance to bats should they be present during works to the Gas House, possibly including during winter.</p> <p>If proposals change and the ash tree (T205) to the rear of the Gas House is to be felled or otherwise affected, this impact would also apply to that tree.</p>	<p><u>A Natural England mitigation licence will be required prior to works commencing on the Gas House which may impact bats.</u></p> <p>All works will follow the approved Natural England method statement. This will include a tool box talk to contractors prior to works commencing on building and ash tree (T205 - if affected) with confirmed roosts, inspection and supervision of works to high risk features (e.g. roof coverings, loft spaces, stone walls, eaves and cavities in the tree) by the Project Ecologist and capture and translocation of bats by hand by the ecologist to a pre-erected bat box. Three concrete-type bat boxes will be erected on suitably mature trees in an undisturbed area of the site for this purpose. If bats cannot be safely captured, they will be excluded from the features by the use of one-way valves over a minimum of five nights of suitable weather conditions. No exclusion will take place during winter (November to end of February inclusive).</p> <p>The following key elements of work will not be completed during the bat hibernation period (November to end of February inclusive) as a precaution to avoid disturbance and harm during this sensitive period:</p> <ul style="list-style-type: none"> ▪ Re-structuring/re-pointing of existing stone/brickwork ▪ Exposing of the wall tops via roof stripping works ▪ Felling of ash tree (T205 – if development proposals change and it is required)
	<p>Modification of common pipistrelle, soprano pipistrelle and Brandt's bat day roosts in the Gas House, used by single to low numbers of bats.</p> <p>If proposals change and the ash tree (T205) is to be affected, potential loss of soprano pipistrelle occasional/day roost used by single to low numbers of bats.</p>	<p>It is anticipated that all roosts recorded within the Gas House can be retained or modified. The proposals also indicate that the soprano pipistrelle roost in the ash tree will be retained.</p> <p>Roof coverings (slate, leadwork etc.) will be repaired, but only following inspection of the features by the Project Ecologist. Roosting locations will be retained during the repairs where possible, and if repairs are required of the roosting feature (e.g. to make watertight) then a raised slate, ridge tile with a gap for access or dedicated bat access tile will be installed in the same location.</p> <p>Gaps in the stonework and in the pointing will also be repaired, with roosts retained where possible and with at least eight gaps leading onto the wall tops, measuring approx. 20mm x 40mm, two on</p>

		<p>each elevation.</p> <p>No use of the loft space is required; therefore this will be retained for bat use. A door will be installed on the currently open entrance hatch to minimise any disturbance when accessing the first floor of the southern section of the building.</p> <p>No breathable roofing membranes will be installed.</p> <p>If development proposals change and removal of the ash tree (T205) is required, it will first be inspected for bats by the supervising ecologist, bats will be captured by hand if possible and transported to a pre-installed bat box, or alternatively excluded in accordance with the latest version of the Bat Workers Manual.</p> <p>It will then be “soft felled” – cut in sections, making sure to avoid cutting through internal cavities, and then lowering the sections to the ground. They will be stacked/left overnight so that the potential access points (e.g. woodpecker/squirrel holes) are not blocked, before they can then be moved as required.</p> <p>Any tree felling in the area surrounding T205 will be completed in a way that avoids falling timber on T205.</p>
	<p>Low residual risk of harm/disturbance to bats in the unlikely event that they are roosting within other trees scheduled for removal at the time of their removal.</p>	<p>Trees which require removal will be soft felled as detailed above, though these do not specifically require ecological supervision.</p> <p>If they are due to be felled over 12 months from the last survey, an updating survey will be required of any moderate or high roosting suitability trees.</p>
	<p>Increased lighting affecting foraging/commuting areas potentially used by bats (and other nocturnal wildlife)</p>	<p>Light levels around retained and newly installed roost locations and foraging/commuting areas (e.g. woodland and trees) will be low level, below 2m in height, and low lux (below 1 lux 5m from the light source).</p> <p>Warm-light LEDs with very low UV will be used, with cowls designed to accurately target which areas are lit.</p>
<p>Common amphibians (excluding GCNs)</p>	<p>Harm/disturbance to common amphibians, including common toad</p>	<p>Works will be undertaken to a precautionary amphibian method statement.</p>
<p>Birds</p>	<p>Harm/disturbance to nesting birds if vegetation clearance or building works are carried out during the bird breeding season</p>	<p>A pre-commencement check for nesting birds will be undertaken by a suitably experienced ornithologist if vegetation clearance or building works to the Gas House is undertaken between March and August inclusive.</p>

	Loss of bird foraging opportunities of up to local value	Landscape planting to include plants bearing flowers, nectar and fruits which are attractive to invertebrates, thereby helping to maintain the food resource for birds and wildlife generally
	Loss of bird nesting opportunities of up to local value	<p>Installation of six concrete type bird nest boxes on trees within the woodland areas – four general purpose ~26-28mm and ~32mm entrance hole types and two open fronted types. Boxes are to be installed at a minimum height of 2m, on a north or east orientation.</p> <p>Four concrete type bird nest boxes/bricks will be installed on the renovated Gas House building, two suitable for swift (minimum 5m high) and two suitable for house sparrow (eaves level).</p>
Hedgehog	Harm/disturbance to hedgehog	Works will be undertaken to a precautionary hedgehog method statement including a hand search of suitable refugia, such as log piles, prior to removal.
Wildlife (general)	Entrapment of wildlife during construction if trenches are left open overnight	Any excavations left open overnight will have a means of escape for wildlife that may become trapped in the form of a ramp at least 300mm in width and angled no greater than 45°.

E.3 RESIDUAL & CUMULATIVE IMPACTS

Provided that the measures detailed in the above table are implemented, no significant residual adverse impacts are envisaged.

Some impacts on roosting bats are envisaged as a result of the redevelopment of the Raby Castle masterplan area (application reference: DM/20/01183/FPA). However, a mitigation strategy has already been approved for the application, and no significant in-combination effects are envisaged on the local bat populations as a result of the two applications.

E.4 MONITORING

Given the nature of the proposed mitigation and compensation strategy, no monitoring is proposed, though this is subject to change based on the results of further bat survey work.

E.5 ADDITIONAL ENHANCEMENT RECOMMENDATIONS

The following enhancements are recommended:

- Removal of rhododendron within the woodland to the rear of the Gas House in accordance with an invasive species method statement.
- Creation of a hedgehog/reptile/amphibian hibernacula or habitat pile within the woodland to the rear of the Gas House.
- Installation of two flat, concrete type bat boxes (Schwegler 1FF or similar) to be installed in the enclosed loft space of the Gas House to enhance internal roosting opportunities.

Good working practice:

-
- Timber treatments that are toxic to mammals will be avoided. If required, timber treatment will be carried out in the spring or autumn. Both pre-treated timbers and timber treatments will use chemicals classed as safe for use where bats may be present (see <https://data.jncc.gov.uk/data/e5888ae1-3306-4f17-9441-51a5f4dc416a/Batwork-manual-3rd-edn.pdf> - Chapter 10).

F. CONCLUSIONS

Provided that the recommendations in this report (as well as any following subsequent surveys) are implemented, it is anticipated that proposals may proceed with no significant adverse effect on notable species and/or habitats. Ecological enhancement opportunities include control of non-native invasive species and bat and bird roosting/nesting provision, contributing to local and national conservation targets

APPENDICES

APPENDIX 1 – COPYRIGHT, CONFIDENTIALITY & LIABILITY

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APPENDIX 2 - PLANNING POLICY AND LEGISLATIVE CONTEXT

NATIONAL PLANNING POLICY

The table below details the key paragraphs from the National Planning Policy Framework (NPPF)¹⁷ relating to the natural environment:

TABLE 8: NATIONAL PLANNING POLICY FRAMEWORK: CONSERVING AND ENHANCING THE NATURAL ENVIRONMENT	
Statement	Paragraph
<p>Planning policies and decisions should contribute to and enhance the natural and local environment by:</p> <ul style="list-style-type: none"> a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. 	170
<p>Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework¹⁸; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.</p>	171
<p>Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads¹⁹. The scale and extent of development within these designated areas should be limited. Planning permission should be refused for major development²⁰ other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:</p> <ul style="list-style-type: none"> a) the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy; b) the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated. 	172
<p>Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 172), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.</p>	173
<p>To protect and enhance biodiversity and geodiversity, plans should:</p> <ul style="list-style-type: none"> a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological 	174

¹⁷ National Planning Policy Framework (February 2019), Department for Communities and Local Government,

¹⁸ Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.

¹⁹ English National Parks and the Broads: UK Government Vision and Circular 2010 provides further guidance and information about their statutory purposes, management and other matters.

²⁰ For the purposes of paragraphs 172 and 173, whether a proposal is 'major development' is a matter for the decision maker, taking into account its nature, scale and setting, and whether it could have a significant adverse impact on the purposes for which the area has been designated or defined.

TABLE 8: NATIONAL PLANNING POLICY FRAMEWORK: CONSERVING AND ENHANCING THE NATURAL ENVIRONMENT

Statement	Paragraph
<p>networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity²¹; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation²²; and</p> <p>b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.</p>	
<p>When determining planning applications, local planning authorities should apply the following principles:</p> <p>a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;</p> <p>b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;</p> <p>c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons²³ and a suitable compensation strategy exists; and</p> <p>d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.</p>	175
<p>The following should be given the same protection as habitats sites:</p> <p>a) potential Special Protection Areas and possible Special Areas of Conservation;</p> <p>b) listed or proposed Ramsar sites²⁴; and</p> <p>c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.</p>	176
<p>The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.</p>	177

Section 40 of the Natural Environment and Rural Communities Act 2006, places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity.

Planning Practice Guidance²⁵ states:

- Planning authorities need to consider the potential impacts of development on protected and priority species, and the scope to avoid or mitigate any impacts when considering site allocations or planning applications. (para. 016)

²¹ Circular 06/2005 provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

²² Where areas that are part of the Nature Recovery Network are identified in plans, it may be appropriate to specify the types of development that may be suitable within them.

²³ For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.

²⁴ Potential Special Protection Areas, possible Special Areas of Conservation and proposed Ramsar sites are sites on which Government has initiated public consultation on the scientific case for designation as a Special Protection Area, candidate Special Area of Conservation or Ramsar site.

²⁵ Planning Practice Guidance: Natural Environment (www.planningguidance.communities.gov) Updated July 2019

- Information on biodiversity and geodiversity impacts and opportunities needs to inform all stages of development (including site selection and design, pre-application consultation and the application itself). An ecological survey will be necessary in advance of a planning application if the type and location of development could have a significant impact on biodiversity and existing information is lacking or inadequate. (para. 018)
- Even where an Environmental Impact Assessment is not needed, it might still be appropriate to undertake an ecological survey, for example, where protected species may be present or where biodiverse habitats may be lost. (para. 018)
- As with other supporting information, local planning authorities should require ecological surveys only where clearly justified. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity. (para. 018)
- The National Planning Policy Framework encourages net gains for biodiversity to be sought through planning policies and decisions. Biodiversity net gain delivers measurable improvements for biodiversity by creating or enhancing habitats in association with development. Biodiversity net gain can be achieved on-site, off-site or through a combination of on-site and off-site measures. (para. 022)

PROTECTED SPECIES LEGISLATION

The table below details the relevant legislation for the protected species covered within the scope of the survey.

TABLE 9: SUMMARISED SPECIES LEGISLATION		
Species	Relevant Legislation	Level of Protection
Bats (All species)	<ul style="list-style-type: none"> • Protection under the Wildlife and Countryside Act (WCA) (1981) (Listed on Schedule 5) - as amended • Classified as protected species under The Conservation of Habitats and Species Regulations 2017 (as amended) • Bats are also protected by the Wild Mammals (Protection) Act 1996 	<p>The WCA (1981) and The Conservation of Habitats and Species Regulations 2017 (as amended) make it an offence to:</p> <ul style="list-style-type: none"> • Intentionally kill, injure, or take any species of bat • Intentionally or recklessly disturb bats • Intentionally or recklessly damage destroy or obstruct access to bat roosts
Otter	<ul style="list-style-type: none"> • Protection under the Wildlife and Countryside Act (WCA) (1981) (Listed on Schedule 5) - as amended • Classified as protected species under The Conservation of Habitats and Species Regulations 2017 (as amended) • Otters are also protected by the Wild Mammals (Protection) Act 1996 	<p>The WCA (1981) and The Conservation of Habitats and Species Regulations 2017 (as amended) make it an offence to:</p> <ul style="list-style-type: none"> • intentionally kill, injure, or take otters • intentionally or recklessly disturb otters • intentionally or recklessly amage destroy or obstruct access to otter holts or any place used by the animal for shelter or protection
Great Crested Newt	<ul style="list-style-type: none"> • Protection under the Wildlife and Countryside Act (WCA) (1981) (Listed on Schedule 5) - as amended • Classified as protected species under The Conservation of Habitats and Species Regulations 2017 (as amended) 	<p>The WCA (1981) and The Conservation of Habitats and Species Regulations 2017 (as amended) make it an offence to:</p> <ul style="list-style-type: none"> • intentionally kill, injure, or take great crested newts • intentionally or recklessly disturb great crested newts • intentionally or recklessly damage destroy or obstruct access to any place used by the animal for shelter or protection
Red Squirrel	<ul style="list-style-type: none"> • Full protection under the Wildlife and Countryside Act (WCA) (1981) (Listed on Schedule 5) - as amended • Red squirrels are also protected by 	<p>The WCA (1981) makes it an offence to:</p> <ul style="list-style-type: none"> • intentionally kill, injure, or take red squirrels • intentionally or recklessly damage destroy or obstruct access to any place used by the animal

TABLE 9: SUMMARISED SPECIES LEGISLATION		
Species	Relevant Legislation	Level of Protection
	the Wild Mammals (Protection) Act 1996	for shelter or protection or disturb red squirrels whilst they are using such a place.
Birds	<ul style="list-style-type: none"> Protection under the Wildlife and Countryside Act (1981) as amended with the exception of some species listed in Schedule 2 of the Act 	<p>The WCA (1981) makes it an offence to (with exceptions for certain species):</p> <ul style="list-style-type: none"> Intentionally kill, injure or take any wild bird Intentionally take, damage or destroy nests in use or being built (including ground nesting birds) Intentionally take, damage or destroy eggs Species listed on Schedule 1 of the WCA or their dependant young are afforded additional protection from disturbance whilst they are at their nests
White-clawed Crayfish	<ul style="list-style-type: none"> Partially protected by the Wildlife and Countryside Act (1981) 	<p>The WCA (1981) makes it an offence to:</p> <ul style="list-style-type: none"> Take a white-clawed crayfish from its habitat Sell, offer for sale, advertise for sale, possess or transport for the purposes of selling any live or dead white clawed crayfish
Badger	<ul style="list-style-type: none"> Protection of Badgers Act 1992 Badgers are also protected by the Wild Mammals (Protection) Act 1996 	<p>The Protection of Badgers Act (1992) makes it an offence to intentionally or recklessly:</p> <ul style="list-style-type: none"> Damage a badger sett or any part of it Destroy a badger sett Obstruct access to, or any entrance of a badger sett Disturb a badger whilst it is occupying a badger sett
Water Vole	<ul style="list-style-type: none"> Full protection under the Wildlife and Countryside Act (WCA) (1981) (Listed on Schedule 5) - as amended Water voles are also protected by the Wild Mammals (Protection) Act 1996 	<p>The WCA (1981) makes it an offence to:</p> <ul style="list-style-type: none"> intentionally kill, injure, or take water voles intentionally or recklessly damage destroy or obstruct access to any place used by the animal for shelter or protection or disturb water voles whilst they are using such a place
Common reptiles (Slow-worm, Adder, Grass Snake, Common Lizard)	<ul style="list-style-type: none"> Partially protected by the Wildlife and Countryside Act 	<p>The WCA (1981) makes it an offence to:</p> <ul style="list-style-type: none"> intentionally kill or injure these animals sell, offer for sale, advertise for sale, possess or transport for the purposes of selling any live or dead animals or part of these animals
<p><i>Under the Countryside and Rights of Way Act 2000 (CROW Act) the offence in section 9(4) of the Wildlife and Countryside Act 1981 of damaging a place of shelter or disturbing those species given full protection under the act is extended to cover reckless damage or disturbance.</i></p>		

INVASIVE SPECIES LEGISLATION

The table below details the legislation in relation to invasive species and lists those invasive species most likely to be found in this region.

TABLE 10: SUMMARISED INVASIVE SPECIES LEGISLATION		
Relevant Legislation	Description of Offence	Species <i>(Covered by the Legislation and most likely to be found in this Region)</i>

TABLE 10: SUMMARISED INVASIVE SPECIES LEGISLATION

Relevant Legislation	Description of Offence	Species <i>(Covered by the Legislation and most likely to be found in this Region)</i>
Listed on Part II of Schedule 9 of the Wildlife and Countryside Act (1981 as amended)	Section 14 of the WCA (1981) states: <ul style="list-style-type: none"> if any person plants or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9, he shall be guilty of an offence. 	Himalayan balsam Cotoneaster Montbretia Japanese knotweed Giant hogweed Rhododendron Pirri-pirri bur New Zealand pygmyweed Giant rhubarb Japanese rose

PROTECTED SITE LEGISLATION

CONTEXT IN REGARD TO THE UK'S EXIT FROM THE EUROPEAN UNION

As of 1st January 2021, the UK is no longer bound by the Birds Directive and Habitats Directive. However, the Conservation of Habitats and Species Regulations still applies, which formerly acted to transpose the Birds Directive and the Habitats Directive into English and Welsh law. These are still referred to below for contextual purposes, as designated site citations and conservation objectives may not have been updated following the changes to applicable legislation and may still refer to the Directives.

STATUTORILY DESIGNATED SITES

Ramsar Site

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. The Convention recognises wetlands as important ecosystems and includes a range of wetland types from marsh to both fresh and salt water habitats. The wetlands can also include additional areas adjacent to the main water-bodies such as river banks or coastal areas where appropriate.

Special Protection Area (SPA)

SPAs are classified by the UK Government under the EC Birds Directive and comprise areas which are important for both rare and migratory birds.

Special Areas of Conservation (SAC)

SACs are designated under the EC Habitats Directive and are areas which have been identified as best representing the range and variety of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 unless they are offshore.

Sites of Special Scientific Interest (SSSI)

SSSIs are designated as sites which are examples of important flora, fauna, or geological or physiological features. They are notified under the Wildlife and Countryside Act 1981 with improved provisions introduced by the Countryside and Rights of Way Act 2000.

National Nature Reserve (NNR)

NNRs are designated by Natural England under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 and support important ecosystems which are managed for conservation. They may also provide important opportunities for recreation and scientific study.

Country Parks

Country Parks are statutorily designated and managed by local authorities in England and Wales under the Countryside Act 1968. They do not necessarily have any nature conservation importance, but provide opportunities for recreation and leisure near urban areas.

Local Nature Reserves (LNR)

LNRs are designated under the National Parks and Access to the Countryside Act 1949 by local authorities in consultation with Natural England. They are managed for nature conservation and used as a recreational and educational resource.

NON-STATUTORILY DESIGNATED SITES

Non-Governmental Organisation Property

These are sites of biodiversity importance which are managed as reserves by a range of NGOs. Examples include sites owned by the RSPB, the Woodland Trust and the Wildlife Trusts.

Local Wildlife Site (LWS)

These are sites defined within the local plans under the Town and Country Planning system and are material considerations of any planning application determination. They are designated by the local authority although criteria for designation can vary between authorities.

PRIORITY SPECIES

Although not afforded any legal protection, national priority species (species of principal importance, as listed in Section 41 of the NERC Act (2006)), and local and regional priority species, as detailed within the relevant biodiversity action plans, are material considerations in the planning process and as such have been assessed accordingly within this report.

The tables below detail the species/species groups and habitats listed as priorities within the biodiversity action plans of the main Local Planning Authorities' within the north-east of England.

TABLE 11: BIODIVERSITY ACTION PLANS					
Northumberland Biodiversity Action Plan					
Species			Habitats		
Barn Owl	Bats	Black Grouse	Blanket Bog	Built Environment	Brownfield Land
Coastal Birds	Common Seal	Dingy Skipper	Calaminarian Grassland	Coastal heathland	Fen, Marsh & Swamp
Dormouse	Farmland Birds	Freshwater Fish	Gardens & Allotments	Heather Moorland	Lowland Heathland
Freshwater Pearl Mussel	Garden Birds	Great Crested Newt	Lowland Meadows & Pastures	Maritime Cliffs & Slopes	Native Woodland
Grey Seal	Hedgehog	Otter	Ponds, Lakes & Reservoirs	Recreational & Amenity Space	Reedbed
Red Squirrel	River Jelly Lichen	Upland Waders	Rivers & Streams	Rocky Shore, Reefs & Islands	Saline Lagoons
Violet Crystalwort	Water Rock- bristle	Water Vole	Saltmarsh & Mudflat	Sand Dunes	Transport Corridors
White-Clawed Crayfish			Trees & Hedgerows	Upland Hay Meadows	Whin Grassland
Durham Biodiversity Action Plan					
Species			Habitats		
Barn Owl	Coastal Birds	Farmland Birds	Native Hedgerows	Veteran Trees, Parkland and Wood Pasture	Woodland and Scrub
Nightjar	Spotted Flycatcher	Upland Birds	Ponds, Lakes & Reservoirs	Lowland Fen	Rivers & Streams
Urban and Garden Wildlife	Freshwater Fish	Grass Snake	Blanket Bog and Upland Wet Heath	Calaminarian Grassland	Upland Calcareous Grassland
Great Crested	Reptiles	Chalk Carpet	Upland Dry	Upland	Upland Scree

TABLE 11: BIODIVERSITY ACTION PLANS					
Newt		Moth	heath and Acid Grassland	Haymeadows	and Rock Habitats
Cistus Forrester	Dark Green Fritillary	Dingy Skipper	Brownfield Sites	Built Structures	Coastal Habitats
Glow Worm	Grayling	Green Hairstreak	Lowland Heath	Lowland Meadows & Pasture	Magnesian Limestone Grassland
Least Minor Moth	Mud Snail	Northern Brown Argus	Transport Corridors	Waxcap Grassland	
Northern Dart	Round Mouthed Whorl Snail	Small Pearl-bordered Fritillary			
White Clawed Crayfish	White-letter Hairstreak	Badger			
Bats	Brown Hare	Dormouse			
Harvest Mouse	Hedgehog	Otter			
Pine Marten	Polecat	Red Squirrel			
Water Vole	Water Shrew	Black Poplar			
Juniper	Pale Bristle-Moss	Yellow Marsh Saxifrage			
Newcastle and North Tyneside Biodiversity Action Plan					
Habitats			Species		
Brownfield Land	Transport Corridors	Open Water & Wetland	Amphibians	Dingy Skipper	Otter
Rivers and Watercourses	Managed Urban Greenspace	Native Woodland	Urban Birds	Water Vole	Red Squirrel
Lowland Grassland	Scrub, Shrub & Hedgerow	Buildings and Structures	Hedgehog	Slow Worm	Bumblebee
Estuary & Coastal			Brown hare	Farmland Birds	Bats
Tees Valley Biodiversity Action Plan					
Species			Habitats		
Barn Owl	Ringed Plover	Grey Partridge	Tree Sparrow	Traditional Orchards	Semi-natural Broadleaved Lowland Woodland
Little Tern	Corn Bunting	Shelduck	Wagtail Yellow	Reedbeds	Rivers & Streams
Bittern	Swift	Purple Milk-vetch	Water Violet	Arable field Margins	Roadside Verges
Globeflower	Pepper saxifrage	Tufted Sedge	Knotted hedge-parsley	Lowland Meadows	Sand Dunes
Yellow Star of Bethlehem	Burnt Orchid	Green Winged Orchid	Strawberry Clover	School Grounds	Maritime Cliffs and Slopes
Flat Sedge	Small Leaved Lime	Black Poplar	Lyme Grass	Grazing Marsh	Hedgerows
Scarlet Wax Cap	White-letter Hairstreak	Grayling	Dingy Skipper	Gardens and Allotments	Saline Lagoons
Blomer's Rivulet	Crescent Striped	Forester	Large Red-Belted Clearwing	Marsh and Saltmarsh	Ponds, Lakes & Reservoirs
Fen Wainscot	Shore Wainscot	Eccentric Grass Snail	Moss Chrysalis Snail	Parks and Recreation Grounds	Lowland Heath
Moss Chrysalis Snail	Bats (except common pipistrelle)	Brown Hare	Harvest Mouse	Brownfields	Churchyards and Cemeteries
Harbour Seal	Water Vole	Common Lizard	Slow Worm		
Great Crested Newt	Bullhead	Salmon	Brown Trout		
European Eel	Brook Lamprey	Sea Lamprey	River Lamprey		
Cumbria Biodiversity Action Plan					
Species			Habitats		
Red Wood Ant	Wall Mason Bee	a ground beetle	Rivers	Lakes, Ponds	Hedgerows

TABLE 11: BIODIVERSITY ACTION PLANS

		<i>Dyschirius angustatus</i>		and Tarns	
a ground beetle <i>Bembidion testaceum</i>	Oxbow Diving Beetle	Barn Owl	Traditional Orchards	Wood-Pasture & Parkland	Semi-natural Woodland
Song Thrush	Pearl Bordered Fritillary	High Brown Fritillary	Lowland Dry Acid Grassland	Calcareous Grassland	Hay Meadows and Pastures
Marsh Fritillary	Netted Carpet	Least Minor	Coastal and Floodplain Grazing Marsh	Heathland	Fen, Marsh and Swamp
a caddisfly <i>Glossosoma intermedium</i>	Freshwater Crayfish	Variable Damselfly	Bogs	Montane Habitats	Rock habitats
White-faced Dragonfly	Atlantic Salmon	Schelly	Calaminarian Grasslands	Previously developed land	Coastal Habitats above High Water
Vendace	Southern silver Stiletto-fly	Northern Silver Stiletto-fly	Coastal Intertidal Habitats	Coastal Saline lagoons	Coastal Subtidal Habitats
River Jelly Lichen	a lichen <i>Lobaria amplissima</i>	Pink Waxcap			
Medicinal Leech	Whiskered Bat	Brandt's Bat			
Natterer's Bat	Daubenton's Bat	Noctule			
Common Pipistrelle	Soprano Pipistrelle	Brown Long-eared Bat			
Red Squirrel	Water Vole	Hazel Dormouse			
Sandbowl Snail	a whorl snail <i>Vertigo geyeri</i>	Slender Green Feather-moss			
Great Crested Newt	Natterjack Toad	Pillwort			
Juniper	Northern Hawksbeard	Small White Orchid			